

**TILL-GEOCHEMISTRY SURVEY IN THE GREAT
GULL LAKE (NTS MAP AREA 2D/06),
MOUNT SYLVESTER (NTS MAP AREA 2D/03)
AND ADJACENT MAP AREAS**

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Open File NFLD/3387

**St. John's, Newfoundland
February, 2020**

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SUMMARY

This report provides the data for 405 samples collected from a 2017 till-geochemistry survey in the Great Gull Lake (NTS 2D/06) and northwest Mount Sylvester (NTS 2D/03) map areas, as well as portions of NTS map areas 2D/04, 05, 11, 12 and 1M/13 (Figure 1). The survey was conducted using helicopter and truck.

The purpose of the 2017 study was to investigate the till-geochemical signatures of the aforementioned NTS map areas, and to provide data for the provincial till-geochemical database to assist in ongoing exploration efforts.

NOTES ON DATABASE

This database includes the results of the geochemical analyses of 60 elements from the <63 μm sieve fraction of 405 B- or C-horizon samples, collected in 2017. Analyses using inductively coupled plasma-optical emission spectrometry (ICP-OES) following a 4-acid digestion were car-

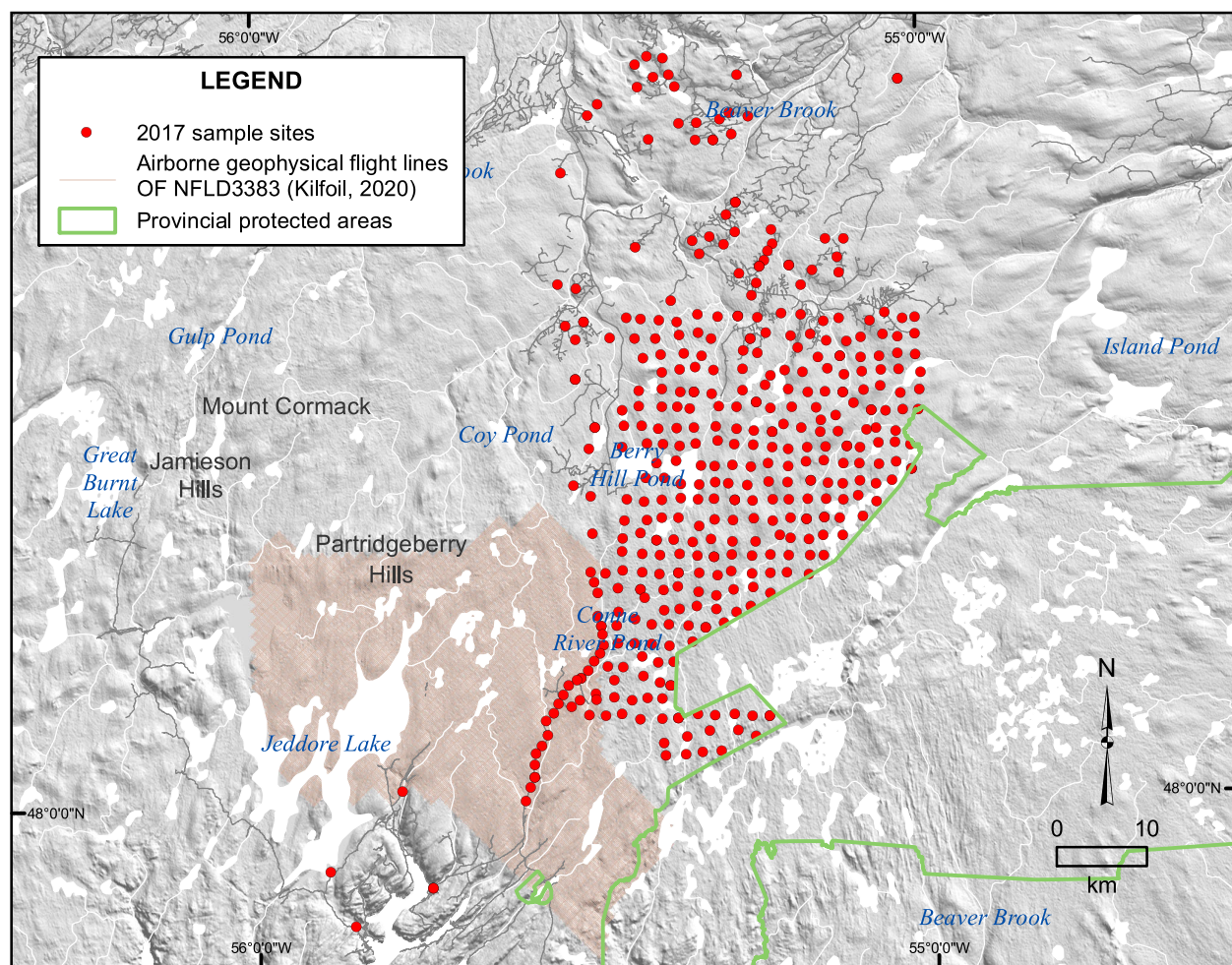


Figure 1. Map showing the location of the 2017 sample sites. Area delineated by green represents provincial protected areas (Bay du Nord wilderness area). Flight lines (brown) for new airborne geophysical data (Kilfoil, *in press*) are shown to the northeast of Jeddore Lake.

ried out at the Geological Survey of Newfoundland and Labrador's (GSNL) laboratory in St. John's for aluminum, arsenic, barium, beryllium, cadmium, calcium, cerium, chromium, cobalt, copper, dysprosium, iron, lanthanum, lead, lithium, magnesium, manganese, molybdenum, nickel, niobium, phosphorus, potassium, rubidium, scandium, sodium, strontium, titanium, vanadium, yttrium, zinc, and zirconium. Analyses by instrumental neutron activation analysis (INAA) were performed at Maxxam Laboratories (now Bureau Veritas) in Mississauga, ON, for antimony, arsenic, barium, bromine, cerium, cesium, chromium, cobalt, europium, gold, iron, hafnium, lanthanum, lutetium, molybdenum, rubidium, scandium, samarium, selenium, sodium, tantalum, terbium, thorium, tungsten, uranium and ytterbium. Silver, fluoride and loss-on-ignition (LOI) analyses were also completed at the GSNL laboratory. Silver was analyzed by ICP-OES after nitric acid digestion; fluoride by ion-selective electrode after an alkaline fusion, and LOI by gravimetry. A detailed description of the above analytical methods is provided in Finch *et al.* (2018). To distinguish the different analytical methods, the trace-element variables are labelled with a combination of the element symbol name and a numeric suffix (*e.g.*, Cu2) indicating the type of digestion or preparation and the instrument used to analyze the element:

- Suffix1 for INAA with no digestion
- Suffix 2 for ICP-OES after 4-acid digestion,
- Suffix 6 for ICP-OES after HNO₃ digestion, and
- Suffix 9 for ion-selective electrode after alkaline fusion

(for further details *see* Geoscience Atlas till geochemistry help file at http://geoatlas.gov.nl.ca/Custom/help/Till_geochem_help_tables/Table2_AnalyticalMethods.html/). A complete list of variables, detection limits and range of values are given in Table 1. Values below the detection limits are replaced by a value that is ½ of the detection limit. In the (limited) case where some elements analyzed by INAA show variable detection limits, the reported value is ½ the detection limit. The location data for each sample is given in Universal Transverse Mercator (UTM) eastings and northings (Zone 21; NAD 27). A brief sample and site description is also provided. The field and geochemical data is available in digital format (*i.e.*, *.csv comma-separated values file) in Appendix A.

Results of standards and duplicates are similar to those reported in other till-sampling programs (*e.g.*, Brushett and Amor, 2016; Organ and Amor, 2016a, b). Standard and duplicate data will be released at a later date, along with geochemical distribution maps.

ACKNOWLEDGMENTS

The author is grateful to Joanne Rooney for her skills with the publishing of this report. Kim Morgan is thanked for her drafting talents with the figure. Pauline Honarvar is much appreciated for her meticulous editing of both the text and the tables, and her discussions about the presentation of geochemical data. A special thank you to Gerry Hickey, for his logistical expertise and his commitment to ensuring our safety during the survey. Dave Taylor and Robyn Constantine are thanked for their involvement with the sample collection. A special thank you and shout out to MUN summer student Brittany Baker, whose thoroughness and attention to detail during this survey was much appreciated.

Table 1. Geochemical elements for the 2017 survey, their analysis methods, measurement units, detection limits (D.L.), number of samples that are less than the DL (<D.L.) and range of data values

Element	Method	Units	D.L.	<D.L.	Max	Min	Element	Method	Units	D.L.	<D.L.	Max	Min
Ag6	ICP-OES	ppm	0.1	399	1.0	<0.1	Lu1	INAA	ppm	0.05	1	1.2	<0.05
Al2	ICP-OES	%	0.01	0	11.28	4.21	Mg2	ICP-OES	%	0.01	0	2.83	0.06
As1	INAA	ppm	0.5	0	324.0	0.8	Mn2	ICP-OES	ppm	1	0	2860	72
As2	ICP-OES	ppm	2	0	320	2	Mo1	INAA	ppm	1	341	16	<1
Au1*	INAA	ppb	1	247	33	<1	Mo2	ICP-OES	ppm	1	248	15	<1
Ba1	INAA	ppm	50	0	1300	59	Na1	INAA	%	0.05	0	2.9	0.6
Ba2	ICP-OES	ppm	1	0	1418	45	Na2	ICP-OES	%	0.01	0	3.05	0.57
Be2	ICP-OES	ppm	0.1	0	5.5	0.7	Nb2	ICP-OES	ppm	1	0	21	1
Br1	INAA	ppm	1	6	156	<1	Ni2	ICP-OES	ppm	1	0	188	3
Ca2	ICP-OES	%	0.01	0	2.37	0.14	P2	ICP-OES	ppm	1	0	2032	90
Cd2	ICP-OES	ppm	0.1	218	0.4	<0.1	Pb2	ICP-OES	ppm	1	0	26	4
Ce1	INAA	ppm	3	0	468	26	Rb1	INAA	ppm	5	0	170	6
Ce2	ICP-OES	ppm	1	0	256	21	Rb2	ICP-OES	ppm	1	0	164	13
Co1*	INAA	ppm	2	54	32	<2	Sb1	INAA	ppm	0.1	4	6.6	<0.1
Co2	ICP-OES	ppm	1	1	58	<1	Sc1	INAA	ppm	0.1	0	23.3	1.8
Cr1*	INAA	ppm	25	1	1610	<25	Sc2	ICP-OES	ppm	0.1	0	25.0	2.1
Cr2	ICP-OES	ppm	1	0	247	5	Se1*	INAA	ppm	1	404	3	<1
Cs1	INAA	ppm	0.5	0	16.0	1.4	Sm1	INAA	ppm	0.1	0	24.5	1.7
Cu2	ICP-OES	ppm	1	0	121	3	Sr2	ICP-OES	ppm	1	0	321	54
Dy2	ICP-OES	ppm	0.1	0	5.8	1.0	Ta1	INAA	ppm	0.2	1	4.2	<0.2
Eu1*	INAA	ppm	0.5	97	3.0	<0.5	Tb1	INAA	ppm	0.5	6	2.2	<0.5
F9	ISE	ppm	5	0	516	78	Th1	INAA	ppm	0.5	0	129	4.3
Fe1	INAA	%	0.1	0	6.5	0.2	Ti2	ICP-OES	ppm	1	0	9335	1161
Fe2	ICP-OES	%	0.01	0	6.80	0.29	U1	INAA	ppm	0.1	0	15.4	1.7
Hf1	INAA	ppm	1	0	24	2	V2	ICP-OES	ppm	1	0	168	9
K 2	ICP-OES	%	0.01	0	3.08	0.18	W1	INAA	ppm	1	18	21	<1
La1	INAA	ppm	1	0	229	9	Y2	ICP-OES	ppm	1	0	27	6
La2	ICP-OES	ppm	1	0	142	10	Yb1*	INAA	ppm	0.5	2	8.2	<0.5
Li2	ICP-OES	ppm	0.1	0	86.1	12.3	Zn2	ICP-OES	ppm	1	0	135	12
LOI	Gravimetric	%	0.1	0	29.2	1.1	Zr2	ICP-OES	ppm	1	0	250	22

Note: Certain elements show elevated detection limits in a few samples due to low sample weights or matrix effects. In these limited cases, the total number of samples under the variable detection limits is reported.

REFERENCES

Brushett, D. and Amor, S.D.

2016: Till geochemistry of Eastern Pond and Miguels Lake (NTS map areas 2D/11, 12), Jeddore Lake (NTS map areas 1M/13, 2D/04 and 12A/01) and surrounding areas. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File NFLD/3273, 107 pages.

Finch, C., Roldan, R., Walsh, L., Kelly, J. and Amor, S.D.

2018: Analytical methods for chemical analysis of geological materials. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File NFLD/3316, 67 pages.

Kilfoil, G.J.

In press: Airborne geophysical survey of the Twillick Brook region, Newfoundland (NTS map area 2D/04 and parts of 2D/03, 05, 1M/13, 14 and 12A/01). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File NFLD/3383.

Organ, J.S. and Amor, S.A.

2016a: Till geochemistry of Sheffield Lake, Springdale, Dawes Pond and The Topsails (NTS map areas 12H/07, 08, 01, 02). Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File 012H/2212, 34 pages.

2016b: Till geochemistry of The Topsails and Rainy Lake (NTS map areas 12H/02 and 12A/14) and surrounding areas. Government of Newfoundland and Labrador, Department of Natural Resources, Geological Survey, Open File NFLD/3301, 29 pages.

APPENDIX A

Appendix A is available as a digital comma-separated file (.csv) through [this link](#).

Appendix A: Till Geochemistry 2017