

INTRODUCTION

This Surficial Geology Map of NTS 94-002 (Canadian Geoscience Map 106) is the product of collaboration between the Geological Survey of Canada and the British Columbia Ministry of Energy, Mines and Natural Gas as part of the Geoscience for Energy and Minerals Program (GEM-EM) Yukon Basins Project. The accompanying geodatabase includes field observation points and field photos, landform features as lines, and surficial geology unit polygons. The map and geodatabase are essential for geoscientific information for a range of potential end-users including resource explorationists, geotechnical engineers, land-use managers, terrestrial ecologists, archaeologists, geographers and cartographers in northern British Columbia. By providing this geoscientific information, the Geoscience for Energy and Minerals Program (GEM-EM) will help to reduce the economic costs and risks associated with the sustainable development of energy and mineral resources in NTS 94-002. Environmental impact assessments for new access roads, work camps, well pads, pipelines and power transmission line corridors, water storage and waste management systems and other infrastructure will benefit from the geoscientific information presented here. By identifying areas prone to geological hazards (e.g., landslides, permafrost, flooding), CGM 106 will also help to protect natural resources, infrastructure and communities vulnerable to climate change in Canada's north.

APPROACH TO SURFICIAL GEOLOGY MAPPING
Terrain mapping and field-based benchmarking studies have led to a better understanding of the regional distribution of surficial deposits, wetlands, and other geomorphic processes in the NTS 94-002 map area (Hurley and Hickin, 2010; Hurley et al., 2011a,b). Surficial geology units and landforms were classified using a combination of stereo-pair aerial photographs (BC59710, 158C9710, 158D9710, 158E9710 and 158F9710 series), LANDSAT 7 satellite imagery from digital numbers (DN) (2010) and the Canadian Topography Mission digital elevation models (DEM) (2011). The base map was generated from CANVEC shape files (2010) and the Canadian Topography Mission digital elevation models (DEM) (2011). The base map was generated from CANVEC shape files (2010) and the Canadian Topography Mission digital elevation models (DEM) (2011). The base map was generated from CANVEC shape files (2010) and the Canadian Topography Mission digital elevation models (DEM) (2011).

Fieldwork was undertaken in 2009 and 2010 to ground truth surficial geology polygons interpreted from photos and satellite imagery, and to validate the surficial geology units and landforms. Fieldwork was undertaken in 2009 and 2010 to ground truth surficial geology polygons interpreted from photos and satellite imagery, and to validate the surficial geology units and landforms. Fieldwork was undertaken in 2009 and 2010 to ground truth surficial geology polygons interpreted from photos and satellite imagery, and to validate the surficial geology units and landforms.

INFERRED GEOLOGICAL HISTORY
The surficial landscape of NTS 94-002 is a product of underlying bedrock and geological structures, with ornamentation by the Late Wisconsinan Laurentide Ice Sheet. Fine-grained sandstone and shale (Lower Cretaceous Sikani Formation) subunit off deposits in the Fort Nelson area (Stott and Taylor, 1968). The distribution of glacial and non-glacial landforms is depicted on the surficial geology map. Map units in the legend include organic deposits, alluvial, colluvial, silty, glaciofluvial and glaciolacustrine deposits, tills and areas of bedrock.

Topography and drainage patterns were greatly modified during the phase of maximum ice cover (>18 °C ka BP or >21.4 calendar ka BP) and the Laurentide Ice Sheet. The Laurentide Ice Sheet advanced from the north and the Cordilleran Ice Sheet from the south. The Laurentide Ice Sheet advanced from the north and the Cordilleran Ice Sheet from the south. The Laurentide Ice Sheet advanced from the north and the Cordilleran Ice Sheet from the south.

Deposition began sometime after 18 °C ka BP (>21.4 calendar ka BP) and ended before 10 °C ka BP (>12.6 calendar ka BP) with retreat of the Laurentide Ice Sheet. The Laurentide Ice Sheet advanced from the north and the Cordilleran Ice Sheet from the south. The Laurentide Ice Sheet advanced from the north and the Cordilleran Ice Sheet from the south.

Post-glaciation (>10 °C ka BP or ca. 12 calendar ka BP to present), changes in regional base-level led to episodes of channel incision and aggradation, and resulted in the formation of several alluvial terraces along major streams and river valleys. In the early Holocene, palaeo-fluvial terrace formation followed initial valley incision by the Laird and other major rivers. Most streams and rivers have alluvial fans (unit Af) and terraces (unit Tm) above active floodplains (unit Ap) consisting of silt and sand. Poorly drained clay-rich silts and clays (unit Gb) and glaciolacustrine sediments in lowland areas are covered by extensive proglacial till deposits (unit Owb). Fans (unit Af) and undifferentiated wetlands (unit O) are commonly associated with glaciolacustrine and some peat deposits.

Canadian Geoscience Map 106 is an output of the Geo-Mapping for Energy and Minerals Yukon Basins Project managed by Carl Ozyer and Larry Lane (GS-Calgary). The assistance of Robert Coching, Sean Eagles, Yu Dohar, Mike Sigoun, Scott Tweedy and Martin Legault (MNR Scientific Publishing Services) was greatly appreciated. The map was prepared using ArcGIS 10.1. The map was prepared using ArcGIS 10.1. The map was prepared using ArcGIS 10.1.

Abstract
Canadian Geoscience Map 106 depicts the surficial geology over some 780 km² covered by the Tsmih Creek map sheet (NTS 94-002) in northeastern British Columbia. The map area lies within the Fort Nelson Lowland and is incised by west-flowing Fort Nelson River and north-draining Tsmih Creek. Bedrock is mainly composed of glacial materials dating to the Late Pleistocene (Late Wisconsinan Glaciation, >25 to 10 ka) and non-glacial Holocene (10 ka to present). Deposits of till, green on the map, are generally suitable for placement of infrastructure. Glaciolacustrine and eolian deposits with mineral aggregate and groundwater potential are coloured orange and buff. Slopes disturbed by landslides and debris flows appear brown. Glaciolacustrine and organic deposits with sporadically discontinuous permafrost are coloured purple and grey. Alluvial deposits prone to flooding, erosion, and sedimentation appear yellow on the map.

Résumé
La Carte géoscientifique du Canada 106 illustre la géologie de surface sur environ 780 km² couvert par le feuillet cartographique de Tsmih Creek (SNRC 94-002), dans le nord-est de la Colombie-Britannique. La région cartographique se situe dans les basses terres de Fort Nelson et est marquée par l'écoulement de la rivière de Fort Nelson et de la rivière de Tsmih. Le socle rocheux est couvert de matériaux glaciaires de l'Holocène (de 10 ka jusqu'à nos jours). Les dépôts de till, de couleur verte sur la carte, sont généralement propices à l'établissement de l'infrastructure. Les dépôts fluvioglaciers et éoliens, qui possèdent un potentiel en minéraux, en agrégats et en eau souterraine, sont figurés par les couleurs orange et gris. Les dépôts alluviaux sujets aux inondations, à l'érosion et à la sédimentation apparaissent en jaune sur la carte.

Table with 3 columns: CGM 128, CGM 127, CGM 124; CGM 103, CGM 102, CGM 101; CGM 107, CGM 106, CGM 105. Includes coordinates 94-04, 94-05, 94-06, 94-07.

National Topographic System reference and index to adjoining published Geological Survey of Canada maps

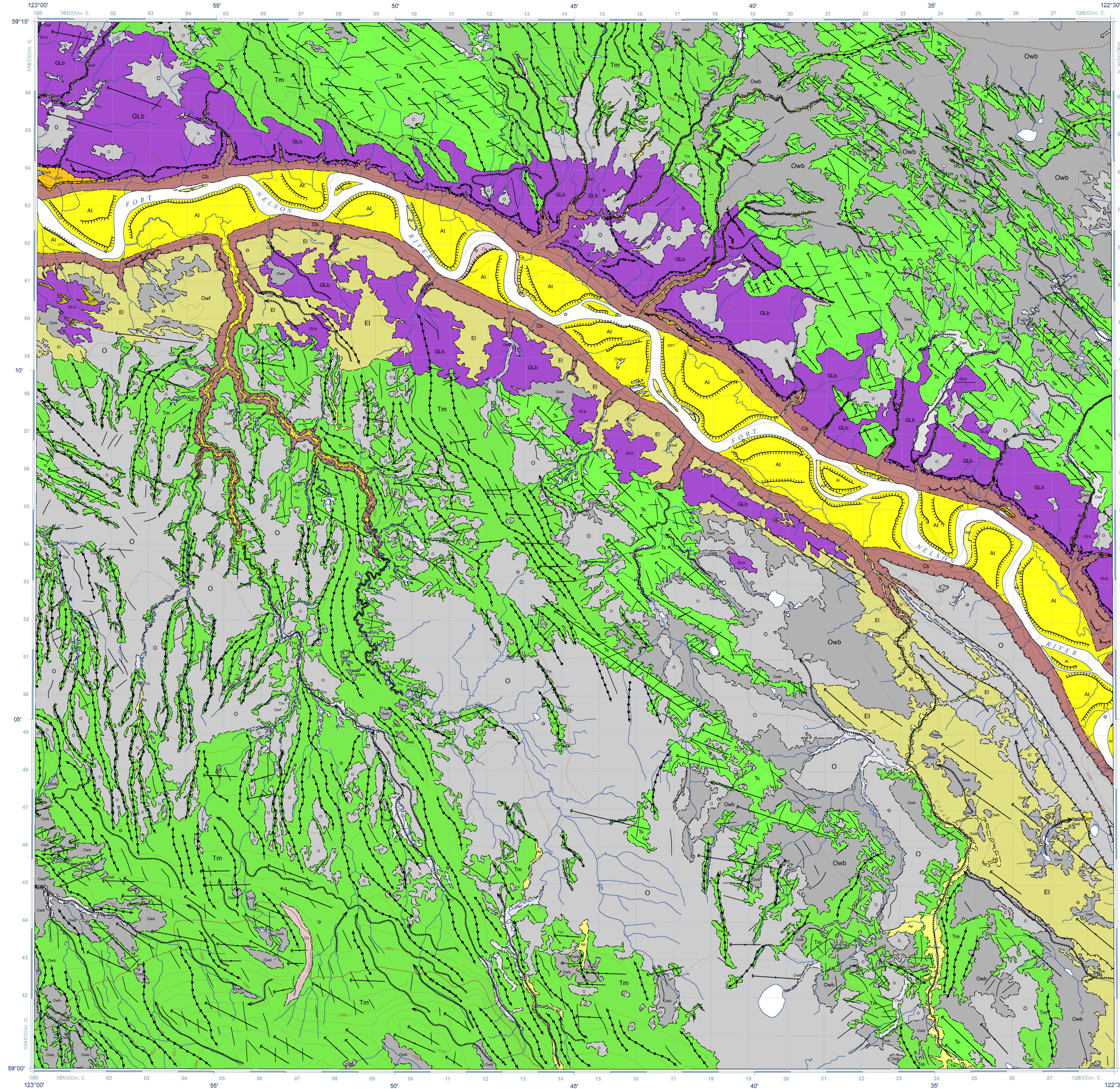
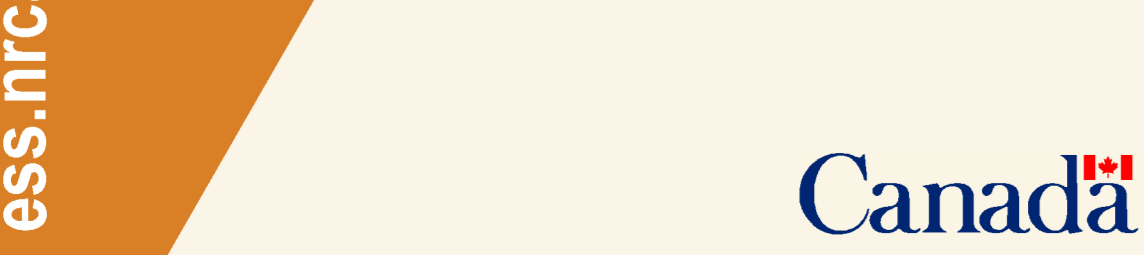
Cover illustration
Loess covered glacial lake sediments incised by Tsmih Creek, near confluence with the Fort Nelson River in northeast British Columbia, view north. Photograph by D.H. Hurley, 2013-078. Catalogue No. M183-1106-2012E-PDF ISBN 978-1-102-1442-9 doi:10.4095/291969 © Her Majesty the Queen in Right of Canada 2013

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CANADIAN GEOSCIENCE MAP 106 SURFICIAL GEOLOGY TSIMEH CREEK British Columbia 1:50 000



Canadian Geoscience Maps



Legend and references section. Includes 'Holocene earth materials and landforms' with units Owb, Owf, O, Af, Ai, Ap, Ei, Er, Cv, Cb, GFl, Tm, Tl. Includes 'Late Pleistocene to Holocene earth materials and landforms' with units Ei, Er, Cv, Cb. Includes 'Late Pleistocene earth materials and landforms' with unit GbL. Includes a 'Geological boundary' legend and a 'Recommended citation' section.