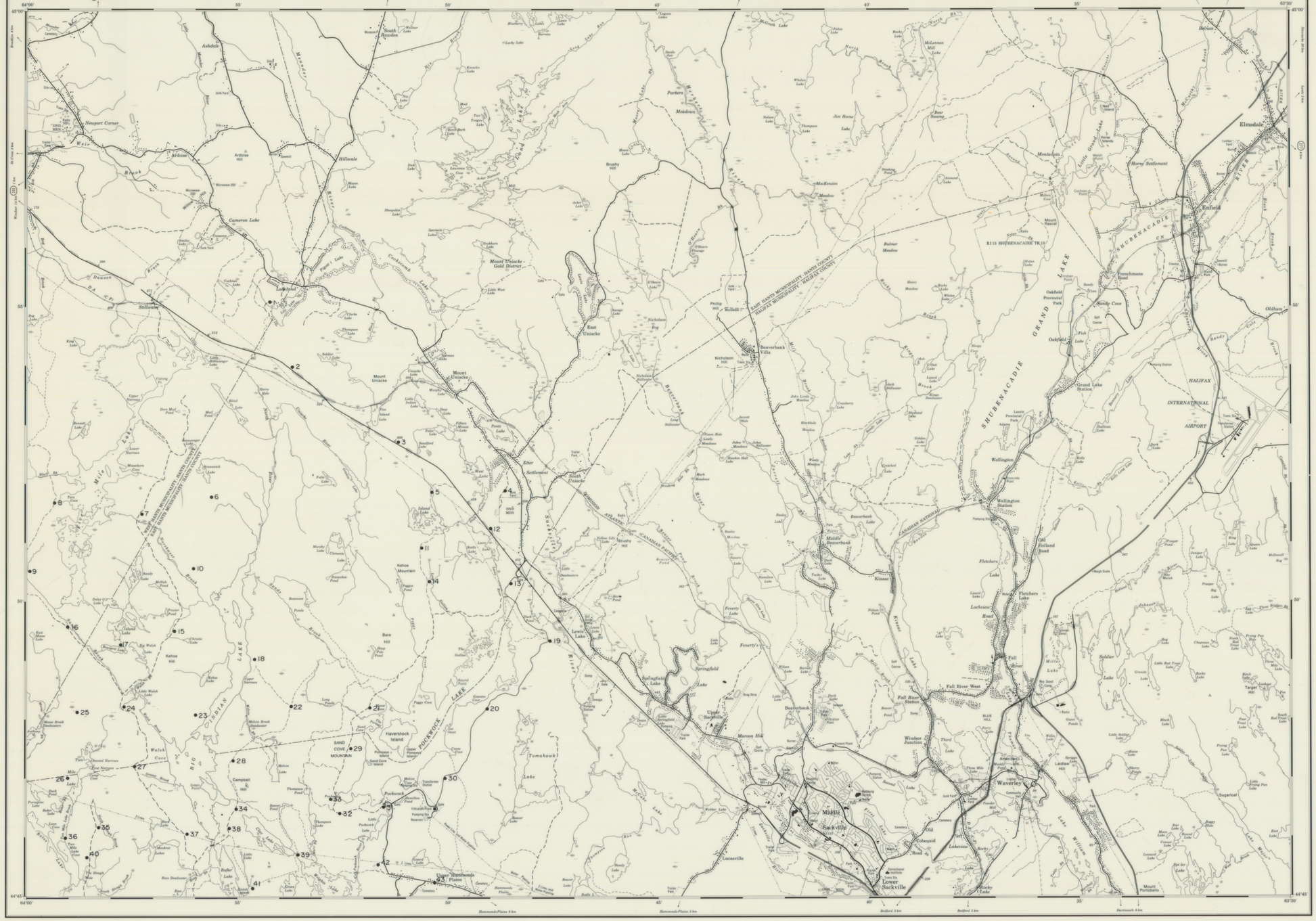

GEOCHEMICAL ANALYSIS

TiO_2 and Fe values in weight percent; remaining elements in ppm

MAP	TT	Sr*	Ni*	TiO_2*	Cr*	Ba*	Th*	Sc*	Nb*	Pb*	Zn*	Cu*	As*	Rb*	Mo*	Sb*	Ta*	U*
1	GWB	91	**32**	1.05	92	470	11	11.0	17	16	67	19	19.0	94	1	0.5	1.3	2
2	LT	123	40	0.97	100	**670**	12	13.0	16	29	94	**54**	20.0	120	2	0.6	1.1	2
3	GTB	114	41	0.96	105	620	12	14.0	15	21	89	**36**	29.0	100	2	0.4	1.1	2
4	STB	90	19	**1.17**	**120**	590	12	12.0	17	28	46	**34**	34.0	92	**18**	0.5	1.0	2
5	LT	107	25	1.05	**112**	480	11	13.0	17	19	88	32	18.0	100	2	0.6	1.1	2
6	GTA	115	32	1.32	110	640	16	17.0	19	28	**112**	**29**	11.0	160	1	0.4	1.2	2
7	LT	122	25	0.99	71	490	17	11.0	16	13	63	14	7.2	110	1	0.4	1.2	1
8	LT	105	32	1.21	**112**	540	16	14.0	17	16	80	21	10.0	140	2	0.5	1.3	1
9	GTC	101	25	1.02	**137**	390	15	10.0	14	27	72	14	11.0	86	**4**	**0.5**	1.1	2
10	LT	115	32	**1.28**	100	580	**20**	**15.0**	17	21	91	25	12.0	150	3	0.6	1.3	2
11	LT	106	36	1.10	100	500	14	13.0	17	25	82	13	16.0	110	2	0.5	1.2	2
12	GTB/GWB	126	30	1.09	91	550	18	15.0	15	28	104	25	33.0	130	1	0.3	1.1	2
13	GWB	112	31	0.97	106	440	11	12.0	15	17	63	23	8.3	69	2	0.3	1.0	2
15	LT	96	23	1.05	69	500	18	12.0	19	24	**97**	13	7.1	160	1	0.4	1.8	2
16	LT	96	27	1.05	72	500	19	12.0	17	18	67	16	7.0	120	0	0.5	1.6	1
17	GTB	88	32	1.25	88	410	17	14.0	18	20	**97**	17	6.6	140	**3**	0.4	1.7	2
18	GTB	122	15	0.76	40	440	22	8.1	13	23	58	9	5.0	99	**3**	0.2	1.2	1
19	GWC	112	33	0.73	100	**770**	12	**13.0**	12	55	72	44	7.0	94	1	0.2	0.8	2
20	GTB/GWB	119	33	1.03	67	560	22	12.0	15	18	79	17	6.7	135	2	0.2	1.3	1
21	GTB	106	26	1.13	77	660	19	15.0	18	27	**98**	18	8.5	160	2	0.4	1.5	1
22	GTA	98	21	0.92	56	480	20	12.0	16	26	68	9	6.5	140	3	0.2	1.6	3
23	GTB	97	23	1.11	73	400	16	11.0	18	15	86	12	7.0	98	1	0.4	1.3	2
24	LT	90	28	**1.25**	78	510	**19**	12.0	**22**	18	74	8	8.0	130	1	0.5	1.8	3
25	LT	84	24	1.09	75	440	16	11.0	16	15	67	16	8.2	120	2	0.6	1.4	2
26	GTB	89	14	0.91	47	470	22	9.3	16	16	81	6	3.9	170	1	0.2	2.2	4
27	LT	89	25	1.12	79	430	17	12.0	16	19	66	14	12.0	120	2	0.5	1.6	3
28	LT	105	18	1.01	68	420	17	9.2	17	15	57	8	8.9	96	1	0.5	1.4	1
29	LT	**125**	26	1.05	77	600	17	14.0	18	26	87	16	10.0	140	1	0.5	1.5	2
30	GWB	**129**	22	0.82	58	410	14	7.2	12	19	44	10	5.4	61	1	0.4	1.0	1
31	GTB	126	18	0.75	45	470	17	7.6	14	13	49	7	5.3	110	1	0.3	1.9	2
33	LT	91	26	0.99	69	480	**19**	13.0	16	**37**	78	19	9.1	150	2	0.5	1.6	2
35	GTB	87	23	1.03	64	420	18	11.0	17	24	87	14	7.6	130	0	0.4	1.8	2
36	GTB	90	10	0.62	37	380	16	6.3	14	**64**	**195**	17	25.0	150	1	0.2	1.8	3
37	GTB	95	16	0.93	55	440	19	8.7	16	27	66	8	5.4	110	2	0.4	1.4	3
38	GTB	107	18	1.03	55	540	24	12.0	17	27	79	7	7.2	140	2	0.3	1.6	3
39	GTB	82	17	1.15	51	370	32	14.0	21	33	**126**	7	10.0	190	2	0.3	2.0	4
40	GTB	92	15	0.84	63	380	15	6.8	13	14	41	11	4.0	89	1	0.3	1.1	2
41	GTB	104	16	0.86	41	430	26	8.0	14	18	**82**	22	8.7	110	**3**	0.3	1.2	4
42	GTB	95	16	1.19	46	360	26	**14.0**	**23**	9	50	4	7.2	91	1	0.3	2.4	**14**
43	GWB	112	30	0.85	63	580	15	10.0	13	14	66	17	7.9	98	1	0.4	1.2	2

MAP	Fe*	Mn*	Tarv	Mtarv	Wtv	Snrv	Tawv	Mtawv	Wwv	Snwv	W(1)
1	2.9	2.5	380	17.0	**155**	2	12.0	0.118	1.077	0.014	0.083	2.96
2	2.8	2.8	**1000**	22.0	153	8	10.0	0.123	0.856	0.045	0.056	2.66
3	2.7	**3.0**	540	15.0	108	57	8.0	0.073	0.523	0.276	0.039	1.96
4	3.0	2.9	**270**	8.0	65	20	7.0	0.129	1.050	0.032	0.032	5.41
5	3.0	2.9	600	4.0	88	2	5.0	0.030	0.662	0.015	0.038	3.20
6	4.1	**3.6**	**800**	1.0	5	12	0.5	**0.058**	0.040	0.097	0.004	3.23
7	3.6	2.4	500	3.0	31	2	1.0	0.018	0.183	0.012	0.006	2.37
8	3.8	2.6	620	26.0	223	12	19.0	0.148	**1.262**	0.068	0.108	2.02
9	4.2	2.0	**660**	7.0	43	2	6.0	0.118	0.726	0.034	0.101	6.75
10	4.8	3.0	740	2.0	13	8	4.0	0.009	0.058	0.036	0.018	1.91
11	4.3	2.8	600	11.0	112	2	6.0	0.075	0.574	0.014	0.043	2.95
12	4.3	3.0	570	1.0	7	6	0.5	0.016	0.110	0.094	0.008	6.78
13	2.6	2.7	210	10.0	99	2	1.0	0.030	0.519	0.009	0.009	3.03
15	4.9	2.9	600	1.0	12	7	5.0	0.003	0.042	0.024	0.017	1.39
16	4.4	2.9	520	4.0	40	2	1.0	0.009	0.109	0.009	0.005	2.08
17	4.3	**3.0**	460	2.0	10	2	0.5	0.014	0.069	0.014	0.003	2.73
18	2.3	2.2	490	14.0	92	2	1.0	0.004	0.043	0.009	0.002	1.91
19	2.3	2.2	490	14.0	92	2	1.0	0.153	1.008	0.022	0.011	5.42
20	4.5	2.9	680	3	9	0.5	0.005	0.028	0.084	0.005	0.005	4.07
21	4.6	**3.2**	**800**	0.5	9	7	0.5	0.002	0.032	0.025	0.002	1.53
22	3.1	**2.5**	560	1.0	11	7	0.5	0.003	0.038	0.007	0.002	2.17
23	3.8	**2.6**	410	19.0	141	12	9.0	0.078	0.581	0.049	0.037	2.33
24	5.1	2.9	440	7.0	61	25	7.0	0.036	0.315	0.129	0.036	1.24
25	4.1	2.0	380	24.0	184	2	9.0	0.155	**1.189**	0.013	0.058	2.68
26	6.1	2.2	520	4.0	25	2	1.0	0.095	0.595	0.048	0.024	11.05
27	4.1	2.9	420	30.0	220	2	25.0	0.117	0.859	0.008	0.098	2.29
28	6.2	2.0	340	2.0	23	2	0.5	0.013	0.153	0.013	0.003	2.82
29	5.1	**3.8**	**1000**	1.0	28	2	0.5	0.005	0.133	0.009	0.002	2.61
30	3.2	1.3	240	1.0	6	2	0.5	0.007	0.040	0.013	0.003	2.99
31	5.0	1.5	450	1.0	33	2	2.0	0.008	0.249	0.015	0.015	3.37
33	6.2	2.5	700	6.0	57	2	11.0	0.022	0.206	0.007	0.040	1.59
35	4.5	2.4	480	20.0	149	16	12.0	0.107	0.798	0.086	0.064	2.25
36	6.5	1.5	310	2.0	14	2	0.5	0.030	0.209	0.030	0.007	6.93
37	4.4	2.0	380	21.0	156	16	7.0	0.071	0.524	0.054	0.024	1.61
38	5.5	**2.5**	**620**	8.0	68	2	5.0	0.052	0.443	0.013	0.033	2.61
39	7.8	**3.3**	**660**	1.0	10	2	10.0	0.066	0.057	0.011	0.057	2.30
40	4.0	1.4	350	2.0	16	2	0.5	0.028	0.221	0.028	0.007	6.47
41	6.6	1.5	500	2.0	8	40	0.5	0.014	0.054	0.270	0.003	3.20
42	7.3	**2.5**	**880**	1.0	68	150	15.0	0.066	0.420	**0.906**	0.093	2.64
43	3.6	2.2	600	10.0	107	10	4.0	0.031	0.329	0.031	0.012	1.34

NOTES

Data Treatment and Presentation

Till geochemical data has been sub-divided into three populations after the till nomenclature of Finck and Graves (in press). The tills are categorized as follows: granite tills (GTA,GTB and GTC), Meguma Group tills (STB,STC,GWB and GWC), and Lawrencetown Till (LT).

In the granite till population Nb, Ta, U, Rb, Cu, Pb, Zn, Mo, Sb, As, Sn and W have anomalous values defined as being > the 95th percentile of the cumulative frequency distribution. Ni, Cr, Sc, Ba, Sr, Th and TiO_2 are expected to show decreasing values with increasing differentiation in granitoids and are considered anomalous in this population if the value is < the 5th percentile. Values for all elements > the 95th percentile in the Lawrencetown Till and Meguma Group Till populations are regarded as anomalous. The Meguma Group tills were sampled in the exo-contact zone of the South Mountain Batholith and as such dilution by granitic material is common. A better representation of average elemental abundance in slate and greywacke tills is presented in Stea and O'Reilly (1982).

Threshold values for elements within each population have been calculated using the entire data from mapsheets 110/05, 110/12, 110/13 and 21A/09. Basic statistics are shown in the table below. Refer to Graves and Finck (in press) for the lithologic composition of the till samples. The sample numbering system for this geochemical map and the clast lithology map are keyed.

Raw heavy mineral analytical values for Sn, W, Nb and Ta were weighted as in Toverud (1982) using the formula:

Awv = Arv x W1/W2 where

Awv = weighted analytical value (ppm)
Arv = raw analytical value (ppm)
W1 = weight of heavy minerals in -50+230 fraction
W2 = total weight of the -50+230 fraction used in the heavy mineral separation.

This method of representing geochemical data corrects for (1) the problem of weight variation among heavy mineral concentrates in a till sample population and (2) unequal weight of initial sample size. Raw analytical values are not comparable unless normalized against the weight fraction of 'heavies' in the total till. Toverud's formula produces a calculated analytical value that represents the 'ppm level' of the element in the whole till.

Sample Preparation and Analytical Methods

Till matrix (<1.25 cm) from each sample site was submitted to Minerals Engineering Centre at Technical University of Nova Scotia for sample preparation. Heavy minerals were extracted from the -50+230 fraction of the till matrix by heavy liquid separation using tetrabromethane. The -50+230 fraction was wet sieved from 5 kg of till matrix. The heavy mineral concentrate was analyzed for W by neutron activation (NAA) and for Sn, Nb and Ta by inductively coupled plasma mass spectroscopy (ICPMS) at X-Ray Assay Laboratories Ltd. The -230 fraction of the till was analyzed at Saint Mary's University by X-ray fluorescence for Cu, Pb, Zn, Nb, Sr, Ni, Cr and TiO_2 and at Bondar-Clegg Ltd. for the Gold + 25 package from which Rb, Sb, Ta, U, Th, Ba, Sc, As, Ba, Mo, and W are presented. Fe and Mn were analyzed at Bondar-Clegg by atomic absorption. Au samples contaminated, therefore no data is available.

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Stea, R.R. and O'Reilly, G.A.
1982 Till geochemistry of the Meguma Terrane in Nova Scotia and its metallogenic implications; in Prospecting in Areas of Glaciated Terrain, 1982, ed. P. H. Davenport; Canadian Institute of Mining and Metallurgy, p. 82-104.

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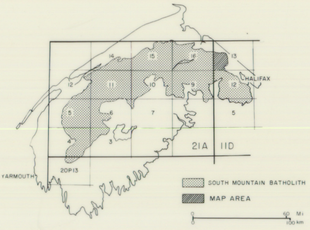
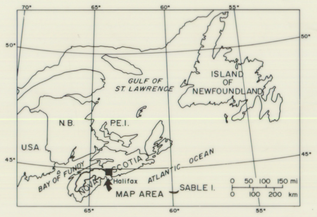
STATISTICS

TILL TYPE	GRANITE TILL (GTA,GTB,GTC)					MEGUMA TILL (GWB,GWC,STB)					LAWRENCETOWN TILL				
Element	MEAN	MIN.	MAX.	5th	N	MEAN	MIN.	MAX.	95th	N	MEAN	MIN.	MAX.	95th	N
Sr	73.48	37	126	50	379	89.35	56	132	118	43	94.82	68	132	124	67
Ni	17.49	0	45	7	379	24.77	13	48	31.75	43	26.9	13	44	40.5	67
TiO_2	0.723	0.108	1.32	0.45	379	0.79	0.45	1.32	1.13	43	1.01	0.74	1.35	1.22	67
Cr	35.8	9	110	18	379	56.8	22	134	107.5	43	70.87	40	113	116.67	67
Ba	319.7	170	660	221	375	429.3	310	770	585	43	451.12	250	680	616.67	67
Th	16.64	9	34	10.5	375	15	11	28	19.5	43	14.28	10	20	18.7	67
Sc	6.19	3.2	18	4.1	375	8.56	4.4	16	13	43	10.66	5.9	16	14.2	67
	MEAN	MIN.	MAX.	95th	N										
Nb	16.52	9	34	21.5	379	14.9	10	19	17.8	43	17.45	14	22	20.5	67
Pb	25.09	3	296	42.5	379	30.2	13	124	67.5	43	21	7	37	34.5	67
Zn	58.8	19	703	96.5	379	69.6	31	199	143.3	43	73.96	37	109	98.05	67
Cu	9.72	0	87	28.5	379	26.3	0	79	61.3	43	16.78	2	35	33.5	67
As	12.61	2.5	137	31	375	33.1	2.5	112	96	43	12.44	5.2	44	21.67	67
Rb	158	62	390	256.5	375	136.2	61	230	180	43	123.8	44	220	192	67
Mo	1.7	1	7	2.9	375	3.7	1	32	16	43	1.84	1	3	2.97	67
Sb	0.31	0.1	1.7	0.5	375	0.47	0.1	3	1.2	43	0.55	0.3	0.9	0.785	67
Ta	2.18	1	7.2	3.28	375	1.69	0.8	3.2	2.24	43	1.57	1	2.4	2.7	67
W	4.14	1	38	8.85	375	3.6	1	8	7	43	2.57	1	8	4.55	67
U	6.45	2.7	85.1	10.9	375	4.45	2.3	7.1	6	43	4.64	2.6	20.2	7.58	67
Fe	1.28	0.4	4.1	2.45	375	2.7	0.4	20	7.5	43	2.29	1.1	3.8	3.31	67
Mn	283.1	57	880	585	375	350.7	72	1600	720	43	501.96	130	1000	815.8	67
Tarv	15.75	0.5	177	43.3	380	12.2	0.5	41	33.3	43	20.01	1	79	37.8	67
Mtarv	83.13	4	686	233	380	61.95	6	156	154.7	43	139.85	8	388	242.11	67
Wrv	45.78	2	1500	152	380	30.5	2	300	110	43	25.39	2	630	53.3	67
Snrv	32.37	0.5	450	120	380	30.2	0.5	182	100	43	22.32	0.5	195	100	67
Tawv	0.14	0.002	1.362	0.425	380	0.211	0.003	0.927	0.833	43	0.149	0.003	0.718	0.32	67
Mtawv	0.71	0.015	4.348	2.05	380	1.04	0.021	6.047	3.07	43	2.267	0.031	3.528	1.056	67
Wwv	0.32	0.003	10.07	0.84	380	0.417	0.013	4.806	1.33	43	0.137	0.006	2.602	0.45	67
Snwv	0.27	0.001	4.526	1.05	380	0.5	0.002	3.178	2.5	43	0.144	0.002	0.805	0.717	67
	AVG.	MIN.	MAX.	STD.	N	AVG.	MIN.	MAX.	STD.	N	AVG.	MIN.	MAX.	STD.	N
W(1)	3.82	1.04	17.92	2.3	380	7.23	1.13	32.82	6.57	43	3.02	1.05	8.36	1.38	67





TILL TYPES

GTA	Granite Till A
GTB	Granite Till B
GTC	Granite Till C
GWB	Greywacke Till B
GWC	Greywacke Till C
STB	Slate Till B
GTB/GWB	Till collected near South Mountain Batholith / Goldenville Formation contact
LT	Lawrencetown Till

LEGEND

●	sample site
*	analysis of the -230 till fraction
rv	heavy mineral raw analytical value
wv	heavy mineral weighted analytical value
W(1)	weight of heavy minerals in the -50+230 till fraction
na	not analyzed
nd	not detected
1.189	bold numbers indicate anomalous values

OPEN FILE MAP 87-011
PRELIMINARY
TILL GEOCHEMISTRY OF MT. UNIACKE MAP SHEET
NTS 11D/13
SOUTH MOUNTAIN BATHOLITH PROJECT

F.J. BONER, P.W. FINCK and R.M. GRAVES

NOVA SCOTIA DEPARTMENT OF MINES AND ENERGY
Honourable Joel R. Matheson, Q.C. John J. Laffin, P.Eng., F.E.I.C.

HALIFAX, NOVA SCOTIA
1987

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