

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:	Artificially made ground or geological materials that have been disturbed by human activity, such that their physical properties (e.g. structure, cohesion, compaction) have been drastically altered.
O	ORGANIC DEPOSITS:	Undifferentiated peat (woody to fibrous muck) occurring in 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, health shrubs and short, stunted trees.
OF	Fen peat:	Occurs in peatland which receives water from slowly flowing streams and groundwater, with the water table lying at the land surface; peatland surface is dominated by sedges, with grasses and reeds near local pools, and is 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, glaciofluvial and eolian sediments, generally poorly sorted.	
F	FLUVIAL DEPOSITS: Sediments transported and deposited by streams and rivers; synonymous with alluvium. 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 and modern lakes; includes offshore sand, silt and clay, minor organic deposits; may also include minor littoral (nearshore) beaches and bars composed of sand, silt and minor gravel.	
E	EOLIAN DEPOSITS: Wind deposited sediments; comprise well-sorted, medium- to fine-grained sand and minor silt; generally massive to locally cross-bedded or ripple-laminated; includes both active and vegetated dunes and sand sheets.	
PLEISTOCENE		
LG	GLACIOLACUSTRINE DEPOSITS: Primarily fine-grained, distal sediments deposited in and along the margins of glacial lakes, including sediments released by the melting of floating ice. Includes laminated (rhythmically bedded) to massive fine sand, silt and clay, and may contain ice-raftered debris.	
LGL	Littoral and nearshore sediments: Massive to stratified, well-sorted silty sand, pebbly sand and minor gravel; occurs in beaches, bars, spits and deltaic foresets deposited during regression and lowering of glacial lakes.	
LGL	Ice-contact sediments: Sediments deposited in ice-walled lake plains along the margins of stagnant glacial ice. Characterized by low- to high-relief hummocky topography, including fat-topped hills. Typically comprise glaciolacustrine sediment, including laminated to massive fine sand, silt and clay in the central part of these features, and littoral sediments around their margins. Locally contain diamict resulting from the collapse, melt-out or slumping of supraglacial debris from the surrounding ice walls.	
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 meltwater streams flowing either in direct contact with the ice margin (kame terraces) or within and/or under glacial ice (eskers, crevasse ridges). Includes massive to stratified, poorly to moderately sorted, coarse-grained sediments (predominantly pebble gravel and coarse-grained sand, locally till) and may show evidence of ice melting (slumped structures).	
M	MORAINES: Diamictic (till) deposited directly by glacial ice and consisting of a mixture of clay, silt, sand and minor pebbles, cobbles and boulders. Locally, the unit may contain blocks of bedrock, pre-existing stratified sediment and till, or lenses of glaciolacustrine and/or glaciofluvial sediment.	
MS	Stagnant ice moraine: Material resulting from the collapse and slumping of englacial and supraglacial sediment in response to the melting of buried stagnant ice at the ice margin; sediment is mainly diamictic, but locally includes stratified sediments of glaciolacustrine or glaciofluvial origin. Characterized by low to high-relief hummocky topography.	
MT	Ice-thrust moraine: Terrain formed from the glaciotectonic displacement of materials as blocks or rafts in a more or less intact state. Materials may include syngenetic till, as well as masses of pre-existing sediments and/or bedrock. Characterized by high to moderate relief and features include hill-hole pairs and glaciotectonic smoothed hills; all landforms parallel the local ice flow direction; includes flutes, drumlins and drumlinoids.	
MF	Fluted moraine: Glacially streamlined terrain; varies from alternating furrows and ridges to nearly equidimensional smooth hills; all landforms parallel the local ice flow direction; includes flutes, drumlins and drumlinoids.	
FP	PREGLACIAL FLUVIAL DEPOSITS: Sediments transported and deposited by streams and rivers prior to glaciation. This includes sand and gravel deposited in paleovalleys (i.e., preglacial floodplains, terraces, fans and deltas).	
PRE-QUATERNARY		
RT	UNCONSOLIDATED FLUVIAL GRAVELS: Predominantly well-sorted, quartzite and chert gravel and cobbles; Cordilleran source, Paleogene to Neogene.	
R	BEDROCK	

SYMBOL LEGEND

Eolian forms: dune ridges	Primary road, paved
Escarpment	Primary road, gravel
Meltwater channel (minor)	Unimproved road
Crevasse filling	Truck trail
Ice-thrust ridge	River
Esker (paleoflow direction unknown)	Lake
Drumlinoid or streamlined landform	UTM, Zone 11 Grid
Minor moraine ridge	Contour, intervals 50 metres
Major moraine ridge	

BASEMAP LEGEND

Primary road, paved	
Primary road, gravel	
Unimproved road	
Truck trail	
River	
Lake	
UTM, Zone 11 Grid	
Contour, intervals 50 metres	

UNIT NOTATION

Example: sandy GLACIOLACUSTRINE plain
 s LG p Geomorphic modifier
 Textural modifier Genetic unit

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
 \$ = silt
 c = clay
 a = sand-silt-clay

GENETIC & GEOMORPHOLOGICAL MODIFIERS

c crevasse fill	ice-contact ridges formed by the slumping of sediment into crevasses on the ice surface or the squeezing of fill into fractures at the ice base
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 and/or thin deposit of sand and gravel
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, includes kettle holes, pitted morphology, thermokarst depressions, karst sinkholes
m meander	sinuous curves, loops and oxbows produced as meltwater and modern streams shift their channels 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; low to high relief
s slumped	landslide blocks, slope failure debris
t terrace	a bench of either erosional or depositional origin that flanks the sides of floodplains, valleys and lakes; includes fluvial and glaciofluvial terraces, shoreline terraces and antiplanation terraces
u undulating	low-relief rolling terrain; swell and swale topography
v veneer	thin mantle of unconsolidated sediment that is 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
y dissected	channeled or dissected by glacial meltwater and/or Holocene fluvial activity

Complex

Where two or more classes of terrain are interdispersed 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. Examples are:
 *MPLGV' indicates the area is underlain by approximately 60% morainal plain and up to 40% glaciolacustrine veneer
 *MvLGV/FGp' indicates at least 60% of the area is underlain by morainal veneer, with up to 40% glaciolacustrine veneer and less than 15% glaciofluvial plain
 *LGP/M' indicates more than 60% of the area is underlain by a glaciolacustrine plain, with less than 15% moraine

Stratigraphic Sequence

Where materials of different origins or textures are known to be superimposed or can be confidently inferred, the sequence is indicated in conventional order using vertical separators, such as:
 *sLGV | Mp' indicates sandy glaciolacustrine veneer deposited on morainal plain

Transitional Association

Locally, two or more terrain units are juxtaposed by reason of related origin, temporal sequence or ambiguous geomorphological 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:
 *LG-LGL' indicates glaciolacustrine indistinguishable from littoral and nearshore glaciolacustrine sediment

Morphological Overprint

Where a sequence of geomorphological processes has produced a multi-aspect or compound terrain fabric, the geomorphological modifier suffixes are appended in the inferred order of superposition. *Mpy' indicates a morainal plain has been moulded into ridges and finally dissected by streams. *FGph' indicates a glaciofluvial plain that includes discontinuous hummocks and ridges.

Methodology

The Alberta Geological Survey conducted surficial geology field mapping in the area during 2011. Observations made during field mapping were combined with the interpretation of Light Detection and Ranging (LIDAR) bare-earth data (Figure 1), digital orthorectified airphotos (1:60 000 scale, taken during 1964) and image classification of peatlands from Landsat 7 multispectral data (Natural Resources Canada, 2004). The LIDAR digital elevation model was used to delineate landforms through shaded-relief images created from three illumination directions. The shaded relief shown as an underlay on the main map was produced by fusing shaded-relief (315° illumination azimuth, 45° declination) and slope-gradient images.

Acknowledgements

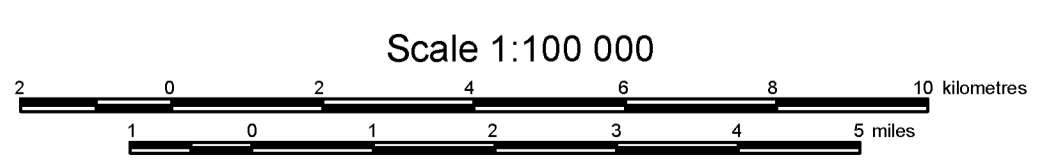
B. Hogberg, C. Heikinen, and K. Mckay assisted with the fieldwork. K. Mckay completed the digital cartography and GIS. Spatial Data Warehouse Ltd. provided the base data. D.J. Utting provided constructive comments that improved this map.

References

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Map 563
Surficial Geology of the Crooked Lake Area (NTS 83K/SW)

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Projection: Universal Transverse Mercator
 Datum: North American Datum, 1983

