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EXPLANATION OF LANDFORM UNIT NOTATIONS

Compositional-Genetic Category — Age Modifier — Process or Form Modifier — Textural Modifier — Morphologic Modifier(s)

Stratigraphic relationships given where thickness of upper unit is irregular and where underlying unit is a known compositional-genetic unit other than bedrock.

Compositional-Genetic Categories[1]

A- Alluvial Deposits: sand and gravel with veneer of fine sediment and organics; mainly Pleistocene; floodplain (Ap) modern.

C- Colluvial Deposits: various materials, mainly rubble, includes landslides (Cl); undifferentiated age.

D- Drift: undifferentiated till, sand, and gravel.

E- Eolian Deposits: fine sand and silt; pre-Wisconsian (pre-Reid).

G- Glaciofluvial Deposits: sand and gravel with veneer of fine sediment.

L- Lacustrine Deposits: mainly silt and clay with little fine sand; Late Wisconsin (McConnell).

M- Morainal Deposits: till, silty/sandy diamicton; rock glaciers (MR), rubble; modern.

R- Bedrock: various types; pre-Pleistocene.

Textural Modifiers

a- sand or gravel

b- boulders, blocks, boulders

f- fine sand, silt and clay; commonly with high organic content

g- gravel, gravelly

r- rubble, predominantly sand to boulder-sized fragments

Age Modifiers[2]

1- Late Wisconsin (McConnell)

2- Early Wisconsin or Illinoian (Reid)

2a- Early Wisconsin or Illinoian (Lauverside Glaciation)

3- Illinoian or pre-Illinoian (pre-Reid)

Morphologic Modifiers

a- apron

b- blanket[3]

f- fan

h- hummocky

m- undulating, rolling

n- nondescript slope, bedrock controlled

p- plain, floodplain

r- ridge, ridged

s- steep slope (greater than 35°); cliff

t- terrace, terraced

v- veneer[4]

1- gentle to moderate slope (5-15°)

2- moderate to steep slope (15-35°)

Process or Form Modifiers

A- active deposition

X- thermokarst, modified by thermokarst

R- rilled

[1] General descriptions of texture and age are given for each category; only where texture and age differ from the general description are textural and age modifiers used.

[2] The age modifier is used only where the deposit can be definitely ascribed to a single age, except for Ap which is modern.

[3] Blanket indicates category forms near continuous cover greater than 1 m thick, generally 0.3 to 1 m thick, over a unit, commonly rock.

[4] Veneer indicates category forms broken thin cover, generally less than 1 m thick, not averaging 0.3 m thick, over a unit, commonly rock.

Geological boundary (defined, approximate, assumed)

Fault scarp, postglacial

Fluted bedrock

Fluted till

Morainic ridge (age as given by modifier)

Meltwater channel (age as given by modifier)

Nivation terrace

Note: Not all units and symbols shown in the legend necessarily appear on this map.

Pingo

Thermokarst depression

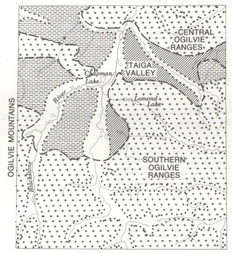
Landslide scar

Stream-transported material (unconsolidated material, bedrock in part)

Stream-cut ravines and canyons (unconsolidated material, bedrock in part)

Limit of mapping

PHYSIOGRAPHY



VALLEY or BASIN (DEPRESSION) - Low-lying land bordered by higher ground; flat, smooth, or gently undulating terrain with few surface irregularities.

PLATEAU - Land standing well above valleys but below elevation of nearby mountains; flat, smooth, gently sloping to moderately hilly terrain; in places dissected by valleys, but major part of surface is near summit level.

HILLS - Prominences that rise above surrounding terrain; relief less than 350 m; rounded summits.

MOUNTAINS - Prominences that rise above surrounding terrain; relief more than 350 m; have restrictive summit area and steep slopes.

BOUNDARIES

Between physiographic systems.

Between major physiographic subdivisions.

Delineating minor physiographic subdivisions.

Geology by R.D. Thomas and V.N. Rampton, 1980

Linework by Terrain Analysis and Mapping Services Ltd., Carp, Ontario

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Approximate magnetic declination, 1982, 32°1'0' East decreasing 9.9' annually

Elevations in feet above mean sea level

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INDEX MAP

MAP 7-1982

SURFICIAL GEOLOGY AND GEOMORPHOLOGY

UPPER BLACKSTONE RIVER

YUKON TERRITORY

Scale 1:100 000

Kilometres 2 0 2 4 6 8 Kilometres

Miles 2 0 2 4 Miles

Universal Transverse Mercator Projection

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DESCRIPTIVE NOTES

The Ogilvie Mountains are represented within the map area by the Southern and Central Ogilvie Ranges and Taiga Valley.[1]

This part of the Southern Ogilvie Ranges reaches 2130 m elevation southeast of North Fork Pass with most peaks being over 1800 m. The major valley floors lie at 600 to 900 m elevation and have been filled with glacial deposits. Valley sides and slopes are steep, and valley floors are broad and flat as a result of glaciation. The main rivers of the area are the northward-flowing East Blackstone, Blackstone, and West Hart rivers, and Lonesome Creek, a tributary to the West Hart. North Fork Pass is the divide along the Dempster Highway between Peel River drainage (to the Mackenzie) and Blackstone River drainage (to the Yukon). The Central Ogilvie Ranges consist mainly of Precambrian or Cambrian quartzites, slates, schists, and volcanics; Ordovician chert and argillites; and Devonian to Permian slate, limestones, and chert.[1]

The Central Ogilvie Ranges, in the extreme northeast of the map area, consist of rounded mountains with summits between 1500 and 1800 m and valley elevation. Total relief is 1000 m; the streams form a trellis pattern. The mountains are made up of Proterozoic argillite, slate, phyllite, dolomite, and conglomerate; Ordovician and Silurian dolomite and limestone; and Middle Devonian to Carboniferous shale, argillite, and slate.[1]

Taiga Valley is a rolling area with up to 100 m relief, lies between the Southern and Central Ogilvie ranges. Taiga Valley is underlain by poorly resistant late-Paleozoic rocks, which underlie nearlying in the area.[1] Most relief may be attributed to glacial landforms.

The map area lies within the zone of widespread discontinuous permafrost.[2,3] Permafrost conditions vary widely throughout most of the area[4,5] with talliks present beneath large rivers and lakes. Ground ice occurs as ice-wedge polygons in moderately to poorly drained, fine grained sediments; as segregated and ice lenses in peaty stratified ice layers up to 2 m thick in ice-rich till; several metres of massive ice in some morainal units and in some low-lying areas; and as pingos in the valley of Blackstone River. Thermokarst features such as closed-system pingos occur on the low alluvial terraces along Blackstone valley west of Chapman Lake; the surface aquatic pegs (formed before the pingo) has dated at 3020 ± 90 years B.P. (GSC-2885).[6] Palsas, which are indicative of the ice-rich materials, have developed on the poorly drained area within the North Fork Pass.[7]

Since the formation and final uplift of the Ogilvie Mountains, the area has been primarily affected by subaerial erosion resulting in the formation of a gently northward-sloping pediment similar to that found throughout the unglaciated parts of the Yukon. This surface formed during the late Tertiary as it overlies Eocene deposits in the Eagle Plain to the north and is overlain in the map area by early Pleistocene drift. Streams and glaciers have dissected the pediment such that only remnants of the original surface remain.

Patches of till beyond the Reid glacial limit are evidence of at least one pre-Reid glaciation. These are located mainly in the northwest part of the map area where isolated patches of hummocky till occur on the pediment. Other occurrences of till, immediately beyond the Reid glacial limit, have also been found in the valley of Blackstone River and in the Lonesome Creek valley. In this area, till is present beyond the limit of Reid Glaciation in Lonesome Lake valley and in the next major valley to the northeast. Till also occurs above the Reid limit in the Blackstone River valley, in the valley of Lonesome Creek and along the East Blackstone. Erratic boulders were seen up to 1525 m elevation about 8 km northwest of Chapman Lake and up to 100 m above the Reid limit along East Blackstone River valley. From this distribution of till and erratics it is concluded that the pre-Reid glaciation was more extensive than the Reid Glaciation and probably covered most of the area of the map. Ice flowing from the north and west extent ice filled the major valleys at least 100 m higher than and extended further north than during the Reid Glaciation. Only at one location within the Reid glacial limit has more than one till been found. At this location, which is about 8 km west of Chapman Lake, the section is composed of: 4 m of grey, sandy Reid till; 2 m of interbedded coarse sand and pebble gravel; 4 m clayey silt with rounded pebbles; 3 m of interbedded sand and cobble gravel; 3 m of slumped section; 3 m of grey, clayey till. The intervening stratified sediments may be either outwash or alluvial and colluvial deposits. Although the lower till is considered to be pre-Reid and is described as being attributable to one event, the possibility exists that more than one pre-Reid glaciation occurred locally and that the deposits may be the result of more than one glaciation. Furthermore, with the present limited knowledge it is difficult to correlate local deposits and glacial events with those south of the Ogilvie Mountains (Nansen or Klaza glaciations).

Reid Glaciation is marked by major valley glaciers flowing from cirques in the Southern Ogilvie Ranges, northward down Blackstone River, eastward down Creek, eastwards down West Hart River, and northeastward along the unnamed valley north of Lonesome Creek. The moraines built at the limit of the glacial advance are well developed in the valley of Blackstone River, in the valley of Lonesome River and east of East Blackstone River. Correlation of the moraines can be difficult because they occur at different elevations. Moraines at different elevations in close proximity have been explained by two pulses of the same major glaciation[8] or have been, in part, correlated with the Reid, and the remainder attributed to a readvance of the Reid.[9] Moraines at different elevations have been correlated on the basis of morphology; this technique is considered by some to be invalid in this area[10] because the original surface topography of the area was not uniform prior to the glaciation. Radiocarbon dates on basal peats in thermokarst areas range from 3000 to 13 870 years B.P., and probably reflect the age of the thermokarst rather than the time of deglaciation. During deglaciation, meltwater deposited glaciofluvial gravels along the major valleys.

McConnell Glaciation was much less extensive than the earlier glaciations. Terminal moraines occur near the mouths of the tributary valleys; the most extensive moraine occurs at Lonesome Lake and represents the limit of all cirques that supplied the glaciers for Reid Glaciation were active during the McConnell.[11] During retreat of McConnell glaciers, meltwater deposited outwash terraces set into the Reid terraces. McConnell terraces were subsequently incised by the present streams and are now the first major terraces above the modern floodplain.

Lakes formed in some areas behind dams of morainal debris deposited during a glaciation. Most of these lakes were short lived as the outlet streams cut down through the dams in places, for example in the headwaters of Blackstone River, the lake dammed behind the McConnell moraine lasted sufficiently long to allow accumulation of a substantial thickness of materials. During and immediately following each glaciation, eolian activity deposited thin loess over deposits on the valley floors.

Modern processes include mass wasting and alluviation. Active-layer detachment slides, solifluction lobes, and frost heave are common on the valley sides; solifluction, creep, and frost shattering of rock occur on all slopes. Some low slopes along the banks of Blackstone and East Blackstone rivers have been attributed by others to solifluction.[12] Rock glaciers are common in cirques in the southern part of the map area, but are rare in the northern part. Alluviation has been caused by overbank deposits of silt and sand during floods; silt and sand also occur along large rivers. River icings form on a number of rivers in the area, notably the North Klondike and the East Blackstone (before it enters North Fork Pass); icings on small streams may be up to several metres thick and may persist until August.

Hazards to development result from permafrost conditions and the modern processes of erosion as outlined above. Thaw subsidence and thermokarst due to various land uses, principally roads, have been severe in the North Fork Pass and Chapman Lake areas, which are underlain by till or poorly drained outwash. Flooding along rivers is a major concern during spring thaw and after periods of heavy rain. The best sources of granular material are the glaciofluvial and alluvial terraces; till can be used but may require treatment.

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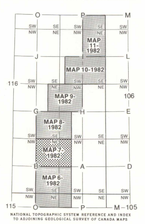

MAP 7-1982

UPPER BLACKSTONE RIVER

YUKON TERRITORY

Canada

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