

Table 3 (continued) Surface Water Samples from Hackett River, 2005
Total Metals Analysis (mg/L)

All units mg/l unless otherwise noted

e) $0.0002 \text{ mol/L at } [\text{CaCO}_3] = 0.120 \text{ mol/L at } \text{pH} \geq 6.5$, $[\text{Ca}^{2+}] \geq 4 \text{ mg/L}$, $\text{DOC} \geq 2 \text{ mg/L}$

d) $0.001 \text{ mg/L at } [\text{CaCO}_3] = 0 - 60 \text{ mg/L; } 0.002 \text{ mg/L at } [\text{CaCO}_3] = 60 - 120 \text{ mg/L; } 0.004 \text{ mg/L at } [\text{CaCO}_3] = 120 - 180 \text{ mg/L; } 0.004 \text{ mg/L at } [\text{CaCO}_3] = 180 \text{ mg/L}$

* Average of sample and replicate

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results exceed CME Aquatic Life Guidelines

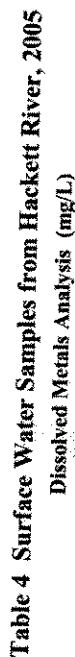


Table 4 Surface Water Samples from Hackett River, 2005
Dissolved Metals Analysis (mg/L)

All units mg/l unless otherwise noted

b) Canadian water quality guidelines for the protection of aquatic life. Council of Ministers of the Environment, 2003

b) $0.005 \text{ mg/L at pH} < 6.5$, $[\text{Ca}^{2+}] < 4 \text{ mg/L}$, $\text{DOC} < 2 \text{ mg/L}$; $0.1 \text{ mg results exceed CCME Aquatic Life Guidelines}$

c) $0.002 \text{ mg/L at } [\text{CaCO}_3] = 0 - 120 \text{ mg/L}$, $0.003 \text{ mg/L at } [\text{CaCO}_3] = 120 - 180 \text{ mg/L}$, $0.004 \text{ mg/L at } [\text{CaCO}_3] = 180 - 190 \text{ mg/L}$

d) $0.001 \text{ mg/L at } [\text{CaCO}_3] = 0 - 120 \text{ mg/L}$, $0.0015 \text{ mg/L at } [\text{CaCO}_3] = 120 - 180 \text{ mg/L}$, $0.004 \text{ mg/L at } [\text{CaCO}_3] > 180 \text{ mg/L}$

2) $0.025 \text{ mg/L at } [\text{CaCO}_3] = 0 - 60 \text{ mg/L}$; $0.065 \text{ mg/L at } [\text{CaCO}_3] = 60 - 120 \text{ mg/L}$; $0.004 \text{ mg/L at } [\text{CaCO}_3] = 120 - 180 \text{ mg/L}$; $0.002 \text{ mg/L at } [\text{CaCO}_3] = 180 - 240 \text{ mg/L}$; $0.001 \text{ mg/L at } [\text{CaCO}_3] = 240 - 300 \text{ mg/L}$

*Average of sample and standard.

* Average of sample and replicate

Italy	results exceed CCME Aquatic Life Guidelines
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title: results exceed CCME Aquatic Life Guidelines

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Appendix B2, 12/08/2003, 233201.gnc

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Table 4 (continued) Surface Water Samples from Hackett River, 2005
Dissolved Metals Analysis (mg/L)

Station	Detection Limits	Water Quality Guidelines CCME	Copper Lake	Hackett Lake	Hackett D/S	Camp Lake	Tunkia Damflow	Hackett Lake Outflow	Hackett Damflow	Camp Creek
Dissolved Metals										
Aluminum	0.001	0.005-0.1 ^a	0.0168	0.0159	0.0166	0.0181	0.01815	0.0038	0.0038	0.0156
Antimony	0.0001		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	0.0001	0.005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	0.00005		0.00286	0.00459	0.00304	0.00424	0.009035	0.00464	0.00464	0.00499
Beryllium	0.0005		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth	0.0005		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron	0.01		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	0.00005	0.000017	<0.000050	0.000076	<0.000050	0.000070	0.00184	<0.000050	<0.000050	<0.00010
Calcium	0.02		2.46	5.55	1.51	2.50	8.19	3.58	3.58	3.15
Chromium	0.0005	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	0.0001		<0.00010	0.0002	<0.00010	<0.00010	0.000885	<0.00010	<0.00010	<0.00010
Copper	0.0001	0.002-0.004 ^c	0.00113	0.02765	0.00130	0.00208	0.0335	0.00443	0.00138	0.00247
Iron	0.03	0.3	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	0.00005	0.001-0.007 ^d	<0.000050	<0.000050	<0.000050	<0.000050	0.001255	<0.000050	<0.000050	<0.000050
Lithium	0.005		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium	0.005		0.856	1.63	0.688	1.05	1.835	1.51	1.51	1.30
Manganese	0.00005		0.00105	0.004585	0.000603	0.000970	0.0566	0.000612	0.00387	0.00124
Mercury	0.00005	0.000026	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	0.00005	0.073	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel	0.0005	0.025-0.15 ^e	0.00308	0.00069	0.00117	0.00288	0.00327	0.00065	0.00718	<0.000050
Phosphorus	0.3		<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium	0.05		0.394	0.8405	0.487	0.506	0.663	0.883	0.456	0.521
Selenium	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silicon	0.05		0.151	0.495	0.149	0.307	0.918	0.452	0.144	0.361
Silver	0.00001	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	0.05		0.584	0.6605	0.592	0.824	0.731	0.624	0.624	0.652
Strontium	0.0001		0.00539	0.00829	0.00477	0.00737	0.0445	0.0126	0.00868	0.00912
Thallium	0.0001	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin	0.0001		<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	0.01		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	0.00001		0.000013	0.000011	0.000010	0.000023	<0.000010	0.000084	<0.000010	0.000030
Vanadium	0.001		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc	0.001	0.03	0.0046	0.0169	0.0064	0.0240	0.3795	0.0375	0.0064	0.0378

All units mg/L unless otherwise noted

a) Canadian water quality guidelines for the protection of aquatic life. Council of Ministers of the Environment, 2003

b) 0.005 mg/L at pH < 6.5. [Ca²⁺] < 2 mg/L. 0.1 mg results exceed CCME Aquatic Life Guidelines

c) 0.002 mg/L at [CaCO₃] = 0 - 120 mg/L; 0.003 mg/L at [CaCO₃] = 120 - 180 mg/L; 0.004 mg/L at [CaCO₃] > 180 mg/L

d) 0.001 mg/L at [CaCO₃] = 0 - 60 mg/L; 0.002 mg/L at [CaCO₃] = 60 - 120 mg/L; 0.004 mg/L at [CaCO₃] = 120 - 180 mg/L; 0.007 mg/L at [CaCO₃] > 180 mg/L

e) 0.025 mg/L at [CaCO₃] = 0 - 60 mg/L; 0.065 mg/L at [CaCO₃] = 60 - 120 mg/L; 0.110 mg/L at [CaCO₃] = 120 - 180 mg/L; 0.150 mg/L at [CaCO₃] > 180 mg/L

* Average of sample and replicate

Results exceed CCME Aquatic Life Guidelines



Table 5. QA/QC: Field Replicates
Surface Water Analysis Results (mg/L)

Station	Camp Lake	Camp Lake Rep	RPD	Station	Camp Lake	Camp Lake Rep	RPD
Date	7/7/2005	7/7/2005	%	Date	7/7/2005	7/7/2005	%
Physical Tests				Dissolved Anions			
Conductivity (uS/cm)	85.2	85.7	1%	Alkalinity-Total CaCO ₃	3.7	3.7	0%
Total Dissolved Solids	42.7	42.3	1%	Chloride Cl	6.48	6.48	0%
Hardness CaCO ₃	28.6	27.4	4%	Sulphate SO ₄	22.0	21.9	0%
pH	6.44	6.41	0%				
Total Suspended Solids	<4.0	<4.0	0%				
Turbidity (NTU)	0.86	1.01	16%				
Nutrients				Organic Parameters			
Ammonia Nitrogen N	0.005	0.0057	0%	Dissolved Organic Carbon C	1.59	1.56	2%
Total Kjeldahl Nitrogen N	0.155	0.188	19%	Total Organic Carbon C	1.96	1.93	2%
Nitrate Nitrogen N	<0.0050	0.0080	0%				
Nitrite Nitrogen N	<0.0050	<0.0050	0%				
Nitrite/Nitrate Nitrogen N	<0.0071	0.0080	0%				
Dissolved ortho-Phosphate P	<0.0010	<0.0010	0%				
Total Phosphate P	<0.0020	<0.0020	0%				
Total Metals				Dissolved Metals			
Aluminum T-Al	0.0928	0.0742	22%	Aluminum D-Al	0.0160	0.0203	24%
Antimony T-Sb	<0.00010	<0.00010	0%	Antimony D-Sb	<0.00010	<0.00010	0%
Arsenic T-As	<0.00010	<0.00010	0%	Arsenic D-As	<0.00010	<0.00010	0%
Barium T-Ba	0.00941	0.00918	2%	Barium D-Ba	0.00919	0.00888	0%
Beryllium T-Be	<0.00050	<0.00050	0%	Beryllium D-Be	<0.00050	<0.00050	0%
Bismuth T-Bi	<0.00050	<0.00050	0%	Bismuth D-Bi	<0.00050	<0.00050	0%
Boron T-B	<0.010	<0.010	0%	Boron D-B	<0.010	<0.010	0%
Cadmium T-Cd	0.00198	0.00193	3%	Cadmium D-Cd	0.00185	0.00183	1%
Calcium T-Ca	8.31	8.10	3%	Calcium D-Ca	8.35	8.03	4%
Chromium T-Cr	<0.00050	<0.00050	0%	Chromium D-Cr	<0.00050	<0.00050	0%
Cobalt T-Co	0.00091	0.00087	4%	Cobalt D-Co	0.00089	0.00088	1%
Copper T-Cu	0.0442	0.0418	6%	Copper D-Cu	0.0353	0.0317	11%
Iron T-Fe	0.122	0.104	16%	Iron D-Fe	<0.030	0.038	0%
Lead T-Pb	0.000816	0.000484	51%	Lead D-Pb	0.000153	0.000098	44%
Lithium T-Li	<0.0050	<0.0050	0%	Lithium D-Li	<0.0050	<0.0050	0%
Magnesium T-Mg	1.89	1.84	3%	Magnesium D-Mg	1.89	1.78	6%
Manganese T-Mn	0.0585	0.0574	2%	Manganese D-Mn	0.0574	0.0558	3%
Mercury T-Hg	<0.000050	<0.000050	0%	Mercury D-Hg	<0.000050	<0.000050	0%
Molybdenum T-Mo	<0.000050	<0.000050	0%	Molybdenum D-Mo	<0.000050	<0.000050	0%
Nickel T-Ni	0.00331	0.00312	6%	Nickel D-Ni	0.00343	0.00311	0%
Phosphorus T-P	<0.30	<0.30	0%	Phosphorus D-P	<0.30	<0.30	0%
Potassium T-K	0.883	0.848	0%	Potassium D-K	0.892	0.834	7%
Silicon T-Si	0.950	0.955	1%	Silicon D-Si	0.918	0.942	3%
Silver T-Ag	<0.000010	<0.000010	0%	Silver D-Ag	<0.000010	<0.000010	0%
Sodium T-Na	0.676	0.658	0%	Sodium D-Na	0.706	0.756	7%
Strontium T-Sr	0.0456	0.0447	2%	Strontium D-Sr	0.0449	0.0441	2%
Thallium T-Tl	<0.00010	<0.00010	0%	Thallium D-Tl	<0.00010	<0.00010	0%
Tin T-Sn	<0.00010	<0.00010	0%	Tin D-Sn	<0.00010	<0.00010	0%
Titanium T-Ti	<0.010	<0.010	0%	Titanium D-Ti	<0.010	<0.010	0%
Uranium T-U	0.000013	0.000011	0%	Uranium D-U	<0.000010	<0.000010	0%
Vanadium T-V	<0.0010	<0.0010	0%	Vanadium D-V	<0.0010	<0.0010	0%
Zinc T-Zn	0.383	0.375	2%	Zinc D-Zn	0.378	0.381	1%