



GEOLOGICAL SURVEY OF CANADA
OPEN FILE 2951

**Biogeochemical survey, Baie Verte area,
Newfoundland: black spruce twigs
(parts of NTS 12H/16 and 12I/1)**

C.E. Dunn, W.A. Spirito, R.G. Balma

1995



Natural Resources
Canada

Ressources naturelles
Canada

Canada

GEOLOGICAL SURVEY OF CANADA

Open File 2951

BIOGEOCHEMICAL SURVEY, BAIE VERTE AREA, NEWFOUNDLAND: BLACK SPRUCE TWIGS (Parts of NTS 12H 16 AND 12I 1)

C.E. Dunn, W.A. Spirito, and R.G. Balma

1995

TABLE OF CONTENTS

	page
Introduction	1
Survey Description and Methodology	2
Scope of Survey	2
Sample Collection	2
Sample Preparation and Analysis	3
Analytical Quality Control	3
Geology	10
Bedrock	10
Mineralization	11
Physiography, Vegetation and Quaternary Deposits	11
Map Production and Handling	12
Element Distribution Maps	12
General Comments	12
Effects from Rambler (Blue Maps)	13
Distribution Maps of Elements Determined by INAA	13
Gold (Au)	13
Arsenic (As)	14
Barium (Ba)	14
Bromine (Br)	14
Calcium (Ca)	14
Cobalt (Co)	15
Chromium (Cr)	15
Cesium (Cs)	15
Iron (Fe)	15
Hafnium (Hf)	16
Potassium (K)	16
Sodium (Na)	16
Rubidium (Rb)	16
Antimony (Sb)	16
Scandium (Sc)	17
Strontium (Sr)	17
Thorium (Th)	17
Uranium (U)	17
Tungsten (W)	18
Zinc (Zn)	18
Rare-Earth Elements (REE)	18
Distribution Maps of Elements Determined by ICP-ES	18
Silver (Ag)	18
Aluminum (Al)	19
Boron (B)	19
Beryllium (Be)	19

Bismuth (Bi)	19
Cadmium (Cd)	20
Copper (Cu)	20
Mercury (Hg)	20
Lithium (Li)	21
Magnesium (Mg)	21
Manganese (Mn)	21
Molybdenum (Mo)	22
Nickel (Ni)	22
Phosphorus (P)	22
Lead (Pb)	22
Selenium (Se)	23
Tellurium (Te)	23
Titanium (Ti)	23
Vanadium (V)	23
Notes on the Biogeochemical Data Listings	23
Acknowledgements	24
References	25

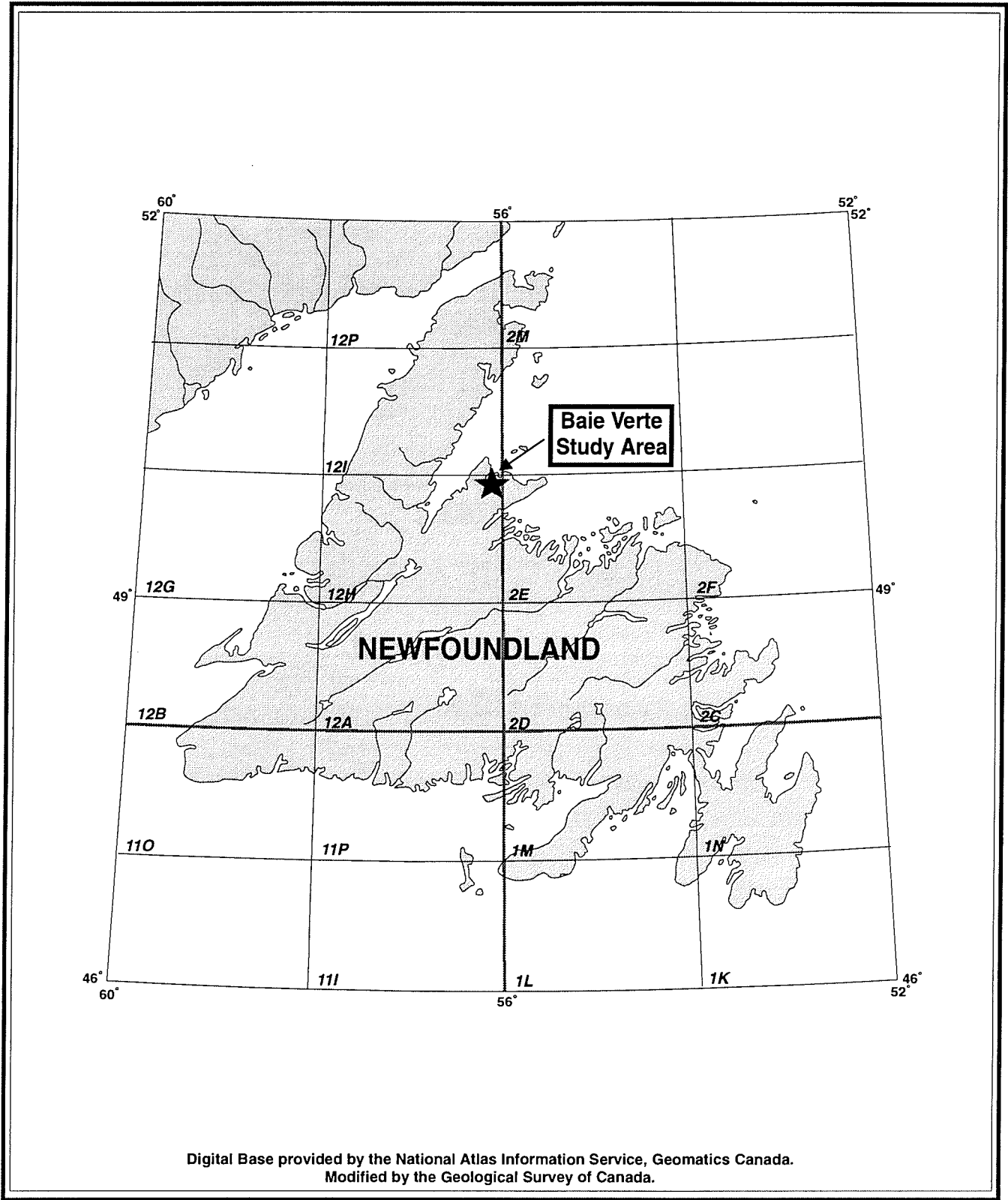
FIGURES

Geographic Features	Follows Table of Contents
-------------------------------	---------------------------

TABLES

Table 1: Mean and Standard Deviation for Standard V6a Analyzed by INA	4
Table 2: Mean and Standard Deviation for Standard V6a Analyzed by ICP-ES	5
Table 3: Standards V6a and V5 - concentrations in ash determined by INAA	6
Table 4: Standards V6a and V5 - concentrations in ash determined by ICP-ES	6
Table 5: Laboratory Duplicates - concentrations in ash determined by INAA	7
Table 6: Laboratory Duplicates - concentrations in ash determined by ICP-ES	7
Table 7: Determination Limits and Substitution Values for Elements Analyzed by INA	8
Table 8: Determination Limits and Substitution Values for Elements Analyzed by ICP-ES	9
Table 9: Metal Concentrations in Different Size Fractions of Tailings from the Consolidated Rambler Mine	21
Table 10: Abbreviations Used in Appendix A	24
Table 11: Abbreviations Used in Appendix B	24
Appendix A - Data Listings (Field and Analytical)	A1
Appendix B - Statistical Summary	B1
Appendix C - Element Distribution Maps and Overlay of Sample Sites, Geology, Mineral Occurrences and Main Communities; Colour Geology and Sample Location Map	in envelope

GSC OPEN FILE 2951



Survey area with respect to
National Topographic System (NTS) map sheets

BIOGEOCHEMICAL SURVEY, BAIE VERTE AREA, NEWFOUNDLAND: BLACK SPRUCE TWIGS

C.E. Dunn, W.A. Spirito, and R.G. Balma

INTRODUCTION

This Open File contains data from a biogeochemical survey in the Baie Verte area of northern Newfoundland. The survey was conducted in conjunction with a hydrogeochemical survey (Hall *et al.*, in prep.), in June, 1992, by the Geological Survey of Canada under the Canada - Newfoundland Cooperation Agreement on Mineral Development (1990 - 1994). It contains results of the first reconnaissance-style biogeochemical survey to be undertaken in Newfoundland. Field observations, data listings, statistical summaries, a geology and sample location map, and element distribution maps are presented. The maps show element concentrations in the ash of twigs from black spruce (*Picea mariana*). Instrumental neutron activation analysis (INAA) was used for determining 35 elements, of which 27 were in sufficient concentration to be detected and quantified. In addition, data are included for 15 elements determined by inductively-coupled plasma emission spectrometry (ICP-ES) and for 4 elements by other methods. All data reported are concentrations in ash remaining after controlled ignition at 470°C. For black spruce, the ashing process concentrates the elements with little or no loss of elements except for a few of high volatility (e.g. Br and Hg).

The value to exploration of reconnaissance geochemical surveys that involve the collection of lake or stream sediments and waters has been extensively tried, tested and documented. Several reconnaissance biogeochemical survey similar to that reported here, but at lower sample density, have been conducted in Nova Scotia (e.g. Dunn *et al.*, 1989; Dunn *et al.*, 1994), and interpretive accounts are given in Dunn (1988, 1990), Rogers and Dunn, 1989, Dunn *et al.* (1991), and Rogers and Dunn (1993).

Unlike other geochemical sample media, plants require certain elements for their existence. Zinc, for example, is needed for plant metabolism. Therefore, subtle differences in Zn concentrations between sample sites are more likely to reflect the health of the plant than significant differences in the chemistry of the substrate. However, major differences in Zn concentrations may reflect the presence of Zn mineralization.

The Zn example illustrates that biogeochemical data should be interpreted with caution and the text notes provided for each element should be considered. Biogeochemistry is a complex science involving the interaction of organic and inorganic processes that are controlled by many physicochemical parameters. However, despite these complexities, careful and systematic collection and preparation of vegetation samples can provide cost-effective new insight, not readily obtainable by other means, to the chemistry of the substrate and its groundwaters.

The data listed in Appendix A are available in digital form from:

GSC Bookstore
Geological Survey of Canada
601 Booth St.
Ottawa
Ontario, K1A 0E8 Tel: (613) 995-4342 Fax: (613) 943-0646

The data will be supplied on an MS-DOS (IBM-PC) 3.5" 1.44 Mb diskette, as a .DBF file, which can be read by any DBASE-compatible software, and as an ASCII comma delimited file.

SURVEY DESCRIPTION AND METHODOLOGY

Scope of Survey

In the early summer of 1991 an orientation survey was conducted in the Baie Verte region to collect samples of tissues from common trees and shrubs. The analytical data obtained from these samples indicated that the most suitable tree in this area for a biogeochemical survey would be the ubiquitous black spruce. At several locations the metal concentrations were extraordinarily high in both twigs and outer bark. Therefore, during a two week period in June, 1992, samples of twigs and bark were collected from 145 sites within an area of approximately 200 km² to the east of the town of Baie Verte (Fig. 1). The reason for collecting both tissue types was that although they provide similar information, there are subtle differences for a few elements because of the ability of spruce to fix elements in different tissue types. Data from the spruce bark will be reported in a separate GSC Open File.

Sample Collection

The preferred sample spacing was one site per 1 km², but logistical limitations to sample collection resulted in an average sample density of approximately 1 per 1.5 km². Traverses were made along roads, driveable trails, and on foot through the forest. Access to a few locations around the peninsula was gained by boat. At each sample location vegetation samples were selected from a site at least 50 m from a highway, or 10 m from a little-used track in order to minimize roadside contamination.

Live twigs and needles were snipped from the limbs using standard anvil-type, teflon-coated, garden pruning snips, and placed in heavy-duty brown paper hardware bags (approximately 25 x 35 cm) and secured with masking tape. Usually 5 - 7 twigs, each comprising approximately 10 years of growth, provided the required 200 g of material. Within the survey area this amount of growth was commonly a twig length of 25 - 30 cm. Although there is annual variation in uptake and storage of many chemical elements (some accumulating near the twig ends), and it is important to maintain moderate consistency in the amount of growth collected, the over-riding factor for consideration is the *diameter* of the twig. It is important to maintain a consistent ratio of twig bark to twig wood, because many of the heavy metals are located in the bark, and not in the woody tissue of the twig. If this ratio changes

substantially, then variations in element content may be attributable to mixing thick with thin twigs, providing false anomalies. For the spruce survey the twig diameter at most locations was approximately 5 mm where twig growth was 10 years old.

Sample Preparation and Analysis

After the samples were air-dried for several weeks in a greenhouse, the needles were separated from the twigs by simply shaking the bags. Spruce needles have a different chemical composition from the twigs, with substantially lower levels of most heavy and base metals in the needles. The ratio of needle to twig may vary among sample locations, so if twigs are not separated from needles some false anomalies may be generated which are simply a function of different twig to needle ratios.

The 200 g samples of fresh limbs yielded approximately 50 g of dry twigs. These were weighed into aluminum trays and placed in a pottery kiln. The temperature was raised slowly (over 2 - 3 hours) to 470°C. After a further 12 hours no charcoal remained, and the twigs were reduced to approximately 1 g of ash. Half was weighed accurately and compacted into small polyethylene vials, suitable for instrumental neutron activation analysis (INAA), and submitted for the determination of 35 elements (maps are provided for 27 of these elements - concentrations of Ag, Hg, Ir, Sn, and Tb were all below the detection levels of 2 ppm, 1 ppm, 2 ppb, 100 ppm, and 0.5 ppm, respectively); reproducibility of data was poor for Ni (detection level of 50 ppm), and for Mo and Se at the low levels present (mostly <2 ppm), therefore no maps of these elements determined by INAA are included and instead there are maps by the wet chemical methods. Appropriate vegetation ash standards and duplicates were inserted to ensure quality control. The precision obtained varied among elements and with element concentration. Of the elements reported here, most samples contained levels substantially higher than detection limits, thereby providing analytical precision of better than +/- 10 percent.

The remaining half of the ash sample was submitted for multi-element ICP-ES analysis, following an aqua regia digestion. This solution was analyzed also for Hg by cold vapour AAS (atomic absorption spectrometry) and for elements that form hydrides - As, Bi, Sb, Se, and Te. Data for As and Sb by this method are similar to those obtained by INAA, therefore results by hydride generation are not repeated for these two elements. For most elements this extraction is 'total', although for some (e.g. Al, B) it is only partial. However, the analytical precision was good for most elements, such that the relative element distribution patterns are meaningful even if the absolute concentrations are only partial.

Analytical Quality Control

Included within each block of 20 samples prepared for analysis there was one standard ash sample (V6a or V5) to determine analytical accuracy, and one duplicate ash sample for assessing the analytical precision obtained from the field samples. These two samples are similar in composition (jack pine twigs). Data on mean values and standard deviations for each element in samples of V6a are given in Tables 1 and 2. Tables 3 and 4 contain the raw data from which these determinations were made. Tables 5 and 6 list the analytical data obtained on the duplicate pairs. Reproducibility is good except at very low concentrations. Tables 7 and

8 show the determination (detection) limits quoted for each element by the analytical laboratories, and the substitution values used for statistical calculations where analyses were below these levels.

**Table 1: Mean and Standard Deviation for Standard V6a
Analyzed by INA (N=9)**

Element			Mean	Standard Deviation
Gold	ppb	Au	12	2
Arsenic	ppm	As	6.1	0.9
Barium	ppm	Ba	437	20
Bromine	ppm	Br	21	5
Calcium	%	Ca	15.5	1.3
Cobalt	ppm	Co	8	1
Chromium	ppm	Cr	58	5
Cesium	ppm	Cs	1.1	0.6
Iron	%	Fe	1.87	0.14
Hafnium	ppm	Hf	4.9	0.4
Potassium	%	K	3.31	0.65
Sodium	ppm	Na	10281	740
Rubidium	ppm	Rb	44	11
Antimony	ppm	Sb	1.3	0.2
Scandium	ppm	Sc	4.6	0.2
Strontium	ppm	Sr	1020	286
Thorium	ppm	Th	2.9	0.4
Uranium	ppm	U	1.5	0.3
Tungsten	ppm	W	*	*
Zinc	ppm	Zn	927	85
Lanthanum	ppm	La	20.0	1.6
Cerium	ppm	Ce	42	5
Neodymium	ppm	Nd	22	3
Samarium	ppm	Sm	3.7	0.3
Europium	ppm	Eu	0.77	0.11
Ytterbium	ppm	Yb	1.51	0.09
Lutetium	ppm	Lu	0.28	0.02

* all values below determination limit

Table 2: Mean and Standard Deviation for V6a
Analyzed by ICP-ES (N=7)

Element			Mean	Standard Deviation
Silver	ppm	Ag	0.4	0.2
Aluminum	%	Al	0.98	0.23
Boron	ppm	B	216	49
Beryllium	ppm	Be	*	*
Bismuth	ppm	Bi	0.4	0.1
Cadmium	ppm	Cd	2.8	0.7
Copper	ppm	Cu	113	34
Mercury	ppb	Hg	*	*
Lithium	ppm	Li	8	2
Magnesium	%	Mg	2.27	0.50
Manganese	ppm	Mn	801	255
Molybdenum	ppm	Mo	4	2
Nickel	ppm	Ni	44	12
Phosphorus	%	P	0.580	0.130
Lead	ppm	Pb	208	53
Selenium	ppm	Se	0.5	0.2
Tellurium	ppm	Te	**	**
Titanium	%	Ti	0.03	0.01
Vanadium	ppm	V	26	7

* all values below determination limit

** 71 % of values below determination limit

Table 3: Standards V6a and V5 - concentrations in ash determined by INAA

	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
V6a	5.4	9	470	24	16.7	8	58	<0.5	1.83	4.5	3.17	10100	43	1.2	4.5	690	3.2	1.5	<1	930	21.0	42	27	3.6	0.82	1.61	0.28
V6a	5.0	15	420	23	15.5	9	54	1.2	1.82	4.8	3.17	9980	38	1.1	4.5	390	2.5	1.7	<1	970	18.0	39	22	3.5	0.79	1.59	0.26
V6a	6.9	13	430	30	15.7	7	64	<0.5	2.12	4.7	3.25	10000	38	1.7	4.5	1200	2.9	1.2	<1	1000	20.0	44	24	3.9	0.61	1.39	0.29
V6a	5.7	12	400	21	12.8	7	60	1.3	1.77	4.3	2.37	9620	53	1.1	4.3	1100	2.5	1.0	<1	870	18.0	33	19	3.4	0.63	1.37	0.26
V6a	5.7	12	450	22	15.8	7	51	1.2	1.68	5.0	3.30	12100	54	1.2	4.4	1100	2.7	1.3	<1	760	20.0	40	21	3.2	0.70	1.58	0.29
V6a	7.7	12	440	16	14.3	10	56	1.1	1.86	5.1	3.08	10100	29	1.6	4.4	1200	3.0	1.4	<1	840	20.0	45	17	3.7	0.80	1.55	0.28
V6a	5.7	11	430	16	15.5	7	55	1.8	1.79	5.3	2.80	9730	32	1.2	4.6	1200	2.6	1.5	<1	970	19.0	38	22	3.7	0.92	1.49	0.28
V6a	7.0	9	440	16	16.4	8	61	<0.5	2.02	5.2	4.29	10600	56	1.2	4.8	1200	3.1	2.2	<1	1000	21.0	41	25	4.0	0.88	1.52	0.30
V6a	6.2	16	450	17	16.9	8	66	2.0	1.96	5.2	4.40	10300	57	1.3	5.0	1100	3.8	1.5	<1	1000	23.0	52	24	4.1	0.82	1.48	0.32
V5	7.4	17	330	27	16.0	10	19	4.9	1.28	1.6	2.22	3260	38	2.0	1.9	1400	1.6	<0.1	<1	2200	18.0	25	15	2.1	<0.02	0.61	0.11
V5	9.3	22	530	35	19.6	13	29	5.0	1.44	2.1	2.49	3900	58	2.8	2.4	1700	1.8	<0.1	<1	2400	22.0	30	19	2.5	0.46	0.88	0.15
V5	9.6	19	520	29	18.1	14	29	4.5	3.23	2.0	2.98	4440	52	2.5	2.2	1300	1.7	<0.1	<1	2100	19.0	26	10	1.9	0.38	0.84	0.12

Table 4: Standards V6a and V5 - concentrations in ash determined by ICP-ES (Hg by Cold Vapour AAS)

	Ag ppm 0.2	Al % 0.01	B ppm 2	Be ppm 0.3	Bi ppm 0.2	Cd ppm 0.2	Cu ppm 1	Hg ppb 10	Li ppm 2	Mg % 0.01	Mn ppm 1	Mo ppm 2	Ni ppm 1	P % 0.001	Pb ppm 3	Se ppm 0.2	Te ppm 0.2	Ti % 0.02	V ppm 2
V6a	0.6	1.16	246	<0.3	0.5	3.4	133	<10	9	2.54	933	5	54	0.644	255	0.9	<0.2	0.03	31
V6a	0.5	1.09	234	<0.3	0.3	3.0	114	<10	8	2.57	1205	5	51	0.607	230	0.4	<0.2	0.03	29
V6a	0.3	0.93	214	<0.3	0.5	2.9	162	<10	7	2.36	833	5	45	0.595	217	0.4	0.2	0.03	27
V6a	0.5	1.12	242	<0.3	0.3	3.1	116	<10	8	2.57	802	5	50	0.660	220	0.4	0.4	0.03	29
V6a	0.3	1.07	240	<0.3	0.5	3.1	107	<10	10	2.44	776	6	43	0.660	238	0.3	<0.2	0.04	31
V6a	0.4	1.00	230	<0.3	0.6	2.7	109	<10	7	2.26	708	4	44	0.581	202	0.6	0.6	0.03	25
V6a	0.4	1.00	214	<0.3	0.3	2.6	96	<10	8	2.36	706	4	38	0.564	190	0.7	0.2	0.04	24
V5	0.9	1.08	340	<0.3	0.9	11.0	245	<10	7	2.32	2846	3	71	1.000	395	0.7	0.2	0.02	22
V5	0.5	0.97	369	<0.3	0.8	11.1	252	15	7	2.21	2282	3	55	1.033	403	0.8	<0.2	0.02	20
V5	0.7	1.05	333	<0.3	0.6	10.6	191	15	6	2.26	2606	3	57	1.127	388	1.0	0.8	0.02	20

Table 5: Laboratory Duplicates - concentrations in ash determined by INAA

Sample Number	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
AL92/1099	4.7	<5	870	39	11.7	13	90	<0.5	2.66	3.6	6.28	22700	59	2.1	12.0	550	3.7	2.0	<1	2100	21.0	34	26	4.0	0.67	1.65	0.30
AL92/1100	4.2	8	960	39	8.8	13	87	1.4	2.58	3.1	4.92	22400	64	0.6	12.0	1000	3.4	2.1	<1	1800	22.0	38	19	4.1	1.02	1.68	0.33
AL92/1139	29.0	18	660	28	9.5	51	450	<0.5	5.63	2.4	8.50	20300	62	1.4	30.0	920	1.0	1.3	<1	1300	11.0	26	15	3.5	0.86	2.50	0.45
AL92/1140	27.0	19	670	30	8.5	50	470	<0.5	5.70	2.2	7.20	20700	75	1.4	31.0	<300	1.5	1.0	<1	1300	11.0	26	15	3.6	0.87	2.49	0.43
AL92/1170	200	810	2400	24	9.8	27	140	2.4	5.18	2.7	7.24	14800	85	26.0	17.0	<300	1.9	3.9	8	9500	12.0	20	11	2.6	0.63	2.00	0.38
AL92/1171	200	620	2600	28	10.3	26	130	2.9	5.00	3.1	8.09	14800	86	26.0	17.0	<300	1.7	3.4	6	9900	11.0	22	11	2.5	0.69	1.86	0.40

Table 6: Laboratory Duplicates - concentrations in ash determined by ICP-ES (Hg by Cold Vapour AAS)

Sample Number	Ag ppm 0.2	Al % 0.01	B ppm 2	Be ppm 0.3	Bi ppm 0.2	Cd ppm 0.2	Cu ppm 1	Hg ppb 10	Li ppm 2	Mg % 0.01	Mn ppm 1	Mo ppm 2	Ni ppm 1	P % 0.001	Pb ppm 3	Se ppm 0.2	Te ppm 0.2	Ti % 0.02	V ppm 2
ICP92/1099	0.6	1.00	295	<0.3	0.3	1.0	131	<10	7	2.66	15763	<2	73	1.069	77	1.1	<0.2	0.07	32
ICP92/1100	0.6	1.03	305	<0.3	0.4	1.1	135	10	7	2.73	15956	<2	75	1.094	73	1.1	0.2	0.08	32
ICP92/1139	0.9	2.47	213	<0.3	0.3	1.8	206	<10	12	4.25	5894	<2	195	0.885	32	0.6	0.5	0.09	69
ICP92/1140	0.9	2.51	200	<0.3	0.5	1.6	199	<10	12	4.26	5227	<2	194	0.749	35	0.6	0.6	0.10	72
ICP92/1170	9.6	1.27	310	<0.3	1.2	12.7	8609	110	7	2.14	8879	12	83	1.410	2533	<0.2	0.6	0.04	35
ICP92/1171	9.4	1.25	307	<0.3	1.4	12.5	8413	115	7	2.15	9357	11	86	1.421	2323	<0.2	0.2	0.04	34

Table 7: Determination Limits and Substitution Values for Elements Analysed by INAA

Element		Units of Measure	Determination Limit	Substitution Value
Gold	Au	ppb	5	3.125
Arsenic	As	ppm	0.5	0.3125
Barium	Ba	ppm	10	*
Bromine	Br	ppm	1	*
Calcium	Ca	%	0.2	*
Cobalt	Co	ppm	1	*
Chromium	Cr	ppm	1	*
Cesium	Cs	ppm	0.5	0.3125
Iron	Fe	%	0.05	*
Hafnium	Hf	ppm	0.5	0.3125
Potassium	K	%	0.05	*
Sodium	Na	ppm	10	*
Rubidium	Rb	ppm	5	*
Antimony	Sb	ppm	0.1	*
Scandium	Sc	ppm	0.1	*
Strontium	Sr	ppm	300	187.5
Thorium	Th	ppm	0.1	0.0625
Uranium	U	ppm	0.1	0.0625
Tungsten	W	ppm	1	0.625
Zinc	Zn	ppm	20	*
Lanthanum	La	ppm	0.1	*
Cerium	Ce	ppm	3	1.875
Neodymium	Nd	ppm	5	3.125
Samarium	Sm	ppm	0.1	*
Europium	Eu	ppm	0.01	0.00625
Ytterbium	Yb	ppm	0.05	0.03125
Lutetium	Lu	ppm	0.05	0.03125

* all values above the determination limit

Table 8: Determination Limits and Substitution Values for Elements Analysed by ICP-ES

Element		Units of Measure	Determination Limit	Substitution Value
Silver	Ag	ppm	0.2	*
Aluminum	Al	%	0.01	*
Boron	B	ppm	2	*
Beryllium	Be	ppm	0.3	0.1875
Bismuth	Bi	ppm	0.2	0.125
Cadmium	Cd	ppm	0.2	*
Copper	Cu	ppm	1	*
Mercury	Hg	ppb	10	6.25
Lithium	Li	ppm	2	1.25
Magnesium	Mg	%	0.01	*
Manganese	Mn	ppm	1	*
Molybdenum	Mo	ppm	2	1.25
Nickel	Ni	ppm	1	*
Phosphorus	P	%	0.001	*
Lead	Pb	ppm	3	*
Selenium	Se	ppm	0.2	0.125
Tellurium	Te	ppm	0.2	0.125
Titanium	Ti	%	0.02	0.0125
Vanadium	V	ppm	2	*

* all values above the determination limit

GEOLOGY

Bedrock

The survey area lies within the Dunnage tectono-stratigraphic Zone, near its western margin with the Fleur de Lys Belt of the Humber Zone (Hibbard, 1983). Dimmell and Hartley (1991) note that 'the peninsula is bisected into contrasting lithostratigraphic terranes by the Baie-Verte-Brompton Line (BVBL), a north-northeast trending, steeply dipping, structural zone that separates oceanic rocks of the Dunnage Zone to the east from the ancient continental margin of the Humber Zone to the west'. The 'Baie Verte Belt' was informally named by Hibbard (1983) to denote the mostly Cambro-Ordovician assemblage of volcanic and intrusive rocks that occur on the east side of the Baie Verte Peninsula. The survey area is dominated by ophiolites of the Point Rousse Complex and the Pacquet Harbour Group. These were intruded by the Burlington Granodiorite during the Early Ordovician (ca. 460 Ma). To the west of the Burlington Granodiorite there is a small region within the survey area where there are mafic volcanic and volcanoclastic rocks of the Lower Silurian Flatwater Pond Group. In the southwest of the survey area Siluro-Devonian quartz-feldspar porphyry of the Cape Brule Porphyry underlie a few of the biogeochemical sample sites.

The Cambro-Ordovician Point Rousse Complex comprises mostly pillow lava, mafic and ultramafic volcanic and volcanoclastic rocks, and diabase dykes. Included are minor amounts of iron formation, marble and chert, and there are intrusions of feldspar porphyry diabase dykes. It is a dismembered but complete ophiolite suite, mostly steeply dipping, that occurs in structural blocks that have been metamorphosed to lower greenschist facies. Locally, at the margins of the Burlington Granodiorite they attain amphibolite facies.

Rocks of the Pacquet Harbour Group are also Cambro-Ordovician in age and comprise a similar suite of rocks to the Point Rousse Complex, but with the addition of gabbro, and mafic epiclastic and felsic volcanoclastic rocks. Gale (1971, 1973) determined from geochemical studies that the lavas of the Group fall into two groups - tholeiitic and komatiitic basalt. The stratigraphic relationships of the Pacquet Harbour Group lithologies is uncertain because of poor exposure and complex relationships. Felsic volcanoclastic rocks (keratophyres) predominate in the centre of the survey area around the Rambler mine.

There is a major tectonic contact known as the Scrape Thrust which transects the survey area. Rocks of the Pacquet Harbour Group have been thrust northward over the Point Rousse Complex.

For the purpose of this report, the complex range of lithologies have been grouped into three main units: Burlington Granodiorite, Pacquet Harbour Group, Point Rousse Complex. A few sample sites were over younger rocks of the Flatwater Pond Group and the quartz feldspar rocks that form the Cape Brule Porphyry in the east and the King Point Complex in the south; both are identified on the maps as Unit 4 'Quartz Feldspar Porphyry'.

Mineralization

Exploration of the Baie Verte peninsula for base and precious metals commenced in 1864. The main activity has centred around the Rambler area. Sulphide mineralization was first found in 1903, but a mine was not brought into production until 1964. From 1964-1982 Consolidated Rambler Mines Limited mined the Main, East, Ming and Big Rambler Pond massive sulphide deposits. A total of 4.75 million tons was produced grading mostly 1 - 1.3% Cu. The relatively small Rambler Main deposit (440,000 short tons), yielded also 2.16% Zn, 0.15 oz/t Au and 0.85 oz/t Ag. Several small gold deposits have been worked within the survey area (e.g. Goldenville, and Deer Cove), and within the past 10 years the area has received renewed interest. New gold deposits and showings associated with quartz veining and pyrite have been discovered in the ophiolites of the Point Rousse Complex - Stog'er Tight, Romeo, Juliet, and Pine Cove. The most important of these is the Pine Cove deposit in which gold is associated with pyrite in quartz veins and in sheared and altered host rocks. Dimmell and Hartley (1991) describe the mineralized zones as 'silicified, chloritized (basalt and massive, fine-grained pyroclastic rocks), oxidized and sulphidized (basalts and hematitic arenite)'.

Several gold showings have been found recently in the southeastern part of the survey area within rocks of the Pacquet Harbour Group - notably the Brass Buckle quartz vein hosted mineralization, and massive native gold at the Krissy showing approximately 2 km south of Rambler Main (P. Dimmell, pers. communication, 1993).

Throughout the survey area the metallic mineral occurrences are mostly pyrite and chalcopyrite, with some pyrrhotite, sphalerite, galena, bornite, and native gold. Tellurium is associated with the Au at the Brass Buckle deposit.

PHYSIOGRAPHY, VEGETATION AND QUATERNARY DEPOSITS

The coastline of the Baie Verte peninsula is rugged and with steep cliffs that rise more than 100 m to the forested hilly topography of the Peninsula. Southward the topography is less severe. Ponds, small lakes and streams are common, and there is an increasing incidence of bogs toward the south. The entire area is forested with black spruce (*Picea mariana*) with some white spruce (*Picea glauca*), jack pine (*Pinus banksiana*) and balsam fir (*Abies balsamea*). Interspersed are paper birch (*Betula papyrifera*), trembling aspen (*Populus tremuloides*) and shrub alder (*Alnus rugosa* and *Alnus crispa*). Reafforestation (mostly black spruce and jack pine) of the southern half of the survey area over the past 20 years followed extensive clear-cutting.

The area is covered with a veneer of sandy till, mostly less than 1 m thick, upon which a podzol has developed. Studies have indicated that the displacement of metal-rich zones by glaciation is only minor (Dimmell and Hartley, 1991).

MAP PRODUCTION AND DATA HANDLING

Maps were drawn using the Universal Transverse Mercator (UTM) projection, with a central meridian of 56° (Zone 21). The coastline and drainage were digitized from maps at a scale of 1:50,000.

Data for the study area were compiled using Microsoft Access relational database software. Separate tables for the INAA, ICP-ES, field and location data were created. These tables were linked through a primary site-id key. Data listings for all field samples are presented in Appendix A.

Statistics were generated for each element using SPSS software (Statistical Package for the Social Sciences). Statistical summaries provided in Appendix B were generated using software developed in the Applied Geochemistry Subdivision of the Geological Survey of Canada. For computing purposes, analytical results less than detection were assigned a value 5/8 the determination limit. For samples with duplicate analyses, the analysis from the first of each duplicate pair was plotted.

The element distribution, sample site and geology maps were created using Arc/Info v. 6.1.1 software, running on a SUN workstation. Site specific location and analytical point data were transferred from the relational database into Arc/Info point attribute tables. Geology, faults, hydrography, roads and other topographic features were digitized manually and stored in separate Arc/Info polygon, arc and point coverages. In order to partially automate the mapping process an Arc/Info macro was written, prompting users to enter all variables necessary to create the element distribution maps. The maps show percentile values of the data, and dots of increasing size that correspond to relative concentrations of elements according to an exponential function. Different functions were used (as shown beneath the percentile values on the right hand of each map) in order to provide an appropriate visual impact. For output, Arc/Info maps were first converted into graphics files and then converted to PostScript files. These were subsequently printed at 600 dots per inch on a laser printer and appear in Appendix C.

ELEMENT DISTRIBUTION MAPS

General Comments

Interpretation of the element distribution maps requires some consideration of the role of chemical elements in plant function. Some comments are given in this section to assist in this interpretation. These notes deal first with those elements determined by INAA, followed by those determined by ICP-ES. This sequence is the same as the element listings in Appendix A and the statistical summary in Appendix B.

For determinations by INAA, elements are arranged alphabetically by chemical symbol, except for the rare earth elements (REE) which are arranged according to convention in order of increasing atomic weight - i.e. La, Ce, Nd, Eu, Sm, Yb. For determinations by ICP-ES,

elements are arranged alphabetically by chemical symbol.

Effects from Rambler (Blue Maps)

Results indicate that there is high enrichment of many elements in the vegetation around the Rambler area. In view of the wide extent of tailings from the Rambler and Ming deposits, it is probable that the chemistry of trees from this area is a mixed signature of metals that were absorbed through the root systems, and air-borne particulates from the mine tailings that have lodged on the plant surfaces. As a result, regardless of the origin of these element enrichments, the effects of mineralization in the Rambler area dominate the distribution patterns of many elements, such that the map plots do not reveal subtle variations in plant chemistry that may occur throughout the rest of the survey area. In an attempt to eliminate the effects of airborne particulates from Rambler, 23 sites from that area were excluded from the original data set, and new maps plotted. These sites are location numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 59, 63, 108, 110, 114, 508, 524, 527, 529, 534, 535, 536, 543, 544. Consequently, for some elements there are two maps: the first shows relative concentrations of an element for all sites, whereas the second shows relative concentrations with the presumed effects of Rambler excluded. To assist in comparing the two data sets, the maps with the reduced number of samples are plotted on blue paper, and a suffix of RE (i.e. Rambler Excluded) is inserted alongside the element symbol at the top right-hand corner of each map.

Distribution Maps of Elements Determined by INAA

Gold (Au)

Gold is not known to be essential for plant growth and health. Consequently, patterns of Au distribution reflect zones of relative gold enrichment in soils, groundwaters and near-surface rocks. The background concentration of Au in the ash of black spruce twigs is commonly less than 10 ppb Au. Because of the low (ppb) traces of Au that are present, the precision of the INAA on duplicate pairs is not as good as that of most other elements determined by this method, and at concentrations below 10 ppb Au the reproducibility of analyses is poor. Gold concentrations in spruce twigs from the survey area are moderately high (median of 17 ppb - see p.B1), and unusually enriched in samples from around the Ming and Rambler deposits where there is a maximum of 810 ppb Au. Because the Pacquet Harbour Group hosts these deposits, the statistical breakdown of the data according to underlying rock Group shows strong Au enrichment in the Pacquet Harbour (mean 81 ppb Au; median 19 ppb Au). There is no notable Au enrichment in samples from the Burlington Granodiorite.

The map of Au distribution that excludes the Rambler area shows there to be subtle enrichment around the Brass Buckle and Pine Cove deposits, and at a few isolated locations. Two sites 1 km southwest of Deer Cove show moderate Au enrichment. Several sites to the east of Rambler are weakly enriched in Au. These anomalies may be due to airborne contamination, but it is noteworthy that they are up-drainage from Rambler. Similarly, the anomaly close to Highway 414 west of Rambler is not in the Rambler drainage system, and is down drainage from source waters on the Burlington granodiorite. The source of the Au at an isolated site 3 km west of Brass Buckle is unknown.

Arsenic (As)

Arsenic is renowned for its toxicity, yet some species of tree (especially Douglas-fir) can accumulate extraordinary amounts without exhibiting any visible harmful affects (Warren et al., 1964; Dunn and Scagel, 1989). Arsenic is an essential element for the metabolism of carbohydrates in fungi and algae, and a few ppm As in most conifer tissues is to be expected. Arsenic is highly enriched around the Rambler and Ming deposits (maximum of 210 ppm As) and relative to the other rock groups is enriched throughout the Pacquet Harbour Group (mean 25 ppm As; median 6.7 ppm As). The map that excludes data from the Rambler area shows mostly isolated occurrences of As enrichment of which the most noteworthy are those which are coincident with Au enrichment in the twigs - south of Deer Cove; west of Rambler (Hwy 414); and near Hwy 418, close to the Scrape Thrust.

Barium (Ba)

All samples yielded substantially more barium than the INAA detection limit of 10 ppm Ba. Black spruce twigs commonly contain up to 2000 ppm Ba. Some unusually high concentrations occur within the map area, with up to 8,000 ppm in a samples east of Rambler. From a comparison with the maps of Au and Cu distributions it is evident that Ba is not associated with the Au and base metal deposits of the survey area. There is a general depletion of Ba in samples from the mafic rocks of the Point Rousse Complex where the median concentration of 940 ppm Ba is less than half that of either the Burlington Granodiorite or the Pacquet Harbour Group. There is a general southward increase in Ba content of the spruce twigs, with notable enrichment to the east of Rambler, and near the contact between the Burlington Granodiorite and the Pacquet Harbour Group.

Bromine (Br)

Bromine is a volatile element that is present in most, if not all terrestrial plants, but it is not known to be an essential element. It can occur in many forms as complexes within plants. Some Br complexes volatilize during the ashing process, causing losses of 30 - 90 percent of the Br contained within the plant tissues. Although there is sometimes a Au/Br association in plant ash from zones of mineralization (Dunn, 1986), this is not apparent in the survey area although there is moderate enrichment at Pine Cove, south of Deer Cove, and at a few isolated locations.

It might be expected that Br enrichment would occur in shoreline samples, due to the influence of Br-bearing salt spray from the ocean. However, most high concentrations of Br occur as isolated anomalies inland. It is likely that Br from the salt spray volatilized during the ashing process, and that the zones of Br enrichment are related to local chemistry and physicochemical conditions.

Calcium (Ca)

Calcium is a major 'building block' element, essential for the rigidity of cell walls in most plants. The variations in Ca content of the twigs are greater than is usual for a population of spruce twigs. Slight enrichment in trees from the Point Rousse Complex in part reflects the relative enrichment of Ca that is characteristic of mafic volcanic rocks. However, there is also enrichment near known zones of mineralization within the Point Rousse Complex, suggesting that the alteration associated with mineralization may have encouraged Ca uptake by the trees.

Cobalt (Co)

Traces of Co are required by some plants to assist in the fixation of major nutrients (e.g. N, S). One ppm Co in ash is all that is required by most plants (Kabata-Pendias and Pendias, 1984), but conifer twigs commonly have approximately 5 ppm Co. Within the survey area the median content of Co in the spruce twigs is 19 ppm. Plant tissues commonly contain elevated levels of Co over ultramafic rocks, and it has been observed that some plants exhibit Co enrichment in the vicinities of gold mineralization in northern Saskatchewan (Dunn, 1986). Cobalt enrichment occurs within the Pacquet Harbour Group to the south of the Rambler deposit where there are unusual concentrations of up to 110 ppm Co. This enrichment could reflect a zone of lithogeochemical enrichment related to the Rambler mineralization. The mafic nature of the Point Rousse Complex has resulted also in Co enrichment, but to a lesser degree than in the Pacquet Harbour Group except for an isolated site of Au enrichment south of Deer Cove.

Chromium (Cr)

Chromium is a non-essential element for which precise INAA data are obtained at low ppm levels. Concentrations are unusually high with respect to the normal range of values for black spruce twigs (10 - 20 ppm Cr), especially in samples from over the Point Rousse Complex where the median concentration is 120 ppm Cr and the maximum is 510 ppm Cr. Concentrations of this order are characteristic for plants growing over ultramafic rocks. Within the Pacquet Harbour Group there are high concentrations (maximum of 190 ppm Cr), especially northward from Rambler. Even samples from the Burlington Granodiorite are locally enriched in Cr, attesting to the high background concentrations in the Baie Verte area.

Cesium (Cs)

This alkali metal performs no known essential function in plant tissues, and is usually present at less than 3 ppm Cs in conifer twig ash. Within the survey area Cs concentrations are mostly close to normal background levels, with only a few sites showing moderate, but not exceptional Cs concentrations.

Iron (Fe)

Iron is essential for photosynthesis and is a major constituent of chlorophyll. In addition, there is a residual content of Fe which reflects the composition of the substrate. Statistical analysis of many biogeochemical data sets has revealed the presence of an 'iron factor' (Dunn, Ch. 20 'Biogeochemical Prospecting for Metals' in Brooks *et al.*, 1995), represented by a close association among Fe, Hf, Sc, Th, and the rare-earth elements. There are similarities in the distribution patterns of these elements in the Baie Verte area, but there is a strong overprint of the elements that occur with iron in the major zone of mineralization around the Rambler and Ming deposits - namely Au, Ag, As, Cd, Cu, Hg, Mo, Pb, Sb, U, and Zn. Locally there is unusually high enrichment of Fe in both the Pacquet Harbour Group (up to 7.17% Fe) and the Point Rousse Complex (up to 5.63% Fe), especially when compared to common background concentrations of <1% Fe in black spruce twigs. Once the influence of Rambler is excluded the strong relative enrichment of Fe in the Point Rousse Complex is apparent, especially on the eastern side of the peninsula.

Hafnium (Hf)

Ash of conifer twigs usually contains 1 - 2 ppm Hf. Hafnium levels are higher where Fe concentrations are high because the two elements are commonly associated in plants. The uptake of Hf by plants may also be controlled by Zr, because of their close geochemical affinities. The weak, but relatively high enrichment of Hf over the Burlington Granodiorite may be due to a Hf/Zr association.

Potassium (K)

Potassium has no structural role in plants, but it serves a number of catalytic roles and is required in large amounts (Bidwell, 1979). It is very important in the overall metabolism of plants. The moderate concentrations present in the black spruce twigs (median of 14.2%) are normal to low for this species because of the low K content of the mafic rocks.

Sodium (Na)

The effect of salt-spray from the sea may be contributing to the high concentrations of Na in the trees, especially around the shores of the peninsula. Relative enrichment of Na on the Burlington Granodiorite probably reflects the higher Na concentration of this lithology relative to rocks of the ophiolitic suite.

Rubidium (Rb)

There is an antagonism between K and Rb in plants (Kabata-Pendias and Pendias, 1984) because of their competition for the same binding sites, often resulting in differences in the distribution patterns of the two elements. Cesium, too, is involved, but the strong correlation commonly shown between Rb and Cs in trees is not apparent in the survey area. Background levels of Rb in black spruce twigs are usually in excess of 200 ppm, such that the biogeochemical data indicate a Rb depletion resulting from the generally mafic nature of the substrate, since Rb occurs mostly in granitic rocks. Twig samples from sites on the Burlington Granodiorite have relatively high concentrations of Rb (median of 170 ppm Rb).

Antimony (Sb)

Excellent analytical precision is obtained for Sb by INAA down to sub-ppm levels in ash. Although Sb can be readily taken up by plants in soluble forms, it is considered a non-essential element (Kabata-Pendias and Pendias, 1984) and is usually present at low ppm levels. In black spruce twigs background concentrations are commonly about 1 ppm Sb, as is the case in the Baie Verte area where the median concentration is 0.9 ppm Sb (p. B 19). The map of Sb distribution shows a strong anomaly around the Rambler and Ming deposits with a maximum concentration of 47 ppm Sb. When samples from around these deposits are removed from the data set (map of 'Antimony - Rambler Excluded') there remain few sites where concentrations exceed 2 ppm Sb. Several sites of relative enrichment to the southwest of Rambler could be showing the effects of contamination from the mine site. However, this area is not within the path of the dominant wind direction nor is it down-drainage from Rambler, and therefore these anomalies may indicate some Sb enrichment in the substrate. There is weak Sb enrichment at Pine Cove.

Scandium (Sc)

Data on the essentiality of Sc in biologic systems are inconclusive (Horovitz, 1988). If required, Sc is needed only in 'ultra-trace' amounts, and therefore its presence in twigs is controlled essentially by the chemistry of the substrate and by the distribution of other elements. In particular, there is a high correlation between Sc and Fe. Background concentrations in black spruce twigs are commonly 2 - 3 ppm Sc, rarely exceeding this amount where there is no Fe enrichment although there can be Fe enrichment without Sc. At Rambler the high levels of Fe are derived from Fe sulphides with which Sc levels are not elevated. Outside of the Rambler area there is a strong similarity between the distribution patterns of Fe and Sc, with the highest concentrations occurring over mafic rocks of the Point Rousse Complex to the west of Ming's Bight.

Strontium (Sr)

INAA has poor sensitivity to traces of Sr, and analytical precision is inferior to that for most other elements considered in this study. However, Sr concentrations are well above detection limits in most samples, such that the areas of Sr enrichment depict significant regional variations.

Strontium is essential for some plant species, but its general essentiality still needs confirmation. It performs a function similar to Ca in plants, and may be incorporated into their structural components. Interactions between Ca and Sr are complex, but within the survey area there is a broad similarity between the distribution patterns of the two elements. The mean concentration of 1300 ppm Sr is identical to that obtained for a suite of over 300 black spruce twig samples from southeastern Cape Breton Island (Dunn *et al.*, 1994). Samples from over the mafic rocks of the Point Rousse Complex are relatively enriched in Sr, notably in the Pine Cove and Deer Cove areas, containing a median concentration of 1600 ppm Sr and a maximum of 3600 ppm Sr.

Thorium (Th)

Thorium has low solubility and is not essential for plant growth. Its concentration in plant ash is typically < 2 ppm, and even over zones of Th-rich mineralization (e.g. allanite with > 5000 ppm Th in northern Saskatchewan) only a few ppm accumulate in the tissues (Dunn and Hoffman, 1986). In the Baie Verte area the Th concentrations are anomalously low (median of 0.7 ppm Th), reflecting the low Th concentrations typical of mafic rocks. There is no appreciable enrichment of Th associated with the Rambler mineralization. Concentrations in trees from the Burlington Granodiorite are typical of those growing on felsic plutons.

Uranium (U)

Although U_3O_8 has high solubility, it rarely exceeds concentrations of more than 2 ppm in plant ash. There are a number of notable exceptions, particularly in northern Saskatchewan where black spruce twigs near the Athabasca uranium deposits locally contain over 2000 ppm U (Dunn, 1983). In the Baie Verte area 76% of the samples yielded U concentrations below the determination limit of 0.1 ppm U (p. B 26). With respect to the survey area in general there is clearly enrichment of U associated with the Ming, but not the Rambler deposits, indicating the presence of U with the fluids from which the massive sulphides of the Ming deposits were

derived. As would be expected, concentrations are slightly higher over the Burlington Granodiorite because of the relatively high U content of felsic plutons.

Tungsten (W)

Tungsten is not known to perform any useful function in plant metabolism. The detection limit for W by INAA is 2 ppm in ash, which is above the usual concentrations in tree tissues, and analytical precision at this level is poor. In the survey area only 8 samples yielded more than 2 ppm W, with all but one occurring in the Pacquet Harbour Group. Of these the most notable is an unusually high 37 ppm W to the east of Rambler.

Zinc (Zn)

Zinc is essential for carbohydrate and protein metabolism, therefore differences of a few 100 ppm Zn in ash are probably related to the health of the tree rather than subtle changes in substrate chemistry. Black spruce twigs commonly contain 2000 - 2500 ppm Zn, therefore the trees in the Baie Verte area are moderately enriched in Zn (median 2900 ppm Zn), and highly enriched around the Rambler and Ming deposits where a maximum of 9500 ppm Zn is recorded. The Pacquet Harbour Group has a high median concentration of 3200 ppm Zn. Once the effects of Rambler have been excluded it becomes evident that there is moderate enrichment of Zn associated with the Brass Buckle deposit; east of Rambler; and the various deposits around Pine Cove.

Rare-Earth Elements (REE)

Because of their chemical coherence, these elements are considered as a single group. Included in standard INAA multi-element packages are determinations for lanthanum (La), cerium (Ce), neodymium (Nd), samarium (Sm), europium (Eu), terbium (Tb), ytterbium (Yb), and lutetium (Lu). Of these elements, excellent precision is obtained for all except Nd, and Tb. Terbium consistently yields concentrations below the detection level (0.5 ppm) and therefore no map of Tb is included. The overall concentrations of the REE are quite low for black spruce twigs. Although there are broad similarities in their distribution patterns, the REE show some distinct differences. In particular, the light rare-earth elements (LREE - La, Ce, Nd and, to a lesser degree, Sm) are relatively enriched over the Burlington Granodiorite, whereas the heavier REE (Eu, Yb and Lu) are more enriched over mafic rocks of the Point Rousse Complex. All REE are weakly enriched in the Ming area. There is commonly a close association between the REE and Fe in tree tissues, and a comparison with the map of Fe distribution shows broad similarities. There remains, however, an underlying control on the REE patterns which is attributable to the REE signatures of the different rock types.

Distribution Maps of Elements Determined by ICP-ES

Silver (Ag)

Silver is not known to be essential to plant life, and can become toxic to plants by substituting for K in membranes and thereby inhibiting the absorption of other cations by roots (Hendrix and Higinbotham, 1974). However, at the few ppm concentrations present within the study area (and most natural environments) the inhibiting effects of Ag on the uptake of other

elements is insignificant. The 50th percentile value of 2.6 ppm Ag is high for black spruce twigs indicating a high regional background of Ag in the Baie Verte area. The map of Ag distribution shows clearly the enrichment of Ag associated with the Ming deposits where there is a maximum of 14 ppm Ag. The map excluding sites around the Rambler and Ming deposits shows a few isolated occurrences of Ag enrichment, and weak enrichment associated with the Brass Buckle deposit.

Aluminum (Al)

All dry vegetation samples were placed in Al trays for ashing, therefore a certain amount of contamination from this source is inevitable. However, the wide range in Al concentrations, the high levels of Al in the samples, and the similarity of Al distribution patterns to those of Fe suggest that areas of *relative* Al enrichment are significant. The aqua regia extraction used is not 'total', but good precision was obtained for duplicate samples. Tests undertaken to compare data obtained on an ash standard by ICP-ES (aqua regia digestion) with some INAA data (determinations for short-lived isotopes) indicate that the acid digestion releases approximately 50% of the Al. With respect to the rest of the survey area there is notable depletion of Al in samples from over the Burlington Granodiorite suggesting that Al is more tightly bound into crystal lattices in this area than in areas of mafic and altered rocks.

Boron (B)

Borosilicate test tubes were used for the acid digestion of the ash samples. Test studies at Acme Analytical Laboratories indicate that this digestion may release 5 - 10 ppm B from the borosilicate, but this amount is insignificant in comparison with the 100s ppm B present in the ash. Tests indicate that the analytical procedure provides data which represent about 50% of the true concentrations of B in the samples. Precision, however, is excellent.

Boron is essential for plant growth, and it is believed to play an important role in the translocation of sugars. The median concentrations of B show little variation from one substrate to the next.

Beryllium (Be)

There is usually less than 2 ppm Be in soils, and because it is a non-essential element for plant growth (in high concentrations it is toxic), its presence in the substrate is reflected in the black spruce twigs by concentrations of less than 1 ppm Be at all but three sites. With the exception of a single site east of Ming's Bight where there is weak Be enrichment, all sites with more than 0.5 ppm Be occur over, or close to the margin of the Burlington Granodiorite. Analytical precision is good above 0.5 ppm Be.

Bismuth (Bi)

The map of Bi distribution shows clearly the association with mineralization at the Rambler and Ming deposits. With the effects of these deposits excluded there remain few sites with concentrations above 1 ppm Bi. The patterns indicate that there may be a little Bi associated with the Brass Buckle, Romeo, Juliet, and Pine Cove deposits.

Cadmium (Cd)

Although there is a strong geochemical association between Cd and Zn in many geochemical environments, this is not evident in plant tissues because of the requirement that plants have for Zn but not for Cd. However, Cd is easily absorbed by plants and may therefore be expected to reflect relative Cd concentrations in soil and groundwater. Absolute concentrations differ among plant species because Cd can be captured by a variety of organic compounds in cell walls and therefore not all will be transported to the tree extremities. Although concentrations are not high for spruce twigs, there is notable relative enrichment of Cd in samples from over the Pacquet Harbour Group, especially around the Ming and Brass Buckle deposits.

Copper (Cu)

Data obtained by ICP-ES from the aqua regia leach are both precise and accurate. Copper plays a fundamental role in plant metabolism. It assists in respiration, photosynthesis, nitrogen fixation and valence changes, and it is present in many micro-components of plants (small and large molecules, chloroplasts, mitochondria etc.). As a consequence, the background concentration of Cu in ash of black spruce twigs is high compared to many trace elements, and commonly over 200 ppm Cu.

The interpretation of Cu distribution patterns in tree tissues should be approached with caution, since laboratory studies report numerous antagonistic and synergistic interactions with both major and minor elements. These are reviewed briefly by Kabata-Pendias and Pendias (1984). However, despite the essentiality of Cu and the complex metabolic roles that it may play, substantial differences among the survey samples are more likely to reflect significant differences in the Cu content of the substrate than the relatively small differences attributable to micronutrient functions.

A statistical breakdown of the data set shows that the over all median concentration is 237 ppm Cu, and that there is notable enrichment in the Pacquet Harbour Group (median 330 ppm Cu), with quite remarkable enrichment of up to 1.2% Cu near the Ming deposits. The high levels in this area are interpreted to reflect some contamination from airborne particulates, some uptake of Cu dissolved in water derived from acid rock drainage of tailings, and also a natural background component. On replotting the data (map of 'Cu - Rambler Excluded') there remain several sites with high Cu concentrations to the east of Rambler, and one adjacent to the Scrape thrust.

Mercury (Hg)

Although most Hg volatilizes during ashing of twigs, it has been suggested that there is sometimes residual Hg in plant ash (in the form of a carbide) in the vicinities of some mineral deposits (Kovalevskii, 1986). Around Rambler, and for a distance of 3 - 4 km to the southeast, spruce twigs yielded anomalously high concentrations of Hg in ash coincident with enrichment of Au, As, Mo, Sb, Se, and Fe. It is tempting to assign these coincident anomalies to new and undiscovered zones of gold mineralization. However, a more probable explanation is that the metals are associated with fine particles of wind-blown sulphide-rich dust, derived from the large open area of mine tailings at Rambler, that have become lodged in the tree tissues. Analysis of these tailings shows that most of the Hg, Au, As, Se, and Mo is associated with the < -250

mesh particles (Table 9). Not all the Hg volatilized during ashing because it was tightly locked within the crystal lattices of the sulphide grains. Despite careful washing of vegetation samples, it is not always possible to remove all dust because some becomes firmly embedded and with time tissue may grow around and over some grains, such that they become incorporated within the plant structure.

Table 9: Metal Concentrations in Different Size Fractions of Tailings from the Consolidated Rambler Mine

	Hg ppb	Au ppb	As ppm	Mo ppm	Se ppm	Sb ppm	Cr ppm
Coarse: > -32 mesh (> 500 μ)	110	200	33	2	8	18	170
-32 to -80 (500-180 μ)	175	300	70	8	15	31	160
-80 to -150 (180-106 μ)	195	700	390	19	87	28	95
-150 to -250 (106-63 μ)	485	750	600	26	120	19	45
Fine: < -250 mesh (< 63 μ)	1170	1700	670	41	120	37	190

The source of Hg enrichment in the sample from between the Stog'er Tight and Pine Cove deposits is unknown.

Lithium (Li)

Lithium commonly follows Rb and Cs in nature. In black spruce twigs it is less abundant than Rb but enriched with respect to Cs. Background levels are commonly in the range of 4 - 8 ppm Li. It is not known to be essential to plant metabolism, and its high solubility (except where firmly bonded to clay minerals) causes Li enrichment in soils and waters to be readily reflected in plant tissues. Samples with the highest Li content are from the Pacquet Harbour Group, although the median Li value is slightly lower than that of the Point Rousse Complex.

Magnesium (Mg)

Magnesium is a macronutrient which plays several important roles in plant health, including photosynthesis and numerous enzymic reactions. From a biogeochemical prospecting perspective, major differences in Mg concentrations in plants can indicate significant differences in the underlying lithology, but smaller differences are not known to be of value in delineating zones of mineralization. The high concentrations in samples from the mafic rocks of the Point Rousse Complex are notable, with up to 7.2% Mg and a median value of 4.07%

Manganese (Mn)

Manganese is an essential element which is readily taken up by plants, especially where the acidity of the ground is high. In acidic environments there is a Mn/Fe antagonism, which is extended to elements with a broad affinity for Fe. Samples from the southern part of the survey area are markedly enriched in Mn with up to 7.7% Mn over the Pacquet Harbour Group

and a median concentration of 3.25%. By contrast spruce twigs from the Point Rousse Complex have a median concentration of only 1.2% Mn.

Molybdenum (Mo)

Molybdenum in trace amounts is required by most plants for nitrogen fixation and nitrate reduction. Concentrations are usually <2 ppm Mo in conifer twigs, although over highly alkaline soils the trees are able to absorb Mo more readily, and therefore slightly higher levels may be expected. Although no high concentrations of Mo are present in samples from the survey area, there is relative enrichment of Mo associated with the Ming and Rambler deposits.

Nickel (Ni)

The presence of Ni may assist in the translocation of nitrogen in some plants, but its general essentiality is unproven. When in solution, Ni is readily taken up by plants, therefore it may be expected that the Ni content of the twigs is positively correlated with Ni concentrations in groundwaters. INAA has low sensitivity to Ni (detection limit of 50 ppm Ni in ash). In contrast, excellent precision and accuracy are obtained by ICP-ES down to a few ppm Ni.

Background concentrations of Ni in black spruce twigs are commonly 30 - 40 ppm Ni, therefore the survey area has a relatively high background level (median of 76 ppm Ni). The effect of the mafic to ultramafic rocks comprising the Point Rousse Complex is seen north of the Scrape Thrust, where the median level is 226 ppm Ni and there is a maximum of 664 ppm.

Phosphorus (P)

Phosphorus plays a vital role in plant energy metabolism, and it is extremely important as a structural part of many organic compounds. Its uptake by trees may be antagonized by excess Ca which, from the maps showing distribution patterns of Ca and P, appears to take place in the black spruce twigs from sites underlain by the Pacquet Harbour Group and Point Rousse Complex. However, this association does not occur on the more acidic and relatively P-rich terrain of the Burlington Granodiorite. Similarly, high levels of P may influence the uptake of numerous trace metals, although this effect appears to be subordinate to the over-riding effect of the chemistry of the substrate.

Lead (Pb)

Despite the known toxic effects of Pb, it occurs naturally in all plants, and in small traces Pb may even be an essential element (Broyer et al., 1972). It is taken up mainly by root hairs and stored as a pyrophosphate in cell walls. The Pb content of the spruce twigs (median 85 ppm Pb) is similar to background levels in pristine forests elsewhere in northern Canada. Notable enrichment occurs only around the Ming (2533 ppm Pb) and, to a lesser extent, the Rambler deposits. With samples from this area removed from the data set (map of 'Lead - Rambler Excluded') there are no sites with unusually high concentrations of Pb. Relative enrichment occurs near Pine Cove and to both the east and west of Rambler.

Selenium (Se)

Traces of Se are essential for some plants. Selenium occurs in combination with many compounds, some of which break down to release volatile chemical species of Se during the ashing process. Consequently, it is probable that the Se content of the twig ash is not proportional to the total content of the dry tissue. Analytical precision by INAA at low ppm levels of Se is poor, therefore the samples were analyzed for Se by hydride generation with an ICP-ES finish. Typically, Se concentrations in ashed vegetation are less than 2 ppm Se. The median value for the spruce twigs is 1.9 ppm Se, with relative enrichment of up to 10.5 ppm Se in trees from around the Ming and Rambler deposits (median 2.5 ppm Se) with which the Se is associated and concentrated in the -250 mesh fraction (Table 9). The map of Se (Rambler Excluded) shows that elsewhere in the survey area there are no significant zones of Se enrichment except for two sites to the east and two sites to the south of Rambler.

Tellurium (Te)

There are few data on the Te content of conifers and its essentiality is unknown. Tellurium has a geochemical affinity for Se, and its most renowned association is with Au as tellurides. The map shows there to be some Te enrichment associated with Rambler, the Romeo and Juliet deposits, and at a site of unknown source 1.5 km northwest of Ming W. Elsewhere within the survey area there are isolated sites of weak Te enrichment (e.g. Brass Buckle), but at levels below 0.5 ppm Te the precision of the data are poor, therefore their validity is in doubt.

Titanium (Ti)

The essentiality of Ti for plant growth is uncertain, but it may play a role in photosynthesis. The ICP-ES analysis is probably not 'total', although it is likely that most of the Ti in the ash goes into solution during the aqua regia digestion. The pattern of Ti distribution in the survey area shows no clear association with other elements or mineralization. Concentrations are within the normal range for conifer twigs.

Vanadium (V)

The essentiality of V for plant metabolism, other than that of green algae, has not been proven. Soluble V is easily taken up by roots, and it may play a similar role to Mo in fixing nitrogen. Vanadium concentrations are within the normal range for spruce twigs, ranging from 5 - 94 ppm V with a median value of 18 ppm V. Except for the area immediately surrounding the Ming and Rambler deposits, V appears closely associated with Fe.

NOTES ON THE BIOGEOCHEMICAL DATA LISTINGS (APPENDICES A and B)

Appendix A lists field data and all analytical data obtained for the balsam fir twig ash. Appendix B provides simple statistical analyses of the data by treating the data set as a whole, and by dividing the data according to the underlying bedrock geology. Abbreviations used in the appendices are explained in Tables 10 and 11.

Table 10: Abbreviations Used in Appendix A

Map Sheet	National topographic system (NTS): First three characters refer to 1:250,000 scale quadrangle; remaining two characters identify the 1:50,000 scale map sheet within the quadrangle.
Zone, Easting and Northing	The Universal Transverse Mercator (UTM) zone followed by easting and northing co-ordinates in metres.
Twig Min Age Twig Max Age	The minimum age of each length of twig collected. The maximum age of each length of twig collected.
Slope	0 = flat ground 1 = slight incline followed by downward compass direction (e.g. 1N = slight downward incline to the north) 2 = moderate incline 3 = steep incline
Forest Type	Type of vegetation cover and degree of surface water saturation.
Remarks	More detail about the sample site.

Table 11: Abbreviations Used in Appendix B

Rock Type	Underlying bedrock lithology (derived from published geological maps): BG - Burlington Granodiorite PH - Pacquet Harbour Group PR - Point Rousse Complex QP - Quartz-Feldspar Porphyry (Cape Brule Porphyry in east, King's Point Complex in south) FP - Flatwater Pond Group
N dl Cum %	N = number of samples dl = determination limit Cum % = cumulative frequency (as a percentage)

ACKNOWLEDGEMENTS

We acknowledge with thanks the following: Dr. Peter Davenport, John McConnell and other staff members of the Newfoundland Dept. of Mines for much useful advice and information throughout this study; Dr. Stephen Adcock (GSC) for developing the computer program to format the data listings and statistics in Appendix A; Don Burton and NovaGold for

information on the Pine Cove deposit and access to the property; Corona Mines for permitting us to use the trailers that they then owned at the Rambler Property; and in particular, Peter Dimmell for his field assistance, and all the valuable information and advice that he provided.

REFERENCES

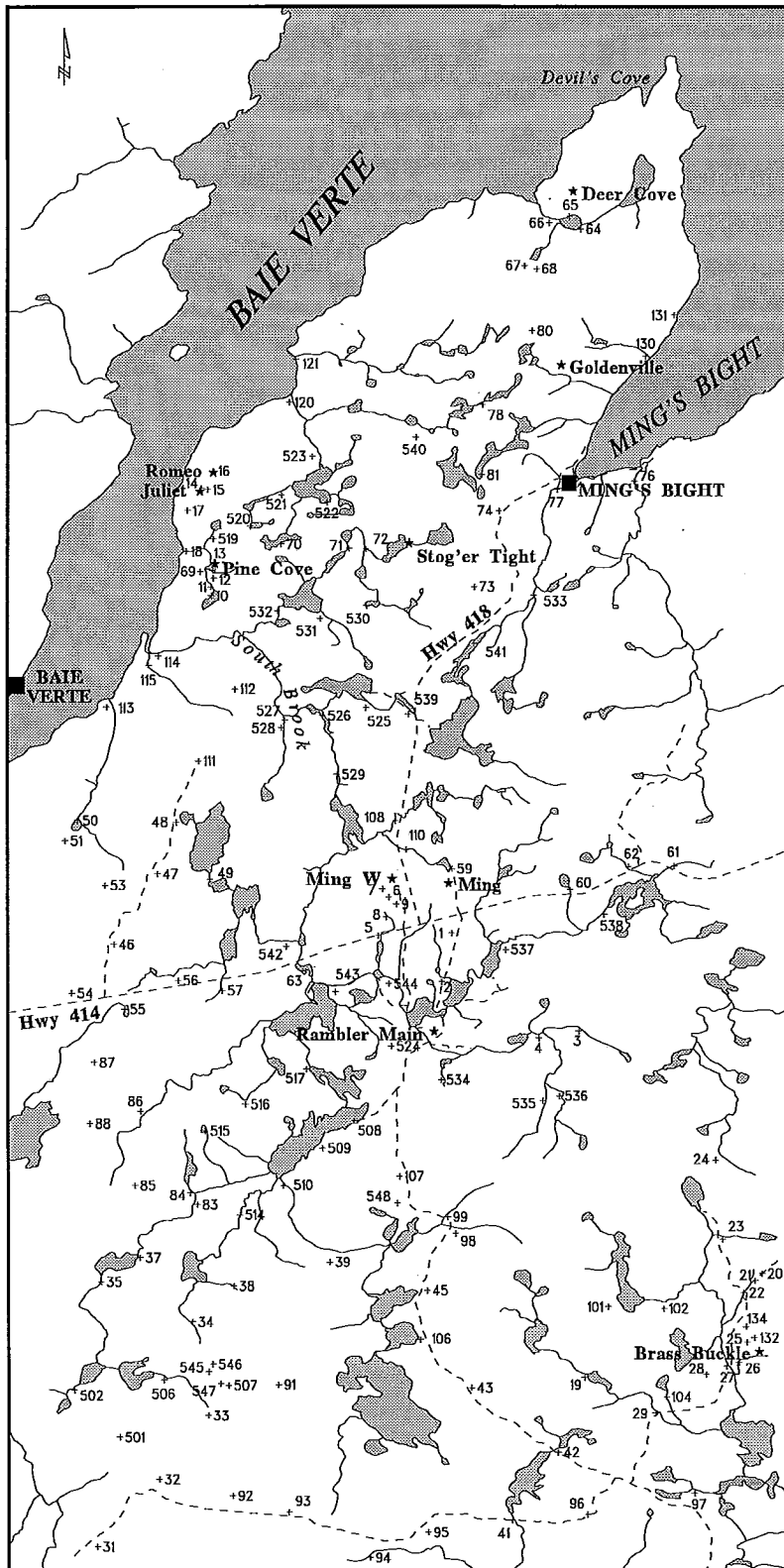
- Bidwell, R.G.S., 1979. Plant Physiology. Second edition, MacMillan Publ. Co., Inc., NY.
- Brooks, R.R., Dunn, C.E., and Hall, G.E.M., 1995. Biological Systems in Mineral Exploration and Processing. Ellis Horwood, U.K., 538 pp.
- Broyer, T.C., Johnson, C.N., and Paull, R.E., 1972. Some aspects of lead in plant nutrition. Plant Soil, **36**: 301.
- Dimmell, P. and Hartley, C., 1991. Gold mineralization and exploration potential of the Pine Cove property, Baie Verte peninsula. In: Ore Horizons No. 1 (Ed. S. Swinden and A. Hogan). Geol. Survey Branch, Nfld. Dept. Mines and Energy, 51-62.
- Dunn, C.E., 1983. Detailed Biogeochemical Surveys for Uranium in the NEA/IAEA Athabasca Test Area. In: Uranium Exploration in Athabasca Basin, Saskatchewan, Canada (Ed. E.M. Cameron). Geol. Surv. Can., Paper 82-11: 259-272.
- Dunn, C.E., 1986. Gold Exploration in Northern Saskatchewan by Biogeochemical Methods. Cdn. Inst. Min. and Metall., Sp. Vol. 38: 418-434.
- Dunn, C.E., 1989. Reconnaissance-level biogeochemical surveys for gold in Canada. Trans. Inst. Min. Metall., Section B, Applied Earth Science: **98**, B153-B161.
- Dunn, C.E., Adcock, S.W., and Spirito, W.A., 1994. Reconnaissance biogeochemical survey of southeastern Cape Breton Island, Nova Scotia: Part 2 Balsam Fir Twigs. Geol Survey Canada, Open File #2758, approx. 200 pp.
- Dunn, C.E., Coker, W.B., and Rogers, P.J., 1991. Reconnaissance and detailed geochemical surveys for gold in eastern Nova Scotia using plants, lake sediment, soil and till. J. Geochem. Explor. **40**: 143-163.
- Dunn, C.E., Banville, R.M.P., and Adcock, S.W., 1989. Reconnaissance biogeochemical survey, eastern Nova Scotia. Geol. Surv.Can. Open File 2002: 95 p. and 28 maps.
- Dunn, C.E. and Hoffman, E. 1986. Multi-Element Study of Vegetation from a Zone of Rare-Earth Rich Allanite and Apatite in Northern Saskatchewan, Canada. Applied Geochem., **1**: 375-381.
- Dunn, C.E., and Scagel, R.F., 1989. Tree top sampling from a helicopter - a new approach to gold exploration. J. Geochem. Explor., **34**: 255-270.
- Gale, G.H., 1971. An investigation of some sulphide deposits of the Rambler area, Newfoundland. Unpublished Ph.D. thesis, Univ. of Durham, England.
- Gale, G.H., 1973. Paleozoic basaltic komatiite and ocean floor type basalts from northeast Newfoundland. Earth and Planetary Science Letters, **18**, 22-28.
- Hall, G.E.M., Balma, R.G., and Spirito, W.A. (in prep.) Hydrogeochemical Survey, Baie Verte Area, Newfoundland (Parts of NTS 12H 16 and 12I 1). Geol. Survey Can. Open File.

- Hendrix, D.L. and Higinbotham, N., 1974. Heavy metals and sulphhydryl reagents as probes of ion uptake in pea stem. *In: Membrane Transport in Plants*, Springer Verlag, Berlin, 412 pp.
- Hibbard, J., 1983. Geology of the Baie Verte Peninsula, Newfoundland. Nfld. Dept. Mines and Energy, Mineral Dev. Division, Memoir 2, 279 pp.
- Horovitz, C.T., 1988. Is the major part of the periodic system really inessential for life? *J. Trace Elem. Electrolytes Health Dis.*, **2**: 135-144.
- Kabata-Pendias, A., and Pendias, H., 1984. Trace Elements in Soils and Plants. CRC Press, Inc., Boca Raton, Florida, 315pp.
- Kovalevskii, A.L., 1986. Mercury-biogeochemical prospecting for mineral deposits. *Biogeochemistry*, **2**: 211-220.
- Rogers, P.J., and Dunn, C.E., 1993. Trace element chemistry of vegetation applied to mineral exploration in eastern Nova Scotia, Canada. *J. Geochem. Explor.*, **48** 71-95.
- Warren, H.V., Delavault, R.R., and Barakso, J., 1964. The role of arsenic as a pathfinder in biogeochemical prospecting. *Econ. Geol.*, **59**: 1381-1389.

SAMPLE LOCATION

BAIE VERTE, NEWFOUNDLAND

559000 572000
5544000 5544000



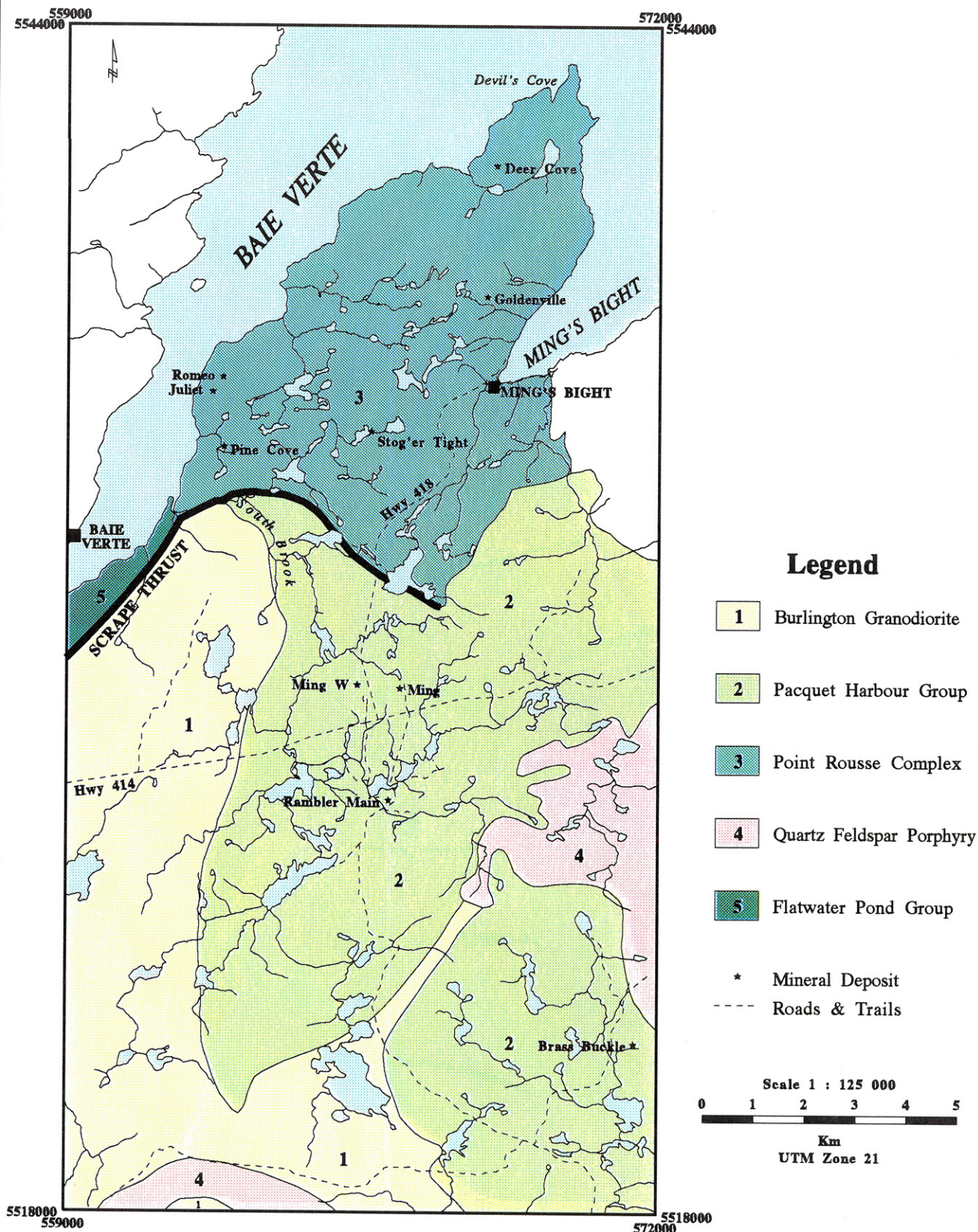
* Mineral Deposit
--- Roads & Trails

Scale 1 : 125 000
0 1 2 3 4 5
Km
UTM Zone 21

5518000 559000 572000 5518000

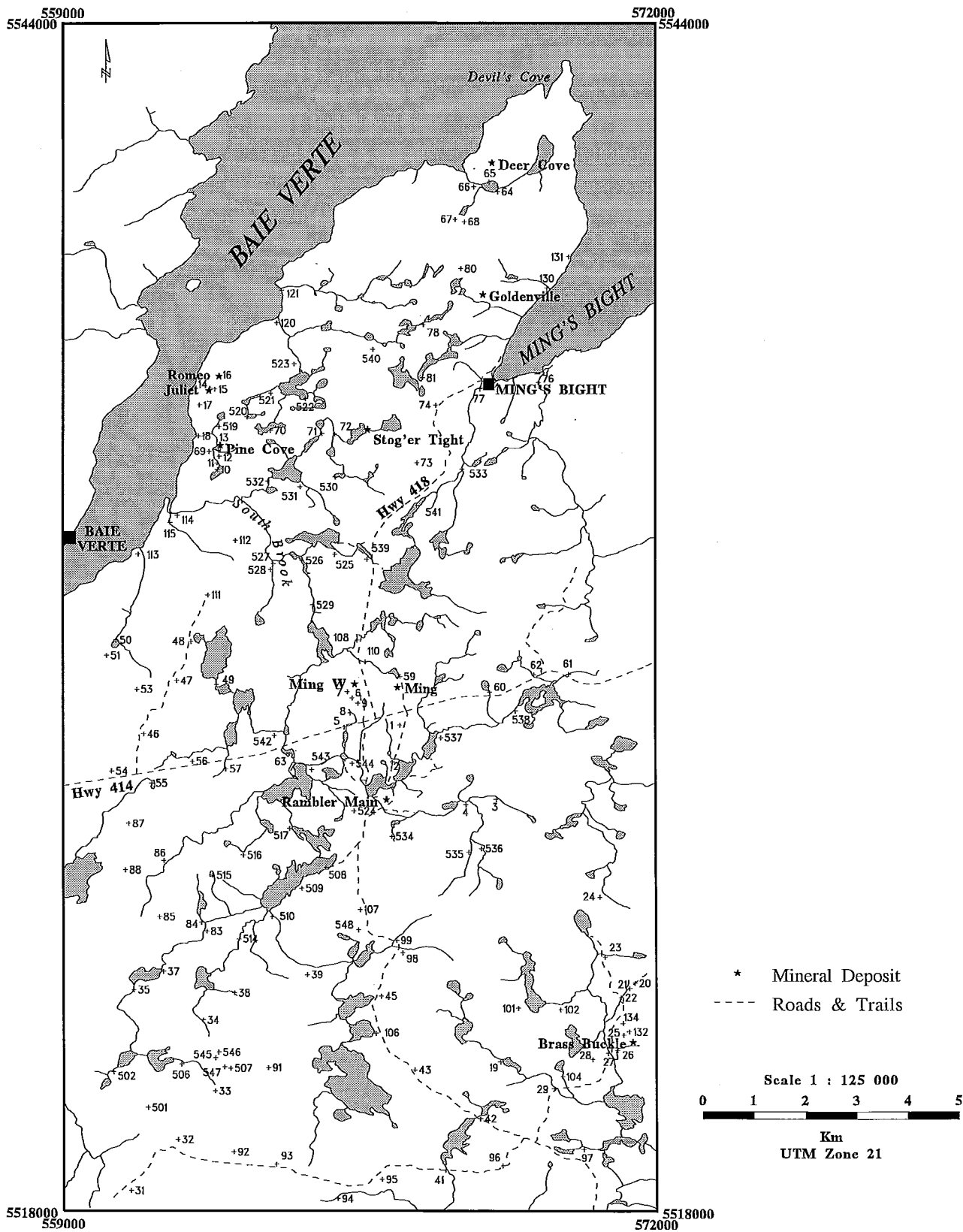
SIMPLIFIED GEOLOGY

BAIE VERTE, NEWFOUNDLAND



SAMPLE LOCATION

BAIE VERTE, NEWFOUNDLAND

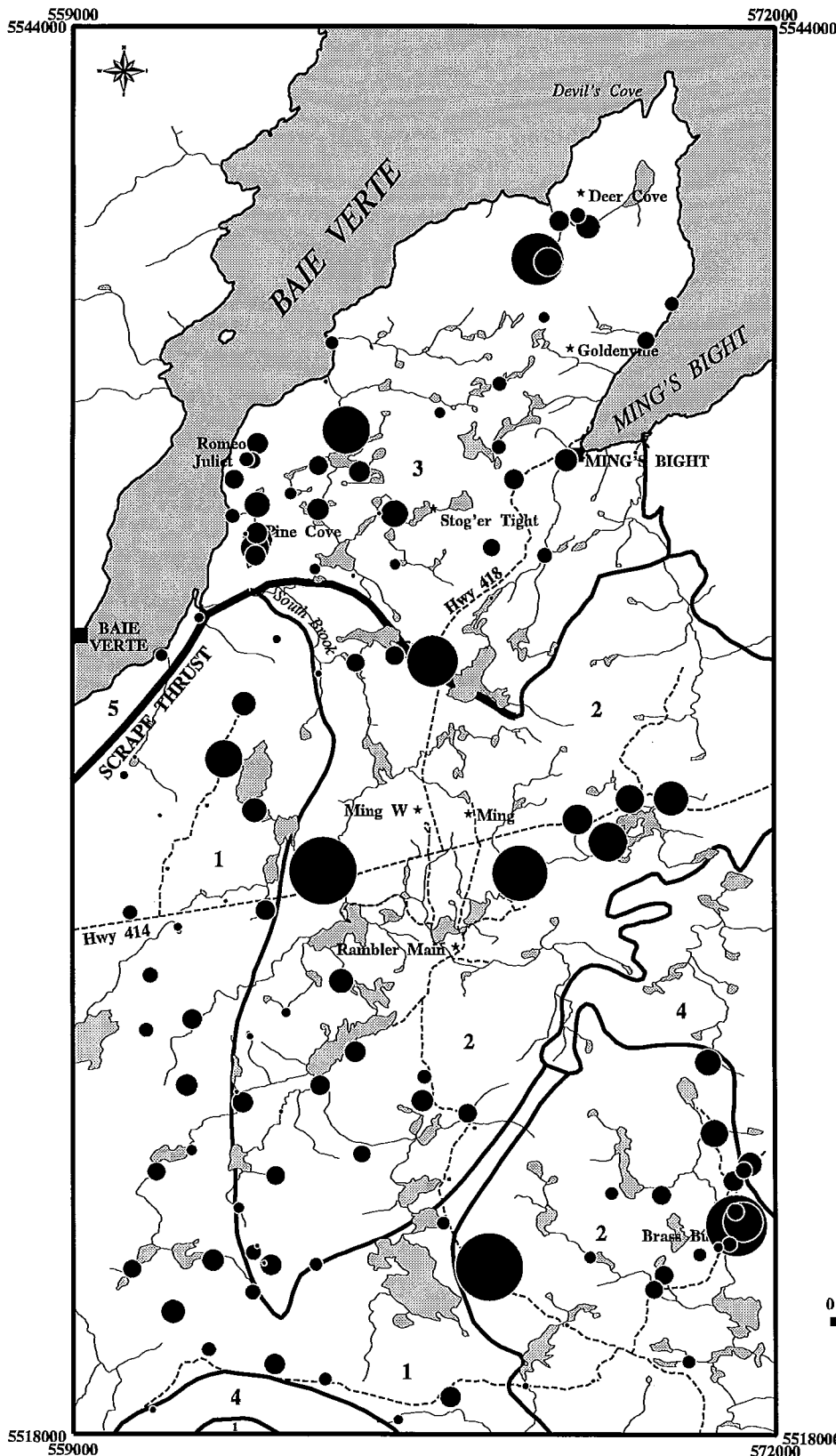




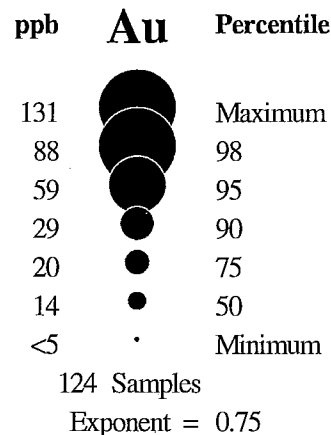
GOLD BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Au
[RE]



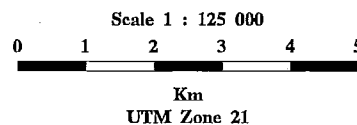
INAA



Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails

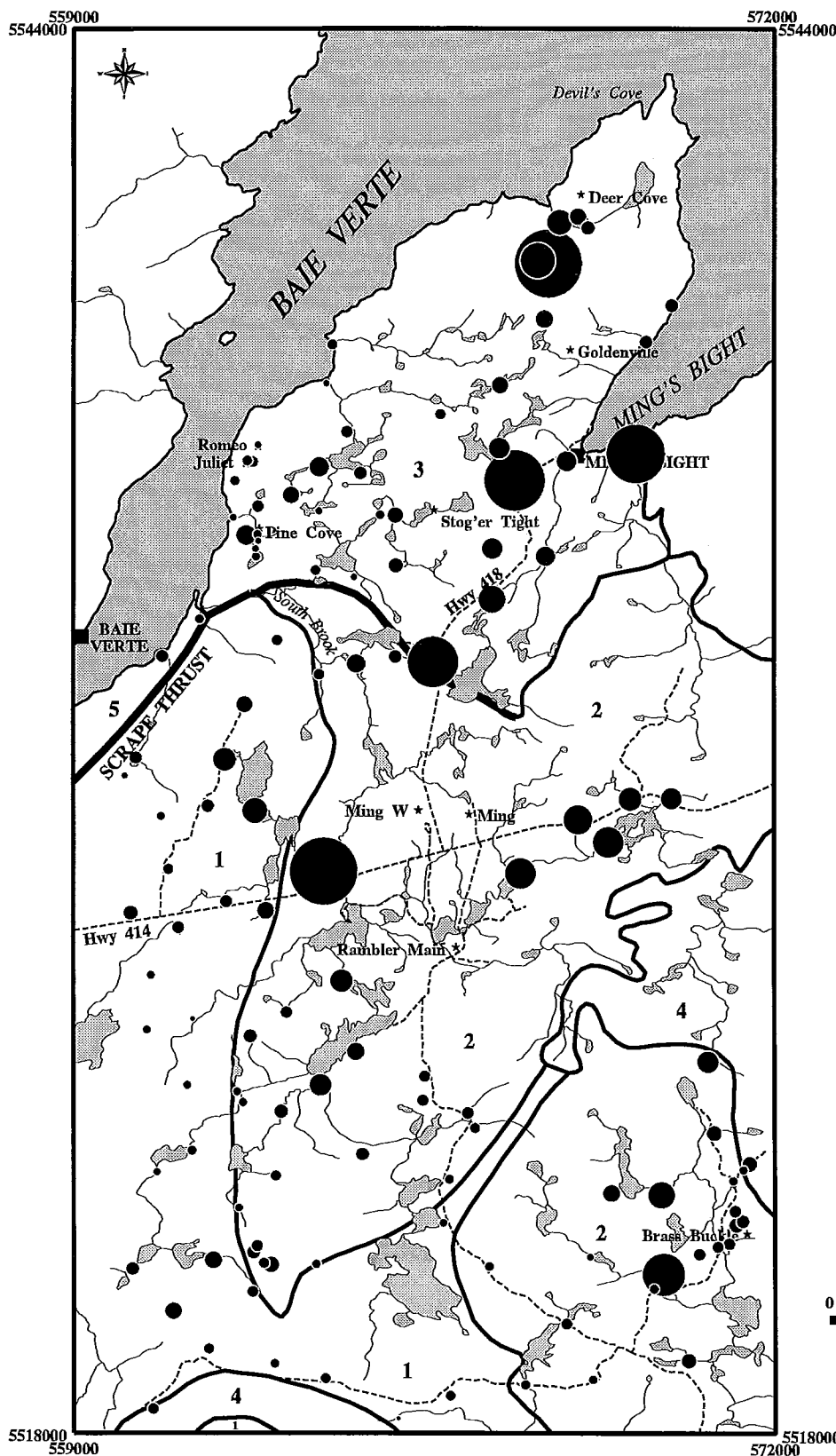




ARSENIC BLACK SPRUCE TWIGS

Rambler Excluded [RE]

As
[RE]



INAA

ppm	As	Percentile
51.0		Maximum
32.5		98
19.0		95
11.5		90
7.0		75
4.4		50
<0.5		Minimum

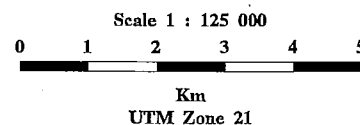
124 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails





IRON BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Fe
[RE]

INAA

pct	Fe	Percentile
5.63		Maximum
4.39		98
3.11		95
2.16		90
1.38		75
0.98		50
0.29		Minimum

124 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

* Mineral Deposit

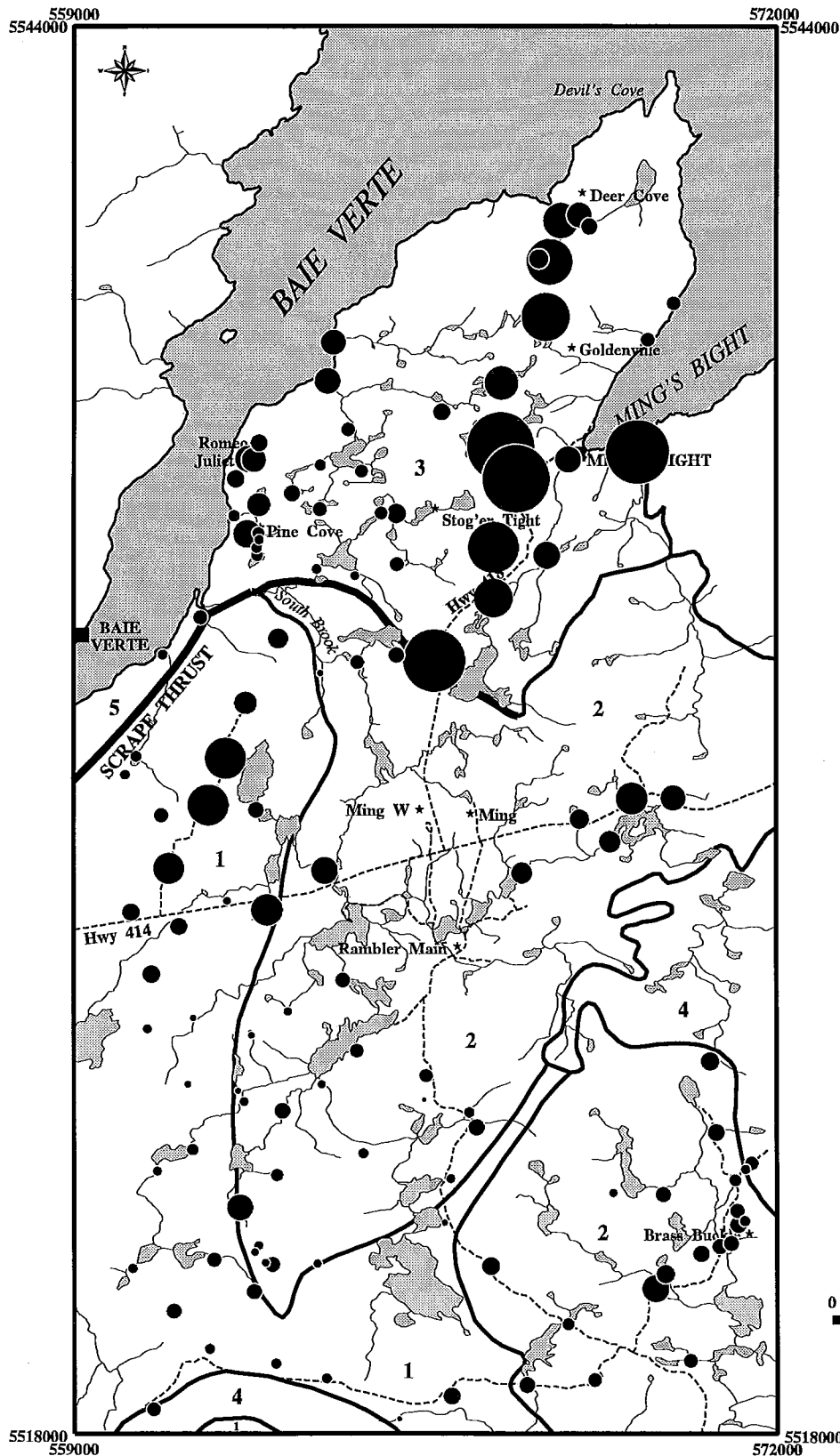
----- Roads & Trails

Scale 1 : 125 000



Km

UTM Zone 21

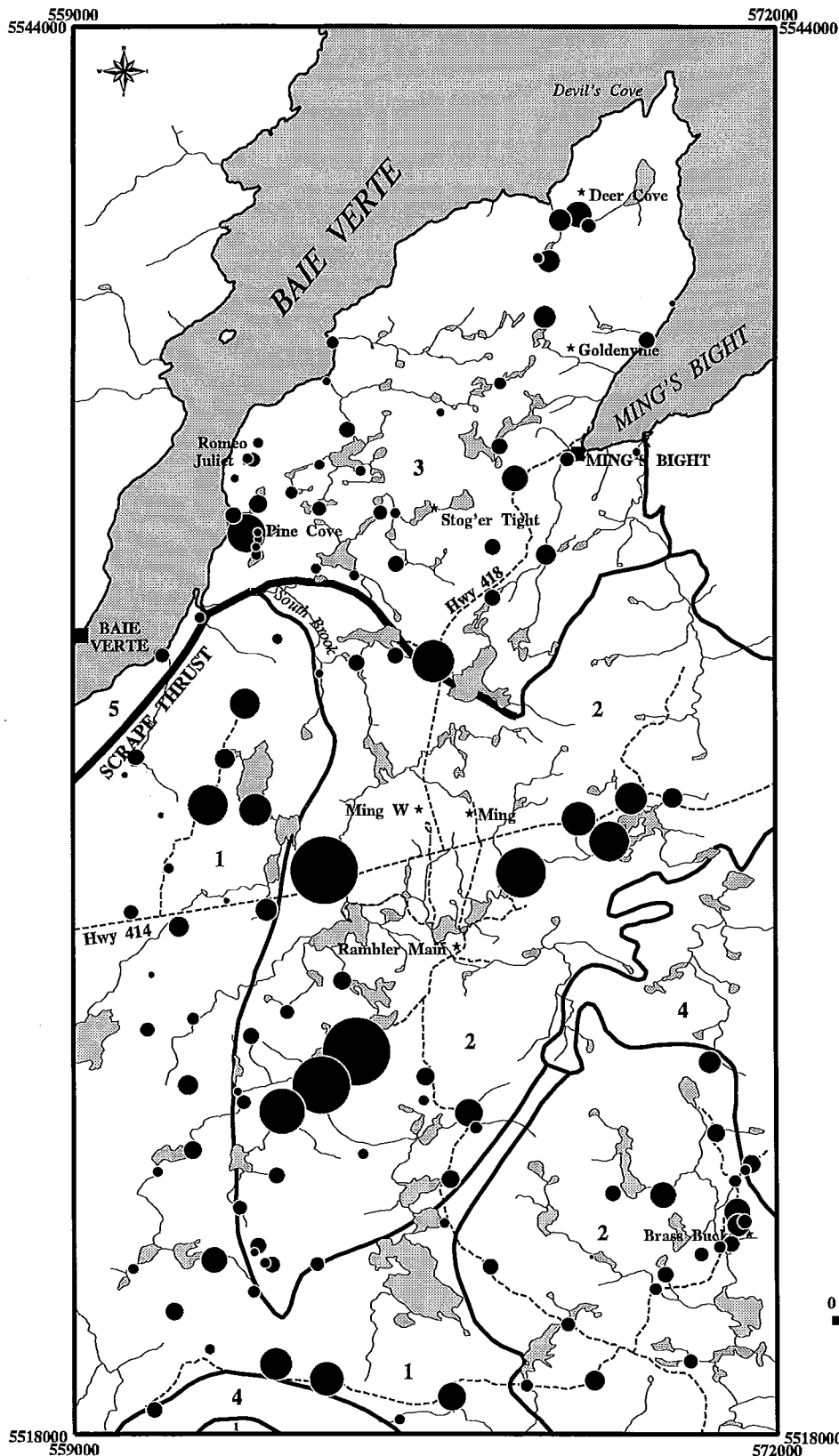




ANTIMONY BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Sb
[RE]



INAA

ppm	Sb	Percentile
4.9		Maximum
3.5		98
2.2		95
1.7		90
1.1		75
0.8		50
0.3		Minimum

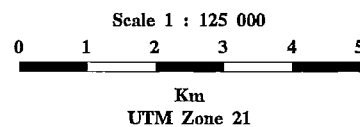
124 Samples

Exponent = 1

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails

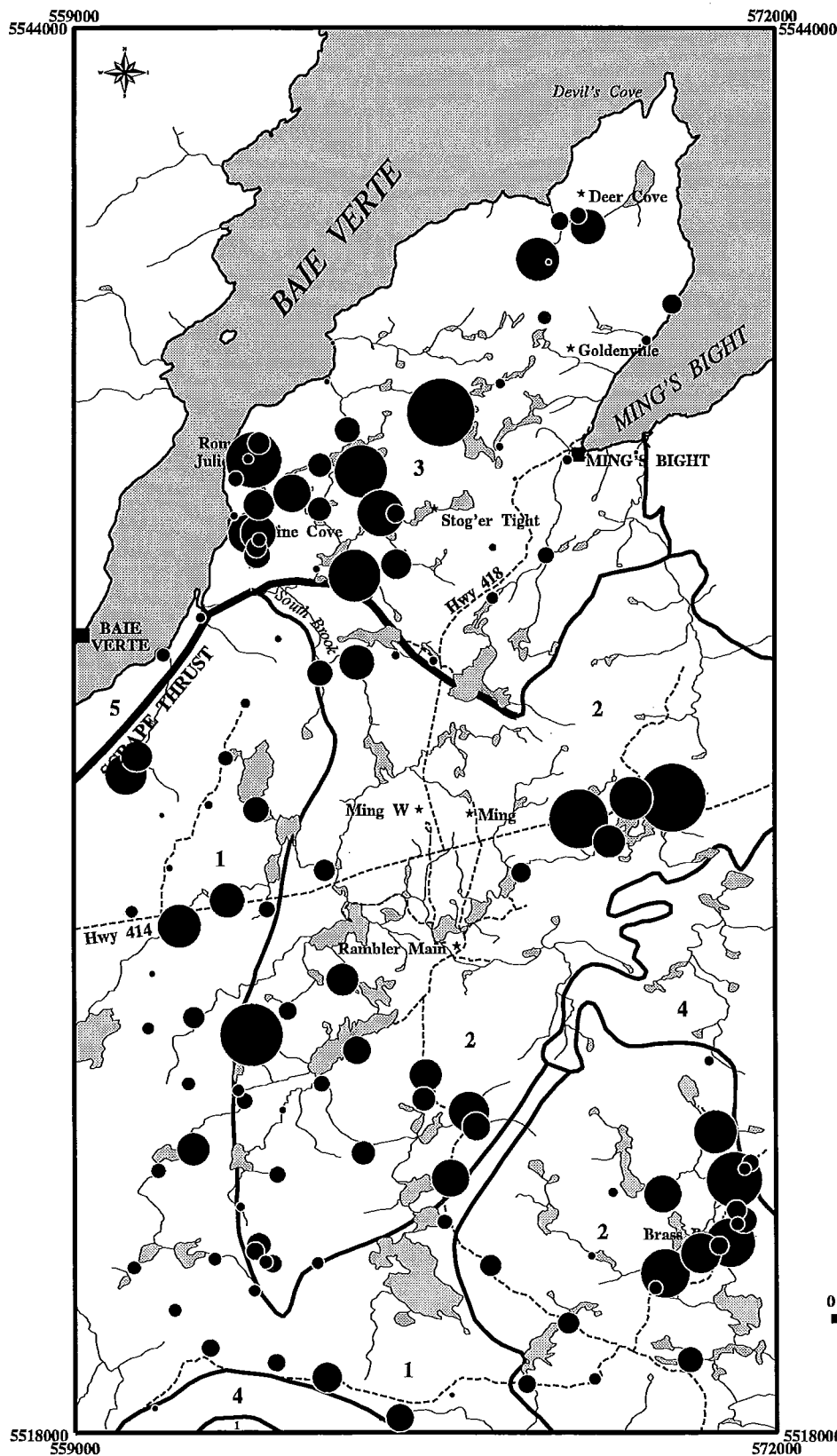




ZINC BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Zn
[RE]



INAA

ppm	Zn	Percentile
5700		Maximum
4650		98
4275		95
3900		90
3400		75
2800		50
1200		Minimum

124 Samples

Exponent = 2

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



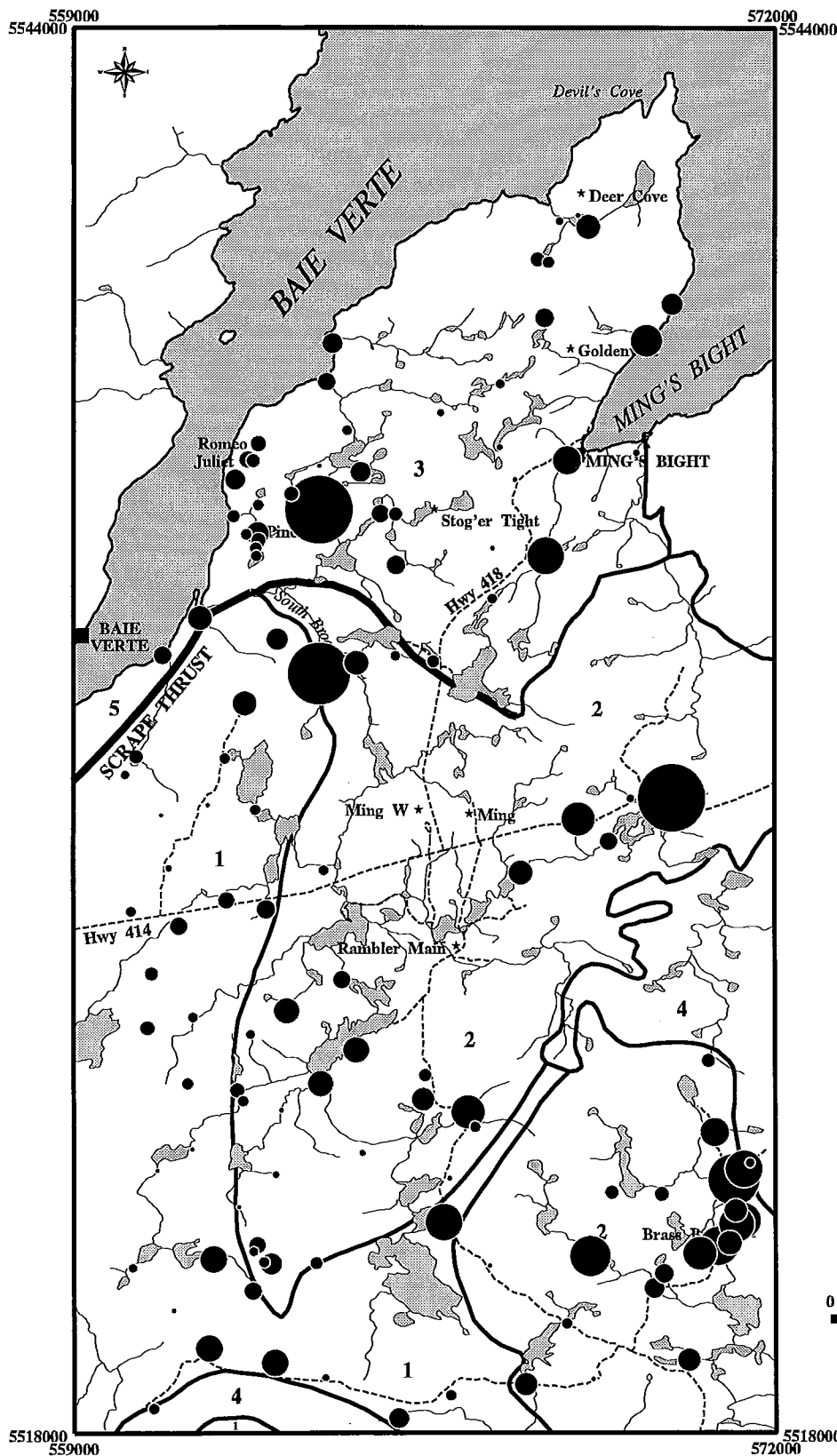
Km
UTM Zone 21



SILVER BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Ag
[RE]



ICP-ES

ppm	Ag	Percentile
9.2		Maximum
5.3		98
4.0		95
3.7		90
3.0		75
2.3		50
0.3		Minimum

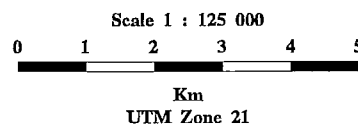
122 Samples

Exponent = 2

Simplified Geology

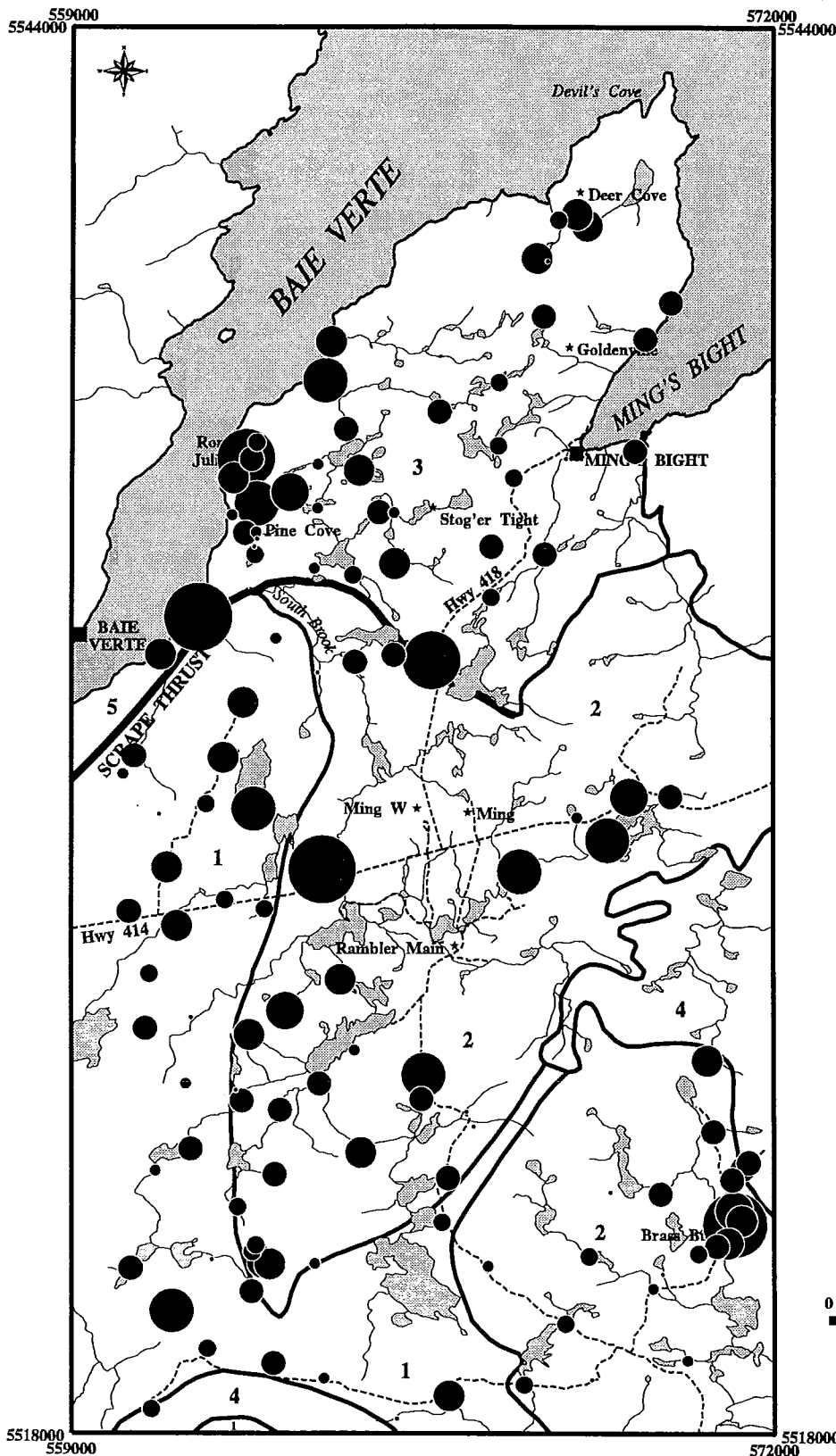
- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails



BISMUTH BLACK SPRUCE TWIGS

Rambler Excluded [RE]



HYDRIDE

ppm	Bi	Percentile
1.8	●	Maximum
1.1	●	98
0.7	●	95
0.6	●	90
0.5	●	75
0.4	●	50
<0.2	●	Minimum

124 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



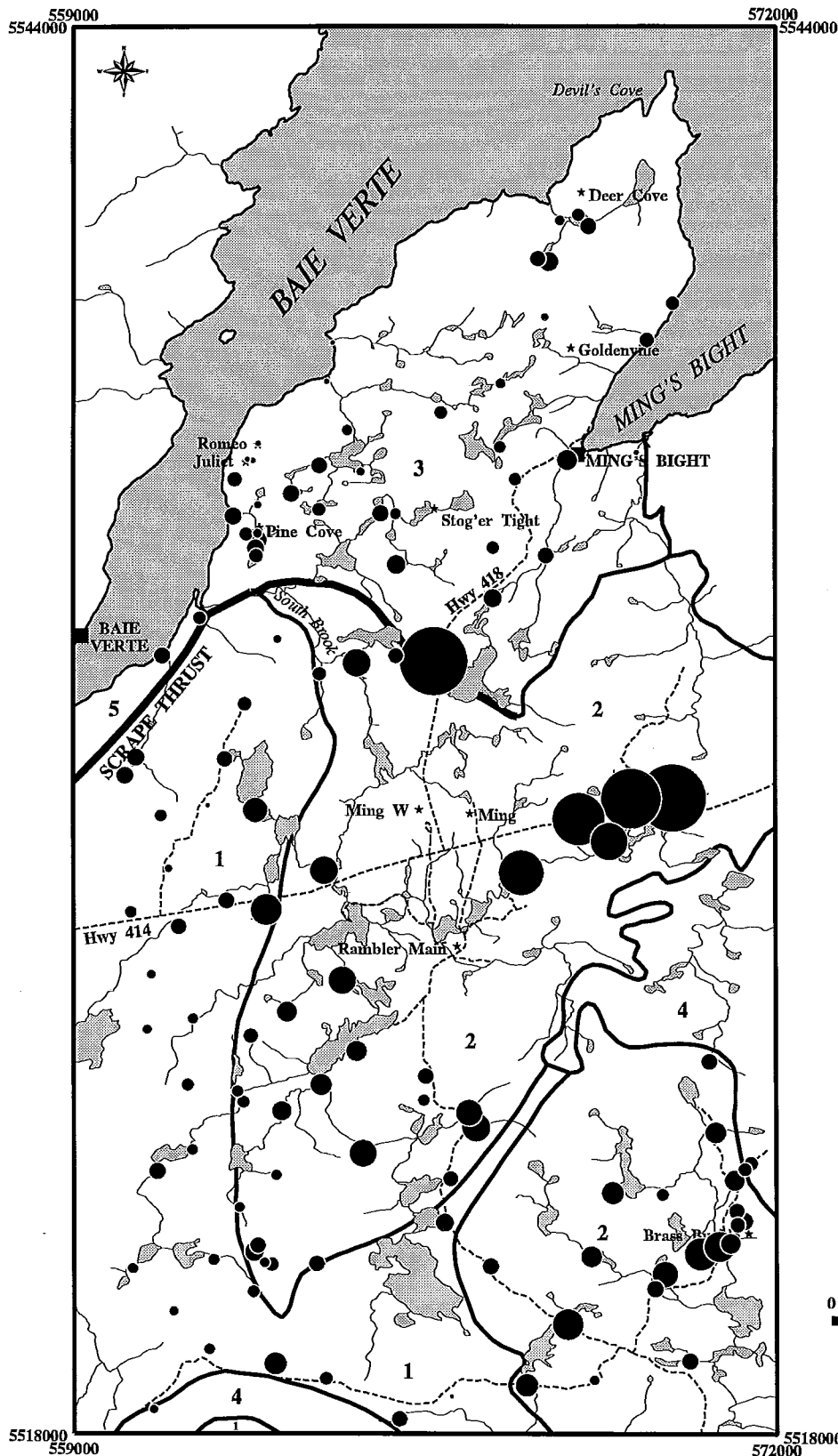
Km
UTM Zone 21



COPPER BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Cu
[RE]



ICP-ES

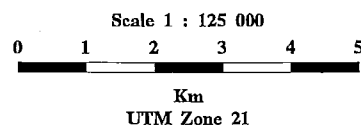
ppm	Cu	Percentile
879		Maximum
720		98
429		95
346		90
268		75
232		50
128		Minimum

122 Samples
Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit
--- Roads & Trails

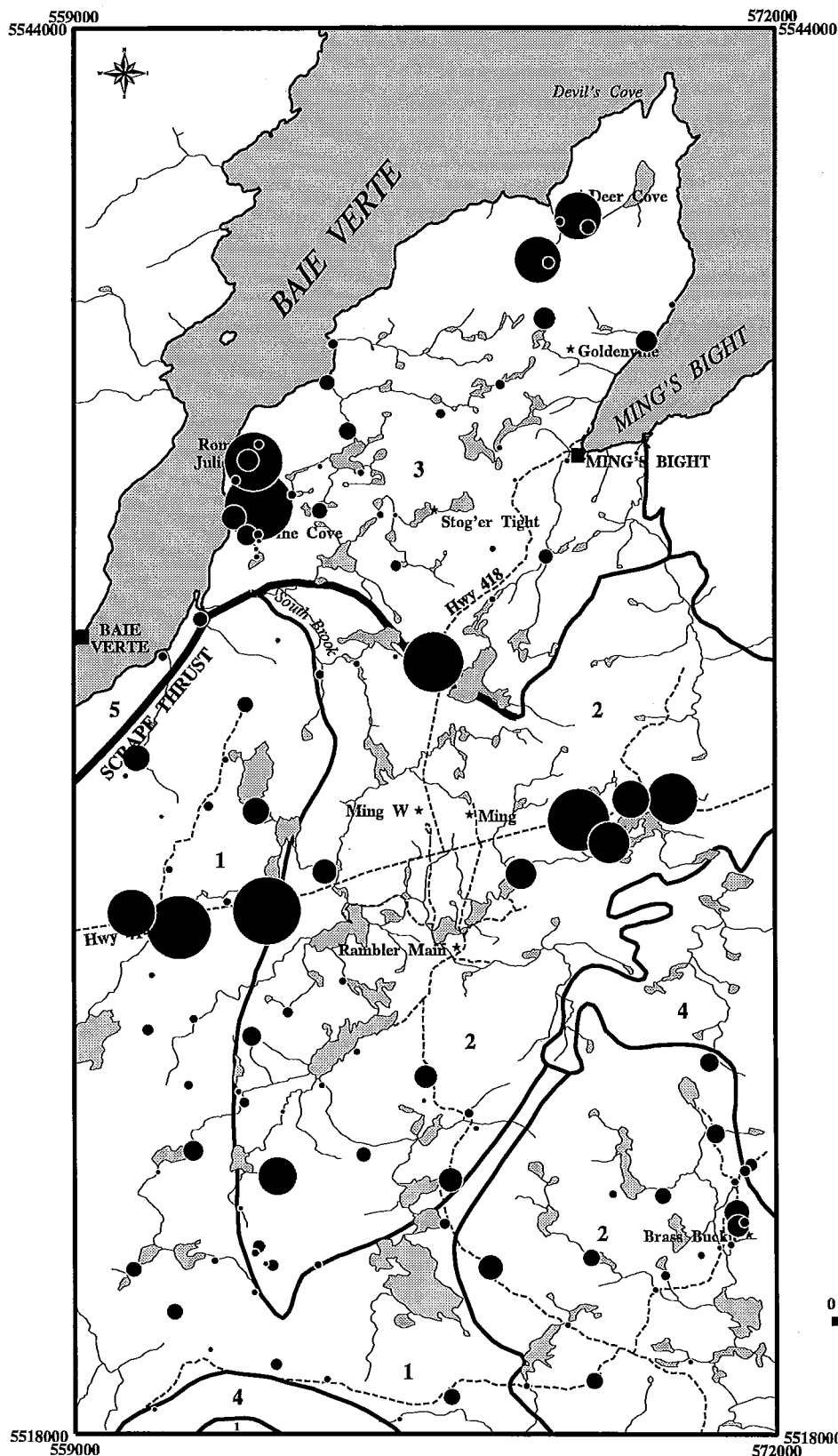




LEAD BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Pb
[RE]



ICP-ES

ppm	Pb	Percentile
233		Maximum
195		98
180		95
150		90
109		75
77		50
30		Minimum

122 Samples

Exponent = 2

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km

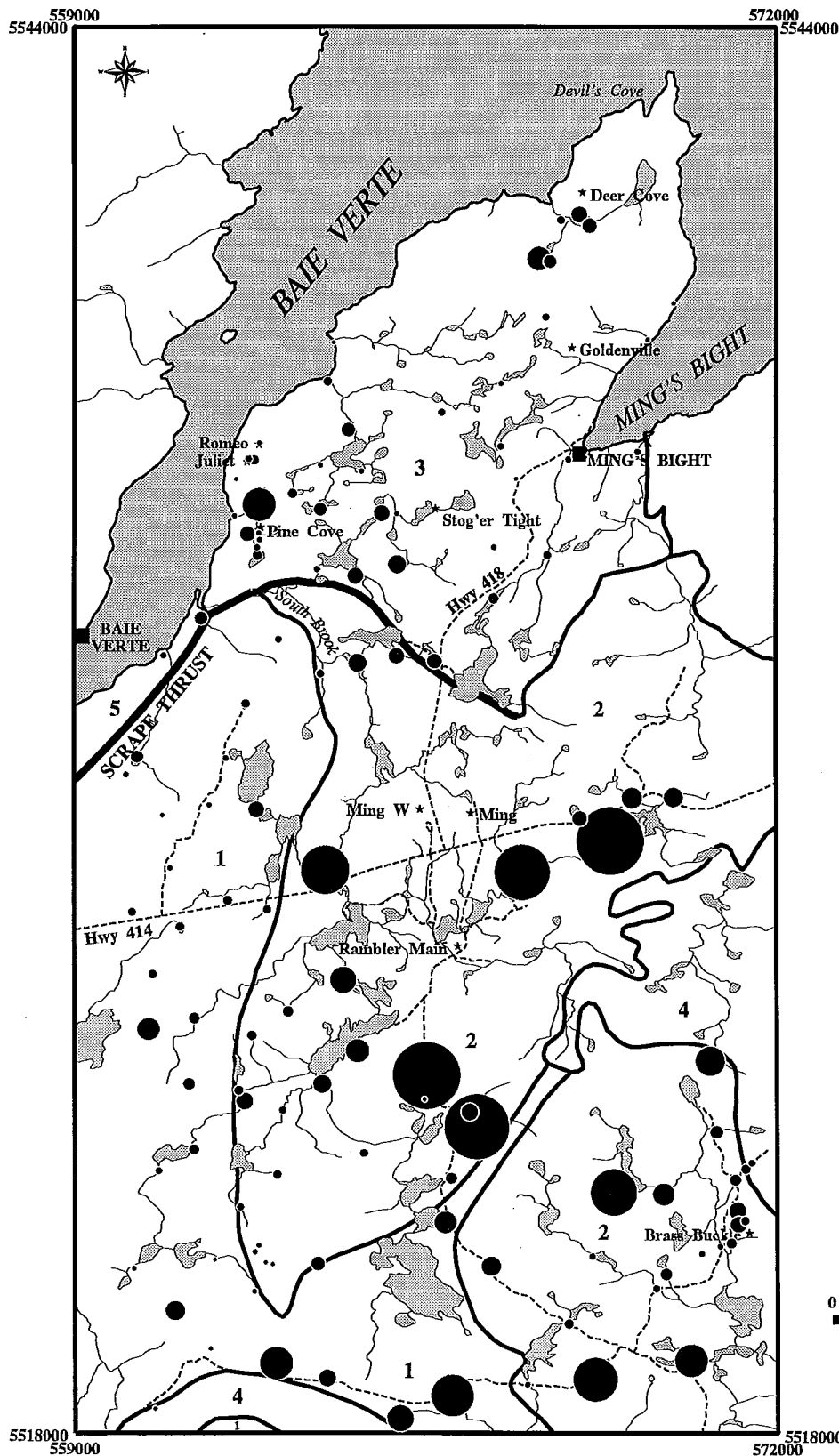
UTM Zone 21



SELENIUM BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Se
[RE]



HYDRIDE

ppm	Se	Percentile
5.5		Maximum
5.3		98
4.4		95
3.4		90
2.5		75
1.8		50
0.4		Minimum

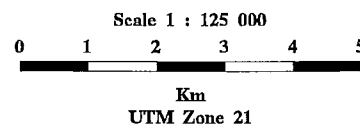
124 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

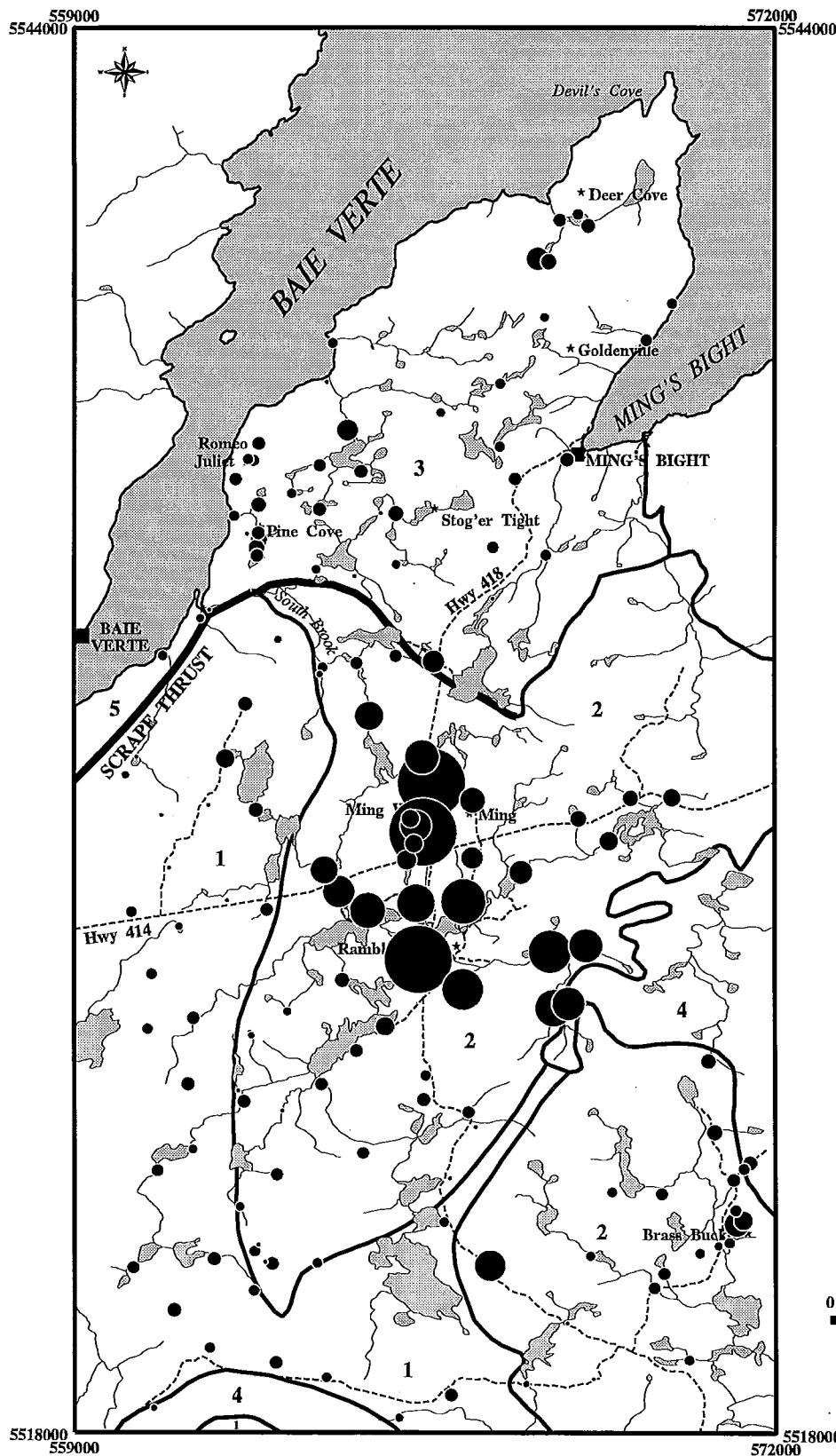
- * Mineral Deposit
- Roads & Trails





GOLD BLACK SPRUCE TWIGS

Au



INAA

ppb	Au	Percentile
810		Maximum
709		98
196		95
127		90
27		75
17		50
<5		Minimum

147 Samples

Exponent = 0.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



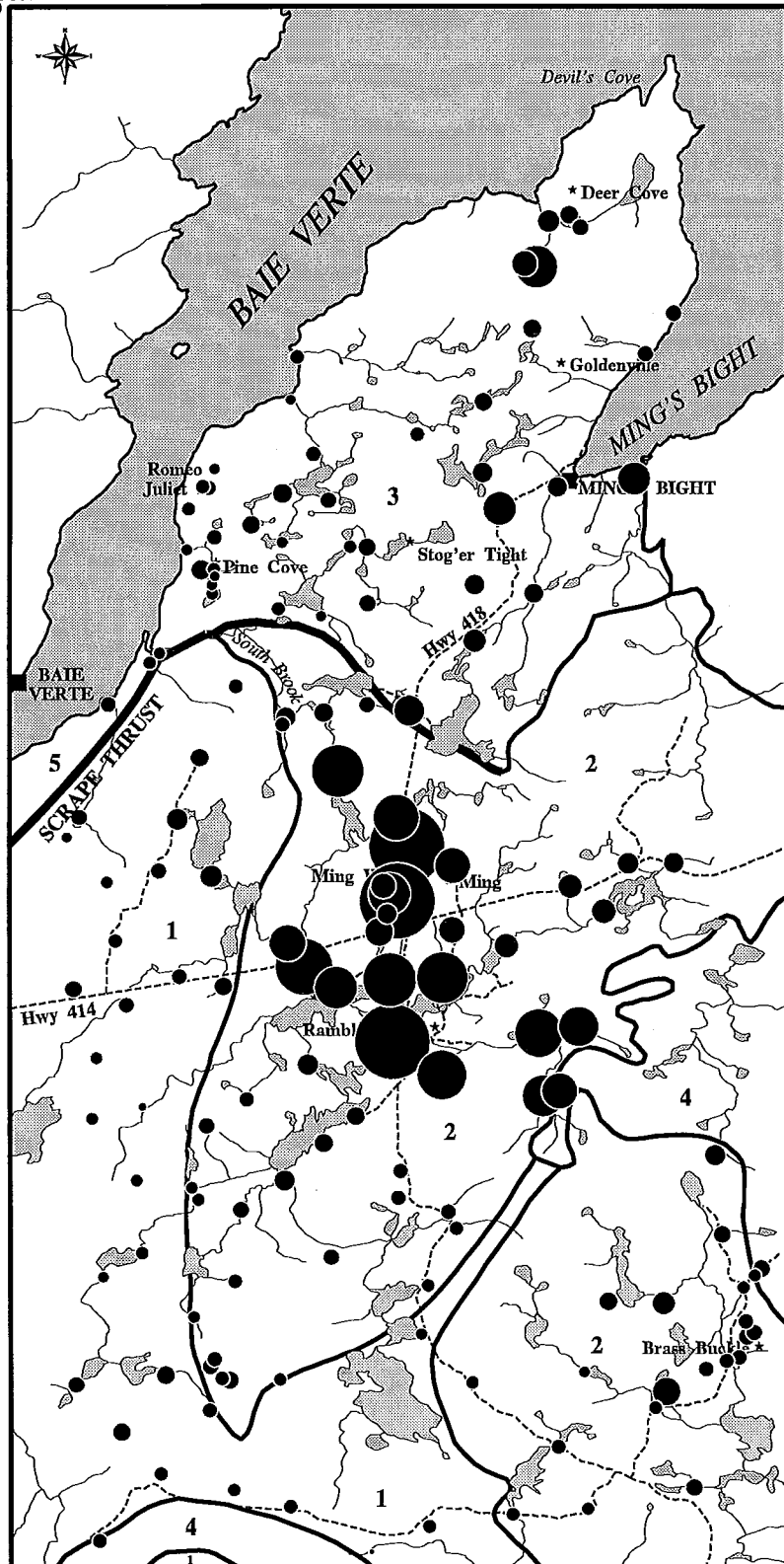
Km
UTM Zone 21



As

ARSENIC BLACK SPRUCE TWIGS

559000 572000
5544000 5544000



INAA

ppm	As	Percentile
210.0		Maximum
180.8		98
76.2		95
45.0		90
9.4		75
4.8		50
<0.5		Minimum

147 Samples

Exponent = 0.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

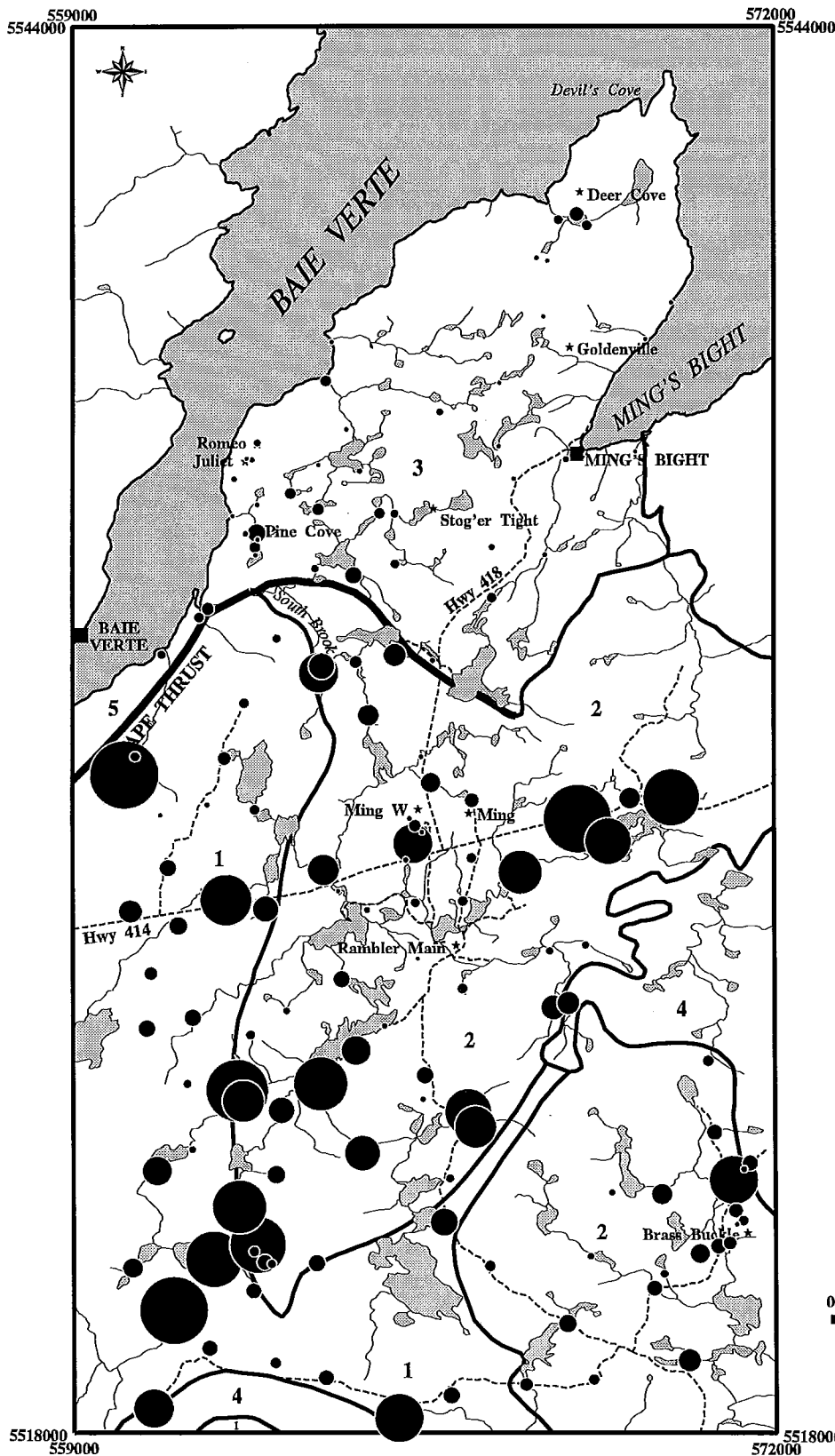
5518000
559000

5518000
572000



Ba

BARIUM BLACK SPRUCE TWIGS



INAA

ppm	Ba	Percentile
8000		Maximum
4612		98
4160		95
3720		90
2400		75
1700		50
310		Minimum

147 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

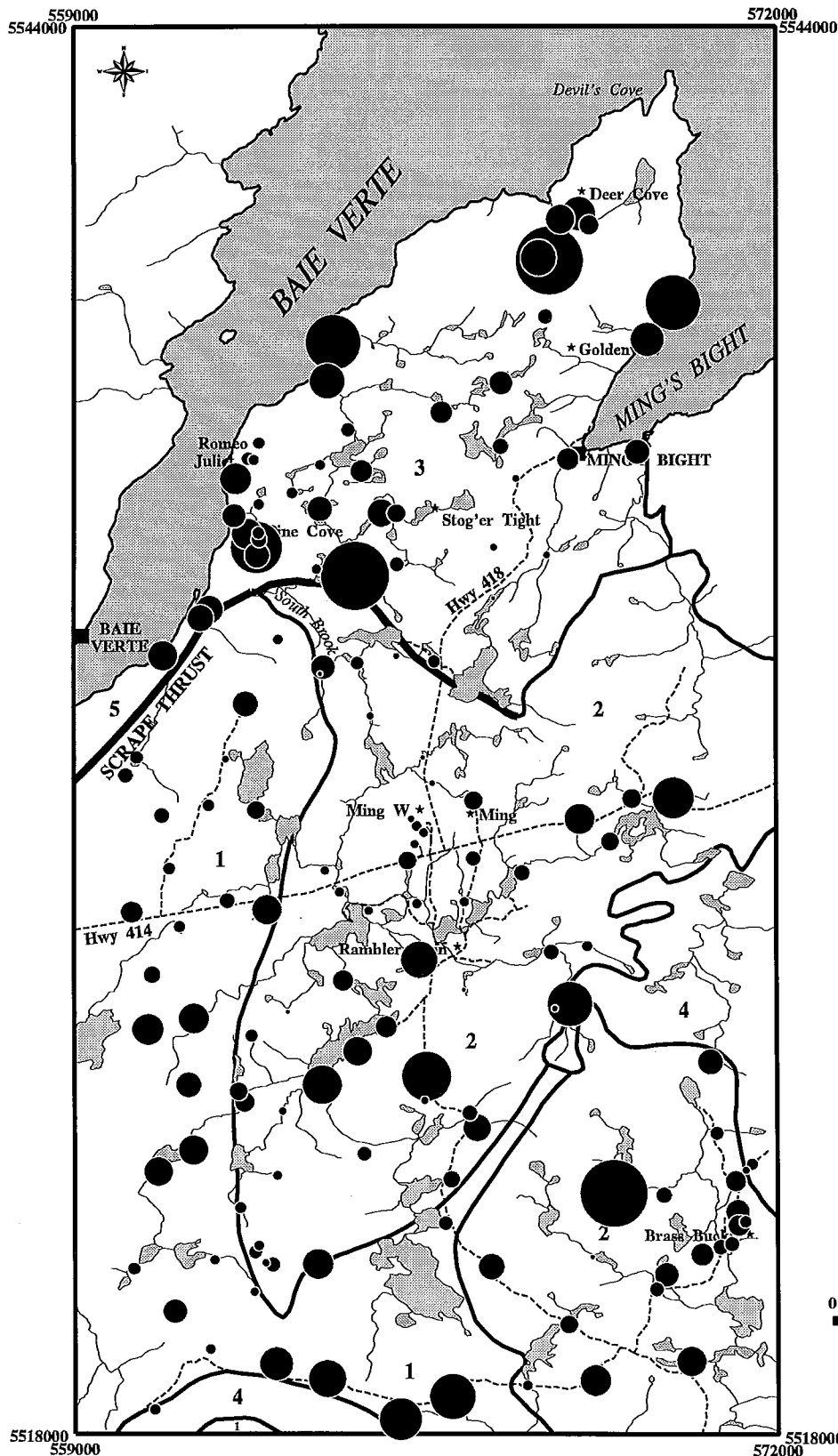
----- Roads & Trails

Scale 1 : 125 000










Km
UTM Zone 21

BROMINE BLACK SPRUCE TWIGS



INAA

ppm	Br	Percentile
120		Maximum
110		98
89		95
75		90
62		75
46		50
16		Minimum

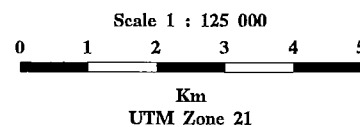
147 Samples

Exponent = 1.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

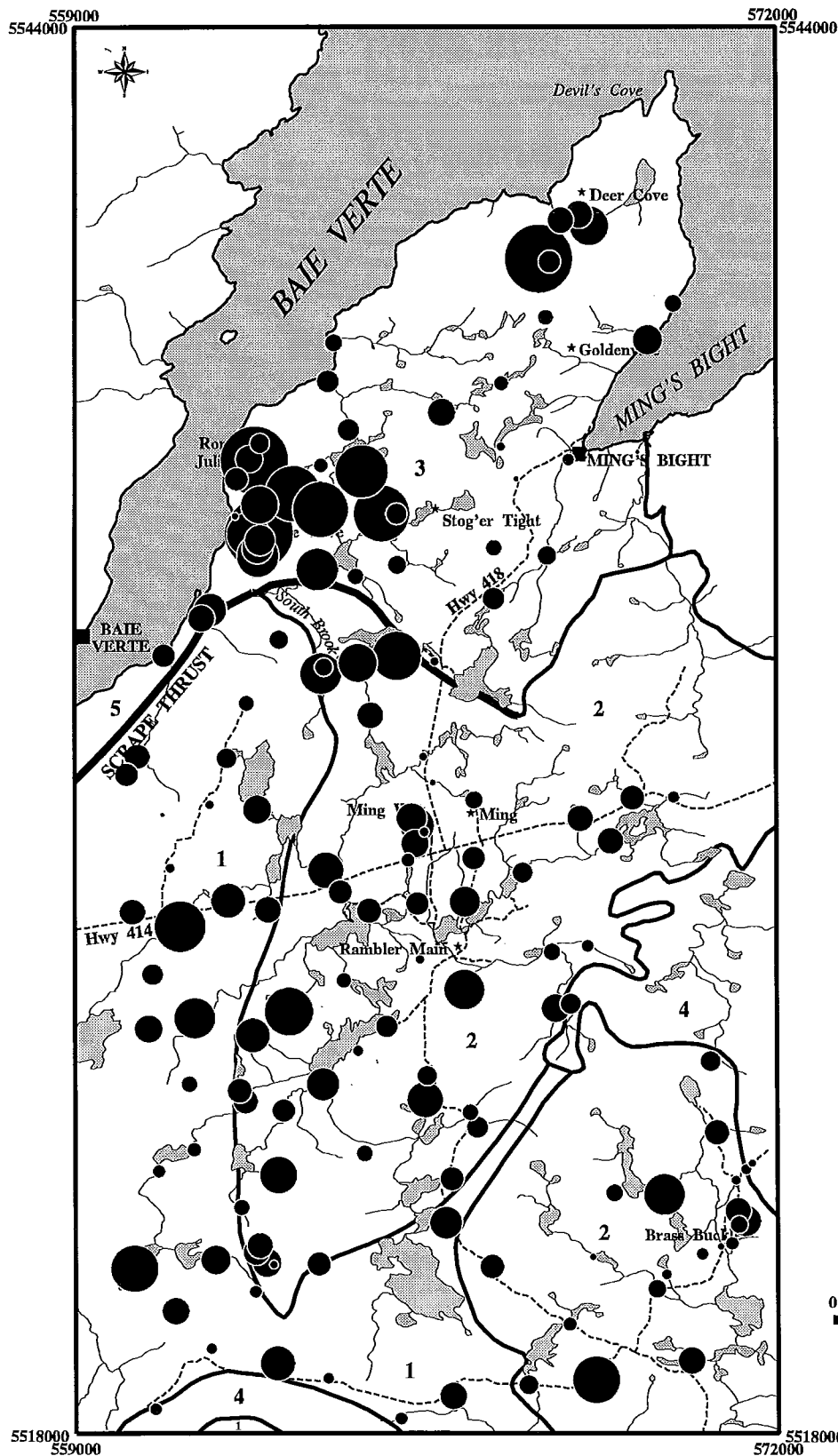
- * Mineral Deposit
- Roads & Trails





Ca

CALCIUM BLACK SPRUCE TWIGS



INAA

pct	Ca	Percentile
27.2		Maximum
25.1		98
22.7		95
20.9		90
18.5		75
16.7		50
6.9		Minimum

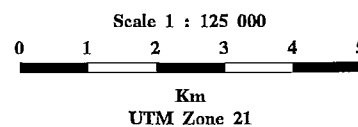
147 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails

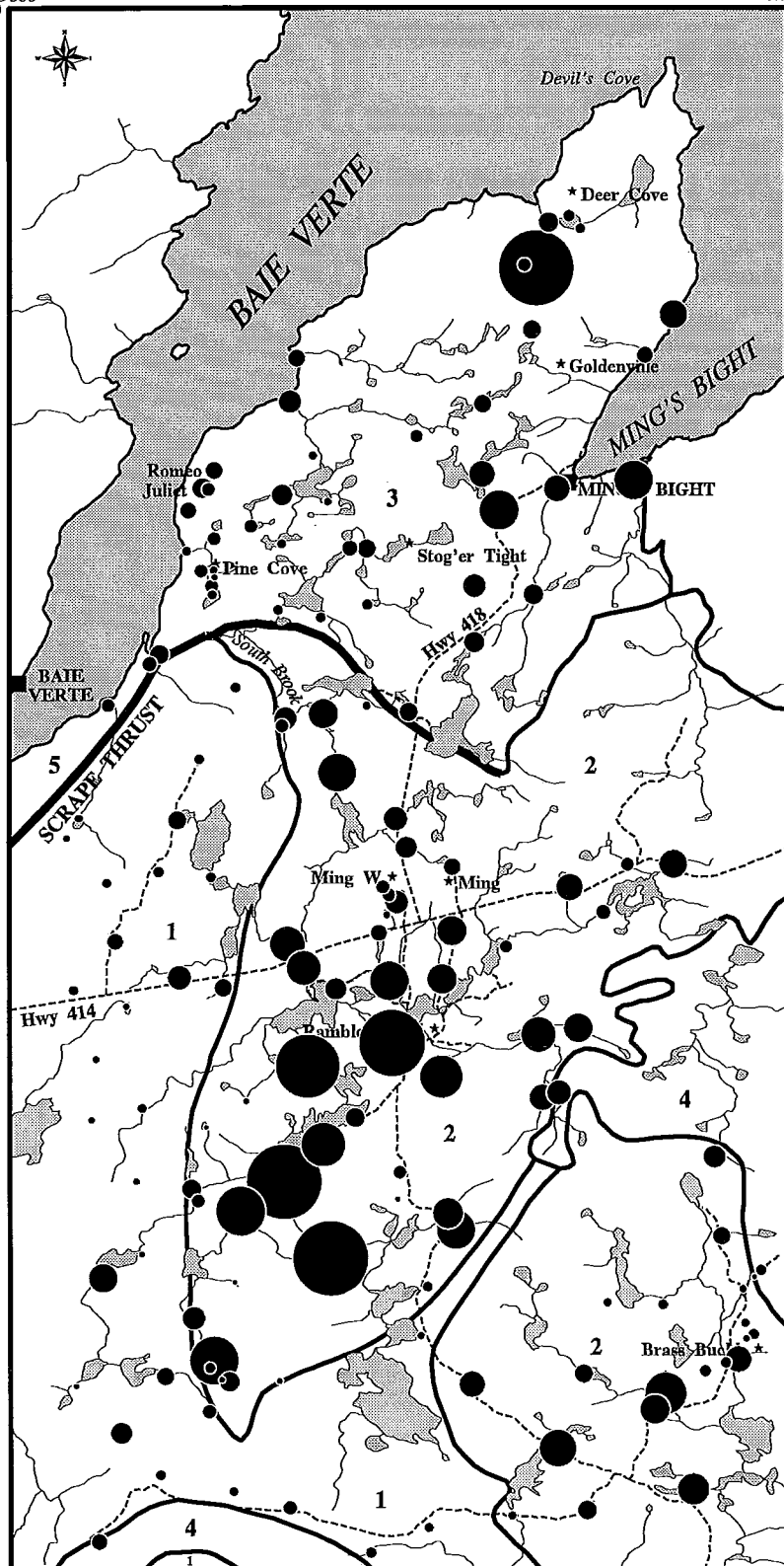




Co

COBALT BLACK SPRUCE TWIGS

559000 572000
5544000 5544000



INAA

ppm	Co	Percentile
110		Maximum
98		98
61		95
49		90
30		75
20		50
5		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km

UTM Zone 21

5518000
559000

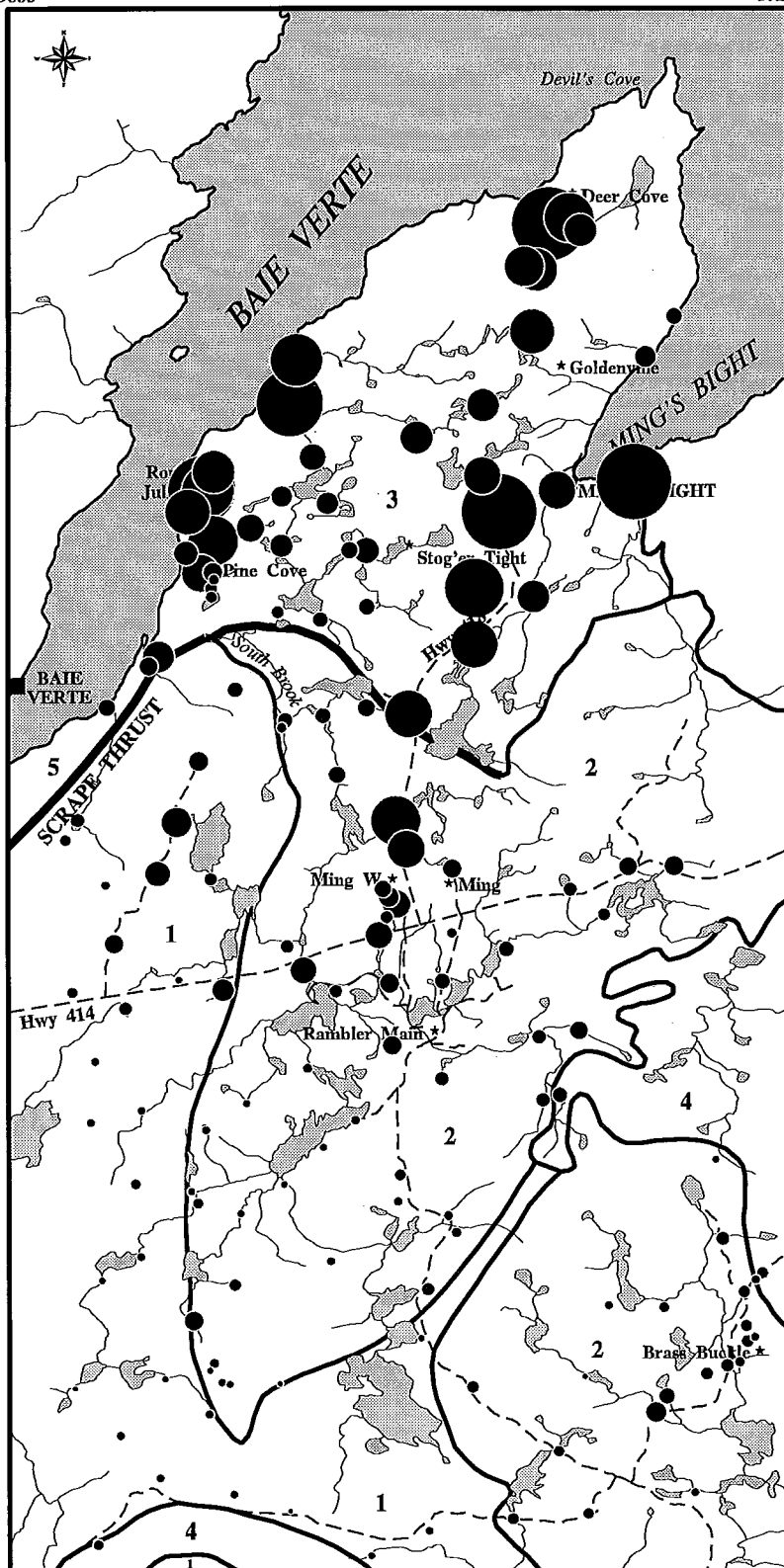
5518000
572000



Cr

CHROMIUM BLACK SPRUCE TWIGS

559000 5544000 572000 5544000



INAA

ppm	Cr	Percentile
510		Maximum
296		98
200		95
170		90
81		75
43		50
8		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

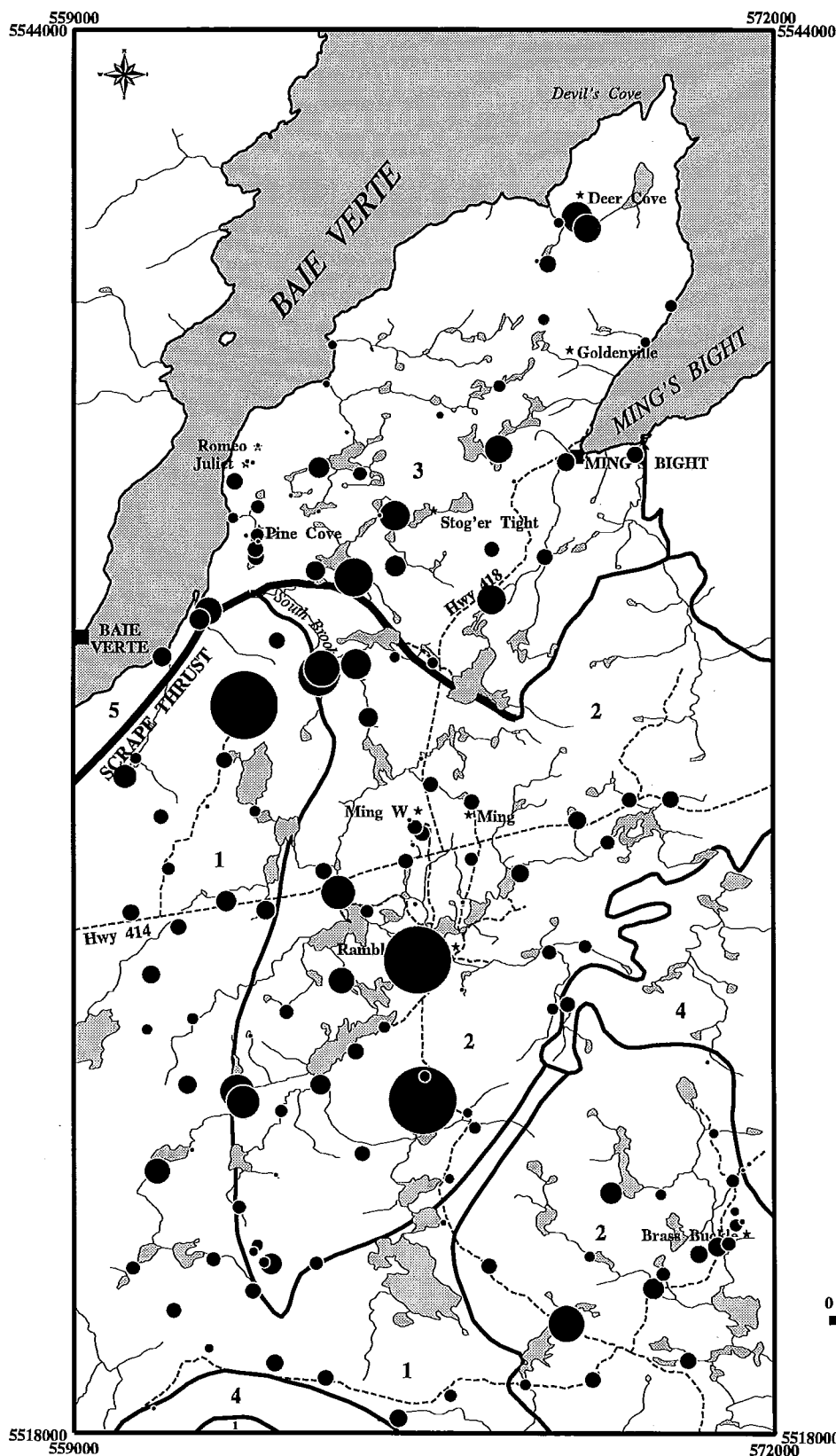
5518000
559000

5518000
572000



Cs

CESIUM BLACK SPRUCE TWIGS



INAA

ppm	Cs	Percentile
22.0		Maximum
20.0		98
7.9		95
5.8		90
3.1		75
2.2		50
<0.5		Minimum

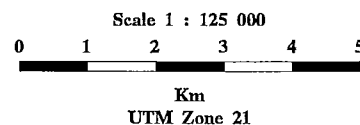
147 Samples

Exponent = 0.75

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

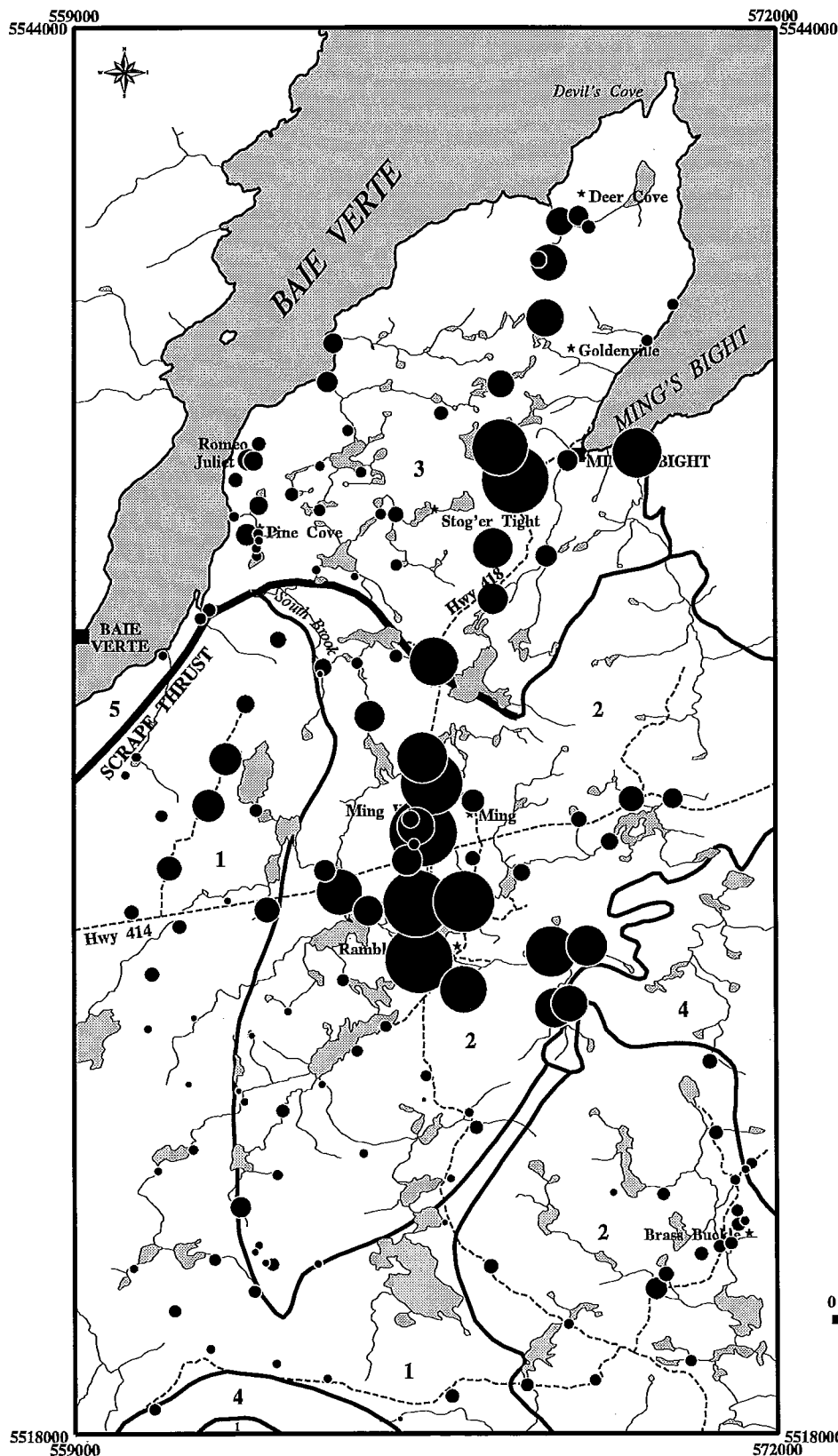
- Mineral Deposit
- Roads & Trails





Fe

IRON BLACK SPRUCE TWIGS



INAA

pct	Fe	Percentile
7.17		Maximum
5.69		98
4.49		95
3.33		90
1.71		75
1.05		50
0.29		Minimum

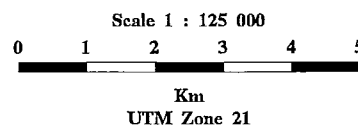
147 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

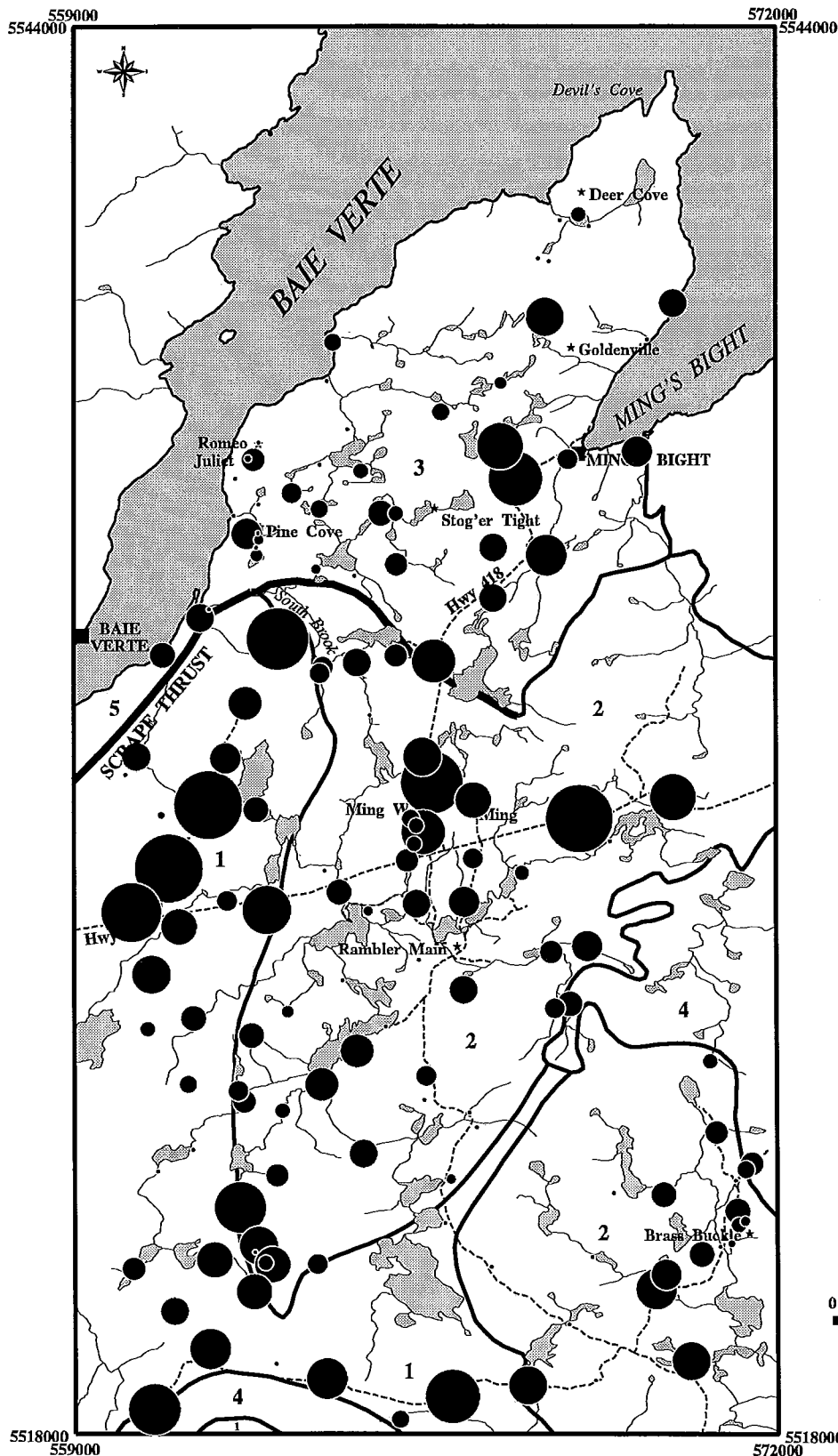
- * Mineral Deposit
- Roads & Trails





Hf

HAFNIUM BLACK SPRUCE TWIGS



INAA

ppm	Hf	Percentile
3.6		Maximum
2.9		98
2.4		95
2.0		90
1.5		75
1.1		50
<0.5		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000

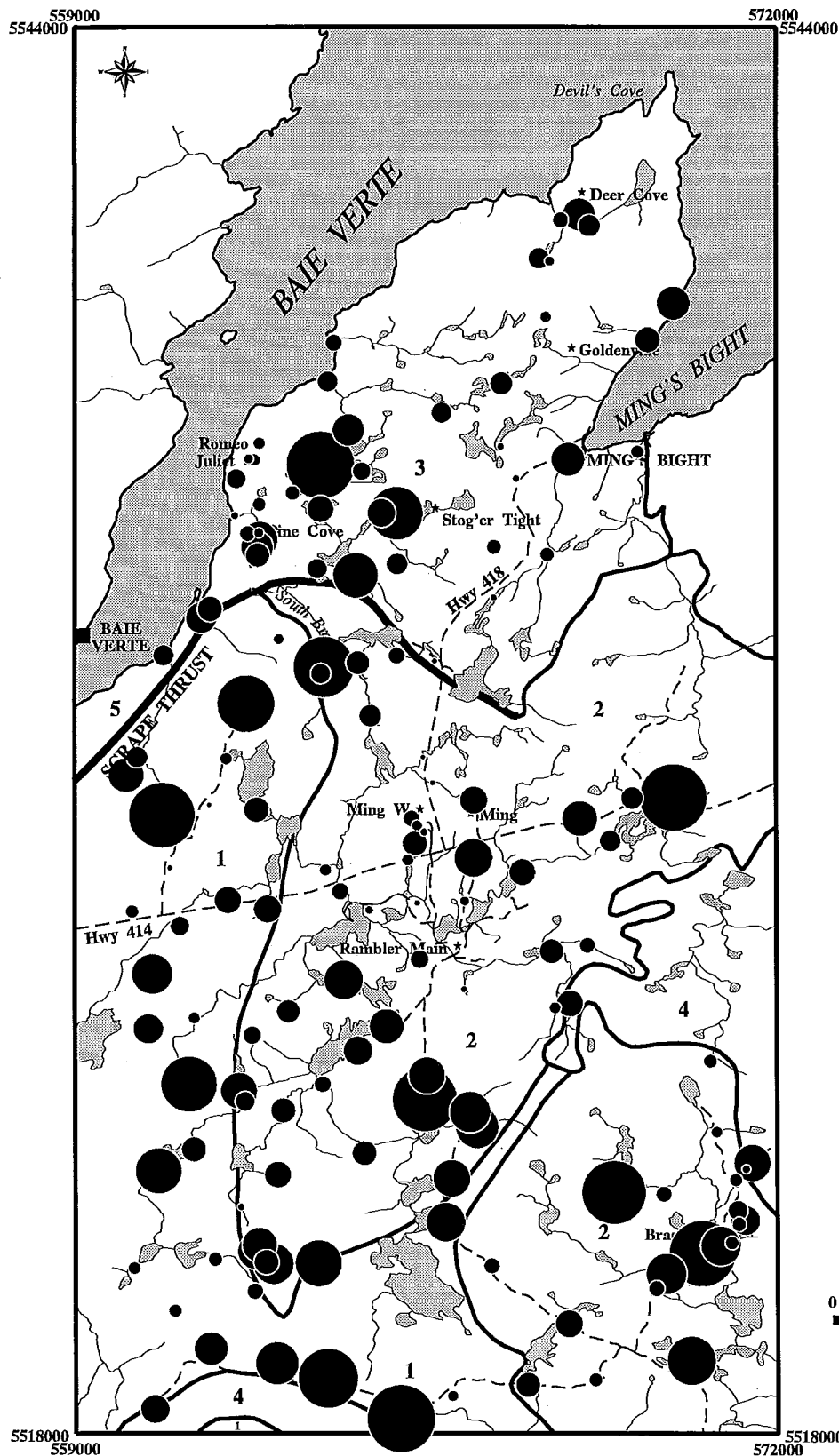


Km

UTM Zone 21



POTASSIUM BLACK SPRUCE TWIGS



INAA

pct	K	Percentile
26.90		Maximum
22.47		98
21.70		95
19.12		90
16.90		75
14.00		50
5.16		Minimum

147 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000

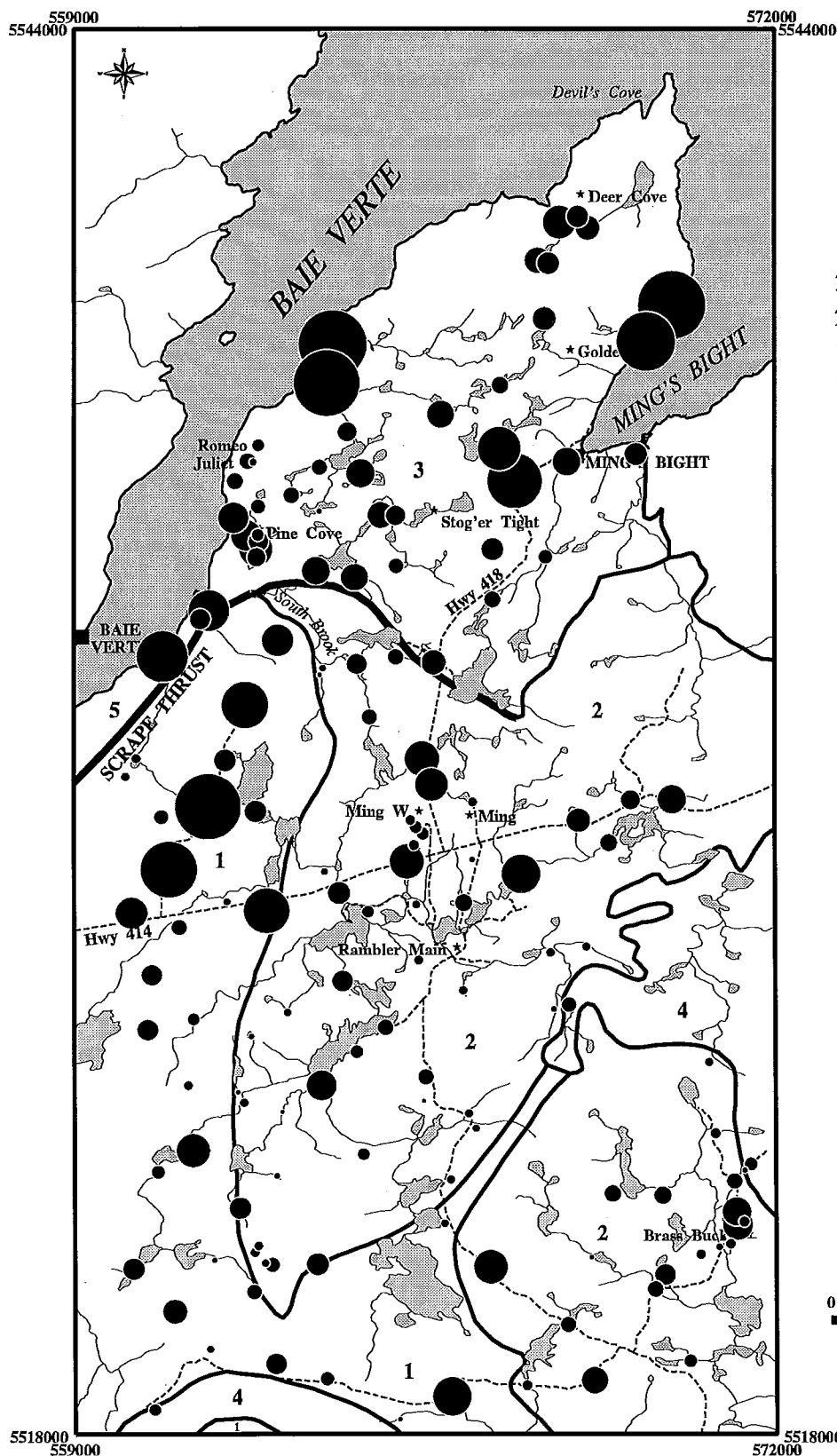


Km
UTM Zone 21



Na

SODIUM BLACK SPRUCE TWIGS



INAA

ppm Na	Percentile
37400	Maximum
23096	98
19900	95
15500	90
12700	75
9400	50
2920	Minimum

147 Samples

Exponent = 1.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



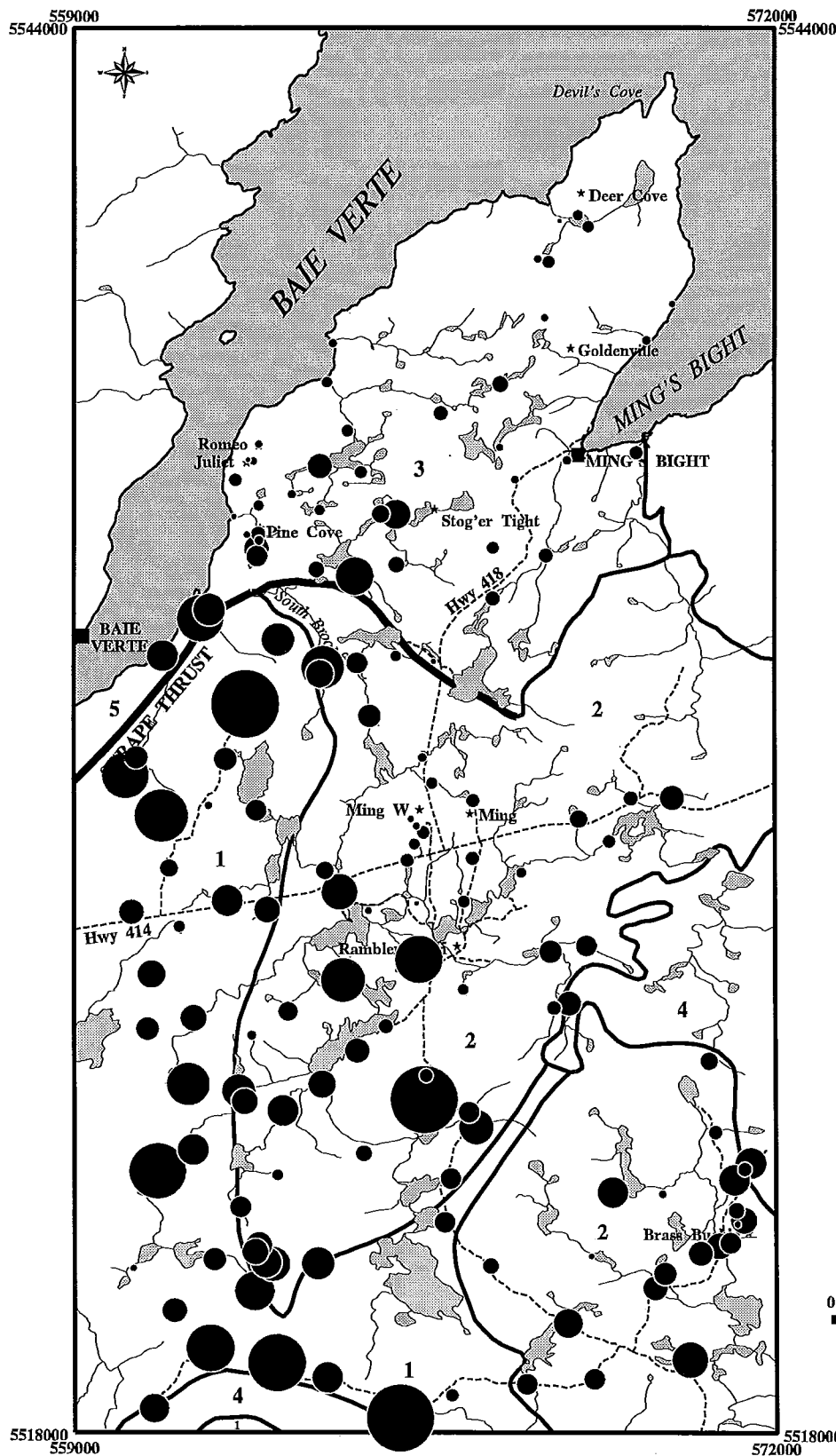
Km

UTM Zone 21



Rb

RUBIDIUM BLACK SPRUCE TWIGS



INAA

ppm	Rb	Percentile
450		Maximum
421		98
300		95
242		90
180		75
120		50
39		Minimum

147 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

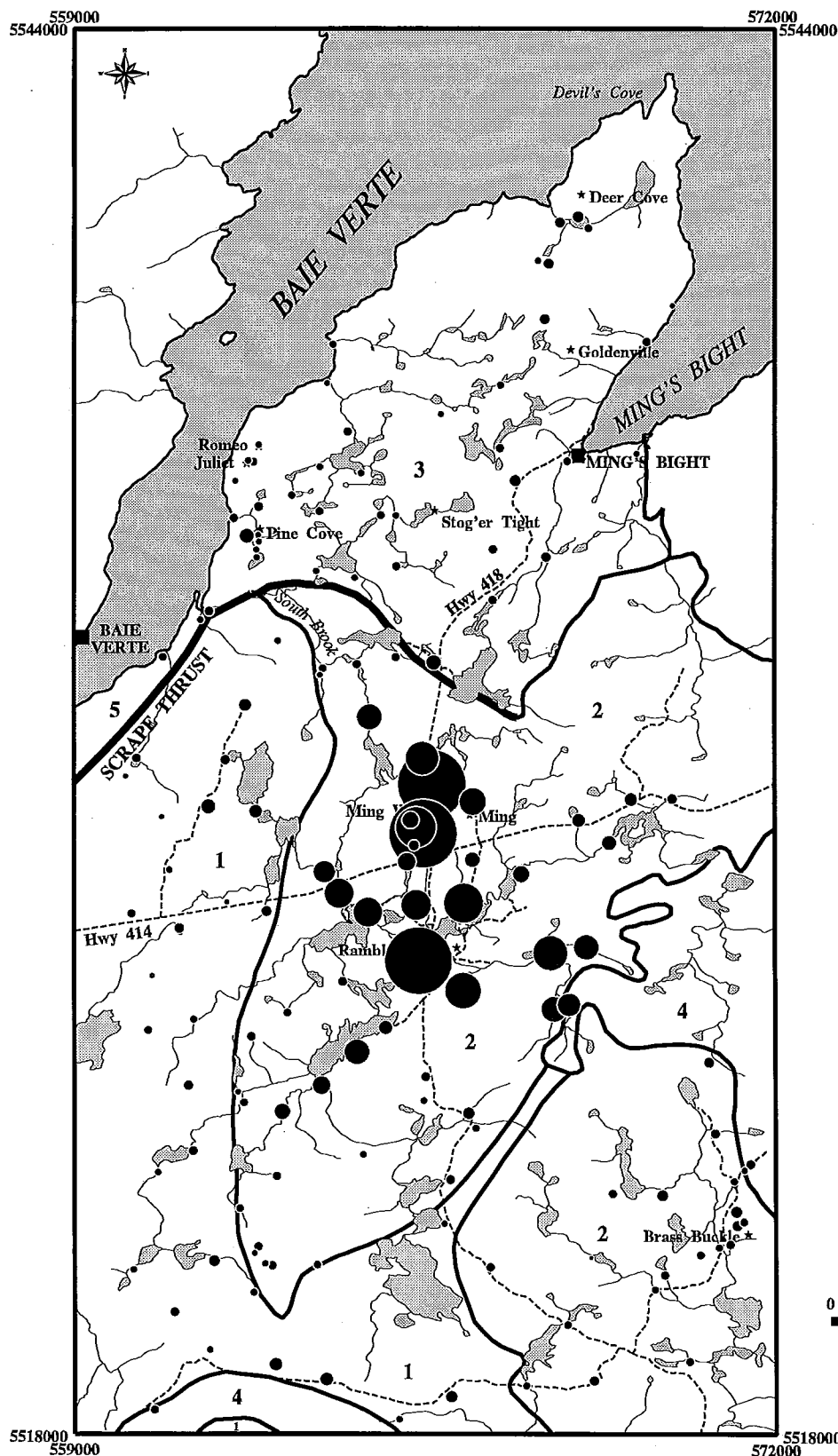
Scale 1 : 125 000










Km

UTM Zone 21

ANTIMONY BLACK SPRUCE TWIGS



INAA

ppm	Sb	Percentile
47.0		Maximum
21.2		98
7.9		95
4.9		90
1.5		75
0.9		50
0.3		Minimum

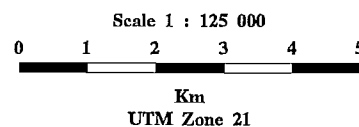
147 Samples

Exponent = 0.75

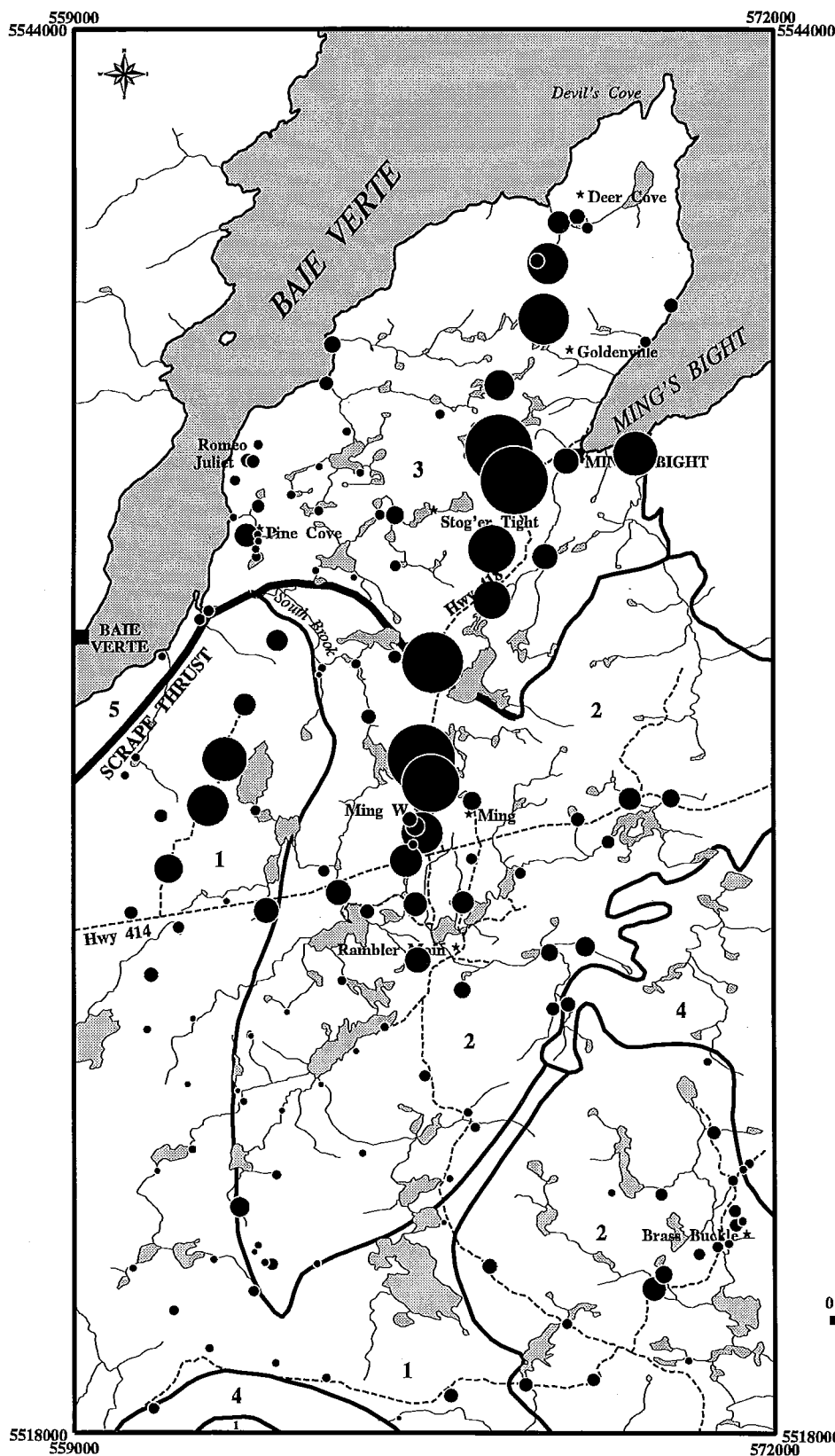
Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group








- * Mineral Deposit
- Roads & Trails



SCANDIUM BLACK SPRUCE TWIGS



INAA

ppm	Sc	Percentile
30.0		Maximum
20.0		98
13.6		95
8.9		90
4.9		75
2.9		50
0.9		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



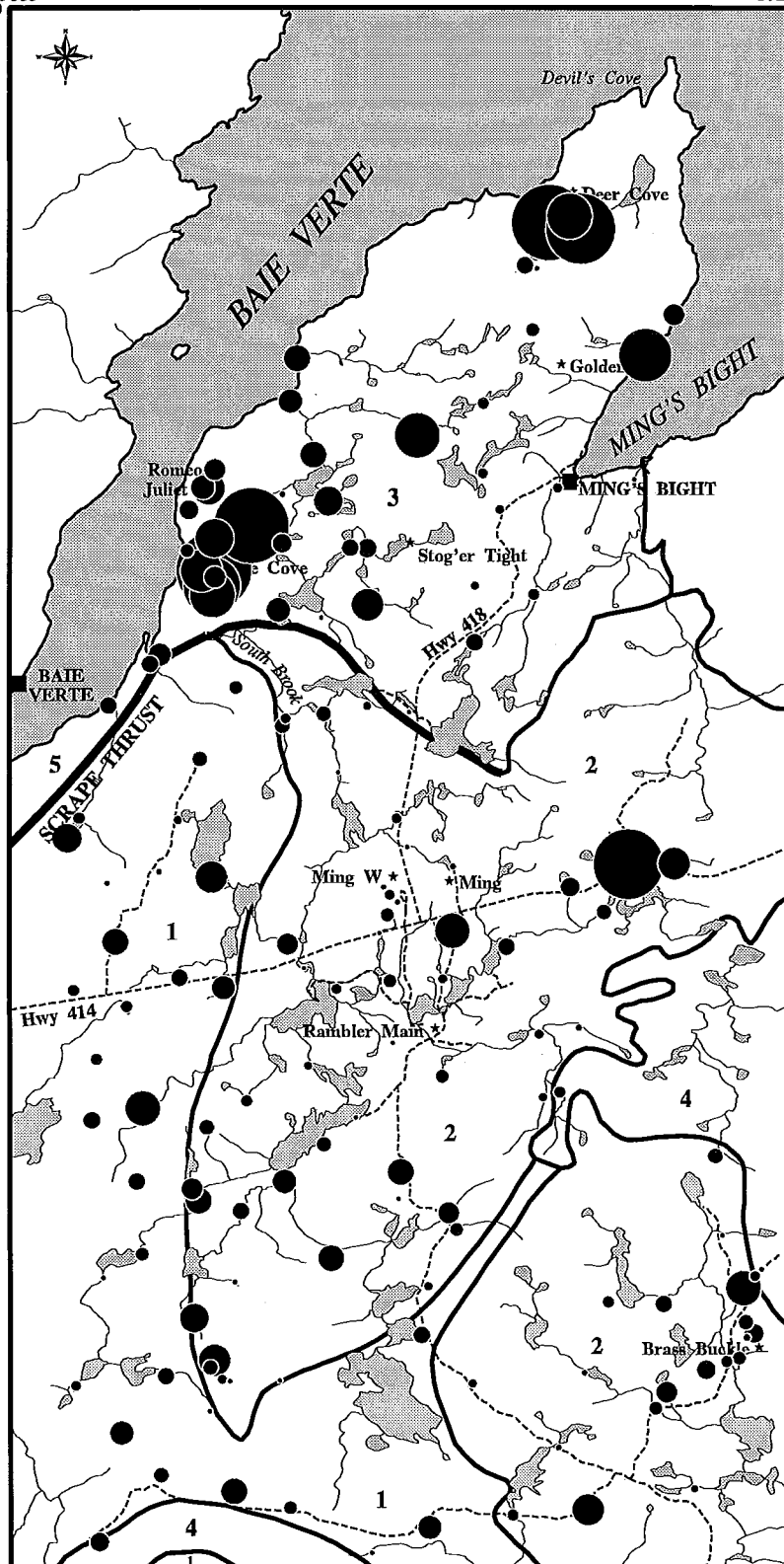
Km
UTM Zone 21



Sr

STRONTIUM BLACK SPRUCE TWIGS

559000 5544000 572000 5544000



INAA

ppm	Sr	Percentile
3600		Maximum
3116		98
2520		95
2100		90
1700		75
1300		50
<300		Minimum

147 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

5518000
559000

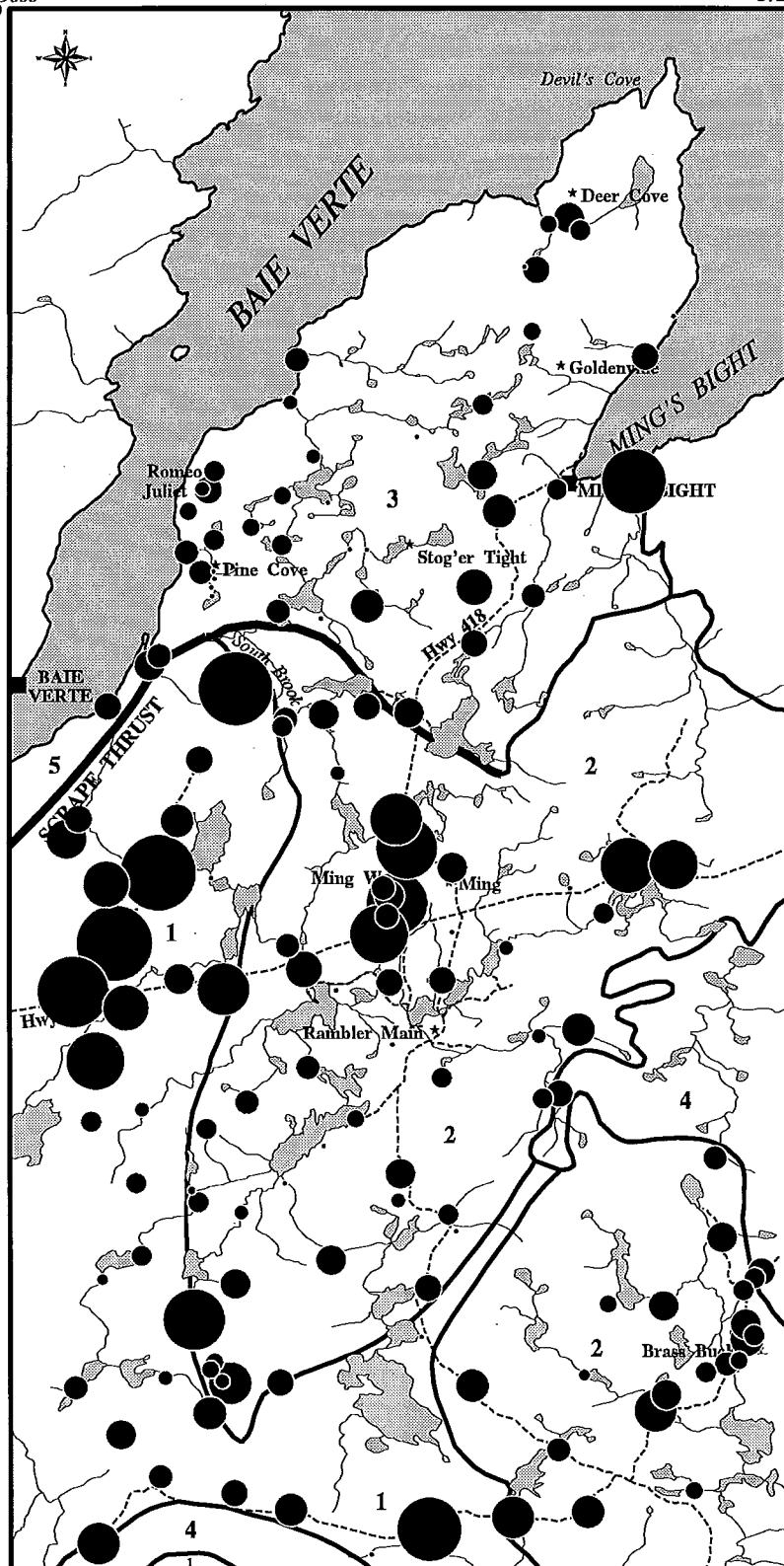
5518000
572000



Th

THORIUM BLACK SPRUCE TWIGS

559000 5544000 572000 5544000



INAA

ppm	Th	Percentile
3.7		Maximum
2.4		98
1.9		95
1.6		90
0.9		75
0.7		50
<0.1		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km

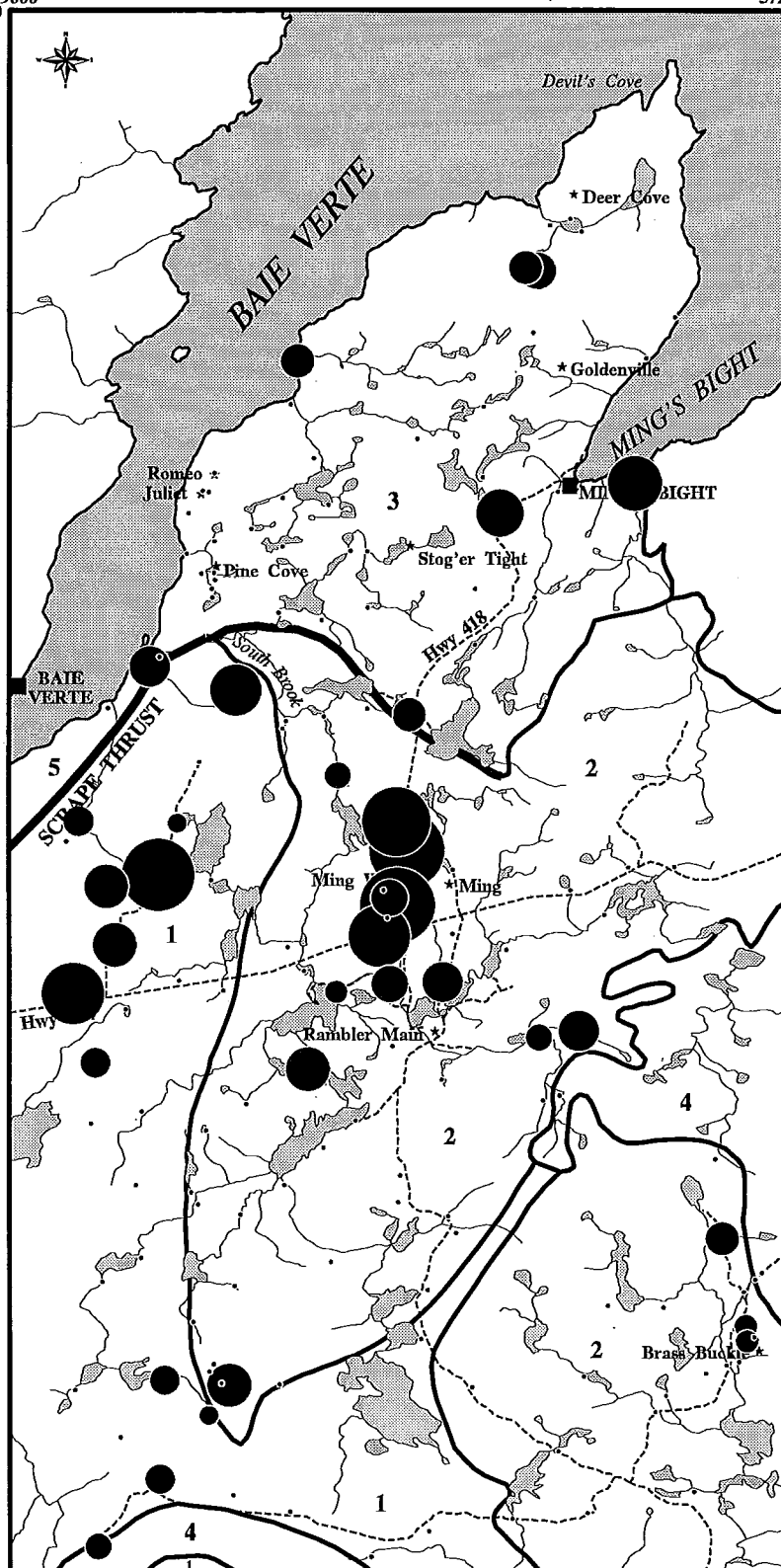
UTM Zone 21

5518000
559000





5518000
572000

URANIUM BLACK SPRUCE TWIGS

559000 572000
5544000 5544000








INAA

ppm	U	Percentile
4.4		Maximum
2.1		98
1.5		95
1.1		90
<0.1	.	75
<0.1	.	50
<0.1	.	Minimum

147 Samples

Exponent = 1

Simplified Geology

-  Burlington Granodiorite
-  Pacquet Harbour Group
-  Point Rousse Complex
-  Quartz Feldspar Porphyry
-  Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

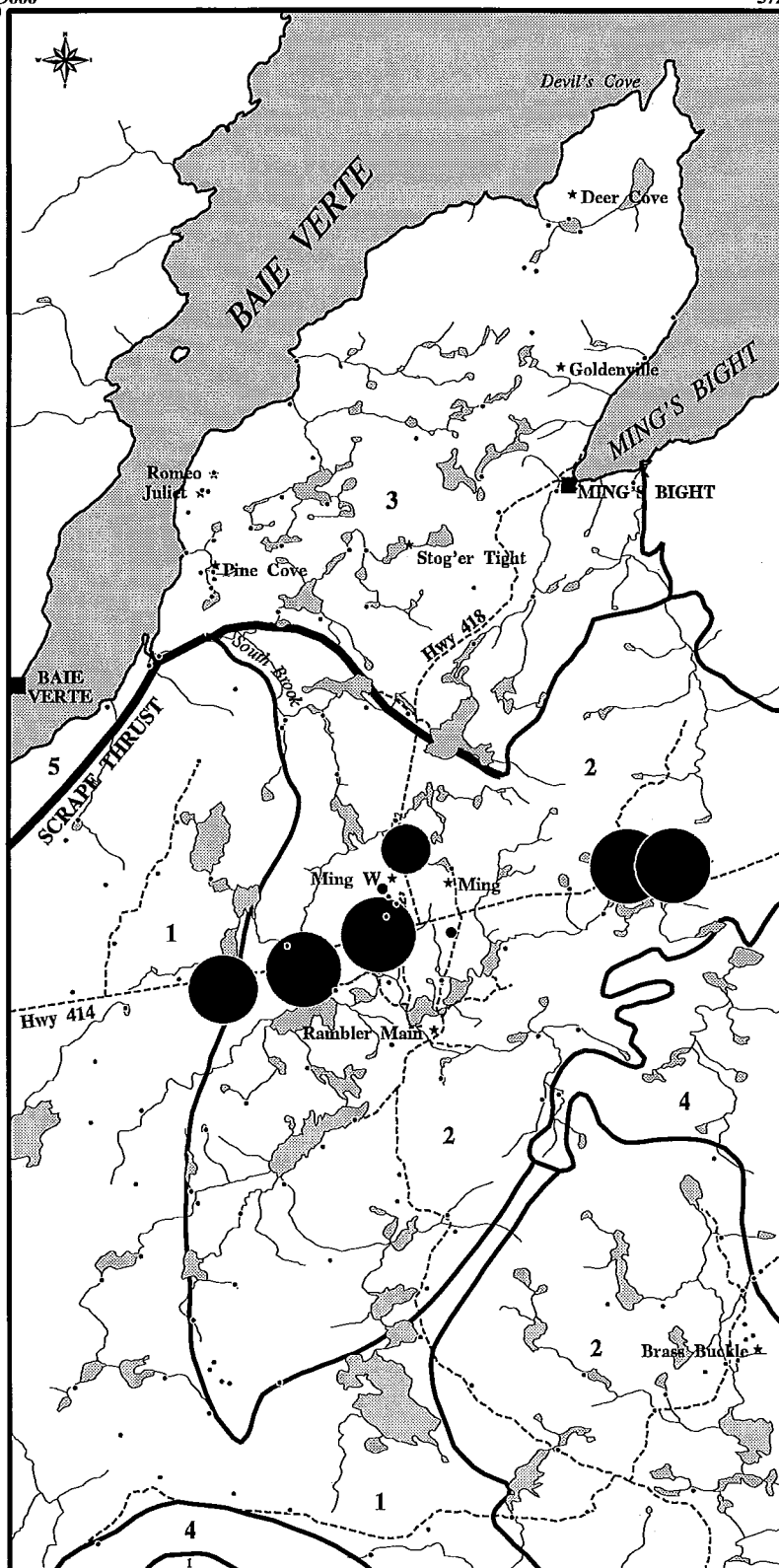
5518000
559000

5518000
572000










TUNGSTEN BLACK SPRUCE TWIGS

559000 5544000 572000 5544000



INAA

ppm	W	Percentile
37		Maximum
12		98
2		95
<1		90
<1		75
<1		50
<1		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km

UTM Zone 21

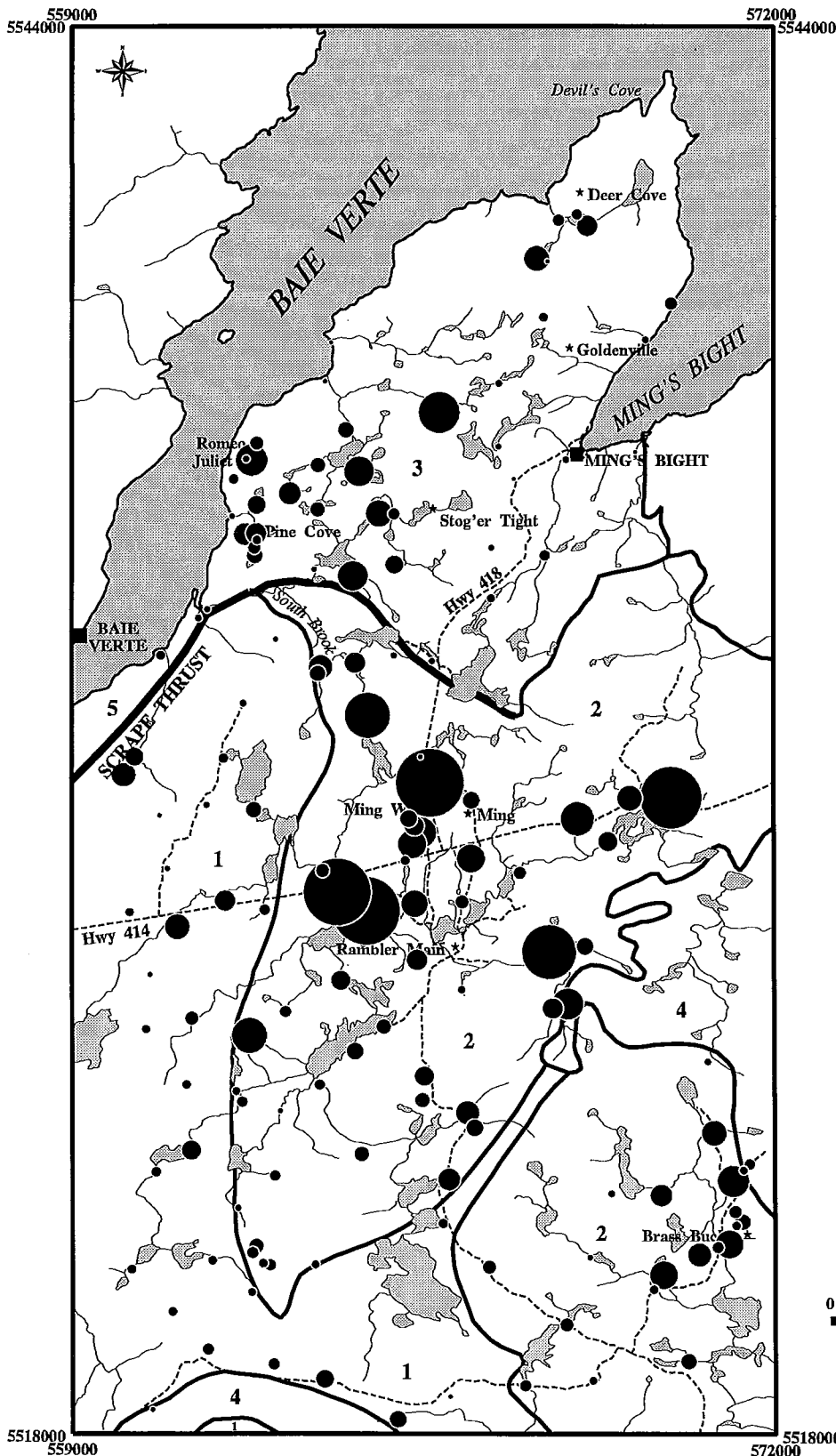
5518000
559000

5518000
572000



Zn

ZINC BLACK SPRUCE TWIGS



INAA

ppm	Zn	Percentile
9500		Maximum
5932		98
4680		95
4200		90
3600		75
2900		50
1200		Minimum

147 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000

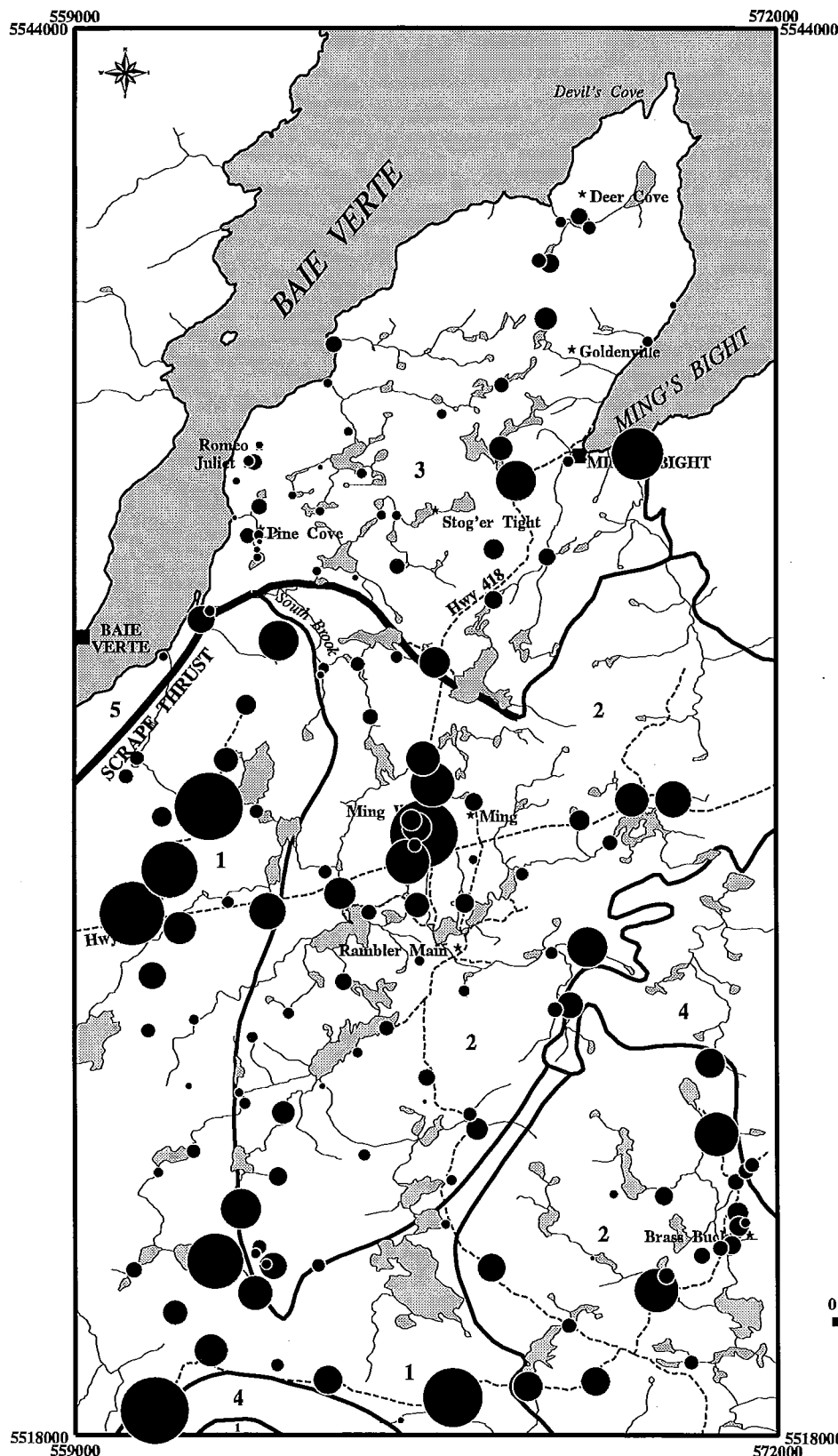


Km
UTM Zone 21



La

LANTHANUM BLACK SPRUCE TWIGS



INAA

ppm	La	Percentile
21.0		Maximum
18.1		98
14.6		95
11.0		90
6.9		75
4.5		50
1.7		Minimum

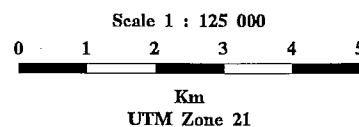
147 Samples

Exponent = 1

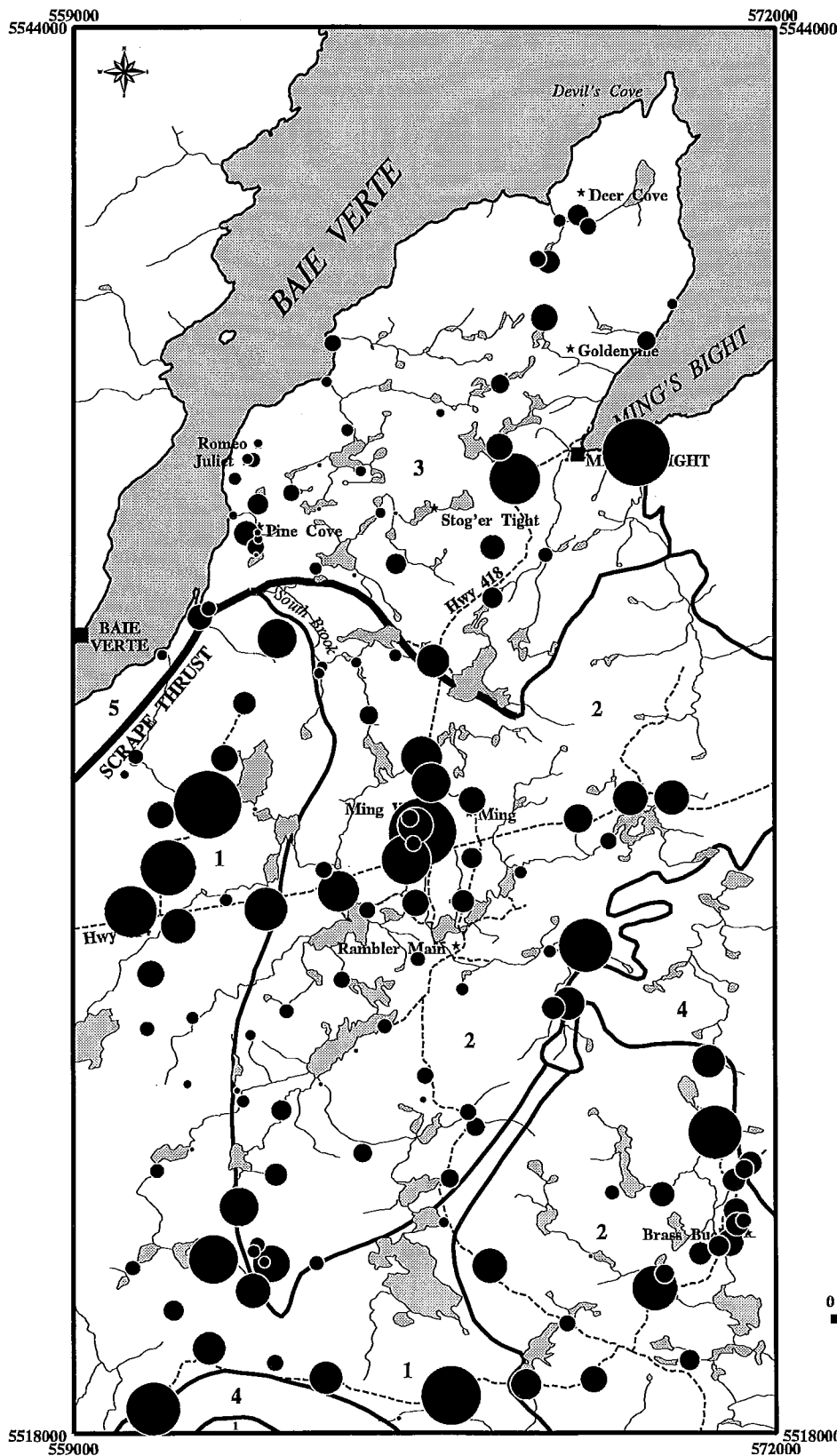
Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

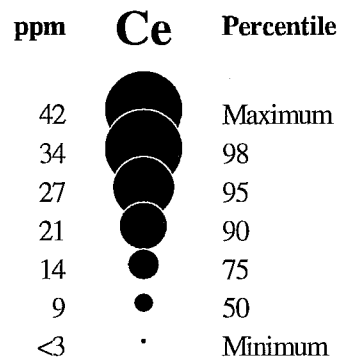
- * Mineral Deposit
- Roads & Trails



CERIUM **BLACK SPRUCE TWIGS**



INAA



147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



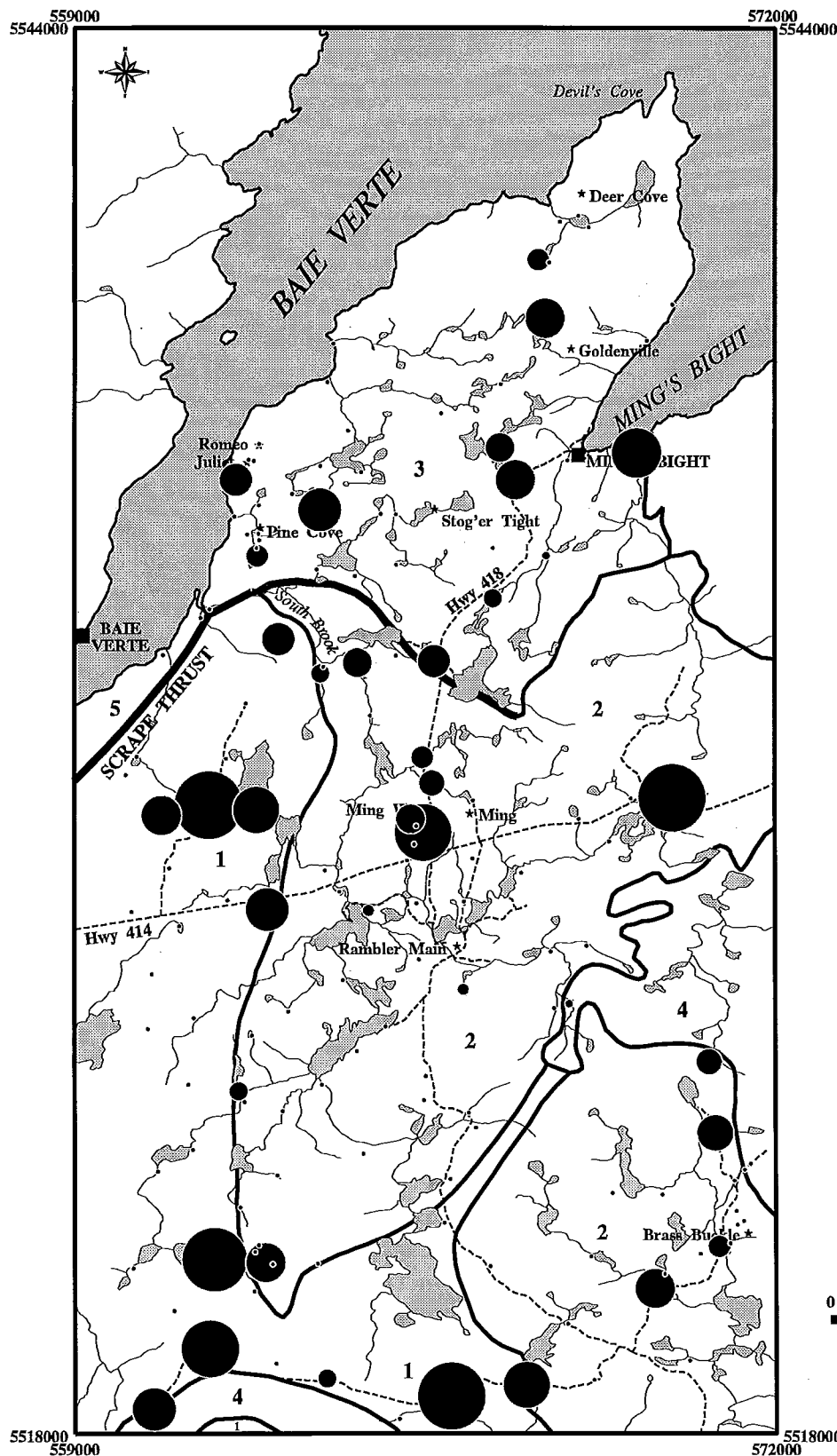
Km

UTM Zone 21



Nd

NEODYMIUM BLACK SPRUCE TWIGS



INAA

ppm	Nd	Percentile
26		Maximum
23		98
18		95
15		90
6		75
<5		50
<5		Minimum

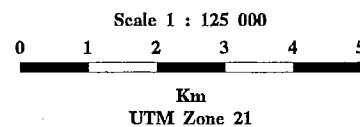
147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

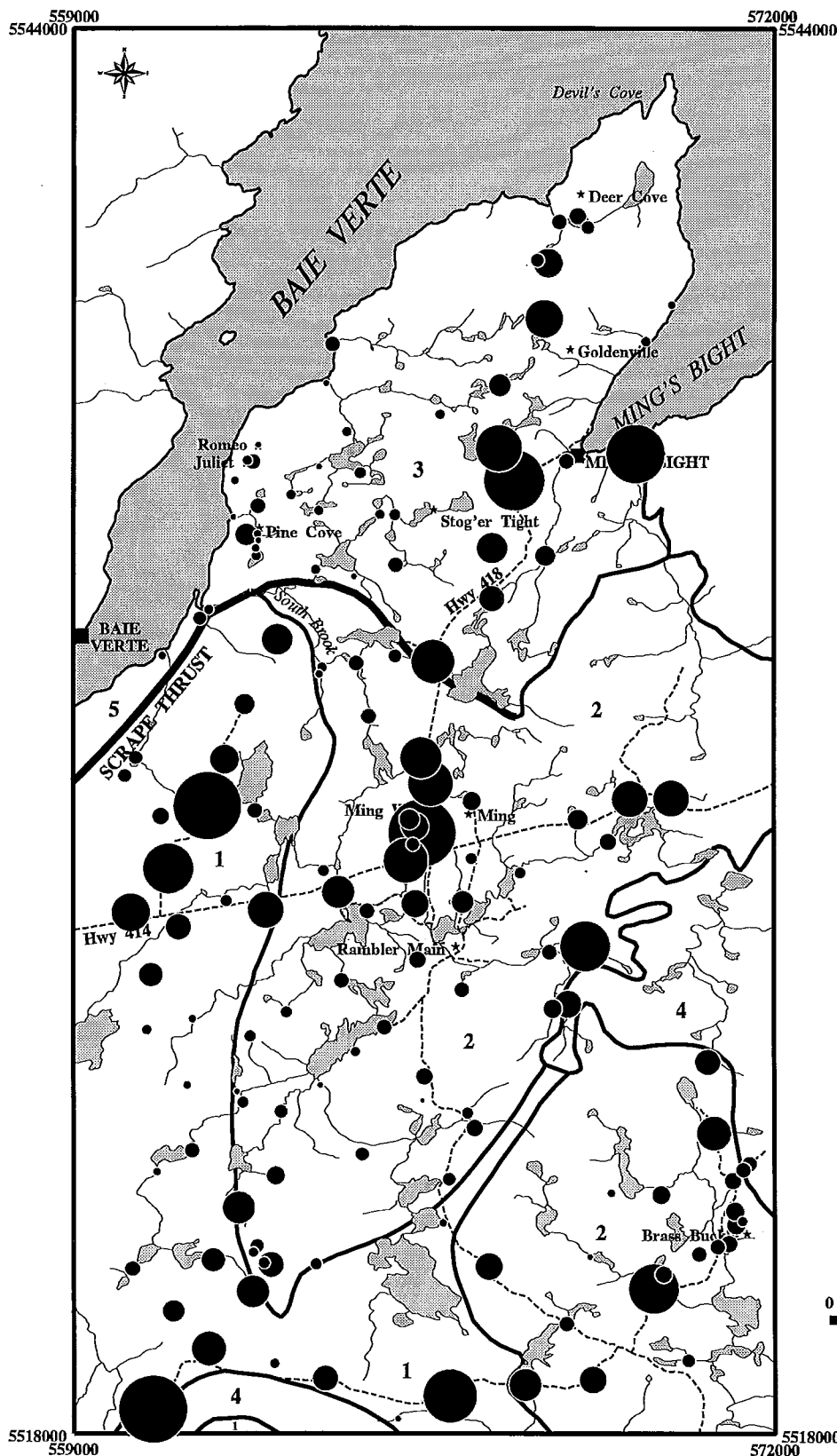
- * Mineral Deposit
- Roads & Trails












Sm

SAMARIUM BLACK SPRUCE TWIGS



INAA

ppm	Sm	Percentile
4.2		Maximum
3.9		98
2.9		95
2.2		90
1.5		75
0.9		50
0.3		Minimum

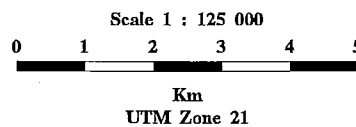
147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

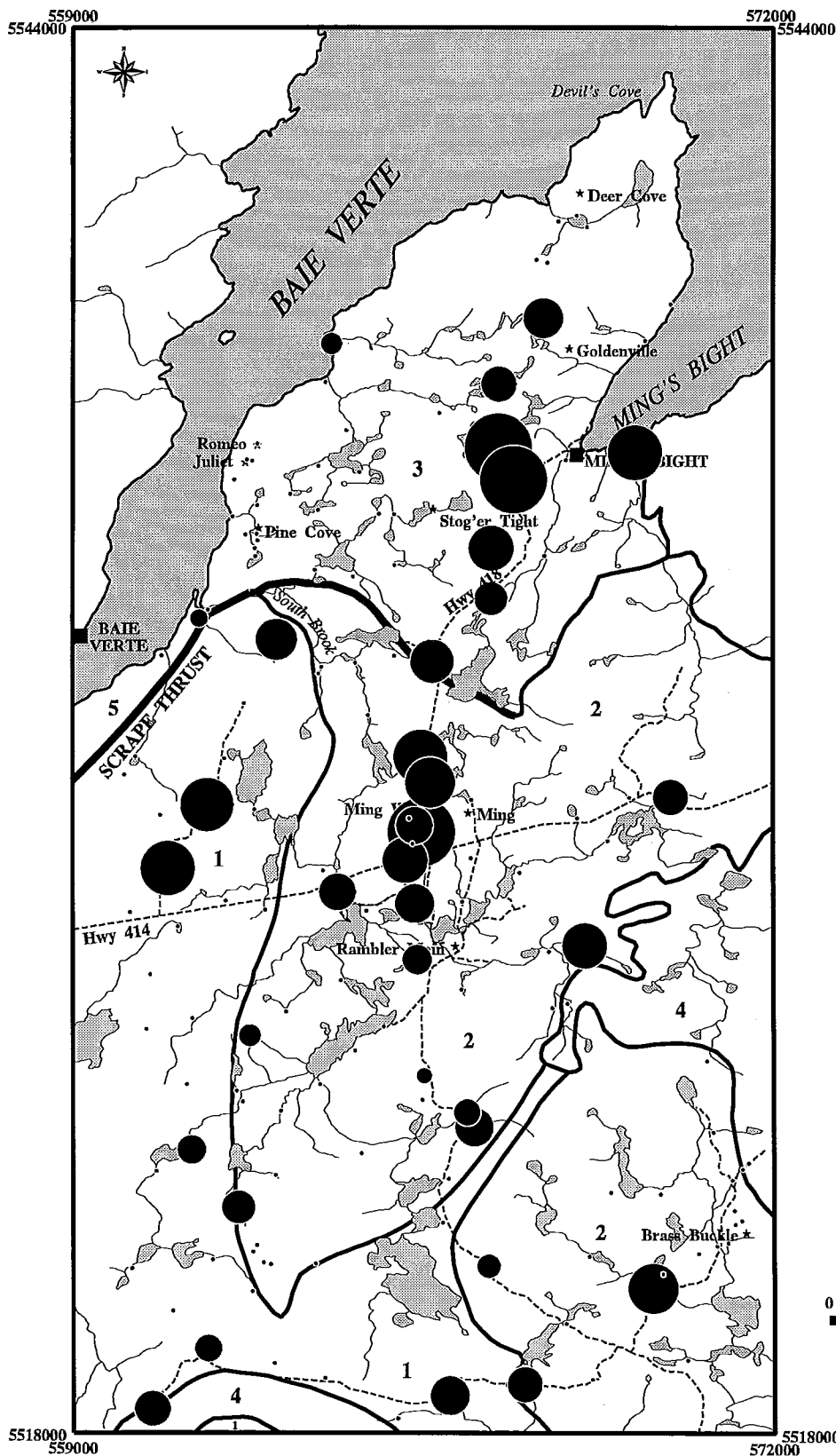
- * Mineral Deposit
- Roads & Trails





Eu

EUROPIUM BLACK SPRUCE TWIGS



INAA

ppm	Eu	Percentile
1.24		Maximum
0.86		98
0.65		95
0.49		90
<0.01		75
<0.01		50
<0.01		Minimum

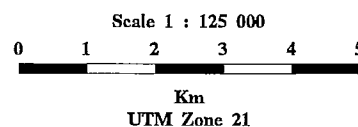
147 Samples

Exponent = 1

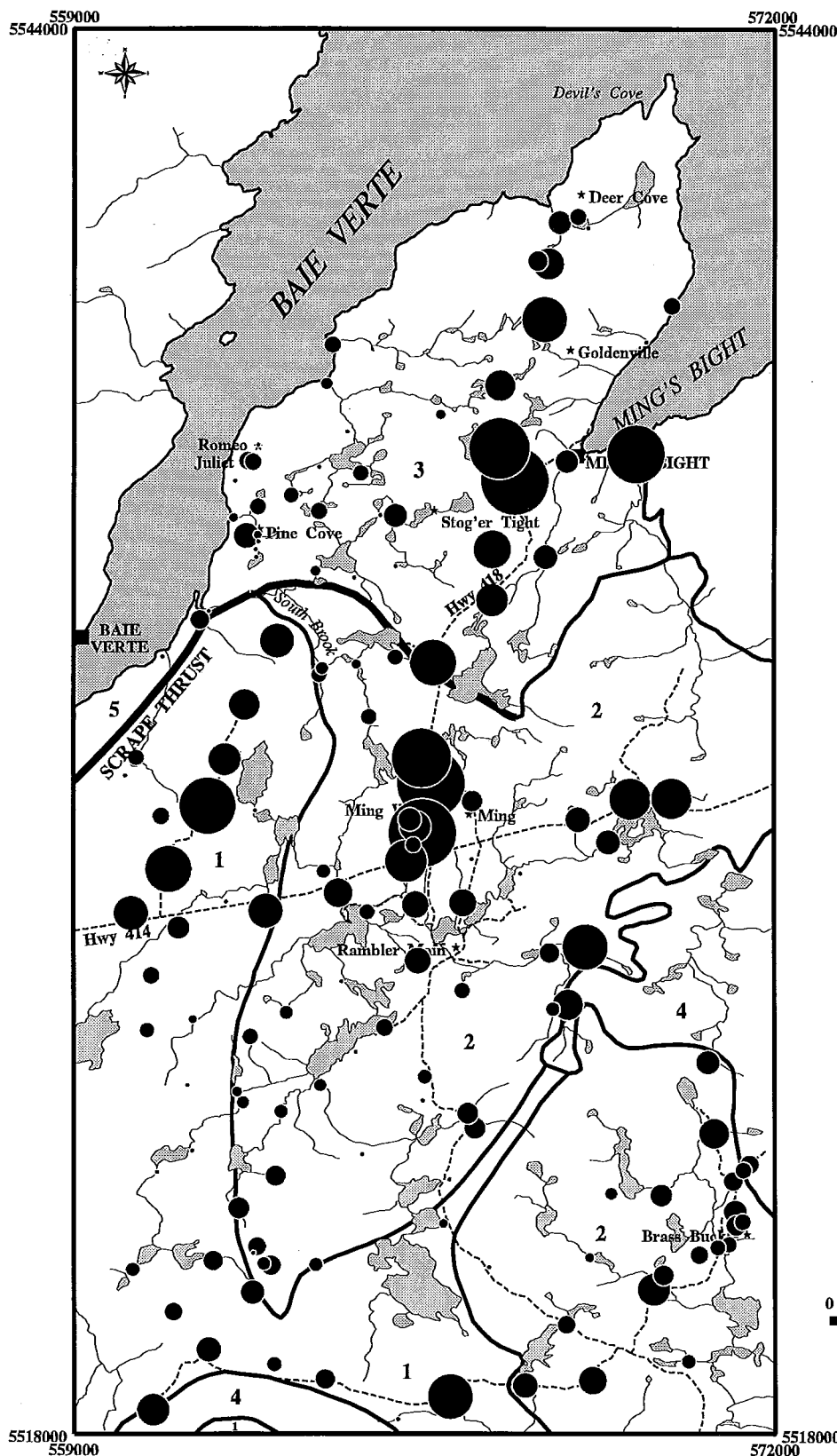
Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

- Mineral Deposit
- Roads & Trails



YTTERBIUM BLACK SPRUCE TWIGS



INAA

ppm	Yb	Percentile
2.50	Maximum	Maximum
2.00	98	98
1.53	95	95
1.17	90	90
0.68	75	75
0.43	50	50
<0.05	Minimum	Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit
--- Roads & Trails

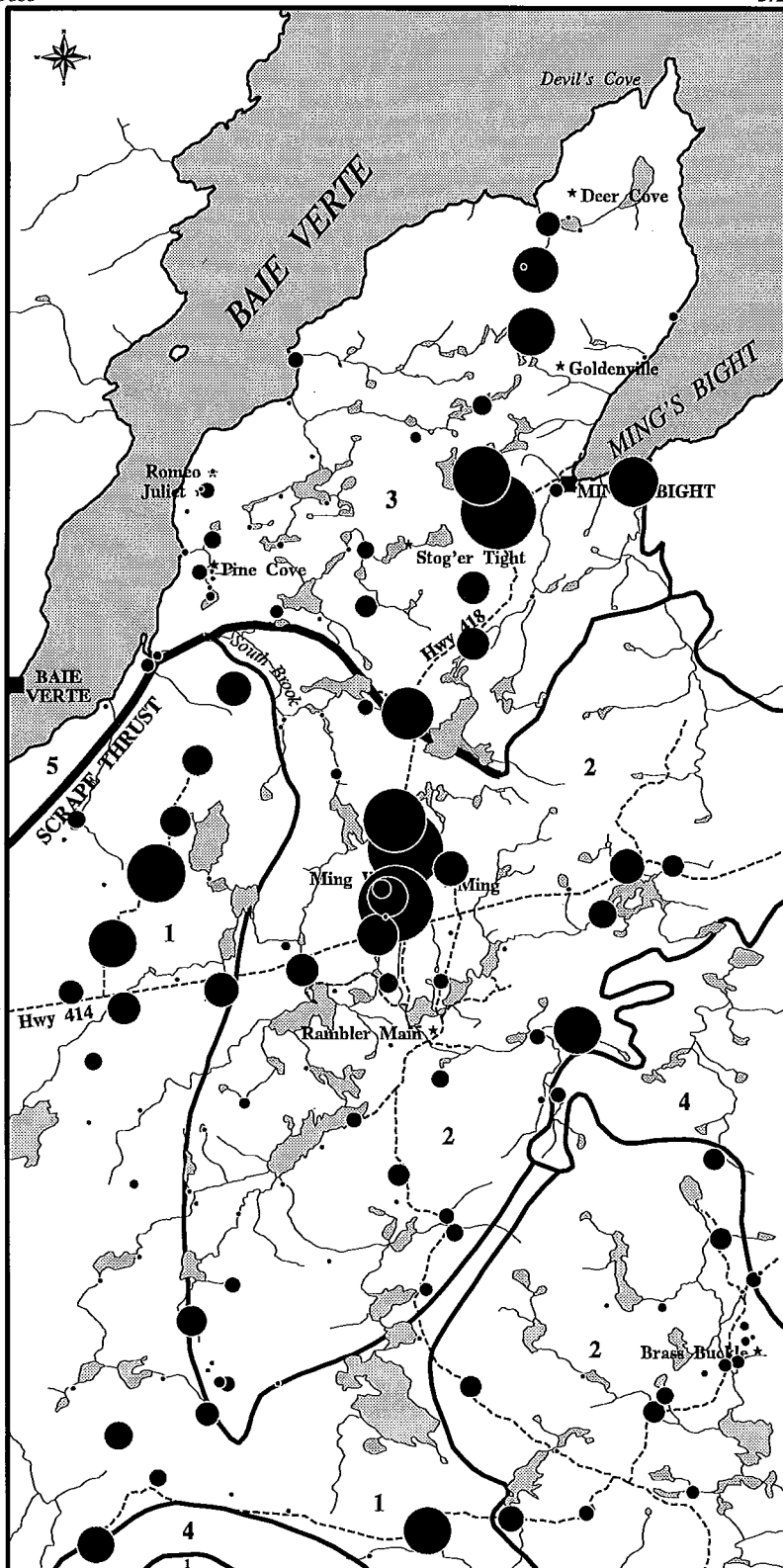
Scale 1 : 125 000
0 1 2 3 4 5
Km
UTM Zone 21



Lu

LUTETIUM BLACK SPRUCE TWIGS

559000 572000
5544000 5544000



INAA

ppm	Lu	Percentile
0.45		Maximum
0.38		98
0.27		95
0.21		90
0.13		75
0.08		50
<0.05		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

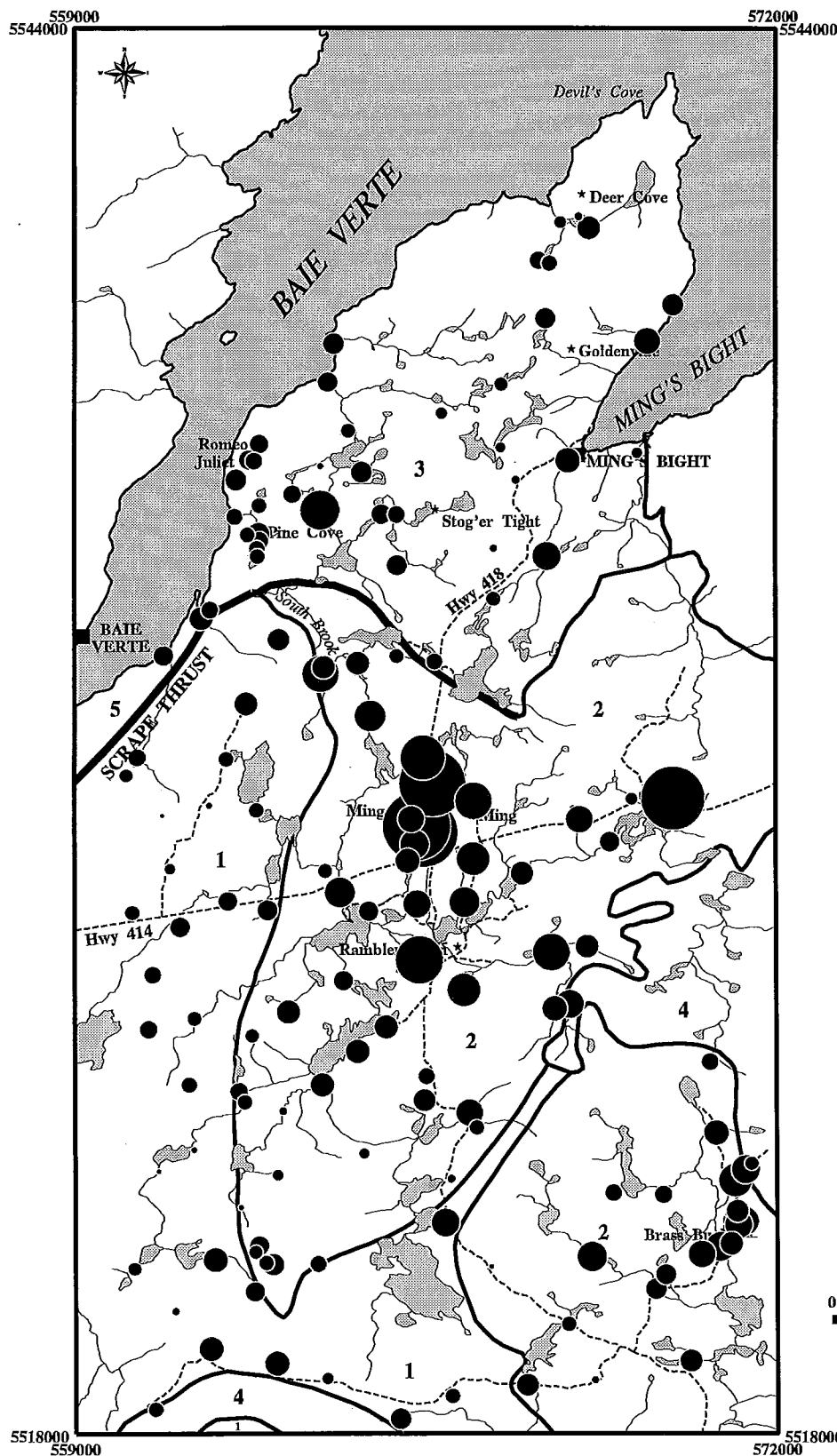
5518000
559000

5518000
572000



Ag

SILVER BLACK SPRUCE TWIGS



ICP-ES

ppm	Ag	Percentile
14.0		Maximum
9.8		98
5.4		95
4.2		90
3.3		75
2.6		50
0.3		Minimum

145 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

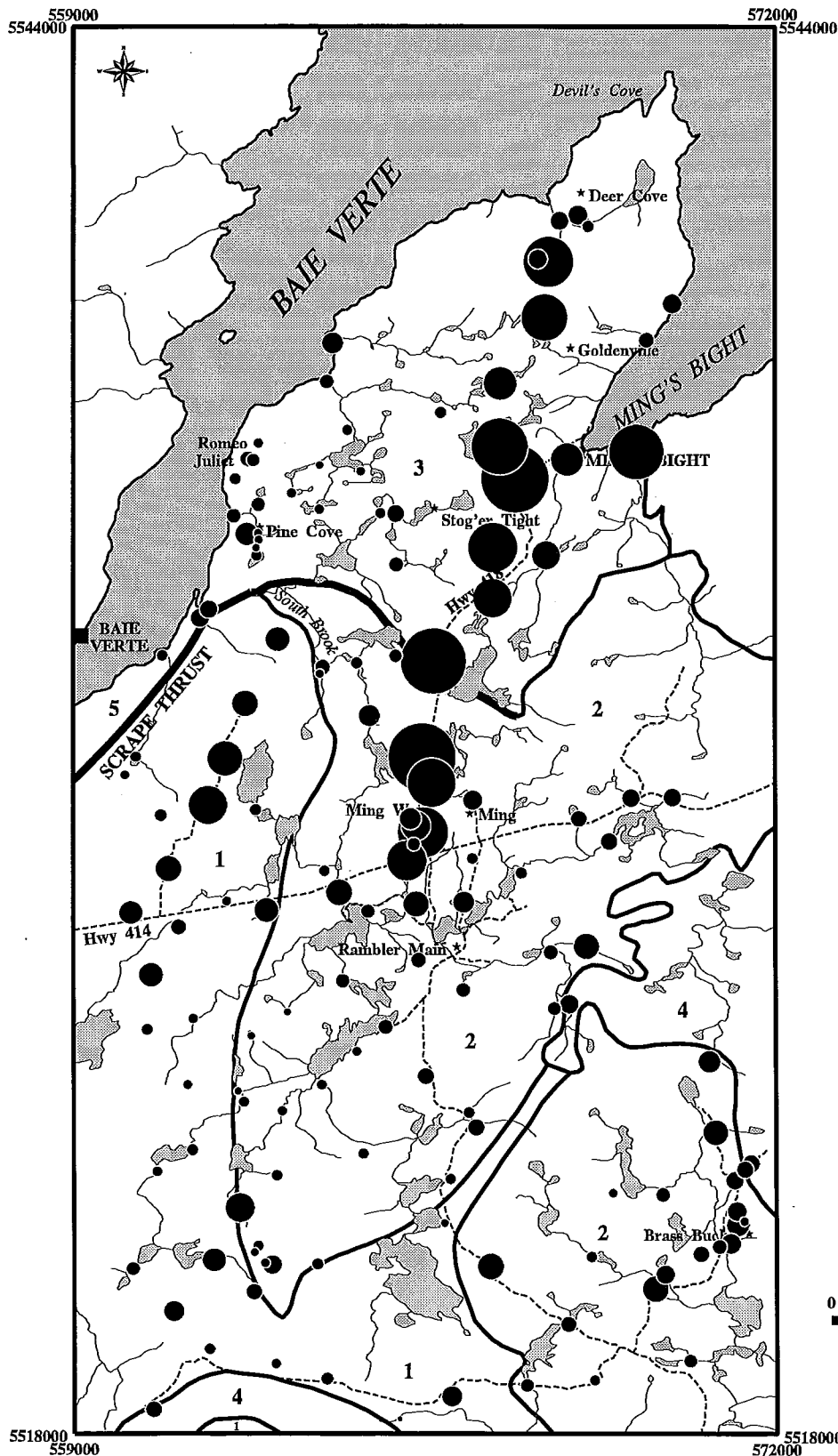
Scale 1 : 125 000



Km

UTM Zone 21

ALUMINUM BLACK SPRUCE TWIGS



ICP-ES

pct	Al	Percentile
3.37		Maximum
1.78		98
1.31		95
0.89		90
0.56		75
0.38		50
0.12		Minimum

145 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

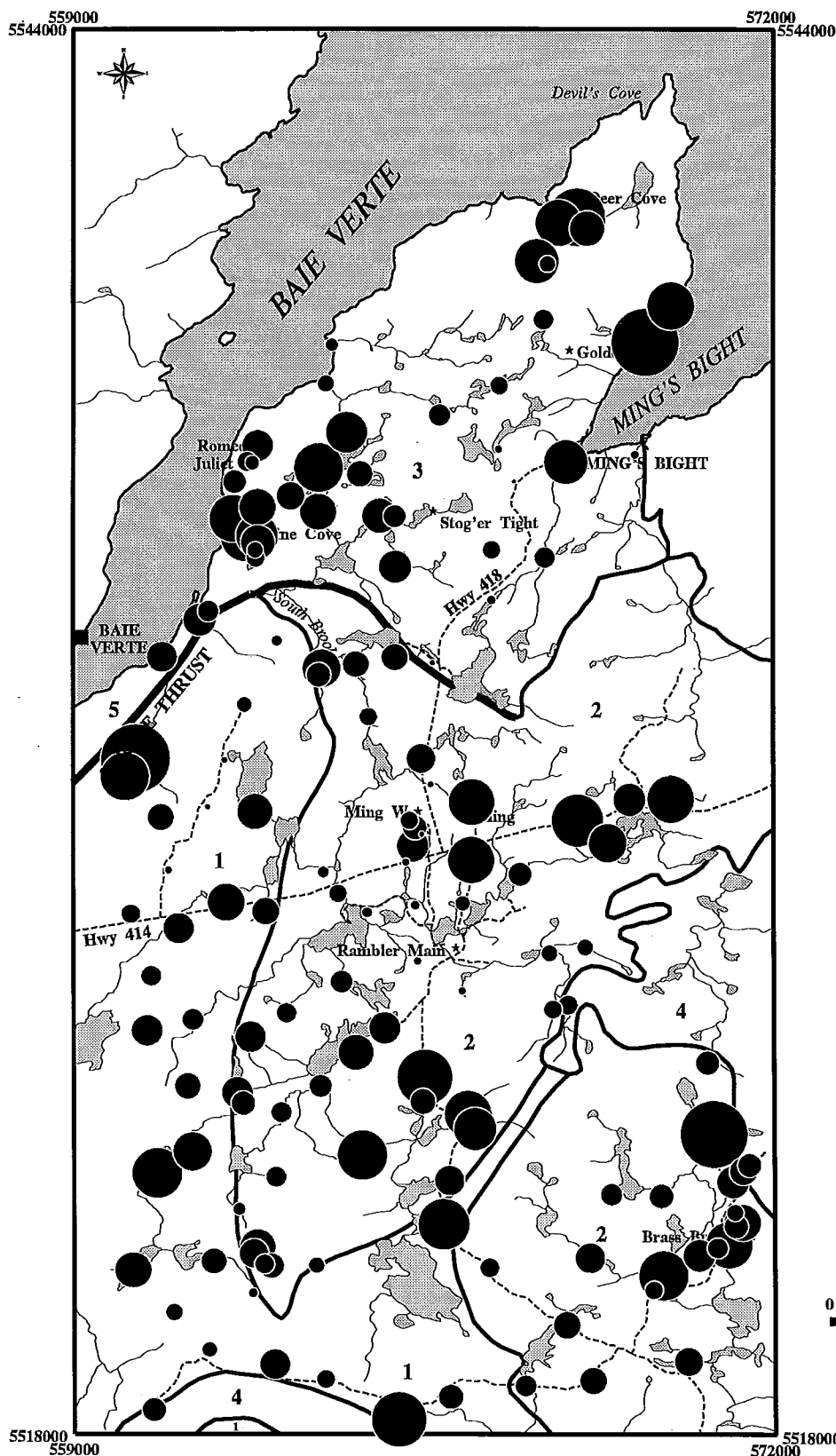
Scale 1 : 125 000



Km
UTM Zone 21



BORON BLACK SPRUCE TWIGS



ICP-ES

ppm	B	Percentile
874		Maximum
805		98
725		95
701		90
627		75
549		50
213		Minimum

145 Samples

Exponent = 2

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



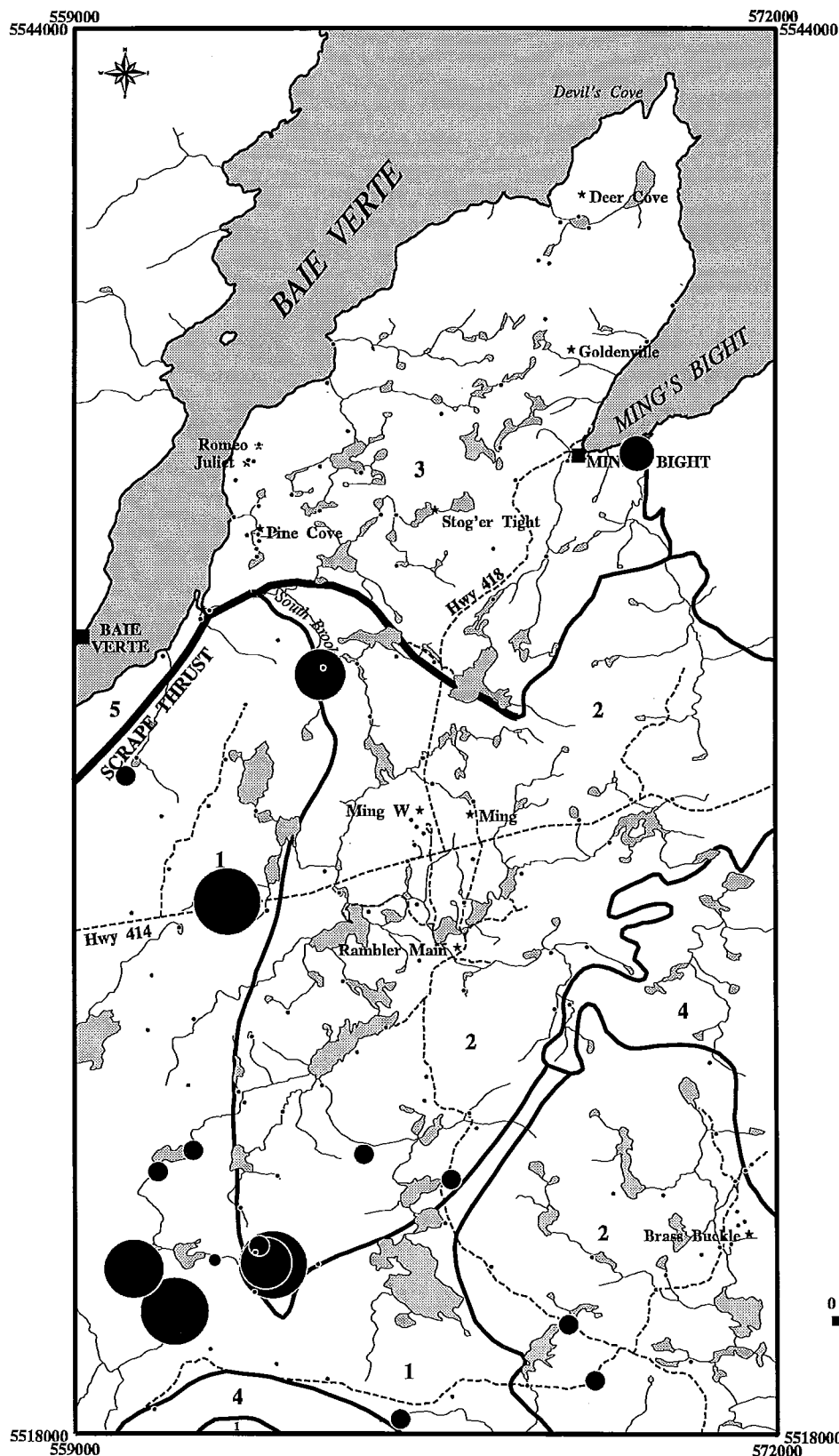
Km

UTM Zone 21



Be

BERYLLIUM BLACK SPRUCE TWIGS



ICP-ES

ppm	Be	Percentile
1.5		Maximum
1.0		98
0.5		95
0.4		90
<0.3		75
<0.3		50
<0.3		Minimum

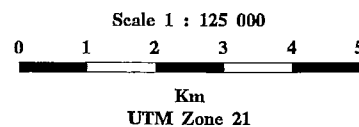
145 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

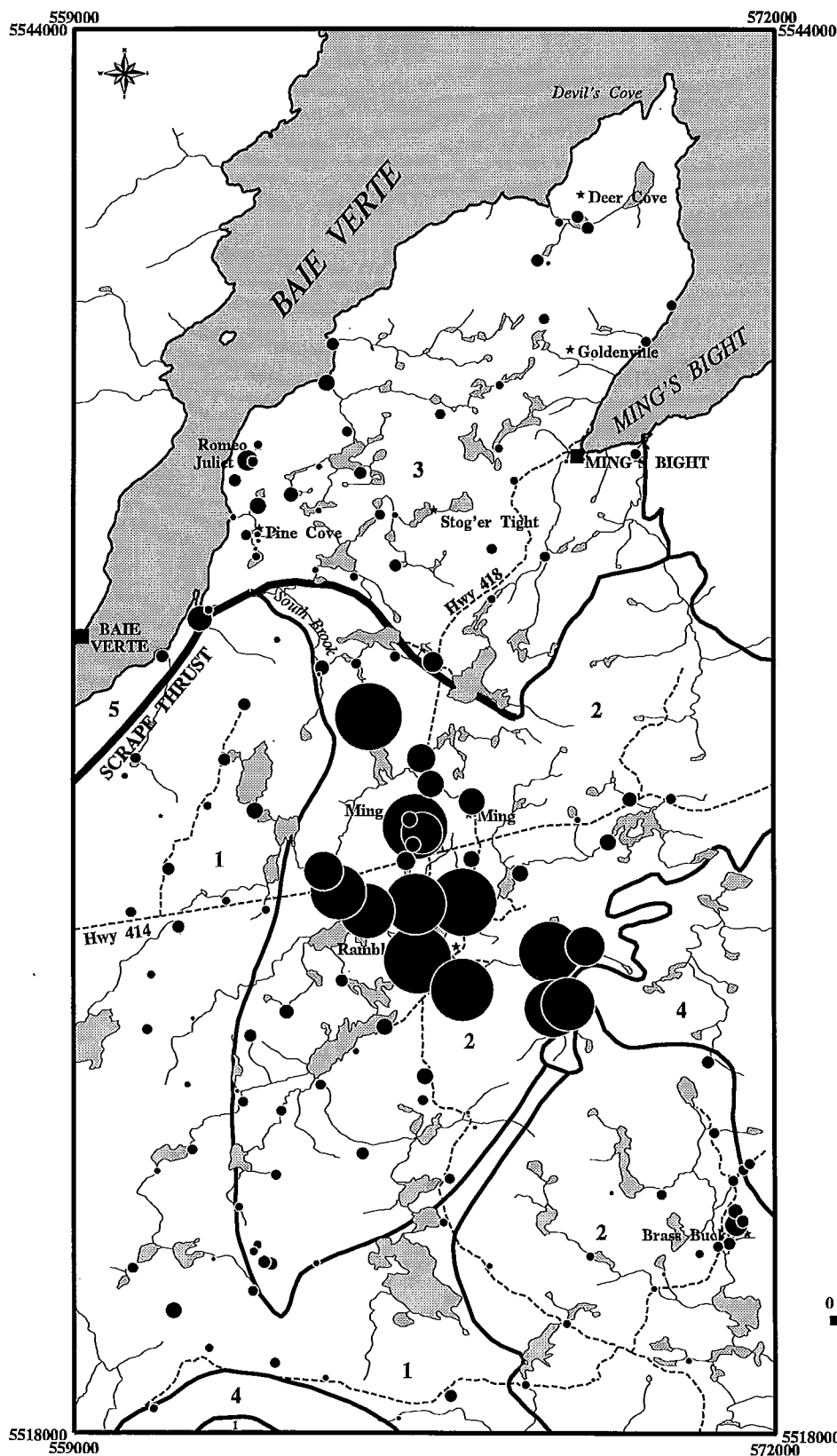
- * Mineral Deposit
- Roads & Trails





Bi

BISMUTH BLACK SPRUCE TWIGS



HYDRIDE

ppm	Bi	Percentile
7.5		Maximum
3.2		98
2.8		95
1.4		90
0.6		75
0.4		50
<0.2		Minimum

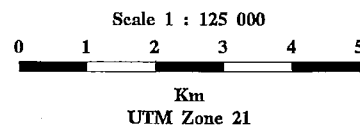
147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails

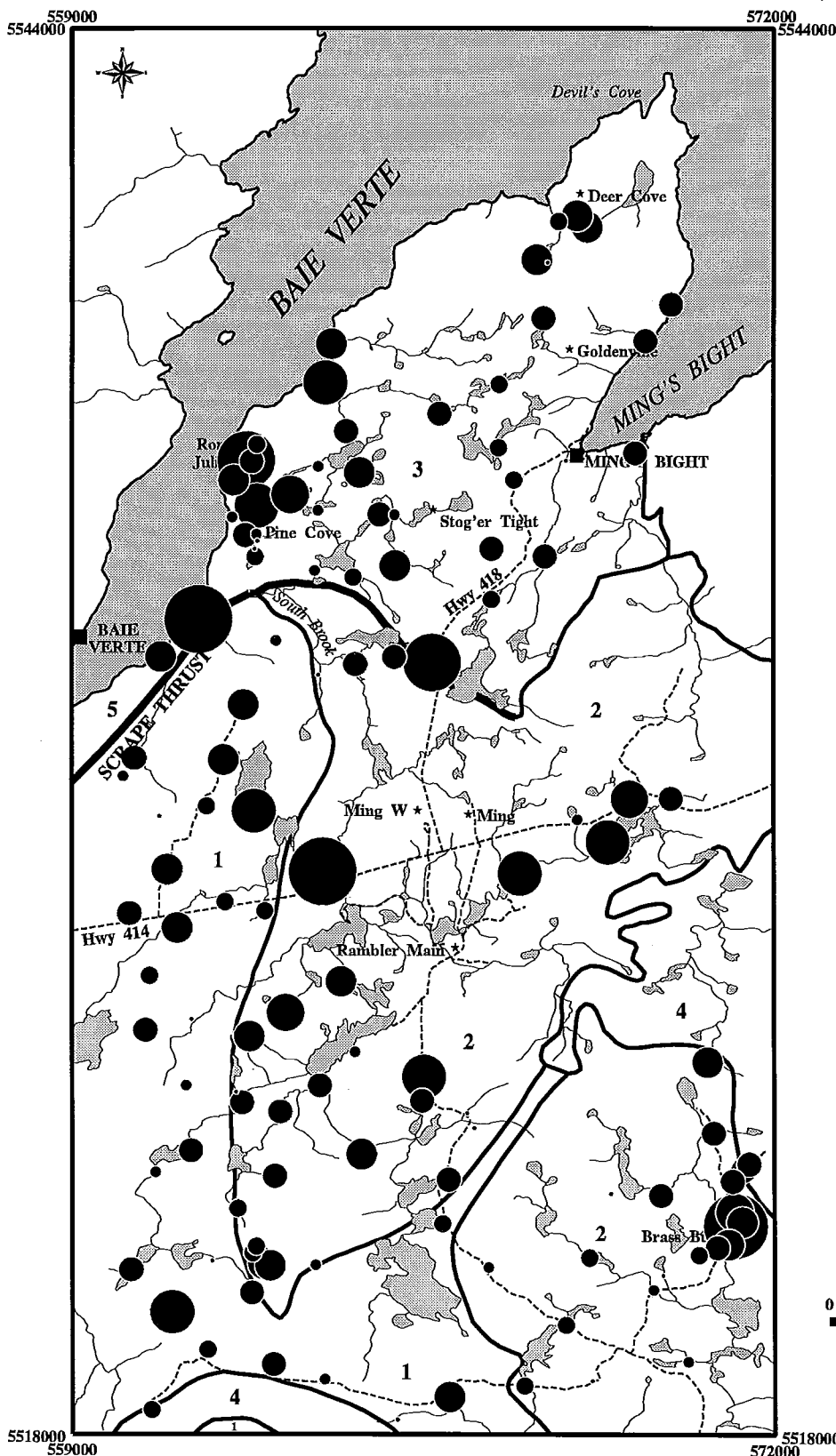




BISMUTH BLACK SPRUCE TWIGS

Rambler Excluded [RE]

Bi
[RE]



HYDRIDE

ppm	Bi	Percentile
1.8		Maximum
1.1		98
0.7		95
0.6		90
0.5		75
0.4		50
<0.2		Minimum

124 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km

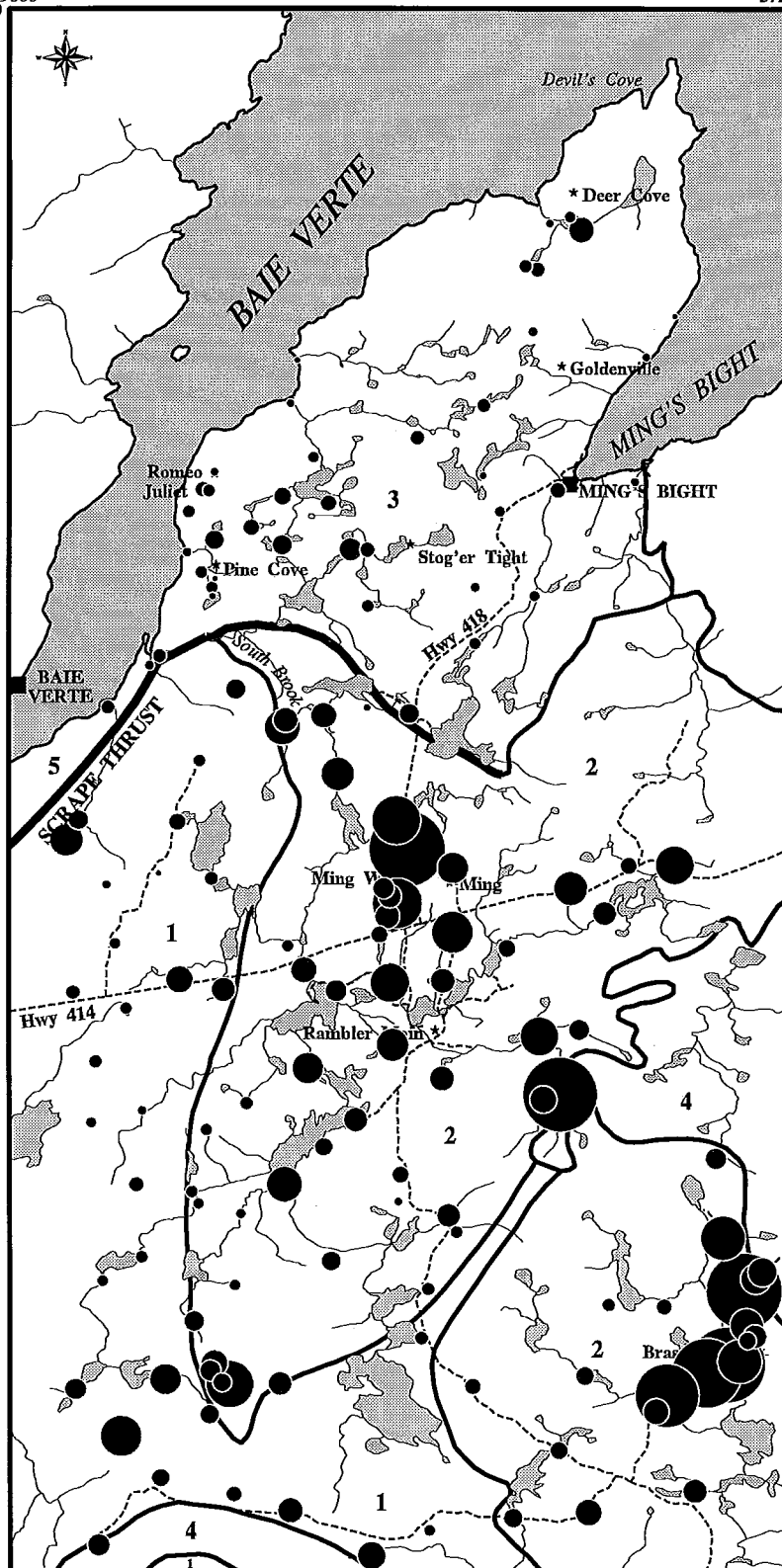
UTM Zone 21



CADMIUM BLACK SPRUCE TWIGS

Cd

559000 5544000 572000 5544000



ICP-ES

ppm	Cd	Percentile
13.6		Maximum
12.6		98
8.2		95
6.4		90
4.2		75
2.9		50
0.9		Minimum

145 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

- Mineral Deposit
- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

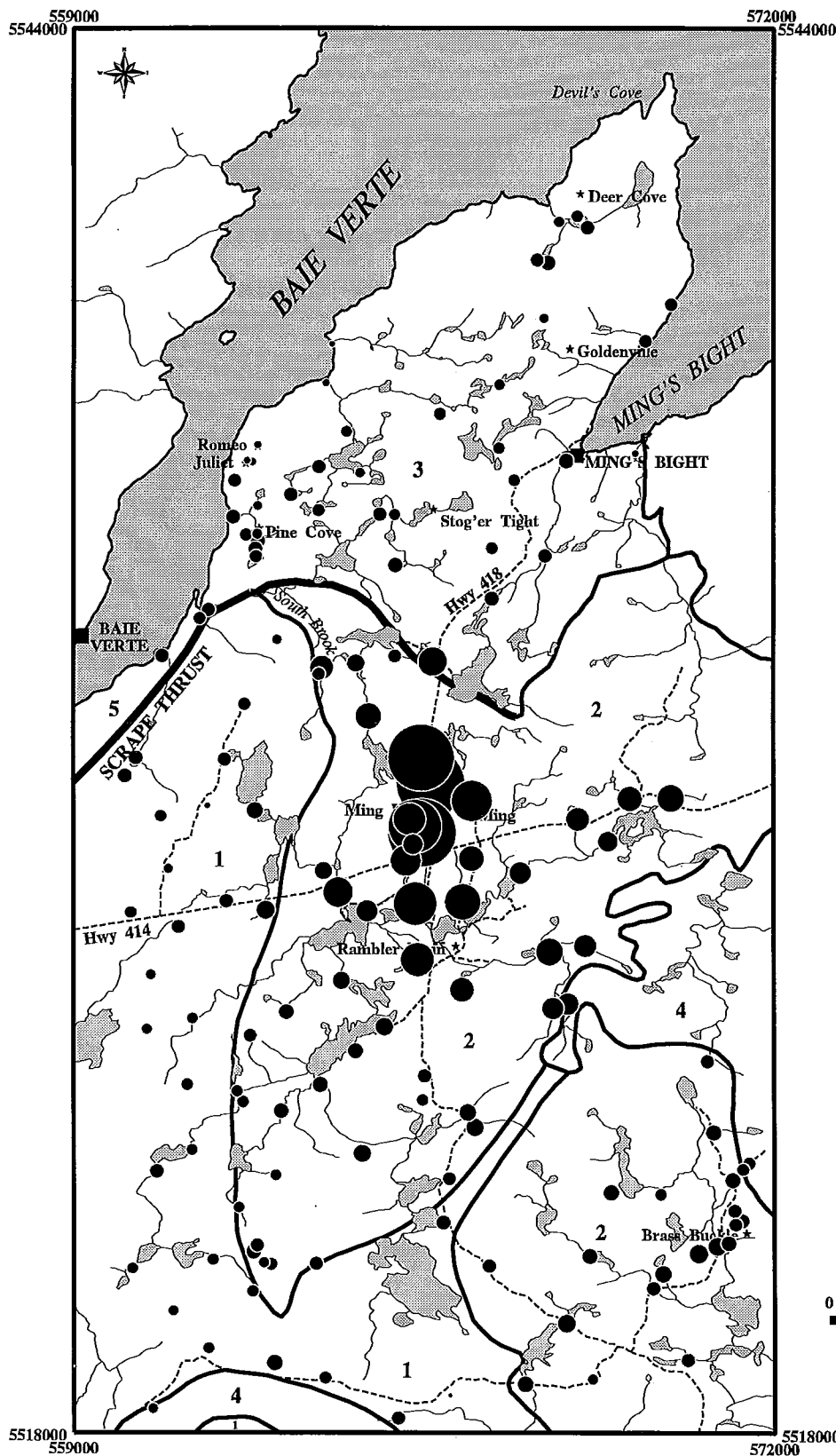
5518000
559000

5518000
572000



Cu

COPPER BLACK SPRUCE TWIGS



ICP-ES

ppm	Cu	Percentile
11903		Maximum
5246		98
1322		95
734		90
342		75
237		50
128		Minimum

145 Samples

Exponent = 0.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

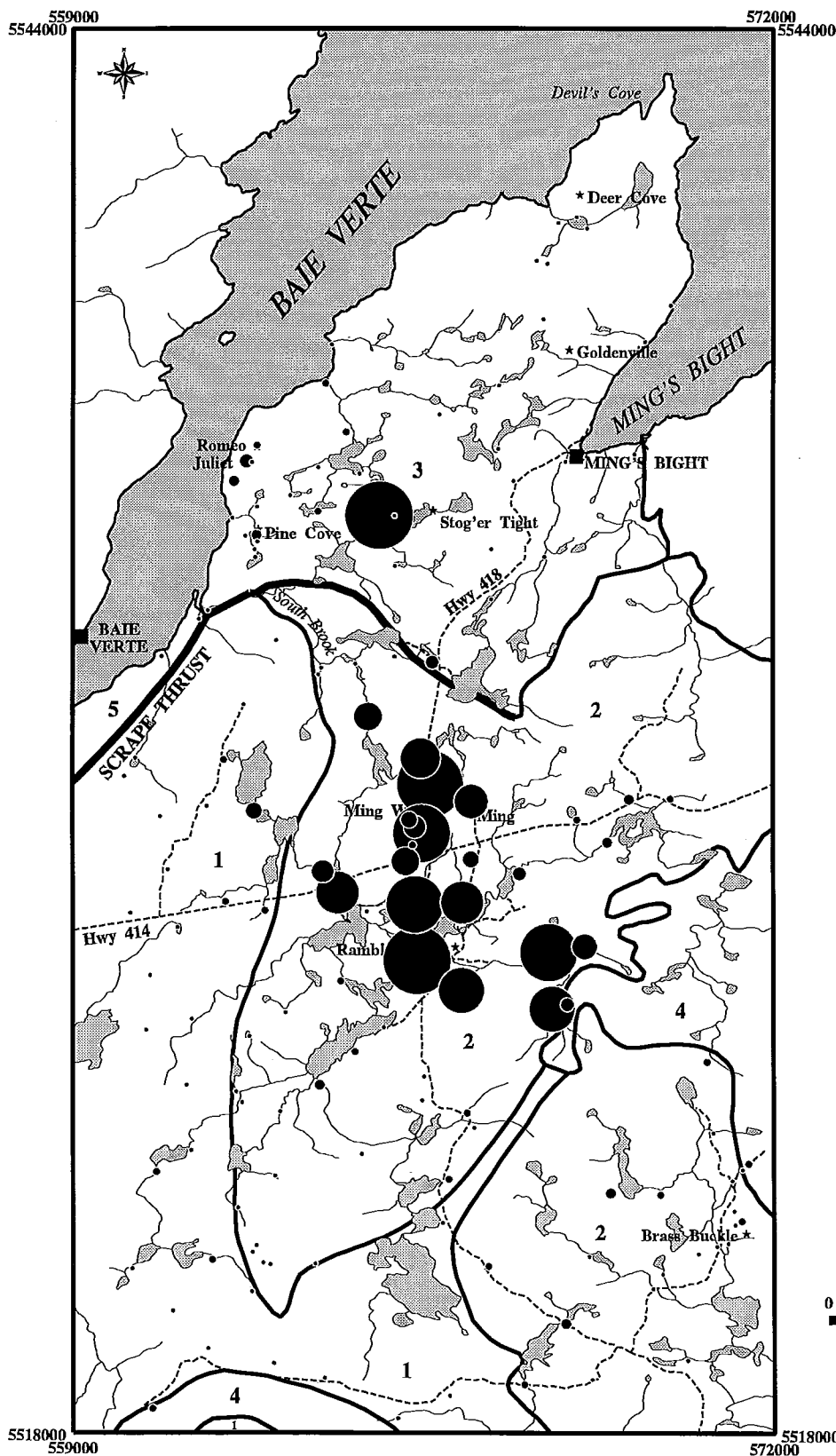
--- Roads & Trails

Scale 1 : 125 000










Km
UTM Zone 21

MERCURY BLACK SPRUCE TWIGS



ICP-ES

ppm	Hg	Percentile
150		Maximum
113		98
75		95
42		90
10		75
<10		50
<10		Minimum

145 Samples

Exponent = 1

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



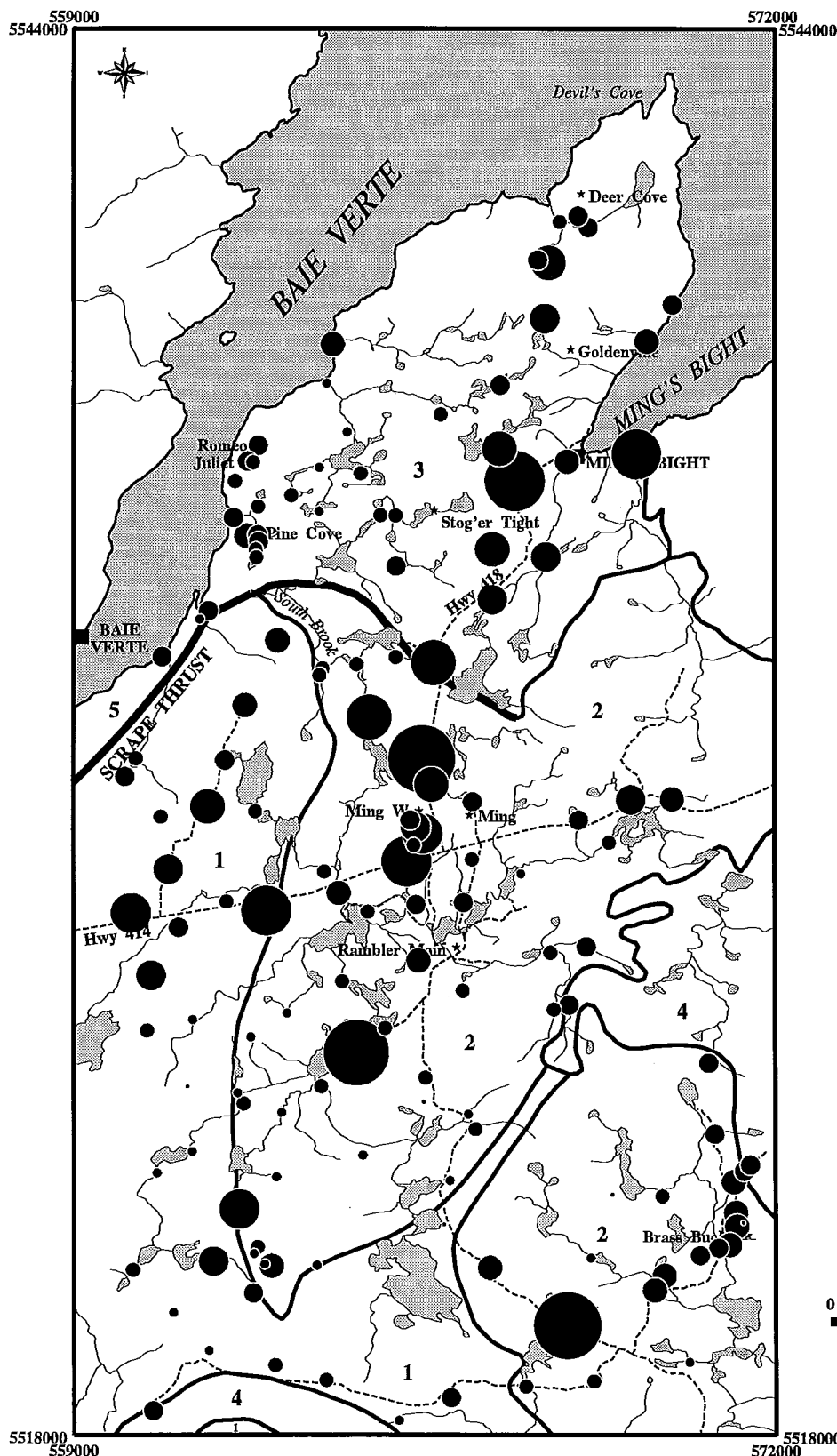
Km

UTM Zone 21



Li

LITHIUM BLACK SPRUCE TWIGS



ICP-ES

ppm	Li	Percentile
22		Maximum
13		98
10		95
7		90
5		75
4		50
<2		Minimum

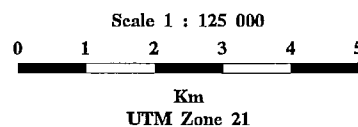
145 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

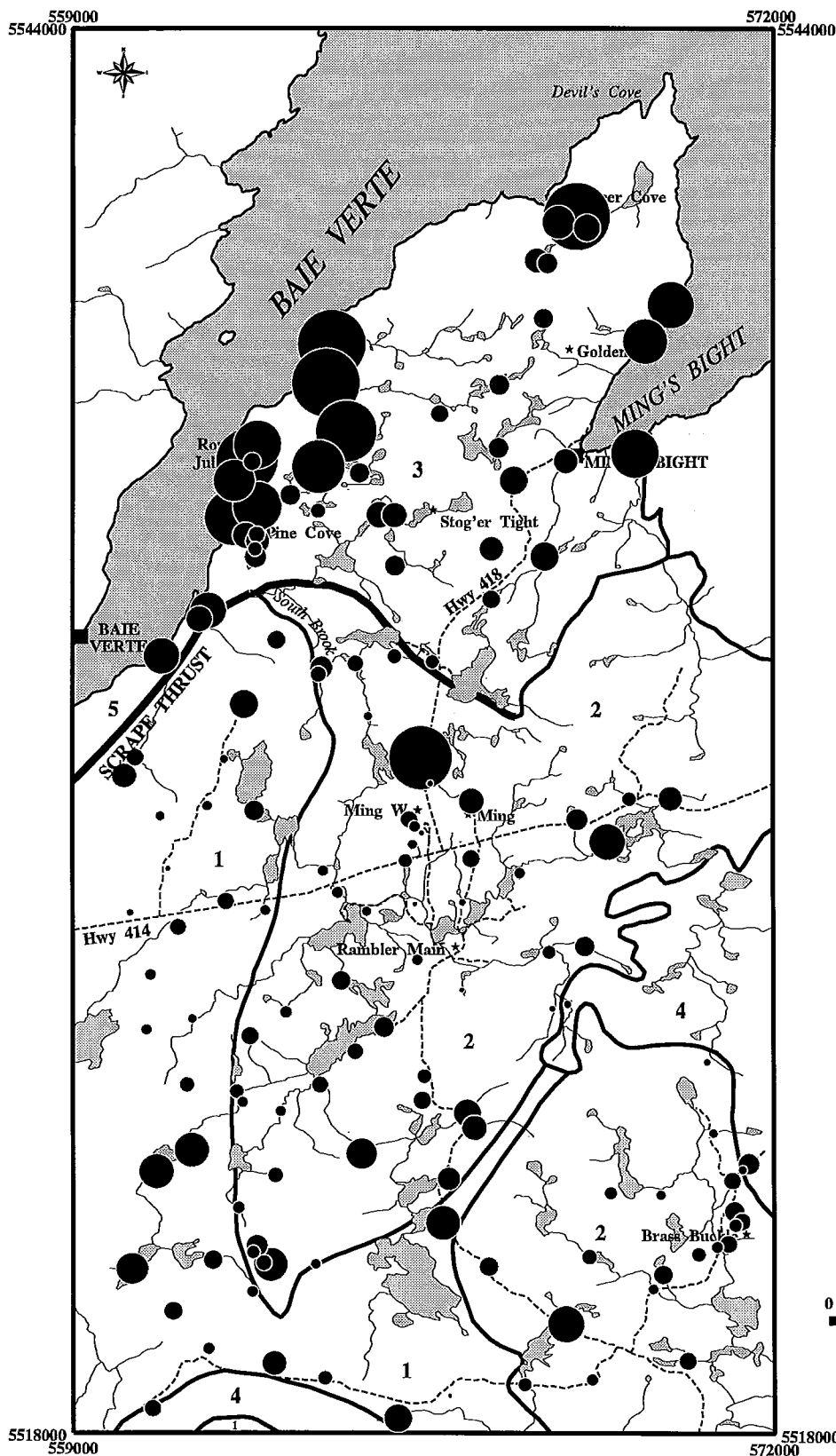
- Mineral Deposit
- Roads & Trails












Mg

MAGNESIUM BLACK SPRUCE TWIGS



ICP-ES

pct	Mg	Percentile
7.20		Maximum
6.62		98
5.91		95
4.95		90
4.01		75
3.41		50
1.70		Minimum

145 Samples

Exponent = 1.5

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



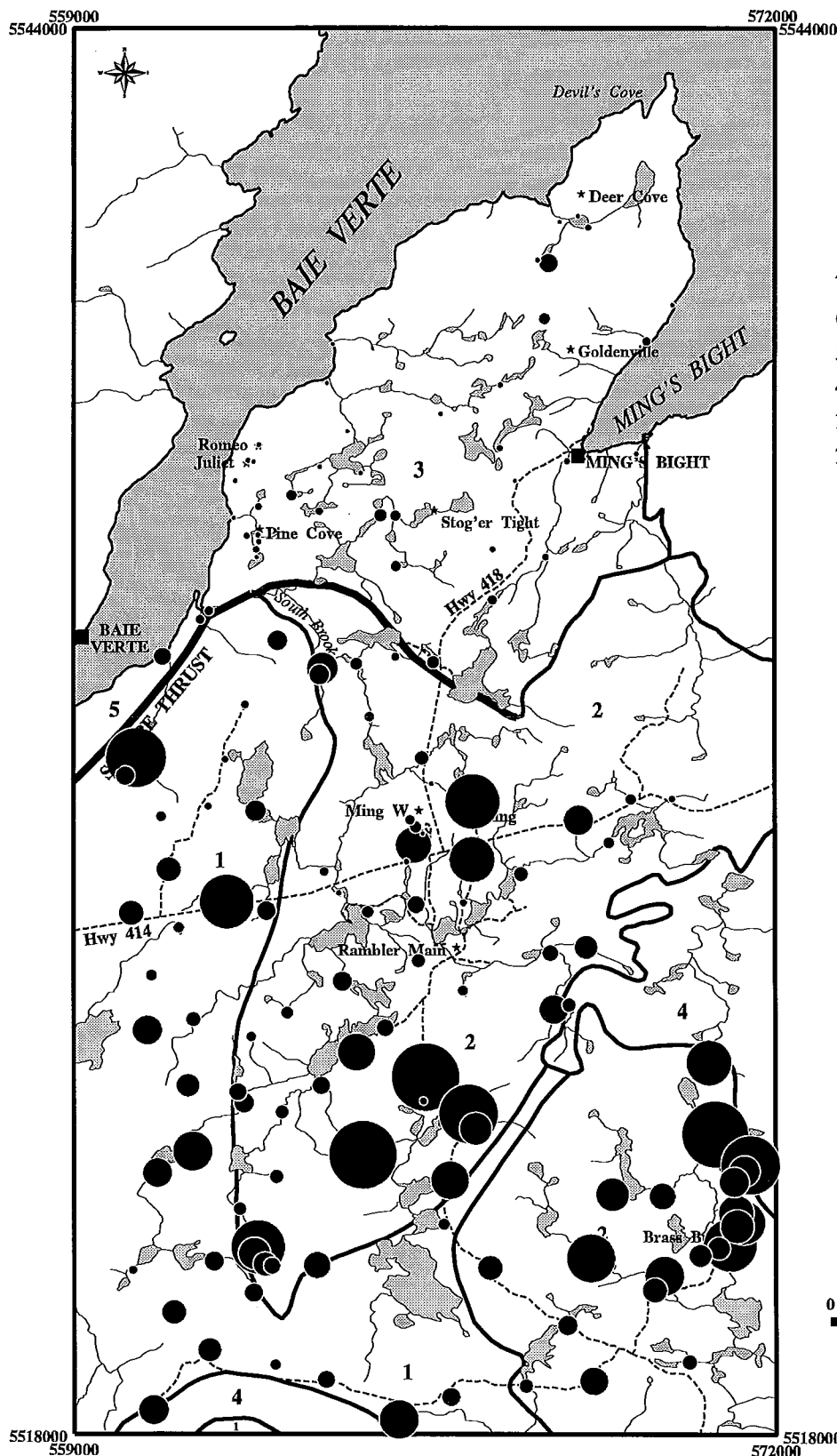
Km

UTM Zone 21



Mn

MANGANESE BLACK SPRUCE TWIGS



ICP-ES

ppm	Mn	Percentile
76891		Maximum
63137		98
56196		95
48513		90
37548		75
25895		50
2938		Minimum

145 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

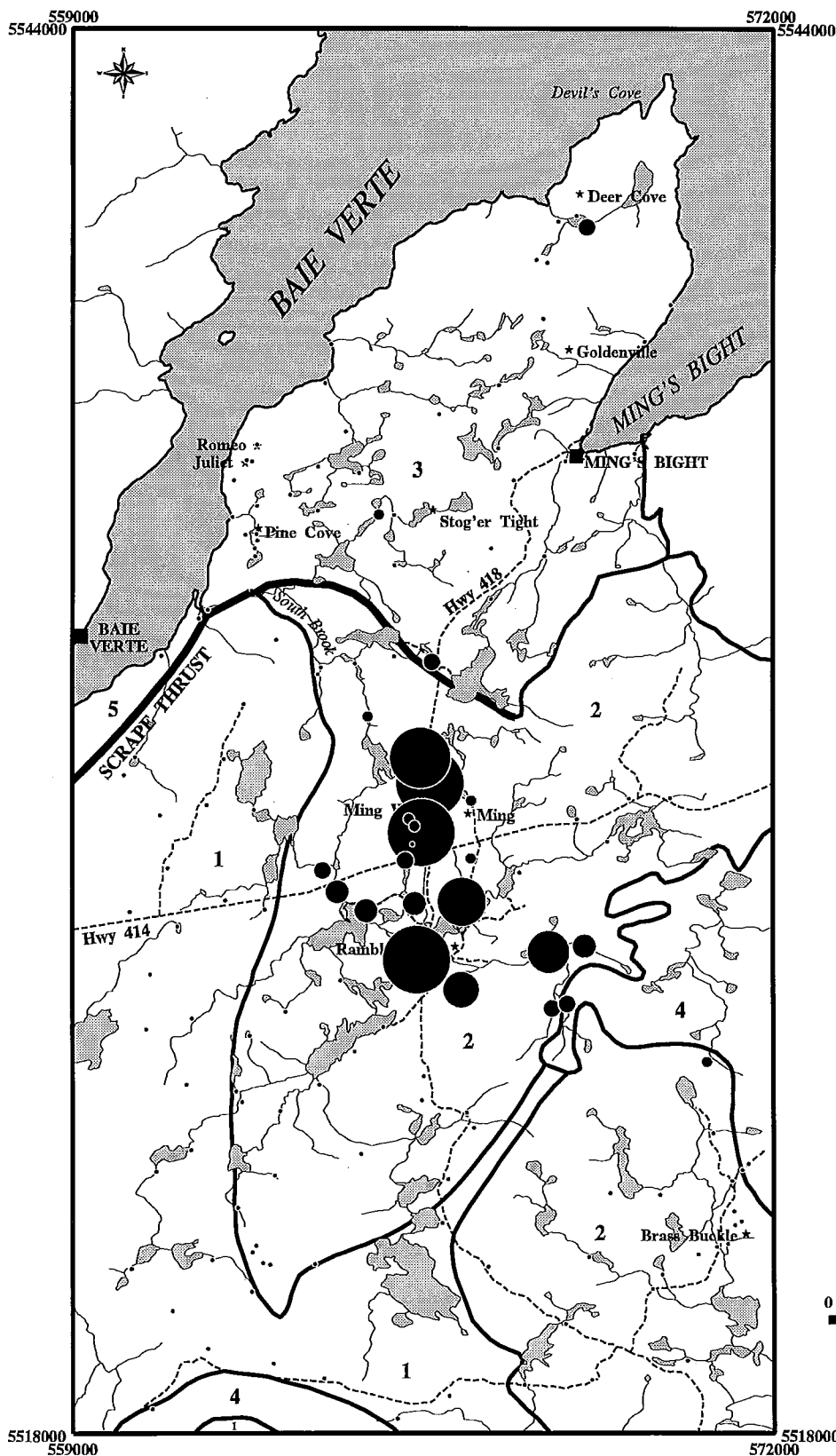
Scale 1 : 125 000










Km

UTM Zone 21

MOLYBDENUM BLACK SPRUCE TWIGS



ICP-ES

ppm	Mo	Percentile
14		Maximum
11		98
5		95
3		90
<2		75
<2		50
<2		Minimum

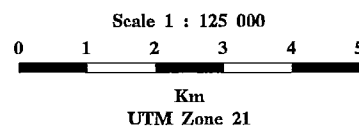
145 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

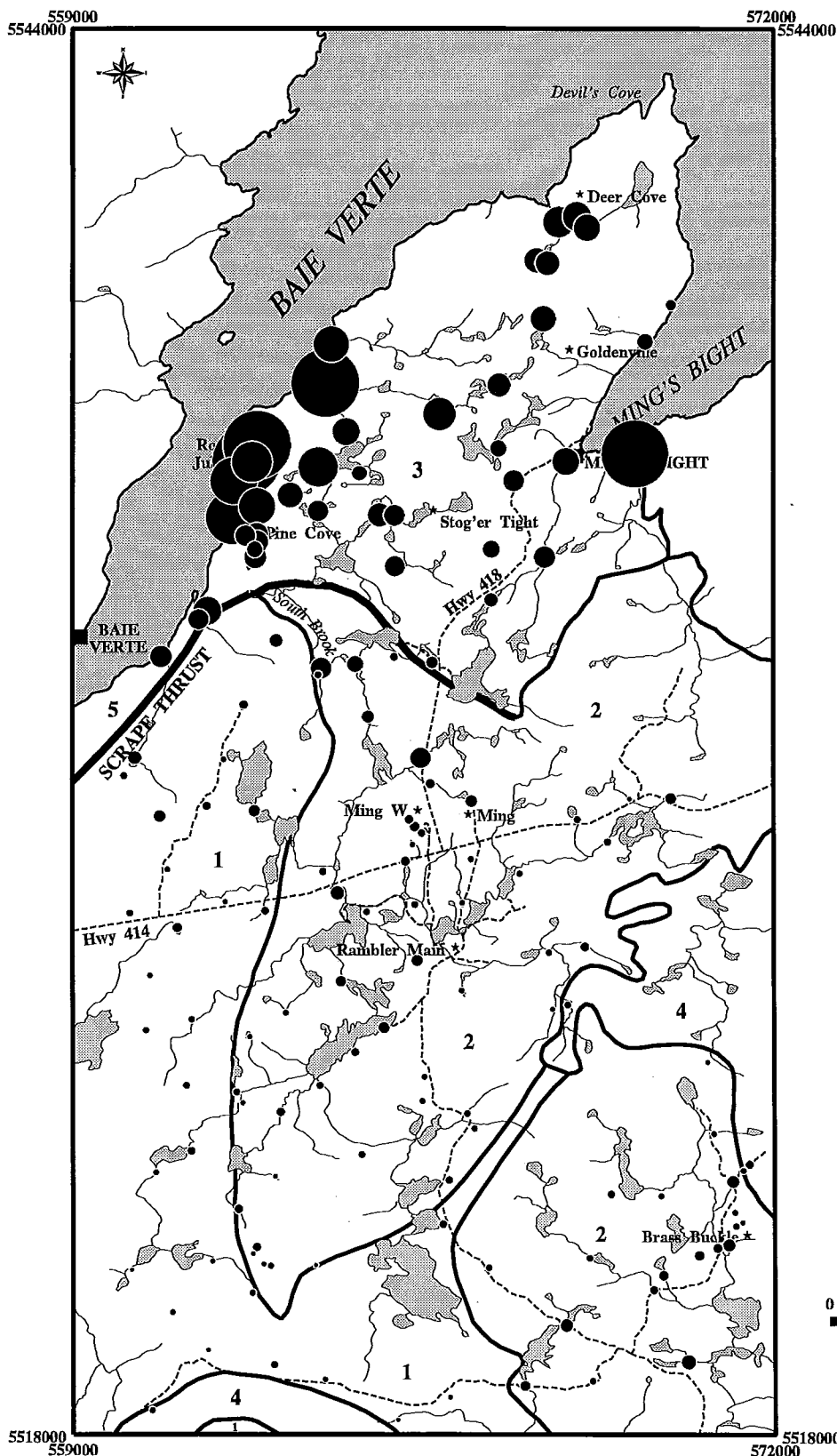
- * Mineral Deposit
- Roads & Trails





Ni

NICKEL BLACK SPRUCE TWIGS



ICP-ES

ppm	Ni	Percentile
664		Maximum
641		98
376		95
256		90
171		75
76		50
34		Minimum

145 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



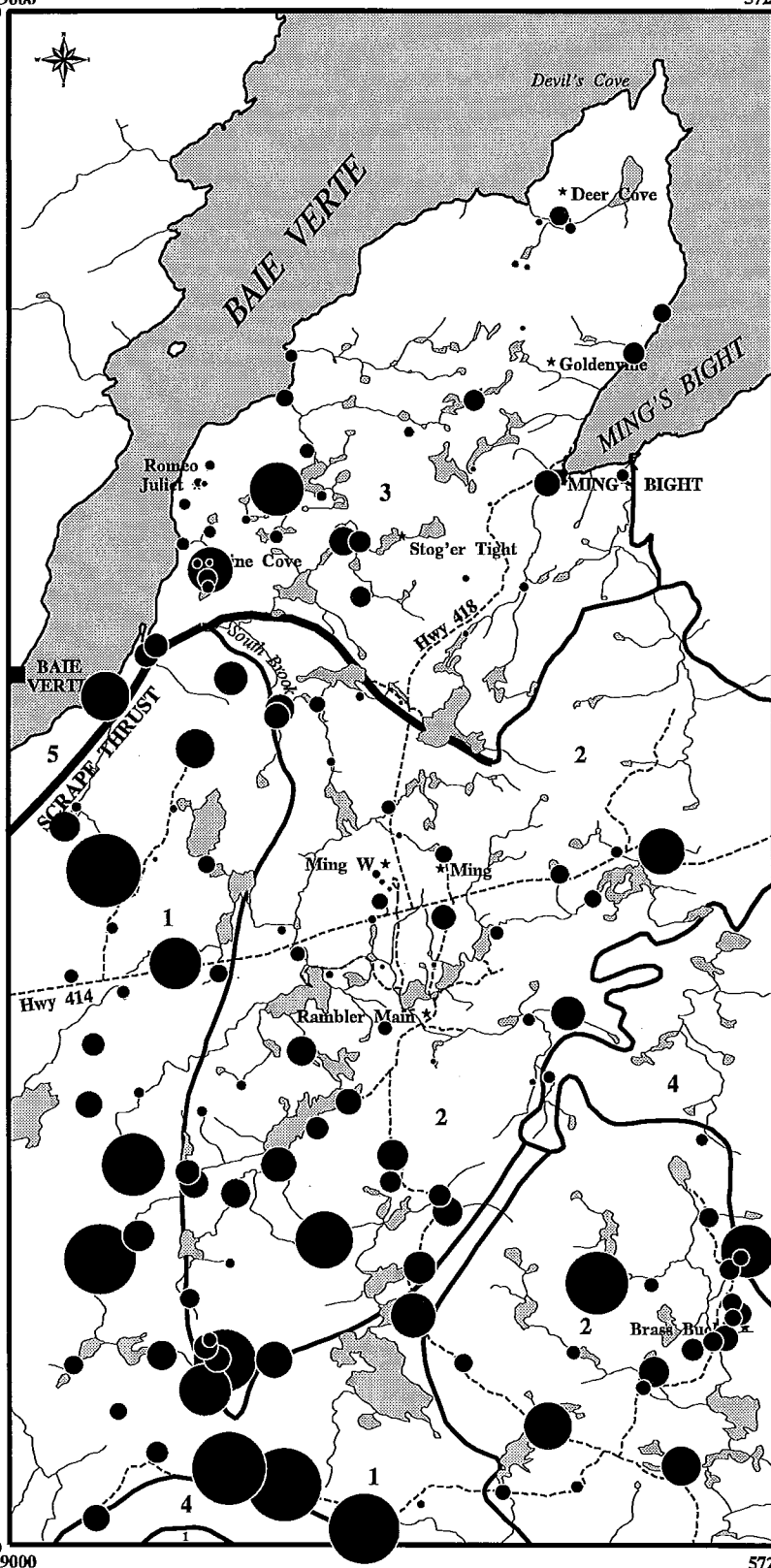
Km
UTM Zone 21



PHOSPHORUS BLACK SPRUCE TWIGS

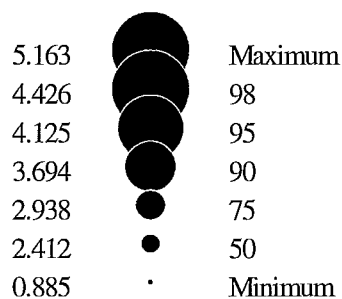
559000
5544000

572000
5544000



ICP-ES

pct P Percentile



145 Samples

Exponent = 2

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



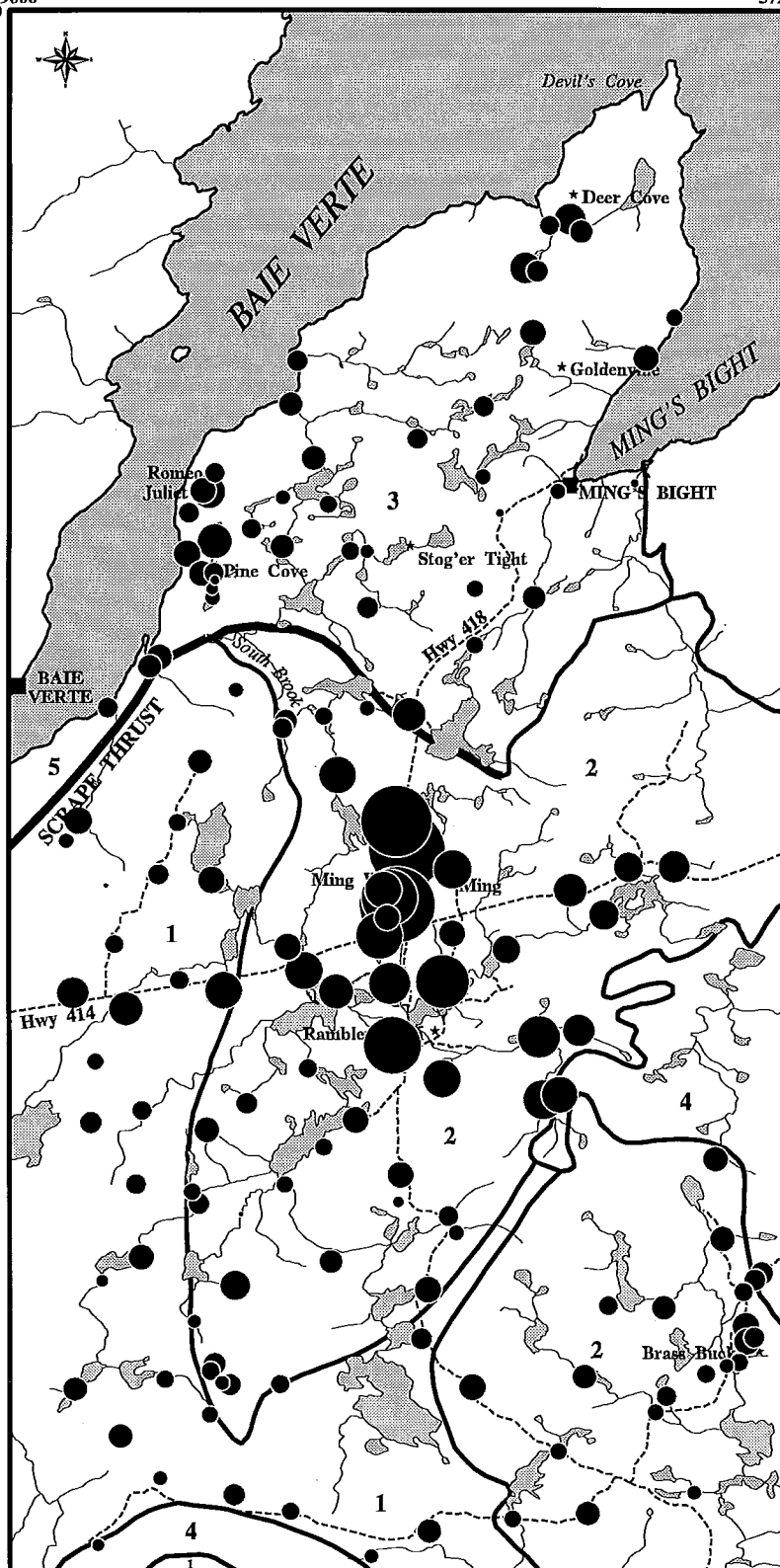
Km
UTM Zone 21










Pb

LEAD BLACK SPRUCE TWIGS

559000 5544000 572000 5544000



ICP-ES

ppm	Pb	Percentile
2533		Maximum
1014		98
354		95
232		90
124		75
85		50
30		Minimum

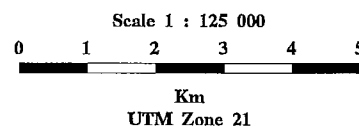
145 Samples

Exponent = 0.5

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

- * Mineral Deposit
- Roads & Trails



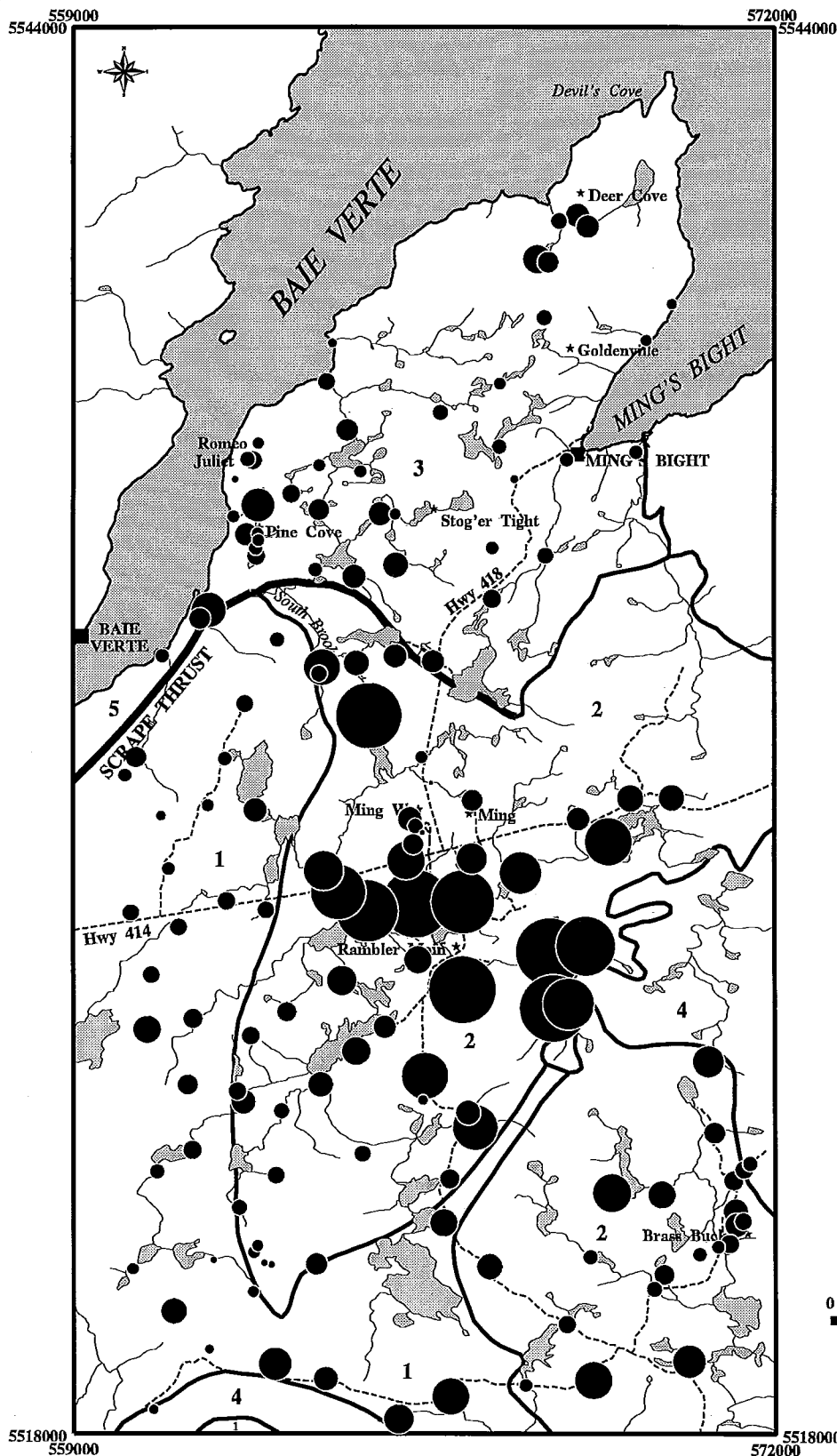
5518000 559000

5518000 572000










Se

SELENIUM BLACK SPRUCE TWIGS



HYDRIDE

ppm	Se	Percentile
10.5		Maximum
8.1		98
7.2		95
4.6		90
2.8		75
1.9		50
<0.2		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

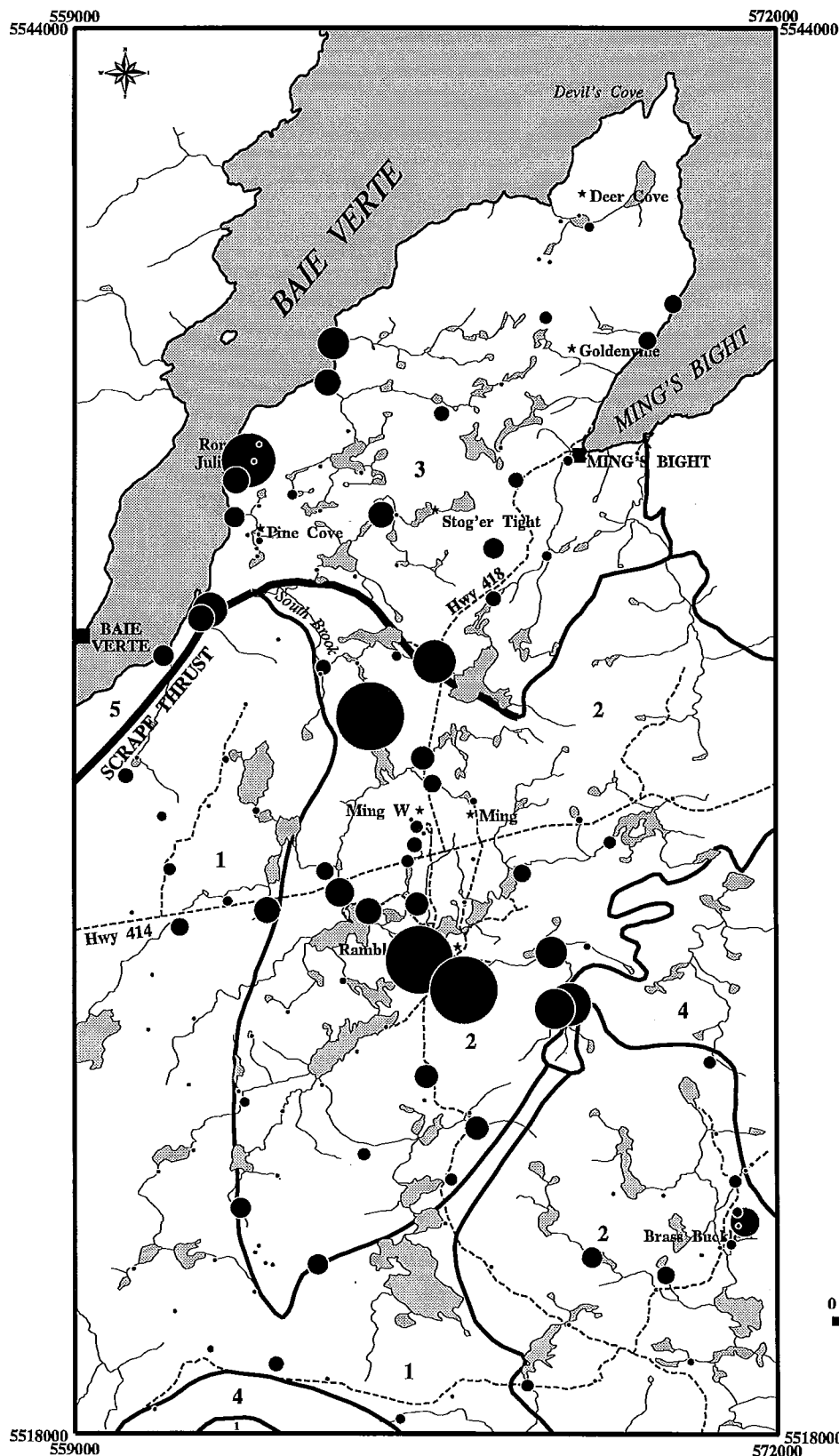
Scale 1 : 125 000










Km

UTM Zone 21

TELLURIUM BLACK SPRUCE TWIGS



HYDRIDE

ppm	Te	Percentile
2.6		Maximum
2.4		98
1.3		95
0.9		90
0.5		75
<0.2		50
<0.2		Minimum

147 Samples

Exponent = 1

Simplified Geology

- 1 Burlington Granodiorite
- 2 Pacquet Harbour Group
- 3 Point Rousse Complex
- 4 Quartz Feldspar Porphyry
- 5 Flatwater Pond Group

* Mineral Deposit

----- Roads & Trails

Scale 1 : 125 000



Km

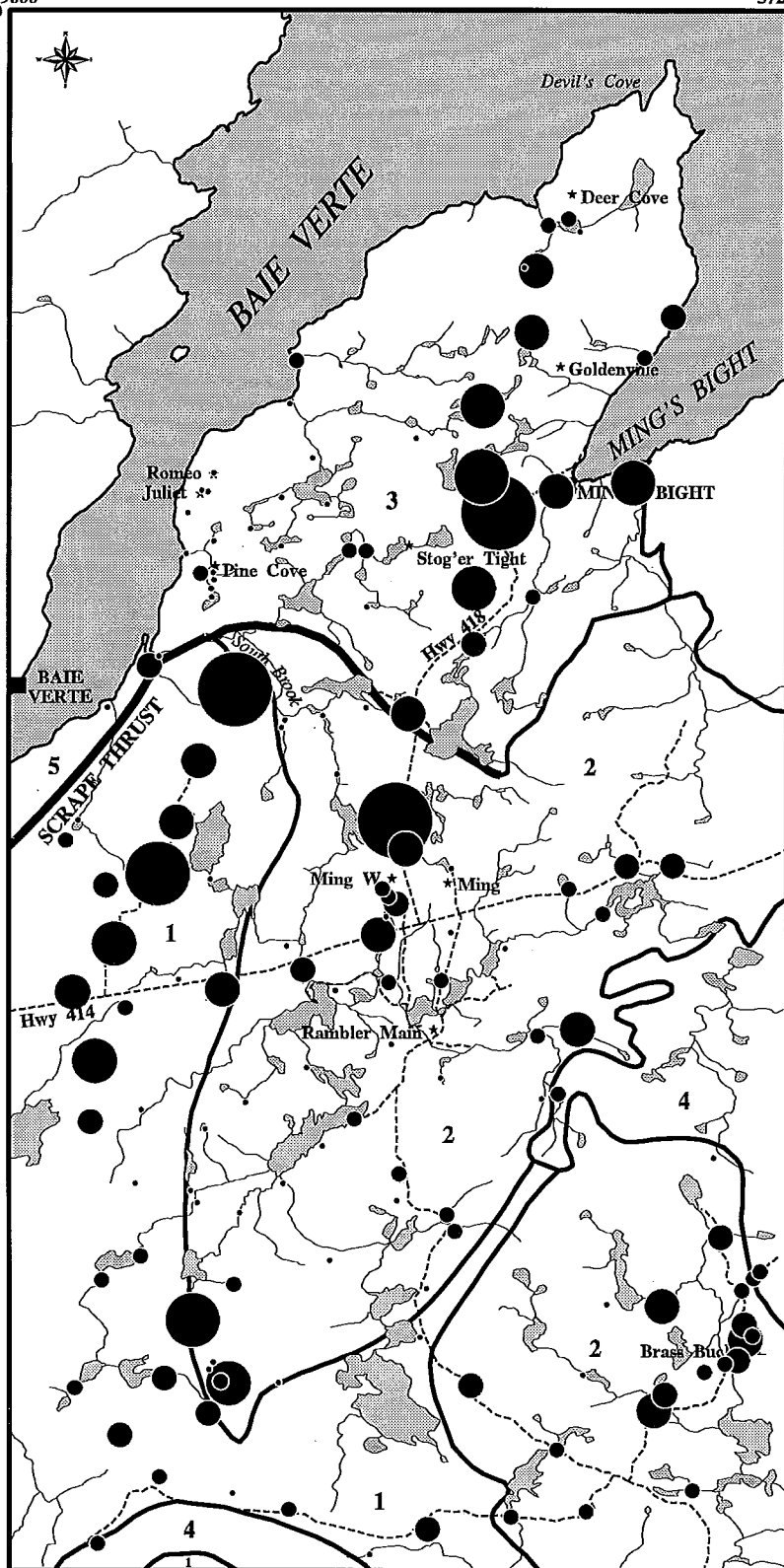
UTM Zone 21



TITANIUM BLACK SPRUCE TWIGS

559000
5544000

572000
5544000



ICP-ES

pct	Ti	Percentile
0.11		Maximum
0.08		98
0.05		95
0.04		90
0.03		75
0.02		50
<0.02		Minimum

145 Samples

Exponent = 1

Simplified Geology

- Burlington Granodiorite
- Pacquet Harbour Group
- Point Rousse Complex
- Quartz Feldspar Porphyry
- Flatwater Pond Group

- Mineral Deposit
- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

5518000
559000

5518000
572000



Natural Resources
Canada

Ressources naturelles
Canada

GEOLOGICAL SURVEY OF CANADA



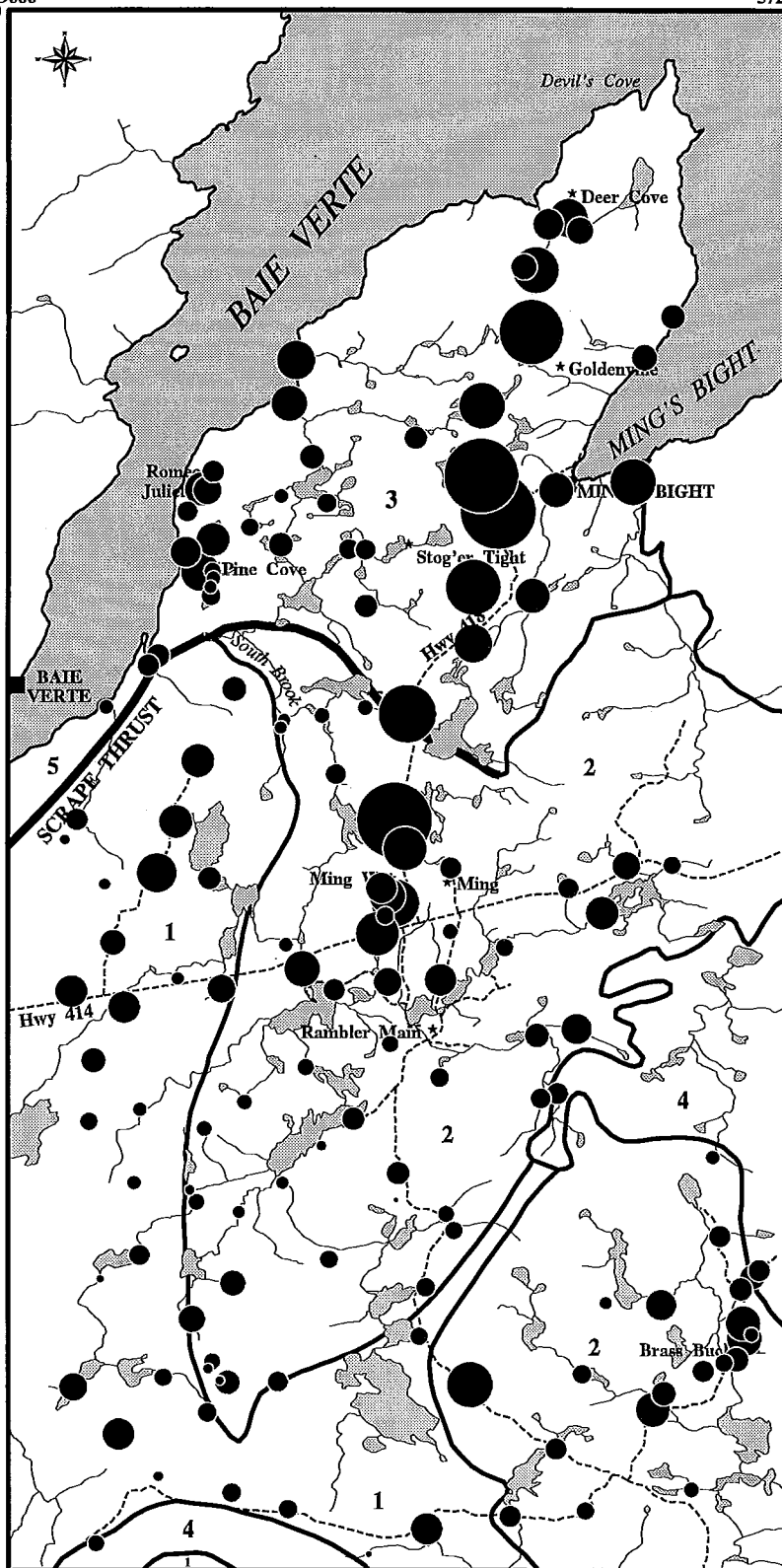
COMMISSION GÉOLOGIQUE DU CANADA

V

VANADIUM BLACK SPRUCE TWIGS

559000
5544000

572000
5544000



ICP-ES

ppm	V	Percentile
94		Maximum
60		98
38		95
31		90
26		75
18		50
5		Minimum

145 Samples

Exponent = 1

Simplified Geology

- 1** Burlington Granodiorite
- 2** Pacquet Harbour Group
- 3** Point Rousse Complex
- 4** Quartz Feldspar Porphyry
- 5** Flatwater Pond Group

* Mineral Deposit

--- Roads & Trails

Scale 1 : 125 000



Km
UTM Zone 21

5518000
559000

5518000
572000

Appendix A

Data Listings

(Field and Analytical)

Abbreviations are explained in Table 10 (page 24)

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
1	12H/16	21	566369	5528670	8	8	0	Wet open woodland	Pacquet Harbour Group	Old clear cut
2	12H/16	21	566206	5527868	10	10	0	Wet open woodland	Pacquet Harbour Group	Boggy
3	12H/16	21	568487	5527051	10	10	1W	Wet open woodland	Pacquet Harbour Group	Valley
4	12H/16	21	567820	5526943	10	10	1W	Moist open woodland	Pacquet Harbour Group	Valley
5	12H/16	21	565149	5528633	10	10	0	Wet medium woodland	Pacquet Harbour Group	
6	12H/16	21	565320	5529269	10	12	0	Wet open bog	Pacquet Harbour Group	On mound in bog
7	12H/16	21	565218	5529401	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
8	12H/16	21	565281	5528935	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
9	12H/16	21	565451	5529149	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
10	12H/16	21	562369	5534260	8	8	0	Moist open woodland	Point Rousse Complex	
11	12H/16	21	562360	5534405	8	8	0	Moist open woodland	Point Rousse Complex	Up slope from sulphides
12	12H/16	21	562408	5534550	8	8	0	Moist open woodland	Point Rousse Complex	Up slope from sulphides
13	12H/16	21	562393	5534672	10	10	0	Wet open bog	Point Rousse Complex	On mound in bog
14	12H/16	21	562205	5536038	10	10	3W	Dry medium woodland	Point Rousse Complex	Near quartz-hosted gold
15	12H/16	21	562305	5536016	10	10	0	Wet medium woodland	Point Rousse Complex	Near quartz-hosted gold
16	12H/16	21	562402	5536329	10	10	1S	Wet open bog	Point Rousse Complex	Near quartz-hosted gold
17	12H/16	21	561972	5535668	10	10	3W	Moist dense woodland	Point Rousse Complex	Near stream
18	12H/16	21	561944	5534989	10	10	3SW	Moist dense woodland	Point Rousse Complex	
19	12H/16	21	568560	5521292	10	10	1S	Dry open woodland	Pacquet Harbour Group	
20	12H/16	21	571529	5523021	7	8	2SW	Dry open woodland	Qtz-Feldspar Porphyry	Along strike from gold mineralization
21	12H/16	21	571415	5522908	10	10	2S	Dry open woodland	Qtz-Feldspar Porphyry	Above low-grade gold zone with pyrite
22	12H/16	21	571224	5522706	10	10	1SW	Dry open woodland	Pacquet Harbour Group	
23	12H/16	21	570874	5523591	8	10	0	Moist open woodland	Pacquet Harbour Group	
24	12H/16	21	570763	5524912	8	10	0	Wet open bog	Pacquet Harbour Group	
25	12H/16	21	571278	5521883	8	10	2S	Dry open woodland	Pacquet Harbour Group	Up slope from gold mineralization
26	12H/16	21	571146	5521537	8	10	1W	Wet open woodland	Pacquet Harbour Group	Down slope from gold mineralization
27	12H/16	21	570938	5521479	7	8	1S	Moist open woodland	Pacquet Harbour Group	
28	12H/16	21	570594	5521341	7	8	1S	Moist open woodland	Pacquet Harbour Group	
29	12H/16	21	569747	5520696	8	9	1S	Moist open woodland	Pacquet Harbour Group	
31	12H/16	21	560458	5518460	8	8	0	Moist open woodland	Qtz-Feldspar Porphyry	Partially logged

GSC Open File 2951

Baie Verte: Black Spruce Twigs - INAA Data - concentrations in ash

Field Number	Ash Yield %	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
1	1.3	17.0	58	1600	44	16.7	38	28	2.0	1.19	1.1	17.80	4810	95	2.2	2.9	2100	<0.1	<0.2	2	4100	2.9	11	<5	0.7	<0.05	<0.05	<0.05
2	2.0	79.0	290	1600	34	18.6	38	51	<0.5	5.11	1.5	9.87	10000	87	9.7	6.3	940	0.8	1.1	<1	3000	5.6	12	<5	1.3	<0.04	0.76	0.10
3	1.6	44.0	154	1300	36	13.2	37	62	1.9	3.38	1.5	12.20	6180	140	4.9	5.6	650	1.0	1.1	<1	3300	11.0	27	<5	2.9	0.56	1.32	0.25
4	1.8	68.0	265	1300	45	15.0	45	45	2.2	4.24	1.2	14.70	6480	150	8.1	4.9	950	0.4	0.7	<1	5400	3.8	7	<5	0.9	<0.04	0.53	0.10
5	2.6	20.0	45	930	50	13.7	20	97	2.3	2.49	1.2	10.80	15200	93	3.0	9.4	<300	1.8	1.7	12	2500	12.0	25	<5	2.6	0.56	1.21	0.22
6	1.9	50.0	126	1800	35	19.3	16	70	2.2	3.05	0.9	10.40	7840	57	10.0	5.2	1000	0.9	1.0	<1	3500	8.0	18	<5	1.6	0.45	0.87	0.21
7	1.6	15.0	36	770	27	18.5	16	56	<0.5	1.34	1.0	12.50	6870	53	2.6	3.9	430	0.7	<0.1	2	3300	5.8	9	12	1.2	<0.03	0.61	0.11
8	1.4	8.5	37	3500	31	17.9	8	38	<0.5	0.82	0.9	14.90	7060	80	1.2	2.3	1200	0.7	<0.1	<1	4100	3.9	8	<5	0.8	<0.04	0.38	<0.05
9	2.8	210	708	800	33	12.0	29	100	2.4	7.17	2.0	8.88	7990	91	47.0	12.0	470	1.9	4.4	<1	4200	20.0	42	20	4.2	1.24	2.00	0.39
10	2.1	2.5	18	640	60	20.9	11	34	2.6	0.77	0.8	14.70	10400	140	0.6	2.4	2400	<0.1	<0.1	<1	3200	2.7	<3	10	0.6	<0.03	<0.05	0.07
11	2.2	1.8	27	1700	93	18.6	16	37	2.5	0.71	<0.5	16.50	14800	160	0.5	2.0	2700	<0.1	<0.2	<1	2900	2.2	9	<5	0.5	<0.04	<0.05	<0.05
12	1.6	1.5	28	680	45	18.5	7	29	<0.5	0.63	0.7	17.30	10800	69	0.5	1.8	1600	<0.1	<0.1	<1	2500	1.9	5	<5	0.4	<0.04	<0.05	<0.05
13	2.5	2.8	19	2300	39	27.2	9	66	1.9	0.79	<0.5	10.10	7920	100	0.5	2.0	3500	<0.1	<0.1	<1	3600	3.1	4	<5	0.5	<0.04	0.17	<0.05
14	2.0	3.4	12	410	41	17.7	25	260	<0.5	1.71	0.6	9.95	9420	43	0.6	3.6	1700	0.4	<0.1	<1	2200	3.3	6	<5	0.6	<0.03	0.45	<0.05
15	1.8	3.7	14	870	36	25.1	16	200	<0.5	1.58	1.2	11.10	5570	59	0.8	3.5	2000	0.8	<0.1	<1	4300	4.6	8	<5	0.9	<0.03	0.43	0.10
16	1.8	1.9	19	1200	38	15.7	21	160	<0.5	1.11	<0.5	11.00	7830	59	0.6	2.5	1600	0.6	<0.1	<1	3000	2.5	5	<5	0.4	<0.03	<0.05	<0.05
17	1.9	3.1	17	970	69	16.7	20	170	2.7	1.15	<0.5	13.50	9520	90	0.5	2.7	1500	0.5	<0.1	<1	2600	2.5	7	13	0.5	<0.04	<0.05	<0.05
18	1.6	2	12	500	58	10.5	11	85	1.4	0.77	<0.5	8.95	14100	48	0.9	1.9	1200	0.7	<0.1	<1	2000	1.9	5	<5	0.4	<0.03	0.19	0.06
19	1.2	2	10	1200	20	10.2	23	12	1.4	0.29	<0.5	5.16	3840	49	0.3	0.9	540	0.3	<0.1	<1	2000	1.8	3	<5	0.4	<0.03	0.20	<0.05
20	1.6	5.8	22	2100	38	11.0	13	35	<0.5	0.89	1.2	17.50	8270	200	1.0	2.4	420	0.8	<0.1	<1	2700	4.3	12	<5	0.9	<0.04	0.48	<0.05
21	1.5	2.7	14	1100	29	12.5	6	24	<0.5	0.63	1.0	9.36	4620	97	0.6	2.0	1000	0.6	<0.1	<1	2400	4.5	10	<5	0.9	<0.03	0.41	0.10
22	1.5	2.8	18	3900	54	11.9	9	37	1.9	0.79	<0.5	11.40	9320	200	0.7	2.7	2100	0.6	<0.1	<1	4300	4.7	12	<5	1.0	<0.04	0.50	<0.05
23	1.6	6	27	2100	42	17.2	22	43	1.2	1.12	1.2	10.70	7140	95	1.0	3.7	450	0.9	0.9	<1	3900	12.0	27	14	2.0	<0.04	0.83	0.13
24	1.7	9.3	25	1700	61	16.0	28	18	<0.5	1.22	0.9	11.60	6220	120	1.2	2.1	1300	0.7	<0.1	<1	2200	8.3	17	11	1.5	<0.04	0.64	0.13
25	1.8	5.6	77	770	55	15.1	8	38	1.8	1.09	0.9	11.90	13900	55	1.2	3.5	740	1.0	0.6	<1	2500	5.6	12	<5	1.1	<0.03	0.53	0.07
26	1.4	4.3	12	1900	44	13.5	33	28	2.1	1.01	0.6	11.50	6910	140	0.9	2.2	1200	0.5	<0.1	<1	4100	5.4	14	<5	1.0	<0.03	0.39	0.09
27	1.8	4.1	8	2100	45	10.4	13	41	3.4	1.02	<0.5	18.00	5410	170	0.7	2.9	1100	0.7	<0.1	<1	2800	4.5	11	10	0.9	<0.03	0.39	0.09
28	1.7	4.3	11	2400	57	13.1	14	38	3.0	1.10	1.3	22.20	6890	160	0.8	3.1	1500	0.6	<0.2	<1	3800	4.8	12	<5	0.9	<0.04	0.46	0.06
29	1.8	3.2	16	2100	43	15.4	38	71	3.9	1.78	1.9	12.40	9490	160	0.7	6.9	1200	1.3	<0.1	<1	2500	12.0	23	15	2.9	0.63	0.92	0.13
31	1.8	3.9	6	3500	37	13.3	20	30	<0.5	0.94	2.3	15.80	7860	190	0.9	3.0	1500	1.3	0.7	<1	1800	18.0	27	16	3.9	0.43	0.91	0.20

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
1	12H/16	21	566369	5528670	8	8	0	Wet open woodland	Pacquet Harbour Group	Old clear cut
2	12H/16	21	566206	5527868	10	10	0	Wet open woodland	Pacquet Harbour Group	Boggy
3	12H/16	21	568487	5527051	10	10	1W	Wet open woodland	Pacquet Harbour Group	Valley
4	12H/16	21	567820	5526943	10	10	1W	Moist open woodland	Pacquet Harbour Group	Valley
5	12H/16	21	565149	5528633	10	10	0	Wet medium woodland	Pacquet Harbour Group	
6	12H/16	21	565320	5529269	10	12	0	Wet open bog	Pacquet Harbour Group	On mound in bog
7	12H/16	21	565218	5529401	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
8	12H/16	21	565281	5528935	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
9	12H/16	21	565451	5529149	10	12	0	Wet open bog	Pacquet Harbour Group	Oxidizing sulphides
10	12H/16	21	562369	5534260	8	8	0	Moist open woodland	Point Rousse Complex	
11	12H/16	21	562360	5534405	8	8	0	Moist open woodland	Point Rousse Complex	Up slope from sulphides
12	12H/16	21	562408	5534550	8	8	0	Moist open woodland	Point Rousse Complex	Up slope from sulphides
13	12H/16	21	562393	5534672	10	10	0	Wet open bog	Point Rousse Complex	On mound in bog
14	12H/16	21	562205	5536038	10	10	3W	Dry medium woodland	Point Rousse Complex	Near quartz-hosted gold
15	12H/16	21	562305	5536016	10	10	0	Wet medium woodland	Point Rousse Complex	Near quartz-hosted gold
16	12H/16	21	562402	5536329	10	10	1S	Wet open bog	Point Rousse Complex	Near quartz-hosted gold
17	12H/16	21	561972	5535668	10	10	3W	Moist dense woodland	Point Rousse Complex	Near stream
18	12H/16	21	561944	5534989	10	10	3SW	Moist dense woodland	Point Rousse Complex	
19	12H/16	21	568560	5521292	10	10	1S	Dry open woodland	Pacquet Harbour Group	
20	12H/16	21	571529	5523021	7	8	2SW	Dry open woodland	Qtz-Feldspar Porphyry	Along strike from gold mineralization
21	12H/16	21	571415	5522908	10	10	2S	Dry open woodland	Qtz-Feldspar Porphyry	Above low-grade gold zone with pyrite
22	12H/16	21	571224	5522706	10	10	1SW	Dry open woodland	Pacquet Harbour Group	
23	12H/16	21	570874	5523591	8	10	0	Moist open woodland	Pacquet Harbour Group	
24	12H/16	21	570763	5524912	8	10	0	Wet open bog	Pacquet Harbour Group	
25	12H/16	21	571278	5521883	8	10	2S	Dry open woodland	Pacquet Harbour Group	Up slope from gold mineralization
26	12H/16	21	571146	5521537	8	10	1W	Wet open woodland	Pacquet Harbour Group	Down slope from gold mineralization
27	12H/16	21	570938	5521479	7	8	1S	Moist open woodland	Pacquet Harbour Group	
28	12H/16	21	570594	5521341	7	8	1S	Moist open woodland	Pacquet Harbour Group	
29	12H/16	21	569747	5520696	8	9	1S	Moist open woodland	Pacquet Harbour Group	
31	12H/16	21	560458	5518460	8	8	0	Moist open woodland	Qtz-Feldspar Porphyry	Partially logged

GSC Open File 2951

Baie Verte: Black Spruce Twigs - ICP-ES Data (Hg by Cold Vapour AAS) - concentrations in ash

Field Number	Ag ppm	Al %	B ppm	Be ppm	Bi ppm	Cd ppm	Cu ppm	Hg ppb	Li ppm	Mg %	Mn ppm	Mo ppm	Ni ppm	P %	Pb ppm	Se ppm	Te ppm	Ti %	V ppm
	0.2	0.01	2	0.3	0.2	0.2	1	10	2	0.01	1	2	1	0.001	3	0.2	0.2	0.02	2
1	4.6	0.29	696	<0.3	0.7	6.9	672	25	3	3.43	51252	2	55	2.784	121	3.4	<0.2	<0.02	13
2	4.2	0.56	454	<0.3	4.1	4.1	1379	70	4	2.28	15538	8	50	1.239	497	7.5	<0.2	0.02	26
3	3.1	0.67	466	<0.3	1.8	3.4	536	40	4	3.62	35585	4	78	3.186	175	7.0	0.2	0.04	25
4	5.2	0.38	468	<0.3	2.9	6.4	777	95	3	3.03	28498	7	59	2.059	306	10.3	1.1	0.02	20
5	3.3	1.05	341	<0.3	0.8	2.8	993	45	10	3.03	12399	3	82	1.669	374	4.3	0.4	0.04	35
6	14.0	0.76	539	<0.3	3.1	3.9	3127	35	6	2.78	22997	2	86	1.315	545	1.4	0.4	0.02	29
7	3.6	0.56	484	<0.3	0.6	3.5	1105	25	4	3.32	20158	2	77	1.691	224	2.5	<0.2	0.02	25
8	4.0	0.34	603	<0.3	0.6	4.1	436	10	3	2.59	45110	<2	46	2.331	111	2.1	0.5	<0.02	15
9	12.5	1.32	294	<0.3	1.9	8.3	11903	95	8	2.00	7109	11	68	0.958	2468	0.2	<0.2	0.03	38
10	1.9	0.29	488	<0.3	0.3	1.2	217	<10	3	3.74	5607	<2	203	2.034	51	1.8	<0.2	<0.02	16
11	2.0	0.21	462	<0.3	<0.2	2.0	245	<10	3	3.08	15052	<2	144	2.476	40	1.3	<0.2	<0.02	11
12	2.3	0.23	617	<0.3	<0.2	1.0	248	<10	4	3.90	11958	<2	200	3.594	34	1.1	0.2	<0.02	12
13	3.0	0.23	669	<0.3	0.2	0.9	172	15	4	3.29	10966	<2	219	1.371	74	1.1	<0.2	<0.02	14
14	2.5	0.39	498	<0.3	0.9	2.5	138	20	4	6.29	10521	<2	664	1.750	114	1.4	1.9	<0.02	27
15	2.2	0.34	443	<0.3	0.4	2.1	142	<10	3	3.38	8166	<2	379	1.352	182	1.8	<0.2	<0.02	23
16	2.4	0.26	596	<0.3	0.3	1.4	141	10	4	5.50	9992	<2	640	1.844	72	1.0	<0.2	<0.02	18
17	2.8	0.30	533	<0.3	0.5	2.1	224	15	3	5.12	9593	<2	441	1.971	74	0.4	0.9	<0.02	17
18	2.1	0.37	699	<0.3	0.2	1.6	248	<10	4	5.96	6276	<2	495	2.095	122	1.1	0.7	<0.02	25
19	4.1	0.29	589	<0.3	0.3	3.1	284	<10	2	3.19	53164	<2	61	2.181	104	1.4	0.7	<0.02	16
20	1.7	0.45	535	<0.3	0.4	4.8	215	10	4	3.70	58685	<2	73	3.853	90	1.4	<0.2	0.02	18
21	3.9	0.44	568	<0.3	0.4	5.0	211	<10	4	2.50	41572	<2	52	2.287	83	1.8	<0.2	0.02	20
22	4.6	0.46	604	<0.3	0.4	12.6	276	<10	5	3.37	40858	<2	111	2.567	67	2.0	0.4	0.02	19
23	3.4	0.66	802	<0.3	0.4	7.4	285	<10	4	2.53	62303	<2	53	2.529	109	2.2	<0.2	0.03	18
24	2.2	0.58	539	<0.3	0.5	3.5	237	10	4	2.30	51218	2	43	2.039	109	3.5	0.4	<0.02	12
25	3.8	0.59	539	<0.3	1.0	2.9	228	<10	5	2.99	43563	<2	59	2.378	117	2.5	<0.2	0.04	28
26	3.1	0.53	696	<0.3	0.5	7.3	275	<10	5	3.41	55613	<2	112	2.837	63	1.9	0.3	0.03	20
27	4.0	0.38	510	<0.3	0.4	13.6	373	<10	4	2.85	35025	<2	83	2.530	48	1.2	<0.2	0.02	15
28	3.7	0.42	605	<0.3	0.3	11.6	392	<10	4	3.10	34948	<2	88	2.675	65	1.3	<0.2	0.02	18
29	2.8	0.69	489	<0.3	0.2	4.3	244	<10	5	2.71	36847	<2	73	2.236	57	1.5	<0.2	0.04	28
31	1.9	0.43	538	<0.3	0.3	3.7	170	10	4	3.36	40970	<2	56	2.893	42	0.8	<0.2	0.02	14

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
32	12H/16	21	561489	5519583	7	8	1W	Moist open woodland	Burlington Granodiorite	Partially logged
33	12H/16	21	562304	5520649	10	10	1W	Wet open logged	Burlington Granodiorite	
34	12H/16	21	562048	5522214	10	10	0	Wet open bog	Pacquet Harbour Group	
35	12H/16	21	560531	5522886	7	7	0	Moist open logged	Burlington Granodiorite	
37	12H/16	21	561181	5523283	10	10	0	Moist medium woodland	Burlington Granodiorite	
38	12H/16	21	562732	5522811	10	10	0	Wet open bog	Pacquet Harbour Group	Chlorotic needles
39	12H/16	21	564330	5523208	8	8	0	Moist open logged	Pacquet Harbour Group	
41	12H/16	21	567353	5518909	10	10	0	Wet medium logged	Pacquet Harbour Group	
42	12H/16	21	568123	5520041	10	10	2N	Dry dense woodland	Pacquet Harbour Group	
43	12H/16	21	566685	5521113	10	10	0	Wet open bog	Pacquet Harbour Group	
45	12H/16	21	565946	5522739	10	10	0	Wet dense woodland	Pacquet Harbour Group	Fallen tree
46	12H/16	21	560748	5528493	8	10	0	Moist open logged	Burlington Granodiorite	
47	12H/16	21	561474	5529658	10	10	0	Wet medium bog	Burlington Granodiorite	
48	12H/16	21	561788	5530517	10	10	2E	Wet open logged	Burlington Granodiorite	
49	12H/16	21	562351	5529568	10	10	0	Wet dense woodland	Burlington Granodiorite	
50	12H/16	21	560150	5530554	10	10	0	Moist dense woodland	Burlington Granodiorite	Small tree
51	12H/16	21	559953	5530219	8	10	0	Wet dense woodland	Burlington Granodiorite	
53	12H/16	21	560608	5529470	8	8	1E	Dry open logged	Burlington Granodiorite	
54	12H/16	21	560060	5527685	10	10	0	Dry medium woodland	Burlington Granodiorite	
55	12H/16	21	560933	5527416	10	10	0	Wet dense woodland	Burlington Granodiorite	
56	12H/16	21	561818	5527893	10	10	0	Wet medium woodland	Burlington Granodiorite	On mound between bog and oxidized tailings
57	12H/16	21	562552	5527724	10	10	2N	Moist medium woodland	Burlington Granodiorite	
59	12H/16	21	566377	5529738	10	10	0	Wet open bog	Pacquet Harbour Group	
60	12H/16	21	568349	5529396	7	7	0	Wet dense woodland	Pacquet Harbour Group	
61	12H/16	21	570089	5529785	7	7	0	Wet dense woodland	Pacquet Harbour Group	
62	12H/16	21	569321	5529775	10	10	1S	Wet dense woodland	Pacquet Harbour Group	Alder swamp
63	12H/16	21	563892	5528051	10	10	0	Moist dense woodland	Pacquet Harbour Group	Above flood plain
64	12I/1	21	568525	5540329	10	10	0	Wet open scrub	Point Rousse Complex	Bottom of cliff
65	12I/1	21	568336	5540538	10	10	2S	Wet open scrub	Point Rousse Complex	
66	12I/1	21	567994	5540433	10	10	0	Wet open scrub	Point Rousse Complex	

GSC Open File 2951
Baie Verte: Black Spruce Twigs - INAA Data - concentrations in ash

Field Number	Ash Yield %	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
32	1.8	3.5	12	2100	35	12.7	12	22	1.1	0.69	1.9	16.80	5680	300	0.6	2.2	1300	0.7	0.8	<1	2800	9.0	17	20	2.0	0.32	0.68	0.11
33	2.1	4	13	2100	32	13.3	17	23	2.5	1.00	1.7	12.50	9090	250	0.7	2.9	390	1.0	0.5	<1	2400	9.5	18	<5	1.9	<0.04	0.65	0.14
34	2.1	2.4	9	4100	38	14.6	29	66	2.0	1.70	2.3	8.52	11500	140	0.8	5.6	1900	1.9	<0.1	<1	2100	11.0	20	<5	1.9	0.40	0.57	0.17
35	1.6	2	16	3000	66	13.5	37	17	5.1	0.61	<0.5	19.10	8410	350	0.6	1.5	420	0.3	<0.2	<1	2600	3.1	8	<5	0.5	<0.05	<0.05	<0.05
37	1.5	3	9	1200	67	14.0	7	22	<0.5	0.77	<0.5	14.90	15000	200	1.0	2.1	1200	0.6	<0.2	<1	3500	4.2	<3	<5	0.9	0.34	<0.05	<0.05
38	1.5	3.6	17	2300	33	20.0	5	36	<0.5	0.82	1.2	15.30	4790	80	0.9	2.4	470	0.9	<0.2	<1	2700	5.4	12	<5	1.1	<0.04	0.54	0.10
39	1.2	4.7	15	3300	43	14.7	110	22	2.4	0.67	1.4	14.80	7810	110	0.6	1.8	1800	0.9	<0.2	<1	3100	3.6	10	<5	0.8	<0.05	<0.05	<0.05
41	1.7	3.2	6	1900	35	15.7	10	35	1.5	1.06	1.8	14.90	7050	140	0.7	3.8	1100	1.3	<0.1	<1	2800	8.3	16	17	1.9	0.43	0.69	0.15
42	1.6	4	<5	2300	50	13.9	48	33	8.4	0.81	<0.5	15.60	9330	190	0.8	2.8	600	0.7	<0.2	<1	3000	4.4	9	<5	0.9	<0.05	0.47	<0.05
43	1.5	2.9	131	1700	62	17.0	33	37	2.5	1.20	<0.5	12.40	15100	110	0.9	4.2	880	1.0	<0.2	<1	3000	7.9	18	<5	1.6	0.27	<0.05	0.13
45	1.3	3	<5	1400	48	16.9	12	40	1.2	0.61	0.7	17.60	6240	140	1.0	1.8	880	0.8	<0.2	<1	3700	3.3	10	<5	0.8	<0.04	<0.05	0.09
46	2.8	3.6	<5	2200	39	11.9	20	65	1.9	2.02	3.5	7.35	20600	120	0.6	8.3	1800	2.8	1.2	<1	1900	15.0	28	<5	2.9	0.68	1.34	0.25
47	3.1	4.7	<5	870	39	11.7	13	90	<0.5	2.66	3.6	6.28	22700	59	2.1	12.0	550	3.7	2.0	<1	2100	21.0	34	26	4.0	0.67	1.65	0.30
48	2.4	10.0	40	1900	28	15.9	23	110	2.6	2.66	1.5	11.00	11500	150	1.1	13.0	880	1.0	0.5	<1	2600	6.8	14	<5	1.7	<0.03	0.91	0.17
49	1.5	11.0	23	1600	50	18.1	12	39	1.5	1.04	1.3	15.00	11500	140	1.7	2.7	2000	<0.1	<0.2	<1	3200	4.1	<3	17	0.9	<0.05	<0.05	<0.05
50	1.5	4.5	<5	1500	40	17.1	9	43	1.5	0.72	1.4	13.90	6550	150	0.9	2.1	1100	0.8	0.8	<1	3400	4.1	8	<5	0.8	<0.04	0.39	0.11
51	1.5	1.5	7	4600	44	16.7	8	32	4.4	0.65	<0.5	17.10	6250	290	0.4	2.1	1900	1.2	<0.2	<1	3800	4.3	5	<5	0.8	<0.04	<0.05	<0.05
53	2.1	2.4	<5	580	45	7.3	11	23	2.3	0.94	0.6	22.10	8790	330	0.4	3.5	520	1.4	1.2	<1	1600	5.7	14	15	1.0	<0.04	0.43	<0.05
54	2.3	5.3	12	2600	55	17.3	11	31	2.7	1.14	2.6	11.40	14400	160	0.8	3.5	1100	2.2	1.7	<1	2400	17.0	26	<5	2.2	<0.04	0.96	0.14
55	1.6	4.4	7	2300	38	22.5	8	40	2.6	1.13	1.7	13.30	9220	82	1.1	3.1	1100	1.4	<0.2	<1	3900	9.0	18	<5	1.5	<0.04	0.60	0.18
56	1.5	4.5	<5	4000	45	19.4	30	18	3.7	0.53	1.1	15.40	5540	200	0.4	1.6	1400	0.9	<0.2	<1	3600	3.6	7	<5	0.7	<0.05	<0.05	<0.05
57	2.1	6.9	18	2800	67	17.6	22	78	3.3	2.08	2.2	15.60	18100	170	1.2	7.2	1700	1.6	<0.2	11	2700	10.0	22	16	2.1	<0.05	0.97	0.19
59	1.6	34.0	81	2000	51	15.2	21	64	2.5	1.88	1.7	15.60	6540	94	5.5	5.2	600	0.9	<0.2	<1	3300	5.2	14	<5	1.1	<0.04	0.56	0.19
60	1.6	13.0	30	8000	68	17.5	34	43	3.1	1.28	2.9	17.20	12100	120	1.8	3.8	1500	<0.1	<0.2	<1	4400	5.9	15	<5	1.2	<0.06	0.68	<0.05
61	1.9	9	36	4200	82	13.0	36	67	2.8	1.65	2.1	22.40	13600	160	1.1	5.1	2000	1.5	<0.3	37	5700	10.0	18	23	2.1	0.43	1.16	0.13
62	1.7	10.0	28	2500	52	17.1	16	63	2.4	2.09	<0.5	14.30	10600	100	1.7	6.4	3000	1.7	<0.2	12	3900	9.3	18	<5	2.1	<0.05	1.19	0.19
63	1.9	98.0	135	590	34	16.9	44	95	7.6	3.80	1.3	12.80	11700	230	6.3	7.3	<300	1.1	<0.2	12	5900	8.8	21	<5	1.9	0.45	0.80	0.18
64	1.5	5.2	22	1600	52	20.3	12	120	5.7	1.08	<0.5	14.20	12200	84	0.8	2.9	3000	0.6	<0.2	<1	3600	4.0	9	<5	0.8	<0.04	<0.05	<0.05
65	1.8	6.7	13	2000	72	17.8	14	190	6.6	1.62	0.9	16.60	11400	76	1.4	4.3	2400	0.9	<0.2	<1	2700	4.9	11	<5	1.0	<0.04	0.42	<0.05
66	2.4	11.0	18	1500	66	17.5	25	290	1.3	2.30	<0.5	12.40	14800	39	1.2	6.4	3600	0.5	<0.2	<1	2800	3.4	7	<5	0.9	<0.04	0.62	0.14

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
32	12H/16	21	561489	5519583	7	8	1W	Moist open woodland	Burlington Granodiorite	Partially logged
33	12H/16	21	562304	5520649	10	10	1W	Wet open logged	Burlington Granodiorite	
34	12H/16	21	562048	5522214	10	10	0	Wet open bog	Pacquet Harbour Group	
35	12H/16	21	560531	5522886	7	7	0	Moist open logged	Burlington Granodiorite	
37	12H/16	21	561181	5523283	10	10	0	Moist medium woodland	Burlington Granodiorite	
38	12H/16	21	562732	5522811	10	10	0	Wet open bog	Pacquet Harbour Group	Chlorotic needles
39	12H/16	21	564330	5523208	8	8	0	Moist open logged	Pacquet Harbour Group	
41	12H/16	21	567353	5518909	10	10	0	Wet medium logged	Pacquet Harbour Group	
42	12H/16	21	568123	5520041	10	10	2N	Dry dense woodland	Pacquet Harbour Group	
43	12H/16	21	566685	5521113	10	10	0	Wet open bog	Pacquet Harbour Group	
45	12H/16	21	565946	5522739	10	10	0	Wet dense woodland	Pacquet Harbour Group	Fallen tree
46	12H/16	21	560748	5528493	8	10	0	Moist open logged	Burlington Granodiorite	
47	12H/16	21	561474	5529658	10	10	0	Wet medium bog	Burlington Granodiorite	
48	12H/16	21	561788	5530517	10	10	2E	Wet open logged	Burlington Granodiorite	
49	12H/16	21	562351	5529568	10	10	0	Wet dense woodland	Burlington Granodiorite	
50	12H/16	21	560150	5530554	10	10	0	Moist dense woodland	Burlington Granodiorite	On mound between bog and oxidized tailings
51	12H/16	21	559953	5530219	8	10	0	Wet dense woodland	Burlington Granodiorite	
53	12H/16	21	560608	5529470	8	8	1E	Dry open logged	Burlington Granodiorite	
54	12H/16	21	560060	5527685	10	10	0	Dry medium woodland	Burlington Granodiorite	
55	12H/16	21	560933	5527416	10	10	0	Wet dense woodland	Burlington Granodiorite	
56	12H/16	21	561818	5527893	10	10	0	Wet medium woodland	Burlington Granodiorite	Small tree
57	12H/16	21	562552	5527724	10	10	2N	Moist medium woodland	Burlington Granodiorite	
59	12H/16	21	566377	5529738	10	10	0	Wet open bog	Pacquet Harbour Group	
60	12H/16	21	568349	5529396	7	7	0	Wet dense woodland	Pacquet Harbour Group	
61	12H/16	21	570089	5529785	7	7	0	Wet dense woodland	Pacquet Harbour Group	
62	12H/16	21	569321	5529775	10	10	1S	Wet dense woodland	Pacquet Harbour Group	Alder swamp
63	12H/16	21	563892	5528051	10	10	0	Moist dense woodland	Pacquet Harbour Group	Above flood plain
64	12I/1	21	568525	5540329	10	10	0	Wet open scrub	Point Rousse Complex	Bottom of cliff
65	12I/1	21	568336	5540538	10	10	2S	Wet open scrub	Point Rousse Complex	
66	12I/1	21	567994	5540433	10	10	0	Wet open scrub	Point Rousse Complex	Stunted trees

GSC Open File 2951

Baie Verte: Black Spruce Twigs - ICP-ES Data (Hg by Cold Vapour AAS) - concentrations in ash

Field Number	Ag ppm 0.2	Al % 0.01	B ppm 2	Be ppm 0.3	Bi ppm 0.2	Cd ppm 0.2	Cu ppm 1	Hg ppb 10	Li ppm 2	Mg % 0.01	Mn ppm 1	Mo ppm 2	Ni ppm 1	P % 0.001	Pb ppm 3	Se ppm 0.2	Te ppm 0.2	Ti % 0.02	V ppm 2
32	3.3	0.29	454	<0.3	0.3	3.0	190	<10	2	2.85	35868	<2	39	2.651	47	0.7	0.2	0.02	9
33	2.6	0.42	378	<0.3	0.4	3.2	201	<10	4	2.82	31486	<2	57	3.808	58	1.0	<0.2	0.03	16
34	0.5	0.77	424	<0.3	0.3	3.4	184	<10	8	2.89	24814	<2	76	2.524	44	1.5	0.7	0.06	22
35	0.4	0.27	715	0.4	0.2	1.9	243	10	2	4.68	40320	<2	53	4.346	41	1.4	<0.2	0.02	7
37	0.6	0.30	647	0.4	0.4	2.1	191	<10	2	4.69	47472	<2	72	3.083	113	1.9	<0.2	0.02	17
38	1.3	0.29	510	<0.3	0.4	1.9	187	<10	2	3.19	25895	<2	44	1.829	151	1.7	<0.2	0.02	21
39	1.2	0.28	712	0.4	0.5	3.2	340	<10	2	4.44	76891	<2	59	3.972	96	1.6	0.4	<0.02	15
41	3.0	0.35	519	<0.3	0.3	3.2	301	10	3	3.04	26371	<2	90	2.293	61	1.2	0.4	0.02	18
42	1.9	0.41	569	0.4	0.3	3.0	376	15	22	4.84	32485	<2	116	3.683	58	1.8	<0.2	0.02	18
43	0.4	0.69	498	<0.3	0.2	2.7	241	10	5	3.53	36856	<2	62	2.468	124	2.8	<0.2	0.03	37
45	0.9	0.28	587	0.4	0.4	2.2	230	10	2	3.85	46704	<2	67	3.130	122	2.0	0.4	<0.02	16
46	1.3	0.67	343	<0.3	0.5	1.9	161	<10	6	2.00	36600	<2	51	2.008	66	1.2	0.4	0.05	21
47	0.6	1.00	295	<0.3	0.3	1.0	131	<10	7	2.66	15763	<2	73	1.069	77	1.1	<0.2	0.07	32
48	1.9	0.91	319	<0.3	0.5	2.8	234	10	4	2.46	15505	<2	52	1.636	62	1.3	0.2	0.04	27
49	1.9	0.31	626	<0.3	0.7	2.3	317	25	3	3.63	33560	<2	105	2.412	128	2.5	0.2	<0.02	19
50	2.2	0.28	874	<0.3	0.4	3.2	247	<10	3	3.34	58960	<2	117	1.824	127	2.1	<0.2	<0.02	18
51	1.6	0.24	702	0.4	0.2	5.4	247	<10	4	3.95	31482	<2	64	3.037	49	1.2	0.5	0.02	9
53	0.3	0.32	559	<0.3	<0.2	1.5	200	<10	3	2.58	20878	<2	106	5.163	30	0.8	0.3	0.03	10
54	1.8	0.60	491	<0.3	0.4	2.3	196	<10	8	2.23	36429	<2	59	2.145	166	1.6	<0.2	0.04	26
55	2.6	0.40	594	<0.3	0.5	2.0	235	<10	4	3.29	21581	<2	85	2.070	190	1.7	0.6	0.02	26
56	2.5	0.25	640	1.0	0.3	4.5	239	10	3	3.34	56152	<2	47	3.807	68	1.8	0.3	<0.02	11
57	2.7	0.64	568	<0.3	0.3	4.0	378	10	10	2.72	31570	<2	70	2.442	233	1.7	0.9	0.04	23
59	5.2	0.51	692	<0.3	1.2	5.2	1798	55	4	4.04	56215	2	107	2.402	252	2.2	0.2	<0.02	18
60	3.7	0.42	726	<0.3	0.2	5.6	577	10	4	3.74	40766	<2	64	2.499	187	2.4	0.2	0.02	17
61	9.2	0.47	699	<0.3	0.4	6.4	780	10	5	3.94	14797	<2	100	3.645	171	2.8	<0.2	0.03	15
62	1.5	0.47	607	<0.3	0.6	2.8	649	15	6	3.09	22160	<2	42	2.011	149	2.9	<0.2	0.03	23
63	4.2	0.69	484	<0.3	2.6	4.3	949	70	5	2.85	12197	4	125	2.239	242	6.4	1.0	0.03	29
64	3.1	0.31	624	<0.3	0.5	4.2	240	<10	4	4.14	14103	3	248	1.941	94	2.4	0.3	<0.02	22
65	0.9	0.51	754	<0.3	0.5	1.9	204	<10	4	6.58	7605	<2	268	2.511	166	2.5	<0.2	0.02	31
66	1.5	0.48	694	<0.3	0.3	1.4	179	<10	3	4.58	2938	<2	287	1.511	71	1.6	<0.2	0.02	25

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
67	12I/1	21	567587	5539728	10	12	1N	Wet open scrub	Point Rousse Complex	Chlorotic needles
68	12I/1	21	567788	5539675	10	15	2NW	Wet open scrub	Point Rousse Complex	Stunted tree in valley
69	12H/16	21	562185	5534658	7	8	1N	Wet open logged	Point Rousse Complex	
70	12H/16	21	563528	5535108	7	8	2N	Moist medium logged	Point Rousse Complex	
71	12H/16	21	564662	5535032	7	8	1S	Moist medium woodland	Point Rousse Complex	
72	12H/16	21	564942	5535025	7	7	1N	Medium dense woodland	Point Rousse Complex	Edge of bog
73	12H/16	21	566750	5534402	10	10	0	Wet open bog	Point Rousse Complex	
74	12H/16	21	567165	5535664	6	8	2E	Dry dense woodland	Point Rousse Complex	In valley
76	12H/16	21	569425	5536159	6	8	1E	Moist medium woodland	Point Rousse Complex	Young tree
77	12H/16	21	568136	5536021	8	8	3E	Moist medium woodland	Point Rousse Complex	
78	12H/16	21	566889	5537428	10	10	0	Moist open woodland	Point Rousse Complex	
80	12H/16	21	567715	5538651	10	10	1E	Dry open scrub	Point Rousse Complex	Oxidized volcanics; small trees; trench
81	12H/16	21	566878	5536261	10	12	1E	Moist medium woodland	Point Rousse Complex	
83	12H/16	21	562126	5524172	10	10	0	Wet dense woodland	Pacquet Harbour Group	
84	12H/16	21	562016	5524371	8	10	1S	Wet medium woodland	Pacquet Harbour Group	
85	12H/16	21	561095	5524494	10	10	1N	Wet dense woodland	Burlington Granodiorite	
86	12H/16	21	561196	5525718	10	10	0	Wet medium bog	Burlington Granodiorite	
87	12H/16	21	560425	5526532	10	10	1W	Wet open logged	Burlington Granodiorite	
88	12H/16	21	560350	5525519	10	10	0	Moist open logged	Burlington Granodiorite	
91	12H/16	21	563477	5521163	10	10	1N	Dry open logged	Pacquet Harbour Group	Reaforested area
92	12H/16	21	562708	5519308	10	10	0	Moist medium logged	Burlington Granodiorite	
93	12H/16	21	563646	5519030	10	10	0	Dry open logged	Burlington Granodiorite	
94	12H/16	21	564993	5518279	5	6	1S	Moist open logged	Burlington Granodiorite	Young tree
95	12H/16	21	565959	5518702	10	10	0	Wet open bog	Burlington Granodiorite	
96	12H/16	21	568611	5519002	10	10	0	Moist open bog	Pacquet Harbour Group	
97	12H/16	21	570390	5519359	10	10	1E	Moist open logged	Pacquet Harbour Group	
98	12H/16	21	566423	5523690	10	10	0	Wet dense bog	Pacquet Harbour Group	Alder swamp
99	12H/16	21	566290	5523966	10	10	0	Wet dense bog	Pacquet Harbour Group	Alder swamp
101	12H/16	21	568962	5522476	10	10	0	Dry open logged	Pacquet Harbour Group	
102	12H/16	21	569890	5522444	10	10	0	Wet open woodland	Pacquet Harbour Group	

GSC Open File 2951
Baie Verte: Black Spruce Twigs - INAA Data - concentrations in ash

Field Number	Ash Yield %	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
67	1.7	16.0	62	790	75	26.3	16	150	<0.5	1.29	<0.5	13.90	12700	61	0.6	3.8	1400	<0.1	0.9	<1	3900	4.3	9	10	0.8	<0.04	0.52	<0.05
68	2.2	51.0	27	460	120	16.5	110	160	2.8	2.99	<0.5	10.00	11600	88	1.2	12.0	<300	0.8	1.0	<1	1500	5.5	12	<5	1.7	<0.03	0.87	0.24
69	1.6	8.3	<5	940	68	21.0	16	140	<0.5	1.79	1.5	12.30	14100	53	2.0	6.7	2300	0.7	<0.2	<1	3700	4.5	13	<5	1.3	<0.04	0.69	0.10
70	1.7	2.1	20	1800	60	23.2	11	81	<0.5	0.94	1.0	15.30	4510	77	0.8	2.4	1500	0.6	<0.2	<1	3100	2.9	<3	16	0.6	<0.04	0.42	0.06
71	1.6	2.8	<5	1700	64	23.3	19	57	<0.5	0.86	1.3	15.80	12800	120	0.8	2.7	1400	<0.1	<0.2	<1	4000	3.0	6	<5	0.6	<0.05	<0.05	<0.05
72	1.7	6.3	26	1400	50	16.1	23	92	6.4	1.27	0.9	20.30	10700	190	0.6	5.1	1500	<0.1	<0.2	<1	2800	3.0	<3	<5	0.7	<0.04	0.63	0.11
73	2.3	8.8	15	1100	28	14.6	29	230	2.4	3.32	1.4	12.00	11600	88	0.9	14.0	840	1.1	<0.2	<1	2000	5.8	13	<5	1.8	0.56	1.08	0.18
74	5.0	29.0	18	660	28	9.5	51	450	<0.5	5.63	2.4	8.50	20300	62	1.4	30.0	920	1.0	1.3	<1	1300	11.0	26	15	3.5	0.86	2.50	0.45
76	3.2	28.0	<5	310	60	6.9	50	510	2.7	4.12	1.5	11.40	11700	95	0.5	13.0	<300	2.0	1.5	<1	1400	14.0	36	18	3.4	0.69	1.70	0.26
77	2.0	8.5	21	1100	56	13.2	33	140	3.1	1.70	1.1	16.90	13400	67	0.8	7.4	960	0.6	<0.2	<1	2200	3.4	<3	<5	0.9	<0.04	0.62	0.09
78	2.2	6.7	12	540	58	14.1	22	120	1.7	2.22	0.8	14.40	9740	110	0.7	8.8	1100	0.6	<0.2	<1	2200	4.4	10	<5	1.3	0.43	0.86	0.12
80	2.3	7.2	9	540	44	14.4	23	170	1.5	3.15	1.8	10.70	11900	58	1.2	15.0	1200	0.5	<0.2	<1	2500	6.4	14	15	2.2	0.49	1.31	0.25
81	3.0	9	12	660	46	11.6	33	140	5.7	4.66	2.1	8.64	17500	58	0.9	20.0	1000	0.9	<0.2	<1	2000	6.7	14	12	2.7	0.90	1.79	0.30
83	1.4	2.7	19	3600	53	17.2	16	31	7.3	0.60	1.2	13.50	6390	170	0.8	1.8	1800	0.6	<0.2	<1	2700	3.6	7	<5	0.7	<0.04	0.30	<0.05
84	1.5	2.5	<5	4400	50	17.1	24	20	7.6	0.43	1.1	17.40	4080	210	0.5	1.2	1600	0.2	<0.2	<1	2400	2.9	4	9	0.4	<0.04	0.23	<0.05
85	1.4	2.5	20	1400	61	14.7	8	30	3.2	0.48	1.0	20.70	6510	270	1.1	1.5	1400	0.6	<0.2	<1	2500	2.3	5	<5	0.5	<0.04	<0.05	0.07
86	1.8	0.9	18	2200	68	20.7	11	21	1.6	0.45	1.3	10.90	7900	170	0.7	1.5	2100	0.4	<0.2	<1	3000	3.2	7	<5	0.5	<0.04	0.17	<0.05
87	2.1	2.5	13	1900	48	16.2	8	23	3.1	1.18	1.8	18.10	11000	180	0.4	4.0	1100	1.8	0.8	<1	1800	7.6	14	<5	1.4	<0.03	0.43	0.11
88	1.7	2.5	12	2200	69	17.9	8	22	1.4	0.60	0.9	16.00	11100	150	0.8	2.0	1400	0.6	<0.1	<1	2400	4.2	8	<5	0.6	<0.03	0.37	<0.05
91	1.7	2.8	11	2200	68	16.9	7	12	2.0	0.58	1.1	19.20	11600	210	0.8	1.8	<300	0.8	<0.1	<1	2400	4.0	8	<5	0.7	<0.03	0.33	<0.05
92	1.3	2.9	19	1700	72	19.5	11	21	2.9	0.69	<0.5	18.60	11200	360	1.7	2.0	1800	0.8	<0.2	<1	2800	3.9	9	<5	0.6	<0.05	0.37	<0.05
93	2.1	3.5	11	2100	77	12.8	17	8	2.6	0.68	1.9	21.30	8550	200	1.8	2.3	1200	1.0	<0.2	<1	3400	8.1	17	9	1.5	<0.04	0.52	<0.05
94	1.6	<0.5	8	3900	83	13.3	13	18	3.0	0.35	1.0	26.90	3700	450	0.6	1.1	<300	<0.1	<0.2	<1	3300	2.2	<3	<5	0.4	<0.04	<0.05	<0.05
95	2.3	3.4	19	2200	87	17.8	11	21	1.8	1.13	2.4	10.50	16300	90	1.5	3.9	1700	2.0	<0.1	<1	1600	16.0	30	24	3.1	0.48	1.31	0.25
96	1.5	2.8	<5	1700	69	21.9	24	33	2.6	0.92	<0.5	11.60	13000	140	1.1	3.5	2000	1.0	<0.2	<1	2400	8.1	14	<5	1.6	<0.04	0.78	0.10
97	1.6	5.8	11	2600	67	17.8	41	22	2.7	0.93	1.8	19.60	8210	230	0.8	1.9	770	0.5	<0.2	<1	3200	4.3	11	<5	0.8	<0.04	0.35	0.09
98	1.2	3.5	<5	3600	64	16.3	50	28	1.7	1.08	<0.5	18.60	5760	220	0.7	2.5	1200	<0.1	<0.1	<1	3300	6.3	10	<5	1.0	0.47	0.57	0.11
99	1.5	4.4	17	3800	45	14.7	39	26	1.2	0.70	<0.5	18.30	6320	140	1.5	2.3	1600	0.6	<0.1	<1	3800	4.1	9	<5	0.7	0.31	0.57	0.10
101	1.7	7	11	1100	110	15.1	10	22	4.1	0.56	<0.5	21.90	9810	200	0.9	1.9	1100	0.5	<0.1	<1	2200	2.8	8	<5	0.5	<0.03	0.29	<0.05
102	1.5	12.0	17	2500	46	20.8	12	30	1.5	1.02	1.3	12.40	10100	62	1.4	3.4	1400	0.9	<0.1	<1	3700	5.4	13	<5	1.1	<0.03	0.60	0.07

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
67	12I/1	21	567587	5539728	10	12	1N	Wet open scrub	Point Rousse Complex	Chlorotic needles
68	12I/1	21	567788	5539675	10	15	2NW	Wet open scrub	Point Rousse Complex	Stunted tree in valley
69	12H/16	21	562185	5534658	7	8	1N	Wet open logged	Point Rousse Complex	
70	12H/16	21	563528	5535108	7	8	2N	Moist medium logged	Point Rousse Complex	
71	12H/16	21	564662	5535032	7	8	1S	Moist medium woodland	Point Rousse Complex	
72	12H/16	21	564942	5535025	7	7	1N	Medium dense woodland	Point Rousse Complex	Edge of bog
73	12H/16	21	566750	5534402	10	10	0	Wet open bog	Point Rousse Complex	
74	12H/16	21	567165	5535664	6	8	2E	Dry dense woodland	Point Rousse Complex	In valley
76	12H/16	21	569425	5536159	6	8	1E	Moist medium woodland	Point Rousse Complex	Young tree
77	12H/16	21	568136	5536021	8	8	3E	Moist medium woodland	Point Rousse Complex	
78	12H/16	21	566889	5537428	10	10	0	Moist open woodland	Point Rousse Complex	
80	12H/16	21	567715	5538651	10	10	1E	Dry open scrub	Point Rousse Complex	Oxidized volcanics; small trees; trench
81	12H/16	21	566878	5536261	10	12	1E	Moist medium woodland	Point Rousse Complex	
83	12H/16	21	562126	5524172	10	10	0	Wet dense woodland	Pacquet Harbour Group	
84	12H/16	21	562016	5524371	8	10	1S	Wet medium woodland	Pacquet Harbour Group	
85	12H/16	21	561095	5524494	10	10	1N	Wet dense woodland	Burlington Granodiorite	
86	12H/16	21	561196	5525718	10	10	0	Wet medium bog	Burlington Granodiorite	
87	12H/16	21	560425	5526532	10	10	1W	Wet open logged	Burlington Granodiorite	
88	12H/16	21	560350	5525519	10	10	0	Moist open logged	Burlington Granodiorite	
91	12H/16	21	563477	5521163	10	10	1N	Dry open logged	Pacquet Harbour Group	Reaforested area
92	12H/16	21	562708	5519308	10	10	0	Moist medium logged	Burlington Granodiorite	
93	12H/16	21	563646	5519030	10	10	0	Dry open logged	Burlington Granodiorite	
94	12H/16	21	564993	5518279	5	6	1S	Moist open logged	Burlington Granodiorite	Young tree
95	12H/16	21	565959	5518702	10	10	0	Wet open bog	Burlington Granodiorite	
96	12H/16	21	568611	5519002	10	10	0	Moist open bog	Pacquet Harbour Group	
97	12H/16	21	570390	5519359	10	10	1E	Moist open logged	Pacquet Harbour Group	
98	12H/16	21	566423	5523690	10	10	0	Wet dense bog	Pacquet Harbour Group	Alder swamp
99	12H/16	21	566290	5523966	10	10	0	Wet dense bog	Pacquet Harbour Group	Alder swamp
101	12H/16	21	568962	5522476	10	10	0	Dry open logged	Pacquet Harbour Group	
102	12H/16	21	569890	5522444	10	10	0	Wet open woodland	Pacquet Harbour Group	

GSC Open File 2951

Baie Verte: Black Spruce Twigs - ICP-ES Data (Hg by Cold Vapour AAS) - concentrations in ash

Field Number	Ag ppm	Al %	B ppm	Be ppm	Bi ppm	Cd ppm	Cu ppm	Hg ppb	Li ppm	Mg %	Mn ppm	Mo ppm	Ni ppm	P %	Pb ppm	Se ppm	Te ppm	Ti %	V ppm
	0.2	0.01	2	0.3	0.2	0.2	1	10	2	0.01	1	2	1	0.001	3	0.2	0.2	0.02	2
67	2.3	0.50	682	<0.3	0.5	2.2	234	<10	4	3.96	10161	<2	226	1.566	164	3.1	<0.2	<0.02	21
68	2.0	1.32	468	<0.3	0.3	2.5	267	<10	7	3.62	31289	<2	221	1.360	83	2.2	<0.2	0.04	37
69	1.9	0.59	716	<0.3	0.4	2.1	211	<10	5	4.07	14378	<2	187	1.716	113	2.4	<0.2	0.02	31
70	5.5	0.26	633	<0.3	0.2	3.3	212	10	2	3.14	16840	<2	188	2.129	100	2.2	<0.2	<0.02	20
71	2.6	0.28	622	<0.3	0.4	3.8	242	150	3	4.11	24656	2	215	2.987	65	2.5	0.9	0.02	17
72	2.2	0.45	527	<0.3	0.2	2.5	193	<10	3	4.00	21700	<2	192	2.654	45	1.0	<0.2	0.02	17
73	0.8	1.30	485	<0.3	0.4	1.6	206	<10	7	3.93	13114	<2	156	1.546	58	1.2	0.7	0.05	44
74	0.9	2.47	213	<0.3	0.3	1.8	206	<10	12	4.25	5894	<2	195	0.885	32	0.6	0.5	0.09	69
76	1.3	1.44	359	0.6	0.4	1.5	137	<10	10	5.54	9699	<2	634	2.071	32	1.3	<0.2	0.05	37
77	3.4	0.86	681	<0.3	<0.2	2.6	275	<10	5	3.96	13913	<2	253	2.866	52	1.3	0.3	0.04	28
78	1.7	0.87	486	<0.3	0.3	2.3	182	<10	4	3.65	11937	<2	216	2.621	78	1.1	<0.2	0.05	37
80	2.7	1.22	505	<0.3	0.4	1.6	160	<10	6	3.58	22626	<2	236	1.179	117	1.5	0.4	0.04	51
81	1.2	1.48	349	<0.3	0.3	1.3	199	<10	7	3.63	14292	<2	150	1.314	52	1.4	<0.2	0.06	59
83	1.9	0.28	542	<0.3	0.4	1.9	202	<10	3	2.76	32599	<2	44	2.987	80	2.6	0.3	<0.02	14
84	2.3	0.21	597	<0.3	<0.2	2.1	196	<10	2	3.11	30055	<2	63	2.773	58	1.8	<0.2	<0.02	9
85	2.0	0.25	558	<0.3	0.2	2.5	204	<10	<2	3.18	35351	<2	64	4.127	75	2.1	<0.2	<0.02	12
86	1.8	0.26	518	<0.3	<0.2	1.6	186	<10	2	2.52	26701	<2	58	1.909	71	2.0	<0.2	<0.02	12
87	2.2	0.63	506	<0.3	0.3	2.2	171	<10	6	2.79	22659	<2	47	2.684	57	1.7	<0.2	0.05	20
88	2.3	0.30	594	<0.3	0.4	1.8	176	<10	3	2.71	40501	<2	58	2.879	85	3.0	<0.2	0.03	15
91	2.1	0.30	462	<0.3	0.2	3.9	235	<10	2	2.68	38562	<2	37	3.282	67	2.3	0.7	<0.02	17
92	3.3	0.26	591	<0.3	0.4	2.6	297	<10	3	3.97	21975	<2	65	4.420	86	3.7	0.5	<0.02	16
93	1.4	0.33	490	<0.3	0.2	4.2	210	<10	3	3.10	30332	<2	47	4.491	64	2.6	<0.2	0.02	16
94	2.8	0.14	743	0.4	<0.2	4.7	234	<10	2	4.24	47418	<2	34	4.349	46	3.3	0.3	<0.02	6
95	1.9	0.54	547	<0.3	0.5	1.9	128	<10	4	1.70	31351	<2	44	1.645	103	4.2	<0.2	0.03	26
96	0.8	0.28	566	0.4	<0.2	4.4	180	<10	3	2.88	39940	<2	60	2.037	103	4.3	<0.2	0.02	15
97	3.0	0.35	578	<0.3	0.2	4.0	242	<10	2	3.42	27306	<2	133	3.411	47	3.7	0.2	0.02	13
98	1.9	0.44	673	<0.3	<0.2	2.1	352	<10	3	4.02	42702	<2	58	3.013	52	5.2	0.8	0.02	15
99	3.7	0.30	698	<0.3	<0.2	3.9	332	10	2	4.19	58601	<2	60	2.656	75	2.6	<0.2	0.02	14
101	2.2	0.24	525	<0.3	<0.2	2.2	297	15	<2	2.95	43462	<2	67	4.144	70	4.4	<0.2	<0.02	11
102	2.3	0.37	544	<0.3	0.4	2.6	202	10	3	2.65	38239	<2	52	2.210	102	3.0	<0.2	0.04	25

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
104	12H/16	21	569930	5520965	6	8	0	Moist open logged	Pacquet Harbour Group	
106	12H/16	21	565834	5521925	10	10	0	Moist open woodland	Burlington Granodiorite	
107	12H/16	21	565492	5524646	10	10	0	Wet medium bog	Pacquet Harbour Group	
108	12H/16	21	565434	5530538	10	10	0	Wet medium woodland	Pacquet Harbour Group	
110	12H/16	21	565612	5530062	10	10	0	Moist medium logged	Pacquet Harbour Group	
111	12H/16	21	562156	5531533	10	10	0	Dry medium logged	Burlington Granodiorite	Top of hill
112	12H/16	21	562760	5532719	10	10	2N	Dry dense woodland	Burlington Granodiorite	
113	12H/16	21	560632	5532428	10	10	0	Moist medium woodland	Flatwater Pond Group	100 m from coast
114	12H/16	21	561490	5533272	10	10	0	Moist dense woodland	Point Rousse Complex	Rust-coated rocks and dust from tailings
115	12H/16	21	561327	5533114	10	10	0	Moist dense woodland	Flatwater Pond Group	Above flood plain
120	12H/16	21	563665	5537467	10	10	3W	Moist dense woodland	Point Rousse Complex	
121	12H/16	21	563774	5538182	10	10	3W	Moist dense woodland	Point Rousse Complex	
130	12H/16	21	569613	5538230	10	10	4E	Dry medium woodland	Point Rousse Complex	Waterfall; highly sheared slate
131	12I/1	21	570092	5538904	10	10	4E	Dry medium woodland	Point Rousse Complex	Highly sheared slate with quartz veins
132	12H/16	21	571399	5521952	8	8	0	Dry open woodland	Pacquet Harbour Group	Above Brass Buckle showing
134	12H/16	21	571260	5522139	8	10	0	Dry medium woodland	Pacquet Harbour Group	200 m NW of showing
501	12H/16	21	560833	5520288	10	10	0	Moist medium bog	Burlington Granodiorite	
502	12H/16	21	560084	5521080	10	10	0	Moist open bog	Burlington Granodiorite	
506	12H/16	21	561571	5521241	10	10	0	Moist medium woodland	Burlington Granodiorite	
507	12H/16	21	562643	5521153	10	10	1W	Dry open woodland	Pacquet Harbour Group	Gold-bearing till
508	12H/16	21	564747	5525559	10	10	1N	Dry medium woodland	Pacquet Harbour Group	
509	12H/16	21	564214	5525108	8	10	0	Moist medium woodland	Pacquet Harbour Group	
510	12H/16	21	563560	5524489	10	10	0	Moist medium woodland	Pacquet Harbour Group	
514	12H/16	21	562833	5524002	10	10	0	Moist medium woodland	Pacquet Harbour Group	
515	12H/16	21	562263	5525397	10	10	0	Moist open bog	Pacquet Harbour Group	
516	12H/16	21	562933	5525838	10	10	0	Moist medium woodland	Pacquet Harbour Group	
517	12H/16	21	563954	5526417	8	10	0	Moist medium woodland	Pacquet Harbour Group	
519	12H/16	21	562401	5535195	10	10	1S	Moist medium woodland	Point Rousse Complex	
520	12H/16	21	563015	5535402	10	10	0	Moist medium woodland	Point Rousse Complex	
521	12H/16	21	563533	5535920	10	10	1E	Moist medium woodland	Point Rousse Complex	

GSC Open File 2951
Baie Verte: Black Spruce Twigs - INAA Data - concentrations in ash

Field Number	Ash Yield %	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
104	1.6	20.0	17	1400	59	12.4	54	53	2.1	1.22	1.5	18.20	11200	150	0.9	5.0	1600	0.9	<0.2	<1	4100	4.7	10	<5	1.0	<0.04	0.54	0.11
106	1.4	2.4	11	2900	43	19.0	9	16	0.7	0.44	<0.5	18.00	5970	140	0.6	1.3	1400	<0.1	<0.1	<1	2600	3.0	6	<5	0.5	<0.03	0.19	<0.05
107	1.3	4.1	12	2200	91	15.8	16	34	1.4	0.88	1.1	17.50	9260	94	1.0	3.1	1800	0.9	<0.2	<1	3500	4.9	9	<5	1.0	0.16	0.35	0.13
108	3.1	60.0	160	720	19	11.4	30	190	<0.5	4.19	1.8	6.50	15300	67	7.6	20.0	1000	1.6	1.9	<1	1800	9.3	21	10	2.4	0.68	1.74	0.32
110	3.3	200	810	2400	24	9.8	27	140	2.4	5.18	2.7	7.24	14800	85	26.0	17.0	<300	1.9	3.9	8	9500	12.0	20	11	2.6	0.63	2.00	0.38
111	1.8	6.5	22	1600	61	14.4	12	66	20.0	1.47	1.6	20.90	18300	440	1.6	6.3	1300	0.8	<0.1	<1	2200	5.8	12	<5	1.2	<0.03	0.86	0.17
112	2.2	3.7	7	1400	35	15.5	12	49	2.6	1.32	2.7	10.30	14400	210	0.6	6.1	1200	2.3	1.4	<1	1900	11.0	20	13	1.8	0.51	0.97	0.19
113	1.9	4.5	10	1400	67	16.7	16	56	3.3	0.68	1.3	13.80	19300	200	0.8	1.9	1400	0.8	<0.1	<1	2500	2.8	6	<5	0.5	<0.03	<0.05	0.05
114	2.0	2.4	<5	1845	64	19.0	24	115	5.4	1.06	<0.5	14.90	16864	204	1.0	2.9	1655	0.7	<0.2	<1	2100	3.3	8	<5	0.6	<0.04	<0.05	0.07
115	1.7	2.9	8	1600	62	17.6	18	63	3.6	0.93	1.4	16.20	11000	290	0.6	2.9	1400	0.9	1.1	<1	2200	7.6	13	<5	0.8	0.19	0.50	0.09
120	2.2	1.6	<5	1700	74	16.5	28	260	0.8	1.70	<0.5	13.80	22700	78	0.5	3.8	1700	0.4	<0.1	<1	1700	2.9	6	<5	0.4	<0.03	0.27	<0.05
121	2.5	3.5	11	680	97	15.1	21	200	1.1	1.63	1.0	12.60	37400	65	0.7	4.7	1800	0.7	0.9	<1	1200	4.8	9	<5	0.9	0.24	0.42	0.10
130	1.6	4.8	15	570	72	18.4	20	75	1.3	0.92	<0.5	15.00	21100	67	0.9	3.0	2600	0.8	<0.2	<1	2200	3.3	10	<5	0.6	<0.03	<0.05	<0.05
131	2.0	5	12	600	97	15.0	36	54	1.7	0.91	1.4	16.80	32600	53	0.4	3.9	1600	<0.1	<0.1	<1	2900	2.4	6	<5	0.5	<0.03	0.43	0.07
132	1.6	4.8	42	1600	39	18.7	13	22	0.6	0.70	0.7	16.00	7240	170	0.8	2.2	1500	0.6	<0.1	<1	3200	3.0	8	<5	0.6	<0.03	0.41	0.05
134	1.6	4.4	14	2000	59	17.5	10	35	1.1	0.96	1.3	13.60	13600	110	1.4	3.4	1300	0.9	0.6	<1	2900	6.0	13	<5	1.1	<0.03	0.62	0.07
501	1.9	6.8	22	4900	59	17.8	27	23	2.4	1.00	1.4	11.40	12300	160	1.0	2.7	1700	0.9	<0.2	<1	2500	6.9	11	<5	1.3	<0.06	0.47	0.16
502	2.0	4.8	16	2400	39	21.8	6	10	2.0	0.64	1.2	11.20	11400	53	0.6	1.8	1000	0.7	<0.2	<1	2500	4.7	8	<5	0.9	<0.04	0.33	<0.05
506	1.7	7.1	20	4200	34	18.3	22	16	2.2	0.96	1.7	11.80	4660	150	1.4	1.9	1400	0.4	0.8	<1	2500	15.0	25	22	1.4	<0.05	0.52	<0.05
507	1.6	6.4	19	1400	44	11.2	25	18	3.9	1.02	1.7	18.20	8920	220	0.9	3.2	<300	1.3	1.2	<1	2800	7.5	19	<5	1.5	<0.05	0.53	0.10
508	1.5	7	41	1000	55	16.5	24	25	1.6	0.90	<0.5	17.10	9390	99	1.9	2.2	<300	0.5	<0.1	<1	3100	4.4	8	<5	0.9	<0.04	0.44	0.10
509	1.5	7.2	19	3000	66	12.6	57	20	2.7	0.91	1.6	15.90	8220	160	4.9	1.5	1300	<0.1	<0.2	<1	3300	3.2	<3	<5	0.6	<0.05	<0.06	<0.05
510	1.7	9.4	18	4100	79	19.1	98	17	3.6	0.56	1.6	12.70	14000	180	3.0	1.4	1700	<0.1	<0.1	<1	2700	2.2	<3	<5	0.4	<0.04	0.30	<0.05
514	1.6	5.2	<5	2800	29	16.7	64	18	1.8	1.05	0.9	14.90	2920	200	2.4	1.5	1400	0.4	<0.1	<1	1900	6.5	11	<5	0.8	<0.04	0.33	<0.05
515	1.5	5	6	1500	40	19.4	5	22	<0.5	0.46	1.3	13.00	4760	69	0.9	1.4	1300	0.6	<0.1	<1	4500	3.4	6	<5	0.7	0.25	0.40	<0.05
516	1.6	4.2	8	1200	16	22.1	7	19	2.2	0.57	0.8	14.50	5840	130	0.8	1.4	1100	0.7	<0.1	<1	2800	3.5	8	<5	0.7	<0.03	0.33	0.08
517	1.3	9.8	23	2200	54	14.3	83	27	5.2	0.99	<0.5	17.90	11200	280	1.0	2.4	830	0.7	1.2	<1	3500	5.0	9	<5	0.9	<0.04	<0.05	<0.05
519	1.4	4.3	24	720	36	20.0	16	190	2.0	1.52	<0.5	11.50	8800	77	1.0	3.5	2200	0.6	<0.1	<1	3400	4.7	11	<5	0.9	<0.04	0.41	0.11
520	1.6	6.7	10	1700	37	23.2	16	100	<0.5	1.07	1.1	11.90	9400	64	0.7	2.2	3100	0.5	<0.1	<1	3700	2.7	9	<5	0.6	<0.04	0.38	<0.05
521	1.2	8.1	17	480	35	13.9	26	73	3.8	0.75	<0.5	24.10	9160	160	0.6	1.8	570	0.5	<0.2	<1	3100	1.9	<3	<5	0.4	<0.05	<0.05	<0.05

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
104	12H/16	21	569930	5520965	6	8	0	Moist open logged	Pacquet Harbour Group	
106	12H/16	21	565834	5521925	10	10	0	Moist open woodland	Burlington Granodiorite	
107	12H/16	21	565492	5524646	10	10	0	Wet medium bog	Pacquet Harbour Group	
108	12H/16	21	565434	5530538	10	10	0	Wet medium woodland	Pacquet Harbour Group	
110	12H/16	21	565612	5530062	10	10	0	Moist medium logged	Pacquet Harbour Group	
111	12H/16	21	562156	5531533	10	10	0	Dry medium logged	Burlington Granodiorite	Top of hill
112	12H/16	21	562760	5532719	10	10	2N	Dry dense woodland	Burlington Granodiorite	
113	12H/16	21	560632	5532428	10	10	0	Moist medium woodland	Flatwater Pond Group	100 m from coast
114	12H/16	21	561490	5533272	10	10	0	Moist dense woodland	Point Rousse Complex	Rust-coated rocks and dust from tailings
115	12H/16	21	561327	5533114	10	10	0	Moist dense woodland	Flatwater Pond Group	Above flood plain
120	12H/16	21	563665	5537467	10	10	3W	Moist dense woodland	Point Rousse Complex	
121	12H/16	21	563774	5538182	10	10	3W	Moist dense woodland	Point Rousse Complex	
130	12H/16	21	569613	5538230	10	10	4E	Dry medium woodland	Point Rousse Complex	Waterfall; highly sheared slate
131	12I/1	21	570092	5538904	10	10	4E	Dry medium woodland	Point Rousse Complex	Highly sheared slate with quartz veins
132	12H/16	21	571399	5521952	8	8	0	Dry open woodland	Pacquet Harbour Group	Above Brass Buckle showing
134	12H/16	21	571260	5522139	8	10	0	Dry medium woodland	Pacquet Harbour Group	200 m NW of showing
501	12H/16	21	560833	5520288	10	10	0	Moist medium bog	Burlington Granodiorite	
502	12H/16	21	560084	5521080	10	10	0	Moist open bog	Burlington Granodiorite	
506	12H/16	21	561571	5521241	10	10	0	Moist medium woodland	Burlington Granodiorite	
507	12H/16	21	562643	5521153	10	10	1W	Dry open woodland	Pacquet Harbour Group	Gold-bearing till
508	12H/16	21	564747	5525559	10	10	1N	Dry medium woodland	Pacquet Harbour Group	
509	12H/16	21	564214	5525108	8	10	0	Moist medium woodland	Pacquet Harbour Group	
510	12H/16	21	563560	5524489	10	10	0	Moist medium woodland	Pacquet Harbour Group	
514	12H/16	21	562833	5524002	10	10	0	Moist medium woodland	Pacquet Harbour Group	
515	12H/16	21	562263	5525397	10	10	0	Moist open bog	Pacquet Harbour Group	
516	12H/16	21	562933	5525838	10	10	0	Moist medium woodland	Pacquet Harbour Group	
517	12H/16	21	563954	5526417	8	10	0	Moist medium woodland	Pacquet Harbour Group	
519	12H/16	21	562401	5535195	10	10	1S	Moist medium woodland	Point Rousse Complex	
520	12H/16	21	563015	5535402	10	10	0	Moist medium woodland	Point Rousse Complex	
521	12H/16	21	563533	5535920	10	10	1E	Moist medium woodland	Point Rousse Complex	

GSC Open File 2951

Baie Verte: Black Spruce Twigs - ICP-ES Data (Hg by Cold Vapour AAS) - concentrations in ash

Field Number	Ag ppm	Al %	B ppm	Be ppm	Bi ppm	Cd ppm	Cu ppm	Hg ppb	Li ppm	Mg %	Mn ppm	Mo ppm	Ni ppm	P %	Pb ppm	Se ppm	Te ppm	Ti %	V ppm
	0.2	0.01	2	0.3	0.2	0.2	1	10	2	0.01	1	2	1	0.001	3	0.2	0.2	0.02	2
104	2.7	0.49	714	<0.3	<0.2	10.6	328	<10	5	3.55	47521	<2	88	3.049	76	2.1	0.6	0.03	20
106	3.9	0.22	723	<0.3	0.3	2.3	258	<10	<2	4.68	23112	<2	70	3.589	83	3.0	<0.2	<0.02	15
107	2.1	0.43	745	<0.3	0.7	2.8	235	<10	3	3.12	72732	<2	51	3.090	119	5.4	0.8	0.02	19
108	6.3	3.37	581	<0.3	1.3	8.1	4954	65	18	6.37	26126	10	187	2.181	888	1.1	0.8	0.11	94
110	9.6	1.27	310	<0.3	1.2	12.7	8609	110	7	2.14	8879	12	83	1.410	2533	<0.2	0.6	0.04	35
111	3.1	0.68	455	<0.3	0.5	2.1	215	<10	5	4.26	17552	<2	77	3.382	100	1.7	<0.2	0.04	27
112	2.9	0.63	395	<0.3	0.2	3.3	163	<10	5	3.47	32619	<2	116	3.164	48	1.4	<0.2	0.08	20
113	2.6	0.29	591	<0.3	0.5	2.3	237	<10	4	4.77	29971	<2	199	3.710	74	1.3	0.7	<0.02	12
114	2.2	0.46	515	<0.3	0.3	2.3	236	<10	4	4.79	19387	<2	260	2.745	112	3.9	1.2	<0.02	19
115	3.1	0.48	606	<0.3	1.1	1.6	209	<10	2	4.07	19448	<2	186	2.760	96	2.2	0.9	0.03	18
120	2.6	0.37	472	<0.3	0.7	1.4	141	10	2	7.20	4962	<2	648	2.403	99	1.7	0.9	<0.02	29
121	2.8	0.56	426	<0.3	0.5	1.1	132	<10	5	7.04	5353	<2	331	2.080	78	0.7	1.1	0.02	31
130	3.6	0.40	845	<0.3	0.4	1.4	224	<10	5	5.33	18568	<2	144	2.643	116	1.0	0.6	0.02	21
131	2.9	0.50	701	<0.3	0.4	1.0	215	<10	4	5.46	7768	<2	93	2.466	59	0.9	0.6	0.03	20
132	3.8	0.24	633	<0.3	0.5	3.9	250	10	<2	3.38	50002	<2	45	2.693	77	1.7	1.0	0.02	12
134	3.0	0.50	472	<0.3	0.6	5.5	233	<10	5	3.60	44682	<2	53	2.516	124	2.6	0.3	0.03	28
501	0.8	0.54	475	1.5	0.7	6.9	176	<10	2	3.49	36559	<2	51	2.402	102	2.8	<0.2	0.03	26
502	1.6	0.35	629	0.9	0.4	3.5	184	<10	3	4.48	18228	<2	35	2.492	99	1.0	<0.2	0.02	23
506	3.3	0.61	553	0.3	<0.2	5.2	195	10	6	3.54	32261	<2	45	3.020	63	0.4	<0.2	0.03	15
507	2.9	0.50	549	1.2	0.5	7.9	217	<10	5	4.63	29297	<2	56	4.120	86	0.4	<0.2	0.05	20
508	3.2	0.38	602	<0.3	0.7	4.0	363	<10	3	3.64	29588	<2	100	2.861	121	2.4	<0.2	0.02	19
509	3.2	0.25	626	<0.3	0.2	3.0	278	10	13	3.28	46279	<2	71	2.693	62	3.1	<0.2	<0.02	9
510	3.2	0.27	528	<0.3	0.4	5.9	287	15	3	3.31	30434	<2	62	3.235	58	2.7	<0.2	<0.02	11
514	0.9	0.26	510	<0.3	0.4	1.7	270	<10	2	2.75	25368	<2	75	2.991	30	1.5	<0.2	<0.02	11
515	1.7	0.21	595	<0.3	0.5	2.0	224	<10	2	3.41	20392	<2	47	1.892	110	1.8	<0.2	<0.02	13
516	3.2	0.20	504	<0.3	0.6	2.2	275	<10	2	2.88	23884	<2	54	1.862	81	2.0	<0.2	<0.02	13
517	2.6	0.37	526	<0.3	0.5	5.2	345	10	3	3.54	32367	<2	95	3.000	67	3.3	0.2	<0.02	14
519	1.9	0.36	634	<0.3	0.7	3.2	157	<10	3	5.57	15861	<2	342	2.068	200	3.7	<0.2	<0.02	27
520	2.3	0.26	573	<0.3	0.6	2.7	243	<10	3	3.63	21884	<2	231	1.762	72	1.8	0.3	<0.02	15
521	0.6	0.21	710	<0.3	0.2	2.9	236	<10	2	5.79	8801	<2	370	3.870	48	1.1	<0.2	<0.02	12

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
522	12H/16	21	564294	5535806	10	10	0	Wet open bog	Point Rousse Complex	
523	12H/16	21	564048	5536571	10	10	1N	Moist medium woodland	Point Rousse Complex	
524	12H/16	21	565365	5526801	10	10	1W	Moist medium woodland	Pacquet Harbour Group	
525	12H/16	21	564945	5532412	10	10	0	Moist medium woodland	Pacquet Harbour Group	
526	12H/16	21	564222	5532281	10	10	0	Moist medium woodland	Pacquet Harbour Group	Sulphides
527	12H/16	21	563591	5532206	10	10	1N	Moist medium woodland	Pacquet Harbour Group	
528	12H/16	21	563535	5532083	10	10	2W	Dry medium woodland	Pacquet Harbour Group	
529	12H/16	21	564456	5531305	10	10	1E	Moist medium woodland	Pacquet Harbour Group	
530	12H/16	21	564953	5534091	10	10	1N	Moist medium woodland	Point Rousse Complex	
531	12H/16	21	564181	5533881	10	10	1E	Moist medium woodland	Point Rousse Complex	
532	12H/16	21	563469	5534006	10	10	1W	Moist medium woodland	Point Rousse Complex	
533	12H/16	21	567742	5534259	10	10	1N	Moist medium woodland	Point Rousse Complex	
534	12H/16	21	566191	5526244	10	10	0	Moist open bog	Pacquet Harbour Group	Above level of dust contamination
535	12H/16	21	567883	5525898	10	10	0	Moist medium bog	Pacquet Harbour Group	
536	12H/16	21	568163	5525980	10	10	1N	Moist medium bog	Qtz-Feldspar Porphyry	
537	12H/16	21	567277	5528404	10	10	0	Moist open bog	Pacquet Harbour Group	
538	12H/16	21	568914	5528981	10	10	0	Moist medium woodland	Pacquet Harbour Group	
539	12H/16	21	565649	5532309	10	10	1S	Moist medium woodland	Point Rousse Complex	
540	12H/16	21	565780	5536892	10	10	0	Moist medium woodland	Point Rousse Complex	
541	12H/16	21	566747	5533468	10	10	4W	Dry medium woodland	Point Rousse Complex	
542	12H/16	21	563621	5528448	10	10	0	Wet medium bog	Pacquet Harbour Group	
543	12H/16	21	564427	5527702	10	10	1S	Moist medium bog	Pacquet Harbour Group	Iron staining
544	12H/16	21	565323	5527835	10	10	0	Moist medium bog	Pacquet Harbour Group	Iron staining
545	12H/16	21	562317	5521383	10	10	0	Dry open logged	Pacquet Harbour Group	Near gold-bearing till
546	12H/16	21	562387	5521506	10	10	1S	Moist open woodland	Pacquet Harbour Group	
547	12H/16	21	562513	5521185	10	10	2W	Dry medium woodland	Pacquet Harbour Group	Gold-bearing till
548	12H/16	21	565454	5524200	10	10	0	Dry medium woodland	Pacquet Harbour Group	Near outcrop with visible gold

GSC Open File 2951
Baie Verte: Black Spruce Twigs - INAA Data - concentrations in ash

Field Number	Ash Yield %	As ppm 0.5	Au ppb 5	Ba ppm 10	Br ppm 1	Ca % 0.2	Co ppm 1	Cr ppm 1	Cs ppm 0.5	Fe % 0.05	Hf ppm 0.5	K % 0.05	Na ppm 10	Rb ppm 5	Sb ppm 0.1	Sc ppm 0.1	Sr ppm 300	Th ppm 0.1	U ppm 0.1	W ppm 1	Zn ppm 20	La ppm 0.1	Ce ppm 3	Nd ppm 5	Sm ppm 0.1	Eu ppm 0.01	Yb ppm 0.05	Lu ppm 0.05
522	1.6	4.7	19	920	56	22.8	9	76	2.0	0.85	0.9	13.10	13500	88	0.6	2.0	1900	<0.1	<0.2	<1	4200	3.2	6	<5	0.7	<0.04	0.39	<0.05
523	1.4	4.3	54	640	42	16.4	10	95	<0.5	0.90	<0.5	16.50	10500	86	0.9	2.2	1800	0.4	<0.2	<1	3200	2.9	7	<5	0.6	<0.04	<0.05	<0.05
524	2.1	180	740	340	76	11.6	87	65	21.0	7.01	<0.5	13.20	6560	300	21.0	7.4	<300	<0.1	<0.2	<1	3600	3.1	8	<5	1.0	0.35	0.72	<0.05
525	1.6	4.9	17	2600	26	22.2	10	59	1.4	1.04	1.2	12.60	9300	79	0.9	3.5	870	0.8	<0.1	<1	2100	3.7	7	<5	0.8	<0.04	0.39	0.10
526	1.5	7.7	16	1800	41	20.3	37	51	6.4	0.92	1.4	14.50	10900	140	0.9	2.5	1300	0.9	<0.1	<1	3600	4.2	6	12	0.9	<0.04	0.21	<0.05
527	1.5	8.5	11	2800	59	15.3	28	49	8.1	1.41	1.1	21.40	5330	270	0.8	2.1	980	0.7	<0.1	<1	3800	3.4	6	<5	0.6	<0.04	0.30	<0.05
528	1.5	3.9	6	3500	20	20.8	16	29	10.0	0.45	1.1	13.60	4040	180	0.5	1.4	1300	0.6	<0.1	<1	3200	2.5	6	9	0.5	<0.04	0.38	<0.05
529	1.7	80.0	107	2500	29	17.6	49	56	3.4	2.51	<0.5	14.20	9220	150	5.0	4.0	<300	0.4	0.7	<1	5000	4.6	10	<5	0.9	<0.03	0.40	0.08
530	1.5	5.6	9	1500	43	15.4	13	53	3.8	0.94	1.2	14.00	9010	110	0.9	2.9	2000	1.0	<0.1	<1	3400	4.6	11	<5	0.9	<0.04	<0.05	0.13
531	1.5	1.8	<5	2200	120	14.7	12	49	9.1	0.60	<0.5	19.00	13100	240	0.6	1.6	<300	<0.1	<0.2	<1	4200	2.2	<3	<5	0.4	<0.05	<0.06	<0.05
532	1.7	3.3	9	1300	34	20.9	12	39	3.4	0.66	0.7	13.60	13400	110	0.6	1.8	1700	0.7	<0.1	<1	1900	2.9	7	<5	0.6	<0.03	0.22	0.09
533	1.5	8.1	13	780	28	15.6	25	120	2.6	1.77	1.9	11.80	8710	100	1.1	7.3	1100	0.7	<0.2	<1	2700	5.0	8	6	1.2	<0.04	0.65	<0.05
534	2.0	72.0	240	1600	16	20.6	55	44	<0.5	3.92	1.4	7.94	6360	80	8.6	4.7	1200	0.6	<0.1	<1	2300	3.5	7	7	0.9	<0.03	0.40	0.11
535	1.5	49.0	190	2700	25	18.1	33	45	1.6	3.27	1.1	10.80	4780	98	5.1	3.7	870	0.6	<0.1	<1	3600	4.5	12	<5	1.1	<0.04	0.34	0.06
536	1.8	35.0	149	2600	86	16.1	31	49	2.4	3.00	1.3	15.40	9010	160	4.4	4.1	1100	0.8	<0.2	<1	4300	7.4	17	6	1.6	<0.04	0.86	0.10
537	1.6	14.0	67	3700	46	16.0	15	51	3.1	1.40	0.9	15.30	16400	76	2.6	3.0	1400	0.4	<0.2	<1	2900	3.9	7	<5	0.7	<0.04	<0.05	<0.05
538	1.7	14.0	42	3800	50	17.5	18	39	2.2	1.42	<0.5	14.00	9880	90	2.1	3.6	1300	0.6	<0.2	<1	3500	4.5	9	<5	1.0	<0.05	0.66	0.16
539	3.3	24.0	60	860	40	11.6	23	180	1.5	4.05	2.0	7.59	12300	47	2.2	18.0	<300	0.9	0.9	<1	2100	8.5	17	13	2.5	0.54	1.34	0.27
540	1.7	3.6	9	1200	56	17.9	15	120	0.8	1.13	1.0	13.80	13100	100	0.5	2.5	2400	<0.1	<0.1	<1	4800	3.1	5	<5	0.6	<0.03	0.21	0.08
541	2.1	12.0	5	1600	18	16.5	26	180	6.1	2.53	1.4	8.30	9550	100	0.9	11.0	1400	0.8	<0.1	<1	2400	5.3	11	9	1.5	0.40	0.91	0.18
542	1.8	36.0	99	3100	32	19.7	45	42	2.7	1.77	<0.5	10.90	5500	120	4.0	3.1	1600	0.7	<0.1	<1	3000	4.0	9	<5	0.7	<0.03	0.34	0.07
543	1.7	51.0	173	1100	32	17.2	27	40	1.9	2.46	0.7	9.29	7890	57	6.2	3.9	1000	<0.1	0.6	<1	6700	4.5	9	7	0.9	<0.03	0.38	<0.05
544	2.1	87.0	200	1500	34	16.7	50	67	<0.5	5.60	1.4	7.89	6080	41	6.5	6.8	1200	0.8	1.0	<1	4000	7.0	14	<5	1.6	0.48	0.74	0.12
545	1.5	4.9	13	1600	41	17.5	13	15	1.1	0.52	<0.5	17.30	6690	170	0.5	1.4	1300	0.5	<0.1	<1	2800	3.1	7	<5	0.6	<0.04	<0.05	<0.05
546	1.3	4.2	<5	4200	35	17.4	63	27	1.6	0.60	1.8	17.10	6460	170	0.9	1.8	2000	0.5	<0.2	<1	3100	4.2	8	<5	0.8	<0.04	0.47	<0.05
547	1.6	3.7	<5	2100	29	18.2	7	21	1.4	0.55	0.9	14.90	5850	200	0.6	1.9	930	0.4	<0.2	<1	2500	3.1	6	15	0.7	<0.04	0.32	0.08
548	1.3	4.1	20	950	29	19.7	6	24	22.0	0.31	<0.5	22.00	3060	420	0.6	0.9	<300	0.4	<0.1	<1	3100	1.7	4	<5	0.3	<0.04	<0.05	<0.05

GSC Open File 2951

Baie Verte: Black Spruce Twigs - Field Information

Field Number	Map Sheet	Zone	Easting	Northing	Twig Min Age	Twig Max Age	Slope	Forest Type	Rock Unit	Remarks
522	12H/16	21	564294	5535806	10	10	0	Wet open bog	Point Rouse Complex	
523	12H/16	21	564048	5536571	10	10	1N	Moist medium woodland	Point Rouse Complex	
524	12H/16	21	565365	5526801	10	10	1W	Moist medium woodland	Pacquet Harbour Group	
525	12H/16	21	564945	5532412	10	10	0	Moist medium woodland	Pacquet Harbour Group	
526	12H/16	21	564222	5532281	10	10	0	Moist medium woodland	Pacquet Harbour Group	Sulphides
527	12H/16	21	563591	5532206	10	10	1N	Moist medium woodland	Pacquet Harbour Group	
528	12H/16	21	563535	5532083	10	10	2W	Dry medium woodland	Pacquet Harbour Group	
529	12H/16	21	564456	5531305	10	10	1E	Moist medium woodland	Pacquet Harbour Group	
530	12H/16	21	564953	5534091	10	10	1N	Moist medium woodland	Point Rouse Complex	
531	12H/16	21	564181	5533881	10	10	1E	Moist medium woodland	Point Rouse Complex	
532	12H/16	21	563469	5534006	10	10	1W	Moist medium woodland	Point Rouse Complex	
533	12H/16	21	567742	5534259	10	10	1N	Moist medium woodland	Point Rouse Complex	
534	12H/16	21	566191	5526244	10	10	0	Moist open bog	Pacquet Harbour Group	Above level of dust contamination
535	12H/16	21	567883	5525898	10	10	0	Moist medium bog	Pacquet Harbour Group	
536	12H/16	21	568163	5525980	10	10	1N	Moist medium bog	Qtz-Feldspar Porphyry	
537	12H/16	21	567277	5528404	10	10	0	Moist open bog	Pacquet Harbour Group	
538	12H/16	21	568914	5528981	10	10	0	Moist medium woodland	Pacquet Harbour Group	
539	12H/16	21	565649	5532309	10	10	1S	Moist medium woodland	Point Rouse Complex	
540	12H/16	21	565780	5536892	10	10	0	Moist medium woodland	Point Rouse Complex	
541	12H/16	21	566747	5533468	10	10	4W	Dry medium woodland	Point Rouse Complex	
542	12H/16	21	563621	5528448	10	10	0	Wet medium bog	Pacquet Harbour Group	
543	12H/16	21	564427	5527702	10	10	1S	Moist medium bog	Pacquet Harbour Group	Iron staining
544	12H/16	21	565323	5527835	10	10	0	Moist medium bog	Pacquet Harbour Group	Iron staining
545	12H/16	21	562317	5521383	10	10	0	Dry open logged	Pacquet Harbour Group	Near gold-bearing till
546	12H/16	21	562387	5521506	10	10	1S	Moist open woodland	Pacquet Harbour Group	
547	12H/16	21	562513	5521185	10	10	2W	Dry medium woodland	Pacquet Harbour Group	Gold-bearing till
548	12H/16	21	565454	5524200	10	10	0	Dry medium woodland	Pacquet Harbour Group	Near outcrop with visible gold

GSC Open File 2951

Baie Verte: Black Spruce Twigs - ICP-ES Data (Hg by Cold Vapour AAS) - concentrations in ash

Field Number	Ag ppm 0.2	Al % 0.01	B ppm 2	Be ppm 0.3	Bi ppm 0.2	Cd ppm 0.2	Cu ppm 1	Hg ppb 10	Li ppm 2	Mg % 0.01	Mn ppm 1	Mo ppm 2	Ni ppm 1	P % 0.001	Pb ppm 3	Se ppm 0.2	Te ppm 0.2	Ti % 0.02	V ppm 2
522	2.8	0.24	556	<0.3	0.5	2.6	167	<10	3	3.58	8632	<2	132	1.880	61	1.1	<0.2	<0.02	16
523	1.8	0.28	663	<0.3	0.4	1.9	188	10	2	6.26	4814	<2	252	2.231	105	2.3	<0.2	<0.02	20
524	6.8	0.39	350	<0.3	7.5	5.4	1188	145	5	2.74	25754	14	100	2.188	571	3.0	2.6	<0.02	14
525	1.8	0.34	563	<0.3	0.4	1.3	228	<10	3	3.12	18624	<2	71	1.755	51	2.5	0.3	<0.02	13
526	3.1	0.31	558	<0.3	0.4	4.2	343	<10	3	3.27	24174	<2	147	2.325	62	2.7	<0.2	<0.02	13
527	3.1	0.39	645	<0.3	0.6	4.1	571	<10	3	3.80	41828	<2	192	2.982	88	4.1	0.5	<0.02	11
528	5.1	0.23	543	0.8	<0.2	5.9	215	<10	3	3.23	32757	<2	65	2.825	75	1.6	<0.2	<0.02	11
529	4.3	0.56	482	<0.3	3.2	5.5	706	45	9	2.50	20572	2	112	1.721	231	7.8	2.6	<0.02	17
530	2.7	0.38	607	<0.3	0.5	2.1	264	<10	4	3.64	21715	<2	186	2.590	84	2.7	<0.2	<0.02	19
531	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	2.5	<0.2	-	-
532	-	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	1.3	<0.2	-	-
533	3.9	0.74	512	<0.3	0.4	1.8	237	<10	6	4.29	15401	<2	197	1.807	96	1.6	0.3	0.02	28
534	4.6	0.37	345	<0.3	3.0	4.1	621	75	3	1.95	21301	6	52	1.278	239	8.0	2.4	<0.02	16
535	3.4	0.35	489	<0.3	2.7	4.5	514	75	3	2.14	40186	3	44	1.468	266	8.0	1.4	<0.02	17
536	3.9	0.50	501	<0.3	2.5	12.4	516	20	4	2.38	25772	3	61	2.050	223	6.0	1.5	0.02	18
537	3.1	0.31	536	<0.3	0.7	2.9	509	20	2	2.78	26725	<2	57	2.171	137	4.8	0.6	<0.02	15
538	2.6	0.44	647	<0.3	0.7	3.9	435	15	3	4.78	22439	<2	66	2.414	156	5.5	0.4	0.02	27
539	2.1	1.72	299	<0.3	0.9	3.3	879	20	9	3.04	24751	3	107	0.986	185	2.4	1.5	0.04	46
540	1.4	0.31	521	<0.3	0.4	2.4	208	<10	3	3.40	9005	<2	304	1.879	77	1.5	0.5	<0.02	19
541	1.8	1.02	370	<0.3	0.3	2.0	259	<10	6	3.47	20090	<2	123	1.459	60	1.9	0.5	0.03	31
542	1.8	0.29	408	<0.3	1.8	2.0	347	35	3	2.75	19052	3	67	1.732	124	4.5	0.6	<0.02	12
543	2.6	0.36	389	<0.3	2.6	3.6	495	<10	3	2.60	23297	4	60	1.586	204	7.3	0.9	<0.02	18
544	3.8	0.67	373	<0.3	2.9	6.5	2013	95	4	1.84	29876	4	61	1.057	295	10.5	0.8	0.02	23
545	1.7	0.22	583	<0.3	0.3	3.5	264	<10	2	2.99	42500	<2	43	2.752	67	1.1	<0.2	<0.02	9
546	2.5	0.28	627	0.4	0.3	4.4	235	<10	3	3.74	56070	<2	76	2.183	89	1.0	<0.2	<0.02	14
547	1.9	0.24	500	0.8	0.5	3.1	181	<10	2	3.24	36123	<2	45	2.850	49	0.4	<0.2	0.02	8
548	3.0	0.12	554	<0.3	0.4	1.4	196	<10	<2	3.44	16042	<2	52	2.628	37	0.8	<0.2	<0.02	5

Appendix B

Statistical Summary

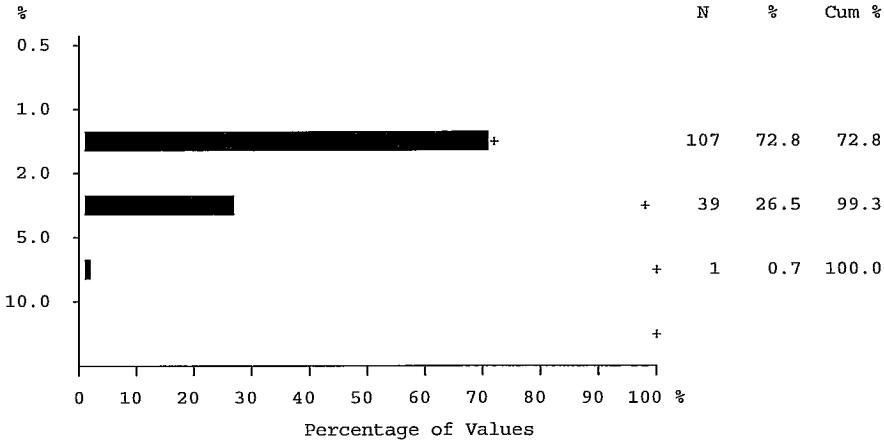
Abbreviations are explained in Table 11 (page 24)

GSC Open File 2951
Statistics for Black Spruce Twigs

Ash Yield

Number of values - 147

Determination limit - 0.1 %



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	1.816	1.886	1.679	2.012	1.675	1.800
Standard deviation	0.501	0.429	0.382	0.666	0.150	0.141
Skewness	2.608	0.919	2.264	2.384	-0.139	0.000
Kurtosis	10.838	0.440	6.198	7.486	-2.280	-2.750
Geometric Mean	1.764	1.843	1.645	1.933	1.670	1.797
Percentiles						
Minimum value	1.200	1.300	1.200	1.200	1.500	1.700
25th	1.500	1.500	1.500	1.600	1.525	1.700
50th	1.700	1.800	1.600	1.800	1.700	1.800
75th	2.000	2.100	1.725	2.200	1.800	1.900
80th	2.100	2.200	1.800	2.300	1.800	1.900
90th	2.320	2.400	2.090	2.850	1.800	1.900
95th	2.920	2.950	2.690	3.285	1.800	1.900
98th	3.300	3.100	3.216	5.000	1.800	1.900
99th	4.184	3.100	3.300	5.000	1.800	1.900
Maximum value	5.000	3.100	3.300	5.000	1.800	1.900

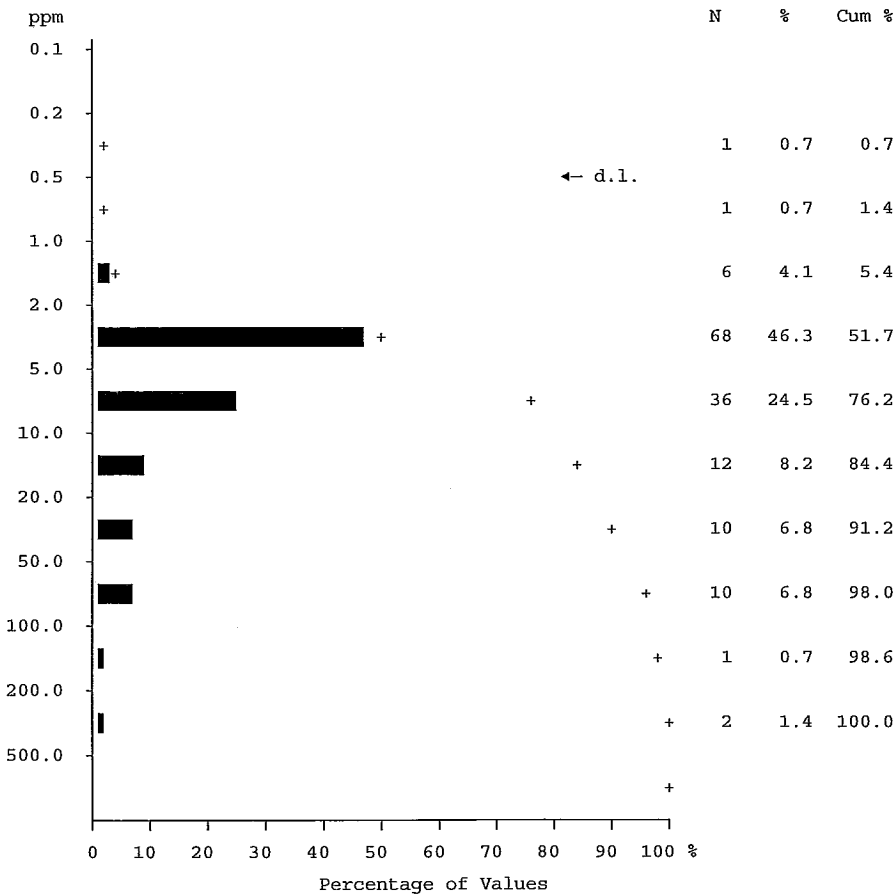
Ash

GSC Open File 2951
Statistics for Black Spruce Twigs

Arsenic (INAA)

Number of values - 147

Determination limit - 0.5 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	1	1	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	15.414	4.176	25.097	7.931	11.850	3.700
Standard deviation	31.878	2.452	43.564	9.404	15.486	1.131
Skewness	4.210	1.030	2.804	2.838	0.735	0.000
Kurtosis	19.830	0.803	7.947	8.837	-1.698	-2.750
Geometric Mean	6.615	3.443	10.042	5.317	6.800	3.612
Percentiles						
Minimum value	0.313	0.313	2.000	1.500	2.700	2.900
25th	3.300	2.500	4.100	2.800	3.000	2.900
50th	4.800	3.600	6.700	4.900	4.850	3.700
75th	9.400	5.050	20.000	8.350	27.700	4.500
80th	12.400	6.500	42.400	8.880	35.000	4.500
90th	45.000	7.100	78.300	21.600	35.000	4.500
95th	76.200	10.500	134.900	28.850	35.000	4.500
98th	180.800	11.000	205.800	51.000	35.000	4.500
99th	205.200	11.000	210.000	51.000	35.000	4.500
Maximum value	210.000	11.000	210.000	51.000	35.000	4.500

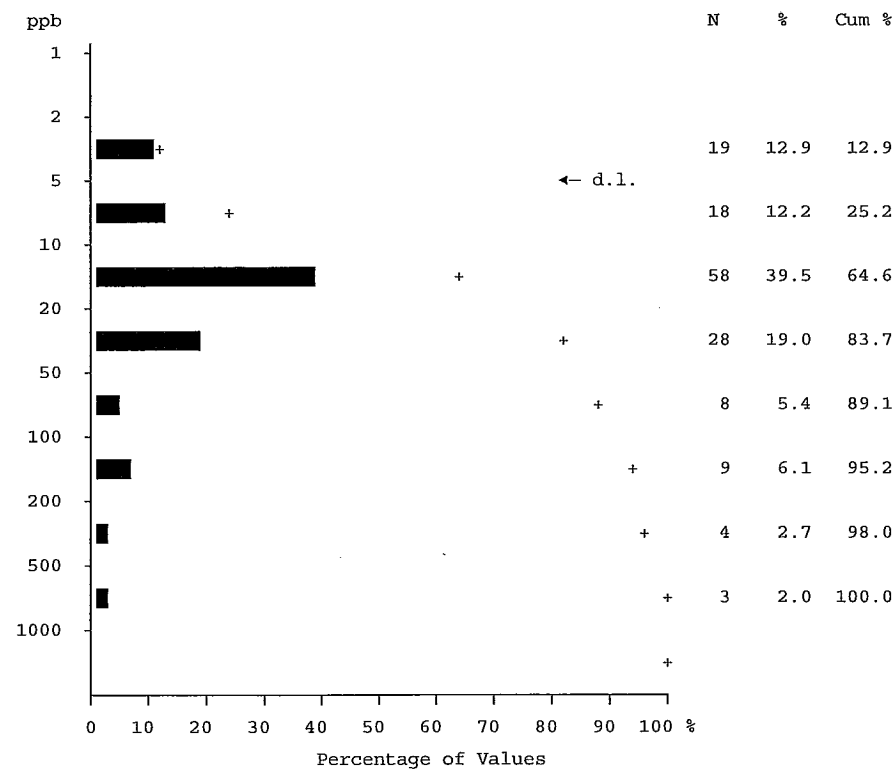
As

GSC Open File 2951
Statistics for Black Spruce Twigs

Gold (INAA)

Number of values - 147

Determination limit - 5 ppb



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	19	5	8	6	0	0
Number of missing values	0	0	0	0	0	0
Mean	47.472	13.470	80.743	17.304	47.750	9.000
Standard deviation	114.228	8.173	158.323	13.587	67.815	1.414
Skewness	5.041	0.964	3.353	1.878	0.729	0.000
Kurtosis	27.667	1.518	11.364	3.609	-1.701	-2.750
Geometric Mean	18.079	10.949	27.033	13.215	22.907	8.944
Percentiles						
Minimum value	3.125	3.125	3.125	3.125	6.000	8.000
25th	9.000	7.000	11.000	9.000	8.000	8.000
50th	17.000	12.000	19.000	14.500	18.000	9.000
75th	27.000	19.000	78.000	20.250	117.250	10.000
80th	38.200	20.000	122.200	22.800	149.000	10.000
90th	127.000	22.000	199.000	27.700	149.000	10.000
95th	196.000	31.500	478.100	59.100	149.000	10.000
98th	709.280	40.000	780.600	62.000	149.000	10.000
99th	776.400	40.000	810.000	62.000	149.000	10.000
Maximum value	810.000	40.000	810.000	62.000	149.000	10.000

Au

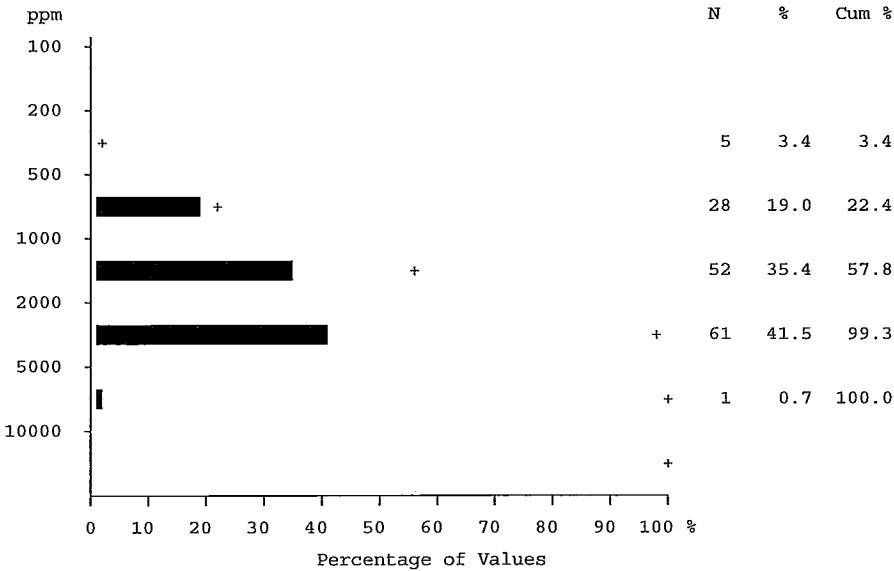
GSC Open File 2951
Statistics for Black Spruce Twigs

Barium (INAA)

Number of values - 147

Determination limit - 10 ppm

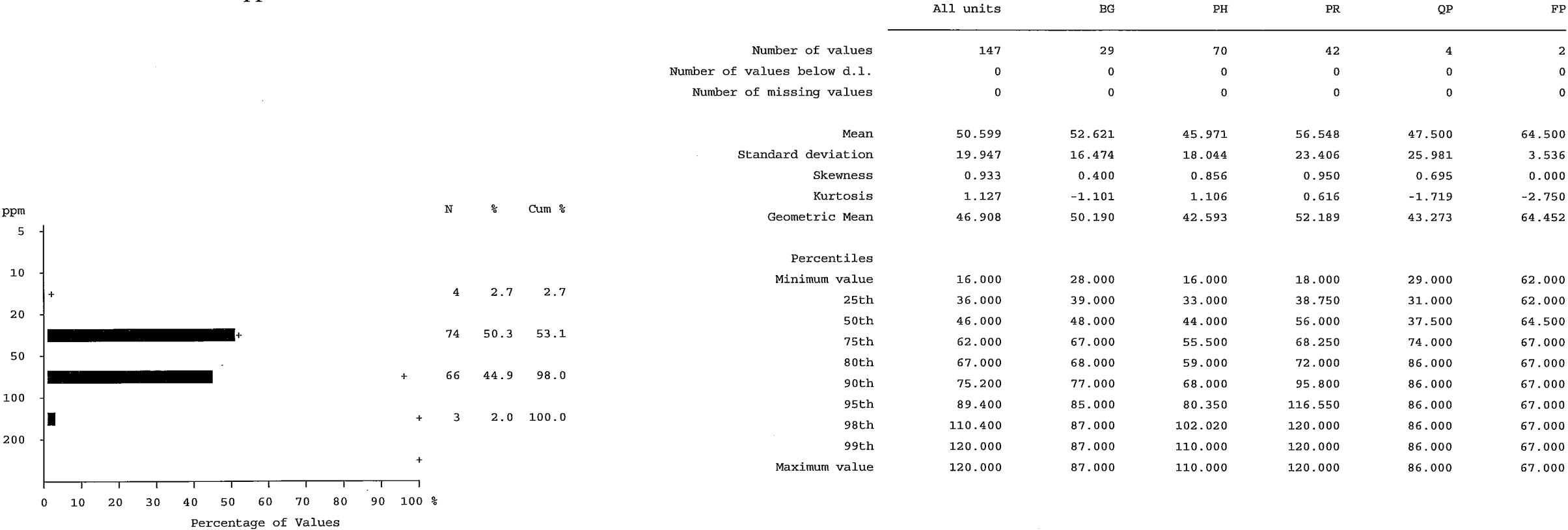
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	1940.714	2356.897	2271.000	1087.262	2325.000	1500.000
Standard deviation	1164.615	1077.521	1240.876	541.272	1001.249	141.421
Skewness	1.435	0.783	1.528	0.518	-0.051	0.000
Kurtosis	3.869	-0.141	4.510	-0.979	-1.964	-2.750
Geometric Mean	1624.712	2125.427	1969.068	957.984	2141.230	1496.663
Percentiles						
Minimum value	310.000	580.000	340.000	310.000	1100.000	1400.000
25th	1100.000	1600.000	1400.000	640.000	1350.000	1400.000
50th	1700.000	2200.000	2100.000	930.000	2350.000	1500.000
75th	2400.000	2850.000	2850.000	1600.000	3275.000	1600.000
80th	2640.000	3000.000	3460.000	1700.000	3500.000	1600.000
90th	3720.000	4200.000	3890.000	1831.500	3500.000	1600.000
95th	4160.000	4750.000	4200.000	2170.000	3500.000	1600.000
98th	4612.000	4900.000	6488.000	2300.000	3500.000	1600.000
99th	6512.000	4900.000	8000.000	2300.000	3500.000	1600.000
Maximum value	8000.000	4900.000	8000.000	2300.000	3500.000	1600.000



GSC Open File 2951
Statistics for Black Spruce Twigs

Bromine (INAA)

Number of values - 147
Determination limit - 1 ppm

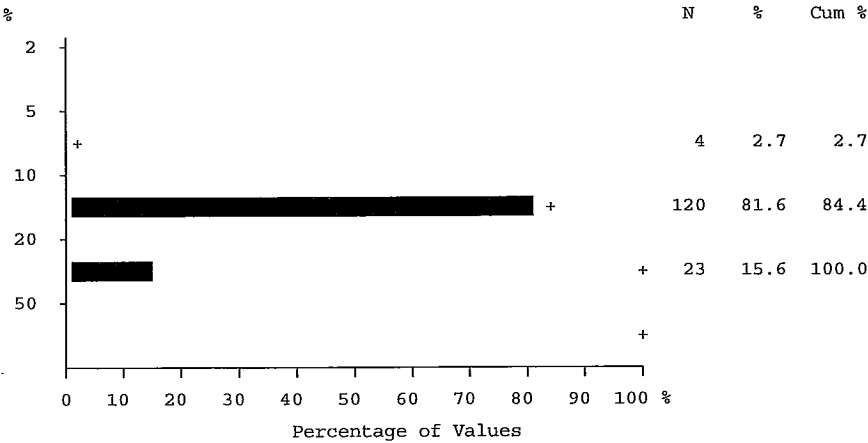


Br

GSC Open File 2951
Statistics for Black Spruce Twigs

Calcium (INAA)

Number of values - 147
Determination limit - 0.2 %



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	16.516	16.162	16.313	17.383	13.225	17.150
Standard deviation	3.533	3.366	2.960	4.429	2.141	0.636
Skewness	0.132	-0.333	-0.198	0.120	0.315	0.000
Kurtosis	0.371	-0.100	-0.517	-0.190	-1.892	-2.750
Geometric Mean	16.121	15.780	16.032	16.792	13.099	17.144
Percentiles						
Minimum value	6.900	7.300	9.800	6.900	11.000	16.700
25th	14.300	13.400	14.525	14.675	11.375	16.700
50th	16.700	16.700	16.800	16.600	12.900	17.150
75th	18.500	18.200	18.125	20.450	15.400	17.600
80th	19.180	19.000	18.680	20.940	16.100	17.600
90th	20.900	20.700	20.270	23.270	16.100	17.600
95th	22.680	22.150	21.295	26.120	16.100	17.600
98th	25.148	22.500	22.158	27.200	16.100	17.600
99th	26.768	22.500	22.200	27.200	16.100	17.600
Maximum value	27.200	22.500	22.200	27.200	16.100	17.600

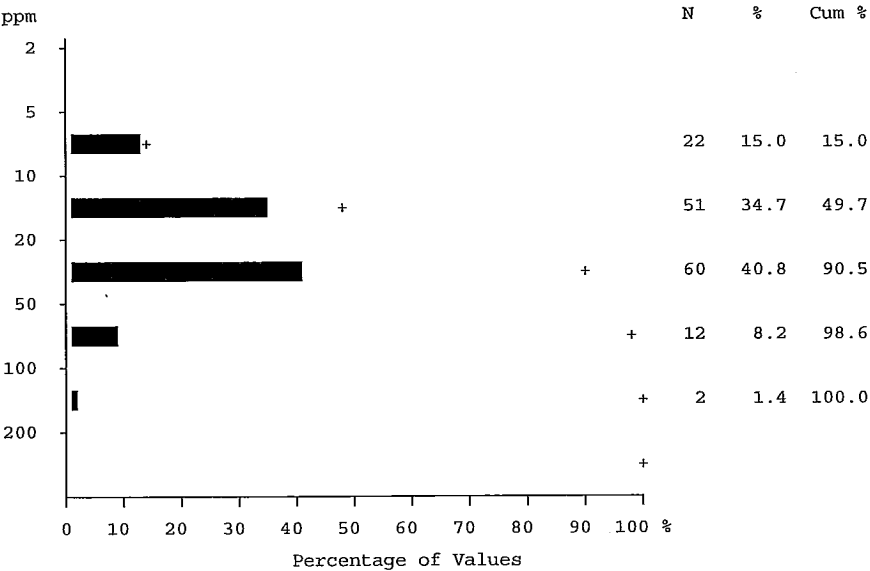
Ca

GSC Open File 2951
Statistics for Black Spruce Twigs

Cobalt (INAA)

Number of values - 147
Determination limit - 1 ppm

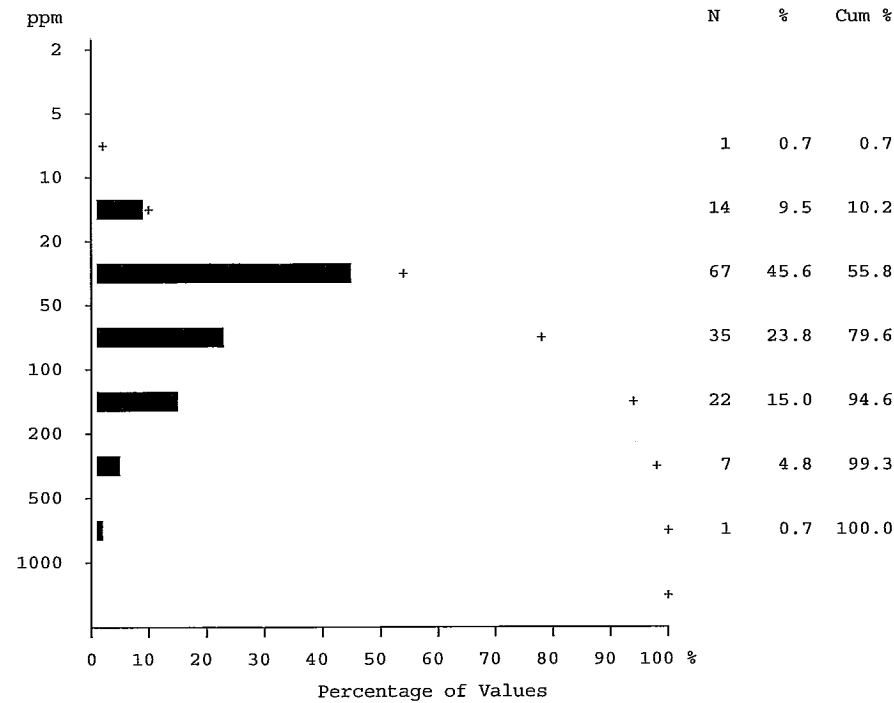
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	24.503	14.310	30.400	22.738	17.500	17.000
Standard deviation	19.183	7.607	22.244	16.917	10.661	1.414
Skewness	2.177	1.302	1.411	3.386	0.178	0.000
Kurtosis	5.869	0.947	2.114	14.300	-2.010	-2.750
Geometric Mean	19.391	12.774	23.494	19.396	14.829	16.971
Percentiles						
Minimum value	5.000	6.000	5.000	7.000	6.000	16.000
25th	12.000	8.500	13.000	12.750	7.750	16.000
50th	20.000	12.000	26.000	20.000	16.500	17.000
75th	30.000	18.500	39.500	25.250	28.250	18.000
80th	34.800	22.000	45.000	26.800	31.000	18.000
90th	49.200	27.000	56.800	35.100	31.000	18.000
95th	60.600	33.500	84.800	50.850	31.000	18.000
98th	98.480	37.000	104.960	110.000	31.000	18.000
99th	110.000	37.000	110.000	110.000	31.000	18.000
Maximum value	110.000	37.000	110.000	110.000	31.000	18.000



GSC Open File 2951
Statistics for Black Spruce Twigs

Chromium (INAA)

Number of values - 147
Determination limit - 1 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	70.585	34.379	43.743	144.286	34.500	59.500
Standard deviation	74.736	24.892	29.131	100.871	10.661	4.950
Skewness	2.913	1.506	2.474	1.723	0.371	0.000
Kurtosis	11.353	1.433	8.482	3.561	-1.902	-2.750
Geometric Mean	48.990	28.081	37.256	116.720	33.335	59.397
Percentiles						
Minimum value	8.000	8.000	12.000	29.000	24.000	56.000
25th	26.000	19.500	24.750	74.500	25.500	56.000
50th	43.000	23.000	37.500	120.000	32.500	59.500
75th	81.000	41.500	53.750	182.500	45.500	63.000
80th	100.000	49.000	61.400	194.000	49.000	63.000
90th	170.000	78.000	69.700	260.000	49.000	63.000
95th	200.000	100.000	98.350	426.000	49.000	63.000
98th	296.400	110.000	169.000	510.000	49.000	63.000
99th	481.200	110.000	190.000	510.000	49.000	63.000
Maximum value	510.000	110.000	190.000	510.000	49.000	63.000

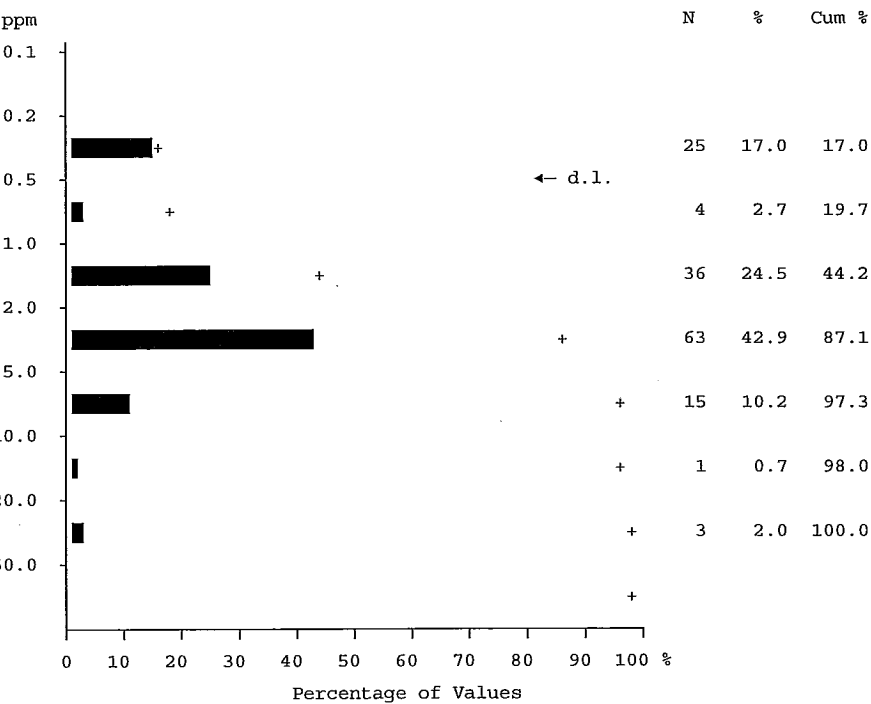
Cr

GSC Open File 2951
Statistics for Black Spruce Twigs

Cesium (INAA)

Number of values - 147

Determination limit - 0.5 ppm



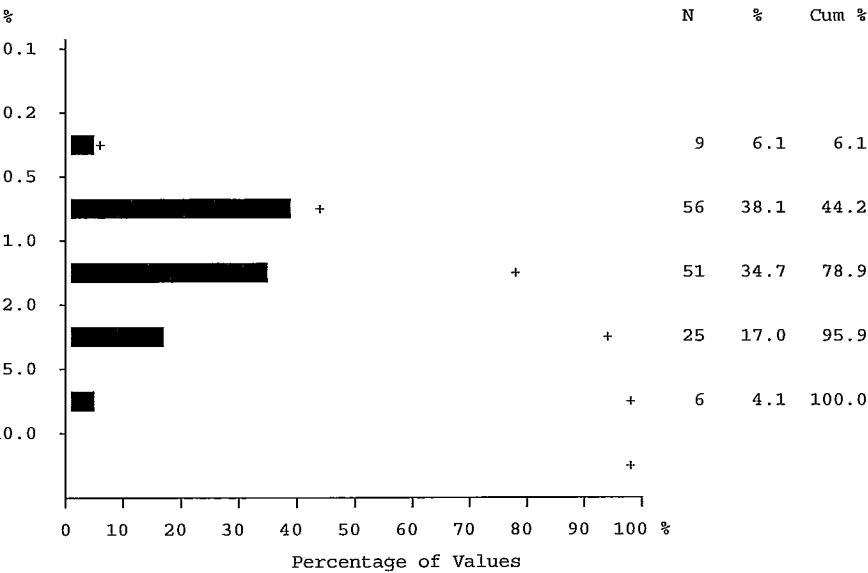
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	25	2	9	11	3	0
Number of missing values	0	0	0	0	0	0
Mean	2.813	2.942	3.116	2.377	0.834	3.450
Standard deviation	3.263	3.456	3.799	2.154	1.044	0.212
Skewness	3.753	4.099	3.398	1.173	0.750	0.000
Kurtosis	17.499	17.512	13.134	0.733	-1.688	-2.750
Geometric Mean	1.803	2.154	1.992	1.474	0.520	3.447
Percentiles						
Minimum value	0.313	0.313	0.313	0.313	0.313	3.300
25th	1.300	1.550	1.400	0.313	0.313	3.300
50th	2.200	2.500	2.150	1.800	0.313	3.450
75th	3.100	3.050	3.100	3.175	1.878	3.600
80th	3.400	3.200	3.560	3.800	2.400	3.600
90th	5.780	4.400	7.570	5.980	2.400	3.600
95th	7.900	12.550	9.120	6.570	2.400	3.600
98th	20.040	20.000	21.580	9.100	2.400	3.600
99th	21.520	20.000	22.000	9.100	2.400	3.600
Maximum value	22.000	20.000	22.000	9.100	2.400	3.600

Cs

GSC Open File 2951
Statistics for Black Spruce Twigs

Iron (INAA)

Number of values - 147
Determination limit - 0.05 %



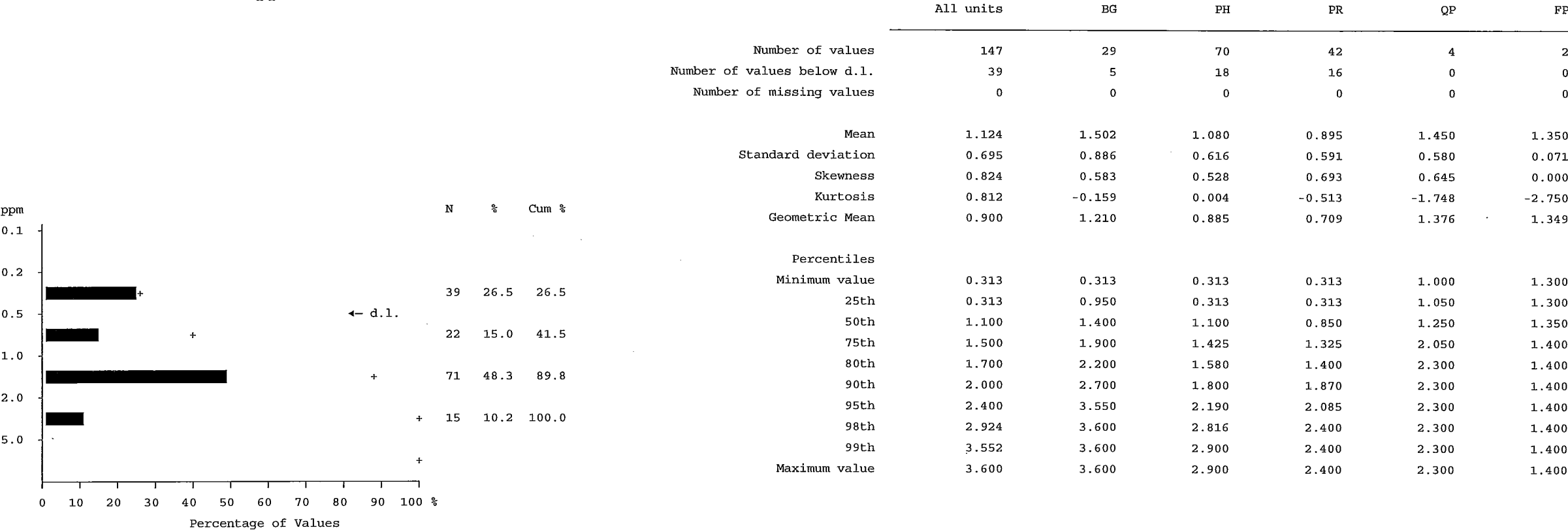
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	1.535	1.036	1.676	1.694	1.365	0.805
Standard deviation	1.305	0.616	1.548	1.192	1.098	0.177
Skewness	2.125	1.371	1.898	1.580	0.715	0.000
Kurtosis	4.600	1.053	3.046	1.831	-1.708	-2.750
Geometric Mean	1.193	0.898	1.235	1.404	1.121	0.795
Percentiles						
Minimum value	0.290	0.350	0.290	0.600	0.630	0.680
25th	0.750	0.625	0.768	0.890	0.695	0.680
50th	1.050	0.940	1.055	1.210	0.915	0.805
75th	1.710	1.160	1.805	1.898	2.485	0.930
80th	2.084	1.320	2.484	2.392	3.000	0.930
90th	3.332	2.080	4.163	3.831	3.000	0.930
95th	4.492	2.660	5.369	4.579	3.000	0.930
98th	5.685	2.660	7.103	5.630	3.000	0.930
99th	7.093	2.660	7.170	5.630	3.000	0.930
Maximum value	7.170	2.660	7.170	5.630	3.000	0.930

GSC Open File 2951
Statistics for Black Spruce Twigs

Hafnium (INAA)

Number of values - 147

Determination limit - 0.5 ppm

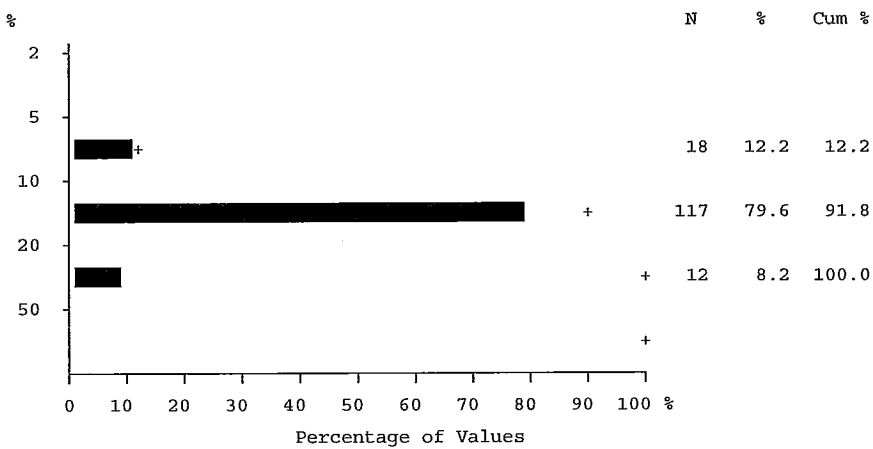


GSC Open File 2951
Statistics for Black Spruce Twigs

Potassium (INAA)

Number of values - 147

Determination limit - 0.05 %



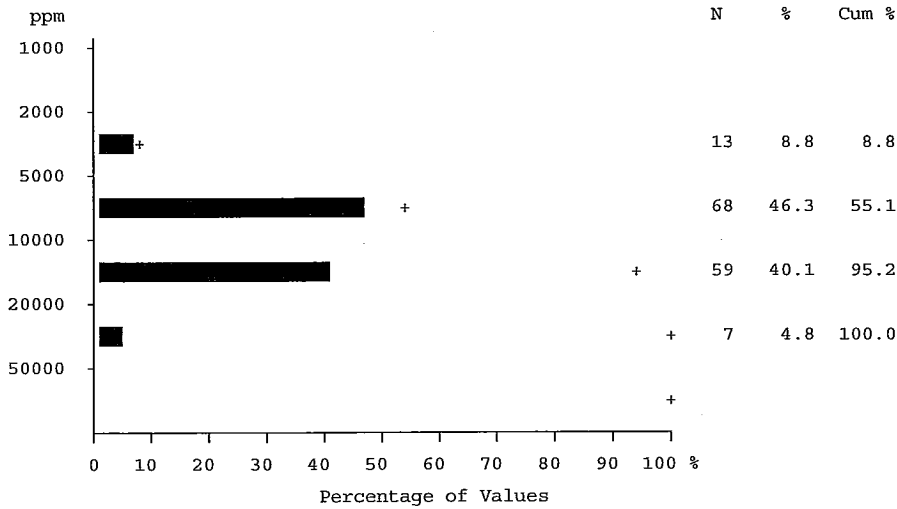
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	14.232	15.115	14.300	13.446	14.515	15.000
Standard deviation	3.915	4.732	3.888	3.409	3.555	1.697
Skewness	0.328	0.330	0.024	0.659	-0.598	0.000
Kurtosis	0.077	-0.391	-0.385	0.678	-1.765	-2.750
Geometric Mean	13.678	14.375	13.729	13.038	14.129	14.952
Percentiles						
Minimum value	5.160	6.280	5.160	7.590	9.360	13.800
25th	11.400	11.300	11.600	11.075	10.870	13.800
50th	14.000	15.000	14.400	13.550	15.600	15.000
75th	16.900	18.350	17.325	15.425	17.075	16.200
80th	17.440	19.100	17.760	16.500	17.500	16.200
90th	19.120	21.300	19.140	17.180	17.500	16.200
95th	21.700	24.500	21.945	20.105	17.500	16.200
98th	22.468	26.900	22.316	24.100	17.500	16.200
99th	25.556	26.900	22.400	24.100	17.500	16.200
Maximum value	26.900	26.900	22.400	24.100	17.500	16.200

GSC Open File 2951
Statistics for Black Spruce Twigs

Sodium (INAA)

Number of values - 147
Determination limit - 10 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	10362.680	10917.931	8487.571	13154.857	7440.000	15150.000
Standard deviation	5039.622	4912.126	3291.022	6201.692	1939.295	5868.986
Skewness	1.927	0.651	0.587	2.144	-0.614	0.000
Kurtosis	6.656	-0.456	-0.525	5.318	-1.766	-2.750
Geometric Mean	9371.023	9887.070	7872.701	12120.472	7212.299	14570.518
Percentiles						
Minimum value	2920.000	3700.000	2920.000	4510.000	4620.000	11000.000
25th	6560.000	6530.000	6210.000	9495.000	5430.000	11000.000
50th	9400.000	11000.000	7825.000	11800.000	8065.000	15150.000
75th	12700.000	14400.000	10675.000	14100.000	8825.000	19300.000
80th	13540.000	15000.000	11440.000	14800.000	9010.000	19300.000
90th	15500.000	18300.000	13870.000	20860.000	9010.000	19300.000
95th	19900.000	21650.000	15145.000	31115.000	9010.000	19300.000
98th	23096.000	22700.000	15938.000	37400.000	9010.000	19300.000
99th	35096.000	22700.000	16400.000	37400.000	9010.000	19300.000
Maximum value	37400.000	22700.000	16400.000	37400.000	9010.000	19300.000

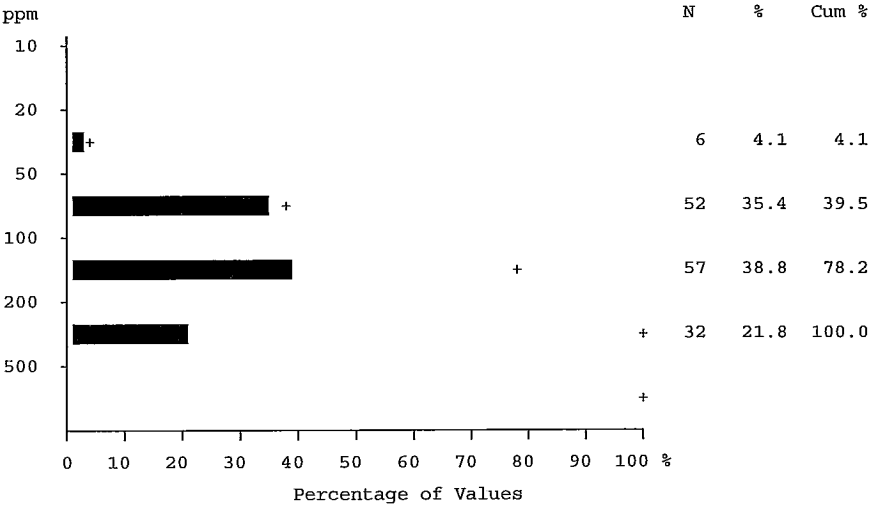


Na

GSC Open File 2951
Statistics for Black Spruce Twigs

Rubidium (INAA)

Number of values - 147
Determination limit - 5 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	141.497	206.000	140.657	91.500	161.750	245.000
Standard deviation	81.246	104.569	67.862	44.317	46.392	63.640
Skewness	1.401	0.760	1.233	1.538	-0.483	0.000
Kurtosis	2.319	-0.261	2.605	2.091	-1.901	-2.750
Geometric Mean	122.042	181.006	126.019	83.355	155.836	240.832
Percentiles						
Minimum value	39.000	53.000	41.000	39.000	97.000	200.000
25th	80.000	145.000	90.750	60.500	112.750	200.000
50th	120.000	170.000	140.000	81.000	175.000	245.000
75th	180.000	280.000	172.500	102.500	197.500	290.000
80th	200.000	300.000	198.000	110.000	200.000	290.000
90th	242.000	360.000	220.000	160.000	200.000	290.000
95th	300.000	445.000	274.500	201.900	200.000	290.000
98th	420.800	450.000	369.600	240.000	200.000	290.000
99th	445.200	450.000	420.000	240.000	200.000	290.000
Maximum value	450.000	450.000	420.000	240.000	200.000	290.000

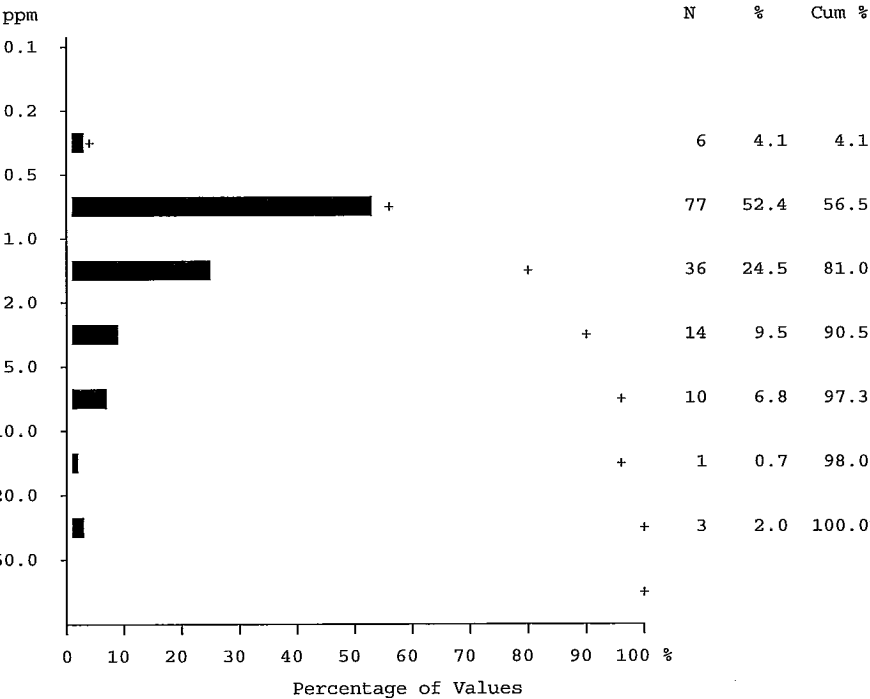
Rb

GSC Open File 2951
Statistics for Black Spruce Twigs

Antimony (INAA)

Number of values - 147

Determination limit - 0.1 ppm



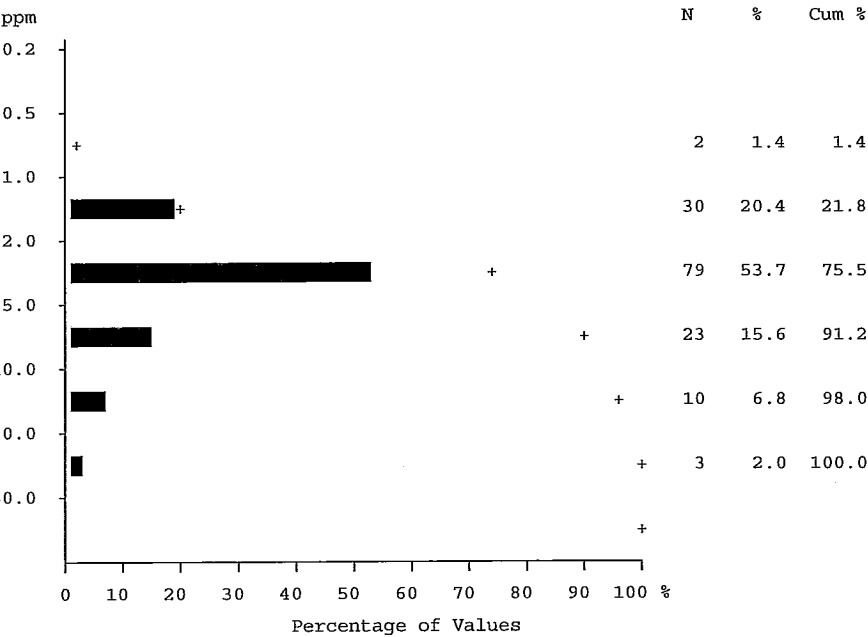
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	2.169	0.966	3.530	0.843	1.725	0.700
Standard deviation	4.879	0.481	6.812	0.381	1.791	0.141
Skewness	6.557	0.694	4.467	1.748	0.729	0.000
Kurtosis	51.044	-0.703	23.040	3.346	-1.700	-2.750
Geometric Mean	1.159	0.858	1.684	0.779	1.242	0.693
Percentiles						
Minimum value	0.300	0.400	0.300	0.400	0.600	0.600
25th	0.600	0.600	0.800	0.600	0.675	0.600
50th	0.900	0.800	1.050	0.800	0.950	0.700
75th	1.500	1.300	3.250	0.925	3.550	0.800
80th	1.840	1.500	4.980	1.040	4.400	0.800
90th	4.920	1.700	8.050	1.340	4.400	0.800
95th	7.900	1.950	14.950	1.910	4.400	0.800
98th	21.200	2.100	38.180	2.200	4.400	0.800
99th	36.920	2.100	47.000	2.200	4.400	0.800
Maximum value	47.000	2.100	47.000	2.200	4.400	0.800

Sb

GSC Open File 2951
Statistics for Black Spruce Twigs

Scandium (INAA)

Number of values - 147
Determination limit - 0.1 ppm



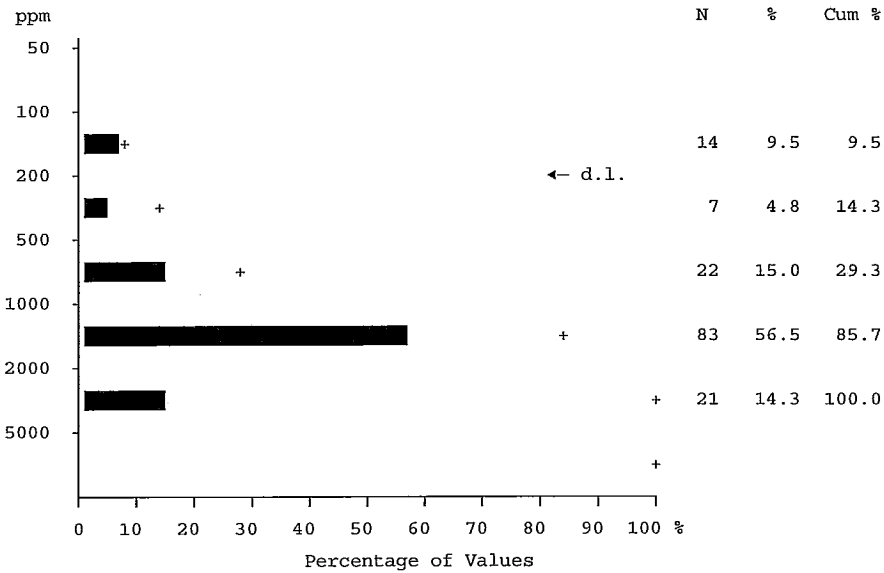
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	4.401	3.662	3.891	6.000	2.875	2.400
Standard deviation	4.262	3.050	3.260	6.042	0.914	0.707
Skewness	2.916	1.776	2.893	2.064	0.348	0.000
Kurtosis	10.520	2.326	10.071	4.327	-1.966	-2.750
Geometric Mean	3.337	2.886	3.125	4.258	2.772	2.347
Percentiles						
Minimum value	0.900	1.100	0.900	1.600	2.000	1.900
25th	2.000	1.850	1.900	2.350	2.100	1.900
50th	2.900	2.300	3.100	3.500	2.700	2.400
75th	4.900	3.950	4.750	7.325	3.825	2.900
80th	5.800	6.100	5.180	9.680	4.100	2.900
90th	8.920	8.300	6.890	14.700	4.100	2.900
95th	13.600	12.500	10.570	19.700	4.100	2.900
98th	20.000	13.000	18.740	30.000	4.100	2.900
99th	25.200	13.000	20.000	30.000	4.100	2.900
Maximum value	30.000	13.000	20.000	30.000	4.100	2.900

GSC Open File 2951
Statistics for Black Spruce Twigs

Strontium (INAA)

Number of values - 147
Determination limit - 300 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	14	1	9	4	0	0
Number of missing values	0	0	0	0	0	0
Mean	1295.918	1249.914	1111.964	1657.024	1005.000	1400.000
Standard deviation	683.595	496.944	582.854	841.131	445.833	0.000
Skewness	0.594	-0.361	0.304	0.264	-0.220	-
Kurtosis	0.847	-0.642	0.175	-0.238	-1.878	-
Geometric Mean	1069.079	1113.472	911.347	1359.346	912.396	1400.000
Percentiles						
Minimum value	187.500	187.500	187.500	187.500	420.000	1400.000
25th	880.000	1050.000	717.500	1100.000	565.000	1400.000
50th	1300.000	1300.000	1150.000	1600.000	1050.000	1400.000
75th	1700.000	1700.000	1500.000	2225.000	1400.000	1400.000
80th	1800.000	1700.000	1600.000	2400.000	1500.000	1400.000
90th	2100.000	1900.000	1890.000	2910.000	1500.000	1400.000
95th	2520.000	2050.000	2045.000	3440.000	1500.000	1400.000
98th	3116.000	2100.000	2622.000	3600.000	1500.000	1400.000
99th	3552.000	2100.000	3000.000	3600.000	1500.000	1400.000
Maximum value	3600.000	2100.000	3000.000	3600.000	1500.000	1400.000



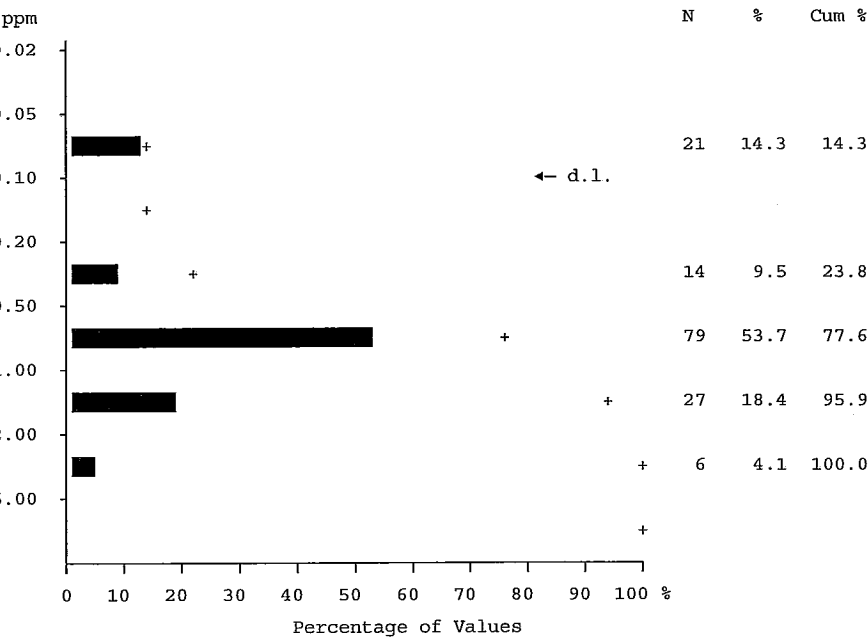
Sr

GSC Open File 2951
Statistics for Black Spruce Twigs

Thorium (INAA)

Number of values - 147

Determination limit - 0.1 ppm



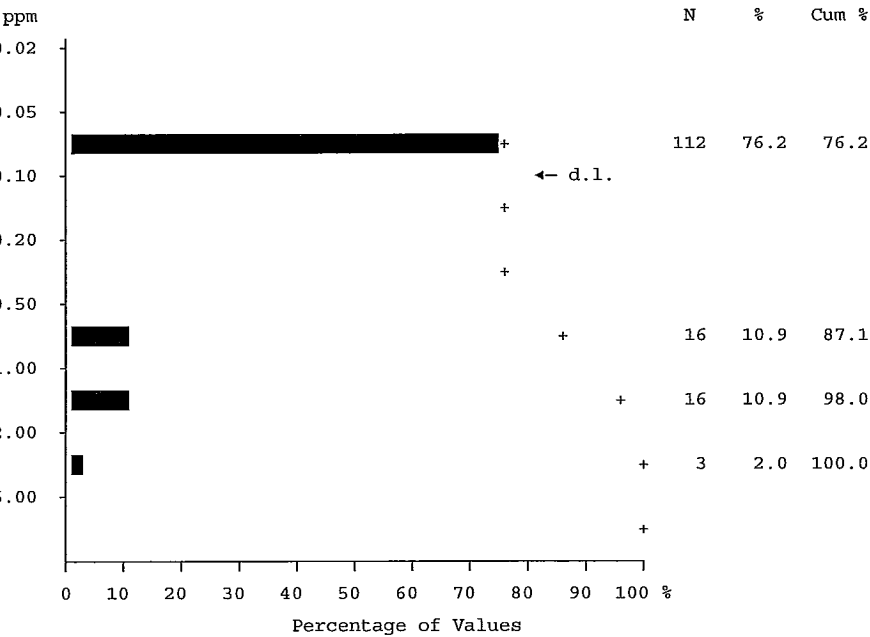
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	21	3	7	11	0	0
Number of missing values	0	0	0	0	0	0
Mean	0.772	1.106	0.756	0.552	0.875	0.850
Standard deviation	0.562	0.852	0.450	0.391	0.299	0.071
Skewness	1.724	1.184	0.798	0.909	0.518	0.000
Kurtosis	5.178	1.094	0.537	2.354	-1.792	-2.750
Geometric Mean	0.546	0.761	0.585	0.365	0.841	0.849
Percentiles						
Minimum value	0.063	0.063	0.063	0.063	0.600	0.800
25th	0.500	0.600	0.500	0.063	0.650	0.800
50th	0.700	0.900	0.700	0.600	0.800	0.850
75th	0.900	1.500	0.900	0.800	1.175	0.900
80th	1.000	1.800	1.000	0.800	1.300	0.900
90th	1.520	2.300	1.480	0.970	1.300	0.900
95th	1.900	3.250	1.845	1.085	1.300	0.900
98th	2.320	3.700	1.900	2.000	1.300	0.900
99th	3.268	3.700	1.900	2.000	1.300	0.900
Maximum value	3.700	3.700	1.900	2.000	1.300	0.900

Th

GSC Open File 2951
Statistics for Black Spruce Twigs

Uranium (INAA)

Number of values - 147
Determination limit - 0.1 ppm

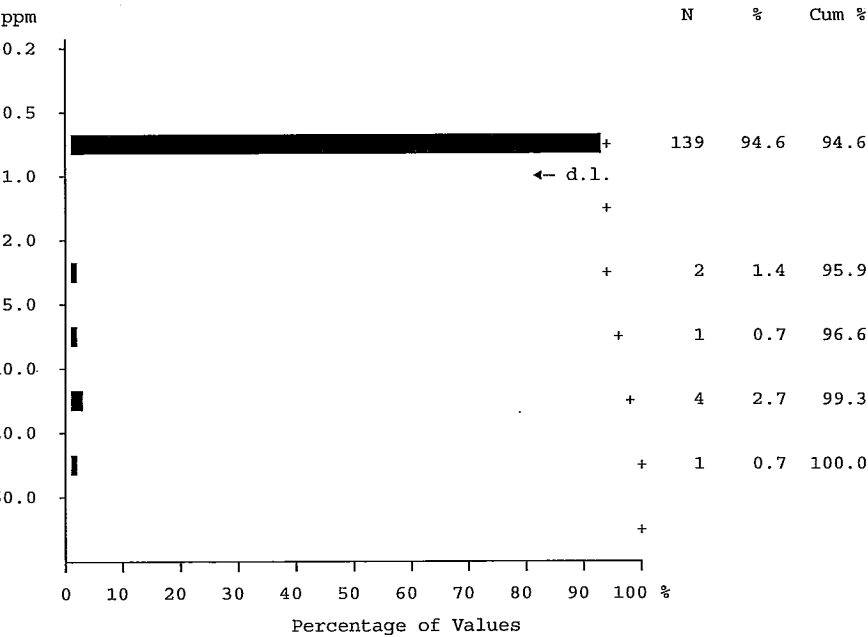


	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	112	18	54	36	3	1
Number of missing values	0	0	0	0	0	0
Mean	0.337	0.442	0.371	0.208	0.222	0.581
Standard deviation	0.635	0.573	0.778	0.372	0.319	0.734
Skewness	3.544	1.232	3.523	2.227	0.750	0.000
Kurtosis	16.419	0.308	13.712	3.557	-1.688	-2.750
Geometric Mean	0.123	0.177	0.122	0.094	0.114	0.262
Percentiles						
Minimum value	0.063	0.063	0.063	0.063	0.063	0.063
25th	0.063	0.063	0.063	0.063	0.063	0.063
50th	0.063	0.063	0.063	0.063	0.063	0.581
75th	0.063	0.800	0.063	0.063	0.541	1.100
80th	0.700	0.800	0.600	0.063	0.700	1.100
90th	1.100	1.400	1.100	0.900	0.700	1.100
95th	1.460	1.850	1.790	1.255	0.700	1.100
98th	2.076	2.000	4.190	1.500	0.700	1.100
99th	4.160	2.000	4.400	1.500	0.700	1.100
Maximum value	4.400	2.000	4.400	1.500	0.700	1.100

GSC Open File 2951
Statistics for Black Spruce Twigs

Tungsten (INAA)

Number of values - 147
Determination limit - 1 ppm



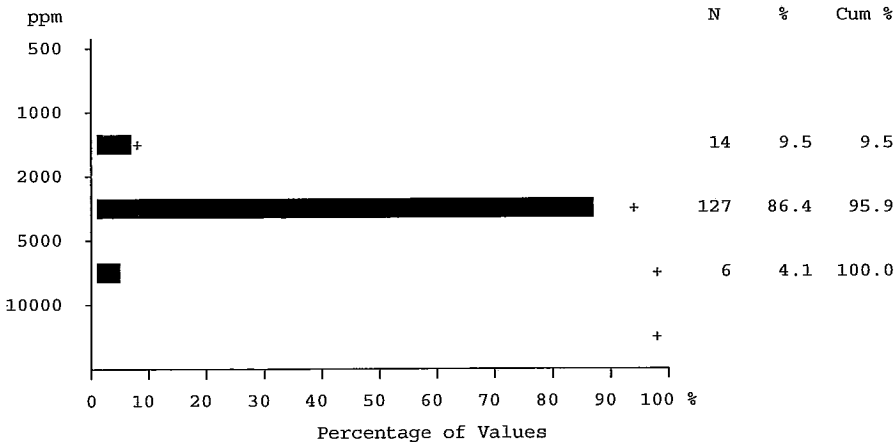
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	139	28	63	42	4	2
Number of missing values	0	0	0	0	0	0
Mean	1.244	0.983	1.777	0.625	0.625	0.625
Standard deviation	3.531	1.927	4.929	0.000	0.000	0.000
Skewness	7.824	4.841	5.612	-	-	-
Kurtosis	70.737	22.203	35.075	-	-	-
Geometric Mean	0.719	0.690	0.806	0.625	0.625	0.625
Percentiles						
Minimum value	0.625	0.625	0.625	0.625	0.625	0.625
25th	0.625	0.625	0.625	0.625	0.625	0.625
50th	0.625	0.625	0.625	0.625	0.625	0.625
75th	0.625	0.625	0.625	0.625	0.625	0.625
80th	0.625	0.625	0.625	0.625	0.625	0.625
90th	0.625	0.625	1.862	0.625	0.625	0.625
95th	2.000	5.813	12.000	0.625	0.625	0.625
98th	12.000	11.000	26.500	0.625	0.625	0.625
99th	25.000	11.000	37.000	0.625	0.625	0.625
Maximum value	37.000	11.000	37.000	0.625	0.625	0.625

GSC Open File 2951
Statistics for Black Spruce Twigs

Zinc (INAA)

Number of values - 147
Determination limit - 20 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	3062.585	2672.414	3422.857	2790.476	2800.000	2350.000
Standard deviation	1059.285	636.899	1197.119	886.431	1067.708	212.132
Skewness	1.992	0.190	2.279	0.214	0.474	0.000
Kurtosis	8.718	-0.901	8.173	-0.776	-1.829	-2.750
Geometric Mean	2909.533	2597.811	3264.441	2646.340	2661.209	2345.208
Percentiles						
Minimum value	1200.000	1600.000	1800.000	1200.000	1800.000	2200.000
25th	2400.000	2300.000	2700.000	2100.000	1950.000	2200.000
50th	2900.000	2600.000	3200.000	2750.000	2550.000	2350.000
75th	3600.000	3250.000	3825.000	3450.000	3900.000	2500.000
80th	3740.000	3400.000	4080.000	3640.000	4300.000	2500.000
90th	4200.000	3600.000	4490.000	4140.000	4300.000	2500.000
95th	4680.000	3850.000	5790.000	4285.000	4300.000	2500.000
98th	5932.000	3900.000	8324.000	4800.000	4300.000	2500.000
99th	8156.000	3900.000	9500.000	4800.000	4300.000	2500.000
Maximum value	9500.000	3900.000	9500.000	4800.000	4300.000	2500.000



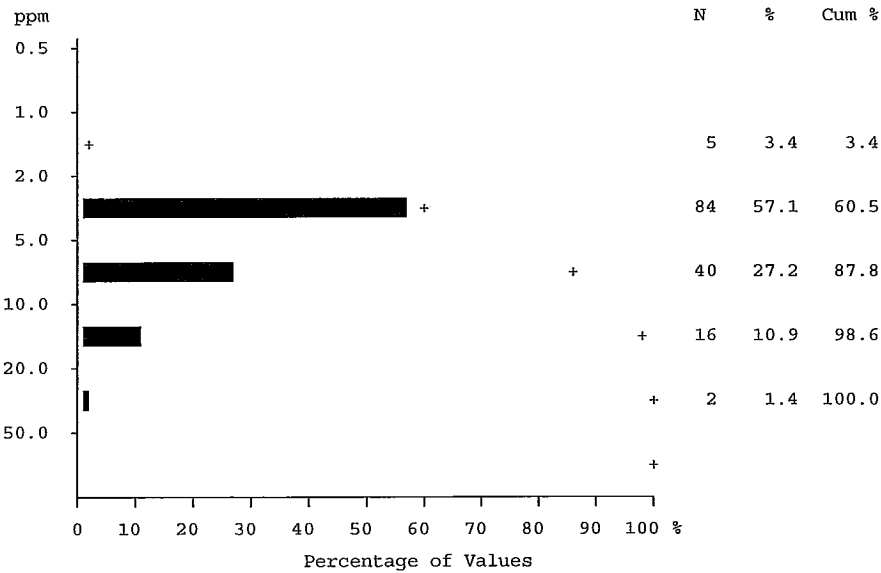
Zn

GSC Open File 2951
Statistics for Black Spruce Twigs

Lanthanum (INAA)

Number of values - 147
Determination limit - 0.1 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	5.703	7.597	5.683	4.181	8.550	5.200
Standard deviation	3.701	4.985	3.183	2.387	6.457	3.394
Skewness	1.859	1.052	1.790	2.256	0.649	0.000
Kurtosis	3.604	0.092	4.289	5.831	-1.767	-2.750
Geometric Mean	4.860	6.269	5.016	3.737	7.125	4.613
Percentiles						
Minimum value	1.700	2.200	1.700	1.900	4.300	2.800
25th	3.200	4.000	3.575	2.850	4.350	2.800
50th	4.500	5.800	4.550	3.300	5.950	5.200
75th	6.900	9.750	7.125	4.825	15.350	7.600
80th	8.040	11.000	8.080	5.120	18.000	7.600
90th	11.000	16.000	10.900	6.610	18.000	7.600
95th	14.600	19.000	12.000	10.625	18.000	7.600
98th	18.080	21.000	16.640	14.000	18.000	7.600
99th	20.520	21.000	20.000	14.000	18.000	7.600
Maximum value	21.000	21.000	20.000	14.000	18.000	7.600

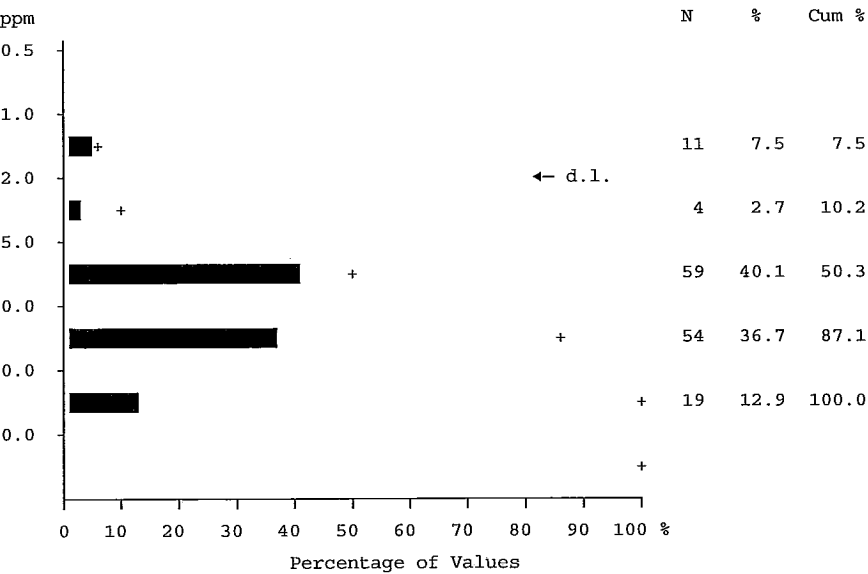


GSC Open File 2951
Statistics for Black Spruce Twigs

Cerium (INAA)

Number of values - 147

Determination limit - 3 ppm



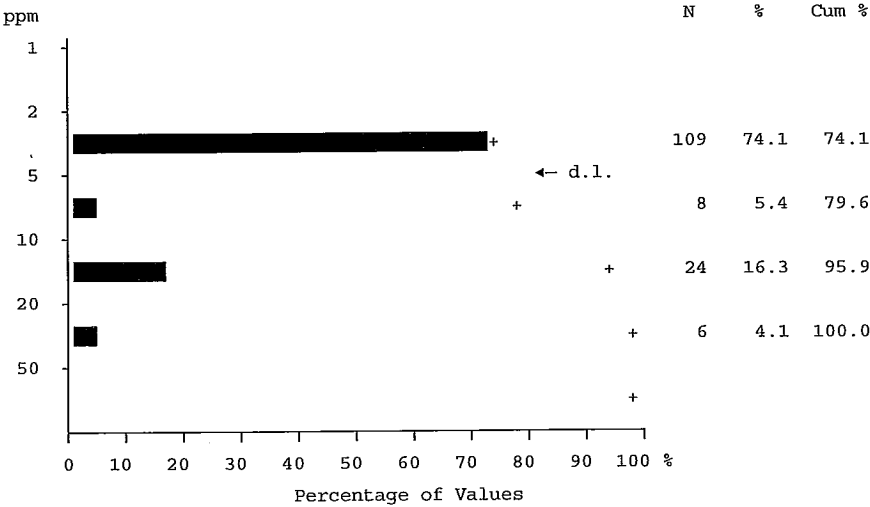
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	11	3	2	6	0	0
Number of missing values	0	0	0	0	0	0
Mean	11.487	13.677	11.939	8.839	16.500	9.500
Standard deviation	7.296	8.886	6.766	6.339	7.594	4.950
Skewness	1.400	0.586	1.631	2.208	0.452	0.000
Kurtosis	2.342	-0.721	4.101	6.636	-1.921	-2.750
Geometric Mean	9.390	10.567	10.301	7.101	15.320	8.832
Percentiles						
Minimum value	1.875	1.875	1.875	1.875	10.000	6.000
25th	7.000	7.000	8.000	5.000	10.500	6.000
50th	9.000	12.000	10.000	8.000	14.500	9.500
75th	14.000	19.000	14.250	11.000	24.500	13.000
80th	17.000	22.000	17.800	11.400	27.000	13.000
90th	21.200	28.000	20.900	14.000	27.000	13.000
95th	27.000	32.000	25.900	24.650	27.000	13.000
98th	34.080	34.000	35.700	36.000	27.000	13.000
99th	39.120	34.000	42.000	36.000	27.000	13.000
Maximum value	42.000	34.000	42.000	36.000	27.000	13.000

GSC Open File 2951
Statistics for Black Spruce Twigs

Neodymium (INAA)

Number of values - 147
Determination limit - 5 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	109	20	54	31	2	2
Number of missing values	0	0	0	0	0	0
Mean	5.875	7.741	5.296	5.568	7.063	3.125
Standard deviation	5.313	7.591	4.533	4.498	6.111	0.000
Skewness	1.865	1.186	2.080	1.461	0.647	-
Kurtosis	2.541	-0.200	3.630	0.571	-1.769	-
Geometric Mean	4.507	5.304	4.245	4.440	5.533	3.125
Percentiles						
Minimum value	3.125	3.125	3.125	3.125	3.125	3.125
25th	3.125	3.125	3.125	3.125	3.125	3.125
50th	3.125	3.125	3.125	3.125	4.563	3.125
75th	6.000	14.000	3.125	6.750	13.500	3.125
80th	10.000	16.000	8.600	10.000	16.000	3.125
90th	15.000	22.000	12.000	14.400	16.000	3.125
95th	17.600	25.000	15.900	15.850	16.000	3.125
98th	23.040	26.000	21.740	18.000	16.000	3.125
99th	25.040	26.000	23.000	18.000	16.000	3.125
Maximum value	26.000	26.000	23.000	18.000	16.000	3.125

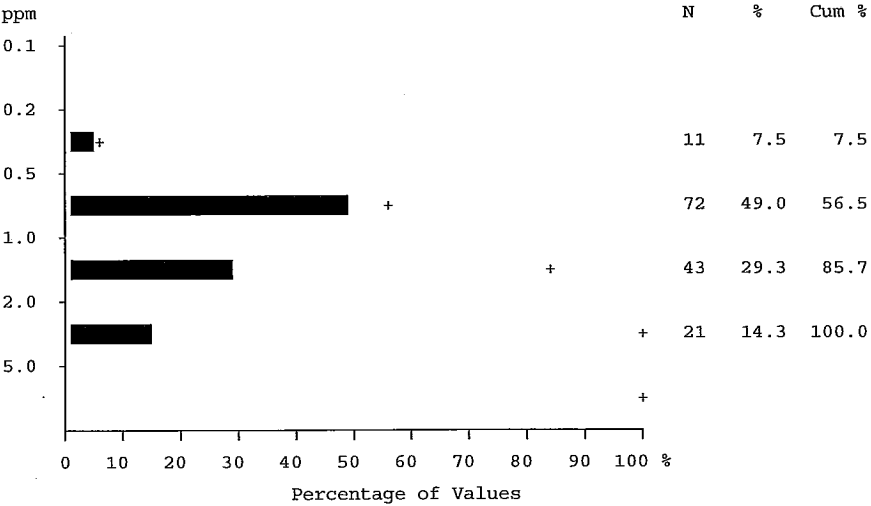


Nd

GSC Open File 2951
Statistics for Black Spruce Twigs

Samarium (INAA)

Number of values - 147
Determination limit - 0.1 ppm



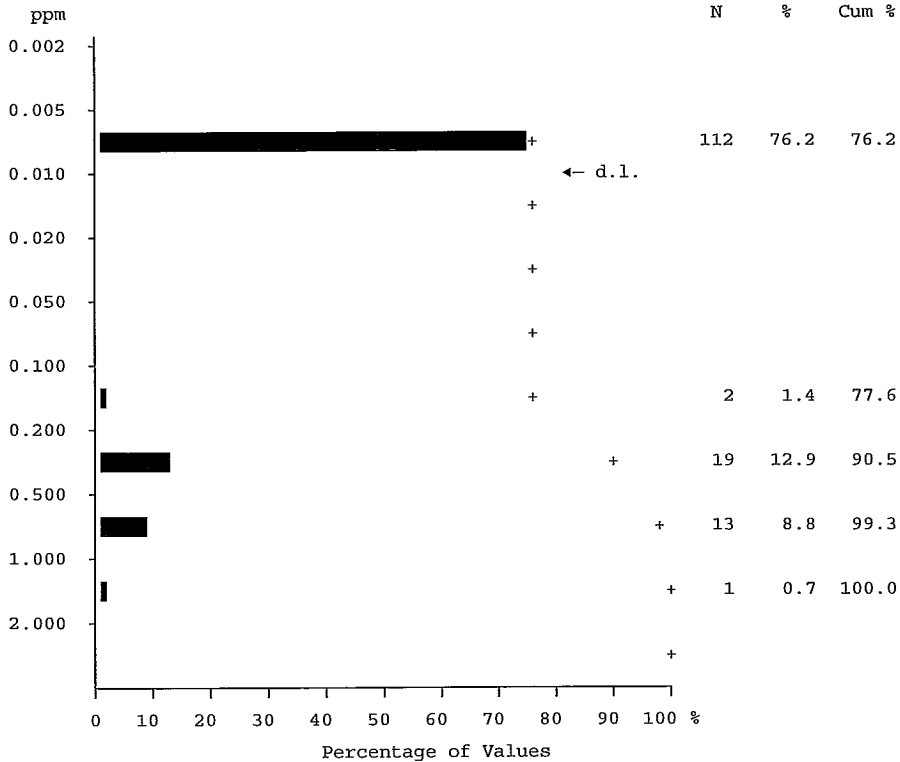
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	1.178	1.366	1.171	1.021	1.825	0.650
Standard deviation	0.792	0.878	0.706	0.785	1.422	0.212
Skewness	1.694	1.185	1.809	1.792	0.638	0.000
Kurtosis	2.712	0.964	3.819	2.435	-1.777	-2.750
Geometric Mean	0.985	1.135	1.016	0.831	1.499	0.632
Percentiles						
Minimum value	0.300	0.400	0.300	0.400	0.900	0.500
25th	0.600	0.650	0.700	0.575	0.900	0.500
50th	0.900	1.200	0.900	0.700	1.250	0.650
75th	1.500	1.850	1.500	1.225	3.325	0.800
80th	1.640	2.000	1.600	1.380	3.900	0.800
90th	2.240	2.900	2.100	2.410	3.900	0.800
95th	2.900	3.550	2.735	3.295	3.900	0.800
98th	3.904	4.000	3.654	3.500	3.900	0.800
99th	4.104	4.000	4.200	3.500	3.900	0.800
Maximum value	4.200	4.000	4.200	3.500	3.900	0.800

GSC Open File 2951
Statistics for Black Spruce Twigs

Europium (INAA)

Number of values - 147
Determination limit - 0.01 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	112	23	52	33	3	1
Number of missing values	0	0	0	0	0	0
Mean	0.123	0.108	0.129	0.126	0.112	0.098
Standard deviation	0.235	0.214	0.241	0.252	0.212	0.130
Skewness	2.022	1.684	2.130	1.829	0.750	0.000
Kurtosis	3.809	1.268	4.992	2.030	-1.688	-2.750
Geometric Mean	0.017	0.015	0.018	0.016	0.017	0.034
Percentiles						
Minimum value	0.006	0.006	0.006	0.006	0.006	0.006
25th	0.006	0.006	0.006	0.006	0.006	0.006
50th	0.006	0.006	0.006	0.006	0.006	0.098
75th	0.006	0.006	0.183	0.006	0.324	0.190
80th	0.314	0.320	0.342	0.304	0.430	0.190
90th	0.494	0.510	0.479	0.554	0.430	0.190
95th	0.654	0.675	0.630	0.835	0.430	0.190
98th	0.862	0.680	1.005	0.900	0.430	0.190
99th	1.077	0.680	1.240	0.900	0.430	0.190
Maximum value	1.240	0.680	1.240	0.900	0.430	0.190

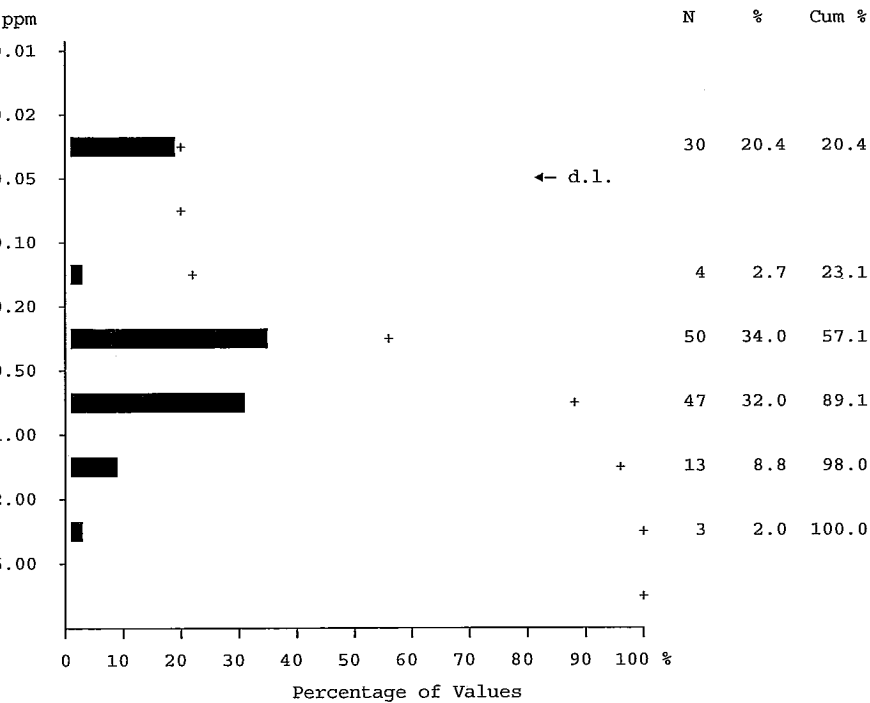


GSC Open File 2951
Statistics for Black Spruce Twigs

Ytterbium (INAA)

Number of values - 147

Determination limit - 0.05 ppm



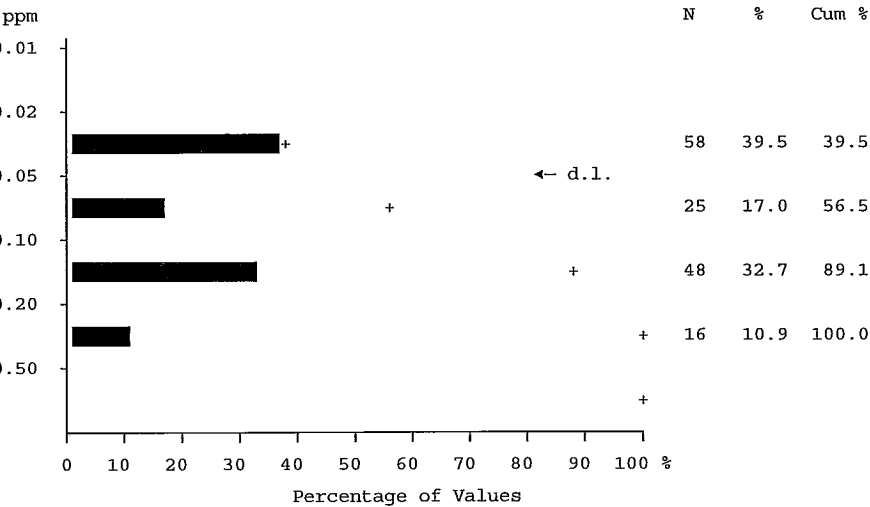
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	30	7	9	13	0	1
Number of missing values	0	0	0	0	0	0
Mean	0.526	0.528	0.536	0.507	0.665	0.266
Standard deviation	0.457	0.443	0.412	0.556	0.256	0.331
Skewness	1.514	0.718	1.657	1.609	-0.012	0.000
Kurtosis	2.913	-0.327	3.410	2.542	-2.396	-2.750
Geometric Mean	0.307	0.288	0.367	0.232	0.626	0.125
Percentiles						
Minimum value	0.031	0.031	0.031	0.031	0.410	0.031
25th	0.210	0.101	0.328	0.031	0.428	0.031
50th	0.430	0.430	0.450	0.415	0.670	0.266
75th	0.680	0.885	0.665	0.660	0.898	0.500
80th	0.812	0.960	0.736	0.864	0.910	0.500
90th	1.166	1.310	1.136	1.331	0.910	0.500
95th	1.526	1.495	1.509	1.777	0.910	0.500
98th	2.000	1.650	2.000	2.500	0.910	0.500
99th	2.260	1.650	2.000	2.500	0.910	0.500
Maximum value	2.500	1.650	2.000	2.500	0.910	0.500

Yb

GSC Open File 2951
Statistics for Black Spruce Twigs

Lutetium (INAA)

Number of values - 147
Determination limit - 0.05 ppm

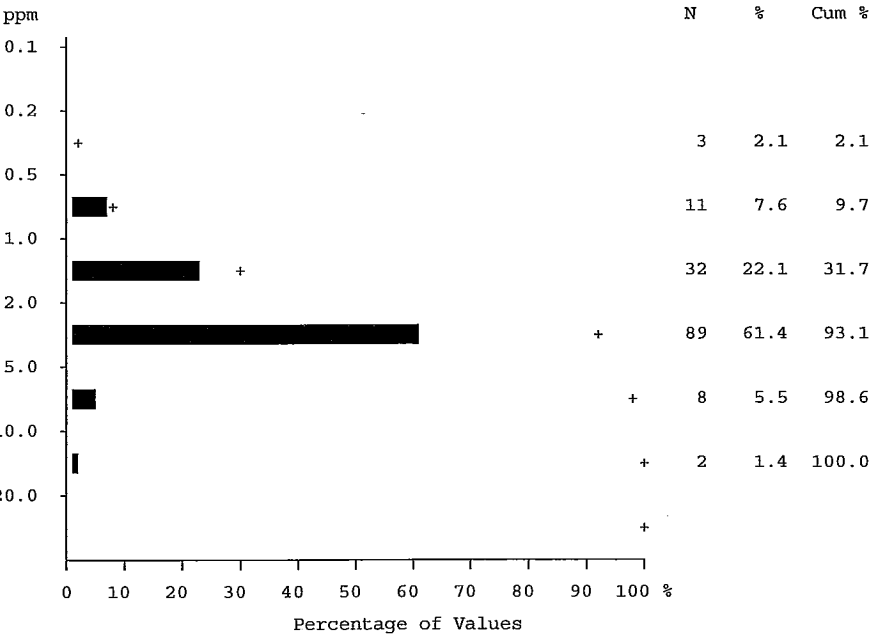


	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	58	14	25	18	1	0
Number of missing values	0	0	0	0	0	0
Mean	0.099	0.103	0.097	0.100	0.108	0.070
Standard deviation	0.083	0.083	0.079	0.095	0.069	0.028
Skewness	1.624	0.711	1.805	1.725	0.249	0.000
Kurtosis	2.846	-0.762	3.667	2.816	-1.857	-2.750
Geometric Mean	0.073	0.072	0.073	0.070	0.089	0.067
Percentiles						
Minimum value	0.031	0.031	0.031	0.031	0.031	0.050
25th	0.031	0.031	0.031	0.031	0.048	0.050
50th	0.080	0.070	0.085	0.070	0.100	0.070
75th	0.130	0.170	0.130	0.123	0.175	0.090
80th	0.154	0.180	0.130	0.156	0.200	0.090
90th	0.212	0.250	0.190	0.257	0.200	0.090
95th	0.266	0.275	0.282	0.296	0.200	0.090
98th	0.380	0.300	0.386	0.450	0.200	0.090
99th	0.421	0.300	0.390	0.450	0.200	0.090
Maximum value	0.450	0.300	0.390	0.450	0.200	0.090

GSC Open File 2951
Statistics for Black Spruce Twigs

Silver (ICP-ES)

Number of values - 147
Determination limit - 0.2 ppm



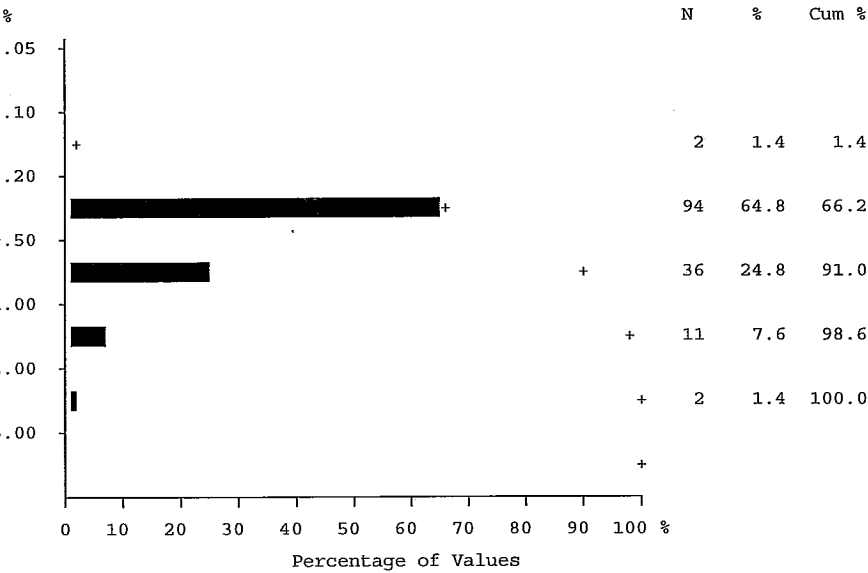
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	2.863	2.055	3.471	2.345	2.850	2.850
Standard deviation	1.882	0.944	2.371	0.937	1.215	0.354
Skewness	2.908	-0.168	2.370	0.562	-0.009	0.000
Kurtosis	12.746	-0.822	6.987	1.500	-2.427	-2.750
Geometric Mean	2.381	1.758	2.886	2.078	2.647	2.839
Percentiles						
Minimum value	0.300	0.300	0.400	0.600	1.700	2.600
25th	1.900	1.500	2.100	1.800	1.750	2.600
50th	2.600	2.000	3.100	2.200	2.900	2.850
75th	3.300	2.750	4.000	2.775	3.900	3.100
80th	3.680	2.900	4.200	2.800	3.900	3.100
90th	4.240	3.300	5.200	3.370	3.900	3.100
95th	5.410	3.600	9.380	3.885	3.900	3.100
98th	9.832	3.900	13.370	5.500	3.900	3.100
99th	13.310	3.900	14.000	5.500	3.900	3.100
Maximum value	14.000	3.900	14.000	5.500	3.900	3.100

GSC Open File 2951
Statistics for Black Spruce Twigs

Aluminum (ICP-ES)

Number of values - 147

Determination limit - 0.01 %



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	0.510	0.436	0.479	0.652	0.455	0.385
Standard deviation	0.410	0.217	0.416	0.514	0.031	0.134
Skewness	3.632	0.878	5.012	1.485	0.599	0.000
Kurtosis	18.387	-0.136	30.923	2.007	-1.785	-2.750
Geometric Mean	0.424	0.390	0.406	0.486	0.454	0.373
Percentiles						
Minimum value	0.120	0.140	0.120	0.210	0.430	0.290
25th	0.285	0.265	0.288	0.283	0.433	0.290
50th	0.380	0.330	0.380	0.395	0.445	0.385
75th	0.560	0.620	0.538	0.830	0.488	0.480
80th	0.630	0.630	0.576	0.990	0.500	0.480
90th	0.886	0.680	0.690	1.428	0.500	0.480
95th	1.314	0.955	1.149	1.708	0.500	0.480
98th	1.780	1.000	2.509	2.470	0.500	0.480
99th	2.956	1.000	3.370	2.470	0.500	0.480
Maximum value	3.370	1.000	3.370	2.470	0.500	0.480

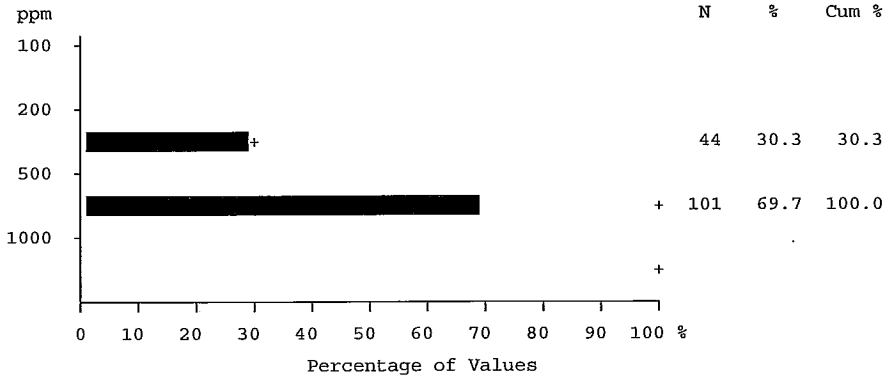
GSC Open File 2951
Statistics for Black Spruce Twigs

Boron (ICP-ES)

Number of values - 147

Determination limit - 2 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	558.614	551.103	548.814	577.450	535.500	598.500
Standard deviation	118.132	134.532	106.685	139.920	27.404	10.607
Skewness	-0.329	0.088	-0.163	-0.778	-0.082	0.000
Kurtosis	0.128	-0.329	-0.107	-0.274	-1.877	-2.750
Geometric Mean	537.644	534.368	537.813	537.119	534.971	598.453
Percentiles						
Minimum value	213.000	295.000	294.000	213.000	501.000	591.000
25th	485.500	465.000	487.750	475.250	509.500	591.000
50th	549.000	558.000	543.500	544.500	536.500	598.500
75th	626.500	634.500	605.500	667.500	560.500	606.000
80th	646.600	647.000	631.800	681.800	568.000	606.000
90th	701.400	723.000	697.800	709.100	568.000	606.000
95th	725.100	808.500	719.400	752.100	568.000	606.000
98th	805.440	874.000	778.060	845.000	568.000	606.000
99th	860.660	874.000	802.000	845.000	568.000	606.000
Maximum value	874.000	874.000	802.000	845.000	568.000	606.000

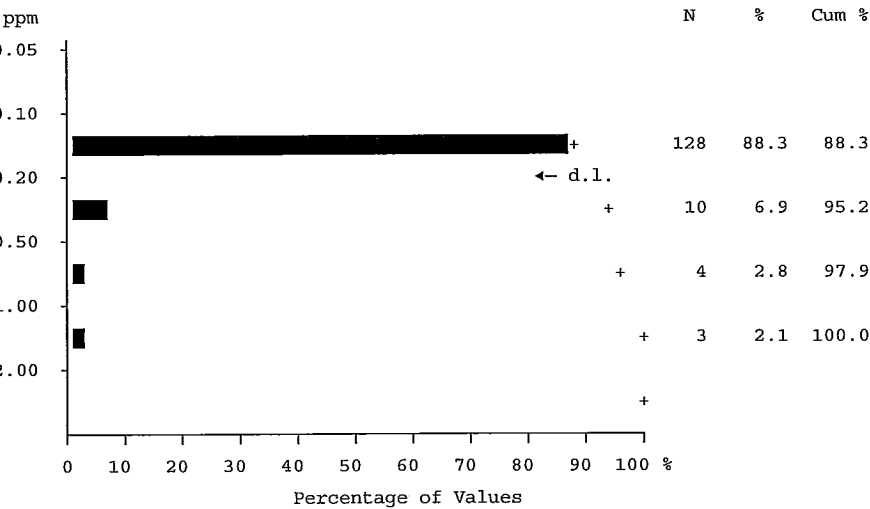


GSC Open File 2951
Statistics for Black Spruce Twigs

Beryllium (ICP-ES)

Number of values - 147

Determination limit - 0.3 ppm



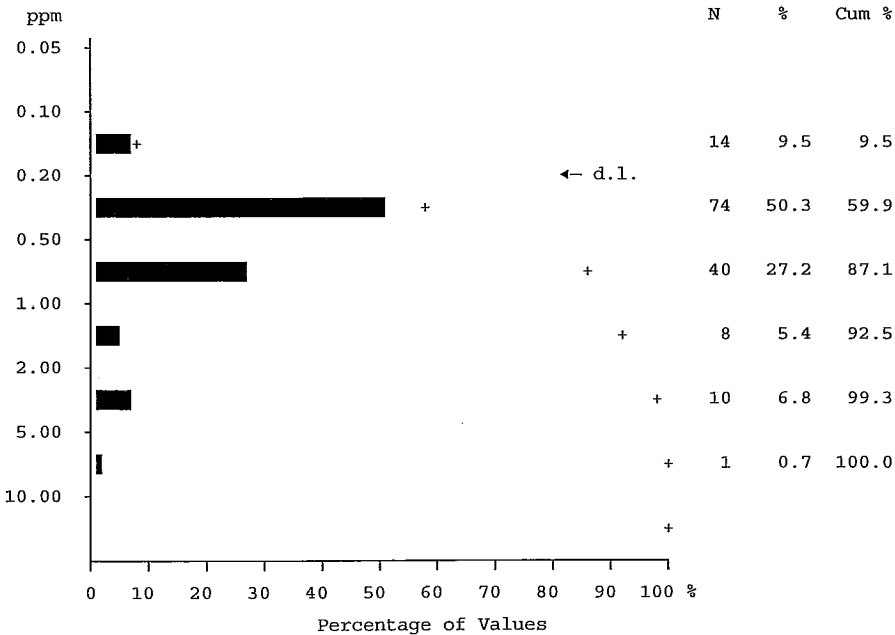
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	128	21	62	39	4	2
Number of missing values	2	0	0	2	0	0
Mean	0.246	0.319	0.235	0.207	0.188	0.188
Standard deviation	0.190	0.304	0.164	0.066	0.000	0.000
Skewness	4.149	2.601	4.170	5.229	-	-
Kurtosis	18.881	6.238	18.500	28.264	-	-
Geometric Mean	0.213	0.254	0.212	0.193	0.188	0.188
Percentiles						
Minimum value	0.188	0.188	0.188	0.188	0.188	0.188
25th	0.188	0.188	0.188	0.188	0.188	0.188
50th	0.188	0.188	0.188	0.188	0.188	0.188
75th	0.188	0.350	0.188	0.188	0.188	0.188
80th	0.188	0.400	0.188	0.188	0.188	0.188
90th	0.400	0.900	0.400	0.188	0.188	0.188
95th	0.540	1.250	0.580	0.188	0.188	0.188
98th	1.016	1.500	1.032	0.600	0.188	0.188
99th	1.362	1.500	1.200	0.600	0.188	0.188
Maximum value	1.500	1.500	1.200	0.600	0.188	0.188

GSC Open File 2951
Statistics for Black Spruce Twigs

Bismuth (hydride)

Number of values - 147
Determination limit - 0.2 ppm

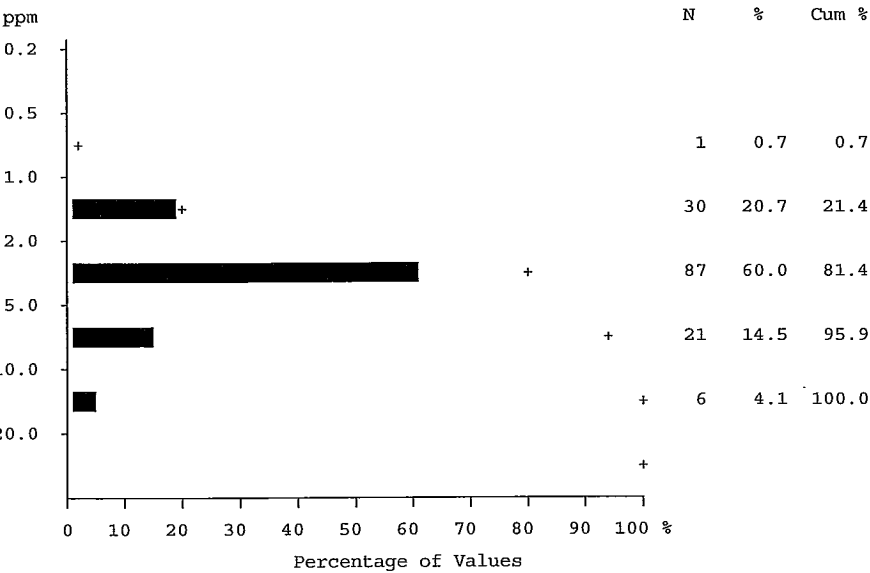
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	14	4	7	3	0	0
Number of missing values	0	0	0	0	0	0
Mean	0.664	0.345	0.944	0.388	0.900	0.800
Standard deviation	0.909	0.159	1.223	0.181	1.068	0.424
Skewness	4.117	0.443	2.844	0.993	0.746	0.000
Kurtosis	22.335	-0.473	10.271	1.005	-1.690	-2.750
Geometric Mean	0.436	0.308	0.558	0.348	0.589	0.742
Percentiles						
Minimum value	0.125	0.125	0.125	0.125	0.300	0.500
25th	0.300	0.200	0.300	0.300	0.325	0.500
50th	0.400	0.300	0.500	0.400	0.400	0.800
75th	0.600	0.450	0.850	0.500	1.975	1.100
80th	0.700	0.500	1.280	0.500	2.500	1.100
90th	1.400	0.500	2.880	0.670	2.500	1.100
95th	2.820	0.700	3.145	0.870	2.500	1.100
98th	3.236	0.700	6.072	0.900	2.500	1.100
99th	5.868	0.700	7.500	0.900	2.500	1.100
Maximum value	7.500	0.700	7.500	0.900	2.500	1.100



GSC Open File 2951
Statistics for Black Spruce Twigs

Cadmium (ICP-ES)

Number of values - 147
Determination limit - 0.2 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	3.629	2.962	4.607	2.198	6.475	1.950
Standard deviation	2.427	1.366	2.709	0.781	3.991	0.495
Skewness	2.001	1.041	1.592	0.245	0.703	0.000
Kurtosis	4.644	0.475	2.309	-0.350	-1.715	-2.750
Geometric Mean	3.034	2.696	4.002	1.953	5.760	1.918
Percentiles						
Minimum value	0.900	1.000	1.300	0.900	3.700	1.600
25th	2.050	1.950	2.875	1.425	3.975	1.600
50th	2.900	2.500	3.900	2.050	4.900	1.950
75th	4.200	3.750	5.525	2.500	10.550	2.300
80th	4.660	4.200	6.300	2.600	12.400	2.300
90th	6.440	5.200	8.080	3.290	12.400	2.300
95th	8.240	6.150	12.050	3.775	12.400	2.300
98th	12.608	6.900	13.222	4.200	12.400	2.300
99th	13.186	6.900	13.600	4.200	12.400	2.300
Maximum value	13.600	6.900	13.600	4.200	12.400	2.300

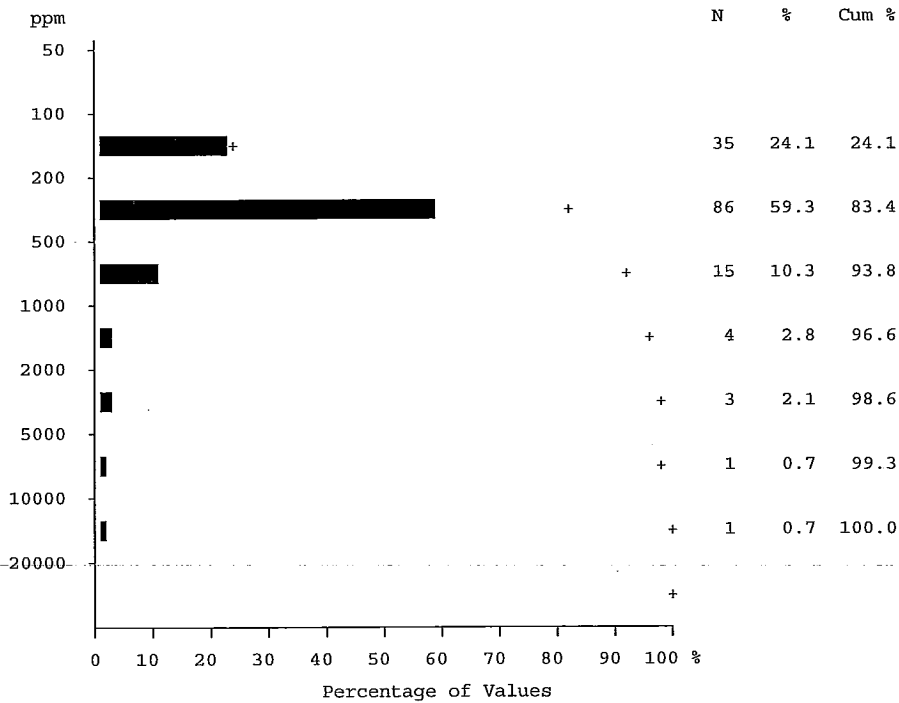
Cd

GSC Open File 2951
Statistics for Black Spruce Twigs

Copper (ICP-ES)

Number of values - 147
Determination limit - 1 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	519.662	214.034	832.871	234.375	278.000	223.000
Standard deviation	1285.824	53.319	1800.508	114.686	159.965	19.799
Skewness	6.854	1.028	4.657	4.319	0.713	0.000
Kurtosis	51.283	1.340	22.825	22.047	-1.709	-2.750
Geometric Mean	297.934	208.172	430.854	209.114	251.163	222.560
Percentiles						
Minimum value	128.000	128.000	180.000	132.000	170.000	209.000
25th	200.500	180.000	235.000	173.750	180.250	209.000
50th	237.000	201.000	330.000	211.500	213.000	223.000
75th	341.500	241.000	588.000	241.500	440.750	237.000
80th	377.600	247.000	699.200	244.600	516.000	237.000
90th	734.400	297.000	1359.900	263.500	516.000	237.000
95th	1321.700	347.500	3949.150	274.600	516.000	237.000
98th	5246.400	378.000	10519.520	879.000	516.000	237.000
99th	10387.760	378.000	11903.000	879.000	516.000	237.000
Maximum value	11903.000	378.000	11903.000	879.000	516.000	237.000

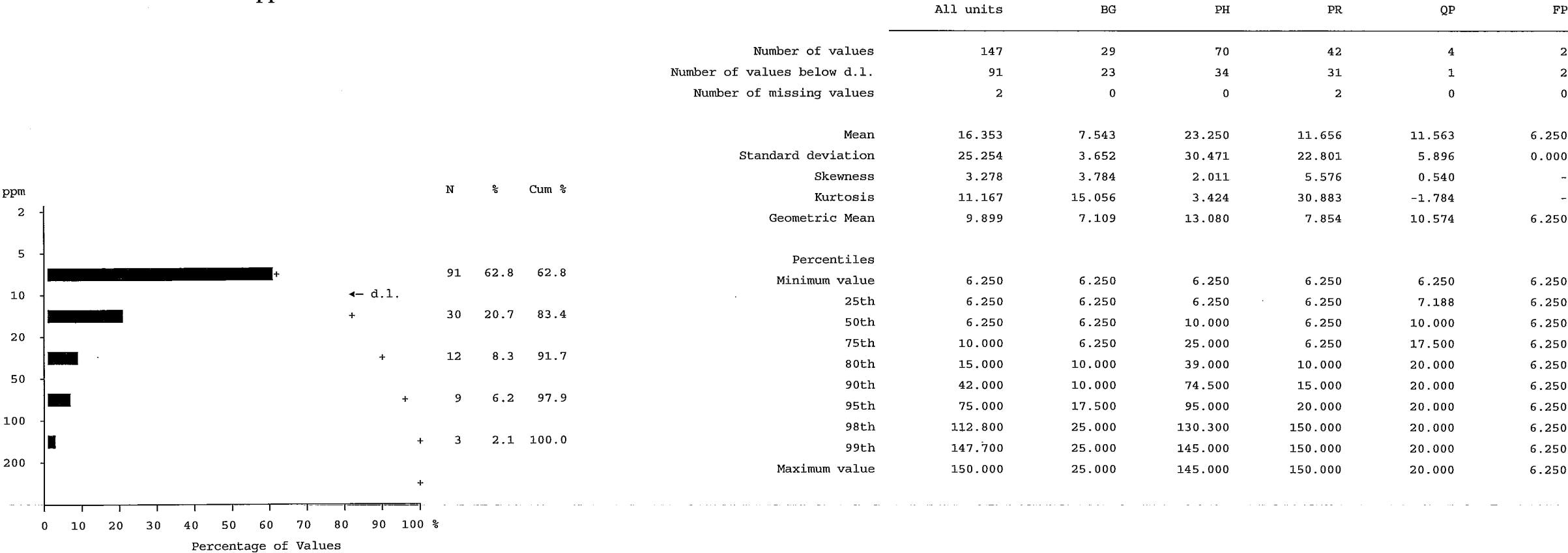


Cu

GSC Open File 2951
Statistics for Black Spruce Twigs

Mercury (Cold Vapour AAS)

Number of values - 147
Determination limit - 10 ppm

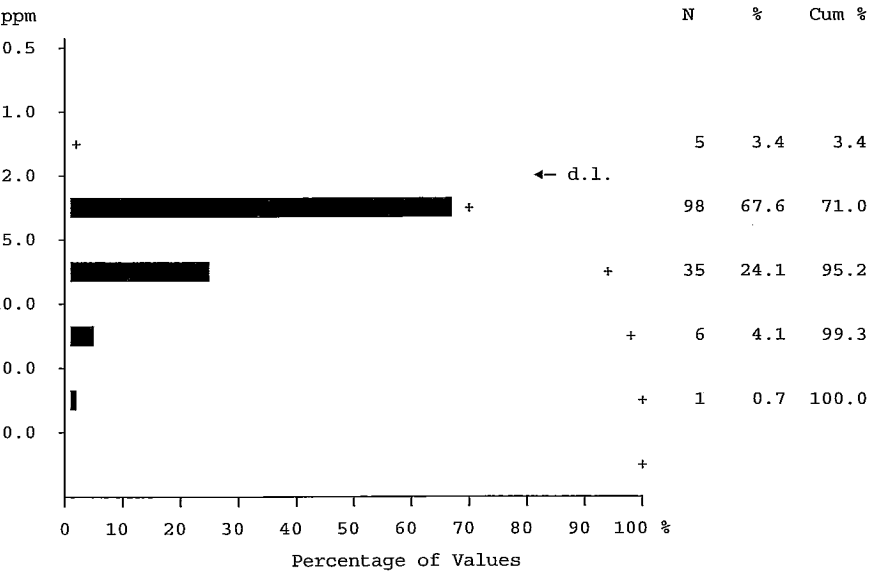


Hg

GSC Open File 2951
Statistics for Black Spruce Twigs

Lithium (ICP-ES)

Number of values - 147
Determination limit - 2 ppm



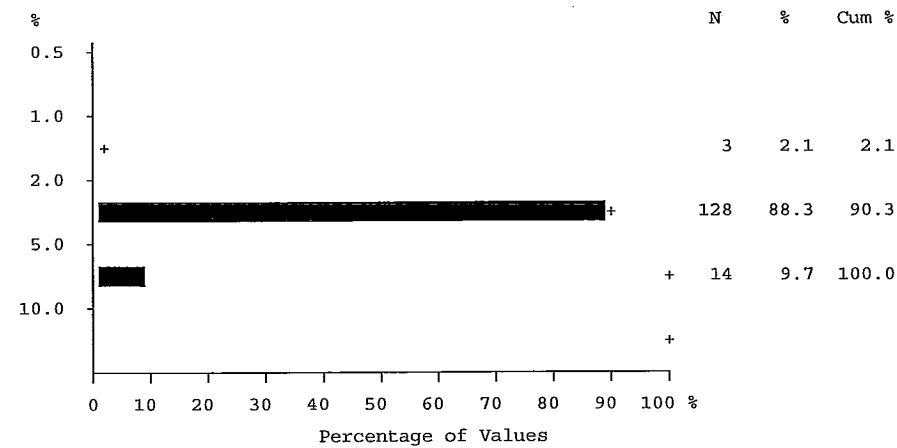
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	5	2	3	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	4.245	3.845	4.282	4.700	4.000	3.000
Standard deviation	2.827	2.082	3.441	2.222	0.000	1.414
Skewness	3.023	1.115	3.133	1.187	-	0.000
Kurtosis	13.329	0.786	11.511	1.493	-	-2.750
Geometric Mean	3.653	3.372	3.558	4.068	4.000	2.828
Percentiles						
Minimum value	1.250	1.250	1.250	2.000	4.000	2.000
25th	3.000	2.000	2.750	3.000	4.000	2.000
50th	4.000	3.000	3.000	4.000	4.000	3.000
75th	5.000	5.000	5.000	5.000	4.000	4.000
80th	5.000	6.000	5.000	6.000	4.000	4.000
90th	7.000	7.000	7.900	7.000	4.000	4.000
95th	9.700	9.000	11.350	9.950	4.000	4.000
98th	13.400	10.000	20.320	12.000	4.000	4.000
99th	20.160	10.000	22.000	12.000	4.000	4.000
Maximum value	22.000	10.000	22.000	12.000	4.000	4.000

GSC Open File 2951
Statistics for Black Spruce Twigs

Magnesium (ICP-ES)

Number of values - 147

Determination limit - 0.01 %



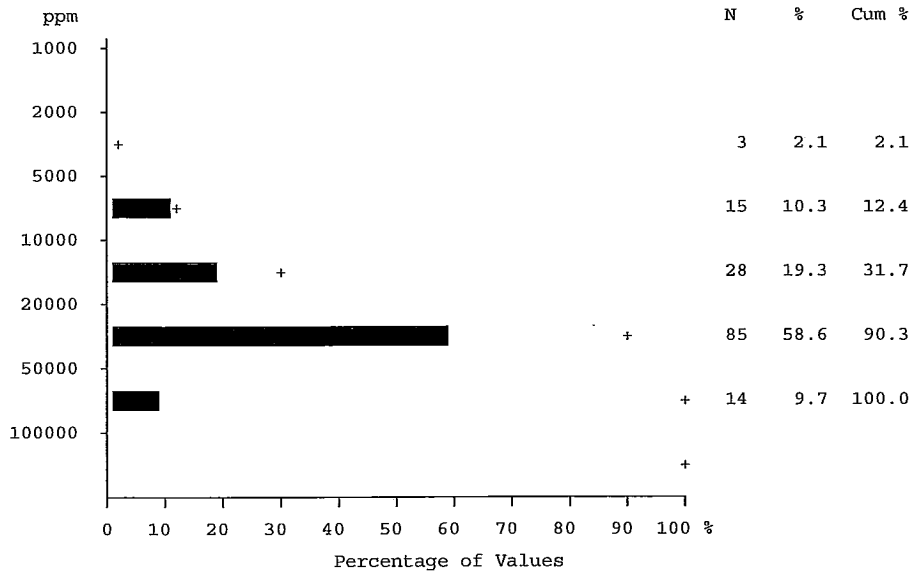
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	3.638	3.289	3.216	4.659	2.985	4.420
Standard deviation	1.050	0.826	0.737	1.206	0.646	0.495
Skewness	1.002	0.160	1.233	0.246	0.077	0.000
Kurtosis	1.240	-0.966	3.501	-1.203	-2.326	-2.750
Geometric Mean	3.456	3.186	3.140	4.353	2.933	4.406
Percentiles						
Minimum value	1.700	1.700	1.840	3.040	2.380	4.070
25th	2.865	2.685	2.758	3.623	2.410	4.070
50th	3.410	3.290	3.120	4.035	2.930	4.420
75th	4.010	3.960	3.543	5.490	3.615	4.770
80th	4.230	4.240	3.636	5.564	3.700	4.770
90th	4.952	4.680	4.038	6.287	3.700	4.770
95th	5.909	4.685	4.698	7.017	3.700	4.770
98th	6.617	4.690	5.727	7.200	3.700	4.770
99th	7.126	4.690	6.370	7.200	3.700	4.770
Maximum value	7.200	4.690	6.370	7.200	3.700	4.770

Mg

GSC Open File 2951
Statistics for Black Spruce Twigs

Manganese (ICP-ES)

Number of values - 147
Determination limit - 1 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	28508.752	32077.414	34352.471	13984.075	41749.750	24709.500
Standard deviation	15232.759	11155.322	14549.556	6792.150	13450.289	7440.885
Skewness	0.526	0.552	0.566	0.301	0.080	0.000
Kurtosis	-0.083	-0.190	0.112	-0.742	-1.874	-2.750
Geometric Mean	23675.752	30229.193	31147.742	11631.414	40062.268	24142.825
Percentiles						
Minimum value	2938.000	15505.000	7109.000	2938.000	25772.000	19448.000
25th	15812.000	22317.000	23737.250	8282.500	29571.500	19448.000
50th	25895.000	31570.000	32542.000	11947.500	41271.000	24709.500
75th	37547.500	36579.500	43487.250	18136.000	54406.750	29971.000
80th	40839.600	40320.000	46045.200	19949.400	58685.000	29971.000
90th	48513.400	47472.000	55368.100	22551.800	58685.000	29971.000
95th	56196.100	57556.000	60266.900	24746.250	58685.000	29971.000
98th	63137.320	58960.000	75144.220	31289.000	58685.000	29971.000
99th	74977.860	58960.000	76891.000	31289.000	58685.000	29971.000
Maximum value	76891.000	58960.000	76891.000	31289.000	58685.000	29971.000

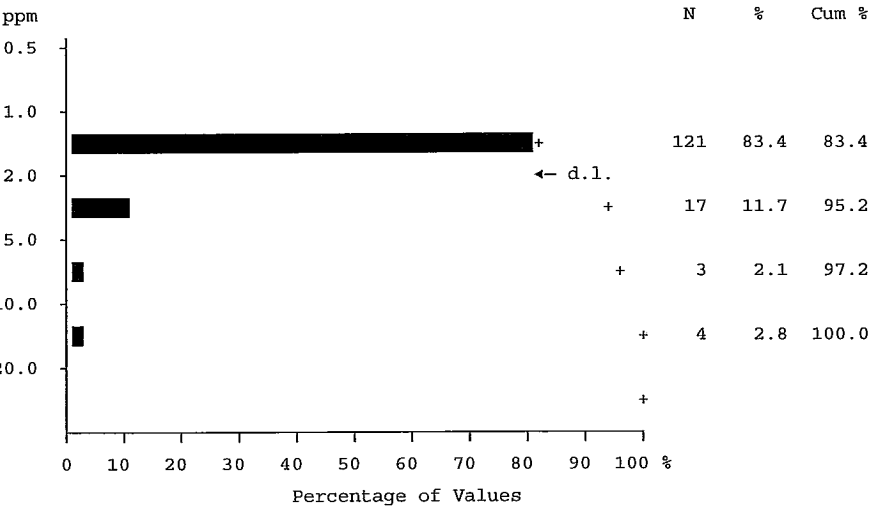
Mn

GSC Open File 2951
Statistics for Black Spruce Twigs

Molybdenum (ICP-ES)

Number of values - 147

Determination limit - 2 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	121	29	50	37	3	2
Number of missing values	2	0	0	2	0	0
Mean	1.860	1.250	2.393	1.419	1.688	1.250
Standard deviation	1.960	0.000	2.698	0.407	0.875	0.000
Skewness	4.205	-	2.758	2.943	0.750	-
Kurtosis	18.573	-	7.035	8.565	-1.688	-
Geometric Mean	1.509	1.250	1.766	1.321	1.556	1.250
Percentiles						
Minimum value	1.250	1.250	1.250	1.250	1.250	1.250
25th	1.250	1.250	1.250	1.250	1.250	1.250
50th	1.250	1.250	1.250	1.250	1.250	1.250
75th	1.250	1.250	2.000	1.250	2.563	1.250
80th	1.250	1.250	2.800	1.250	3.000	1.250
90th	3.000	1.250	5.800	1.250	3.000	1.250
95th	5.400	1.250	10.450	2.950	3.000	1.250
98th	11.080	1.250	13.160	3.000	3.000	1.250
99th	13.080	1.250	14.000	3.000	3.000	1.250
Maximum value	14.000	1.250	14.000	3.000	3.000	1.250

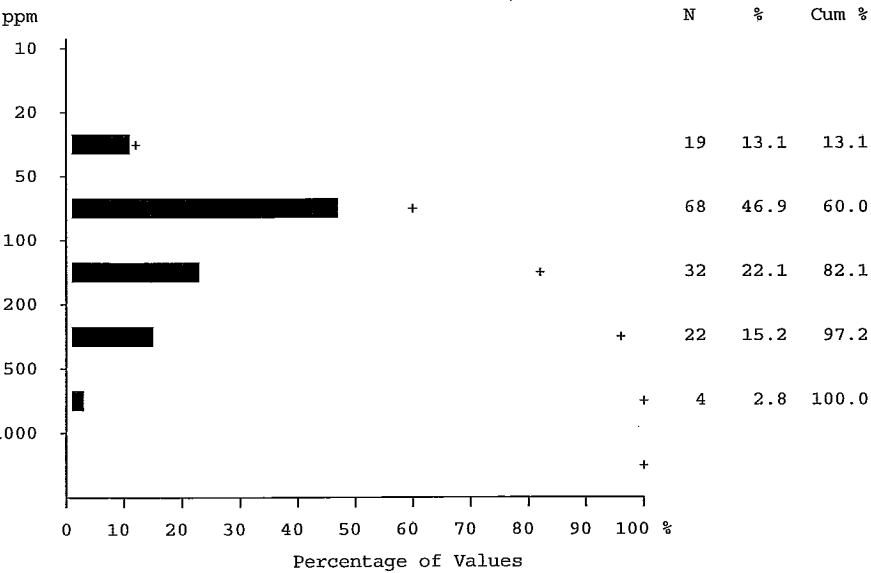
Mo

GSC Open File 2951
Statistics for Black Spruce Twigs

Nickel (ICP-ES)

Number of values - 147

Determination limit - 1 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	129.303	64.172	74.100	285.100	60.500	192.500
Standard deviation	123.616	22.779	31.038	154.553	9.110	9.192
Skewness	2.471	0.972	1.762	1.090	0.413	0.000
Kurtosis	6.788	0.034	3.577	0.405	-1.910	-2.750
Geometric Mean	96.242	60.735	69.169	242.564	60.008	192.390
Percentiles						
Minimum value	34.000	34.000	37.000	93.000	52.000	186.000
25th	57.000	47.000	53.000	187.250	53.000	186.000
50th	76.000	58.000	64.500	223.500	58.500	192.500
75th	171.000	72.500	86.500	324.250	70.000	199.000
80th	194.400	77.000	94.000	364.400	73.000	199.000
90th	255.800	106.000	112.000	620.100	73.000	199.000
95th	376.300	116.500	139.300	647.600	73.000	199.000
98th	640.640	117.000	189.900	664.000	73.000	199.000
99th	656.640	117.000	192.000	664.000	73.000	199.000
Maximum value	664.000	117.000	192.000	664.000	73.000	199.000

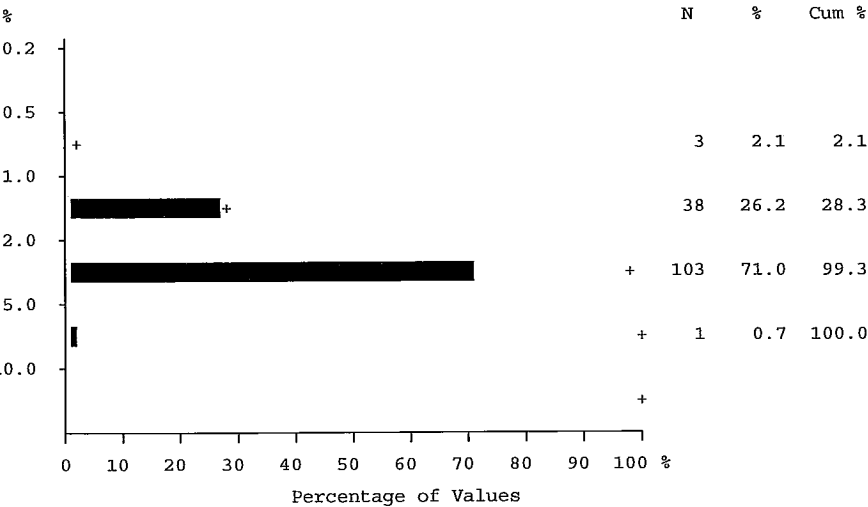
Ni

GSC Open File 2951
Statistics for Black Spruce Twigs

Phosphorus (ICP-ES)

Number of values - 147

Determination limit - 0.001 %



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	2.505	2.967	2.456	2.139	2.771	3.235
Standard deviation	0.826	1.030	0.699	0.668	0.804	0.672
Skewness	0.442	0.268	0.156	0.181	0.376	0.000
Kurtosis	0.095	-0.924	-0.141	-0.207	-1.985	-2.750
Geometric Mean	2.330	2.787	2.350	1.956	2.689	3.200
Percentiles						
Minimum value	0.885	1.069	0.958	0.885	2.050	2.760
25th	1.880	2.108	2.031	1.551	2.109	2.760
50th	2.412	2.879	2.484	2.003	2.590	3.235
75th	2.938	3.808	2.891	2.502	3.613	3.710
80th	3.034	4.127	2.998	2.615	3.853	3.710
90th	3.694	4.420	3.277	2.854	3.853	3.710
95th	4.125	4.827	3.813	3.564	3.853	3.710
98th	4.426	5.163	4.134	3.870	3.853	3.710
99th	4.854	5.163	4.144	3.870	3.853	3.710
Maximum value	5.163	5.163	4.144	3.870	3.853	3.710

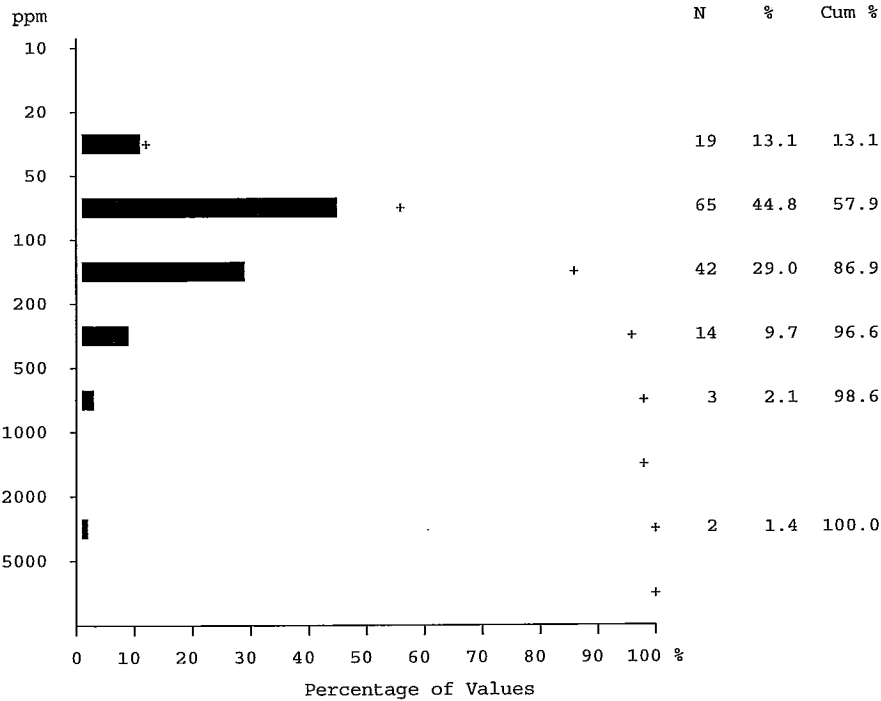
GSC Open File 2951
Statistics for Black Spruce Twigs

Lead (ICP-ES)

Number of values - 147

Determination limit - 3 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	150.428	87.483	214.914	91.850	109.500	85.000
Standard deviation	299.515	46.026	419.967	43.530	78.573	15.556
Skewness	6.805	1.460	4.663	0.697	0.582	0.000
Kurtosis	49.659	1.853	22.214	-0.180	-1.771	-2.750
Geometric Mean	97.521	78.235	121.233	79.253	91.457	84.285
Percentiles						
Minimum value	30.000	30.000	30.000	32.000	42.000	74.000
25th	62.000	57.500	66.500	58.250	52.250	74.000
50th	85.000	75.000	106.500	77.500	86.500	85.000
75th	124.000	102.500	178.000	112.750	189.750	96.000
80th	155.000	113.000	229.600	115.600	223.000	96.000
90th	231.800	166.000	367.200	165.800	223.000	96.000
95th	353.600	211.500	713.650	184.850	223.000	96.000
98th	1014.400	233.000	2505.700	200.000	223.000	96.000
99th	2503.100	233.000	2533.000	200.000	223.000	96.000
Maximum value	2533.000	233.000	2533.000	200.000	223.000	96.000



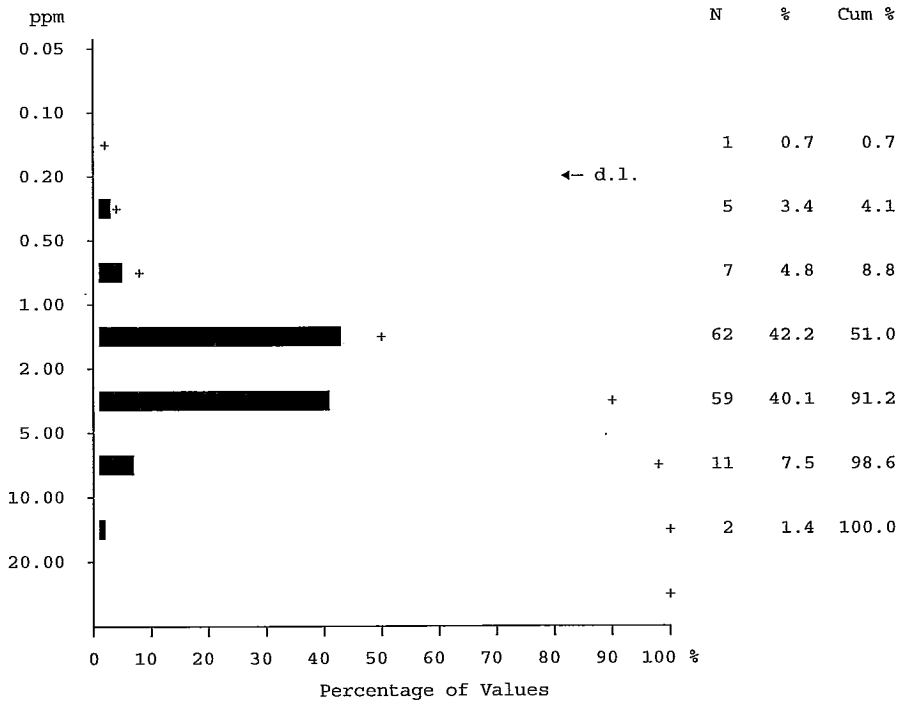
Pb

GSC Open File 2951
Statistics for Black Spruce Twigs

Selenium (hydride)

Number of values - 147
Determination limit - 0.2 ppm

	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	1	0	1	0	0	0
Number of missing values	0	0	0	0	0	0
Mean	2.442	1.893	3.132	1.700	2.500	1.750
Standard deviation	1.848	0.924	2.303	0.788	2.369	0.636
Skewness	2.069	0.681	1.389	0.857	0.682	0.000
Kurtosis	4.830	-0.270	1.448	0.327	-1.730	-2.750
Geometric Mean	1.936	1.674	2.382	1.530	1.865	1.691
Percentiles						
Minimum value	0.125	0.400	0.125	0.400	0.800	1.300
25th	1.300	1.200	1.600	1.100	0.950	1.300
50th	1.900	1.700	2.500	1.500	1.600	1.750
75th	2.800	2.550	4.150	2.325	4.950	2.200
80th	3.100	2.800	4.480	2.400	6.000	2.200
90th	4.560	3.300	7.270	2.640	6.000	2.200
95th	7.180	3.950	8.000	3.610	6.000	2.200
98th	8.092	4.200	10.416	3.900	6.000	2.200
99th	10.404	4.200	10.500	3.900	6.000	2.200
Maximum value	10.500	4.200	10.500	3.900	6.000	2.200



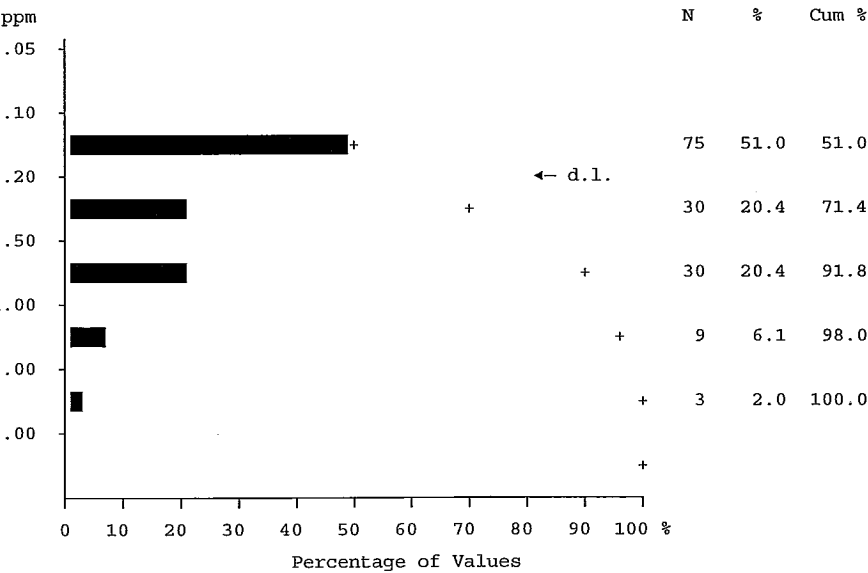
Se

GSC Open File 2951
Statistics for Black Spruce Twigs

Tellurium (hydride)

Number of values - 147

Determination limit - 0.2 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	75	18	32	22	3	0
Number of missing values	0	0	0	0	0	0
Mean	0.396	0.229	0.444	0.406	0.469	0.800
Standard deviation	0.460	0.187	0.535	0.424	0.688	0.141
Skewness	2.652	2.001	2.633	1.689	0.750	0.000
Kurtosis	8.345	3.665	7.373	2.435	-1.688	-2.750
Geometric Mean	0.257	0.186	0.280	0.264	0.233	0.794
Percentiles						
Minimum value	0.125	0.125	0.125	0.125	0.125	0.700
25th	0.125	0.125	0.125	0.125	0.125	0.700
50th	0.125	0.125	0.200	0.125	0.125	0.800
75th	0.500	0.300	0.600	0.600	1.156	0.900
80th	0.600	0.300	0.700	0.700	1.500	0.900
90th	0.900	0.500	0.990	1.040	1.500	0.900
95th	1.320	0.750	1.850	1.455	1.500	0.900
98th	2.408	0.900	2.600	1.900	1.500	0.900
99th	2.600	0.900	2.600	1.900	1.500	0.900
Maximum value	2.600	0.900	2.600	1.900	1.500	0.900

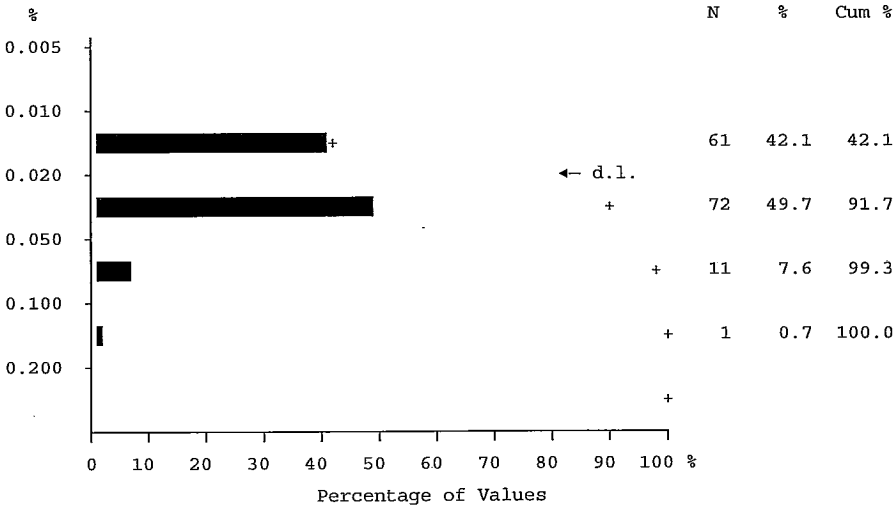
Te

GSC Open File 2951
Statistics for Black Spruce Twigs

Titanium (ICP-ES)

Number of values - 147
Determination limit - 0.02 %

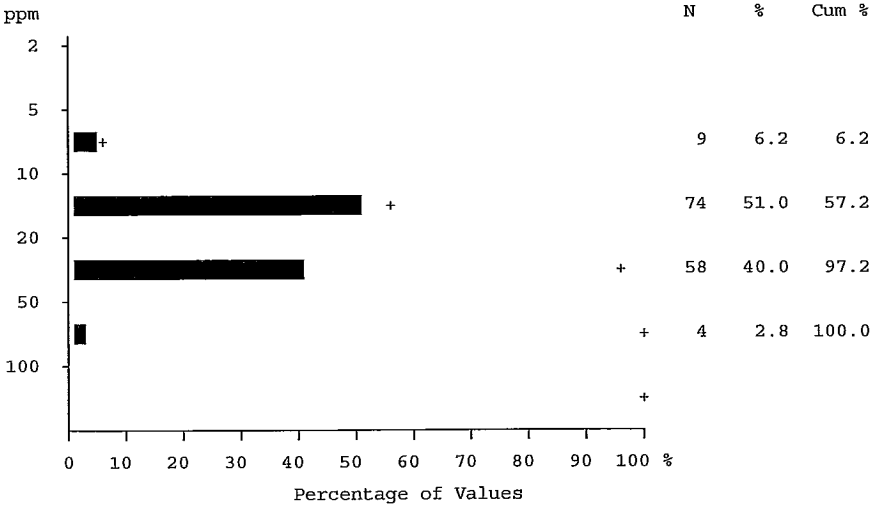
	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	61	8	31	21	0	1
Number of missing values	2	0	0	2	0	0
Mean	0.024	0.029	0.022	0.025	0.020	0.021
Standard deviation	0.016	0.017	0.015	0.017	0.000	0.012
Skewness	2.321	1.288	3.320	1.632	-	0.000
Kurtosis	7.250	1.206	15.331	2.854	-	-2.750
Geometric Mean	0.020	0.025	0.019	0.020	0.020	0.019
Percentiles						
Minimum value	0.013	0.013	0.013	0.013	0.020	0.013
25th	0.013	0.013	0.013	0.013	0.020	0.013
50th	0.020	0.020	0.020	0.013	0.020	0.021
75th	0.030	0.040	0.030	0.030	0.020	0.030
80th	0.030	0.040	0.030	0.040	0.020	0.030
90th	0.040	0.050	0.040	0.050	0.020	0.030
95th	0.050	0.075	0.045	0.059	0.020	0.030
98th	0.081	0.080	0.089	0.090	0.020	0.030
99th	0.101	0.080	0.110	0.090	0.020	0.030
Maximum value	0.110	0.080	0.110	0.090	0.020	0.030



GSC Open File 2951
Statistics for Black Spruce Twigs

Vanadium (ICP-ES)

Number of values - 147
Determination limit - 2 ppm



	All units	BG	PH	PR	QP	FP
Number of values	147	29	70	42	4	2
Number of values below d.l.	0	0	0	0	0	0
Number of missing values	2	0	0	2	0	0
Mean	20.952	17.931	19.186	27.800	17.500	15.000
Standard deviation	11.560	6.902	11.496	13.037	2.517	4.243
Skewness	2.671	0.095	4.047	1.073	-0.424	0.000
Kurtosis	11.859	-1.064	23.061	1.082	-1.820	-2.750
Geometric Mean	18.708	16.507	17.245	24.090	17.355	14.697
Percentiles						
Minimum value	5.000	6.000	5.000	11.000	14.000	12.000
25th	14.000	12.000	13.000	17.250	15.000	12.000
50th	18.000	17.000	17.000	22.500	18.000	15.000
75th	25.500	24.500	22.250	31.000	19.500	18.000
80th	27.000	26.000	25.000	35.800	20.000	18.000
90th	31.400	27.000	28.900	45.800	20.000	18.000
95th	37.700	29.500	35.900	58.600	20.000	18.000
98th	59.800	32.000	70.480	69.000	20.000	18.000
99th	82.500	32.000	94.000	69.000	20.000	18.000
Maximum value	94.000	32.000	94.000	69.000	20.000	18.000