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Introduction

- 10 days of Quaternary fieldwork was completed along the road network in the Lynn Lake area this summer.
- Geological observations, sampling of glacial sediments (till) and/or measurements of ice-flow indicators were recorded at 110 sites
- Till samples will be sent for clast lithology and geochemical analyses. This data will be added to regional (1:250 000 scale) studies:
 - GSC open files 2118 and 5873
 - MGS open file 2005-2
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 - MGS open file 2005-2
 - and recently-digitized detailed local- to property-scale studies:
 - MGS open files 85-3, 86-2, 87-2 and 91-4.

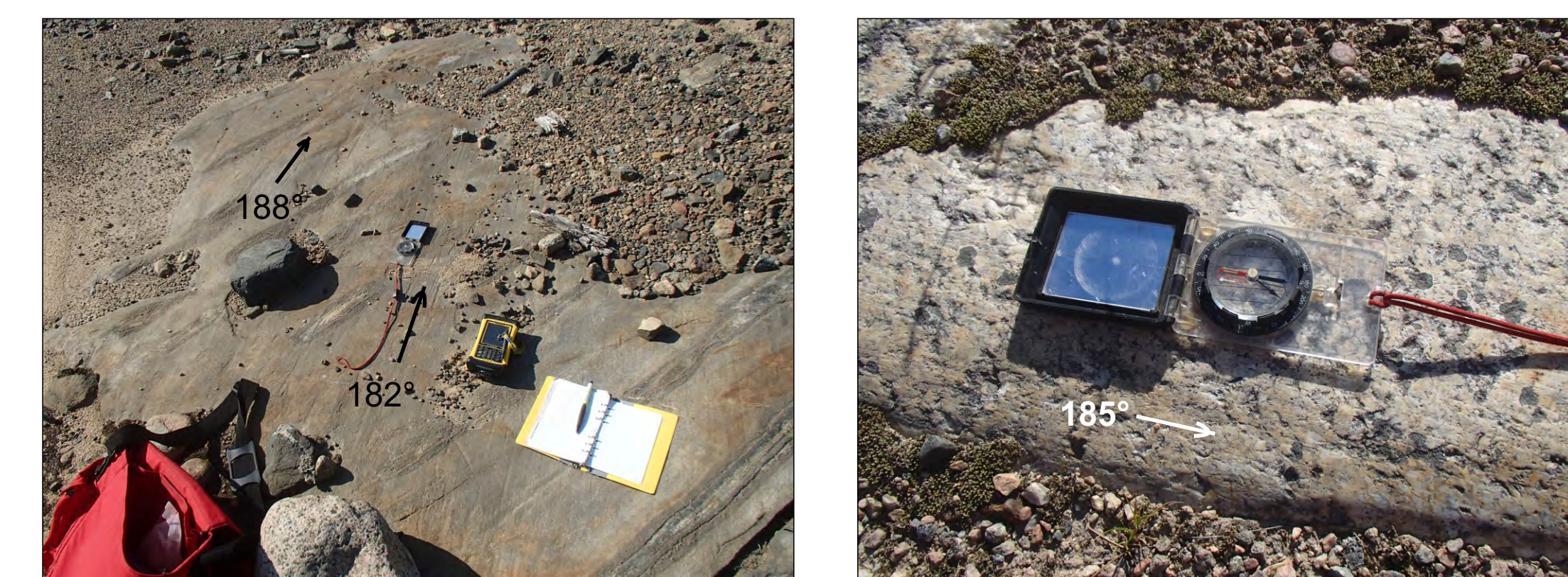
Ongoing research will help to determine the relationship between the orientation of erosional ice-flow indicators (striae), streamlined landforms (drumlinoid ridges) and till composition.

Ice-flow History



A road-cut has exposed this roche moutonnée that trends toward the northwest.

Close-up of another spot along this road-cut, that is finely striated to the northwest.



Deep striations toward the south cross the top of this low-lying, nearly-flat bedrock outcrop.

A low-lying outcrop is finely striated toward the south.



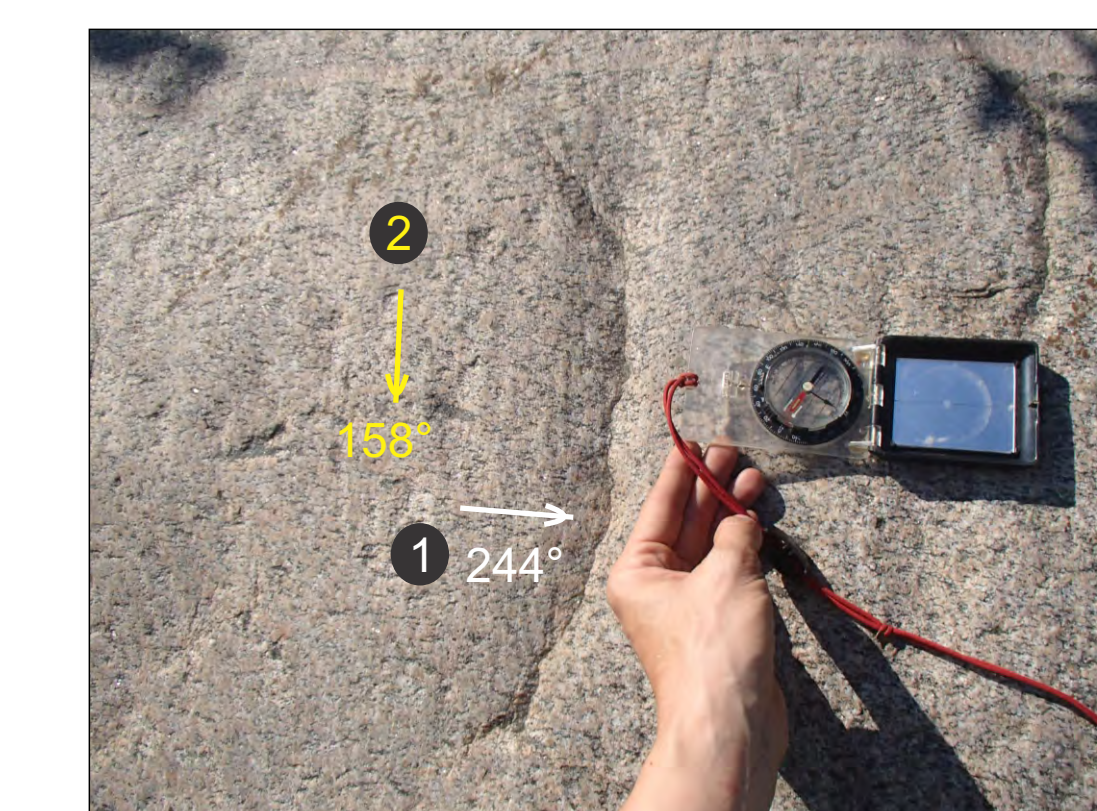
A concave crescentic gouge that indicates ice flowed to the east-southeast is cross-cut by striations across the surface of the rock that trend to the south-southwest.



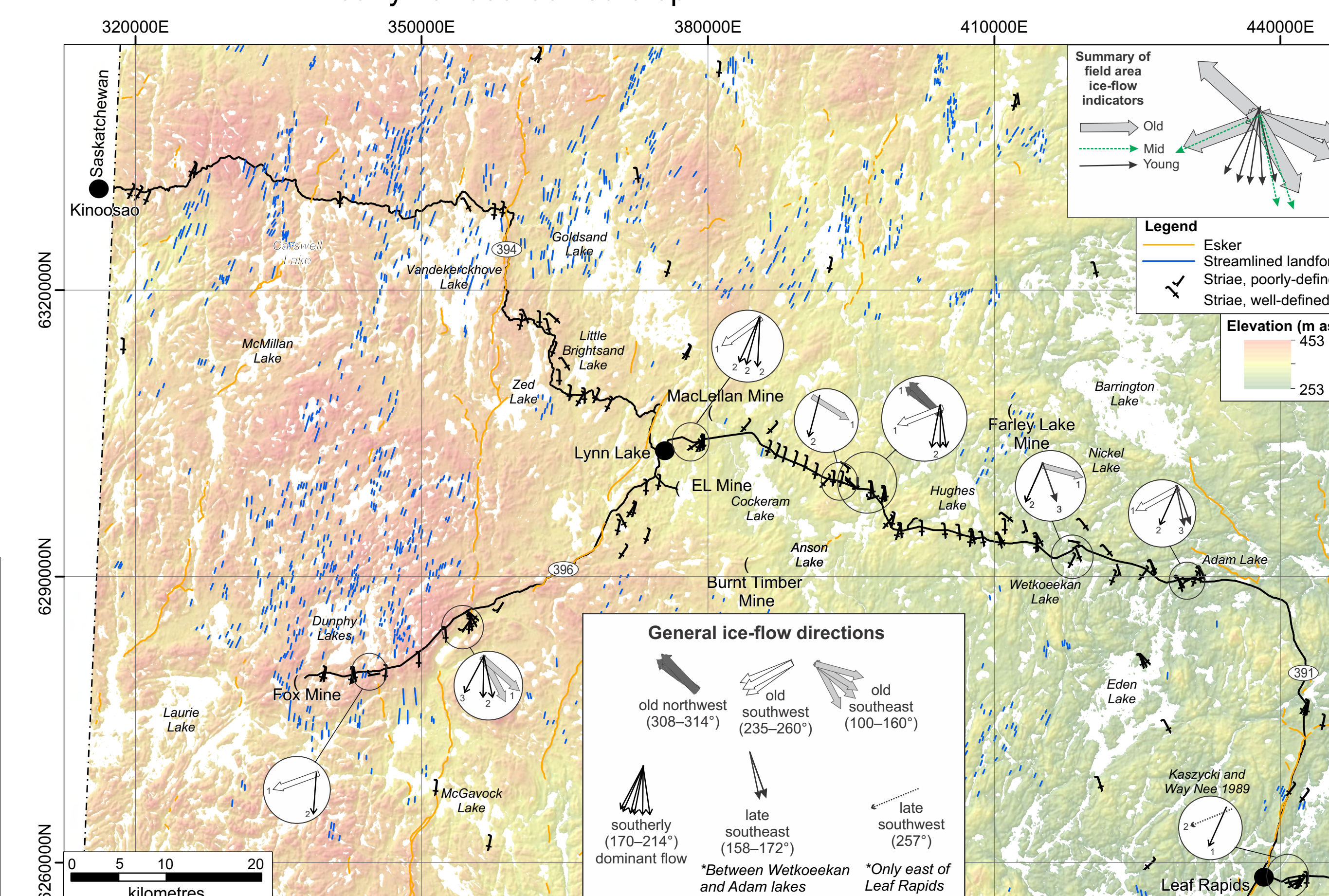
Fine striations that trend to the south-southwest are protected in a low-lying area from younger fine striations that cross the top of the outcrop and trend to the southeast.



Striations toward the south-southwest on a sloping face are protected from fine striations that cover the top of the outcrop and trend to the southeast.



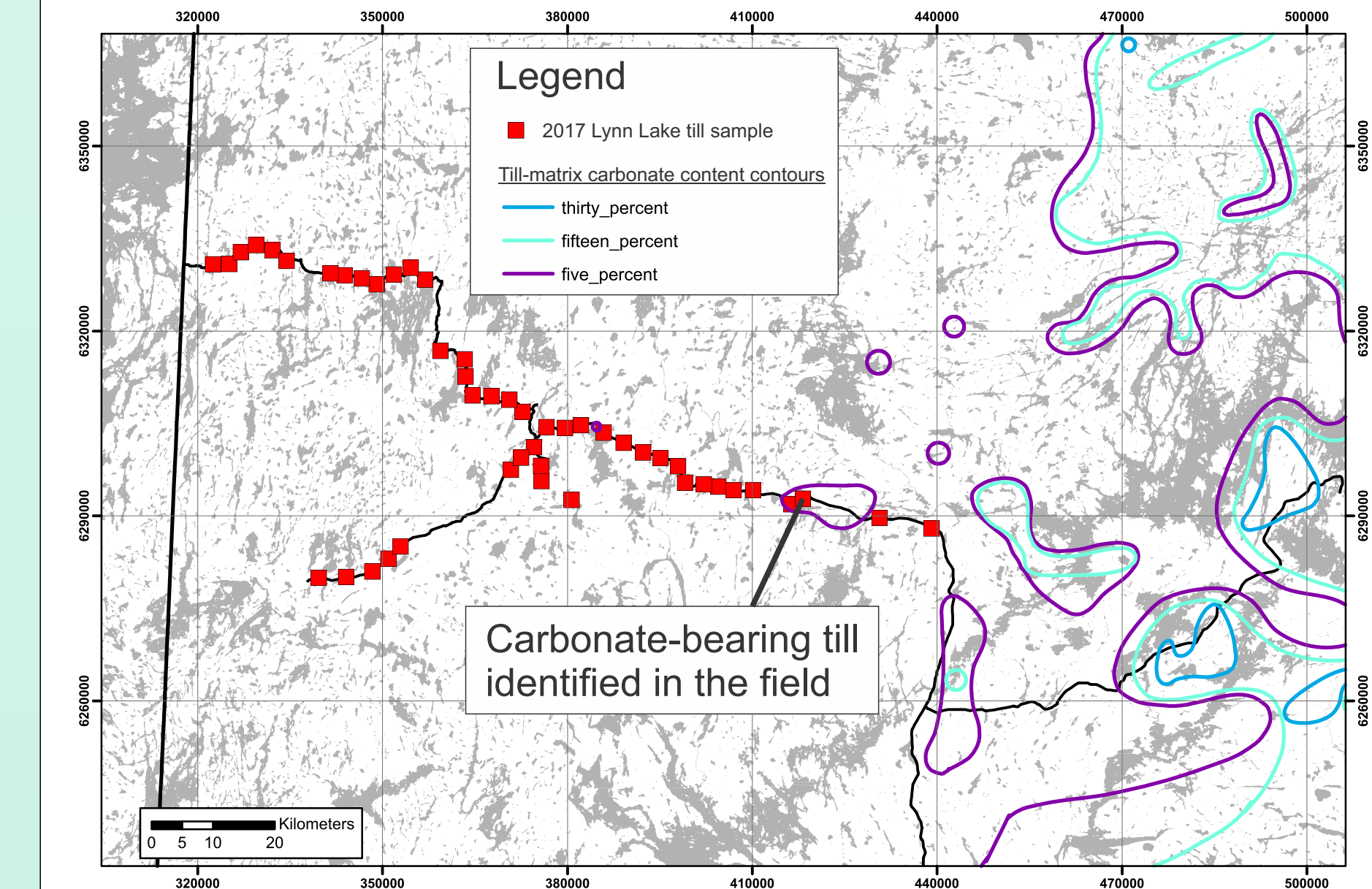
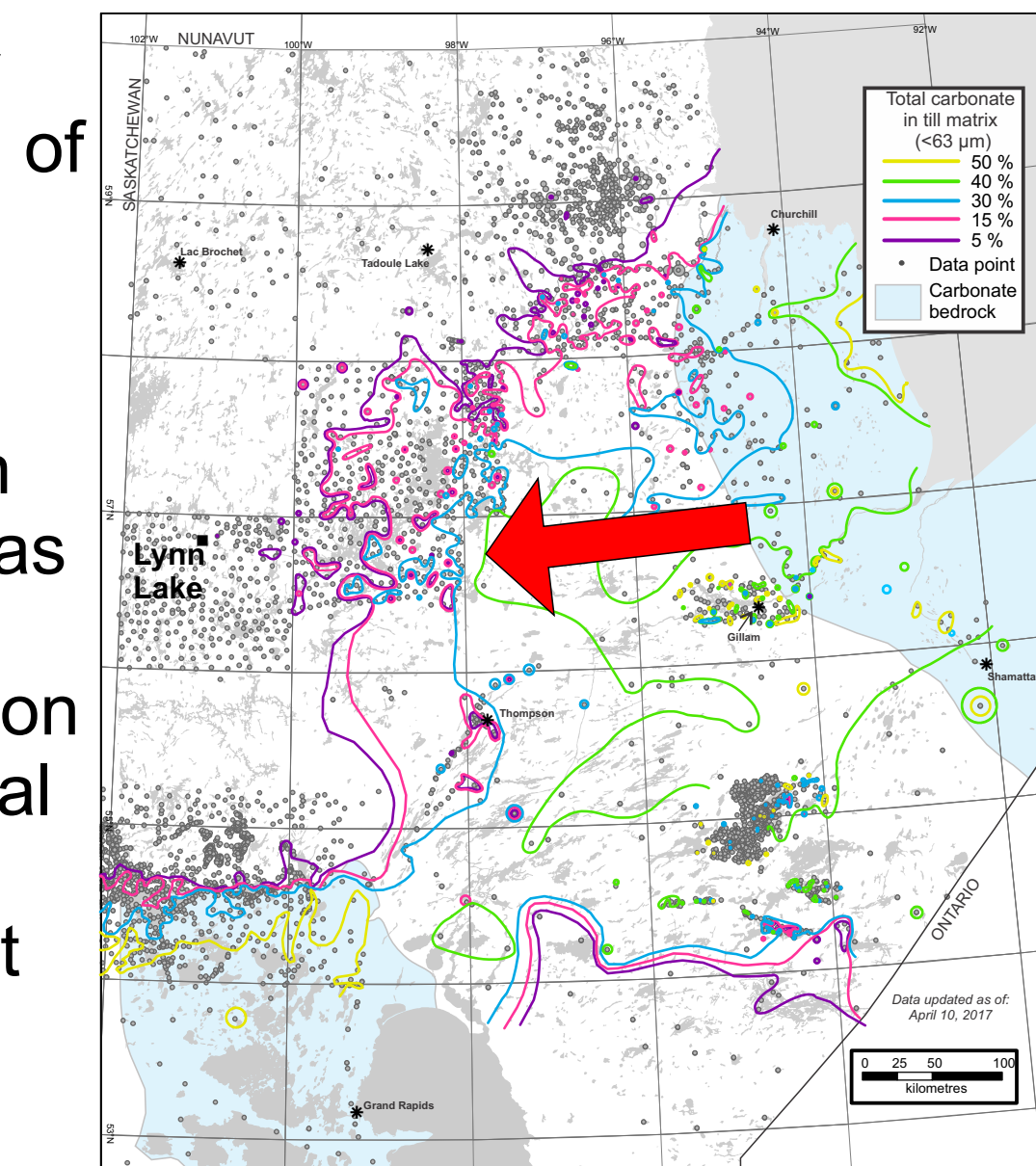
A concave crescentic gouge that indicates ice flowed to the southwest is cross-cut by abundant striations on the top of the outcrop that trend to the southeast.



Ice-flow indicators in the study area. Large white circles depict the relative-age relationships between indicators at each site(s). The general ice-flow directions provide a key for differentiating between old and young ice flows of similar orientations.

Carbonate dispersal

The Lynn Lake study area is at the tail end of a 'continental-scale' dispersal train of carbonate detritus originating in Hudson Bay. Carbonate till was identified in the field using 10% HCl solution and pending analytical results will assist in delineating the extent of carbonate-bearing till.

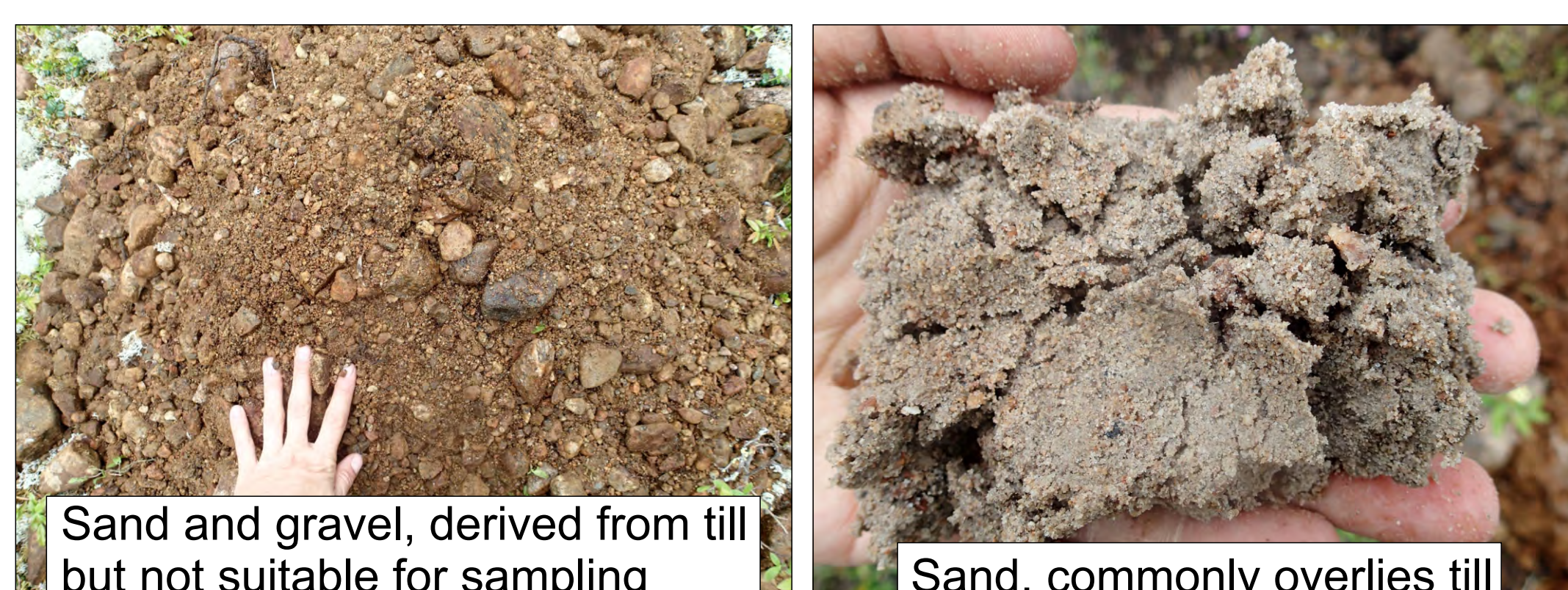
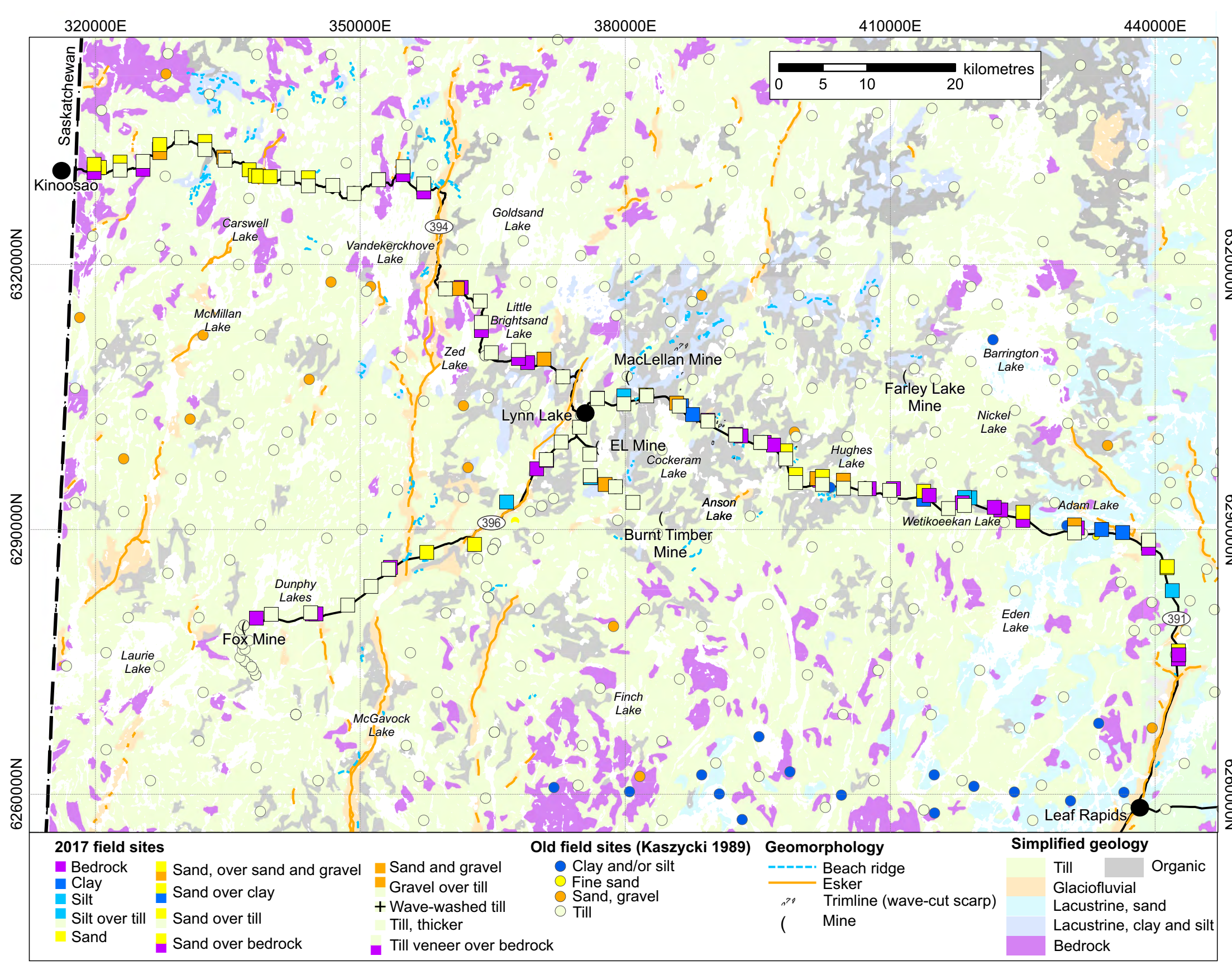


Surficial Geology

Most of the surficial geology maps currently available are not considered accurate enough for a detailed till-sampling program.

Field sites are shown on the map to the right, overlying the 1:250 000 simplified surficial geology.

- More detailed 1:125 000 maps exist and should be used instead. These GSC maps are not displayed here, because they have not been digitized.
- The field sites are color-coded by surficial material. These sites show that the background mapping is often incorrect. When sampling for till, it is very important that the correct type of sediment is consistently being sampled.



Till sampled for geochemistry should be taken from the soil C-horizon. This ensures that the sample has not been altered by modern soil processes.

Depending on the time of year, and position of sample on the landscape, till samples may look like this - wet soup sampled from a low-lying area.

Future Work

This project was initiated in 2017. Ongoing analyses will focus on tracing lithological indicators from bedrock source areas, using:

- clast-lithology counts,
- major and trace element geochemical composition of the till matrix, and
- kimberlite indicator mineral (KIM) results.

- Results of these analyses will:
- aid in determining 'background' geochemistry values,
 - help to identify elements that can be used to identify prospective bedrock targets,
 - help to determine the distance of subglacial transport in the area, and
 - provide the first public KIM results for the study area, which can be compared with the near-by samples collected by the MGS at Southern Indian Lake (Hodder 2017).



A till-sample hole is deep enough once half of your 6'4" assistant can fit in the hole.



Dig deep!



Can't forget to fill in the hole once the sample is taken (perhaps not with the assistant).

Kimberlite indicator Minerals

- This is the first public study to collect till samples for kimberlite indicator mineral (KIM) analysis in the Lynn Lake area.
- The diamond potential of the Lynn Lake area is unknown. KIMs were recently recovered from till in the Southern Indian Lake area (Hodder, 2017).
- Sample pails (22.7 L) of till were collected for KIM analysis in the Lynn Lake area. These samples were submitted to the De Beers Group of Companies to be analysed through in-kind support.
- The KIM sample locations were withheld from De Beers, to allow equal opportunity for follow-up by all interested parties when the data is publicly released at a later date.

References

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