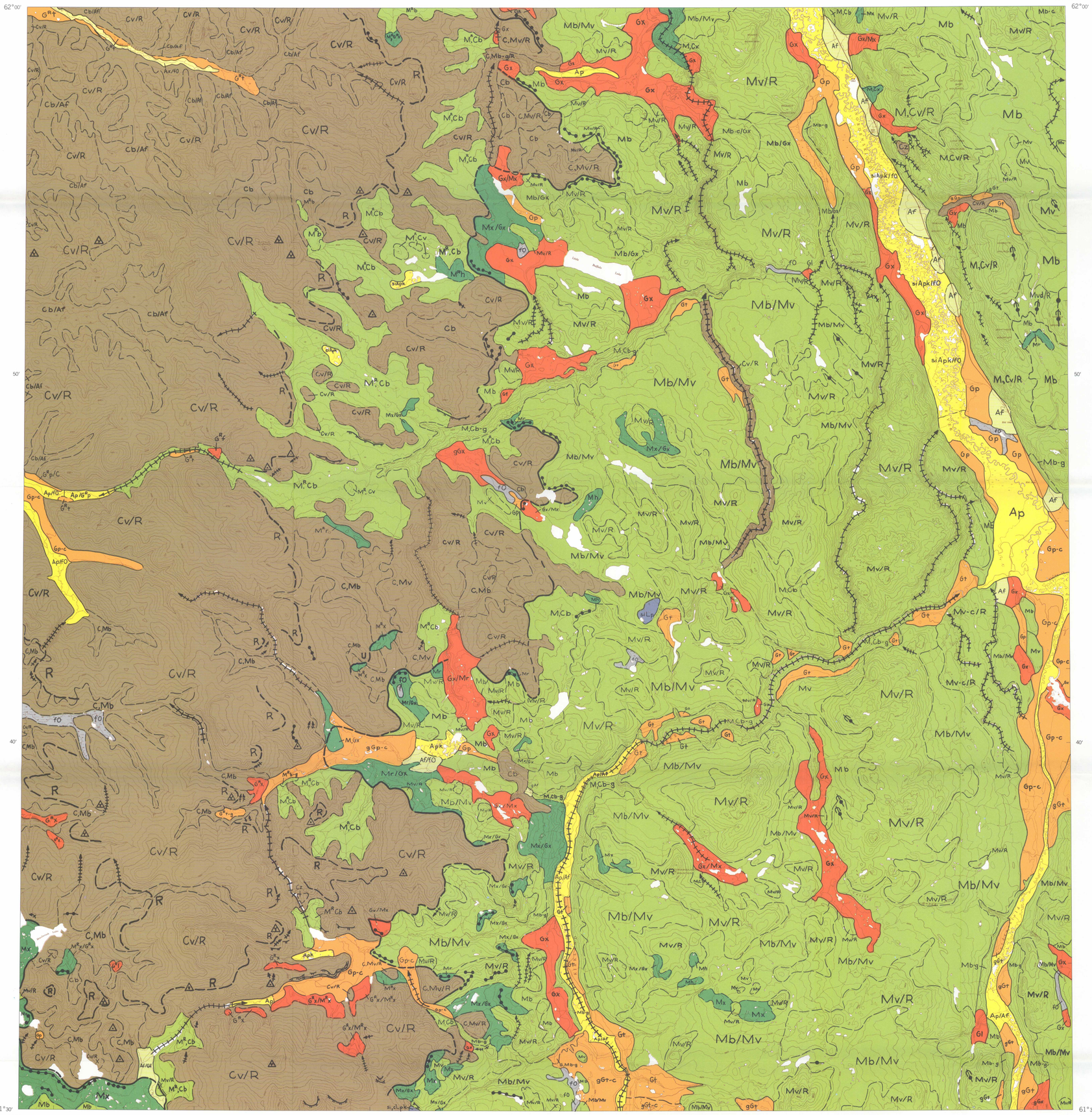
Energy, Mines and Resources Canada / Énergie, Mines et Ressources Canada

GEOLOGICAL SURVEY OF CANADA / COMMISSION GÉOLOGIQUE DU CANADA



SURFICIAL GEOLOGY AND GEOMORPHOLOGY

MAP UNIT*		NAME	MATERIAL	TYPICAL THICKNESS (m)	LANDFORM	GENERAL COMMENTS
fO	ORGANIC DEPOSITS	Fen; locally includes marsh, swamp, and shallow water classes of Tarnocai (1980)	Mesic to humic woody sedge peat; commonly underlain by woody organic silt	0.4-1.5	Flat to gently sloping except for low hummocks and ridges	Occurrence of permafrost sporadic, in general more prevalent with increasing elevation; in some areas mapped as fO, organic accumulation is less than 0.4 m and hence does not meet the thickness criterion for organic deposits and hence should be considered as an organic soil horizon
Ap, Apk	ALLUVIAL DEPOSITS	Alluvial plain, thermokarst alluvial plain	Alluvial plains of larger streams typically have 1 to 3 m of silt overlying gravel; small streams have various thicknesses of silt, sand and gravel. Thermokarst alluvial plain (Apk) bordering Nordenskiold River in Map 23-1987 may be underlain by glaciolacustrine silt and clay	5-10	Flat to gently irregular; floodplains of larger streams commonly have distinct meander scrolls and oxbow lakes; thermokarst alluvial plains have irregular thermokarst ponds and depressions 2 to 3 m below the alluvial plain surface	Flooding common to infrequent; permafrost absent beneath active channels of permanent streams but common elsewhere; permafrost occurs throughout thermokarst alluvial plains except beneath ponds and wet depressions; with segregated ground ice to 50% by volume
Apt		Alluvial plain and alluvial terrace, undivided	As for Ap.	5-10	Flat to gently irregular	Flooding common to infrequent on floodplain, rare on bordering terrace; permafrost common
Af		Alluvial fan or fan apron	Mainly gravel and coarse sand in steeply sloping fans, sand and silt with organic layers in gently sloping fans	2-20	Gently to steeply sloping fans occur where high gradient tributary streams meet lower gradient trunk streams; fan aprons are formed by coalescence of small fans associated with intermittent streams and rivlits	Streams on fans are subject to sudden and damaging changes in course (avulsions); fans comprising mainly gravel and coarse sand may be free of permafrost, or if perennially frozen, are thaw-stable; fans comprising mainly silt are typically perennially frozen; the silt may be ice-rich and unstable when thawed
Ax		Alluvial complex; combinations of Ap, Apt, and Af	Silt, sand, gravel	2-20	Various	See Ap, Apt, Af, as applicable
Lp, Lpk	GLACIOLACUSTRINE DEPOSITS	Glaciolacustrine plain	Silt, clay, locally may be covered by 1 m or more of organic silt, marl, or peat	2-20	Generally flat but commonly with 25% or more of area occupied by thermokarst ponds or depressions 1 to 4 m below the general surface (Lpk)	Permafrost present throughout except beneath thermokarst ponds; 15 to 50% segregated ice by volume; highly unstable when thawed
Lb, Lb-g		Glaciolacustrine blanket, gullied glaciolacustrine blanket	As for Lp	2-5	Gently to moderately sloping, commonly blanketing lower slopes of valleys and wedging out upslope	Mostly perennially frozen; limited data suggest that content of segregated ice is typically low, but high ice contents are possible; highly susceptible to erosion
Lv		Glaciolacustrine veneer	As for Lp	0-2	Thin layer conforming to surface of subjacent unit (commonly Mb)	Permafrost common; ice content variable
Gp, Gp-c $G^R p$	GLACIOFLUVIAL DEPOSITS	Glaciofluvial plain, channelled glaciofluvial plain (McConnell age, Reid age)	Gravel, sand; typically with 15 to 30 cm-thick veneer of eolian silt on deposits of McConnell age with up to 50 cm on deposits of Reid age	5-30	Flat to very gently sloping, commonly with shallow anastomosing channels Gp-c	Permafrost not common, but where present, deposits are mostly thaw-stable; constitute main source of aggregate for construction purposes; good drainage and soil stability make the units suitable for location of most types of facilities; areas of Gp, Gt are preferred for airstrips or other installations requiring large areas of well drained stable terrain; generally high permeability permits use of septic disposal systems
Gt $G^R t$		Glaciofluvial terrace (McConnell age, Reid age)	Gravel, sand	2-20	As for Gp, but in terrace position adjacent to a major stream	
Gh, Gr		Hummocky or ridged glaciofluvial deposits	Gravel, sand	5-30	Hummocky (including kames) or ridged (including eskers and esker complexes)	
Gl, Gf		Glaciofluvial delta, glaciofluvial fan	Gravel, sand	2-30	Glaciofluvial deltas have typical delta form with flat top and steep outer slope; glaciofluvial fans have characteristic fan form, with moderate slope	
Gx $G^R x$		Glaciofluvial complex; combinations of Gp, Gt, Gh, Gr (McConnell age, Reid age)	Gravel, sand	2-30	Various; includes areas that would be classed as Gp or Gt except for presence of kettles	
Md	GLACIAL DEPOSITS	Drumlinoid or fluted till plain	Glacial till consisting of pebbles, cobbles, and boulders in a clayey silt to silty sand matrix, typically with a veneer of eolian silt up to 50 cm thick; up to 2 m silt and/or organic deposits common between drumlins or in troughs of flutings	2-50	Till plain with individual drumlins and/or distinct glacial fluting	Permafrost sporadic; commonly drumlin crests and elevated parts of flutings are permafrost free or have a thick active layer, whereas associated silt and/or organic deposits are likely to be perennially frozen and may be ice-rich. Construction of linear facilities such as roads would be much easier parallel to rather than across the grain of the topography
Mvd		Drumlinoid moraine veneer	Glacial till consisting of pebbles, cobbles, and boulders in a clayey silt to silty sand matrix; may have veneer of eolian silt up to 50 cm thick	0-2	Till veneer over bedrock, with drumlinoid or crag-and-tail topography	As for Mv (below)
Mb, Mb-c Mb-g $M^R b$ $M^R b$-g		Moraine blanket, channelled moraine blanket, gullied moraine blanket (McConnell age, Reid age)	As for Md except that veneer of eolian silt may be lacking	2-10	Gently to moderately sloping, conforming broadly to topography of subjacent bedrock	Permafrost sporadic; common on northerly facing slopes, less common on southerly facing slopes. Suitable for conventional cut-and-fill road construction where permafrost is lacking
M, Cb		Moraine-colluvial blanket	Till and colluvium	2-10	As for Mb	
Mv, Mv-c		Moraine veneer, channelled moraine veneer	As for Md; bedrock common in channels in Mv-c	0-2	Gently to highly irregular, conforming to irregularities of the subjacent bedrock surface; locally has subparallel ice marginal channels which typically are incised to or into bedrock (Mv-c)	Permafrost sporadic; engineering capabilities and limitations determined in large part by the lithology and topography of the subjacent bedrock
M, Cv		Moraine-colluvial veneer	Till and colluvium	0-2	As for Mv	
Mh, Mr $M^R h$ $M^R h$		Hummocky moraine, ridged moraine (McConnell age, Reid age)	Glacial till consisting of pebbles, cobbles, and boulders in a silty sand matrix	2-50	Hummocks and ridges with slopes to 30° and relief to 20 m (exceptionally 40 m) superposed on flat to moderately sloping surfaces. Locally, ridges included in Mx are levees of large mudflows formed during early retreat stage of McConnell Glaciation by slope failures where lateral moraines formed embankments on steep slopes	Few data available on distribution of permafrost; vegetation cover suggests general absence of permafrost or presence of unusually thick active layer; locally affords well drained road location sites and constitutes source of common fill
Mx $M^R x$		Moraine complex; combinations of Mh, Mr Mm (McConnell age, Reid age)				
Mm $M^R m$		Rolling moraine (McConnell age, Reid age)	As for Md; up to 2 m silt and/or organic deposits common in depressions	5-50	Broad hummocks 10-30 m high and 100 to 300 m across; slopes to 12°	No data on distribution of permafrost or prevalence of ground ice; probably similar to Md, Mb
Cb	COLLUVIAL DEPOSITS	Colluvial blanket	Any of the deposits described above, plus bedrock detritus, modified and/or intermixed as a result of downslope movement of material; texture ranges from coarse blocky bedrock detritus of mountain tops to clayey or silty diamicton of some lower slopes; locally includes talus and/or mudflow deposits; on many slopes there is a downslope transition from material that has been moved by gravity (Cb) to material that has been transported by water. Extensive slopes have therefore been designated as Cb/Af or Af/Cb	2-5	Gently to moderately sloping, conforming broadly to the topography of subjacent deposits; periglacial features, including small solifluction lobes, sorted polygons, and felsenmeer are conspicuous and widespread above treeline (1280 to 1370 m; 4200 to 4500 ft.)	Permafrost sporadic; widespread on northerly facing slopes and on high plateau and mountain surfaces; other properties variable, depending on constituent materials
C, Mb		Colluvial-moraine blanket	Colluvium and till	2-5	As for Cb	
Cv		Colluvial veneer	As for Cb	0-2	Gently to highly irregular, conforming to topography of subjacent material (usually bedrock)	As for Cb; engineering properties and limitations determined in large part by the character of subjacent material (usually bedrock)
C, Mv		Colluvial-moraine veneer	Colluvium and till	0-2	As for Cv	
Cz		Rockslides	Blocky bedrock detritus	10-50	Hummocky	The few occurrences in the area are associated with bedrock slopes that are locally oversteeped by glacial erosion or deep incision of ice marginal channels
R R-c	ROCK	Bedrock, channelled bedrock	Rock; see text Figure 2 for distribution of major rock types		Various	Permafrost sporadic; ground ice low to completely lacking

*The most commonly occurring units are shown above; for others, refer to Explanation of Map Unit Designations; coloured legend blocks indicate primary map units that appear on this map

EXPLANATION OF MAP UNIT DESIGNATIONS

SIMPLE MAP UNITS

A simple map unit designation consists of a genetic symbol (upper case letter) followed by one or more morphologic descriptors (lower case letters). The range of material texture to be expected within a map unit is indicated under "MATERIAL". Where the texture of the material is known more specifically, it is indicated by one or more textural prefixes (lower case letter).

MIXED UNITS

Two types of mixed units are used:

a. Combinations of the form "Gx/Mh" indicate that two distinct types of deposit are distinguishable within the boundaries of the unit, but cannot be differentiated because of map scale. The first named deposit type occupies more than 50% of the delineated area, the second named less than 50% but more than 10%. Deposit types that constitute less than 10% of the delineated area are ignored.

b. Combinations of the form "M, Cv", "M, C, Lb" etc., indicate that two or more distinct genetic classes of deposit are known to occur or suspected to occur within a delineated area; the respective classes of deposit lack distinctive landforms that would permit differentiation by airphoto interpretation, and differentiation on the ground has not been undertaken. The order in which the respective classes are listed indicates the likely relative prevalence by area of each class within the delineated area.

GEOLOGICAL AGE OF DEPOSITS

Glacial and glaciofluvial deposits of Reid age are distinguished by a superscript "R" as in $M^R b/G^R x$. Map unit designators for glacial, glaciofluvial, and glaciolacustrine deposits of McConnell age lack the superscript. Colluvial, alluvial, and organic deposits have not been differentiated on the basis of age.

TEXTURAL MODIFIERS	GENETIC CATEGORIES	MORPHOLOGIC MODIFIERS	EROSIONAL MODIFIERS
f - fen[1]	O - Organic deposits	b - blanket (generally 2m thick)	c - channelled
c - clay	A - Alluvial deposits	d - drumlinoid	g - gullied
si - silt	C - Colluvial deposits	f - fan	(listed in the form Gp-c, Mb-g)
s - sand	G - Glaciofluvial deposits	h - hummocky	
g - gravel	L - Glaciolacustrine deposits	k - thermokarst	
	M - Morainic deposits	m - rolling	
	R - Bedrock	p - plain	
		r - ridged	
		t - terrace	
		v - veneer (generally 2m thick)	
		x - complex (combinations of modifiers)	
		i - delta	

[1] Fen is not, strictly speaking, a textural term but a wetland class as defined by Tarnocai (1980).

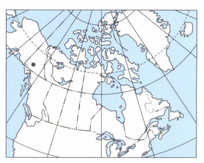
REFERENCE

Tarnocai, C.
1980 Canadian wetland registry in Proceedings of a Workshop on Canadian Wetlands (Saskatoon 1979), C.D.A. Rubec and F.C. Pollet (ed.); Environment Canada, Land Directorate, Ecological Land Classification, Series 12.

SYMBOLS

Geological boundary (defined, approximate)
Glacial limit (defined, approximate)
Reid Glaciation
Uncorrelated
McConnell Glaciation
Cryoplanation terrace
Cirque
Moraine ridge
Drumlin, drumlinoid ridge, glacial fluting
Direction of ice movement inferred from form
Direction of ice movement unknown
Esker
Meltwater channel
Glacial lake shoreline
Rock glacier
Pingo, open-system, closed-system
Ground observation (erratics found, not found)

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
100 West Pender Street, Vancouver, B.C. V6B 1R8



INDEX MAP

Canada

Geology by O.L. Hughes, 1966, 1967, 1979, based mainly on airphoto interpretation with limited ground checking

Thematic information on this map is in part reproduced directly from author's copy

Geological cartography by the Geological Survey of Canada

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

MAP 23-1987

SURFICIAL GEOLOGY

LITTLE BUFFALO LAKE

YUKON TERRITORY

Scale 1:100 000 - Échelle 1/100 000

Kilometres 2 0 2 4 6 8 Kilomètres

Universal Transverse Mercator Projection
© Crown copyrights reserved

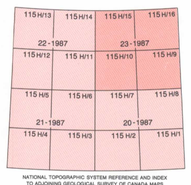
Projection transverse universelle de Mercator
© Droits de la Couronne réservés

Base map assembled by the Geological Survey of Canada from maps published at 1:50 000 scale by the Surveys and Mapping Branch, in 1961, 1968

Copies of the topographical editions covering this map area may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, Ontario, K1A 0E9

Mean magnetic declination 1988, 29°32' East, decreasing 16.2' annually. Readings vary from 29°15' E in the SW corner to 29°49' E in the NE corner of the map

Elevations in feet above mean sea level



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

Printed by the Cartographic Information and Distribution Centre. Published 1989

ESIC CIST
JUN 28 1999
Earth Sciences Sector / Secteur des sciences de la Terre
MAP LIBRARY / CARTOTHÈQUE

Recommended citation:
Hughes, O.L.
1989: Surficial geology, Little Buffalo Lake, Yukon Territory; Geological Survey of Canada, Map 23 - 1987, scale 1:100 000

This map has been produced from a scanned version of the original map
Reproduction par numérisation d'une carte sur papier