



**Western Copper  
Corporation**

**Project Proposal**  
**Carmacks Copper Project**  
**Yukon Territory**

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**Appendix H2**

**Baseline Water and Sediment Quality Data 1989 – 2006**

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Water Quality Data for Station W-1 (Tributary to Williams Creek) from 1989 to 1992

Parameter	Units	Sample Date						Average	Range	CCME Guidelines Freshwater Aquatic Life*
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92			
<b>Physical Parameters</b>										
pH		7.7	7.9	8.1	7.9	7.9	7.5	7.8	7.5 - 8.1	6.5 - 9.0
Conductivity	umho/cm	462	410	450	389	350	475	422.7	350 - 475	
Total Suspended Solids	mg/L	20	17	100	<5	12	33	36.4	BD - 100	
Turbidity	NTU	----	3	12	2	1	3	4.2	1 - 12	
Hardness as CaCO <sub>3</sub>	mg/L	184.2	208	215	196	180	207	198.4	180 - 215	
<b>Anions</b>										
Alkalinity as CaCO <sub>3</sub>	mg/L	53	119	125	115	142	140	115.7	53 - 142	
Chloride	mg/L	4.7								
Fluoride	mg/L	3.3								
Sulphate	mg/L	129	112	102	95	93.9	83.9	102.6	83.9 - 129	
<b>Nutrients</b>										
Ammonia-Nitrogen	mg/L	0.1	<0.05	<0.05	<0.05	<0.05	<0.05		BD - 0.1	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.1	<0.5	0.6	1.1	<0.2	0.6		BD - 1.1	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<5.0	<0.03	<2.0	<2.0		BD	0.06
Total Phosphorous	mg/L	----	----	0.05	0.005	0.011	0.049	0.029	0.005 - 0.05	
<b>Total Metals</b>										
Aluminum	mg/L	0.03	<0.005	----	<0.005	<0.005	0.091		BD - 0.091	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	<0.02	<0.05	<b>0.16</b>	<0.04	<0.04	<0.05		BD - 0.16	0.005
Barium	mg/L	0.146	0.087	0.186	0.054	0.068	0.385	0.154	0.054 - 0.385	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Boron	mg/L	0.004	----	----	----	----	----			
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	<b>0.0004</b>		BD - 0.0004	0.000017
Calcium	mg/L	55.3	64.4	63.9	59	59	62	60.6	55.3 - 64.4	
Chromium	mg/L	<b>0.0066</b>	<b>0.002</b>	<b>0.009</b>	<0.001	<0.001	<b>0.002</b>		BD - 0.009	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0005	<0.001	0.002	<0.001	<0.001	0.003		BD - 0.003	
Copper	mg/L	<0.0005	<0.001	<0.001	<0.001	<0.001	<b>0.008</b>		BD - 0.008	0.002 - 0.004
Iron	mg/L	0.181	0.038	0.244	0.1	0.099	0.152	0.136	0.038 - 0.244	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.004	<0.005		BD	0.001 - 0.007
Lithium	mg/L	0.26	<0.05	<0.05	<0.05	<0.05	<0.05		BD - 0.26	
Magnesium	mg/L	11.2	13.7	13.2	14	13.4	14.2	13.3	11.2 - 14.2	
Manganese	mg/L	<0.001	0.003	0.01	<0.001	<0.001	0.005		BD - 0.01	
Mercury	mg/L	<0.005	----	----	----	----	----		BD	0.0001
Molybdenum	mg/L	0.015	0.021	0.025	0.022	0.015	0.023	0.020	0.015 - 0.025	0.073
Nickel	mg/L	0.0009	<0.001	0.005	<0.001	0.003	0.002		BD - 0.005	0.025 - 0.15
Phosphorous	mg/L	<0.05	0.02	0.06	0.03	<0.02	0.08		BD - 0.08	
Potassium	mg/L	1.1	1.27	1.18	1.22	1.1	1.51	1.23	1.1 - 1.51	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02		BD	0.001
Silicon	mg/L	4.42	7.5	2.7	6.43	8.72	9.52	6.55	2.7 - 9.52	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001		BD	0.0001
Sodium	mg/L	4.42	10.9	8.8	9.34	8.91	11.4	8.96	4.42 - 11.4	
Strontium	mg/L	0.644	0.74	0.62	0.82	0.75	0.75	0.72	0.62 - 0.82	
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01		BD	
Titanium	mg/L	<0.001	<0.001	0.01	0.001	<0.001	<0.001		BD - 0.01	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		BD	
Vanadium	mg/L	<0.0002	0.0059	<0.0005	<0.001	<0.001	0.015		BD - 0.015	
Zinc	mg/L	<b>0.0476</b>	0.008	<0.001	0.005	0.002	0.01		BD - 0.0476	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>										
Aluminum	mg/L	----	<0.005	<0.005	<0.005	<0.005	<0.005		BD	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02		BD	
Arsenic	mg/L	----	<0.05	0.120	<0.04	<0.04	<0.05		BD - 0.120	
Barium	mg/L	----	0.057	0.065	0.041	0.066	0.067	0.059	0.041 - 0.067	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004		BD	
Calcium	mg/L	----	61.8	64.7	57.9	52.8	59.9	59.4	52.80 - 64.70	
Chromium	mg/L	----	<0.001	0.001	<0.001	<0.001	<0.001		BD - 0.001	
Cobalt	mg/L	----	<0.001	0.001	<0.001	<0.001	0.002		BD - 0.002	
Copper	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Iron	mg/L	----	<0.005	0.080	0.080	0.090	<0.004		BD - 0.090	
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005		BD	
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05		BD	
Magnesium	mg/L	----	13.1	13.0	12.4	11.6	13.9	12.8	11.60 - 13.90	
Manganese	mg/L	----	0.003	0.003	<0.001	<0.001	0.002		BD - 0.003	
Molybdenum	mg/L	----	0.024	0.023	0.019	0.014	0.021	0.0	0.014 - 0.024	
Nickel	mg/L	----	<0.001	0.002	<0.001	<0.001	<0.001		BD - 0.002	
Phosphorous	mg/L	----	<0.02	0.030	0.020	0.020	0.050		BD - 0.050	
Potassium	mg/L	----	1.19	1.04	0.99	1.10	1.45	1.15	0.990 - 1.450	
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02		BD	
Silicon	mg/L	----	6.800	2.600	6.360	8.640	9.470	6.774	2.600 - 9.470	
Silver	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Sodium	mg/L	----	10.000	9.64	8.26	8.60	10.90	9.48	8.260 - 10.900	
Strontium	mg/L	----	0.690	0.610	0.730	0.680	0.700	0.682	0.610 - 0.730	
Thorium	mg/L	----	<0.02	<0.02	<0.005	<0.005	<0.01		BD	
Titanium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Uranium	mg/L	----	<0.02	<0.02	<0.02	<0.02	<0.02		BD	
Vanadium	mg/L	----	0.004	<0.0005	<0.001	<0.001	0.015		BD - 0.015	
Zinc	mg/L	----	0.006	<0.001	0.002	0.002	0.010		BD - 0.010	
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD	

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 1°C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-2 (Williams Creek D/S of W-1 Tributary) for 1989 and 2006

Parameter	Units	Sample Date					Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-05	Oct-05	Jun-06	Jul-06			
<b>In-Situ Parameters</b>									
Water Temperature	°C				2.20		2.20		
pH		----	----	8.0	8.31	8.21	8.17	8.0 - 8.31	6.5 - 9.0
Conductivity	umho/cm	----	----	260	305	472	346	260 - 472	
Total Suspended Solids	ppm				152	258	205	152 - 258	
Dissolved Oxygen	mg/L				6.78	7.34	7.06	6.78 - 7.34	
Oxygen Reduction Potential	mV				137	-54	41.5		
<b>Physical Parameters</b>									
pH		7.7	7.97	7.9			7.86	7.7 - 7.97	6.5 - 9.0
Conductivity	umho/cm	431	308	252		419	352.5	252 - 431	
Total Suspended Solids	mg/L	8	----	----	152	258	139.3	139.3 - 258	
Total Dissolved Solids	mg/L	----	170	140			155.0	140 - 170	
Hardness as CaCO <sub>3</sub>	mg/L	133.1	144	123		206	151.5	133.1 - 206	
<b>Organic Parameters</b>									
Total Inorganic Carbon					21.2	39.6	30.4	21.2 - 39.6	
Total Organic Carbon					14.9	10.1	12.5	10.1 - 14.9	
Dissolved Organic Carbon					14.9	9.3	12.1	9.3 - 14.9	
<b>Anions</b>									
Alkalinity as CaCO <sub>3</sub>	mg/L	100	128	101			109.7	100 - 128	
Chloride	mg/L	3.6	0.9	1.1			1.9	0.9 - 3.6	
Fluoride	mg/L	1.1	----	----					
Sulphate	mg/L	76	31.6	29			45.5	29 - 76	
<b>Nutrients</b>									
Ammonia-Nitrogen	mg/L	0.06	<0.05	<0.05	<0.05	<0.05		BD - 0.06	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.1	0.03	0.02		0.14		BD - 0.14	
Nitrite-Nitrogen	mg/L	<0.003	<0.005	<0.005		0.14		BD - 0.14	0.06
Total Phosphorous	mg/L	----	0.1	0.1	<0.1	<0.1		BD - 0.1	
Orthophosphate	mg/L	----	0.08	0.1		0.1	0.09	0.08 - 0.1	
<b>Total Metals</b>									
Aluminum	mg/L	<0.02	0.079	0.035	<b>0.104</b>	0.063		BD - 0.104	0.005 - 0.1
Antimony	mg/L	<0.005	<0.0002	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	<0.02	0.0006	0.0005	0.0005	0.0004		BD - 0.0006	0.005
Barium	mg/L	0.035	0.043	0.033	0.04	0.056	0.0414	0.033 - 0.056	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.0005	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	<0.001	0.01	0.007	0.011	0.013		BD - 0.013	
Cadmium	mg/L	<0.0002	<0.00001	<0.00001	<b>0.00004</b>	<0.00001		BD - 0.00004	0.000017
Calcium	mg/L	44.2	39.8	34	31.6	56.5	41.2	31.6 - 56.5	
Chromium	mg/L	<0.0002	<0.0005	0.0005	<0.0005	0.0006		<0.0002 - 0.0005	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0005	<0.001	<0.0001	0.0002	0.0002		BD - 0.0002	
Copper	mg/L	<0.0005	0.001	0.002	0.001	<0.001		BD - 0.002	0.002 - 0.004
Iron	mg/L	<b>0.371</b>	<b>0.4</b>	0.30		0.4	0.37	0.3 - 0.4	0.3
Lead	mg/L	<0.002	<0.0001	<0.0001	<0.0001	<0.0001		BD	0.001 - 0.007
Lithium	mg/L	0.3	0.001	0.001	<0.001	0.001		BD - 0.3	
Magnesium	mg/L	12.8	10.8	8.9	9	14.9	11.3	8.9 - 14.9	
Manganese	mg/L	0.068	0.026	0.029	0.111	0.031	0.053	0.026 - 0.111	
Mercury	mg/L	<0.005	----	----					0.0001
Molybdenum	mg/L	0.003	0.003	0.002	0.003	0.007	0.004	0.002 - 0.007	0.073
Nickel	mg/L	0.0015	0.0009	0.0008	0.0008	0.0009	0.0010	0.0008 - 0.0015	0.025 - 0.15
Phosphorous	mg/L	<0.05	----	----	<0.1				
Potassium	mg/L	0.9	0.5	0.4	0.8	1.1	0.7	0.4 - 1.1	
Selenium	mg/L	<0.005	<0.0002	<0.0002	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	3.99	8.39	8.37	5.84	6.91	6.70	3.99 - 8.39	
Silver	mg/L	<0.002	<0.0001	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	12.8	10.5	9.1	9.1	15.4	11.4	9.1 - 15.4	
Strontium	mg/L	0.444	0.396	0.322	0.287	0.594	0.409	0.287 - 0.594	
Titanium	mg/L	<0.001	0.0038	<0.0005	0.0051	0.0043		BD - 0.0051	
Uranium	mg/L	<0.02	<0.0005	<0.0005	<0.0005	0.0009		BD - 0.0009	
Vanadium	mg/L	<0.0002	0.0015	0.0011	0.0017	0.0012		BD - 0.0017	
Zinc	mg/L	<b>0.033</b>	0.001	0.001	0.004	0.003	0.008	0.001 - 0.04	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>									
Aluminum	mg/L		0.02	0.019	0.02	0.012	0.018	0.012 - 0.02	
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L		0.0005	0.0005	0.0005	0.0004	0.0005	0.0004 - 0.0005	
Barium	mg/L		0.03	0.034	0.036	0.057	0.039	0.03 - 0.057	
Beryllium	mg/L		<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L		<0.0005	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L		0.003	0.005	0.009	0.013	0.008	0.003 - 0.013	
Cadmium	mg/L		<0.00001	<0.00001	0.00002	0.00001		BD	
Calcium	mg/L		38.1	32.9	33.4	55.2	39.9	32.9 - 55.2	
Chromium	mg/L		<0.0005	<0.0005	<0.0005	0.001		BD - 0.001	
Cobalt	mg/L		<0.0001	<0.0001	0.0001	<0.0001		BD - 0.0001	
Copper	mg/L		0.001	<0.001	0.001	0.001		BD - 0.001	
Iron	mg/L		0.34	0.25		0.29	0.29	0.25 - 0.34	
Lead	mg/L		<0.0001	<0.0001	0.0004	0.0002		BD - 0.0004	
Lithium	mg/L		<0.001	0.001	<0.001	0.002		BD - 0.002	
Magnesium	mg/L		11.9	10	9.7	16.6	12.1	9.7 - 16.6	
Manganese	mg/L		0.005	0.019	0.103	0.031	0.040	0.005 - 0.103	
Molybdenum	mg/L		<0.001	0.002	0.004	0.007		BD - 0.007	
Nickel	mg/L		0.0007	<0.0005	<0.0005	<0.0005		BD - 0.0007	
Potassium	mg/L		0.6	0.4	0.4	1	0.6	0.4 - 1	
Selenium	mg/L		<0.0002	<0.0002	<0.0002	<0.0002		BD	
Silicon	mg/L		9.83	9.46	6.06	7.68	8.26	6.06 - 9.46	
Silver	mg/L		<0.0001	<0.0001	<0.0001	<0.0001		BD	
Sodium	mg/L		10.5	8.9	8.1	15.3	10.7	8.1 - 15.3	
Strontium	mg/L		0.141	0.32	0.287	0.587	0.334	0.141 - 0.587	
Titanium	mg/L		0.0014	0.0017	0.0051	0.002	0.0026	0.0014 - 0.0051	
Uranium	mg/L		<0.0005	<0.0005	<0.0005	0.001		BD - 0.001	
Vanadium	mg/L		0.0006	0.0011	0.0017	0.0011	0.0011	0.0006 - 0.0017	
Zinc	mg/L		<0.001	<0.001	0.004	0.001		BD - 0.004	

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-3 (Tributary to Williams Creek, from WRSA) from 1989 to 2006

Parameter	Units	Sample Date												Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	May-92	Jul-92	Oct-92	May-94	Sep-97	Aug-05	Oct-05	Mar-06	Jun-06	Jul-06			
<b>In-Situ Parameters</b>																
Water Temperature	°C															
pH								7.4			8.5	6.36	7.74	7.6	7.95	7.4 - 8.5
Conductivity	umho/cm							200	330	320	283	389	949	412	200 - 949	
Total Suspended Solids	ppm												191	478	335	191 - 478
Dissolved Oxygen	mg/L												4.3	2.2	3.3	2.2 - 4.3
Oxygen Reduction Potential	mV												120	-52		6.5 - 9.0
<b>Physical Parameters</b>																
pH		7.5	8.2	7.9	7.5	7.4	7.7	7.35	7.51	7.66	7.1			7.52	7.1 - 8.2	6.5 - 9.0
Conductivity	umho/cm	380	263	114	210	340	240	216	367	318	410	313	363	295	114 - 410	
Total Suspended Solids	mg/L	<5	<5	<5	<5	<5	<5	2			<2	<2	20		BD - 20	
Total Dissolved Solids	mg/L							188		210	180			193	180 - 210	
Turbidity	NTU		<1	1	1	<1	1				1.2	0.8	0.8	1.0	BD - 1.2	
Hardness as CaCO <sub>3</sub>	mg/L	167.4	150	50.3	109	162	107.5	129	181	164	218	168	189	150	50.3 - 218	
<b>Organic Parameters</b>																
Total Inorganic Carbon													15.7	44.8	15.7 - 44.8	
Total Organic Carbon													14.1	13.3	13.3 - 14.1	
Dissolved Organic Carbon										10.9			14.1	11.5	10.9 - 14.1	
<b>Anions</b>																
Alkalinity as CaCO <sub>3</sub>	mg/L	130	153	57	152	160	112	159	177	143				138	57 - 177	
Hydroxide as CaCO <sub>3</sub>	mg/L							<5	<1	<5	<5				BD	
Carbonate as CaCO <sub>3</sub>	mg/L							<5	<1	<6	<6				BD	
Bicarbonate as CaCO <sub>3</sub>	mg/L							112	159	216	174			165	112 - 216	
Chloride	mg/L	2.8						0.83	1.4	1.8	1.1			1.59	0.83 - 2.8	
Fluoride	mg/L	<1						<1	0.18						BD - 0.18	
Sulphate	mg/L	21	8.1	3.6	9.5	16.8	14	20	26	22				15.7	3.6 - 26	
<b>Nutrients</b>																
Ammonia-Nitrogen	mg/L	0.08	<0.05	<0.05	<0.05	0.07	<0.05		<0.05	<0.05	<0.05	<0.05			BD - 0.08	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.2	<0.2	<0.05	0.017	<0.01	0.01			0.1		BD - 0.017	
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<0.03	<2.0	<2	<0.5	0.001	<0.005	<0.005			<0.02	0.1	BD - 0.002	0.06
Total Phosphorous	mg/L			0.02	0.013	0.01	0.008		<0.01	0.1			<0.1		BD - 0.1	
Orthophosphate	mg/L								0.07	0.09				0.11	0.09	0.07 - 0.11
<b>Total Metals</b>																
Aluminum	mg/L	<0.02	<0.005	0.091	0.067	0.03	0.04	<b>0.197</b>	0.037	0.01	0.006	0.029	0.312	0.082	BD - 0.312	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.02	<0.02	<0.02	<0.02	0.0006	<0.002	<0.002	<0.002	<0.002	<0.002		BD - 0.0006	
Arsenic	mg/L	<0.02	<0.05	<0.04	<0.04	<0.05	<0.02	0.0007	0.0004	0.0004	0.0006	0.0005	0.0007		BD - 0.0007	0.005
Barium	mg/L	0.037	0.051	0.019	0.038	0.092	0.04	0.0429	0.047	0.042	0.048	0.051	0.047	0.0462	0.019 - 0.092	
Beryllium	mg/L	<0.0001	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		BD	
Boron	mg/L	<0.001						0.003	0.006	0.005	0.003	0.005	0.006	0.0047	BD - 0.006	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001	0.00002	<0.00001	<0.00001		BD - 0.00002	0.000017
Calcium	mg/L	52.4	48.3	15	39.8	53.3	33.9	51.6	55.5	50.1	65.7	51	61.6	48.2	15 - 65.7	
Chromium	mg/L	<b>0.0024</b>	<b>0.009</b>	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001		BD - 0.0024	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0005	<0.001	<0.001	<0.001	0.002	<0.001	0.0002	<0.0001	<0.0001	0.0001	0.0001	0.0001	0.0002	BD - 0.002	
Copper	mg/L	<0.0005	<0.001	<0.001	<b>0.009</b>	<b>0.013</b>	<b>0.028</b>	0.0017	0.001	0.001	0.002	0.002	0.002		BD - 0.028	0.002 - 0.004
Iron	mg/L	0.084	0.088	0.171	0.172	0.261	<b>0.38</b>	<b>0.6</b>	0.2	0.1	0.3		0.9	0.296	0.084 - 0.9	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.005	<0.01	0.00015	<0.0001	<0.0001	0.0001	<0.0001	0.0002		BD - 0.0002	0.001 - 0.007
Lithium	mg/L	0.34	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.002	0.001	<0.001	0.001		BD - 0.34	
Magnesium	mg/L	8.89	8.74	3.56	7.3	11.1	6	9.27	9.3	8.4	11.5	8.9	9.9	8.6	3.56 - 11.5	
Manganese	mg/L	0.57	0.004	0.004	0.159	0.361	0.124	0.293	0.128	0.132	0.157	0.159	0.28	0.198	0.004 - 0.57	
Mercury	mg/L	<0.005						<0.00005							BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	<0.003	<0.003	<0.004	<0.005	0.00087	<0.001	<0.001	<0.001	<0.001	<0.001		BD - 0.00087	0.073
Nickel	mg/L	0.0009	<0.001	<0.001	0.005	0.006	0.005	0.0014	0.0007	0.0007	0.0007	0.0006	0.0013		BD - 0.006	0.025 - 0.15
Phosphorous	mg/L	<0.05	<0.02	0.03	0.03	0.03	<0.05	<0.3							BD - 0.1	
Potassium	mg/L	0.8	0.38	1.26	0.69	0.96	1.4	<2	0.5	0.5	0.5	0.7	0.7		BD - 1.4	
Selenium	mg/L	<0.005	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002		BD	0.001
Silicon	mg/L	4.33	13	5.19	10.2	12.6	6.23	8.16	7.59	7.37	7.66	6.93	7.85	8.09	4.33 - 13	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	7.32	8.06	2.36	6.44	8.51	5.41	8	8.2	7.3	8.2	6.9	8	7.06	2.36 - 8.51	
Strontium	mg/L	0.481	0.27	0.11	0.36	0.46	0.235	0.383	0.458	0.419	0.474	0.368	0.515	0.378	0.11 - 0.515	
Sulfur	mg/L							3.92			8.8	7.2	10.6	12.4	9.59	3.92 - 14.6
Tin	mg/L						<0.01	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.0005		BD	
Thallium	mg/L							<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L	<0.01	<0.02	<0.005	<0.005	<0.01	<0.01								BD	
Titanium	mg/L	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.005	<0.01	0.001	<0.0005	0.0012	0.0018	0.0137	BD - 0.0137	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00028	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		BD - 0.00028	
Vanadium	mg/L	<0.0002	0.0032	<0.001	<0.001	0.006	<0.002	0.001	0.0006	0.0005	0.0006	0.001	0.0019		BD - 0.006	
Zinc	mg/L	<b>0.0523</b>	0.002	0.005	0.004	0.009	<0.005	0.002	0.001	<0.001	0.002	<0.001	0.004		BD - 0.0523	0.03
Zirconium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>																
Aluminum	mg/L		<0.005	0.046	0.066	<0.005	<0.01	0.011	<0.005	0.006	<0.005	0.01	<0.005		BD - 0.066	
Antimony	mg/L		<0.05	<0.02	<0.02	<0.02	<0.02	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		BD - 0.0001	
Arsenic	mg/L		<0.05	<0.04	<0.04	<0.05	<0.02	0.0005	0.0004	0.0005	0.0005	0.0005	0.0004		BD - 0.0005	
Barium	mg/L		0.05	0.017	0.036	0.046	0.039	0.0377	0.047	0.042	0.048	0.046	0.042	0.041	0.017 - 0.05	
Beryllium	mg/L		<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007		BD	
Boron	mg/L							0.002	0.006	0.004	0.002	0.004	0.006	0.004	0.002 - 0.006	
Cadmium	mg/L		<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001	0.00001	<0.00001	<0.00001		BD	
Calcium	mg/L		45.8	14.4	33.6	46	33.9	49.2	55.6	51.4	66.6	52.2	58	46.1	14.4 - 66.6	
Chromium	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			

Water Quality Data for Station W-4 (Williams Creek D/S of Confluence with W-3 Tributary) from 1989 to 2006

Parameter	Units	Sample Date													Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	Sep-97	Aug-05	Oct-05	Mar-06	Jun-06	Jul-06			
<b>In-Situ Parameters</b>																	
Water Temperature	°C												2.2		2.2		
pH		----	----	----	----	----	----	----	7.8	----	7.73		8.38	8.41	8.08	7.73 - 8.41	6.5 - 9.0
Conductivity	umho/cm	----	----	----	----	----	----	----	160	300	280		302	1010	410	160 - 1010	
Total Suspended Solids	ppm												151	506	329	151 - 506	
Dissolved Oxygen	mg/L												8.2	7.51	7.86	7.51 - 8.2	
Oxygen Reduction Potential	mV												102	67	85	67 - 102	
<b>Physical Parameters</b>																	
pH		7.7	8	8.1	7.4	7.8	7.5	7.8	7.71	7.98	7.95	8.15			7.78	7.4 - 8.15	6.5 - 9.0
Conductivity	umho/cm	395	210	465	98	210	370	207	178	309	257	1210	244	415	351	98 - 1210	
Total Suspended Solids	mg/L	<5	37	<5	253	258	<5	<5	3	----	----	6	5	<2		BD - 258	
Total Dissolved Solids	mg/L	----	----	----	----	----	----	179	----	170	140				163	140 - 179	
Turbidity	NTU	----	4	1	14	25	1	2	----	----	----	1.4	1.2	0.1	5.5	0.1 - 25	
Hardness as CaCO <sub>3</sub>	mg/L	145.1	111	216	28.3	103	159	85.6	129	144	120	694	120	196	173	28.3 - 694	
<b>Organic Parameters</b>																	
Total Inorganic Carbon													23.2	38.8	31.0	23.2 - 38.8	
Total Organic Carbon													15	10.6	12.8	10.6 - 15	
Dissolved Organic Carbon												24.8	15.1	9.9	16.6	9.9 - 24.8	
<b>Anions</b>																	
Alkalinity as CaCO <sub>3</sub>	mg/L	120	103	169	28	94	125	79	111	140	106				108	28 - 169	
Hydroxide as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	<1	<5	<5					BD	
Carbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	<1	<6	<6					BD	
Bicarbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	79	111	170	129				122	79 - 170	
Chloride	mg/L	3.6	----	----	----	----	----	0.78	1.3	1.2	0.5				1.5	0.5 - 3.6	
Fluoride	mg/L	<1	----	----	----	----	----	<1	0.2	----	----					BD - 0.2	
Sulphate	mg/L	47	20.7	80.6	3.5	8.9	59.8	18.6	24	29	27				31.9	3.5 - 80.6	
<b>Nutrients</b>																	
Ammonia-Nitrogen	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.07	----	<0.05	<0.05		<0.05	<0.05		BD - 0.07	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.5	0.05	<0.1	<0.2	<0.05	<0.005	0.02	0.02		0.04	0.16		BD - 0.16	
Nitrite-Nitrogen	mg/L	<0.0003	<0.0003	<5	<0.03	<1	<2.0	<0.5	0.001	<0.005	<0.005		0.04	0.16		BD - 0.16	0.06
Total Phosphorus	mg/L	----	----	0.032	0.018	0.173	0.017	0.04	----	0.1	0.1		<0.1	<0.1	0.069	0.017 - 0.173	
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	0.08	0.09				0.1	0.08 - 0.1	
<b>Total Metals</b>																	
Aluminum	mg/L	<0.02	<b>0.154</b>	<0.005	<b>2.75</b>	<b>3.89</b>	0.036	0.03	0.033	0.062	0.064	0.019	0.072	0.027		BD - 3.89	0.005 - 0.1
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.0006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	<0.02	<0.05	<b>0.12</b>	<0.04	<0.04	<0.05	<0.02	0.0006	0.0005	0.0005	0.0009	0.0005	0.0004		BD - 0.12	0.005
Barium	mg/L	0.031	0.049	0.057	0.078	0.11	0.175	0.03	0.0354	0.043	0.034	0.161	0.038	0.053	0.069	0.03 - 0.175	
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	<0.001	----	----	----	----	----	0.004	0.009	0.006	0.012	0.01	0.012			BD - 0.012	
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001	<b>0.00004</b>	<0.00001	<0.00001		BD	0.000017
Calcium	mg/L	40.5	32.7	63.4	15.6	27.7	46.4	25	35.9	47.7	35.1	190	33.4	56.2	49.4	15.6 - 190	
Chromium	mg/L	<0.0002	<b>0.012</b>	<b>0.006</b>	0.002	<b>0.006</b>	0.002	<0.001	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005		BD - 0.012	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0005	<0.001	0.002	0.003	0.002	0.003	0.002	0.0002	<0.0001	<0.0001	<0.0001	0.0002	0.0002	<0.0001	BD - 0.003	
Copper	mg/L	<0.0005	<0.001	<0.001	<b>0.01</b>	<b>0.014</b>	<b>0.008</b>	<b>0.016</b>	0.0011	0.001	0.002	0.002	0.001	<0.001		BD - 0.016	0.002 - 0.004
Iron	mg/L	<b>0.519</b>	<b>1.11</b>	<b>0.349</b>	<b>3.68</b>	<b>6.6</b>	<b>0.709</b>	<b>0.39</b>	<b>0.48</b>	<b>0.4</b>	0.3	0.2		0.3	1.25	0.3 - 6.6	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<b>0.005</b>	<0.005	<0.01	<0.00005	<0.0001	0.0003	0.0002	<0.0001	<0.0001		BD - 0.005	0.001 - 0.007
Lithium	mg/L	0.35	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	0.001	0.002	0.004	0.001	0.001		BD - 0.35	
Magnesium	mg/L	10.7	8.47	16.1	5.2	7.7	13	6.5	9.5	10.6	8.6	47.2	9.2	14.2	12.8	5.2 - 47.2	
Manganese	mg/L	0.077	0.058	0.1	0.136	0.191	0.166	0.069	0.0477	0.031	0.031	0.122	0.064	0.018	0.085	0.031 - 0.191	
Mercury	mg/L	<0.005	----	----	----	----	----	----	<0.00005	----	----	----	----	----		BD	0.0001
Molybdenum	mg/L	<0.001	<0.005	0.01	<0.003	<0.003	<0.004	<0.005	0.00242	0.003	0.002		0.003	0.006		BD - 0.01	0.073
Nickel	mg/L	0.0014	0.002	0.005	<0.001	0.014	0.005	0.003	0.001	0.001	0.0008	0.026	0.006	0.006		BD - 0.026	0.025 - 0.15
Phosphorus	mg/L	<0.05	0.05	0.04	0.03	0.2	0.03	0.05	<0.3	----	----	<0.0005	<0.1	<0.1		BD - 0.2	
Potassium	mg/L	0.8	0.48	1.14	1.41	1	0.95	1	<2	0.5	0.5	5.2		1		BD - 5.2	
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.001	<0.0002	<0.0002	0.0009	<0.0002	<0.0002		BD - 0.0009	0.001
Silicon	mg/L	4.86	13.4	5.5	9.71	16.3	11	5.1	8.54	8.25	8.18	17.3	6.13	7.04	9.33	4.86 - 17.3	
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	11.2	9.93	14.9	2.77	6.58	12.6	6.58	9	10.1	8.7	36.5	9.1	14.6	11.7	2.77 - 36.5	
Strontium	mg/L	0.372	0.26	0.42	0.142	0.24	0.4	0.229	0.273	0.393	0.317	2.16	0.285	0.576	0.467	0.142 - 2.16	
Sulfur	mg/L	----	----	----	----	----	----	5.39	----	9.7	8.3	106	10.6	24	27.3	5.39 - 106	
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001		BD	
Thallium	mg/L	----	----	----	----	----	----	----	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	----	----	----	----	----	----		BD	
Titanium	mg/L	<0.001	0.016	0.002	0.146	0.192	<0.001	0.002	<0.1	0.0031	<0.005	0.0065	0.0031	0.0023		BD - 0.192	
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00031	<0.0005	<0.0005	0.0012	<0.0005	0.0008		BD - 0.00121	
Vanadium	mg/L	<0.0002	0.0049	<0.0005	<0.001	0.016	0.01	<0.002	<0.001	0.0014	0.0011	0.0008	0.0013	0.0009		BD - 0.016	
Zinc	mg/L	<b>0.0578</b>	0.004	<0.001	0.019	0.018	0.008	<0.005	0.003	<0.001	0.016	0.004	0.001	0.002		BD - 0.0578	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	----	<0.001	<0.001	<0.001	<0.001	<0.001		BD - 0.002	
<b>Dissolved Metals</b>																	
Aluminum	mg/L	----	0.007	<0.005	0.03	0.043	0.018	<0.01	0.021	0.014	0.019	0.011	0.016	0.008		BD - 0.043	
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.0006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		BD - 0.00006	
Arsenic	mg/L	----	<0.05	0.11	<0.04	<0.04	<0.05	<0.02	0.0006	0.0006	0.0005	0.001	0.0005	0.0004		BD - 0.11	
Barium	mg/L	----	0.04	0.053	0.01	0.041	0.054	0.03	0.0343	0.046	0.034	0.161	0.036	0.055	0.050	0.01 - 0.161	
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.01	<0.001	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007		BD	
Boron	mg/L	----	----	----	----	----	----	0.004	0.009	0.005	0.012	0.01	0.012		0.009	0.004 - 0.012	
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00005	<0.00001	<0.00001	0.00003	<0.00001	<0.00001		BD	
Calcium	mg/L	----	30.7	61.3	7.49	27.3	43.4	24.5	35.9	39.2	34.1	194	34.4	54.9	48.9	7.49 - 194	
Chromium	mg/L	----	0.002	0.004	<0.001	<0.001	<0.001	<0.001	&								

Water Quality Data for Station W-5 (South East Tributary to Williams Creek) from 1989 to 2006

Parameter	Units	Sample Date									Average	Range	CCME Guidelines Freshwater Aquatic Life	
		Oct-89	Aug-91 (dup)	Dec-91	May-92	Jul-92	Oct-92	May-94	Jun-06	Jul-06				
<b>In-Situ Parameters</b>														
Water Temperature	°C										5.50	5.50	5.5	
pH											7.77	7.77	7.77	
Conductivity	mS										190	190	190.0	
Total Suspended Solids	ppm										93.2	93.2	93.2	
Dissolved Oxygen	mg/L										7.60	7.60	7.6	
Oxygen Reduction Potential	mV										123	123	123	
<b>Physical Parameters</b>														
pH		7.5	7.2	8.1	7.2	7.2	7.5	7.8			7.5	7.2 - 8.1	6.5 - 9.0	
Conductivity	umho/cm	157	91	280	91	89	228	135	168	215	162	89 - 280		
Total Suspended Solids	mg/L	<5	1825	34	103	800	<5	6	3	<2		BD - 1825		
Total Dissolved Solids	mg/L	----	----	----	----	----	----	129				129		
Turbidity	NTU	----	120	17	11	27	3	2	1.1	2	22.9	1.1 - 120		
Hardness as CaCO <sub>3</sub>	mg/L	84	51.8	139	38	135	93.7	52.8	77	96	85.3	38 - 139		
<b>Organic Parameters</b>														
Total Inorganic Carbon										14.2	22.8	18.5	14.2 - 22.8	
Total Organic Carbon										13.7	14.9	14.3	13.7 - 14.9	
Dissolved Organic Carbon										13.9	13	13.5	13 - 13.9	
<b>Anions</b>														
Alkalinity as CaCO <sub>3</sub>	mg/L	88	58	145	44	66	100	112			88	44 - 145		
Hydroxide as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5				BD		
Carbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5				BD		
Bicarbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	112				112		
Chloride	mg/L	1.01	----	----	----	----	----	0.59			0.80	0.59 - 1.01		
Fluoride	mg/L	<1	----	----	----	----	----	<1				BD		
Sulphate	mg/L	3.29	3.2	3.8	2	2.7	9.4	11.6			5.1	2 - 11.6		
<b>Nutrients</b>														
Ammonia-Nitrogen	mg/L	<0.05	0.08	<0.05	<0.05	0.11	0.2	<0.05	<0.05	<0.05		BD - 0.2	1.04 - 2.33 <sup>1</sup>	
Nitrate-Nitrogen	mg/L	<0.1	<0.05	<0.2	<0.05	<0.03	<0.2	<0.05	0.04	0.02		BD - 0.4		
Nitrite-Nitrogen	mg/L	<0.003	0.003	<0.2	<0.03	<0.05	<2.0	<0.5	0.04	0.02		BD - 0.04	0.06	
Total Phosphorous	mg/L	----	----	0.132	0.022	0.24	0.027	0.009	<0.1	<0.1		BD - 0.24		
<b>Total Metals</b>														
Aluminum	mg/L	<0.02	<b>9.58</b>	<0.005	<b>1.71</b>	<b>8.02</b>	0.037	<b>0.25</b>	0.042	0.087		BD - 9.58	0.005 - 0.1	
Antimony	mg/L	<0.005	<0.005	<0.005	<0.02	<0.02	<0.02	<0.002	<0.0002	<0.0002		BD		
Arsenic	mg/L	<0.02	<b>0.11</b>	<b>0.11</b>	0.04	<0.04	<0.05	<0.003	0.0005	0.0005		BD - 0.11	0.005	
Barium	mg/L	0.013	0.455	0.035	0.051	0.239	0.037	0.024	0.028	0.036	0.102	0.013 - 0.455		
Beryllium	mg/L	<0.0001	0.00065	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001		BD - 0.00065		
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.005	<0.0005	<0.0005		BD		
Boron	mg/L	<0.001	----	----	----	----	----	0.006	0.005	0.005		BD - 0.006		
Cadmium	mg/L	<0.0002	<b>0.0006</b>	<0.0003	<0.0003	<0.0003	<b>0.0004</b>	<0.0005	<0.00001	<0.00001		BD - 0.0006	0.000017	
Calcium	mg/L	18.8	29.5	39.6	13.1	25.3	30.3	15.2	22.3	28.1	24.7	13.1 - 39.6		
Chromium	mg/L	<b>0.0016</b>	<b>0.05</b>	<b>0.007</b>	<0.001	<b>0.014</b>	<b>0.002</b>	0.001	<0.0005	<0.0005		BD - 0.05	0.001 <sup>2</sup>	
Cobalt	mg/L	<0.0005	0.016	0.001	<0.001	0.007	0.003	<0.001	<0.0001	0.0002		BD - 0.016		
Copper	mg/L	<0.0005	<b>0.059</b>	<0.001	<b>0.007</b>	<b>0.034</b>	0.004	<b>0.023</b>	0.001	0.002		BD - 0.059	0.002 - 0.004	
Iron	mg/L	<b>0.458</b>	<b>31.4</b>	<b>1.48</b>	<b>2.2</b>	<b>14.4</b>	<b>0.664</b>	<b>0.447</b>	0.2	<b>0.5</b>	5.75	0.2 - 31.4	0.3	
Lead	mg/L	<0.002	<b>0.015</b>	<0.004	<0.004	<b>0.009</b>	<0.005	<b>-0.01</b>	<0.0001	<0.0001		BD - 0.015	0.001 - 0.007	
Lithium	mg/L	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	<0.001		BD - 0.36		
Magnesium	mg/L	4.16	8.95	10.1	4.09	6.9	7.62	3.55	5.6	6.4	6.37	3.55 - 10.1		
Manganese	mg/L	0.046	0.62	0.191	0.098	0.419	0.304	0.014	0.02	0.078	0.199	0.014 - 0.62		
Mercury	mg/L	<0.005	----	----	----	----	----	----	<0.001			BD	0.0001	
Molybdenum	mg/L	<0.001	<0.005	<0.005	<0.003	<0.003	<0.004	<0.005	0.0005	<0.001		BD	0.073	
Nickel	mg/L	0.0029	0.04	0.007	<0.001	0.025	0.004	0.002	0.0005	0.001		BD - 0.04	0.025 - 0.15	
Phosphorous	mg/L	<0.05	1.64	0.16	0.08	0.82	0.03	<0.05				BD - 1.64		
Potassium	mg/L	<0.2	3.28	1.65	1.61	1.21	0.52	1.2	0.6	0.5		BD - 3.28		
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002		BD	0.001	
Silicon	mg/L	5.53	19.8	5.9	7.84	22.2	13	5.26	6.02	6.3	10.21	5.26 - 22.2		
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001		BD	0.0001	
Sodium	mg/L	5.57	6.56	9.7	2.85	6.28	8.65	5.25	8.8	10.6	7.14	2.85 - 10.6		
Strontium	mg/L	0.089	0.22	0.159	0.083	0.15	0.157	0.086	0.115	0.162	0.136	0.083 - 0.22		
Sulfur	mg/L	----	----	----	----	----	----	2.99	6.1	8.6	5.90	2.99 - 8.6		
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.001	<0.001		BD		
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01				BD		
Titanium	mg/L	<0.001	1.07	0.005	0.084	0.364	<0.001	0.016	0.0019	0.004		BD - 1.07		
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.0005	<0.0005		BD		
Vanadium	mg/L	<0.0002	0.126	<0.0005	0.008	0.043	0.007	<0.002	0.0006	0.001		BD - 0.126		
Zinc	mg/L	<b>0.0661</b>	<b>0.072</b>	0.004	0.015	<b>0.043</b>	0.01	<0.005	<0.001	0.007		BD - 0.072	0.03	
Zirconium	mg/L	----	0.005	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001		BD - 0.005		
<b>Dissolved Metals</b>														
Aluminum	mg/L	----	0.037	<0.005	0.058	0.06	0.034	0.01	0.014	0.016		BD - 0.06		
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.002	<0.0002	<0.0002		BD		
Arsenic	mg/L	----	<0.05	0.09	<0.04	<0.04	<0.05	<0.02	0.0005	0.0004		BD - 0.09		
Barium	mg/L	----	0.037	0.032	0.017	0.041	0.031	0.023	0.046	0.036	0.033	0.017 - 0.046		
Beryllium	mg/L	----	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001		BD		
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0005	0.0007		BD		
Cadmium	mg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.00001	<0.00001		BD		
Calcium	mg/L	----	23.7	39.4	10	19	26.1	15.1		26.8	22.9	10 - 39.4		
Chromium	mg/L	----	0.007	0.006	<0.001	<0.001	<0.001	<0.001	<0.0005	0.001		BD - 0.007		
Cobalt	mg/L	----	0.001	0.001	<0.001	<0.001	0.003	<0.001	0.0001	<0.0001		BD - 0.003		
Copper	mg/L	----	0.001	<0.001	0.006	<0.001	0.001	0.009	0.002	0.001		BD - 0.009		
Iron	mg/L	----	0.987	0.748	0.392	0.63	0.322	0.076		0.27	0.489	0.076 - 0.987		
Lead	mg/L	----	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.0001	<0.0001		BD		
Lithium	mg/L	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.002	<0.001	<0.001		BD		
Magnesium	mg/L	----	5.82	9.83	2.88	4.37	6.6	3.51		7	5.72	2.88 - 9.83		
Manganese	mg/L	----	0.142	0.224	0.053	0.194	0.271	0.007		0.071	0.137	0.007 - 0.271		
Molybdenum	mg/L	----	<0.005	<0.005	<0.003	<0.003	<0.004	<0.005	<0.001	<0.001		BD		
Nickel	mg/L	----	0.0045	0.005	<0.001	0.002	0.003	0.004	0.0006	0.0006		BD - 0.005		
Phosphorous	mg/L	----	<0.02	0.11	0.03	0.03	0.03	<0.05				BD - 0.11		
Potassium	mg/L	----	0.23	1.25	1.12	0.28	0.5	1.1		<0.4	0.75	0.23 - 1.25		
Selenium	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002		BD		
Silicon	mg/L	----	10.6	5.5	4.3	14.3	11.4	4.97	6.46					

Water Quality Data for Station W-6 (Williams Creek D/S of South East Tributary) from 1989 and 2006

Parameter	Units	Sample Date				Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Oct-05	Jun-06	Jul-06			
<b>In-Situ Parameters</b>								
Water Temperature	°C			2.20		2.20	2.20	
pH		----	8.06	8.31	8.31	8.23	8.06 - 8.31	6.5 - 9.0
Conductivity	umho/cm	----	240	285	459	328	240 - 459	
Total Suspended Solids	ppm			145	231	188	145 - 231	
Dissolved Oxygen	mg/L			7.07	6.99	7.03	6.99 - 7.07	
Oxygen Reduction Potential	mV			145	-36	54.5		
<b>Physical Parameters</b>								
pH		7.9	7.93			7.92	7.9 - 7.93	6.5 - 9.0
Conductivity	umho/cm	415	242	232	413	326	232 - 415	
Total Suspended Solids	mg/L	<5	----	52	5		BD - 52	
Total Dissolved Solids	mg/L	----	140			140	140	
Turbidity	NTU	----	----	4.9	2	3.5	2 - 4.9	
Hardness as CaCO <sub>3</sub>	mg/L	168.6	120	120	198	152	120 - 198	
<b>Organic Parameters</b>								
Total Inorganic Carbon				18.3	40.4	29.4	18.3 - 40.4	
Total Organic Carbon				16	10.8	13.4	10.8 - 16	
Dissolved Organic Carbon				15.5	10	12.8	10 - 15.5	
<b>Anions</b>								
Alkalinity as CaCO <sub>3</sub>	mg/L	140	100			120	100 - 140	
Chloride	mg/L	1.3	1			1.2	1 - 1.3	
Fluoride	mg/L	<1	----				BD	
Sulphate	mg/L	51	26			38.5	26 - 51	
<b>Nutrients</b>								
Ammonia-Nitrogen	mg/L	0.05	<0.05	<0.05	<0.05		BD - 0.05	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.1	0.02		0.08		BD - 0.08	
Nitrite-Nitrogen	mg/L	0.003	<0.005		0.08		BD - 0.08	0.06
Total Phosphorous	mg/L	----	0.1	<0.1	0.1		BD - 0.1	
Orthophosphate	mg/L	----	0.09		0.1	0.10	BD - 0.1	
<b>Total Metals</b>								
Aluminum	mg/L	<0.02	0.048	0.808	0.14		BD - 0.808	0.005 - 0.1
Antimony	mg/L	<0.005	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	<0.02	0.0003	0.0007	0.0005		BD - 0.0007	0.005
Barium	mg/L	0.034	0.031	0.054	0.06	0.045	0.031 - 0.06	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.002	0.006	0.011	0.014	0.008	0.002 - 0.014	
Cadmium	mg/L	<0.0002	<0.00001	<b>0.00002</b>	<0.00001		BD	0.000017
Calcium	mg/L	43.8	31.5	31.6	56.6	40.9	31.5 - 56.6	
Chromium	mg/L	<b>0.0012</b>	0.0005	<b>0.0014</b>	0.0008	0.0010	0.0005 - 0.0014	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0005	<0.0001	0.0005	0.0001		BD - 0.0005	
Copper	mg/L	0.001	0.001	0.003	0.001	0.002	0.001 - 0.003	0.002 - 0.004
Iron	mg/L	<b>0.637</b>	0.3		<b>0.5</b>	<b>0.479</b>	0.3 - 0.637	0.3
Lead	mg/L	<0.002	0.0001	0.0003	0.0002		BD - 0.0003	0.001 - 0.007
Lithium	mg/L	0.3	0.001	0.002	0.002	0.076	0.001 - 0.3	
Magnesium	mg/L	13.9	8.4	9.2	15.3	11.7	8.4 - 15.3	
Manganese	mg/L	0.101	0.032	0.122	0.064	0.080	0.032 - 0.122	
Mercury	mg/L	<0.005	----				BD	0.0001
Molybdenum	mg/L	<0.001	0.002	0.003	0.006		BD - 0.006	0.073
Nickel	mg/L	0.0018	0.0009	0.0013	0.0011	0.0013	0.0009 - 0.0018	0.025 - 0.15
Phosphorous	mg/L	<0.05	----		0.1		BD - 0.1	
Potassium	mg/L	0.9	0.4	0.9	1	0.8	0.4 - 1.0	
Selenium	mg/L	<0.005	<0.0002	0.0003	<0.0002		BD - 0.0003	0.001
Silicon	mg/L	5.08	8.05	7.11	7.08	6.83	5.08 - 8.05	
Silver	mg/L	<0.002	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	14.3	8.4	9.5	16.7	12.2	8.4 - 16.7	
Strontium	mg/L	0.426	0.285	0.286	0.574	0.393	0.285 - 0.574	
Thorium	mg/L	<0.01	----				BD	
Titanium	mg/L	<0.001	<0.0005	0.0335	0.0073		BD - 0.0335	
Uranium	mg/L	<0.02	<0.0005	<0.0005	0.001		BD - 0.001	
Vanadium	mg/L	<0.0002	0.0009	0.0038	0.0015		BD - 0.0038	
Zinc	mg/L	<b>0.108</b>	0.002	0.003	0.004	0.029	0.002 - 0.108	0.03
Zirconium	mg/L	----	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>								
Aluminum	mg/L	----	0.02	0.03	0.013	0.021	0.013 - 0.03	
Antimony	mg/L	----	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	----	0.0005	0.0004	0.0004	0.0004	0.0004 - 0.0005	
Barium	mg/L	----	0.032	0.037	0.057	0.042	0.032 - 0.057	
Beryllium	mg/L	----	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	----	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	----	0.006	0.01	0.013	0.010	0.006 - 0.013	
Cadmium	mg/L	----	<0.00001	<0.00001	<0.00001		BD	
Calcium	mg/L	----	31	31.2	52.3	38.2	31 - 52.3	
Chromium	mg/L	----	<0.0005	<0.0005	<0.0005		BD	
Cobalt	mg/L	----	<0.0001	0.0001	<0.0001		BD - 0.0001	
Copper	mg/L	----	<0.001	0.002	0.001		BD - 0.002	
Iron	mg/L	----	0.23		0.2	0.22	0.2 - 0.23	
Lead	mg/L	----	<0.0001	<0.0001	<0.0001		BD	
Lithium	mg/L	----	0.001	0.001	0.002	0.001	0.001 - 0.002	
Magnesium	mg/L	----	9.6	9.3	16.4	11.8	9.3 - 16.4	
Manganese	mg/L	----	0.02	0.093	0.056	0.056	0.02 - 0.093	
Mercury	mg/L	----	----					
Molybdenum	mg/L	----	0.002	0.003	0.005	0.003	0.002 - 0.005	
Nickel	mg/L	----	0.0008	<0.0005	<0.0005		BD - 0.0008	
Potassium	mg/L	----	0.4	0.9	1	0.8	0.4 - 1	
Selenium	mg/L	----	<0.0002	<0.0002	<0.0002		BD	
Silicon	mg/L	----	9.3	6.07	7.58	7.65	6.07	
Silver	mg/L	----	<0.0001	<0.0001	<0.0001		BD	
Sodium	mg/L	----	8.5		15.8	12.2	8.5 - 15.8	
Strontium	mg/L	----	0.296	0.288	0.561	0.382	0.288 - 0.561	
Titanium	mg/L	----	0.0012	0.0014	0.0018	0.0015	0.0012 - 0.0018	
Uranium	mg/L	----	<0.0005	<0.0005	0.001		BD - 0.001	
Vanadium	mg/L	----	0.001	0.0017	0.001	0.0012	0.001 - 0.0017	
Zinc	mg/L	----	<0.001	0.004	0.001		BD - 0.004	
Zirconium	mg/L	----	----					

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10°C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-7 (WRSA Tributary Near Road, U/S of W-3) from 1989 to 2006

Parameter	Units	Sample Date														Average	Range	CCME Guidelines Freshwater Aquatic Life	
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	May-94 (Dupl)	Aug-05	Aug-05 (Dupl)	Oct-05	Jun-06	Jul-06					
<b>In-Situ Parameters</b>																			
Water Temperature	°C														11.9	11.9	7.6 - 8.4	6.5 - 9.0	
pH		----	----	----	----	----	----	----	----	----	----	----	----	7.6	7.9	8.4	185	180 - 190	
Conductivity	umho/cm	----	----	----	----	----	----	----	190	----	180	147	182	185	147	182	185	180 - 190	
Total Suspended Solids	ppm														75.3	89.2	82.3	75.3 - 89.2	
Dissolved Oxygen	mg/L														7.5	8.3	7.9	7.5 - 8.3	
Oxygen Reduction Potential	mV														104.0	-5.0	49.5		
<b>Physical Parameters</b>																			
pH		7.7	7.6	7.3	7.4	7.6	7.5	7.7	7.7	7.64	----	7.71				7.59	7.3 - 7.71	6.5 - 9.0	
Conductivity	umho/cm	325	192	435	81	166	345	145	143	206	----	177	137	185	209		81 - 435		
Total Suspended Solids	mg/L	<5	<5	23	<5	<5	<5	<5	<5	----	----	----	<2	<2			BD - 23		
Total Dissolved Solids	mg/L	----	----	----	----	----	----	145	147	120	----	96	127				96 - 147		
Turbidity	NTU	----	1	6	2	4	<1	1	1	----	----		0.6				BD - 6		
Hardness as CaCO <sub>3</sub>	mg/L	123.6	114	188	39.4	122	158	62.2	62.6	100	----	92	78	95	102		39.4 - 188		
<b>Organic Parameters</b>																			
Total Inorganic Carbon															13.2	21.7	17.5	13.2 - 21.7	
Total Organic Carbon															26.3	26.7	26.5	26.3 - 26.7	
Dissolved Organic Carbon															27.4	25.6	26.5	25.6 - 27.4	
<b>Anions</b>																			
Alkalinity as CaCO <sub>3</sub>	mg/L	120	111	230	41	110	141	73	74	100	----	85				109	41 - 230		
Hydroxide as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	<5	<5	----	<5					BD		
Carbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	<5	<6	----	<6					BD		
Bicarbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	73	74	121	----	104	93.0				73 - 121		
Chloride	mg/L	2.6	----	----	----	----	----	<0.3	<0.3	0.9	----	<0.4					BD - 2.6		
Fluoride	mg/L	<1	----	----	----	----	----	<1	<1	----	----	----					BD		
Sulphate	mg/L	15.1	10.9	0.83	1.1	11	29.6	4.6	4.6	12	----	6.7				9.64	0.83 - 29.6		
<b>Nutrients</b>																			
Ammonia-Nitrogen	mg/L	0.05	<0.05	0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.1	----	0.05	<0.05	<0.05			BD - 0.1	1.04 - 2.33 <sup>1</sup>	
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.05	<0.1	<0.2	<0.05	<0.05	<0.01	----	<0.01			0.02		BD		
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<0.5	<0.03	<1	<2.0	<0.5	<0.5	<0.005	----	<0.005			0.02		BD	0.06	
Total Phosphorous	mg/L	----	----	0.3	0.016	0.015	<0.005	<0.005	<0.005	0.1	----	<0.1	<0.1	<0.1			BD - 0.3		
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	0.07	----	0.09	0.08	0.08			0.07 - 0.09		
<b>Total Metals</b>																			
Aluminum	mg/L	<0.02	<0.005	<0.005	0.084	<b>0.192</b>	0.035	<0.01	<0.01	0.035	0.034	0.096	0.025	0.038			BD - 0.192	0.005 - 0.1	
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002			BD		
Arsenic	mg/L	<0.02	<0.05	<b>0.16</b>	<0.04	<0.04	<0.05	<0.02	<0.02	0.0004	0.0004	0.0005	0.0005	0.0005	0.036		BD - 0.16	0.005	
Barium	mg/L	0.037	0.036	0.091	0.012	0.039	0.062	0.024	0.024	0.03	0.03	0.024	0.022	0.033			0.012 - 0.091		
Beryllium	mg/L	<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			BD		
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			BD		
Boron	mg/L	0.007	----	----	----	----	----	----	----	0.004	0.004	0.003	0.004	0.005	0.005		0.003 - 0.007		
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<0.0005	<0.0005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			BD	0.000017	
Calcium	mg/L	38.2	36.2	68.3	11.5	37	54.4	19.2	19.4	31.4	----	28.1	23.1	29.5	33.0		11.5 - 68.3		
Chromium	mg/L	<b>0.0081</b>	<b>0.007</b>	<b>0.007</b>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	0.0007	<0.0005	<0.0005			BD - 0.0081	0.001 <sup>2</sup>	
Cobalt	mg/L	<0.0005	<0.001	0.007	<0.001	<0.001	0.002	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			BD - 0.007		
Copper	mg/L	<b>0.009</b>	<0.001	<0.001	<b>0.01</b>	<b>0.004</b>	<b>0.005</b>	<b>0.014</b>	<b>0.014</b>	0.002	0.002	0.002	0.002	0.002			BD - 0.014	0.002 - 0.004	
Iron	mg/L	0.195	0.267	<b>11.6</b>	0.072	0.266	0.219	0.172	0.175	0.2	----	0.1	0.1	1.22			0.072 - 11.6	0.3	
Lead	mg/L	0.003	<0.004	<0.004	<0.004	<0.004	<0.005	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	0.0001			BD - 0.003	0.001 - 0.007	
Lithium	mg/L	0.36	<0.06	<0.05	<0.05	<0.05	<0.05	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001			BD - 0.36		
Magnesium	mg/L	8.84	6.83	12.6	2.83	7.2	11.3	3.54	3.57	5.9	----	5.3	4.4	5.1	6.45		2.83 - 12.6		
Manganese	mg/L	0.026	0.03	3.62	0.004	0.007	0.073	0.069	0.069	0.014	----	0.006	<0.005	<0.005			BD - 3.62		
Mercury	mg/L	<0.005	----	----	----	----	----	----	----	----	----	----	----	----			BD	0.0001	
Molybdenum	mg/L	<0.001	<0.005	0.008	<0.003	<0.003	<0.004	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001			BD - 0.008	0.073	
Nickel	mg/L	0.002	0.002	0.009	<0.001	0.007	0.002	0.003	0.001	0.0011	0.001	0.0012	0.0008	0.0011			BD - 0.009	0.025 - 0.15	
Phosphorous	mg/L	<0.05	<0.02	0.34	0.03	0.03	0.03	<0.05	<0.05	----	----	----	<0.1	<0.1			BD - 0.34		
Potassium	mg/L	0.3	0.25	0.5	1.54	0.35	0.44	1.2	1.2	----	----	<0.4	<0.4	<0.4			BD - 1.54		
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002			BD - 0.002	0.001	
Silicon	mg/L	4.69	13.9	5.8	4.14	13.9	14.8	5.42	5.42	8.72	----	9.76	6.69	6.01	8.27		4.14 - 14.8		
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			BD	0.0001	
Sodium	mg/L	7.21	5.66	6.45	1.74	6.09	9.93	3.48	3.6	6.1	----	5.5	4.2	5.2	5.42		1.74 - 9.93		
Strontium	mg/L	0.161	0.14	0.23	0.053	0.18	0.26	0.086	0.088	0.136	0.132	0.111	0.087	0.126	0.138		0.053 - 0.26		
Sulfur	mg/L	----	----	----	----	----	----	1.31	1.38	3.2	----	2	1.4	1.86			1.31 - 3.2		
Tin	mg/L	----	----	----	----	----	----	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001			BD		
Thorium	mg/L	<0.01	<0.02	<0.02	<0.005	<0.005	<0.01	<0.01	<0.01	----	----	----	----	----			BD		
Titanium	mg/L	<0.001	<0.001	0.005	0.002	0.008	<0.001	0.002	0.002	0.0014	0.0014	<0.0005	0.0007	0.0016			BD - 0.008		
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			BD		
Vanadium	mg/L	<0.0002	0.0008	<0.0005	<0.001	<0.001	0.006	<0.002	0.002	0.0007	0.0007	0.0008	0.0005	0.0012			BD - 0.006		
Zinc	mg/L	0.0185	0.01	0.003	0.005	0.007	0.014	<0.005	<0.005	<0.001	0.001	0.002	<0.001	0.004			BD - 0.0185	0.03	
Zirconium	mg/L	----	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			BD - 0.002		
<b>Dissolved Metals</b>																			
Aluminum	mg/L	----	<0.005	<0.005	0.059	0.017	0.035	<0.01	<0.01	0.016	----	0.028	0.028	0.015			BD - 0.059		
Antimony	mg/L	----	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0002	----	<0.002	<0.002	<0.002			BD		
Arsenic	mg/L	----	<0.05	0.12	<0.04	<0.04	<0.05	<0.02	<0.02	0.0005	----	0.0004	0.0004	0.0006			BD - 0.12		
Barium	mg/L	----	0.036	0.09	0.01	0.039	0.061	0.027	0.025	0.03	----	0.024	0.021	0.032	0.036		0.01 -		



Water Quality Data for Station W-9 (Williams Creek U/S of Access Road) from 1989 to 2006

Parameter	Units	Sample Date														Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-89	Aug-91	Dec-91	May-92	Jul-92	Oct-92	May-94	Aug-94	Sep-97	Oct-99 <sup>1</sup>	Aug-05	Oct-05	Mar-06	Jun-06			
<b>In Situ Parameters</b>																		
Water Temperature	°C	----	----	----	----	----	----	7.7	7.6	----	----	----	6.53	----	----	6.53	6.53	6.5 - 9.0
pH	umho/cm	----	----	----	----	----	----	316.91	160	----	----	240	180	974	----	6.53	374	160 - 974
Conductivity	umho/cm	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Total Suspended Solids	ppm	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Dissolved Oxygen	mg/L	----	----	----	----	----	----	4.91	----	----	----	----	----	----	----	----	----	----
Oxygen Reduction Potential	mV	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
<b>Physical Parameters</b>																		
pH	umho/cm	7.8	8.2	7.9	7.5	7.9	7.6	7.8	7.94	7.63	----	----	7.82	7.91	7.8	7.82	7.5 - 8.2	6.5 - 9.0
Conductivity	umho/cm	505	275	635	85	130	475	200	520	195	----	----	271	225	1520	206	435	406
Total Suspended Solids	mg/L	<5	<5	15	<5	<5	<5	<5	----	72	----	----	<5	<2	6	6	24.8	85 - 1520
Total Dissolved Solids	mg/L	----	----	----	----	----	----	160	----	----	----	150	130	----	----	----	147	BD - 72
Turbidity	NTU	<1	7	2	<1	<1	<1	1	7.96	----	----	----	1.3	1.4	0.9	3.08	130 - 160	BD - 7
Hardness as CaCO <sub>3</sub>	mg/L	185.3	142	297	31.2	95.6	194	78.1	223.6	135	----	127	110	737	100	203	190	31.2 - 737
<b>Organic Parameters</b>																		
Total Inorganic Carbon	mg/L	----	----	----	----	----	----	----	----	----	----	----	----	----	17.4	46.9	32.2	17.4 - 46.9
Total Organic Carbon	mg/L	----	----	----	----	----	----	----	----	----	----	----	----	----	16.3	8	12.2	8 - 16.3
Dissolved Organic Carbon	mg/L	----	----	----	----	----	----	----	----	----	----	----	----	----	16.7	8.3	11.6	8.3 - 16.7
<b>Anions</b>																		
Alkalinity as CaCO <sub>3</sub>	mg/L	170	157	255	38	84	188	102	223	127	----	125	100	----	----	143	38 - 255	----
Hydroxide as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	----	<1	----	<5	<5	----	----	----	----	BD
Carbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	<5	----	<1	----	<6	<6	----	----	----	----	BD
Bicarbonate as CaCO <sub>3</sub>	mg/L	----	----	----	----	----	----	102	----	127	----	152	122	----	----	126	102 - 152	----
Chloride	mg/L	2	----	----	----	----	----	0.5	1.69	1.4	----	1.4	0.7	----	----	1.28	0.5 - 2	----
Fluoride	mg/L	<1	----	----	----	----	----	<1	----	0.23	----	----	----	----	----	----	----	BD - 0.23
Sulphate	mg/L	54	17	50.8	1.8	6.2	47.8	14.4	56.27	21	----	18	17	----	----	27.6	1.8 - 54	----
<b>Nutrients</b>																		
Ammonia-Nitrogen	mg/L	0.08	<0.05	0.44	<0.05	<0.05	0.06	<0.05	0.0173	----	----	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	BD - 0.44
Nitrate-Nitrogen	mg/L	<0.1	<0.1	<0.05	<0.05	<0.05	<0.2	<0.05	0.005	0.007	----	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	BD - 0.007
Nitrite-Nitrogen	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.002	----	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.06
Total Phosphorous	mg/L	----	----	0.012	0.009	0.009	0.009	<0.005	0.0167	----	----	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	BD - 0.029
Orthophosphate	mg/L	----	----	----	----	----	----	----	----	----	----	0.07	0.09	----	----	0.09	0.07 - 0.1	----
<b>Total Metals</b>																		
Aluminum	mg/L	<0.02	<0.005	<0.005	0.088	0.057	0.026	0.01	0.0063	0.569	<0.06	0.023	0.029	0.017	0.162	0.055	0.055	BD - 0.569
Antimony	mg/L	<0.005	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	0.0007	0.0007	<0.02	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	BD - 0.0007
Arsenic	mg/L	<0.02	<0.05	0.16	<0.04	<0.04	<0.04	<0.02	0.06	0.0011	<0.02	0.0005	0.0004	0.0013	0.0005	0.0006	0.0006	BD - 0.16
Barium	mg/L	0.043	0.049	0.082	0.013	0.034	0.067	0.028	0.0703	0.0556	0.04	0.041	0.03	0.224	0.039	0.064	0.059	0.013 - 0.224
Beryllium	mg/L	<0.0001	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.001	<0.0005	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	BD
Bismuth	mg/L	----	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	----	<0.0005	<0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	BD
Boron	mg/L	0.004	----	----	----	----	----	0.03	0.006	<0.04	0.009	0.006	0.004	0.011	0.021	0.021	0.021	BD - 0.104
Cadmium	mg/L	<0.0002	<0.0003	<0.0003	0.0004	<0.0003	<0.0004	<0.0005	0.006	<0.0005	<0.002	<0.0001	<0.0001	0.00008	<0.0001	<0.0001	<0.0001	BD - 0.0004
Calcium	mg/L	44.2	35.6	63	9.8	25.7	46.5	20.9	57.033	34.3	46.8	34.5	29.2	25.7	52.5	46.3	46.3	8.8 - 147
Chromium	mg/L	0.008	0.007	0.007	<0.001	<0.001	<0.001	<0.001	0.0177	0.0009	<0.002	<0.0005	<0.0005	0.0008	<0.0005	0.0008	0.0008	0.001 <sup>3</sup>
Cobalt	mg/L	<0.0005	<0.001	0.004	<0.001	0.001	0.003	<0.001	0.006	0.0005	<0.004	<0.001	<0.001	0.0001	0.0002	<0.0001	<0.0001	BD - 0.004
Copper	mg/L	<0.0005	<0.001	<0.001	0.002	0.003	0.027	0.001133	0.0025	<0.003	0.001	0.002	0.003	0.002	0.001	0.001	0.001	BD - 0.027
Iron	mg/L	0.199	0.138	3.17	0.117	0.137	0.197	0.137	0.1743	0.91	0.08	0.1	0.1	0.1	0.3	0.419	0.08 - 3.17	0.3
Lead	mg/L	<0.002	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.06	0.00049	<0.03	<0.001	<0.001	0.0004	0.0001	0.0002	0.0002	BD - 0.00049
Lithium	mg/L	0.29	<0.06	<0.05	<0.05	<0.05	<0.05	<0.002	----	0.001	----	0.001	0.002	0.014	0.001	0.002	0.002	BD - 0.29
Magnesium	mg/L	18.2	13.8	22.7	3.1	7.5	19.2	6.6	20.033	11.1	11.2	10	8.2	87.1	8.3	17.4	17.6	3.1 - 88.2
Manganese	mg/L	0.015	0.016	1.3	0.003	<0.001	0.044	0.023	0.0273	0.0713	0.007	0.01	0.006	0.125	0.019	0.026	0.026	BD - 3
Mercury	mg/L	<0.005	----	----	----	----	----	----	<0.0005	<0.0005	----	----	----	----	----	----	----	BD
Molybdenum	mg/L	<0.001	<0.005	0.007	<0.003	<0.004	<0.004	<0.005	0.01	0.00049	<0.005	<0.001	<0.001	0.004	<0.001	0.001	0.001	BD - 0.007
Nickel	mg/L	0.0012	0.005	0.007	<0.001	0.006	0.003	0.002	0.02	0.0018	<0.01	0.0008	0.0008	<0.0005	0.0006	0.001	0.001	BD - 0.007
Phosphorous	mg/L	<0.05	<0.02	0.37	0.03	<0.02	0.02	<0.05	0.1	<0.3	<0.1	----	----	----	----	<0.1	<0.1	BD - 0.37
Potassium	mg/L	1.3	0.82	1.91	0.85	0.45	1.64	1.1	1.4	<2	<0.5	0.5	0.4	6.1	0.7	1.2	1.2	BD - 15.8
Selenium	mg/L	<0.005	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	0.06	<0.001	<0.03	<0.002	<0.002	0.0006	<0.0002	<0.0002	<0.0002	BD - 0.0009
Silicon	mg/L	----	9.9	4.3	8.15	25.5	46.3	20.1	7.057	34.3	50.8	33.4	31.5	150	6.02	8.66	8.66	8.16
Silver	mg/L	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0063	0.00001	<0.03	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	BD - 0.0001
Sodium	mg/L	19.1	14.2	7	2.13	5.98	22.9	6.72	24.033	11	10	9.8	8.8	100	8.5	20.4	19.1	2.13 - 100
Strontium	mg/L	0.583	0.4	0.56	0.078	0.28	0.54	0.238	0.828	0.294	0.47	0.347	0.266	2.77	0.255	0.654	0.571	0.078 - 2.77
Sulfur	mg/L	----	----	----	----	----	----	3.71	----	----	14.8	5.9	5.2	61.7	6.1	20.1	16.8	3.71 - 61.7
Tin	mg/L	----	----	----	----	----	----	<0.01	0.006	<0.0001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	BD
Thallium	mg/L	----	----	----	----	----	----	----	----	<0.0005	<0.03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	BD
Thorium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	BD - 0.01
Titanium	mg/L	<0.001	<0.001	0.007	0.004	0.002	0.001	0.003	0.004	<0.01	<0.003	0.0012	<0.0005	0.0039	0.007	0.0042	0.0042	BD - 0.007
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	0.00061	<0.005	<0.0005	<0.0005	0.0068	<0.0005	0.0016	0.0016	BD - 0.0068
Vanadium	mg/L	<0.0002	0.0038	<0.0005	0.001	<0.001	0.016	0.002	0.01	0.003	<0.003	0.0009	0.0006	0.0014	0.0018	0.0012	0.0012	BD - 0.016
Zinc	mg/L	0.0064	0.008	<0.001	0.007	0.003	0.017	<0.005	0.0097	0.005	<0.001	<0.001	<0.001	0.011	0.001	0.003	0.003	BD -

Water Quality Data for Station W-10 (Williams Creek U/S of Yukon River) from 1989 to 2006

Parameter	Units	Sample Date											Average	Range	CCME Guidelines Freshwater Aquatic Life	
		Aug-91	Dec-91	May-92	Jul-92	Oct-92	Aug-94	Oct-99 <sup>1</sup>	Oct-05	Mar-06	Jun-06	Jul-06				
<b>In Situ Parameters</b>																
Water Temperature	°C						4.54				4		4.27	4 - 4.54		
pH							8.08		8.5	6.6	7.2	8.65	7.81	6.6 - 8.65	6.5 - 9.0	
Conductivity	umho/cm						240.97		220	247	757	720	437	220 - 757		
Total Suspended Solids	ppm										375	345	360	345 - 375		
Dissolved Oxygen	mg/L										9.3	6.74	8.02	6.74 - 9.3		
Oxygen Reduction Potential	mV										158	74	116	74 - 158		
Mean Depth	m								0.11							
Stream Width	m								2.8							
Mean Velocity	m/sec								0.02							
Discharge	(m <sup>3</sup> /sec)								0.01							
<b>Physical Parameters</b>																
pH		8.1	8.1	7.6	8	7.7	8.13		8.08	7.29			7.88	7.29 - 8.13	6.5 - 9.0	
Conductivity	umho/cm	188	204	97	140	355	386		257	320	280	366	259	97 - 355		
Total Suspended Solids	mg/L	<5	<5	25	20	<5				<2	4	<2		BD - 25		
Total Dissolved Solids	mg/L								140	0.6				0.6 - 140		
Turbidity	NTU	2	1	7	6	<1	0.2			155	1.6	0.6		BD - 155		
Hardness as CaCO <sub>3</sub>	mg/L	105	171	58.1	102	156	187		130		142	184	137	58.1 - 184		
<b>Organic Parameters</b>																
Total Inorganic Carbon											22.5	36.4	29.5	22.5 - 36.4		
Total Organic Carbon											14.2	12.2	13.2	12.2 - 14.2		
Dissolved Organic Carbon										6.4	15.1	12.2	11.2	6.4 - 15.1		
<b>Anions</b>																
Alkalinity as CaCO <sub>3</sub>	mg/L	103	166	59	94	144	156		111				119	59 - 166		
Sulphate	mg/L	15.5	12.2	4.9	9.5	34.8	50		22				21.3	4.9 - 34.8		
<b>Nutrients</b>																
Ammonia-Nitrogen	mg/L	<0.05	0.05	<0.05	<0.05	<0.05	0.004					0.03	<0.05	BD - 0.05	1.04 - 2.33 <sup>2</sup>	
Nitrate-Nitrogen	mg/L	<0.1	0.08	<0.05	<0.1	<0.20	0.005		0.01			0.03		BD - 0.08		
Nitrite-Nitrogen	mg/L	<0.003	<0.5	<0.03	<1	<2.0	0.045		<0.005			0.03		BD - 0.03	0.06	
Total Phosphorous	mg/L		0.015	0.014	0.04	0.025	0.005				<0.1	<0.1	0.033	0.014 - 0.1		
Orthophosphate	mg/L								0.08			0.09	0.085	0.08 - 0.09		
<b>Total Metals</b>																
Aluminum	mg/L	<0.005	<0.005	<b>0.389</b>	<b>0.463</b>	0.043	0.06	<0.06	<b>0.194</b>	<b>0.180</b>	<b>0.132</b>	0.04		BD - 0.463	0.005 - 0.1	
Antimony	mg/L	<0.05	<0.05	<0.02	<0.02	<0.02		<0.02	<0.0002	0.016	<0.0002	<0.0002		BD - 0.016		
Arsenic	mg/L	<0.05	<b>0.08</b>	<0.04	<0.04	<0.05	0.06	<0.04	0.0004	<b>0.034</b>	0.0005	0.0004		BD - 0.08	0.005	
Barium	mg/L	0.026	0.146	0.026	0.034	0.055	0.05	0.041	0.034	0.077	0.039	0.044	0.052	0.026 - 0.146		
Beryllium	mg/L	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	0.001	<0.0002	<0.0001	0.0002	<0.0001	<0.0001		BD - 0.0002		
Bismuth	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02		<0.02	<0.0005	<b>0.008</b>	<0.0005	<0.0005		BD - 0.008		
Cadmium	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	<b>0.0001</b>	<b>0.002</b>	<0.00001	<b>0.037</b>	<b>0.014</b>			BD - 0.037	0.000017	
Calcium	mg/L	32.1	59	16.3	29.9	47.9	56.9	38.2	37.6	0.030	<0.00001	55.1		16.3 - 59		
Chromium	mg/L	<b>0.009</b>	<b>0.004</b>	<0.001	<0.001	<0.001	0.006	<0.002	0.0008	0.003	<0.0005	<0.0005		BD - 0.009	0.001 <sup>3</sup>	
Cobalt	mg/L	<0.001	0.002	<0.001	<0.001	0.002	0.006	<0.004	0.0001	0.001	0.001	<0.0001		BD - 0.002		
Copper	mg/L	<0.001	<0.001	0.001	<b>0.005</b>	<b>0.005</b>	0.0024	<0.003	0.002	0.002	0.002	0.002		BD - 0.005	0.002 - 0.004	
Iron	mg/L	0.163	0.07	<b>0.454</b>	<b>0.824</b>	0.257	0.026	0.1	<b>0.4</b>	0.002	0.002	0.1	0.240	0.002 - 0.824	0.3	
Lead	mg/L	<0.004	<0.004	<0.004	<0.004	<0.005	0.0007	<0.03	0.0002	0.002	0.0001	<0.0001		BD - 0.002	0.001 - 0.007	
Lithium	mg/L	<0.06	<0.05	<0.05	<0.05	<0.05			0.002	0.026	0.002	0.002		BD - 0.026		
Magnesium	mg/L	6.79	8.61	4.53	6.71	12	13.9	14.6	7.9	0.010	9	11.6	8.70	0.010 - 14.6		
Manganese	mg/L	0.004	0.034	0.024	0.027	0.018	0.004	0.014	0.039	0.013	0.01	0.005	0.017	0.004 - 0.034		
Molybdenum	mg/L	<0.005	<0.003	<0.003	<0.003	<0.004	0.01	<0.005	0.001	0.002	0.001	0.001		BD - 0.002	0.073	
Nickel	mg/L	0.006	0.004	<0.001	0.006	0.003	0.02	<0.01	0.0011	0.004	0.0006	0.0007		BD - 0.006	0.025 - 0.15	
Phosphorous	mg/L	<0.02	<0.02	0.02	0.04	0.03	0.1	<0.1		0.022		<0.1		BD - 0.04		
Potassium	mg/L	0.41	1.24	1.4	0.62	1.3	1	<0.5	0.6	0.994	0.8	1		BD - 1.4		
Selenium	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	0.06	<0.03	<0.0002	0.008	<0.0002	<0.0002		BD - 0.008	0.001	
Silicon	mg/L	13.2	1.4	6.18	12.2	10	7.46	<0.03	8.37	8.6	6.11	6.82		BD - 13.2		
Silver	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0006	<b>15.8</b>	<0.0002	<b>3.199</b>	<0.0001	<0.0001		BD - 15.8	0.0001	
Sodium	mg/L	7.77	2.57	3.49	6.02	11.1	10	0.434	8	3.934	8.2	9.9	6.49	0.434 - 11.1		
Strontium	mg/L	0.24	0.166	0.132	0.29	0.47	0.665	<0.003	0.325	0.260	0.342	0.55		BD - 0.55		
Thallium	mg/L								<0.00005		<0.00005	<0.00005		BD	0.0008	
Thorium	mg/L	<0.02	<0.02	<0.005	<0.005	<0.01				0.006				BD - 0.006		
Titanium	mg/L	0.002	0.001	0.017	0.02	<0.001	0.002	<0.003	<0.0005	0.008	0.0059	0.0024		BD - 0.02		
Uranium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02		<0.003	0.0007	0.010	0.001	0.0017		BD - 0.010		
Vanadium	mg/L	0.0021	<0.0005	<0.001	<0.001	0.01	0.01		0.0012	0.0027	0.0012	0.0007		BD - 0.01		
Zinc	mg/L	0.003	<b>0.195</b>	0.007	0.01	0.008	0.003	<0.01	0.001	<b>0.045</b>	0.002	0.002		BD - 0.195	0.03	
Zirconium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001		<0.003	<0.001	0.001	<0.001	<0.001		BD - 0.001		
<b>Dissolved Metals</b>																
Aluminum	mg/L	<0.005	<0.005	0.08	0.042	0.043	0.05	<0.02	0.024	0.011	0.018	0.008		BD - 0.08		
Antimony	mg/L	<0.05	<0.05	<0.02	<0.02	<0.02		<0.015	<0.0002	<0.0002	<0.0002	<0.0002		BD		
Arsenic	mg/L	<0.05	0.06	<0.04	<0.04	<0.05	0.05	<0.04	0.0004	0.0005	0.0004	0.0005		BD - 0.06		
Barium	mg/L	0.026	0.038	0.017	0.03	0.054	0.047	0.043	0.034	0.053	0.035	0.042	0.038	0.017 - 0.054		
Beryllium	mg/L	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.001		
Bismuth	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02		<0.02	<0.0005	<0.0005	<0.0005	0.0008		BD - 0.0008		
Cadmium	mg/L	<0.0003	<0.0003	<0.0003	<0.0003	<0.0004	0.0001	<0.002	<0.00001	0.00002	0.012	0.00001		BD - 0.012		
Calcium	mg/L	31	57.1	15.8	29.5	43.5	52.7	42	37.2	44.3	<0.00001	52.6		BD - 57.1		
Chromium	mg/L	<0.001	0.004	<0.001	<0.001	<0.001	0.005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005		BD - 0.004		
Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.005	<0.003	<0.0001	0.0001	<0.0001	<0.0001		BD - 0.001		
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	0.005	<b>0.0024</b>	<0.001	0.001	<0.001	0.002	0.002		BD - 0.005		
Iron	mg/L	0.08	0.022	0.171	0.164	0.129	0.008	0.094	0.15	0.19	0.05	0.106		0.022 - 0.19		
Lead	mg/L	<0.004	<0.004	<0.004	<0.004	<0.005	0.0005	<0.02	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.0005		
Lithium	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05			0.001	0.002	0.001	0.002		BD - 0.002		
Magnesium	mg/L	6.63	6.92	4.38	6.65	11	13	16.1	8.3	10.8	8.6	12.8	9.56	4.38 - 16.1		
Manganese	mg/L	0.001	0.002	<0.001	<0.001	0.016	0.003	0.016	0.014	0.01	0.01	<0.005		BD - 0.010		
Molybdenum	mg/L	<0.005	<0.005	<0.003	<0.003	<0.004	0.01	<0.004	0.001	0.001	0.002	0.001		BD - 0.01		
Nickel	mg/L	0.004	<0.001	<0.001	0.004	0.003	0.02	<0.008	0.0008	<0.0005	<0.0005	0.0006		BD - 0.02		
Phosphorous	mg/L	<0.02	<0.02	0.02	0.04	0.02	0.1	<0.04						BD - 0.04		
Potassium	mg/L	0.59	0.64	1.25	0.5	1.32	1.1	<0.4	<0.4	0.7	0.5	1		BD - 1.32		
Selenium	mg/L	<0.01	<0.01	<0.02	<0.02	<0.02	0.05	<0.03	<0.0002	<0.0002	<0.0002	<0.0002		BD - 0.05		
Silicon	mg/L	10.4	1.2	5.21	11.5	8.9	7.14	<0.01	8.38	6.64	6.29	7.44		BD - 11.5		
Silver	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005	17.4	<0.0001	<0.0001	<0.0001	<0.0001		BD -		

Water Quality Data for Station W-11 (Nancy Lee Creek) from 1989 to 2006

Parameter	Units	Sample Date							Average	Range	CCME Guidelines Freshwater Aquatic Life
		Dec-91	May-92	Oct-92	Aug-94	Oct-05	Jun-06	Jul-06			
<b>In Situ Parameters</b>											
Water Temperature	deg C				4.93		5.5		5.22	4.93 - 5.5	
pH		----	----	----	7.66	7.45	7.85	7.86	7.71	7.45 - 7.86	6.5 - 9.0
Conductivity	umho/cm	----	----	----	231.93	210	547	808	449	210 - 808	
Total Suspended Solids	ppm						295	405	350	295 - 405	
Dissolved Oxygen	mg/L						8.65	8.51	8.58	8.51 - 8.65	
Oxygen Reduction Potential	mV						161	36	98.5	36 - 161	
<b>Physical Parameters</b>											
pH		8.1	7.4	7.8	7.89	8.05			7.85	7.4 - 8.1	6.5 - 9.0
Conductivity	umho/cm	350	84	320	367	232	235	311	271	84 - 431	
Total Suspended Solids	mg/L	<5	8	<5	----	----	9	<2		BD - 9	
Total Dissolved Solids	mg/L	----	----	----	----	130				130	
Turbidity	NTU	1	5	<1	0.5	----	2.5	0.9		BD - 5	
Hardness as CaCO <sub>3</sub>	mg/L	169	47	151	175	120	120	159	134	47 - 175	
<b>Organic Parameters</b>											
Total Inorganic Carbon							18.5	33	25.8	18.5 - 33	
Total Organic Carbon							17.4	16.3	16.9	16.3 - 17.4	
Dissolved Organic Carbon							16.8	16.2	16.5	16.2 - 16.8	
<b>Anions</b>											
Alkalinity as CaCO <sub>3</sub>	mg/L	135	50	143	145	106			116	50 - 143	
Chloride	mg/L	----	----	----	1.44	1.2				1.2 - 1.44	
Fluoride	mg/L	----	----	----	----	----					
Sulphate	mg/L	49.2	2.6	29.2	47.4	15			28.7	2.6 - 49.2	
<b>Nutrients</b>											
Ammonia-Nitrogen	mg/L	<0.05	<0.05	<0.05	0.013	<0.05	<0.05	<0.05		BD - 0.013	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	<0.2	<0.05	<0.2	0.005	0.02				BD - 0.02	
Nitrite-Nitrogen	mg/L	<2	<0.03	<2	0.011	<0.005		0.02		BD - 0.02	0.06
Total Phosphorous	mg/L	0.01	0.012	0.006	0.007	0.1	<0.1	<0.1		BD - 0.1	
Orthophosphate	mg/L	----	----	----	----	0.08		0.09		0.08 - 0.09	
<b>Total Metals</b>											
Aluminum	mg/L	<0.005	<b>0.13</b>	0.055	0.06	<b>0.129</b>	<b>0.395</b>	0.034		BD - 0.395	0.005 - 0.1
Antimony	mg/L	<0.05	<0.02	<0.02		<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	<b>0.12</b>	<0.04	<0.05	<b>0.06</b>	0.0006	0.0006	0.0004		BD - 0.12	0.005
Barium	mg/L	0.04	0.016	0.046	0.046	0.029	0.037	0.045	0.037	0.016 - 0.046	
Beryllium	mg/L	<0.0005	<0.0002	<0.0002	0.001	<0.0001	<0.0001	<0.0001		BD - 0.001	
Bismuth	mg/L	<0.01	<0.02	<0.02	----	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	----	----	----	----	0.006	0.01	0.016	0.011	0.006 - 0.016	
Cadmium	mg/L	<0.0003	<0.0003	<0.0004	<b>0.006</b>	<0.0001	<b>0.00001</b>	<0.00001		BD - 0.006	0.000017
Calcium	mg/L	53.9	13.8	42.6	54.2	34.5	34.7	57	41.5	13.8 - 53.9	
Chromium	mg/L	<b>0.004</b>	<0.001	<0.001	<b>0.011</b>	0.0006	0.0008	0.0007		BD - 0.004	0.001 <sup>2</sup>
Cobalt	mg/L	<0.001	<0.001	0.002	0.006	0.0001	0.0003	<0.0001		BD - 0.006	
Copper	mg/L	<0.001	0.003	<b>0.005</b>	<b>0.006</b>	0.002	0.003	0.002		BD - 0.006	0.002 - 0.004
Iron	mg/L	<0.005	0.161	0.268	0.082	<b>0.4</b>		<0.1		BD - 0.268	0.3
Lead	mg/L	<0.004	<0.004	<0.005	0.0009	<0.0001	0.0002	<0.0001		BD - 0.0009	0.001 - 0.007
Lithium	mg/L	<0.05	<0.05	<0.05	----	0.002	0.001	0.002		BD - 0.002	
Magnesium	mg/L	11.3	3.4	11.5	12.4	6.5	6.8	12	9.13	3.4 - 12.4	
Manganese	mg/L	0.003	0.007	0.083	0.004	0.067	0.027	<0.005		BD - 0.083	
Mercury	mg/L	----	----	----	----	----	----	----			0.0001
Molybdenum	mg/L	<0.05	<0.003	<0.004	0.01	<0.001	<0.001	0.002		BD - 0.01	0.073
Nickel	mg/L	0.002	<0.001	<0.02	0.02	0.0013	0.001	0.0011		BD - 0.002	0.025 - 0.15
Phosphorous	mg/L	<0.02	<0.02	<0.02	0.1	----	----	<0.1		BD - 0.1	
Potassium	mg/L	1.13	1.3	1	1	0.5	0.7	1	0.947	0.5 - 1.13	
Selenium	mg/L	<0.01	<0.02	<0.02	<b>0.06</b>	<0.0002	<0.0002	<0.0002		BD - 0.06	0.001
Silicon	mg/L	3.6	4.92	10	7.99	8.31	6.63	6.85	6.90	3.6 - 10	
Silver	mg/L	<0.001	<0.001	<0.001	<b>0.0006</b>	<0.0001	<0.0001	<0.0001		BD - 0.0006	0.0001
Sodium	mg/L	9.29	2.78	9.69	9.3	7	7	10.4	7.92	2.78 - 10.4	
Strontium	mg/L	0.39	0.088	0.33	0.6	0.23	0.244	0.614	0.357	0.088 - 0.614	
Thorium	mg/L	<0.02	<0.005	<0.01	----	----	----	----		BD	
Titanium	mg/L	0.002	0.003	<0.001	0.003	<0.0005	0.0172	0.0023		BD - 0.0172	
Uranium	mg/L	<0.02	<0.02	<0.02	----	0.0005	0.0008	0.0017		BD - 0.0017	
Vanadium	mg/L	<0.0005	<0.001	0.008	0.01	0.001	0.0021	0.0007		BD - 0.008	
Zinc	mg/L	0.004	0.007	0.003	0.003	0.001	0.002	0.003	0.004	0.001 - 0.007	0.03
Zirconium	mg/L	<0.001	<0.001	<0.001	----	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>											
Aluminum	mg/L	<0.005	0.084	0.05	0.05	0.029	0.024	0.015		BD - 0.084	
Antimony	mg/L	<0.05	<0.02	<0.02	----	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.1	<0.04	<0.05	0.05	0.0005	0.0005	0.0006		BD - 0.05	
Barium	mg/L	0.035	0.014	0.045	0.042	0.028	0.029	0.036	0.033	0.014 - 0.045	
Beryllium	mg/L	<0.0005	<0.0002	<0.0002	0.001	<0.0001	<0.0001	<0.0001		BD - 0.001	
Bismuth	mg/L	<0.01	<0.02	<0.02	----	<0.0005	<0.0005	0.0008		BD - 0.0008	
Boron	mg/L	----	----	----	----	0.005	0.007	0.011	0.008	0.005 - 0.011	
Cadmium	mg/L	<0.0003	<0.0003	<0.0004	0.0001	<0.00001	<0.00001	0.00001		BD - 0.0001	
Calcium	mg/L	50.1	13.2	41.4	51.2	35.3	35.4	47.1	39.1	13.2 - 51.2	
Chromium	mg/L	0.003	<0.001	<0.001	0.008	<0.0005	<0.0005	<0.0005		BD - 0.008	
Cobalt	mg/L	<0.001	<0.001	0.001	0.005	<0.0001	<0.0001	<0.0001		BD - 0.005	
Copper	mg/L	<0.001	<0.001	0.004	0.0029	0.001	0.002	0.002		BD - 0.004	
Iron	mg/L	----	0.115	0.2	0.029	0.22		0.1	0.1328	0.1 - 0.22	
Lead	mg/L	<0.004	<0.004	<0.005	0.0005	<0.0001	<0.0001	<0.0001		BD - 0.0005	
Lithium	mg/L	<0.05	<0.05	<0.05	----	0.001	0.001	0.002		BD - 0.002	
Magnesium	mg/L	10.7	3.24	11.4	11.4	7	7	10	8.68	3.24 - 11.4	
Manganese	mg/L	<0.001	<0.001	0.08	0.001	0.028	0.005	<0.005		BD - 0.08	
Mercury	mg/L	----	----	----	----	----	----	----			
Molybdenum	mg/L	<0.005	<0.003	<0.004	0.01	<0.001	<0.001	<0.001		BD - 0.01	
Nickel	mg/L	0.002	<0.001	0.003	0.02	0.0011	0.0006	0.001		BD - 0.003	
Phosphorous	mg/L	<0.02	<0.02	<0.02	0.1	----	----	----		BD - 0.1	
Potassium	mg/L	0.92	1.19	0.99	0.9	<0.4	0.7	0.7		0.7 - 1.19	
Selenium	mg/L	<0.01	<0.02	<0.02	0.05	<0.0002	<0.0002	<0.0002		BD - 0.05	
Silicon	mg/L	3.3	4.47	9.6	7.72	8.78	6.15	6.36	6.63	3.3 - 9.6	
Silver	mg/L	<0.001	<0.001	<0.001	0.0005	<0.0001	<0.0001	<0.0001		BD - 0.0005	
Sodium	mg/L	8.24	2.74	9.6	8.8	6.8	7.2	8.2	7.37	2.74 - 9.6	
Strontium	mg/L	0.37	0.084	0.33	0.573	0.238	0.258	0.432	0.326	0.084 - 0.573	
Thorium	mg/L	<0.02	<0.005	<0.01	----	----	----	----		BD	
Titanium	mg/L	<0.001	0.001	<0.001	0.002	0.0013	0.001	0.0013		BD - 0.002	
Uranium	mg/L	<0.02	<0.02	<0.02	----	0.0005	0.0008	0.0012		BD - 0.0012	
Vanadium	mg/L	<0.0005	<0.001	0.006	0.01	0.0009	0.0012	0.0008		BD - 0.006	
Zinc	mg/L	<0.001	0.003	0.006	0.002	<0.001	0.002	0.003		BD - 0.003	
Zirconium	mg/L	<0.001	<0.001	<0.001	----	----	----	----		BD	

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

August 94 values: Ag, Cu, Pb, have both ICP and GF measurements; only GF recorded here.

Water Quality Data for Station W-12 (Williams Creek D/S of Confluence with Nancy Lee Creek) from 2006

Parameter	Units	Sample Date				Average	Range	CCME Guidelines Freshwater Aquatic Life
		Oct-05	Mar-06	Jun-06	Jul-06			
<b>In Situ Parameters</b>								
Water Temperature	deg C			5		5.0		
pH		8.25	6.57	8.08	8.49	7.85	6.57 - 8.49	6.5 - 9.0
Conductivity	umho/cm	250	644	721	918	633	250 - 918	
Total Suspended Solids	ppm			360	475	418	360 - 475	
Dissolved Oxygen	mg/L			6.97	6.19	6.58	6.19 - 6.97	
Oxygen Reduction Potential	mV			159	32	95.5	32 - 159	
<b>Physical Parameters</b>								
pH		8.06	7.7			7.88	7.7 - 8.06	6.5 - 9.0
Conductivity	umho/cm	253	690	264	370	394	253 - 690	
Total Dissolved Solids	mg/L	140	3	5		49.3	3 - 140	
Hardness as CaCO <sub>3</sub>	mg/L	130	360	130	179	200	130 - 360	
<b>Organic Parameters</b>								
Total Inorganic Carbon				20.9	35.8	28.4	20.9 - 35.8	
Total Organic Carbon				14.7	12.3	13.5	12.3 - 14.7	
Dissolved Organic Carbon			6.8	15	12	11.3	6.8 - 15	
<b>Anions</b>								
Alkalinity as CaCO <sub>3</sub>	mg/L	107				107	107	
Chloride	mg/L	1.2				1.2	1.2	
Sulphate	mg/L	22				22.0	22	
<b>Nutrients</b>								
Ammonia-Nitrogen	mg/L	<0.05		<0.05	<0.05		BD	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	0.02		0.03	0.04	0.030	0.02 - 0.04	
Nitrite-Nitrogen	mg/L	<0.005		0.03	0.04		BD - 0.04	0.06
Total Phosphorous	mg/L	0.1		<0.1	<0.1		BD - 0.01	
Orthophosphate	mg/L	0.08			0.1	0.09	0.08 - 0.1	
<b>Total Metals</b>								
Aluminum	mg/L	<b>0.156</b>	0.01	<b>0.389</b>	0.038	0.148	0.01 - 0.389	0.005 - 0.1
Antimony	mg/L	<0.0002	<0.0002	0.0003	<0.0002		BD - 0.0003	
Arsenic	mg/L	0.0005	0.0005	0.0008	0.0004	0.0006	0.0004 - 0.0008	0.005
Barium	mg/L	0.033	0.085	0.044	0.035	0.049	0.033 - 0.085	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.007	0.058	0.012	0.01	0.022	0.007 - 0.058	
Cadmium	mg/L	<0.00001	<b>0.00001</b>	<b>0.00012</b>	<0.00001		BD - 0.00012	0.000017
Calcium	mg/L	36.8	97.8		50.5	61.7	36.8 - 97.8	
Chromium	mg/L	0.0007	<0.0005	<b>0.0019</b>	<0.0005		BD - 0.0007	0.001 <sup>2</sup>
Cobalt	mg/L	0.0001	<0.0001	0.0005	<0.0001		BD - 0.0005	
Copper	mg/L	0.002	0.004	<b>0.01</b>	0.002	0.005	0.002 - 0.01	0.002 - 0.004
Iron	mg/L	<b>0.4</b>	<0.1		0.1		BD - 0.4	0.3
Lead	mg/L	0.0001	0.0002	0.0022	<0.0001		BD - 0.0022	0.001 - 0.007
Lithium	mg/L	0.002	0.006	0.002	0.001	0.003	0.002 - 0.006	
Magnesium	mg/L	7.7	26.5	8.4	9.3	13.0	7.7 - 26.5	
Manganese	mg/L	0.048	0.012	0.015	<0.005		BD - 0.048	
Molybdenum	mg/L	0.001	0.002	0.002	<0.001		BD - 0.002	0.073
Nickel	mg/L	0.0011	<0.0005	0.0007	0.001		BD - 0.0011	0.025 - 0.15
Potassium	mg/L	0.6	2	0.9	0.8	1.08	0.6 - 2	
Selenium	mg/L	<0.0002	0.0006	<0.0002	<0.0002		BD - 0.0006	0.001
Silicon	mg/L	8.26	9.53	6.3	7.21	8.03	6.3 - 9.53	
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	7.7	17.4	8.1	8.8	10.5	7.7 - 17.4	
Strontium	mg/L	0.304	1.44	0.317	0.412	0.618	0.304 - 1.44	
Titanium	mg/L	<0.0005	0.0025	0.0095	0.0021		BD - 0.0095	
Uranium	mg/L	0.0006	0.0052	0.0008	0.0013	0.0020	0.0006 - 0.0052	
Vanadium	mg/L	0.0011	0.0007	0.0014	0.0007	0.0010	0.0007 - 0.0014	
Zinc	mg/L	0.001	0.003	0.002	0.003	0.002	0.001 - 0.003	0.03
Zirconium	mg/L	<0.001	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>								
Aluminum	mg/L	0.025	<0.005	0.389	0.008		BD - 0.389	
Antimony	mg/L	<0.0002	<0.0002	0.0003	<0.0002		BD - 0.0003	
Arsenic	mg/L	0.0005	0.0004	0.0008	0.0004	0.0005	0.0004 - 0.0008	
Barium	mg/L	0.032	0.086	0.044	0.048	0.053	0.032 - 0.086	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	0.007	0.056	0.012	0.015	0.023	0.007 - 0.056	
Cadmium	mg/L	<0.00001	0.00002	0.00012	0.00002		BD - 0.00012	
Calcium	mg/L	37.4	97.9	36.9	52.8	56.3	37.4 - 97.9	
Chromium	mg/L	<0.0005	<0.0005	0.0019	<0.0005		BD - 0.0019	
Cobalt	mg/L	0.0001	<0.0001	0.0005	<0.0001		BD - 0.0005	
Copper	mg/L	0.001	0.001	0.01	0.002	0.004	0.001 - 0.01	
Iron	mg/L	0.18	<0.01		0.05		BD - 0.18	
Lead	mg/L	<0.0001	0.0002	0.0022	0.0001		BD - 0.0022	
Lithium	mg/L	0.002	0.005	0.002	0.002	0.003	0.002 - 0.005	
Magnesium	mg/L	8	28.1	9.1	11.4	14.2	8 - 28.1	
Manganese	mg/L	0.016	0.011	0.01	<0.005		BD - 0.016	
Molybdenum	mg/L	0.001	0.002	0.002	0.002	0.0018	0.001 - 0.002	
Nickel	mg/L	0.0009	<0.0005	0.0023	0.0006		BD - 0.0023	
Potassium	mg/L	0.5	1.8	0.4	0.7	0.85	0.5 - 1.8	
Selenium	mg/L	<0.0002	0.0006	<0.0002	0.0004		BD - 0.0006	
Silicon	mg/L	8.53	10.3	6.99	7.33	8.29	8.53 - 10.3	
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		BD	
Sodium	mg/L	7.6	16.5	7.1	9.8	10.3	7.1 - 16.5	
Strontium	mg/L	0.319	1.44	0.353	0.403	0.629	0.319 - 1.44	
Titanium	mg/L	0.0013	0.0024	0.0268	0.0015	0.0080	0.0013 - 0.0268	
Uranium	mg/L	0.0006	0.0054	0.0009	0.0016	0.0021	0.0006 - 0.0054	
Vanadium	mg/L	0.0009	0.0013	0.0021	0.0007	0.0013	0.0009 - 0.0021	
Zinc	mg/L	0.001	0.002	0.03	0.003	0.0090	0.001 - 0.009	

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station W-13 (Williams Creek U/S of Confluence with Nancy Lee Creek) from 2006

Parameter	Units	Sample Date					Average	Range	CCME Guidelines Freshwater Aquatic Life
		Aug-94	Oct-05	Mar-06	Jun-06	Jul-06			
<b>In Situ Parameters</b>									
Water Temperature	deg C	6.31			4.00		5.16	4.0 - 6.31	
pH		8.0	8.4	6.9	8.24	8.57	8.03	6.9 - 8.57	6.5 - 9.0
Conductivity	umho/cm	252	280	408	714	1088	548	252 - 1088	
Total Suspended Solids	ppm				366	542	454	366 - 542	
Dissolved Oxygen	mg/L				8.12	8.51	8.32	8.12 - 8.51	
Oxygen Reduction Potential	mV				161	29	95.0	29 - 161	
<b>Physical Parameters</b>									
pH		8.1	8.08	8.09			8.09	8.08 - 8.10	6.5 - 9.0
Conductivity	umho/cm	421	284	670	293	417	417	284-670	
Total Dissolved Solids	mg/L		159				159	159	
Hardness as CaCO <sub>3</sub>	mg/L	195	140	351	149	209	209	140 - 351	
<b>Organic Parameters</b>									
Total Inorganic Carbon					22.2	39	30.6	22.2 - 39	
Total Organic Carbon					12.5	6.8	9.7	6.8 - 12.5	
Dissolved Organic Carbon				7.4	12.6	7	9.0	7.0 - 12.6	
<b>Anions</b>									
Alkalinity as CaCO <sub>3</sub>	mg/L	163	114				139	114 - 163	
Chloride	mg/L	1.69	0.6				1.15	0.6 - 1.69	
Sulphate	mg/L	56.8	31.1				44.0	31.1 - 56.8	
<b>Nutrients</b>									
Ammonia-Nitrogen	mg/L	0.005	<0.05		<0.05	<0.05		BD - 0.005	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	0.005	0.02			0.05	0.025	0.005 - 0.02	
Nitrite-Nitrogen	mg/L	0.039	<0.005			0.05		BD - 0.05	0.06
Total Phosphorous	mg/L	0.011	<0.1		<0.1	<0.1		BD - 0.011	
Orthophosphate	mg/L		0.09			0.09	0.90	0.09	
<b>Total Metals</b>									
Aluminum	mg/L	0.06	<b>0.232</b>	<b>&lt;0.005</b>	<b>0.085</b>	0.016	0.098	BD - 0.232	0.005 - 0.1
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	<b>0.06</b>	0.0005	0.0004	0.0004	0.0003	0.0123	0.0004 - 0.06	0.005
Barium	mg/L	0.062	0.039	0.091	0.043	0.057	0.058	0.039 - 0.091	
Beryllium	mg/L	0.001	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.001	
Bismuth	mg/L		<0.0005	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.02	0.008	0.035	0.013	0.017	0.019	0.008 - 0.035	
Cadmium	mg/L	<b>0.0001</b>	<0.00001	0.00001	<b>0.00002</b>	<0.00001		BD - 0.0001	0.000017
Calcium	mg/L	57.7	38.1	95.2	39.6	63.7	58.9	38.1 - 95.2	
Chromium	mg/L	<b>0.02</b>	0.0008	<0.0005	<0.0005	<0.0005		BD - 0.02	0.001 <sup>2</sup>
Cobalt	mg/L	0.006	0.0001	<0.0001	<0.0001	<0.0001		BD - 0.006	
Copper	mg/L	0.0015	0.002	0.002	0.002	0.001	0.002	0.0015 - 0.002	0.002 - 0.004
Iron	mg/L	0.015	0.3	<0.1		<0.1		BD - 0.3	0.3
Lead	mg/L	<b>0.06</b>	0.0001	0.0001	0.0001	<0.0001	0.0151	0.0001 - 0.06	0.001 - 0.007
Lithium	mg/L		0.002	0.007	0.002	0.002	0.003	0.002 - 0.007	
Magnesium	mg/L	14.1	9	24.5	9.7	14.2	14.3	9 - 24.5	
Manganese	mg/L	0.001	0.013	<0.005	<0.005	<0.005		BD - 0.013	
Molybdenum	mg/L	0.01	0.002	0.002	0.003	0.003	0.004	0.002 - 0.01	0.073
Nickel	mg/L	0.02	0.0011	<0.0005	<0.0005	0.0005		BD - 0.02	0.025 - 0.15
Potassium	mg/L	1.3	0.7	2.5		1.2	1.00	0.7 - 2.5	
Selenium	mg/L	<b>0.06</b>	<0.0002	0.0005	<0.0002	<0.0002		BD - 0.06	0.001
Silicon	mg/L	7.37	8.08	8.88	5.72	6.34	7.28	5.72 - 8.88	
Silver	mg/L	<b>0.0006</b>	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.0006	0.0001
Sodium	mg/L	11.6	9.2	17.8	9.1	12.5	12.0	9.1 - 17.8	
Strontium	mg/L	0.659	0.401	1.14	0.388	0.704	0.658	0.388 - 1.14	
Titanium	mg/L	0.003	<0.0005	0.0023	0.0035	0.0018		BD - 0.0035	
Uranium	mg/L		0.0005	0.0044	0.0007	0.0018	0.0019	0.0005 - 0.0044	
Vanadium	mg/L	0.01	0.0014	0.0003	0.001	0.0006	0.0027	0.0003 - 0.01	
Zinc	mg/L	0.002	0.002	0.002	0.001	0.002	0.0018	0.001 - 0.002	0.03
Zirconium	mg/L		<0.001	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>									
Aluminum	mg/L	0.01	0.018	<0.005	0.023	<0.005		BD - 0.023	
Antimony	mg/L		<0.0002	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.05	0.0004	0.0005	0.0005	0.0003	0.0103	0.0004 - 0.05	
Barium	mg/L	0.06	0.037	0.091	0.041	0.059	0.058	0.037 - 0.091	
Beryllium	mg/L	0.001	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.001	
Bismuth	mg/L		<0.0005	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	0.01	0.008	0.029	0.012	0.017	0.015	0.008 - 0.029	
Cadmium	mg/L	0.005	<0.00001	0.00001	<0.00001	0.00001		BD - 0.005	
Calcium	mg/L	56.1	39.5	96.7	42.2	58.5	58.6	39.5 - 96.7	
Chromium	mg/L	0.01	<0.0005	<0.0005	<0.0005	<0.0005		BD - 0.01	
Cobalt	mg/L	0.005	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.005	
Copper	mg/L	0.0019	0.001	<0.001	0.002	0.001		BD - 0.002	
Iron	mg/L	0.005	0.13	<0.1		<0.1		BD - 0.13	
Lead	mg/L	0.0005	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.0005	
Lithium	mg/L		0.002	0.006	0.001	0.002	0.003	0.002 - 0.006	
Magnesium	mg/L	13.3	9.9	26.6	10.5	15.2	15.1	9.9 - 26.6	
Manganese	mg/L	0.001	<0.005	<0.005	<0.005	<0.005		BD - 0.001	
Molybdenum	mg/L	0.01	0.002	0.002	0.003	0.003	0.004	0.002 - 0.01	
Nickel	mg/L	0.02	0.0007	<0.0005	<0.0005	<0.0005		BD - 0.02	
Potassium	mg/L	1.1	0.6	2.4	1	1.1	1.24	0.6 - 2.4	
Selenium	mg/L	0.05	<0.0002	0.0005	<0.0002	<0.0002		BD - 0.05	
Silicon	mg/L	7.33	8.21	10.1	5.96	6.75	7.67	6.75 - 10.1	
Silver	mg/L	0.0005	<0.0001	<0.0001	<0.0001	<0.0001		BD - 0.0005	
Sodium	mg/L	11.3	8.9	17.4	10	11.6	11.8	8.9 - 17.4	
Strontium	mg/L	0.646	0.426	1.17	0.435	25.8	5.70	0.426 - 25.8	
Titanium	mg/L	0.002	0.0013	0.0022	0.0017	0.0019	0.0018	0.0013 - 0.0022	
Uranium	mg/L		0.0005	0.0045	0.0008	0.0016	0.0019	0.0005 - 0.0045	
Vanadium	mg/L	0.01	0.001	0.0007	0.0012	0.0007	0.0027	0.0007 - 0.01	
Zinc	mg/L	0.002	0.002	0.002	0.003	0.002	0.0022	0.002 - 0.003	

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10°C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life (Aug 94) Ag, Cu, Pb, have both ICP and GF measurements; only GF recorded here.

Water Quality Data for Station Y-1

Parameter	Units	Sample Date			Average	Range	CCME Guidelines Freshwater Aquatic Life
		Mar-06	Jun-06	Jul-06			
<b>In Situ Parameters</b>							
Water Temperature	deg C		9		9.0		
pH		7.26	8.26	8.7	8.07	7.26 - 8.7	<b>6.5 - 9.0</b>
Conductivity	umho/cm	103.5	360	339	268	103.5 - 360	
Total Suspended Solids	ppm		163	169	166	163 - 169	
Dissolved Oxygen	mg/L		10.5	7.8	9.15	7.8 - 10.5	
Oxygen Reduction Potential	mV		156	77	117	77- 156	
<b>Physical Parameters</b>							
pH		7.87			7.87		
Conductivity	umho/cm	160	293	124	192	160 - 293	
Total Suspended Solids	mg/L	<2	<2	40		BD - 40	
Total Dissolved Solids	mg/L						
Turbidity	NTU	0.4	1.5	8.5	3.47	0.4 - 8.5	
Hardness as CaCO <sub>3</sub>	mg/L	83	149	62	98.0	83 - 149	
<b>Organic Parameters</b>							
Total Inorganic Carbon			11.1	14.8	13.0	11.1 - 14.8	
Total Organic Carbon			4.1	2.7	3.40	2.7 - 4.1	
Dissolved Organic Carbon		2.8	4	2.9	3.23	2.8 - 4	
<b>Anions</b>							
Alkalinity as CaCO <sub>3</sub>	mg/L						
Hydroxide as CaCO <sub>3</sub>	mg/L						
Carbonate as CaCO <sub>3</sub>	mg/L						
Bicarbonate as CaCO <sub>3</sub>	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Sulphate	mg/L						
<b>Nutrients</b>							
Ammonia-Nitrogen	mg/L		<0.05	<0.05		BD	<b>1.04 - 2.33<sup>1</sup></b>
Nitrate-Nitrogen	mg/L		0.05	<0.02		BD - 0.05	
Nitrite-Nitrogen	mg/L		0.05	<0.02		BD - 0.05	<b>0.06</b>
Total Phosphorous	mg/L		<0.1	0.2		BD - 0.2	
<b>Total Metals</b>							
Aluminum	mg/L	0.023	<b>2.1</b>	<b>0.791</b>	<b>0.9713</b>	0.023 - 2.1	<b>0.005 - 0.1</b>
Antimony	mg/L	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.0005	0.0013	0.0008	0.0009	0.0005 - 0.0013	<b>0.005</b>
Barium	mg/L	0.04	0.068	0.042	0.050	0.04 - 0.068	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.005	0.004	0.004	0.004	0.004 - 0.005	
Cadmium	mg/L	<0.00001	<b>0.00005</b>	<0.00001		BD - 0.00005	<b>0.000017</b>
Calcium	mg/L	24.3		19.3	21.8	19.3 - 24.3	
Chromium	mg/L	<0.0005	<b>0.004</b>	0.0022		BD - 0.004	<b>0.001<sup>2</sup></b>
Cobalt	mg/L	<0.0001	0.0012	0.0005		BD - 0.0012	
Copper	mg/L	<0.001	0.004	0.002		BD - 0.004	<b>0.002 - 0.004</b>
Iron	mg/L	<0.1		1.1		BD - 1.1	<b>0.3</b>
Lead	mg/L	<0.0001	0.0008	0.0005		BD - 0.0008	<b>0.001 - 0.007</b>
Lithium	mg/L	0.001	0.002	0.001	0.001	0.001 - 0.002	
Magnesium	mg/L	5.6	5.4	4.2	5.07	4.2 - 5.6	
Manganese	mg/L	<0.005	0.065	0.028		BD - 0.065	
Mercury	mg/L						<b>0.0001</b>
Molybdenum	mg/L	0.001	<0.001	0.001		BD - 0.001	<b>0.073</b>
Nickel	mg/L	<0.0005	0.0041	0.0025		BD - 0.0041	<b>0.025 - 0.15</b>
Phosphorous	mg/L		<0.1	0.2		BD - 0.2	
Potassium	mg/L	0.9	0.5	0.9	0.767	0.5 - 0.9	
Selenium	mg/L	0.0003	<0.0002	<0.0002		BD - 0.0003	<b>0.001</b>
Silicon	mg/L	2.72	2.87	4.32	3.30	2.72 - 4.32	
Silver	mg/L	<0.0001	<0.0001	<0.0001		BD	<b>0.0001</b>
Sodium	mg/L	2.2	1.3	1.5	1.67	1.3 - 2.2	
Strontium	mg/L	0.12	0.08	0.086	0.095	0.08 - 0.12	
Sulfur	mg/L	3.8	3.1	2.8	3.23	2.8 - 3.8	
Tin	mg/L	<0.001	<0.001	<0.001		BD	
Thallium	mg/L	<0.00005	<0.00005	<0.00005		BD	<b>0.0008</b>
Thorium	mg/L						
Titanium	mg/L	0.0012	0.0012	0.0557	0.0194	0.0012 - 0.0557	
Uranium	mg/L	0.0008	0.0008	0.0008	0.0008	0.0008	
Vanadium	mg/L	0.0003	0.0004	0.0028	0.0012	0.0003 - 0.0028	
Zinc	mg/L	<0.001	0.003	0.005		BD - 0.005	<b>0.03</b>
Zirconium	mg/L	<0.001		<0.001		BD	
<b>Dissolved Metals</b>							
Aluminum	mg/L	<0.005	2.1	0.014		BD - 2.1	
Antimony	mg/L	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.0004	0.0013	0.0004	0.0007	0.0004 - 0.0013	
Barium	mg/L	0.041	0.068	0.031	0.047	0.031 - 0.068	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	0.004	0.004	0.002	0.003	0.002 - 0.004	
Cadmium	mg/L	0.00002	0.00005	<0.00001		BD - 0.00005	
Calcium	mg/L	23.5	19.6	17.7	20.3	17.7 - 23.5	
Chromium	mg/L	<0.0005	<0.0005	0.001		BD - 0.001	
Cobalt	mg/L	<0.0001	<0.0001	<0.0001		BD	
Copper	mg/L	<0.001	0.001	0.001		BD - 0.001	
Iron	mg/L	<0.01		0.02		BD - 0.02	
Lead	mg/L	<0.0001	<0.0001	0.0001		BD - 0.0001	
Lithium	mg/L	<0.001	<0.001	<0.001		BD	
Magnesium	mg/L	5.9	4.7	4.2	4.93	4.2 - 5.9	
Manganese	mg/L	<0.005	0.01	<0.005		BD - 0.01	
Molybdenum	mg/L	0.001	<0.001	0.001		BD - 0.001	
Nickel	mg/L	<0.0005	<0.0005	0.0008		BD - 0.0008	
Phosphorous	mg/L						
Potassium	mg/L	0.5	0.5	0.5	0.5	0.5	
Selenium	mg/L	<0.0002	<0.0002	0.0002		BD - 0.0002	
Silicon	mg/L	2.88	2.87	2.8	2.85	2.87 - 2.88	
Silver	mg/L	<0.0001	<0.0001	<0.0001		BD	
Sodium	mg/L	1.9	1.3	1.3	1.50	1.3 - 1.9	
Strontium	mg/L	0.118	0.08	0.085	0.094	0.08 - 0.118	
Sulfur	mg/L	3.8	3.1	2.8	3.23	2.8 - 3.8	
Tin	mg/L	<0.001	<0.001	<0.001		BD	
Thallium	mg/L	<0.00005	<0.00005	<0.00005		BD	
Thorium	mg/L						
Titanium	mg/L	<0.0005	0.0012	0.0006		BD - 0.0012	
Uranium	mg/L	0.0008	0.0008	0.0006	0.0007	0.0006 - 0.0008	
Vanadium	mg/L	0.0003	0.0004	0.0002	0.0003	0.0002 - 0.0004	
Zinc	mg/L	0.002	0.003	0.002	0.0023	0.002 - 0.003	
Zirconium	mg/L						

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Station Y-2

Parameter	Units	Sample Date			Average	Range	CCME Guidelines Freshwater Aquatic Life
		Mar-06	Jun-06	Jul-06			
<b>In Situ Parameters</b>							
Water Temperature	deg C		9			9	
pH		6.93	8.57	8.63	8.04	6.93 - 8.63	6.5 - 9.0
Conductivity	umho/cm	153.5	295	352	267	153.5 - 352	
Total Suspended Solids	ppm		160	178	169	160 - 178	
Dissolved Oxygen	mg/L		10.5	6.85	8.68	6.85 - 10.5	
Oxygen Reduction Potential	mV		153	32	92.5	32 - 153	
<b>Physical Parameters</b>							
pH		7.79				0.79	
Conductivity	umho/cm	150	90	129	123	90-150	
Total Suspended Solids	mg/L	<2	90	21		BD - 90	
Total Dissolved Solids	mg/L						
Turbidity	NTU	0.6	25	7.1	10.9	0.6 - 25	
Hardness as CaCO <sub>3</sub>	mg/L	77	66	63	68.7	63-77	
<b>Organic Parameters</b>							
Total Inorganic Carbon			10.4	13.6	12.0	10.4 - 13.6	
Total Organic Carbon			4.1	2.8	3.45	2.8 - 4.1	
Dissolved Organic Carbon		1.5	4.6	3.1	3.07	1.5 - 4.6	
<b>Anions</b>							
Alkalinity as CaCO <sub>3</sub>	mg/L						
Hydroxide as CaCO <sub>3</sub>	mg/L						
Carbonate as CaCO <sub>3</sub>	mg/L						
Bicarbonate as CaCO <sub>3</sub>	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Sulphate	mg/L						
<b>Nutrients</b>							
Ammonia-Nitrogen	mg/L		<0.05	<0.05		BD	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L			0.12	0.12	0.12	
Nitrite-Nitrogen	mg/L			0.12	0.12	0.12	0.06
Total Phosphorous	mg/L		0.1	0.1	0.10	0.10	
<b>Total Metals</b>							
Aluminum	mg/L	0.043	2.04	0.573	0.885	0.043 - 2.04	0.005 - 0.1
Antimony	mg/L	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.0005	0.0011	0.0007	0.0008	0.0005 - 0.0011	0.005
Barium	mg/L	0.035	0.062	0.04	0.046	0.035 - 0.062	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	<0.0005		BD	
Boron	mg/L	0.004	0.004	0.004	0.004	0.004	
Cadmium	mg/L	<0.00001	0.00005	0.00001		BD - 0.00005	0.000017
Calcium	mg/L	22.3		19.8	21.1	19.8 - 22.3	
Chromium	mg/L	<0.0005	0.0037	0.0018		BD - 0.0037	0.001 <sup>2</sup>
Cobalt	mg/L	<0.0001	0.0012	0.0003		BD - 0.0012	
Copper	mg/L	<0.001	0.004	0.002		BD - 0.004	0.002 - 0.004
Iron	mg/L	<0.1		0.8		BD - 0.8	0.3
Lead	mg/L	<0.0001	0.0009	0.0003		BD - 0.0009	0.001 - 0.007
Lithium	mg/L	0.001	0.002	0.001	0.001	0.001 - 0.002	
Magnesium	mg/L	5.1	5.3	4.2	4.87	4.2 - 5.3	
Manganese	mg/L	<0.005	0.066	0.02		BD - 0.066	
Mercury	mg/L						0.0001
Molybdenum	mg/L	0.001	<0.001	0.001		BD - 0.001	0.073
Nickel	mg/L	<0.0005	0.0041	0.0019		BD - 0.0041	0.025 - 0.15
Phosphorous	mg/L		0.1	0.1	0.10	0.10	
Potassium	mg/L	0.8		0.9	0.850	0.8 - 0.9	
Selenium	mg/L	<0.0002	0.0003	<0.0002		BD - 0.0003	0.001
Silicon	mg/L	2.56	6.39	4.02	4.32	2.56 - 6.39	
Silver	mg/L	<0.0001	<0.0001	<0.0001		BD	0.0001
Sodium	mg/L	2.2	1.8	1.7	1.90	1.7 - 2.2	
Strontium	mg/L	0.104	0.08	0.092	0.092	0.08 - 0.104	
Sulfur	mg/L	3.5	5.6	3.2	4.10	3.2 - 5.6	
Tin	mg/L	<0.001	<0.001	<0.001		BD	
Thallium	mg/L	<0.00005	<0.00005	<0.00005		BD	0.0008
Thorium	mg/L						
Titanium	mg/L	0.0023	0.111	0.04	0.051	0.0023 - 0.11	
Uranium	mg/L	0.0007	0.0008	0.0008	0.001	0.0007 - 0.0008	
Vanadium	mg/L	0.0003	0.0059	0.002	0.003	0.0003 - 0.0059	
Zinc	mg/L	0.001	0.007	0.004	0.004	0.001 - 0.007	0.03
Zirconium	mg/L	<0.001	<0.001	<0.001		BD	
<b>Dissolved Metals</b>							
Aluminum	mg/L	0.014	0.026	0.013	0.018	0.013 - 0.026	
Antimony	mg/L	<0.0002	<0.0002	<0.0002		BD	
Arsenic	mg/L	0.0004	0.0004	0.0005	0.0004	0.0004 - 0.0005	
Barium	mg/L	0.035	0.028	0.029	0.031	0.028 - 0.035	
Beryllium	mg/L	<0.0001	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	0.002	<0.002	0.002		BD - 0.002	
Cadmium	mg/L	<0.00001	0.00001	<0.00001		BD - 0.00001	
Calcium	mg/L	22.1	19.1	18.2	19.8	18.2 - 22.1	
Chromium	mg/L	<0.0005	<0.0005	<0.0005		BD	
Cobalt	mg/L	<0.0001	<0.0001	<0.0001		BD	
Copper	mg/L	<0.001	0.001	<0.001		BD - 0.001	
Iron	mg/L	0.03		0.01	0.020	0.01 - 0.03	
Lead	mg/L	0.0001	<0.0001	<0.0001		BD - 0.0001	
Lithium	mg/L	<0.001	<0.001	<0.001		BD	
Magnesium	mg/L	5.4	4.6	4.4	4.80	4.4 - 5.4	
Manganese	mg/L	<0.005	<0.005	<0.005		BD	
Molybdenum	mg/L	0.001	<0.001	0.001		BD - 0.001	
Nickel	mg/L	<0.0005	0.0041	<0.0005		BD - 0.0041	
Phosphorous	mg/L	0.6				0.600	
Potassium	mg/L		0.9	0.5	0.70	0.5 - 0.9	
Selenium	mg/L	<0.0002	<0.0002	<0.0002		BD	
Silicon	mg/L	2.68	2.82	2.85	2.78	2.68 - 2.85	
Silver	mg/L	<0.0001	<0.0001	<0.0001		BD	
Sodium	mg/L	1.7	1.8	1.5	1.67	1.5 - 1.8	
Strontium	mg/L	0.103	0.079	0.09	0.091	0.079 - 0.103	
Sulfur	mg/L	3.6	3	2.9	3.17	2.9 - 3.6	
Tin	mg/L	<0.001	<0.001	<0.001		BD	
Thallium	mg/L	<0.00005	<0.00005	<0.00005		BD	
Thorium	mg/L						
Titanium	mg/L	0.0009	0.001	0.0006	0.001	0.0009 - 0.001	
Uranium	mg/L	0.0008	0.0008	0.0006	0.001	0.0006 - 0.0008	
Vanadium	mg/L	0.0003	0.0004	0.0002	0.0003	0.0002 - 0.0004	
Zinc	mg/L	<0.001	0.002	0.001		BD - 0.002	
Zirconium	mg/L						

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Water Quality Data for Groundwater Monitoring Well MW96-A

Parameter	Units	Sample Date			Average	Range	CCME Guidelines Freshwater Aquatic Life
		28-Sep-97	9-Jun-06	14-Jul-06			
<b>In Situ Parameters</b>							
pH							6.5 - 9.0
Conductivity	umho/cm						
<b>Physical Parameters</b>							
pH		7.82	<0.05				
Conductivity	umho/cm		19400	353	9877	353 - 19400	
Total Suspended Solids	mg/L	444	26	1390	620	26 - 1390	
Total Dissolved Solids	mg/L	200			200	200	
Turbidity	NTU		8	450	229	8 - 450	
Hardness as CaCO <sub>3</sub>	mg/L		134	128	131	128 - 150	
<b>Anions</b>							
Alkalinity as CaCO <sub>3</sub>	mg/L						
Hydroxide as CaCO <sub>3</sub>	mg/L						
Carbonate as CaCO <sub>3</sub>	mg/L						
Bicarbonate as CaCO <sub>3</sub>	mg/L						
Chloride	mg/L						
Fluoride	mg/L						
Sulphate	mg/L						
<b>Nutrients</b>							
Ammonia-Nitrogen	mg/L		<0.05	0.5		BD - 0.5	1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	0.879	0.65	0.66	0.730	0.65 - 0.879	
Nitrite-Nitrogen	mg/L	0.002	0.65	0.66	0.437	0.002 - 0.66	0.06
Total Phosphorous	mg/L		0.1	24.2	12.2	BD - 24.2	
<b>Total Metals</b>							
Aluminum	mg/L	1.35	0.743	1010	337	0.743 - 1010	0.005 - 0.1
Antimony	mg/L	0.0001	0.0007	0.0011	0.0006	0.0001 - 0.0011	
Arsenic	mg/L	0.0005	0.0021	0.176	0.0595	0.0005 - 0.176	0.005
Barium	mg/L	0.274	0.429	30.5	10.4	0.274 - 30.5	
Beryllium	mg/L	<0.0005	<0.0001	0.038		BD - 0.038	
Bismuth	mg/L	<0.0005	<0.0005	0.001		BD - 0.001	
Boron	mg/L	0.002	0.009	0.092	0.0343	0.002 - 0.092	
Cadmium	mg/L	0.00006	0.00029	0.0147	0.0050	0.00006 - 0.0147	0.000017
Calcium	mg/L	42.7	31.7	1290	455	31.7 - 1290	
Chromium	mg/L	0.001	0.0014	1.14	0.381	0.0014 - 1.14	0.001 <sup>2</sup>
Cobalt	mg/L	0.0004	0.0006	0.355	0.1187	0.0004 - 0.355	
Copper	mg/L	0.0018	0.011	1.14	0.384	0.0018 - 1.14	0.002 - 0.004
Iron	mg/L	1.14	0.7	1440	481	0.7 - 1440	0.3
Lead	mg/L	0.00173	0.0023	0.934	0.313	0.00173 - 0.934	0.001 - 0.007
Lithium	mg/L	0.001	0.005	0.488	0.165	0.001 - 0.488	
Magnesium	mg/L	7.16	12.5	374	131	7.16 - 374	
Manganese	mg/L	0.0487	0.478	36.5	12.3	0.0487 - 36.5	
Mercury	mg/L	<0.00005				BD	0.0001
Molybdenum	mg/L	0.00212	0.014	0.38	0.197	0.00212 - 0.38	0.073
Nickel	mg/L	0.0011	0.002	0.362	0.122	0.0011 - 0.362	0.025 - 0.15
Phosphorous	mg/L	<0.3	0.1	24.2		BD - 24.2	
Potassium	mg/L	<2	2.3	73.7		BD - 73.7	
Selenium	mg/L	<0.001	0.0005	<0.0002		BD	0.001
Silicon	mg/L	8.83	6.06	108	41.0	6.06 - 108	
Silver	mg/L	<0.00001	0.0001	0.003		BD - 0.003	0.0001
Sodium	mg/L	7	29.8	105	47.3	7 - 105	
Strontium	mg/L	0.147	1.64	16.9	6.23	0.147 - 16.9	
Sulfur	mg/L		4.9	15.5	10.2	4.9 - 15.5	
Tin	mg/L	0.0008	0.002	0.037	0.013	0.002 - 0.037	
Thallium	mg/L	<0.00005	<0.00005	0.00079		BD - 0.00079	0.0008
Thorium	mg/L						
Titanium	mg/L	0.04	0.04	60.8	20.3	0.04 - 60.8	
Uranium	mg/L	0.00056	0.0025	0.0135	0.0055	0.00056 - 0.0135	
Vanadium	mg/L	0.002	0.003	3.27	1.09	0.002 - 3.27	
Zinc	mg/L	0.007	0.016	5.17	1.73	0.016 - 5.17	0.03
Zirconium	mg/L		<0.001	0.173		BD - 0.173	
<b>Dissolved Metals</b>							
Aluminum	mg/L	0.009	0.009	0.03	0.016	0.009 - 0.03	
Antimony	mg/L	0.00006	0.0006	0.0006	0.0004	0.00006 - 0.0006	
Arsenic	mg/L	0.0002	0.0016	0.002	0.0013	0.0002 - 0.002	
Barium	mg/L	0.227	0.283	0.23	0.247	0.227 - 0.283	
Beryllium	mg/L	<0.0005	<0.0001	<0.0001		BD	
Bismuth	mg/L	<0.0005	<0.0005	0.0007		BD - 0.0007	
Boron	mg/L	0.002	0.007	0.007	0.0053	0.002 - 0.007	
Cadmium	mg/L	<0.00005	0.00002	<0.00001		BD - 0.00002	
Calcium	mg/L	41.2	33	30.9	35.0	30.9 - 41.2	
Chromium	mg/L	<0.0005	<0.0005	<0.0005		BD	
Cobalt	mg/L	<0.0001	<0.0001	<0.0001		BD	
Copper	mg/L	0.0003	0.006	<0.001	0.0060	BD - 0.006	
Iron	mg/L	<0.03	<0.01	0.01		BD - 0.01	
Lead	mg/L	<0.00005	<0.0001	0.0001		BD - 0.0001	
Lithium	mg/L	0.001	0.004	0.004	0.0030	0.001 - 0.004	
Magnesium	mg/L	6.76	12.6	12.4	10.6	6.9 - 12.6	
Manganese	mg/L	0.00913	<0.005	0.015		BD - 0.015	
Molybdenum	mg/L	0.00183	0.013	0.017	0.0106	0.00183 - 0.017	
Nickel	mg/L	0.0005	<0.0005	0.0016		BD - 0.0016	
Phosphorous	mg/L	<0.3				BD	
Potassium	mg/L	<2	2.6	2.4		BD - 2.6	
Selenium	mg/L	<0.001	0.0002	0.0004		BD - 0.0004	
Silicon	mg/L	5.14	4.68	4.63	4.82	4.63 - 5.14	
Silver	mg/L	<0.00001	<0.0001	<0.0001		BD	
Sodium	mg/L	6	31.5	30.6	22.7	6 - 31.5	
Strontium	mg/L	0.147	1.56	1.66	1.12	0.147 - 1.66	
Sulfur	mg/L		4.8	6.3	5.55	4.8 - 6.3	
Tin	mg/L	0.0001	<0.001	<0.001		BD - 0.0001	
Thallium	mg/L	<0.00005	<0.00005	<0.00005		BD	
Thorium	mg/L						
Titanium	mg/L	<0.01	<0.0005	0.0007		BD - 0.0007	
Uranium	mg/L	0.00041	0.0025	0.0024	0.0018	0.00041 - 0.0025	
Vanadium	mg/L	<0.001	0.0016	0.001		BD - 0.0016	
Zinc	mg/L	0.003	0.002	<0.001		BD - 0.003	
Zirconium	mg/L						

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life



Water Quality Data for Groundwater Monitoring Well MW96-B

Parameter	Units	Sample Date		Average	CCME Guidelines Freshwater Aquatic Life
		9-Jun-06	14-Jul-06		
<b>In Situ Parameters</b>					
pH					6.5 - 9.0
Conductivity	umho/cm				
<b>Physical Parameters</b>					
pH					
Conductivity	umho/cm	19200	275	9738	
Total Suspended Solids	mg/L	56	62	59.0	
Total Dissolved Solids	mg/L				
Turbidity	NTU	25	25	25.0	
Hardness as CaCO <sub>3</sub>	mg/L	150	142	146	
<b>Anions</b>					
Alkalinity as CaCO <sub>3</sub>	mg/L				
Hydroxide as CaCO <sub>3</sub>	mg/L				
Carbonate as CaCO <sub>3</sub>	mg/L				
Bicarbonate as CaCO <sub>3</sub>	mg/L				
Chloride	mg/L				
Fluoride	mg/L				
Sulphate	mg/L				
<b>Nutrients</b>					
Ammonia-Nitrogen	mg/L	<0.05	<0.05		1.04 - 2.33 <sup>1</sup>
Nitrate-Nitrogen	mg/L	1.12	1.2	1.16	
Nitrite-Nitrogen	mg/L	1.12	1.2	1.16	0.06
Total Phosphorous	mg/L	<0.06	0.1		
<b>Total Metals</b>					
Aluminum	mg/L	2.55	1.56	2.06	0.005 - 0.1
Antimony	mg/L	<0.0002	<0.0002		
Arsenic	mg/L	0.0007	0.0008	0.0008	0.005
Barium	mg/L	0.329	0.306	0.318	
Beryllium	mg/L	<0.0001	<0.0001		
Bismuth	mg/L	<0.0005	<0.0005		
Boron	mg/L	0.004	0.005	0.005	
Cadmium	mg/L	0.00009	0.00006	0.00008	0.000017
Calcium	mg/L	46.7	50.6	48.7	
Chromium	mg/L	0.0023	0.0014	0.0019	0.001 <sup>2</sup>
Cobalt	mg/L	0.0007	0.0005	0.0006	
Copper	mg/L	0.005	0.004	0.005	0.002 - 0.004
Iron	mg/L	1.7	1.4	1.55	0.3
Lead	mg/L	0.0042	0.0039	0.0041	0.001 - 0.007
Lithium	mg/L	0.001	0.001	0.001	
Magnesium	mg/L	7.3	6.7	7.00	
Manganese	mg/L	0.14	0.111	0.126	
Mercury	mg/L				0.0001
Molybdenum	mg/L	<0.001	0.001		0.073
Nickel	mg/L	0.001	0.0018	0.0014	0.025 - 0.15
Phosphorous	mg/L	<0.06	0.1		
Potassium	mg/L	1.3	1.2	1.25	
Selenium	mg/L	0.001	0.0006	0.0008	0.001
Silicon	mg/L	9.05	9.07	9.06	
Silver	mg/L	<0.0001	<0.0001		0.0001
Sodium	mg/L	3.5	3.3	3.40	
Strontium	mg/L	0.182	0.175	0.179	
Sulfur	mg/L	2	2	2.0	
Tin	mg/L	0.002	0.002	0.0	
Thallium	mg/L	<0.00005	<0.00005		0.0008
Thorium	mg/L				
Titanium	mg/L	0.108	0.0664	0.0872	
Uranium	mg/L	<0.0005	<0.0005		
Vanadium	mg/L	0.006	0.0043	0.0052	
Zinc	mg/L	0.016	0.014	0.015	0.03
Zirconium	mg/L	<0.001	0.003		
<b>Dissolved Metals</b>					
Aluminum	mg/L	0.006	0.006	0.006	
Antimony	mg/L	<0.0002	<0.0002		
Arsenic	mg/L	<0.0002	0.0002		
Barium	mg/L	0.268	0.262	0.265	
Beryllium	mg/L	<0.0001	<0.0001		
Bismuth	mg/L	<0.0005	0.0007		
Boron	mg/L	0.002	0.003	0.003	
Cadmium	mg/L	0.00002	0.00041	0.0002	
Calcium	mg/L	48.6	45.2	46.9	
Chromium	mg/L	<0.0005	0.0005		
Cobalt	mg/L	<0.0001	<0.0001		
Copper	mg/L	0.001	<0.001		
Iron	mg/L	<0.01	<0.01		
Lead	mg/L	<0.0001	<0.0001		
Lithium	mg/L	<0.001	<0.001		
Magnesium	mg/L	6.9	6.9	6.90	
Manganese	mg/L	<0.005	<0.005		
Molybdenum	mg/L	<0.001	<0.001		
Nickel	mg/L	<0.0005	<0.0005		
Phosphorous	mg/L				
Potassium	mg/L	1	0.8	0.90	
Selenium	mg/L	0.001	0.0009	0.001	
Silicon	mg/L	5.25	5.35	5.30	
Silver	mg/L	<0.0001	<0.0001		
Sodium	mg/L	3.4	2.8	3.10	
Strontium	mg/L	0.156	0.172	0.164	
Sulfur	mg/L	1.9	2	1.95	
Tin	mg/L	<0.001	<0.001		
Thallium	mg/L	<0.00005	<0.00005		
Thorium	mg/L				
Titanium	mg/L	<0.0005	<0.0005		
Uranium	mg/L	<0.0005	<0.0005		
Vanadium	mg/L	0.002	0.0015	0.0018	
Zinc	mg/L	0.002	0.003	0.003	
Zirconium	mg/L				

Note: < Denotes that sample is below the laboratory detection limit

<sup>1</sup> Range is based on a average pH of 8.0 and a temperature range of 0 to 10 °C

<sup>2</sup> Based on guideline for Hexavalent chromium (Cr(VI))

BD = Below Detection

bolded values indicate parameter exceeds CCME guidelines for Freshwater Aquatic Life

Summary of Sediment Metals Concentrations - Carmacks Copper Project, Williams Creek

Site Id	W2						W3						W4						W5				
Replicate	A (-10 mesh)	B (-100 mesh)	A	B	C	A	A	A (-10 mesh)	B (-100 mesh)	A	B	C	A	A	A (-10 mesh)	B (-100 mesh)	A	B	C	A	A	A	A
Sample Date	8/11/2005		10/17/2005 <sup>1</sup>			6/13/2006	7/21/2006	8/11/2005		10/17/2005			6/19/2006	July-92 <sup>2</sup>	8/11/2005		10/17/2005			6/13/2006	7/21/06	6/13/2006	7/21/2006
Parameter																							
pH	6.7	6.8	7.3	7.1	7.3	6.7	7.2	6.6	6.8	6.7	6.8	6.9	6.1	-	6.6	6.7	7.3	7.2	7.3	6.8	7.3	6.6	7
Carbon (Total Organic %)	-	-	3.12					-	-	4.52				-	-	-	2.14						
Carbon (Total Inorganic %)	-	-	0.09					-	-	0.09				-	-	-	0.06						
Dissolved Metals (ug/g)																							
Aluminum	3800	6500	9000	7910	8370			5400	6900	10000	9180	8960		8920	5400	6900	5390	8460	6040				
Antimony	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<0.5	<0.5	<0.5	<4.0	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	0.66	<0.5	2.3	0.4	1.3	5	0.8	1.1	<0.5	1.4	3.2	1.8	3.8	<9.0	<0.5	<0.5	1.6	2	<0.2	<b>7.8</b>	1.3	4.7	0.6
Barium	49	78	128	92	108	154	69.8	88	100	158	165	131	183	112	60	76	77.1	144	67.3	224	61.7	173	49
Beryllium	0.16	0.23	0.27	0.22	0.23	0.28	0.12	0.23	0.27	0.32	0.27	0.25	0.28	0.2	0.24	0.31	0.17	0.26	0.16	0.35	0.13	0.3	0.1
Bismuth	<1	<1	<0.5	<0.5	<0.5			<1	<1	<0.5	<0.5	<0.5		<7.0	<1	<1	<0.5	<0.5	<0.5				
Cadmium	0.09	0.1	0.2	0.1	0.2	0.2	0.05	0.1	0.1	0.2	0.2	0.2	0.2	<0.09	0.1	0.1	0.1	0.2	0.09	0.2	<0.05	0.1	<0.05
Calcium	2300	4400	9900	7180	8310			4800	5700	11700	9460	8930		7040	3700	4700	4570	9320	4800				
Chromium	6.8	14	18.9	16	17.4	20.8	8.94	12	16	21.4	18.6	18	18.7	16.6	13	18	15	19	13.4	25.6	8.09	19.2	7.02
Cobalt	3.1	4.6	6.55	5.44	5.85	5.91	3.7	4	4.8	6.6	5.84	5.7	5.66	5.2	4	5	4.8	6.32	4.4	7.2	3.4	6.22	3
Copper	3.2	5.9	13.8	10.2	11.4	21.2	4.3	8.8	8.7	23.5	19.2	16.2	26.4	11.3	8.4	11	6.85	14.2	6.38	<b>38.8</b>	4.4	24.4	3.8
Iron	8300	12000	17600	13500	15500			12000	15000	16700	18800	17400		13300	11000	14000	13700	19100	12900				
Lead	1.9	2.6	3.9	3	3.4	4.5	1.5	2.7	3	4.3	4.5	3.8	4.6	5	3	3.6	2.7	4	2.5	5.5	1.9	4.4	1.4
Lithium	2.9	4.8	7.59	6.61	6.93			4.1	5	8.5	7.8	7.47		200	3.9	5	4.3	6.83	4.7				
Magnesium	1800	2900	3960	3480	3610			2300	2800	3830	3410	3430		3730	2400	3000	2450	3560	2580				
Manganese	89	130	485	165	309			220	240	563	699	305		184	90	110	392	846	162				
Mercury	0.0088	0.01	0.038	0.03	0.035	0.032	0.014	0.014	0.017	0.044	0.042	0.036	0.038		0.012	0.016	0.022	0.036	0.02	0.049	0.006	0.039	0.007
Molybdenum	0.2	0.3	1.2	0.85	1	1.6	0.3	<0.2	<0.2	0.5	0.7	0.2	0.4	<0.5	<0.2	<0.2	0.4	0.78	0.3	1.5	0.2	0.4	0.07
Nickel	5.2	8.9	13.1	11	11.5	13.5	6.28	8.2	9.8	14.9	12.8	12.2	13.1	10.3	8.1	11	9.88	12.5	8.1	17.3	5.69	12.3	4.2
Phosphorus	310	650	815	725	832			520	760	765	812	789		630	500	670	577	876	667				
Potassium	320	460	774	630	685			390	440	711	611	603		1300	420	510	410	658	500				
Selenium	<0.49	<0.49	<0.3	<0.3	<0.3	<0.3	<0.3	<0.50	<0.49	<0.3	<0.3	<0.3	<0.3	<0.9	<0.49	<0.50	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Silicon	40	33	115	117	110			40	44	103	90.2	89.3		300	31	33	138	89.3	131				
Silver	<0.3	<0.3	0.2	0.2	<0.2	<0.2	<0.2	<0.3	<0.3	0.3	0.5	0.2	<0.2		<0.3	<0.3	0.4	0.2	0.2	<0.2	<0.2	<0.2	<0.2
Sodium	140	220	315	275	291			210	230	348	297	306		540	170	200	185	306	228				
Strontium	26	45	104	74.6	85.4			50	52	107	93.6	89.4		56.9	27	34	45.7	96.8	46.5				
Thallium	<0.5	<0.5	0.67	<0.3	0.5	<0.3	0.4	<0.5	<0.5	0.83	1.3	0.52	<0.3		<0.5	<0.5	0.4	1.4	<0.3	<0.3	<0.3	<0.3	<0.3
Tin	<0.5	<0.5	0.74	1.1	0.88	0.4	0.2	<0.5	<0.5	0.7	0.5	0.57			<0.5	<0.5	3	2	0.67	0.4	<0.2	0.3	<0.2
Titanium	230	360	390	358	381			300	350	382	335	340		690	320	390	284	357	323				
Vanadium	17	26	34.6	29.7	34.1	42.3	24.2	27	35	37.9	37.6	36.2	38.6	30	30	38	29.8	40	31.2	47.9	26.3	39.1	24.9
Zinc	16	28	40.9	36.3	38.5	45.4	23.8	23	28	42.4	36.4	36.1	41.9	33	21	27	25.5	39	27.2	55.4	19.7	41.9	18
Zirconium	2.6	3.4	4.4	3.8	3.9			3	3.2	4.8	3.8	3.6		7.1	3.4	4	2.7	3.6	2.6				
Plus 100 Mesh (percent)																							
Minus 100 Mesh (percent)																							

<sup>1</sup>October 2005 sample fraction analyzed: -100 mesh  
<sup>2</sup>July 1992 sample fraction analyzed: -100 mesh  
 Bolded values indicate CCME interim freshwater sediment quality guideline exceeded.

Summary of Sediment Metals Concentrations - Carmacks Copper Project, Williams Creek

Site Id	W6			W7			W9								W10																
	A	B	C	A	A	B	C	A	A	A	B	C	A (-10 mesh)	B (-100 mesh)	A	B	C	A	A	A	B	A	B	C	A	B	C	A			
Replicate	10/17/2005			6/19/2006	10/17/2005			6/19/2006	July-92	August-94			8/11/2005		10/17/2005			6/13/2006	7/21/2006	July-92			August-94			10/17/2005			6/9/2006		
Parameter																															
pH	7.2	7.4	7.3	6.7	6.3	7	7.2	6.5	-				6.5	6.7	7.1	7.2	6.4	6.8	7.4	-	-							7.1	7.2	7.2	
Carbon (Total Organic %)	1.98				1.24				-				-	-	4.07					-	-							2.26			
Carbon (Total Inorganic %)	<0.05				<0.05				-				-	-	0.1					-	-							0.08			
Dissolved Metals (ug/g)																															
Aluminum	8180	7870	6320		11100	7460	7350		8710	12200	12100	10100		8000	8600	9920	10400	9600			8240	7670	13300	12400	13700		6800	9330	7910		
Antimony	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.4					<1	<1	<0.5	<0.5	<0.5		0.8	<0.5	<4	<4				<0.5	<0.5	<0.5	<0.5	
Arsenic	0.72	1.1	0.4	1.4	3.5	2.3	3.3	<b>9.9</b>	<10	<8.0	<8.0	<8.0		1.2	0.81	2.1	2.3	1.4	2.4	1.9	<9	<10	<8.0	<8.0	<8.0		1.2	2.2	2.2	3.5	
Barium	94	90.1	68	132	147	88.2	88.4	223	111	166	173	143		130	120	124	137	125	142	71.7	130	132	220	177	223		87.3	132	114	128	
Beryllium	0.23	0.22	0.16	0.22	0.37	0.26	0.25	0.47	0.2	0.8	0.6	0.6		0.36	0.35	0.31	0.32	0.28	0.3	0.18	0.2	0.2	0.8	0.7	0.9		0.24	0.31	0.27	0.28	
Bismuth	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5		<7.0					<1	<2	<0.5	<0.5	<0.5			<6	<7					<0.5	<0.5	<0.5		
Cadmium	0.2	0.2	0.06	0.2	0.2	0.1	0.2	0.2	<0.10	<0.8	<0.8	<0.8		0.2	0.2	0.2	0.2	0.2	0.1		<0.09	<0.10	<0.8	<0.8	<0.8		0.2	0.2	0.2	0.2	
Calcium	8000	7390	4800		4320	4130	4870		6990	9030	9670	7730		8500	6900	8810	10400	7640			7080	7040	10400	9380	11100		4890	7510	6520		
Chromium	20.2	17.4	12.7	17.6	25.2	20.6	18.4	37.2	16.4	25.2	22.5	22.2		18	20	20.1	21.2	19.2	23.1	11.6	20	18.5	29.5	29.1	30.8		16.8	19.7	16.4	18.8	
Cobalt	5.84	5.58	4.4	5.97	7.05	5.78	5.84	9.49	5.8	9.4	8.3	7.2		6.2	6.4	6.81	7.15	6.45	6.74	4.5	6.4	6.5	8.8	10	9.3		5.92	7.26	6.26	5.82	
Copper	9.94	8.96	5.05	16.6	19.7	12.3	13.5	<b>43.9</b>	10.1	11	13	9.7		17	14	18.3	19.7	17.5	18.6	6.61	17	16.9	21.8	22.4	26		13.4	22.6	19.6	<b>94.4</b>	
Iron	16200	15800	11700		19700	18800	17900		15300	21500	22000	19600		16000	16000	17000	18100	16600			18900	18200	22900	24900	23200		18900	17600	15200		
Lead	3.3	3.2	2.2	3.5	4.6	3.5	3.5	7.4	5	<8.0	<8.0	<8.0		4.3	3.9	4	4.4	3.8	4.5	2.4	6	9	<8.0	<8.0	<8.0		4	4.4	4	5.1	
Lithium	6.56	6.25	4.9		7.34	5.06	5.23		70					6.8	7.2	8.97	9.32	8.43			100	100					6.14	8.96	7.71		
Magnesium	3470	3360	2700		3830	2840	2950		3990	4530	4700	3970		4100	4300	4500	4690	4170			4160	4020	5110	5110	5420		3350	4440	3830		
Manganese	232	215	141		270	277	468		228	364	328	351		170	160	285	374	189			359	352	450	300	412		277	526	598		
Mercury	0.027	0.025	0.0524	0.025	0.022	0.02	0.022	0.045						0.025	0.022	0.038	0.038	0.034	0.025	0.009							0.025	0.036	0.04	0.027	
Molybdenum	0.66	0.67	0.2	0.79	0.4	0.2	0.2	0.97	<0.5	<2.0	<2.0	<2.0		<0.2	<0.2	0.2	0.2	0.2	0.2	0.2	<0.5	<0.5	<2.0	<2.0	<2.0		0.2	0.3	0.3	0.4	
Nickel	11.4	10.5	8	12.3	17.4	12.2	11.6	24	10.6	18	20	20		14	15	15.1	15.8	13.9	16.2	9.29	11.9	12	21	22	24		11.2	15.6	13.4	21.3	
Phosphorus	982	940	796		645	698	724		650	950	960	910		580	660	728	790	763			850	860	960	1000	920		746	748	620		
Potassium	682	628	460		907	611	610		1000	1280	1240	992		720	780	1020	1070	906			1200	1100	1770	1520	1730		629	897	761		
Selenium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<1.0					<0.48	<0.50	<0.3	<0.3	<0.3	<0.3	<0.3	<0.9	<1.0					<0.3	<0.3	<0.3	<0.3	
Silicon	107	105	133		172	156	138		270	472	387	299		59	44	84.5	98.1	80			450	410	281	334	480		139	99.8	94.3		
Silver	<0.2	0.1	<0.2	<0.2	0.72	0.4	<0.2	<0.2	-	<2.0	<2.0	<2.0		<0.3	<0.3	0.1	<0.2	0.1	<0.2	<0.2			<2.0	<2.0	<2.0		0.2	<0.2	<0.2	<0.2	
Sodium	283	271	205		226	203	222		390	390	370	310		270	260	358	374	355			370	340	400	510	560		240	312	256		
Strontium	72.5	68	44.7		28.1	24.2	28.9		65.3	109	119	89.7		100	80	92.7	109	79.3			61.4	56.1	111	95.6	118		47	70	61.8		
Thallium	<0.3	<0.3	<0.3	0.5	0.3	1	0.87	<0.3	-					<0.5	<0.5	<0.3	0.7	0.54	<0.3	<0.3	-	-					<0.3	0.88	1.4	<0.3	
Tin	0.78	0.52	0.3	0.4	1.1	0.54	0.65	0.6	-	<8.0	<8.0	<8.0		<0.5	<0.5	0.52	0.55	0.58	0.4	0.3	-	-	<8.0	<8.0	<8.0		0.56	23.4	0.4	0.5	
Titanium	406	385	293		336	308	292		674	936	868	757		260	390	407	421	391			682	685	889	876	897		353	351	286		
Vanadium	38.2	36.8	26.7	32.3	44.8	44.9	39.1	70.5	31	56	55	49		31	33	34.4	35.8	34	43.3	29.6	45	46	68	73	68		46.1	37.1	31.5	44.7	
Zinc	36.6	35	27.9	47.1	36.8	29.2	30	57.3	37	48.9	50.3	44.1		37	38	43.7	46.6	43.6		26.9	39.2	39.6	53.3	57.6	57.6		35.1	45	39.1	57.4	
Zirconium	3.9	3.6	2.8		4.4	3.4			5.4					4.8	5.1	4.7	5.13	4.7			5	5.3					3.1	3.9	3.3		
Plus 100 Mesh (percent)																															
Minus 100 Mesh (percent)																															

<sup>1</sup>October 2005 sample fraction analyzed: -100 mesh  
<sup>2</sup>July 1992 sample fraction analyzed: -100 mesh  
 Bolded values indicate CCME interim freshwater sediment quality guideline exceeded.

Summary of Sediment Metals Concentrations - Carmacks Copper Project, Williams Creek

Site Id	W11					W12					W13					Average	Range	CCME Guideline																							
	A	B	A	B	C	A	B	C	A	A	B	A	B	C	A			Interim Freshwater Sediment Quality Guidelines (ug/g)	Probable Effect Levels (ug/g)																						
Replicate	7/7/1992					August-94					10/17/2005					6/13/2006					7/7/1992					10/17/2005					6/13/2006										
Sample Date	7/7/1992					August-94					10/17/2005					6/13/2006					7/7/1992					10/17/2005					6/13/2006										
Parameter																																									
pH	-	-	-	-	-	7.5	7.6	7.4	7.1	-	-	7.3	7.3	7.3	7.2	-	-	7.6	7.9	6.6	7.1	7.02	6.3 - 7.9																		
Carbon (Total Organic %)	-	-	-	-	-	1.18					-	-	1.83					-	-	3.15					2.55	1.18 - 4.52															
Carbon (Total Inorganic %)	-	-	-	-	-	0.06					-	-	0.07					-	-	0.15						BD - 0.15															
Dissolved Metals (ug/g)																																									
Aluminum	6750	6730	11600	11900	9260	7040	4930	8150		8620	7280	5830	7790	6230		9980	8710	10100	10900	9710		8524.56	3800-12200																		
Antimony	<4	<4				<0.5	<0.5	<0.5	<0.5	<4	<4	<0.5	<0.5	<0.5	<0.5	<4	<4	<0.5	<0.5	<0.5	0.9		BD																		
Arsenic	<10	<10	<8.0	<8.0	<8.0	2.2	1.1	1.2	4.5	<10	<10	2.1	2.3	2	5.3	<10	<10	3.3	3.1	1.1	2.8		BD - 3.5	<b>5.9</b>	17.0																
Barium	66.9	70	183	236	158	96.6	56	89.6	150	158	120	62.6	110	78.4	171	201	168	180	199	155	226	127.77	46-236																		
Beryllium	0.2	0.2	0.7	0.8	0.7	0.22	0.15	0.24	0.29	0.2	0.2	0.19	0.25	0.2	0.38	0.3	0.2	0.41	0.44	0.31	0.46	0.32	0.15 - 0.44																		
Bismuth	<7	<8				<0.5	<0.5	<0.5		<8	<7	<0.5	<0.5	<0.5		<7	<7	<0.5	<0.5	<0.5			BD																		
Cadmium	0.3	0.3	<0.8	<0.8	<0.8	0.2	0.1	0.2	0.1	0.3	0.3	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.4		BD - 0.3	<b>0.6</b>	3.5																
Calcium	5600	4890	10200	10200	8150	5960	4240	7320		8010	6550	4650	6680	4910		9770	9260	8930	10600	11700		7325.09	3700 - 11700																		
Chromium	17.7	14.7	30.4	28.7	33	15.2	10.6	18.7	21.9	20.1	17.8	13.7	16.2	13	22.1	22.4	19.3	22.9	25.4	19.6	27.5	19.19	6.8 - 33.0	<b>37.3</b>	90																
Cobalt	5.5	5.5	8.5	9.3	9.1	5.72	4	5.83	6.31	6.7	6	4.6	6.3	5.06	7.12	7.2	7.4	8.56	8.87	6.42	8.51	6.26	3.1 - 9.3																		
Copper	11.4	10	<b>50.1</b>	<b>74.7</b>	<b>57.3</b>	16.8	9.18	16.5	26	<b>75.8</b>	17.6	15.4	20.6	15.7	33.9	20.1	17.3	24.4	26	28.9	28.7	19.98	3.2 - 75.8	<b>35.7</b>	197																
Iron	15000	11800	25300	24600	35100	15200	10900	17000		21800	18600	13800	16100	13100		23100	18100	22900	26300	16200		17503.51	10900 - 26300																		
Lead	7	6	<8.0	<8.0	<8.0	3.5	2.3	3.5	4.4	8	6	3.1	3.8	2.9	5.8	7	9	7.02	7.67	4.2	7.3	4.32	1.9 - 9	<b>35</b>	91.3																
Lithium	<40	<40				6.19	4	6.97		<40	<40	5.17	6.93	5.35		<40	<40	11.2	11.5	8.3			2.9 - 100																		
Magnesium	3120	3030	4510	4630	4140	3310	2330	3770		4260	3770	2880	3620	2930		5370	4860	5600	5910	3700		3763.51	1800 - 5910																		
Manganese	190	189	742	575	474	693	250	385		357	328	208	769	457		412	351	493	582	551		356.51	89 - 846																		
Mercury						0.026	0.018	0.027	0.032			0.033	0.033	0.025	0.042	-	-	0.038	0.045	0.042	0.047	0.03	0.014 - 0.0524	<b>0.17</b>	0.486																
Molybdenum	<0.5	<0.5	<2.0	<2.0	2	0.2	0.2	0.2	0.4	<0.5	<0.5	0.3	0.3	0.2	0.59	<0.5	<0.5	0.68	0.61	0.5	0.96		BD - 2																		
Nickel	11.3	11.5	25	22	20	11	7.24	11.8	14.7	13.3	12.8	9.21	12.2	9.52	17.3	16.6	16.3	19.6	20.5	14.2	22.1	13.69	5.2 - 25																		
Phosphorus	810	540	880	830	1000	728	556	889		940	820	581	732	627		1100	900	940	975	725		771.07	310 - 1000																		
Potassium	600	750	1280	1350	1000	611	400	677		940	910	543	725	525		1400	1200	1260	1330	696		844.42	320 - 1770																		
Selenium	<1	<1				<0.3	<0.3	<0.3	<0.3	<1	<1	<0.3	<0.3	<0.3	<0.3	<1	<1	<0.3	<0.3	<0.3	<0.3		BD																		
Silicon	490	500	302	313	311	116	103	113		670	600	114	84.1	87.2		690	760	152	114	85.1		210.54	33 - 760																		
Silver	-	-	<2.0	<2.0	<2.0	<0.2	0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<0.2	-	-	<0.2	0.94	<0.2	<0.2		BD - 0.94																		
Sodium	270	310	560	540	290	282	196	331		260	230	199	294	232		290	280	248	271	394		301.98	140 - 560																		
Strontium	37.5	37.2	109	107	77.9	48	29.6	51.1		62.8	46.6	45.8	61.3	43.8		70.7	57.1	88	86.6	104		68.93	24.2 - 119																		
Thallium	7	-				1.1	0.3	0.53	<0.3	-	-	<0.3	1.4	0.58	<0.3	-	7	0.67	1	1.2	<0.3		BD - 7																		
Tin	594	-	<8.0	9	<8.0	0.66	0.69	0.5	0.4	-	-	1	0.62	0.5	0.4	-	-	2	1.1	0.5	0.4		BD - 23.4																		
Titanium	<10	487	903	934	1010	308	252	354		704	539	250	317	277		691	558	324	346	372		474.27	230 - 936																		
Vanadium	44	34	75	74	110	34.1	26	39.6	43	53	46	31.5	35.6	29.5	42.4	52	42	48.3	56.5	37.3	48.2	41.45	17 - 110																		
Zinc	30.8	29.3	48.6	48.1	46.1	32	22.6	34.7	46.8	40.1	36	27.6	36.1	28.2	56.5	48	47.4	58.2	61.4	41	70.4	39.07	16 - 61.4	<b>123</b>	315																
Zirconium	3.2	3.5				2.9	2.3	3.2		5.1	5	2.6	3.2	2.6		4.9	5.1	4.5	4.7	4.7		3.96	2.3 - 7.1																		
Plus 100 Mesh (percent)	86.79	78.74								88.73	68.24						57.67																								
Minus 100 Mesh (percent)	13.21	21.26								11.27	31.76						42.33																								

<sup>1</sup>October 2005 sample fraction analyzed: -100 mesh  
<sup>2</sup>July 1992 sample fraction analyzed: -100 mesh  
 Bolded values indicate CCME interim freshwater sediment quality guideline exceeded.