

Quaternary geology of the Schultz Lake area (NTS 66A) and implications for mineral exploration

Isabelle McMartin and Lynda Dredge

GSC Northern Canada Division, Geological Survey of Canada

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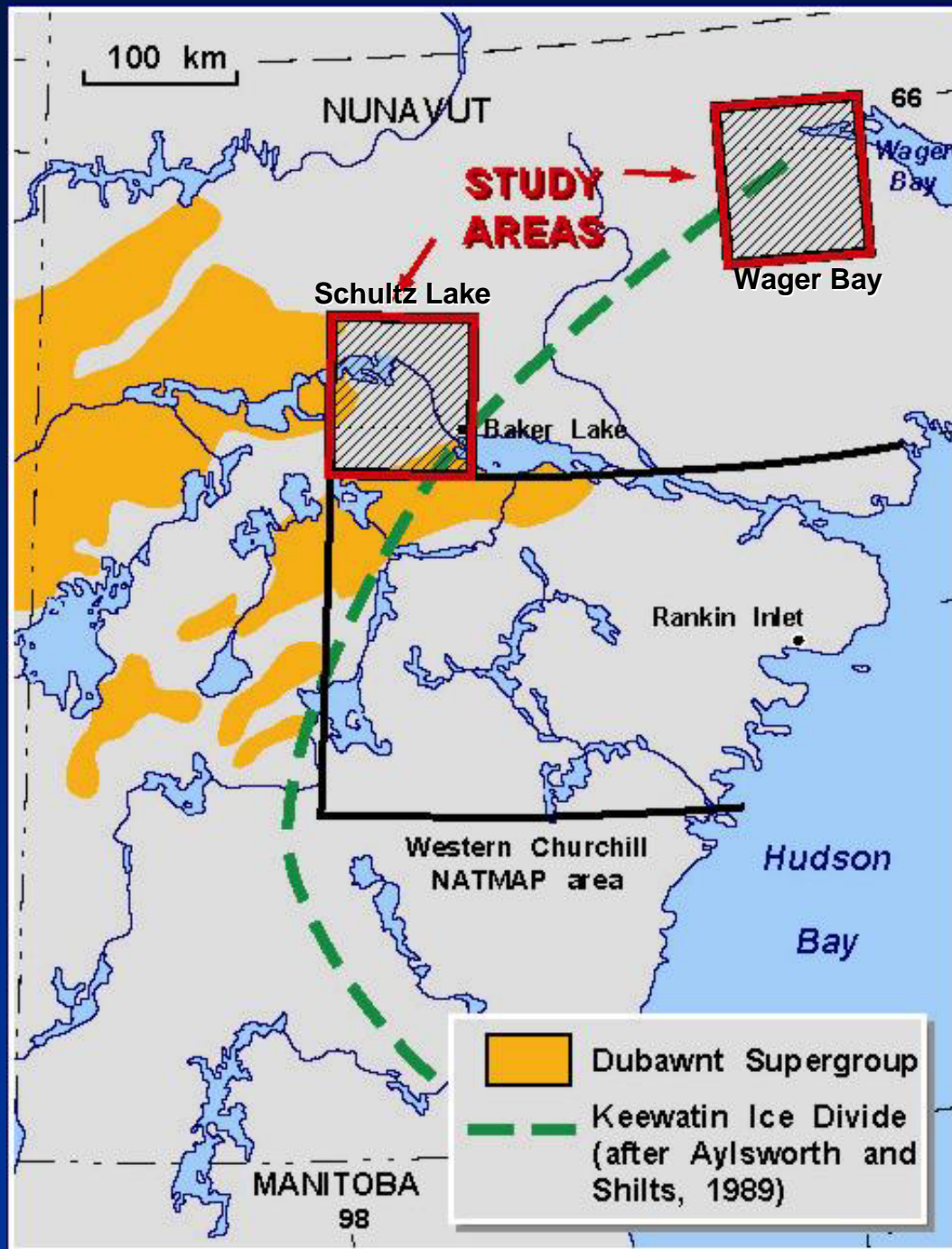


Natural Resources
Canada

Ressources naturelles
Canada

Canada

Location



Bedrock Schultz Lake

Bedrock legend

PROTEROZOIC



Dubawnt Supergroup

-  Thelon Fm and regolith
-  Wharton Group (Pitz and Amarook Fm)
-  Baker Lake Group (CIF and Martell Syenite)

ARCHEAN OR PROTEROZOIC

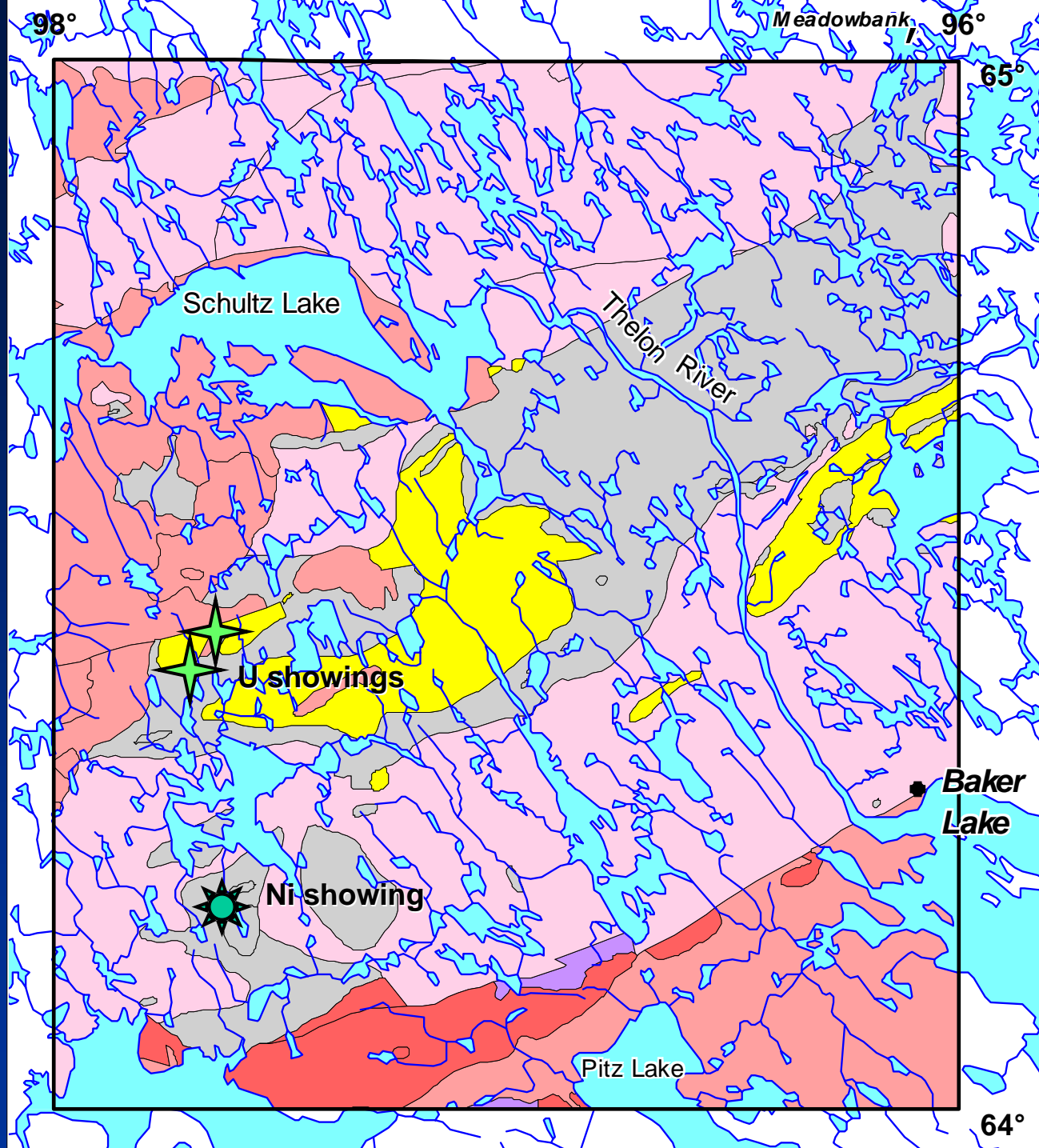
-  Quartzite (Ketyet and Woodburn)

ARCHEAN

-  Granitoid rocks and gneisses
-  Woodburn Group (sedimentary and volcanic rocks)

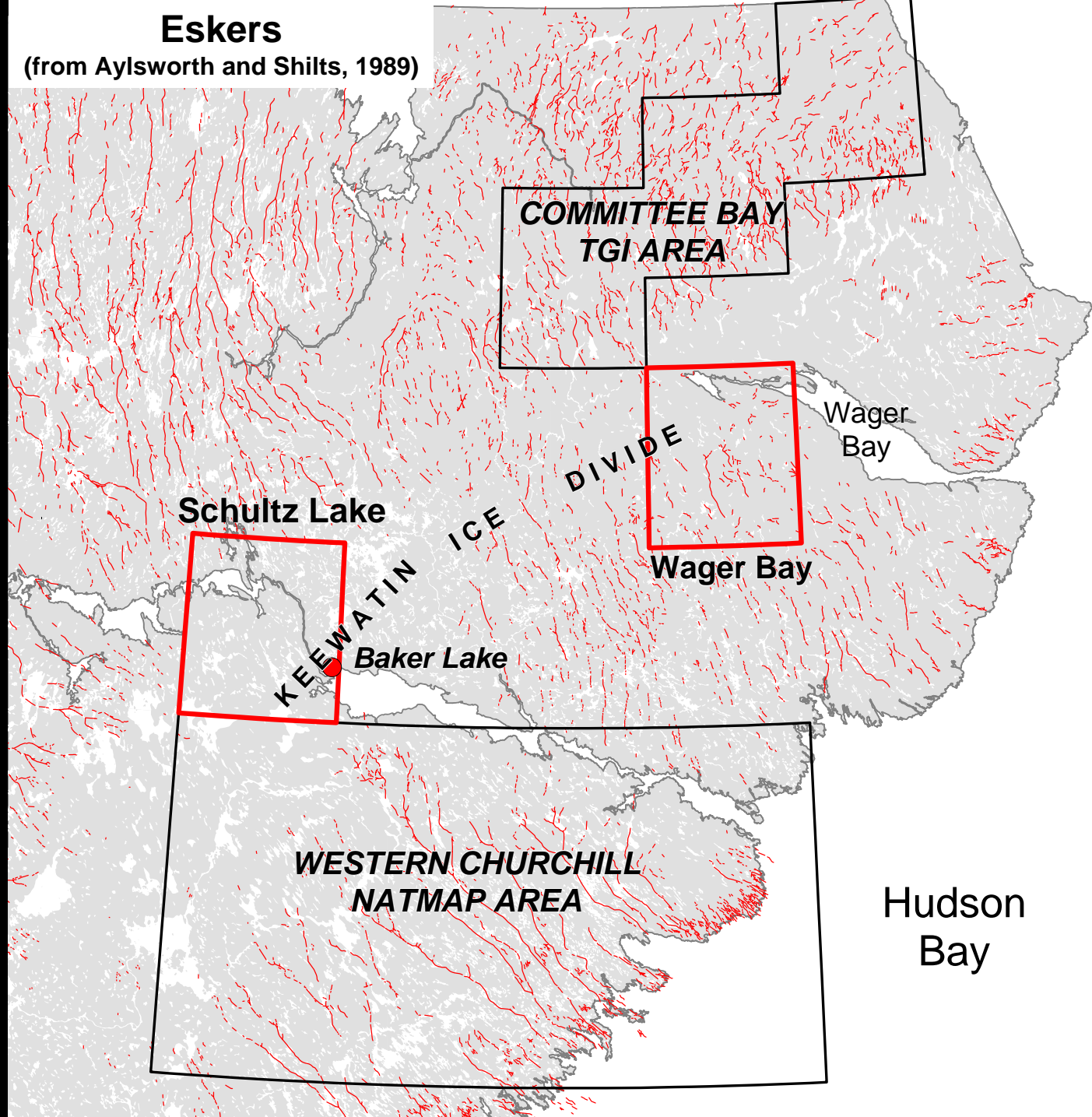
Modified from Paul et al., 2002
(GSC OF 4236)

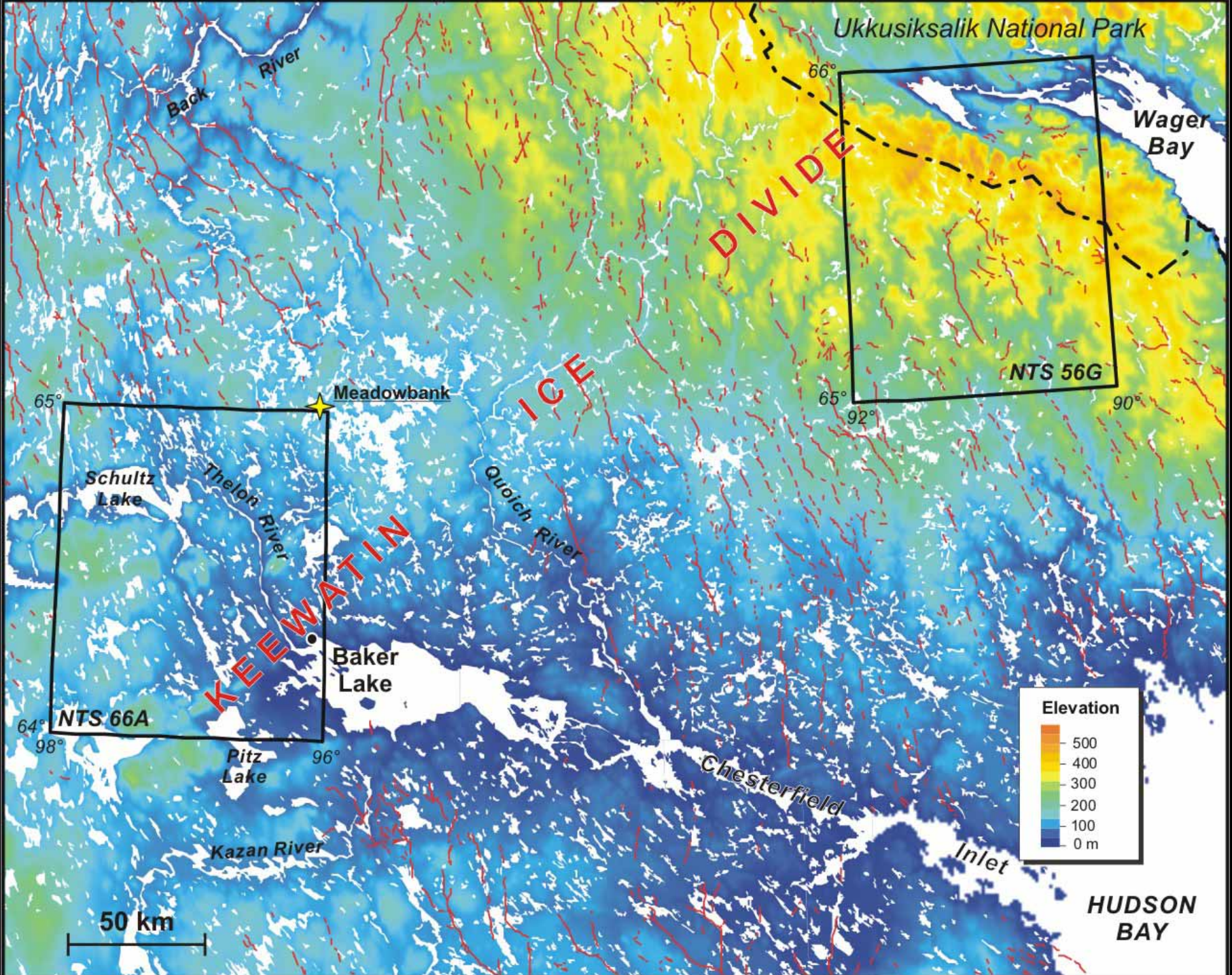
5 km



Eskers

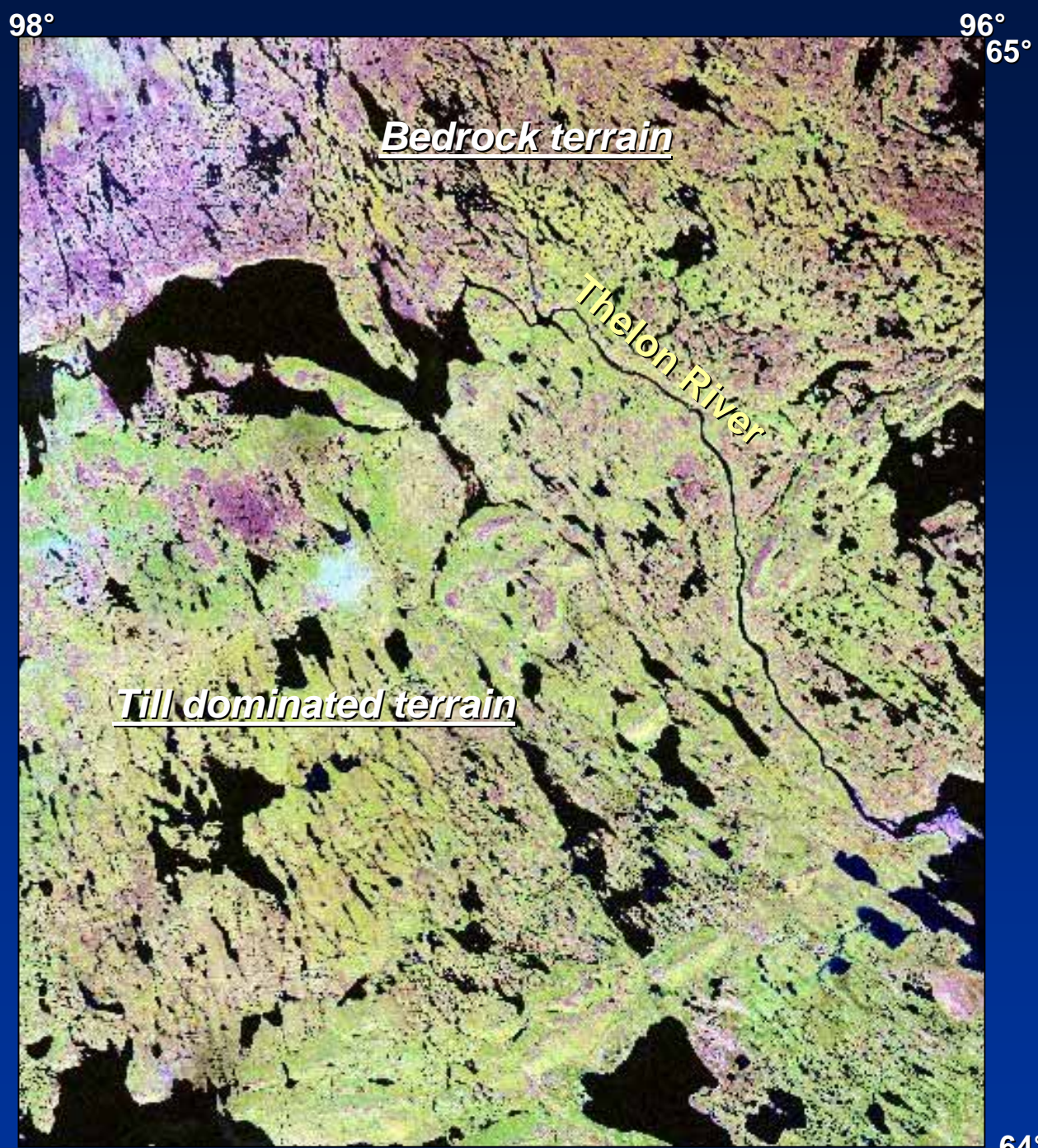
(from Aylsworth and Shilts, 1989)





Landscapes

Schultz Lake



Landsat TM 542

5 km

98°

96°
65°

64°



Till plain



Bedrock/Till veneer





Outwash



Esker sediments

Marine limit

(from Aylsworth et al., 1990)

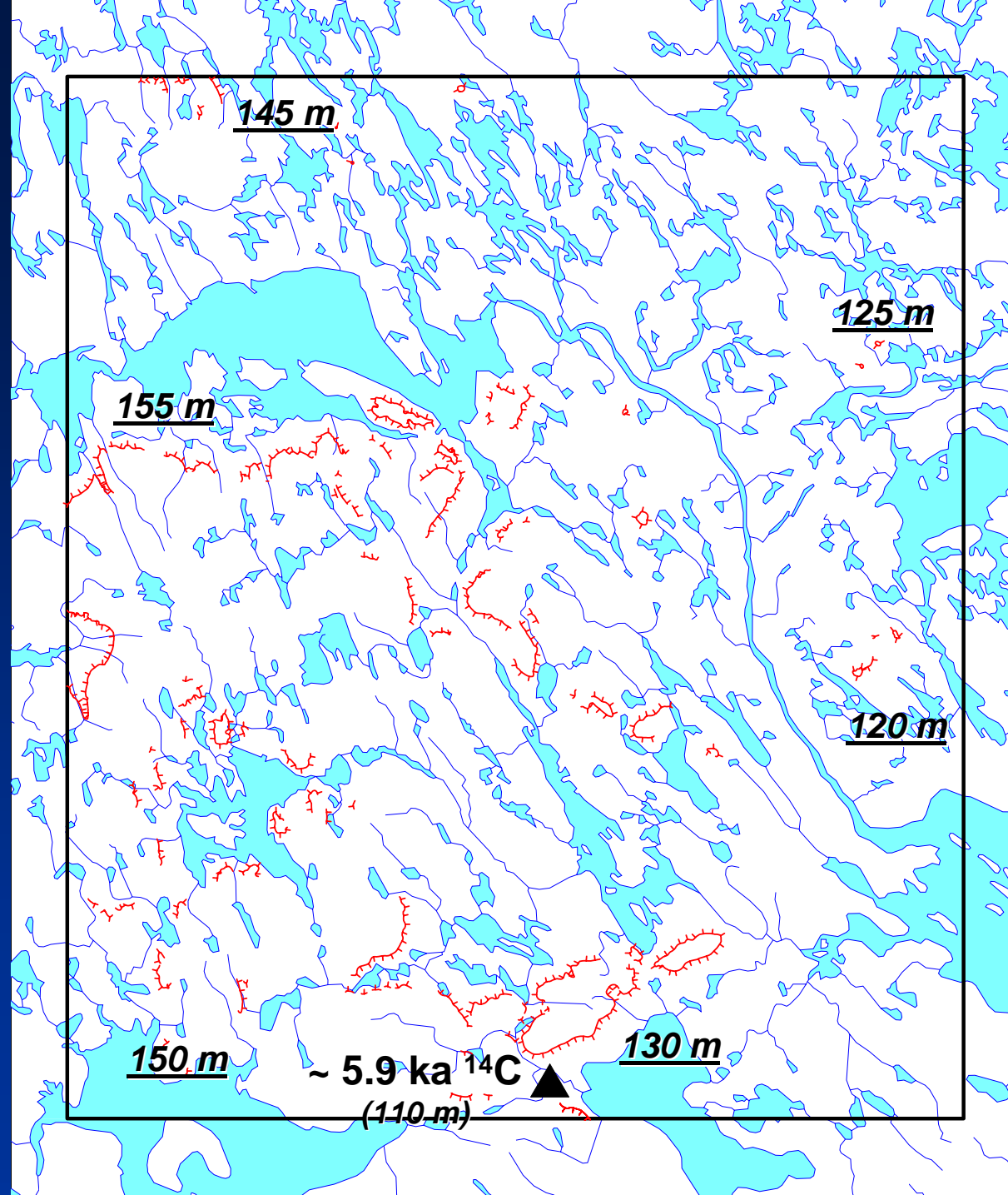
Trimline in till veneer



Wave-cut notch in till blanket



Delta-kame



Marine sediments

(from Aylsworth et al., 1990)

Cobble beach ridges



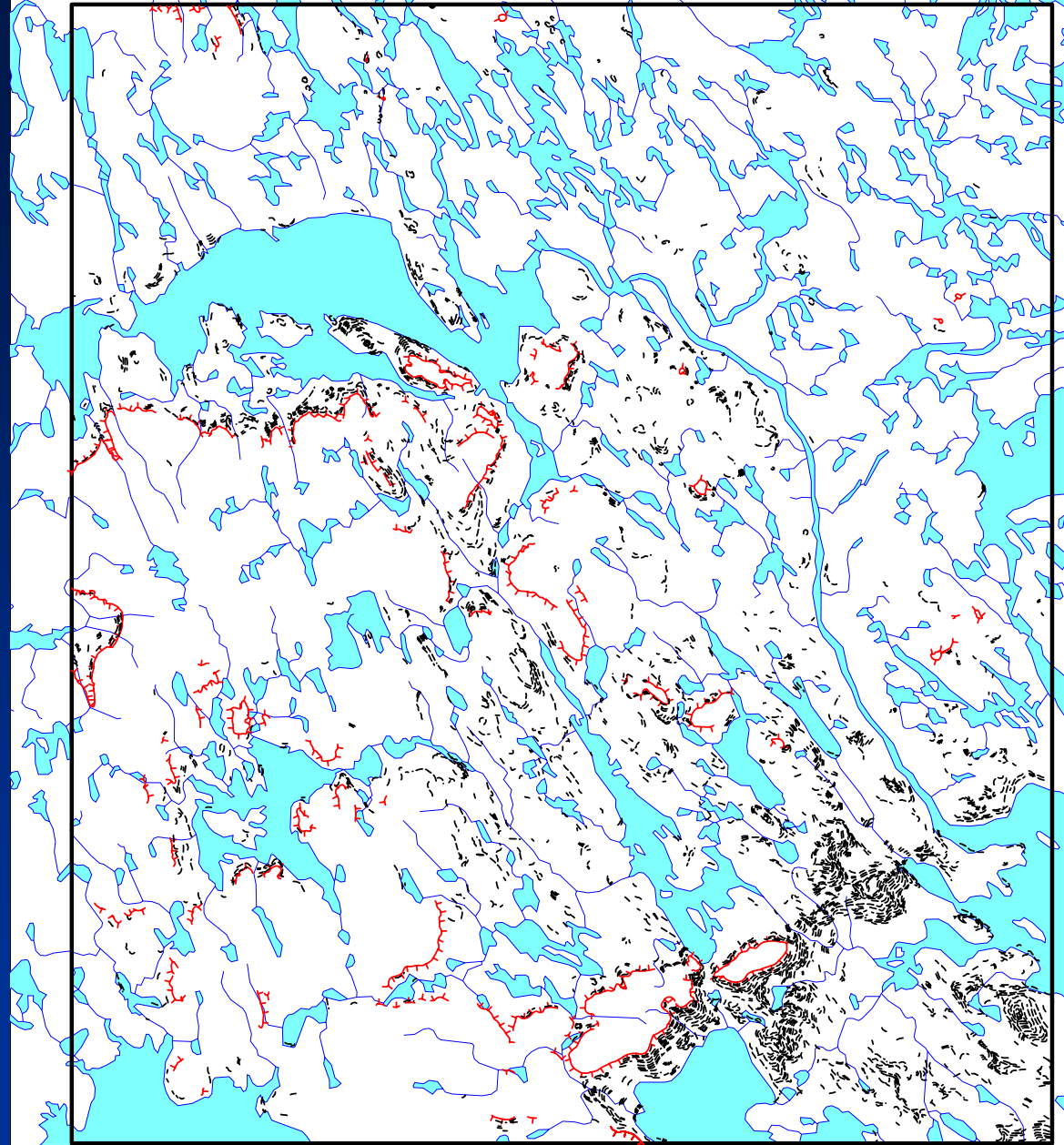
Nearshore sands



Offshore sands and silts



Marine shorelines



Evidence for complex ice flow history:

- ❖ Preserved faceted and striated surfaces
- ❖ Palimpsest streamlined landforms
- ❖ Multiple-till sections
- ❖ Contrasting surface till characteristics

Glacially eroded surfaces

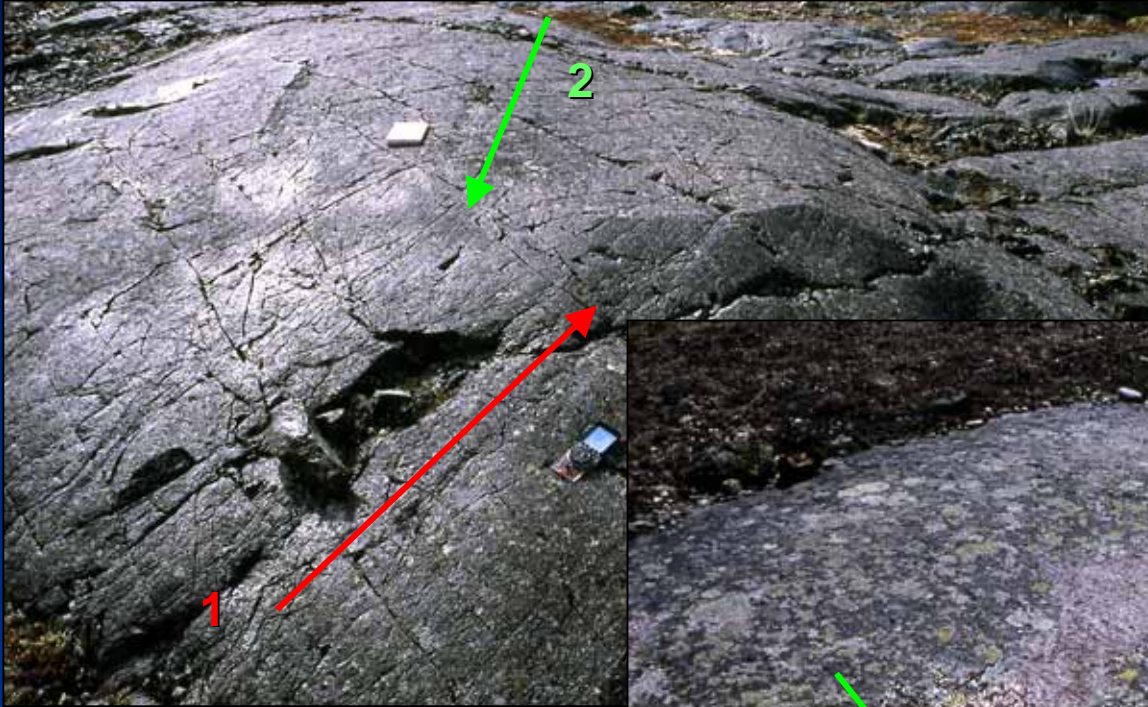


Crescentic fractures



Cross-cutting striae

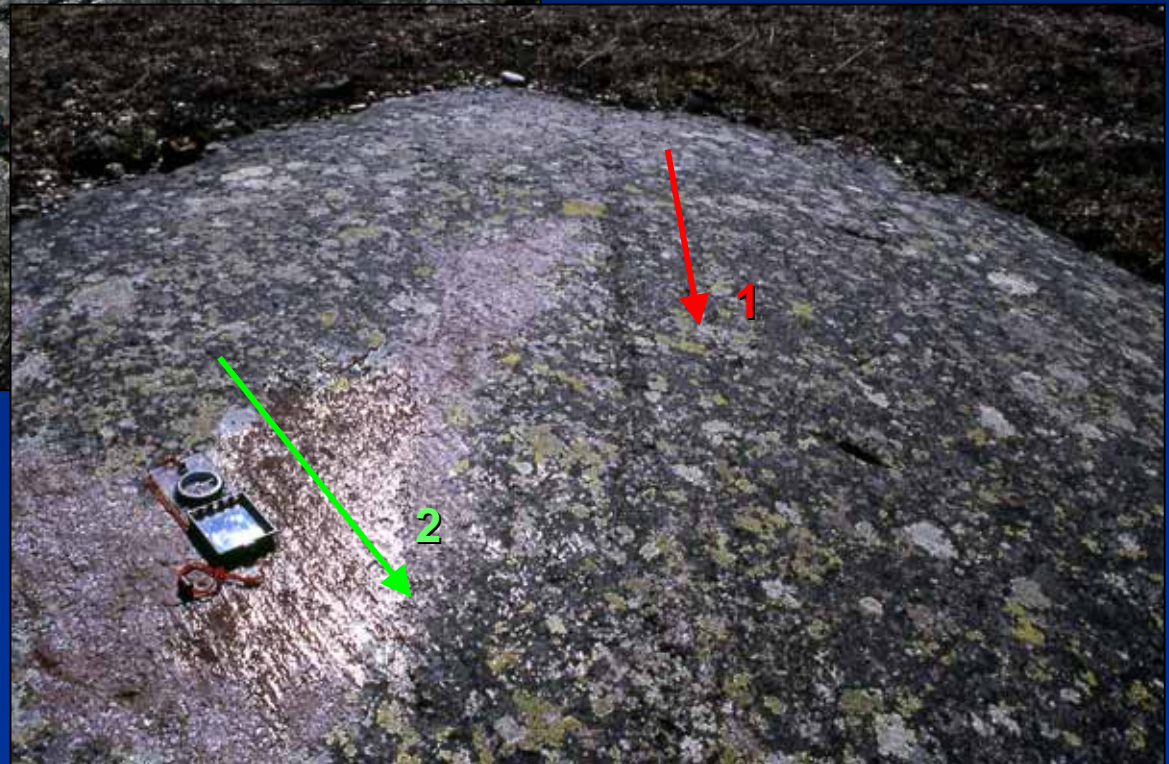
Faceted surfaces



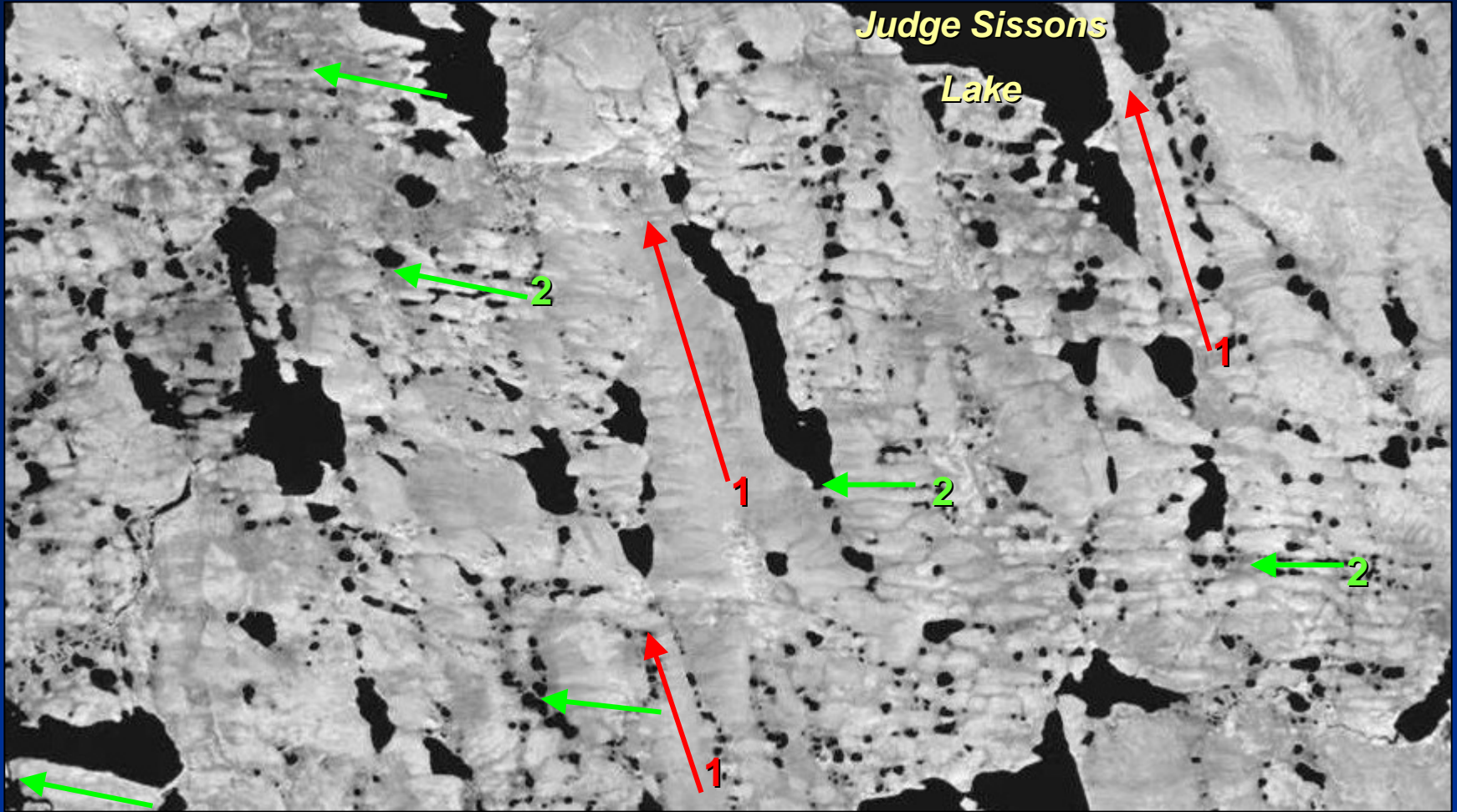
Opposite indicators



Preserved indicators

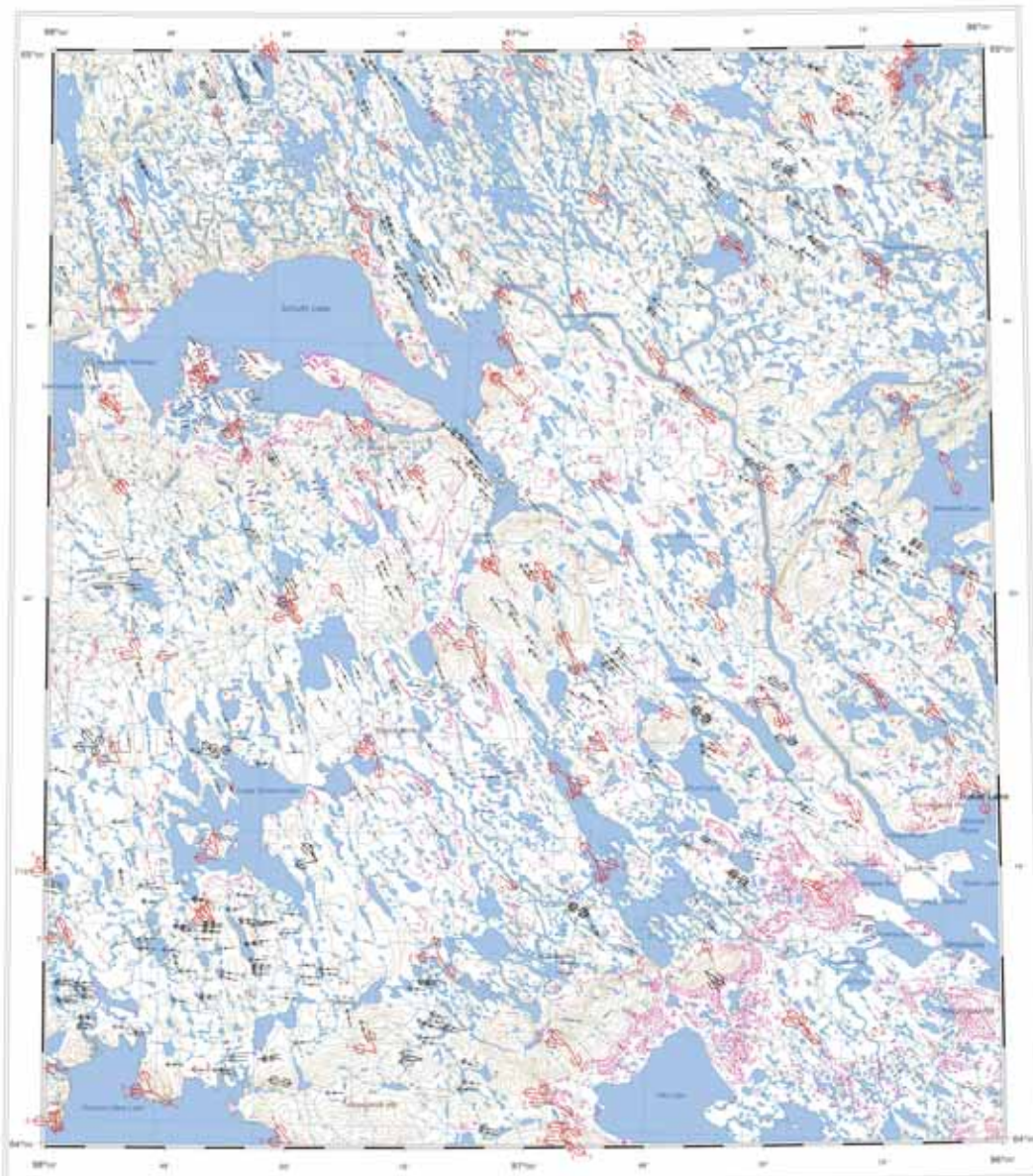


Palimpsest streamlined landforms



Landsat TM Band 4

Ice flow map



LEGEND

- Roche moutonnée
- Striation:
 Well defined
- Poorly defined
- Sense unknown
- Cross striae (T-ridges)
- Information derived from existing map*:
 Trend of nearshore ridges
- Esker ridge
- Hummocky moraine
- Trend of ribbed or minor moraine ridges
- Trend of drumlin or fluting
- Trend of crag-and-tail
- Linear feature related to ice flow
- Striae

REFERENCES

- * Ayresworth, J.M., Cunningham, C.M. and Shills, W.W. 1980. Surficial geology, Schultz Lake, District of Keewatin, Northwest Territories, Geological Survey of Canada, Map 43-1986, scale 1:125,000.
- Cunningham, C.M. and Shills, W.W. 1977. Surficial geology of the Baker Lake area, District of Keewatin, Geological Survey of Canada, Report on Activities 8, p. 311-314.
- Klassen, R.A. 1985. Drift composition and glacial dispersal from Baker Lake area, District of Keewatin, Northwest Territories, Geological Survey of Canada, Bulletin 456, 98 p.
- McMartin, I. and Dredge, L.A. in press. History of ice flow in the Schultz Lake (NTS 65A) and Viger Bay (NTS 56C) areas, Kivallik Region, Nunavut, Geological Survey of Canada, Current Research 2005.
- Ulling, D.J. and McMartin, I. 2004. Ice-movement indicators mapping north of the Keewatin Ice Sheet, Mealybank area, Nunavut, Geological Survey of Canada, Current Research 2004-C3.

This digital map is part of GSC Open File 4926:
 McMartin, I., Dredge, L.A. and Robertson, L. 2005. Ice flow maps and database: Schultz Lake (NTS 65A) and Viger Bay (NTS 56C) areas, Kivallik Region, Nunavut, Geological Survey of Canada, Open File 4926, 1 CD-ROM.
 Striation mapping by I. McMartin, L. Dredge and J.-F. Gagnon in 2004.

Figure 1.
ICE FLOW INDICATORS
SCHULTZ LAKE
NUNAVUT

Scale: 1:250,000
 0 5 10 15 Km

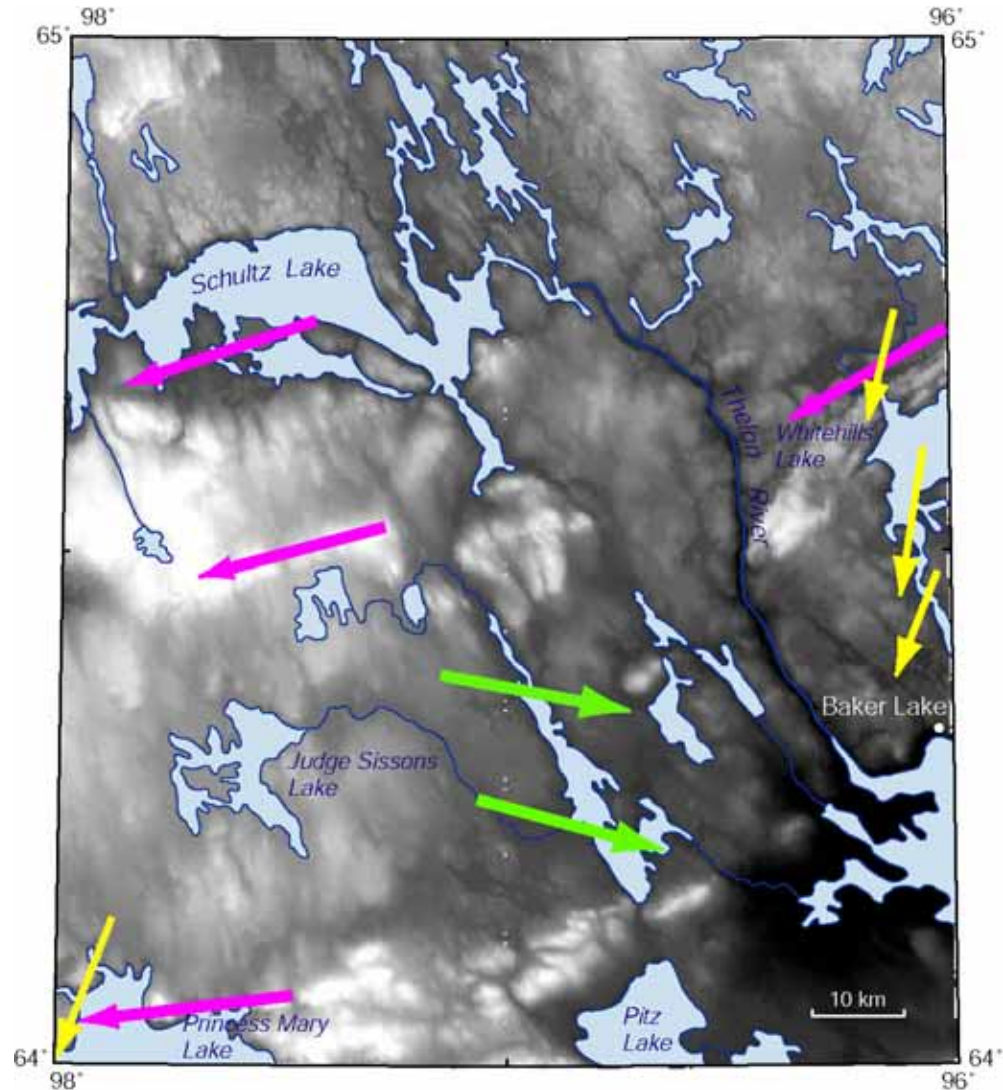
Contour interval: 20 metres
 Unapproved Topographic Map and
 Sheet for reference only (NSC 01, June 14)



GSC OF 4926 (2005)
McMartin, Dredge
and Robertson

Sequence of ice flows

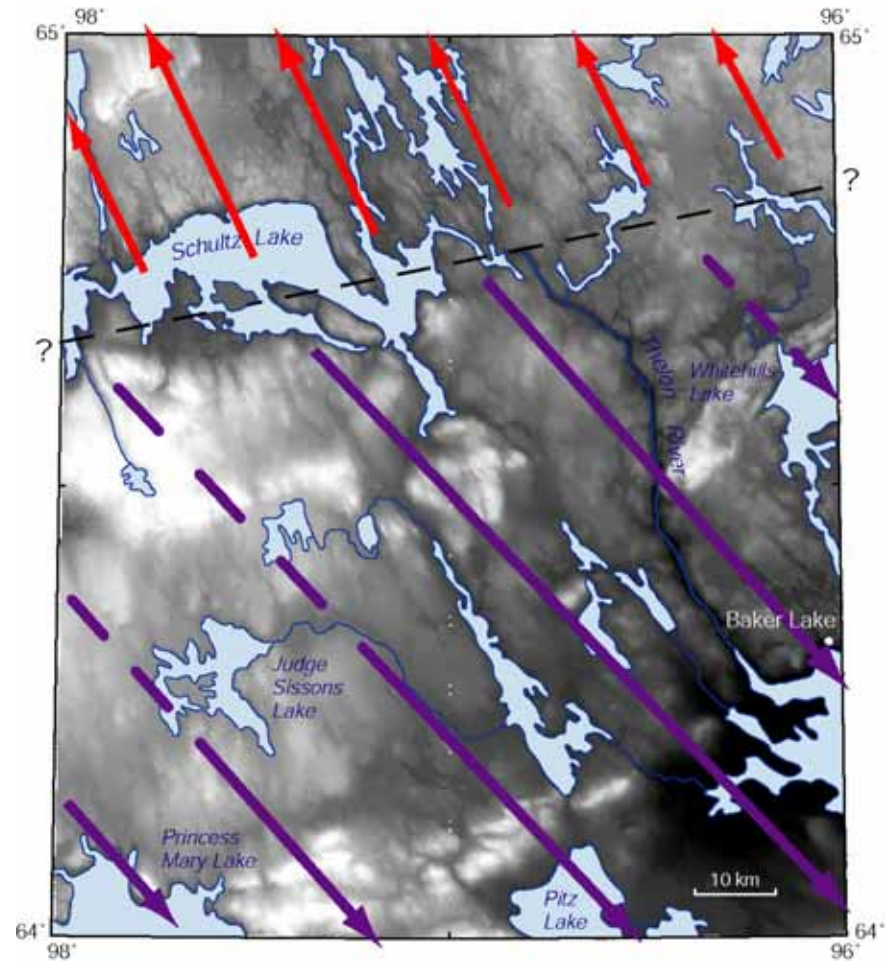
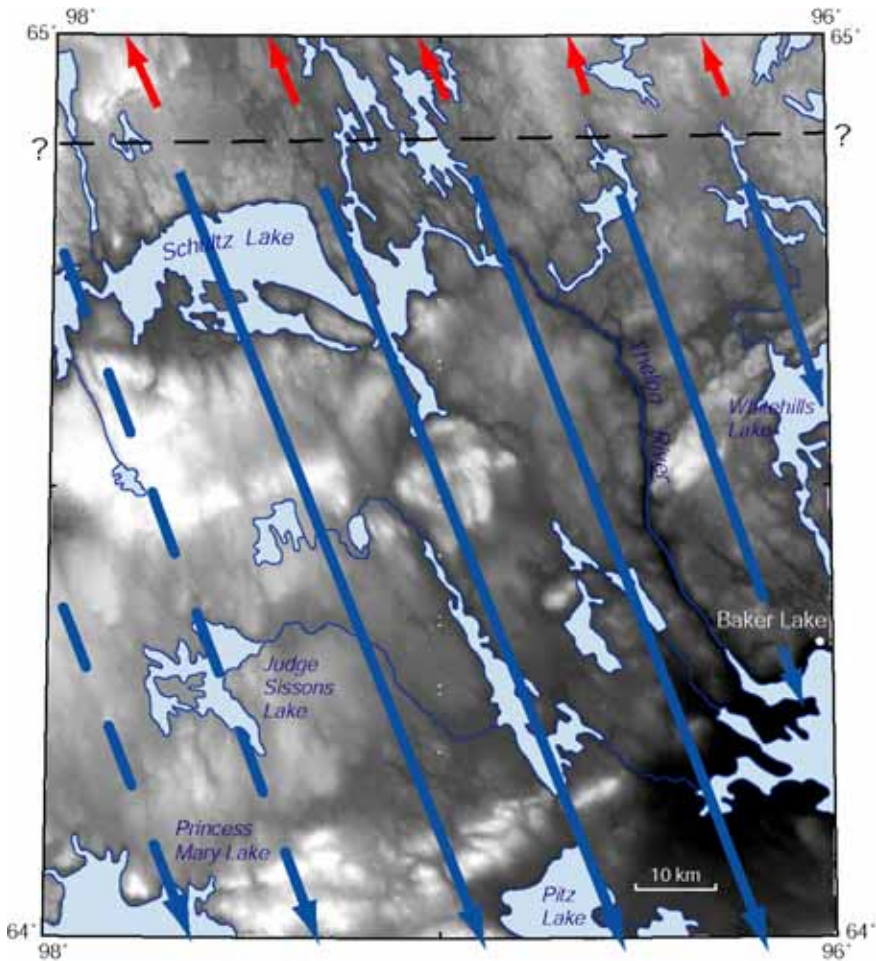
Schultz Lake



GSC CR B-02 (2005)
McMartin and Dredge

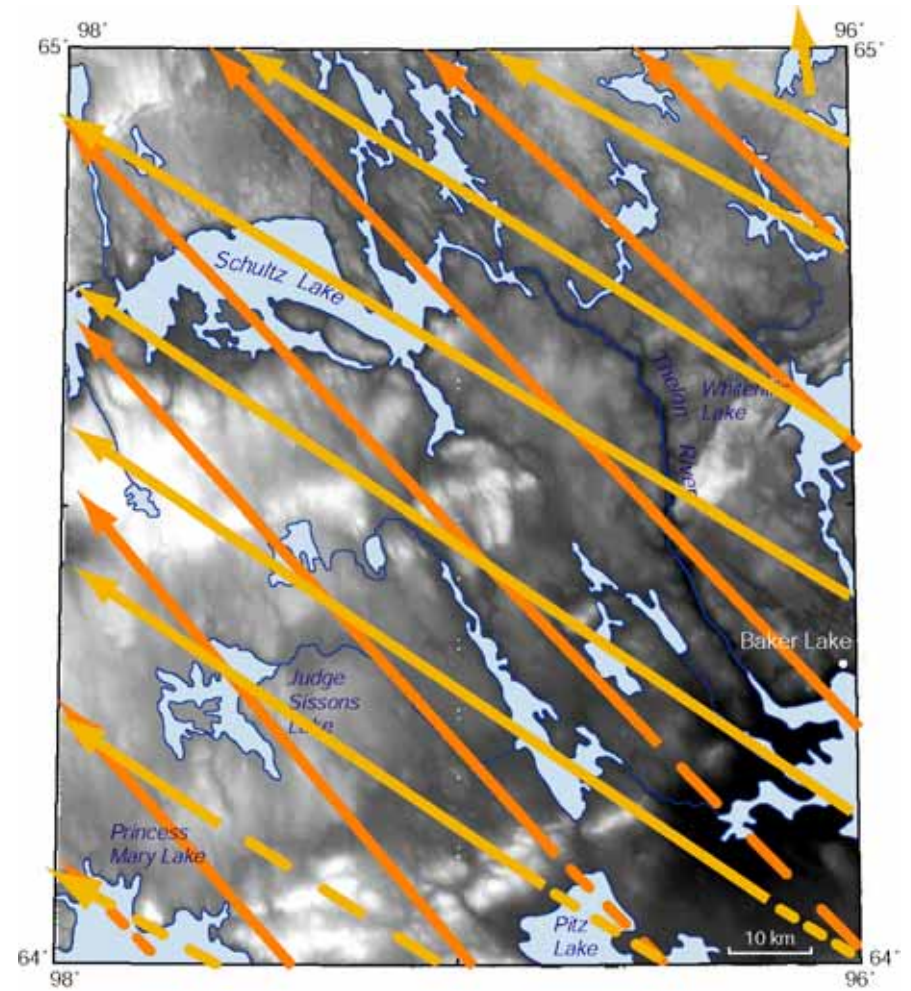
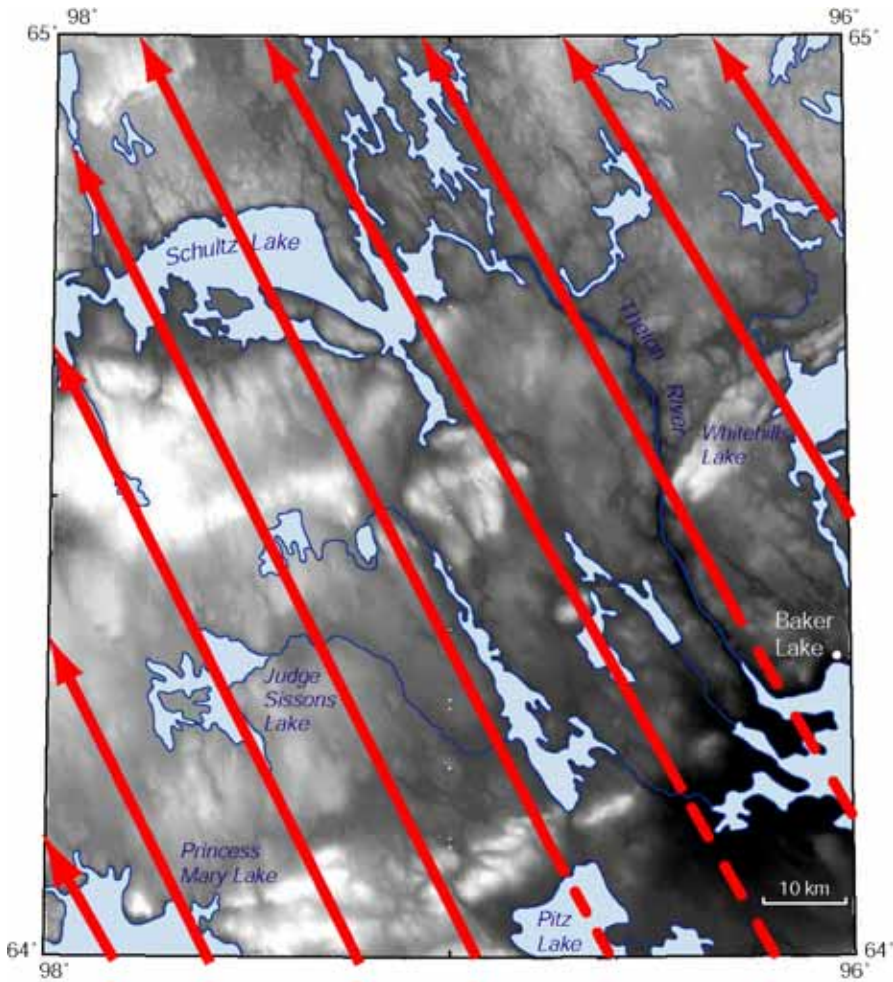
Sequence of ice flows

Schultz Lake



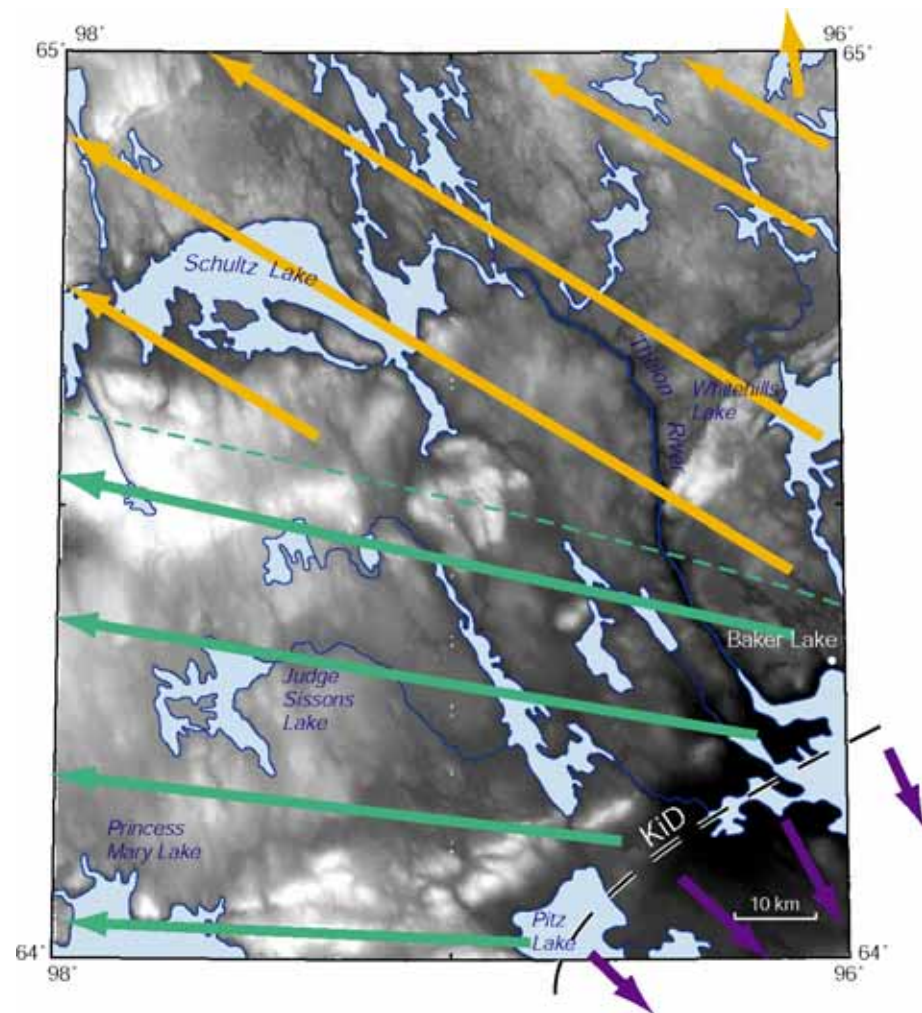
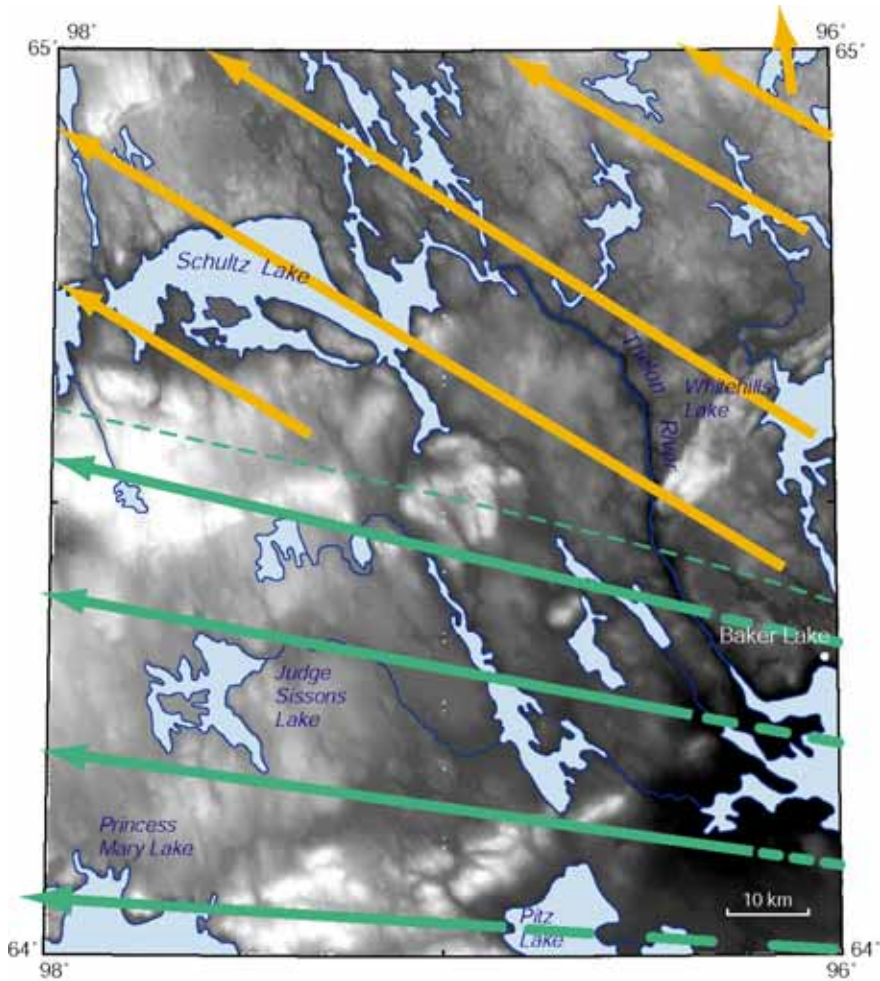
Sequence of ice flows

Schultz Lake



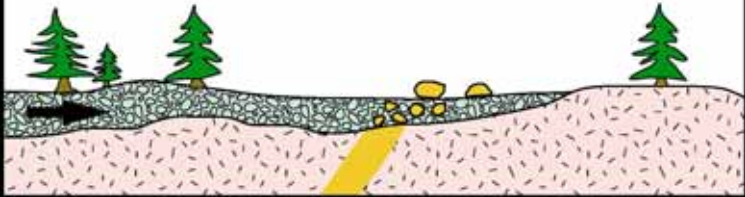
Sequence of ice flows

Schultz Lake

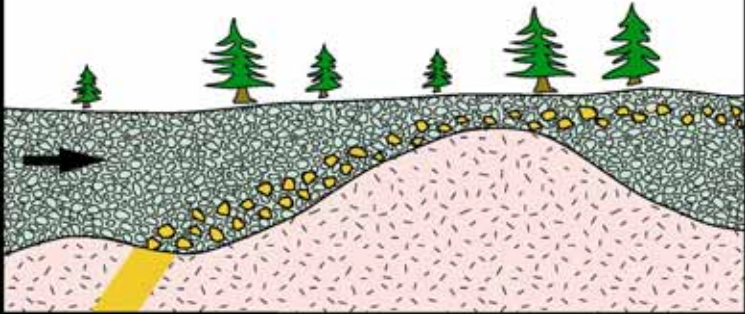


Thelon River sections

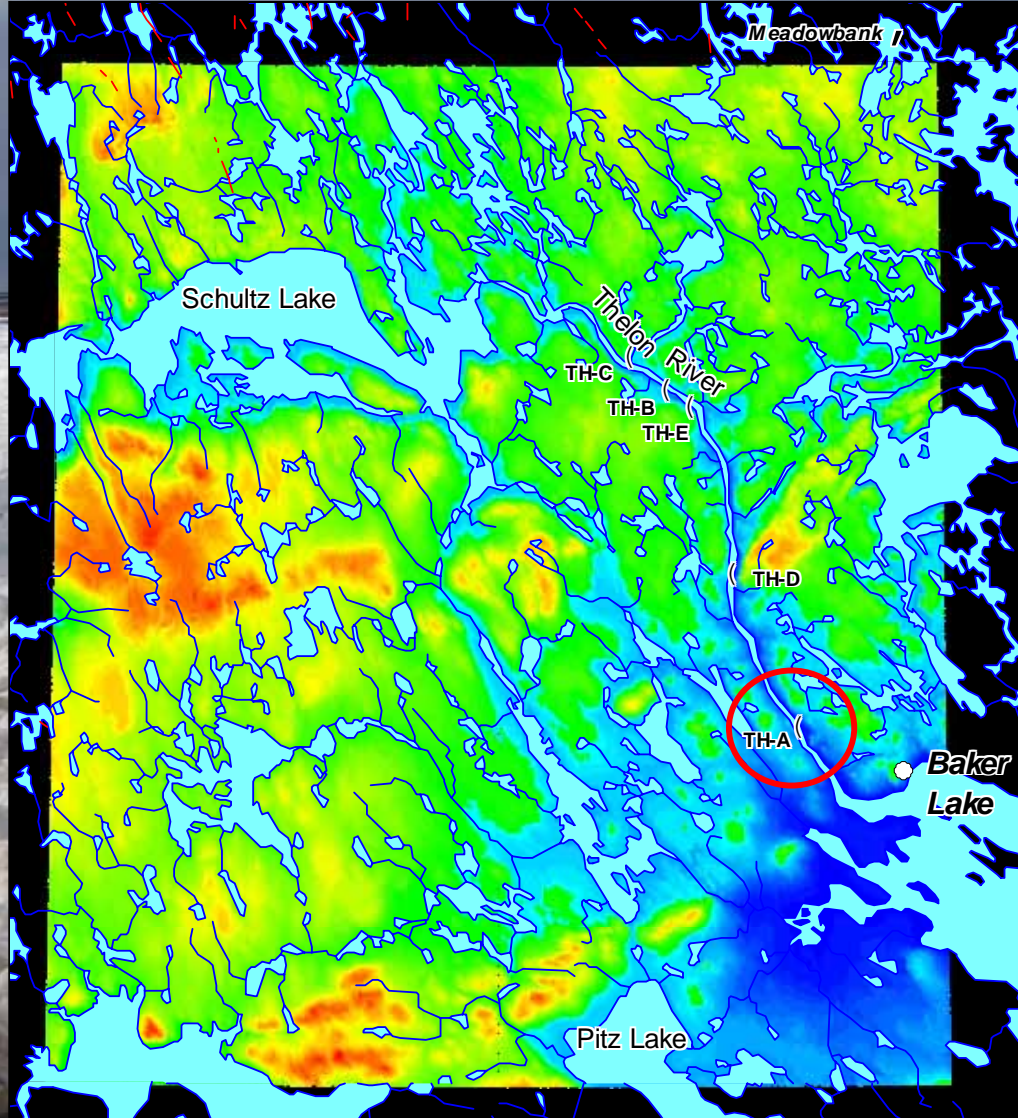
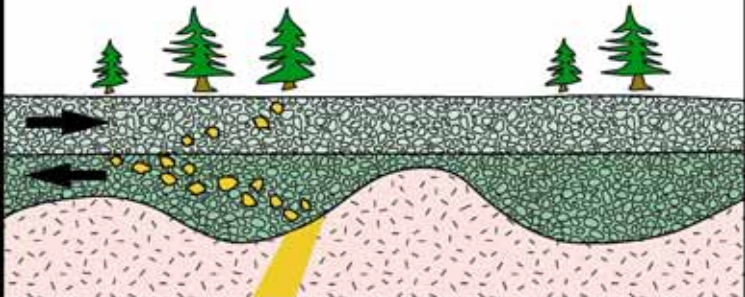
Meadowbank



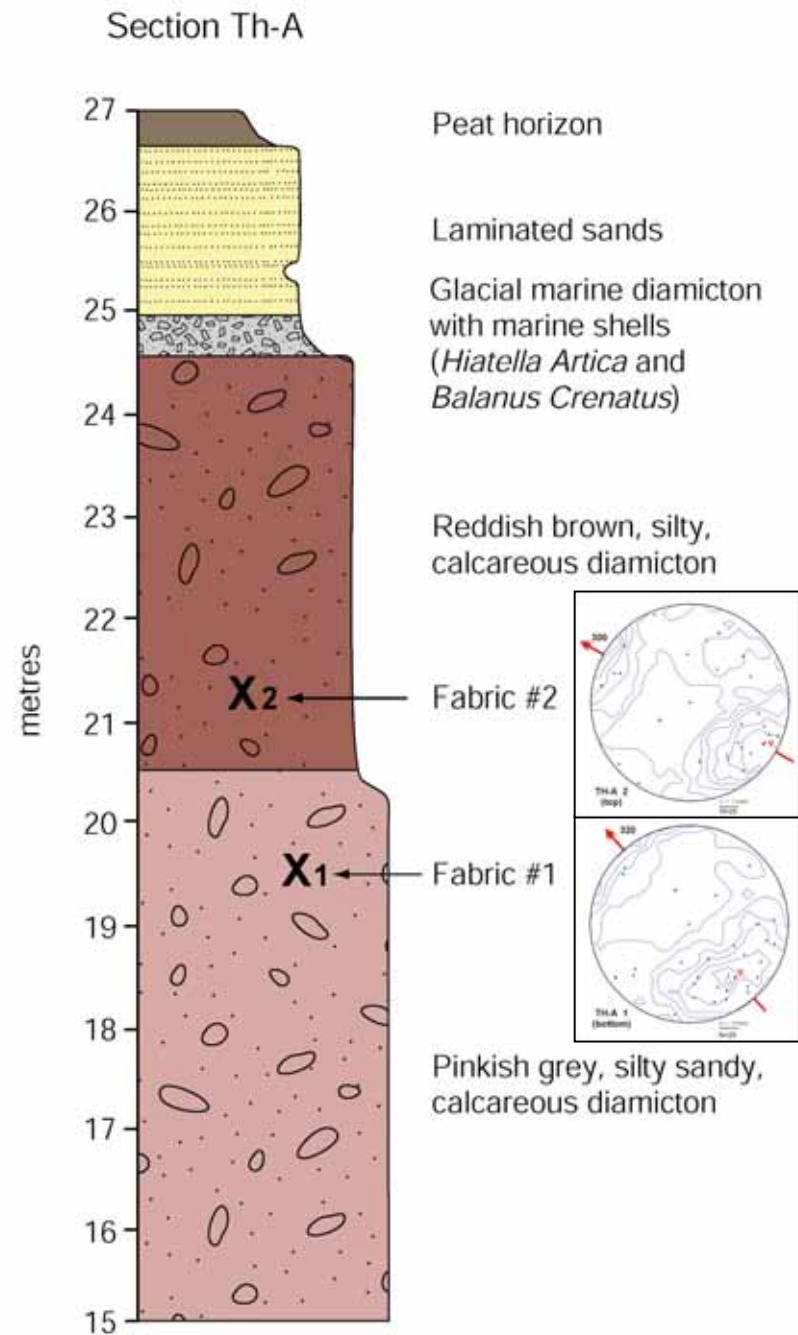
Meliadine



Thelon R. valley



Section TH-A



Surface till samples

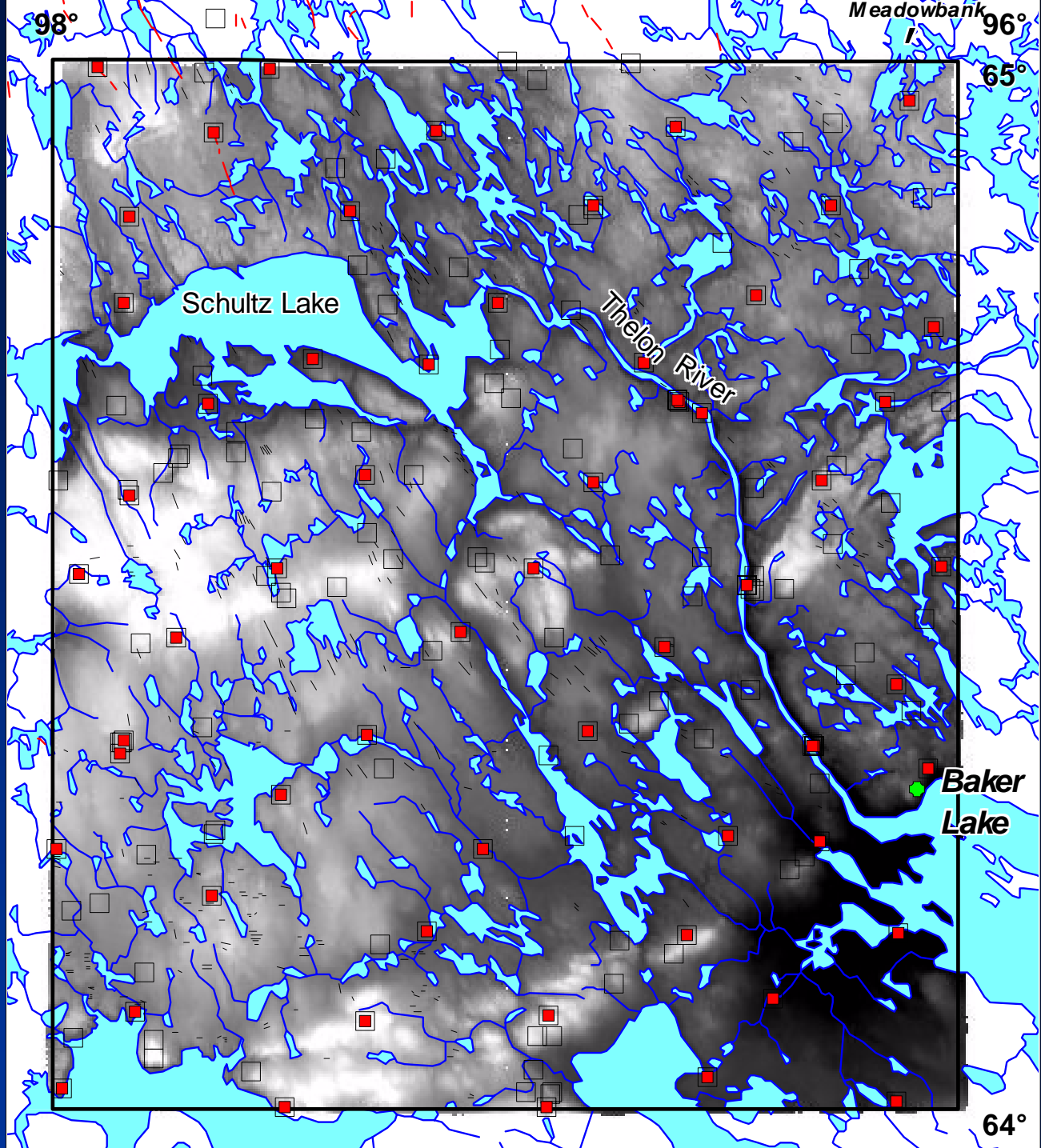
Schultz Lake
(n=55)

- ✓ Geochemistry
- ✓ Gold grain counts
- Kimberlite indicator minerals
- Pebble counts

DEM

Western Churchill Metallogeny Project

5 km



Surface till color




-  Red/pink till
-  Grey/brown till
-  Grey/brown till and Dubawnt clasts
-  MIX of red/pink and grey/brown till

P: Pitz erratic observed

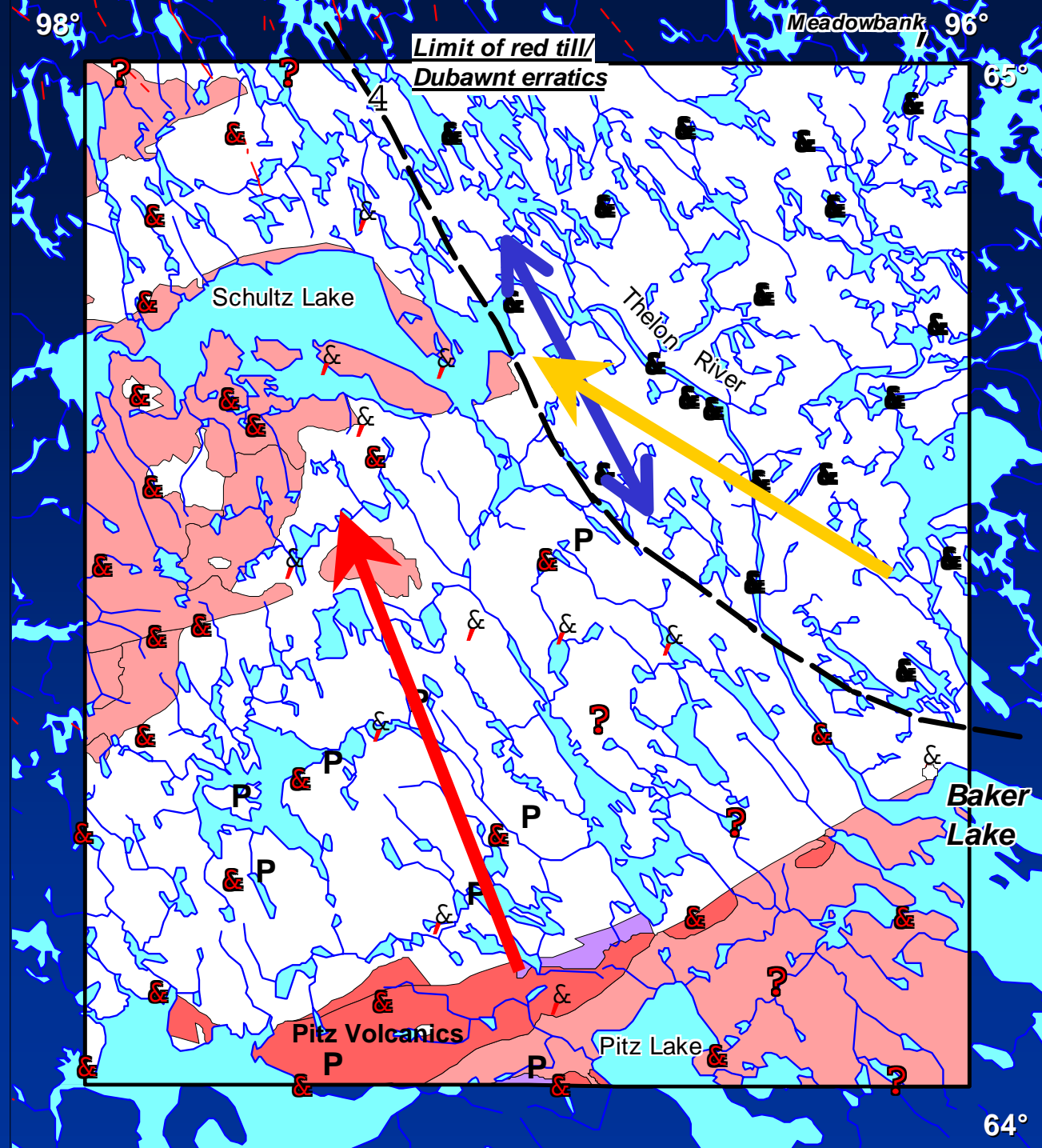
Bedrock legend

PROTEROZOIC

Dubawnt Supergroup

-  Thelon Fm and regolith
-  Wharton Group (Pitz and Amarook Fm)
-  Baker Lake Group (CIF)

5 km



Copper

ppm
by ICP-AES
aqua regia
<63 μm

1 to 393 ppm

Mo, Zn, \pm Pb

Bedrock legend

PROTEROZOIC

Dubawnt Supergroup

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ARCHEAN OR PROTEROZOIC

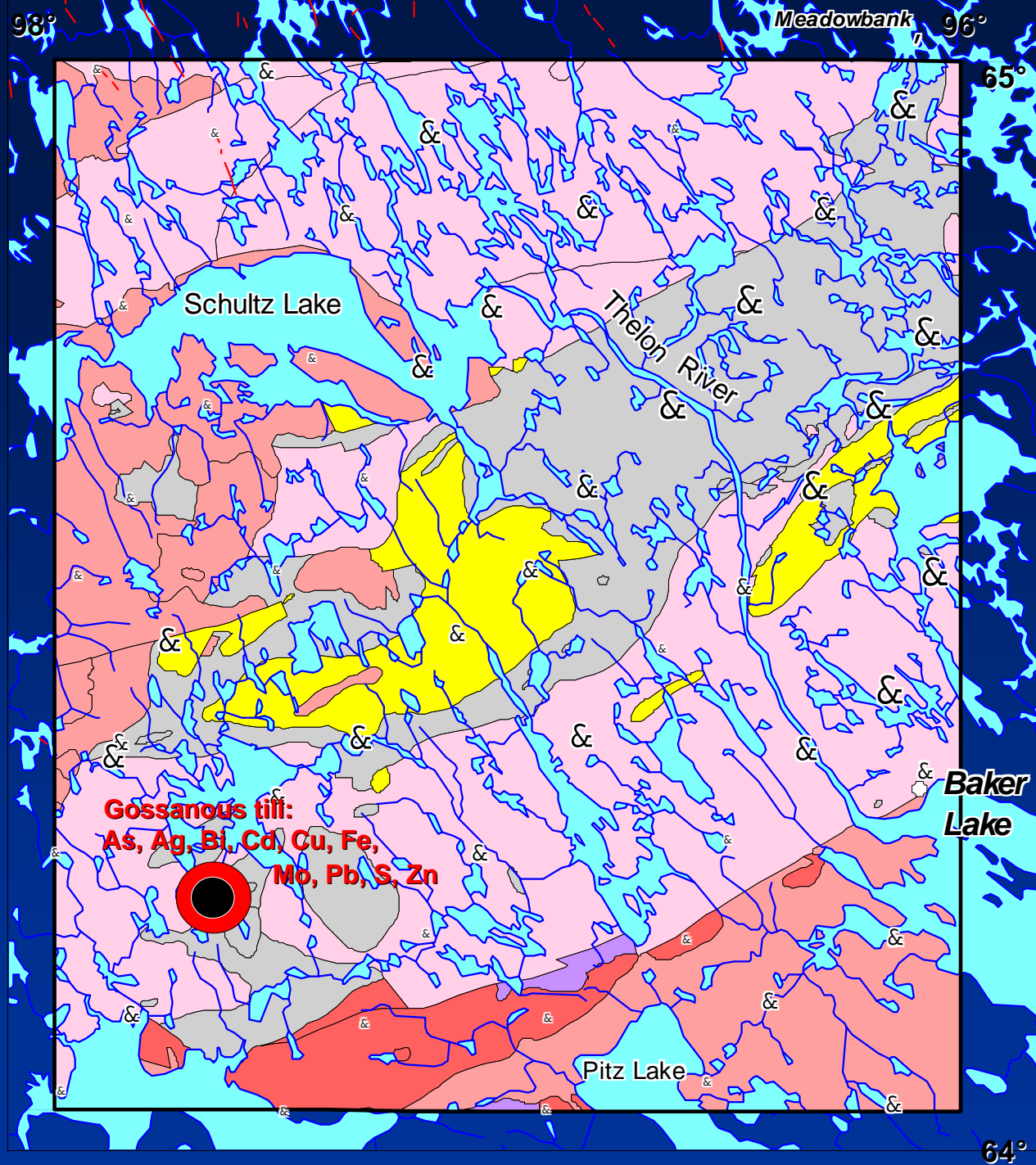
- Quartzite (Ketyet and Woodburn)

ARCHEAN

- Granitoid rocks and gneisses
- Woodburn Group (sedimentary and volcanic rocks)

Modified from Paul et al., 2002
(GSC OF 4236)

5 km



Gold grains total

0 to 68 grains
(not normalized)

Bedrock legend

PROTEROZOIC

Dubawnt Supergroup

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- Baker Lake Group (CIF and Martell Syenite)

ARCHEAN OR PROTEROZOIC

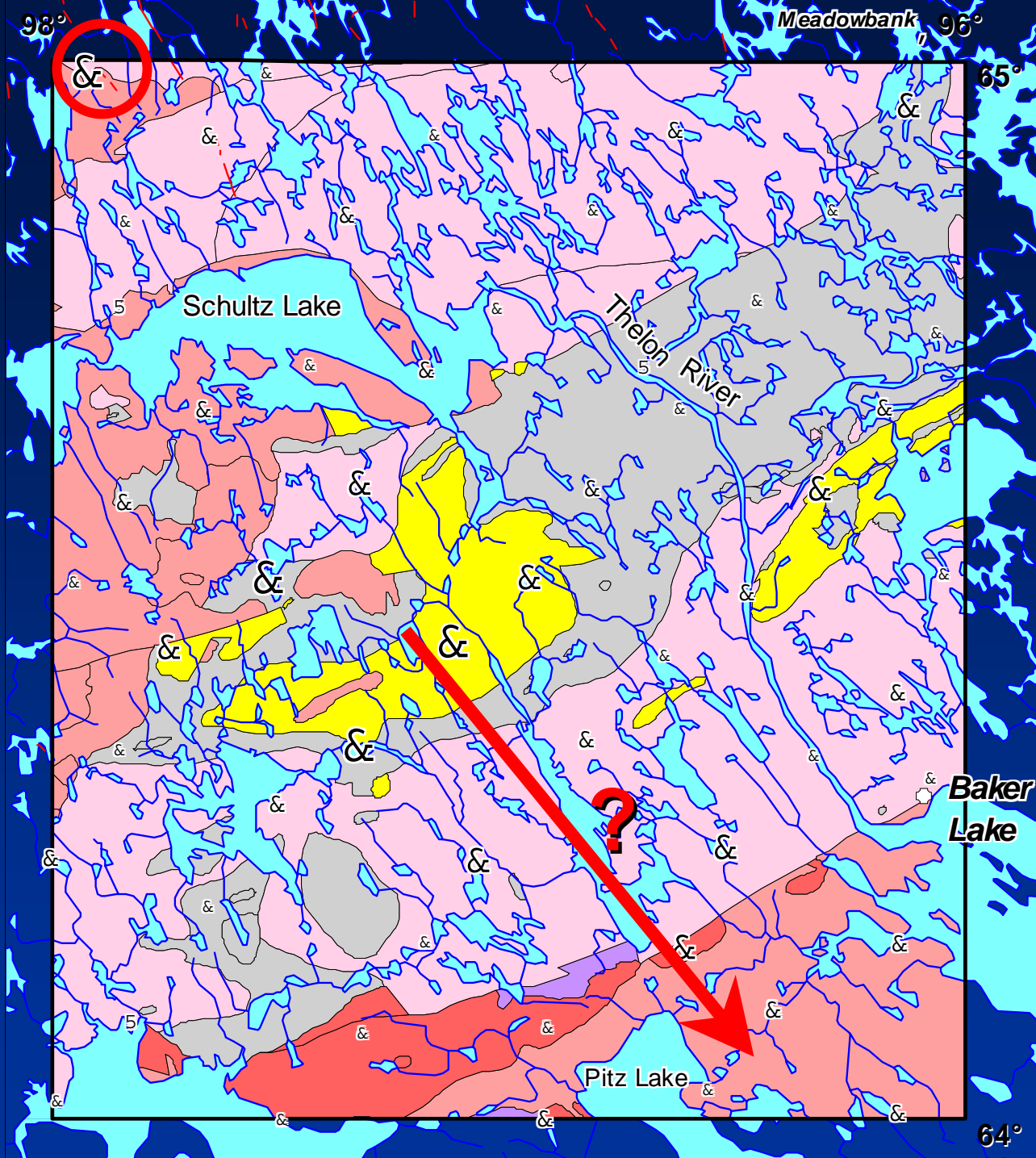
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ARCHEAN

- Granitoid rocks and gneisses
- Woodburn Group (sedimentary and volcanic rocks)

Modified from Paul et al., 2002
(GSC OF 4236)

5 km



Gold grains pristine

0 to 40 grains
(not normalized)

Bedrock legend

PROTEROZOIC

Dubawnt Supergroup

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ARCHEAN OR PROTEROZOIC

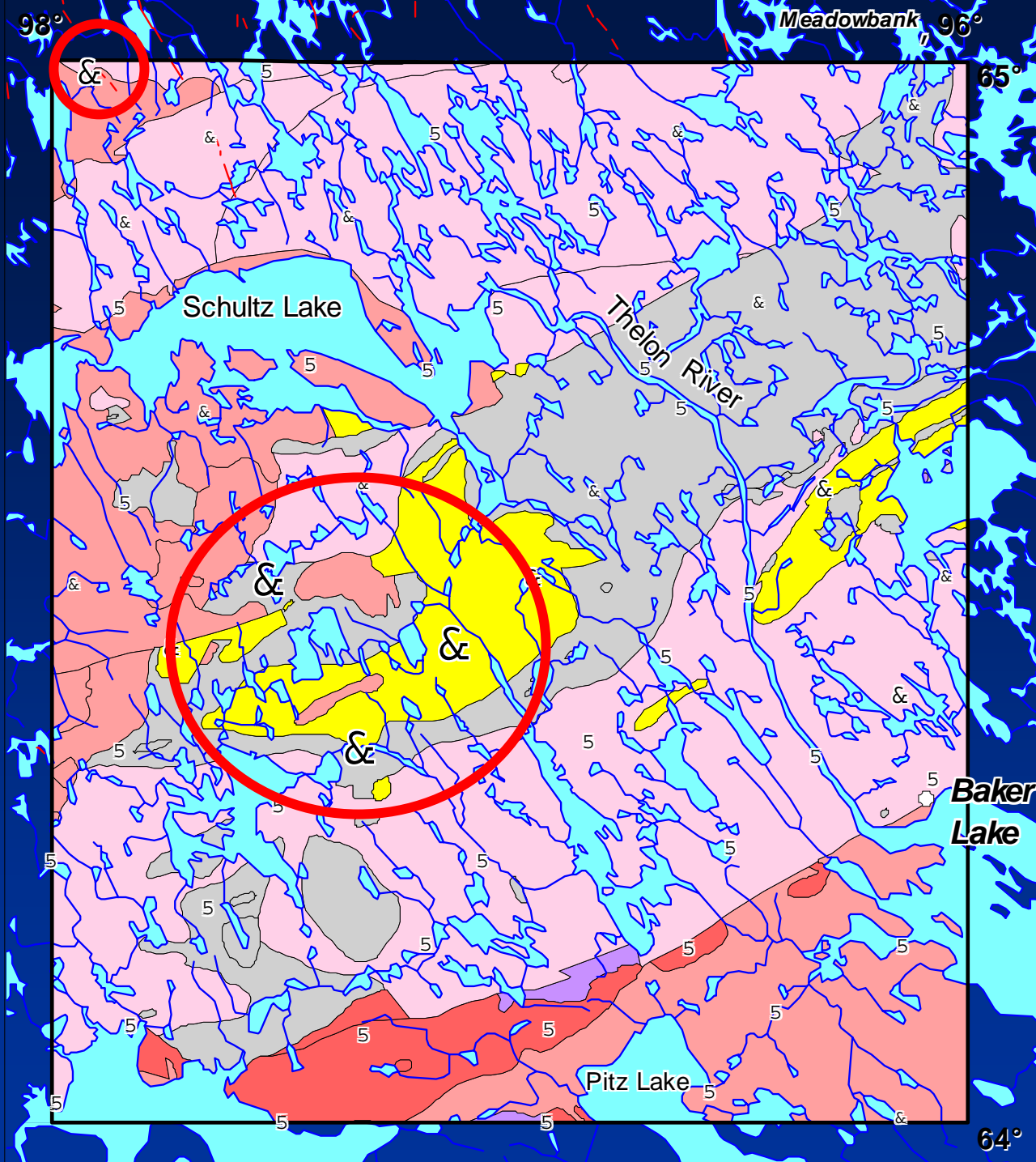
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ARCHEAN

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Modified from Paul et al., 2002
(GSC OF 4236)

5 km



Uranium

ppm

by gamma ray
spectrometry

<63 μm

(data provided by Ken Ford
through RPM project)

0.91 to 4.61 ppm

Bedrock legend

PROTEROZOIC

Dubawnt Supergroup

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ARCHEAN OR PROTEROZOIC

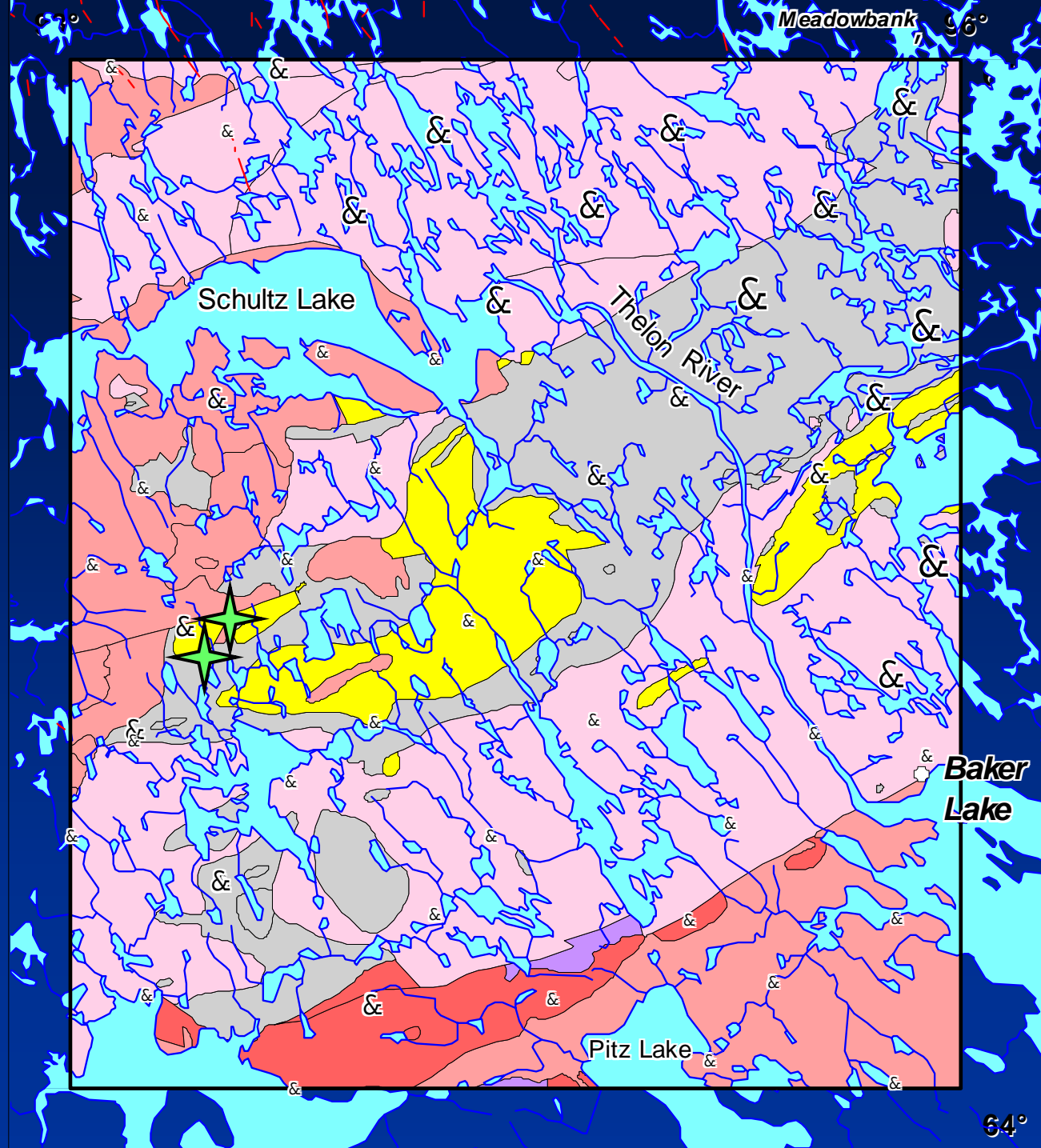
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ARCHEAN

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Modified from Paul et al., 2002
(GSC OF 4236)

5 km



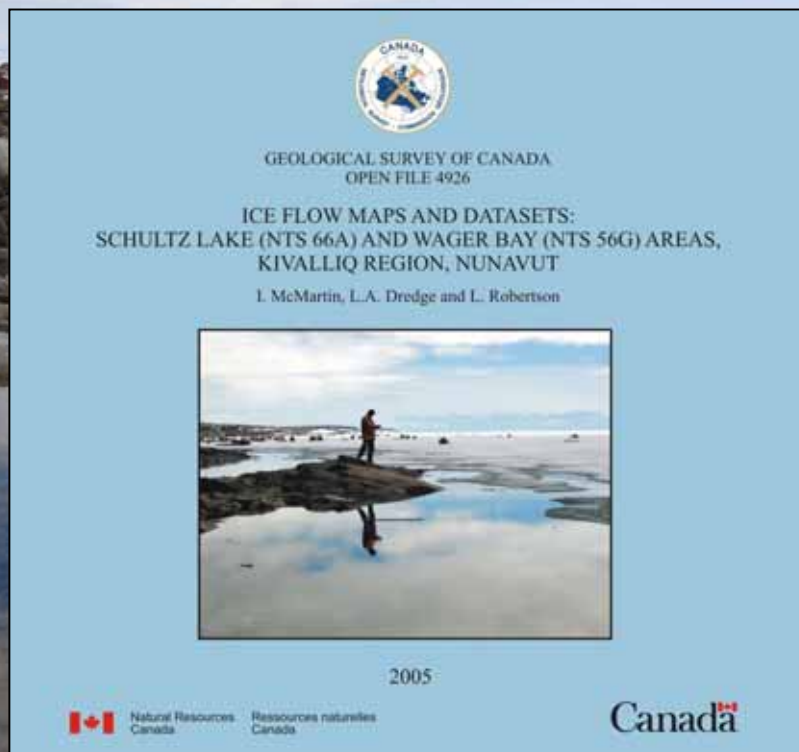
Conclusions

(Schultz and Wager)

- ❖ Although both areas lay beneath the KID, ice flow sequences, nature of surficial deposits, glacial transport history and characteristics are different: contrast in bedrock geology, topography, ice dynamics and ice margin configurations
- ❖ Schultz Lake area: major shifts in glacial directions, multiple till stratigraphy, well-developed polished surfaces and streamlined landforms: mobile, wet-based ice sheet, and shifting ice divide - till provenance is complicated
- ❖ Wager Bay area: poor development of glacial landscape, more consistent ice flows on either side of ice divide: stable ice divide, maybe cold-based prior to deglaciation - till has a more local provenance
- ❖ Except for the early SW flow and perhaps the southward-northward flows, all later flows could relate to deglaciation, opening of Hudson Bay, major migrations of the ice divide, formation of pro-glacial lakes, and rapid changes in the position and configuration of the ice margin

GSC Open File 4926

*McMartin, Dredge and Robertson (2005):
Ice flow maps and datasets: Schultz Lake (NTS 66A) and
Wager Bay (NTS 56G) areas, Kivalliq Region, Nunavut.*



April 1st, 2005

A photograph of a coastal town in Nunavut, Canada. The foreground is dominated by large, smooth, grey and brown boulders. In the middle ground, there is a cluster of colorful buildings, including houses and industrial structures, situated along a rocky shore. Several small boats are docked at the water's edge. The background shows a vast, open landscape under a cloudy sky.

GSC Current Research Paper B-1

Dredge and McMartin (2005):

Glacial lakes in the Wager Bay area, Kivalliq region, Nunavut.

GSC Current Research Paper B-2

McMartin and Dredge (2005):

History of ice flows in the Schultz Lake and Wager Bay areas, Kivalliq region, Nunavut.

GSC Current Research Paper xx

Dredge and McMartin (in press):

Postglacial marine deposits and marine limit determinations, inner Wager Bay area, Kivalliq region, Nunavut.

Acknowledgements

- Kaviq Kaluraq, J-F Gagnon
- GSC bedrock mapping group
- Polar Continental Shelf Project
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