Drift Prospecting and Exploration Geochemistry in Glaciated Terrain, Northwestern New Brunswick, Canada

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NATMAP contribution
“Geological Bridges in Eastern Canada”
OBJECTIVES

NATMAP Quaternary Geology Component

• Follow up on National Geochemical Reconnaissance stream sediment and airborne geophysical surveys with Quaternary mapping, regional till geochemical sampling and drift prospecting in NATMAP bedrock mapping project areas (21 O/11, 12, 13, & 14).

• Study the effects of glacial dispersal at the Legacy, Patapedia, and Popelogan skarn occurrences and apply the data to the regional dataset (1750 sites) collected at 1:50 000 scale.
OBJECTIVES

NATMAP Quaternary Geology Component

• Develop a methodology for exploration geochemistry by studying glacial dispersal of anomalies, pebble lithology of till and background till-geochemical signatures over different rock units.

• Produce a Quaternary geology map consistent with previous work completed in New Brunswick (MDA) and Gaspesie, Quebec (Vieillette 1989).
Appalachian Foreland and Platform Architectures in Eastern Canada

Figure 1

 Transects 3 and 4

Caledonia Phase
(Early - Middle Wisconsinan)

Late Wisconsinan

Q/14

BC

Baie des Chaleurs

Bathurst

Miramichi

S

E

Natmap Quaternary Project

Numbers refer to sequence of Ice-Flow
Bedrock Geology (after Carroll, 2003)
CHALEUR UPLANDS
EDMUNDSTON HIGHLANDS – “KEDGWICK NOTCH”
Basal Till

Pabos Formation
Thick till, Chaleur Uplands
Edmundston Highlands area

Ae and Bf soil horizons

Clast rich basal till with sandy/clay/loam matrix

Basal till with higher clast content including several pebble erratics

Broken bedrock typical of regolith overlying the Temiscouata Fm.
Locally derived stony basal till
Figure 1

- Numbers refer to sequence of Ice-Flow

- Natmap Quaternary Project

- Caledonia Phase (Early - Middle Wisconsinan)
- Late Wisconsinan

- Quebec
- Edmundston
- Saint John River
- New Brunswick
- Maine
- NM-ND

- Baie des Chaleurs
- Bathurst
- Miramichi
- Mount Carleton
- Highlands
- TR

- 1
- 2
- 3
- 4
- 5
- 6

- 21O/13
- O/14
- O/11
- B/C
Former Glacial Meltwater Channel
Glacial striae near Kedgwick River valley, Edmundston Highlands
Felsic Dyke

Basal Till

Pabos Fm

Felsic Dyke
Ni in basal till
KEDGWICK AREA

Ni in stream sediments

Rock veneer (no till)

>200 ppm Ni in stream sediments
No till zone
Nickel in Stream-Sediments

Geochemical Data from Friske et. al. 1999; Open File 3820
Copper in Stream-Sediments

Geochemical Data from Friske et. al. 1999; Open File 3820
Kedgwick Area Ni Anomaly

- Good correlation of Ni in stream-sediments and basal till, with the areal extent of the Boland Brook Formation and consistent Ni values of 2–3 times avg. continental crust invoke a ‘formational’ source for the Ni; possibly concentrated by mechanical and/or chemical processes related to relief.
Cu-Skarns – Matapedia Group

1) Legacy deposit – 444,528t @ 1.7% Cu & 0.86 g/t Au over 0.3 m (+Ag, Pb, Zn)

2) Patapedia (N, C, S zones) – Cu, Zn, Pb

3) Popelogan (S) – Cu, Zn, Pb, W
Figure 1b  
Cu in Basal Till  Legacy Deposit

Cu ppm
> 285
> 174
> 117
< 42

McKenzie Gulch  
(Legacy Deposit)  
Cu, Ag, Zn, Au
CONCLUSIONS

• Till is thin, although locally is up to 3m thick.
• Ice movement was in an east-southeast direction (090-160) in the western part of the area and east-northeast in the eastern part of the area (030-100).
• Pebbles in till reflect local bedrock.
• Boulder erratics from as far away as the Canadian Shield are scattered throughout the area.
• There are definite till geochemical signatures over different bedrock (e.g. elevated Ni, Co and Cr concentrations over parts of the Grog Brook Group in the Kedgwick and Menneval areas).
CONCLUSIONS

• Cu, Pb, and Zn, as well as Au and pathfinders are anomalous over the Patapedia and Legacy deposits.

• 50 to 100 till sample sites on a roughly 250 centred grid, in an area covering approximately 70 claims is sufficient to detect sulphide mineralization on the Patapedia property and provide data to direct further geochemical sampling and trenching.
Till Samplers?
The End
NATMAP PRODUCTS

- Terrain Classification and field data study - Gournamitz River (21 O/12) area - Arseneau 2003
- Paper McKenzie Gulch (Legacy Deposit) area 1998
- Open File - Till geochemistry of 21 O/11, 12, 13, & 14 map areas including Patapedia area
- Quaternary geology map of 21 O/11, 12, 13, & 14 map areas
- Synthesis paper - NATMAP study area