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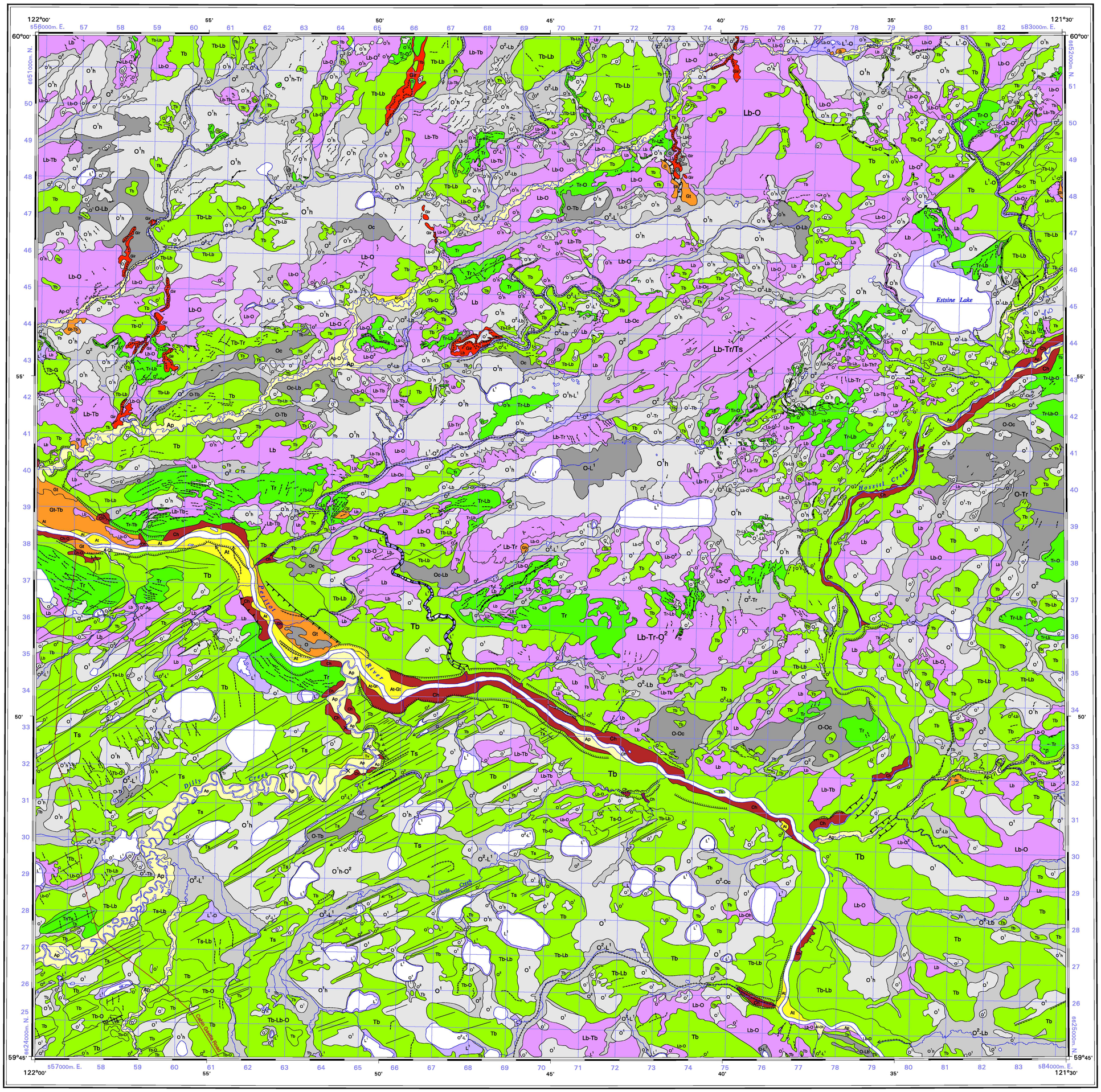
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA



LEGEND

This legend is common to GSC Open File maps produced for NTS sheet 94 P. Not all map units in the common legend appear on this map.

QUATERNARY
SURFICIAL DEPOSITS
POST LAST GLACIATION

NONGLACIAL ENVIRONMENTS

ORGANIC DEPOSITS: *peat and muck; 1 to 3 m thick on average; formed by the accumulation of plant material in various stages of decomposition; generally occurs as flat, wet terrain (swamps and bogs), over poorly drained substrates.*

- O^1 — ***Bog peat:*** *sphagnum or forest peat formed in an ombrotrophic environment; wet terrain; may be treed or treeless;* O^1h*: hummocky, mounds and plateaus; area may be underlain by ground ice or shallow permafrost conditions;* O^1k*: thermokarst terrain related to melting ground ice.*
- O^2 — ***Fen peat:*** *peat derived from sedges and partially decayed shrubs in a eutrophic environment; forms relatively open peatlands with a mineral-rich water table that porsists seasonally near the surface; often covered with low shrubs and sometimes a sparse layer of trees.*
- O — ***Undifferentiated bog and fen deposits:*** *Oh: undifferentiated hummocky bog and fen deposits; area may be underlain by ground ice or shallow permafrost conditions; Ok: undifferentiated bog and fen deposits with thermokarst terrain related to melting of ground ice; Oc: undifferentiated bog and fen deposits, cut by numerous subparallel channels on gentle slopes.*

COLLUVIAL DEPOSITS: *mass wasting debris; poorly sorted, massive to stratified debris deposited by direct, gravity-induced movement; composition dependant on source material.*

- Ch — ***Landslide and slump debris:*** *active and inactive landslides; hummocky topography; diamicton, generally 1 to 10 m thick, but may exceed 10 m near the toe of large landslides.*
- Cv — ***Colluvial veneer:*** *thin and discontinuous cover of slumped and/or soliflucted material <1 m thick; overlies bedrock or till.*

ALLUVIAL DEPOSITS: *sorted gravel, sand, minor silt, and organic detritus deposited by streams; commonly stratified.*

- Ap — ***Floodplain deposits:*** *sorted gravel, sand, silt, and organic detritus >1 m thick; forming active floodplains close to river level with meander channels and scroll marks.*
- At — ***Fluvial terrace deposits:*** *inactive terraces above modern floodplain; >2 m thick; represents a potential aggregate source.*
- Af — ***Alluvial fan deposits:*** *poorly sorted gravel, sand, and organic detritus >1 m thick.*
- Av — ***Alluvium veneer:*** *< 1 m thick; primarily as uniform sheets of slope wash on gentle slopes.*
- A — *Undifferentiated fluvial deposits.*
- L^1 — ***LACUSTRINE DEPOSITS:*** *sand, silt, and minor clay deposited in a former lake; >1 m thick; generally overlain by organic deposits; exposed by recent fluctuations in lake levels.*

NONGLACIAL AND PROGLACIAL ENVIRONMENTS

EOLIAN DEPOSITS: *wind-deposited medium to fine sand; derived from deltaic or glaciolacustrine deposits; in some areas eolian sediments are thin or absent between dunes.*

- Er — ***Ridged eolian deposits:*** *forming dunes; generally >2 m thick.*

POSTGLACIAL OR LATE WISCONSINAN

PROGLACIAL AND GLACIAL ENVIRONMENTS

GLACIOLACUSTRINE DEPOSITS: *fine sand, silt, and clay, with minor debris-flow diamicton, deposited in glacier-dammed lakes in valleys and along the margin of the retreating Laurentide Ice Sheet; usually overlain by organic deposits in lowlands.*

- Lb — ***Glaciolacustrine blanket:*** *>1 m thick.*

GLACIOFLUVIAL DEPOSITS: *well to poorly stratified sand and gravel; minor diamicton; deposited behind, at, or in front of the ice margin by glacial meltwater; represents a potential aggregate source.*

- G — ***Proglacial outwash:*** *cross-stratified gravel and sand deposited in front of the ice margin;* Gh*: forming hummocks;* Gt*: outwash terrace deposits, often associated with meltwater channels and canyons; 1 to 10 m thick.*
- Gi — ***Ice-contact stratified drift:*** *poorly-sorted sand and gravel with minor diamictons; deposited in contact with the retreating glacier; 1 to >20 m thick;* Gir*: esker ridges.*

TILL: *diamicton deposited directly by the Laurentide Ice Sheet; sandy to clayey matrix with striated clasts of various lithologies, including many Canadian Shield, carbonate and sandstone erratics; clast content is typically low (<10 %).*

- Tb — ***Till blanket:*** *>1 m thick, continuous till cover forming undulating topography that locally obscures underlying units.*
- Ts — ***Streamlined and fluted till:*** *>1 m thick, till surface marked by streamlined landforms including flutes and drumlins.*
- Th — ***Hummocky till:*** *>1 m thick; hummocky till surface.*
- Tr — ***Ridged till deposits:*** *>1 m thick, moraines or crevasse fillings forming a ridged topography.*
- Tv — ***Till veneer:*** *<1 m thick, discontinuous till cover, underlying bedrock topography is discernible.*

PRE-QUATERNARY BEDROCK

- R — ***Sedimentary bedrock:*** *Cretaceous Fort St. John Group shales (including the Shaftesbury Formation) and Dunvegan Formation sandstone exposed in highlands and along meltwater channel and canyon walls.*

NOTE: *In areas where the surficial cover forms a complex pattern, the area is coloured according to the dominant unit and labelled in descending order of cover (e.g., O-Tr). Where buried aggregate deposits (sand and gravel - commonly associated with* Gt *or* Gd *surficial units) are known, or suspected, areas are coloured according to the overlying unit and labelled in the following manner:* Lv/Gd.

Geological boundary (defined)

Meltwater channel or underfit channel, small (paleoflow direction known, unknown)

Meltwater channel, large (paleoflow direction known, unknown)

Lateral meltwater channel (barb points up slope and down ice-flow direction)

Esker

Escarpment

Kettle

Major moraine

Minor moraine and crevasse filling

Ice moulded form in till (direction of flow inferred, not inferred)

Outcrop

DESCRIPTIVE NOTES

The continental Laurentide Ice Sheet glaciated the Estsine Lake (NTS 94 P/13) map area during the Late Wisconsinan (ca. 25 000–10 000 years ago). Extensive glacial flutings show that the ice flowed in from the northeast. The flutings are most pronounced south of Petitot River where the ice flowed uphill under compression. Compressive ice flow in this area probably resulted in the thick accumulations of till, which are evident as broad ridges in the west part of the map area along the southern Petitot River valley. Nevertheless, sandstone and shale outcrops along Dilly Creek show that the underlying bedrock also controls much of the topography.

In places, numerous small ridges drape over the glacial flutings in crosscutting patterns. These features are likely a combination of crevasse fillings and minor moraines and can provide some indication of the ice sheet configuration, particularly during deglaciation. The patterns indicate that the ice margin generally receded to the northeast, but esker systems on either side of the modern Petitot River, and numerous kettle lakes south of the river, indicate that stagnant glacier ice also remained in the area.

At some point during deglaciation, glacial lakes formed in the lowland when the Laurentide Ice Sheet and local stagnant ice masses blocked the regional drainage. A series of nested moraines near Estsine Lake outline various positions of a lobate ice margin extending from the northeast. This lobe seems to crosscut the overall pattern of minor moraines and crevasse fills, suggesting a local stillstand or minor readvance during regional ice retreat. Subaerial channels, and possibly subglacial channels bounded by glacier ice, routed meltwaters to the Petitot River valley lowland. A large confluent channel formed in the west half of the map area where extensive glaciofluvial deposits occur as terraces along Petitot River.

Poorly drained areas underlain by clayey till and glaciolacustrine sediments are covered by extensive muskeg, forming hummocky peatlands. These areas are in large part underlain by permafrost and probably contain significant amounts of ground ice.

LOCATION MAP

Author: J.M. Bednarski

Geology by J.M. Bednarski, 2003, 2004, with additional data provided by T. Ferbey and A. Hickin, Resource Development and Geoscience Branch, British Columbia Ministry of Energy and Mines

Airphoto interpretation by J.M. Bednarski, 2004

Compilation of geology was onto 1:40 000 orthorectified airphoto mosaic by J.M. Bednarski

Digital cartography by M. Proulx, Earth Sciences Sector Information Division (ESS Info)

OPEN FILE 4825

SURFICIAL GEOLOGY

ESTSINE LAKE

BRITISH COLUMBIA

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

This map was produced from processes that conform to the ESS Info Publishing Services Subdivision Quality Management System, registered to the ISO 9001: 2000 standard

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

Digital base map provided by the BC Watershed Atlas (1:50 000, TRIM base), modified by J.M. Bednarski

Magnetic declination 2005, 24°3' E, decreasing 18.6' annually

95 B/1 OF1754	95 A/4	95 A/3
94-0/16	94 P/13 OF4825	94 P/14
94-0/9	94 P/12 OF4846	94 P/11

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

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2005

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