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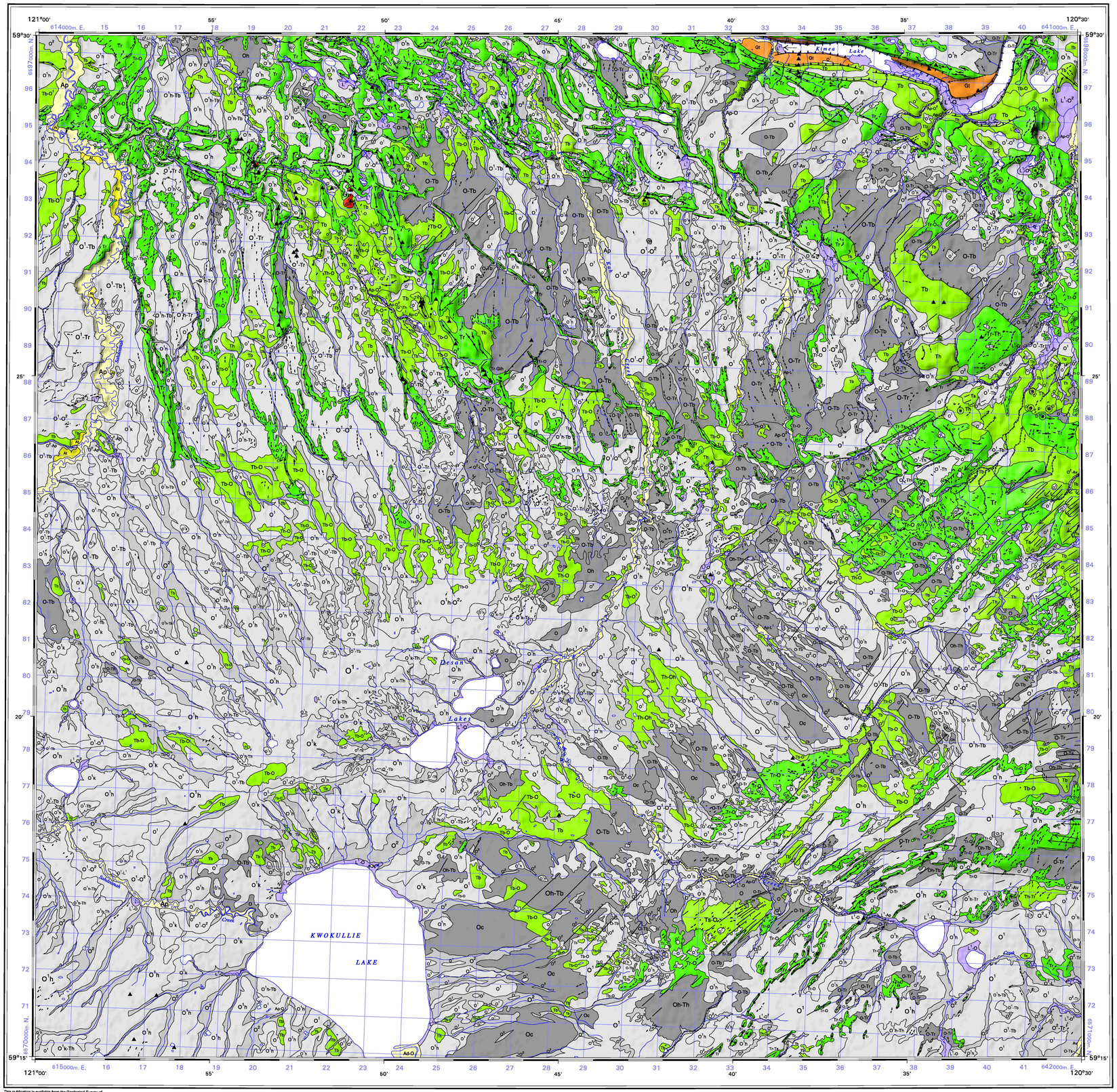
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA



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.

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.

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.*

O¹ — ***Bog peat:*** *sphagnum or forest peat formed in an ombrotrophic environment; wet terrain; may be treed or treeless; O¹h, hummocky, mounds and plateaus; area may be underlain by ground ice or shallow permafrost conditions; O¹k, thermokarst terrain related to melting ground ice.*

O² — ***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 persists seasonally near the surface; generally covered with low shrubs and sometimes a sparse layer of trees; O²k, thermokarst terrain related to melting ground ice.*

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.*

C — *Undifferentiated colluvial deposits.*

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; Ad, deltaic deposits.*

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.*

L¹ — ***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.*

Ev — ***Eolian veneer:*** *discontinuous veneer of eolian sediments; <1 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.*

Lv — ***Glaciolacustrine veneer:*** *thin and discontinuous; <1 m thick.*

GLACIOFLUVIAL DEPOSITS: *well to poorly stratified sand and gravel; minor diamictons; 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; Gp, outwash plain deposits, generally 1 to 5 m thick, generally mantle valley floors and surfaces adjacent to glacial meltwater channel margins; Gt, outwash terrace deposits, generally associated with meltwater channels and canyons; 1 to 10 m thick; Gd, glaciofluvial delta deposits; 1 to >30 m thick; Gv, glaciofluvial veneer thin and discontinuous; <1 m thick; Gf, glaciofluvial fan deposits; >1 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; Gih, hummocky topography relating to melting of underlying ice; Gik, surface marked by kettle holes; Gir, esker ridges; Git, karne terraces; Gid, ice-contact glaciofluvial delta deposits; 1 to >30 m thick, surface marked by kettles.*

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.*

Geological boundary (defined)
Meltwater channel or underfit channel, small (paleoflow direction known, unknown)
Meltwater channel, large (paleoflow direction known, unknown)
Kettle (large, small)
Major moraine
Minor moraine or crevasse filling
Ice contact face
Ice moulded form in till (direction of flow inferred, not inferred)
Drumlin
Field observation site

NOTES

Kwokullie Lake map area (NTS 94 P/7) covers the northeast part of the Etsho Plateau whose northern boundary is defined by a large meltwater channel that is now occupied by Kimea lake and creek at about 460 m above sea level (asl). The Kimea meltwater channel was cut by an ancestral Petitot River that flowed westward during deglaciation when the retreating Laurentide Ice Sheet still covered the land to the north. Prior to this time (ca. 25 000–11 000 years ago), the Laurentide Ice Sheet covered the entire map area with a dominant ice flow from the northeast. Etsho Plateau gradually rises to 720 m asl in the southeast quadrant of the map area and, although it offers some relief, most of the area is underlain by poorly-drained clayey till that is mantled by extensive organic deposits. Hummocky organic deposits containing various amounts of ground ice are common on the upper plateau, especially around Kwokullie and Desan lakes, where recent disturbances have led to thermokarst terrain.

Glacial flutings and drumlins concentrated on the upstream flank of the Etsho Plateau indicate that at least two distinct ice lobes emanated from the ice sheet at some time after the glacial maximum. A persistent northern lobe was responsible for the widespread southwest ice flow however, in the southeast quadrant of the map area, it was deflected by a second lobe flowing westward up the plateau. A southwest-trending moraine system appears to mark the interlobate boundary. Subsequent episodic retreat of the two lobes is marked by groups of recessional moraines to the north and east. There are at least two main concentrations of recessional moraines on the northern flank of the plateau. Within these moraine concentrations, cross-cutting relationships are common, indicating that many stillstands and minor readvances of the northern lobe occurred as it thinned and retreated to the north. In general the end moraines are thin and rise above the boggy terrain with only a few metres of relief. They are composed mainly of till but, in places, they also contain discontinuous deposits of stratified material, with minor amounts of ice-thrust glaciofluvial and glaciolacustrine sediment.

Author: J.M. Bednarski

Geology by J.M. Bednarski, 2003–2005, with additional data provided by V. Levson and T. Ferbey, Resource Development and Geoscience Branch, BC Energy, Mines, and Petroleum Resources

Airphoto interpretation by J.M. Bednarski, 2003–2005

Compilation of geology was on to 1:20 000 orthorectified airphoto mosaic by J.M. Bednarski, 2006

Digital cartography by D. Viner, Data Dissemination Division (DDD)

This map was produced from processes that conform to the Scientific and Technical Publishing Services Subdivision (DDD) Quality Management System, registered to the ISO 9001: 2008 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

Shaded relief image prepared by DDD, derived from the digital elevation model supplied by J.M. Bednarski, based on 3 Arc Second SRTM imagery Illumination: azimuth 310°, altitude 45°, vertical factor 4.8x

Magnetic declination 2011, 20°31'E, decreasing 21.0' annually

OPEN FILE 6562

SURFICIAL GEOLOGY

KWOKULLIE LAKE

BRITISH COLUMBIA

Scale 1:50 000/Échelle 1/50 000

kilometres 1 0 1 2 3 4 kilometres

Universal Transverse Mercator Projection
North American Datum 1983

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

LOCATION MAP

94 P/13 OF4825	94 P/14	94 P/15	94 P/16 OF5480
94 P/12 OF4846	94 P/11 OF5506	94 P/10 OF5505	94 P/9 OF5479
94 P/5	94 P/6	94 P/7 OF6562	94 P/8 OF5481

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

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6562
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COMMISSION GÉOLOGIQUE DU CANADA
2011

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Recommended citation:

Bednarski, J.M., 2011. Surficial geology, Kwokullie Lake, British Columbia; Geological Survey of Canada, Open File 6562, scale 1:50 000. doi:10.4095/289249

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