Newfoundland & Labrador

Industry, Energy and Technology

Mines

HUMUS AND TILL GEOCHEMISTRY AS EXPLORATION TOOLS FOR Au MINERALIZATION IN NEWFOUNDLAND: DATA FROM GLOVER ISLAND (NTS 12A/12 AND 13), JACKSON'S ARM (NTS 12H/15) AND NIPPERS HARBOUR (NTS 2E/13) MAP AREAS

S. Hashmi

Open File NFLD/3440

St. John's, Newfoundland
October, 2023

NOTE

Open File reports and maps issued by the Geological Survey Division of the Newfoundland and Labrador Department of Industry, Energy and Technology are made available for public use. They have not been formally edited or peer reviewed, and are based upon preliminary data and evaluation.

The purchaser agrees not to provide a digital reproduction or copy of this product to a third party. Derivative products should acknowledge the source of the data.

DISCLAIMER

The Geological Survey, a division of the Department of Industry, Energy and Technology (the "authors and publishers"), retains the sole right to the original data and information found in any product produced. The authors and publishers assume no legal liability or responsibility for any alterations, changes or misrepresentations made by third parties with respect to these products or the original data. Furthermore, the Geological Survey assumes no liability with respect to digital reproductions or copies of original products or for derivative products made by third parties. Please consult with the Geological Survey in order to ensure originality and correctness of data and/or products.

Departmental website: https://www.gov.nl.ca/iet
Geological Survey website: https://www.gov.nl.ca/iet/mines/geoscience
Email: pub@gov.nl.ca

Recommended citation:
Hashmi, S.
2023: Humus and till geochemistry as exploration tools for Au mineralization in Newfoundland: Data from Glover Island (NTS 12A/12 and 13), Jackson's Arm (NTS 12H/15) and Nippers Harbour (NTS 2E/13) map areas. Government of Newfoundland and Labrador, Department of Industry, Energy and Technology, Geological Survey, Open File NFLD/3440, 16 pages.

CONTENTS

FIGURE

TABLES

INTRODUCTION

During the 2022 field season, a pilot project to test the suitability of humus as a sample medium for grassroots exploration was completed at select sites, near known Au mineralization in Newfoundland (Figure 1; *see* Hashmi *et al.*, 2022; Hashmi, 2023). This data release presents the analytical results for both, humus and till samples, as well as comments on the samples. A total of 77 humus and 8 BC-horizon till samples were collected *via* truck, foot traverse, all-terrain vehicles and helicopter. Of these, 25 humus and 5 till samples were collected near Au mineralization in the Jackson's Arm map area, 25 humus samples near Au mineralization in the Nippers Harbour map area, and 27 humus and 3 till samples on Glover Island (Corner Brook and Little Grand Lake map areas). Humus samples were collected using a knife, and till samples were collected using a shovel and geological pick. Quality control measures in the field included thorough cleaning of sampling equipment between sample sites, and written and photographic documentation at each site (Hashmi, 2023).

MATERIALS AND METHODS

HUMUS

Sample Preparation

The humus sample bags were and air-dried (covered with a paper towel). Samples were spread onto non-reactive aluminum pans and fully dried in a Hotpack® oven at 45°C, for between 48 and 60 hours. The dried humus samples were then cooled to room temperature, returned to their sample bags and gently crushed using a rubber mallet to break up larger pieces of decomposed organic matter. If a sample contained abundant roots, needles or woody material, it was first passed through a 2000 µm (10 mesh) stainless steel sieve. The crushed sample was sieved through a 180 µm (80 mesh) stainless steel screen using a ROTAP® sieve shaker for 15 minutes and the fine fraction retained. After each sample preparation, the sieve was cleaned in four stages: 1) dust and other particles were brushed out of the sieve and cleaned using compressed air, 2) the sieve was ultrasonically cleaned for 50 minutes, 3) the sieve was rinsed using deionized water, sprayed with acetone and dried in an oven, and, 4) the dried sieve was cleaned using compressed air. Humus samples were submitted to the Geological Survey of Newfoundland and Labrador (GSNL) laboratory and ALS Canada Ltd. for geochemical analyses. The analytical data pertaining to the humus samples are reported in Table 1. Quality assurance before sample submission for analyses consisted of insertion of lab duplicates to test analytical precision.

Analytical Techniques

The following analyses were completed on the <180 µm (80 mesh) fraction at the GSNL laboratory and presented in Appendix A.

1) Four-acid (hydrochloric acid, hydrofluoric acid, nitric acid and perchloric acid) digestion followed by inductively coupled plasma-optical emission spectrometry (ICP-OES) to determine concentrations of major and trace elements (Ag, Al, As, Ba, Be, Ca, Cd, Ce, Co,

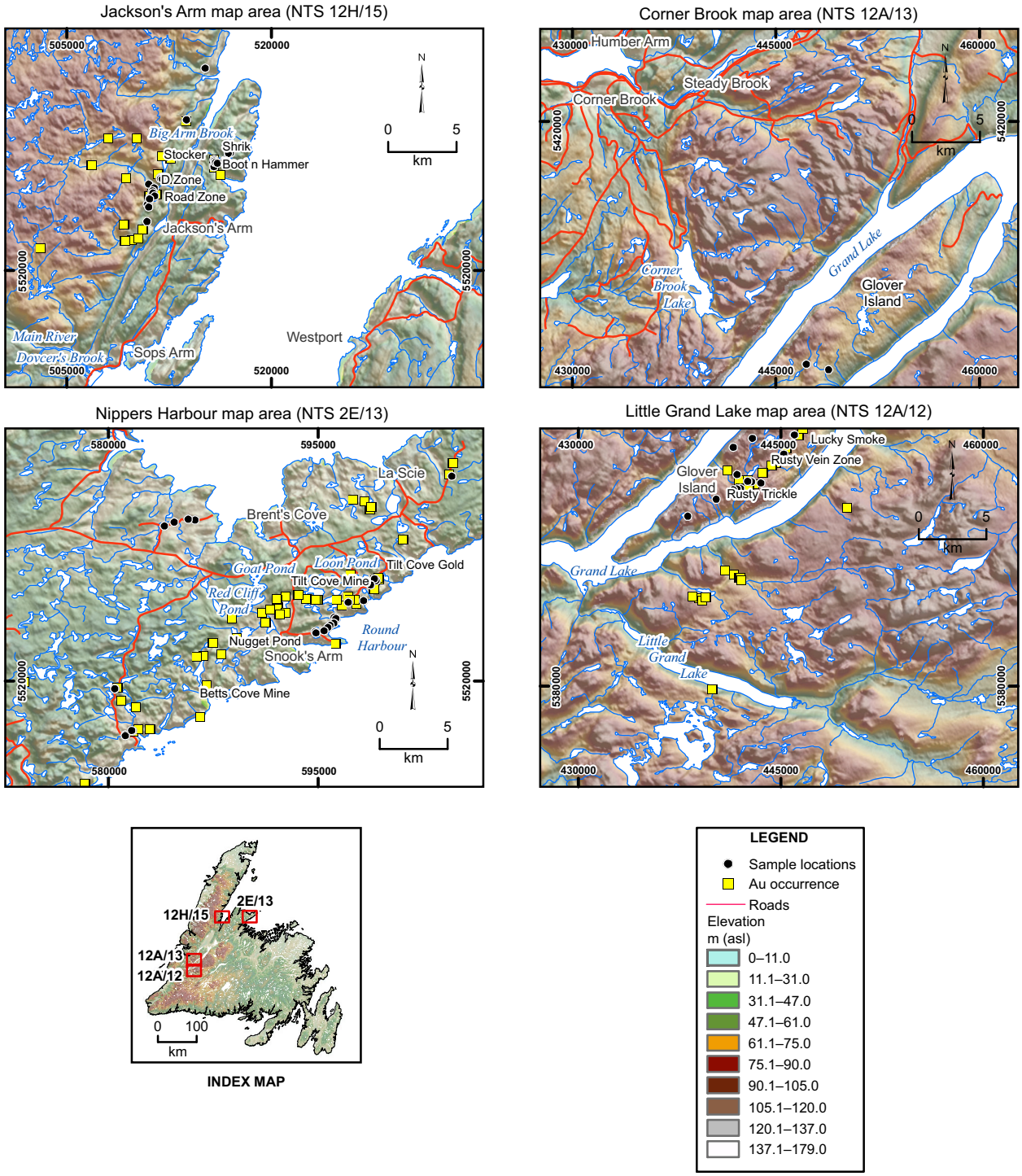

Figure 1. *Humus and till sample sites from the 2022 field season in Jackson's Arm, Nippers Harbour, Little Grand Lake and Corner Brook map areas; the entire area is underlain by topographic hill shade.*

Table 1. Analytical data pertaining to humus samples

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
LOI	GSNL	Gravitmetry	LOI	A	wt. %	NA	0	66.6	98.9	88
Ag30	GSNL	ICP-MS	30	A	ppm	0.2	42	0.2	1.5	90
As30	GSNL	ICP-MS	30	A	ppm	0.2	0	0.2	51.9	90
Ba30	GSNL	ICP-MS	30	A	ppm	1	0	5	527	90
Bi30	GSNL	ICP-MS	30	A	ppm	0.2	81	0.2	0.4	90
Cd30	GSNL	ICP-MS	30	A	ppm	0.1	2	0.1	2.9	90
Ce30	GSNL	ICP-MS	30	A	ppm	1	16	1	233	90
Co30	GSNL	ICP-MS	30	A	ppm	0.5	16	0.5	24.8	90
Cs30	GSNL	ICP-MS	30	A	ppm	0.1	29	0.1	1	90
Cu30	GSNL	ICP-MS	30	A	ppm	1	16	1	140	90
Dy30	GSNL	ICP-MS	30	A	ppm	0.1	34	0.1	9.1	90
Er30	GSNL	ICP-MS	30	A	ppm	0.1	53	0.1	4.9	90
Eu30	GSNL	ICP-MS	30	A	ppm	0.1	61	0.1	3.0	90
Ga30	GSNL	ICP-MS	30	A	ppm	0.2	8	0.2	8.2	90
Gd30	GSNL	ICP-MS	30	A	ppm	0.1	26	0	12	90
Ge30	GSNL	ICP-MS	30	A	ppm	0.2	85	0.2	0.6	90
Hf30	GSNL	ICP-MS	30	A	ppm	0.2	65	0.2	1.2	90
Ho30	GSNL	ICP-MS	30	A	ppm	0.1	73	0.2	1.9	90
La30	GSNL	ICP-MS	30	A	ppm	1	53	1	129	90
Lu30	GSNL	ICP-MS	30	A	ppm	0.1	82	0.1	0.8	90
Mo30	GSNL	ICP-MS	30	A	ppm	0.5	83	0.5	11.6	90
Nb30	GSNL	ICP-MS	30	A	ppm	0.5	63	0.6	19.1	90
Nd30	GSNL	ICP-MS	30	A	ppm	0.1	0	0.2	86.3	90
Ni30	GSNL	ICP-MS	30	A	ppm	0.5	2	0.7	32.0	90
Pb30	GSNL	ICP-MS	30	A	ppm	0.2	0	1.1	58.1	90
Pr30	GSNL	ICP-MS	30	A	ppm	0.1	12	0.1	25.1	90
Rb30	GSNL	ICP-MS	30	A	ppm	0.5	0	0.9	35.7	90
Sb30	GSNL	ICP-MS	30	A	ppm	0.1	3	0.1	1.9	90
Sm30	GSNL	ICP-MS	30	A	ppm	0.1	26	0.1	13.6	90
Sn30	GSNL	ICP-MS	30	A	ppm	0.1	4	0.1	5.1	90
Sr30	GSNL	ICP-MS	30	A	ppm	1	0	7	92	90
Ta30	GSNL	ICP-MS	30	A	ppm	0.1	73	0.1	1.3	90
Tb30	GSNL	ICP-MS	30	A	ppm	0.1	72	0.1	1.7	90
Th30	GSNL	ICP-MS	30	A	ppm	0.2	48	0.2	3.1	90
Tl30	GSNL	ICP-MS	30	A	ppm	0.2	82	0.2	0.5	90
Tm30	GSNL	ICP-MS	30	A	ppm	0.1	82	0.1	0.9	90
U30	GSNL	ICP-MS	30	A	ppm	0.2	70	0.2	2.1	90
V30	GSNL	ICP-MS	30	A	ppm	1	3	1	54	90
W30	GSNL	ICP-MS	30	A	ppm	0.2	71	0.2	1.3	90
Y30	GSNL	ICP-MS	30	A	ppm	0.5	42	0.5	46.7	90
Yb30	GSNL	ICP-MS	30	A	ppm	0.1	51	0.1	4.4	90
Zn30	GSNL	ICP-MS	30	A	ppm	3	1	3	30	90
Zr30	GSNL	ICP-MS	30	A	ppm	0.5	10	0.5	49.1	90
Ag6	GSNL	ICP-OES	6	A	ppm	0.1	42	0.1	1.1	82
Al2	GSNL	ICP-OES	2	A	wt. %	0.01	0	0.07	3.64	90
As2	GSNL	ICP-OES	2	A	ppm	1	57	1	42	90
Ba2	GSNL	ICP-OES	2	A	ppm	1	0	5	559	90
Be2	GSNL	ICP-OES	2	A	ppm	0.1	57	0.1	1.4	90
Ca2	GSNL	ICP-OES	2	A	wt. %	0.01	1	0.01	1.32	90
Cd2	GSNL	ICP-OES	2	A	ppm	0.1	2	0.1	2.5	90
Ce2	GSNL	ICP-OES	2	A	ppm	5	63	5	221	90
Co2	GSNL	ICP-OES	2	A	ppm	1	34	1	30	90
Cr2	GSNL	ICP-OES	2	A	ppm	1	15	1	106	90
Cu2	GSNL	ICP-OES	2	A	ppm	1	0	2	136	90
Dy2	GSNL	ICP-OES	2	A	ppm	0.5	76	0.5	9.5	90
Fe2	GSNL	ICP-OES	2	A	wt. %	0.01	0	0.03	2.78	90
K2	GSNL	ICP-OES	2	A	wt. %	0.01	0	0.02	1.52	90
La2	GSNL	ICP-OES	2	A	ppm	1	53	1.0	128.0	90
Li2	GSNL	ICP-OES	2	A	ppm	0.1	1	0.1	11.2	90
Mg2	GSNL	ICP-OES	2	A	wt. %	0.01	0	0.06	0.45	90
Mn2	GSNL	ICP-OES	2	A	ppm	1	0	4	9579	90
Mo2	GSNL	ICP-OES	2	A	ppm	1	87	1	11	90
Na2	GSNL	ICP-OES	2	A	wt. %	0.01	0	0.02	0.56	90

Table 1. Continued

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Nb2	GSNL	ICP-OES	2	A	ppm	1	73	1	15	90
Ni2	GSNL	ICP-OES	2	A	ppm	1	2	1	30	90
P2	GSNL	ICP-OES	2	A	ppm	1	0	195	1728	90
Pb2	GSNL	ICP-OES	2	A	ppm	1	0	1	79	90
Rb2	GSNL	ICP-OES	2	A	ppm	5	44	5	38	90
S2	GSNL	ICP-OES	2	A	ppm	100	0	251	1659	90
Sc2	GSNL	ICP-OES	2	A	ppm	0.1	0	0.1	18.5	90
Sr2	GSNL	ICP-OES	2	A	ppm	1	0	8	102	90
Ti2	GSNL	ICP-OES	2	A	ppm	5	0	36	2400	90
V2	GSNL	ICP-OES	2	A	ppm	1	1	1	60	90
Y2	GSNL	ICP-OES	2	A	ppm	1	57	1	49	90
Zn2	GSNL	ICP-OES	2	A	ppm	1	0	8	125	90
Zr2	GSNL	ICP-OES	2	A	ppm	1	37	1	44	90
F9	GSNL	ISE	9	A	ppm	5	0	10	430	61
Ag	ALS Canada	ME-MS07	MS7	B	ppm	0.002	0	0.007	0.079	86
Al	ALS Canada	ME-MS07	MS7	B	ppm	1	0	79	23900	86
As	ALS Canada	ME-MS07	MS7	B	ppm	0.01	0	0.02	36.7	86
Au	ALS Canada	ME-MS07	MS7	B	ppm	0.001	84	0.006	0.01	86
B	ALS Canada	ME-MS07	MS7	B	ppm	0.2	76	0.2	0.8	86
Ba	ALS Canada	ME-MS07	MS7	B	ppm	0.01	0	1.55	67.5	86
Be	ALS Canada	ME-MS07	MS7	B	ppm	0.005	8	0.005	0.84	86
Bi	ALS Canada	ME-MS07	MS7	B	ppm	0.003	60	0.003	0.078	86
Br	ALS Canada	ME-MS07	MS7	B	ppm	1	0	3	113	86
Ca	ALS Canada	ME-MS07	MS7	B	ppm	10	0	90	11350	86
Cd	ALS Canada	ME-MS07	MS7	B	ppm	0.001	0	0.066	0.982	86
Ce	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.1325	234	86
Co	ALS Canada	ME-MS07	MS7	B	ppm	0.001	0	0.04	4.5	86
Cr	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	0.05	17.35	86
Cs	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0009	0.144	86
Cu	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	0.18	25.9	86
Dy	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0057	7.27	86
Er	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0026	4.4	86
Eu	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.001	2.28	86
Fe	ALS Canada	ME-MS07	MS7	B	ppm	1	0	21	13350	86
Ga	ALS Canada	ME-MS07	MS7	B	ppm	0.05	40	0.05	1.44	86
Gd	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.008	10.85	86
Ge	ALS Canada	ME-MS07	MS7	B	ppm	0.005	83	0.012	0.174	86
Hf	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0015	0.0554	86
Hg	ALS Canada	ME-MS07	MS7	B	ppm	0.01	11	0.01	0.09	86
Ho	ALS Canada	ME-MS07	MS7	B	ppm	0.0001	0	0.0063	0.0083	86
I	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	0.18	25	86
In	ALS Canada	ME-MS07	MS7	B	ppm	0.001	1	0.001	0.028	86
K	ALS Canada	ME-MS07	MS7	B	ppm	5	0	169	1870	86
La	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0634	128	86
Li	ALS Canada	ME-MS07	MS7	B	ppm	0.01	0	0.01	0.07	86
Lu	ALS Canada	ME-MS07	MS7	B	ppm	0.0001	0	0.0004	0.522	86
Mg	ALS Canada	ME-MS07	MS7	B	ppm	0.5	0	518.0	2760.0	86
Mn	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	2.49	1995	86
Mo	ALS Canada	ME-MS07	MS7	B	ppm	0.001	0	0.008	3.37	86
Nb	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0007	0.242	86
Nd	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.071	90.3	86
Ni	ALS Canada	ME-MS07	MS7	B	ppm	0.05	24	0.05	4.81	86
Pb	ALS Canada	ME-MS07	MS7	B	ppm	0.005	0	0.388	40.2	86
Pr	ALS Canada	ME-MS07	MS7	B	ppm	0.0001	0	0.0151	26.6	86
Rb	ALS Canada	ME-MS07	MS7	B	ppm	0.005	0	0.199	5.78	86
Re	ALS Canada	ME-MS07	MS7	B	ppm	0.0002	54	0.0002	0.0008	86
Sb	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0155	0.0999	86
Se	ALS Canada	ME-MS07	MS7	B	ppm	0.02	11	0.03	2.56	86
Sm	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0084	13.25	86
Sn	ALS Canada	ME-MS07	MS7	B	ppm	0.005	0	0.018	0.511	86
Sr	ALS Canada	ME-MS07	MS7	B	ppm	0.005	0	4.12	42.1	86
Ta	ALS Canada	ME-MS07	MS7	B	ppm	0.001	36	0.001	0.018	86
Tb	ALS Canada	ME-MS07	MS7	B	ppm	0.0001	0	0.001	1.46	86
Te	ALS Canada	ME-MS07	MS7	B	ppm	0.005	30	0.005	0.019	86

Table 1. Continued

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Th	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0109	1.41	86
Ti	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	1.95	184	86
Tl	ALS Canada	ME-MS07	MS7	B	ppm	0.001	0	0.001	0.119	86
Tm	ALS Canada	ME-MS07	MS7	B	ppm	0.0001	0	0.0002	0.628	86
U	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0078	1.76	86
V	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	0.09	9.53	86
W	ALS Canada	ME-MS07	MS7	B	ppm	0.001	30	0.001	0.074	86
Y	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0317	45.5	86
Yb	ALS Canada	ME-MS07	MS7	B	ppm	0.0005	0	0.0035	3.41	86
Zn	ALS Canada	ME-MS07	MS7	B	ppm	0.05	0	5.59	87.7	86
Zr	ALS Canada	ME-MS07	MS7	B	ppm	0.001	0	0.036	1.555	86
Ag	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	0	0.037	36	83
Al	ALS Canada	ME-VEG41a	VEG	B	%	0.01	0	0.69	12	83
As	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	2.41	825	83
Au	ALS Canada	ME-VEG41a	VEG	B	ppm	0.0002	0	0.0021	8.47	83
B	ALS Canada	ME-VEG41a	VEG	B	ppm	1	0	6	218	83
Ba	ALS Canada	ME-VEG41a	VEG	B	ppm	0.1	0	65.7	914	83
Be	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	0.17	8.21	83
Bi	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	0	0.176	5.71	83
Ca	ALS Canada	ME-VEG41a	VEG	B	%	0.01	0	0.22	16.8	83
Cd	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	0	0.734	34.3	83
Ce	ALS Canada	ME-VEG41a	VEG	B	ppm	0.003	0	9	500.1	83
Co	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	0	3.25	125.5	83
Cr	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	4.83	250.1	83
Cs	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.383	4.94	83
Cu	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	12.9	5820	83
Fe	ALS Canada	ME-VEG41a	VEG	B	ppm	1.0	0	13000.0	50000.1	83
Ga	ALS Canada	ME-VEG41a	VEG	B	ppm	0.004	0	2.5	22.8	83
Ge	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.021	1.8	83
Hf	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	1	0.004	0.429	83
Hg	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	33	0.001	0.022	83
In	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.022	0.418	83
K	ALS Canada	ME-VEG41a	VEG	B	%	0.01	0	0.23	4.52	83
La	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	0	4.83	1740	83
Li	ALS Canada	ME-VEG41a	VEG	B	ppm	0.1	0	1.6	22.3	83
Mg	ALS Canada	ME-VEG41a	VEG	B	%	0.001	0	0.29	20.3	83
Mn	ALS Canada	ME-VEG41a	VEG	B	ppm	0.1	0	71.3	28400	83
Mo	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	0.99	31.9	83
Na	ALS Canada	ME-VEG41a	VEG	B	%	0.001	0	0.026	1.525	83
Nb	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	0	0.084	1.985	83
Ni	ALS Canada	ME-VEG41a	VEG	B	ppm	0.04	0	5.92	2950	83
P	ALS Canada	ME-VEG41a	VEG	B	%	0.001	0	0.188	3.07	83
Pb	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	25.5	1645	83
Pd	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	35	0.001	0.015	83
Pt	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	9	0.002	0.049	83
Rb	ALS Canada	ME-VEG41a	VEG	B	ppm	1.00%	0	10.45	205	83
Re	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	1	0.001	0.028	83
S	ALS Canada	ME-VEG41a	VEG	B	%	0.01	0	0.21	3.96	83
Sb	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	0.57	16.8	83
Sc	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	2.98	52.5	83
Se	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.857	35	83
Sn	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	1.08	43.1	83
Sr	ALS Canada	ME-VEG41a	VEG	B	ppm	0.02	0	35.4	1845	83
Ta	ALS Canada	ME-VEG41a	VEG	B	ppm	0.001	33	0.005	0.029	83
Te	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.007	3.38	83
Th	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	0	1.05	19.9	83
Ti	ALS Canada	ME-VEG41a	VEG	B	%	0.001	0	0.024	0.307	83
Tl	ALS Canada	ME-VEG41a	VEG	B	ppm	0.002	0	0.034	4.12	83
U	ALS Canada	ME-VEG41a	VEG	B	ppm	0.005	0	0.329	36.3	83
V	ALS Canada	ME-VEG41a	VEG	B	ppm	0.05	0	12.05	246	83
W	ALS Canada	ME-VEG41a	VEG	B	ppm	0.01	0	0.06	1.98	83
Y	ALS Canada	ME-VEG41a	VEG	B	ppm	0.003	0	2.46	450	83
Zn	ALS Canada	ME-VEG41a	VEG	B	ppm	0.1	0	104.5	2290	83
Zr	ALS Canada	ME-VEG41a	VEG	B	ppm	0.02	0	0.26	13.85	83

Cr, Cu, Dy, Fe, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, S, Sc, Sr, Ti, V, Y, Zn and Zr). This analysis is abbreviated as "2". Note that Ag is digested by nitric acid and determined by ICP-OES and is abbreviated as "6".

2) Alkaline fusion followed by ion-selective electrode (ISE) technique to determine fluoride ion (F-) and abbreviated as "9".

3) Loss on ignition (LOI) *via* gravimetry to determine percentage of organic matter and abbreviated as "LOI".

4) A 4-acid digest followed by ICP-MS to determine major and trace elements (Ag, As, Ba, Bi, Cd, Ce, Co, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Tb, Th, Tl, Tm, U, V, W, Y, Yb and Zn). This analysis is abbreviated as "30".

The following analyses were completed on the <180 μm (80 mesh) fraction at ALS Canada Ltd. (North Vancouver) and presented in Appendix B:

1) A 100 g aliquot was submitted for ashed aqua regia digestion (1:3 nitric to hydrochloric acid) and analyzed *via* inductively coupled plasma mass spectrometry (ICP-MS) and inductively coupled plasma atomic emission spectroscopy (ICP-AES). Here, the humus sample is ashed (fully decomposed) at 475°C for 24 hours, with an ashed yield of approximately 2 to 4 g and digested in aqua regia. Ashing of the humus is useful because it concentrates the elemental contents; back calculation of elemental concentration to the pre-ashed sample weight can reduce detection limits by an order of magnitude over other analytical methods. A super trace Au detection package was ordered to determine Au concentration at parts per trillion (ppt). A 1 g aliquot was digested in 25 ml Na pyrophosphate, and analyzed by ICP-MS. This analysis is abbreviated as "VEG" in Appendix B and as "ME-VEG41a™" in the ALS schedule of fees (Appendix E).

2) A 1 g aliquot was digested in 25 ml Na pyrophosphate, and analyzed by ICP-MS. This analysis is abbreviated as "MS07" in Appendix B.

TILL

Sample Preparation

Initial till sample preparation was completed at the GSNL laboratory. The samples were dried in a Hotpack® oven at 55°C, and gently crushed using a rubber mallet. The samples were placed in a RO-TAP® to isolate the silt + clay (-63 μm) fraction for analyses. The >63 μm fraction was archived. The RO-TAP® was cleaned between each sample with ethanol and dried in the oven. Till samples were submitted to multiple laboratories for geochemical analyses. The analytical data pertaining to the till samples are reported in Table 2. Quality assurance before sample submission for analyses consisted of insertion of lab duplicates to test analytical precision and the insertion of Canadian certified reference materials (CCRMs) to test analytical accuracy.

Table 2. Analytical data pertaining to till samples

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Au	ALS Canada	Au_ICP22	FA	D	ppm	0.001	0	0.002	0.371	8
Ag	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.012	0.075	7
Al	ALS Canada	AuME-ST44	ST4	D	wt. %	0.01	0	2.19	6.39	7
As	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	4.2	239	7
Au	ALS Canada	AuME-ST44	ST4	D	ppm	0.0001	0	0.003	0.0624	7
B	ALS Canada	AuME-ST44	ST4	D	ppm	2	0	2	3	7
Ba	ALS Canada	AuME-ST44	ST4	D	ppm	0.05	0	20.8	285	7
Be	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	0.311	1.42	7
Bi	ALS Canada	AuME-ST44	ST4	D	ppm	0.0005	0	0.0173	0.0875	7
Ca	ALS Canada	AuME-ST44	ST4	D	wt. %	0.01	0	0.09	2.59	7
Cd	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.042	0.296	7
Ce	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	19.45	161	7
Co	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	3.37	24.5	7
Cr	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	15.45	205	7
Cs	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.58	1.84	7
Cu	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	6.92	60.8	7
Fe	ALS Canada	AuME-ST44	ST4	D	wt. %	0.001	0	3.22	8.85	7
Ga	ALS Canada	AuME-ST44	ST4	D	ppm	0.004	0	4.58	30.1	7
Ge	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	0.039	0.27	7
Hf	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.023	0.232	7
Hg	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.004	0.213	7
In	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	0.026	0.107	7
K	ALS Canada	AuME-ST44	ST4	D	wt. %	0.01	0	0.02	0.97	7
La	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	6.03	63.5	7
Li	ALS Canada	AuME-ST44	ST4	D	ppm	0.1	0	5.5	23.5	7
Mg	ALS Canada	AuME-ST44	ST4	D	wt. %	0.01	0	0.22	1.27	7
Mn	ALS Canada	AuME-ST44	ST4	D	ppm	0.1	0	201	2040	7
Mo	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.315	5.05	7
Na	ALS Canada	AuME-ST44	ST4	D	wt. %	0.001	0	0.003	0.016	7
Nb	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.201	11.3	7
Ni	ALS Canada	AuME-ST44	ST4	D	ppm	0.02	0	3.65	100.5	7
P	ALS Canada	AuME-ST44	ST4	D	wt. %	0.0005	0	0.0209	0.269	7
Pb	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	4.85	116	7
Pd	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	7	<0.001	<0.001	7
Pt	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.001	0.003	7
Rb	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	3.02	70	7
Re	ALS Canada	AuME-ST44	ST4	D	ppm	0.0002	1	0.0002	0.0007	7
S	ALS Canada	AuME-ST44	ST4	D	wt. %	0.002	0	0.011	0.064	7
Sb	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.035	0.402	7
Sc	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	0	3.55	16.5	7
Se	ALS Canada	AuME-ST44	ST4	D	ppm	0.002	0	0.061	2.59	7
Sn	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	1.7	10	7
Sr	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	4.33	56	7
Ta	ALS Canada	AuME-ST44	ST4	D	ppm	0.005	4	0.006	0.016	7
Te	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.013	0.047	7
Th	ALS Canada	AuME-ST44	ST4	D	ppm	0.0005	0	0.681	15.7	7
Ti	ALS Canada	AuME-ST44	ST4	D	wt. %	0.0001	0	0.0208	0.423	7
Tl	ALS Canada	AuME-ST44	ST4	D	ppm	0.0005	0	0.0337	0.646	7
U	ALS Canada	AuME-ST44	ST4	D	ppm	0.0005	0	0.484	3.48	7
V	ALS Canada	AuME-ST44	ST4	D	ppm	0.05	0	60.6	114.5	7
W	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	0.067	0.157	7
Y	ALS Canada	AuME-ST44	ST4	D	ppm	0.001	0	8.69	41.2	7
Zn	ALS Canada	AuME-ST44	ST4	D	ppm	0.1	0	36.7	175.5	7
Zr	ALS Canada	AuME-ST44	ST4	D	ppm	0.01	0	0.55	8.92	7
LOI	GSNL	Gravimetry	LOI	C	wt. %	0.1	0	1.9	31.9	9
Ag6	GSNL	ICP-OES	6	C	ppm	0.1	9	<0.1	<0.1	9
Al2	GSNL	ICP-OES	2	C	wt. %	0.01	0	6.51	8.83	9
As2	GSNL	ICP-OES	2	C	ppm	1	0	9	310	9
Ba2	GSNL	ICP-OES	2	C	ppm	1	0	233	1079	9
Be2	GSNL	ICP-OES	2	C	ppm	0.1	0	0.8	2.7	9
Ca2	GSNL	ICP-OES	2	C	wt. %	0.01	0	0.54	3.54	9
Cd2	GSNL	ICP-OES	2	C	ppm	0.1	0	0.2	0.6	9
Ce2	GSNL	ICP-OES	2	C	ppm	5	0	35	243	9

Table 2. Continued

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Co2	GSNL	ICP-OES	2	C	ppm	1	0	5	45	9
Cr2	GSNL	ICP-OES	2	C	ppm	1	0	29	478	9
Cu2	GSNL	ICP-OES	2	C	ppm	1	0	9	61	9
Dy2	GSNL	ICP-OES	2	C	ppm	0.5	0	4.2	15.7	9
Fe2	GSNL	ICP-OES	2	C	wt. %	0.01	0	5.22	10.02	9
K2	GSNL	ICP-OES	2	C	wt. %	0.01	0	0.68	2.92	9
La2	GSNL	ICP-OES	2	C	ppm	1	0	12	98	9
Li2	GSNL	ICP-OES	2	C	ppm	0.1	0	7.6	44.7	9
Mg2	GSNL	ICP-OES	2	C	wt. %	0.01	0	0.40	1.86	9
Mn2	GSNL	ICP-OES	2	C	ppm	1	0	393	3694	9
Mo2	GSNL	ICP-OES	2	C	ppm	1	4	2	5	9
Na2	GSNL	ICP-OES	2	C	wt. %	0.01	0	0.86	2.09	9
Nb2	GSNL	ICP-OES	2	C	ppm	1	0	4	27	9
Ni2	GSNL	ICP-OES	2	C	ppm	1	0	17	129	9
P2	GSNL	ICP-OES	2	C	ppm	1	0	404	2621	9
Pb2	GSNL	ICP-OES	2	C	ppm	1	1	4	168	9
Rb2	GSNL	ICP-OES	2	C	ppm	5	0	30	119	9
S2	GSNL	ICP-OES	2	C	ppm	100	1	142	601	9
Sc2	GSNL	ICP-OES	2	C	ppm	0.1	0	15.0	48.4	9
Sr2	GSNL	ICP-OES	2	C	ppm	1	0	177	321	9
Ti2	GSNL	ICP-OES	2	C	ppm	5	0	4719	11031	9
V2	GSNL	ICP-OES	2	C	ppm	1	0	89	213	9
Y2	GSNL	ICP-OES	2	C	ppm	1	0	19	69	9
Zn2	GSNL	ICP-OES	2	C	ppm	1	0	53	157	9
Zr2	GSNL	ICP-OES	2	C	ppm	1	0	32	109	9
F9	GSNL	ISE	9	C	ppm	5	0	97	669	9
Ce2	GSNL	ICP-OES	2	C	ppm	5	0	35	243	9
Ag	ALS Canada	ME-MS61L	MSL	D	ppm	0.002	0	0.016	0.15	7
Al	ALS Canada	ME-MS61L	MSL	D	wt. %	0.01	0	7.53	9.17	7
As	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	8.92	390	7
Ba	ALS Canada	ME-MS61L	MSL	D	ppm	1	0	276	1100	7
Be	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	0.81	2.52	7
Bi	ALS Canada	ME-MS61L	MSL	D	ppm	0.002	0	0.027	0.113	7
Ca	ALS Canada	ME-MS61L	MSL	D	wt. %	0.01	0	0.62	3.76	7
Cd	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	0.084	0.317	7
Ce	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	37.4	235	7
Co	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	10.85	28.5	7
Cr	ALS Canada	ME-MS61L	MSL	D	ppm	0.3	0	18.8	351	7
Cs	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	0.76	3.56	7
Cu	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	18.4	54.8	7
Fe	ALS Canada	ME-MS61L	MSL	D	wt. %	0.002	0	5.19	9.28	7
Ga	ALS Canada	ME-MS61L	MSL	D	ppm	0.05	0	14.45	38.3	7
Ge	ALS Canada	ME-MS61L	MSL	D	ppm	0.05	0	0.12	0.29	7
Hf	ALS Canada	ME-MS61L	MSL	D	ppm	0.004	0	1.365	4.58	7
In	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	0.069	0.179	7
K	ALS Canada	ME-MS61L	MSL	D	wt. %	0.01	0	0.72	3.19	7
La	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	12.5	93.5	7
Li	ALS Canada	ME-MS61L	MSL	D	ppm	0.2	0	19	50.2	7
Mg	ALS Canada	ME-MS61L	MSL	D	wt. %	0.01	0	0.76	1.84	7
Mn	ALS Canada	ME-MS61L	MSL	D	ppm	0.2	0	844	2150	7
Mo	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	1.66	0.86	7
Na	ALS Canada	ME-MS61L	MSL	D	wt. %	0.001	0	0.943	2.31	7
Nb	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	4.53	21.6	7
Ni	ALS Canada	ME-MS61L	MSL	D	ppm	0.08	0	9.43	152	7
P	ALS Canada	ME-MS61L	MSL	D	wt. %	0.001	0	0.043	0.299	7
Pb	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	7.44	58.3	7
Rb	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	28.2	138.5	7
Re	ALS Canada	ME-MS61L	MSL	D	ppm	0.0004	7	<0.0004	<0.0004	7
S	ALS Canada	ME-MS61L	MSL	D	wt. %	0.01	0	0.01	0.06	7
Sb	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	0.08	1.58	7
Sc	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	15.85	48.9	7
Se	ALS Canada	ME-MS61L	MSL	D	ppm	0.006	0	0.05	2.76	7
Sn	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	2.43	11	7
Sr	ALS Canada	ME-MS61L	MSL	D	ppm	0.02	0	184.5	293	7

Table 2. Continued

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Ta	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	0.27	1.02	7
Te	ALS Canada	ME-MS61L	MSL	D	ppm	0.005	0	0.013	0.304	7
Th	ALS Canada	ME-MS61L	MSL	D	ppm	0.004	0	3.6	9.46	7
Ti	ALS Canada	ME-MS61L	MSL	D	wt. %	0.001	0	0.275	1.015	7
Tl	ALS Canada	ME-MS61L	MSL	D	ppm	0.002	0	0.166	0.861	7
U	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	1	2.62	7
V	ALS Canada	ME-MS61L	MSL	D	ppm	0.1	0	84.4	209	7
W	ALS Canada	ME-MS61L	MSL	D	ppm	0.008	0	0.392	4.45	7
Y	ALS Canada	ME-MS61L	MSL	D	ppm	0.01	0	20.3	71.8	7
Zn	ALS Canada	ME-MS61L	MSL	D	ppm	0.2	0	57.9	200	7
Zr	ALS Canada	ME-MS61L	MSL	D	ppm	0.1	0	41.5	155	7
Ag30	GSNL	4A-ICP-MS	30	C	ppm	0.2	9	<0.2	<0.2	9
As30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	11.4	428.5	9
Ba30	GSNL	4A-ICP-MS	30	C	ppm	1	0	261	1167	9
Bi30	GSNL	4A-ICP-MS	30	C	ppm	0.2	9	<0.2	<0.2	9
Cd30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.1	0.5	9
Ce30	GSNL	4A-ICP-MS	30	C	ppm	1	0	40	258	9
Co30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	4.9	43.5	9
Cs30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.7	4.0	9
Cu30	GSNL	4A-ICP-MS	30	C	ppm	1	0	5	64	9
Dy30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	4.8	17.8	9
Er30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	2.3	7.3	9
Eu30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	1.5	4.9	9
Ga30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	16.6	42.8	9
Gd30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	5.6	23.7	9
Ge30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	0.5	0.9	9
Hf30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	1.2	3.9	9
Ho30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.8	2.8	9
La30	GSNL	4A-ICP-MS	30	C	ppm	1	0	14	100	9
Lu30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.3	0.8	9
Mo30	GSNL	4A-ICP-MS	30	C	ppm	0.5	1	0.6	6.2	9
Nb30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	6.8	28.5	9
Nd30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	19.2	134.7	9
Ni30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	5.8	170.5	9
Pb30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	6.8	134.3	9
Pr30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	4.4	32.7	9
Rb30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	31.0	134.6	9
Sb30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.1	2.0	9
Sm30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	4.9	26.2	9
Sn30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	1.1	5.5	9
Sr30	GSNL	4A-ICP-MS	30	C	ppm	1	0	194	317	9
Ta30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.4	1.4	9
Tb30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.9	3.2	9
Th30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	3.8	21.2	9
Tl30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	0.2	1.0	9
Tm30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	0.3	0.9	9
U30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	1.0	4.4	9
V30	GSNL	4A-ICP-MS	30	C	ppm	1	0	90	232	9
W30	GSNL	4A-ICP-MS	30	C	ppm	0.2	0	0.6	5.7	9
Y30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	22.1	73.2	9
Yb30	GSNL	4A-ICP-MS	30	C	ppm	0.1	0	2.2	5.9	9
Zn30	GSNL	4A-ICP-MS	30	C	ppm	3	0	56	184	9
Zr30	GSNL	4A-ICP-MS	30	C	ppm	0.5	0	42.4	134.4	9
Total clay %	GeoLabs	PSA	PSA	D	vol. %	NA	NA	0.67	1.87	8
Total silt and clay %	GeoLabs	PSA	PSA	D	vol. %	NA	NA	12.73	33.68	8
Total silt %	GeoLabs	PSA	PSA	D	vol. %	NA	NA	12.73	33.68	8
Ag	ALS Canada	ME-MS61	MS6	D	ppm	0.01	0	0.09	0.44	4
Al	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	6.87	10.9	4
As	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	37.1	213	4
Ba	ALS Canada	ME-MS61	MS6	D	ppm	10	0	100	1450	4

Table 2. Continued

Element	Laboratory	Method	Abbreviation/ Suffix	Appendix	Unit	Lower detection limit (LDL)	Samples below LDL	Minimum	Maximum	Samples analyzed
Be	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	1.04	2.93	4
Bi	ALS Canada	ME-MS61	MS6	D	ppm	0.01	0	0.15	0.52	4
Ca	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	0.15	1.47	4
Cd	ALS Canada	ME-MS61	MS6	D	ppm	0.02	0	0.21	0.97	4
Ce	ALS Canada	ME-MS61	MS6	D	ppm	0.01	0	51.7	142.5	4
Co	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	15.7	66.7	4
Cr	ALS Canada	ME-MS61	MS6	D	ppm	1	0	62	550	4
Cs	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	1.2	4.44	4
Cu	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	112.5	233	4
Fe	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	6.65	22.9	4
Ga	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	10.8	45.8	4
Ge	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	0.11	0.37	4
Hf	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	1.9	0.8	4
Hg	ALS Canada	ME-MS61	MS6	D	ppm	0.005	0	0.043	0.378	2
In	ALS Canada	ME-MS61	MS6	D	ppm	0.005	0	0.109	0.251	4
K	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	0.21	3.62	4
La	ALS Canada	ME-MS61	MS6	D	ppm	0.5	0	12.8	54.8	4
Li	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	17.7	52.6	4
Mg	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	0.62	2.54	4
Mn	ALS Canada	ME-MS61	MS6	D	ppm	5	0	240	5470	4
Mo	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	1.44	3.3	4
Na	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	0.44	0.95	4
Nb	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	5.1	30.8	4
Ni	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	53.3	258	4
P	ALS Canada	ME-MS61	MS6	D	ppm	10	0	1060	3890	4
Pb	ALS Canada	ME-MS61	MS6	D	ppm	0.5	0	16.2	124	4
Rb	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	9.8	96.5	4
Re	ALS Canada	ME-MS61	MS6	D	ppm	0.002	2	0.002	0.004	4
S	ALS Canada	ME-MS61	MS6	D	wt. %	0.01	0	0.01	0.15	4
Sb	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	1.09	3.21	4
Sc	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	20.8	90.2	4
Se	ALS Canada	ME-MS61	MS6	D	ppm	1	0	1	5	4
Sn	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	6	34.8	4
Sr	ALS Canada	ME-MS61	MS6	D	ppm	0.2	0	18.1	131.5	4
Ta	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	0.32	1.86	4
Te	ALS Canada	ME-MS61	MS6	D	ppm	0.05	0	0.07	0.19	4
Th	ALS Canada	ME-MS61	MS6	D	ppm	0.01	0	7.18	16.65	4
Ti	ALS Canada	ME-MS61	MS6	D	wt. %	0.005	0	0.192	4.16	4
Tl	ALS Canada	ME-MS61	MS6	D	ppm	0.02	0	0.1	1.63	4
U	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	1.4	4.5	4
V	ALS Canada	ME-MS61	MS6	D	ppm	1	0	121	385	4
W	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	0.7	3.3	4
Y	ALS Canada	ME-MS61	MS6	D	ppm	0.1	0	24.1	49.1	4
Zn	ALS Canada	ME-MS61	MS6	D	ppm	2	0	49	446	4
Zr	ALS Canada	ME-MS61	MS6	D	ppm	0.5	0	23.9	204	4

Analytical Techniques

The following analyses were completed at the GSNL laboratory and presented in Appendix C. A detailed description of each analytical procedure can be found in Finch *et al.* (2018).

1) Four-acid (hydrochloric acid, hydrofluoric acid, nitric acid and perchloric acid) digestion followed by inductively coupled plasma-optical emission spectrometry (ICP-OES) to determine concentrations of major and trace elements (Ag, Al, As, Ba, Be, Ca, Cd, Ce, Co, Cr, Cu, Dy, Fe, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, S, Sc, Sr, Ti, V, Y, Zn and Zr). This analysis is indicated by element suffix "2". Note that Ag is digested by nitric acid and determined by ICP-OES and is indicated by element suffix "6".

2) Alkaline fusion followed by ion-selective electrode (ISE) technique to determine fluoride ion (F-) and indicated by element suffix "9".

3) Loss on ignition (LOI) *via* gravimetry to determine percentage of organic matter and written as "LOI".

4) A 4-acid digest followed by ICP-MS to determine major and trace elements (Ag, As, Ba, Bi, Cd, Ce, Co, Cs, Cu, Dy, Er, Eu, Ga, Gd, Ge, Hf, Ho, La, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sb, Sc, Sm, Sn, Sr, Tb, Th, Tl, Tm, U, V, W, Y, Yb and Zn). This analysis is indicated by element suffix "30".

The following analyses were completed at ALS Canada Ltd. and presented in Appendix D:

1) Fire assay followed by inductively couple plasma-atomic emission spectroscopy (ICP-AES) on a 50 g aliquot to determine Au content. This analysis is indicated by suffix "FA" in column header in Appendix D and abbreviated as "Au-ICP22" in the ALS schedule of fees (Appendix E).

2) Aqua regia digest on a 50 g sample, followed by inductively coupled plasma-mass spectrometry (ICP-MS) to determine the concentration of major and trace elements (Ag, Al, As, Au, B, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Ga, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Pd, Pt, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn and Zr). This analysis is indicated by element suffix "ST4" in Appendix D and as "AuME-ST44™" in the ALS schedule of fees (Appendix E).

3) A 4-acid digest on a 0.25 g aliquot, followed by ICP-MS to determine major and trace elements (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Fe, Ga, Ge, Hf, Hg, In, K, La, Li, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Pd, Pt, Rb, Re, S, Sb, Sc, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn and Zr). This analysis was completed on the silt + clay sized fraction of 19 till samples and the clay sized fraction of one till sample. Note that the clay separation was completed at ALS. The analysis completed on the clay fraction is indicated by element suffix "MS6" in Appendix B and as "ME-MS61™" in ALS Canada Ltd. 2022 geochemistry schedule of fees and services (Appendix E). Note that Hg by this method is indicated by element suffix "MS4" in Appendix D and "ME-MS42™" in Appendix E. The analysis completed on the silt + clay fraction is indicated by element suffix "MSL" in Appendix B and as "ME-MS61L™" in ALS schedule of fees (Appendix E).

Lastly, a 100 g aliquot was submitted to the Ontario Geological Survey's Geoscience Lab (GeoLabs) for particle size analysis (PSA). This analysis is abbreviated as "PSA" in Appendix D.

RESULTS

The following data is presented as comma separated value files (.csv) in Appendices A–D: sample number, year, location, elevation, horizon, depth, map unit, additional notes on location, and the elements analyzed. Major elements are reported in wt. %, whereas minor and trace ele-

ments are reported in ppm, unless otherwise specified. Negative values represent results below the detection limit; above detection limit values are indicated by a "0.1" added to the number. For example, values for Ce, Cr and Fe in Appendix B above the upper reporting limit are indicated by "500.1", "250.1" and "5000.1". A value of "-9" indicates that a sample was not analyzed for that element. Different analytical procedures are indicated by suffixes (refer to Tables 1 and 2 for a list of analytical methods for each element and associated abbreviations in column headers). All location data is projected in Universal Transverse Mercator (UTM) easting and northing, zone 21, and the datum used is NAD 27.

ACKNOWLEDGMENTS

The following individuals are thanked for their efforts with the timely completion of the data release: Kim Morgan for cartography and GIS support and Pauline Honarvar and Sara Jenkins for reviewing the database and report.

REFERENCES

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.

Hashmi, S.
2023: Humus as a sample medium to target Au mineralization in Newfoundland: Preliminary data from Glover island (NTS 12A/12 and 13, Jackson's Arm (NTS 12H/15) and Nippers Harbour (NT 2E/13) map areas. *In* Current Research. Government of Newfoundland and Labrador, Department of Industry, Energy and Technology, Geological Survey, Report 23-1, pages 1-21.

Hashmi, S., Leybourne, M.I., Hamilton, S., Layton-Matthews, D. and McClenaghan, M.B.
2022: Suitability of surficial media for Ni–Cu–PGE exploration in an established mining camp: A case study from the South Range of the Sudbury Igneous Complex, Canada. Geochemistry: Environment, Exploration, Analysis, Volume 22(1): geochem2021 – 051. doi: https://doi.org/10.1144/geochem2021-051

APPENDICES

Appendices A–D are available as digital comma-separated value files (.csv) and Appendix E as a pdf through this link.

APPENDIX A: Humus Data from GSNL Laboratory

APPENDIX B: Humus Data from ALS Canada Ltd.

APPENDIX C: Till Data from GSNL Laboratory
Note: As of March 7, 2024, at the request of the author, the column heading AL2_PPM has been corrected to AL2_PCT.

APPENDIX D: Till Data from ALS Canada Ltd.

APPENDIX E: ALS Canada Ltd. 2022 Geochemistry Schedule of Fees and Services