Deblonde, C., Cocking, R.B., Kerr, D.E., Campbell, J.E., Eagles, S., Everett, D., Huntley, D.H., Inglis, E., Parent, M.,

Thomas, R.D. and Rampton, V.N., 1982. Surficial geology and geomorphology, Upper Blackstone River, Yukon Territory;

Plouffe, A., Robertson, L., Smith, I.R., and Weatherston, A., 2017, Surficial Data Model, version 2.3.0; revisions to the science language of the integrated Geological Survey of Canada data model for surficial geology maps; Geological Survey of Canada, Open File 8236, 1 .zip file. https://doi.org/10.4095/302717 Geological Survey of Canada, Map 7-1982, scale 1:100 000. https://doi.org/10.4095/119066

This new surficial geology map product represents the conversion of Map 7-1982 (Thomas and Rampton, 1982) and its legend, using the Geological Survey of Canada's Surficial Data Model (SDM version 2.3) (Deblonde et al., 2017). All geoscience knowledge and information from Map 7-1982 that conformed to the current SDM were maintained during the conversion process. Supplementary legacy information (descriptive notes) 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

surficial geology maps.

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 numérique de façon structurée et cohérente. Cette

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**SURFICIAL GEOLOGY** 

parts of NTS 116-B & 116-C and 116-A



Ce nouveau produit cartographique de la géologie des dormations superficielles correspond a la conversion de la Carte 7-1982 (Thomas and Rampton, 1982) et de sa légende, en se servant du Modèle de données des formations superficielles (MDFS version 2.3) de la Commission géologique du Canada (Deblonde et al., 2017). Toutes les connaissances et l'information de nature géoscientifique de la Carte 7-1982 qui sont en conformité avec le modèle de données ont été conservées pendant le processus de conversion. De l'information additionnelle (notes descriptives) présente sur la carte originale n'est pas incluse 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, 'interprétation, la gestion et la diffusion efficaces de l'information géologique cartographique en mode

National Topographic System reference © Her Majesty the Queen in Right of

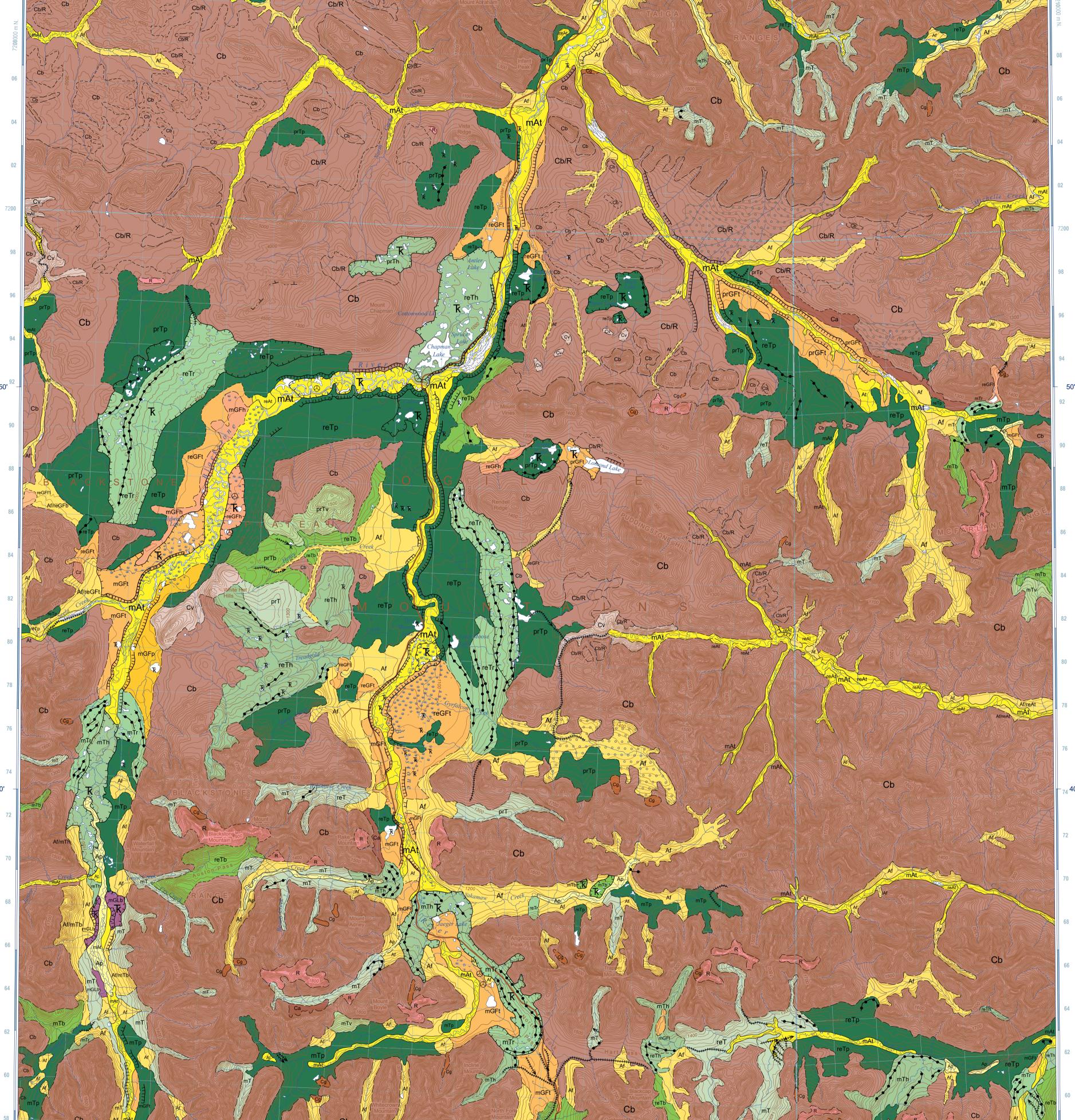
Canada, as represented by the Minister of Natural Resources, 2018

Natural Resources Ressources naturelles Canada Canada

**CANADIAN GEOSCIENCE MAP 355 UPPER BLACKSTONE RIVER** 



façon de faire offre un outil efficace de gestion des ances elabore a l'aide d'une géodatabase qu pourra évoluer suivant le type d'information à paraître sur les nouvelles cartes des formations superficielles.



QUATERNARY

HOLOCENE (MODERN)

Colluvial apron deposits: angular cobbles and boulders, relatively narrow size range in any one area, lithology of fragments same as that of adjacent cliffs; thickness greater than 6 m except near edges; orming tallus aprons; occurs in the Ogilvie Mountains in steen-sided glaciated valleys and particularly in cirques; overlies bedrock or drift; may exhibit mass movements.

\_andslide deposits: extremely variable textures; large blocks of shattered bedrock and unsorted coarse-grained diamicton most common; clasts generally angular to subangular; variable thickness to 0 m common; although small landslides, particularly retrogressive thaw-flow slides and active-layer detachment slides occur throughout the area, particularly associated with shale bedrock, they are generally too small to be mapped; large mappable landslides, chiefly rotational slumps, occur primarily in Ogilyie Mountains: these occur in rock along the steep valley sides; surfaces may be hummocky, ridged. rolling, or irregular; permafrost generally present, probably ice rich; many old slides seem to have been reactivated as rock glaciers.

ock glacier: rubble; variable thickness.

Colluvial veneer: poorly sorted diamicton; silty clay with angular granules to small pebbles develop on shale, and silty sand with cobbles or blocks develop on sandstone, limestone, or other coarse-grained bedrock; surface organic material generally less than 5 cm thick but may attain 30 cm; the colluvial veneer is generally less than 50 cm thick though locally may be thicker than 1 m; in unglaciated areas, the contact with the underlying weathered bedrock is gradational; common on steep slopes, ridge crests, and glacially scoured rock; commonly includes unmapped areas or bedrock, and more rarely areas of drift; may contain ice wedges which have melted out locally; undifferentiated age.

Colluvial blanket: variable composition from silty clay with fine sand capped by 10-40 cm of organic material, to poorly sorted cobble diamicton to bouldery diamicton, matrix is commonly silty sand. coarse-grained material is angular, may contain significant proportion of organic material and lenses of stratified gravel or sand, particularly in valley bottoms; generally less than 3 m thick except in valley bottoms where it may be thicker; common on slopes underlain by bedrock in unglaciated terrain; commonly overlies bedrock or, more rarely, terrace deposits and drift; may contain small unmapped areas of drift and alluvium: the contact between colluvium and weathered bedrock is gradational, particularly in unglaciated areas; in places up to 1 m of gravel may occur between colluvium and bedrock; may contain ground ice and may exhibit solifluction, subsidence, thermokarst lakes, active-layer detachment slides, and retrogressive thaw flows due to thawing of permafrost where disturbed;

undifferentiated age. Alluvial floodplain sediments: cobble to pebble gravel, rounded to well rounded, with very coarse to coarse sand matrix; in places capped by up to 1 m of sand and silt, and up to 50 cm of organic material; in places contains organic material 3-10 m thick; 1-5 m or more thick; generally flat: may include annually flooded or abandoned channels borders most large streams and Blackstone River: may be bounded by low terraces and stream-cut scarps; may contain shallow thermokarst depressions; may be underlain by colluvium, drift, or bedrock.

**Alluvial fan sediments:** fine sand with pebble gravel north of the Ogilvie Mountains; pebble to cobble gravel and boulders up to 2 m diameter with silty sand matrix in the Ogilvie Mountains; composition and grain size are dependent on the local source; poorly to well sorted and poorly to well stratified; aprons generally 2-5 m thick; average thickness of fans is 5 m but more than 10 m in places; apron tops are commonly capped by 30-100 cm of organic material; occurs at the base of valley walls in glaciated areas and covers most low parts of valleys in unglaciated areas; aprons commonly overlie bedrock in unglaciated areas and drift or bedrock in glaciated areas: fans commonly overlie alluvial terraced sediments and may impinge on present floodplains; may contain thermokarst depressions and ground ice; vulnerable to thermokarst subsidence if disturbed.

Alluvial terraced sediments: sand and gravel; estimated thickness 1–5 m; forming small terraces above streams and rivers.

LATE WISCONSINAN (McCONNELL GLACIATION) Alluvial terraced sediments: typically less than 20 cm of organic material (mainly peat) overlying silty sand, 10–100 cm thick, overlying 10–200 cm of cobble to pebble gravel; well stratified and sorted; clasts are well rounded to subrounded; may contain disseminated or interbedded organic material throughout; rarely up to 4 m thick or more over bedrock; comprise the first major terrace level above the present floodplain; occurs discontinuously along all major rivers and streams and many of their tributaries; commonly overlies a bedrock bench but may overlie colluvium or drift; the silty sand near the top of the deposit may be eolian in origin; in narrow valleys, fans or aprons may encroach onto the flat top of the terrace and may cover it: may be ice-rich in places; may exhibit slumping due to thaw or permafrost.

ilaciolacustrine blanket: silt and fine sand containing minor amounts f clay and organic material, stratified; generally 3–5 m thick; forming to gently rolling plains; may be capped by up to 50 cm of organic naterial; minor deposits commonly overlie morainal and glaciofluvial sediments; commonly associated with alluvial terraced deposits; thermokarst depressions are common in areas of high ice contents; slumps and flows may follow disturbance on steep slopes.

Glaciofluvial outwash-plain sediments: medium to coarse sand and gravel, sorted, stratified, and subrounded; gravel is composed mainly of pebbles and small cobbles but material up to 30 cm diameter may be present; generally greater than 5 m thick and commonly over 10 m thick; commonly overlain by up to 30 cm of organic material and silt particularly in depressions; forming outwash plains associated with valley floors, set into older drift or along valley walls; underlain by bedrock or older drift; in places overlain by veneers of loess (unmapped), younger drift, lacustrine sediments, or alluvial fans; may contain ground ice and exhibit landslides.

Glaciofluvial terraced sediments: medium to coarse sand and gravel, sorted, stratified, and subrounded; gravel is composed mainly of pebbles and small cobbles but material up to 30 cm diameter may be present; generally greater than 5 m thick and commonly over 10 m thick; commonly overlain by up to 30 cm of organic material and silt particularly in depressions; may be associated with valley floors, set into older drift or along valley walls; underlain by bedrock or older drift; in places overlain by veneers of loess (unmapped), younger drift, lacustrine sediments, or alluvial fans; may contain ground ice and exhibit landslides.

Glaciofluvial hummocky sediments: medium- to coarse-grained sand and fine gravel, well rounded, rare coarse bouldery gravel; average hickness is 5 m but may be up to 20 m; depressions commonly have veneers of silt and peat; forming hummocky kames and kettle complexes; generally restricted to valley floors and adjacent to morainal sediments; alluvial terraces commonly incised within this unit; may contain unmapped areas of till and glaciolascustrine sediments; commonly underlain by bedrock or till; in places veneered with loess (generally not mapped); in places channelled by meltwater; may exhibit active thermokarst depressions; vulnerable to moderate erosion on steep slopes if disturbed.

**Hummocky till:** diamicton; hard, dense, silty fine sand matrix with pebbles and cobbles of various lithologies, subangular to subrounded, oarse clasts are striated; in places crudely sorted and stratified; up to 30 m thick, average is 5 m; may be capped by less than 10 cm of organic material, rarely loess; disintegration moraine; locally present on valley floors; channelled in places; may be ice-rich in places and

vulnerable to thermokarst subsidence. Ridged till: diamicton; hard, dense, silty sand matrix with subangular to subrounded boulders, pebbles, and cobbles, various lithologies: may contain patches of crudely sorted and stratified loose ablation till; typically 5-10 m thick; may be capped by less than 10 cm of organic material or rarely by loess; individual morainic ridges and groups of ridges are common at limit of each glaciation; colluvium and till or drift common upslope from ridges; drift or alluvium common downslope from ridges; underlain by drift (commonly glaciofluvial gravels), colluvium, or bedrock; relief is 5–10 m and in places up to 50 m; sediments are ice-rich below 2 m depth; may exhibit 0.5-1.0 m of subsidence along Dempster Highway and elsewhere due to thawing

ill plain; diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix; where deficient in fines it may include poorly sorted and stratified sediments (ablation till); commonly capped with up to 30 cm of organic material, particularly in depressions; typically 5–10 m thick; units may contain unmapped patches of outwash; may be overlain by fine-grained pond and organic deposits in depressions; may be overlain by colluvial deposits and alluvial fans on steep slopes; underlain by drift and bedrock; flat to gently rolling; may contain ground ice and may exhibit solifluction, subsidence, slumping, and retrogressive thaw flows due to thawing of permafrost where disturbed.

Till veneer: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix; generally loose. rarely contains patches of poorly sorted material; organic material cover less than 10 cm; thickness generally less than 50 cm; may incorporate some of the underlying material by frost action; common on slopes within the limit of glaciation; unit may contain unmapped patches of outwash, colluvium, and bedrock.

Till blanket: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix, generally loose, rarely contains patches of poorly sorted material; may be capped by up to 30 cm of organic material; generally 0.5–3 m thick; common on slopes within glacial limits; upslope of till blanket is colluvium or bedrock, downslope are other glacial deposits; generally underlain by bedrock; may contain unmapped patches of outwash, colluvium, and bedrock; may exhibit solifluction and mass-wasting on steep slopes.

Till, undifferentiated: diamicton; silty sandy matrix; variable thickness but typically 5–10 m; irregular surface with relief up to 5 m.

**EARLY WISCONSINAN OR ILLINOIAN (REID GLACIATION)** Alluvial terraced sediments: sand and rounded to subrounded gravel moderately sorted and well stratified; contains some interbeds of sand or silty sand; commonly covered by 1 m or more of peat; in places peat overlies a bedrock bench or other unconsolidated sediments: occurs mainly along major rivers and creeks as discontinuous deposits between the present floodplain or the lowest terrace deposits and the valley wall or more rarely the highest terrace deposits; does not occur within the limit of Reid Glaciation; in narrow valleys, fans, or aprons may encroach onto the flat top of the terrace and may cover it; contains ground ice and may exhibit subsidence due to thawing of

permafrost where disturbed. Glaciofluvial terraced sediments: medium to coarse sand and gravel sorted, stratified, and subrounded; gravel is composed mainly of pebbles and small cobbles but material up to 30 cm diameter may be present; generally greater than 5 m thick and commonly over 10 m thick; commonly overlain by up to 30 cm of organic material and silt, particularly in depressions; may be associated with valley floors, set into older drift, or along valley walls; underlain by bedrock or older drift; in places overlain by veneers of loess (unmapped), younger drift, lacustrine sediments or alluvial fans; may contain ground ice and

Subaerial outwash-fan sediments: medium to coarse sand and gravel, sorted, stratified, and subrounded; gravel is composed mainly of pebbles and small cobbles but material up to 30 cm diameter may be present; generally greater than 5 m thick and commonly over 10 m thick; commonly overlain by up to 30 cm of organic material and silts. particularly in depressions; forming outwash fans associated with valley floors, set into older drift or along valley walls; underlain by bedrock or older drift; in places overlain by veneers of loess (unmapped), younger drift, lacustrine sediments or alluvial fans; may contain ground ice and exhibit landslides.

Glaciofluvial hummocky sediments: medium- to coarse-grained sand and fine gravel, well rounded; includes rare coarse bouldery gravel; average thickness is 5 m but may be up to 20 m; depressions commonly have veneers of silt and peat; forming hummocky kames and kettle complexes; generally restricted to valley floors and adjacent to morainal sediments; alluvial terraces commonly incised within this unit; may contain unmapped areas of till and glaciolascustrine sediments: commonly underlain by bedrock or till: in places veneered with loess (generally not mapped); in places channelled by meltwater: may exhibit active thermokarst depressions; vulnerable to moderate erosion on steep slopes if disturbed.

Glaciofluvial blanket: subrounded gravel with small patches of sand, sorted and poorly stratified; variable thickness but generally 0.5–3 m; may include patches of glaciofluvial veneer; may be overlain by organic material and silt generally less than 10 cm thick; occurs along valley slopes and overlies older drift, colluvium, or bedrock. This unit appears only as secondary unit in stratigraphic relationships within polygons.

Hummocky till: diamicton; hard, dense, silty fine sand matrix with pebbles and cobbles, subangular to subrounded, various lithologies coarse clasts are striated; in places crudely sorted and stratified; up to 30 m thick, average is 5 m; may be capped by less than 10 cm of organic material, rarely loess; disintegration moraine; locally present on valley floors; channelled in places; may be ice-rich in places and Ridged till: diamicton; hard, dense, silty sand matrix with boulders,

pebbles, and cobbles, subangular to subrounded, various lithologies nay contain patches of crudely sorted and stratified loose ablation till typically 5-10 m thick; may be capped by less than 10 cm of organic material or rarely by loess; individual morainic ridges and groups of ridges are common at limit of each glaciation; colluvium and till or drift common upslope from ridges; drift or alluvium common downslope from ridges; underlain by drift (commonly glaciofluvial gravels), colluvium or bedrock; relief is 5-10 m and in places up to 50 m; sediments are ice-rich below 2 m depth; may exhibit 0.5-1.0 m of subsidence along Dempster Highway and elsewhere due to thawing of ice wedges and ground ice.

Till plain: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix; where deficient in nes it may include poorly sorted and stratified sediments (ablation till); commonly capped with up to 30 cm of organic material, particularly in depressions; typically 5-10 m thick; units may contain unmapped patches of outwash; may be overlain by fine-grained pond and organic deposits in depressions; may be overlain by colluvial deposits and alluvial fans on steep slopes; underlain by drift and bedrock; flat to gently rolling; may contain ground ice and may exhibit solifluction, subsidence, slumping, and retrogressive thaw flows due to thawing of permafrost where disturbed.

Till veneer: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix, generally loose, rarely contains patches of poorly sorted material, organic material cover less than 10 cm; thickness generally less than 50 cm; may incorporate some of the underlying material by frost action; common on slopes within the limit of glaciation; morainal deposits common downslope from till veneer and colluvium upslope; unit may contain unmapped patches of outwash, colluvium and bedrock.

Till blanket: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix, generally loose, rarely contains patches of poorly sorted material, may be capped by up to 30 cm of organic material; generally 0.5–3 m thick; common on slopes within glacial limits; upslope of till blanket is colluvium or bedrock, downslope are other glacial deposits; generally underlain by bedrock; may contain unmapped patches of outwash, colluvium, and bedrock; may exhibit solifluction and mass-wasting on steep slopes.

Till, undifferentiated: diamicton; silty sandy matrix; variable thickness but typically 5-10 m; irregular surface with relief up to 5 m.

ILLINOIAN OR PRE-ILLINOIAN (PRE-REID GLACIATION) Glaciofluvial terraced sediments: medium to coarse sand and

subrounded gravel, sorted, stratified; gravel is composed mainly of pebbles and small cobbles but material up to 30 cm diameter may be present; generally greater than 5 m thick and commonly over 10 m thick; commonly overlain by up to 30 cm of organic material and silt, particularly in depressions; may be associated with valley floors, set into older drift or along valley walls; underlain by bedrock or older drift; in places overlain by veneers of loess (unmapped), younger drift, lacustrine sediments or alluvial fans; may contain ground ice and

Hummocky till: diamicton; hard, dense, silty fine sand matrix with subangular to subrounded pebbles and cobbles of various lithologies; coarse clasts are striated, in places crudely sorted and stratified; up to 30 m thick, average is 5 m; may be capped by less than 10 cm of organic material, rarely loess; disintegration moraine; locally present on valley floors; channelled in places; may be ice-rich in places and vulnerable to thermokarst subsidence.

Till plain: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix; where deficient in fines it may include poorly sorted and stratified sediments (ablation till); commonly capped with up to 30 cm of organic material, particularly in depressions; typically 5-10 m thick; units may contain unmapped patches of outwash: may be overlain by fine-grained pond and organic deposits in depressions: may be overlain by colluvial deposits and alluvial fans on steep slopes; underlain by drift and bedrock; flat to gently rolling; may contain ground ice and may exhibit solifluction, subsidence, slumping, and retrogressive thaw flows due to thawing of permafrost where disturbed.

Till veneer: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix, generally loose, rarely contains patches of poorly sorted material, organic material cover less than 10 cm; thickness generally less than 50 cm; may incorporate some of the underlying material by frost action; common on slopes within the limit of glaciation; morainal deposits common downslope from till veneer and colluvium upslope; unit may contain unmapped patches of outwash, colluvium and bedrock.

Till blanket: diamicton; angular to subrounded boulders, cobbles, and pebbles of various lithologies in a silty sand matrix, generally loose, rarely contains patches of poorly sorted material, may be capped by up to 30 cm of organic material; generally 0.5–3 m thick; common on slopes within glacial limits; upslope of till blanket is colluvium or bedrock, downslope are other glacial deposits; generally underlain by bedrock; may contain unmapped patches of outwash, colluvium, and bedrock; may exhibit solifluction and mass-wasting on steep slopes.

Till, undifferentiated: diamicton; silty sandy matrix; variable thickness but typically 5–10 m; irregular surface with relief up to 5 m.

PRE-QUATERNARY Bedrock, undifferentiated: varied bedrock types; bedrock pediment, outcrops, cliffs, and ridge crests; may contain vein ice in fractures; evidence of frost shattering is common.

Stratigraphic relationship: a stratigraphic relationship is shown with two map-unit designators separated by a slash (/) (e.g. Af/At indicates alluvial fan sediments overlying alluvial terraced sediments). Thermokarst depression:

Extensive gullied terrain, rilled 600000 Geological contact:

Landslide escarpment, active

Tryoplanation terrace scarp (nivation terrace) Terrace scarp, escarpment, may include bedrock at base

Minor meltwater channel: Paleocurrent direction unspecified, may include stream-cut ravine and canvon

Paleocurrent direction known • • • • • • • Major moraine ridge, various ages

Geological Survey of Canada, 2018. Surficial geology, upper Blackstone River, Yukon, parts of NTS 116-B & 116-C and 116-A; Geological Survey of Canada, Canadian Geoscience Map 355 (Surficial Data Model v. 2.3 conversion of Map 7-1982), scale 1:100 000. https://doi.org/10.4095/308111

**Geological Survey of Canada Canadian Geoscience Maps** 

**Author: Geological Survey of Canada** Geology by R.D. Thomas and V.N. Rampton, based on airphoto interpretation with field observations, 1980 Geology conforms to Surficial Data Model v. 2.3 (Deblonde et al., 2017).

> Data conversion by D.E. Kerr, 2017 Geology has been spatially adjusted to fit the updated base. Geomatics by S. Eagles Cartography by M.J. Baldock

> > Scientific editing by A. Weatherston

parts of NTS 116-B & 116-C and 116-A

Initiative of the Geological Survey of Canada, conducted under the uspices of Natural Resources Canada's Geo-mapping for Energy and

Minerals (GEM) Program Map projection Universal Transverse Mercator, zone 7 North American Datum 1983

44 56 138°00' UTM ZONE 7 UTM ZONE 8

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications Elevations above mean sea level are expressed in metres (NTS 116-B/9,10,11 and 116-A/12,13) and feet (NTS 116-B/15). Mean magnetic declination 2018, 20°01'E, decreasing 26' annually Readings vary from 19°52'E in the SW corner to 20°10'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 (http://geoscan.nrcan.gc.ca/).

**CANADIAN GEOSCIENCE MAP 355** SURFICIAL GEOLOGY

**UPPER BLACKSTONE RIVER** 

parts of NTS 116-B & 116-C and 116-A

**CANADIAN GEOSCIENCE MAP 355** 

**SURFICIAL GEOLOGY** 

**UPPER BLACKSTONE RIVER**