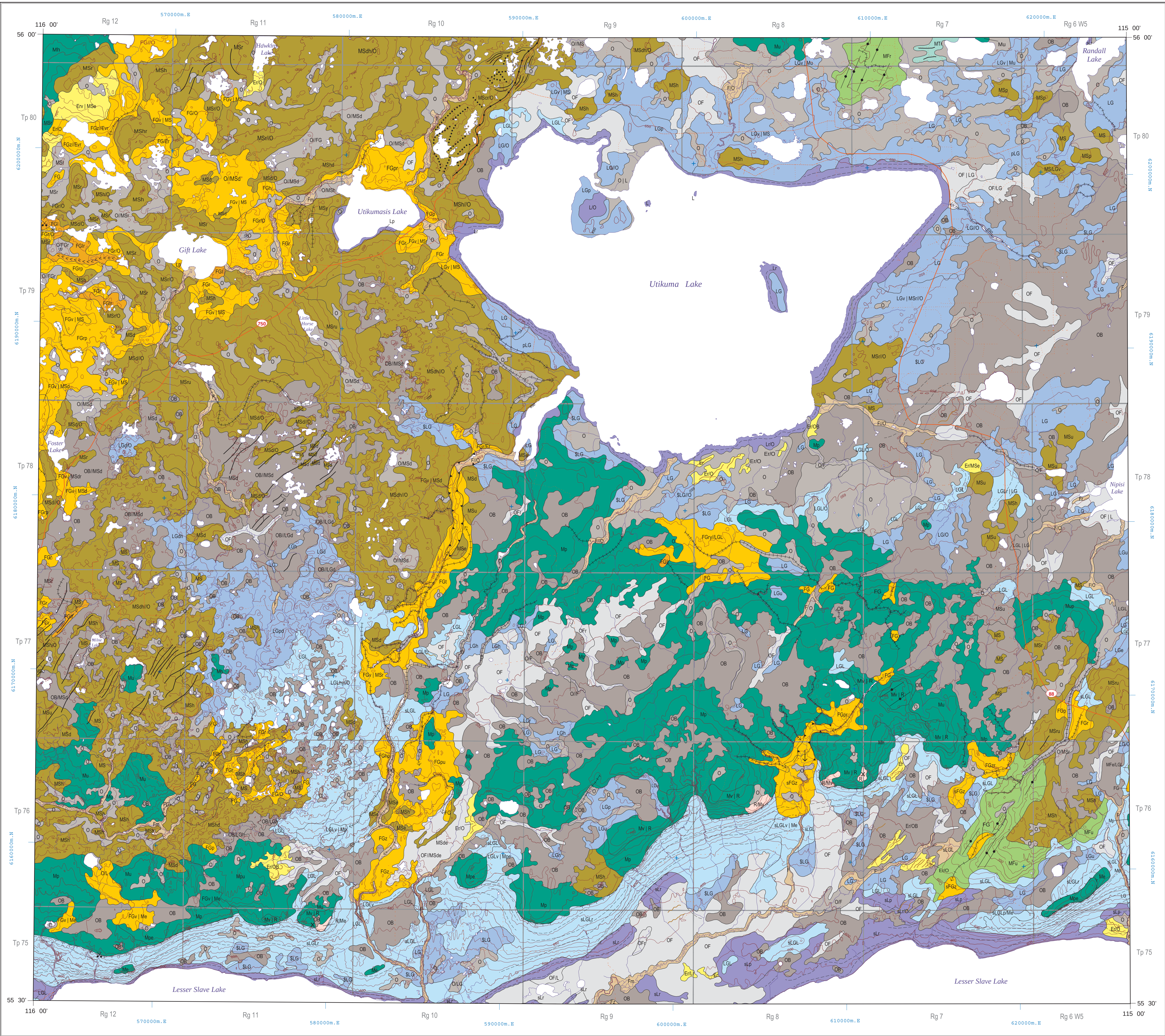


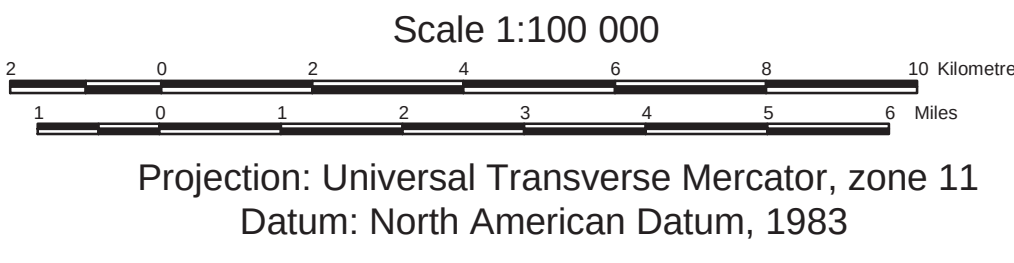


Copies of this map may be obtained from:
Information Sales Office
Alberta Geological Survey
Telephone: (780) 422-3767
Web site: www.aggs.gov.ab.ca

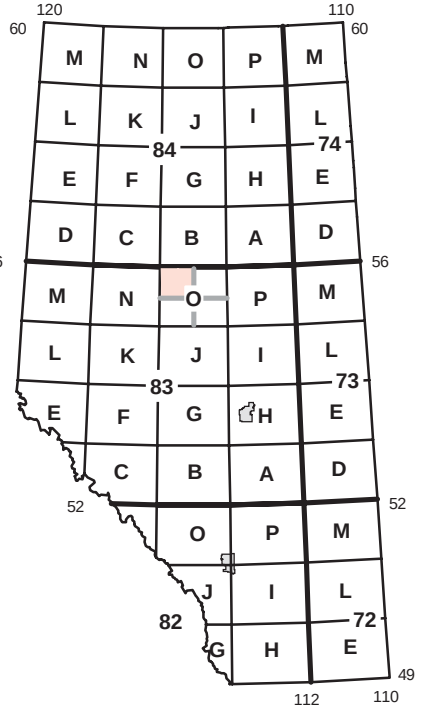
Map 312

Surficial Geology of the Utikuma Area, Alberta (NTS 830/NW)

Geology by: R.C. Paulen, J.G. Pawlowicz and M.M. Fenton



Published 2004



This is a common map legend for the surficial geology of northern Alberta. Coloured legend blocks indicate map units that appear on this map. Not all map symbols shown in the legend necessarily appear on this map.

UNIT	UNIT NAME	DESCRIPTION AND GENESIS
QUATERNARY		
HOLOCENE		
A		ANTHROPOGENIC MATERIALS: Culturally-made or modified geological materials such that their physical properties (e.g., structure, cohesion, compaction) have been drastically altered.
O		ORGANIC DEPOSITS: Undifferentiated peat layers, woody to fibrous muck, occurring in undifferentiated wetlands; commonly underlain by fine-grained, poorly-drained glaciolacustrine deposits; includes marshes, swamps, bogs and fens.
OB		Bog peat: Occurs in a peatland with a fluctuating water table and commonly a raised surface; peatland surface is dominated by sphagnum mosses, heath shrubs and short, stunted trees.
OF		Fen peat: Occurs in a peatland with water table at surface and slow internal drainage; peatland surface is dominated by sedges, with grasses and reeds near local pools, sparsely treed.
C		COLLUVIAL DEPOSITS: Materials that have reached their present position as a result of direct, gravity-induced movement; commonly occurs as slope and slump deposits confined to valley slopes and floors; includes pre-existing bedrock, till, glaciolacustrine, glacioluvial and eolian sediments, generally poorly sorted.
F		FLUVIAL DEPOSITS: Sediments transported and deposited by streams and rivers; synonymous with alluvial. Includes well-sorted stratified sand, gravel, silt, clay and organic sediments occurring in channel and overbank deposits (e.g., postglacial floodplains, terraces, fans and deltas).
L		LACUSTRINE DEPOSITS: Sediments deposited in and adjacent to recent lakes; offshore sand, silt and clay, minor organic deposits; littoral (nearshore beaches and bars) sand and silt and minor gravel.
E		EOLIAN DEPOSITS: Wind-deposited sediments; well-sorted, medium- to fine-grained sand, and minor silt (loess); generally massive to locally cross-bedded or ripple laminated; includes both active and vegetated deposits.
PLEISTOCENE		
LG		GLACIOLACUSTRINE DEPOSITS: Fine-grained distal sediments deposited in or along the margins of glacial lakes, including sediments that were released by the melting of floating ice. Includes laminated (rhythmically bedded) to massive fine sand, silt and clay, and may contain ice-rafted stones.
LGL		Littoral and nearshore sediments: Massive to stratified well-sorted silty sand, pebbly sand and minor gravel; occurs as beaches, bars, spits and forest debris deposits deposited during regression and lowering of glacial lakes.
FG		GLACIOFLUVIAL DEPOSITS: Sediments deposited by glacial meltwater streams as subaerial or subaqueous outwash, includes sand and gravel, often stratified, minor silt, and may show evidence of ice melting (slumped structures). Features include meltwater channels, kettle holes, terraces and minor ice-contact sediments.
FGI		Ice-contact sediments: Sediments deposited by glacial meltwater streams in direct contact with glacial ice, either in front of (dune terraces) or within glacial ice (eskers, crevasse ridges); includes massive to stratified, poor to moderately sorted coarse sediments (predominantly pebble gravel and coarse sand, locally till) and may show evidence of ice melting (slumped structures).
M		MORANE: Material deposited directly by glacial ice without modification by any other agent of transportation. Includes non-sorted diamictic deposits as till (a mixture of clay, silt, sand and minor pebbles, cobbles and boulders) at the ice margin or beneath a glacier. Locally, it may contain blocks of bedrock, pre-existing stratified drift and till. Beds and lenses of glaciolacustrine and/or glacioluvial sediments may occur.
MS		Stagnant ice moraine: Terrain resulting from the collapse and lateral movement of englacial and supraglacial sediment in response to melting of buried stagnant ice at the ice margin; sediment is mainly diamictic (fill), but locally includes stratified sediments of glaciolacustrine or glacioluvial origin. Characterized by low- to high-relief hummocky topography.
MT		Ice-thrust moraine: Terrain resulting from glacio-tectonic transport of originally subglacial sediment and deposited by the glacier more or less intact; deposits may include syngenetic till as well as masses of deposited pre-existing till, stratified drift and/or bedrock. Characterized by high to moderate relief and features include hill-hole pairs and glacio-tectonic moraine ridges.
MF		Fluted moraine: Glacially streamlined terrain; varies from alternating furrows and ridges to nearly equidimensional smoothed hills; all landforms parallel to the local ice flow direction; includes flutes, drumlins and drummedons.
PP		PREGLACIAL FLUVIAL DEPOSITS: Sediments transported and deposited by streams and rivers prior to glaciation, includes sand and gravel deposits occurring in paleovalleys (i.e., preglacial floodplains, terraces, fans and deltas); ranging in age from middle Wisconsin to late Tertiary.
RT		UNCONSOLIDATED FLUVIAL GRAVELS: Predominantly well-sorted, quartzite and chert gravel and cobbles; Cordilleran source, Tertiary age.
R		BEDROCK: Undivided, may include crystalline (Shield), carbonate or clastic sedimentary rock, and/or coal.

SYMBOL LEGEND

Thermokarst depression	⌵
Landslide and active layer failure scar (small)	⌵
Landslide and active layer failure scar (large)	⌵
Eolian forms; dune ridges	⌵
Beach or strandline	⌵
Wave cut bench	⌵
Escarpment	⌵
Meltwater channel (minor)	⌵
Meltwater channel (minor, flow indicated)	⌵
Meltwater channel (major)	⌵
Meltwater channel (major, flow indicated)	⌵
Crevasse filling	⌵
Ice contact slope	⌵
Kettle	⌵
Esker, direction of paleoflow unknown	⌵
Esker, direction of paleoflow indicated	⌵
Drumlinoid or streamlined landform	⌵
Drumlinoid, down-ice flow indicated	⌵
Buried drumlinoid or streamlined landform	⌵
Minor moraine ridge, De Geer, Rogen, ribbed, westboard (minor)	⌵
Major moraine ridge	⌵
Iceberg scour	⌵
Ice thrust ridge	⌵
Striation (direction unknown)	⌵
Striation (direction known)	⌵
Bedrock outcrop	⌵
Gravel and/or sand pit	⌵
Section of stratigraphic interest	⌵

ROADS LEGEND

Paved	⌵
Gravel	⌵
Unimproved	⌵
Truck-trail	⌵
River	⌵
Lake	⌵
UTM, Zone 11 Grid	⌵
Contour, intervals 10 metres	⌵

UNIT NOTATION

Example: GLACIOLACUSTRINE plain

Textural modifier	Genetic class	Geomorphic modifier
Textural Modifier		
Textural characteristics may be applied to the terrain classification as a prefix based on field observations or by inference from distinctive genesis and/or morphology. When two modifiers are given, the second letter is the dominant texture, with the first letter indicating the secondary texture, i.e. sc for sandy clay		
p = pebble		
g = gravel		
s = sand		
sl = silt		
c = clay		
a = sand-silt-clay		
GENETIC & GEOMORPHIC MODIFIERS		
c	crevasse fill	ice-contact ridges and linear forms deposited by meltwater in stagnant ice
d	doughnut rings and ridges	circular hummocks with a central depression, plateau mounds and brain-like pattern ridges, low to moderate relief
e	eroded	planar surface eroded by glacial meltwater, often capped by a boulder lag deposit and/or thin deposit of sand and gravel
f	fan	gently sloping fan-shaped mass of detrital debris
g	gullied	slopes dissected by modern ravines created by intermittent runoff
h	hummock	assemblage of approximately equidimensional hills and hollows; moderate to high relief (commonly greater than 2 m)
k	collapse	depression, including kettles, pitted outwash, thermokarst depressions, karst sinkholes
m	meander	sinuous curves, loops and oxbows produced as meltwater and modern streams shift their channel over time
p	plain	deposit greater than 2 m thick; commonly masks geomorphic pattern of underlying deposits; flat to gently rolling topography (commonly less than 2 m relief)
r	ridged	one or more parallel or subparallel, convex, linear morphological elements with a length-to-width ratio greater than 2 m; low to high relief
s	slumped	landslide blocks, slope failure debris
t	terrace	terrace bench cut by either meltwater or wave action; antiplation terrace, kame terrace
u	undulating	low-relief rolling terrain; swell and swale topography
v	veneer	thin mantle of unconsolidated material too thin to mask the minor irregularities of the surface of the underlying material; it ranges in thickness from 10 cm to 1 metre and may be discontinuous
w	washboard	low relief transverse moraine ridges, usually formed from basal ice shearing
y	dissected	channelled or dissected by glacial meltwater flow, dissected terrain by Holocene fluvial activity
z	delta	lake delta, ice-contact delta

Complex

Where two or more classes of terrain are interspersed in a mosaic or repeating pattern on a scale too small to warrant meaningful differentiation, the proportion of each component in the combination is given in a two or three position designation set off by slashes denoting arbitrary percentage limits. For example,

***MvLGv** means that the area is underlain by approximately 60% morainal plain and up to 40% glaciolacustrine veneer.

***MvLGvFgP** means that at least 60% of the area is underlain by morainal veneer, with up to 40% glaciolacustrine veneer and less than 15% glacioluvial plain.

***LGpM** means that more than 60% of the area is underlain by a glaciolacustrine plain, with less than 15% moraine.

Stratigraphic Sequence

Where materials of different origin or texture are known to be superimposed or can be confidently inferred, the sequence is indicated in conventional order using vertical separators, such as:

***LGv | Mp** Thin sandy glaciolacustrine sediment deposited on morainal plain

Transitional Association

Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence, or ambiguous geomorphic distinction. In the last case, both components may or may not be present. Such situations are identified by a compound designation marked by a hyphen. Examples are: ***FGz-LGz** indicating ice-contact delta indistinguishable from glaciolacustrine delta, or ***FGz-MSv** indicating ice-contact kame and kettle topography that blends with hummocky stagnant ice moraine.

Morphologic Overprint

Where a sequence of geomorphic processes has produced a multi-aspect or compound terrain fabric, the geomorphic modifier suffixes are appended in the inferred order of superposition. ***Mpy** means that a plain of till has been moulded into ridge forms and finally dissected by modern streams. ***FGphr** means that a glacioluvial plain has been discontinuously covered by ice-contact hummocks and ridges.

Acknowledgements:

Surficial mapping was completed in 2002 under the AGS's Quaternary mapping initiative. Jill Weiss, Brandon Brown and Rod Sutton provided assistance with fieldwork and completion of the digital databases. Digital cartography and GIS were completed by Monica Price and Natasha Blundon. Digital base produced by the Resource Data Division, Alberta Environment, supplied by Spatial Data Warehouse Ltd.

References:

Andriashuk, L.D. (1986.) Aerial interpretation of surficial geology, Lesser Slave Lake - Utikuma Lake map area, Alberta Energy and Utilities Board, EUB/AGS Open File Report 1985-18, scale 1:250 000.
Edwards, W.A.D., Budney, H.D., Berzansk, T. and Burkovic, L. (2004.) Sand and gravel deposits with aggregate potential, Lesser Slave Lake, Alberta (NTS 830), Alberta Energy and Utilities Board, EUB/AGS Map 262, scale 1:250 000.
Scafe, D.W., Buchan, W. and Bernhane, H. (1986.) Aggregate resources Lesser Slave Lake 830, Alberta Energy and Utilities Board, EUB/AGS Map A830, scale 1:250 000.
Scafe, D.W. and Shan, P.C. (1986.) Sand and gravel resources of the Peace River (south half of 84B) and Lesser Slave Lake (north half of 830) map areas, Alberta, Alberta Energy and Utilities Board, EUB/AGS Open File Report 1985-18, scale 1:250 000.
St-Onge, D.A. (1972.) Sequence of glacial lakes in north-central Alberta, Geological Survey of Canada, Bulletin 213, 16 p.
Tamouai, C., Kettles, J.M. and Lucille, B. (2002.) Peatlands of Canada database, Geological Survey of Canada, Open File 4002.
Taylor, R.S. (1960.) Some Pleistocene lakes of northern Alberta and adjacent areas (revised), Journal of the Alberta Society of Petroleum Geologists, vol. 8, p. 167-185.
Vogwill, R.J.J. (1978.) Hydrogeology of the Lesser Slave Lake area, Alberta, Alberta Energy and Utilities Board, EUB/AGS Earth Sciences Report 1977-01, 30p.
Vogwill, R.J.J. (1979.) Bedrock topography of the Lesser Slave Lake map area, Alberta, NTS 830, Alberta Energy and Utilities Board, EUB/AGS Map 64, scale 1:250 000.
Wolfe, S.A. (2002.) Eolian deposits of the Prairie Provinces of Canada, Geological Survey of Canada, Open File 4118, CD-ROM.
Wymnyk, A., Lindsay, J.D., Heringa, P.K. and Odynsky, W. (1963.) Exploratory soil survey of Alberta map sheets 830, 83P, and 73M; Alberta Exploratory Soil Survey Report 64-1, 53 p.