

## Legend

### **QUATERNARY Surficial deposits**

### Holocene

### Nonglacial environments

**ORGANIC DEPOSITS:** peat and muck; 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. Fibric fens are present along some water channels. Thickness varies from very thin organic veneers (15–30 cm) overlying till and boulder fields to small organic plains >3 m thick. Permafrost is commonly present underlying/within organics

Organic undifferentiated: peat and muck, unmapped thickness.

Organic veneer: thin accumulations of peat, 30-100 cm thick.

Organic blanket: thicker accumulations of peat that locally obscure underlying units, 1—3 m thick. Some polygons include hummocky mounds and plateaus underlain by discontinuous permafrost.

>Organic plain: thick accumulations of peat that mask the underlying topography, >3 m thick. Some polygons include hummocky mounds and lateaus underlain by discontinuous permafrost. ALLUVIAL DEPOSITS: sorted sand, silt and clay with minor gravel and

organic detritus; commonly stratified; deposited along and/or within all modern rivers and streams.

Floodplain deposits: sorted sand, silt, clay, minor gravel and organic detritus >0.5 m thick; forming active floodplains close to river and stream level.

### Late Wisconsinan Proglacial and glacial environments

### GLACIOFLUVIAL DEPOSITS: orange-brown pebbly sand with common cobble/boulder mantle at surface; deposited within, behind, at or in front of the ice margin by flowing glacial meltwater. The near-surface sand is

commonly well-sorted and massive, though no observations could be made at depth. These deposits are typically situated within meltwater corridors, interspersed with eroded till blankets and hummocky ablation till **Glaciofluvial veneer:** <1–2 m thick, discontinuous sand and gravel cover; underlying topography is discernible.

and associated geomorphic patterns. Thinner patches of sediment may

Glaciofluvial blanket: >2 m thick, continuous sand and gravel cover forming flat to undulating topography that locally obscures underlying units

Subaerial outwash sediments: massive to stratified sand to pebbly sand with ~5% cobbles and boulders, deposited in a subaerial environment at or in front of the ice margin by glacial meltwater. Sediments are >2 m thick and may drape the underlying topography like a blanket, or where thicker, mask underlying topography completely. Surface may be kettled.

Ice-contact glaciofluvial sediments: undifferentiated deposits; poorly sorted sand and gravel with minor diamicton, deposited by glacial meltwater in direct contact with the glacier; 1 to >10 m thick; forming gently undulating to hummocky topography related to melting of underlying ice. Features include kettles, kames and ridges. **GFh** is also associated with meltwater corridors, interspersed among eroded till, hummocky till and scoured

Eskers and esker systems: stratified sand and gravel with minor diamicton deposited by meltwater flow within tunnels beneath or within the glacier; present as large (3–10 m high), long (10–30 km), regularly spaced (18–25 km) esker segments, with smaller (1–5 m high) and shorter esker ridges found between the large ridges.

> environments. Tills consist mainly of granitic material. The till has been emplaced mainly by ice flowing from the Late Wisconsinan Keewatin Ice Divide, within the Laurentide Ice Sheet. Till eroded within meltwater corridors has a chaotic undulating to hummocky surface geomorphology (second modifier e). Fines have been removed from the upper 0.5-1 m. Streamlined till: >5 m thick, subglacial till moulded beneath the glacier into

to former ice-flow direction. Ridges are generally scattered, with non-

GLACIAL DEPOSITS: unsorted to poorly sorted diamictons (till) with a

sandy-silt to silty-sand matrix, deposited in subglacial or ice marginal

shape), and non-directional drumlinoid ridges or flutings. Ridges are typically 0.1–3 km long and 3–10 m high. **Tste** indicates significant secondary surface reworking by meltwater within a meltwater corridor. Ridged till: sinuous low-relief bouldery till ridges, assumed to lie transverse

uniform morphology. Hummocky till: supraglacial meltout (ablation) till deposited by melting of stagnant ice; loose, texturally variable sandy to gravelly matrix, some sorting; angular to subangular clasts; locally includes poorly sorted sand and gravel; gently undulating to hummocky topography. Small meltwater channels, boulder-lag concentrations, and sculpted slopes are common when **Th** occurs within or adjacent to a meltwater corridor. **The** indicates significant secondary surface reworking by meltwater within a meltwater

**Till veneer:** <1-2 m thick, discontinuous till cover, underlying topography is discernible. Tve indicates significant secondary surface reworking by meltwater within a corridor.

Till blanket: >2 m thick, continuous till cover forming flat to undulating topography that locally obscures underlying units. Some thinner patches of till may occur within. **Tbe** indicates significant secondary surface reworking by meltwater within a corridor.

### **PRE-QUATERNARY Bedrock**

Archean and Precambrian rocks: undivided foliated granitoid, metasedimentary and associated intrusive rocks; may be overlain by a thin, discontinuous veneer of till that rarely exceeds 1 m thick. Rf indicates regolith (unconsolidated mantle of weathered rock and soil material overlying solid rock) encountered in the field along Kilpatrick Lake.

**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 underlying stratigraphic units are known, areas are coloured according to the overlying unit and labelled with a slash (Ov/T)

Station with sample

Small outcrop

Station without sample Striation, direction known

Striation, direction unknown

$\longrightarrow$	Drumlin	•
	Drumlinoid ridge or flute	0
••••	Minor moraine	٤
	Ribbed moraine	H
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	Esker	×

Major meltwater channel

Minor meltwater channel

# Surficial Geology, Snyder Lake, northwestern Manitoba (parts of NTS 64N5)

Quaternary geological investigations were undertaken in the Snyder Lake area of northwestern Manitoba in the summer of 2011. In conjunction with detailed bedrock mapping (Kremer and Böhm, 2011) this work provides a modern geoscience knowledge-base tailored towards current and future mineral exploration and/or infrastructure development. Geologic observations, sampling of glacial sediments (till) and/or measurements of ice-flow indicators were recorded at 131 stations within a 577 km² area along the shores of Snyder and Grevstad lakes. This map is complimented by a Report of Activities (Trommelen, 2011a) and a field-based ice-flow indicator data repository (Trommelen, 2011b), and builds on previous 1:250 000 scale mapping (Dredge et al., 1982).

The region is part of the extensive discontinuous permafrost zone (Sladen, 2011) and permafrost was encountered beneath organic deposits. Elevation varies mainly from 380 to 430 m asl. Local relief is generally 10 to 30 m, but reaches up to 60 metres at several large crag-and-tail landforms (tadpoleshaped landforms developed by glacial erosion of rocks of unequal resistance and/or by infill of a leeside cavity). Numerous lakes and wetlands are present throughout the hummocky bouldery terrain, interspersed with swaths of streamlined terrain. The drift cover is generally thick and bedrock outcrops are rare. Where present, the regional southwest trend of bedrock ridges typically coincides with the main ice-flow orientation, which has enhanced the bedrock ridges and eroded linear lake basins. Two main southwest-trending esker channel systems are present across the area. The iceflow indicator record on Grevstad Lake is quite sparse and most interpretations were made on indicators from the Snyder Lake area (Figure 1).

The underlying bedrock consists predominately of Archean granitic gneiss, Paleoproterozoic psammite, pelite and calcsilicate of the Wollaston Supergroup, and subordinate granitic intrusive rocks (Kremer and Böhm 2011).

Dredge, L. A., Nixon, F. M. and Richardson, R. J. H. 1982: Surficial geology, Kasmere Lake, Manitoba; Geological Survey of Canada, Prelimary Map, Map 19-1981, scale 1:250 000.

Kremer, P. D. and Böhm, C. O. 2011: Bedrock geology of the Snyder Lake area, northwestern Manitoba (parts of NTS 64N5); Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, Preliminary Map PMAP2011-1, scale 1: 35 000.

Sladen, W. E. 2011: Permafrost; Geological Survey of Canada, Open File 6724.

Trommelen, M. S. 2011a: Far North Geomapping Initiative: Quaternary geology of the Snyder-Grevstad lakes area, far northwestern Manitoba (parts of NTS 64N5); in Report of Activities 2011, Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, p. 18-28.

Trommelen, M. S. 2011b: Field-based ice-flow indicator data, Snyder-Grevstad lakes area, northwestern Manitoba (parts of NTS 64N5), Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, Data Repository Item DRI2011002, Microsoft Excel® file.

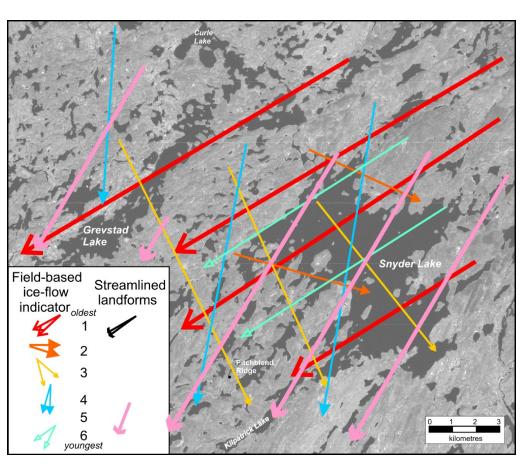
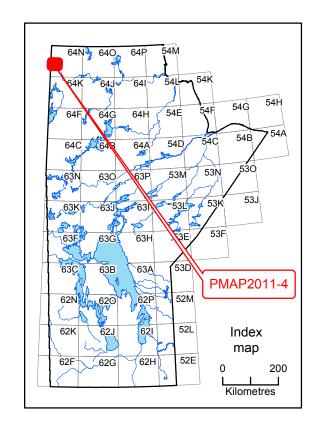


Figure 1. Generalized ice-flow history for the map area, interpreted from field-based micro-scale ice-flow indicators and streamlined landform orientation.



## Geology by M.S. Trommelen

GIS cartography by L.E. Chackowsky

## SUGGESTED REFERENCE:

Trommelen, M.S. 2011: Surficial geology, Snyder Lake, northwestern Manitoba (part of NTS 64N5); Manitoba Innovation, Energy and Mines, Manitoba Geological Survey, Preliminary Map PMAP2011-4, scale 1:50 000.

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This map is a provisional summary of work carried out during the summer field season and is produced directly from the geologist's manuscript. It is not to be regarded as a final interpretation of the geology of the area.

Published by: Manitoba Innovation, Energy and Mines, 2011.

This map is available to download free of charge at www.manitoba.ca/minerals; to purchase a copy contact Publication Sales at 1-800-223-5215 or (204) 945-4154 or minesinfo@gov.mb.ca.

