

8 APPENDICES

8.1 Water quality guidelines and comparisons

8.1.1 Water quality guidelines and criteria for relevant ions, nutrients and physical parameters.

Parameter	B.C. water quality guidelines for Drinking Water and Recreation ^{1,2}	B.C. water quality guidelines for Freshwater Aquatic Life ²	Idaho acute standard for aquatic life ^{2,3}	Idaho chronic standard for aquatic life ^{2,3}
Chloride- Cl (dissolved)	less than or equal to 250 mg/L (aesthetic objective)			
Fluoride (undistilled)	1.5 mg/L (maximum)			
Sulfate-SO ₄	less than or equal to 500 mg/L (aesthetic objective)	100 mg/L (maximum) 50 mg/L (alert level)		
Hardness-CaCO ₃	80 to 100 mg/L as CaCO ₃ is acceptable over 200 mg/L as CaCO ₃ is poor but can be tolerated over 500 mg/L as CaCO ₃ is normally unacceptable			
Magnesium-Mg (dissolved)	100 mg/L taste threshold for sensitive people 500 mg/L, taste threshold for average people over 700 mg/L, laxative effects for everyone			
Sodium-Na	less than or equal to 200 mg/L (aesthetic objective) 20 mg/L alert level for people on sodium restricted diets			
Electrical Conductivity	700 µS/cm(maximum)			
pH	6.5 to 8.5 (aesthetic objective) 5.0 to 9.0 (buffering capacity)		6.5-9.5	6.5-9.5
Total Dissolved Solids	less than or equal to 500 mg/L (aesthetic objective)			

¹Drinking water and Recreation criteria are for drinking water unless otherwise stated (MoE 2001)

²Based on measurements of total parameter concentrations unless stated

³Based on measurements of dissolved parameter concentrations

8.1.2 Water quality guidelines and criteria for metals

Parameter	B.C. water quality guidelines for Drinking Water and Recreation ²	B.C. water quality guidelines for Freshwater Aquatic Life (Maximum) ²	Idaho acute Standard ^{2,3}	B.C. water quality guidelines for Freshwater Aquatic Life 30-day average ²	Idaho chronic aquatic life standards ^{2,3}
Aluminum, Dissolved-Al	0.2 mg/L (maximum)	0.1 mg/L where pH ≥ 6.5	NA	0.05 mg/L where pH ≥ 6.5	NA
Antimony, Total-Sb	0.006 mg/L (proposed interim maximum)	0.002 mg/L ⁶	NA	NA	NA
Arsenic, Total-As	0.025 mg/L (maximum)	0.005 mg/L ⁶	0.36 mg/L ⁶	NA	0.19 mg/L ⁶
Cadmium, Total-Cd	0.005 mg/L (maximum)	0.00001 mg/L ⁴ 0.000033 mg/L ⁵	0.0008 mg/L ⁴ 0.0037 mg/L ⁵	NA	0.0004 mg/L ⁴ 0.0010 mg/L ⁵
Chromium, Total-Cr	0.050 mg/L (maximum)	0.001 mg/L (Cr IV) 0.009 mg/L (Cr III) ⁶	0.1763 mg/L ⁴ 0.5487 mg/L ⁵	NA	0.0572 mg/L ⁴ 0.1780 mg/L ⁵
Copper, Total-Cu	≤1 mg/L (aesthetics)	0.00435 mg/L ⁴ 0.011 mg/L ⁵	0.0046 mg/L ⁴ 0.0170 mg/L ⁵	0.002 mg/L ⁴ 0.00004 mg/L ⁵	0.0035 mg/L ⁴ 0.0144 mg/L ⁵
Iron, Total-Fe	less than or equal to 0.3 mg/L (aesthetic objective)	0.3 mg/L ⁶	NA	NA	NA
Lead, Total-Pb	0.010 mg/L (maximum)	0.014 mg/L ⁴ 0.082 mg/L ⁵	0.0139 mg/L ⁴ 0.0646 mg/L ⁵	0.004 mg/L ⁴ 0.006 mg/L ⁵	0.0139 mg/L ⁴ 0.0025 mg/L ⁵
Manganese, Total-Mn	≤.050 mg/L (aesthetics)	0.8 mg/L ⁴ 1.6 mg/L ⁵	NA	0.7 mg/L ⁴ 1.0 mg/L ⁵	NA
Mercury, Total-Hg	0.001 mg/L (maximum)	0.0001 mg/L ⁶	0.002 mg/L ⁴ 0.002 mg/L ⁵	0.00002 mg/L ⁶	0.000012 mg/L ⁴ 0.000012 mg/L ⁵
Silver, Total-Ag		0.0001 mg/L ⁶	0.0003 mg/L ⁴ 0.00034 mg/L ⁵	0.00005 mg/L ⁶	NA
Zinc, Total-Zn	≤5 mg/L (aesthetics)	0.033 mg/L ⁴ 0.040 mg/L ⁵	0.0354 mg/L ⁴ 0.1144 mg/L ⁵	0.0075 mg/L ⁴ 0.015 mg/L ⁵	0.0322 mg/L ⁴ 0.1039 mg/L ⁵

²Based on measurements of total parameter concentrations unless stated

³Applies to measurements of dissolved parameter concentrations as well

⁴Based on a hardness of 25 mg/L CaCO₃ for Boundary Creek and Boundary Creek Wildlife Reserve.

⁵Based on a hardness of 100 mg/L CaCO₃ for Kootenay River.

⁶For Boundary Creek, Boundary Creek Wildlife Reserve and the Kootenay River.

NA- Not applicable.

8.1.3 Water quality of monitoring sites compared to MoE guidelines.

Station	B.C. MoE Guidelines for Aquatic life Boundary Creek/Wildlife Refuge		B.C. MoE Guidelines for Aquatic life Kootenay River		Month sampled	Boundary Creek						Kootenay River		Wildlife Refuge
	Maximum	30-day Average	Maximum	30-day Average		BC-1	BC-1A	BC-1B	BC-2	BC-3	BC-4	KR-1	KR-1A	WR-1
Flow (cfs)	NA	NA	NA	NA	June/July ¹	15.11	43.96	NS	103.09	NS	149	NS	NS	1.34
Hardness	NA	NA	NA	NA	June/July ¹	3.28	8.05	5.4	12.79	18.1	31.53	NS	NS	NS
					Sept.	60	35	35	26	21	23	102	102	NS
Cd, Total water (mg/L)	0.00001	NA	0.00003	NA	June/July ¹	<0.0001	0.0008	0.0002	0.0002	0.0002	0.0001	<0.0001	0.001	0.002
					Sept.	<0.0001	0.0008	0.0005	0.0003	0.0003	0.0001	<0.0001	<0.0001	NS
Pb, Total water (mg/L)	0.0139	0.004	0.082	0.006	June/July ¹	<0.003	0.068	NS	0.021	0.018	0.011	0.008	0.008	0.011
					Sept.	0.00036	0.034	0.021	0.014	0.0081	0.0029	0.00066	0.00048	NS
Zn, Total water (mg/L)	0.033	0.0075	0.040	0.015	June/July ¹	<0.01	0.05	NS	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
					Sept.	<0.01	0.04	0.02	<0.01	<0.01	<0.01	0.02	<0.01	NS

¹Data from Maxim 2004; BC-Boundary Creek; KR-Kootenay River; KS-floodplain; WR-Boundary Creek wildlife refuge area NA-not applicable; NS-not sampled; Bolded values exceeded at least one guideline.

8.2 Sediment Quality Data

8.2.1 Lab Reports from sediment collected at Site BC-1

28-Oct-03	ANALYTICAL REPORT						
Form	50093291						
Sampling site :	E253490						
Submitted by :	JOLENE RAGGETT						
Philip ID :	13049163	13049164					
Client ID :	REG/1	DEP	REG/2	RIF			
Sparcode	Parameter	Unit	MDL	Media	Workroute		
SUBCSUBC	SUBCONTRACT	--- (1)	--- (2)	None	00/00	Subcontract	
PHYSICAL							
TEMPARRI	Temperature Arrival	1	1	Celsius	0	00/00	Temperature on arrival
250760	Moisture	27.6	20.9	%(W/W)	0.1	00/00	Hom; Gravimetric 105C
GENERAL							
INORGANICS							
0125-AVS	Acid Volatile Sulfides	0.4	---	ug/g	0.2	00/00	Acid Volatile Sulphide
AVSICALC	Acid Volatile Sulfides	0.012	---	umole/g	0.006	--/--	Calculated Result
CARBON							
1240941	Inorganic Carbon - Total	< 500	760	ug/g	500	00/00	Ash on Leco
0103CAL2	Organic Carbon - Total	11000	2500	ug/g		--/--	Calculated Result
C--T0790	Carbon - Total	11000	3300	ug/g	500	00/00	D/G:Leco Carbon
PHOSPHORUS							
P--TMS20	Phosphorus Total (P)	256	---	ug/g	10	02-May	D&G:HNO3/HCl Dig:ICP-MS
METALS TOTAL							
Al-TMS20	Aluminum	8520	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sb-TMS20	Antimony	< 0.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
As-TMS20	Arsenic	1.1	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ba-TMS20	Barium	66.9	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Be-TMS20	Beryllium	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Bi-TMS20	Bismuth	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cd-TMS20	Cadmium	0.13	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ca-TMS20	Calcium	862	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cr-TMS20	Chromium	8	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Co-TMS20	Cobalt	5.7	---	ug/g	0.3	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cu-TMS20	Copper	8.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Fe-TMS20	Iron	19500	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Pb-TMS20	Lead	5.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mg-TMS20	Magnesium	4710	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mn-TMS20	Manganese	184	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Hg-TMS20	Mercury	< 0.05	---	ug/g	0.05	28-Jun	D&G:HNO3/HCl Dig:ICP-MS
Mo-TMS20	Molybdenum	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ni-TMS20	Nickel	7.6	---	ug/g	0.8	02-May	D&G:HNO3/HCl Dig:ICP-MS
K--TMS20	Potassium	1590	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Se-TMS20	Selenium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ag-TMS20	Silver	< 0.05	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Na-TMS20	Sodium	< 100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sr-TMS20	Strontium	3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Te-TMS20	Tellurium	< 0.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Tl-TMS20	Thallium	0.19	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sn-TMS20	Tin	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ti-TMS20	Titanium	425	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
V--TMS20	Vanadium	12	---	ug/g	2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zn-TMS20	Zinc	50	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zr-TMS20	Zirconium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Matrix :	Soil	Soil					
Sampled on:	23/09/2003	23/09/2003					
Sampled at:	16:00	16:00					

Result comments and/or text results :

- (1) Text results for sample 13049163 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.
- (2) Text results for sample 13049164 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.

28-Oct-03 DUPLICATE SUMMARY
Form 50093291

Parameter	Client ID	Philip ID	Sample Conc.	Duplicate Conc.	MDL	Unit	Relative % Diff.
Moisture	REG/2 RIF	13049164	20.9	18.4	0.1	%(W/W)	12.72

28-Oct-03 SPIKE SUMMARY
Form 50093291

Parameter	Client ID	Philip ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recovery
Inorganic Carbon - Total	Blank Spike. Batch :	34404708	< 500	6400	6350	ug/g	99
Carbon - Total	Blank Spike. Batch :	34404707	< 500	37000	39000	ug/g	94
Arsenic	Blank Spike. Batch :	34202741	< 0.2	2.4	2	ug/g	120
Cadmium	Blank Spike. Batch :	34202741	< 0.05	2.18	2	ug/g	109
Lead	Blank Spike. Batch :	34202741	< 0.1	2.3	2	ug/g	116
Selenium	Blank Spike. Batch :	34202741	< 0.5	2.3	2	ug/g	113
Thallium	Blank Spike. Batch :	34202741	< 0.05	2.14	2	ug/g	107
Mercury	Blank Spike. Batch :	34202741	< 0.05	0.2	0.2	ug/g	102
Acid Volatile Sulfides	Blank Spike. Batch :	34103169	< 0.2	4.7	5	ug/g	95

28-Oct-03 ANALYSIS DATES
Form 50093291

Philip ID:	13049163	13049164	
Client ID:	REG/1 DEP	REG/2 RIF	
SUBCSUBC	SUBCONTRACT	27-Oct-03	27-Oct-03
250760	Moisture	01-Oct-03	01-Oct-03
0125-AVS	Acid Volatile Sulfides	08-Oct-03	---
TOC-S	Billing TOC-Soil	06-Oct-03	06-Oct-03
Hg-TMS20	Mercury	03-Oct-03	---
ICPMS200	Soil Metals by ICP-MS	03-Oct-03	---
Matrix:	Soil	Soil	
Sampled on:	23-Sep-03	23-Sep-03	

28-Oct-03 BATCH NUMBERS
Form 50093291

Philip ID:	13049163	13049164	
Client ID:	REG/1 DEP	REG/2 RIF	
SUBCSUBC	SUBCONTRACT	35501689	35501689
250760	Moisture	34404601	34404601
0125-AVS	Acid Volatile Sulfides	34103169	---
TOC-S	Billing TOC-Soil	34404707	34404707
Hg-TMS20	Mercury	34202741	---
ICPMS200	Soil Metals by ICP-MS	34202741	---
Matrix:	Soil	Soil	
Sampled on:	23-Sep-03	23-Sep-03	

28-Oct-03 BLANK SUMMARY
Form 50093291

All method blanks were less than MDL

8.2.2 Lab Reports from sediment collected at Site BC-1A

28-Oct-03	ANALYTICAL REPORT						
Form	50093292						
Sampling site :	E253491						
Submitted by :	JOLENE RAGGETT						
Philip ID :	13049165	13049166					
Client ID :	REG/1 DEP	REG/2 RIF					
Sparcode	Parameter	Unit	MDL	Media	Workroute		
SUBCSUBC	SUBCONTRACT	--- (1)	--- (2)	None		00/00	Subcontract
PHYSICAL							
TEMPARRI	Temperature Arrival	1	1	Celsius	0	00/00	Temperature on arrival
250760	Moisture	35.5	12.1	%(W/W)	0.1	00/00	Hom; Gravimetric 105C
GENERAL							
INORGANICS							
0125-AVS	Acid Volatile Sulfides	< 0.2	---	ug/g	0.2	00/00	Acid Volatile Sulphide
AVSfCALC	Acid Volatile Sulfides	< 0.006	---	umole/g	0.006	--/--	Calculated Result
CARBON							
1240941	Inorganic Carbon - Total	< 500	570	ug/g	500	00/00	Ash on Leco
0103CAL2	Organic Carbon - Total	10000	2700	ug/g		--/--	Calculated Result
C--T0790	Carbon - Total	10000	3300	ug/g	500	00/00	D/G:Leco Carbon
PHOSPHORUS							
P--TMS20	Phosphorus Total (P)	231	---	ug/g	10	02-May	D&G:HNO3/HCl Dig:ICP-MS
METALS TOTAL							
Al-TMS20	Aluminum	6230	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sb-TMS20	Antimony	4.5	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
As-TMS20	Arsenic	4	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ba-TMS20	Barium	29	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Be-TMS20	Beryllium	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Bi-TMS20	Bismuth	0.4	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cd-TMS20	Cadmium	1.91	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ca-TMS20	Calcium	836	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cr-TMS20	Chromium	5	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Co-TMS20	Cobalt	4.8	---	ug/g	0.3	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cu-TMS20	Copper	69.1	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Fe-TMS20	Iron	15100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Pb-TMS20	Lead	1320	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mg-TMS20	Magnesium	3200	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mn-TMS20	Manganese	160	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Hg-TMS20	Mercury	0.8	---	ug/g	0.05	28-Jun	D&G:HNO3/HCl Dig:ICP-MS
Mo-TMS20	Molybdenum	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ni-TMS20	Nickel	6.1	---	ug/g	0.8	02-May	D&G:HNO3/HCl Dig:ICP-MS
K--TMS20	Potassium	1110	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Se-TMS20	Selenium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ag-TMS20	Silver	1.91	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Na-TMS20	Sodium	< 100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sr-TMS20	Strontium	2.8	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Te-TMS20	Tellurium	< 0.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Tl-TMS20	Thallium	0.13	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sn-TMS20	Tin	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ti-TMS20	Titanium	302	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
V--TMS20	Vanadium	9	---	ug/g	2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zn-TMS20	Zinc	278	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zr-TMS20	Zirconium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Matrix :	Soil	Soil					
Sampled on:	23/09/2003	23/09/2003					
Sampled at:	16:00	16:00					

Result comments and/or text results :

- (1) Text results for sample 13049165 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.
- (2) Text results for sample 13049166 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.

28-Oct-03 SPIKE SUMMARY

Form 50093292

Parameter	Client ID	Philip ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recovery
Inorganic Carbon - Total	Blank Spike. Batch :	34404708	< 500	6400	6350	ug/g	99
Carbon - Total	Blank Spike. Batch :	34404707	< 500	37000	39000	ug/g	94
Arsenic	Blank Spike. Batch :	34202741	< 0.2	2.4	2	ug/g	120
Cadmium	Blank Spike. Batch :	34202741	< 0.05	2.18	2	ug/g	109
Lead	Blank Spike. Batch :	34202741	< 0.1	2.3	2	ug/g	116
Selenium	Blank Spike. Batch :	34202741	< 0.5	2.3	2	ug/g	113
Thallium	Blank Spike. Batch :	34202741	< 0.05	2.14	2	ug/g	107
Mercury	Blank Spike. Batch :	34202741	< 0.05	0.2	0.2	ug/g	102
Acid Volatile Sulfides	Blank Spike. Batch :	34103169	< 0.2	4.7	5	ug/g	95

28-Oct-03 ANALYSIS DATES

Form 50093292

Philip ID:	13049165	13049166	
Client ID:	REG/1 DEP	REG/2 RIF	
SUBCSUBC	SUBCONTRACT	27-Oct-03	27-Oct-03
250760	Moisture	01-Oct-03	01-Oct-03
0125-AVS	Acid Volatile Sulfides	08-Oct-03	---
TOC-S	Billing TOC-Soil	06-Oct-03	06-Oct-03
Hg-TMS20	Mercury	03-Oct-03	---
ICPMS200	Soil Metals by ICP-MS	03-Oct-03	---
Matrix:	Soil	Soil	
Sampled on:	23-Sep-03	23-Sep-03	

28-Oct-03 BATCH NUMBERS

Form 50093292

Philip ID:	13049165	13049166	
Client ID:	REG/1 DEP	REG/2 RIF	
SUBCSUBC	SUBCONTRACT	35501689	35501689
250760	Moisture	34404601	34404601
0125-AVS	Acid Volatile Sulfides	34103169	---
TOC-S	Billing TOC-Soil	34404707	34404707
Hg-TMS20	Mercury	34202741	---
ICPMS200	Soil Metals by ICP-MS	34202741	---
Matrix:	Soil	Soil	
Sampled on:	23-Sep-03	23-Sep-03	

28-Oct-03 BLANK SUMMARY

Form 50093292

All method blanks were less than MDL

8.2.3 Lab Reports from sediment collected at Site BC-1B

28-Oct-03	ANALYTICAL REPORT						
Form	50093293						
Sampling site :	E253492						
Submitted by :	JOLENE RAGGETT						
Philip ID :	13049179	13049180					
Client ID :	REG/1 DEP	REG/2 RIF					
Sparcode	Parameter	Unit	MDL	Media	Workroute		
SUBCSUBC	SUBCONTRACT	--- (1)	--- (2)	None		00/00	Subcontract
PHYSICAL							
TEMPARRI	Temperature Arrival	1	1	Celsius	0	00/00	Temperature on arrival
250760	Moisture	16.8	14.9	%(W/W)	0.1	00/00	Hom; Gravimetric 105C
GENERAL							
INORGANICS							
0125-AVS	Acid Volatile Sulfides	< 0.2	---	ug/g	0.2	00/00	Acid Volatile Sulphide
AVSfCALC	Acid Volatile Sulfides	< 0.006	---	umole/g	0.006	--/--	Calculated Result
CARBON							
1240941	Inorganic Carbon - Total	< 500	760	ug/g	500	00/00	Ash on Leco
0103CAL2	Organic Carbon - Total	6700	3500	ug/g		--/--	Calculated Result
C--T0790	Carbon - Total	6700	4300	ug/g	500	00/00	D/G:Leco Carbon
PHOSPHORUS							
P--TMS20	Phosphorus Total (P)	200	---	ug/g	10	02-May	D&G:HNO3/HCl Dig:ICP-MS
METALS TOTAL							
Al-TMS20	Aluminum	5000	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sb-TMS20	Antimony	2.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
As-TMS20	Arsenic	1.7	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ba-TMS20	Barium	24.4	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Be-TMS20	Beryllium	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Bi-TMS20	Bismuth	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cd-TMS20	Cadmium	0.9	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ca-TMS20	Calcium	568	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cr-TMS20	Chromium	4	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Co-TMS20	Cobalt	6.4	---	ug/g	0.3	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cu-TMS20	Copper	46.1	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Fe-TMS20	Iron	15400	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Pb-TMS20	Lead	726	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mg-TMS20	Magnesium	2400	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mn-TMS20	Manganese	161	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Hg-TMS20	Mercury	0.19	---	ug/g	0.05	28-Jun	D&G:HNO3/HCl Dig:ICP-MS
Mo-TMS20	Molybdenum	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ni-TMS20	Nickel	10.5	---	ug/g	0.8	02-May	D&G:HNO3/HCl Dig:ICP-MS
K--TMS20	Potassium	980	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Se-TMS20	Selenium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ag-TMS20	Silver	0.64	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Na-TMS20	Sodium	< 100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sr-TMS20	Strontium	2.6	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Te-TMS20	Tellurium	< 0.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Tl-TMS20	Thallium	0.11	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sn-TMS20	Tin	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ti-TMS20	Titanium	229	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
V--TMS20	Vanadium	9	---	ug/g	2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zn-TMS20	Zinc	146	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zr-TMS20	Zirconium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Matrix :	Soil	Soil					
Sampled on:	23/09/2003	23/09/2003					
Sampled at:	16:00	16:00					

Result comments and/or text results :

- (1) Text results for sample 13049179 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.
- (2) Text results for sample 13049180 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.

28-Oct-03 DUPLICATE SUMMARY

Form 50093293

Parameter	Client ID	Philip ID	Sample	Duplicate	MDL	Unit	Relative
Acid Volatile Sulfides	REG/1 DEP	13049179	< 0.2	< 0.2	0.2	ug/g	0

28-Oct-03 SPIKE SUMMARY

Form 50093293

Parameter	Client ID	Philip ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recovery
Inorganic Carbon - Total	Blank Spike. Batch :	34404708	< 500	6400	6350	ug/g	99
Carbon - Total	Blank Spike. Batch :	34404707	< 500	37000	39000	ug/g	94
Arsenic	Blank Spike. Batch :	34202741	< 0.2	2.4	2	ug/g	120
Cadmium	Blank Spike. Batch :	34202741	< 0.05	2.18	2	ug/g	109
Lead	Blank Spike. Batch :	34202741	< 0.1	2.3	2	ug/g	116
Selenium	Blank Spike. Batch :	34202741	< 0.5	2.3	2	ug/g	113
Thallium	Blank Spike. Batch :	34202741	< 0.05	2.14	2	ug/g	107
Mercury	Blank Spike. Batch :	34202741	< 0.05	0.2	0.2	ug/g	102
Acid Volatile Sulfides	REG/1 DEP	13049179	< 0.2	6	6.01	ug/g	98
Acid Volatile Sulfides	Blank Spike. Batch :	34103169	< 0.2	4.7	5	ug/g	95

28-Oct-03 ANALYSIS DATES

Page 4 of 6 Form 50093293

Philip ID:	13049179	13049180
Client ID:	REG/1 DEP	REG/2 RIF
SUBCSUBC	SUBCONTRACT	27-Oct-03 27-Oct-03
250760	Moisture	01-Oct-03 01-Oct-03
0125-AVS	Acid Volatile Sulfides	08-Oct-03 ---
TOC-S	Billing TOC-Soil	06-Oct-03 06-Oct-03
Hg-TMS20	Mercury	03-Oct-03 ---
ICPMS200	Soil Metals by ICP-MS	03-Oct-03 ---
Matrix:	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03

28-Oct-03 BATCH NUMBERS

Form 50093293

Philip ID:	13049179	13049180
Client ID:	REG/1 DEP	REG/2 RIF
SUBCSUBC	SUBCONTRACT	35501689 35501689
250760	Moisture	34404601 34404601
0125-AVS	Acid Volatile Sulfides	34103169 ---
TOC-S	Billing TOC-Soil	34404707 34404707
Hg-TMS20	Mercury	34202741 ---
ICPMS200	Soil Metals by ICP-MS	34202741 ---
Matrix:	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03

28-Oct-03 BLANK SUMMARY

Form 50093293

All method blanks were less than MDL

8.2.4 Lab Reports from sediment collected at Site BC-2

28-Oct-03	ANALYTICAL REPORT						
Form	50093294						
Sampling site :	E253493						
Submitted by :	JOLENE RAGGETT						
Philip ID :	13049181	13049182					
Client ID :	REG/1 DEP	REG/2 RIF					
Sparcode	Parameter	Unit	MDL	Media	Workroute		
SUBCSUBC	SUBCONTRACT	--- (1)	--- (2)	None		00/00	Subcontract
PHYSICAL							
TEMPARRI	Temperature Arrival	1	1	Celsius	0	00/00	Temperature on arrival
250760	Moisture	17.1	12.4	%(W/W)	0.1	00/00	Hom; Gravimetric 105C
GENERAL							
INORGANICS							
0125-AVS	Acid Volatile Sulfides	0.9	---	ug/g	0.2	00/00	Acid Volatile Sulphide
AVSfCALC	Acid Volatile Sulfides	0.03	---	umole/g	0.006	--/--	Calculated Result
CARBON							
1240941	Inorganic Carbon - Total	< 500	< 500	ug/g	500	00/00	Ash on Leco
0103CAL2	Organic Carbon - Total	4500	2500	ug/g		--/--	Calculated Result
C--T0790	Carbon - Total	4500	2500	ug/g	500	00/00	D/G:Leco Carbon
PHOSPHORUS							
P--TMS20	Phosphorus Total (P)	208	---	ug/g	10	02-May	D&G:HNO3/HCl Dig:ICP-MS
METALS TOTAL							
Al-TMS20	Aluminum	3910	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sb-TMS20	Antimony	0.3	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
As-TMS20	Arsenic	0.6	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ba-TMS20	Barium	19.4	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Be-TMS20	Beryllium	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Bi-TMS20	Bismuth	0.4	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cd-TMS20	Cadmium	0.23	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ca-TMS20	Calcium	457	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cr-TMS20	Chromium	2	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Co-TMS20	Cobalt	3.4	---	ug/g	0.3	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cu-TMS20	Copper	11.1	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Fe-TMS20	Iron	13100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Pb-TMS20	Lead	209	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mg-TMS20	Magnesium	1890	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mn-TMS20	Manganese	133	---	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Hg-TMS20	Mercury	< 0.05	---	ug/g	0.05	28-Jun	D&G:HNO3/HCl Dig:ICP-MS
Mo-TMS20	Molybdenum	0.6	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ni-TMS20	Nickel	3.4	---	ug/g	0.8	02-May	D&G:HNO3/HCl Dig:ICP-MS
K--TMS20	Potassium	1080	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Se-TMS20	Selenium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ag-TMS20	Silver	0.12	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Na-TMS20	Sodium	< 100	---	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sr-TMS20	Strontium	1.9	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Te-TMS20	Tellurium	< 0.1	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Tl-TMS20	Thallium	0.11	---	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sn-TMS20	Tin	0.2	---	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ti-TMS20	Titanium	222	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
V--TMS20	Vanadium	7	---	ug/g	2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zn-TMS20	Zinc	53	---	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zr-TMS20	Zirconium	< 0.5	---	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Matrix :	Soil	Soil					
Sampled on:	23/09/2003	23/09/2003					
Sampled at:	16:00	16:00					

Result comments and/or text results :

- (1) Text results for sample 13049181 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.
- (2) Text results for sample 13049182 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.

28-Oct-03 SPIKE SUMMARY

Form 50093294

Parameter	Client ID	Philip ID	Sample	Sample & Spike	Unit Percent
Inorganic Carbon – Total	Blank Spike. Batch :	34404708	< 500	6400	6350 ug/g 99
Carbon – Total	Blank Spike. Batch :	34404707	< 500	37000	39000 ug/g 94
Arsenic	Blank Spike. Batch :	34202741	< 0.2	2.4	2 ug/g 120
Cadmium	Blank Spike. Batch :	34202741	< 0.05	2.18	2 ug/g 109
Lead	Blank Spike. Batch :	34202741	< 0.1	2.3	2 ug/g 116
Selenium	Blank Spike. Batch :	34202741	< 0.5	2.3	2 ug/g 113
Thallium	Blank Spike. Batch :	34202741	< 0.05	2.14	2 ug/g 107
Mercury	Blank Spike. Batch :	34202741	< 0.05	0.2	0.2 ug/g 102
Acid Volatile Sulfides	Blank Spike. Batch :	34103169	< 0.2	4.7	5 ug/g 95

28-Oct-03 ANALYSIS DATES

Form 50093294

Philip ID:	13049181	13049182
Client ID:	REG/1 DEP	REG/2 RIF
SUBCSUBC	SUBCONTRACT	27-Oct-03 27-Oct-03
250760	Moisture	01-Oct-03 01-Oct-03
0125-AVS	Acid Volatile Sulfides	08-Oct-03 ---
TOC-S	Billing TOC-Soil	06-Oct-03 06-Oct-03
Hg-TMS20	Mercury	03-Oct-03 ---
ICPMS200	Soil Metals by ICP-MS	03-Oct-03 ---
Matrix:	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03

28-Oct-03 BATCH NUMBERS

Form 50093294

Philip ID:	13049181	13049182
Client ID:	REG/1 DEP	REG/2 RIF
SUBCSUBC	SUBCONTRACT	35501689 35501689
250760	Moisture	34404601 34404601
0125-AVS	Acid Volatile Sulfides	34103169 ---
TOC-S	Billing TOC-Soil	34404707 34404707
Hg-TMS20	Mercury	34202741 ---
ICPMS200	Soil Metals by ICP-MS	34202741 ---
Matrix:	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03

28-Oct-03 BLANK SUMMARY

Form 50093294

All method blanks were less than MDL

8.2.5 Lab Reports from sediment collected at Site BC-4

Form	50093295								
Sampling site :	E253494								
Submitted by :	JOLENE RAGGETT								
Philip ID :	13049183	13049184	13049185	13049186					
Client ID :	REG/1	REG/2	REG/3	REG/4					
Sparcode	DEP	RIF	REP/3	BLE/4					
SUBCSUBC	Unit	MDL	Media	Work route					
PHYSICAL	--- (1)	--- (2)	--- (3)	---	None	00/00	Subcontract		
TEMPERATURE									
TEMPARRI	Arrival	1	1	1	1	Celsius	0	00/00	Temperature on arrival
250760	Moisture	20	12.7	19.8	---	%(W/W)	0.1	00/00	Hom; Gravimetric 105C
GENERAL INORGANICS									
0125-AVS	Acid Volatile Sulfides	1	---	< 0.2	---	ug/g	0.2	00/00	Acid Volatile Sulphide
AVSfCALC	Acid Volatile Sulfides	0.03	---	< 0.006	---	umole/g	0.006	--/--	Calculated Result
1240941	Inorganic Carbon – Total	570	570	< 500	---	ug/g	500	00/00	Ash on Leco
0103CAL2	Organic Carbon – Total	9100	1600	7200	---	ug/g	--/--		Calculated Result
C—T0790	Carbon – Total	9700	2200	7200	---	ug/g	500	00/00	D/G:Leco Carbon
PHOSPHORUS									
P—TMS20	Phosphorus								
	Total (P)	178	---	147	< 10	ug/g	10	02-May	D&G:HNO3/HCl Dig:ICP-MS
METALS TOTAL									
Al-TMS20	Aluminum	2670	---	2620	3480	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sb-TMS20	Antimony	0.1	---	< 0.1	< 0.1	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
As-TMS20	Arsenic	1	---	0.9	< 0.2	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ba-TMS20	Barium	19.1	---	23.1	4960	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Be-TMS20	Beryllium	0.1	---	0.2	< 0.1	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Bi-TMS20	Bismuth	3	---	0.1	0.1	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cd-TMS20	Cadmium	0.31	---	0.4	0.43	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ca-TMS20	Calcium	607	---	453	3350	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cr-TMS20	Chromium	< 1	---	< 1	1	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Co-TMS20	Cobalt	2.3	---	2.7	< 0.3	ug/g	0.3	02-May	D&G:HNO3/HCl Dig:ICP-MS
Cu-TMS20	Copper	5.3	---	4.6	0.7	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Fe-TMS20	Iron	7650	---	7650	< 100	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Pb-TMS20	Lead	140	---	126	19	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mg-TMS20	Magnesium	1100	---	1210	914	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Mn-TMS20	Manganese	112	---	160	3.5	ug/g	0.2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Hg-TMS20	Mercury	< 0.05	---	< 0.05	< 0.05	ug/g	0.05	28-Jun	D&G:HNO3/HCl Dig:ICP-MS
Mo-TMS20	Molybdenum	0.3	---	0.2	< 0.1	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ni-TMS20	Nickel	1.7	---	1.6	< 0.8	ug/g	0.8	02-May	D&G:HNO3/HCl Dig:ICP-MS
K—TMS20	Potassium	782	---	840	3400	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Se-TMS20	Selenium	< 0.5	---	< 0.5	< 0.5	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ag-TMS20	Silver	< 0.05	---	< 0.05	0.09	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Na-TMS20	Sodium	< 100	---	< 100	11100	ug/g	100	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sr-TMS20	Strontium	2.9	---	2.7	115	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Te-TMS20	Tellurium	< 0.1	---	< 0.1	< 0.1	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Tl-TMS20	Thallium	0.07	---	0.08	< 0.05	ug/g	0.05	02-May	D&G:HNO3/HCl Dig:ICP-MS
Sn-TMS20	Tin	0.2	---	0.2	0.9	ug/g	0.1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Ti-TMS20	Titanium	148	---	167	2	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
V—TMS20	Vanadium	7	---	7	< 2	ug/g	2	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zn-TMS20	Zinc	46	---	47	3670	ug/g	1	02-May	D&G:HNO3/HCl Dig:ICP-MS
Zr-TMS20	Zirconium	< 0.5	---	< 0.5	2.3	ug/g	0.5	02-May	D&G:HNO3/HCl Dig:ICP-MS
Matrix :	Soil	Soil	Soil	Soil					
Sampled on:	23/09/2003	23/09/2003	23/09/2003	23/09/2003					
Sampled at:	16:00	16:00	16:00	16:00					

Sample 13049186 comment : ALL METALS RESULTS EXPRESSED AS MICROGRAMS.

Result comments and/or text results :

- (1) Text results for sample 13049183 sparcode SUBCSUBC follow :
- (2) Text results for sample 13049184 sparcode SUBCSUBC follow :
- (3) Text results for sample 13049185 sparcode SUBCSUBC follow :
Please see attached report. Subcontracted to Soilcon.

28-Oct-03 SPIKE SUMMARY

Form 50093295

Parameter	Client ID	Philip ID	Sample Conc.	Sample & Spike Conc.	Spike Amount	Unit	Percent Recovery
Inorganic Carbon - Total	Blank Spike. Batch :	34404708	< 500	6400	6350	ug/g	99
Carbon - Total	Blank Spike. Batch :	34404707	< 500	37000	39000	ug/g	94
Arsenic	Blank Spike. Batch :	34202741	< 0.2	2.4	2	ug/g	120
Cadmium	Blank Spike. Batch :	34202741	< 0.05	2.18	2	ug/g	109
Lead	Blank Spike. Batch :	34202741	< 0.1	2.3	2	ug/g	116
Selenium	Blank Spike. Batch :	34202741	< 0.5	2.3	2	ug/g	113
Thallium	Blank Spike. Batch :	34202741	< 0.05	2.14	2	ug/g	107
Mercury	Blank Spike. Batch :	34202741	< 0.05	0.2	0.2	ug/g	102
Acid Volatile Sulfides	Blank Spike. Batch :	34103169	< 0.2	4.7	5	ug/g	95

28-Oct-03 ANALYSIS DATES

Form 50093295

Philip ID:	13049183	13049184	13049185	13049186
Client ID:	REG/1 DEP	REG/2 RIF	REP/3	BLE/4
SUBCSUBC	SUBCONTRACT	27-Oct-03	27-Oct-03	27-Oct-03
250760	Moisture	01-Oct-03	01-Oct-03	01-Oct-03
0125-AVS	Acid Volatile Sulfides	08-Oct-03	---	08-Oct-03
TOC-S	Billing TOC-Soil	06-Oct-03	06-Oct-03	06-Oct-03
Hg-TMS20	Mercury	03-Oct-03	---	03-Oct-03
ICPMS200	Soil Metals by ICP-MS	03-Oct-03	---	03-Oct-03
Matrix:	Soil	Soil	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03	23-Sep-03	23-Sep-03

28-Oct-03 BATCH NUMBERS

Form 50093295

Philip ID:	13049183	13049184	13049185	13049186
Client ID:	REG/1 DEP	REG/2 RIF	REP/3	BLE/4
SUBCSUBC	SUBCONTRACT	35501689	35501689	35501689
250760	Moisture	34404601	34404601	34404601
0125-AVS	Acid Volatile Sulfides	34103169	---	34103169
TOC-S	Billing TOC-Soil	34404707	34404707	34404707
Hg-TMS20	Mercury	34202741	---	34202741
ICPMS200	Soil Metals by ICP-MS	34202741	---	34202741
Matrix:	Soil	Soil	Soil	Soil
Sampled on:	23-Sep-03	23-Sep-03	23-Sep-03	23-Sep-03

28-Oct-03 BLANK SUMMARY

Form 50093295

All method blanks were less than MDL

8.3 Sediment quality guidelines and comparisons

8.3.1 Sediment quality guidelines.

Parameter	B.C. MoE Sediment guidelines ¹	Cleanup Guidelines ¹ (Maxim 2004)	Probable Effect Level ¹ (NOAA 1999) also adopted by B.C. MoE
Aluminum, Total-Al		293	NA
Antimony, Total-Sb		NA	NA
Arsenic, Total-As	5.9 ISQG ²	700	17
Cadmium, Total-Cd	0.60 interim TEL	19,500	3.5
Chromium, Total-Cr	37 ISQG	735,000	90
Copper, Total-Cu	36 ISQG	21,100	197
Iron, Total-Fe	21,200 (about 2%) lowest effect level based on SLC ³ 43,766 (about 4%) severe effects level based on SLC	NA	NA
Lead, Total-Pb	35 ISQG	1,100	91
Manganese, Total Mn		665	NA
Mercury, Total-Hg	0.174 ISQG	220	0.486
Nickel, Total-Ni	16 lowest effect level based on SLC ³ 75 severe effect level based on SLC	14,650	NA
Selenium, Total-Se	5	NA	NA
Silver, Total-Ag	0.5 Ontario ⁴	NA	NA
Zinc, Total-Zn	123 ISQG	220,000	315

¹All guidelines in µg/g or mg/kg; ²ISQG=Interim Sediment Quality Guideline; ³SLC=Screening Level Concentration; ⁴Ontario sediment quality guideline ,

8.3.2 Levels of metals in the sediment at monitoring sites compared to MoE guidelines.

Station	Month ² sampled	PEL ³	B.C. MoE ISQG ⁴	Boundary Creek						Kootenay River		Flood plain sediment		Wildlife Refuge
				BC-1 (upstream/ control)	BC-1A	BC-1B	BC-2	BC-3	BC-4	KR-1	KR-1A	KS-1	KS-2	WR-1
Cd, sediment (ug/g)	June/July	3.5	0.6	<2	<2	<2	<2	<2	<2	<2	NS	2	<2	<2
	Sept.			0.13	1.91	0.9	0.23	NS	0.31	NS	NS	NS	NS	NS
Pb, sediment (ug/g)	June/July	91	35	141	1390	NS	674	140	225	<20	NS	5140	60	328
	Sept.			5.3	1320	726	209	NS	140	NS	NS	NS	NS	NS
Zn, sediment (ug/g)	June/July	315	123	62	246	NS	121	140	84	97	NS	356	167	91
	Sept.			50	278	146	53	NS	46	NS	NS	NS	NS	NS
Hg, sediment (ug/g)	June/July	0.846	0.174	<0.20	1.30	NS	<0.20	0.40	<0.20	<0.20	NS	2.50	<0.20	<0.20
	Sept.			<0.05	0.8	0.19	<0.05	NS	<0.05		NS			
Cu, sediment (ug/g)	June/July	197	36	23	94	NS	33	29	11	31	NS	90	15	15
	Sept.			8.5	69.1	46.1	11.1	NS	5.3	NS	NS	NS	NS	NS

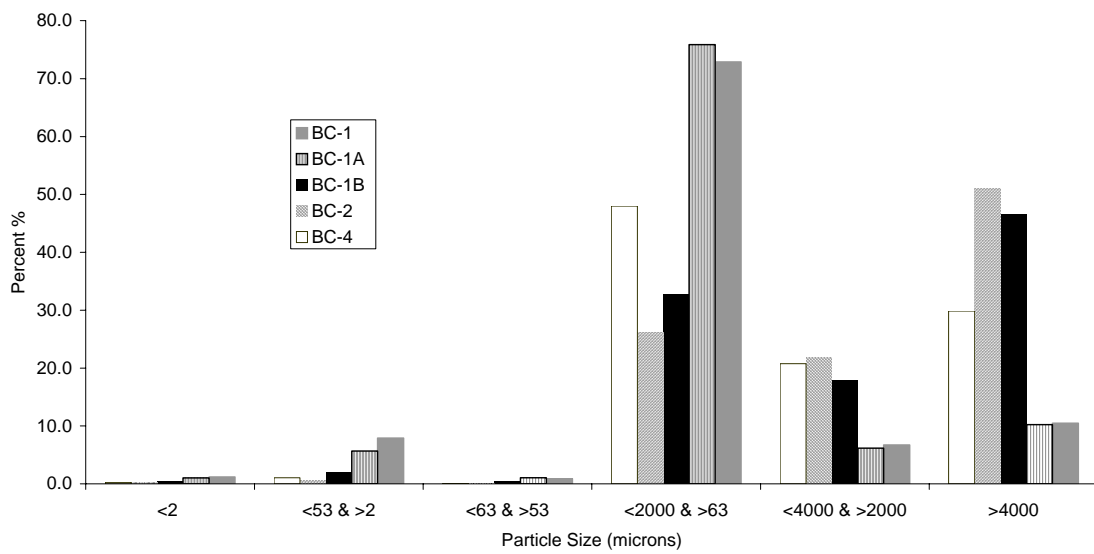
¹Data from Maxim 2004; ²Probable Effects Level (US NOAA 1999); ³Interim Sediment Quality Guideline; BC-Boundary Creek; KR-Kootenay River; KS-floodplain and WR-Boundary Creek wildlife refuge area NS-not sampled; Bolded values exceeded at one guideline

8.4 Particle size data

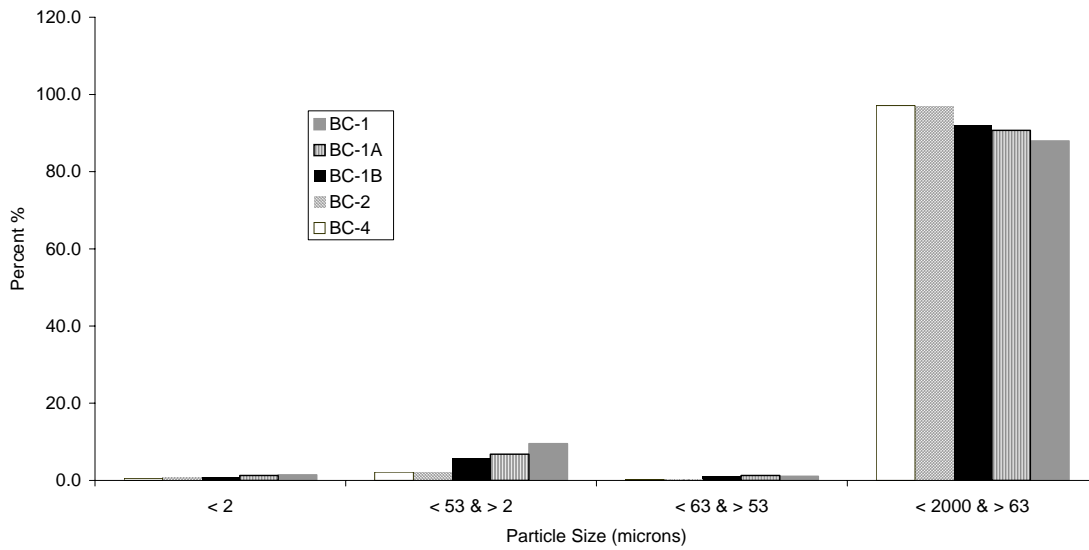
8.4.1 Particle sizes of sediment samples collected at each site

Type of sample	Particle Size (mm)	E253490	E253491	E253492	E253493	E253494
		BC-1	BC-1A	BC-1B	BC-2	BC-4
Depositional	<i>% of entire sample</i>					
	>4.00	10.46	10.22	46.62	51.10	29.83
	<4.00 & >2.00	6.69	6.17	17.85	21.85	20.75
	<2.00 & >0.063	78.77	81.46	49.15	47.43	68.14
	<0.063 & >0.053	0.94	1.13	0.63	0.17	0.18
	<0.053 & >0.002	8.54	6.07	3.10	0.99	1.50
	<0.002	1.28	1.12	0.50	0.32	0.35
	<i>% of <2 mm fraction</i>					
	<2.00 & >0.063	87.98	90.73	92.08	96.99	97.11
	<0.063 & >0.053	1.05	1.26	1.17	0.34	0.25
	<0.053 & >0.002	9.53	6.76	5.80	2.02	2.14
	<0.002	1.43	1.25	0.95	0.66	0.49
	Riffle	<i>% of entire sample</i>				
>4.00		50.08	47.71	54.93	20.80	60.05
<4.00 & >2.00		13.83	22.61	19.57	25.73	15.37
<2.00 & >0.063		44.34	49.43	42.35	75.05	39.22
<0.063 & >0.053		0.50	0.28	0.24	0.34	0.06
<0.053 & >0.002		4.73	2.22	2.11	3.18	0.48
<0.002		0.36	0.36	0.38	0.64	0.20
<i>% of <2 mm fraction</i>						
<2.00 & >0.063		88.82	94.53	93.95	94.75	98.15
<0.063 & >0.053		0.99	0.54	0.53	0.43	0.15
<0.053 & >0.002		9.47	4.24	4.68	4.01	1.20
<0.002		0.72	0.68	0.84	0.81	0.49

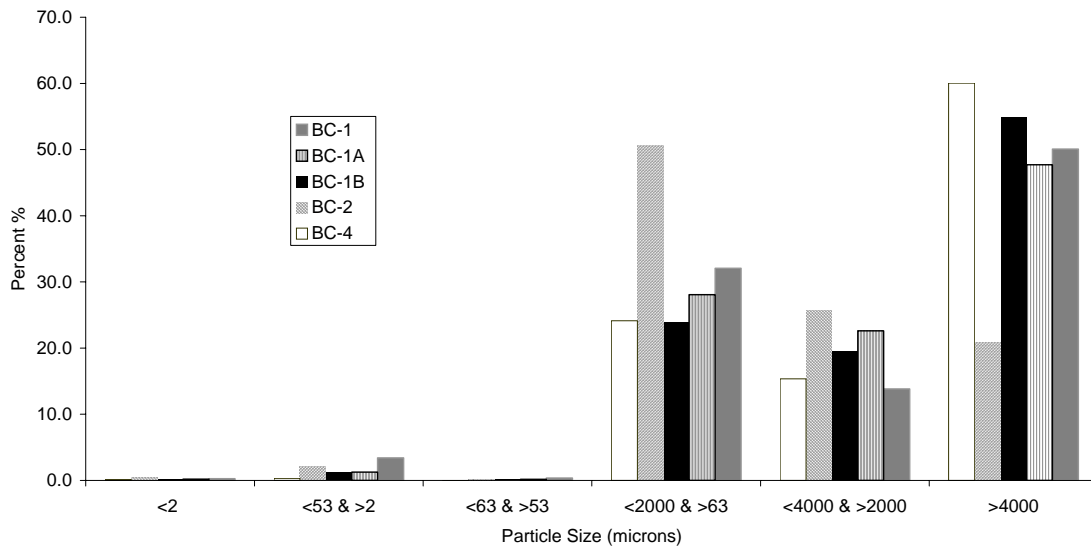
8.4.2 *Percent of each of particle size found in depositional sediment collected at each site in whole sample in September.*



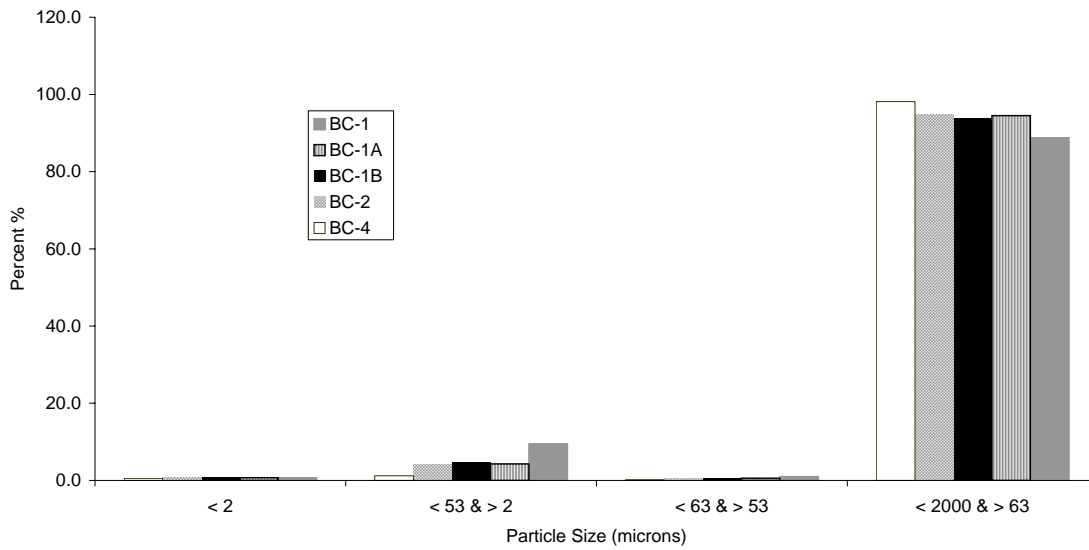
8.4.3 Percent of each of particle size found in depositional sediment collected at each site <2 mm fraction in September.



8.4.4 Percent of each of particle size found in riffle sediment collected at each site in whole sample in September.



8.4.5 Percent of each of particle size found in riffle sediment collected at each site <2mm fraction in September.



8.5 Macroinvertebrate Data

8.5.1 Raw macroinvertebrate data from site BC-1

Site Name			BC-1 Boundary Creek Upstream of Blue Joe Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Class : Oligochaeta		CG	30	4	3	78	12	127	78	3	25	31.33
Order : Ephemeroptera												
Family : Ephemerellidae	nymph	CG	5	10	3	22	41	81	41	3	16	15.71
Caudatella sp.	nymph	CG	0	0	0	1	0	1	1	0	0	0.45
Drunella doddsi	nymph	SC	1	13	12	8	7	41	13	1	8	4.76
Drunella sp.	nymph	PR	0	4	0	0	0	4	4	0	1	1.79
Family : Baetidae												
Baetis spp.	nymph	CG	65	120	37	154	114	490	154	37	98	46.6
Family : Leptophlebiidae	nymph	CG	4	2	5	31	34	76	34	2	15	15.87
Paraleptophlebia sp.	nymph	CG	0	0	0	2	0	2	2	0	0	0.89
Family : Heptageniidae	nymph	SC	37	56	32	164	188	477	188	32	95	74.6
Epeorus spp.	nymph	SC	0	0	0	8	0	8	8	0	2	3.58
Rhithrogena sp.	nymph	SC	55	75	39	70	71	310	75	39	62	14.93
Order : Coleoptera	adult	PR	0	1	0	0	1	2	1	0	0	0.55
Family : Elmidae	larvae	CG	2	17	18	44	22	103	44	2	21	15.13
Zaitzevia sp.	larvae	CG	0	3	2	2	2	9	3	0	2	1.1
Order : Plecoptera	nymph	PR	1	3	0	1	0	5	3	0	1	1.22
Family : Perlidae	nymph	PR	11	16	4	15	2	48	16	2	10	6.35
Hesperoperla pacifica	nymph	PR	1	0	0	0	0	1	1	0	0	0.45
Doroneuria sp.	nymph	PR	0	4	0	6	0	10	6	0	2	2.83
Family : Leuctridae/Capniidae	nymph	SH	182	233	115	228	329	1087	329	115	217	78.34
Family : Chloroperlidae	nymph	PR	6	11	11	10	16	54	16	6	11	3.56
Sweltsa complex	nymph	PR	19	6	0	35	35	95	35	0	19	16.14
Family : Taeniopterygidae	nymph	SC	0	0	0	1	5	6	5	0	1	2.17
Taenionema sp.	nymph	SC	1	8	0	0	0	9	8	0	2	3.49
Family : Nemouridae												
Zapada sp.	nymph	SH	1	8	1	18	6	34	18	1	7	6.98
Order : Trichoptera												
Family : Hydropsychidae												
Arctopsyche sp.	larvae	CF	0	2	0	1	1	4	2	0	1	0.84
Family : Glossosomatidae												
Glossosoma sp.	larvae	SC	1	19	5	15	5	45	19	1	9	7.62
Family : Brachycentridae												
Micrasema sp.	larvae	SH	0	1	0	5	4	10	5	0	2	2.35

Raw macroinvertebrate data from site BC-1 continued.

Site Name Sampling Date(s) Replicate Number			BC-1 Boundary Creek Upstream of Blue Joe Cr. September 23, 2003									
			1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Family : Rhyacophilidae												
Rhyacophila sp.	larvae	PR	8	13	7	20	10	58	20	7	12	5.22
Order : Diptera												
Family : Chironomidae	pupae	CG	0	0	0	1	0	1	1	0	0	0.45
Family : Chironomidae	larvae	CG	4	3	0	46	72	125	72	0	25	32.4
Sub-family : Tanypodinae	larvae	PR	1	0	1	4	6	12	6	0	2	2.51
Sub-family : Chironominae	larvae	CG	0	14	18	95	97	224	97	0	45	47.22
Sub-family : Orthocladiinae	larvae	CG	4	14	3	57	61	139	61	3	28	28.84
Family : Tipulidae	larvae	SH	0	0	1	0	5	6	5	0	1	2.17
Hexatoma sp.	larvae	PR	0	2	0	2	2	6	2	0	1	1.1
Dicranota sp.	larvae	PR	0	2	3	3	2	10	3	0	2	1.22
Antocha sp.	larvae	CG	0	0	0	0	1	1	1	0	0	0.45
Family : Empididae												
Chelifera sp.	larvae	CG	0	0	1	0	0	1	1	0	0	0.45
Oreogeton sp.	larvae	PA	4	11	0	0	0	15	11	0	3	4.8
Family : Psychodidae												
Pericoma sp.	larvae	CG	0	4	9	23	10	46	23	0	9	8.7
Family : Simuliidae	pupae	CF	0	1	0	0	0	1	1	0	0	0.45
Family : Simuliidae	larvae	CF	0	1	0	1	0	2	1	0	0	0.55
Simulium sp.	larvae	CF	1	0	0	0	0	1	1	0	0	0.45
Family : Ceratopogonidae												
Bezzia sp.	larvae	CG	0	2	1	4	2	9	4	0	2	1.48
Class : Arachnida												
Group : Hydracarina		PR	8	34	19	142	82	285	142	8	57	55.28
Phylum : Nematoda		PA	0	0	0	3	0	3	3	0	1	1.34
Phylum : Mollusca												
Class : Gastropoda												
Order : Pelecypoda												
Family : Sphaeriidae		CF	0	0	0	1	0	1	1	0	0	0.45
Phylum : Platyhelminthes												
Class : Turbellaria												
Polycelis coronata		CG	0	0	0	0	1	1	1	0	0	0.45
Class : Crustacea												
Sub-class : Ostracoda		CG	0	1	0	0	1	2	1	0	0	0.55
Total number of invertebrates found			452	718	350	1,321	1,247	4,088	1,321	350	818	447.22
Density of invertebrates (#/m²)			5,022	7,978	3,889	14,678	13,856	45,422	14,678	3,889	9,084	4969.13

8.5.2 Raw macroinvertebrate data from site BC-1A.

Site Name			BC-1A Boundary Creek Between Blue Joe and Grass Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Class : Oligochaeta		CG	2	21	0	2	14	39	21	0	8	9.23
Order : Ephemeroptera												
Family : Ephemerellidae	nymph	CG	4	1	1	6	3	15	6	1	3	2.12
<i>Caudatella sp.</i>	nymph	CG	0	1	0	0	0	1	1	0	0	0.45
<i>Drunella doddsi</i>	nymph	SC	1	13	4	5	3	26	13	1	5	4.6
<i>Drunella grandis</i>	nymph	CG	0	0	0	0	1	1	1	0	0	0.45
Family : Baetidae												
<i>Baetis spp.</i>	nymph	CG	100	152	241	116	206	815	241	100	163	59.65
Family : Leptophlebiidae	nymph	CG	0	0	0	0	1	1	1	0	0	0.45
Family : Heptageniidae	nymph	SC	93	95	123	33	94	438	123	33	88	33.01
<i>Epeorus spp.</i>	nymph	SC	0	5	0	0	0	5	5	0	1	2.24
<i>Rhithrogena sp.</i>	nymph	SC	28	68	26	40	52	214	68	26	43	17.53
Order : Coleoptera	adult	PR	0	0	0	2	3	5	3	0	1	1.41
Order : Coleoptera	larvae	PR	1	0	0	0	0	1	1	0	0	0.45
Family : Elmidae	larvae	CG	10	0	0	4	40	54	40	0	11	16.83
<i>Lara sp.</i>	larvae	SH	0	1	0	0	0	1	1	0	0	0.45
<i>Narpus sp.?</i>	larvae	CG	0	8	3	9	3	23	9	0	5	3.78
Order : Plecoptera	nymph	PR	73	65	80	152	0	370	152	0	74	54.03
Family : Perlidae	nymph	PR	1	9	1	11	2	24	11	1	5	4.82
<i>Doroneuria sp.</i>	nymph	PR	4	2	1	0	1	8	4	0	2	1.52
Family : Leuctridae/Capniidae	nymph	SH	0	2	0	32	188	222	188	0	44	81.42
Family : Chloroperlidae	nymph	PR	15	0	0	0	2	17	15	0	3	6.54
<i>Kathroperla sp.</i>	nymph	CG	0	0	0	0	2	2	2	0	0	0.89
<i>Sweltsa</i> complex	nymph	PR	27	30	69	42	66	234	69	27	47	19.74
Family : Taeniopterygidae												
<i>Taenionema sp.</i>	nymph	SC	27	35	22	30	11	125	35	11	25	9.14
Family : Nemouridae												
<i>Zapada sp.</i>	nymph	SH	10	13	36	4	31	94	36	4	19	13.92
Family : Perlodidae	nymph	PR	0	0	0	0	1	1	1	0	0	0.45
<i>Megarcys sp.</i>	nymph	PR	0	0	0	1	1	2	1	0	0	0.55
Order : Peltoperlidae												
<i>Yoroperla sp.</i>	nymph	SH	0	1	0	2	1	4	2	0	1	0.84

Raw macroinvertebrate data from site BC-1A continued

Site Name			BC-1A Boundary Creek Between Blue Joe and Grass Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Order : Trichoptera												
Family : Hydropsychidae												
Arctopsyche sp.	larvae	CF	3	0	2	2	3	10	3	0	2	1.22
Family : Glossosomatidae												
Glossosoma sp.	larvae	SC	14	7	29	13	110	173	110	7	35	42.92
Family : Brachycentridae												
Micrasema sp.	larvae	SH	0	0	0	0	3	3	3	0	1	1.34
Family : Rhyacophilidae												
Rhyacophila sp.	larvae	PR	2	2	4	0	5	13	5	0	3	1.95
Order : Diptera												
Family : Chironomidae												
Family : Chironomidae	pupae	CG	0	0	0	0	1	1	1	0	0	0.45
Family : Chironomidae	larvae	CG	15	85	75	0	0	175	85	0	35	41.68
Sub-family : Tanypodinae	larvae	PR	0	0	0	1	7	8	7	0	2	3.05
Sub-family : Chironominae	larvae	CG	23	11	5	70	325	434	325	5	87	135.58
Sub-family : Orthocladiinae	larvae	CG	0	0	0	15	124	139	124	0	28	54.17
Family : Tipulidae												
Hexatoma sp.	larvae	PR	0	1	0	0	1	2	1	0	0	0.55
Dicranota sp.	larvae	PR	1	0	2	2	1	6	2	0	1	0.84
Family : Empididae												
Oreogeton sp.	larvae	PA	1	2	0	1	2	6	2	0	1	0.84
Family : Psychodidae												
Pericoma sp.	larvae	CG	1	3	1	5	9	19	9	1	4	3.35
Family : Simuliidae												
Simulium sp.	larvae	CF	0	1	1	0	0	2	1	0	0	0.55
Family : Ceratopogonidae												
Bezzia sp.	larvae	CG	1	1	0	2	5	9	5	0	2	1.92
Class : Arachnida												
Group : Hydracarina		PR	13	15	13	6	65	112	65	6	22	24.06
Phylum : Nematoda												
		PA	0	0	0	0	1	1	1	0	0	0.45
Total number of invertebrates found			474	652	741	609	1,389	3,865	1,389	474	773	357.57
Density of invertebrates (#/m²)			5,267	7,244	8,233	6,767	15,433	42,944	15,433	5,267	8,589	3972.97

8.5.3 Raw macroinvertebrate data from site BC-1B

Site Name			BC-1B Boundary Creek Between Blue Joe and Grass Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Class : Oligochaeta		CG	0	0	0	3	1	4	3	0	1	1.3
Order : Ephemeroptera												
Family : Ephemerellidae	nymph	CG	0	1	0	4	2	7	4	0	1	1.67
<i>Drumella doddsi</i>	nymph	SC	1	2	2	3	2	10	3	1	2	0.71
Family : Baetidae												
<i>Baetis spp.</i>	nymph	CG	77	199	114	95	62	547	199	62	109	53.74
Family : Leptophlebiidae	nymph	CG	0	18	2	13	1	34	18	0	7	8.17
Family : Heptageniidae	nymph	SC	90	108	45	96	60	399	108	45	80	26.29
<i>Epeorus spp.</i>	nymph	SC	0	1	0	2	0	3	2	0	1	0.89
<i>Rhithrogena sp.</i>	nymph	SC	49	93	66	45	51	304	93	45	61	19.68
Order : Coleoptera												
Family : Elmidae	larvae	CG	4	18	7	6	10	45	18	4	9	5.48
<i>Narpus sp.?</i>	larvae	CG	0	1	3	0	2	6	3	0	1	1.3
Order : Plecoptera	nymph	PR	0	2	0	1	1	4	2	0	1	0.84
Family : Perlidae	nymph	PR	1	4	0	0	3	8	4	0	2	1.82
<i>Hesperoperla pacifica</i>	nymph	PR	0	1	3	0	0	4	3	0	1	1.3
Family : Leuctridae/Capniidae	nymph	SH	102	155	33	79	92	461	155	33	92	43.93
Family : Chloroperlidae	nymph	PR	0	5	1	0	0	6	5	0	1	2.17
<i>Kathroperla sp.</i>	nymph	CG	0	0	0	0	1	1	1	0	0	0.45
<i>Sweltsa</i> complex	nymph	PR	40	36	23	32	18	149	40	18	30	9.12
Family : Taeniopterygidae												
<i>Taenionema sp.</i>	nymph	SC	64	34	46	55	51	250	64	34	50	11.11
Family : Nemouridae												
<i>Zapada sp.</i>	nymph	SH	6	18	15	14	5	58	18	5	12	5.77
Family : Perlodidae	nymph	PR	0	0	0	0	1	1	1	0	0	0.45
<i>Megarcys sp.</i>	nymph	PR	1	0	1	1	1	4	1	0	1	0.45
Order : Thysanoptera	adult	UN	1	0	0	0	0	1	1	0	0	0.45

Raw macroinvertebrate data from site BC-1B continued

Site Name Sampling Date(s) Replicate Number			BC-1B Boundary Creek Between Blue Joe and Grass Cr. September 23, 2003									
			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Order : Trichoptera	larvae	UN	0	0	0	0	1	1	1	0	0	0.45
Family : Hydropsychidae												
<i>Arctopsyche sp.</i>	larvae	CF	2	0	0	1	0	3	2	0	1	0.89
Family : Glossosomatidae												
<i>Glossosoma sp.</i>	larvae	SC	5	66	6	10	16	103	66	5	21	25.74
Family : Brachycentridae	larvae	CF	0	0	0	0	1	1	1	0	0	0.45
<i>Micrasema sp.</i>	larvae	SH	0	1	0	0	3	4	3	0	1	1.3
Family : Rhyacophilidae												
<i>Rhyacophila sp.</i>	larvae	PR	3	5	3	4	3	18	5	3	4	0.89
Order : Diptera												
Family : Tabanidae												
<i>Tabanus sp.</i>	larvae	PR	0	1	0	0	0	1	1	0	0	0.45
Family : Chironomidae	pupae	CG	0	1	2	0	2	5	2	0	1	1
Family : Chironomidae	larvae	CG	44	152	545	11	169	921	545	11	184	212.78
Sub-family : Tanypodinae	larvae	PR	13	17	18	18	16	82	18	13	16	2.07
Sub-family : Chironominae	larvae	CG	68	27	132	225	77	529	225	27	106	76.42
Sub-family : Orthocladiinae	larvae	CG	2	23	31	24	20	100	31	2	20	10.84
Family : Tipulidae												
<i>Tipula sp.</i>	larvae	SH	0	1	0	0	0	1	1	0	0	0.45
<i>Hexatoma sp.</i>	larvae	PR	0	3	1	1	0	5	3	0	1	1.22
<i>Dicranota sp.</i>	larvae	PR	0	4	5	4	0	13	5	0	3	2.41
Family : Empididae												
<i>Hemerodromia sp.</i>	larvae	PR	0	0	0	0	3	3	3	0	1	1.34
<i>Oreogeton sp.</i>	larvae	PA	0	0	3	1	1	5	3	0	1	1.22
Family : Simuliidae	pupae	CF	0	2	0	0	0	2	2	0	0	0.89
<i>Simulium sp.</i>	larvae	CF	4	18	0	1	0	23	18	0	5	7.67
Family : Ceratopogonidae												
<i>Bezzia sp.</i>	larvae	CG	0	3	1	1	4	9	4	0	2	1.64
Class : Arachnida												
Group : Hydracarina		PR	23	11	3	6	7	50	23	3	10	7.81
Total number of invertebrates found			600	1,031	1,111	756	687	4,185	1,111	600	837	222.45
Density of invertebrates (#/m²)			6,667	11,456	12,344	8,400	7,633	46,500	12,344	6,667	9,300	2471.7

8.5.4 Raw macroinvertebrate data from site BC-2.

Site Name			BC-2 Boundary Creek D/S Grass Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Class : Oligochaeta		CG	0	0	0	1	0	1	1	0	0	0.45
Order : Ephemeroptera	adult	CG	1	0	0	0	0	1	1	0	0	0.45
Family : Ephemerellidae	nymph	CG	10	1	0	0	0	11	10	0	2	4.38
Drunella doddsi	nymph	SC	6	13	5	4	1	29	13	1	6	4.44
Drunella grandis	nymph	CG	0	0	1	1	0	2	1	0	0	0.55
Family : Baetidae												
Baetis spp.	nymph	CG	154	108	48	57	31	398	154	31	80	50.53
Family : Leptophlebiidae	nymph	CG	0	0	0	0	1	1	1	0	0	0.45
Family : Heptageniidae	nymph	SC	76	56	26	8	38	204	76	8	41	26.33
Epeorus spp.	nymph	SC	0	2	1	0	0	3	2	0	1	0.89
Rhithrogena sp.	nymph	SC	57	66	42	43	13	221	66	13	44	20.12
Order : Coleoptera	adult	PR	1	0	0	0	0	1	1	0	0	0.45
Family : Elmidae	larvae	CG	4	15	0	4	3	26	15	0	5	5.72
Zaitzevia sp.	larvae	CG	3	0	1	0	1	5	3	0	1	1.22
Narpus sp.?	larvae	CG	0	1	1	0	0	2	1	0	0	0.55
Order : Hemiptera												
Family : Corixidae	adult	UN	1	0	0	0	0	1	1	0	0	0.45
Order : Plecoptera	nymph	PR	0	1	0	0	0	1	1	0	0	0.45
Family : Perlidae	nymph	PR	6	2	4	1	4	17	6	1	3	1.95
Hesperoperla pacifica	nymph	PR	0	2	0	0	0	2	2	0	0	0.89
Family :												
Leuctridae/Capniidae	nymph	SH	88	49	21	4	33	195	88	4	39	31.96
Family : Chloroperlidae	nymph	PR	1	0	0	0	0	1	1	0	0	0.45
Kathroperla sp.	nymph	CG	2	0	0	0	0	2	2	0	0	0.89
Sweltsa complex	nymph	PR	45	34	13	9	8	109	45	8	22	16.72
Family : Taeniopterygidae												
Taenionema sp.	nymph	SC	43	34	68	19	21	185	68	19	37	19.91
Family : Nemouridae												
Zapada sp.	nymph	SH	19	23	11	4	6	63	23	4	13	8.2
Family : Perlodidae	nymph	PR	1	1	0	0	0	2	1	0	0	0.55
Megarcys sp.	nymph	PR	3	4	1	0	0	8	4	0	2	1.82
Order : Peltoperlidae												
Yoroperla sp.	nymph	SH	0	0	1	0	0	1	1	0	0	0.45

Raw macroinvertebrate data from site BC-2 continued.

Site Name			BC-2 Boundary Creek D/S Grass Cr.									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Order : Trichoptera												
Family : Hydropsychidae												
Arctopsyche sp.	larvae	CF	3	6	0	0	0	9	6	0	2	2.68
Family : Glossosomatidae												
Glossosoma sp.	larvae	SC	0	6	1	0	2	9	6	0	2	2.49
Family : Brachycentridae												
Micrasema sp.	larvae	SH	15	17	7	9	3	51	17	3	10	5.76
Family : Rhyacophilidae												
Rhyacophila sp.	larvae	PR	8	10	13	4	1	36	13	1	7	4.76
Family : Hydroptilidae												
Agraylea sp.	larvae	UN	3	9	5	3	1	21	9	1	4	3.03
Order : Diptera												
Family : Chironomidae												
	pupae	CG	1	3	1	2	0	7	3	0	1	1.14
	larvae	CG	330	14	0	0	9	353	330	0	71	145.13
	larvae	CG	0	1	2	0	0	3	2	0	1	0.89
	larvae	PR	22	9	12	2	3	48	22	2	10	8.08
	larvae	CG	12	332	140	52	79	615	332	12	123	125.77
	larvae	CG	8	25	122	8	18	181	122	8	36	48.5
Family : Tipulidae												
Hexatoma sp.	larvae	PR	0	1	1	0	1	3	1	0	1	0.55
Dicranota sp.	larvae	PR	2	0	0	0	0	2	2	0	0	0.89
Family : Empididae												
Hemerodromia sp.	larvae	PR	1	2	1	1	0	5	2	0	1	0.71
Oreogeton sp.	larvae	PA	3	0	0	0	0	3	3	0	1	1.34
Family : Simuliidae												
	pupae	CF	0	1	0	0	0	1	1	0	0	0.45
Family : Ceratopogonidae												
Bezzia sp.	larvae	CG	3	1	2	0	2	8	3	0	2	1.14
Class : Arachnida												
Group : Hydracarina		PR	33	28	12	9	9	91	33	9	18	11.43
Total number of invertebrates found			965	878	563	245	289	2,940	965	245	588	329.36
Density of invertebrates (#/m²)			10,722	9,756	6,256	2,722	3,211	32,667	10,722	2,722	6,533	3659.52

8.5.5 Raw macroinvertebrate data from site BC-4.

Site Name Sampling Date(s) Replicate Number			BC-4 Boundary Creek At Gauging Station									
			September 23, 2003									
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
			1	2	3	4	5					
Class : Oligochaeta		CG	0	0	1	0	1	2	1	0	0	0.55
Order : Ephemeroptera												
Family : Ameletidae												
Ameletus sp.	nymph	CG	0	0	2	0	4	6	4	0	1	1.79
Family : Ephemerellidae	nymph	CG	125	53	309	173	540	1200	540	53	240	191.99
Drunella grandis	nymph	CG	0	0	0	2	0	2	2	0	0	0.89
Drunella sp.	nymph	PR	0	0	0	0	1	1	1	0	0	0.45
Family : Baetidae												
Acentrella sp.	nymph	CG	2	1	6	1	3	13	6	1	3	2.07
Baetis spp.	nymph	CG	56	70	290	343	119	878	343	56	176	132.07
Family : Leptophlebiidae	nymph	CG	8	9	25	4	13	59	25	4	12	8.04
Paraleptophlebia sp.	nymph	CG	0	0	1	0	0	1	1	0	0	0.45
Family : Heptageniidae	nymph	SC	15	35	41	11	55	157	55	11	31	18.35
Rhithrogena sp.	nymph	SC	18	10	27	26	13	94	27	10	19	7.6
Order : Coleoptera												
Family : Elmidae	larvae	CG	0	0	0	0	1	1	1	0	0	0.45
Narpus sp.?	larvae	CG	0	0	1	1	1	3	1	0	1	0.55
Order : Plecoptera	nymph	PR	0	2	0	0	0	2	2	0	0	0.89
Family : Perlidae	nymph	PR	0	0	5	1	0	6	5	0	1	2.17
Family : Leuctridae/Capniidae	nymph	SH	34	5	15	9	42	105	42	5	21	16.17
Family : Chloroperlidae	nymph	PR	1	2	0	2	0	5	2	0	1	1
Sweltsa complex	nymph	PR	14	2	5	7	13	41	14	2	8	5.17
Family : Taeniopterygidae												
Taenionema sp.	nymph	SC	0	1	0	0	0	1	1	0	0	0.45
Family : Nemouridae												
Zapada sp.	nymph	SH	1	1	5	2	0	9	5	0	2	1.92
Family : Perlodidae	nymph	PR	0	0	0	1	0	1	1	0	0	0.45
Megarcys sp.	nymph	PR	0	0	0	1	0	1	1	0	0	0.45
Skwala sp.	nymph	PR	0	0	0	0	1	1	1	0	0	0.45

Raw macroinvertebrate data from site BC-4 continued.

Site Name			BC-4 Boundary Creek At Gauging Station									
Sampling Date(s)			September 23, 2003									
Replicate Number			1	2	3	4	5					
Taxon	Life stage	FFG	Total organisms/sample					Total	Max	Min	Mean	St. Dev.
Order : Trichoptera	larvae	UN	0	0	0	0	1	1	1	0	0	0.45
Family : Hydropsychidae	larvae	CF	1	1	3	0	6	11	6	0	2	2.39
Arctopsyche sp.	larvae	CF	0	0	0	1	0	1	1	0	0	0.45
Hydropsyche sp.	larvae	CF	3	18	25	57	5	108	57	3	22	21.79
Family : Brachycentridae												
Micrasema sp.	larvae	SH	0	0	0	1	0	1	1	0	0	0.45
Family : Rhyacophilidae												
Rhyacophila sp.	larvae	PR	0	0	0	1	0	1	1	0	0	0.45
Family : Hydroptilidae												
Agraylea sp.	larvae	CG	0	0	2	0	0	2	2	0	0	0.89
Order : Diptera	adult	UN	1	0	0	1	0	2	1	0	0	0.55
Order : Diptera	pupae	UN	0	0	0	1	0	1	1	0	0	0.45
Family : Chironomidae	pupae	CG	0	0	2	1	4	7	4	0	1	1.67
Family : Chironomidae	larvae	CG	20	3	4	2	15	44	20	2	9	8.17
Sub-family: Diamesinae	larvae	CG	0	0	1	0	0	1	1	0	0	0.45
Sub-family : Tanypodinae	larvae	PR	15	0	25	3	43	86	43	0	17	17.53
Sub-family : Chironominae	larvae	CG	0	1	7	0	13	21	13	0	4	5.72
Sub-family : Orthocladiinae	larvae	CG	9	3	8	11	22	53	22	3	11	7.02
Family : Tipulidae	larvae	SH	1	0	0	0	0	1	1	0	0	0.45
Hexatoma sp.	larvae	PR	0	0	1	0	0	1	1	0	0	0.45
Dicranota sp.	larvae	PR	1	1	4	0	0	6	4	0	1	1.64
Antocha sp.	larvae	CG	1	0	1	0	4	6	4	0	1	1.64
Family : Empididae												
Hemerodromia sp.	larvae	PR	0	0	6	3	4	13	6	0	3	2.61
Oreogeton sp.	larvae	PA	0	0	0	1	1	2	1	0	0	0.55
Family : Simuliidae	larvae	CF	0	0	0	1	0	1	1	0	0	0.45
Family : Ceratopogonidae												
Bezzia sp.	larvae	CG	3	1	1	0	3	8	3	0	2	1.34
Class : Arachnida			0	0	1	0	0	1	1	0	0	0.45
Group : Hydracarina		PR	65	29	172	62	155	483	172	29	97	62.97
Phylum : Nematoda		PA	0	0	0	0	1	1	1	0	0	0.45
Total number of invertebrates found			394	248	996	730	1,084	3,452	1,084	248	690	365.19
Density of invertebrates (#/m²)			4,378	2,756	11,067	8,111	12,044	38,356	12,044	2,756	7,671	4057.65

8.6 Biometrics

8.6.1 Biometrics resulting from Site BC-1.

Biostatistical Metrics	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Site BC-1										
Total density (no/m²)	5022	7978	3889	1467	13856	45422	14678	3889	9084	4969
Density of EPT individuals (no/m²)	4422	6711	3011	9056	9644	32844	9644	3011	6569	2869
Density of Ephemeroptera (no/m²)	1856	3111	1422	5111	5056	16556	5056	1422	3311	1733
Density of Metal Sensitive Ephemeroptera (no/m²)	722	1156	656	1578	1700	5811	1700	656	1162	478
Total No. of Taxa	18	25	20	28	26	117	28	18	23	4.22
No. EPT Taxa	11	13	10	15	13	62	15	10	12	1.95
EPT/Total Taxa	0.61	0.52	0.50	0.54	0.50	2.67	0.61	0.50	0.53	0.05
No. Ephemeroptera Taxa	4	4	4	6	4	22	6	4	4	0.89
No. Metal Sensitive Ephemeroptera taxa	3	3	3	5	3	17	5	3	3	0.89
% Ephemeroptera	36.95	39.00	36.57	34.82	36.49	183.83	39.00	34.82	36.77	1.49
% Plecoptera	49.12	40.25	37.43	23.77	31.52	182.08	49.12	23.77	36.42	9.50
% Trichoptera	1.99	4.87	3.43	3.10	1.60	15.00	4.87	1.60	3.00	1.29
% Diptera	3.10	7.52	10.57	17.87	20.69	59.74	20.69	3.10	11.95	7.27
% Other Orders	8.85	8.36	12.00	20.44	9.70	59.35	20.44	8.36	11.87	4.99

8.6.2 Biometrics resulting from Site BC-1A.

Biostatistical Metrics	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Site BC-1A										
Total density (no/m²)	5267	7244	8233	6767	15433	42944	15433	5267	8589	3973
Density of EPT individuals (no/m²)	4511	5578	7111	5433	8744	31378	8744	4511	6276	1666
Density of Ephemeroptera (no/m²)	2511	3722	4389	2222	4000	16844	4389	2222	3369	951
Density of Metal Sensitive Ephemeroptera (no/m²)	367	978	344	567	667	2922	978	344	584	258
Total No. of Taxa	19	23	17	21	29	109	29	17	22	4.60
No. EPT Taxa	11	14	11	11	17	64	17	11	13	2.68
EPT/Total Taxa	0.58	0.61	0.65	0.52	0.59	2.94	0.65	0.52	0.59	0.05
No. Ephemeroptera Taxa	3	5	3	3	5	19	5	3	4	1.10
No. Metal Sensitive Ephemeroptera taxa	2	4	2	2	4	14	4	2	3	1.10
% Ephemeroptera	47.68	51.38	53.31	32.84	25.92	211.12	53.31	25.92	42.22	12.15
% Plecoptera	33.12	24.08	28.21	44.99	22.03	152.43	44.99	22.03	30.49	9.15
% Trichoptera	4.85	1.53	4.86	2.46	8.71	22.42	8.71	1.53	4.48	2.78
% Diptera	8.86	16.10	11.47	15.93	34.27	86.63	34.27	8.86	17.33	9.96
% Other Orders	5.49	6.90	2.16	3.78	9.07	27.39	9.07	2.16	5.48	2.69

8.6.3 Biometrics resulting from Site BC-1B.

Biostatistical Metrics	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Site BC-1B										
Total density (no/m²)	6667	11456	12344	8400	7633	46500	12344	6667	9300	2472
Density of EPT individuals (no/m²)	4900	8322	4000	5056	4167	26444	8322	4000	5289	1756
Density of Ephemeroptera (no/m²)	2411	4689	2544	2867	1978	14489	4689	1978	2898	1051
Density of Metal Sensitive Ephemeroptera (no/m²)	556	1278	778	744	622	3978	1278	556	796	284
Total No. of Taxa	19	24	21	24	23	111	24	19	22	2.17
No. Metal Sensitive Ephemeroptera taxa	2	4	3	4	3	16	4	2	3	0.84
No. EPT Taxa	12	13	12	13	14	64	14	12	13	0.84
EPT/Total Taxa	0.63	0.54	0.57	0.54	0.61	2.90	0.63	0.54	0.58	0.04
No. Ephemeroptera Taxa	3	5	4	5	4	21	5	3	4	0.84
% Ephemeroptera	36.17	40.93	20.61	34.13	25.91	157.75	40.93	20.61	31.55	8.18
% Plecoptera	35.67	24.73	10.98	24.07	25.18	120.64	35.67	10.98	24.13	8.77
% Trichoptera	1.67	6.98	0.81	1.98	3.49	14.94	6.98	0.81	2.99	2.43
% Diptera	21.83	24.44	66.43	37.83	42.50	193.04	66.43	21.83	38.61	17.83
% Other Orders	4.67	2.91	1.17	1.98	2.91	13.64	4.67	1.17	2.73	1.30

8.6.4 Biometrics resulting from Site BC-2.

Biostatistical Metrics	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Site BC-2										
Total density (no/m²)	10722	9756	6256	2722	3211	32667	10722	2722	6533	3660
Density of EPT individuals (no/m²)	6011	4933	2978	1844	1811	17578	6011	1811	3516	1886
Density of Ephemeroptera (no/m²)	3378	2733	1367	1256	9333	9667	9333	1256	1933	1061
Density of Metal Sensitive Ephemeroptera (no/m²)	811	911	544	533	167	2967	911	167	593	290
Total No. of Taxa	24	24	25	19	20	112	25	19	22	2.70
No. EPT Taxa	14	15	16	12	13	70	16	12	14	1.58
EPT/Total Taxa	0.58	0.63	0.64	0.63	0.65	3.13	0.65	0.58	0.63	0.03
No. Ephemeroptera Taxa	3	4	5	4	4	20	5	3	4	0.71
No. Metal Sensitive Ephemeroptera taxa	2	3	4	3	3	15	4	2	3	0.71
% Ephemeroptera	31.50	28.02	21.85	46.12	29.07	156.56	46.12	21.85	31.31	9.01
% Plecoptera	21.55	17.08	21.14	15.10	24.91	99.79	24.91	15.10	19.96	3.88
% Trichoptera	3.01	5.47	4.62	6.53	2.42	22.04	6.53	2.42	4.41	1.70
% Diptera	39.59	44.42	49.91	26.53	38.75	199.20	49.91	26.53	39.84	8.67
% Other Orders	4.35	5.01	2.49	5.71	4.84	22.41	5.71	2.49	4.48	1.22

8.6.5 Biometrics resulting from Site BC-4.

Biostatistical Metrics	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Site BC-4										
Total density (no/m²)	4378	2756	11067	8111	12044	38356	12044	2756	7671	4058
Density of EPT individuals (no/m²)	3089	2333	8456	7144	9067	30089	9067	2333	6018	3109
Density of Ephemeroptera (no/m²)	2489	1978	7789	6222	8311	26789	8311	1978	5358	2960
Density of Metal Sensitive Ephemeroptera (no/m²)	1678	800	4044	2278	6344	15144	6344	800	3029	2201
Total No. of Taxa	15	15	23	21	21	95	23	15	19	3.74
No. EPT Taxa	9	10	12	14	10	55	14	9	11	2.00
EPT/Total Taxa	0.60	0.67	0.52	0.67	0.48	2.93	0.67	0.48	0.59	0.09
No. Ephemeroptera	5	5	6	5	6	27	6	5	5	0.55
No. Metal Sensitive Ephemeroptera taxa	3	3	4	3	4	17	4	3	3	0.55
% Ephemeroptera Taxa	56.85	71.77	70.38	76.71	69.00	344.72	76.71	56.85	68.94	7.36
% Plecoptera	12.69	5.24	3.01	3.15	5.17	29.26	12.69	3.01	5.85	3.97
% Trichoptera	1.02	7.66	3.01	8.22	1.11	21.01	8.22	1.02	4.20	3.51
% Diptera	12.94	3.63	6.02	3.29	10.06	35.94	12.94	3.29	7.19	4.20
% Other Orders	16.50	11.69	17.57	8.63	14.67	69.06	17.57	8.63	13.81	3.65

8.7 Functional Feeding Groups

8.7.1 Functional feeding groups resulting from Site BC-1.

Functional Feeding Group Analysis										
Site BC-1										
By total numbers	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	1	4	0	3	1	9	4	0	2	1.64
Colector-Gatherers	114	194	100	560	470	1438	560	100	288	213.05
Parasites	4	11	0	3	0	18	11	0	4	4.51
Predators	55	96	45	238	156	590	238	45	118	80.04
Scrapers	95	171	88	265	271	890	271	88	178	88.40
Shredders	183	242	117	251	344	1137	344	117	227	84.45
Total	452	718	350	1320	1242	4082				
By percentages %	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	0.2	0.6	0.0	0.2	0.1	1.1	0.6	0.0	0.4	0.37
Colector-Gatherers	25.2	27.0	28.6	42.4	37.8	161.1	42.4	25.2	32.2	7.50
Parasites	0.9	1.5	0.0	0.2	0.0	2.6	1.5	0.0	0.5	0.67
Predators	12.2	13.4	12.9	18.0	12.6	69.0	18.0	12.2	13.8	2.41
Scrapers	21.0	23.8	25.1	20.1	21.8	111.9	25.1	20.1	22.4	2.07
Shredders	40.5	33.7	33.4	19.0	27.7	154.3	40.5	19.0	30.9	8.03
Total	100.0	100.0	100.0	100.0	100.0					

8.7.2 Functional feeding groups resulting from Site BC-1A.

Functional Feeding Group Analysis										
Site BC-1A										
By total numbers	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	7	3	5	2	3	20	7	2	4	2.00
Collector-Gatherers	156	283	326	229	734	1728	734	156	346	226.22
Parasites	1	2	0	1	3	7	3	0	1	1.14
Predators	137	124	170	217	155	803	217	124	161	36.05
Scrapers	163	223	204	121	270	981	270	121	196	56.97
Shredders	10	17	36	38	223	324	223	10	65	89.25
Unknown	0	0	0	1	1	2	1	0	0	0.55
Total	474	652	741	609	1389	3865				
By percentages %	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	1.5	0.5	0.7	0.3	0.2	3.2	1.5	0.2	1.1	1.04
Collector-Gatherers	32.9	43.4	44.0	37.6	52.8	210.8	52.8	32.9	42.2	7.51
Parasites	0.2	0.3	0.0	0.2	0.2	0.9	0.3	0.0	0.2	0.11
Predators	28.9	19.0	22.9	35.6	11.2	117.7	35.6	11.2	23.5	9.34
Scrapers	34.4	34.2	27.5	19.9	19.4	135.4	34.4	19.4	27.1	7.33
Shredders	2.1	2.6	4.9	6.2	16.1	31.9	16.1	2.1	6.4	5.67
Unknown	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.0	0.0	0.07
Total	100.0	100.0	100.0	100.0	100.0					

8.7.3 Functional feeding groups resulting from Site BC-1B.

Functional Feeding Group Analysis										
Site BC-1B										
By total numbers	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	6	20	0	2	1	29	20	0	6	8.26
Colector-Gatherers	195	443	837	382	351	2208	837	195	442	239.23
Parasites	0	0	3	1	1	5	3	0	1	1.22
Predators	81	89	58	67	53	348	89	53	70	15.19
Scrapers	209	304	165	211	180	1069	304	165	214	54.06
Shredders	108	175	48	93	100	524	175	48	105	45.63
Unknown	1	0	0	0	1	2	1	0	0	0.55
Total	600	1031	1111	756	687	4185				
By percentages %	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	1.0	1.9	0.0	0.3	0.1	3.3	1.9	0.0	1.2	1.24
Colector-Gatherers	32.5	43.0	75.3	50.5	51.1	252.4	75.3	32.5	50.5	15.80
Parasites	0.0	0.0	0.3	0.1	0.1	0.5	0.3	0.0	0.1	0.11
Predators	13.5	8.6	5.2	8.9	7.7	43.9	13.5	5.2	8.8	3.00
Scrapers	34.8	29.5	14.9	27.9	26.2	133.3	34.8	14.9	26.7	7.35
Shredders	18.0	17.0	4.3	12.3	14.6	66.2	18.0	4.3	13.2	5.45
Unknown	0.2	0.0	0.0	0.0	0.1	0.3	0.2	0.0	0.1	0.09
Total	100.0	100.0	100.0	100.0	100.0					

8.7.4 Functional feeding groups resulting from Site BC-2.

Functional Feeding Group Analysis										
Site BC-2										
By total numbers	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	3	7	0	0	0	10	7	0	2	3.08
Colector-Gatherers	528	500	316	125	144	1613	528	125	323	190.16
Parasites	3	0	0	0	0	3	3	0	1	0.00
Predators	123	94	57	26	26	326	123	26	65	42.75
Scrapers	182	177	143	74	75	651	182	74	130	53.02
Shredders	122	89	40	17	42	310	122	17	62	42.54
Unknown	4	10	5	3	1	23	10	1	5	3.36
Total	965	877	561	245	288	2936				
By percentages %	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	0.3	0.8	0.0	0.0	0.0	1.1	0.8	0.0	0.4	0.47
Colector-Gatherers	54.7	57.0	56.3	51.0	50.0	269.1	57.0	50.0	53.8	3.15
Parasites	0.3	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.1	0.14
Predators	12.7	10.7	10.2	10.6	9.0	53.3	12.7	9.0	10.7	1.35
Scrapers	18.9	20.2	25.5	30.2	26.0	120.8	30.2	18.9	24.2	4.63
Shredders	12.6	10.1	7.1	6.9	14.6	51.4	14.6	6.9	10.3	3.36
Unknown	0.4	1.1	0.9	1.2	0.3	4.0	1.2	0.3	0.8	0.41
Total	100.0	100.0	100.0	100.0	100.0					

8.7.5 Functional feeding groups resulting from Site BC-4.

Functional Feeding Group Analysis										
Site BC-4										
By total numbers	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	4	19	28	59	11	121	59	4	24	21.42
Colector-Gatherers	224	141	661	538	743	2307	743	141	461	266.47
Parasites	0	0	0	1	2	3	2	0	1	0.89
Predators	96	36	218	81	217	648	218	36	130	83.22
Scrapers	33	46	68	37	68	252	68	33	50	16.74
Shredders	36	6	20	12	42	116	42	6	23	15.40
Unknown	1	0	0	2	1	4	2	0	1	0.84
Total	394	248	995	730	1084	3451				
By percentages %	1	2	3	4	5	Total	Max	Min	Mean	St. Dev.
Collector-Filterers	1.0	7.7	2.8	8.1	1.0	20.6	8.1	1.0	7.0	6.79
Colector-Gatherers	56.9	56.9	66.4	73.7	68.5	322.4	73.7	56.9	64.5	7.44
Parasites	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.0	0.1	0.09
Predators	24.4	14.5	21.9	11.1	20.0	91.9	24.4	11.1	18.4	5.45
Scrapers	8.4	18.5	6.8	5.1	6.3	45.1	18.5	5.1	9.0	5.46
Shredders	9.1	2.4	2.0	1.6	3.9	19.1	9.1	1.6	3.8	3.09
Unknown	0.3	0.0	0.0	0.3	0.1	0.6	0.3	0.0	0.1	0.13
Total	100.0	100.0	100.0	100.0	100.0					

8.8 Results from data screening

8.8.1 Biometrics used in analysis of Rapid bioassessment III.

Metric ¹	Measure	Indicator	Biological Scoring Criteria	
			Comparability to reference site	Score
Taxa richness	Total number of taxa	Indicates health of the community, reflects increasing water quality, habitat diversity and suitability	>80%	6
			60-80%	4
			40-60%	2
			<40%	0
HBI	Tolerance	Indicates tolerance to organic pollution. $HBI = \sum x_i t_i / n$ x_i = number of individuals within a species, t_i = tolerance value of a species, n = total number of organisms in the sample	>85%	6
			70-85%	4
			50-70	2
			<40%	0
Scrapers/collector-filterers	Functional feeding group measure	Provides an indication of the periphyton community composition and availability of Fine Particulate Organic Material (FPOM) associated with organic enrichment. Alternatively, it may indicate toxicants bound to FPOM.	>50%	6
			35-50%	4
			20-35%	2
			<20%	0
EPT/(EPT+ chironomid) ratio	Tolerance	Measure of community balance, good biotic condition is reflected in communities with even distribution of all four groups	>75%	6
			50-75%	4
			24-50%	2
			<25%	0
% Dominant taxon	Composition	Indicates community balance, a community with only a few taxa indicates community stress	<20%	6
			20-30%	4
			30-40%	2
			>40%	0
EPT/total taxa	Taxonomic richness	Ratio of sensitive taxa (including mayflies (E), stoneflies (P) and caddisflies (T)) to total number of taxa	>90%	6
			80-90%	4
			70-80%	2
			<70%	0
Community Loss Index	Index of dissimilarity	Community loss = (total #species in sample A - # species common to both samples) / total # species in sample B Measures the loss of benthic species between a reference station and station of comparison	<0.5	6
			0.5-1.5	4
			1.5-4.0	2
			>4.0	0
Ratio of Shredders/Total functional feeding groups	Functional feeding group measure	Allows potential impairment as indicated by the Coarse particulate organic matter-based Shredder community and toxicants of a terrestrial source such as pesticides and herbicides	>50%	6
			35-50%	4
			20-35%	2
			<20%	0

¹from Plafkin *et al.* 1989

8.8.2 Impairment rating score for each site.

Metric	Mean metric value (n=5)					% Comparison with reference site					Bioassessment Score from Plafkin <i>et al.</i> 89				
	BC-1A	BC-1B	BC-2	BC-4	BC-1 ¹	BC-1A	BC-1B	BC-2	BC-4	BC-1 ¹	BC-1A	BC-1B	BC-2	BC-4	BC-1 ¹
Taxa richness	22	22	22	19	23	306	306	306	264	100	6	6	6	6	6
HBI	4.4	3.5	3.5	3.4	2.4	55	69	69	71	100	2	2	2	4	6
Scrapers/ collector-filterers	3.2	3.4	3.5	1.0	7.2	44	47	49	14	100	4	4	4	0	6
EPT/(EPT+chironomid abundance)	0.83	0.61	0.59	0.93	0.89	93	69	66	105	100	6	6	6	6	6
% Contrib. Dom. Taxon	25	28	30	38	30	4	4	4	2	4	4	4	4	2	6
EPT index	13	13	14	11	12	43	43	47	37	100	6	6	6	6	6
Community Loss Index	0.27	0.38	0.31	0.4	0						6	6	6	6	6
Ratio of Shredders/Total	0.09	0.09	0.12	0.09	0.10	85	85	120	85	100	6	6	6	6	6
Sum of Bioassessment scores											40	40	40	36	48
<i>Percent of ref. Site²</i>											83	83	83	75	100
Impairment rating²											Non	Non	Non	Slight	Non

¹Reference ²Downstream sites BC-1A, BC-1B, BC-2, BC-4 are compared upstream site BC-1