GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

EXPLANATION OF LANDFORM UNIT NOTATIONS

Compositional-Genetic Category — Age Modifier — Textural Modifier — Morphologic Modifier(s): ${}_{f}A^{A}_{p}$

$\frac{C_{b1}}{D}$ Stratigraphic relationship given where thickness of upper unit is irregular and where underlying unit is a known compositional-genetic unit other than bedrock.

Compositional-Genetic Category[1]

- A- Alluvial Deposits: sand and gravel with veneer of fine sediment; Postglacial, rarely older; floodplain (A_p), modern.
- C- Colluvium: various materials, mainly rubble, includes landslides (C_L); undifferentiated Pleistocene in age; talus aprons (C_a), Neoglacial, mainly modern.
- D- Drift: undifferentiated till, sand, gravel, and lacustrine sediment; Late Wisconsinan (Macauley).
- E- Eolian Deposits: sand, silt, or tephra; Postglacial.
- G- Glaciofluvial Deposits: sand and gravel with veneer of fine sediment; Late Wisconsinan (Macauley).
- I- Ice; snow and firn veneer; Neoglacial.
- L- Lacustrine Deposits: mainly silt and clay with little fine sand; Late Wisconsinan (Macauley).
- M- Morainal Deposits: till, silty/sandy, Late Wisconsinan (Macauley); ice-cored moraines and debris-covered glaciers (M/I) and rock glaciers (MR), rubble, Neoglacial.
- R- Bedrock: various types; pre-Pleistocene.

Textural Modifiers

- a- sand or gravel; ${}_{a}M$- till containing a high proportion of sand, gravel, rubble, or boulders
- b- boulders, blocks, bouldery
- c- clay, clayey
- f- silt, clay, and fine sand; commonly with high organic content
- g- gravel, gravelly
- r- rubble; predominantly sand to boulder-sized fragments
- s- sand, sandy
- v- volcanic tephra, sand or fine gravel
- x- interbedded volcanic tephra (v) and sand (s) or fines (f); overlies gravel in alluvial fans (${}_{x}A_{f}$)

Age Modifier

- A- Modern
- L- Late Wisconsinan (Macauley)
- N- Neoglacial
- P- Postglacial
- 2- Early Wisconsinan or Illinoian (Mirror Creek)

CHRONOLOGY

	MODERN NEOGLACIAL	POSTGLACIAL
2800 years B.P.	HYPSITHERMAL	
8700 years B.P.	EARLY POSTGLACIAL	
12 500 years B.P.	MACAULEY GLACIATION	LATE WISCONSINAN
29 500 years B.P.	NONGLACIAL INTERVAL(S)	EARLY WISCONSINAN or ILLINOIAN
	MIRROR CREEK GLACIATION	

Morphologic Modifiers

- a- apron
- b- blanket[2]
- c- castled outcrop
- d- delta
- f- fan
- h- hummocky
- m- undulating, rolling
- p- plain, floodplain
- r- ridge, ridged
- s- steep slope (greater than 35°) cliff
- t- terrace, terraced
- v- veneer[3]
- 1- gentle to moderate slope (5-15°)
- 2- moderate to steep slope (15-35°)

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

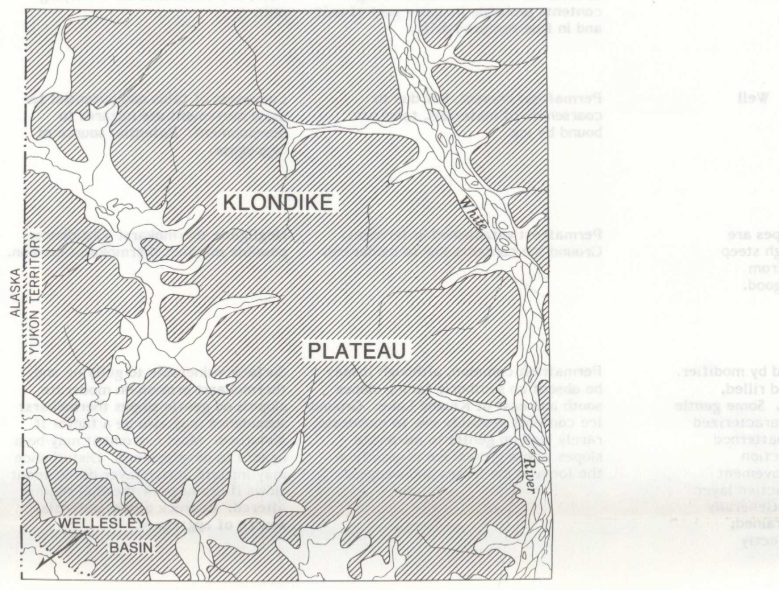
[2] Blanket indicates category forms nearly continuous cover greater than 1 m thick, generally 0.5 to 3 m thick, over underlying unit.

[3] Veneer indicates category forms broken thin cover, usually less than 1 m thick, but averaging 0.5 m thick, over underlying unit.

Geological boundary (defined, approximate, assumed)
Drumlin, fluted till
Rock drumlin, crag and tail, fluted bedrock
Glacially scoured bedrock hillock
Esker
Kame
Kame terrace
Pits (kettle holes)
Morainic ridges; Early Wisconsinan(?), Late Wisconsinan, Neoglacial
Lake strandline; Early Wisconsinan(?), Late Wisconsinan, Neoglacial
Meltwater channel; Early Wisconsinan(?), Late Wisconsinan, Neoglacial
Stratigraphic section (A3)
Note: Symbols in red may form geological boundaries.

Rock glacier (MR)
Altiplanation terrace
Pingo
Thermokarst depression
Castled bedrock outcrop
Bedrock outcrop
Organic deposit
Landslide
Landslide scar
Stream-trimmed scarp (unconsolidated material, bedrock in part): Postglacial, Late Wisconsinan
Stream-trimmed scarp Modern (unconsolidated material, bedrock in part)
Stream-cut ravines and canyons (unconsolidated material, bedrock in part): Postglacial, Late Wisconsinan
Stream-cut ravines and canyons, modern (unconsolidated material, bedrock in part)

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.

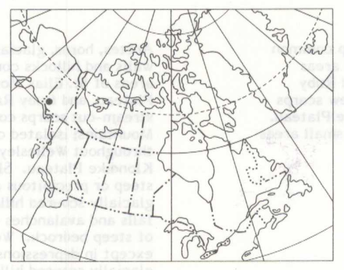
MOUNTAINS - Prominences that rise above surrounding terrain; relief more than 350 m; have restrictive summit area and steep slopes.

BOUNDARIES
- Between physiographic systems.
- Between major physiographic subdivisions.
- Delineating minor physiographic subdivisions.
- Between physiographic elements.

141°00′ 63°00′

140°00′ 63°00′
62°30′ 141°00′
140°00′ 62°30′

Copies of this map may be obtained from the Geological Survey of Canada:
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7



INDEX MAP

MAP 4-1978

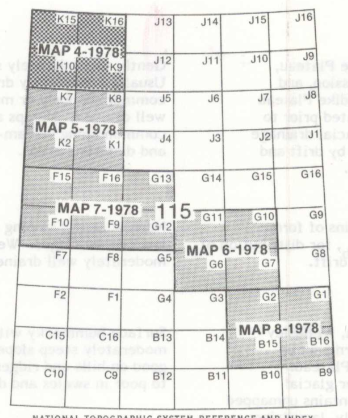
SURFICIAL GEOLOGY AND GEOMORPHOLOGY
MIRROR CREEK
YUKON TERRITORY

Scale 1:100 000

Kilometres 2 0 2 4 6 8 Kilometres
Miles 2 0 2 4 Miles

Universal Transverse Mercator Projection

Printed by the Surveys and Mapping Branch, 1979



SURFICIAL GEOLOGY AND GEOMORPHOLOGY

MIRROR CREEK

(115K-NE)

DESCRIPTIVE NOTES

Klondike Plateau is basically a dissected plain with long, interconnected, smooth-topped ridge crests rising 300 m above Wellesley Basin and Scottie Creek valley and 600 to 1000 m above White River valley[1]. The incised valley bottoms, which are separated from the smooth slopes of the ridge crests by steep valley walls, have a dendritic pattern that centres on Scottie Creek and White River valleys. The uplands are well drained whereas the flat valley bottoms are imperfectly to poorly drained. White River is a broad braided stream that primarily carries glacial meltwater and sediment from the Icefield Ranges north to Yukon River. Klondike Plateau is underlain by metamorphic rocks of Precambrian or Paleozoic age that have been intruded by granitic rocks of Mesozoic age[2]. Minor Tertiary intrusives and extrusives are present.

The area lies within the zone of widespread permafrost[3,4]. Permafrost is probably more than 30 m thick throughout most of the area[5]. Open taliks probably are present under large lakes and the White River channel. Other areas possibly lacking permafrost are xeric slopes, especially south-facing slopes, as indicated by the distribution of open-system pingos[6]. Ground ice is present in a number of forms; polygonal ground in fine grained sediments and peat indicates the presence of widespread ice-wedge polygons; ice lenses and veinlets have been noted in organic and fine grained sediments, especially in the upper 3 to 8 m; the pingos undoubtedly contain ice cores. Most shallow lakes in the flat-bottomed valleys of the Klondike Plateau have a thermokarst origin.

During the Pleistocene periglacial processes continually have affected the stream-sculptured topography. Altiplanation terraces and tors are common along high ridges[7,8]. Solifluction lobes and sorted steps and polygons, which are present but not abundant, indicate sporadic active solifluction.

The southern flank of the Klondike Plateau has been glaciated twice: the most extensive glaciation, the Mirror Creek glaciation, likely is early Wisconsinan in age, whereas the least extensive glaciation, the Macauley glaciation, is late Wisconsinan[8,9]. Mirror Creek glaciers dammed and formed lakes in minor valleys flowing towards Wellesley Basin and in White River valley southeast of Mount Baker. The southern tributaries of Scottie Creek near Mount Dave were occupied by meltwater streams during the Mirror Creek glaciation. Meltwater during the Macauley glaciation did not affect the Scottie Creek drainage system as the Macauley glaciers only reached the southern edge of Klondike Plateau. White River was a focus of meltwater drainage during both glaciations. During one of the glaciations Tanana River in Alaska was blocked, presumably near Lake Mansfield[10], and a lake formed in the upper Tanana River drainage system, which includes Scottie Creek; strandlines are evident between 580 and 610 m elevation in the Scottie Creek drainage basin. During both glaciations, and possibly earlier glaciations, silt was blown north onto unglaciated terrain and deposited as loess. Much of this loess has been redeposited in the valleys through solifluction and slope wash. The redeposited loess has been reworked further by streams and thermokarst through modern time[8,9,11,12].

On the unglaciated uplands a silty rubbly blanket covers shattered bedrock. In the glaciated areas drift is interlayered with silty rubble on glaciated upland surfaces. The drift along White River, opposite the mouth of Ten Mile Creek, is thick and appears to be mainly outwash and till with rare occurrences of glaciolacustrine sediment.

Glaciofluvial sand and gravel probably underlie glaciolacustrine and nonglacial fine grained sediment in valleys tributary to Scottie Creek near Mount Dave and in the lower courses of some valleys tributary to White River. Fine grained sediment filling most valleys in the unglaciated Klondike Plateau probably is underlain by locally derived gravel and rubbly colluvium.

Obvious hazards to development are the constantly changing channels of White River; flooding on the White River floodplain; and thermokarst subsidence in flat, low-lying areas underlain by icy organic or icy fine grained sediments. Disturbance on slopes likely will produce local shallow slope failures. Any penetration through the permafrost layer in valley bottoms probably would intercept water under artesian pressure at the base of the permafrost.

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SECTION DESCRIPTIONS

- A1: Colluvium, mixed silt, rubble, and drift (0.5 m) / Till (0-1 m) / Shattered rock and rubbly colluvium (0.2 m) / Bedrock
- A2: Peat (0.5 m) / Silt, frozen (1 m) / Silt and sand, thawed (1.8 m) / Gravel (0.3+m)
- A3: Silt, pebbly (0.6 m) / Gravel (0.4 m) / Colluvium, silty (5 cm) / Gravel (0.2 m) / Colluvium, sandy, pebbly, silty (0.3 m) / Shattered rock and rubbly colluvium (0.2+m)
- A4: Peat, icy (3 m) / Silt, organic, moderately icy (4.6 m) / Gravel, frozen (1.5+m)
- A5: Silt and thin volcanic ash (3 cm) / Silt, pebbly (0.2 m) / Till (?) (0.9 m) / Covered
- A6: Silt (2 m) / Covered
- A7: Peat, icy (1.2 m) / Silt, organic, moderately icy (12.2 m) / Silt, frozen (6.1 m) / Gravel, silty (2+m)
- A8: Peat (0.7 m) / Silt, organic (3 m) / Peat (9 cm) / Silt, organic (1.2 m) / Peat (0.2 m) / Silt, organic (3.1+m) Active layer (0.5 m)
- A9: Peat, icy (2.4 m) / Silt, highly organic, moderate to high ice content (14.7 m) / Gravel, sandy, frozen (1+m)
- A10: Silt and volcanic ash (6 cm) / Silt, few pebbles and cobbles (0.3 m) / Colluvium, rubbly, little silt (1.2 m) / Bedrock
- A11: Silt and volcanic ash (6 cm) / Silt, gritty (0.1 m) / Rubble, coarsens with depth (1.5+m)
- B1: Silt, pebbly (0-1.5 m) / Till (0-2.4 m) / Gravel (45 m) / Covered (15 m)
- B2: Covered (4.9 m) / Silt, organic, woody layers (16.5 m) / Gravel (0.3+m) / Covered (gravel?) (8.6 m)
- D1: Silt (0.2 m) / Sand, fine (1+m)

Geology by V.N. Rampton 1977.

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Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada.

Base maps at the 1:50 000 scale published by the Surveys and Mapping Branch.

Copies of the various topographical editions of this map may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa.

Approximate magnetic declination 1979 30°35.6′ East, decreasing 1.4′ annually.

Elevations in feet above mean sea-level.

MAP 4-1978
MIRROR CREEK
YUKON TERRITORY