GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

LEGEND

This map subdivides the terrain of the Quiet lake map area according to the genesis of the earth materials that directly underlie the surface, the morphology of these materials, and the ongoing geomorphic processes that are actively modifying them.

The map unit notation system is built around a genetic designator as illustrated below:

This notation indicates a plain composed of lacustrine sediments which are undergoing thermokarsting.

Compound units Areas where two or more map units cannot be mapped separately due to resolution limitations posed by the map scale and/or the gradational nature of the units are designated by separating the constituent units with a / . For example:

C_V/M_V

This unit consists of a thin covering of colluvium and till.

Stratigraphically stacked units Where the stratigraphy is known, the map unit is designated as follows:

$\frac{M_h}{G}$

This unit consists of a continuous cover of till over glaciofluvial gravels.

Genetic Category

A- Alluvial deposits: Sand and gravel with local silt, clay, and organic sediments. Alluvial fa's may contain significant deposits of debris flow diamictons.

C- Colluvium: Unsorted sediments ranging from clay to boulders derived by the physical and chemical weathering processes and gravitational reworking from bedrock and glacial sediments.

M- Till: Stony diamicton formed by direct deposition from ice. Much of the till in the map area has undergone redeposition by gravitational processes immediately following initial deposition.

G- Glaciofluvial deposits: Sand and gravel with minor amounts of silt and clay deposited by water flowing on, along the margins of, beneath, and away from glacial ice.

L- Lacustrine and glaciolacustrine deposits: Sand, silt, and clay with local deposits of gravel.

E- Eolian deposits: Wind blown accumulations of fine sand and silt.

O- Accumulations of peat and organic silts and clays.

I- Glacial ice

R- Bedrock: Highly folded and faulted rocks of several and allochthonous terranes including Precambrian to Mesozoic clastics and carbonates, schists and gneisses locally intruded by Mesozoic felsic plutons. Eocene flows and tuff-breccias of olivine basalt occur locally north of Tintina Trench.

Textural Modifers

s - sandy
ȥ - silty
c - clayey
b - bouldery

Morphologic Modifiers

a - apron
b - blanket (continuous covering greater than 1m in thickness assumed to overlie bedrock).
c - channelled
d - delta
f - fan
h - hummocky
k - pitted
m - undulating
n - streamlined by ice flow
p - floodplain, plain
s - areas of vertical or near vertical slopes (used only with R)
r - ridge or ridged
v - veneer (discontinuous covering generally less than 1m in thickness assumed to over lie bedrock).
t - terrace(s)

Activity Modifiers

A - Avalanching
S - Soliflucted
K - Thermokarsting
V - Gulleying

Symbols

Geological boundary (defined, approximate, gradational).

Streamlined landform (former ice flow direction unknown.

Streamlined landform (arrowhead indicates the direction of former ice flow).

Esker (former water flow direction established, not established; may form a map unit boundary).

Meltwater channel (large, small; may form a map unit boundary).

Landslide: major, minor (arrows indicate the direction of movement; serrated pattern indicates the head of the landslide scarp).

Rock glacier

Cirque

Arete

Notes

The Quiet Lake map area was intensely glaciated during the McConnell glaciation. Radiocarbon dating in the region has bracketed this event between ca. 26,000 and 10,000 a. B.P. Pelly Mountains were mantled by continuous ice caps which shed ice both north to the Selwyn Lobe of the Cordilleran Ice Sheet and south to the Cassiar Lobe of the Cordilleran Ice Sheet (Hughes et al., 1968). Only the highest peaks of Pelly Mountains probably protruded above the ice caps as knife-like nunataks. Within Pelly Mountains, directions of ice flow were determined by bedrock topography although flow directions were not always in the same directions as modern stream flow. The northern margin of the Cassiar Lobe flowed westward along the southern quarter of the map area across the low relief upland occupied presently by Nisutlin Lake and the low mountain ranges immediately west. In the area of Quiet Lake, it bifurcated with a major ice stream flowing northwest across Big Salmon Lake and down Big Salmon River valley to beyond the western boundary of the map area. The balance of the Cassiar Lobe flowed southwest around the southern margin of Big Salmon Range. North of Pelly Mountains, the Selwyn Lobe flowed parallel to Tintina Fault. Reconstruction of Selwyn Lobe (Duk-Rodkin et al. 1986) indicates that the surface of Selwyn Lobe was approximately 1645m in the northeast corner of the map area (no similar data is available for the Cassiar Lobe).

Deglaciation was marked by widespread stagnation punctuated by short periods of ice thickening. Mountains were the first to emerge from glacial ice followed by mountain valleys and lastly, Tintina Trench. This process is documented by flights of ice-marginal glaciofluvial channels and terraces along mountain flanks and extensive complexes of glaciofluvial deposits along valley bottoms. Periodic thickening of glacial ice during overall stagnation and downwasting is documented by a succession of extensive glacial lake deposits in the Fox Creek, Lapie River, Rose River, and Nisutlin River basins. Each succeeding lake basin was lower than its predecessor. The geometries of these basins were such that only temporary thickening of the Selwyn and Cassiar Lobes could have accounted for the ponding of lakes in these deglaciated valleys. The lowest major lake occupied Tintina Trench along Pelly River. This was ponded apparently by isostatic downwarping.

Discontinuous permafrost is found throughout the map area. Related processes such as solifluction and thermokarsting are widespread. They are identified as modifying process only where topographic features related to them are well developed. Snow and rock avalanches present the chief geologic hazard in mountainous parts of the map area while cliff and bank erosion are local problems where the major streams of the area course through thick deposits of glaciofluvial and glaciolacustrine sediments.

REFERENCES

Duk-Rodkin, A, Jackson, L.E. Jr., Rodkin, O. 1986: A composite profile of the Cordilleran Ice Sheet during McConnell Glaciation, Glenlyon and Tay River map areas, Yukon Territory; in Current Research, part B, Geological Survey of Canada, paper 86-1B, p. 257-262.

Hughes, O.L., Campbell, R.B., Muller, J.E., and Wheeler, J.O., 1968: Glacial limits and flow patterns, Yukon Territory, South of 65 degrees north latitude. Geological Survey of Canada paper 68-34, 9p.

Geology by L.E. Jackson Jr. 1986

SHEET 2 OF 2