

Gahcho Kué Project
Environmental Impact Statement

Addendum II
Additional Water Quality Baseline Information

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II.1 INTRODUCTION

The purpose of this addendum report is to provide supplemental baseline information on water and sediment quality in the area of the De Beers Canada Inc. (De Beers) Gahcho Kué Project (the Project). The Project is located at Kennady Lake, about 280 kilometres (km) northeast of Yellowknife, Northwest Territories (NWT). This report supplements the data presented in the Environmental Impact Statement, Annex I, Water Quality Baseline.

The objectives of the 2010 supplemental baseline program were as follows:

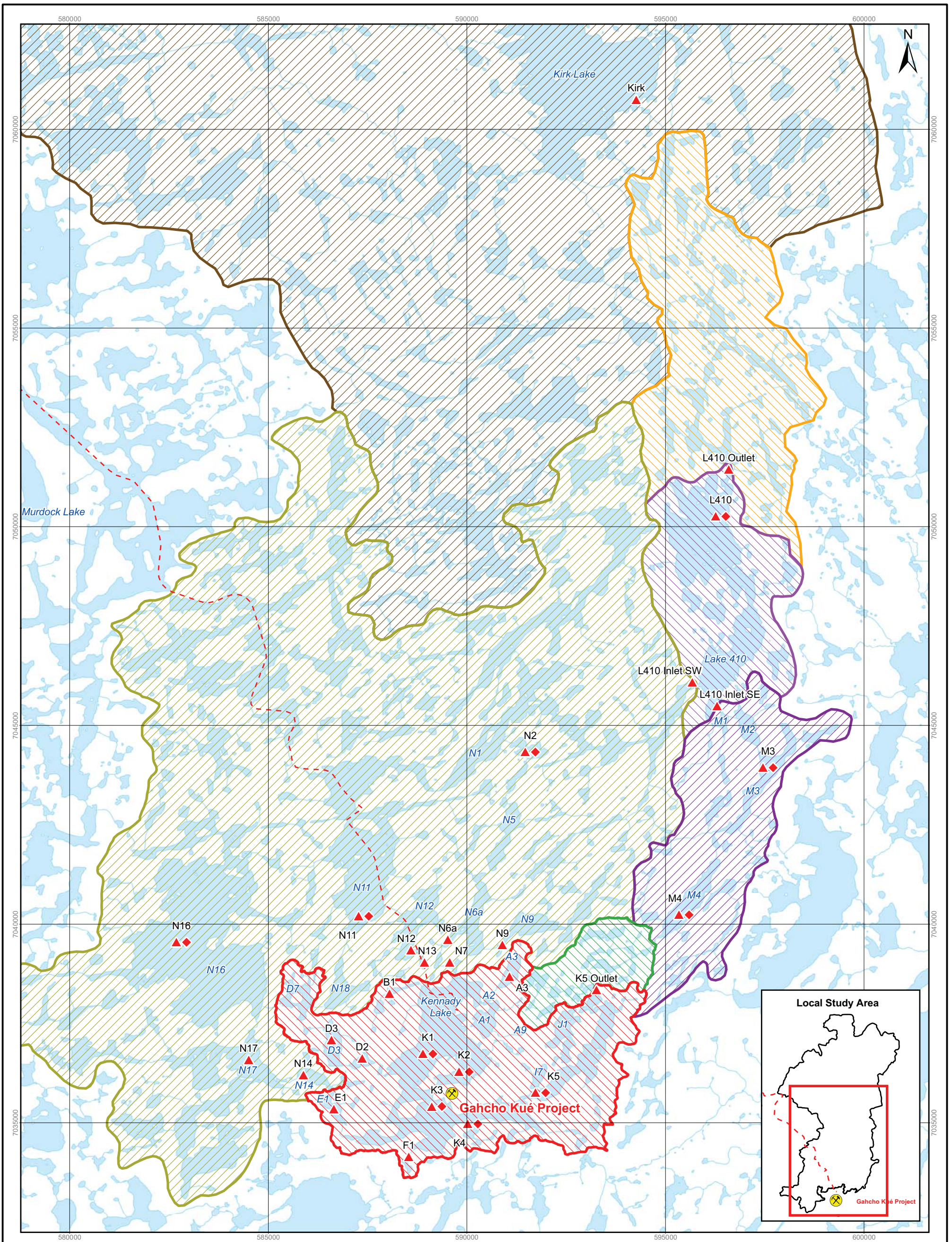
- to collect water and sediment quality data in the Kennady Lake watershed, the adjacent N watershed, the downstream M watershed, Lake 410 and Kirk Lake, to provide recent baseline information within the Local Study Area; and
- to fill identified data gaps in light of changes to the mine plan.

To collect data relevant to the updated mine plan, the N watershed was sampled with special emphasis in 2010, because the updated mine plan calls for diversion of water from Kennady Lake into the N watershed during operations. The diversions to the N watershed are planned through the A, B and D lakes. Therefore, water quality data were also collected from these lakes in 2010. Selected lakes in the E and F watersheds were sampled to provide recent water quality data for watersheds that are expected to be directly affected by mine site water management during operations. Finally, updated water quality data were collected in a subset of lakes downstream of Kennady Lake (i.e., selected M watershed lakes, Lake 410 and Kirk Lake).

II.2 STUDY AREA AND SAMPLING LOCATIONS

The 2010 sampling program was conducted within the LSA defined for the Project (Figure II.2-1). The LSA is a 739 square kilometre (km²) area that includes the watersheds of lakes and streams that may be directly affected by the Project. Study areas are described in greater detail in Annex I, Section I2.

Water and sediment quality samples were collected and field water quality profiles were measured in July 2010 in the five main basins of Kennady Lake, its outlet stream, six small lakes in the Kennady Lake watershed, ten lakes in the M watershed, two lakes in the M watershed, Lake 410 and its inflows and outlet stream, and Kirk Lake (Figure II.2-1, Table II.2-1). Sediment quality samples were collected at a subset of these locations, including the five main basins of Kennady Lake, three lakes in the N watershed, two lakes in the M watershed, and Lake 410.



LEGEND

- | | |
|--------------------|---------------------------|
| Gahcho Kué Project | Watershed Boundary |
| Winter Access Road | Kennady Lake Watershed |
| Watercourse | Watershed L |
| Waterbody | Watershed M |
| Grab Sampling | Watershed N |
| Sediment Sampling | Lake 410 Watershed |
| | Watershed P |
| | Kirk Lake Watershed |

NOTES
Base data source: National Topographic Base Data (NTDB) 1:50,000

GAHCHO KUÉ PROJECT

Surface Water and Sediment Quality Sampling Locations, July 2010

PROJECTION: UTM Zone 12	DATUM: NAD83	
Scale: 1:90,000 		
FILE No: E-SWQ-005-GIS	DATE: December 03, 2010	
JOB No: 09-1365-1004	REVISION No: 1	
OFFICE: GOLD-CAL	DRAWN: SK	

Figure II.2-1

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Table II.2-1 Sampling Details of the 2010 Water Quality field Program

Watershed and Waterbody	Station	Location (UTM, NAD83)	Sampling Date	Water Depth (m)	Water Quality Sampling and Water Quality Profile	Sediment Quality Sampling
Kennady Lake Watershed						
Kennady Lake Basin K1	K1	12.589018.7036735	10-Jul-10	7	X	X
Kennady Lake Basin K2	K2	12.589932.7036285	10-Jul-10	6	X	X
Kennady Lake Basin K3	K3	12.589244.7035406	11-Jul-10	8	X ^(D)	X
Kennady Lake Basin K4	K4	12.590148.7034971	10-Jul-10	5	X	X
Kennady Lake Basin K5	K5	12.591855.7035758	11-Jul-10	4	X	X ^(D)
Kennady Lake outlet stream	K5 Outlet	12.593264.7038349	9-Jul-10	0.5	X	–
Lake A3	A3	12.591071.7038680	13-Jul-10	6	X	–
Lake B1	B1	12.588052.7038252	13-Jul-10	2.5	X	–
Lake D2	D2	12.587364.7036619	14-Jul-10	0.3	X	–
Lake D3	D3	12.586590.7037088	16-Jul-10	1.5	X	–
Lake E1	E1	12.586650.7035339	14-Jul-10	2	X	–
Lake F1	F1	12.588534.7034144	14-Jul-10	2.5	X	–
N Watershed						
Lake N2	N2	12.591599.7044329	17-Jul-10	2	X	X
Lake N6a	N6a	12.589519.7039610	12-Jul-10	2	X	–
Lake N7	N7	12.589570.7039027	13-Jul-10	1	X	–
Lake N9	N9	12.590896.7039474	13-Jul-10	3	X	–
Lake N11	N11	12.587400.7040200	16-Jul-10	3	X	X ^(S)
Lake N12	N12	12.588588.7039342	12-Jul-10	2	X ^(D)	–
Lake N13	N13	12.588933.7039028	12-Jul-10	1	X	–
Lake N14	N14	12.586120.7036093	14-Jul-10	1.5	X	–
Lake N16	N16	12.582817.7039539	16-Jul-10	3	X	X
Lake N17	N17	12.584506.7036583	16-Jul-10	6	X	–
M Watershed						
Lake M3	M3	12.597582.7043941	17-Jul-10	3	X	X
Lake M4	M4	12.595465.7040235	16-Jul-10	6	X ^(D)	X
Lake 410 Watershed						
Lake 410	L410	12.596392.7050262	17-Jul-10	2	X ^(D)	X
Lake 410 southeast inlet stream	L410 Inlet SE	12.596298.7045483	9-Jul-10	0.1	X	–
Lake 410 southwest inlet stream	L410 Inlet SW	12.595678.7046086	9-Jul-10	0.1	X	–
Lake 410 outlet stream	L410 Outlet	12.596591.7051440	9-Jul-10	0.1	X	–
Kirk Lake						
Kirk Lake	Kirk	12.594266.7060748	18-Jul-10	0.75	X	–

Note: UTM = universal transverse Mercator; NAD = north American datum; X = sample collected; – = no sample collected.

^(D) Duplicate sample was also collected.

^(S) Split sample was also collected.

II.3 METHODS

II.3.1 WATER COLUMN PROFILES

At each station, water column profile measurements were made and Secchi depth was measured before collecting water samples. Field water quality measurements were made using a YSI 650 MDS water quality meter and a YSI 600 QS multi-parameter water quality probe, using a 30-m cable. The meter was calibrated at the start of the field program using the methods outlined by the manufacturer. The depth sensor was calibrated at the start of each day.

Temperature (°C), dissolved oxygen (DO) (mg/L and % saturation), specific conductivity ($\mu\text{S}/\text{cm}$) and pH were measured at depth intervals specific to the water depth at each station. For stations with maximum depths of less than 5 metres (m), readings were taken at half-metre intervals. For stations with maximum depths of greater than 5 m, readings were taken at one-metre intervals. Surface readings were taken at 0.3 m below the water surface and bottom readings were taken at approximately 1 m above the bottom.

II.3.2 WATER QUALITY SAMPLE COLLECTION

A Teflon or PVC Kemmerer sampler was used to collect water at each lake station, once water column profiling was completed. Water samples were collected at mid-depth, after verifying that there were no gradients with depth in water temperature or DO concentration. A gradient in these parameters that would dictate a depth-integrated sampling method was defined as a decrease in water temperature by 2°C or greater from the surface temperature, and a decrease in DO to at least half of the surface measurement.

The PVC Kemmerer sampler was used to sample lake water for analysis of non-metal parameters, and the Teflon Kemmerer sampler was used to sample water for analysis of metals. Sample bottles were triple-rinsed with sample water before filling, with the exception of glass bottles and pre-charged plastic bottles. At lake inlet and outlet stations, where water depth was 0.5 m or less, grab water samples were collected at approximately mid-stream using the individual sample bottles. Before filling sample bottles for dissolved parameters, sample water was filtered using a GeoPump with silicon tubing and a high capacity in-line filter of 0.45 μm pore size. Samples were preserved as appropriate, using preservatives provided by the analytical laboratory. Nitrile gloves were worn while collecting water samples, rinsing and filling sample bottles, and filtering and preserving samples. Water samples were stored and shipped to the analytical laboratory in coolers containing ice packs.

Quality control (QC) samples were collected as part of the field program. One field blank and one travel blank was collected and submitted for analysis at three-day intervals during the sampling program, for a total of three field blanks and three travel blanks. In addition, four duplicate water samples were collected during the sampling program, at Stations K3, N12, M4 and L410. QC samples were analyzed for the same parameters as the surface water samples.

Water quality samples were analyzed by Maxxam Analytics Inc. for a standard suite of parameters, including conventional parameters, major ions, nutrients, selected organics, and total and dissolved metals (Table II.3-1).

Water quality results were compared to the most recent Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life (CCME 1999, with updates) and Health Canada's Guidelines for Canadian Drinking Water Quality (CDWQ) (Health Canada 2008).

Concentrations in field blanks and travel blanks were considered notable if they were greater than or equal to five times the corresponding Method Detection Limit (MDL). Differences between concentrations measured in duplicate QC water samples were considered notable if the relative percent difference (RPD) value was greater than 20% and concentrations in one or both samples were greater than or equal to five times the MDL. The RPD was calculated using the following formula:

$$\text{RPD} = (|\text{difference in concentration between duplicate samples}| / \text{mean concentration}) \times 100$$

Table II.3-1 Water Quality Parameters

Group	Parameters
Field parameters	pH, specific conductivity, water temperature, dissolved oxygen
Conventional parameters	pH, specific conductivity, total dissolved solids (TDS, calculated), total suspended solids (TSS), hardness, total alkalinity, dissolved organic carbon (DOC), total organic carbon (TOC)
Major ions	bicarbonate, calcium, carbonate, chloride, magnesium, potassium, sodium, sulphate, sulphide
Nutrients	ammonia, nitrate + nitrite, total phosphorus (TP), dissolved phosphorus
Organics	total phenolics, total recoverable hydrocarbons
Total and dissolved metals	aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, strontium, sulphur, thallium, titanium, uranium, vanadium, zinc

Note: TDS = total dissolved solids; TSS = total suspended solids; DOC = dissolved organic carbon; TOC = total organic carbon; TP = total phosphorus.

II.3.3 SEDIMENT SAMPLE COLLECTION

Sediment samples were collected at 11 of the 29 stations sampled for water quality. Sediment samples were collected using an Ekman grab, after collecting water samples. Each sample was a composite sample, consisting of material from the top 5 cm of three individual grabs, mixed in a stainless steel pan before filling sample jars. Sediment QC samples included a duplicate sample from Station K5 and a split sample from Station N11. These samples were analyzed for the same parameters as lake sediment samples. Samples were stored and shipped to the analytical laboratory in coolers containing ice packs.

Sediment samples were analyzed by Maxxam Analytics Inc. for a standard suite of parameters, including particle size distribution, carbon content, a nutrient, hydrocarbons and selected total metals (Table II.3-2).

Sediment quality data were compared to the CCME freshwater Interim Sediment Quality Guidelines (ISQG) for the protection of aquatic life (CCME 2002).

Differences between concentrations measured in duplicate or split sediment QC samples were considered notable if the RPD value was greater than 20% and concentrations in one or both samples were greater than or equal to five times the MDL.

Table II.3-2 Sediment Quality Parameters

Group	Parameters
Particle size and carbon content	% sand, % silt, % clay, total inorganic carbon, total organic carbon, total carbon
Nutrients	total phosphorus
Organics	total petroleum hydrocarbons
Total metals	arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, potassium, selenium, thallium, vanadium, zinc

Note: % = percent.

II.4 RESULTS

II.4.1 WATER QUALITY

Field water quality parameters in Kennady Lake and its sub-basins were characteristic of unproductive sub-arctic lakes, and were indicative of slightly acidic pH, low conductivity consistent with low dissolved salt concentrations, and DO concentrations near saturation (Table II.4-1, detailed water quality data and field profile data are provided in Appendix II.I). Field water quality profiles indicate nearly complete vertical mixing of all sampled waterbodies in July 2010. The only parameter outside the CCME guideline range was pH; nearly half of the pH measurements made in 2010 were below the aquatic life guideline range. In the N watershed and downstream waterbodies, ranges in field measurements were similar to those in the Kennady Lake watershed (Table II.4-2). In these waterbodies, an even greater proportion of the total number of pH measurements were outside the guideline range compared to the Kennady Lake watershed.

Results for conventional water quality parameters were generally consistent with those for field parameters, and confirmed low levels of dissolved salts in the lakes sampled (Tables II.4-1 and II.4-2). Although hardness was low in all lakes sampled, it had a notably wider range in the Kennady Lake watershed compared to the N watershed and downstream waterbodies. Concentrations of major ions were low, and very similar in all waterbodies sampled. Sulphide concentration was above the chronic aquatic life guideline in about a third of the samples collected from the N watershed and downstream lakes.

Concentrations of nitrogen compounds were mostly below the corresponding analytical detection limits in all waterbodies sampled (Tables II.4-1 and II.4-2). Based on TP concentrations, the lakes sampled in the LSA are mostly oligotrophic, with occasional TP measurements in the mesotrophic range.

A number of total metals and trace elements had concentrations below detection limits at all stations sampled in 2010, including beryllium, boron, chromium, selenium, sulphur, and vanadium (Tables II.4-1 and II.4-2). Total metals with concentrations above water quality guidelines included cadmium in five samples from the Kennady Lake watershed, and cadmium and copper in the other watersheds sampled, in 11 samples and one sample, respectively.

Table II.4-1 Water Quality Summary for Kennady Lake and its Sub-basins, July 2010

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Field Measured										
pH	-	-	114	5.8 ^(c)	6.5	6.7	6.5 - 8.5	51	5.0 - 9.0	0
Temperature	°C	-	114	11	12	20	-	0	-	0
Specific Conductivity	µS/cm	-	114	9	13	14	-	0	-	0
Dissolved Oxygen	mg/L	-	114	7.8	10	10	6.5	0	-	0
Conventional Parameters										
Specific Conductivity	µS/cm	1	12	9	13	13	-	0	-	0
Hardness	mg/L	0.5	6	1.3	4.6	4.9	-	0	-	0
pH	-	-	12	6.2 ^(c)	6.6	6.8	6.5 - 8.5	3	5.0 - 9.0	0
Total Alkalinity	mg/L	0.5	12	2.3	3.1	4.1	-	0	-	0
Total Dissolved Solids, calculated	mg/L	-	12	5	17	38	-	0	-	0
Total Organic Carbon	mg/L	0.5	12	2.8	3.6	8.4	-	0	-	0
Dissolved Organic Carbon	mg/L	0.5	12	2.7	3.6	8.1	-	0	-	0
Total Suspended Solids	mg/L	0.5	12	0.5	1	5	-	0	-	0
Major Ions										
Bicarbonate	mg/L	0.5	12	2.8	3.8	5	-	0	-	0
Calcium	mg/L	0.005	12	0.66	1	1.2	-	0	-	0
Carbonate	mg/L	0.5	12	<0.5	-	<0.5	-	0	-	0
Chloride	mg/L	1	12	1	1	1	230	0	-	0
Magnesium	mg/L	0.05	12	0.32	0.5	0.52	-	0	-	0
Potassium	mg/L	0.05	12	0.24	0.4	0.43	-	0	-	0

Table II.4-1 Water Quality Summary for Kennady Lake and its Sub-basins, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Sodium	mg/L	0.05	12	0.39	0.55	0.59	-	0	-	0
Sulphate	mg/L	1	12	<1	-	<1	-	0	-	0
Sulphide	µg/L	2	12	<2	-	2	2.4	0	-	0
Nutrients										
Nitrate + Nitrite	mg-N/L	0.003	12	<0.003	-	0.078	2.93	0	10	0
Ammonia, total	mg-N/L	0.05	12	<0.05	-	<0.05	21	0	-	0
Phosphorus, total	mg-P/L	0.001-0.003	12	0.004	0.0055	0.009	-	0	-	0
Phosphorus, dissolved	mg-P/L	0.001-0.003	12	0.003	0.003	0.010	-	0	-	0
Organics										
Total Phenolics	µg/L	2	12	<2	-	2	5	0	-	0
Total Recoverable Hydrocarbons	mg/L	2	12	<2	-	<2	-	0	-	0
Total Metals										
Aluminum	µg/L	0.2	12	5.5	12	51	100	0	100	0
Antimony	µg/L	0.02	12	<0.02	-	0.02	-	0	5.5	0
Arsenic	µg/L	0.02	12	0.1	0.12	0.27	5	0	10	0
Barium	µg/L	0.02	12	1.7	2.1	3.7	-	0	1000	0
Beryllium	µg/L	0.01	12	<0.01	-	<0.01	-	0	4	0
Boron	µg/L	20	12	<20	-	<20	-	0	5000	0
Cadmium	µg/L	0.005	13	0.0021	0.0024^(c)	0.0032^(c)	0.0023	5	5	0
Calcium	µg/L	50	12	640	980	1130	-	0	-	0

Table II.4-1 Water Quality Summary for Kennady Lake and its Sub-basins, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Chromium	µg/L	0.1	12	<0.1	-	<0.1	1	0	50	0
Cobalt	µg/L	0.005	12	0.02	0.03	0.1	-	0	-	0
Copper	µg/L	0.05	12	0.28	0.53	1.2	2	0	1300	0
Iron	µg/L	0.2	12	14	32	209	300	0	300	0
Lead ^(c)	µg/L	0.005	12	0.006	0.017	0.08	1	0	10	0
Lithium	µg/L	0.2	12	0.6	0.9	1.4	-	0	-	0
Magnesium	µg/L	50	12	310	505	550	-	0	-	0
Manganese	µg/L	0.05	12	1.6	3.3	5.5	-	0	50	0
Mercury	µg/L	0.0006	13	<0.0006	-	<0.0006	0.026	0	1	0
Molybdenum	µg/L	0.05	12	<0.05	-	0.15	73	0	-	0
Nickel	µg/L	0.02	12	0.19	0.25	0.48	25	0	340	0
Potassium	µg/L	50	12	250	385	440	-	0	-	0
Selenium	µg/L	0.04	12	<0.04	-	<0.04	1	0	10	0
Silver	µg/L	0.005	13	0.00025	0.002	0.0057	0.1	0	-	0
Sodium	µg/L	50	12	390	550	620	-	0	-	0
Strontium	µg/L	0.05	12	4.2	6.5	7.3	-	0	-	0
Sulphur	µg/L	10000	12	<10000	-	<10000	-	0	-	0
Thallium	µg/L	0.002	12	<0.002	<0.002	0.003	0.8	0	0.13	0
Titanium	µg/L	0.5	12	<0.5	-	0.6	-	0	-	0
Uranium	µg/L	0.002	12	0.003	0.008	0.024	-	0	-	0
Vanadium	µg/L	0.2	12	<0.2	-	<0.2	-	0	-	0
Zinc	µg/L	0.1	12	0.1	1	2.3	30	0	5100	0

Table II.4-1 Water Quality Summary for Kennady Lake and its Sub-basins, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Dissolved Metals										
Aluminum	µg/L	0.2	12	3.2	8.2	39	-	0	-	0
Antimony	µg/L	0.02	12	0.01	0.04	0.09	-	0	-	0
Arsenic	µg/L	0.02	12	0.09	0.12	0.26	-	0	-	0
Barium	µg/L	0.02	12	1.6	2.1	3.2	-	0	-	0
Beryllium	µg/L	0.01	12	<0.01	-	<0.01	-	0	-	0
Boron	µg/L	20	12	<20	-	<20	-	0	-	0
Cadmium	µg/L	0.005	12	<0.005	-	<0.005	-	0	-	0
Chromium	µg/L	0.1	12	<0.1	-	<0.1	-	0	-	0
Cobalt ^(c)	µg/L	0.005	12	0.2	0.48	1.5	-	0	-	0
Copper	µg/L	0.05	12	0.32	0.56	1.2	-	0	-	0
Iron	µg/L	0.2	12	3	14	112	-	0	-	0
Lead ^(c)	µg/L	0.005	12	0.006	0.018	0.069	-	0	-	0
Lithium	µg/L	0.2	12	0.6	0.9	1.3	-	0	-	0
Manganese	µg/L	0.05	12	1.2	2.3	5.2	-	0	-	0
Mercury	µg/L	0.0006	12	0.001	0.003	0.009	-	0	-	0
Molybdenum	µg/L	0.05	12	<0.05	-	0.14	-	0	-	0
Nickel	µg/L	0.02	12	0.23	0.29	0.59	-	0	-	0
Selenium	µg/L	0.04	12	<0.04	-	<0.04	-	0	-	0
Silver	µg/L	0.005	12	<0.005	-	<0.005	-	0	-	0
Strontium	µg/L	0.05	12	4	6.6	7.1	-	0	-	0
Sulphur	µg/L	10000	12	<10000	-	<10000	-	0	-	0

Table II.4-1 Water Quality Summary for Kennady Lake and its Sub-basins, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Thallium	µg/L	0.002	12	<0.002	-	0.004	-	0	-	0
Titanium	µg/L	0.5-3	12	<0.5	-	<0.5	-	0	-	0
Uranium	µg/L	0.002	12	0.003	0.0065	0.023	-	0	-	0
Vanadium	µg/L	0.2	12	<0.2	-	<0.2	-	0	-	0
Zinc ^(c)	µg/L	0.1	12	0.4	0.9	2.1	-	0	-	0

Note: °C = degree Celsius; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; µg/L = micrograms per litre; % = percent; n = number of samples.

Bold values indicate concentrations above guidelines, or outside guideline ranges.

- (a) Canadian Environmental Quality Guidelines (CCME 1999, with updates to 2009).
- (b) The human health guideline is based on the CCME drinking water guideline (Health Canada 2008).
- (c) Data are suspect for this parameter (i.e., potentially affected by sample contamination) based on QC sample results.
- (C) Concentration is higher than the chronic aquatic life guideline or beyond the recommended pH or DO concentration range.
- (H) Concentration higher than the human health guideline or beyond the recommended pH range.

Table II.4-2 Water Quality Summary for Lakes in the N Watershed and Watersheds Downstream of Kennady Lake, July 2010

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Field Measured										
pH	-	-	100	6.0 ^(c)	6.4 ^(c)	6.7	6.5 - 8.5	80	5.0 - 9.0	0
Temperature	°C	-	100	7.3	17	21	-	0	-	0
Specific Conductivity	µS/cm	-	100	9	11	13	-	0	-	0
Dissolved Oxygen	mg/L	-	100	8.8	9.3	16	6.5	0	-	0
Conventional Parameters										
Specific Conductivity	µS/cm	1	16	9	11	14	-	0	-	0
Hardness	mg/L	0.5	3	0.9	1	1.2	-	0	-	0
pH	-	-	16	6.3 ^(c)	6.5	6.8	6.5 - 8.5	8	5.0 - 9.0	0
Total Alkalinity	mg/L	0.5	16	1.9	2.9	3.9	-	0	-	0
Total Dissolved Solids, calculated	mg/L	-	16	5	14	26	-	0	-	0
Total Organic Carbon	mg/L	0.5	16	2.9	4.0	7.2	-	0	-	0
Dissolved Organic Carbon	mg/L	0.5	16	2.8	3.8	6.5	-	0	-	0
Total Suspended Solids	mg/L	0.5	16	0.5	1.5	3	-	0	-	0
Major Ions										
Bicarbonate	mg/L	0.5	16	2.3	3.5	4.8	-	0	-	0
Calcium	mg/L	0.005	16	0.68	0.88	1.1	-	0	-	0
Carbonate	mg/L	0.5	16	<0.5	-	<0.5	-	0	-	0
Chloride	mg/L	1	16	<1	-	1	230	0	-	0
Magnesium	mg/L	0.05	16	0.31	0.42	0.54	-	0	-	0
Potassium	mg/L	0.05	16	0.3	0.34	0.41	-	0	-	0

Table II.4-2 Water Quality Summary for Lakes in the N Watershed and Watersheds Downstream of Kennady Lake, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Sodium	mg/L	0.05	16	0.37	0.49	0.63	-	0	-	0
Sulphate	mg/L	1	16	<1	-	<1	-	0	-	0
Sulphide	µg/L	2	16	2	3 ^(c)	4 ^(c)	2.3	5	-	0
Nutrients										
Nitrate + Nitrite	mg-N/L	0.003	16	<0.003	-	0.006	2.93	0	10	0
Ammonia, total	mg-N/L	0.05	16	<0.05	-	0.22	20	0	-	0
Phosphorus, total	mg-P/L	0.001-0.003	16	0.003	0.006	0.015	-	0	-	0
Phosphorus, dissolved	mg-P/L	0.001-0.003	16	0.002	0.003	0.007	-	0	-	0
Organics										
Total Phenolics	µg/L	2	16	<2	-	3	5	0	-	0
Total Recoverable Hydrocarbons	mg/L	2	16	<2	-	<2	-	0	-	0
Total Metals										
Aluminum	µg/L	0.2	16	6.7	15	67	100	0	100	0
Antimony	µg/L	0.02	16	<0.02	-	0.02	-	0	5.5	0
Arsenic	µg/L	0.02	16	0.07	0.11	0.23	5	0	10	0
Barium	µg/L	0.02	16	1.6	2.2	2.6	-	0	1000	0
Beryllium	µg/L	0.01	16	<0.01	-	<0.01	-	0	4	0
Boron	µg/L	20	16	<20	-	<20	-	0	5000	0

Table II.4-2 Water Quality Summary for Lakes in the N Watershed and Watersheds Downstream of Kennady Lake, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Cadmium	µg/L	0.002-0.005	18	0.0021^(c)	0.0044	0.017^(c)	0.00063	11	5	0
Calcium	µg/L	50	16	720	930	1150	-	0	-	0
Chromium	µg/L	0.1	16	<0.1	-	<0.1	1	0	50	0
Cobalt	µg/L	0.005	16	0.019	0.032	0.067	-	0	-	0
Copper	µg/L	0.05	16	0.4	0.6	4.7^(c)	2	1	1300	0
Iron	µg/L	0.2	16	18	43	192	300	0	300	0
Lead ^(c)	µg/L	0.005	16	0.006	0.027	0.36	1	0	10	0
Lithium	µg/L	0.2	16	0.5	0.9	1.2	-	0	-	0
Magnesium	µg/L	50	16	310	415	520	-	0	-	0
Manganese	µg/L	0.05	16	1.2	2.8	4.8	-	0	50	0
Mercury	µg/L	0.0006	18	0.0006	0.006	0.01	0.026	0	1	0
Molybdenum	µg/L	0.05	16	<0.05	-	0.06	73	0	-	0
Nickel	µg/L	0.02	16	0.15	0.24	0.62	25	0	340	0
Potassium	µg/L	50	16	300	345	430	-	0	-	0
Selenium	µg/L	0.04	16	<0.04	-	<0.04	1	0	10	0
Silver	µg/L	0.005	18	0.0005	0.0028	0.0095	0.1	0	-	0
Sodium	µg/L	50	16	360	490	620	-	0	-	0
Strontium	µg/L	0.05	16	4.3	5.7	7	-	0	-	0
Sulphur	µg/L	10000	16	<10000	-	<10000	-	0	-	0
Thallium	µg/L	0.002	16	<0.002	-	0.003	0.8	0	0.13	0

Table II.4-2 Water Quality Summary for Lakes in the N Watershed and Watersheds Downstream of Kennady Lake, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Titanium	µg/L	0.5	16	<0.5	-	<0.5	-	0	-	0
Uranium	µg/L	0.002	16	0.003	0.01	0.016	-	0	-	0
Vanadium	µg/L	0.2	16	<0.2	-	<0.2	-	0	-	0
Zinc	µg/L	0.1	16	0.5	0.95	14	30	0	5100	0
Dissolved Metals										
Aluminum	µg/L	0.2	16	2.9	8.8	54	-	0	-	0
Antimony	µg/L	0.02	16	0.01	0.06	0.1	-	0	-	□
Arsenic	µg/L	0.02	16	0.07	0.11	1.5	-	0	-	0
Barium	µg/L	0.02	16	1.5	2.1	2.5	-	0	-	0
Beryllium	µg/L	0.01	16	<0.01	-	0.02	-	0	-	0
Boron	µg/L	20	16	<20	-	<300	-	0	-	0
Cadmium	µg/L	0.005	16	<0.005	-	<0.03	-	0	-	0
Chromium	µg/L	0.1	16	<0.1	-	<0.5	-	0	-	0
Cobalt ^(c)	µg/L	0.005	16	0.11	0.8	3.7	-	0	-	0
Copper	µg/L	0.05	16	0.36	0.64	0.97	-	0	-	0
Iron	µg/L	0.2	16	0.5	16	144	-	0	-	0
Lead ^(c)	µg/L	0.005	16	0.0025	0.026	0.061	-	0	-	0
Lithium	µg/L	0.2	16	0.7	0.9	1.5	-	0	-	0
Manganese	µg/L	0.05	16	0.89	2.2	7.6	-	0	-	0
Mercury	µg/L	0.0006	16	0.001	0.005	0.009	-	0	-	0
Molybdenum	µg/L	0.05	16	<0.05	-	0.06	-	0	-	0

Table II.4-2 Water Quality Summary for Lakes in the N Watershed and Watersheds Downstream of Kennady Lake, July 2010 (continued)

Parameter	Unit	Detection Limit	n	Minimum	Median	Maximum	Water Quality Guidelines			
							Aquatic Life - Chronic ^(a)		Human Health - Chronic ^(b)	
							Value	Number Above Guideline	Value	Number Above Guideline
Nickel	µg/L	0.02	16	0.17	0.32	0.9	-	0	-	0
Selenium	µg/L	0.04	16	<0.04	-	<0.2	-	0	-	0
Silver	µg/L	0.005	16	<0.005	-	<0.03	-	0	-	0
Strontium	µg/L	0.05	16	4.1	5.8	6.6	-	0	-	0
Sulphur	µg/L	10000	16	<10000	-	<10000	-	0	-	0
Thallium	µg/L	0.002	16	<0.002	-	0.003	-	0	-	0
Titanium	µg/L	0.5-3	16	<0.5	-	<3	-	0	-	0
Uranium	µg/L	0.002	16	0.004	0.0095	0.025	-	0	-	0
Vanadium	µg/L	0.2	16	<0.2	-	<1	-	0	-	0
Zinc ^(c)	µg/L	0.1	16	0.6	1.1	5.6	-	0	-	0

Note: °C = degree Celsius; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; µg/L = micrograms per litre; % = percent; n = number of samples.

Bold values indicate concentrations above guidelines, or outside guideline ranges.

- (a) Canadian Environmental Quality Guidelines (CCME 1999, with updates to 2009).
- (b) The human health guideline is based on the CCME drinking water guideline (Health Canada 2008).
- (c) Data are suspect for this parameter (i.e., potentially affected by sample contamination) based on QC sample results.
- (C) Concentration is higher than the chronic aquatic life guideline or beyond the recommended pH or DO concentration range.
- (H) Concentration higher than the human health guideline or beyond the recommended pH range.

II.4.2 SEDIMENT QUALITY

Sediment quality data collected in 2010 indicate that bottom sediments in the N watershed and downstream waterbodies consist mostly of sand; particle size data are not available for stations in the Kennady Lake watershed (Tables II.4-3, II.4-4 and II.4-5; detailed sediment quality data are provided in Appendix II.I). The high water and organic content, and fine particles present in the Kennady Lake sediment samples resulted in particle size analysis not being done due to insufficient sample after drying. Total organic carbon content of sediments was in the moderate range (i.e., 10 to 20%) in the Kennady Lake watershed, the M watershed lakes and Lake 410, but was more variable in the N watershed (<1 to 17%).

Available phosphorus concentration varied over a relatively narrow range and total petroleum hydrocarbons were occasionally present at detectable concentrations (Tables II.4-3, II.4-4 and II.4-5). Metals above the CCME interim sediment quality guidelines in Kennady Lake and its sub-basins included arsenic, cadmium, chromium, and copper. Chromium and copper had concentrations above the guideline in the N watershed and Lake 410, and arsenic, cadmium, chromium, copper, and zinc were above the guideline in the M watershed lakes.

Table II.4-3 Sediment Quality Summary for Kennady Lake and its Sub-basins, July 2010

Parameter	Unit	Detection Limit		Kennady Lake and its Sub-basins					Interim Sediment Quality Guideline (ISQG)
		Minimum	Maximum	n	Minimum	Median	Maximum	Number Above Guideline	
Carbon Content									
Total Inorganic Carbon	%	0.02	0.02	5	0.34	0.47	0.61	-	-
Total Organic Carbon	%	0.1	0.2	5	10	13	15	-	-
Total Carbon	%	0.2	0.2	5	11	13	15	-	-
Nutrients and Organics									
Available Phosphorus	µg/g	1	2	5	7	23	37	-	-
Total Petroleum Hydrocarbons	µg/g	200	400	6	<200	<200	880	-	-
Total Metals									
Arsenic	µg/g	1	1	5	3	4	8	2	5.9
Barium	µg/g	10	10	5	68	70	91	-	-
Cadmium	µg/g	0.1	0.1	5	0.3	0.5	0.7	1	0.6
Chromium	µg/g	1	1	5	28	37	41	2	37.3
Cobalt	µg/g	1	1	5	8	11	22	-	-
Copper	µg/g	5	5	5	47	71	110	5	35.7
Lead	µg/g	1	1	5	6	7	9	0	35
Mercury	µg/g	0.05	0.05	5	0.05	0.06	0.09	0	0.17
Molybdenum	µg/g	0.4	0.4	5	2.6	3	4.9	-	-
Nickel	µg/g	1	1	5	31	33	48	-	-
Potassium	µg/g	2	4	5	12	39	505	-	-
Selenium	µg/g	0.5	0.5	5	0.7	0.8	1.3	-	-
Thallium	µg/g	0.3	0.3	5	<0.3	<0.3	0.4	-	-
Vanadium	µg/g	1	1	5	33	36	43	-	-
Zinc	µg/g	10	10	5	65	73	120	0	123

Note: **Bolded** numbers identify values above guidelines.
 % = percent; µg/g = micrograms per gram, dry weight; - = not applicable.
 ISQG = interim sediment quality guideline (CCME 2002).

Table II.4-4 Sediment Quality Summary for N Watershed Lakes, July 2010

Parameter	Unit	Detection Limit		N Watershed Lakes					Interim Sediment Quality Guideline (ISQG)
		Minimum	Maximum	n	Minimum	Median	Maximum	Number Above Guideline	
Particle Size and Carbon Content									
Sand	%	2	2	3	71	73	93	-	-
Silt	%	2	2	3	6	22	24	-	-
Clay	%	2	2	3	<2	5	5	-	-
Total Inorganic Carbon	%	0.02	0.02	3	<0.02	0.94	0.95	-	-
Total Organic Carbon	%	0.02	0.2	4	0.39	7.7	17	-	-
Total Carbon	%	0.02	0.2	4	0.39	8.19	18	-	-
Nutrients and Organics									
Available Phosphorus	µg/g	1	1	4	9	17	27	-	-
Total Petroleum Hydrocarbons	µg/g	50	600	3	<600	-	63	-	-
Total Metals									
Arsenic	µg/g	1	1	3	<1	2	2	0	5.9
Barium	µg/g	10	10	3	18	68	68	-	-
Cadmium	µg/g	0.1	0.1	3	<0.1	0.3	0.3	0	0.6
Chromium	µg/g	1	1	3	7	59	82	2	37.3
Cobalt	µg/g	1	1	3	3	6	8	-	-
Copper	µg/g	5	5	3	7	40	47	2	35.7
Lead	µg/g	1	1	3	2	4	6	0	35
Mercury	µg/g	0.05	0.05	3	<0.05	-	<0.05	0	0.17
Molybdenum	µg/g	0.4	0.4	3	<0.4	2	2.3	-	-
Nickel	µg/g	1	1	3	7	37	50	-	-
Potassium	µg/g	2	2	4	8	59.5	156	-	-
Selenium	µg/g	0.5	0.5	3	<0.5	<0.5	0.7	-	-
Thallium	µg/g	0.3	0.3	3	<0.3	-	<0.3	-	-
Vanadium	µg/g	1	1	3	7	23	29	-	-
Zinc	µg/g	10	10	3	11	61	61	0	123

Note: **Bolded** numbers identify values above guidelines.
 % = percent; µg/g = micrograms per gram, dry weight; - = not applicable.
 ISQG = interim sediment quality guideline (CCME 2002).

Table II.4-5 Sediment Quality in Lake 410 and M Watershed Lakes, July 2010

Parameter	Unit	Detection Limit		Lake 410	Lake M3	Lake M4	Interim Sediment Quality Guideline (ISQG)
		Minimum	Maximum				
Particle Size and Carbon Content							
Sand	%	2	2	73	64	51	-
Silt	%	2	2	24	26	36	-
Clay	%	2	2	3	10	13	-
Total Inorganic Carbon	%	0.02	0.02	1.6	0.89	0.6	-
Total Organic Carbon	%	0.02	0.2	18	13	10	-
Total Carbon	%	0.02	0.2	20	14	11	-
Nutrients and Organics							
Available Phosphorus	µg/g	1	2	23	5	9	-
Total Petroleum Hydrocarbons	µg/g	50	800	<800	<600	<500	-
Total Metals							
Arsenic	µg/g	1	1	2	10	7	5.9
Barium	µg/g	10	10	69	84	100	-
Cadmium	µg/g	0.1	0.1	0.3	0.5	1	0.6
Chromium	µg/g	1	1	79	42	60	37.3
Cobalt	µg/g	1	1	7	29	18	-
Copper	µg/g	5	5	40	62	85	35.7
Lead	µg/g	1	1	5	7	7	35
Mercury	µg/g	0.05	0.05	<0.05	0.13	0.08	0.17
Molybdenum	µg/g	0.4	0.4	1.4	4.6	6.4	-
Nickel	µg/g	1	1	50	39	45	-
Potassium	µg/g	2	4	159	82	50	-
Selenium	µg/g	0.5	0.5	0.7	0.9	1.5	-
Thallium	µg/g	0.3	0.3	<0.3	<0.3	<0.3	-
Vanadium	µg/g	1	1	23	48	65	-
Zinc	µg/g	10	10	50	130	150	123

Note: **Bolded** numbers identify values above guidelines.
 % = percent; µg/g = micrograms per gram, dry weight; - = not applicable.
 ISQG = interim sediment quality guideline (CCME 2002).

II.5 QUALITY CONTROL

Total metal results for two of the travel blanks (10 July and 12 July, 2010) were invalidated, because the results were obtained by analyzing the contents of the sulphide bottle, which contained a preservative inappropriate for analysis of metals. Specific conductivity was above the QC assessment criterion in all blanks, but was well below concentrations in surface water samples (Appendix II.I, Table II.I-2). Thus, laboratory specific conductivity data are of acceptable quality.

Concentrations of total lead, dissolved cobalt, dissolved lead, and dissolved zinc were above the QC assessment criterion in one, two, or all three field blanks; dissolved zinc concentration was above the QC criterion in one travel blank (Appendix II.I, Table II.I-2). Concentrations of these metals in the blanks were within or close to the ranges measured in surface water samples, indicating the potential for sample contamination during sample collection, handling, transport, or analysis. Blank sample results for these parameters were verified by the analytical laboratory, but the possibility remains that the laboratory-provided water used to prepare the field blanks contained elevated concentrations of these metals. Thus, the data for the affected parameters were flagged in the summary tables and appendix tables. There were no data quality concerns for other parameters.

A number of parameters had RPD values for duplicate water sample pairs above the QC assessment criterion of 20%, amounting to exceedances for 13 to 18% of the total number of parameters analyzed in the four duplicate sample pairs (Appendix II.I, Table II.I-2). This represents a moderate level of field sampling and analytical precision, and does not influence the interpretation of the 2010 baseline data.

Six of the 20 parameters (i.e., 30%) analyzed in duplicate sediment samples had RPD values above 20% (Appendix II.I, Table II.I-3), also indicating a moderate level of field sampling and analytical precision. This is an expected result for sediment quality samples due to the inherently high spatial variability of sediment physical characteristics, which is a major factor influencing sediment chemistry. Only one parameter had an RPD value slightly above the QC criterion in the split sediment sample pair, indicating a high level of analytical precision.

II.6 REFERENCES

CCME (Canadian Council of Ministers of the Environment). 1999, with updates to 2010. Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment, Winnipeg, MB.

CCME. 2002. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life: Summary Tables, Updated 2002. In: Canadian Environmental Quality Guidelines (1999). Canadian Council of Ministers of the Environment, Winnipeg, MB.

Health Canada. 2008. Summary of Guidelines for Canadian Drinking Water Quality. Prepared by the Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial-Territorial Committee on Environmental and Occupational Health.

APPENDIX II.I

2010 WATER AND SEDIMENT QUALITY DATA

Table II.I-1 Field Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010

Station	Date (dd-mmm-yy)	Location (UTM, NAD83, Zone 12)	Secchi Depth (m)	Depth (m)	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH
L410 Outlet	9-Jul-10	596536 7051491	-	0.30	12.41	11	10.28	96.3	6.42
L410 Inlet SE	9-Jul-10	596319 7045461	-	0.30	12.98	13	10.22	96.9	6.40
L410 Inlet SW	9-Jul-10	595768 7046006	-	0.40	12.40	10	10.17	95.3	6.42
K5	9-Jul-10	593229 7038400	-	0.40	13.18	13	10.01	95.4	6.49
K4	10-Jul-10	590137 7034977	6.3	0.30	12.79	13	10.24	95.2	6.64
				1.00	12.10	13	10.20	94.9	6.68
				2.00	12.80	13	10.19	94.7	6.61
				3.00	12.60	13	10.18	94.6	6.70
				4.00	12.05	13	10.15	94.3	6.70
				5.00	12.04	13	10.13	94.1	6.67
				6.00	12.03	13	10.14	94.1	6.68
				7.00	12.03	13	10.13	94.0	6.64
				8.00	12.03	13	10.11	93.9	6.68
				9.00	12.00	13	10.10	93.7	6.70
10.00	11.93	13	10.08	93.4	6.70				
10.90	BOTTOM	-	-	-	-				
K2	10-Jul-10	589924 7036290	6.0	0.30	11.61	13	10.38	95.5	6.52
				1.00	11.57	13	10.36	95.2	6.55
				2.00	11.54	13	10.34	95.0	6.55
				3.00	11.52	13	10.33	94.8	6.59
				4.00	11.51	13	10.31	94.6	6.59
				5.00	11.51	13	10.30	94.5	6.61
				6.00	11.49	13	10.28	94.3	6.61
				7.00	11.49	13	10.20	94.2	6.62
				8.00	11.46	13	10.27	94.1	6.63
				9.00	11.44	13	10.25	93.9	6.64
				10.00	11.39	13	10.24	93.7	6.62
				11.00	11.31	13	10.22	93.4	6.64
12.30	BOTTOM	-	-	-	-				
K1	10-Jul-10	589018 7036724	6.5	0.30	11.60	13	10.25	94.2	6.45
				1.00	11.57	13	10.23	94.1	6.51
				2.00	11.56	13	10.21	93.8	6.54
				3.00	11.56	13	10.19	93.6	6.53
				4.00	11.54	13	10.18	93.5	6.56
				5.00	11.54	13	10.16	93.3	6.61
				6.00	11.54	13	10.16	93.2	6.61
				7.00	11.54	13	10.14	93.1	6.62
				8.00	11.53	13	10.12	92.9	6.66
				9.00	11.53	13	10.10	92.7	6.62
				10.00	11.53	13	10.09	92.6	6.68
				11.00	11.52	13	10.09	92.6	6.66
				12.00	11.51	13	10.08	92.5	6.63
				13.00	11.50	13	10.06	92.3	6.66
14.00	11.42	13	10.04	92.0	6.68				
15.00	BOTTOM	-	-	-	-				
K3	11-Jul-10	589232 7035411	6.8	0.30	12.63	13	10.33	97.2	6.54
				1.00	12.52	13	10.31	96.8	6.59
				2.00	12.41	13	10.30	96.5	6.63
				3.00	12.38	13	10.29	96.3	6.66
				4.00	12.33	13	10.26	95.9	6.67
				5.00	12.30	13	10.24	95.7	6.69
				6.00	12.29	13	10.22	95.5	6.69
				7.00	12.25	13	10.17	95.0	6.72
				8.00	12.19	13	10.15	94.6	6.68
				9.00	12.08	13	10.14	94.2	6.70
				10.00	10.02	13	10.13	94.0	6.69
				11.00	11.99	13	10.10	93.7	6.68
				12.00	11.93	13	10.07	93.3	6.69
				13.00	11.82	13	10.04	92.7	6.68
				14.00	11.71	13	9.99	92.1	6.67
				15.00	11.44	13	9.79	89.7	6.63
16.00	11.12	13	9.73	88.4	6.57				
16.60	BOTTOM	-	-	-	-				

Table II.I-1 Field Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Station	Date (dd-mmm-yy)	Location (UTM, NAD83, Zone 12)	Secchi Depth (m)	Depth (m)	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH
K5	11-Jul-10	591852 7035760	6.0	0.30	13.28	13	9.91	94.7	6.40
				1.00	13.16	13	9.90	94.3	6.41
				2.00	13.05	13	9.87	93.8	6.45
				3.00	12.92	13	9.85	93.3	6.48
				4.00	12.76	13	9.84	92.9	6.49
				5.00	12.64	13	9.81	92.4	6.52
				6.00	12.62	13	9.78	92.0	6.52
				7.00	12.61	13	9.77	91.9	6.55
				8.00	12.55	13	9.73	91.4	6.56
			9.20	BOTTOM	-	-	-	-	
N12	12-Jul-10	588449 7039297	to bottom	0.50	15.02	10	9.93	98.6	6.45
				1.00	14.92	10	9.92	98.2	6.40
				1.50	14.85	10	9.90	98.0	6.40
				2.00	14.81	10	9.89	97.7	6.42
				2.50	14.72	10	9.90	97.6	6.43
				3.00	14.71	10	9.91	97.6	6.46
				3.30	BOTTOM	-	-	-	-
N13	12-Jul-10	588863 7038977	to bottom	0.25	17.61	11	9.52	99.8	6.35
				0.50	17.39	11	9.51	99.3	6.31
				0.75	17.27	11	9.50	98.9	6.29
				1.00	17.19	11	9.51	98.8	6.29
				1.25	16.95	11	9.46	97.7	6.31
				1.50	16.17	11	9.49	96.5	6.30
				1.75	15.83	12	9.42	95.1	3.26
				2.10	BOTTOM	-	-	-	-
N6	12-Jul-10	589579 7039629	to bottom	0.50	17.76	11	9.68	101.8	6.43
				1.00	17.16	11	9.69	100.6	6.41
				1.50	16.84	11	9.71	100.1	6.41
				2.00	16.32	11	9.81	100.1	6.42
				2.50	16.12	11	9.84	99.8	6.44
				3.00	15.68	11	9.83	99.0	6.44
				3.40	-	-	-	-	-
N9	13-Jul-10	590997 7039655	6.0	0.30	16.18	12	9.69	101.3	6.71
				1.00	16.08	12	9.90	100.5	6.69
				2.00	14.94	12	10.14	100.4	6.69
				3.00	14.48	12	10.13	99.3	6.66
				4.00	13.88	12	10.11	97.9	6.67
				5.00	13.58	12	10.07	96.8	6.64
				6.00	13.16	13	9.86	93.9	6.63
				6.50	BOTTOM	-	-	-	-
A3	13-Jul-10	591078 7038703	6.8	0.30	16.26	14	9.87	100.6	6.43
				1.00	16.14	14	9.85	100.1	6.44
				2.00	15.46	14	9.95	99.6	6.45
				3.00	14.47	14	10.04	98.3	6.46
				4.00	13.86	13	10.05	97.2	6.47
				5.00	13.36	14	10.06	96.2	6.47
				6.00	13.02	14	10.05	95.4	6.48
				7.00	12.45	14	9.97	93.5	6.48
				8.00	12.27	14	9.94	92.9	6.48
				9.00	12.17	14	9.89	92.1	6.49
				10.00	12.05	14	9.76	90.7	6.50
				11.00	11.91	14	9.60	88.9	6.50
				12.00	11.65	14	9.27	85.8	6.49
12.60	BOTTOM	-	-	-	-				
N7	13-Jul-10	589667 7038942	to bottom	0.25	20.52	11	8.99	99.9	6.23
				0.50	20.44	11	8.97	99.5	6.24
				0.75	20.35	11	8.92	98.9	6.21
				1.00	19.98	11	8.95	98.5	6.21
				1.25	18.57	11	9.20	98.1	6.19
				1.50	17.27	11	9.03	94.4	6.14
				1.75	16.58	12	8.78	90.1	6.02
				2.00	BOTTOM	-	-	-	-

Table II.I-1 Field Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Station	Date (dd-mmm-yy)	Location (UTM, NAD83, Zone 12)	Secchi Depth (m)	Depth (m)	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH
B1	13-Jul-10	588058 7038243	2.5	0.50	20.31	9	9.05	100.1	5.91
				1.00	20.06	9	9.06	99.8	5.90
				1.50	19.90	9	9.03	99.0	5.93
				2.00	17.23	9	9.35	97.4	5.99
				2.50	15.62	9	9.48	95.2	5.94
				3.00	15.01	9	9.49	94.0	5.92
				3.50	14.29	9	9.46	92.4	5.90
				4.00	13.81	9	9.36	90.4	5.81
				4.50	13.15	9	8.42	80.5	5.80
			4.80	BOTTOM	-	-	-	-	
N14	14-Jul-10	586120 7036093	to bottom	0.50	19.97	9	8.82	97.0	5.99
				1.00	19.88	9	8.82	96.7	5.98
				1.50	19.78	9	8.80	96.4	6.02
				2.00	19.69	9	8.80	96.2	6.04
				2.50	19.45	9	8.82	95.9	6.07
				3.00	BOTTOM	-	-	-	-
E1	14-Jul-10	586653 7035337	to bottom	0.50	19.88	12	8.86	97.2	5.96
				1.00	19.68	13	8.82	96.4	6.04
				1.50	19.44	12	8.77	95.3	6.08
				2.00	18.73	13	8.78	94.2	6.12
				2.50	16.77	12	9.30	95.8	6.22
				3.00	15.67	12	9.32	93.7	6.10
				3.50	14.84	14	7.76	76.8	5.91
				3.80	BOTTOM	-	-	-	-
F1	14-Jul-10	588454 7033953	3.0	0.50	20.00	9	8.67	95.4	6.32
				1.50	19.86	9	8.65	94.8	6.27
				2.00	18.64	9	8.80	94.1	6.28
				2.50	16.34	9	9.60	98.0	6.27
				3.00	14.21	9	9.88	96.4	6.14
				3.50	13.62	9	9.81	94.3	6.11
				4.00	12.94	9	9.52	90.2	6.07
				4.50	12.42	9	8.96	83.8	5.99
			5.00	BOTTOM	-	-	-	-	
D2	14-Jul-10	587363 7036624	to bottom	0.25	19.67	13	8.60	94.0	6.58
				0.50	19.66	13	8.51	93.0	6.59
				0.70	BOTTOM	-	-	-	-
D3	16-Jul-10	586588 7037079	to bottom	0.25	19.13	9	8.85	95.7	6.44
				0.50	19.15	9	8.82	95.4	6.48
				0.75	19.16	9	8.80	95.2	6.48
				0.10	19.17	9	8.79	95.0	6.46
				1.25	19.16	9	8.77	94.9	6.49
				1.50	19.17	9	8.76	94.7	6.47
				1.75	19.17	9	8.74	94.5	6.48
				2.00	19.16	9	8.70	94.1	6.45
				2.25	19.14	9	8.68	93.9	6.47
				2.50	19.11	9	8.56	92.3	6.59
				2.60	BOTTOM	-	-	-	-
N17	16-Jul-10	584511 7036582	6.0	0.30	17.53	11	9.32	97.5	6.37
				1.00	17.49	11	9.27	96.9	6.42
				2.00	17.47	11	9.24	96.5	6.43
				3.00	17.43	11	9.21	96.2	6.50
				4.00	16.48	11	9.47	96.8	6.43
				5.00	15.64	11	9.57	96.1	6.50
				6.00	14.99	11	9.59	95.0	6.40
				7.00	14.31	11	9.62	93.9	6.39
				8.00	13.80	11	9.64	93.1	6.41
				9.00	13.32	11	9.57	91.6	6.36
				10.00	12.96	11	9.38	89.0	6.34
				11.00	12.81	11	9.19	86.9	6.33
				12.00	12.63	11	8.89	83.9	6.29
			12.40	BOTTOM	-	-	-	-	

Table II.I-1 Field Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Station	Date (dd-mmm-yy)	Location (UTM, NAD83, Zone 12)	Secchi Depth (m)	Depth (m)	Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH
N16	16-Jul-10	582821 7039520	to bottom	0.30	16.27	12	9.64	98.3	6.30
				1.00	16.15	12	9.60	97.6	6.34
				2.00	16.11	12	9.57	97.2	6.38
				3.00	16.03	12	9.55	96.8	6.40
				4.00	15.61	12	9.61	96.6	6.41
				5.00	14.03	12	9.90	96.2	6.39
				5.90	BOTTOM	-	-	-	-
N11	16-Jul-10	587305 7040293	5.5	0.30	17.35	11	9.31	97.0	6.32
				1.00	17.30	11	9.27	96.5	6.38
				2.00	17.25	11	9.23	96.0	6.41
				3.00	17.13	11	9.25	95.9	6.44
				4.00	16.04	11	9.52	96.4	6.54
				5.00	15.27	11	9.55	95.3	6.41
				5.80	BOTTOM	-	-	-	-
M4	16-Jul-10	595456 7040221	5.0	0.30	17.50	13	9.21	96.3	6.25
				1.00	17.44	13	9.17	95.8	6.25
				2.00	17.40	13	9.14	95.3	6.31
				3.00	16.66	13	9.29	95.4	6.33
				4.00	14.95	13	9.56	94.4	6.49
				5.00	14.02	13	9.45	91.8	6.30
				6.00	13.62	13	9.42	90.8	6.29
				7.00	13.36	13	9.35	89.4	6.28
				8.00	12.96	13	9.30	88.2	6.27
				9.00	12.64	13	9.23	87.0	6.28
				10.00	12.52	13	9.16	86.0	6.27
				11.00	12.35	13	9.07	84.9	6.24
12.00	BOTTOM	-	-	-	-				
M3	17-Jul-10	597577 7043941	5.0	0.30	18.07	13	9.33	98.7	6.61
				1.00	18.07	13	9.25	97.9	6.61
				2.00	18.07	13	9.18	97.2	6.62
				3.00	18.05	13	9.14	96.7	6.64
				4.00	15.82	13	9.65	97.2	6.66
				5.00	14.19	13	9.68	94.3	6.44
				6.00	13.54	13	9.52	91.7	6.39
7.00	BOTTOM	-	-	-	-				
N2	17-Jul-10	591602 7044324	to bottom	0.50	18.61	13	9.13	97.7	6.48
				1.00	18.65	13	9.06	97.0	6.52
				1.50	18.65	13	9.03	96.7	6.55
				2.00	18.65	13	9.00	96.3	6.56
				2.50	18.56	13	8.98	96.0	6.57
				3.00	18.46	13	8.96	95.5	6.57
				3.50	BOTTOM	-	-	-	-
L410	17-Jul-10	596390 7050257	to bottom	5.00	18.66	11	9.29	99.5	6.25
				1.00	18.62	11	9.22	98.6	6.31
				1.50	18.60	11	9.16	97.9	6.37
				2.00	18.51	11	9.14	97.6	6.40
				2.50	18.48	11	9.12	97.3	6.43
				3.00	18.45	11	9.10	97.0	6.44
				3.50	18.43	11	9.06	96.5	6.49
				4.00	18.42	11	9.04	96.3	6.47
4.50	BOTTOM	-	-	-	-				
KIRK	18-Jul-10	594102 7060686	to bottom	0.25	17.32	12	8.98	93.6	6.38
				0.50	17.40	12	8.90	92.9	6.43
				0.75	17.42	12	8.87	92.6	6.41
				1.00	17.44	12	8.84	92.3	6.42
				1.25	17.45	12	8.82	92.1	6.45
				1.40	BOTTOM	-	-	-	-

Note: dd-mmm-yy = date (where: dd = day, mmm = month, yy = year); UTM = universal transverse Mercator; NAD = north American datum; m = metre; °C = degree Celsius; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; % = percent.

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010

Parameter	Units	A3	B1	D2	D3	E1	F1	K1	K2	K3	K3 (Duplicate)	RPD	K4	K5	K5 Outlet	Kirk Lake
		13-Jul-10	13-Jul-10	14-Jul-10	16-Jul-10	14-Jul-10	14-Jul-10	10-Jul-10	10-Jul-10	11-Jul-10	11-Jul-10	K3 and K3 (Duplicate)	10-Jul-10	11-Jul-10	09-Jul-10	18-Jul-10
Field Measurements																
pH	-	6.48	5.94	-	6.47	6.12	6.14	6.62	6.61	6.68	-	-	6.67	6.49	6.49	6.41
Specific Conductivity	µS/cm	14	9	-	9	13	9	13	13	13	-	-	13	13	13	12
Temperature	°C	13.02	15.62	-	19.17	18.73	14.21	11.54	11.49	12.19	-	-	12.04	12.76	13.18	17.42
Dissolved Oxygen	mg/L	10.05	9.48	-	8.76	8.78	9.88	10.14	10.28	10.15	-	-	10.13	9.84	10.01	8.87
Conventional Parameters																
Specific Conductivity	µS/cm	13	9	13	9	9	13	13	13	13	13	0%	13	13	13	12
Hardness	mg/L	-	-	-	-	-	-	4.4	4.9	4.6	4.6	0%	4.7	4.5	1.3	-
pH	-	6.82	6.37	6.56	6.44	6.19	6.71	6.66	6.64	6.66	6.65	0%	6.64	6.61	6.64	6.46
Total Alkalinity	mg/L	4.1	2.3	3.4	2.8	2.4	3.7	3.2	3.1	3.4	3.1	9%	3.1	3.1	2.5	3.9
Total Dissolved Solids, calculated	mg/L	16	16	38	24	32	20	18	12	12	24	67%	22	16	<10	<10
Total Organic Carbon	mg/L	3.4	5.8	8.4	4.5	6.1	6.5	3.2	3	3.1	3	3%	2.8	3.3	3.8	4
Dissolved Organic Carbon	mg/L	3.3	5.6	8.1	4.5	6.1	5.7	3	2.9	3.1	3	3%	2.7	3.2	3.8	3.8
Total Suspended Solids	mg/L	<1	1	5	1	1	2	<1	2	3	1	100%	2	1	1	1
Major Ions																
Bicarbonate	mg/L	5	2.8	4.2	3.4	2.9	4.5	3.9	3.8	4.1	3.7	10%	3.7	3.8	3.1	4.8
Calcium	mg/L	1.03	0.75	1.07	0.66	0.7	0.9	1.19	1.05	1.05	1.18	12%	1.17	1.09	0.87	0.8
Carbonate	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5
Chloride	mg/L	<1	<1	<1	<1	<1	<1	1	1	1	2	67%	1	1	1	1
Magnesium	mg/L	0.5	0.33	0.52	0.32	0.35	0.47	0.52	0.51	0.51	0.52	2%	0.52	0.49	0.47	0.5
Potassium	mg/L	0.43	0.24	0.42	0.3	0.24	0.41	0.4	0.4	0.4	0.4	0%	0.41	0.41	0.39	0.4
Sodium	mg/L	0.55	0.41	0.55	0.4	0.39	0.54	0.56	0.56	0.56	0.58	4%	0.58	0.59	0.55	0.6
Sulphate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	0%	<1	<1	<1	<1
Sulphide	µg/L	<2	2	<2	2	<2	<2	<2	<2	<2	<2	0%	<2	<2	<2	3
Nutrients																
Nitrate + Nitrite	mg-N/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.078	<0.006	171%	<0.003	<0.003	<0.003	<0.003
Ammonia, total	mg-N/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.05
Phosphorus, total	mg-P/L	0.005	0.007	0.009	0.005	0.007	0.007	0.004	0.006	0.004	0.004	0%	0.005	0.004	0.006	0.003
Phosphorus, dissolved	mg-P/L	0.003	0.01	0.005	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0%	0.003	0.007	0.003	0.002

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	A3	B1	D2	D3	E1	F1	K1	K2	K3	K3 (Duplicate)	RPD	K4	K5	K5 Outlet	Kirk Lake
		13-Jul-10	13-Jul-10	14-Jul-10	16-Jul-10	14-Jul-10	14-Jul-10	10-Jul-10	10-Jul-10	11-Jul-10	11-Jul-10	K3 and K3 (Duplicate)	10-Jul-10	11-Jul-10	09-Jul-10	18-Jul-10
Organics																
Total Phenolics	mg/L	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.002
Total Recoverable Hydrocarbons	mg/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0%	<2	<2	<2	<2
Total Metals																
Aluminum	µg/L	10.4	47.7	44.5	19.3	51.4	31.5	5.5	6.1	6.8	6.3	8%	7.3	10.6	13.7	16.6
Antimony	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0%	<0.02	<0.02	<0.02	<0.02
Arsenic	µg/L	0.1	0.18	0.27	0.15	0.16	0.16	0.11	0.11	0.12	0.11	9%	0.13	0.12	0.12	0.11
Barium	µg/L	1.79	2.53	3.7	1.66	2.49	2.08	2.01	2.09	2.32	2.22	4%	2.32	2.15	1.76	2.01
Beryllium	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.01
Boron	µg/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	0%	<20	<20	<20	<20
Cadmium	µg/L	<0.002	0.0025	0.0032	0.0024	0.0029	0.0021	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	0.0023	0.0021
Calcium	µg/L	1130	910	1130	640	710	920	980	1120	1020	1100	8%	980	1040	970	840
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.1
Cobalt	µg/L	0.02	0.066	0.105	0.034	0.062	0.054	0.027	0.022	0.023	0.019	19%	0.023	0.023	0.034	0.037
Copper	µg/L	0.56	0.73	1.22	0.61	0.75	0.86	0.28	0.33	0.4	0.3	29%	0.5	0.37	0.5	0.78
Iron	µg/L	17	148	209	94	170	110	14	17	17	17	0%	18	23	42	61
Lead	µg/L	0.011	0.029	0.052	0.015	0.038	0.016	0.008	0.031	0.08	0.018	127%	0.018	0.006	0.011	0.034
Lithium	µg/L	0.9	0.8	1.4	1	0.6	1.2	0.8	0.9	0.9	0.9	0%	0.8	0.9	0.9	1.2
Magnesium	µg/L	520	350	510	310	370	490	520	520	550	540	2%	500	530	460	470
Manganese	µg/L	4.42	2.25	3.64	1.65	1.63	1.88	5.22	5.49	4.83	4.66	4%	5	2.96	2.61	3.41
Mercury	µg/L	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0%	<0.0006	<0.0006	<0.0006	<0.0006
Molybdenum	µg/L	<0.05	<0.05	0.05	<0.05	0.15	<0.05	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.05
Nickel	µg/L	0.25	0.36	0.48	0.3	0.26	0.46	0.19	0.2	0.22	0.21	5%	0.23	0.25	0.23	0.5
Potassium	µg/L	440	250	410	280	250	410	390	380	400	390	3%	370	400	380	430
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.04
Silver	µg/L	0.002	0.0048	0.0057	0.0052	0.0035	0.004	0.001	0.0014	0.0005	0.0011	75%	0.0036	0.0011	0.0012	0.005
Sodium	µg/L	570	430	530	390	410	550	570	570	600	590	2%	550	620	530	510
Strontium	µg/L	6.18	4.78	7.34	4.17	4.92	6.03	6.81	6.74	6.91	6.92	0%	6.98	6.91	6.12	5.53
Sulphur	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	0%	<10	<10	<10	<10
Thallium	µg/L	<0.002	<0.002	0.003	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	0.002
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5
Uranium	µg/L	0.008	0.022	0.022	0.008	0.024	0.013	0.003	0.004	0.004	0.003	29%	0.006	0.007	0.008	0.015
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<0.2
Zinc	µg/L	1.4	1.6	1.2	0.9	2.3	1.6	0.1	0.7	1.3	0.2	147%	0.8	0.4	0.6	1.3

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	A3	B1	D2	D3	E1	F1	K1	K2	K3	K3 (Duplicate)	RPD	K4	K5	K5 Outlet	Kirk Lake
		13-Jul-10	13-Jul-10	14-Jul-10	16-Jul-10	14-Jul-10	14-Jul-10	10-Jul-10	10-Jul-10	11-Jul-10	11-Jul-10	K3 and K3 (Duplicate)	10-Jul-10	11-Jul-10	09-Jul-10	18-Jul-10
Dissolved Metals																
Aluminum	µg/L	6.7	38.5	29	12.7	38.8	23.7	3.2	4.4	4.4	4.7	7%	4.4	7.5	9	12
Antimony	µg/L	<0.02	0.04	0.04	0.03	0.04	0.04	0.03	0.03	0.04	0.04	0%	0.06	0.04	0.09	0.1
Arsenic	µg/L	0.09	0.15	0.26	0.16	0.16	0.16	0.1	0.11	0.11	0.12	9%	0.11	0.12	0.12	1.5
Barium	µg/L	1.64	2.44	3.24	1.61	2.29	2.05	2.03	2.09	2.21	2.34	6%	2.26	2.14	1.75	1.9
Beryllium	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.05
Boron	µg/L	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	0%	<20	<20	<20	<300
Cadmium	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.03
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.5
Cobalt	µg/L	0.196	1.09	1.49	0.933	0.245	1.24	0.279	0.28	0.227	0.318	33%	0.685	0.26	0.698	3.68
Copper	µg/L	0.6	0.76	1.2	0.61	0.65	0.81	0.32	0.43	0.34	0.35	3%	0.46	0.34	0.53	0.8
Iron	µg/L	3	77	84	49	112	70	3	5	4	5	22%	5	11	17	21
Lead	µg/L	0.006	0.016	0.027	0.022	0.048	0.068	0.014	0.069	0.019	0.031	48%	0.009	0.011	0.015	0.03
Lithium	µg/L	1	0.8	1.3	1	0.6	1.3	0.9	0.9	0.8	0.8	0%	0.9	0.9	1	<3
Manganese	µg/L	1.22	3.34	5.24	3.74	2.04	3.52	1.85	2.16	1.5	1.81	19%	2.48	1.79	2.56	7.6
Mercury	µg/L	0.003	0.003	0.008	0.009	0.009	0.009	<0.002	<0.002	0.002	<0.002	0%	<0.002	0.002	0.005	<0.002
Molybdenum	µg/L	<0.05	<0.05	0.06	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.3
Nickel	µg/L	0.29	0.5	0.59	0.34	0.26	0.53	0.29	0.23	0.24	0.28	15%	0.26	0.24	0.3	0.9
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.2
Silver	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.03
Strontium	µg/L	6.27	4.74	6.9	3.99	4.54	5.72	6.89	7.04	7.13	6.95	3%	7.14	7.1	6.4	5.7
Sulphur	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	0%	<10	<10	<10	1860
Thallium	µg/L	<0.002	<0.002	0.004	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.01
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<3
Uranium	µg/L	0.009	0.022	0.017	0.007	0.023	0.013	0.003	0.003	0.004	0.003	29%	0.004	0.006	0.006	0.01
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<1
Zinc	µg/L	0.5	1.1	2.1	1.1	1.6	0.9	0.4	1.9	0.4	1.7	124%	0.9	0.5	0.6	1.3

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	L410 Inlet SE 09-Jul-10	L410 Inlet SW 09-Jul-10	L410 17-Jul-10	L410 (Duplicate) 17-Jul-10	RPD L410 and L410 (Duplicate)	L410 Outlet 09-Jul-10	M3 17-Jul-10	M4 16-Jul-10	M4 (Duplicate) 16-Jul-10	RPD M4 and M4 (Duplicate)	N2 17-Jul-10
Field Measurements												
pH	-	-	-	6.4	-	-	-	6.64	6.29	-	-	6.56
Specific Conductivity	µS/cm	-	-	11	-	-	-	13	13	-	-	13
Temperature	°C	-	-	18.51	-	-	-	18.05	13.62	-	-	18.65
Dissolved Oxygen	mg/L	-	-	9.14	-	-	-	9.14	9.42	-	-	9
Conventional Parameters												
Specific Conductivity	µS/cm	14	11	11	11	0%	12	13	13	13	0%	13
Hardness	mg/L	1.2	0.9	-	-	-	-	-	-	-	-	-
pH	-	6.62	6.55	6.33	6.37	1%	6.6	6.36	6.47	6.46	0%	6.35
Total Alkalinity	mg/L	2.9	1.9	2.8	2.8	0%	2.5	3.1	3.5	3	15%	2.7
Total Dissolved Solids, calculated	mg/L	10	<10	26	30	14%	<10	24	22	20	10%	26
Total Organic Carbon	mg/L	5	3.5	3.9	4.1	5%	3.4	4.1	4	4.3	7%	4.6
Dissolved Organic Carbon	mg/L	4.6	3.4	3.8	4	5%	3.3	4	3.7	4.1	10%	4.6
Total Suspended Solids	mg/L	3	1	1	2	67%	1	3	2	2	0%	<1
Major Ions												
Bicarbonate	mg/L	3.5	2.3	3.4	3.4	0%	3	3.8	4.2	3.7	13%	3.4
Calcium	mg/L	0.9	0.77	0.86	0.85	1%	0.79	1.02	1.03	1.02	1%	1.06
Carbonate	mg/L	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	0%	<0.5
Chloride	mg/L	1	<1	<1	<1	0%	<1	<1	<1	<1	0%	1
Magnesium	mg/L	0.54	0.37	0.4	0.4	0%	0.42	0.5	0.47	0.46	2%	0.43
Potassium	mg/L	0.41	0.33	0.34	0.34	0%	0.35	0.38	0.38	0.37	3%	0.34
Sodium	mg/L	0.58	0.46	0.49	0.49	0%	0.49	0.57	0.52	0.51	2%	0.55
Sulphate	mg/L	<1	<1	<1	<1	0%	<1	<1	<1	<1	0%	<1
Sulphide	µg/L	2	<2	3	<2	40%	<2	<2	2	4	67%	<2
Nutrients												
Nitrate + Nitrite	mg-N/L	<0.003	<0.003	<0.003	<0.003	0%	<0.003	<0.003	<0.003	<0.003	0%	<0.003
Ammonia, total	mg-N/L	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.05	0%	<0.05
Phosphorus, total	mg-P/L	0.007	0.006	0.004	0.006	40%	0.004	0.005	0.005	0.005	0%	0.005
Phosphorus, dissolved	mg-P/L	0.003	0.003	0.005	0.003	50%	0.003	0.003	0.003	0.003	0%	0.004

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	L410 Inlet SE 09-Jul-10	L410 Inlet SW 09-Jul-10	L410 17-Jul-10	L410 (Duplicate) 17-Jul-10	RPD L410 and L410 (Duplicate)	L410 Outlet 09-Jul-10	M3 17-Jul-10	M4 16-Jul-10	M4 (Duplicate) 16-Jul-10	RPD M4 and M4 (Duplicate)	N2 17-Jul-10
Organics												
Total Phenolics	mg/L	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.002	0%	<0.002
Total Recoverable Hydrocarbons	mg/L	<2	<2	<2	<2	0%	<2	<2	<2	<2	0%	<2
Total Metals												
Aluminum	µg/L	19.3	12.5	13.8	13.7	1%	12.9	17.7	12.7	12.4	2%	15.2
Antimony	µg/L	<0.02	<0.02	<0.02	<0.02	0%	<0.02	<0.02	<0.02	<0.02	0%	<0.02
Arsenic	µg/L	0.12	0.07	0.1	0.09	11%	0.1	0.11	0.11	0.11	0%	0.1
Barium	µg/L	1.95	1.96	1.89	1.83	3%	1.86	2.26	2.13	2.21	4%	2.55
Beryllium	µg/L	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.01	0%	<0.01
Boron	µg/L	<20	<20	<20	<20	0%	<20	<20	<20	<20	0%	<20
Cadmium	µg/L	<0.002	<0.002	0.0033	<0.002	49%	<0.002	0.0026	<0.002	<0.002	0%	0.0021
Calcium	µg/L	950	770	860	860	0%	800	1030	1030	1030	0%	1050
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.1	0%	<0.1
Cobalt	µg/L	0.064	0.033	0.026	0.029	11%	0.038	0.025	0.029	0.027	7%	0.034
Copper	µg/L	0.63	0.45	0.56	0.57	2%	0.47	0.63	0.5	0.55	10%	0.75
Iron	µg/L	83	41	37	37	0%	42	44	39	38	3%	52
Lead	µg/L	0.008	0.007	0.028	0.029	4%	0.006	0.037	0.006	0.021	111%	0.034
Lithium	µg/L	1.1	0.8	1	1	0%	0.9	1.1	0.9	1	11%	0.9
Magnesium	µg/L	520	380	410	410	0%	420	490	480	460	4%	430
Manganese	µg/L	4.76	3.23	2.66	2.53	5%	3.46	2.77	5.47	5.12	7%	3.67
Mercury	µg/L	<0.0006	<0.0006	<0.0006	<0.0006	0%	<0.0006	<0.0006	<0.0006	<0.0006	0%	<0.0006
Molybdenum	µg/L	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.05	0%	<0.05
Nickel	µg/L	0.44	0.17	0.23	0.21	9%	0.23	0.32	0.32	0.32	0%	0.19
Potassium	µg/L	390	330	360	350	3%	340	370	380	380	0%	350
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.04	0%	<0.04
Silver	µg/L	0.0027	0.0024	0.0056	0.004	33%	0.0028	0.0028	0.0022	0.0021	5%	0.0052
Sodium	µg/L	550	470	510	490	4%	480	550	530	520	2%	520
Strontium	µg/L	6.01	5.2	5.42	5.44	0%	5.28	6.42	6.62	6.56	1%	6.95
Sulphur	mg/L	<10	<10	<10	<10	0%	<10	<10	<10	<10	0%	<10
Thallium	µg/L	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.002	0%	0.002
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	0%	<0.5
Uranium	µg/L	0.012	0.009	0.013	0.013	0%	0.01	0.013	0.011	0.012	9%	0.015
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<0.2	0%	<0.2
Zinc	µg/L	0.5	0.7	0.8	1.4	55%	0.5	1.3	0.3	0.8	91%	0.8

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	L410 Inlet SE	L410 Inlet SW	L410	L410 (Duplicate)	RPD	L410 Outlet	M3	M4	M4 (Duplicate)	RPD	N2
		09-Jul-10	09-Jul-10	17-Jul-10	17-Jul-10	L410 and L410 (Duplicate)	09-Jul-10	17-Jul-10	16-Jul-10	16-Jul-10	M4 and M4 (Duplicate)	17-Jul-10
Dissolved Metals												
Aluminum	µg/L	13.6	7.8	8.5	8.3	2%	7.6	13.1	7.7	9.4	20%	9.2
Antimony	µg/L	0.06	0.09	0.06	0.05	18%	0.08	0.03	0.03	0.04	29%	0.04
Arsenic	µg/L	0.11	0.07	0.09	0.1	11%	0.1	0.13	0.09	0.1	11%	0.1
Barium	µg/L	1.9	1.96	1.74	1.77	2%	1.79	2.17	2.05	2.12	3%	2.36
Beryllium	µg/L	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.01	0%	<0.01
Boron	µg/L	<20	<20	<20	<20	0%	<20	<20	<20	<20	0%	<20
Cadmium	µg/L	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.005	0%	<0.005
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.1	0%	<0.1
Cobalt	µg/L	0.694	0.674	0.767	0.404	62%	0.839	0.312	0.35	0.22	46%	1.05
Copper	µg/L	0.63	0.46	0.52	0.52	0%	0.49	0.86	0.46	3.2	150%	0.66
Iron	µg/L	42	21	9	8	12%	16	20	10	16	46%	13
Lead	µg/L	0.05	0.014	0.027	0.022	20%	0.016	0.038	0.008	0.282	189%	0.032
Lithium	µg/L	1	0.7	0.9	0.9	0%	0.8	1	1	1	0%	0.9
Manganese	µg/L	4.95	2.38	1.6	1.05	42%	3.02	1.31	1.24	0.97	24%	1.96
Mercury	µg/L	0.006	0.007	0.005	0.004	22%	0.006	0.007	0.009	0.008	12%	0.005
Molybdenum	µg/L	<0.05	<0.05	<0.05	<0.05	0%	<0.05	<0.05	<0.05	<0.05	0%	<0.05
Nickel	µg/L	0.44	0.25	0.35	0.27	26%	0.27	0.42	0.36	0.43	18%	0.3
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.04	0%	<0.04
Silver	µg/L	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.005	0%	<0.005
Strontium	µg/L	6.13	5.33	5.48	5.33	3%	5.44	6.18	6.46	6.54	1%	6.6
Sulphur	mg/L	<10	<10	<10	<10	0%	<10	<10	<10	<10	0%	<10
Thallium	µg/L	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.002	0%	<0.002
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	0%	<0.5
Uranium	µg/L	0.009	0.008	0.012	0.011	9%	0.009	0.012	0.01	0.009	11%	0.012
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<0.2	0%	<0.2
Zinc	µg/L	0.7	0.6	0.7	0.6	15%	0.8	0.9	0.7	5.5	155%	0.8

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	N6a 12-Jul-10	N7 13-Jul-10	N9 13-Jul-10	N11 16-Jul-10	N12 12-Jul-10	N12 (Duplicate) 12-Jul-10	RPD N12 and N12 (Duplicate)	N13 12-Jul-10	N14 14-Jul-10	N16 16-Jul-10	N17 16-Jul-10	Field Blank 10-Jul-10	Field Blank 14-Jul-10	Field Blank 17-Jul-10	Travel Blank 10-Jul-10	Travel Blank 12-Jul-10	Travel Blank 17-Jul-10
Field Measurements																		
pH	-	6.42	6.21	6.66	6.44	6.42	-	-	6.29	6.02	6.4	6.4	-	-	-	-	-	-
Specific Conductivity	µS/cm	11	11	12	11	10	-	-	11	9	12	11	-	-	-	-	-	-
Temperature	°C	16.32	19.98	14.48	17.13	14.81	-	-	17.19	19.78	16.03	14.99	-	-	-	-	-	-
Dissolved Oxygen	mg/L	9.81	8.95	10.13	9.25	9.89	-	-	9.51	8.8	9.55	9.59	-	-	-	-	-	-
Conventional Parameters																		
Specific Conductivity	µS/cm	11	11	12	11	10	10	0%	11	9	12	11	2	2	1	2	2	1
Hardness	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	<0.5	-	-
pH	-	6.69	6.56	6.79	6.45	6.69	6.63	1%	6.58	6.28	6.49	6.41	5.06	5.12	4.85	5.38	-	4.94
Total Alkalinity	mg/L	2.9	2.6	3.2	3.2	3	2.7	11%	2.8	2	3.4	3.3	<0.5	<0.5	<0.5	<0.5	1.6	<0.5
Total Dissolved Solids, calculated	mg/L	12	18	14	16	14	10	33%	18	14	14	22	<10	<10	<10	<10	<10	<10
Total Organic Carbon	mg/L	4.4	7.2	3.3	3.1	3.7	3.9	5%	6.6	4.6	2.9	3.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dissolved Organic Carbon	mg/L	4.3	6.5	3.3	3.1	3.6	3.6	0%	6.3	4.4	2.8	3.1	0.6	0.8	<0.5	<0.5	<0.5	<0.5
Total Suspended Solids	mg/L	2	1	2	2	<1	2	67%	2	3	1	2	<1	2	<1	1	1	1
Major Ions																		
Bicarbonate	mg/L	3.5	3.2	3.9	3.9	3.7	3.3	11%	3.4	2.5	4.2	4	<0.5	<0.5	<0.5	<0.5	2	<0.5
Calcium	mg/L	1.02	0.76	0.88	0.88	0.88	0.81	8%	1.14	0.68	0.95	0.95	<0.05	<0.05	<0.05	<0.05	0.06	<0.05
Carbonate	mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloride	mg/L	<1	<1	<1	<1	<1	<1	0%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Magnesium	mg/L	0.41	0.44	0.44	0.37	0.35	0.35	0%	0.46	0.31	0.41	0.36	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Potassium	mg/L	0.35	0.36	0.37	0.33	0.3	0.3	0%	0.31	0.31	0.37	0.33	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sodium	mg/L	0.51	0.63	0.54	0.44	0.42	0.42	0%	0.44	0.37	0.43	0.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	<1	<1	<1	<1	<1	<1	0%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Sulphide	µg/L	<2	3	<2	<2	2	<2	0%	3	<2	2	4	<2	<2	<2	<2	<2	<2
Nutrients																		
Nitrate + Nitrite	mg-N/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0%	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Ammonia, total	mg-N/L	<0.05	<0.05	<0.05	<0.05	0.22	<0.05	126%	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phosphorus, total	mg-P/L	0.006	0.015	0.006	0.005	0.012	0.007	53%	0.01	0.007	0.005	0.006	0.003	0.003	0.003	0.003	0.002	0.003
Phosphorus, dissolved	mg-P/L	0.003	0.005	0.007	0.003	0.003	0.006	67%	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.003	0.003	0.002

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	N6a	N7	N9	N11	N12	N12 (Duplicate)	RPD	N13	N14	N16	N17	Field Blank	Field Blank	Field Blank	Travel Blank	Travel Blank	Travel Blank
		12-Jul-10	13-Jul-10	13-Jul-10	16-Jul-10	12-Jul-10	12-Jul-10	N12 and N12 (Duplicate)	12-Jul-10	14-Jul-10	16-Jul-10	16-Jul-10	10-Jul-10	14-Jul-10	17-Jul-10	10-Jul-10	12-Jul-10	17-Jul-10
Organics																		
Total Phenolics	mg/L	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0%	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.12	<0.002	<0.002
Total Recoverable Hydrocarbons	mg/L	<2	<2	<2	<2	<2	<2	0%	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Metals																		
Aluminum	µg/L	19.1	67.3	6.8	7.7	13.9	13.9	0%	50.5	15.4	14.8	6.7	0.7	0.6	0.4	-	-	<0.2
Antimony	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0%	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	-	-	<0.02
Arsenic	µg/L	0.13	0.19	0.1	0.09	0.1	0.11	10%	0.23	0.17	0.1	0.14	<0.02	<0.02	<0.02	-	-	<0.02
Barium	µg/L	2.32	2.45	2.04	2.19	2.19	2.25	3%	2.64	1.6	2.14	2.63	0.04	0.05	<0.02	-	-	<0.02
Beryllium	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	<0.01
Boron	µg/L	<20	<20	<20	<20	<20	<20	0%	<20	<20	<20	<20	<20	<20	<20	-	-	<20
Cadmium	µg/L	<0.002	0.0044	<0.002	0.0024	0.0036	0.0027	29%	<0.002	0.0041	<0.002	0.0032	<0.002	<0.002	<0.002	-	-	<0.002
Calcium	µg/L	940	770	1150	920	890	940	5%	1140	720	1040	1000	<50	<50	<50	-	-	<50
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
Cobalt	µg/L	0.03	0.067	0.021	0.019	0.019	0.019	0%	0.067	0.039	0.021	0.025	<0.005	<0.005	<0.005	-	-	<0.005
Copper	µg/L	0.51	0.81	0.4	0.46	0.45	0.53	16%	0.68	0.76	4.72	0.55	<0.05	<0.05	0.09	-	-	<0.05
Iron	µg/L	63	128	18	20	31	30	3%	192	61	24	23	<1	<1	<1	-	-	<1
Lead ^(a)	µg/L	0.026	0.019	0.008	0.011	0.012	0.016	29%	0.044	0.03	0.365	0.037	0.009	0.014	0.029	-	-	<0.005
Lithium	µg/L	0.7	0.8	0.8	0.9	0.5	0.6	18%	0.9	0.9	0.9	0.9	<0.5	<0.5	<0.5	-	-	<0.5
Magnesium	µg/L	410	440	440	380	350	380	8%	460	310	410	360	<50	<50	<50	-	-	<50
Manganese	µg/L	2.25	1.24	3.72	2.78	2.04	2.02	1%	1.52	2.25	4.23	2.78	0.11	0.10	<0.05	-	-	<0.05
Mercury	µg/L	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0%	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	-	-	<0.0006
Molybdenum	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0%	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	<0.05
Nickel	µg/L	0.21	0.41	0.19	0.17	0.15	0.15	0%	0.28	0.62	0.41	0.24	<0.02	<0.02	<0.02	-	-	<0.02
Potassium	µg/L	340	360	370	340	300	330	10%	300	300	370	330	<50	<50	<50	-	-	<50
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	<0.04
Silver	µg/L	0.0042	0.0058	0.003	0.0028	0.0005	0.0064	171%	0.0095	0.0011	0.0029	0.0034	<0.0005	<0.0005	<0.0005	-	-	<0.0005
Sodium	µg/L	500	620	520	440	420	490	15%	430	360	450	420	<50	<50	<50	-	-	<50
Strontium	µg/L	5.33	5.4	6.1	5.91	5.17	5.32	3%	6.08	4.33	6.34	6.38	<0.05	<0.05	<0.05	-	-	<0.05
Sulphur	mg/L	<10	<10	<10	<10	<10	<10	0%	<10	<10	<10	<10	<10	<10	<10	-	-	<10
Thallium	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0%	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	<0.002
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
Uranium	µg/L	0.008	0.016	0.003	0.007	0.011	0.01	10%	0.016	0.01	0.005	0.006	<0.002	<0.002	<0.002	-	-	<0.002
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	<0.2
Zinc	µg/L	1.1	0.9	1	0.8	0.6	0.6	0%	1.8	2.8	14.3	3.1	0.2	0.6	0.5	-	-	0.4

Table II.I-2 Water Quality Data Collected in the Gaucho Kué Project Local Study Area, July 2010 (continued)

Parameter	Units	N6a	N7	N9	N11	N12	N12 (Duplicate)	RPD	N13	N14	N16	N17	Field Blank	Field Blank	Field Blank	Travel Blank	Travel Blank	Travel Blank
		12-Jul-10	13-Jul-10	13-Jul-10	16-Jul-10	12-Jul-10	12-Jul-10	N12 and N12 (Duplicate)	12-Jul-10	14-Jul-10	16-Jul-10	16-Jul-10	16-Jul-10	10-Jul-10	14-Jul-10	17-Jul-10	10-Jul-10	12-Jul-10
Dissolved Metals																		
Aluminum	µg/L	14.1	53.9	4.2	4.9	9.5	8.7	9%	41.6	7.4	2.9	4.2	0.4	<0.2	0.2	0.3	0.5	-
Antimony	µg/L	0.03	0.04	0.07	0.09	0.05	0.03	50%	0.07	0.07	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	-
Arsenic	µg/L	0.11	0.19	0.1	0.07	0.12	0.11	9%	0.23	0.16	0.08	0.1	<0.02	<0.02	<0.02	<0.02	<0.02	-
Barium	µg/L	2.07	2.36	1.94	2.11	2.26	2.17	4%	2.38	1.53	2.04	2.53	0.05	<0.02	0.08	0.02	<0.02	-
Beryllium	µg/L	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Boron	µg/L	<20	<20	<20	<20	<20	<20	0%	<20	<20	<20	<20	<20	<20	<20	<20	<20	-
Cadmium	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
Chromium	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0%	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
Cobalt ^(a)	µg/L	0.499	0.833	0.824	1.57	0.11	0.317	97%	1.39	0.954	0.115	0.616	0.36	0.22	0.177	<0.005	<0.005	-
Copper	µg/L	0.88	0.97	0.49	0.47	0.75	0.66	13%	0.95	0.79	0.36	0.45	0.15	0.1	0.47	<0.05	0.2	-
Iron	µg/L	30	84	3	5	8	8	0%	144	15	<1	5	<1	<1	<1	<1	3	-
Lead ^(a)	µg/L	0.061	0.019	0.006	0.018	0.029	0.034	16%	0.043	0.024	<0.005	0.011	0.007	<0.005	0.028	0.006	0.01	-
Lithium	µg/L	0.9	1	0.9	0.9	0.8	0.8	0%	1.1	1.1	0.9	1.3	<0.5	<0.5	<0.5	<0.5	<0.5	-
Manganese	µg/L	1.68	2.37	1.75	2.71	1.22	0.92	28%	3.38	4.54	0.89	1.93	0.91	0.4	0.46	<0.05	<0.05	-
Mercury	µg/L	0.004	0.003	0.004	0.005	0.003	0.004	29%	0.004	0.008	0.009	0.008	<0.002	0.006	0.008	0.002	0.003	-
Molybdenum	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0%	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-
Nickel	µg/L	0.24	0.5	0.33	0.26	0.2	0.19	5%	0.4	0.4	0.17	0.29	0.04	0.04	0.08	<0.02	<0.02	-
Selenium	µg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0%	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-
Silver	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0%	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-
Strontium	µg/L	5.91	5.44	6.09	5.79	5.26	5.28	0%	6.06	4.06	6.12	6.35	0.06	<0.05	<0.05	<0.05	<0.05	-
Sulphur	mg/L	<10	<10	<10	<10	<10	<10	0%	<10	<10	<10	<10	<10	<10	<10	<10	<10	-
Thallium	µg/L	0.002	0.002	<0.002	<0.002	<0.002	<0.002	0%	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	-
Titanium	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0%	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Uranium	µg/L	0.025	0.018	0.005	0.006	0.012	0.011	9%	0.017	0.008	0.004	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	-
Vanadium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0%	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-
Zinc ^(a)	µg/L	0.9	1.1	1.1	1.1	5.6	0.8	150%	1.6	3	1.4	4.8	0.6	0.3	0.7	0.5	1.1	-

Note: °C = degree Celsius; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; µg/L = micrograms per litre, % = percent; - = not available.

Bold values indicate exceedance of QC assessment criteria.

(a) Data are suspect for this parameter (i.e., potentially affected by sample contamination) based on QC sample results.

Table II.I-3 Sediment Quality Data Collected in the Gahcho Kué Project Local Study Area, July 2010

Parameter	Unit	K1 10-Jul-10	K2 10-Jul-10	K3 11-Jul-10	K4 10-Jul-10	K5 11-Jul-10	K5 (Duplicate) 11-Jul-10	RPD K5 and K5 (Duplicate)	L410 17-Jul-10	M3 17-Jul-10	M4 16-Jul-10	N11 16-Jul-10	N11 (Split Sample) 16-Jul-10	RPD N11 and N11 (Split)	N16 16-Jul-10	N2 17-Jul-10
Particle Size and Carbon Content																
Sand	%	-	-	-	-	-	-	-	73	64	51	73	78	7%	93	71
Silt	%	-	-	-	-	-	-	-	24	26	36	22	17	26%	6	24
Clay	%	-	-	-	-	-	-	-	3	10	13	5	6	18%	<2	5
Total Inorganic Carbon	%	0.47	<0.02	0.34	<0.02	0.61	0.5	20%	1.6	0.89	0.6	0.94	1.1	16%	<0.02	0.95
Total Organic Carbon	%	13	13	10	15	13	13	0%	18	13	10	17	17	0%	0.39	15
Total Carbon	%	13	13	11	15	14	14	0%	20	14	11	18	18	0%	0.39	16
Nutrients and Organics																
Available Phosphorus	µg/g	11	37	30	7	23	34	39%	23	5	9	25	24	4%	9	27
Total Petroleum Hydrocarbons	µg/g	<300	<400	880	<400	<200	<200	0%	<800	<600	<500	<600	<600	0%	63	<600
Total Metals																
Arsenic	µg/g	7	3	4	8	3	3	0%	2	10	7	2	2	0%	<1	2
Barium	µg/g	69	74	91	68	70	69	1%	69	84	100	68	65	5%	18	68
Cadmium	µg/g	0.6	0.5	0.4	0.7	0.3	0.3	0%	0.3	0.5	1	0.3	0.3	0%	<0.1	0.3
Chromium	µg/g	33	28	41	37	40	26	42%	79	42	60	82	74	10%	7	59
Cobalt	µg/g	15	8	11	22	11	10	10%	7	29	18	8	8	0%	3	6
Copper	µg/g	110	91	47	71	47	79	51%	40	62	85	47	45	4%	7	40
Lead	µg/g	7	6	7	9	6	6	0%	5	7	7	6	6	0%	2	4
Mercury	µg/g	0.06	<0.05	<0.05	0.09	0.05	<0.05	0%	<0.05	0.13	0.08	<0.05	<0.05	0%	<0.05	<0.05
Molybdenum	µg/g	3.6	2.7	3	4.9	2.6	2.1	21%	1.4	4.6	6.4	2	1.8	11%	<0.4	2.3
Nickel	µg/g	34	33	48	33	31	23	30%	50	39	45	50	46	8%	7	37
Potassium	µg/g	505	12	39	58	29	19	42%	159	82	50	110	116	5%	9	156
Selenium	µg/g	0.9	0.8	0.8	1.3	0.7	0.7	0%	0.7	0.9	1.5	<0.5	0.6	18%	<0.5	0.7
Thallium	µg/g	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	0%	<0.3	<0.3	<0.3	<0.3	<0.3	0%	<0.3	<0.3
Vanadium	µg/g	42	33	36	43	33	30	10%	23	48	65	29	28	4%	7	23
Zinc	µg/g	120	73	71	99	65	63	3%	50	130	150	61	62	2%	11	61

Note: % = percent; - = no data, or not applicable; µg/g = micrograms per gram dry wt.; RPD = relative percent difference; ISQG = interim sediment quality guideline (CCME 2002).