



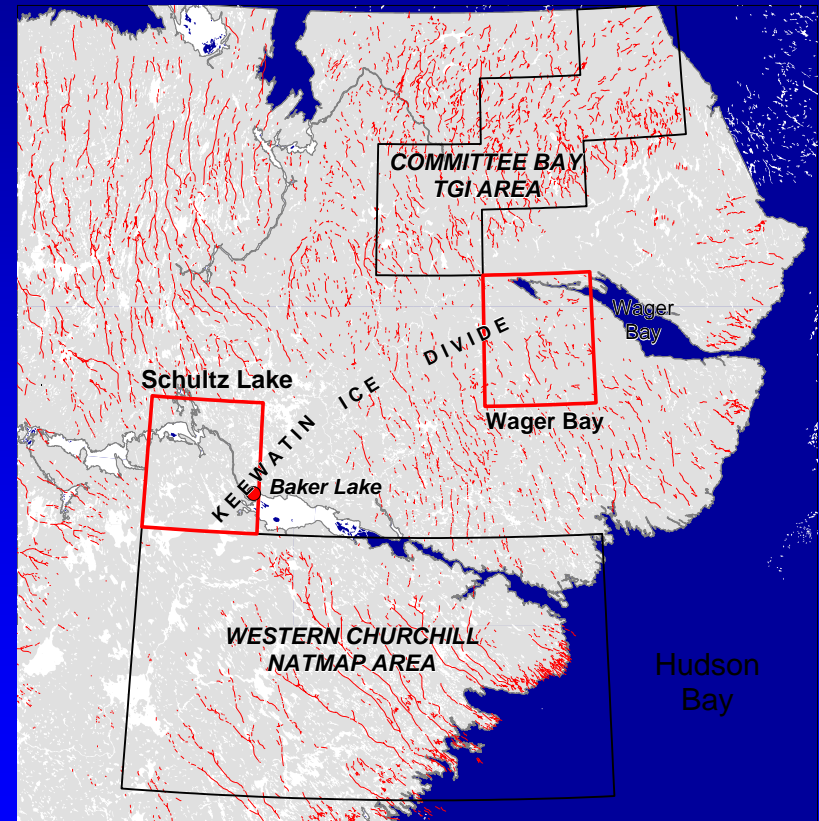
Framework mapping and glacial geology in the Wager Bay map sheet (NTS 56G)

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Western Churchill Metallogeny Project Workshop 2005

Why here?

- Fill in a major knowledge gap for Q geology
 - Recent and past projects in Keewatin/Kivalliq shown
- Provide new information for industry, especially multiple ice flows
- Understanding ice flow beneath the KID
- Info for development of Ukkusiksalik National Park

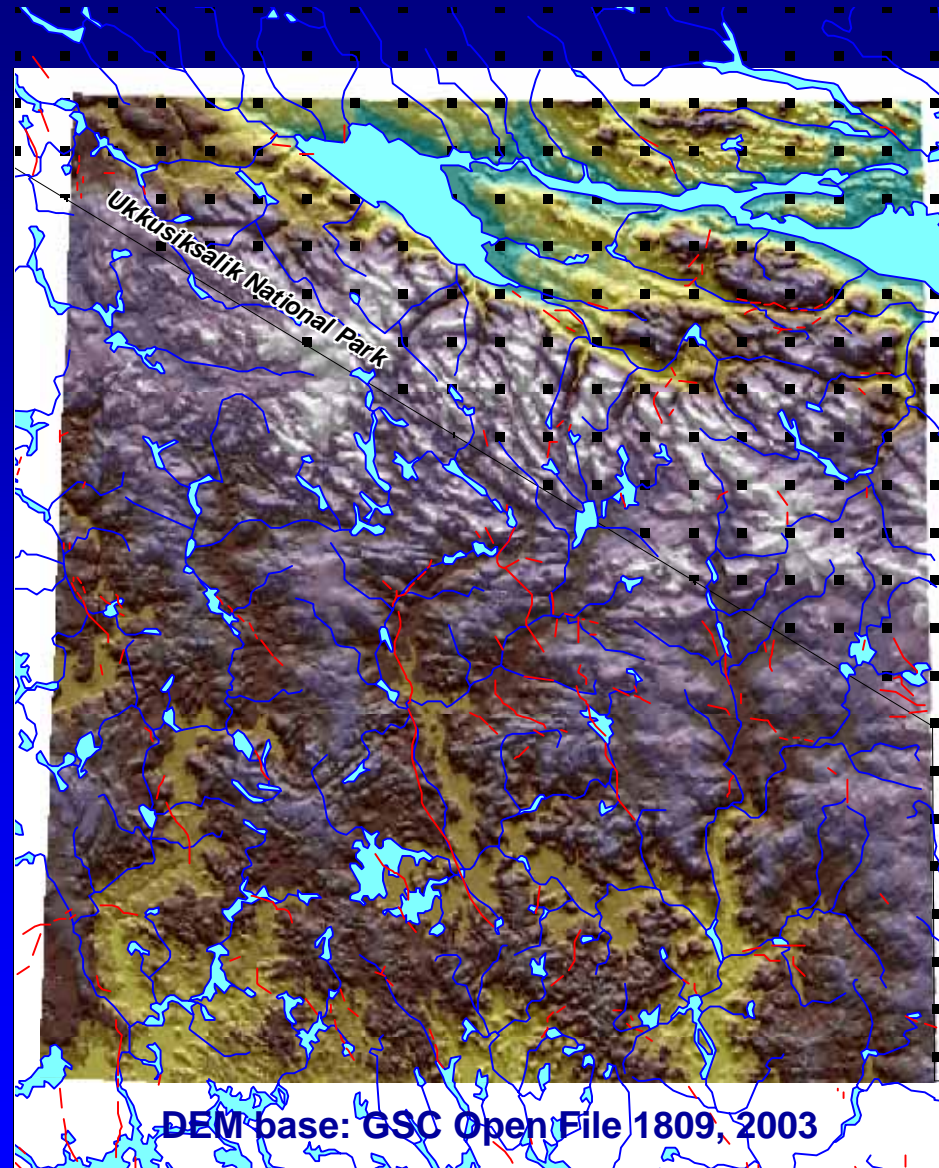


The project

- **Based at Sila Lodge and Dunsmuir Ventures camps for 2 weeks**
- **Glacial geology with main emphasis on determining ice flow directions and location of the KID (120 sites)**
- **Also glacial lakes, postglacial marine overlap and postglacial crustal rebound**
- **Sampling of till for geochemistry and KIMS was a major component (65 sites)**
- **Regional mapping of surficial materials**

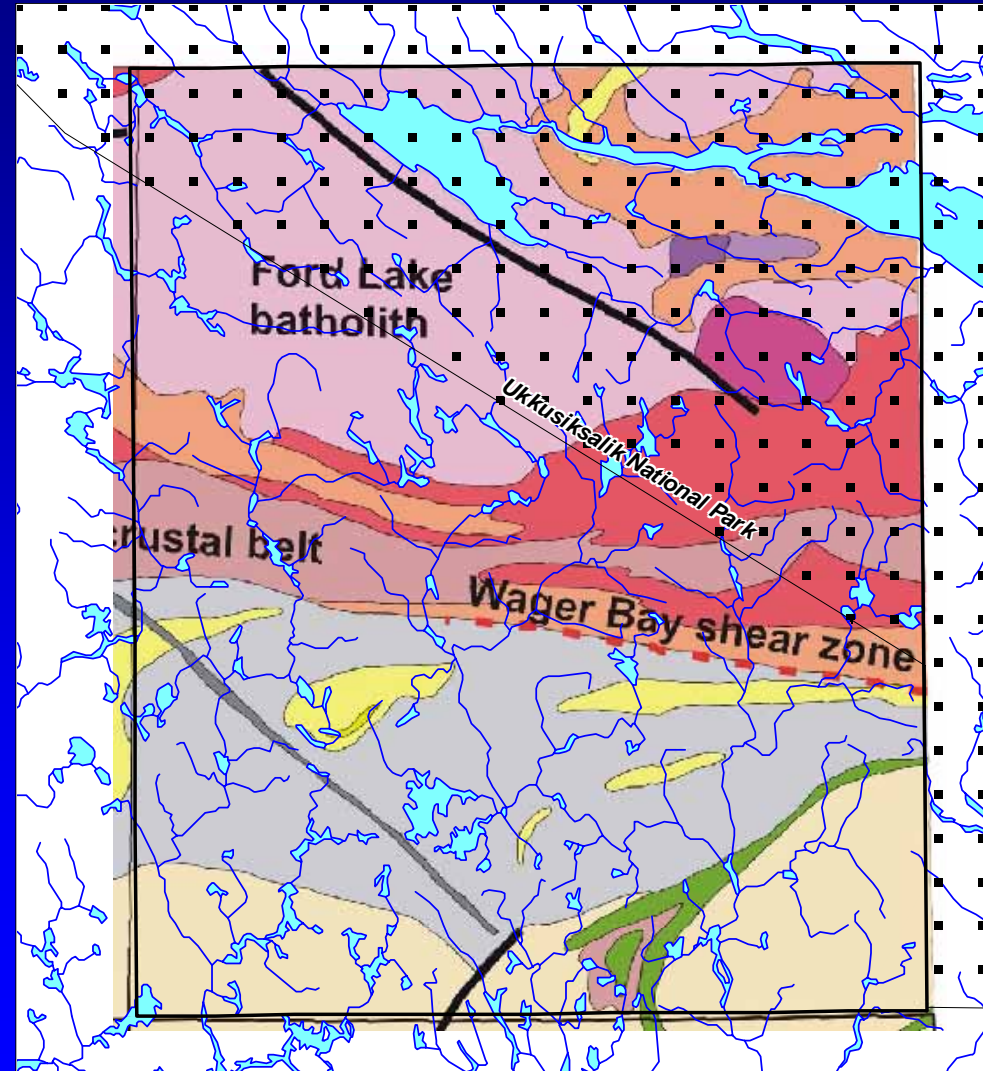
Nature of the area

- *Materials, landforms, style of glaciation, ice flow directions, effect of KID are different from central Kivalliq
- **Topography**
 - SL to 600m
 - Abrupt rise from Wager Bay and then gentle slope southward
 - Drainage divide and Park boundary



Principal materials: Rock

- **Rock types**
 - Archean gneiss and volcanics
 - Proterozoic gneiss and granite
- **Exposure**
- **Regolith beneath ice divide**



Predictive bedrock map

(from GSC OF 1809, 2003)

Principal materials: Till

- **Sandy to bouldery, some mudboils**
- **Till veneer**
 - Uplands
 - South
- **Till plains**
 - Blankets
 - Drumlins, but poorly developed



Principal materials: Glaciofluvial features

- Meltwater landscape south of the uplands
- Eskers in south
- Meltwater channels



Principal materials: Glacial lake deposits

- **Sandy plains**
- **High level deltas**



Principal materials: Marine deposits

- Around Wager Bay
- Beaches, deltas terraces and sand blankets



Ice flow history: Striation record

- 120 sites
- Difficult to determine
 - Gneissic rock types, and regolith
 - Meltwater scouring
 - Near divide, fewer and weaker striae



Tool kit

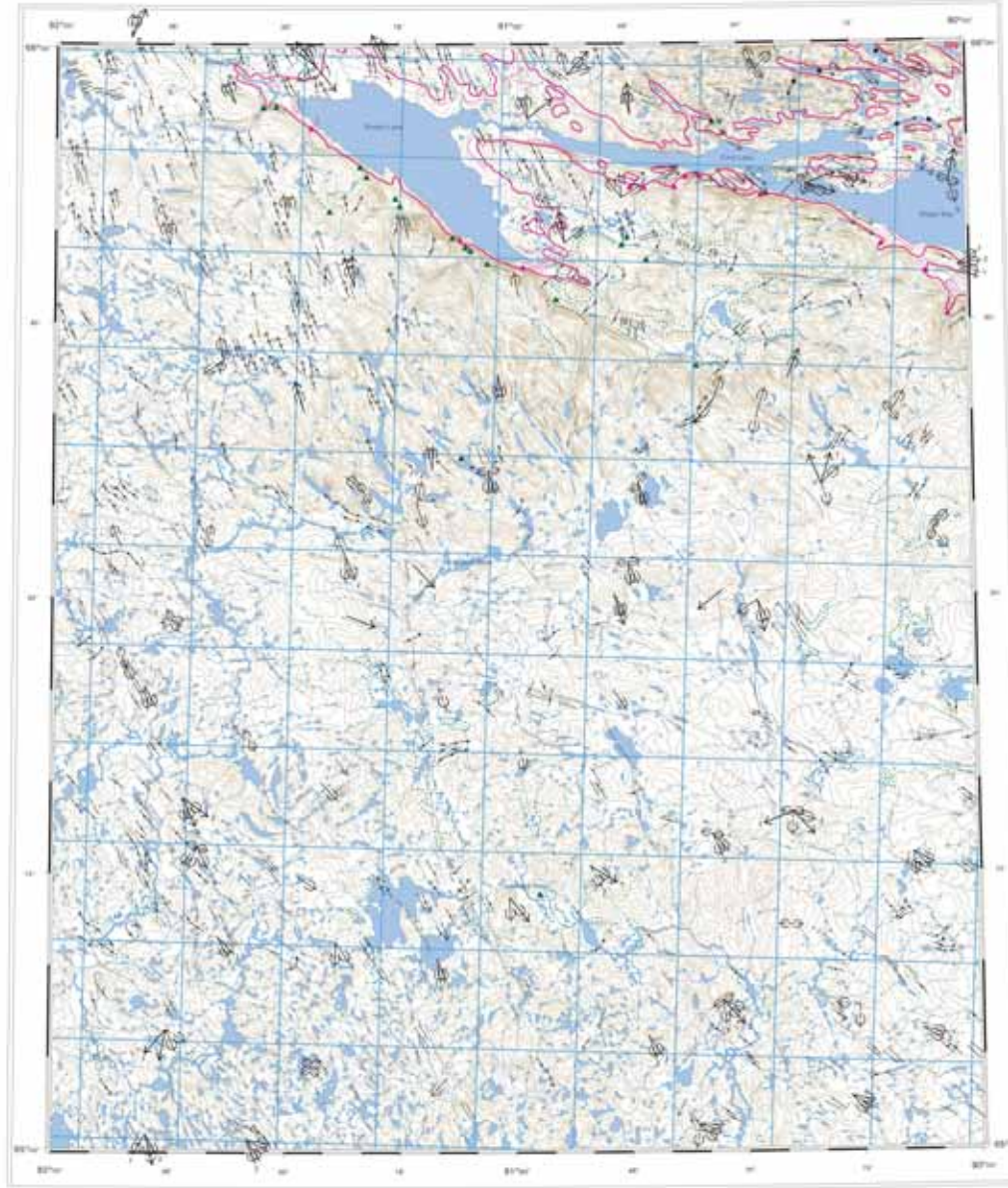
- **Compass**
- **Notebook & pencil**
- **GPS**
- **Trowel/shovel**
- **Scrubber**
- **Water bottle**
- **Lumber crayon**
- **Flashlight**



Ice flow data results

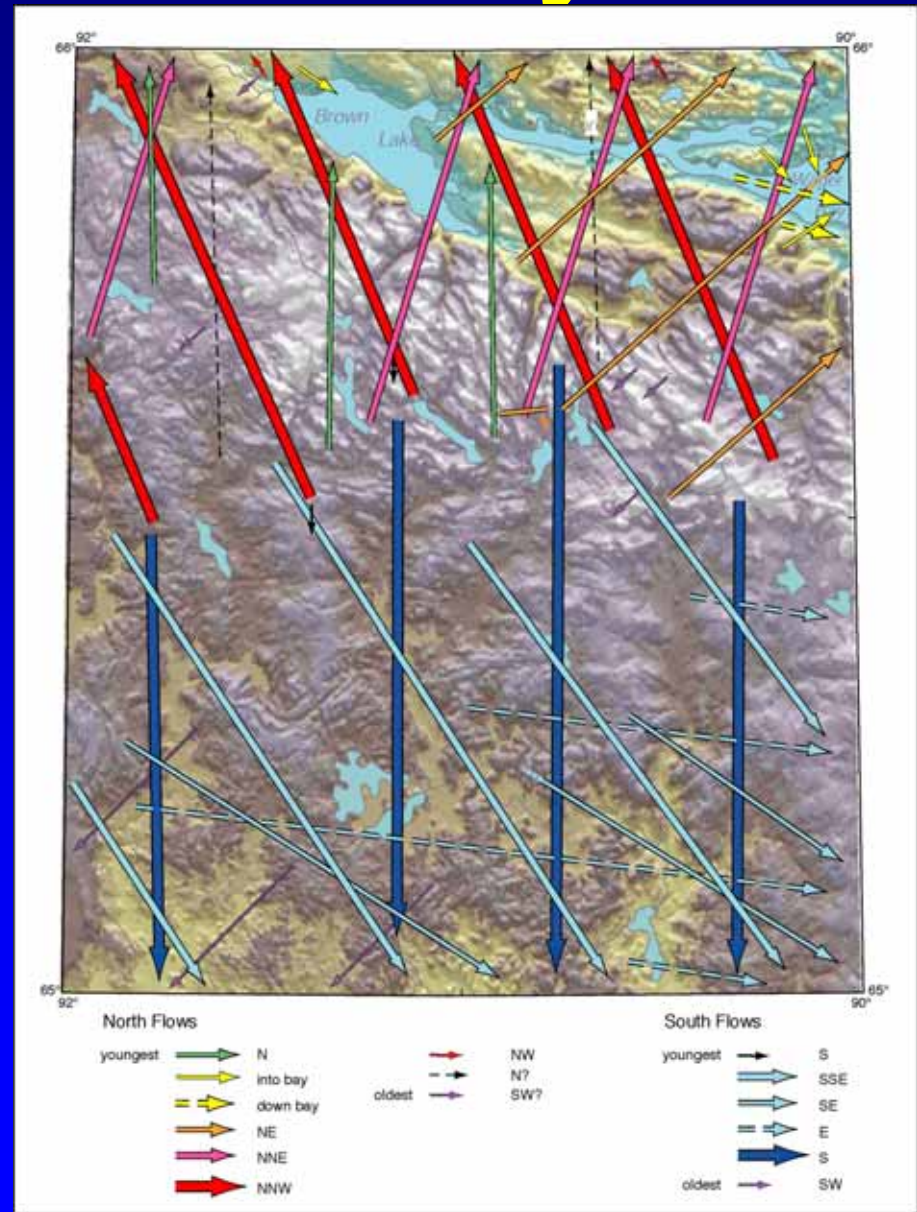
- **Consistent patterns over the area**
 - **Striations**
 - **Streamlined rock and till forms**

GSC OF 4926
McMartin, Dredge
and Robertson



Ice flow summary

- Two main domains
- North sequence
- South sequence
- Small area of overlap
- Location of divide is similar to Lee, somewhat different from Aylsworth maps
- Stable ice divide, minor swings
 - Striation directions consistent
 - Regolith in uplands
 - Cold ice? Few streamlined landforms and weak striae, BUT PRESENT
- Transport distance not far if near ice divide. Need to look at geochemistry
- Current research 2005-B2



Glacial lakes summary

- **Moraine or kame dammed shallow lakes related to temporary blockage of outwash in the south. Sandy deposits**
- **Ice-dammed lakes in the north: Brown Lake and finger lakes with spillways. Few deposits**

Current Research 2005-B1

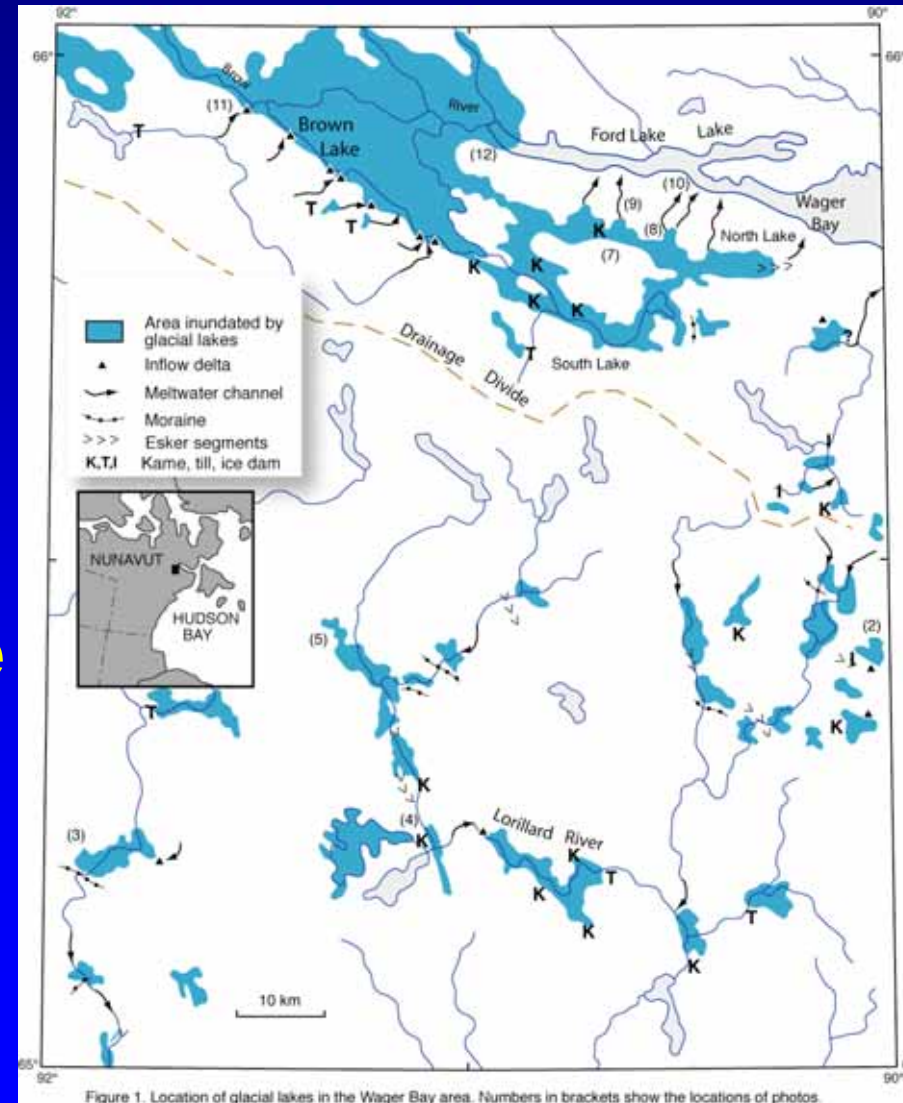
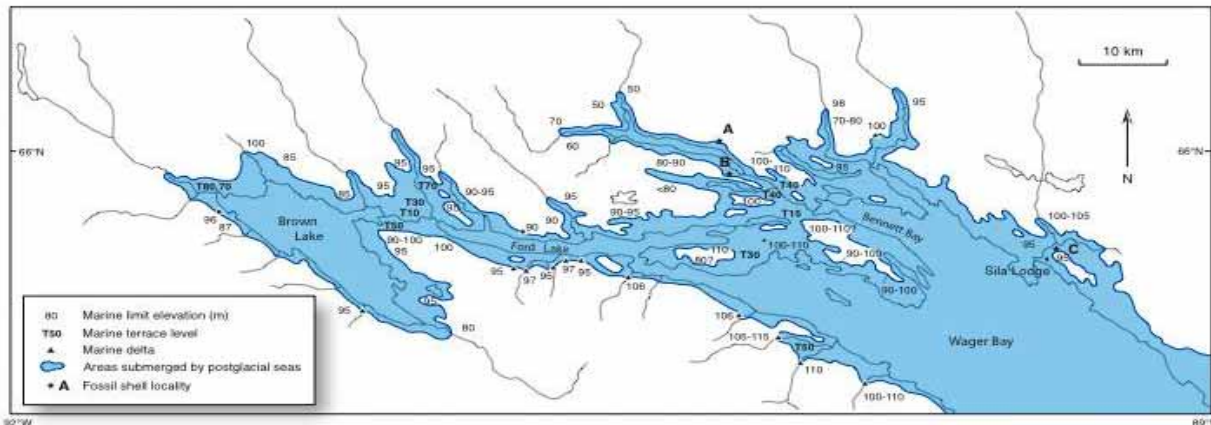


Figure 1. Location of glacial lakes in the Wager Bay area. Numbers in brackets show the locations of photos.

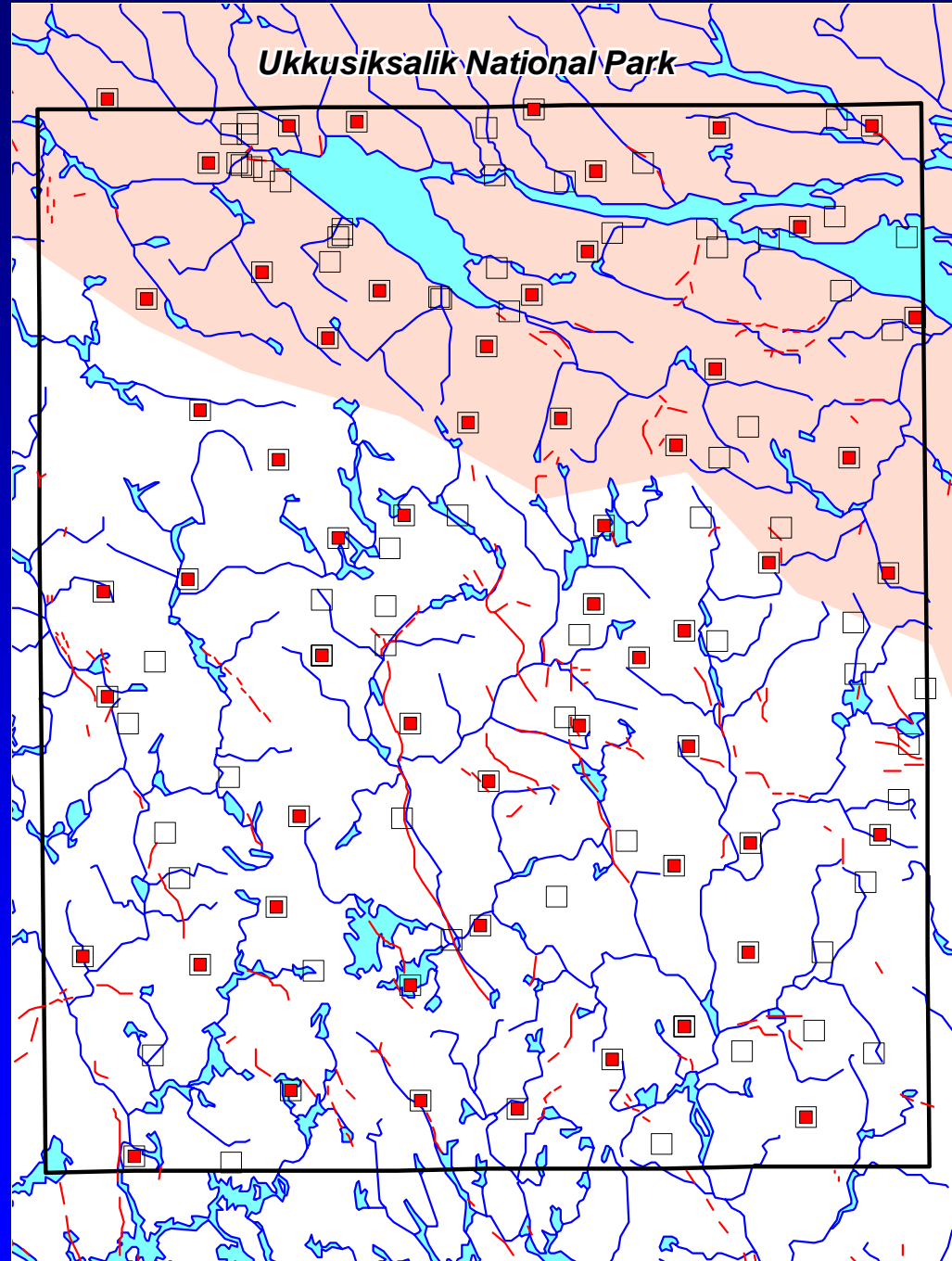
Postglacial marine episode summary

- Deposits limited to Wager Bay
- Marine limit from 110m to about 95m, and 80m where there is remnant ice
- Radiocarbon dates of 5800 years at 60m are minimums for time of deglaciation
- A Laurentide rebound sink. Related to late ice and the Keewatin Ice Divide



Current
Research 2005-
B3

Till geochemistry - sites (65)



Till geochemistry

- No huge hits in this regional survey
- Till/gossan pairs, and “Paliak” boundary zones
- Some relation to underlying RPM rock type
- Site 31
- To be released as a GSC Open File

Effects of gossan/non-gossan pairs

Nickel

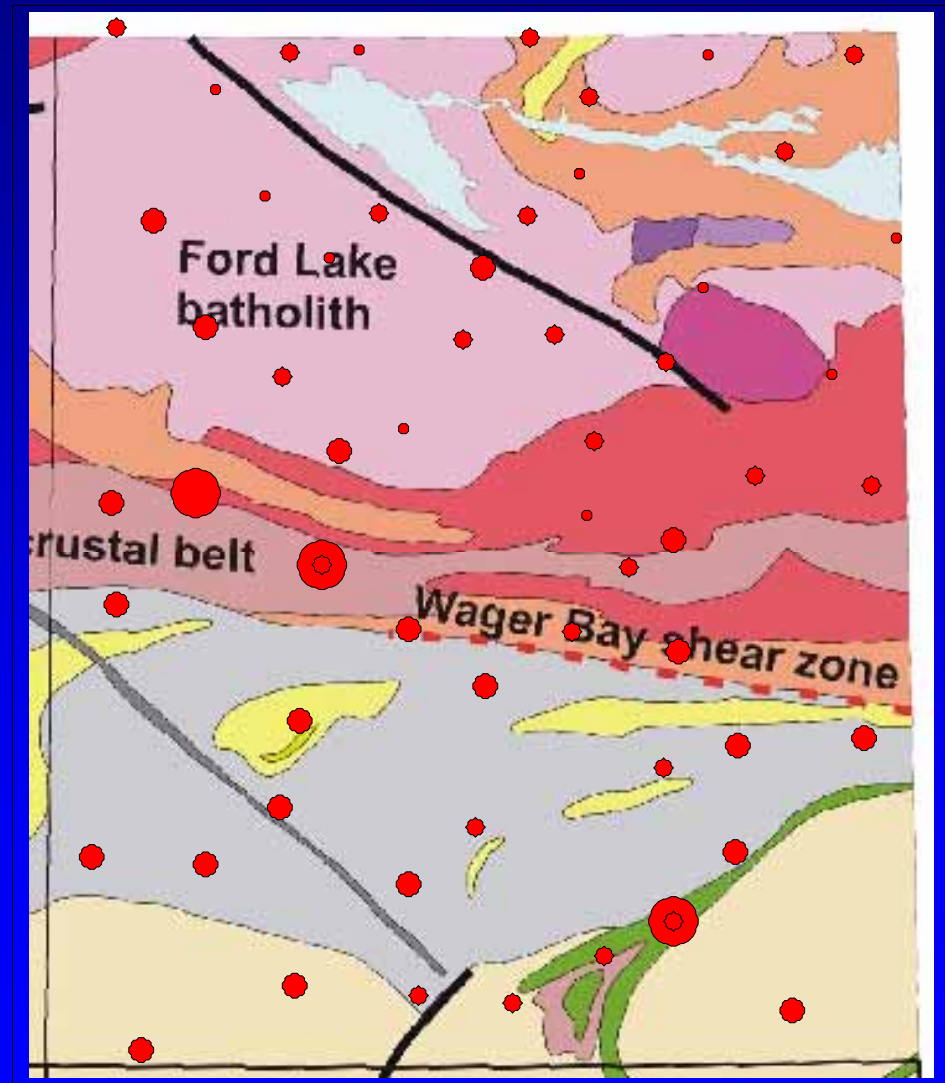
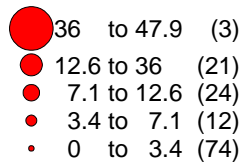
-Nickel is high in fresh till near gossans, but depleted in gossan deposits

-High concentrations along Prot/Archaean contact

ICP Legend

+ Point

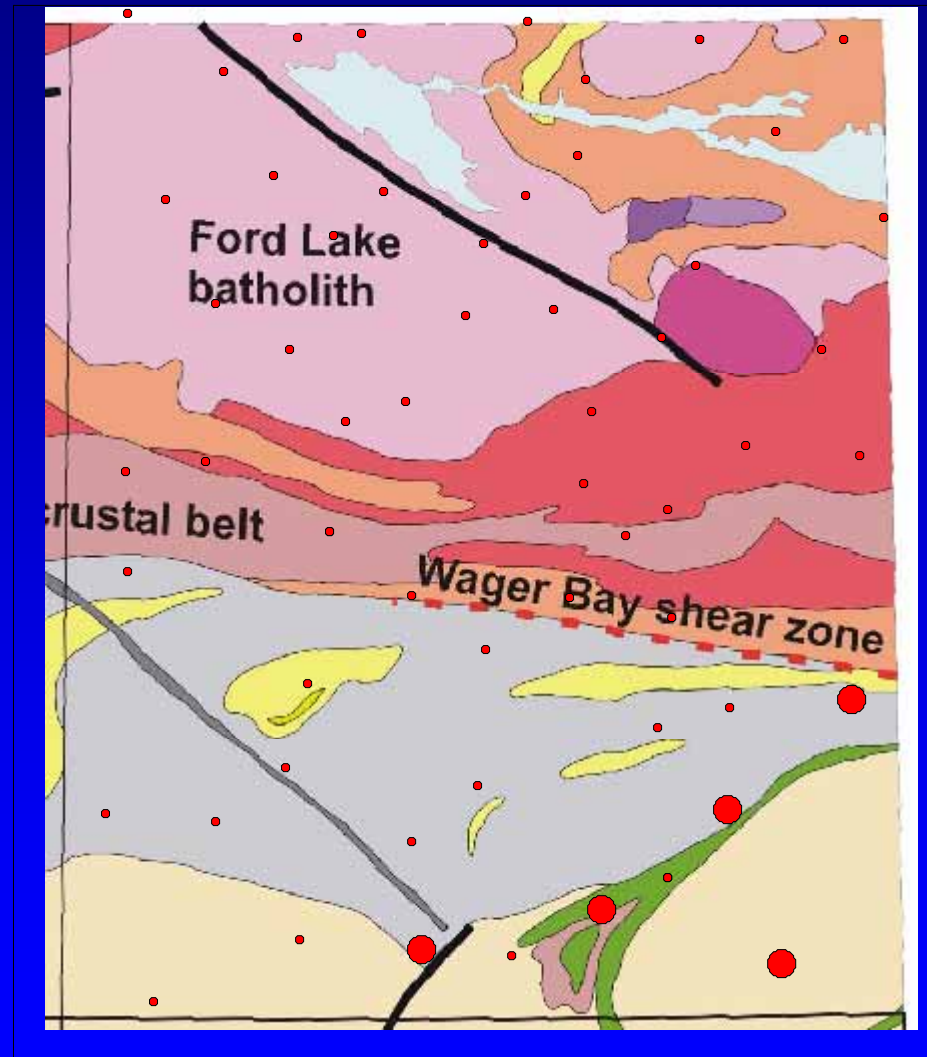
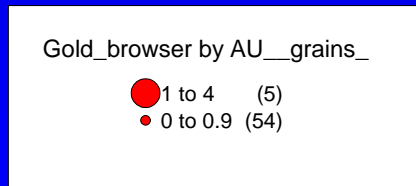
ICP by Ni__ppm_



Predictive bedrock map GSC Open File 1809, 2003

Volcanics-associated gold grains

Element abundance reflects concentrations in underlying rocks

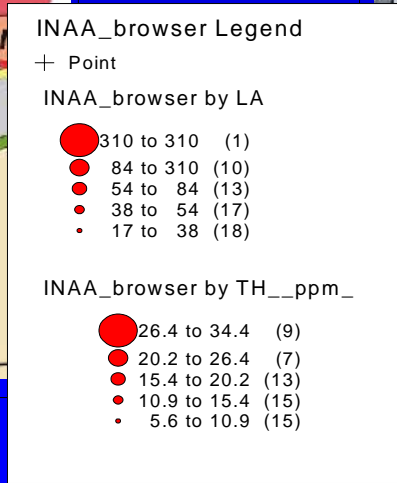
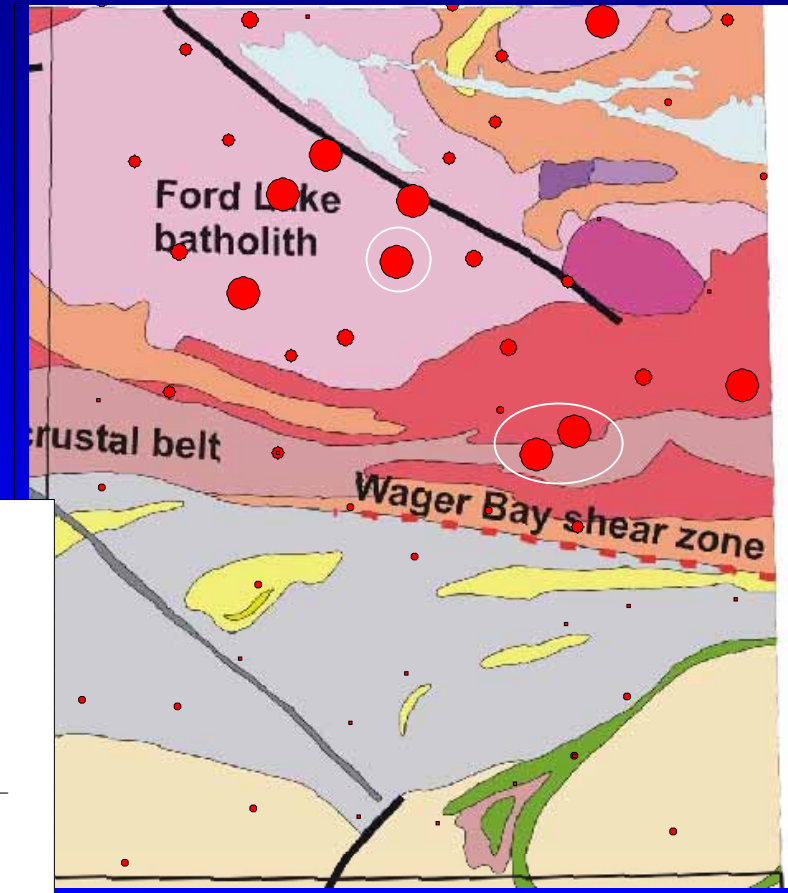
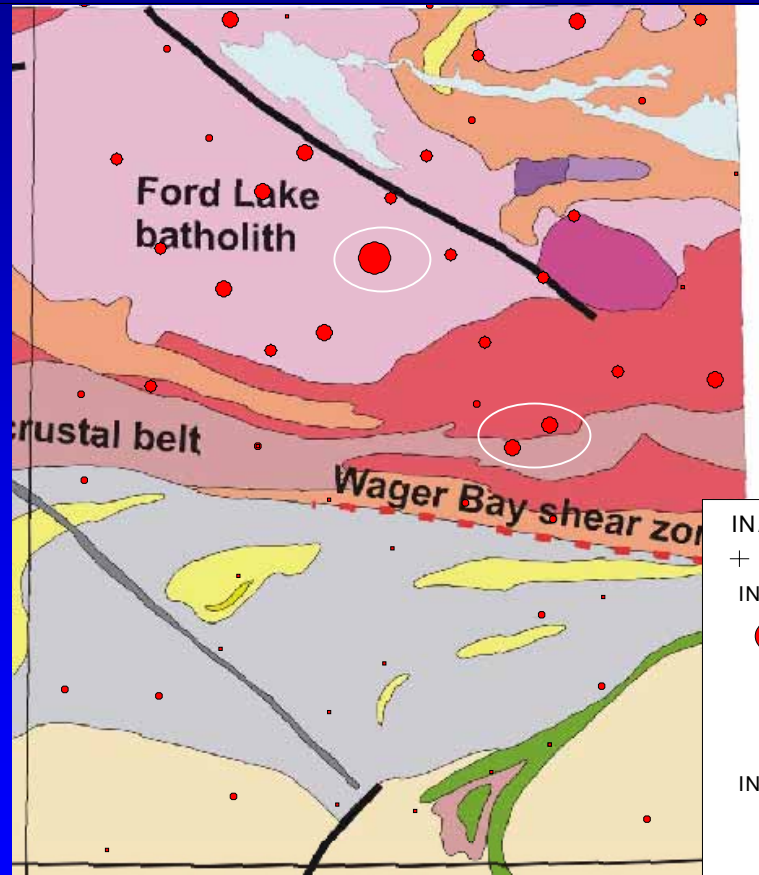


Elements related to the batholith

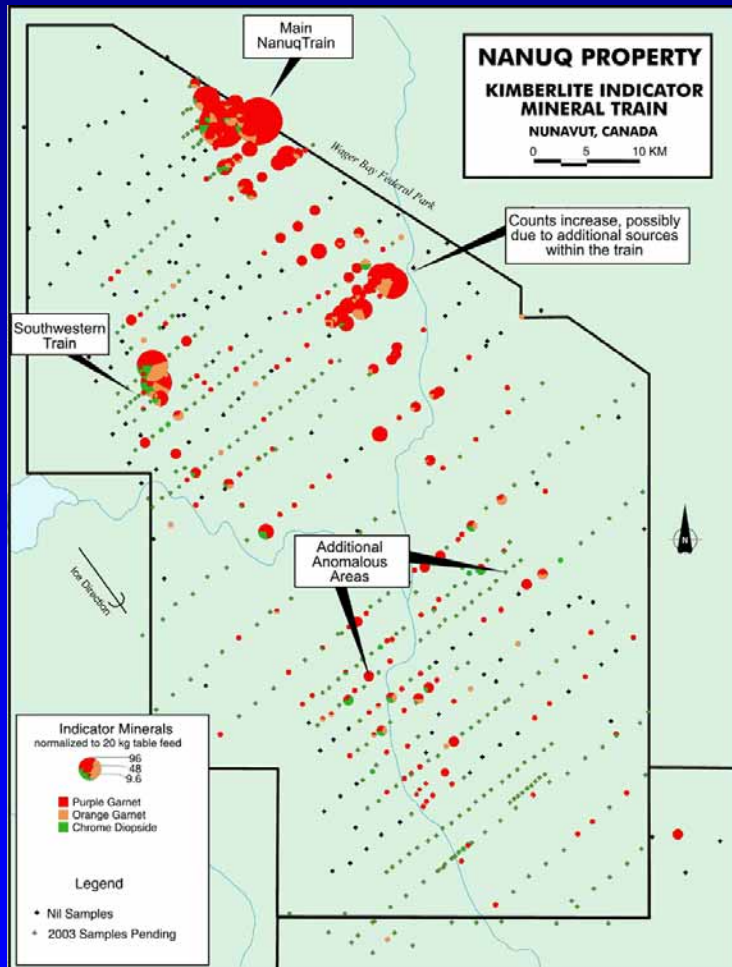
+ possible kimberlite pathfinders

Lanthanum

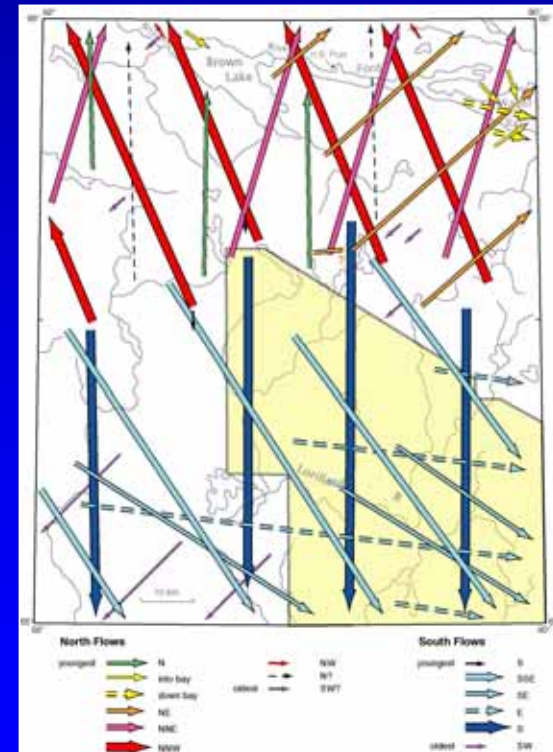
Thorium



Kimberlite indicators



- Awaiting budget



Outputs

1. Ice flow indicators (interpretation) – CR 05-B1
2. Ice flow indicators (maps and datasets) - OF 4926
3. Glacial lake history – CR 05-B2
4. Marine record, radiocarbon dates – CR 05-B3
5. Till geochemistry – in preparation
6. Kimberlite indicators – to be done
7. Surficial maps – to be assessed. Streamlined features are included on the open file maps.

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http://gsc.nrcan.gc.ca/bookstore/download/publist_e.php

**And that is how we spent
our summer**

