Marginal Notes

In 2008, the Ontario government announced plans to permanently protect half of the Far North region of Ontario and launched a planning process to support this goal (Far North Information and Knowledge Management Program). During the initial stages of planning, the need for primary landscape data became apparent. A terrain mapping project to remotely predict surficial materials was initiated by the Ontario Geological Survey in response to this information need.

SPOT imagery (4 colour bands and the panchromatic band), a digital elevation model and its derivatives and the Ontario Hydro Network vector drainage shape files (Ontario Ministry of Natural Resources and Forestry 2015) are the primary data sources for this remote predictive mapping exercise. A multiresolution segmentation algorithm, using different image layer weights, scale parameters and homogeneity criterion, within an object-based image analysis software is used to achieve meaningful objects representing various surficial material types. Objects are then classified based on digital signature, internal variability of signature and proximity to certain vector layers and certain adjacent material types.

Limited helicopter-supported field work combined with the examination of archival information (Riley and Boissonneau (unpublished field notes and photographs); Geological Survey of Canada, Operation Winisk unpublished field notes; Skinner 1973; Sanford, Norris and Bostock 1968; Sanford and Norris 1975; and Thorlefson, Wyatt and Warman 1993, and their unpublished field notes) provided the ground control on the classification of objects. In addition, information from the various other Far North Information and Knowledge Management Program projects, such as base data and land cover information (Ontario Ministry of Natural Resources and Forestry 2014), has been used in the interpretation and classification of the surficial materials.

The maps show only the surface material distribution. For better definition of wetland types, please see Ontario Ministry of Natural Resources and Forestry (2014). Older deposits that occur along many of the deeply incised river valleys are only depicted where their scale is suitable for cartographic presentation. The reader is encouraged to review publications by McDonald (1969), Skinner (1973), Nielsen et al. (1986), Dredge, Morgan and Nielsen (1990), Thorlefson, Wyatt and Warman (1993), Allard et al. (2012), Dubé-Loubert et al. (2013), Gao et al. (2012), Gao and Crabtree (2016) and Dalton et al. (2016, 2017a, 2017b) for additional information and details on the older sediments exposed along rivers within the Hudson Bay Lowland.

This project is funded by the Ministry of Northern Development and Mines. Interaction with the First Nation community members greatly enhanced the map products of the Far North Information and Knowledge Management Program Terrain Mapping Project.

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LEGEND[a]

PHANEROZOIC

CENOZOIC

QUATERNARY

21 **Anthropogenic Deposits:** Mine tailings, waste rock piles and other man-made features.

20 **Marine Mud-Flat Deposits:** Sand, silt and clay; deposited in mud flats and offshore bars within the tidal zone.

19 **Marine Salt-Marsh Deposits:** Silt and clay with organic matter, minor sand; deposited in salt marshes along present-day coast.

18 **Organic Deposits:** Peat, muck and/or marl; deposited in fen wetlands.[b]

17 **Organic Deposits:** Peat, muck and/or marl; deposited in bog wetlands.[b]

16 **Fluvial Deposits (recent):** Stratified sand and gravel; may include silt, minor clay. Deposited in bars and channels of present-day rivers and creeks.

15 **Fluvial Deposits (abandoned):** Stratified sand and gravel; may include silt, minor clay. Deposited in bars and channels along abandoned terraces of rivers and creeks.

14 **Marine Deltaic Deposits:** Stratified sand and gravel; silt, minor clay. Deposited at the mouths of rivers and creeks entering a postglacial sea.

13 **Marine Beach and Nearshore Deposits:** Stratified sand and gravel; minor silt. Deposited primarily in the shore zone and nearshore zone of a postglacial sea.

12 **Marine Basin Deposits:** Massive to stratified silt and clay; minor sand. Deposited in basinal areas of a postglacial sea.

11 **Glaciolacustrine Deltaic Deposits:** Stratified sand and gravel; may include minor silt and clay. Deposited at the mouths of rivers and creeks entering a proglacial lake.

10 **Glaciolacustrine Beach and Nearshore Deposits:** Stratified sand and gravel; minor silt. Deposited primarily in the shore zone and nearshore zone of a proglacial lake.

9 **Glaciolacustrine Basin Deposits:** Stratified silt and clay; minor sand. Deposited in basinal areas of a proglacial lake.

8 **Glaciofluvial Outwash Deposits:** Stratified sand and gravel; including minor silt, clay. Deposited in bars and channels in rivers flowing from a glacier.

7 **Glaciofluvial Ice-Contact Deposits:** Stratified sand and gravel; including minor silt, clay, till and flowtill. Deposited in eskers, kames, deltas and subaqueous fans and in end and recessional moraines along a glacier margin.

6 **Till:** Massive to bedded diamicton; clayey silt to clay matrix, clast content low to moderate, moderate to high matrix carbonate content, may contain discontinuous layers or lenses of stratified gravel, sand, silt and/or clay; includes flowtills. Deposited at the base or along the margins of a glacier.

5 **Till:** Massive to bedded diamicton; sandy silt to silt matrix (clay texture locally), clast content moderate to high, low to high matrix carbonate content, rare discontinuous layers or lenses of stratified gravel, sand, silt and/or clay, or flowtills. Deposited at the base or along the margins of a glacier.

4 **Till:** Massive to bedded diamicton; silty sand to sand matrix, clast content moderate to high, low to moderate matrix carbonate content, rare discontinuous layers or lenses of stratified gravel, sand, silt and/or clay, or flowtills. Deposited at the base or along the margins of a glacier.

3 **Thin Sediment over Bedrock:** Thin, near-continuous cover of Quaternary sediments overlying undifferentiated bedrock. Quaternary sediments are commonly less than 1 m thick; however, areas of outcrop indicated on the map may contain small areas where the cover exceeds 1 m in thickness, but are too small to delineate at this map scale.

PALEOZOIC, MESOZOIC AND CENOZOIC (TERTIARY)

2 **Bedrock:** Undifferentiated bedrock with a thin, discontinuous cover of Quaternary sediments. Quaternary sediments rarely exceed 0.5 m in thickness; however, areas of outcrop indicated on the map may contain small areas where the cover exceeds 1 m in thickness, but are too small to delineate at this map scale.

PRECAMBRIAN

1 **Bedrock:** Undifferentiated bedrock with a thin, discontinuous cover of Quaternary sediments. Quaternary sediments rarely exceed 0.5 m in thickness; however, areas of outcrop indicated on the map may contain small areas where the cover exceeds 1 m in thickness, but are too small to delineate at this map scale.

[a] *The map legend applies to Preliminary Maps P.3625 to P.3758, and P.3767. Deposits on this sheet are mapped primarily where they reach 1 m or more in thickness. Thinner deposits are not generally shown. All legend units or deposit types may not be present on this map.*

[b] *Refer to Ontario Ministry of Natural Resources and Forestry (2014) for better definition of wetland types and distribution.*

SOURCES OF INFORMATION

The digital base map is derived from the Land Information Ontario Data Warehouse, Land Information Ontario, Ministry of Natural Resources and Forestry, scale 1:50 000, with modifications by staff of the Ministry of Northern Development and Mines. The digital base data is current to January 2017. The map co-ordinates are in UTM zone 16, North American Datum 1983 (NAD83).

Magnetic declination at the centre of the map area was approximately 9°16'W in 2018. Mean annual change is 2.5'E.

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SYMBOLS[a]

- Bedrock outcrop (Precambrian, Paleozoic or undifferentiated)[b]
- Lineament observed on remotely sensed imagery
- Brow of large landslide or failure scar
- Base of terraced escarpment (abandoned glaciolacustrine or marine shoreline)
- Base of terraced escarpment (abandoned or modern, fluvial or glaciofluvial terrace)
- Trend or crest of abandoned or modern beach bar or spit
- Base of large ice-contact slope
- Trend of large moraine or moraine crest
- Trend of minor moraine or moraine crest; includes De Geer (or washboard) moraines
- Area of hummocky moraine
- Area of palimpsest moraine
- Area of ribbed landforms; includes Rogen (or ribbed) moraine, scabland-type erosional features and/or megaripples
- Trend of esker or esker crest
- Glacial erosion features carved into the bedrock surface (includes striations, grooves, etc.); direction of ice movement known, unknown
- Crag and tail
- Streamline form with positive relief; includes drumlins and drumlinoid ridges
- Streamline form with negative relief; includes flutes
- Large iceberg keel mark
- Large sand dune (eolian)
- Fluvial channel (direction of flow assumed)
- Forest ring structure (actual size)
- Area of extensive palsas
- Area of suspected karst features
- Indian Reserve, township, park boundary
- Utility
- Road, local road, winter road, trail
- Railroad

[a] *The symbols list applies to Preliminary Maps P.3625 to P.3758, and P.3767. All symbols may not be present on this map.*

[b] *As presented on published and unpublished maps.*

CREDITS

Geology by C. Gao and K.H. Yeung, 2015.

Additional symbols digitized by J. Bonin and M.S. Duhaime.

Preparation of GIS product by K.H. Yeung.

Cartographic production by J. Rickards.

Issued 2018.

Information from this publication may be quoted if credit is given. It is recommended that reference to this map be made in the following form:

Gao, C. and Yeung, K.H. 2018. Surficial geology of the Missisa Lake area southeast, northern Ontario; Ontario Geological Survey, Preliminary Map P.3712, scale 1:100 000.

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.

Ontario

Ontario Geological Survey

MAP P.3712

SURFICIAL GEOLOGY

MISSISA LAKE AREA SOUTHEAST, NORTHERN ONTARIO

Scale 1:100 000

2000 m 0 2 4 km

NTS References: 43 C/1, 2, 7, 8