CACHE EXPLORATION INC.

Outer Welsford's Phase II Final Report on Geochemical Stream Sediment & Heavy Mineral Sampling

Alexander J. D. Smith

Professor David Lentz Ph.D., P.Geo.

APEGNB # M5612

10/17/2010

Table of Contents

Summary 3
Introduction 3
Regional and Local Geology 2
Previous Work 2
Stream Sediment Sampling 3
Heavy Mineral Sampling 5
Results & Discussion 7
Table 1: Summary of rare-earth concentrations in samples 8
Table 2: Determination of thresholds ranges 11
Table 3: Summary of the maximum rare-earth concentrations in stream sediments 12
Table 4: Summary of the maximum rare-earth concentrations in heavy mineral concentrates (HMC) 13
Conclusion 15
Recommendations 16
References 17
APPENDIX A 18
APPENDIX B 19
APPENDIX C 19
APPENDIX D 22

Table of Figures

Figure 1: Location of the Outer Welsford Property 3
Figure 2: Stream identification map 4
Figure 3: Stream sediment sample locations 5
Figure 4: Map of heavyd mineral sample locations 6
Figure 5: Photographs showing examples of the rocky nature of the property's streams 6
Figure 6: Spatial distribution plots of total heay rare-earth elements (HREE) 10
Figure 7: Elevated REE concentrations map for the 2009 soils 14
Figure 8: Anomalous rare-earth element (REE) results from the NB provincial till survey 15

Summary

Geochemical stream sediment and heavy mineral sampling was conducted for about 2.5 weeks from mid May to early June, 2010 by a two-person sampling team. Some 11 separate stream drainages were sampled across the northeast-southwest extent of the Outer Welsford mineral claim block (with the drainages numbered 1 to 11 for reference purposes from southwest to northeast) covering the peralkalic Welsford Intrusive Complex that is known to locally host HREE-Y mineralization. During this period, a total of 59 stream sediment and panned heavy mineral concentrates were collected. The samples, plus CANMET standards, were submitted to ACTLABS, Ancaster, Ontario for Code 1D-enhanced Instrumental Neutron Activation Analysis (INAA). The total light rare earth (LREE, which includes La, Ce, Nd, Sm & Eu) and heavy rare earth (HREE, which includes Tb, Yb & Lu) elements range up to 441.3 parts per million (ppm) and 17.8 ppm, respectively. The LREE maximum results are about 2.4 times the average crustal abundance for LREE, and the HREE maximum results are about 6.7 times the average crustal abundance for HREE.

Furthermore, the stream sampling results show elevated total rare earth elements (TREE) or HREE in 5 different stream drainages (specifically streams #1, 2, 9c, 10, and 11). One of the elevated HREE results is towards the southwestern end of the Outer Welsford property, and shows higher total HREE concentrations than those associated with the known McKeel Lake Y-HREE-enriched aplitic dykes that outcrop near the northeastern end of the property. In short, the stream sampling results are sufficiently encouraging such that further exploration is warranted, particularly in the selected drainages.

Recommendations for further work include: (a) on receipt of the 2010 Phase III geochemical soil sampling results, and also using the 2009 geochemical soil sample results, assess what portions of the #1, 5, 9, 10, & 11 drainages are potentially more elevated in underlying REE-enriched rocks, and then (b) during spring or summer 2011, conduct systematic radiometric prospecting in the indentified anomalous locales to search for Y-REE-bearing aplitic dykes or other phase of the Welsford Intrusive Complex that are or may be REE (especially HREE) enriched.

Introduction

Cache Exploration Inc. currently holds the majority of the Welsford Intrusive Complex, which in places has potentially important concentrations of rare earth elements (REE) in southern New Brunswick (Figure 1). The property, in May 2010, consisted of 130 claims (488m x 464m blocks) located in National Topographic System (NTS) 21G/08 (between Universal Transverse Mercator [UTM projection] coordinates 710680E, 5032760N and 722095E, 5042440N, NAD83 datum, UTM Zone 19N).

As part of Phase II of the Mineral Exploration Program on the Welsford Intrusive complex, geochemical stream sediments and heavy mineral concentrate (HMC) sampling were completed on 11 drainages within the Outer Welsford property (Figure 2). As a result of this, a total of 60 stream sediment samples (Figure 3), and 14 heavy mineral samples (Figure 4) were collected. All these samples were submitted to Activation Laboratories (ACTLABS) with appropriate CANMET certified standard reference materials for Code 1D Enhanced instrumental neutron activation analysis (INAA).

Regional and Local Geology

The Welsford Rare-Earth property is made up of two main geological units; that of the Ordovician and Silurian metasediments that were intruded by the granitic St-George Batholith in the Early Silurian to Devonian period (Sharpe, 1958; Whalen et al., 1996). The main unit that encompasses most of the property is the Early Silurian Welsford Intrusive Complex, dominated by various phases of alkali granites to syenite. This unit intruded the metasediments of the Jones Creek Formation along the southeast margin of the property's boundary. The granitic intrusion developed a margin of hornfels along the metasediment contact (Sharpe, 1958; Whalen et al., 1996).

Generally, the batholiths is medium to coarse grained varying in composition from granodiorite to syenite with HREE-rich pegmatite-aplite dykes (McKeough and Lentz, 2009)

Refer to Hattie (1998, 1999, & 2001), Connell (2002), Seidler et al. (2005), and Lentz and McKeough (2009) for further geological information on the REE-bearing Welsford Intrusive Complex.

Previous Work

During the 1970-80's there was federal-provincial geological mapping of the whole of New-Brunswick at 1:50,000 scale, as well as a regional geochemical survey of the stream sediments in most of southern New Brunswick. The discovery of the radioactive granitic aplite dykes was a result of *Uranerz Exploration and Mining Limited*'s 1979 detailed (1:500) radiometric survey, which was followed up with soil sampling, trenching, and prospecting programs (Uranerz, 1980).

More recent work was done in 1996 by Mr. D. Hattie, who followed up on the Uranerz discovery with more detailed prospecting and rock sampling (Hattie, 1998). As a result of this work, Hattie then conducted a VLF-EM survey (Hattie, 1999, 2001) that led to the drilling of 2 diamond drill holes that intersect the aplitic dykes (Connell, 2002). Petrology and geochemical studies were then conducted on the dykes and drill core (Seidler et al., 2005).

Most recently is the work done by BullRun Investments Inc. in 2009, with a preliminary Phase I soil sampling grid (approximately 340m by 500m sample station spacing) over the entire property; this exploratory work resulted in the collection an analysis of 300 soil samples by INAA at ACTLABS (McKeough & Lentz, 2009).

Figure 1: Location of the Outer Welsford Property, southeastern New Brunswick.

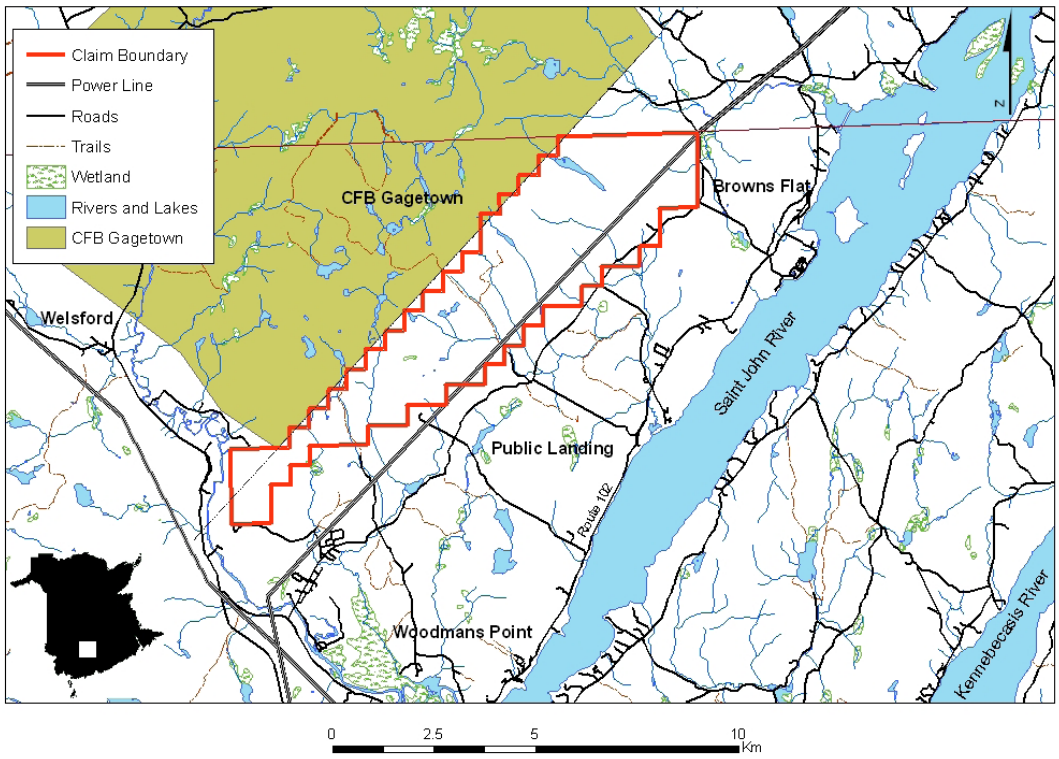


Figure 1 - Welsford Property Location, southeastern NB
NAD83, UTM Zone 19 N

Stream Sediment Sampling

The stream sediment sampling program was initially carried out using a stainless steel trowel; however, because the streams are very rocky and contain very little sediment (Figure 5), Batai sampling pans and associated screens for heavy mineral concentrate sampling were used to separate the larger rock fragments from the desired silts and clays. The sieving was done with the minimal amount of water to prevent the silts and clay from being washed away. The smaller fractions were then collected in standard 10 cm by 26 cm paper sample bags.

A total of 60 stream sediments were collected from each of the 11 drainage samples at approximate intervals of 500 m along each drainage (Figure 3). However, due to the rocky

nature of the streams the sample intervals vary depending on the availability of appropriate stream sediments.

Figure 2: Stream identification map for streams found on the Outer Welsford property.

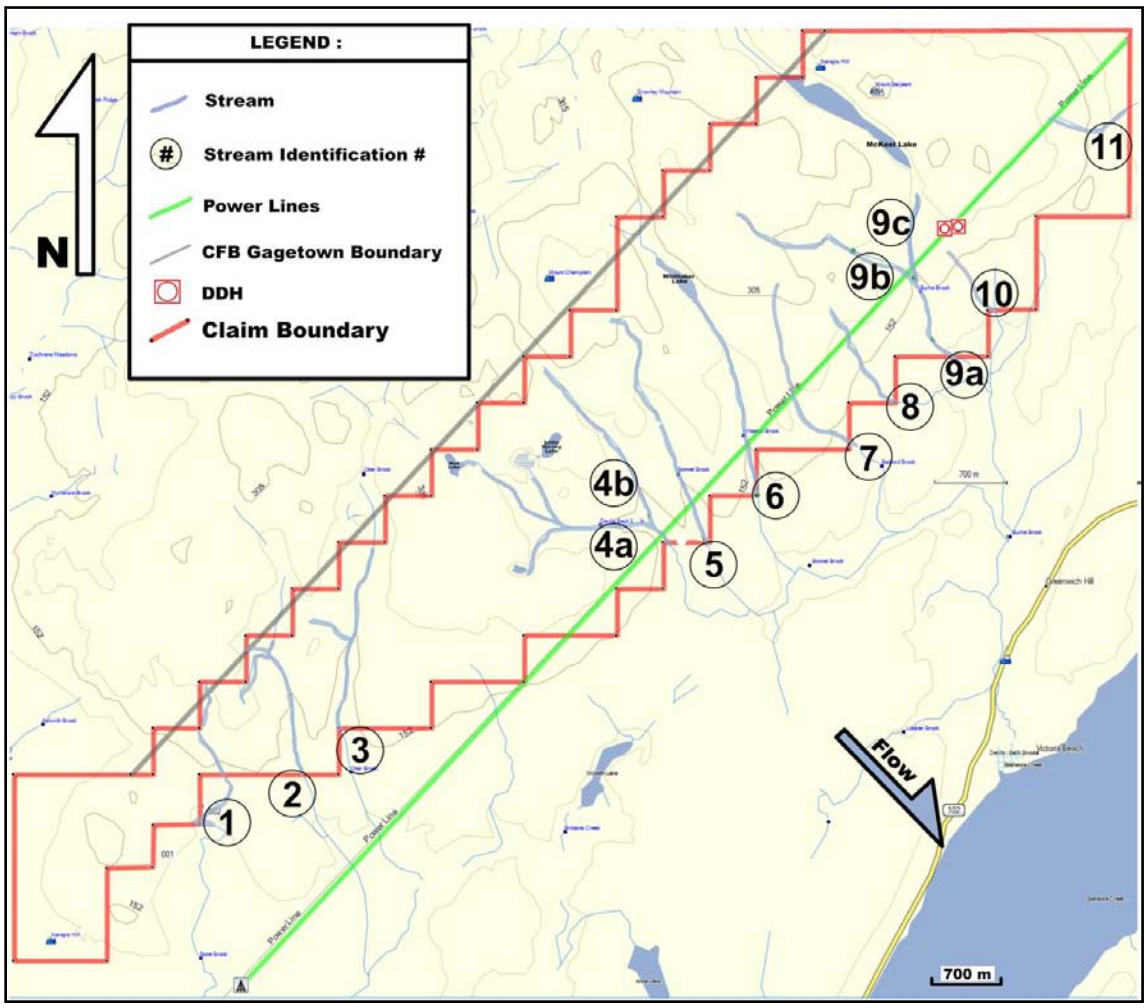
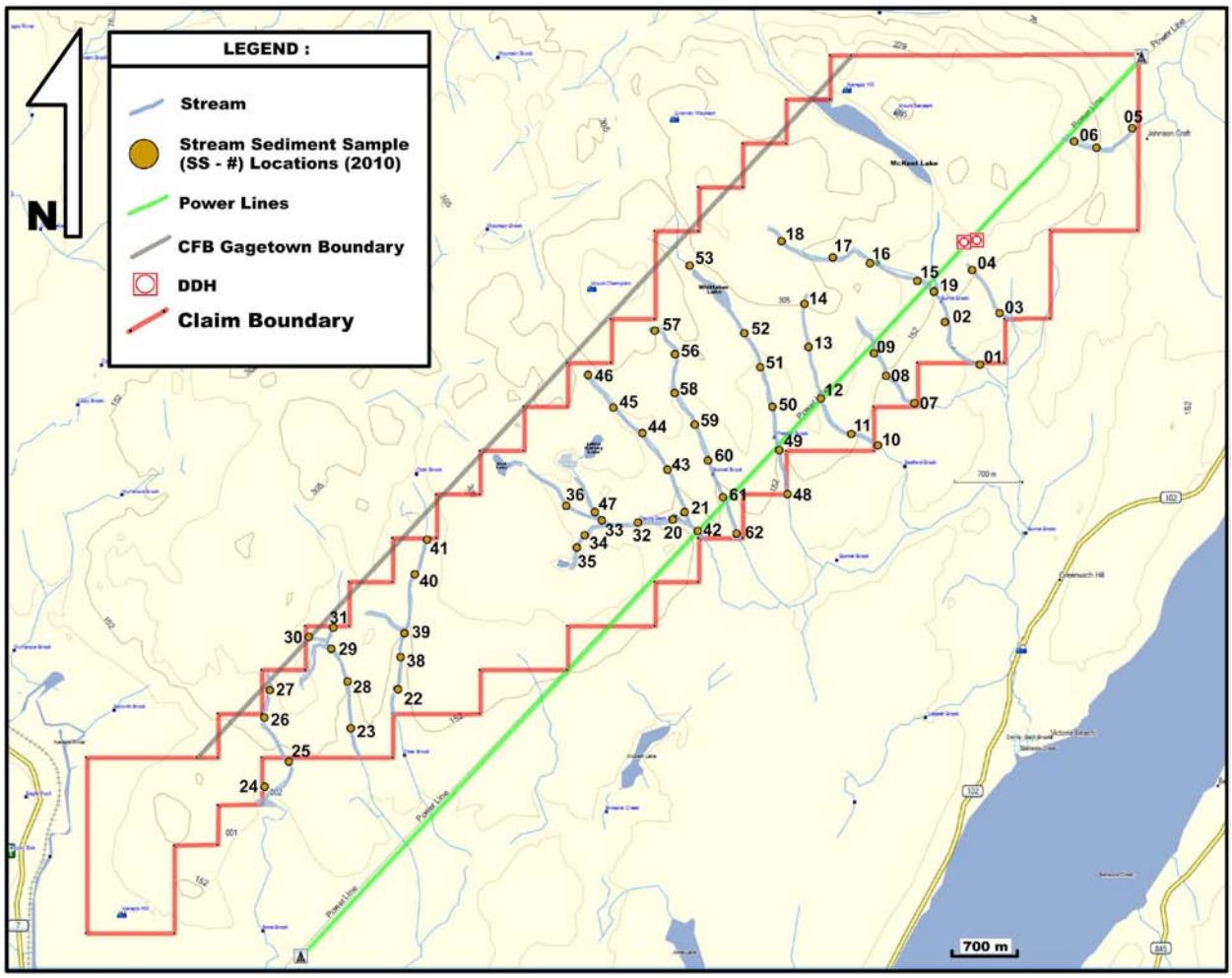


Figure 3: Stream sediment sample locations within the Outer Welsford property, NB.



Heavy Mineral Sampling

The heavy mineral concentrate samples were acquired using Batai sieves and a shovel, where approximately 5 kg samples of sieved 'sand-size' fraction were taken at each stream sample site, but the acquisition of each HMC sample normally required processing and sieving several tens of kilograms of coarse material. This technique was conducted to complement the stream sediment sampling because, in some areas, anomalies are lacking in normal stream sediment, but are more easily detected in HMC material that is panned from the deeper layers of sediment (Rose et al., 1979). A total of 14 samples (Figure 4) were acquired.

Both the stream sediment and HMC samples were submitted to Activation Laboratories (ACTLABS), along with appropriate CANMET certified standard reference materials for Code 1D Enhanced instrumental neutron activation analysis (INAA).

Figure 4: Map showing the location of the heavy mineral samples acquired.

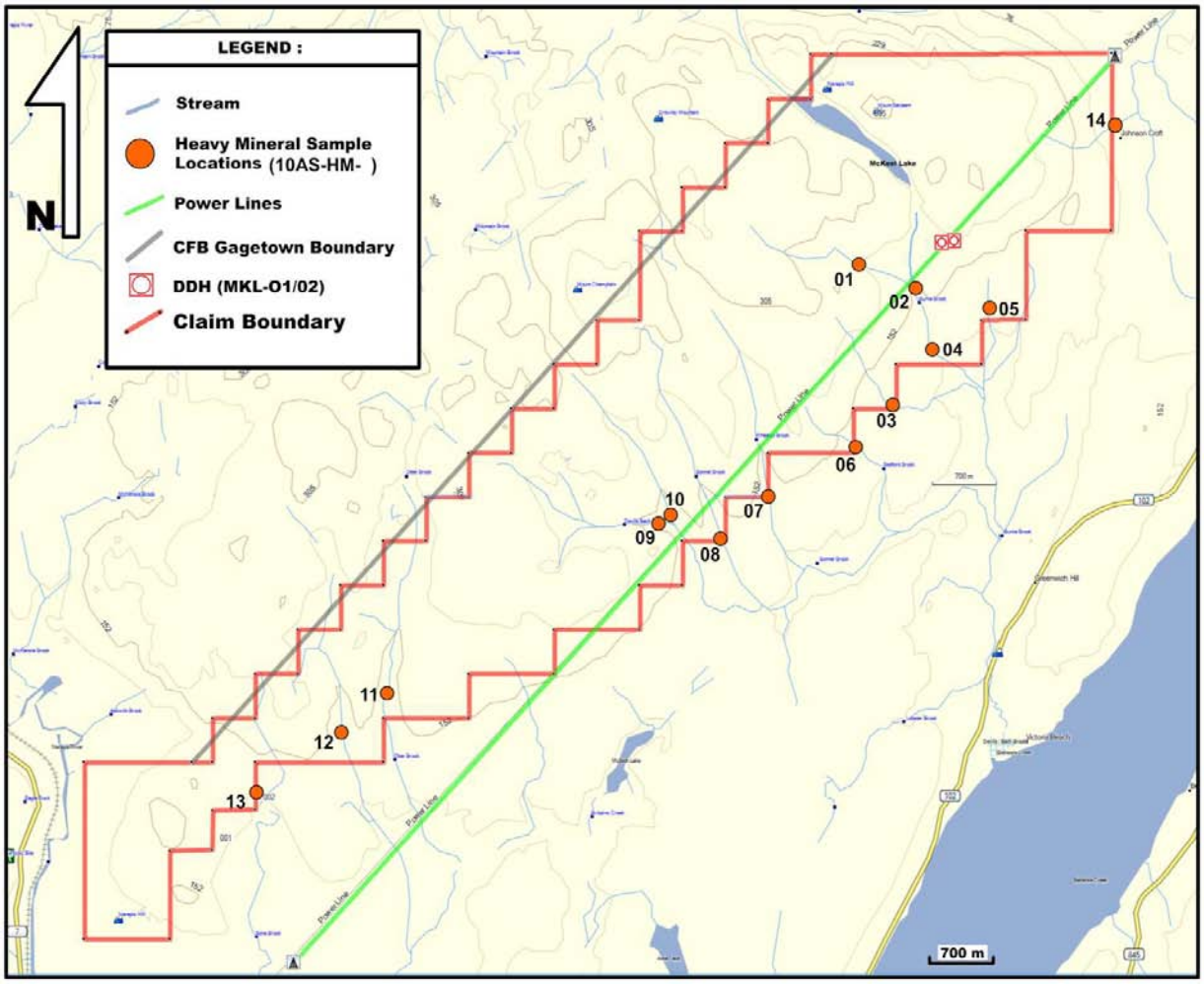
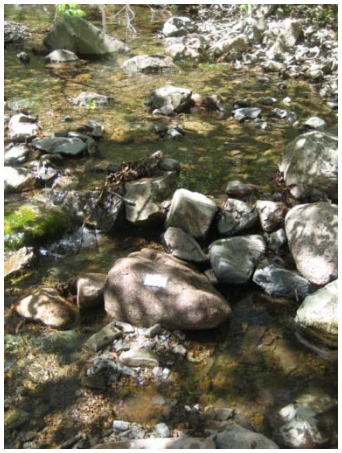


Figure 5: Photographs showing examples of the rocky nature of the streams on the property. a & b) Images of a typical very rocky stream-bed, with very little finer material in most paces; c) Image of the typical coarse sediment found in most stream drainages.







Results & Discussion

The complete INAA analysis results for the stream sediment HMC samples are in Appendix B and Appendix C, respectively.

The results of the certified standard reference material's quality control analysis show that La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Hf and Ta to have average percent differences of -15.3 %, -10.8 %, -16.3 %, -22.6 %, -13.3 %, -50.1 %, 5.8 %, -22.0 %, -18.3 %, and -13.2 %, respectively, from the true value. The complete quality control analysis of the CANMET certified standard reference materials that were submitted with the stream sediment and HMC is also in Appendix A.

Table 1 summarizes the rare earth element results from the soil samples collected in 2009, and the stream sediment and heavy mineral samples collected in 2010. In addition, Table 1 contains average concentration values for the upper continental crust (UCC) (Wedepohl, 1995). From this table it one can make the following observations:

1. The La, Ce, Nd, and Sm, and Eu in the soil samples (2009) are comparable to the average UCC values with only -1%, +18%, +6%, +16%, and -1% difference, respectively. However, Tb, Yb, Lu are enriched with +81%, +228%, and +176% difference relative to the average UCC values.
2. The stream sediment and HMC samples have higher concentrations than the soil samples and average UCC (Table 1); however, they show the same proportional enrichment trends as both the soils and average UCC. This enrichment trend is likely due to the differences in the mobilization processes.
3. All three sample types (soil, stream, and heavy samples) are significantly enriched in Hf, whereas Ta is present in low concentrations. However, because Hf (like Zr) and Ta (like Nb) are known to be enriched in the mineralized dykes (Seidler et al., 2005), they have been included in Table 1.

Considering points 1 to 3 above, it is concluded that the REE concentrations in all three sample types differ in magnitude, but they do share similar enrichment trends for each rare earth element. For this reason, the three sets of data have been used relative to each other in order to identify areas of potential interest.

Table 1: Summary statistics for REE from 2009 samples, 2010 stream sediment samples and 2010 HMC samples. Note the 'statistics' given assume the underlying distribution for each REE approximates 'normality' (i.e., the underlying curve is unimodal, symmetrical and has an area approximately equal to 1, hence 'Gaussian').

	Analyte Symbol	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Total LREE (La, Ce, Nd,	Total HREE (Tb, Yb, Lu)	Total REE	Hf	Ta
		(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
	Avg. UCC (Wedepohl 1995)	32.3	65.7	25.9	4.7	0.95	0.5	1.5	0.3	129.6	2.3	131.9	5.8	1.5
Soil Samples 2009	Average (Avg.)	31.9	77.5	27.4	5.5	0.9	0.9	4.9	0.7	143.2	6.6	149.7	10.2	1.3
	Std. Dev. (σ)	22.0	34.6	29.0	5.8	0.4	1.1	2.6	0.4	79.5	3.6	81.6	6.0	1.2
	Maximum meas. (Max.)	340.0	285.0	428.0	85.0	3.5	13.8	21.3	3.1	1001.5	6.2	1030.9	64.0	7.7
	Minimum meas. (Min.)	10.6	31.0	5.0	2.0	0.2	0.5	1.4	0.2	44.7	1.6	61.4	4.0	0.5
	% Diff. between Avg. & UCC	-1%	18%	6%	16%	-1%	81%	228%	176%	11%	186%	14%	76%	-14%
Stream Sediments 2010	Average (Avg.)	43.5	105.5	36.6	8.8	1.1	1.2	7.2	1.0	195.4	9.4	204.8	13.7	1.9
	Std. Dev. (σ)	11.6	36.2	15.1	3.4	0.3	0.6	1.9	0.3	59.9	2.5	60.7	4.1	1.3
	Maximum meas. (Max.)	94.0	236.0	103.0	22.0	1.8	2.7	14.1	2.1	441.3	17.8	452.2	28.0	5.0
	Minimum meas. (Min.)	28.0	59.0	20.0	5.4	0.2	0.5	4.3	0.6	117.6	6.0	126.0	6.0	1.0
	% Diff. between Avg. & UCC	35%	61%	41%	87%	15%	139%	379%	286%	51%	310%	55%	136%	27%
Heavy Samples 2010	Average (Avg.)	41.2	92.5	37.3	8.8	1.1	2.3	8.1	1.1	180.9	11.5	192.4	25.7	1.7
	Std. Dev. (σ)	11.1	29.6	22.8	3.5	0.7	0.8	3.3	0.4	60.5	4.4	63.8	8.3	1.3
	Maximum meas. (Max.)	67.2	168.0	76.8	18.0	1.8	4.8	19.1	2.4	308.9	26.3	332.5	49.2	5.0
	Minimum meas. (Min.)	32.0	56.0	10.0	6.1	0.2	2.0	5.8	0.8	106.4	8.6	115.1	16.8	1.0
	% Diff. between Avg. & UCC	27%	41%	44%	87%	14%	369%	439%	295%	40%	400%	46%	344%	12%

From these three separate sets of data, a series of plots (Appendix D) have been generated to show the spatial distribution of the analysed REE (specifically La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, and Total REE with n = 8) for the Outer Welsford property. For example, Figure 6 is a set of three graphical plots showing the spatial distribution of the total HREE concentration for each of three datasets (i.e., 2009 soils, 2010 stream sediments, and 2010 HMC samples). As previously discussed, because the datasets have different magnitudes, to have the data be meaningfully comparable, each REE plot is based on their average concentrations and standard deviation and from this various 'anomalous' thresholds have been set. Table 2 shows how the thresholds ranges are calculated.

Some main observations that can be made from the three total HREE plots in Figure 6 and the database found in Appendix D for La, Ce, Nd, Sm, Eu, Tb, Yb, Lu, Hf, and Ta, include:

- **Total REE** concentrations are elevated in streams 1, 9c, 10 and 11 (Figure 2).
- **HREE** concentrations are elevated in streams 1, upper 2, 10 and 11.
- **La** and **Nd** concentrations are elevated in streams 10 and 11.
- **Ce** concentrations are elevated in streams 1, 9c, 10, and 11.
- **Sm** concentrations are elevated in streams 1, 2, 10, and 11.
- **Eu** concentrations are elevated in streams 1, 2, 7, and 8.
- **Tb, Yb, Lu** concentrations are elevated in streams 1, 2, 9c.
- **Tb** concentrations are also elevated in stream 11.
- **Hf** concentrations are elevated in streams 1 and 9c.
- **Ta** concentrations are elevated in streams 2, 9a, and 10.

These observations suggests that streams 1, 2, 9c, 10 and 11 (Figures 2, 6 & 7) show a significant enrichment in rare earth elements (REE) with stream sediment sample concentrations of 365.8ppm, 288.7 ppm, 361.5 ppm, 343.4 ppm, and 452.2 ppm total REE, respectively (Table 1). Of these REE-enriched streams, the heavy rare earth element (HREE = Tb, Yb, Lu) concentrations were found to be greatest in streams 1, upper 2, 9c, and 11 where the stream sediment samples yielded concentrations of 2.7 ppm Tb, 14.1 ppm Yb, and 2.1 ppm Lu; the heavy mineral samples yielded 4.8 ppm Tb, 19.1 ppm Yb, and 2.4 ppm Lu (Table 3 and 4). These values are significantly elevated compared to the average upper continental crust concentrations of 0.5 ppm Tb, 1.5 ppm Yb, and 0.3 ppm Lu (Wedepohl, 1995).

Figure 6: Spatial distribution plots of total HREE for the 2009 soil samples (**left image**), the 2010 stream sediment samples (**center image**), and the 2010 heavy mineral samples (**right image**).

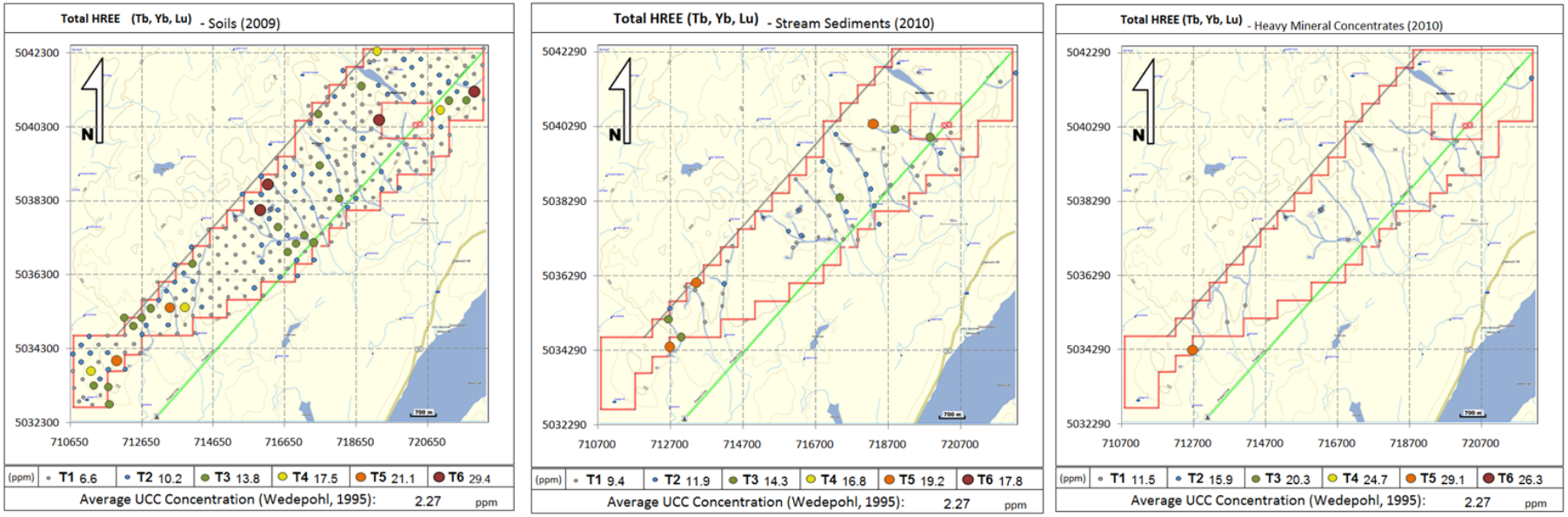


Table 2: Determination of thresholds ranges used for plotting the datasets, as well as example threshold calculations for total HREE concentrations in stream sediments (Table 4).

		Range	Description	Example Threshold Calculation Where: (ppm) Avg. = 9.4 σ = 2.5 Max.= 17.8
T1	**Threshold 1**	T1 ≤ Avg.	T1 is less or equal to the average (Avg.) concentration measured	$T1 = 9.4\ \text{ppm}$
T2	**Threshold 2**	T2 < T3 ≤ Avg. + 1σ	T2 is the average concentration measured + one standard deviation (σ)	$T2 = (9.4 + (1 \times 2.5))\text{ppm} = 11.9$
T3	**Threshold 3**	T2 < T3 ≤ Avg. + 2σ	T3 is the average concentration measured + two standard deviations	$T3 = (9.4 + (2 \times 2.5))\text{ppm} = 14.3$
T4	**Threshold 4**	T3 < T4 ≤ Avg. + 3σ	T4 is the average concentration measured + three standard deviations	$T4 = (9.4 + (3 \times 2.5))\text{ppm} = 16.8$
T5	**Threshold 5**	T4 < T5 ≤ Avg. + 4σ	T4 is the average concentration measured + four standard deviations	$T5 = (9.4 + (4 \times 2.5))\text{ppm} = 19.2$
T6	**Threshold 6**	T5 < T6 ≤ Max	T6 is the maximum (Max) concentration measured.	$T6 = 17.8\ \text{ppm}$

Hf was found to be elevated in streams 1 and 9c, and streams 2, 9a, and 10 were found to contain elevated concentrations of Ta (Table 3). Because Hf (like Zr) and Ta (like Nb) are known to be enriched in the mineralized McKeel Lake dykes (Seidler et al., 2005), this suggests that mineralized aplitic dykes or related mineralized cupola rocks are a possible source for these enrichments in the stream drainages. The watershed associated with the known REE-enriched aplitic dykes (found in proximity to the DDH points on Figure 7) likely drains into streams 9c and 10, accounting for the elevated Hf and Ta concentrations. This observation suggests that streams 1 and 2 may also yield REE-enriched aplitic dykes in proximity. Data Tables 3 and 4 summarize these observations by showing the maximum concentrations measured in each stream for the stream sediment and heavy mineral samples, respectively.

The stream sediment and heavy mineral data (Tables 3 and 4) show relatively moderate concentrations of total HREE (10.9 ppm, and 12.7 ppm, respectively)in stream 11; however, it is also associated with the lowest Hf concentration (9 ppm). Nonetheless, although elevated Hf concentrations are associated with the mineralized REE bearing McKeel Lake dykes (Seidler et al., 2005) does not necessarily mean that drainage 11 is not of potential exploration interest.

Figure 7 compares those drainages with elevated to anomalous REE in stream sediments and/or HMC from the 2010 survey, with anomalous REE-enriched soils which were collected during the 2009 program. Specifically, the areas shaded in red are soil samples that have elevated REE concentrations (Appendix D) and also correlate with REE-enriched stream sediment and HMC results in drainages. These areas of anomalous REE soils could be the possible source areas for the HREE-rich streams #1, 2, 9c, and 11. In short, the areas in red in figure 7 are of potential interest.

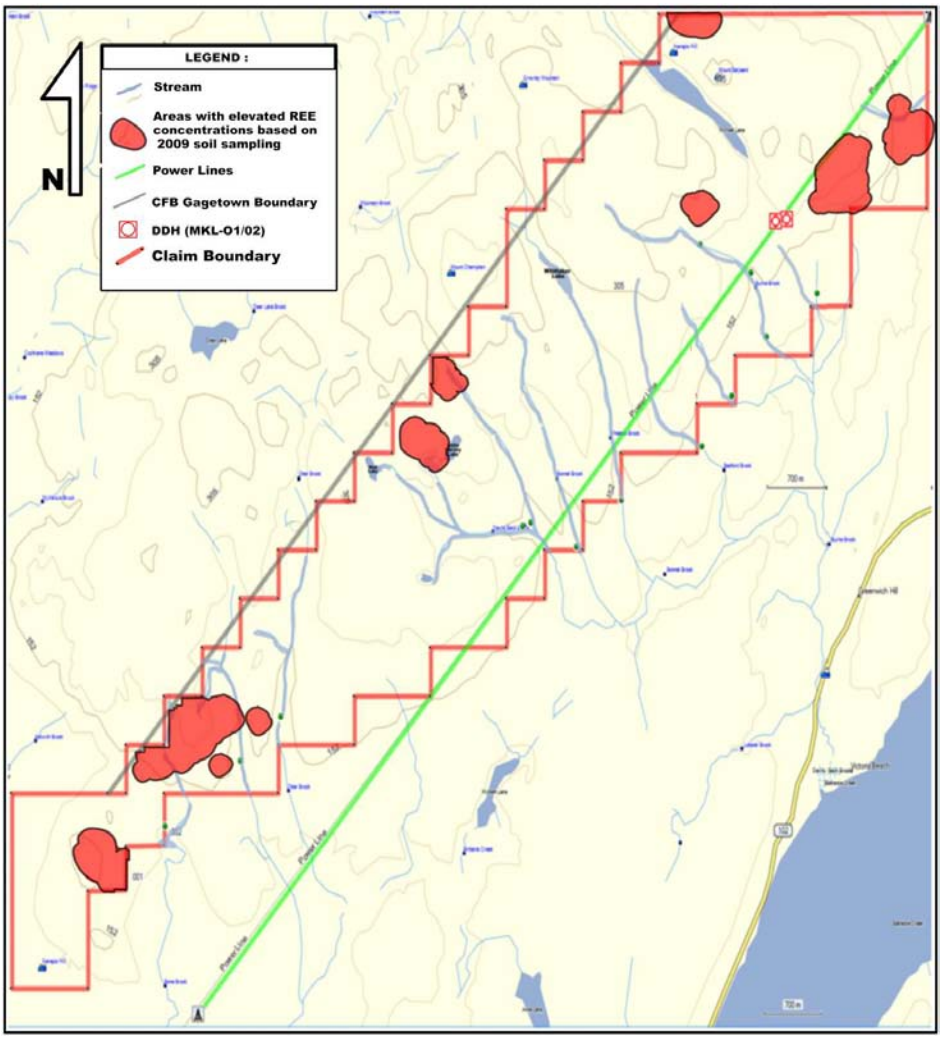
Table 3: Summary of the maximum concentrations of selected REE measured in each stream sediment sample (Figure 3) collected within the Outer Welsford property.

Stream ID	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Total LREE (La, Ce, Nd, Sm, Eu)	Total HREE (Tb, Yb, Lu)	Total REE	Hf	Ta
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
UCC (Wedepohl, 1995)	32.3	65.7	25.9	4.7	0.95	0.5	1.5	0.3	129.6	2.3	131.9	5.8	1.5
Stream 1	55	**236**	66	**16.2**	1.1	**2.5**	**13.2**	**2.1**	**353.9**	**17.8**	**365.8**	**23**	4
Stream 2	77	111	66	**17.7**	**1.6**	**2.7**	**12.9**	**1.82**	271.3	17.42	288.7	16	**5**
Stream 3	42	103	37	8.1	1.3	1.4	7.2	1.15	187.3	9.75	197.1	13	4
Stream 4a	42	96	41	9.7	1.2	1.6	7.6	1.28	187.7	10.18	197.9	15	4
Stream 4b	48	109	40	8.6	1.1	1.7	6.7	0.98	196.7	9.05	204.8	14	3
Stream 5	57	124	40	11.3	1.3	2.2	9.1	1.18	233.4	12.46	245.9	20	3
Stream 6	48	105	37	8.3	1.3	1.6	8.4	1.15	185.1	11.04	195.3	19	4
Stream 7	41	110	41	8.3	**1.8**	1.1	6.2	0.82	200.6	7.29	207.9	15	3
Stream 8	45	112	44	9.4	**1.8**	1.8	6.4	0.91	200.5	8.46	208.0	14	1
Stream 9a	39	131	49	8	1.4	1.5	7.6	0.82	228.4	9.92	236.5	17	**5**
Stream 9b	46	111	38	8.7	1.1	1.2	6.6	1	204.8	8.8	213.6	13	2
Stream 9c	56	**222**	56	13	1.2	**2.6**	**14.1**	**2.04**	**348.2**	17.14	**361.5**	**28**	4
Stream 10	**94**	132	**86**	**22**	1.3	0.5	7.5	1.15	**335.3**	9.15	**343.4**	14	**5**
Stream 11	**82**	**234**	**103**	**20.9**	1.4	**2.5**	7.3	1.12	**441.3**	10.92	**452.2**	9	1
Max.	94	236	103	22	1.8	2.7	14.1	2.1	441.3	17.8	452.2	28	5
Average	55.1	138.3	53.1	12.2	1.4	1.8	8.6	1.3	255.3	11.4	265.6	16.4	3.4

Table 4: Summary of the maximum concentrations of selected REE measured in each HMC sample (Figure 4) collected within the Outer Welsford property.

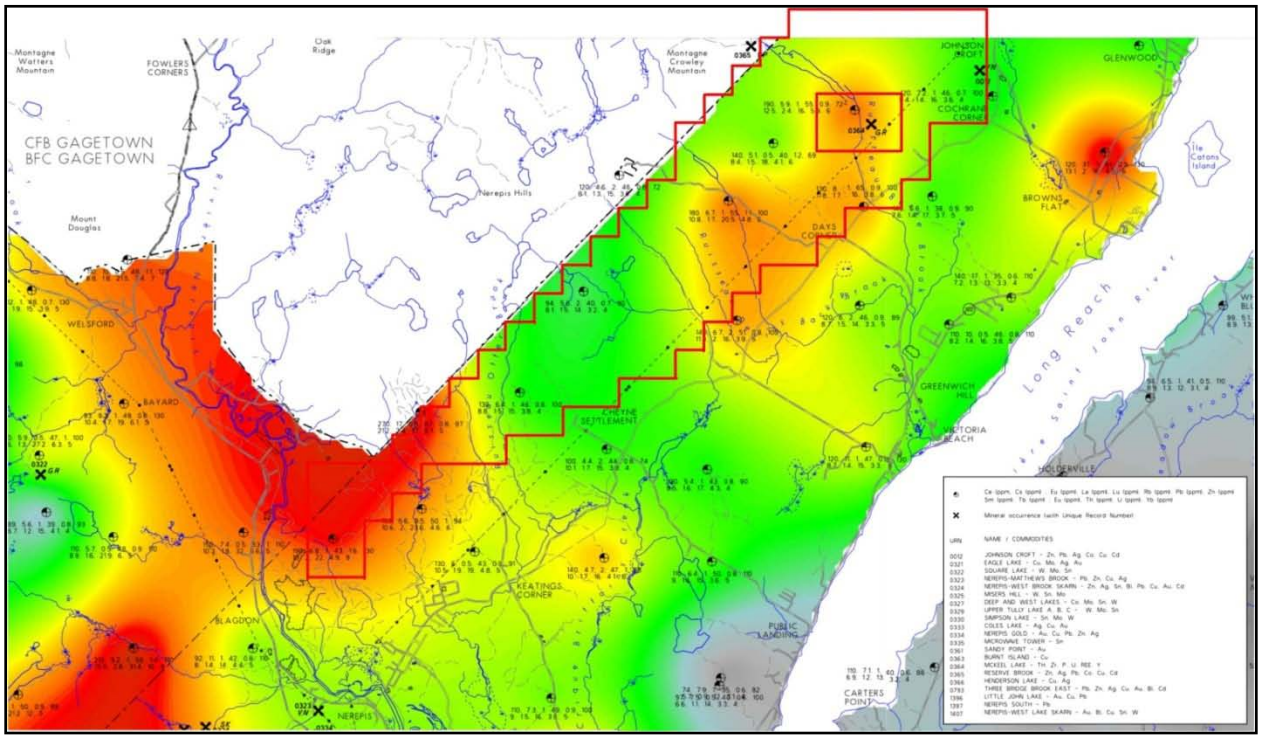
Stream ID	HM Sample ID	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Total LREE (La, Ce, Nd, Sm, Eu)	Total HREE (Tb, Yb, Lu)	Total REE	Hf	Ta
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
1	10AS-HM-13	67	144	77	18.0	0.2	4.8	19.1	2.41	306.2	26.3	332.5	49	1
2	10AS-HM-12	43	88	53	8.4	1.7	2.4	7.0	0.79	193.7	10.2	203.8	20	1
3	10AS-HM-11	37	83	10	6.8	1.4	2.0	6.5	0.78	138.2	9.3	147.5	24	4
4a	10AS-HM-09	35	95	58	6.8	0.2	2.0	7.7	1.11	195.0	10.8	205.8	24	1
4b	10AS-HM-10	42	90	24	7.7	1.5	2.0	8.1	0.89	165.2	11.0	176.2	21	1
5	10AS-HM-08	41	91	65	8.4	1.4	2.0	7.6	1.18	206.8	10.8	217.6	27	1
6	10AS-HM-07	38	98	34	7.6	1.5	2.0	8.4	1.06	179.1	11.5	190.6	34	1
7	10AS-HM-06	32	56	10	6.7	1.7	2.0	5.8	0.88	106.4	8.7	115.1	29	3
8	10AS-HM-03	35	78	32	8.4	1.8	2.0	5.8	0.81	155.2	8.6	163.8	25	5
9a	10AS-HM-04	32	76	10	6.1	1.2	2.0	6.9	0.88	125.3	9.8	135.1	27	1
9b	10AS-HM-01	32	65	34	6.8	0.2	2.0	7.5	0.92	138.0	10.4	148.4	18	1
9c	10AS-HM-02	37	76	47	6.7	0.5	2.0	7.2	0.92	167.2	10.1	177.3	27	1
10	10AS-HM-05	40	88	10	9.2	0.2	2.0	7.7	1.12	147.4	10.8	158.2	18	1
11	10AS-HM-14	65	168	59	15.6	1.7	3.6	7.9	1.16	308.9	12.7	321.6	17	1
	Max. Conc.	67	168	77	18	2	5	19	2	309	26	333	49	5
	Average	41	93	37	9	1	2	8	1	181	11	192	26	2
	UCC (Wedepohl, 1995)	32.3	65.7	25.9	4.7	0.95	0.5	1.5	0.3	129.6	2.3	131.9	5.8	1.5

Figure 7: Elevated REE concentrations in soils from the 2009 program that correlate with the anomalous REE-enriched drainages #1, 2, 9c and 11 within the Outer Welsford property.



Comparing the HREE-enriched areas of soil in (Figure 7) with data from the provincial till survey of southern NB (Figure 8; *from* Allard et al., 2006), a correlation exists, especially in the vicinity of drainages #1, 2, 9 and 10. However, the quality of the correlation must be tempered by the fact that only 10 till samples from the NB provincial survey occur within the Outer Welsford property. Nonetheless, the NB provincial regional till survey was able to recognize the elevated REE concentrations within the Outer Welsford property even with so few till samples.

Figure 8: Anomalous REE results from the NB regional provincial till survey (*modified from* Allard et. al., 2006)



Conclusion

The 2010 Phase II stream sediment and HMC sampling program within the Outer Welsford property has provided useful information as to which streams show elevated total REE and total HREE concentrations, as well as providing meaningful correlations with the Phase I 2009 soil sampling program (McKeough and Lentz, 2009) and the NB provincial till survey (Allard et al., 2006) data.

Specifically, the 2010 stream sediment and HMC sampling identified streams #1, 2, 9c, 10 and 11 as having elevated to anomalous concentrations of REE (Figure 7). These streams correlate with elevated to anomalous REE in soils from the 2009 sampling program (Figure 7) and also with tills from the NB regional till survey (Figure 8).

Therefore, based on these positive results, further follow-up exploration is warranted in selected parts of the Welsford Igneous Intrusive Complex within the Outer Welsford property.

Recommendations

- Further exploration is required in the areas highlighted in red in Figure 7. The follow-up work should include thorough systematic scintillometer (radiometric) prospecting and semi-detailed to locally detailed geological mapping to search for REE-bearing aplitic dykes and their related source cupola lithologies, or both.
- Having said this, further exploration of these areas should wait, to re-assessed, when the results from the 2010 Phase III soil sampling and prospecting exploration program are complete. This is because the Phase III work will result in, denser soil sampling coverage and more systematic, albeit semi-detailed scintillometer prospecting. Once the results from the Phase II and Phase III programs are received and interpreted, the selected areas of follow-up exploration interest likely will be better defined.

References

Allard, S., Pronk, A.G., Bolden, G.R., and Gilmore, W.F.

2006: Multivariate rare-metal mineralization Indicator in Basal Till (<63µm fraction) of the Saint John (NTS 21G/08) Map area, southern New Brunswick, New Brunswick Department of Natural Resources Minerals, Policy, and Planning Division, Map Plate 2006-29.

Connell, M.

2002: Drill core logs, McKeel Lake mineral claims. N.B. Dept. of Natural Resources, Assessment Filed Report 475507.

Hattie, D.

1998: McKeel Lake Group, Kings County, N.B. Dept. of Natural Resources, Assessment File Report 475005, 16 p.

Hattie, D.

1999: VLF profiles and geology, McKeel Lake Group, Kings County, NB. N.B. Dept. of Natural Resources, Assessment File Report 475288, 9 p.

Hattie, D.

2001: VLF profiles and geology, McKeel Lake Group, Kings County, NB. N.B. Dept. of Natural Resources, Assessment File Report 475385, 7 p.

McKeough, M., and Lentz D.R.

2009: Geochemical Soil Survey and Prospecting on the Welsford Rare-Earth Property, NB. BullRun Investments Inc, Assessment Report, 36 p.

Rose, A.W., Hawkes, H.E., and Webb, J.S.

1979: Geochemistry in Mineral Exploration, Second Edition, Academic Press, 657 p.

Seidler, K., Lentz, D.R., Hall, D.C., and Susak, N.

2005: Zircon-rich Ta-Nb-REE Mineralization in the Radioactive McKeel Lake Pegmatite-Aplite System, Welsford Igneough Complex, Southwestern New Brunswick. Exploration and Mining Geology (Rare-Element Pegmatite Special Issue), v. 15, 79-94.

URANERZ Exploration & Mining Limited

1980: Mount Champlain claims, New Brunswick, DNRE-Minerals, Assessment Report Number 472706, 4 p.

Wedepohl, K.H.

1995: The composition of the continental crust. Geochim et Cosmochim. Acta, v.59, p.1217-123

APPENDIX A

Table of analytical quality control by use of CANMET certified standard reference materials.

Analyte Symbol	Au	Ag	As	Ba	Br	Ca	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Ni	Rb	Sb
Unit Symbol	ppb	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	%	ppm	ppm	ppm
Detection Limit	5	5	2	100	1	1	5	10	2	0.02	1	1	5	5	0.05	50	30	0.2
Analysis Method	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
STDS-1	8	5	23	630	40	3.6	17	67	1.8	4.7	6.1	N/A	N/A	5	1.8	24	30	3.3
SS-20B	5	5	16	1000	33	1	15	60	2	4.02	6	1	5	5	1.28	50	60	2.8
SS-40B	5	5	22	700	40	3	16	50	2	4.21	5	1	5	8	1.33	50	50	3.2
SS-57B	5	5	25	700	40	3	17	60	2	4.09	5	1	5	5	1.24	50	30	3
% Difference	37.5	0.0	8.7	-27.0	5.8	35.2	5.9	15.4	-11.1	12.6	12.6	N/A	N/A	-20.0	28.7	-108.3	-55.6	9.1
STDS-3	7	5	28	1490	24	3.3	16	80	5.2	4.4	5.1	N/A	N/A	12	1.5	30	68	4
SS-10B	5	5	23	1700	20	4	16	60	5	3.62	4	1	5	5	1.12	50	70	3.3
SS-30B	5	5	22	1400	22	1	16	70	4	3.83	4	1	5	5	1.13	50	30	3.4
SS-60B	5	5	27	1300	26	1	14	70	5	3.93	5	1	5	18	1.06	50	60	3.5
% Difference	28.6	0.0	14.3	1.6	5.6	39.4	4.2	16.7	10.3	13.8	15.0	N/A	N/A	22.2	26.4	-66.7	21.6	15.0
STDS-4	4	5	15	2000	13	4	13	93	1.9	4.1	5.5	N/A	N/A	9	2.7	30	39	7.3
SS-15B	5	5	10	1900	13	5	14	80	2	3.73	4	1	5	12	1.98	50	30	6.3
SS-35B	5	5	10	2200	11	1	12	70	2	3.31	4	1	5	11	1.86	50	30	5.9
SS-50B	5	5	15	1700	15	4	13	80	3	3.62	4	1	5	5	1.86	50	50	6.9
% Difference	-25.0	0.0	22.2	3.3	0.0	16.7	0.0	17.6	-22.8	13.3	27.3	N/A	N/A	-3.7	29.6	-66.7	6.0	12.8

Analyte Symbol	Sc	Se	Sn	Sr	Ta	Th	U	W	Zn	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu
Unit Symbol	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.1	5	0.05	0.1	1	0.5	0.5	4	50	1	3	5	0.1	0.2	0.5	0.2	0.05
Analysis Method	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
STDS-1	14	N/A	N/A	N/A	0.4	3.7	8	4	178	30	51	28	6	1.6	1.2	4	0.8
SS-20B	11.5	5	0.05	0.1	1	3.1	7.5	4	50	24	46	19	5	1.2	0.5	4	0.67
SS-40B	12.5	5	0.05	0.1	1	2.9	7.5	4	220	26	47	23	5.4	1.2	0.5	4.4	0.69
SS-57B	12.1	5	0.05	0.1	1	3.5	6.5	4	150	26	47	22	5.4	1.3	0.5	4	0.56
% Difference	14.0	N/A	N/A	N/A	-150.0	14.4	10.4	0.0	21.3	15.6	8.5	23.8	12.2	22.9	58.3	-3.3	20.0
STDS-3	13	N/A	N/A	N/A	1.6	8.5	10.5	4	204	39	63	33	7	1.3	1.1	3.4	0.8
SS-10B	10.5	5	0.05	0.1	1	6.7	10	4	170	31	58	25	5	1.3	0.5	3.5	0.65
SS-30B	10.7	5	0.05	0.1	1	7.3	7.9	4	200	31	50	29	5.1	1.3	0.5	3.7	0.56
SS-60B	11.5	5	0.05	0.1	1	6.1	10.6	4	150	34	56	25	5.1	1.4	0.5	3.9	0.55
% Difference	16.2	N/A	N/A	N/A	37.5	21.2	9.5	0.0	15.0	17.9	13.2	20.2	27.6	-2.6	54.5	-8.8	26.7
STDS-4	14	N/A	N/A	N/A	0.9	4.3	3	4	107	24	44	21	5	1.2	0.8	2.6	0.5
SS-15B	12.5	5	0.05	0.1	1	3.8	0.5	4	50	21	43	23	3.8	1.1	0.5	2.8	0.42
SS-35B	11.1	5	0.05	0.1	1	3	0.8	4	130	20	38	18	3.5	0.8	0.5	2.7	0.45
SS-50B	12.2	5	0.05	0.1	1	2	4.8	4	50	22	37	19	3.5	1	0.5	2.7	0.34
% Difference	14.8	N/A	N/A	N/A	-11.1	31.8	32.2	0.0	28.3	12.5	10.6	4.8	28.0	19.4	37.5	-5.1	19.3

APPENDIX B

Table of Stream Sediment INAA results from Activation Laboratories.

Analyte Symbol	Au	Ag	As	Ba	Br	Ca	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Ni	Rb	Sb
Unit Symbol	ppb	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	%	ppm	ppm	ppm
Detection Limit	5	5	2	100	1	1	5	10	2	0.02	1	1	5	5	0.05	50	30	0.2
Analysis Method	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
SS-01	< 5	< 5	41	300	24	< 1	25	60	7	3.84	12	< 1	< 5	< 5	1.07	< 50	80	3.2
SS-02	< 5	< 5	26	300	22	< 1	18	50	6	3.94	17	< 1	< 5	10	0.98	< 50	90	3.1
SS-03	< 5	< 5	21	< 100	6	< 1	13	40	6	3.17	14	< 1	< 5	< 5	1.03	< 50	60	2.1
SS-04	< 5	< 5	28	< 100	51	< 1	10	50	6	2.27	9	< 1	< 5	12	0.72	< 50	< 30	1.8
SS-05	< 5	< 5	33	< 100	68	< 1	14	50	8	2.54	6	< 1	< 5	7	0.56	< 50	< 30	1.2
SS-06	< 5	< 5	23	< 100	56	< 1	69	40	8	3.24	9	< 1	< 5	< 5	0.6	< 50	80	1.7
SS-07	< 5	< 5	17	400	29	< 1	12	70	6	3.26	10	< 1	< 5	< 5	0.75	< 50	60	1.5
SS-08	< 5	< 5	20	< 100	24	< 1	23	80	6	4.16	9	< 1	< 5	< 5	0.91	< 50	70	2
SS-09	< 5	< 5	24	500	16	< 1	20	80	6	4.79	14	< 1	< 5	< 5	0.91	< 50	90	2.6
SS-10	< 5	< 5	21	300	32	< 1	23	70	6	4.08	15	< 1	< 5	< 5	0.88	< 50	60	1.8
SS-11	< 5	< 5	19	200	43	< 1	18	60	5	3.99	11	< 1	< 5	< 5	0.85	< 50	50	1.6
SS-12	< 5	< 5	25	500	32	< 1	24	70	7	4.54	15	< 1	< 5	< 5	0.98	< 50	80	2.4
SS-13	< 5	< 5	15	500	54	< 1	18	60	5	3.5	11	< 1	< 5	< 5	0.75	< 50	< 30	2.1
SS-14	< 5	< 5	17	300	66	< 1	14	60	7	3.38	7	< 1	< 5	< 5	0.55	< 50	60	2.1
SS-15	< 5	< 5	31	< 100	42	< 1	48	70	13	4.64	12	< 1	< 5	28	0.87	< 50	120	2.7
SS-16	< 5	< 5	25	300	44	< 1	37	70	11	4.03	13	< 1	< 5	25	0.75	< 50	80	2.1
SS-17	< 5	< 5	8	400	27	< 1	9	60	6	3.3	28	< 1	< 5	15	1.1	< 50	< 30	1.6
SS-18	< 5	< 5	26	< 100	40	< 1	10	60	9	4.41	27	< 1	< 5	27	1.31	< 50	110	1.8
SS-19	< 5	< 5	23	400	27	< 1	15	60	7	3.77	13	< 1	< 5	< 5	0.89	< 50	40	2.9
SS-20	< 5	< 5	16	400	5	< 1	19	60	5	3.57	11	< 1	< 5	< 5	0.95	< 50	70	1.9
SS-21	< 5	< 5	16	< 100	15	< 1	26	50	6	3.41	10	< 1	< 5	8	0.78	< 50	60	1.2
SS-22	< 5	< 5	10	< 100	12	< 1	21	60	6	3.51	12	< 1	< 5	< 5	0.92	< 50	70	0.8
SS-23	< 5	< 5	9	< 100	29	< 1	17	60	4	3.59	11	< 1	< 5	< 5	0.72	< 50	60	1
SS-24	< 5	< 5	6	< 100	29	4	7	30	8	2.28	23	< 1	< 5	9	1.31	< 50	60	2.4
SS-25	< 5	< 5	9	< 100	55	< 1	11	50	5	2.79	16	< 1	< 5	13	1.24	< 50	< 30	1.2
SS-26	< 5	< 5	6	< 100	45	< 1	11	40	5	2.23	10	< 1	< 5	7	0.84	< 50	< 30	0.8
SS-27	< 5	< 5	9	< 100	33	< 1	31	50	4	3.51	19	< 1	< 5	9	1.04	< 50	< 30	0.9
SS-28	< 5	< 5	10	< 100	26	< 1	23	60	5	3.58	10	< 1	< 5	< 5	0.82	< 50	< 30	1.1
SS-29	< 5	< 5	10	400	13	< 1	26	80	5	3.93	11	< 1	< 5	19	0.94	< 50	60	0.9
SS-30	< 5	< 5	34	400	25	< 1	99	100	9	5.5	14	< 1	< 5	33	1.12	< 50	< 30	1.4
SS-31	< 5	< 5	7	< 100	29	< 1	33	50	5	3.21	16	< 1	< 5	16	1.13	< 50	< 30	0.6
SS-32	< 5	< 5	16	< 100	10	< 1	17	60	4	3.36	14	< 1	< 5	< 5	1	< 50	70	1.5
SS-33	< 5	< 5	15	< 100	5	< 1	16	50	4	3.27	14	< 1	< 5	9	0.92	< 50	60	1.3
SS-34	< 5	< 5	17	400	< 1	2	18	60	6	3.74	14	< 1	< 5	< 5	0.93	< 50	90	1.7
SS-35	< 5	< 5	9	< 100	19	< 1	11	70	5	3.63	15	< 1	< 5	< 5	1.16	< 50	90	1
SS-36	< 5	< 5	54	400	28	< 1	42	50	5	4.52	14	< 1	< 5	18	0.8	< 50	< 30	1.2
SS-38	< 5	< 5	15	< 100	16	< 1	35	70	7	4.05	12	< 1	< 5	13	1	< 50	< 30	1.2
SS-39	< 5	< 5	17	< 100	17	< 1	32	50	7	3.74	13	< 1	< 5	19	0.9	< 50	< 30	1.1
SS-40	< 5	< 5	17	500	15	< 1	30	70	8	4.27	12	< 1	< 5	18	0.85	< 50	< 30	0.9
SS-41	< 5	< 5	20	400	16	< 1	30	80	7	4.38	12	< 1	< 5	8	0.81	< 50	70	1.1
SS-42	< 5	< 5	15	400	8	< 1	17	50	5	3.68	14	< 1	< 5	6	1.01	< 50	80	1.5
SS-43	< 5	< 5	20	300	18	< 1	25	70	5	3.69	10	< 1	< 5	7	0.82	< 50	80	1.9
SS-44	< 5	< 5	21	300	17	< 1	28	70	7	4.06	9	< 1	< 5	17	0.8	< 50	70	1.9
SS-45	< 5	< 5	19	400	16	2	20	60	6	3.56	11	< 1	< 5	6	0.85	< 50	90	1.7
SS-46	< 5	< 5	29	< 100	17	< 1	25	60	6	3.64	9	< 1	< 5	15	0.7	< 50	80	1.6
SS-47	43	< 5	10	500	31	< 1	9	40	4	2.58	14	< 1	< 5	< 5	0.92	< 50	40	1.1
SS-48	< 5	< 5	14	300	18	< 1	20	70	6	4.08	18	< 1	< 5	6	1.24	< 50	50	2.1
SS-49	< 5	< 5	14	300	17	< 1	21	80	5	4.3	17	< 1	< 5	15	1.27	< 50	70	2.4
SS-50	< 5	< 5	12	400	17	< 1	21	70	4	3.96	17	< 1	< 5	5	1.2	< 50	80	2.4
SS-51	< 5	< 5	20	< 100	20	< 1	19	70	4	4.1	19	< 1	< 5	< 5	1.27	< 50	90	3
SS-52	< 5	< 5	20	< 100	31	< 1	40	70	5	3.88	13	< 1	< 5	8	0.88	< 50	100	2.3
SS-53	< 5	< 5	12	300	72	< 1	41	80	5	3.83	16	< 1	< 5	9	0.99	< 50	90	1.1
SS-56	< 5	< 5	21	400	16	< 1	13	80	6	4.93	20	< 1	< 5	23	1.42	< 50	100	1.9
SS-57	< 5	< 5	40	300	22	< 1	15	80	5	5.57	17	< 1	< 5	44	1.46	< 50	< 30	1.5
SS-58	< 5	< 5	16	< 100	37	< 1	28	70	7	3.82	14	< 1	< 5	7	1.03	< 50	90	2
SS-59	< 5	< 5	20	< 100	68	< 1	44	50	5	3.59	13	< 1	< 5	26	1.05	< 50	70	1.4
SS-60	< 5	< 5	17	200	47	< 1	35	50	6	3.95	13	< 1	< 5	10	1.11	< 50	90	2.2
SS-61	< 5	< 5	15	400	19	< 1	22	60	5	3.71	14	< 1	< 5	< 5	0.99	< 50	60	1.2
SS-62	< 5	< 5	16	< 100	32	3	22	90	6	3.81	13	< 1	< 5	< 5	0.99	< 50	110	2

APPENDIX B (continued …)

Analyte Symbol	Sc	Se	Sn	Sr	Ta	Th	U	W	Zn	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Unit Symbol	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g
Detection Limit	0.1	5	0.05	0.1	1	0.5	0.5	4	50	1	3	5	0.1	0.2	0.5	0.2	0.05	
Analysis Method	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
SS-01	10.2	< 5	< 0.05	< 0.1	< 1	12.6	3.6	< 4	160	39	131	49	8	1.4	< 0.5	6.8	0.81	7.2
SS-02	10.5	< 5	< 0.05	< 0.1	5	13.8	7.4	< 4	150	39	131	38	7.7	1.4	1.5	7.6	0.82	7.15
SS-03	10	< 5	< 0.05	< 0.1	5	13.7	6.1	< 4	< 50	49	109	39	9.1	1.1	< 0.5	7.5	1.15	30
SS-04	8.4	< 5	< 0.05	< 0.1	< 1	10.9	5.9	< 4	250	94	132	86	22	1.3	< 0.5	6.5	1.12	17.9
SS-05	8.6	< 5	< 0.05	< 0.1	< 1	9.9	10.4	< 4	300	82	234	103	20.9	1.4	2.5	7.3	1.12	16.7
SS-06	7.9	< 5	< 0.05	< 0.1	< 1	12.9	4.7	< 4	240	57	194	51	13.7	0.8	< 0.5	6.4	1.02	18.2
SS-07	9.8	< 5	< 0.05	< 0.1	< 1	8.8	3.2	< 4	200	39	82	43	9.4	1	1.8	5.8	0.86	22.1
SS-08	13	< 5	< 0.05	< 0.1	< 1	9.8	4.6	< 4	230	41	89	44	8.6	1.4	< 0.5	5.2	0.91	16.4
SS-09	14.1	< 5	< 0.05	< 0.1	< 1	11.8	3.8	< 4	< 50	45	112	33	8.7	1.8	< 0.5	6.4	0.58	6.58
SS-10	12.4	< 5	< 0.05	< 0.1	< 1	10.1	5.6	< 4	120	40	98	37	8.3	1.8	< 0.5	5.8	0.63	6.06
SS-11	12.7	< 5	< 0.05	< 0.1	< 1	8.6	2.3	< 4	130	41	88	31	8.3	1.2	0.7	5.5	0.82	22.4
SS-12	13.1	< 5	< 0.05	< 0.1	< 1	12.7	5.7	< 4	220	41	110	40	8.1	1.5	< 0.5	6.2	0.59	5.75
SS-13	11.3	< 5	< 0.05	< 0.1	< 1	7.8	3.7	< 4	160	37	74	29	7.5	0.9	1	4.7	0.63	21.4
SS-14	10.2	< 5	< 0.05	< 0.1	3	7.4	4.1	< 4	< 50	36	59	41	6.6	0.8	1.1	4.3	0.56	18
SS-15	11.1	< 5	< 0.05	< 0.1	< 1	15.6	10.2	< 4	240	56	222	56	13	1.2	2.6	9.4	1.31	19.9
SS-16	9.8	< 5	< 0.05	< 0.1	< 1	10.9	5.2	< 4	140	44	95	35	8.6	0.5	1	6.6	0.99	19.9
SS-17	11.2	< 5	< 0.05	< 0.1	4	12.5	6.7	< 4	110	35	72	36	6.4	0.7	< 0.5	11	1.63	13.4
SS-18	11.4	< 5	< 0.05	< 0.1	< 1	14.3	5.7	< 4	180	33	77	24	6.2	< 0.2	1	14.1	2.04	12.6
SS-19	11	< 5	< 0.05	< 0.1	2	11.2	4.6	< 4	180	46	111	38	8.7	1.1	1.2	6.6	1	25.7
SS-20	10.3	< 5	< 0.05	< 0.1	< 1	8.7	3.1	< 4	130	36	79	28	5.9	1.2	1.2	5.5	0.83	34.2
SS-21	9.6	< 5	< 0.05	< 0.1	< 1	9.6	3.6	< 4	190	38	102	40	7.1	0.7	1.2	5.6	0.85	33.4
SS-22	9.3	< 5	< 0.05	< 0.1	3	8.4	4.7	< 4	120	34	88	23	6.6	1	< 0.5	6.1	1.03	32.4
SS-23	8.6	< 5	< 0.05	< 0.1	< 1	8.4	7.8	< 4	210	42	95	32	8	1	1	6.3	0.96	28.1
SS-24	5.5	< 5	< 0.05	< 0.1	4	17.2	13.3	< 4	170	53	124	66	14.5	1	2.5	13.2	2.1	28.9
SS-25	7	< 5	< 0.05	< 0.1	< 1	16.6	7.2	< 4	280	51	236	53	12.9	1	1.8	8.8	1.34	24.2
SS-26	6.1	< 5	< 0.05	< 0.1	< 1	10	9.5	< 4	140	55	141	55	16.2	0.8	2.3	8.6	1.31	23.8
SS-27	8	< 5	< 0.05	< 0.1	< 1	11.8	5.1	< 4	90	35	115	32	6.7	1.1	0.9	7.6	1.24	28.7
SS-28	9.9	< 5	< 0.05	< 0.1	< 1	9.4	5.6	< 4	170	46	111	29	8.7	1.3	1.7	6.6	0.97	29.9
SS-29	10	< 5	< 0.05	< 0.1	< 1	6.9	10.5	< 4	< 50	36	88	34	8.1	1.1	1.3	6.7	1.14	30.2
SS-30	11.5	< 5	< 0.05	< 0.1	5	9.8	3.9	< 4	< 50	38	96	35	8.3	1.6	< 0.5	7	0.67	5.75
SS-31	9.5	< 5	< 0.05	< 0.1	< 1	10.7	11.4	< 4	170	77	109	66	17.7	1.6	2.7	12.9	1.82	31.1
SS-32	9	< 5	< 0.05	< 0.1	< 1	10.7	4.1	< 4	< 50	32	88	30	5.8	1	< 0.5	6	1.05	32
SS-33	9	< 5	< 0.05	< 0.1	3	9.7	2	< 4	110	31	89	23	5.7	1	< 0.5	6.4	1.04	33.2
SS-34	11.3	< 5	< 0.05	< 0.1	< 1	12.3	3.7	< 4	100	37	92	30	6.6	1.2	1.1	6.6	1.1	30
SS-35	11.8	< 5	< 0.05	< 0.1	4	9.5	2.6	< 4	130	28	63	20	5.4	1.2	1	6.3	1.07	25.9
SS-36	7.9	< 5	< 0.05	< 0.1	< 1	8.6	7.6	< 4	200	42	94	41	9.7	1	1.6	7.3	1.28	23
SS-38	10.9	< 5	< 0.05	< 0.1	4	9.4	6.2	< 4	190	38	94	37	7.5	0.9	< 0.5	6.8	1.1	29.6
SS-39	10.3	< 5	< 0.05	< 0.1	< 1	10.1	6.4	< 4	200	42	103	33	8.1	1.2	1.4	7.2	1.15	26.9
SS-40	12.1	< 5	< 0.05	< 0.1	< 1	11.8	5.2	< 4	170	39	87	28	7.3	1.3	1.3	6.4	0.98	25.7
SS-41	12.7	< 5	< 0.05	< 0.1	2	11.9	5.4	< 4	100	37	83	23	6.6	1	1	6.4	0.93	26.7
SS-42	10.4	< 5	< 0.05	< 0.1	3	9.6	4.5	< 4	150	35	88	27	6.1	1	0.9	6.7	0.98	30.9
SS-43	11.1	< 5	< 0.05	< 0.1	< 1	9.4	4.6	< 4	180	43	105	28	7.3	1.1	1	5.6	0.76	27.5
SS-44	12	< 5	< 0.05	< 0.1	3	9.9	7	< 4	130	47	108	32	8.6	1.1	1.2	6.1	0.81	25.9
SS-45	10.5	< 5	< 0.05	< 0.1	2	10.5	4.2	< 4	100	48	91	25	8.4	1.1	1.5	6.6	0.95	29.4
SS-46	9.9	< 5	< 0.05	< 0.1	< 1	9.4	4.1	< 4	60	44	109	29	7.1	0.8	1.7	5.5	0.76	27
SS-47	7.1	< 5	< 0.05	< 0.1	3	14.6	5	< 4	120	42	96	35	8.1	0.9	1.4	7.6	1.08	22.3
SS-48	11.5	< 5	< 0.05	< 0.1	3	11.2	5.3	< 4	210	41	105	28	7.5	1.1	1.1	7.7	1.14	29.1
SS-49	12.4	< 5	< 0.05	< 0.1	2	10.9	5.5	< 4	190	41	98	37	7.8	1.3	1.1	7.9	1.15	23.8
SS-50	11.5	< 5	< 0.05	< 0.1	4	10.4	3.5	< 4	200	38	93	23	7.1	1.2	1.1	7.3	1.08	27.6
SS-51	11.7	< 5	< 0.05	< 0.1	< 1	11.7	4.6	< 4	150	39	96	29	6.5	< 0.2	1.5	8.4	1.14	30.8
SS-52	10.8	< 5	< 0.05	< 0.1	< 1	10	5.8	< 4	< 50	41	92	27	7.1	1	0.6	6.8	1.01	26.1
SS-53	11	< 5	< 0.05	< 0.1	3	8.4	13.8	< 4	130	48	96	21	8.3	1.2	1.6	7.4	0.95	21.6
SS-56	13.9	< 5	< 0.05	< 0.1	< 1	10.7	3.9	< 4	140	31	62	24	5.6	1	1.4	8.5	1.18	22.5
SS-57	14.2	< 5	< 0.05	< 0.1	3	9.9	< 0.5	< 4	< 50	33	67	26	6.6	1.3	1.6	7.6	0.91	21.9
SS-58	9.8	< 5	< 0.05	< 0.1	3	8.3	6	< 4	170	42	109	22	7.4	0.9	0.7	7.2	0.98	24.1
SS-59	9.4	< 5	< 0.05	< 0.1	< 1	10.7	6.6	< 4	140	57	124	40	11.3	1.1	2.2	9.1	1.16	21.5
SS-60	10.9	< 5	< 0.05	< 0.1	3	11.4	4.7	< 4	210	47	106	30	9.2	1.1	1.6	7.7	1.07	23.8
SS-61	11	< 5	< 0.05	< 0.1	< 1	9.4	4.3	< 4	190	43	79	28	7.3	1.3	1.4	6.1	0.92	28.5
SS-62	11.3	< 5	< 0.05	< 0.1	< 1	10.1	6.5	< 4	250	44	102	36	8	1.2	1.6	6.5	0.95	25.6

APPENDIX C

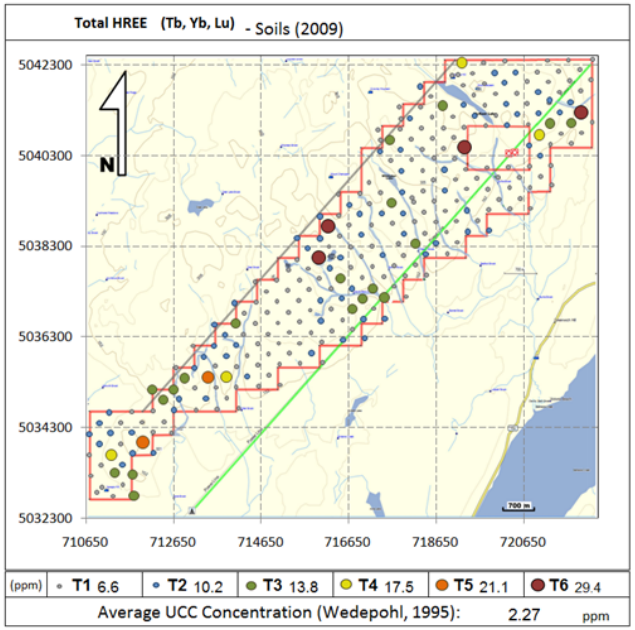
Table of the heavy mineral sample results.

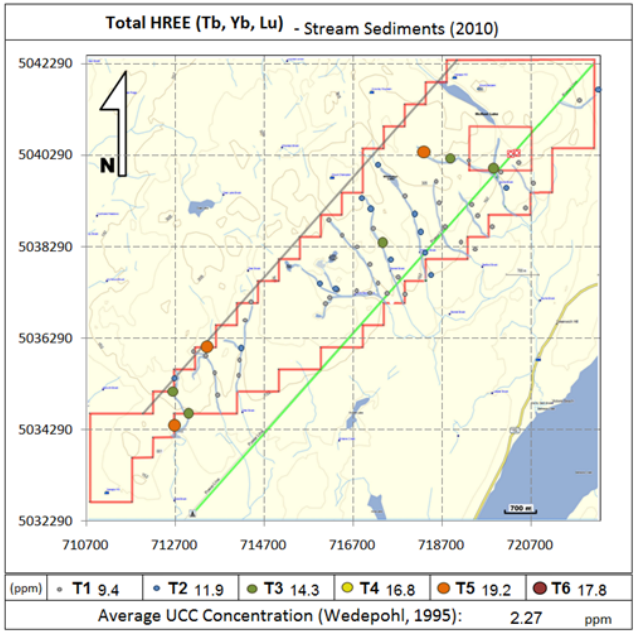
	Au	Ag	As	Ba	Br	Ca	Co	Cr	Cs	Fe	Hf	Hg	Ir	Mo	Na	Ni	Rb	Sb	Sc	Se	Sr	Ta	Th	U	W	Zn	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
HM Sample ID	ppb	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g
10AS-HM-01	5	5	22	200	23	2	26	54	9	4.19	18	1	50	20	0.84	200	50	1.3	9.7	20	0.2	1	12.0	4.5	4	226	32	65	34	6.8	0.2	2.0	7.5	0.92	28.22
10AS-HM-02	5	5	21	200	15	1	15	59	6	4.20	27	1	50	20	0.94	200	50	2.4	11.0	20	0.2	1	11.0	3.8	4	200	37	76	47	6.7	0.5	2.0	7.2	0.92	34.81
10AS-HM-03	5	5	17	290	23	1	10	59	5	4.25	25	1	50	20	0.93	200	50	1.8	11.0	20	0.2	5	8.6	0.5	4	200	35	78	32	8.4	1.8	2.0	5.8	0.81	31.36
10AS-HM-04	5	5	19	200	15	1	15	45	4	3.89	27	1	50	20	0.97	200	50	1.6	9.6	20	0.2	1	9.1	4.1	4	200	32	76	10	6.1	1.2	2.0	6.9	0.88	34.93
10AS-HM-05	5	5	27	200	28	1	9	50	4	3.18	18	1	50	20	0.91	200	50	2.5	8.8	20	0.2	1	11.0	0.5	4	200	40	88	10	9.2	0.2	2.0	7.7	1.12	30.39
10AS-HM-06	5	5	14	200	21	1	15	58	5	4.53	29	1	50	20	0.94	200	50	1.4	12.0	20	0.2	3	8.8	0.5	4	200	32	56	10	6.7	1.7	2.0	5.8	0.88	32.66
10AS-HM-07	5	5	13	480	19	1	17	60	5	4.78	34	1	50	20	0.98	200	50	1.5	10.0	20	0.2	1	11.0	0.5	4	200	38	98	34	7.6	1.5	2.0	8.4	1.06	35.72
10AS-HM-08	5	5	23	200	26	2	20	67	6	4.87	27	1	50	20	1.02	200	50	1.6	11.0	20	0.2	1	12.0	3.8	4	304	41	91	65	8.4	1.4	2.0	7.6	1.18	34.43
10AS-HM-09	5	5	17	200	12	1	18	49	4	4.28	24	1	50	20	1.01	200	66	1.1	9.6	20	0.2	1	9.8	3.7	4	200	35	95	58	6.8	0.2	2.0	7.7	1.11	36.88
10AS-HM-10	5	5	22	200	21	1	14	63	4	4.07	21	1	50	20	0.81	200	50	1.4	10.0	20	0.2	1	10.0	3.0	4	273	42	90	24	7.7	1.5	2.0	8.1	0.89	32.59
10AS-HM-11	5	5	10	200	9	1	19	63	2	4.86	24	1	50	20	1.03	200	50	0.4	10.0	20	0.2	4	8.5	2.8	4	217	37	83	10	6.8	1.4	2.0	6.5	0.78	35.68
10AS-HM-12	5	5	11	240	23	1	18	50	2	4.63	20	1	50	24	0.84	240	60	1.2	9.8	24	0.2	1	8.2	0.6	5	240	43	88	53	8.4	1.7	2.4	7.0	0.79	33.46
10AS-HM-13	5	5	14	240	55	1	10	50	8	3.44	49	1	50	24	1.43	240	60	2.4	7.2	24	0.2	1	16.8	13.2	5	240	67	144	77	18.0	0.2	4.8	19.1	2.41	28.03
10AS-HM-14	5	5	36	912	41	2	18	71	10	4.20	17	1	50	24	0.66	240	60	2.8	10.3	24	0.2	1	9.7	4.2	5	420	65	168	59	15.6	1.7	3.6	7.9	1.16	23.56
Max. Value			36	912	55		26	71	10	4.87	49				1.43	240	66	2.8	12.0			5	16.8	13.2		420	67	168	77	18	1.8	4.8	19.1	2.41	
Min Value			10	200	9		9	45	2	3.18	17				0.66	200	50	0.4	7.2			1	8.2	0.5		200	32	56	10	6	0.2	2.0	5.8	0.78	
Average (Avg.)			19	283	24		16	57	5	4.24	26				0.95	209	53	1.7	10.0			2	10.5	3.3		237	41	93	37	9	1.1	2.3	8.1	1.07	
Std. Dev.			7	196	12		5	8	2	0.50	8				0.17	17	6	0.6	1.1			1	2.2	3.3		62	11	30	23	4	0.7	0.8	3.3	0.41	

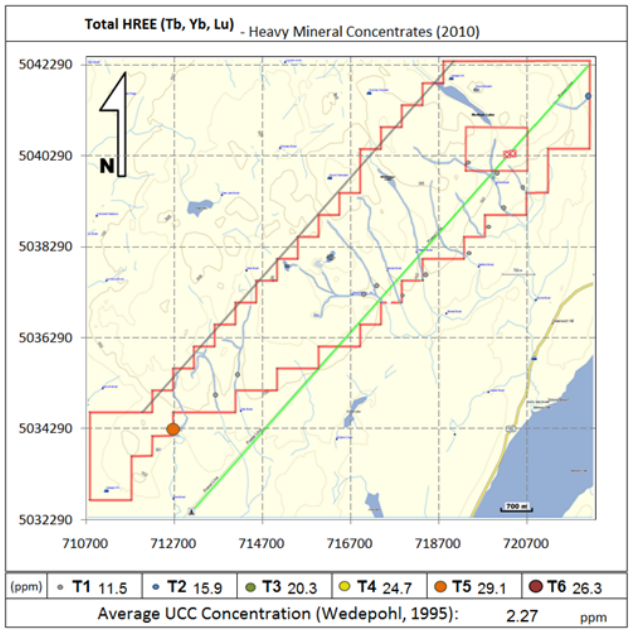
Note : Values below detection limit are highlighted in gray.

APPENDIX D

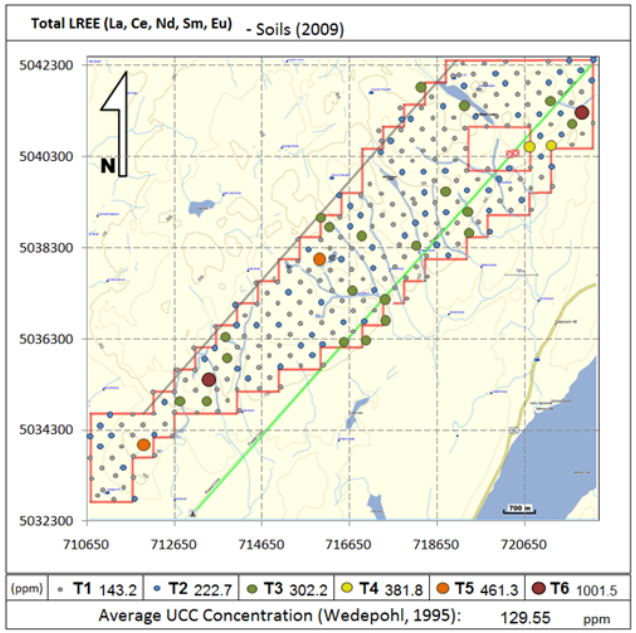
Spatial distribution plots of REE elements results for soil samples (2009), stream sediment samples (2010), and heavy mineral samples (2010).

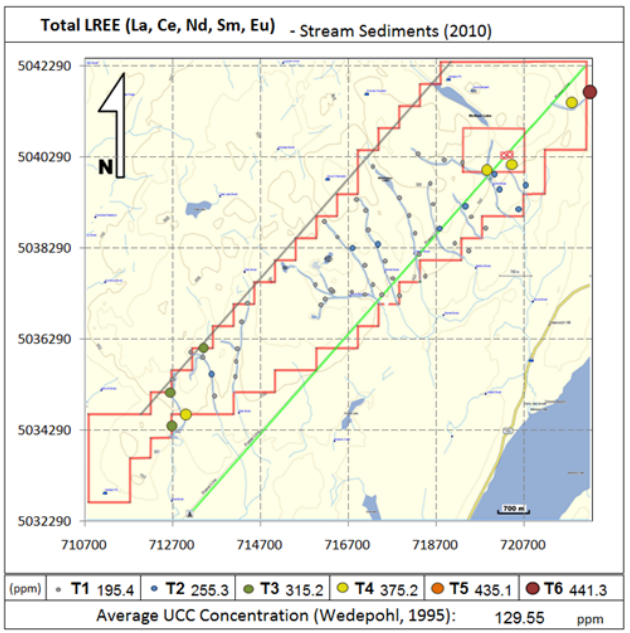


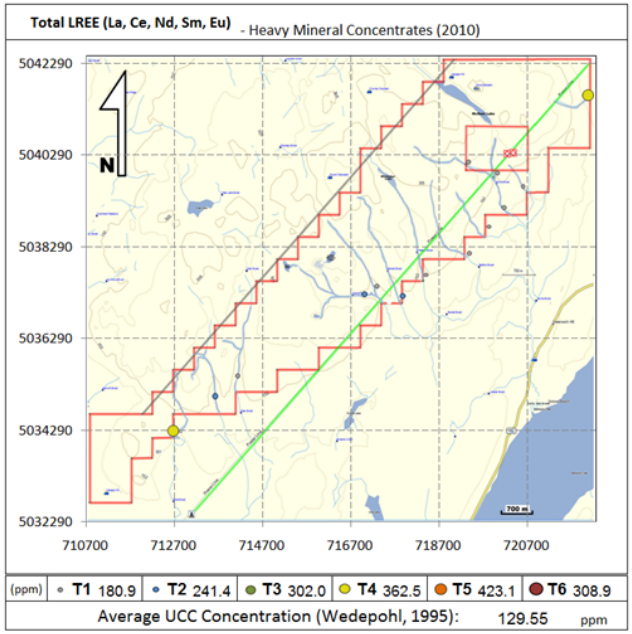


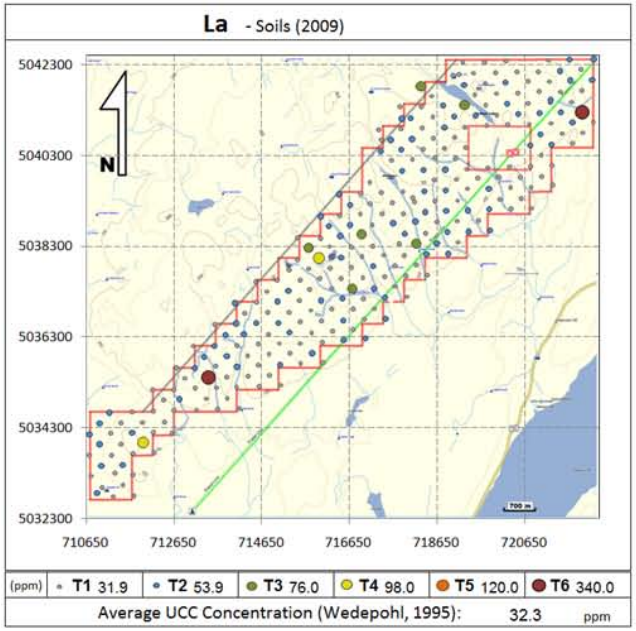


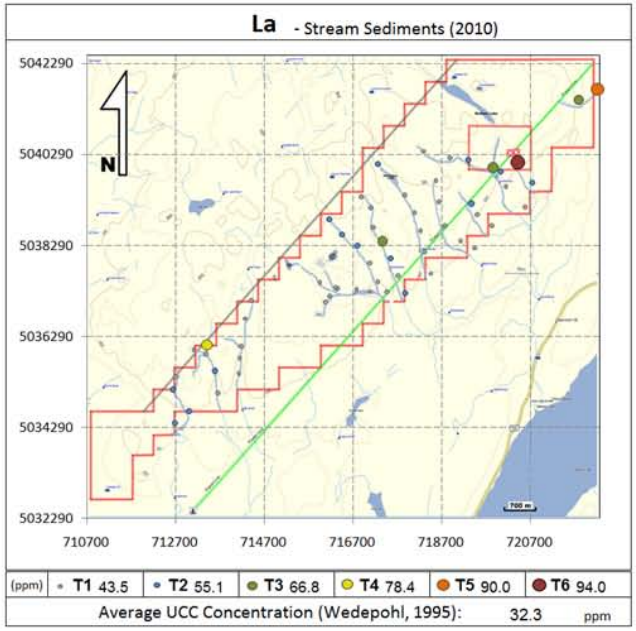
APPENDIX D (continued)

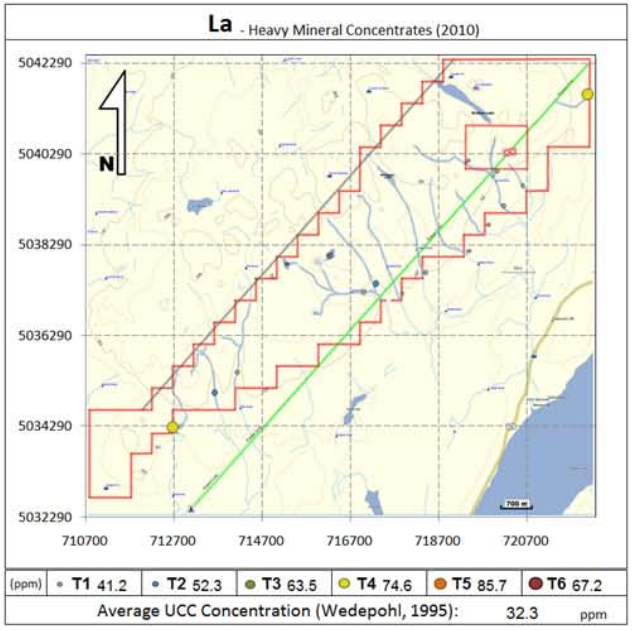




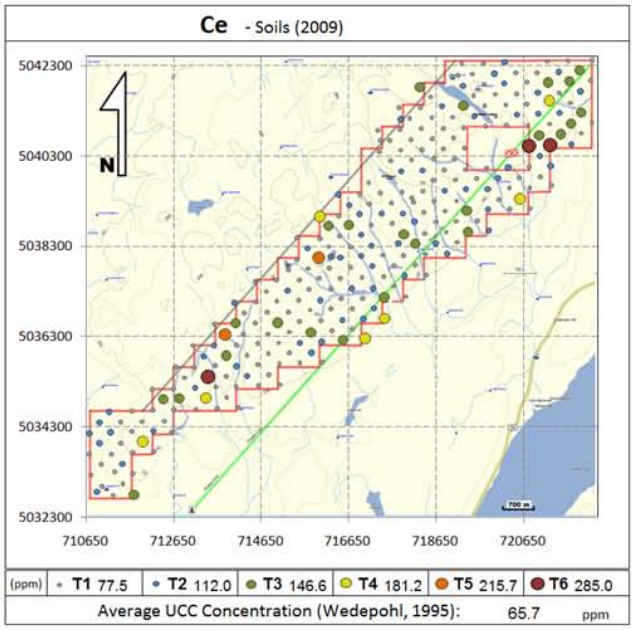


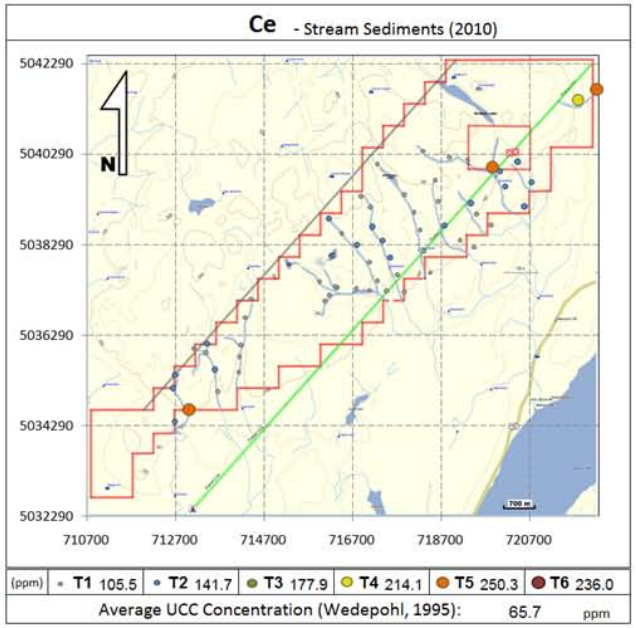


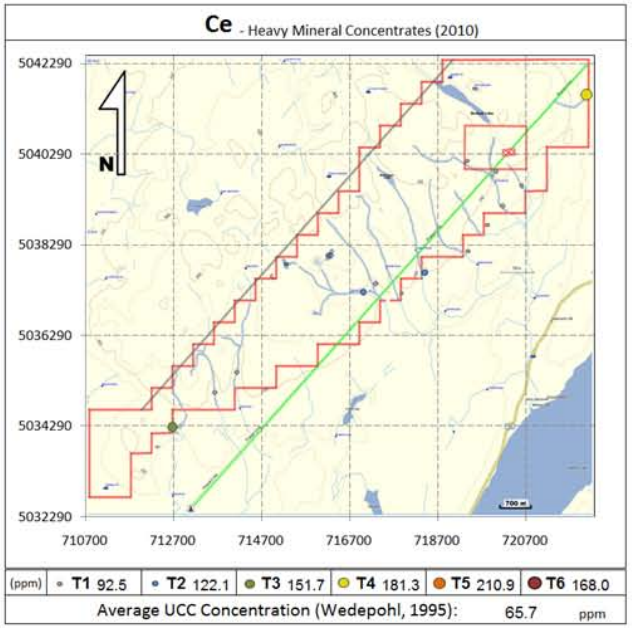


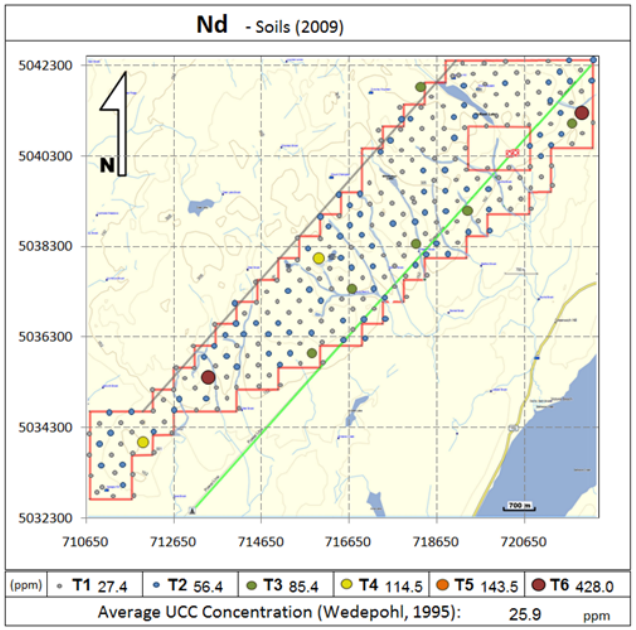


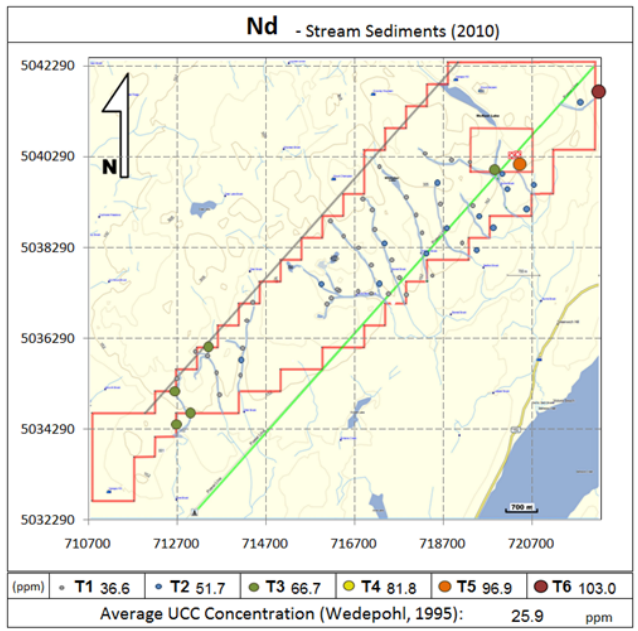
APPENDIX D (continued)

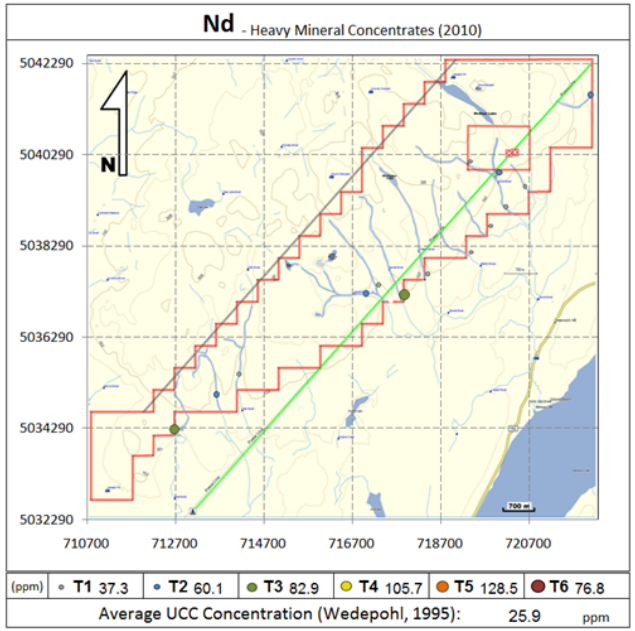




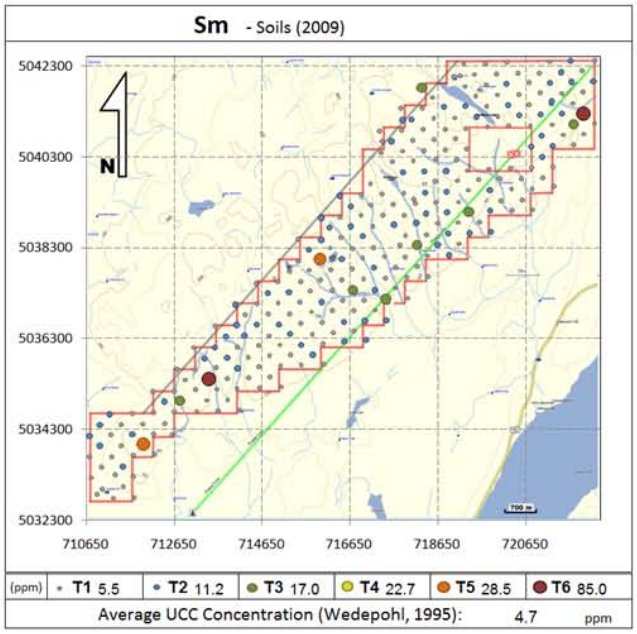


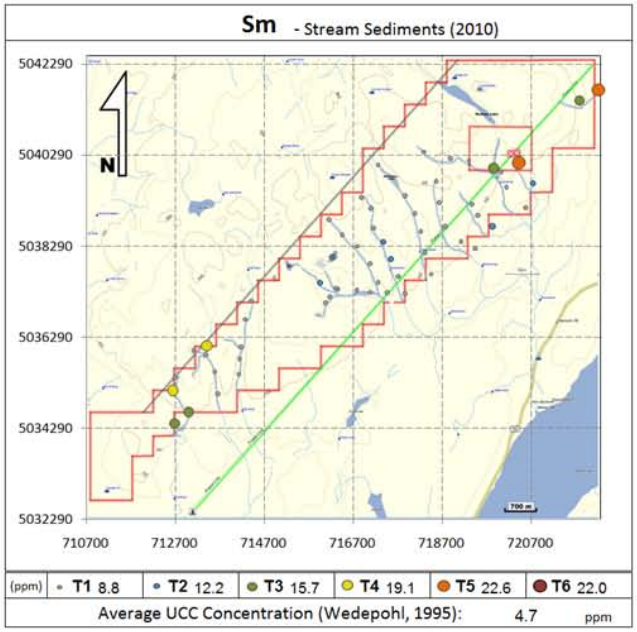


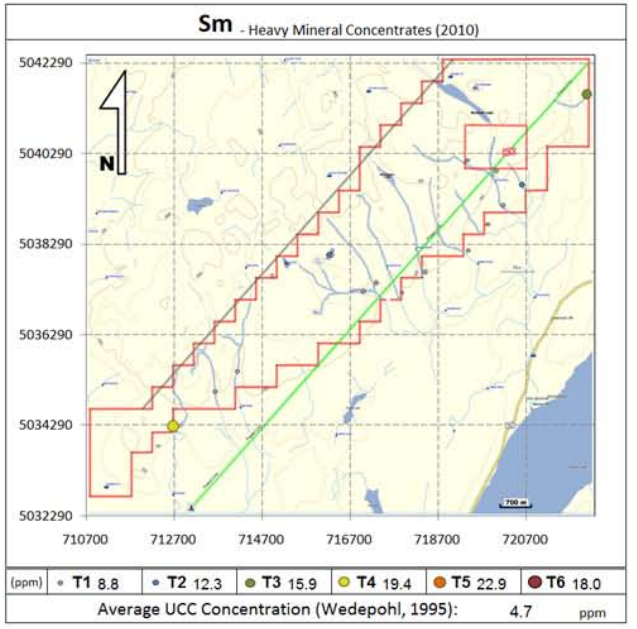


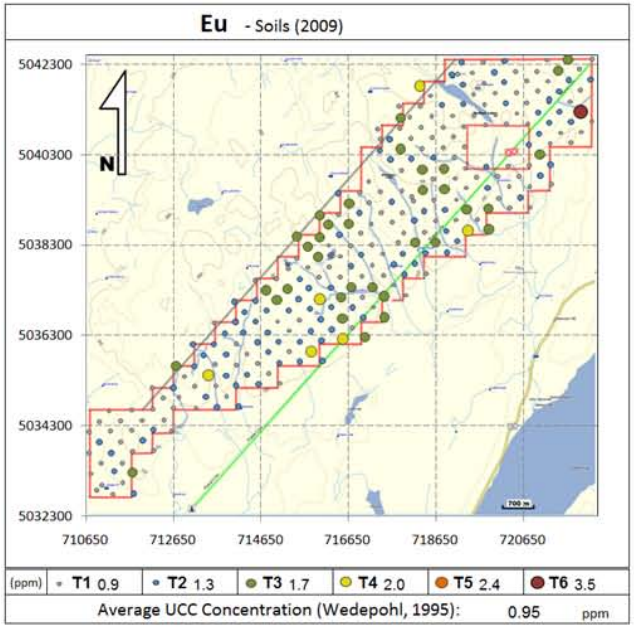


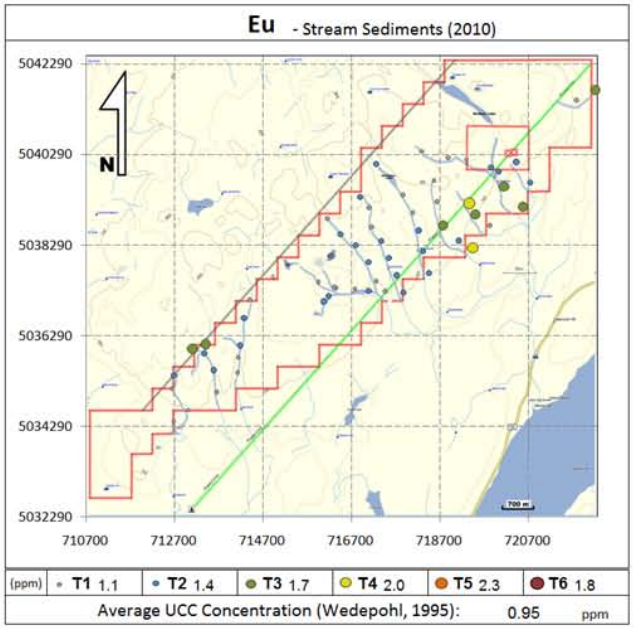
APPENDIX D (continued)

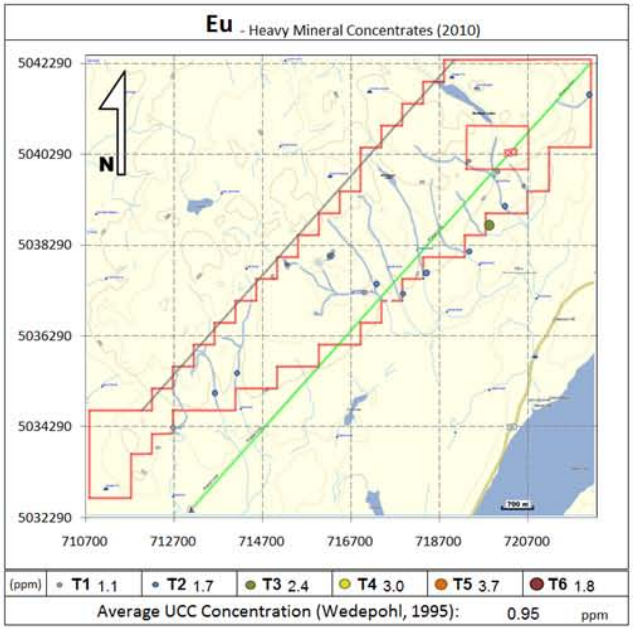




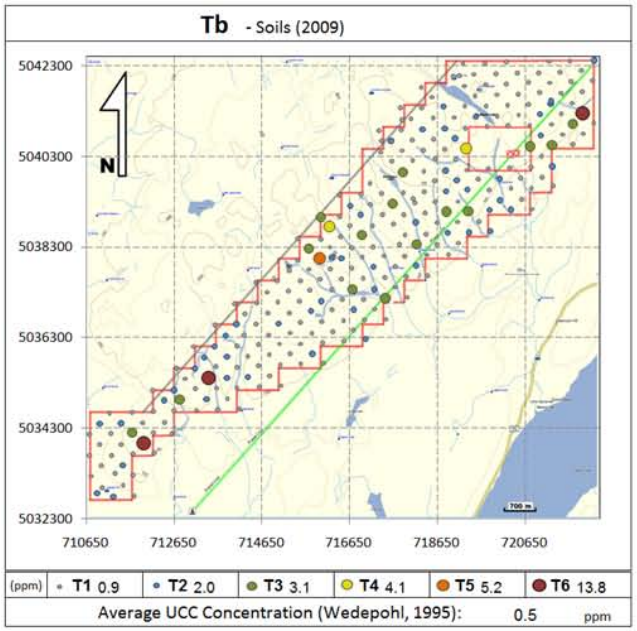


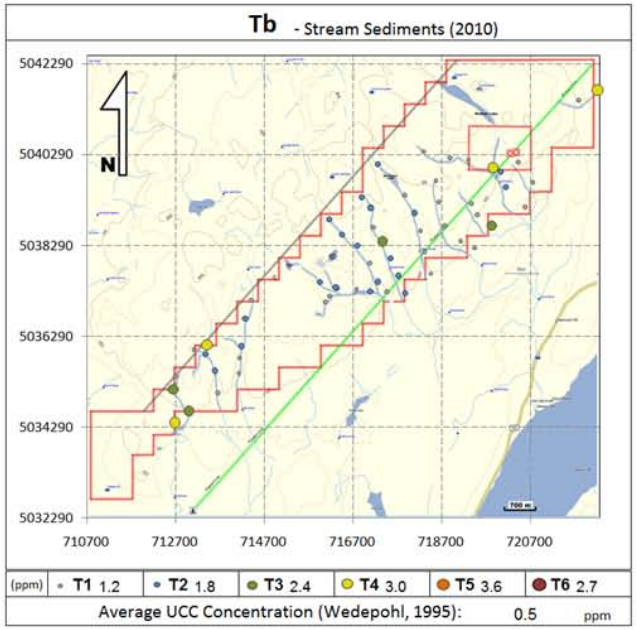


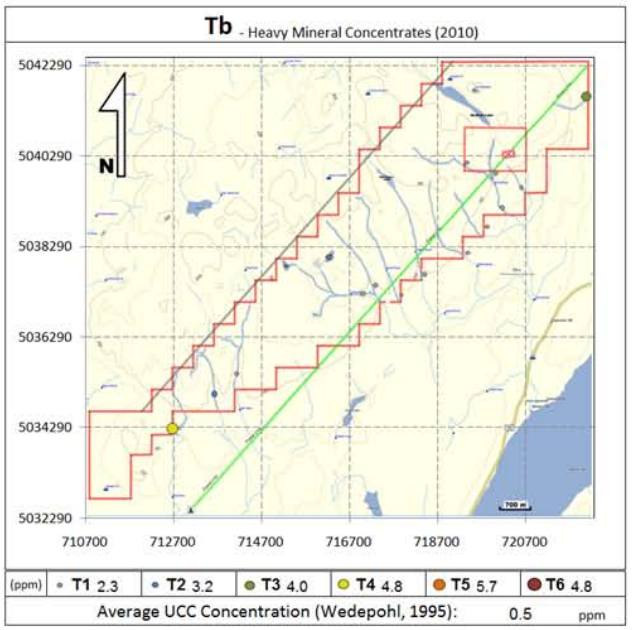


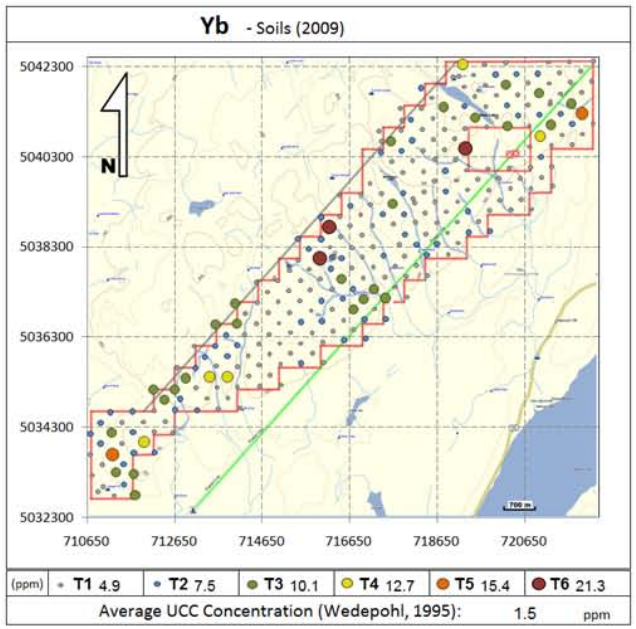


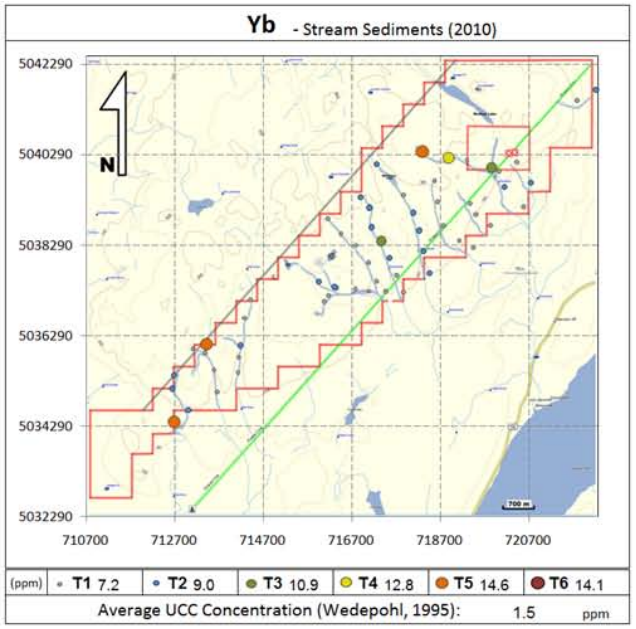
APPENDIX D (continued)

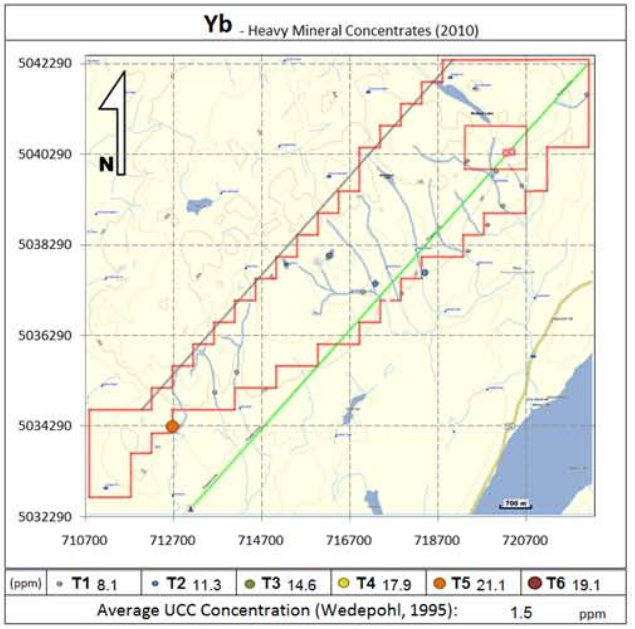




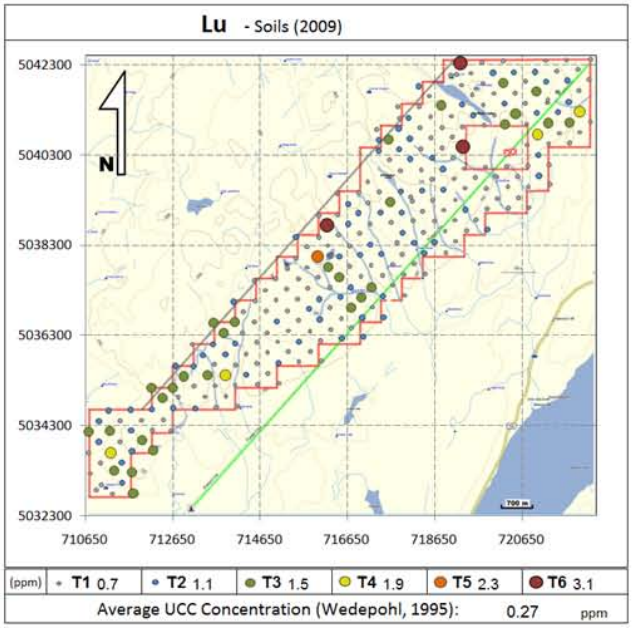


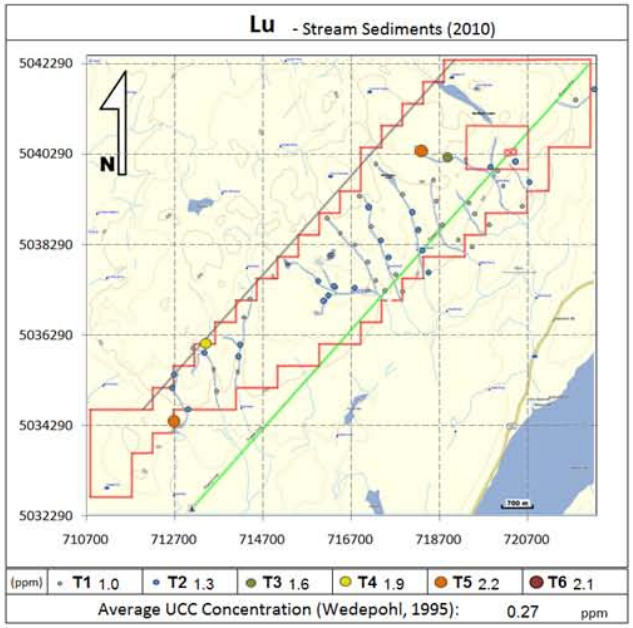


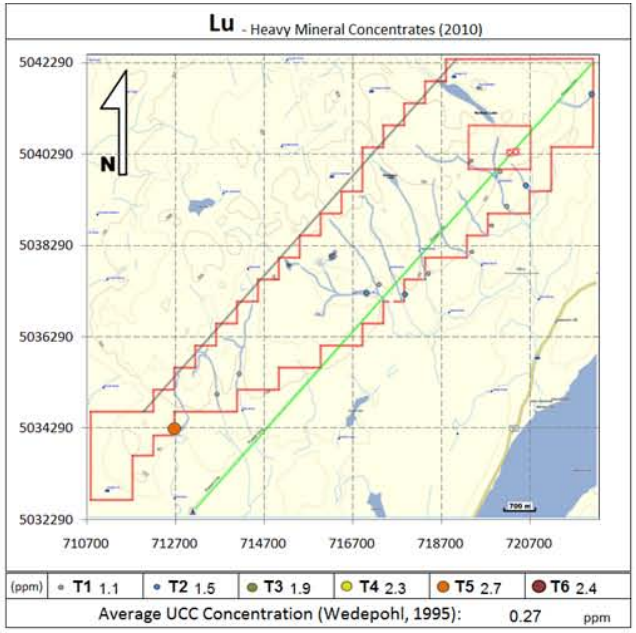


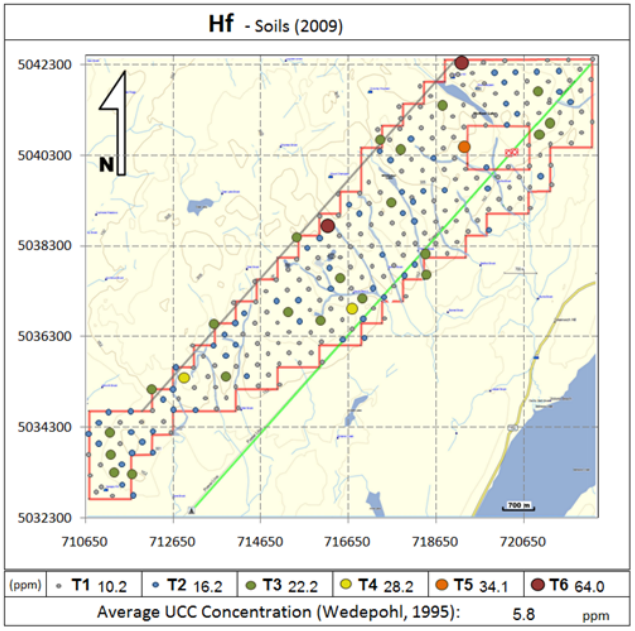


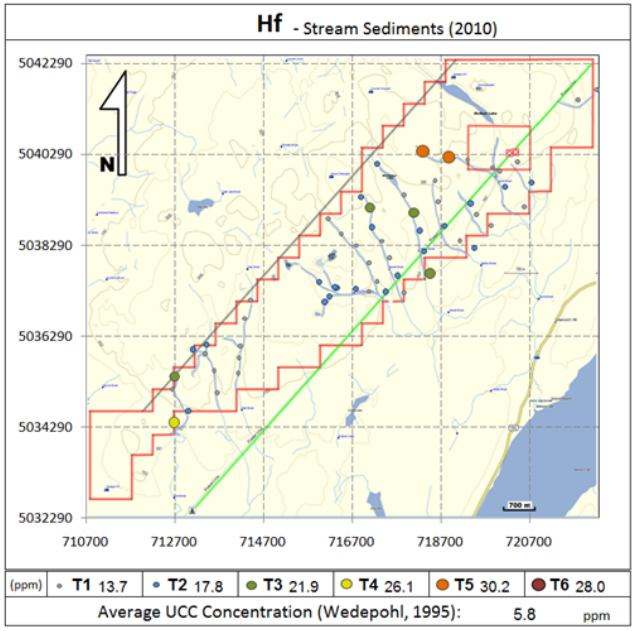
APPENDIX D (continued)

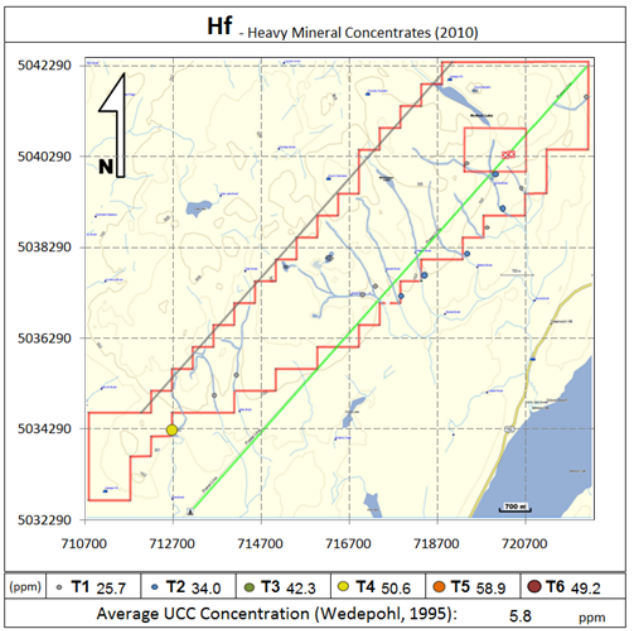












APPENDIX D (continued)

