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GAHCHO KUÉ PROJECT

2011 Climate and Hydrology Supplemental Monitoring Report

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REPORT



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1.0 INTRODUCTION

De Beers Canada Inc. (De Beers) is proposing to develop the Gahcho Kué Project (Project), a diamond mine in the Northwest Territories (NWT). The Project is located in the North Slave region of the NWT at Kennedy Lake, approximately 140 kilometres (km) northeast of Łutselk'e and 280 km northeast of Yellowknife.

Baseline studies have been conducted to support the Environmental Impact Assessment for the Project and the Environmental Impact Review (EIR) Process. These data were reported in the December 2010 EIS (De Beers 2010). Baseline data reported in the 2010 EIS are sufficient to support the environmental assessment within the EIS. However, De Beers is committed to ongoing data collection in advance of regulatory approval of and the permitting process for the Project. As such, supplemental baseline data have been collected in 2011, and will continue to be collected and reported annually, until such time that these activities are no longer required prior to Project construction or evolve into future monitoring programs associated with an approved Project.

The purpose of collecting and reporting the supplemental baseline data for the Project is to support a consistent and transparent baseline program. In general, the goals of the supplemental data collection are to:

- reduce uncertainty and increase the level of confidence in impact predictions;
- broaden the baseline areas of investigation; and
- contribute to long-term future monitoring and adaptive management of the Project.

The focus of the 2011 supplemental data collection reported herein is climate and hydrology. Baseline data collection in 2011 were intended to expand the set of data collected in the area during previous field programs to characterize hydroclimate and hydrological parameters relevant to the Project

Climate and hydrology baseline investigations conducted by Golder Associates Ltd. (Golder) in 2011 were divided into the following components:

- Climate data collected at the Project site included daily and monthly temperature and rainfall from May 26 to September 15, 2011. On August 24, 2011, a new weather station was installed at the Project site and was programmed to measure and record the following parameters: air temperature, soil temperature at 0.3 m depth, air humidity, net shortwave and longwave radiation, atmospheric pressure, and wind speed and direction.
- Snow course surveys to estimate the snow water equivalent inside the Kennady Lake watershed available for runoff during spring time.
- Development of hydrographs from 2011 data at nine hydrometric stations including:

Lake A3;	Lake N9;	Lake N17;
Lake D1;	Lake N11;	Lake N18; and
Lake L1;	Lake N14;	Kirk Lake.



- Development of bathymetric maps for 13 lakes including:

Lake B1;	Lake F1;	Lake I1;
Lake B2;	Lake G1;	Lake I2; and
Lake D7;	Lake G2;	Lake J1.
Lake E2;	Lake H1a;	
Lake E3;	Lake H1b;	

- Identifying the watershed boundaries and flow paths inside two new watersheds, to evaluate the suitability of a proposed new reference lake for the Project.

2.0 METHODS

2.1 Air Temperature

Air temperature at the Gahcho Kué Camp climate station was recorded using an Optimum Instruments Model TSW-5K sealed temperature sensor with radiation shield, and with a sampling interval of 15 minutes. The temperature record was used to derive mean daily and mean monthly temperatures for the period of May 26 to September 15, 2011. The location of the temperature gauge at the Gahcho Kué Camp climate station is shown in Appendix A, Figure A-1.

2.2 Rainfall

Rainfall at the Gahcho Kué Camp climate station was recorded using a tipping bucket rain gauge programmed to record the total amount of rain within each 15 minute period. The recorded rainfall data were used to derive total daily and monthly rainfall for the period of May 26 to September 15, 2011. The location of the rain gauge at the Gahcho Kué Camp climate station is shown Appendix A, Figure A-1.

2.3 Snow Course Survey

Snow course surveys to determine the late spring snow water equivalent (SWE) were conducted between April 4 and 8, 2011. Terrain type classification was defined by AMEC, and is presented in the 2010 EIS (De Beers 2010). For each watershed, proportions of terrain type are presented in Appendix B, along with raw survey data.

Late winter measurements of snow depths and snow densities were performed to characterize the amount of SWE available to contribute to spring runoff, over a range of terrain types. The water equivalent of a snowpack (the equivalent depth of water if the snowpack melted) is the product of snow depth and snow density. Snow course surveys to determine the late spring SWE were conducted between April 4 to 8, 2011 using the following methods:

2.3.1 Plot Selection

Plot locations within the Project area were selected and sampled based on the terrain type. The terrain types included the following:

Crest;	Northwest Slopes, 10 to 33 degrees;
Lake;	Northwest Slopes, > 33 degrees;
Lake Edge;	Southeast Slopes, 10 to 33 degrees;
Low Slopes;	Southeast Slopes, > 33 degrees; and
Northeast Slopes, 10 to 33 degrees;	Southwest Slopes, 10 to 33 degrees.
Northeast Slopes, > 33 degrees;	



This was done to identify differences in snow accumulation between terrain types. A total of 32 plots were selected in 2011 (Appendix B, Figure B-1) to cover all the terrain types and were evenly distributed within Kennady Lake watershed.

2.3.2 Snow Depth Measurement

A total of 22 transects were selected for snow depth survey. The majority of them coincide with the previous snow survey transects defined by AMEC and a few transects were added to evenly distribute them over the entire Kennady Lake watershed. Snow depths were measured along each transect on intervals of 10 m, by driving a snow metre probe into the snowpack and reading the depth on the probe.

2.3.3 Snow Density Measurement

Two density measurements were recorded at each plot site using a snow density sampler. The sampler was carefully inserted to avoid compacting the snowpack. Snow depth was recorded when the corer reached the soil surface. The corer was then pushed farther into the ground to ensure that a plug of soil was extracted with the sampler to prevent granular snow from falling out. After extracting the sampler and carefully removing the soil plug, the snow mass was measured by calculating the difference between the sampler weight with and without the snow core. These measurements were later used to calculate the snow water equivalent of the sample.

2.4 Flow Path Surveys

The suitability for a new reference lake was examined in two different watersheds located east and south of the Project area with no flow disturbances from the Project. The lake located south of the Project area is identified as Lake X6 and the lake located east of the Project area is identified as Reference Lake. The objective of the work was to define each watershed by ground-truthing flow paths. Geodetic water surface elevations of Lake X6, Reference Lake and surrounding major tributary lakes in both watersheds were surveyed on August 19, 2011, using a high accuracy global positioning system (GPS) SOKKIA GSR2700 ISX Real Time Kinematics (RTK) system.

2.5 Hydrometry

Continuous measurement stations were set up during the first field trip between May 24 and 27, 2011, for 9 hydrometric stations: Lake A3, Lake D1, Lake L1, Lake N9, Lake N11, Lake N14, Lake N17, Lake N18 and Kirk Lake. The data were used to develop stage-discharge relationships for the open-water season and to observe the outlet opening timing during the spring melt period. The stations were equipped with pressure transducers coupled with data loggers. Manual discharge and water level data measurements were also collected at these stations during each site visit. The location of each hydrometric station is shown in Appendix A, Figure A-1.

Hydrographs for all nine locations were derived using the following methods:

- A Keller Acculevel Submersible Level Transmitter solid-state pressure transducer and Optimum Instruments DD-520 data logger were installed, at each hydrometric station. Each data logger was programmed to record water pressure measurements at 15 minute intervals. Each station was referenced to an elevation benchmark.
- The transducers were installed before the start of spring melt, as permitted by ice conditions and site access.



- Manual water surface elevations were surveyed from the permanent benchmark using a rod and level, and the pressure transducer readings were recorded during selected data logger downloads.
- The stream discharge measurements were performed according to the Water Survey of Canada standard described by Terzi et al. (1994) during the first and subsequent visits to stations with flowing water. Velocity and depth measurements, used to calculate discharge, were collected using a Marsh McBirney 2000 Flo-Mate™ velocity meter and top-setting wading rod.
- The data loggers at each station were downloaded during each site visit and pressure transducer readings corresponding to each discharge measurement were recorded.
- The pressure transducers and data loggers were removed during the last site visit.
- The record of water surface elevations versus discharge was used to establish a stage-discharge rating curve for each station, when all data were available for flowing water stations. This rating curve was then applied to the continuous record of water surface elevations, as measured by the pressure transducer and recorded by the data logger at each station, to derive a continuous record of discharges.

2.6 Bathymetry

Bathymetric data were collected for 13 lakes (including Lake B1, Lake B2, Lake D7, Lake E2, Lake E3, Lake F1, Lake G1, Lake G2, Lake H1a, Lake H1b, Lake I1, Lake I2, and Lake J1) during a field trip between July 17 and 23, 2011, using the following instruments and methods:

- A Garmin GPSMAP® 531S Sounder mounted on a zodiac boat was used to perform the bathymetric surveys and provide an accurate three dimensional position.
- Spacing of the bathymetric transects depended on the size of each lake and the irregularity of the lake bottom. In general, one longitudinal transect, connecting the two farthest shorelines, was surveyed, with subsequent cross transects (i.e., perpendicular to the longitudinal transect) spaced evenly at a minimum of 5% of the lake length.
- Bathymetric data were collected during calm weather to reduce errors associated with waves on the lakes.
- Bathymetric maps were produced using ArcGIS software.



3.0 RESULTS

3.1 Air Temperature

Temperature data were collected at the Project site from May 26 to September 15, 2011 and are presented in Table 1 and Figure 1, with daily data presented in Appendix C. Table 1 shows a comparison of mean monthly, maximum daily and minimum daily temperatures between the Project site and the Meteorological Service of Canada (MSC) Yellowknife A (MSC Station No. 2204100) and Lutselk'e (220L001) climate stations for the monitoring period (Environment Canada 2011). Figure 1 shows a comparison of mean daily temperatures between the Project site, Yellowknife A and Lutselk'e for concurrent records.

Temperatures at the Project site followed the same trend as those at Yellowknife A and Lutselk'e from May to September 2011, with distinctly lower temperatures in the months of May and June. The maximum recorded temperature of 25.9°C occurred in July and the minimum temperature of -4.8°C, in May.

Locations of the Yellowknife A, Lutselk'e and local climate stations are presented in Table 2.

Table 1: Recorded Mean Daily Temperature Statistics at Gahcho Kué, Yellowknife A and Lutselk'e in 2011 (May 26 to September 15)

Month	Mean Monthly			Maximum Daily			Minimum Daily		
	Gahcho Kué	Lutselk'e ^{(a)(b)}	Yellowknife A ^(a)	Gahcho Kué	Lutselk'e ^{(a)(b)}	Yellowknife A ^(a)	Gahcho Kué	Lutselk'e ^{(a)(b)}	Yellowknife A ^(a)
May	5.1	11.4	10.9	14.1	17.0	19.5	-3.8	4.6	3.6
June	8.4	13.4	13.9	25.9	28.0	28.8	-4.8	-1.8	0.4
July	15.1	18.9	18.2	25.4	26.0	27.3	5.1	11.8	9.6
August	12.2	15.1	15.4	24.0	24.4	25.1	4.2	7.9	5.3
September	7.6	11.6	6.7	18.7	20.3	21.5	-0.5	3.2	0.7

^(a) Data reported by MSC has undergone only a preliminary quality check.

^(b) Based on available hourly data from MSC.

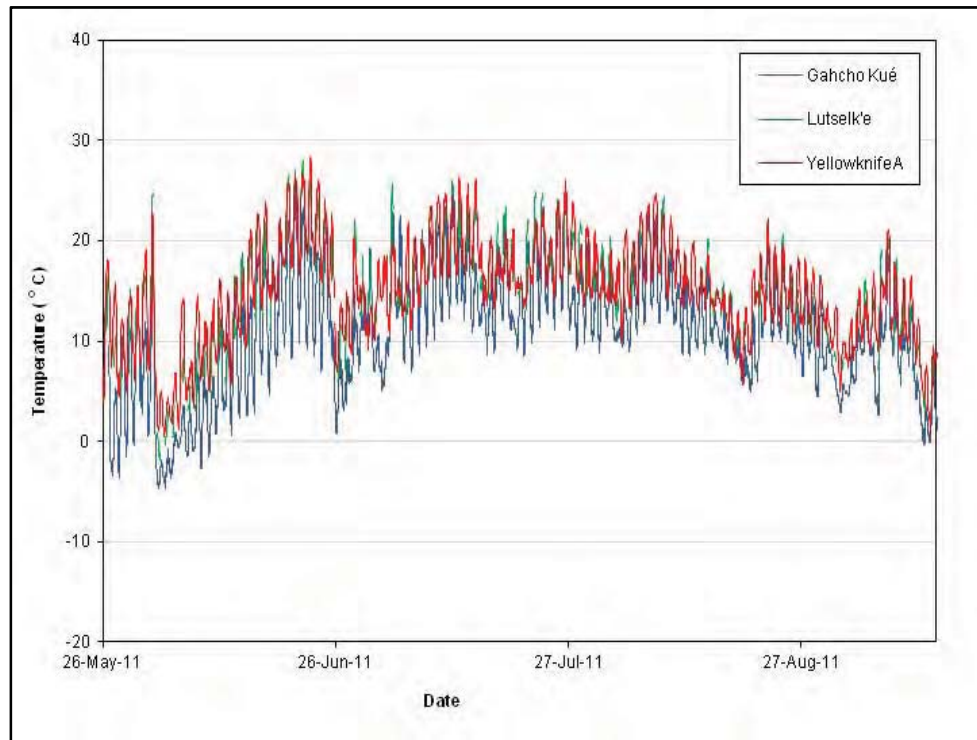
Table 2: Locations of the Gahcho Kué, Yellowknife A and Lutselk'e Climate Stations

Station Name	MSC Station No.	Latitude North	Longitude West	Distance and Direction from Gahcho Kué [km]	Elevation [m]	Period of Record
Gahcho Kué	-	63°26'	109°12'	0	430	1998 to 2005, 2010 to 2011
Lutselk'e	220L001	62°25'	110°40'	136 S	179	1999 to 2011
Yellowknife A	2204100	62°27'	114°26'	287 SW	206	1942 to 2011

Note: km = kilometre; m = metre.



Figure 1: Recorded Hourly Temperatures at Gahcho Kué, Lutselk'e and Yellowknife A in 2011 (May 26 to September 15)



3.2 Rainfall

Rainfall data were collected at the Project site from May 26 to September 15, 2011 and are presented in Table 3 and Figure 2, with daily data presented in Appendix C. Table 3 shows a comparison of monthly and maximum daily rainfall between the Project site, Yellowknife A and Lutselk'e climate stations for concurrent records. Figure 2 shows a comparison of daily rainfall between the Project site, Lutselk'e and Yellowknife A for the monitoring period.

Based on concurrent records in 2011, the total recorded rainfall at the Project site was in less than at Yellowknife A, but similar to Lutselk'e A, with a total of 100 mm. Maximum daily rainfalls were comparable at Gahcho Kué and Yellowknife A (12.4 mm and 17.0 mm), and greater at Lutselk'e A (27.8 mm). These values are reported as measured, and do not include undercatch adjustments. Undercatch factors reported in the 2010 EIS for rainfall are very close for Gahcho Kué and Yellowknife A with values of 1.14 and 1.15. There is no value reported for Lutselk'e, although it is thought that the undercatch factor would be similar to that at Yellowknife A, because of proximity and similar latitudes.

Although the 2010 EIS reports the Yellowknife A and Lupin A (23026HN) climate stations as being most representative of precipitation at the Project site, the collected data were not compared to Lupin A due to frequent data gaps at that station in the 2011 record. The collected data were also compared to Lutselk'e as it is the closest station with a concurrent record for 2011.



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Table 3: Recorded Daily Rainfall at Gahcho Kué, Lutselk'e, and Yellowknife A in 2011 (May 26 to September 15)

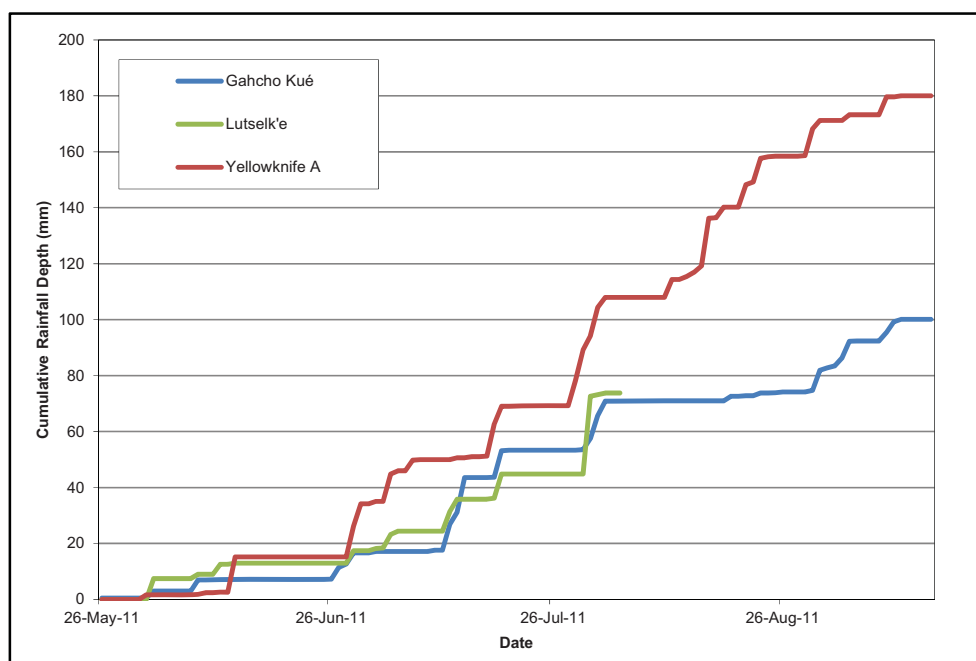
Month	Monthly Rainfall [mm]			Maximum Daily Rainfall [mm]		
	Gahcho Kué	Lutselk'e ^(a)	Yellowknife A ^(a)	Gahcho Kué	Lutselk'e ^(a)	Yellowknife A ^(a)
May	0.5	0.0	0.0	0.5	0.0	0.0
June	16.1	17.4	34.2	4.1	7.4	12.6
July	40.9	55.2	60.0	12.4	27.8	11.4
August	24.4	1.2	77.0	8.1	0.6	17.0
September	18.2	— ^(b)	8.8	5.9	— ^(b)	6.4
Total	100.1	73.8	180.0	12.4	27.8	17.0

^(a) Data reported by MSC have undergone only preliminary quality check.

^(b) Data not reported by MSC at the time of the analysis.

Note: mm = millimetre.

Figure 2: Cumulative Daily Rainfall at Gahcho Kué, Lutselk'e, and Yellowknife A in 2011 (May 4 to September 16)



3.3 Snow Course Survey

Wind redistributes snowfall over the course of a winter, and in general, exposed surfaces such as open lakes areas, collect less snow than sheltered lowland areas. Similarly, prevailing winds redistribute snow unequally across slopes of differing aspect. These effects may result in significant snow accumulation differences between terrain types.

Snow depth and densities were measured at 32 plots over 11 terrain types during the snow course survey. Table 4 presents, by terrain type, the snowpack measurement data collected in April 2008.



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For each terrain type, a mean SWE was calculated and used to derive the SWE for each sub-watershed based on the proportion of that terrain type over the entire sub-watershed as presented in Table 5. The mean SWE was measured at 118 mm for the 2010 to 2011 winter season.

Table 5: Average Snow Water Equivalent per Terrain Type

Terrain Type	Average Density [g/cm ³]	Average Depth [cm]	Average SWE [mm]
Low Slope	0.236	48.3	113
Crest	0.240	27.4	66
SE Slopes (10-33 degrees)	0.316	109.8	348
NE Slopes (10-33 degrees)	0.274	78.1	214
NW Slopes (10-33 degrees)	0.219	35.2	77
SW Slopes (10-33 degrees)	0.271	54.7	148
Lake Edge	0.279	58.9	164
Lake	0.202	21.2	43
NE Slopes (>33 degrees)	0.273	92.7	253
SE Slopes (>33 degrees)	0.295	156.6	462
NW Slopes (>33 degrees)	0.211	103.6	218

Notes: g/cm³ = grams per cubic centimetre; cm = centimetre; mm = millimetre; SWE = Snow Water Equivalent.



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Table 5: Snow Water Equivalent in Surveyed Sub-Watersheds (mm)

Sub-Watershed	Low Slope	Crest	SE Slopes (10-33 degrees)	NE Slopes (10-33 degrees)	NW Slopes (10-33 degrees)	SW Slopes (10-33 degrees)	Lake Edge	Lake	NE Slopes (>33 degrees)	SE Slopes (>33 degrees)	NW Slopes (>33 degrees)	Total
A1	65	1	6	2	1	0	31	8	0	0	0	114
B1	80	1	9	1	1	0	30	2	0	0	0	125
C1	92	2	14	2	0	0	17	0	0	0	0	127
D1	74	2	5	1	1	0	26	5	0	0	0	116
D10	60	2	16	1	0	1	57	1	0	0	0	139
D7	57	2	6	2	1	1	44	7	0	0	0	120
Ea	93	1	8	8	7	0	3	0	0	0	0	120
Eb	72	1	7	3	1	0	33	4	0	0	0	122
F1	59	1	15	12	6	7	36	0	1	0	0	138
G1	86	1	3	3	1	1	24	2	0	0	0	121
H1	83	2	2	2	0	1	27	2	0	0	0	120
I1	74	1	5	1	0	0	31	5	0	0	0	118
J1	59	2	3	1	0	0	40	8	0	0	0	114
K1	35	1	5	1	0	0	23	22	0	0	0	87
K2	55	1	2	1	2	0	30	12	0	0	0	103
K3	37	1	10	3	3	1	28	18	0	0	0	100
K4	57	1	10	3	1	0	29	11	0	0	0	112
K5	61	1	3	1	1	0	32	10	0	0	0	109
L1	78	1	10	2	1	0	33	2	0	0	0	127
L1A	70	2	12	3	1	1	39	2	0	1	0	131
L2	64	2	8	2	1	0	46	4	0	0	0	127

Note: mm = millimetres.



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Snow survey data were collected in various locations in the Snare and Yellowknife basins west of the Gahcho Kué region, and in the Taltson basin south of Great Slave Lake, by Indian and Northern Affairs Canada (now called Aboriginal Affairs and Northern Development Canada) (AANDC 2011). Table 6 presents snow water equivalents measured in 2011 and mean annual snow water equivalent values for the 10 closest stations to the Project area with available data in 2011.

Snow water equivalents for the selected regional stations varied between 58 and 137 mm. All stations reported SWE less than the long term mean in 2011 with the exception of two stations in the Taltson basin.

Table 6: Regional Snow Survey Data Summary

Station	Name	Basin	Location			Period of Record	Gap	SWE [mm]	
			Longitude	Latitude	Elevation [m]			Mean	2011
07SB-SC02	Tibbitt Lake	Yellowknife	113.38 W	62.50 N	244	1981 to 2011	-	82	58
07SB-SC04	Allan Lake	Yellowknife	113.05 W	62.95 N	297	1989 to 2011	-	91	74
07SB-SC05	Denis Lake	Yellowknife	112.62 W	63.37 N	411	1989 to 2011	-	115	73
07SB-SC06	Little Latham Lake	Yellowknife	113.63 W	63.20 N	305	1989 to 2011	-	101	73
07SB-SC07	Nardin Lake	Yellowknife	113.85 W	63.51 N	366	1989 to 2011	-	111	84
07SB-SC08	Sharples Lake East	Yellowknife	112.82 W	63.90 N	369	1989 to 2011	-	113	77
07SA-SC08	Big Lake	Snare	112.93 W	64.80 N	n/a	1995 to 2011	1997	132	100
07QD-SC02	Nonacho Lake	Taltson	109.67 W	61.72 N	320	1965 to 2011	1976 to 1977	107	80
07QD-SC03	Halliday Lake	Taltson	109.03 W	61.38 N	350	1965 to 2011	1976 to 1977	102	108
07QD-SC04	Gray Lake	Taltson	108.30 W	61.80 N	320	1965 to 2011	1976 to 1977	107	137

Notes: m = metre; mm = millimetre; n/a = not available.

3.4 Flow Path Surveys

In the Lake X6 watershed, surveyed elevations ranged from 429.08 m in a headwater lake west of Lake X6 to 417.52 m at the outlet of Lake X6. Based on the National Topographic Data Base the estimated watershed area for Lake X6 is 39.4 km².

In the Reference Lake watershed, surveyed elevations ranged from 417.67 m in a headwater lake south of Reference Lake to 398.74 m at the outlet of Reference Lake. Based on the National Topographic Data Base the estimated watershed area for Reference Lake is 25.8 km².

Surveyed elevations and resulting channel flow path directions are presented in Appendix D, Figures D-1 and D-2.

3.5 Hydrometry

Factsheets describing the location of the hydrometric stations and equipment installed are provided in Appendix A. The appendix also contains stage-discharge data, the derived stage-discharge rating curve based on data collected in 2011, tabulated mean daily discharge and water level data, manual discharge measurement data and related calculation sheets for each station.



3.5.1 Lake A3 and Outflow

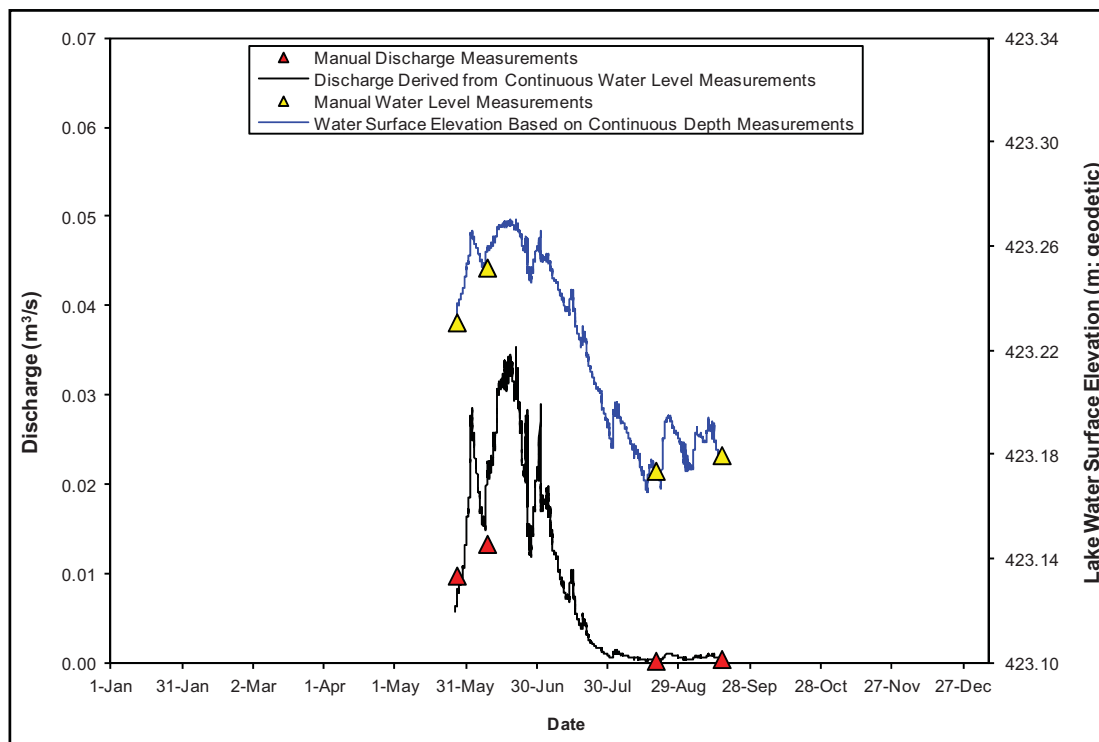
The Lake A3 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 7. The hydrographs for Lake A3 and Outflow are presented in Figure 3.

Table 7: Site Visits to Lake A3 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, non-geodetic]	Outflow	Discharge [m ³ /s]
May 26, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	423.231	✓	0.0098
Jun 8, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	423.252	✓	0.0134
Aug 18, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	423.174	✓	0.0003
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	423.180	✓	0.0005

Note: m= metres, m³/s= cubic metres per second.

Figure 3: Hydrograph for Lake A3 and Outflow in 2011





3.5.2 Lake D1 and Outflow

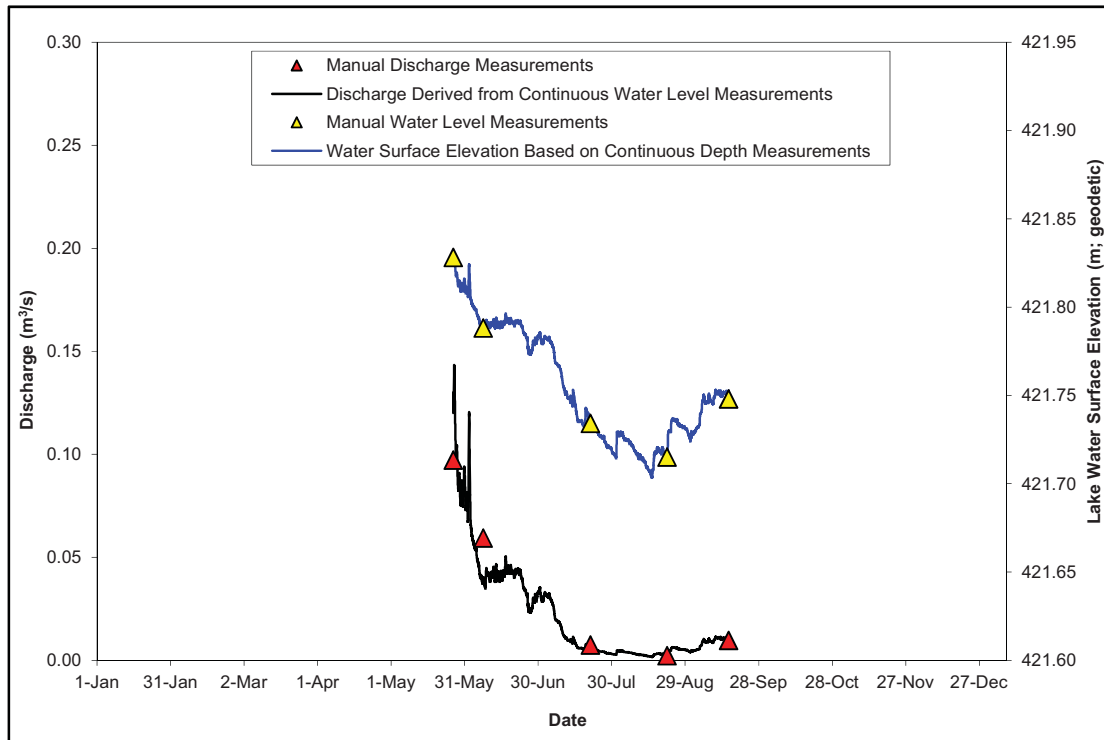
The Lake D1 and Outflow hydrometric station was visited five times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 8. The hydrographs for Lake D1 and Outflow are presented in Figure 4.

Table 8: Site Visits to Lake D1 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, geodetic]	Outflow	Discharge [m ³ /s]
May 26, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	421.828	✓	0.097
Jun 7, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	421.788	✓	0.059
Jul 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	421.734	✓	0.007
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	421.715	✓	0.002
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	421.748	✓	0.010

Note: m= metres, m³/s= cubic metres per second.

Figure 4: Hydrograph for Lake D1 and Outflow in 2011





3.5.3 Lake L1 and Outflow

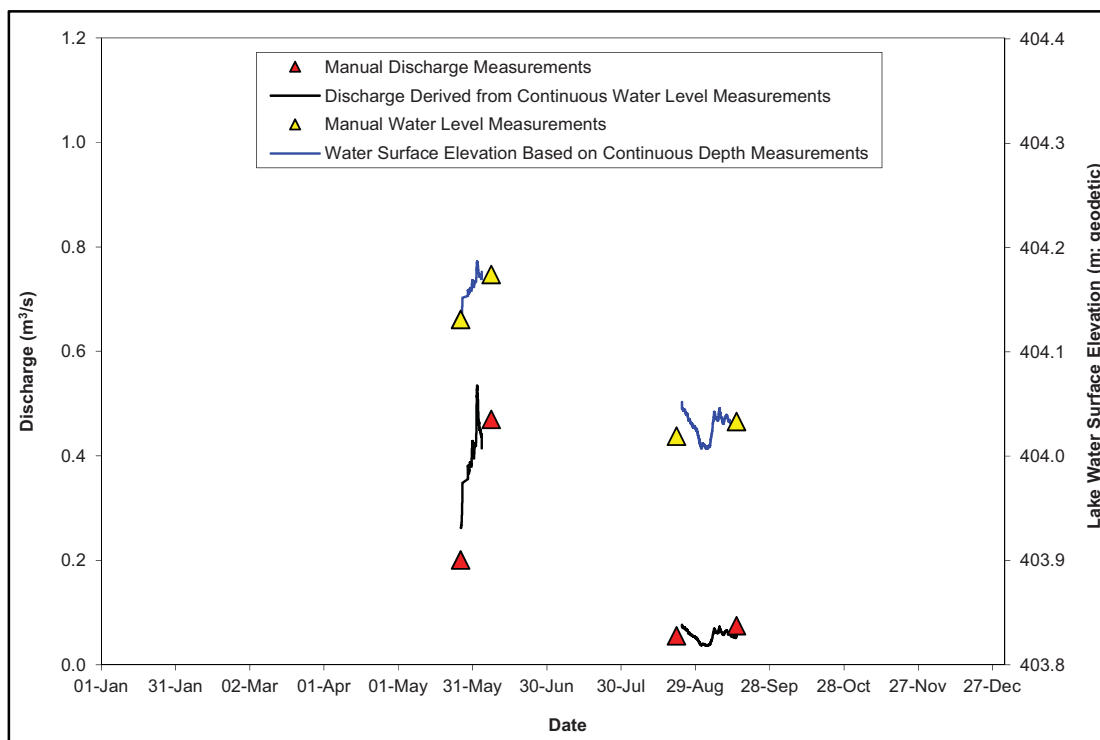
The Lake L1 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 14, 2011, based on continuous logger data. Details of each site visit are provided in Table 9. The hydrographs for Lake L1 and Outflow are presented in Figure 5. Data were not recorded between June 4, 2011 and August 22, 2011 because of data logger malfunction. The data logger was replaced on August 23, 2011.

Table 9: Site Visits to Lake L1 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, geodetic]	Outflow	Discharge [m ³ /s]
May 25, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	404.131	✓	0.200
Jun 7, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	404.174	✓	0.469
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	404.019	✓	0.055
Sep 14, 2010	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	404.033	✓	0.075

Note: m= metres, m³/s= cubic metres per second.

Figure 5: Hydrograph for Lake L1 and Outflow in 2011





3.5.4 Lake N9 and Outflow

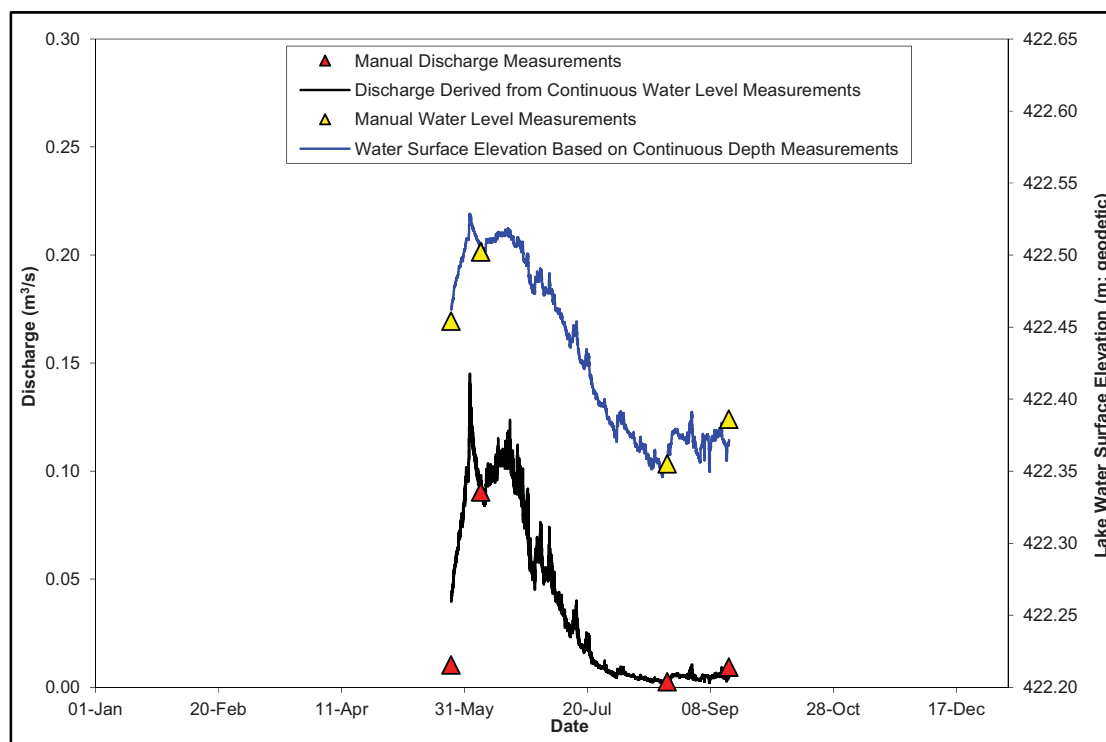
The Lake N9 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 25 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 11. The hydrographs for Lake N9 and Outflow are presented in Figure 7.

Table 10: Site Visits to Lake N9 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, non-geodetic]	Outflow	Discharge [m ³ /s]
May 25, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	422.454	✓	0.010
Jun 6, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	422.502	✓	0.090
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	422.355	✓	0.002
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	422.386	✓	0.009

Note: m= metres, m³/s= cubic metres per second.

Figure 6: Hydrograph for Lake N9 and Outflow in 2011





3.5.5 Lake N11 and Outflow

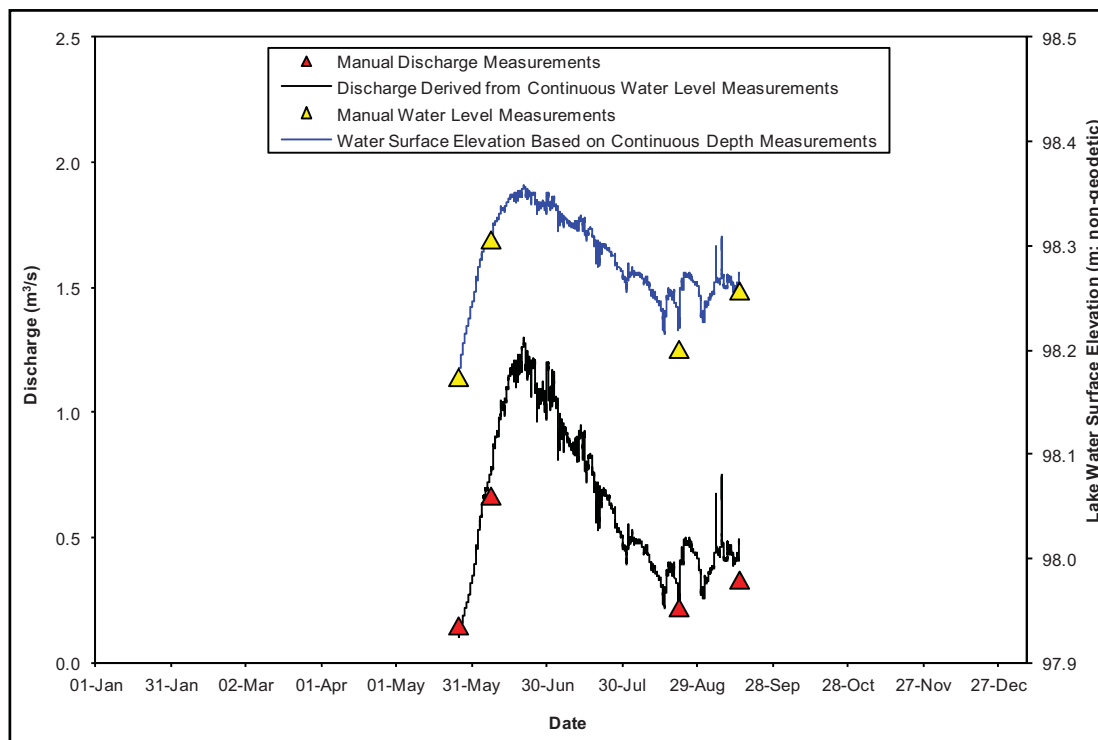
The Lake N11 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 25 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 11. The hydrographs for Lake N11 and Outflow are presented in Figure 7.

Table 11: Site Visits to Lake N11 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, non-geodetic]	Outflow	Discharge [m ³ /s]
May 25, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	98.175	✓	0.152
Jun 7, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	98.307	✓	0.672
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	98.202	✓	0.225
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	98.258	✓	0.335

Note: m= metres, m³/s= cubic metres per second.

Figure 7: Hydrograph for Lake N11 and Outflow in 2011





3.5.6 Lake N14 and Outflow

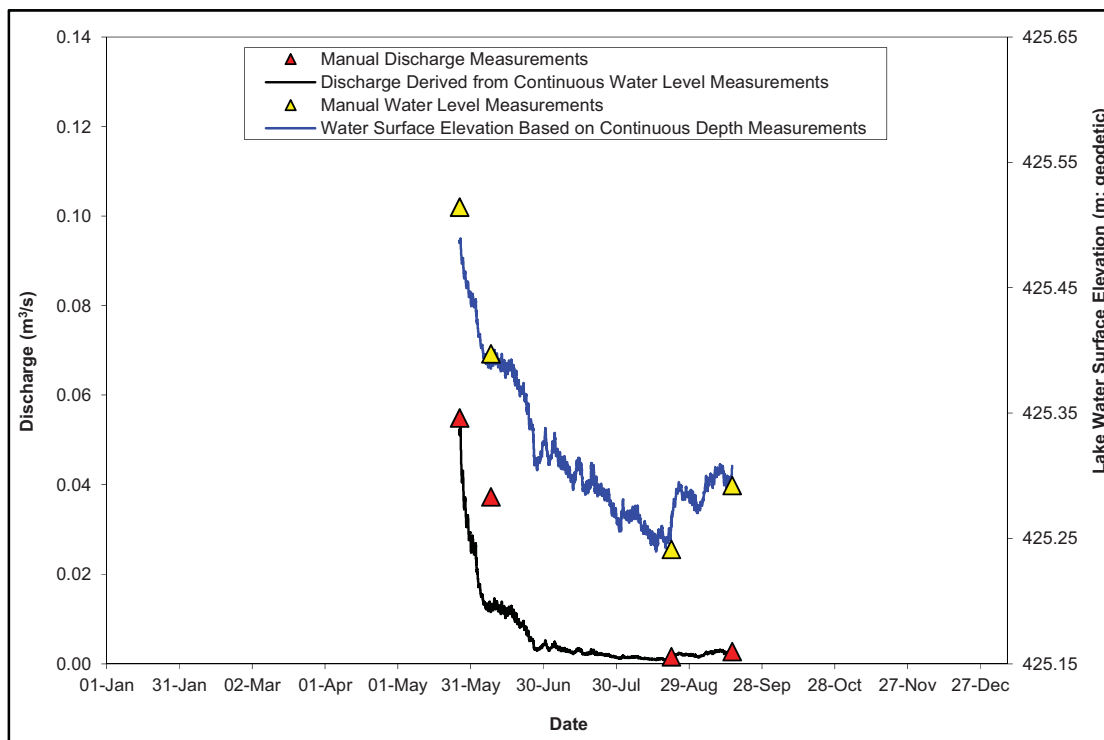
The Lake N14 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 12. The hydrographs for Lake N14 and Outflow are presented in Figure 8.

Table 12: Site Visits to Lake N14 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, geodetic]	Outflow	Discharge [m ³ /s]
May 26, 2011	Installed pressure transducer and data logger. Measured discharge and water level.	✓	425.514	✓	0.055
Jun 8, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	425.397	✓	0.037
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	425.241	✓	0.001
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	425.292	✓	0.003

Note: m= metres, m³/s= cubic metres per second.

Figure 8: Hydrograph for Lake N14 and Outflow in 2011





3.5.7 Lake N17 and Outflow

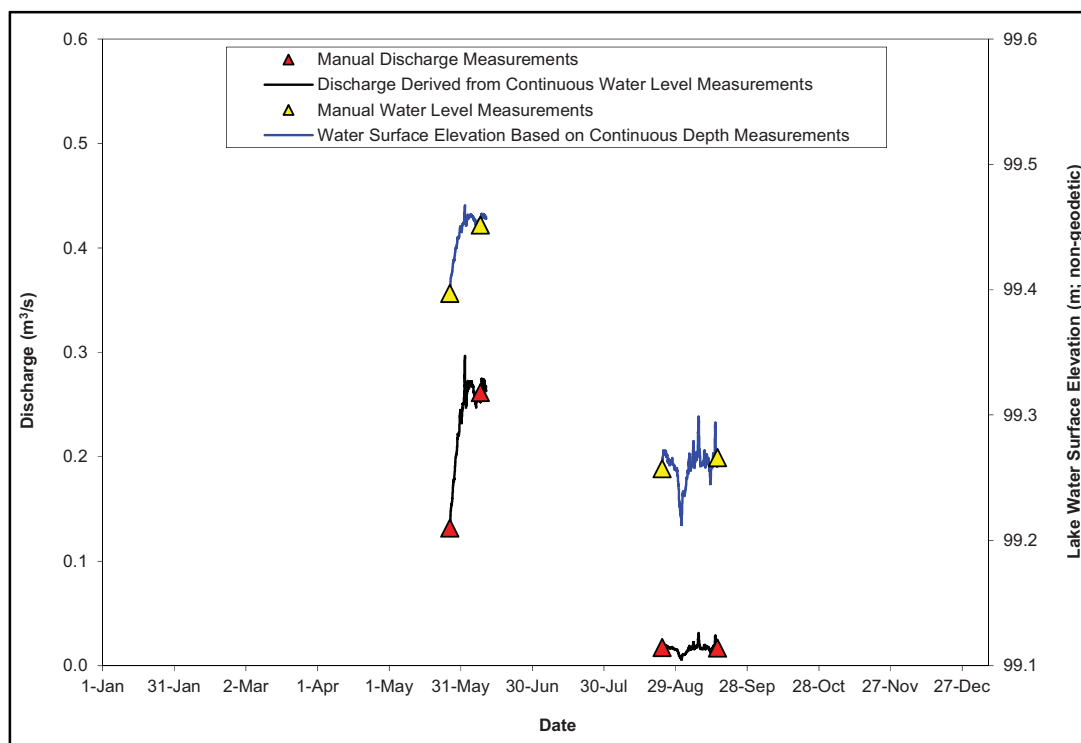
The Lake N17 and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 13. The hydrographs for Lake N17 and Outflow are presented in Figure 9. The data logger was damaged by wildlife on June 10 and it was replaced during the following site visit on August 22, 2011, therefore data were not recorded between June 10, 2011 and August 22, 2011.

Table 13: Site Visits to Lake N17 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, non-geodetic]	Outflow	Discharge [m ³ /s]
May 26, 2011	Installed pressure transducer and data logger. Measured discharge and water level.	✓	99.397	✓	0.132
Jun 8, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	99.452	✓	0.261
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger. Wildlife activity caused malfunction of the datalogger and was replaced the following day.	✓	99.257	✓	0.017
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	99.266	✓	0.017

Note: m= metres, m³/s= cubic metres per second.

Figure 9: Hydrograph for Lake N17 and Outflow in 2011





3.5.8 Lake N18 and Outflow

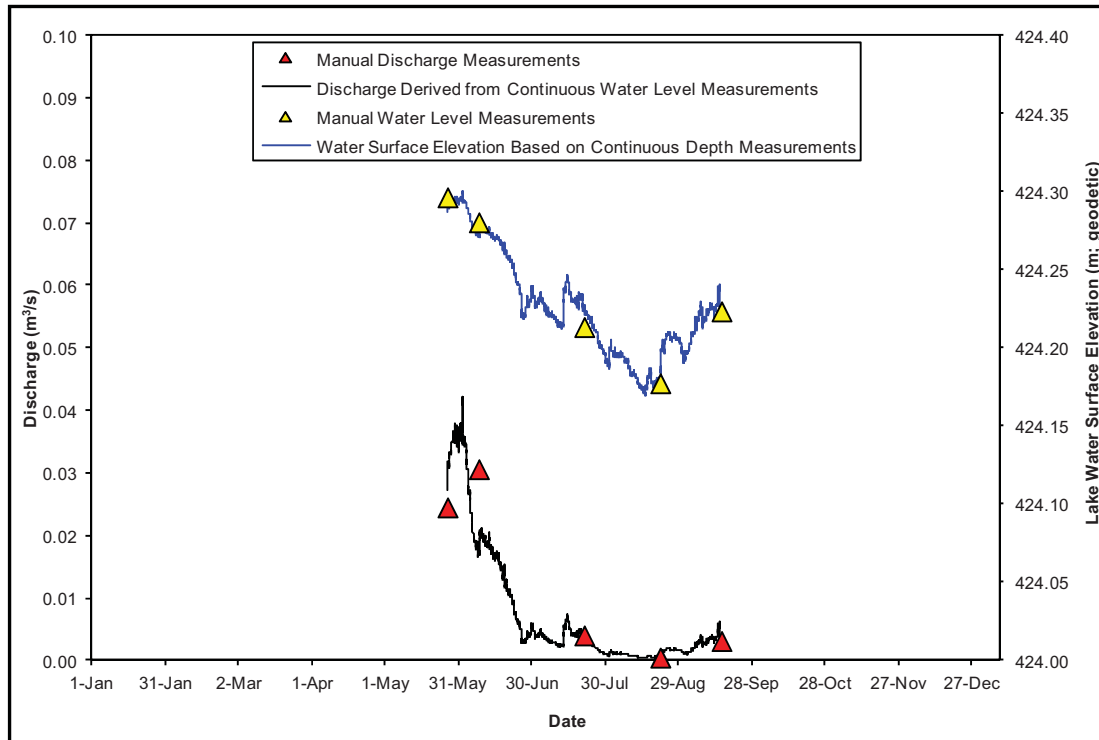
The Lake N18 and Outflow hydrometric station was visited five times in 2011, and a continuous hydrograph was derived for the period of May 26 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 14. The hydrographs for Lake N18 and Outflow are presented in Figure 10.

Table 14: Site Visits to Lake N18 and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [m, geodetic]	Outflow	Discharge [m ³ /s]
May 26, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	424.296	✓	0.024
Jun 8, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	424.280	✓	0.031
Jul 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	424.213	✓	0.004
Aug 21, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	424.177	✓	0.0004
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	424.223	✓	0.003

Note: m= metres, m³/s= cubic metres per second.

Figure 10: Hydrograph for Lake N18 and Outflow in 2011





3.5.9 Kirk Lake and Outflow

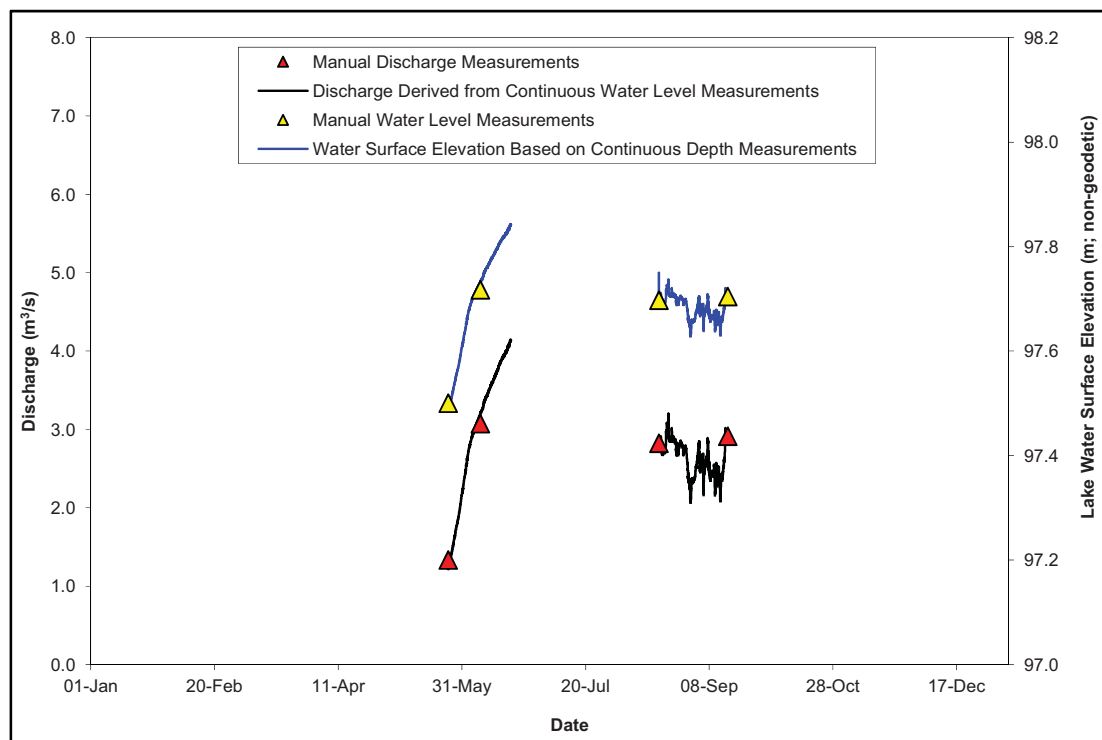
The Kirk Lake and Outflow hydrometric station was visited four times in 2011, and a continuous hydrograph was derived for the period of May 25 to September 15, 2011, based on continuous logger data. Details of each site visit are provided in Table 15. The hydrographs for Kirk Lake and Outflow are presented in Figure 11. Data were not recorded between June 20, 2011 and August 17, 2011. The data logger was found damaged and was replaced on August 18, 2011.

Table 15: Site Visits to Kirk Lake and Outflow Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation [non-geodetic]	Outflow	Discharge [m ³ /s]
May 25, 2011	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	97.500	✓	1.331
Jun 7, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	97.717	✓	3.072
Aug 18, 2011	Measured discharge and water surface elevation and downloaded data logger.	✓	97.697	✓	2.820
Sep 15, 2011	Measured discharge and water surface elevation and downloaded logger. Removed pressure transducer and data logger.	✓	97.704	✓	2.912

Note: m= metres, m³/s= cubic metres per second.

Figure 11: Hydrograph for Kirk Lake and Outflow in 2011





3.6 Bathymetry

During the 2011 open water season, depth data were collected to prepare bathymetric maps for 13 lakes and the bathymetric maps for each lake are presented in Appendix E. The data were collected during single field trip between July 17 and 23, 2011.

Because of the timing when the depth data were collected and the water level variation during the open water season, the use of calculated volumes needs to take into consideration the variation in water level specific to each lake between the start and the end of the open water season, as these volumes can vary during a normal open water season. The surveyed water level at the time of data collection is presented on each bathymetric map. Table 16 presents the calculated volumes for the lakes surveyed during the open water season in 2011, together with the date of survey and measured water level.

Table 16: Lake Volumes Calculated from Measured Bathymetry

Lake Name	Date	Area [m ²]	Volume [m ³]	Maximum Depth [m]
Lake B1	July 22, 2011	83,534	145,245	5.0
Lake B2	July 22, 2011	65,813	59,698	1.8
Lake D7	July 23, 2011	375,858	578,126	5.0
Lake E2	July 22, 2011	28,697	15,675	0.6
Lake E3	July 22, 2011	10,974	4,391	1.1
Lake F1	July 19, 2011	42,682	59,497	6.8
Lake G1	July 19, 2011	26,905	20,255	1.9
Lake G2	July 19, 2011	54,448	87,068	3.8
Lake H1a	July 18, 2011	29,676	27,163	1.9
Lake H1b	July 18, 2011	28,044	39,849	2.9
Lake I1	July 18, 2011	129,748	498,033	11.0
Lake I2	July 18, 2011	19,539	9,738	1.3
Lake J1	July 17, 2011	491,408	679,390	4.2

Note: m² = square metres; m³ = cubic metres; m = metres.



4.0 SUMMARY AND CONCLUSIONS

The hydrometric program for the 2011 field season included nine hydrometric stations, with all with sensors recording the water level every 15 minutes. Temperature and precipitation data were collected as part of the 2011 hydrometric program.

For the six hydrometric stations with continuous discharge hydrographs, including Lake A3, Lake D1, Lake N14, Lake N11, Lake N18 and Lake N9, the water yield for the open water season was calculated based on derived daily values and is presented in Table 17.

Table 17: Water Yield Values for the Automated Stations in the Project Area

Watershed	Watershed Area [km ²]	Runoff Volume [m ³]	Water Yield [mm]
A3 Watershed	0.768	89,700	116.8
D1 Watershed	4.497	213,200	47.4
N14 Watershed	0.975	60,500	62.1
N11 Watershed	114.688	6,351,300	55.4
N18 Watershed	1.630	72,900	44.7
N9 Watershed	5.168	369,000	71.4

Note: km² = square kilometres; m³ = cubic metres; mm = millimetres.

The comparison of water yields shows that the highest value was at A3 watershed and it is almost double than for the rest of the watersheds. This may be explained by the small watershed area and a late outlet channel opening, which caused most of the runoff to take place after the hydrometric station was installed and therefore most of the runoff was recorded.

For the remaining hydrometric stations, it likely that the recorded hydrographs do not capture the entire runoff and the peak flows, or a significant portion of the runoff occurred before the station was installed. It should be noted that for the hydrology of the area approximately 70% of the runoff typically occurs during the freshet period (which is usually 2 to 3 weeks long) and a few days with no recorded data during this period can significantly influence the calculated water yield values.

The 2011 hydrometric program still provides a great deal of useful information, including hydrographs and stage-discharge data that may be used for model calibration and validation, and information on seasonal lake water level variations.



5.0 CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

A handwritten signature in black ink, appearing to read "Ciobotaru".

Dan Ciobotaru, B.Sc.
Hydrologist

A handwritten signature in black ink, appearing to read "Nathan Schmidt".

Nathan Schmidt, PhD., P.Eng.
Principal, Senior Water Resources Engineer

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6.0 REFERENCES

- AANDC (Aboriginal Affairs and Northern Development Canada). 2011. Snow Survey Station Information and Data. Accessed online in October 2011. <http://www.aadnc-aandc.gc.ca/eng/1100100027479>
- Environment Canada. 2011. National Climate and Information Archive. Available online at: http://www.climate.weatheroffice.ec.gc.ca/climateData/canada_e.html.
- Terzi, R.A., T. Winkler and B. Routledge. 1994. Hydrometric Field and Related Manuals, Water Survey of Canada. Environment Canada, Ottawa.



7.0 ABBREVIATIONS

GIS	geographic information system
MSC	Meteorological Service of Canada
NE	northeast
NW	northwest
Project	Gahcho Kué Project
SE	southeast
SW	southwest
SWE	snow water equivalent

7.1 Units of Measure

%	percent
<	less than
>	greater than
°	degree
°C	degrees Celsius
cm	centimetre
g/cm ³	gram per cubic centimetre
km	kilometre
km ²	square kilometre
m	metre
m ²	square metre
m ³	cubic metre
m ³ /s	cubic metre per second
mm	millimetre



8.0 GLOSSARY

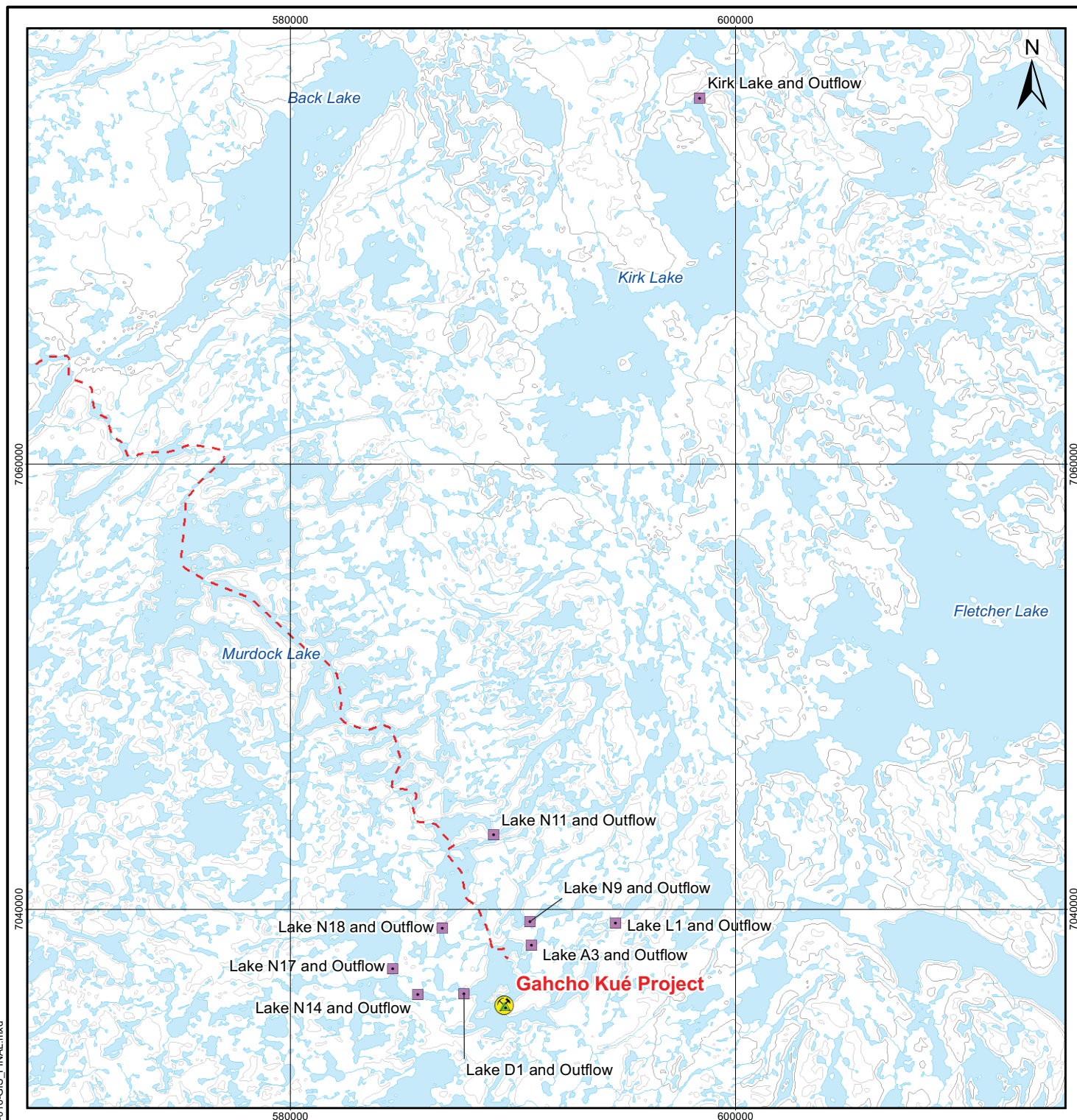
Baseline	Describes the current environmental setting, against which changes in the environment from the Snap Lake Diamond Project could be assessed; as there are no approved developments within the Regional Study Area (RSA), the baseline case focuses on summarizing the available monitoring data gathered at the Snap Lake Diamond Project.
Bathymetry	Measurement of the depth of an ocean or large waterbody.
Effects	A noticeable change in the receptor beyond normal variability due to a chemical of concern or other stressor.
Freshet period	A thaw event resulting from melting snow and ice on rivers.
Geodetic	Coordinates (elevations) that are referenced to a coordinate system (i.e., UTM Zone 12) and are not assumed or local.
Geographic Information System (GIS)	A computer-based tool for analyzing, displaying and manipulating digital spatial data.
Ground-truthing	Visiting locations in the field to confirm or correct information produced from remote sources such as interpreted aerial photographs or classified satellite imagery.
Headwater lake	A lake with no significant tributaries, located in the upper reaches of a catchment.
Hydrograph	Graph showing discharge over time.
Local study area (LSA)	The geographic area selected for examining the direct effects of the project on or very near the proposed project's site location.
Mean	A value that is computed by dividing the sum of a set of terms by the number of terms.
Parameter	A particular physical, chemical, or biological property that is being measured in a waterbody; whatever it is you measure in a waterbody.
Regional Study Area (RSA)	The geographic area selected for examining the proposed project's potential effects within a context that extends beyond the Project site.
Snow water equivalent	The depth of water that would result from melting the snow accumulated in a given area.
Stage-discharge rating curve	An equation relating water surface elevation at a specific location to discharge rate at a specific location.
Transect	A method of sampling snow along a path or fixed line.
Undercatch	The phenomenon whereby a rain or snow gauge measures less than the actual precipitation. Wind turbulence can deflect precipitation from being captured by the gauge, trace events may be too small to measure and wetting of the gauge surface, followed by evaporation, can all cause measured values to be smaller than actual.
Waterbody	An area of water such as a river, stream, lake or sea.



APPENDIX A

Hydrometric Data 2011

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LEGEND

-  Gahcho Kué Project
-  Winter Access Road
-  Watercourse
-  Waterbody
-  Climate Station
-  Hydrometric Station
-  Index Contour (100m interval)
-  Intermediate Contour (20m interval)

NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

GAHCHO KUÉ PROJECT

Hydrometric and Climate Station Locations in 2011

PROJECTION:
UTM Zone 12

DATUM:
NAD83

Scale: 1:250,000
5 2.5 0 5
Kilometres



FILE No:
B2011-Hydro-016-GIS

DATE:
February 28, 2012

JOB NO:
11-1365-0001

REVISION NO:
1

OFFICE:
GOLD-CAL

DRAWN:
DC

CHECK:
NS

Figure A-1



1.0 HYDROMETRIC DATA FROM THE 2011 FIELD SEASON

1.1 Introduction

This appendix presents the hydrometric data collected during the 2011 field season. The following symbols and units are noted:

- m^3/s = cubic metres per second
- m/s = metres per second
- m = metres
- MIN = minimum
- MAX = maximum
- - = no available data
- P = partial
- LDB = left downstream bank
- BM = benchmark
- BM_read = survey reading on top of benchmark
- WL_read = survey reading for water level
- WL_Elev = water level elevation calculated after survey
- SN = serial number

LAKE A3 AND OUTFLOW HYDROMETRIC STATION

LAKE A3

FACTSHEET

LOCATION AND DETAILS

Located on the left downstream bank of Lake A3 outlet, approximately 3 kilometres northeast of Kennady Lake Exploration Camp.

Operational in 2011 from 25 May to 15 September

Benchmark: Bolt on boulder; 424.04 m (geodetic)

Coordinates: UTM: 590846 m E, 7038405 m N (NAD83, Zn12)

Lat/Long: 63°27'45" N, 109°10'39" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



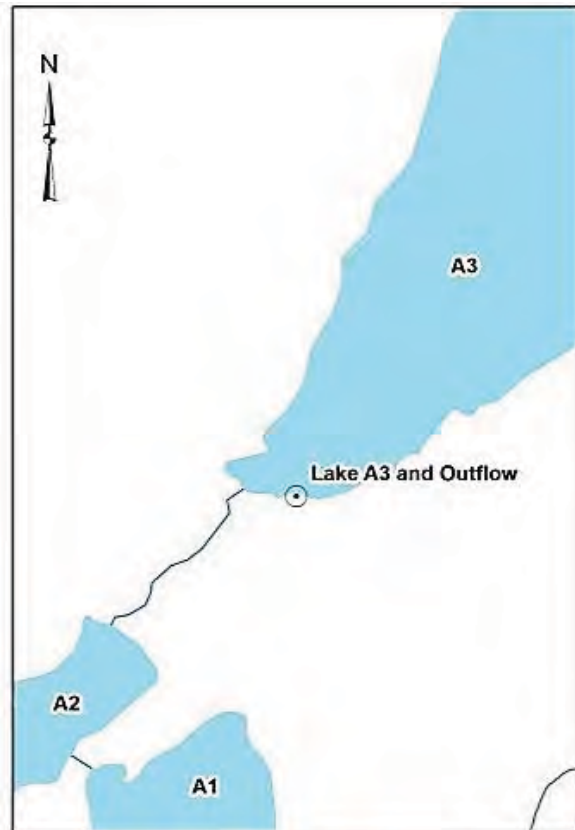
Aerial view of Lake A3, view northeast



Lake A3 Outlet Channel, view downstream



Lake A3 Shoreline during installation, 25 May
2011



NTS Mapping of Area



APPENDIX A

2011 Climate and Hydrology Supplemental Monitoring Report

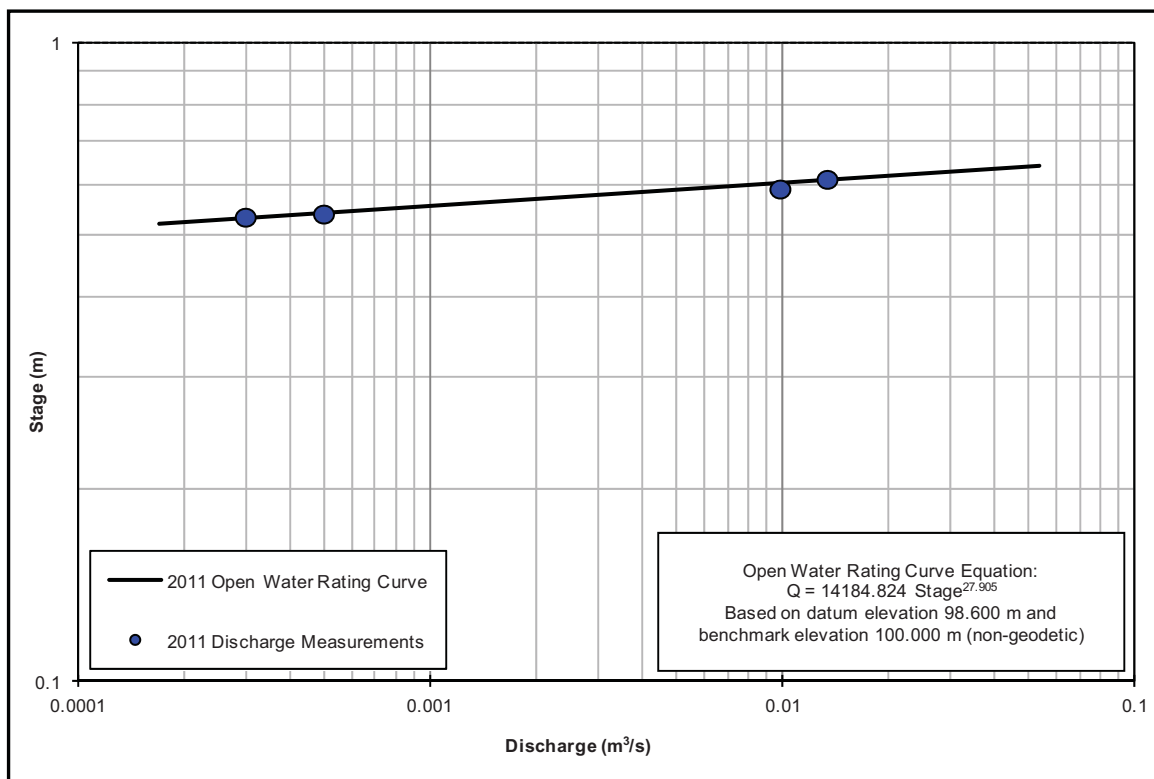
2.0 LAKE A3 AND OUTFLOW

LAKE A3 STATION BENCHMARK ELEVATION 100.000 m (non-geodetic)
DATUM ELEVATION 98.600 m (non-geodetic)

Table A-1: 2011 Hydrometric Data at Lake A3 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
26-May-2011 15:30	0.928	1.707	100.000	99.191	0.913	98.278	98.277	0.621	0.0098
08-Jun-2011 11:00	1.016	1.804	100.000	99.212	0.935	98.277		0.612	0.0134
18-Aug-2011 17:30	1.186	2.052	100.000	99.134	0.856	98.278		0.534	0.0003
15-Sep-2011 13:20	1.149	2.009	100.000	99.140	0.864	98.276		0.540	0.0005

Figure A-2: 2011 Stage-Discharge Rating Curve for Lake A3 and Outflow Station





APPENDIX A

2011 Climate and Hydrology Supplemental Monitoring Report

Table A-2: Lake A3 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.020	0.021	0.001	0.0004	-	-	-
2	-	-	-	-	-	0.028	0.018	0.001	0.0004	-	-	-
3	-	-	-	-	-	0.025	0.018	0.001	0.0004	-	-	-
4	-	-	-	-	-	0.022	0.019	0.001	0.0006	-	-	-
5	-	-	-	-	-	0.020	0.017	0.001	0.0008	-	-	-
6	-	-	-	-	-	0.017	0.014	0.001	0.0007	-	-	-
7	-	-	-	-	-	0.016	0.013	0.001	0.0007	-	-	-
8	-	-	-	-	-	0.018	0.012	0.001	0.0006	-	-	-
9	-	-	-	-	-	0.022	0.010	0.001	0.0007	-	-	-
10	-	-	-	-	-	0.023	0.009	0.001	0.0009	-	-	-
11	-	-	-	-	-	0.025	0.008	0.000	0.0008	-	-	-
12	-	-	-	-	-	0.026	0.008	0.000	0.0008	-	-	-
13	-	-	-	-	-	0.030	0.007	0.000	0.0006	-	-	-
14	-	-	-	-	-	0.032	0.010	0.000	0.0005	-	-	-
15	-	-	-	-	-	0.033	0.008	0.000	0.000 P	-	-	-
16	-	-	-	-	-	0.033	0.006	0.000	-	-	-	-
17	-	-	-	-	-	0.033	0.005	0.000	-	-	-	-
18	-	-	-	-	-	0.034	0.004	0.000	-	-	-	-
19	-	-	-	-	-	0.034	0.005	0.000	-	-	-	-
20	-	-	-	-	-	0.031	0.004	0.000	-	-	-	-
21	-	-	-	-	-	0.032	0.003	0.000	-	-	-	-
22	-	-	-	-	-	0.030	0.003	0.001	-	-	-	-
23	-	-	-	-	-	0.026	0.002	0.001	-	-	-	-
24	-	-	-	-	-	0.022	0.002	0.001	-	-	-	-
25	-	-	-	-	-	0.023	0.002	0.001	-	-	-	-
26	-	-	-	-	0.006 P	0.015	0.002	0.001	-	-	-	-
27	-	-	-	-	0.008	0.013	0.001	0.001	-	-	-	-
28	-	-	-	-	0.009	0.016	0.001	0.001	-	-	-	-
29	-	-	-	-	0.010	0.020	0.001	0.001	-	-	-	-
30	-	-	-	-	0.012	0.023	0.001	0.001	-	-	-	-
31	-	-	-	-	0.016	-	0.001	0.000	-	-	-	-
MIN	-	-	-	-	0.006	0.013	0.001	0.000	0.0004	-	-	-
MEAN	-	-	-	-	0.010	0.025	0.008	0.001	0.0006	-	-	-
MAX	-	-	-	-	0.016	0.034	0.021	0.001	0.0009	-	-	-

Note: P – partial daily discharge.



APPENDIX A

2011 Climate and Hydrology Supplemental Monitoring Report

Table A-3: Lake A3 and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	99.217	99.218	99.156	99.137	-	-	-
2	-	-	-	-	-	99.225	99.215	99.157	99.135	-	-	-
3	-	-	-	-	-	99.222	99.215	99.157	99.135	-	-	-
4	-	-	-	-	-	99.220	99.215	99.154	99.143	-	-	-
5	-	-	-	-	-	99.217	99.213	99.152	99.149	-	-	-
6	-	-	-	-	-	99.214	99.209	99.150	99.147	-	-	-
7	-	-	-	-	-	99.212	99.207	99.148	99.147	-	-	-
8	-	-	-	-	-	99.214	99.206	99.145	99.145	-	-	-
9	-	-	-	-	-	99.220	99.203	99.142	99.146	-	-	-
10	-	-	-	-	-	99.220	99.201	99.142	99.151	-	-	-
11	-	-	-	-	-	99.222	99.198	99.140	99.150	-	-	-
12	-	-	-	-	-	99.223	99.196	99.138	99.148	-	-	-
13	-	-	-	-	-	99.226	99.195	99.134	99.145	-	-	-
14	-	-	-	-	-	99.228	99.201	99.130	99.141	-	-	-
15	-	-	-	-	-	99.228	99.198	99.128	99.141 P	-	-	-
16	-	-	-	-	-	99.228	99.190	99.135	-	-	-	-
17	-	-	-	-	-	99.228	99.186	99.137	-	-	-	-
18	-	-	-	-	-	99.229	99.183	99.135	-	-	-	-
19	-	-	-	-	-	99.229	99.187	99.132	-	-	-	-
20	-	-	-	-	-	99.227	99.184	99.131	-	-	-	-
21	-	-	-	-	-	99.227	99.177	99.131	-	-	-	-
22	-	-	-	-	-	99.226	99.173	99.146	-	-	-	-
23	-	-	-	-	-	99.223	99.171	99.151	-	-	-	-
24	-	-	-	-	-	99.219	99.168	99.154	-	-	-	-
25	-	-	-	-	-	99.219	99.165	99.154	-	-	-	-
26	-	-	-	-	99.192 P	99.211	99.164	99.151	-	-	-	-
27	-	-	-	-	99.196	99.208	99.161	99.149	-	-	-	-
28	-	-	-	-	99.199	99.212	99.156	99.147	-	-	-	-
29	-	-	-	-	99.203	99.217	99.153	99.145	-	-	-	-
30	-	-	-	-	99.206	99.220	99.149	99.143	-	-	-	-
31	-	-	-	-	99.212	-	99.145	99.139	-	-	-	-
MIN	-	-	-	-	99.192	99.208	99.145	99.128	99.135	-	-	-
MEAN	-	-	-	-	99.201	99.221	99.187	99.144	99.144	-	-	-
MAX	-	-	-	-	99.212	99.229	99.218	99.157	99.151	-	-	-

Note: P – partial daily average.



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Table A-4: Discharge Sheet - Lake A3 Outlet, 26 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		26-May-2011	
Waterbody:		A3 Lake			Start Time		15:00	
Crossing ID:		A3 Lake Outlet			End Time		16:10	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1906	
East	590848	BM_read	0.928	Gauge	Transducer SN:		25934	
North	7038406	WL_read	1.707	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.221		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.40	0.00						
2	0.70	0.12		0.000				
3	0.90	0.15		0.009				
4	1.10	0.14		0.018				
5	1.30	0.15		0.030				
6	1.40	0.18		0.046				
7	1.50	0.19		0.034				
8	1.60	0.19		0.021				
9	1.70	0.20		0.012				
10	1.80	0.20		0.015				
11	1.90	0.19		0.030				
12	2.00	0.10		0.009				
13	2.15	0.00						
14								
15	0.30	0.00						
16	0.50	0.08		0.030				
17	0.60	0.11		0.073				
18	0.70	0.16		0.091				
19	0.80	0.16		0.171				
20	0.85	0.16		0.091				
21	0.88	0.16		0.000				
22	0.90	0.00						
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.01	
34						A(m ²)	0.24	
35								



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Table A-5: Discharge Sheet - Lake A3 Outlet, 8 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		8-Jun-2011	
Waterbody:		A3 Lake			Start Time		10:32	
Crossing ID:		A3 Lake Outlet			End Time		11:20	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1906	
East	590848	BM_read	1.016	Gauge	Transducer SN:		25934	
North	7038406	WL_read	1.804	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.212		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.20	0.00						
2	0.30	0.10		0.16				
3	0.40	0.12		0.08				
4	0.50	0.13		0.11				
5	0.60	0.14		0.23				
6	0.70	0.14		0.23				
7	0.80	0.13		0.19				
8	0.90	0.05		0.12				
9	1.00	0.03		0.02				
10	1.20	0.00						
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37					RESULTS:	Q (m ³ /s)	0.013	
38						A(m ²)	0.09	
39								



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Table A-6: Discharge Sheet - Lake A3 Outlet, 18 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		18-Aug-2011	
Waterbody:		A3 Lake			Start Time		17:30	
Crossing ID:		A3 Lake Outlet			End Time		18:00	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1906	
East	590848	BM_read	1.186	Gauge	Transducer SN:		25934	
North	7038406	WL_read	2.052	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.134		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1								
2								
3								
4		Flow visual estimated at 0.3 – 0.5 L/s						
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35					RESULTS:	Q (m ³ /s)	0.0003	
36						A(m ²)		
37								



APPENDIX A

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Table A-7: Discharge Sheet - Lake A3 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sep-2011	
Waterbody:		A3 Lake			Start Time		14:00	
Crossing ID:		A3 Lake Outlet			End Time		14:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1906	
East	590848	BM_read	1.149	Gauge	Transducer SN:		25934	
North	7038406	WL_read	2.009	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.140		Crew:	DC/GE		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.00	0.00						
2	0.06	0.09		0.05				
3	0.13	0.00						
4	0.20	0.08		0.06				
5	0.28	0.00						
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38					RESULTS:	Q (m ³ /s)	0.0005	
39						A(m ²)	0.012	
40								
41								

LAKE D1 AND OUTFLOW HYDROMETRIC STATION

LAKE D1

FACTSHEET

LOCATION AND DETAILS

Located on the right downstream bank of Lake D1 outlet, approximately 2 kilometres west of Kennady Lake Exploration Camp.

Operational in 2011 from 26 May to 15 September

Benchmark: Bolt on boulder; 423.538 m (geodetic)

Coordinates: UTM: 587822 m E, 7036241 m N (NAD83, Zn12)

Lat/Long: 63°26'36" N, 109°14'23" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



Lake D1 outlet view upstream



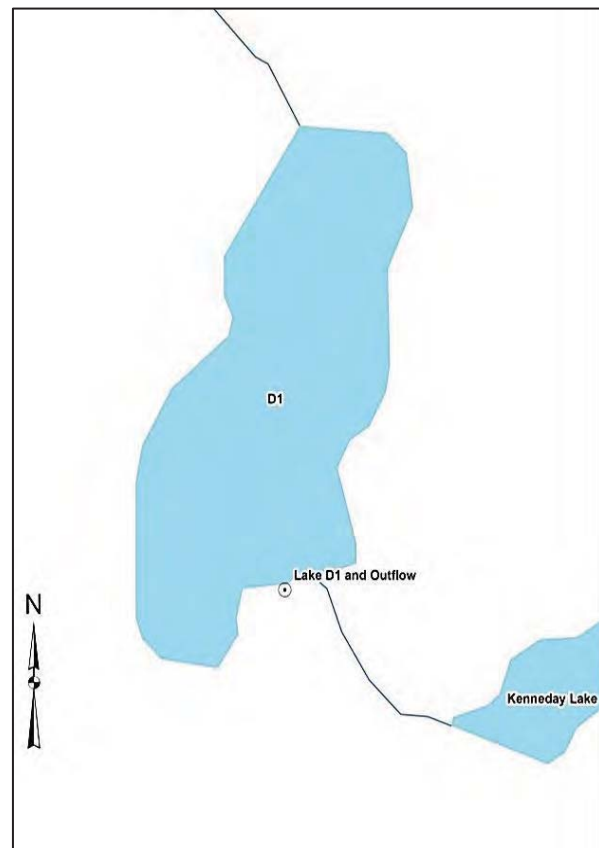
Lake D1 outlet view downstream



Lake D1 outlet discharge cross section



Lake D1 during station install, 6 May 2010, view west



NTS Mapping of Area



LAKE D1 STATION	BENCHMARK ELEVATION	423.538 m (geodetic)
	DATUM ELEVATION	421.388 m (geodetic)

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
26-May-2011 08:40	0.132	1.842	423.538	421.828	0.542	421.286	421.285	0.440	0.097
07-Jun-2011 17:00	0.483	2.233	423.538	421.788	0.505	421.283		0.400	0.059
21-Jul-2011 10:30	0.600	2.404	423.538	421.734	0.448	421.286		0.350	0.007
21-Aug-2011 16:25	0.601	2.424	423.538	421.715	0.427	421.288		0.327	0.002
15-Sep-2011 16:50	0.462	2.252	423.538	421.748	0.467	421.281		0.360	0.010

Open Water Rating Curve

2011 Measurements

2010 Measurements

Open Water Rating Curve Equation:
 $Q = 4804.9 \text{ Stage}^{13.072}$
Based on datum elevation 421.388 m and
benchmark elevation 423.538 m (geodetic)

Year	Discharge (m³/s)	Stage (m)
2010	0.0015	0.25
2010	0.003	0.30
2010	0.008	0.35
2010	0.02	0.45
2010	0.04	0.50
2011	0.002	0.28
2011	0.007	0.32
2011	0.01	0.35
2011	0.06	0.40
2011	0.1	0.55



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Table A-9: Lake D1 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.086	0.030	0.005	0.0046	-	-	-
2	-	-	-	-	-	0.073	0.031	0.004	0.0050	-	-	-
3	-	-	-	-	-	0.058	0.031	0.004	0.0054	-	-	-
4	-	-	-	-	-	0.054	0.031	0.004	0.0074	-	-	-
5	-	-	-	-	-	0.047	0.029	0.004	0.0095	-	-	-
6	-	-	-	-	-	0.041	0.024	0.004	0.0088	-	-	-
7	-	-	-	-	-	0.038	0.019	0.003	0.0095	-	-	-
8	-	-	-	-	-	0.039	0.018	0.003	0.0091	-	-	-
9	-	-	-	-	-	0.042	0.016	0.003	0.0091	-	-	-
10	-	-	-	-	-	0.040	0.012	0.003	0.0109	-	-	-
11	-	-	-	-	-	0.042	0.011	0.003	0.0109	-	-	-
12	-	-	-	-	-	0.042	0.010	0.002	0.0106	-	-	-
13	-	-	-	-	-	0.041	0.009	0.002	0.0106	-	-	-
14	-	-	-	-	-	0.041	0.010	0.002	0.0109	-	-	-
15	-	-	-	-	-	0.041	0.007	0.002	0.011 P	-	-	-
16	-	-	-	-	-	0.045	0.006	0.003	-	-	-	-
17	-	-	-	-	-	0.044	0.006	0.003	-	-	-	-
18	-	-	-	-	-	0.044	0.005	0.003	-	-	-	-
19	-	-	-	-	-	0.043	0.007	0.003	-	-	-	-
20	-	-	-	-	-	0.042	0.007	0.003	-	-	-	-
21	-	-	-	-	-	0.043	0.006	0.003	-	-	-	-
22	-	-	-	-	-	0.043	0.005	0.005	-	-	-	-
23	-	-	-	-	-	0.039	0.005	0.006	-	-	-	-
24	-	-	-	-	-	0.035	0.005	0.006	-	-	-	-
25	-	-	-	-	-	0.030	0.004	0.006	-	-	-	-
26	-	-	-	-	0.138 P	0.024	0.004	0.005	-	-	-	-
27	-	-	-	-	0.106	0.026	0.004	0.005	-	-	-	-
28	-	-	-	-	0.088	0.030	0.003	0.005	-	-	-	-
29	-	-	-	-	0.080	0.031	0.003	0.005	-	-	-	-
30	-	-	-	-	0.083	0.034	0.003	0.004	-	-	-	-
31	-	-	-	-	0.080	-	0.003	0.004	-	-	-	-
MIN	-	-	-	-	0.080	0.024	0.003	0.002	0.0046	-	-	-
MEAN	-	-	-	-	0.096	0.043	0.012	0.004	0.0089	-	-	-
MAX	-	-	-	-	0.138	0.086	0.031	0.006	0.0110	-	-	-

Note: P – partial daily discharge.



APPENDIX A

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Table A-10: Lake D1 and Outflow, 2011 Mean Daily Water Surface Elevation (m, geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	421.813	421.781	421.728	421.729	-	-	-
2	-	-	-	-	-	421.807	421.782	421.728	421.731	-	-	-
3	-	-	-	-	-	421.801	421.782	421.728	421.733	-	-	-
4	-	-	-	-	-	421.798	421.782	421.725	421.741	-	-	-
5	-	-	-	-	-	421.795	421.779	421.725	421.748	-	-	-
6	-	-	-	-	-	421.790	421.774	421.723	421.746	-	-	-
7	-	-	-	-	-	421.788	421.768	421.721	421.748	-	-	-
8	-	-	-	-	-	421.788	421.766	421.719	421.747	-	-	-
9	-	-	-	-	-	421.791	421.762	421.717	421.747	-	-	-
10	-	-	-	-	-	421.790	421.754	421.715	421.752	-	-	-
11	-	-	-	-	-	421.791	421.751	421.714	421.752	-	-	-
12	-	-	-	-	-	421.791	421.748	421.712	421.751	-	-	-
13	-	-	-	-	-	421.790	421.748	421.709	421.751	-	-	-
14	-	-	-	-	-	421.790	421.749	421.707	421.752	-	-	-
15	-	-	-	-	-	421.790	421.742	421.706	421.752 P	-	-	-
16	-	-	-	-	-	421.793	421.736	421.716	-	-	-	-
17	-	-	-	-	-	421.792	421.735	421.719	-	-	-	-
18	-	-	-	-	-	421.792	421.733	421.719	-	-	-	-
19	-	-	-	-	-	421.791	421.739	421.719	-	-	-	-
20	-	-	-	-	-	421.791	421.738	421.717	-	-	-	-
21	-	-	-	-	-	421.792	421.734	421.715	-	-	-	-
22	-	-	-	-	-	421.791	421.732	421.730	-	-	-	-
23	-	-	-	-	-	421.788	421.731	421.735	-	-	-	-
24	-	-	-	-	-	421.785	421.729	421.736	-	-	-	-
25	-	-	-	-	-	421.781	421.727	421.735	-	-	-	-
26	-	-	-	-	421.829 P	421.774	421.727	421.733	-	-	-	-
27	-	-	-	-	421.820	421.776	421.723	421.732	-	-	-	-
28	-	-	-	-	421.814	421.780	421.721	421.732	-	-	-	-
29	-	-	-	-	421.811	421.782	421.720	421.731	-	-	-	-
30	-	-	-	-	421.812	421.784	421.718	421.727	-	-	-	-
31	-	-	-	-	421.811	-	421.716	421.727	-	-	-	-
MIN	-	-	-	-	421.811	421.774	421.716	421.706	421.729	-	-	-
MEAN	-	-	-	-	421.816	421.790	421.746	421.723	421.745	-	-	-
MAX	-	-	-	-	421.829	421.813	421.782	421.736	421.752	-	-	-

Note: P – partial daily average.



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Table A-11: Discharge Sheet - Lake D1 Outlet, 26 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		26-May-2011	
Waterbody:		D1 Lake			Start Time		08:40	
Crossing ID:		D1 Lake Outlet			End Time		09:28	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1660	
East	587822	BM_read	0.189	Gauge	Transducer SN:		21912	
North	7036241	WL_read	1.842	0.66	Meter Type/SN: Marsh McBirney-2005856			
Elevation	423.538	WL_Elev	421.885		Crew:	DC/DG		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.10	0.00						
2	0.20	0.14		0.139				
3	0.40	0.14		0.256				
4	0.60	0.17		0.256				
5	0.90	0.17		0.235				
6	1.20	0.18		0.283				
7	1.45	0.17		0.283				
8	1.80	0.14		0.283				
9	2.00	0.20		0.317				
10	2.20	0.18		0.280				
11	2.35	0.08		0.235				
12	2.55	0.00						
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.097	
34						A(m ²)	0.37	
35								



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Table A-12: Discharge Sheet - Lake D1 Outlet, 7 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		07-June-2011	
Waterbody:		D1 Lake			Start Time		16:50	
Crossing ID:		D1 Lake Outlet			End Time		17:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1660	
East	587822	BM_read	0.523	Gauge	Transducer SN:		21912	
North	7036241	WL_read	2.233	0.6	Meter Type/SN: Marsh McBirney-2005856			
Elevation	423.538	WL_Elev	421.828		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.10	0.00						
2	0.15	0.16						
3	0.20	0.20		0.25				
4	0.35	0.23		0.30				
5	0.50	0.26		0.19				
6	0.65	0.26		0.12				
7	0.80	0.23		0.29				
8	0.95	0.17		0.37				
9	1.10	0.14		0.37				
10	1.25	0.08		0.35				
11	1.35	0.05		0.24				
12	1.45	0.00						
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.059	
34						A(m ²)	0.24	
35								



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Table A-13: Discharge Sheet - Lake D1 Outlet, 21 July 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Jul-2011	
Waterbody:		D1 Lake			Start Time		10:15	
Crossing ID:		D1 Lake Outlet			End Time		11:45	
BM UTM12 Location		Survey with RTK		Staff	Datalogger SN:		1660	
East	587822	BM_read	423.538	Gauge	Transducer SN:		21912	
North	7036241	WL_read	421.734	0.545	Meter Type/SN: Marsh McBirney-2005856			
Elevation	423.538	WL_Elev	425.342		Crew:	DC/PC		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.2	0.00		0.00				
2	0.5	0.05		0.22				
3	0.6	0.05		0.22				
4	0.7	0.07		0.18				
5	0.8	0.08		0.14				
6	0.9	0.10		0.09				
7	1.0	0.10		0.04				
8	1.1	0.10		0.02				
9	1.3	0.00		0.00				
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.007	
34						A(m ²)	0.07	
35								



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Table A-14: Discharge Sheet - Lake D1 Outlet, 21 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Aug-2011	
Waterbody:		D1 Lake			Start Time		16:10	
Crossing ID:		D1 Lake Outlet			End Time		16:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1660	
East	587822	BM_read	0.601	Gauge	Transducer SN:		21912	
North	7036241	WL_read	2.424	0.52	Meter Type/SN: Marsh McBirney-2005856			
Elevation	423.538	WL_Elev	421.715		Crew:	DC/PC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.15	0.00		0.00				
2	0.50	0.05		0.07				
3	0.60	0.06		0.08				
4	0.70	0.07		0.06				
5	0.80	0.08		0.04				
6	0.90	0.10		0.01				
7	1.00	0.06		0.00				
8	1.10	0.00						
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.002	
34						A(m ²)	0.05	
35								



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Table A-15: Discharge Sheet - Lake D1 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sept-2010	
Waterbody:		D1 Lake			Start Time		17:18	
Crossing ID:		D1 Lake Outlet			End Time		17:50	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1660	
East	587822	BM_read	0.462	Gauge	Transducer SN:		21912	
North	7036241	WL_read	2.252	0.57	Meter Type/SN: Marsh McBirney-2005856			
Elevation	423.538	WL_Elev	421.748		Crew:	DC/PC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.25	0.00		0.00				
2	0.50	0.05		0.16				
3	0.60	0.06		0.19				
4	0.70	0.07		0.21				
5	0.80	0.10		0.20				
6	0.90	0.10		0.14				
7	1.00	0.12		0.09				
8	1.10	0.13		0.06				
9	1.20	0.12		0.02				
10	1.30	0.11		0.01				
11	1.35	0.00						
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.01	
34						A(m ²)	0.09	
35								

LAKE L1 AND OUTFLOW HYDROMETRIC STATION

LAKE L1

FACTSHEET

LOCATION AND DETAILS

Located on the left downstream bank of Lake L1 outlet, approximately 6 kilometres northeast of Kennady Lake Exploration Camp.

Operational in 2011 from 26 May to 14 September

Benchmark: Bolt on boulder; 405.552 m (geodetic)

Coordinates: UTM: 594589 m E, 7039431 m N (NAD83, Zn12)

Lat/Long: 63°28'14" N, 109°06'06" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



Lake L1 outlet view downstream towards right bank



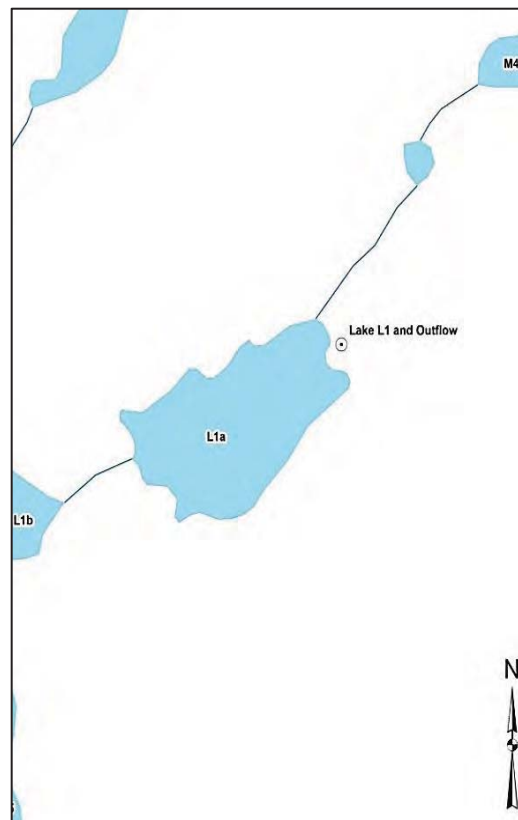
Lake L1 outlet view upstream towards left bank



Lake L1 outlet channel view downstream



Lake L1 left bank on 5 May 2010 at install time



NTS Mapping of Area



LAKE L1 STATION	BENCHMARK ELEVATION	405.552 m (geodetic)
	DATUM ELEVATION	403.700 m (geodetic)

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]	Staff Gauge Reading [m]
25-May-2011 17:00	0.561	1.982	405.552	404.131	0.714	403.417	403.417	0.431	0.200	0.670
07-Jun-2011 15:00	0.740	2.118	405.552	404.174				0.474	0.469	0.710
21-Aug-2011 11:30	0.656	2.189	405.552	404.019				0.319	0.055	0.560
14-Sep-2011 17:00	0.851	2.370	405.552	404.033	0.614	403.419		0.333	0.075	0.570

Open Water Rating Curve Equation:
 $Q = 35.2046 \text{ Stage}^{5.81636}$
Based on datum elevation 403.700 m and
benchmark elevation 405.552 m (geodetic)

Legend:
— 2010 and 2011 Open Water Rating Curve
● 2011 Measurements
● 2010 Measurements

Discharge (m^3/s)	Stage (m)	Measurement Type
0.008	0.25	2010 Measurements
0.04	0.35	2010 Measurements
0.05	0.32	2011 Measurements
0.07	0.35	2011 Measurements
0.12	0.42	2010 Measurements
0.20	0.50	2011 Measurements
0.22	0.52	2010 Measurements
0.40	0.65	2010 Measurements
0.42	0.65	2011 Measurements



APPENDIX A

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Table A-17: Lake L1 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.467	-	-	0.039	-	-	-
2	-	-	-	-	-	0.472	-	-	0.038	-	-	-
3	-	-	-	-	-	0.442 P	-	-	0.038	-	-	-
4	-	-	-	-	-	-	-	-	0.048	-	-	-
5	-	-	-	-	-	-	-	-	0.064	-	-	-
6	-	-	-	-	-	-	-	-	0.062	-	-	-
7	-	-	-	-	-	-	-	-	0.066	-	-	-
8	-	-	-	-	-	-	-	-	0.063	-	-	-
9	-	-	-	-	-	-	-	-	0.060	-	-	-
10	-	-	-	-	-	-	-	-	0.064	-	-	-
11	-	-	-	-	-	-	-	-	0.060	-	-	-
12	-	-	-	-	-	-	-	-	0.057	-	-	-
13	-	-	-	-	-	-	-	-	0.054	-	-	-
14	-	-	-	-	-	-	-	-	0.054 P	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	0.073 P	-	-	-	-
24	-	-	-	-	-	-	-	0.071	-	-	-	-
25	-	-	-	-	-	-	-	0.066	-	-	-	-
26	-	-	-	-	0.284 P	-	-	0.061	-	-	-	-
27	-	-	-	-	-	-	-	0.056	-	-	-	-
28	-	-	-	-	-	-	-	0.054	-	-	-	-
29	-	-	-	-	0.377 P	-	-	0.051	-	-	-	-
30	-	-	-	-	0.397	-	-	0.043	-	-	-	-
31	-	-	-	-	0.412	-	-	0.039	-	-	-	-
MIN	-	-	-	-	0.284	0.442	0.000	0.039	0.038	-	-	-
MEAN	-	-	-	-	0.367	0.460	0.000	0.057	0.055	-	-	-
MAX	-	-	-	-	0.412	0.472	0.000	0.073	0.066	-	-	-

Note: P – partial daily discharge.



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Table A-18: Lake L1 and Outflow, 2011 Mean Daily Water Surface Elevation (m, geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	404.175	-	-	404.011	-	-	-
2	-	-	-	-	-	404.176	-	-	404.009	-	-	-
3	-	-	-	-	-	404.171 P	-	-	404.009	-	-	-
4	-	-	-	-	-	-	-	-	404.021	-	-	-
5	-	-	-	-	-	-	-	-	404.038	-	-	-
6	-	-	-	-	-	-	-	-	404.036	-	-	-
7	-	-	-	-	-	-	-	-	404.040	-	-	-
8	-	-	-	-	-	-	-	-	404.037	-	-	-
9	-	-	-	-	-	-	-	-	404.034	-	-	-
10	-	-	-	-	-	-	-	-	404.038	-	-	-
11	-	-	-	-	-	-	-	-	404.035	-	-	-
12	-	-	-	-	-	-	-	-	404.031	-	-	-
13	-	-	-	-	-	-	-	-	404.028	-	-	-
14	-	-	-	-	-	-	-	-	404.028 P	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	404.046 P	-	-	-	-
24	-	-	-	-	-	-	-	404.044	-	-	-	-
25	-	-	-	-	-	-	-	404.040	-	-	-	-
26	-	-	-	-	404.136P	-	-	404.035	-	-	-	-
27	-	-	-	-	-	-	-	404.031	-	-	-	-
28	-	-	-	-	-	-	-	404.028	-	-	-	-
29	-	-	-	-	404.159P	-	-	404.025	-	-	-	-
30	-	-	-	-	404.16	-	-	404.016	-	-	-	-
31	-	-	-	-	404.17	-	-	404.010	-	-	-	-
MIN	-	-	-	-	404.136	404.171	0.000	404.010	404.009	-	-	-
MEAN	-	-	-	-	404.156	404.174	0.000	404.030	404.028	-	-	-
MAX	-	-	-	-	404.165	404.176	0.000	404.046	404.040	-	-	-

Note: P – partial daily average.



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Table A-19: Discharge Sheet - Lake L1 Outlet, 25 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		25-May-2011	
Waterbody:		L1 Lake			Start Time		16:15	
Crossing ID:		L1 Lake Outlet			End Time		17:30	
BM UTM12 Location		Survey		Staff	Datalogger SN:		xxx	
East	594590	BM_read	0.511	Gauge	Transducer SN:		xxx	
North	7039432	WL_read	1.982	0.67	Meter Type/SN: Marsh McBirney-xxx			
Elevation	405.552	WL_Elev	404.081		Crew:	DC/DG		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.2	0.00						
2	0.6	0.13		0.091				
3	1.1	0.30		0.128				
4	1.6	0.41		0.101				
5	1.9	0.52		0.158				
6	2.2	0.46		0.165				
7	2.7	0.28		0.189				
8	3.0	0.23		0.180				
9	3.4	0.26		0.146				
10	3.7	0.15		0.067				
11	4.0	0.00		0.000				
12	0.8	0.00		0.000				
13	1.1	0.14		0.116				
14	1.4	0.17		0.168				
15	1.7	0.20		0.219				
16	2.0	0.00		0.000				
17	0.0	0.00		0.000				
18	0.3	0.06		0.024				
19	0.5	0.02		0.012				
20	0.6	0.20		0.219				
21	0.7	0.20		0.158				
22	0.9	0.10		0.101				
23	1.0	0.00		0.000				
24	0.1	0.00		0.000				
25	0.3	0.14		0.067				
26	0.4	0.18		0.101				
27	0.5	0.18		0.079				
28	0.6	0.22		0.104				
29	0.7	0.24		0.128				
30	0.8	0.22		0.101				
31	0.9	0.22		0.088				
32	1.0	0.17		0.043				
33	1.2	0.00			RESULTS:	Q (m ³ /s)	0.200	
34						A(m ²)	1.44	
35								



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Table A-20: Discharge Sheet - Lake L1 Outlet, 7 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		7-June-2011	
Waterbody:		L1 Lake			Start Time		14:25	
Crossing ID:		L1 Lake Outlet			End Time		15:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		xxx	
East	594590	BM_read	0.690	Gauge	Transducer SN:		xxx	
North	7039432	WL_read	2.118	0.71	Meter Type/SN: Marsh McBirney-2005856			
Elevation	405.552	WL_Elev	404.124		Crew:	DC/GE		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	-0.1	0.00			0.2	0.00		
2	0.0	0.36		0.000	0.5	0.04		0.064
3	0.1	0.69		0.000	0.8	0.06		0.034
4	0.3	0.68		0.043	1.1	0.00		0.000
5	0.5	0.74		0.107	1.7	0.00		0.000
6	0.9	0.61		0.158	1.8	0.15		0.094
7	1.2	0.62		0.180	2.2	0.06		0.088
8	1.5	0.63		0.137	2.5	0.08		0.055
9	1.7	0.68		0.183	2.9	0.00		0.000
10	2.0	0.48		0.171	0.2	0.00		0.000
11	2.4	0.69		0.174	0.4	0.24		0.143
12	2.7	0.69		0.149	0.6	0.26		0.171
13	3.0	0.58		0.158	0.8	0.26		0.186
14	3.3	0.64		0.149	1.0	0.29		0.210
15	3.6	0.55		0.168	1.1	0.28		0.162
16	4.0	0.25		0.146	1.3	0.00		
17	4.3	0.42		0.116				
18	4.6	0.35		0.119				
19	4.9	0.00		0.000				
20	0.10	0.00		0.000				
21	0.35	0.18		0.195				
22	0.55	0.00		0.000				
23	0.60	0.00		0.000				
24	0.75	0.29		0.082				
25	0.95	0.00		0.000				
26	1.05	0.00		0.000				
27	1.30	0.28		0.134				
28	1.60	0.18		0.098				
29	1.90	0.20		0.128				
30	2.40	0.14		0.046				
31	2.70	0.00		0.000				
32								
33					RESULTS:	Q (m ³ /s)	0.469	
34						A(m ²)	3.43	
35								



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Table A-21: Discharge Sheet - Lake L1 Outlet, 21 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Aug-2011	
Waterbody:		L1 Lake			Start Time		11:30	
Crossing ID:		L1 Lake Outlet			End Time		12:45	
BM UTM12 Location		Survey		Staff	Datalogger SN:		xxx	
East	594590	BM_read	0.606	Gauge	Transducer SN:		xxx	
North	7039432	WL_read	2.189	0.56	Meter Type/SN: Marsh McBirney-2005856			
Elevation	405.552	WL_Elev	403.969		Crew:	DC/GE		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.7	0.00						
2	1.2	0.21		0.13				
3	1.5	0.20		0.18				
4	1.8	0.12		0.15				
5	2.0	0.11		0.10				
6	2.2	0.20		0.12				
7	2.4	0.00		0.00				
8	3.4	0.00		0.00				
9	3.5	0.12		0.16				
10	3.6	0.00		0.00				
11	0.6	0.00		0.00				
12	0.7	0.10		0.13				
13	0.9	0.10		0.16				
14	1.1	0.25		0.19				
15	1.3	0.00		0.00				
16	0.1	0.00		0.00				
17	0.2	0.06		0.15				
18	0.2	0.00		0.00				
19	0.3	0.00		0.00				
20	0.4	0.06		0.09				
21	0.4	0.00		0.00				
22	0.1	0.00		0.00				
23	0.2	0.04		0.02				
24	0.3	0.10		0.07				
25	0.4	0.16		0.14				
26	0.5	0.00		0.00				
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.055	
34						A(m ²)	0.38	
35								



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Table A-22: Discharge Sheet - Lake L1 Outlet, 14 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		14-Sept-2011	
Waterbody:		L1 Lake			Start Time		17:00	
Crossing ID:		L1 Lake Outlet			End Time		17:55	
BM UTM12 Location		Survey		Staff	Datalogger SN:		Xxx	
East	594590	BM_read	0.811	Gauge	Transducer SN:		xxx	
North	7039432	WL_read	2.37	0.57	Meter Type/SN: Marsh McBirney-2005856			
Elevation	405.552	WL_Elev	403.993		Crew:	DC/PC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.90	0.00						
2	1.10	0.13		0.060				
3	1.30	0.17		0.150				
4	1.50	0.11		0.180				
5	1.80	0.26		0.140				
6	2.10	0.28		0.170				
7	2.30	0.00		0.000				
8	1.90	0.00		0.000				
9	2.00	0.21		0.190				
10	2.20	0.00		0.000				
11	0.70	0.00		0.000				
12	0.90	0.11		0.220				
13	1.00	0.13		0.120				
14	1.10	0.00		0.000				
15	1.40	0.00		0.000				
16	1.60	0.06		0.210				
17	1.80	0.20		0.250				
18	2.00	0.22		0.160				
19	2.30	0.00		0.000				
20	1.00	0.00		0.000				
21	1.10	0.10		0.170				
22	1.20	0.10		0.150				
23	1.40	0.08		0.220				
24	1.50	0.05		0.160				
25	1.70	0.00		0.000				
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.075	
34						A(m ²)	0.45	
35								

LAKE N9 AND OUTFLOW HYDROMETRIC STATION

LAKE N9

FACTSHEET

LOCATION AND DETAILS

Located on the left downstream bank of Lake N9 outlet, approximately 4 kilometres northeast of Kennady Lake Exploration Camp.

Operational in 2011 from 25 May to 15 September

Benchmark: Bolt on boulder; 424.764 m (geodetic)

Coordinates: UTM: 590816 m E, 7039437 m N (NAD83, Zn12)

Lat/Long: 63°28'18" N, 109°10'39" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



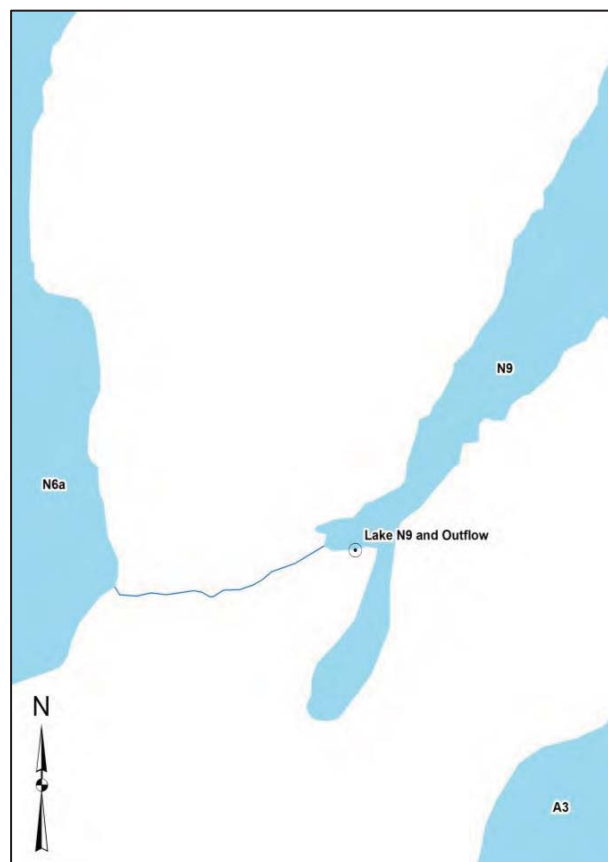
N9 Lake Outlet view north (flow from right to left), during spring freshet, 25 May 2011



View downstream of Lake N9 outlet at spring time



View upstream of Lake N9 outlet, September 2011



NTS Mapping of Area



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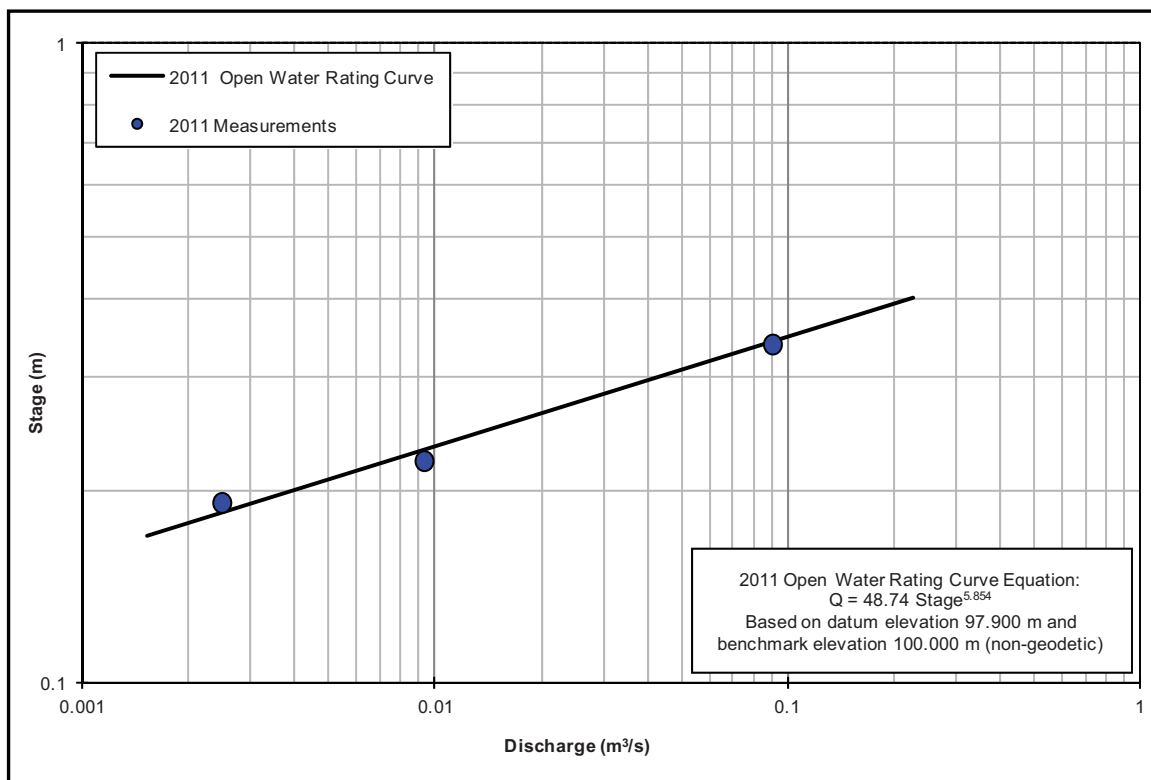
5.0 LAKE N9 AND OUTFLOW

LAKE N9 STATION BENCHMARK ELEVATION 100.000 m (non-geodetic)
DATUM ELEVATION 98.000 m (non-geodetic)

Table A-23: 2011 Hydrometric Data at Lake N9 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
25-May-2011 15:35	0.495	2.805	100.000	97.690	0.239	97.451	97.435	0.290	0.010
06-Jun-2011 18:00	0.310	2.572	100.000	97.738	0.287	97.451		0.338	0.090
21-Aug-2011 14:00	0.427	2.826	100.000	97.601	0.133	97.468		0.201	0.002
15-Sep-2011 15:00	0.462	2.940	100.000	97.522	0.150	97.372		0.122	0.009

Figure A-5: 2011 Stage-Discharge Rating Curve for Lake N9 and Outflow Station





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Table A-24: Lake N9 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.104	0.061	0.007	0.0046	-	-	-
2	-	-	-	-	-	0.126	0.052	0.008	0.0039	-	-	-
3	-	-	-	-	-	0.113	0.053	0.007	0.0034	-	-	-
4	-	-	-	-	-	0.104	0.057	0.006	0.0046	-	-	-
5	-	-	-	-	-	0.097	0.051	0.006	0.0047	-	-	-
6	-	-	-	-	-	0.093	0.046	0.005	0.0052	-	-	-
7	-	-	-	-	-	0.088	0.041	0.005	0.0042	-	-	-
8	-	-	-	-	-	0.090	0.040	0.005	0.0049	-	-	-
9	-	-	-	-	-	0.098	0.036	0.004	0.0052	-	-	-
10	-	-	-	-	-	0.098	0.034	0.004	0.0055	-	-	-
11	-	-	-	-	-	0.098	0.030	0.004	0.0057	-	-	-
12	-	-	-	-	-	0.100	0.027	0.004	0.0058	-	-	-
13	-	-	-	-	-	0.104	0.026	0.003	0.0048	-	-	-
14	-	-	-	-	-	0.105	0.030	0.003	0.0041	-	-	-
15	-	-	-	-	-	0.105	0.030	0.003	0.005 P	-	-	-
16	-	-	-	-	-	0.107	0.022	0.003	-	-	-	-
17	-	-	-	-	-	0.108	0.019	0.003	-	-	-	-
18	-	-	-	-	-	0.105	0.018	0.003	-	-	-	-
19	-	-	-	-	-	0.100	0.021	0.003	-	-	-	-
20	-	-	-	-	-	0.093	0.019	0.003	-	-	-	-
21	-	-	-	-	-	0.097	0.015	0.003	-	-	-	-
22	-	-	-	-	-	0.094	0.012	0.004	-	-	-	-
23	-	-	-	-	-	0.088	0.011	0.005	-	-	-	-
24	-	-	-	-	-	0.076	0.010	0.006	-	-	-	-
25	-	-	-	-	0.043 P	0.078	0.010	0.006	-	-	-	-
26	-	-	-	-	0.050	0.062	0.009	0.005	-	-	-	-
27	-	-	-	-	0.059	0.055	0.009	0.005	-	-	-	-
28	-	-	-	-	0.067	0.056	0.007	0.005	-	-	-	-
29	-	-	-	-	0.075	0.063	0.007	0.005	-	-	-	-
30	-	-	-	-	0.081	0.063	0.006	0.006	-	-	-	-
31	-	-	-	-	0.094	-	0.005	0.006	-	-	-	-
MIN	-	-	-	-	0.043	0.055	0.005	0.003	0.0034	-	-	-
MEAN	-	-	-	-	0.067	0.092	0.026	0.005	0.0047	-	-	-
MAX	-	-	-	-	0.094	0.126	0.061	0.008	0.0058	-	-	-

Note: P – partial daily discharge.



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Table A-25: Lake N9 and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	97.749	97.719	97.621	97.605	-	-	-
2	-	-	-	-	-	97.761	97.711	97.624	97.599	-	-	-
3	-	-	-	-	-	97.755	97.711	97.622	97.595	-	-	-
4	-	-	-	-	-	97.750	97.715	97.617	97.605	-	-	-
5	-	-	-	-	-	97.746	97.710	97.614	97.606	-	-	-
6	-	-	-	-	-	97.743	97.704	97.611	97.610	-	-	-
7	-	-	-	-	-	97.740	97.698	97.611	97.601	-	-	-
8	-	-	-	-	-	97.741	97.696	97.606	97.607	-	-	-
9	-	-	-	-	-	97.746	97.692	97.602	97.609	-	-	-
10	-	-	-	-	-	97.746	97.688	97.604	97.612	-	-	-
11	-	-	-	-	-	97.746	97.682	97.603	97.613	-	-	-
12	-	-	-	-	-	97.747	97.678	97.600	97.613	-	-	-
13	-	-	-	-	-	97.750	97.676	97.596	97.607	-	-	-
14	-	-	-	-	-	97.751	97.683	97.591	97.601	-	-	-
15	-	-	-	-	-	97.750	97.683	97.591	97.605 P	-	-	-
16	-	-	-	-	-	97.751	97.669	97.596	-	-	-	-
17	-	-	-	-	-	97.752	97.662	97.594	-	-	-	-
18	-	-	-	-	-	97.750	97.659	97.590	-	-	-	-
19	-	-	-	-	-	97.748	97.665	97.586	-	-	-	-
20	-	-	-	-	-	97.743	97.661	97.590	-	-	-	-
21	-	-	-	-	-	97.745	97.650	97.593	-	-	-	-
22	-	-	-	-	-	97.744	97.642	97.602	-	-	-	-
23	-	-	-	-	-	97.740	97.639	97.611	-	-	-	-
24	-	-	-	-	-	97.732	97.634	97.614	-	-	-	-
25	-	-	-	-	97.700 P	97.733	97.633	97.614	-	-	-	-
26	-	-	-	-	97.708	97.720	97.632	97.610	-	-	-	-
27	-	-	-	-	97.718	97.714	97.630	97.610	-	-	-	-
28	-	-	-	-	97.724	97.714	97.623	97.609	-	-	-	-
29	-	-	-	-	97.731	97.721	97.619	97.608	-	-	-	-
30	-	-	-	-	97.735	97.721	97.616	97.614	-	-	-	-
31	-	-	-	-	97.744		97.610	97.617		-		-
MIN	-	-	-	-	97.700	97.714	97.610	97.586	97.595	-	-	-
MEAN	-	-	-	-	97.723	97.742	97.667	97.605	97.606	-	-	-
MAX	-	-	-	-	97.744	97.761	97.719	97.624	97.613	-	-	-

Note: P – partial daily average.



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Table A-26: Discharge Sheet - Lake N9 Outlet, 25 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		25-May-2011	
Waterbody:		N9 Lake			Start Time		14:50	
Crossing ID:		N9 Lake Outlet			End Time		15:46	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1905	
East	590816	BM_read	0.495	Gauge	Transducer SN:		25929	
North	7039437	WL_read	2.775	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.720		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.70	0.00						
2	0.71	0.26		0.064				
3	0.75	0.26		0.064				
4	0.80	0.22		0.073				
5	0.90	0.21		0.104				
6	1.00	0.21		0.149				
7	1.10	0.17		0.073				
8	1.20	0.16		0.055				
9	1.40	0.00						
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.01	
34						A(m ²)	0.12	
35								



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Table A-27: Discharge Sheet - Lake N9 Outlet, 6 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		6-Jun-2011	
Waterbody:		N9 Lake			Start Time		17:20	
Crossing ID:		N9 Lake Outlet			End Time		18:15	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1905	
East	590816	BM_read	0.310	Gauge	Transducer SN:		25929	
North	7039437	WL_read	2.572	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.738		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.1	0.00						
2	0.2	0.10		0.216				
3	0.3	0.18		0.296				
4	0.5	0.08		0.195				
5	0.7	0.14		0.195				
6	0.9	0.00		0.000				
7	1.1	0.16		0.183				
8	1.4	0.16		0.408				
9	1.5	0.16		0.290				
10	1.7	0.00		0.000				
11	1.8	0.28		0.158				
12	2.0	0.20		0.104				
13	2.2	0.00		0.000				
14	0.3	0.00		0.000				
15	0.5	0.18		0.000				
16	0.8	0.26		0.040				
17	1.0	0.34		0.049				
18	1.2	0.48		0.186				
19	1.4	0.36		0.165				
20	1.5	0.18		0.024				
21	1.7	0.00						
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37					RESULTS:	Q (m ³ /s)	0.09	
38						A(m ²)	0.93	
39								



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Table A-28: Discharge Sheet - Lake N9 Outlet, 21 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Aug-2011	
Waterbody:		N9 Lake			Start Time		13:50	
Crossing ID:		N9 Lake Outlet			End Time		14:36	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1905	
East	590816	BM_read	0.427	Gauge	Transducer SN:		25929	
North	7039437	WL_read	2.826	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.601		Crew:	DC/CA		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.00	0.00						
2	0.10	0.15						
3	0.13	0.00		0.09				
4	0.20	0.00						
5	0.35	0.15		0.11				
6	0.50	0.00						
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35					RESULTS:	Q (m ³ /s)	0.002	
36						A(m ²)	0.03	
37								



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Table A-29: Discharge Sheet - Lake N9 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)		Date		15-Sep-2011	
Waterbody:		N9 Lake		Start Time		14:45	
Crossing ID:		N9 Lake Outlet		End Time		15:25	
BM UTM12 Location		Survey		Staff		Datalogger SN:	1905
East	590816	BM_read	0.462	Gauge	Transducer SN:		25929
North	7039437	WL_read	2.940	-	Meter Type/SN: Marsh McBirney-2005856		
Elevation	100	WL_Elev	97.522		Crew:	DC/JG	
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]
1	0.20	0.00					
2	0.25	0.11		0.120			
3	0.30	0.14		0.130			
4	0.40	0.21		0.150			
5	0.50	0.80		0.060			
6	0.55	0.00					
7	0.05	0.00					
8	0.10	0.10		0.030			
9	0.20	0.10		0.020			
10	0.30	0.10		0.010			
11	0.35	0.00					
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38					RESULTS:	Q (m ³ /s)	0.009
39						A(m ²)	0.14
40							
41							

LAKE N11 AND OUTFLOW HYDROMETRIC STATION

LAKE N11

FACTSHEET

LOCATION AND DETAILS

Located on the right downstream bank of Lake N11 outlet, approximately 8 kilometres north of Kennady Lake Exploration Camp.

Operational in 2011 from 25 May to 14 September

Benchmark: Bolt on boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 589133 m E, 7043346 m N (NAD83, Zn12)

Lat/Long: 63°30'26" N, 109°12'33" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



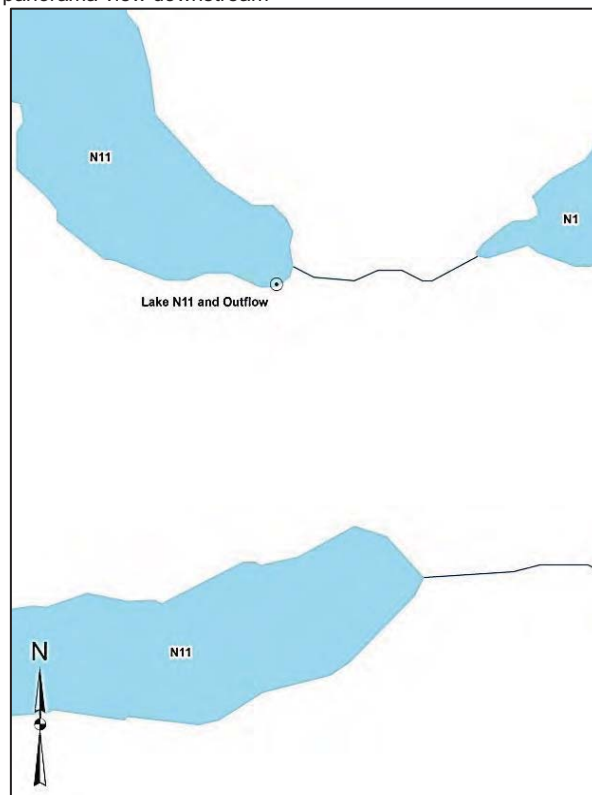
Lake N11 outlet channel panorama view downstream



Lake N11 outlet channel view upstream



Aerial view of Lake N11 outlet during melting, 5 May 2010



NTS Mapping of Area



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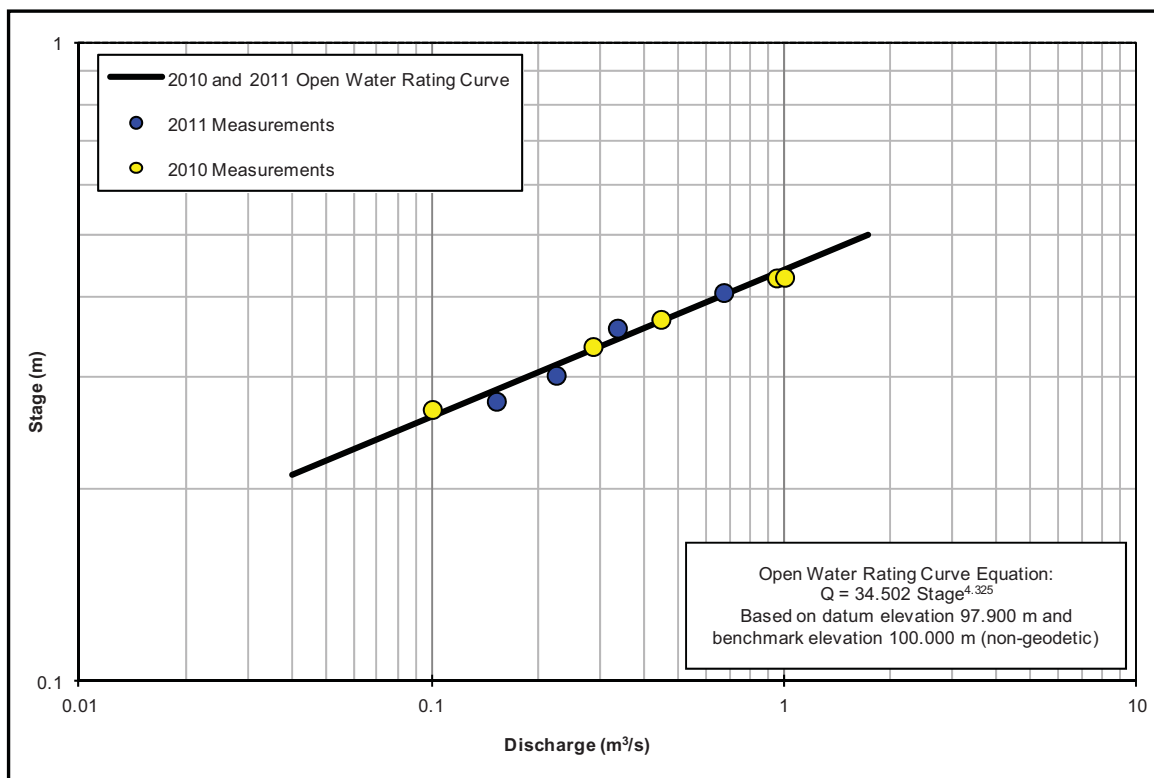
6.0 LAKE N11 AND OUTFLOW

LAKE N11 STATION BENCHMARK ELEVATION 100.000 m (non-geodetic)
 DATUM ELEVATION 97.900 m (non-geodetic)

Table A-30: 2011 Hydrometric Data at Lake N11 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
25-May-2011 14:30	0.255	2.080	100.000	98.175	0.599	97.576	97.573	0.275	0.152
07-Jun-2011 13:15	0.330	2.023	100.000	98.307	0.737	97.570		0.407	0.672
21-Aug-2011 13:00	0.530	2.328	100.000	98.202	0.646	97.556		0.302	0.225
14-Sep-2011 16:15	0.252	1.994	100.000	98.258	0.700	97.558		0.358	0.335

Figure A-6: 2011 Stage-Discharge Rating Curve for Lake N11 and Outflow Station





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Table A-31: Lake N11 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.423	1.066	0.505	0.3317	-	-	-
2	-	-	-	-	-	0.494	1.115	0.494	0.3469	-	-	-
3	-	-	-	-	-	0.582	1.048	0.496	0.3739	-	-	-
4	-	-	-	-	-	0.648	0.939	0.488	0.3889	-	-	-
5	-	-	-	-	-	0.687	0.936	0.486	0.5024	-	-	-
6	-	-	-	-	-	0.711	0.914	0.476	0.4364	-	-	-
7	-	-	-	-	-	0.760	0.927	0.450	0.5399	-	-	-
8	-	-	-	-	-	0.811	0.887	0.447	0.4306	-	-	-
9	-	-	-	-	-	0.898	0.869	0.424	0.4251	-	-	-
10	-	-	-	-	-	0.934	0.856	0.388	0.4597	-	-	-
11	-	-	-	-	-	1.006	0.870	0.382	0.4420	-	-	-
12	-	-	-	-	-	1.023	0.846	0.364	0.4111	-	-	-
13	-	-	-	-	-	1.064	0.920	0.340	0.4189	-	-	-
14	-	-	-	-	-	1.117	0.886	0.318	0.440 P	-	-	-
15	-	-	-	-	-	1.162	0.795	0.271	-	-	-	-
16	-	-	-	-	-	1.169	0.799	0.320	-	-	-	-
17	-	-	-	-	-	1.165	0.809	0.371	-	-	-	-
18	-	-	-	-	-	1.182	0.745	0.378	-	-	-	-
19	-	-	-	-	-	1.199	0.656	0.367	-	-	-	-
20	-	-	-	-	-	1.275	0.636	0.324	-	-	-	-
21	-	-	-	-	-	1.222	0.664	0.281	-	-	-	-
22	-	-	-	-	-	1.179	0.683	0.417	-	-	-	-
23	-	-	-	-	-	1.156	0.671	0.451	-	-	-	-
24	-	-	-	-	-	1.204	0.659	0.477	-	-	-	-
25	-	-	-	-	0.113 P	1.112	0.625	0.479	-	-	-	-
26	-	-	-	-	0.141	1.062	0.604	0.464	-	-	-	-
27	-	-	-	-	0.180	1.059	0.552	0.442	-	-	-	-
28	-	-	-	-	0.220	1.066	0.533	0.432	-	-	-	-
29	-	-	-	-	0.254	1.051	0.508	0.397	-	-	-	-
30	-	-	-	-	0.299	1.138	0.466	0.312	-	-	-	-
31	-	-	-	-	0.348	-	0.429	0.294	-	-	-	-
MIN	-	-	-	-	0.113	0.423	0.429	0.271	0.3317	-	-	-
MEAN	-	-	-	-	0.222	0.985	0.771	0.404	0.4248	-	-	-
MAX	-	-	-	-	0.348	1.275	1.115	0.505	0.5399	-	-	-

Note: P – partial daily discharge.



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Table A-32: Lake N11 and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	98.262	98.339	98.276	98.244	-	-	-
2	-	-	-	-	-	98.274	98.343	98.274	98.248	-	-	-
3	-	-	-	-	-	98.287	98.338	98.275	98.253	-	-	-
4	-	-	-	-	-	98.296	98.328	98.273	98.256	-	-	-
5	-	-	-	-	-	98.301	98.328	98.273	98.275	-	-	-
6	-	-	-	-	-	98.304	98.325	98.271	98.265	-	-	-
7	-	-	-	-	-	98.309	98.327	98.267	98.280	-	-	-
8	-	-	-	-	-	98.315	98.323	98.266	98.264	-	-	-
9	-	-	-	-	-	98.324	98.321	98.262	98.263	-	-	-
10	-	-	-	-	-	98.327	98.320	98.256	98.269	-	-	-
11	-	-	-	-	-	98.334	98.321	98.255	98.266	-	-	-
12	-	-	-	-	-	98.336	98.319	98.251	98.260	-	-	-
13	-	-	-	-	-	98.339	98.326	98.246	98.262	-	-	-
14	-	-	-	-	-	98.344	98.323	98.241	98.265 P	-	-	-
15	-	-	-	-	-	98.347	98.313	98.230	-	-	-	-
16	-	-	-	-	-	98.348	98.314	98.242	-	-	-	-
17	-	-	-	-	-	98.348	98.315	98.252	-	-	-	-
18	-	-	-	-	-	98.349	98.308	98.254	-	-	-	-
19	-	-	-	-	-	98.350	98.297	98.252	-	-	-	-
20	-	-	-	-	-	98.356	98.294	98.243	-	-	-	-
21	-	-	-	-	-	98.352	98.298	98.232	-	-	-	-
22	-	-	-	-	-	98.349	98.300	98.261	-	-	-	-
23	-	-	-	-	-	98.347	98.299	98.267	-	-	-	-
24	-	-	-	-	-	98.351	98.297	98.272	-	-	-	-
25	-	-	-	-	98.175 P	98.343	98.293	98.272	-	-	-	-
26	-	-	-	-	98.188	98.339	98.290	98.269	-	-	-	-
27	-	-	-	-	98.203	98.339	98.283	98.266	-	-	-	-
28	-	-	-	-	98.216	98.339	98.280	98.264	-	-	-	-
29	-	-	-	-	98.226	98.338	98.276	98.258	-	-	-	-
30	-	-	-	-	98.237	98.345	98.270	98.240	-	-	-	-
31	-	-	-	-	98.248	-	98.263	98.236	-	-	-	-
MIN	-	-	-	-	98.175	98.262	98.263	98.230	98.244	-	-	-
MEAN	-	-	-	-	98.213	98.330	98.309	98.258	98.262	-	-	-
MAX	-	-	-	-	98.248	98.356	98.343	98.276	98.280	-	-	-

Note: P – partial daily average.



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Table A-33: Discharge Sheet - Lake N11 Outlet, 25 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		25-May-2011	
Waterbody:		N11 Lake			Start Time		13:25	
Crossing ID:		N11 Lake Outlet			End Time		14:27	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1361	
East	589133	BM_read	0.255	Gauge	Transducer SN:		21914	
North	7043346	WL_read	2.080	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	98.175		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.35	0.00						
2	0.45	0.12		0.104				
3	0.75	0.12		0.098				
4	1.10	0.07		0.162				
5	1.55	0.22		0.140				
6	2.05	0.27		0.305				
7	2.55	0.24		0.274				
8	3.05	0.20		0.287				
9	3.40	0.18		0.229				
10	3.70	0.14		0.235				
11	4.05	0.06		0.232				
12	4.15	0.00		0.000				
13	4.40	0.00		0.000				
14	4.50	0.06		0.192				
15	4.58	0.00						
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.152	
34						A(m ²)	0.66	
35								



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Table A-34: Discharge Sheet - Lake N11 Outlet, 7 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		7-Jun-2011	
Waterbody:		N11 Lake			Start Time		12:48	
Crossing ID:		N11 Lake Outlet			End Time		13:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1361	
East	589133	BM_read	0.330	Gauge	Transducer SN:		21914	
North	7043346	WL_read	2.023	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	98.307		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.1	0.00			2.9	0.18		0.637
2	0.6	0.12		0.076	3.2	0.16		0.411
3	0.9	0.17		0.235	3.4	0.12		0.311
4	1.2	0.19		0.250	3.7	0.00		
5	1.5	0.23		0.241				
6	1.8	0.27		0.323				
7	2.1	0.28		0.338				
8	2.4	0.21		0.415				
9	2.7	0.29		0.351				
10	3.0	0.28		0.439				
11	3.4	0.27		0.354				
12	3.7	0.18		0.387				
13	4.1	0.14		0.308				
14	4.4	0.00		0.000				
15	0.8	0.00		0.000				
16	1.0	0.20		0.396				
17	1.3	0.06		0.341				
18	1.5	0.02		0.152				
19	1.9	0.24		0.247				
20	2.4	0.24		0.250				
21	2.7	0.10		0.341				
22	3.0	0.00		0.000				
23	3.2	0.00		0.000				
24	3.5	0.18		0.216				
25	3.9	0		0.000				
26	4.3	0		0.000				
27	4.5	0.1		0.049				
28	4.6	0		0.000				
29	1.0	0		0.000				
30	1.4	0.2		0.457				
31	1.7	0.29		0.512				
32	2.0	0.3		0.631				
33	2.2	0.24		0.628	RESULTS:	Q (m ³ /s)	0.672	
34	2.5	0.28		0.692		A(m ²)	1.72	
35	2.9							



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Table A-35: Discharge Sheet - Lake N11 Outlet, 21 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Aug-2011	
Waterbody:		N11 Lake			Start Time		12:50	
Crossing ID:		N11 Lake Outlet			End Time		14:15	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1361	
East	589133	BM_read	0.530	Gauge	Transducer SN:		21914	
North	7043346	WL_read	2.328	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	98.202		Crew:	DC/CA		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.50	0.00						
2	0.70	0.17		0.06				
3	1.00	0.21		0.13				
4	1.30	0.11		0.27				
5	1.60	0.15		0.33				
6	1.80	0.15		0.24				
7	2.10	0.29		0.30				
8	2.40	0.30		0.36				
9	2.70	0.25		0.33				
10	3.00	0.33		0.30				
11	3.30	0.30		0.31				
12	3.60	0.22		0.28				
13	3.90	0.22		0.21				
14	4.20	0.13		0.14				
15	4.40	0.13		0.13				
16	4.60	0.20		0.09				
17	4.70	0.00						
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.225	
34						A(m ²)	0.88	
35								



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Table A-36: Discharge Sheet - Lake N11 Outlet, 14 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		27-Jul-2010	
Waterbody:		N11 Lake			Start Time		10:40	
Crossing ID:		N11 Lake Outlet			End Time		11:20	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1361	
East	589133	BM_read	0.252	Gauge	Transducer SN:		21914	
North	7043346	WL_read	1.994	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	98.258		Crew:	DC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.20	0.00						
2	0.40	0.16		0.180				
3	0.80	0.24		0.270				
4	1.20	0.20		0.310				
5	1.50	0.25		0.210				
6	1.90	0.35		0.380				
7	2.30	0.31		0.400				
8	2.60	0.30		0.410				
9	2.90	0.32		0.440				
10	3.20	0.31		0.370				
11	3.50	0.20		0.320				
12	3.80	0.22		0.220				
13	4.10	0.22		0.180				
14	4.40	0.00						
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.335	
34						A(m ²)	1.02	
35								

LAKE N14 AND OUTFLOW HYDROMETRIC STATION

LAKE N14

FACTSHEET

LOCATION AND DETAILS

Located on the south bank of Lake N14, 50 m upstream of the lake outlet and approximately 4 kilometres west of Kennady Lake Exploration Camp.

Operational in 2011 from 26 May to 15 September

Benchmark: Bolt on boulder; 426.048 m (geodetic)

Coordinates: UTM: 585776 m E, 7036191 m N (NAD83, Zn12)

Lat/Long: 63°26'38" N, 109°16'49" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



Lake N14 outlet view upstream



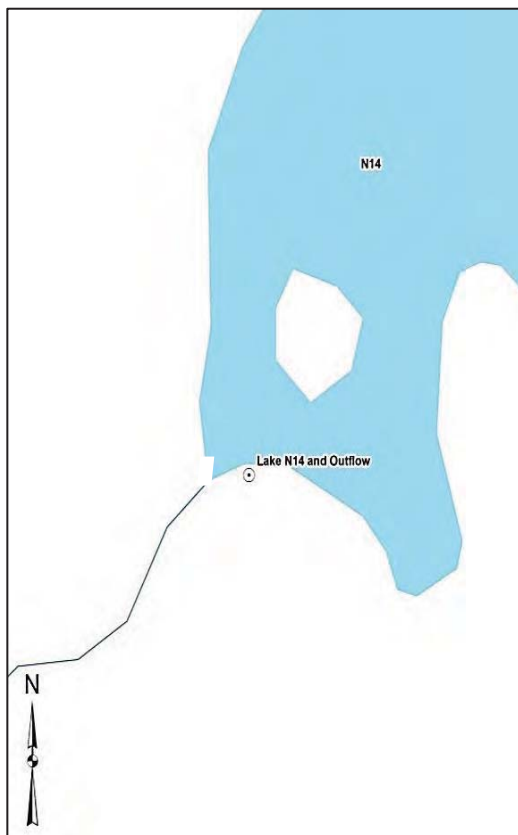
Lake N14 outlet view downstream



Lake N14 outlet view upstream



Lake N14 benchmark view downstream (south)



NTS Mapping of Area



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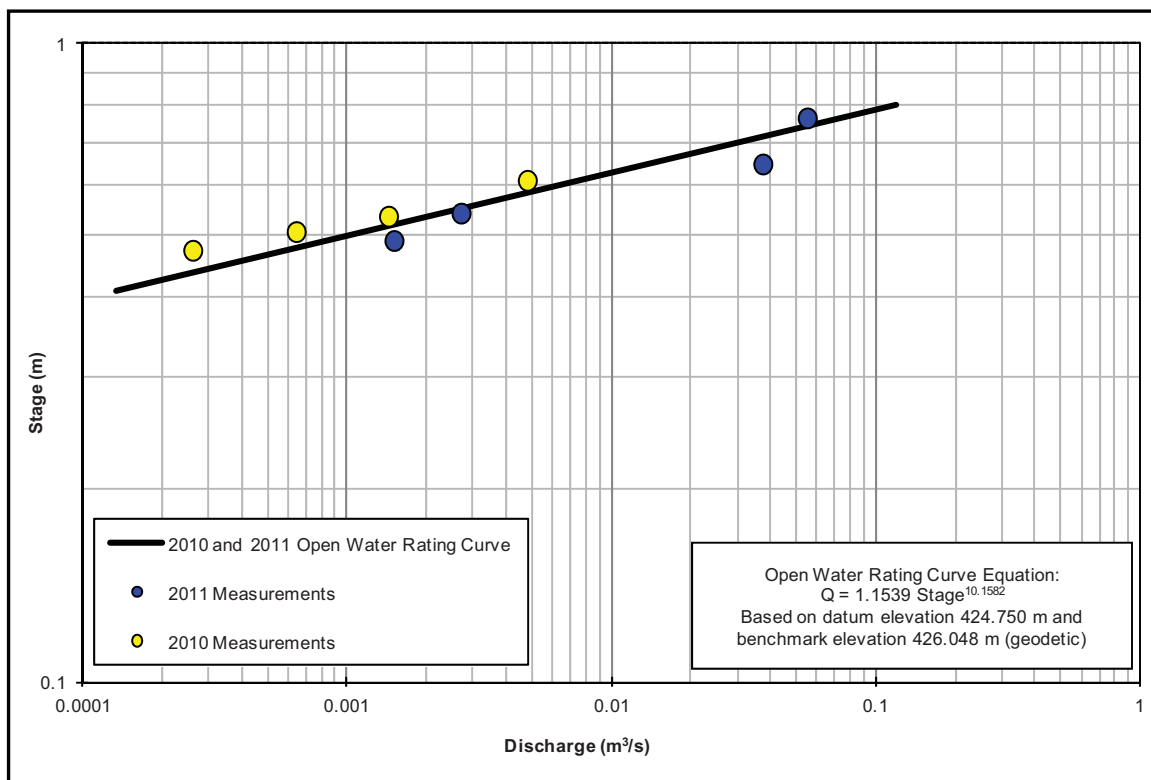
7.0 LAKE N14 AND OUTFLOW

LAKE N14 STATION BENCHMARK ELEVATION 426.048 m (geodetic)
DATUM ELEVATION 424.750 m (geodetic)

Table A-37: 2011 Hydrometric Data at Lake N14 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
26-May-2011 10:30	1.139	1.673	426.048	425.514	0.549	424.965	424.938	0.764	0.055
08-Jun-2011 08:30	1.177	1.828	426.048	425.397	0.450	424.947		0.647	0.037
21-Aug-2011 15:20	1.082	1.919	426.048	425.241	0.324	424.917		0.491	0.002
15-Sep-2011 16:35	1.239	2.025	426.048	425.292	0.371	424.921		0.542	0.003

Figure A-7: 2011 Stage-Discharge Rating Curve for Lake N14 and Outflow Station





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Table A-38: Lake N14 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.026	0.004	0.002	0.0016	-	-	-
2	-	-	-	-	-	0.022	0.003	0.001	0.0017	-	-	-
3	-	-	-	-	-	0.017	0.004	0.001	0.0018	-	-	-
4	-	-	-	-	-	0.015	0.004	0.001	0.0023	-	-	-
5	-	-	-	-	-	0.014	0.004	0.002	0.0024	-	-	-
6	-	-	-	-	-	0.013	0.003	0.002	0.0025	-	-	-
7	-	-	-	-	-	0.013	0.003	0.002	0.0026	-	-	-
8	-	-	-	-	-	0.012	0.003	0.001	0.0027	-	-	-
9	-	-	-	-	-	0.013	0.003	0.001	0.0027	-	-	-
10	-	-	-	-	-	0.013	0.003	0.001	0.0029	-	-	-
11	-	-	-	-	-	0.012	0.003	0.001	0.0029	-	-	-
12	-	-	-	-	-	0.012	0.002	0.001	0.0026	-	-	-
13	-	-	-	-	-	0.012	0.003	0.001	0.0024	-	-	-
14	-	-	-	-	-	0.011	0.003	0.001	0.0025	-	-	-
15	-	-	-	-	-	0.012	0.003	0.001	0.003 P	-	-	-
16	-	-	-	-	-	0.012	0.002	0.001	-	-	-	-
17	-	-	-	-	-	0.011	0.002	0.001	-	-	-	-
18	-	-	-	-	-	0.010	0.002	0.001	-	-	-	-
19	-	-	-	-	-	0.009	0.003	0.001	-	-	-	-
20	-	-	-	-	-	0.009	0.003	0.001	-	-	-	-
21	-	-	-	-	-	0.009	0.002	0.001	-	-	-	-
22	-	-	-	-	-	0.008	0.002	0.002	-	-	-	-
23	-	-	-	-	-	0.007	0.002	0.002	-	-	-	-
24	-	-	-	-	-	0.006	0.002	0.002	-	-	-	-
25	-	-	-	-	-	0.005	0.002	0.002	-	-	-	-
26	-	-	-	-	0.052 P	0.003	0.002	0.002	-	-	-	-
27	-	-	-	-	0.042	0.003	0.002	0.002	-	-	-	-
28	-	-	-	-	0.035	0.003	0.002	0.002	-	-	-	-
29	-	-	-	-	0.032	0.004	0.002	0.002	-	-	-	-
30	-	-	-	-	0.029	0.005	0.001	0.002	-	-	-	-
31	-	-	-	-	0.027	-	0.001	0.002	-	-	-	-
MIN	-	-	-	-	0.027	0.003	0.001	0.001	0.0016	-	-	-
MEAN	-	-	-	-	0.036	0.011	0.003	0.001	0.0024	-	-	-
MAX	-	-	-	-	0.052	0.026	0.004	0.002	0.0029	-	-	-

Note: P – partial daily discharge.



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Table A-39: Lake N14 and Outflow, 2011 Mean Daily Water Surface Elevation (m, geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	425.438	425.320	425.272	425.274	-	-	-
2	-	-	-	-	-	425.426	425.312	425.269	425.276	-	-	-
3	-	-	-	-	-	425.412	425.320	425.267	425.279	-	-	-
4	-	-	-	-	-	425.403	425.325	425.267	425.291	-	-	-
5	-	-	-	-	-	425.396	425.317	425.270	425.295	-	-	-
6	-	-	-	-	-	425.392	425.312	425.271	425.297	-	-	-
7	-	-	-	-	-	425.391	425.310	425.270	425.298	-	-	-
8	-	-	-	-	-	425.390	425.310	425.265	425.300	-	-	-
9	-	-	-	-	-	425.394	425.306	425.259	425.302	-	-	-
10	-	-	-	-	-	425.393	425.303	425.258	425.306	-	-	-
11	-	-	-	-	-	425.390	425.297	425.256	425.305	-	-	-
12	-	-	-	-	-	425.390	425.294	425.253	425.298	-	-	-
13	-	-	-	-	-	425.388	425.305	425.250	425.295	-	-	-
14	-	-	-	-	-	425.384	425.310	425.248	425.296	-	-	-
15	-	-	-	-	-	425.387	425.304	425.245	425.299 P	-	-	-
16	-	-	-	-	-	425.388	425.291	425.253	-	-	-	-
17	-	-	-	-	-	425.383	425.290	425.255	-	-	-	-
18	-	-	-	-	-	425.378	425.291	425.250	-	-	-	-
19	-	-	-	-	-	425.372	425.299	425.247	-	-	-	-
20	-	-	-	-	-	425.367	425.298	425.252	-	-	-	-
21	-	-	-	-	-	425.369	425.292	425.259	-	-	-	-
22	-	-	-	-	-	425.361	425.289	425.276	-	-	-	-
23	-	-	-	-	-	425.352	425.289	425.283	-	-	-	-
24	-	-	-	-	-	425.342	425.287	425.290	-	-	-	-
25	-	-	-	-	-	425.336	425.285	425.289	-	-	-	-
26	-	-	-	-	425.487 P	425.312	425.285	425.284	-	-	-	-
27	-	-	-	-	425.472	425.310	425.278	425.285	-	-	-	-
28	-	-	-	-	425.460	425.314	425.272	425.284	-	-	-	-
29	-	-	-	-	425.452	425.321	425.270	425.283	-	-	-	-
30	-	-	-	-	425.445	425.330	425.263	425.281	-	-	-	-
31	-	-	-	-	425.440	-	425.260	425.278	-	-	-	-
MIN	-	-	-	-	425.440	425.310	425.260	425.245	425.274	-	-	-
MEAN	-	-	-	-	425.459	425.374	425.296	425.267	425.294	-	-	-
MAX	-	-	-	-	425.487	425.438	425.325	425.290	425.306	-	-	-

Note: P – partial daily average



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Table A-40: Discharge Sheet - Lake N14 Outlet, 26 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		26-May-2011	
Waterbody:		N14 Lake			Start Time		9:40	
Crossing ID:		N14 Lake Outlet			End Time		10:55	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1895	
East	585775	BM_read	1.139	Gauge	Transducer SN:		900	
North	7036191	WL_read	1.673	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	426.048	WL_Elev	425.514		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.70	0.00						
2	0.80	0.20		0.037				
3	0.90	0.27		0.067				
4	1.10	0.31		0.094				
5	1.35	0.30		0.140				
6	1.50	0.27		0.168				
7	1.70	0.30		0.186				
8	1.95	0.34		0.021				
9	2.20	0.33		0.155				
10	2.40	0.33		0.052				
11	2.50	0.31		0.000				
12	2.55	0.00						
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.055	
34						A(m ²)	0.54	
35								



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Table A-41: Discharge Sheet - Lake N14 Outlet, 8 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		8-Jun-2011	
Waterbody:		N14 Lake			Start Time		8:15	
Crossing ID:		N14 Lake Outlet			End Time		8:50	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1895	
East	585775	BM_read	1.177	Gauge	Transducer SN:		900	
North	7036191	WL_read	1.828	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	426.048	WL_Elev	425.397		Crew:	DC/CB		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.15	0.00						
2	0.20	0.06		0.00				
3	0.30	0.10		0.03				
4	0.40	0.18		0.05				
5	0.55	0.20		0.11				
6	0.70	0.20		0.13				
7	0.85	0.21		0.16				
8	1.00	0.20		0.15				
9	1.15	0.23		0.16				
10	1.30	0.17		0.15				
11	1.45	0.17		0.11				
12	1.60	0.24		0.10				
13	1.75	0.20		0.05				
14	1.90	0.23		0.06				
15	2.00	0.00						
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.0373	
34						A(m ²)	0.34	
35								



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Table A-42: Discharge Sheet - Lake N14 Outlet, 21 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Aug-2011	
Waterbody:		N14 Lake			Start Time		9:50	
Crossing ID:		N14 Lake Outlet			End Time		10:30	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1985	
East	585775	BM_read	1.082	Gauge	Transducer SN:		900	
North	7036191	WL_read	1.919	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	426.048	WL_Elev	425.211		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1								
2								
3								
4		Flow visual estimated at 1.5 l/s						
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.0015	
34						A(m ²)		
35								



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Table A-43: Discharge Sheet - Lake N14 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sept-2011	
Waterbody:		N14 Lake			Start Time		16:35	
Crossing ID:		N14 Lake Outlet			End Time		17:00	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1895	
East	585775	BM_read	0.239	Gauge	Transducer SN:		900	
North	7036191	WL_read	2.025	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	426.048	WL_Elev	425.262		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.1	0.00						
2	0.2	0.05		0.01				
3	0.5	0.05		0.15				
4	0.6	0.04		0.05				
5	0.7	0.13		0.05				
6	0.8	0.12		0.02				
7	0.9	0.00						
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.0027	
34						A(m ²)	0.05	
35								

LAKE N17 AND OUTFLOW HYDROMETRIC STATION

LAKE N17

FACTSHEET

LOCATION AND DETAILS

Located on the right downstream bank of Lake N17 outlet, approximately 5 kilometres west of Kennady Lake Exploration Camp.

Operational in 2011 from 26 May to 15 September

Benchmark: Bolt on boulder; 100.00 m (non-geodetic)

Coordinates: UTM: 584609 m E, 7037326 m N (NAD83, Zn12)

Lat/Long: 63°27'15" N, 109°18'11" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



Lake N17 outlet view downstream



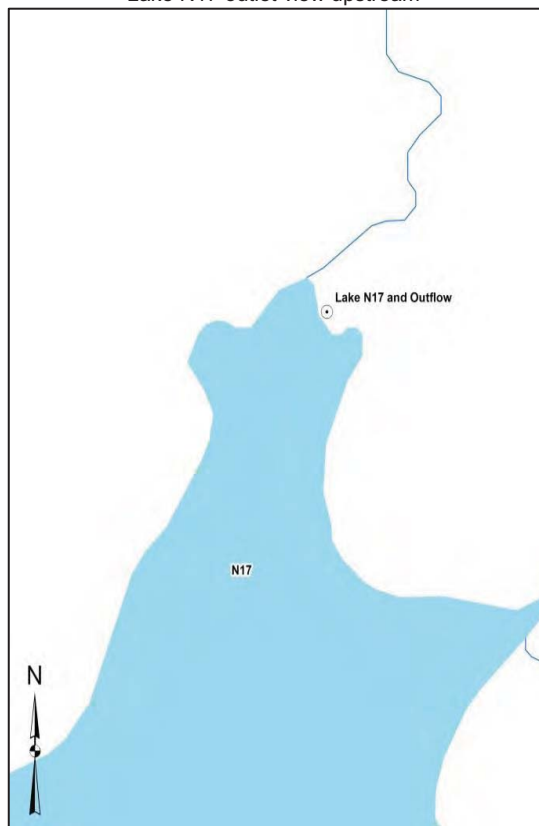
Lake N17 outlet view upstream



Lake N17 outlet



Lake N17 station install on 6 May 2010



NTS Mapping of Area



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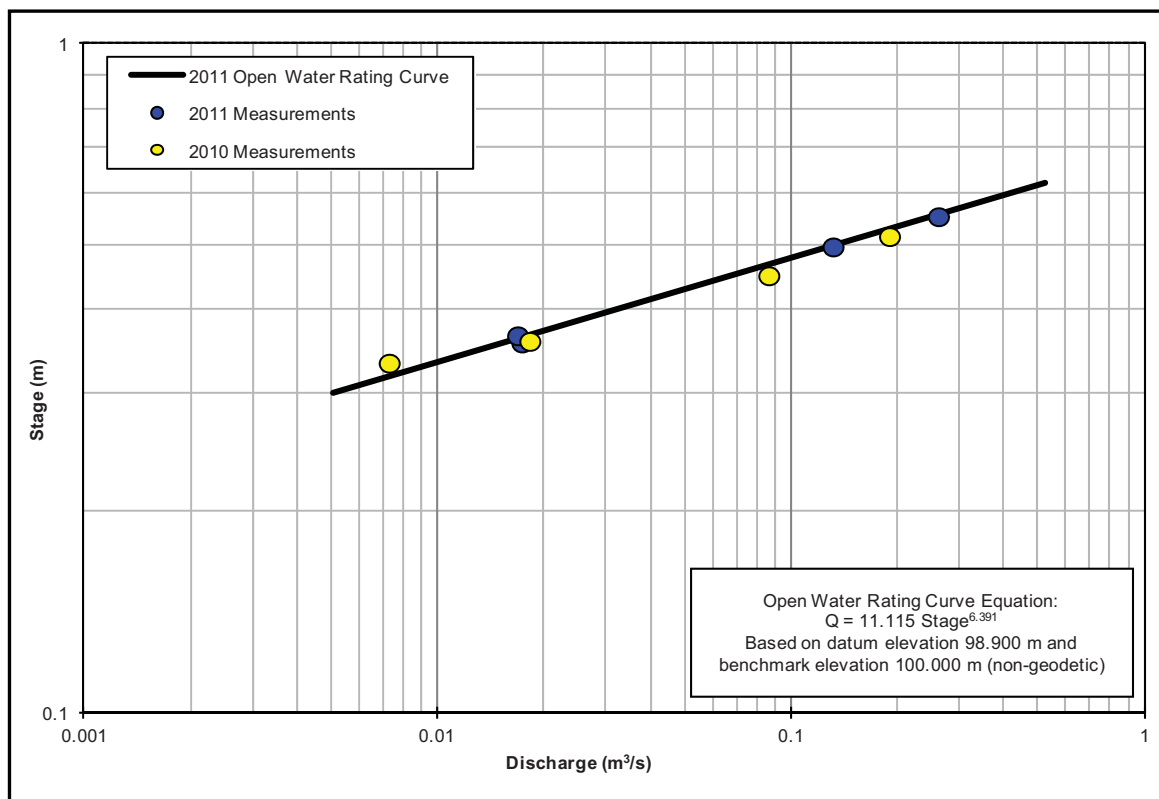
8.0 LAKE N17 AND OUTFLOW

LAKE N17 STATION BENCHMARK ELEVATION 100.000 m (non-geodetic)
 DATUM ELEVATION 98.900 m (non-geodetic)

Table A-44: 2011 Hydrometric Data at Lake N17 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m³/s]
26-May-2011 12:20	1.179	1.782	100.000	99.397	0.502	98.895	98.896	0.497	0.132
08-Jun-2011 09:30	1.034	1.583	100.000	99.452	0.557	98.894		0.552	0.261
23-Aug-2011 13:30	1.228	1.971	100.000	99.257	0.360	98.897		0.357	0.017
15-Sep-2011 16:30	1.216	1.950	100.000	99.266	0.366	98.900		0.366	0.017

Figure A-8: 2011 Stage-Discharge Rating Curve for Lake N17 and Outflow Station





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Table A-45: Lake N17 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.264	-	-	0.0108	-	-	-
2	-	-	-	-	-	0.258	-	-	0.0127	-	-	-
3	-	-	-	-	-	0.269	-	-	0.0164	-	-	-
4	-	-	-	-	-	0.270	-	-	0.0160	-	-	-
5	-	-	-	-	-	0.263	-	-	0.0190	-	-	-
6	-	-	-	-	-	0.254	-	-	0.0179	-	-	-
7	-	-	-	-	-	0.257	-	-	0.0237	-	-	-
8	-	-	-	-	-	0.262	-	-	0.0171	-	-	-
9	-	-	-	-	-	0.271	-	-	0.0171	-	-	-
10	-	-	-	-	-	0.267 P	-	-	0.0178	-	-	-
11	-	-	-	-	-	-	-	-	0.0175	-	-	-
12	-	-	-	-	-	-	-	-	0.0146	-	-	-
13	-	-	-	-	-	-	-	-	0.0172	-	-	-
14	-	-	-	-	-	-	-	-	0.0216	-	-	-
15	-	-	-	-	-	-	-	-	0.016 P	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	0.019 P	-	-	-	-
24	-	-	-	-	-	-	-	0.019	-	-	-	-
25	-	-	-	-	-	-	-	0.018	-	-	-	-
26	-	-	-	-	0.145 P	-	-	0.017	-	-	-	-
27	-	-	-	-	0.164	-	-	0.017	-	-	-	-
28	-	-	-	-	0.189	-	-	0.016	-	-	-	-
29	-	-	-	-	0.212	-	-	0.015	-	-	-	-
30	-	-	-	-	0.233	-	-	0.010	-	-	-	-
31	-	-	-	-	0.243	-	-	0.008	-	-	-	-
MIN	-	-	-	-	0.145	0.254	0.000	0.008	0.0108	-	-	-
MEAN	-	-	-	-	0.198	0.263	0.000	0.015	0.0170	-	-	-
MAX	-	-	-	-	0.243	0.271	0.000	0.019	0.0237	-	-	-

Note: P – partial daily discharge.



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Table A-46: Lake N17 and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	99.457	-	-	99.238	-	-	-
2	-	-	-	-	-	99.455	-	-	99.246	-	-	-
3	-	-	-	-	-	99.459	-	-	99.260	-	-	-
4	-	-	-	-	-	99.459	-	-	99.259	-	-	-
5	-	-	-	-	-	99.457	-	-	99.269	-	-	-
6	-	-	-	-	-	99.453	-	-	99.265	-	-	-
7	-	-	-	-	-	99.455	-	-	99.281	-	-	-
8	-	-	-	-	-	99.456	-	-	99.263	-	-	-
9	-	-	-	-	-	99.459	-	-	99.263	-	-	-
10	-	-	-	-	-	99.458 P	-	-	99.265	-	-	-
11	-	-	-	-	-	-	-	-	99.264	-	-	-
12	-	-	-	-	-	-	-	-	99.254	-	-	-
13	-	-	-	-	-	-	-	-	99.263	-	-	-
14	-	-	-	-	-	-	-	-	99.276	-	-	-
15	-	-	-	-	-	-	-	-	99.260 P	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	99.268 P	-	-	-	-
24	-	-	-	-	-	-	-	99.270	-	-	-	-
25	-	-	-	-	-	-	-	99.266	-	-	-	-
26	-	-	-	-	99.407 P	-	-	99.263	-	-	-	-
27	-	-	-	-	99.417	-	-	99.262	-	-	-	-
28	-	-	-	-	99.428	-	-	99.259	-	-	-	-
29	-	-	-	-	99.438	-	-	99.255	-	-	-	-
30	-	-	-	-	99.446	-	-	99.234	-	-	-	-
31	-	-	-	-	99.450	-	-	99.222	-	-	-	-
MIN	-	-	-	-	99.407	99.453	0.000	99.222	99.238	-	-	-
MEAN	-	-	-	-	99.431	99.457	0.000	99.255	99.262	-	-	-
MAX	-	-	-	-	99.450	99.459	0.000	99.270	99.281	-	-	-

Note: P – partial daily average.



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Table A-47: Discharge Sheet - Lake N17 Outlet, 26 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		26-May-2011	
Waterbody:		N17 Lake			Start Time		11:02	
Crossing ID:		N17 Lake Outlet			End Time		13:05	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1396	
East	584609	BM_read	1.204	Gauge	Transducer SN:		14595	
North	7037326	WL_read	1.782	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.422		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.40	0.00						
2	0.60	0.14		0.00				
3	0.90	0.24		0.07				
4	1.05	0.34		0.15				
5	1.30	0.30		0.18				
6	1.60	0.39		0.22				
7	2.00	0.36		0.11				
8	2.55	0.37		0.13				
9	3.00	0.32		0.12				
10	3.40	0.24		0.09				
11	3.80	0.27		0.04				
12	3.95	0.26		0.03				
13	4.10	0.20		0.02				
14	4.30	0.11		-0.01				
15	4.50	0.00						
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.132	
34						A(m ²)	1.13	
35								



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Table A-48: Discharge Sheet - Lake N17 Outlet, 8 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		8-Jun-2011	
Waterbody:		N17 Lake			Start Time		9:05	
Crossing ID:		N17 Lake Outlet			End Time		9:45	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1396	
East	584609	BM_read	1.034	Gauge	Transducer SN:		14595	
North	7037326	WL_read	1.583	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.452		Crew:	DC/CB		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.2	0.00						
2	0.4	0.15		0.02				
3	0.6	0.27		0.13				
4	0.8	0.35		0.17				
5	1.1	0.50		0.25				
6	1.4	0.34		0.31				
7	1.7	0.49		0.28				
8	2.0	0.30		0.21				
9	2.3	0.31		0.22				
10	2.6	0.34		0.21				
11	2.9	0.34		0.16				
12	3.2	0.33		0.16				
13	3.5	0.31		0.11				
14	3.8	0.25		0.09				
15	4.1	0.21		0.04				
16	4.3	0.18		0.05				
17	4.4	0.00		0.00				
18	0.5	0.00		0.00				
19	0.7	0.21		0.03				
20	0.9	0.26		0.07				
21	1.1	0.30		0.09				
22	1.3	0.18		0.04				
23	1.6	0.20		0.04				
24	1.9	0.20		0.01				
25	2.4	0.00						
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.261	
34						A(m ²)	1.64	
35								



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Table A-49: Discharge Sheet - Lake N17 Outlet, 23 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		23-Aug-2011	
Waterbody:		N17 Lake			Start Time		13:00	
Crossing ID:		N17 Lake Outlet			End Time		13:41	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1396	
East	584609	BM_read	1.228	Gauge	Transducer SN:		14595	
North	7037326	WL_read	1.971	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.257		Crew:	DC/PC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.4	0.00						
2	0.8	0.15		0.05				
3	1.1	0.23		0.06				
4	1.4	0.27		0.07				
5	1.7	0.07		0.04				
6	2.0	0.33		0.02				
7	2.3	0.07		0.04				
8	2.7	0.27		0.01				
9	3.1	0.00						
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.017	
34						A(m ²)	0.46	
35								



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Table A-50: Discharge Sheet - Lake N17 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sept-2011	
Waterbody:		N17 Lake			Start Time		16:05	
Crossing ID:		N17 Lake Outlet			End Time		16:42	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1396	
East	584609	BM_read	1.216	Gauge	Transducer SN:		14595	
North	7037326	WL_read	1.950		Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	99.266		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.3	0.00						
2	0.8	0.10		0.03				
3	1.1	0.25		0.05				
4	1.4	0.32		0.06				
5	1.7	0.30		0.02				
6	2.0	0.25		0.02				
7	2.3	0.22		0.01				
8	2.6	0.13		0.03				
9	2.9	0.11		0.03				
10	3.1	0.00		0.00				
11	0.5	0.00		0.00				
12	1.0	0.05		0.01				
13	1.6	0.00						
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.017	
34						A(m ²)	0.53	
35								

LAKE N18 AND OUTFLOW HYDROMETRIC STATION

LAKE N18

FACTSHEET

LOCATION AND DETAILS

Located on the left downstream bank of Lake N18 outlet, approximately 4.6 kilometres northwest of Kennady Lake Exploration Camp.

Operational in 2011 from 26 May to 15 September

Benchmark: Bolt on boulder; 424.957 m (geodetic)

Coordinates: UTM: 586826 m E, 7039189 m N (NAD83, Zn12)

Lat/Long: 63°28'14" N, 109°15'26" W

Transducer: Keller Acculevel Submersible
Level Transducer

Datalogger: Optimum Instruments DD-520



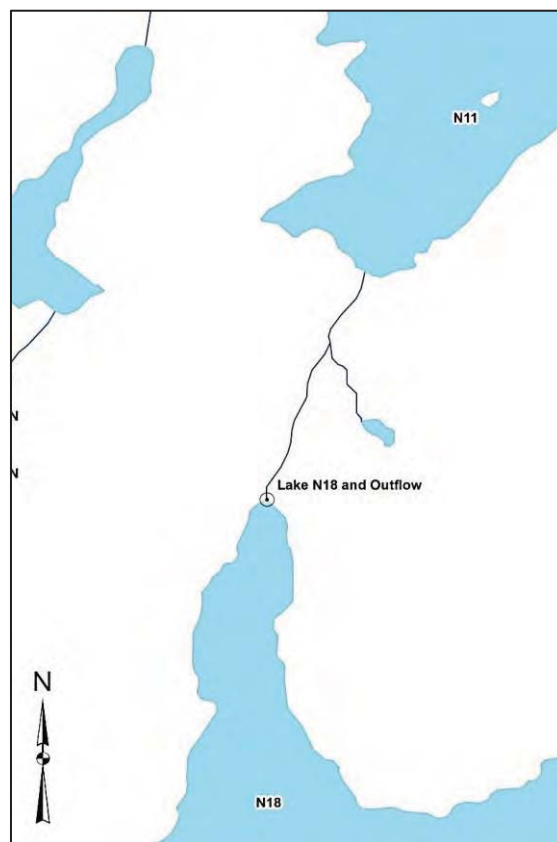
Lake N18 outlet panorama view upstream from right bank



Lake N18 view upstream from outlet



Lake N18 view downstream at outlet



NTS Mapping of Area



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2011 Climate and Hydrology Supplemental Monitoring Report

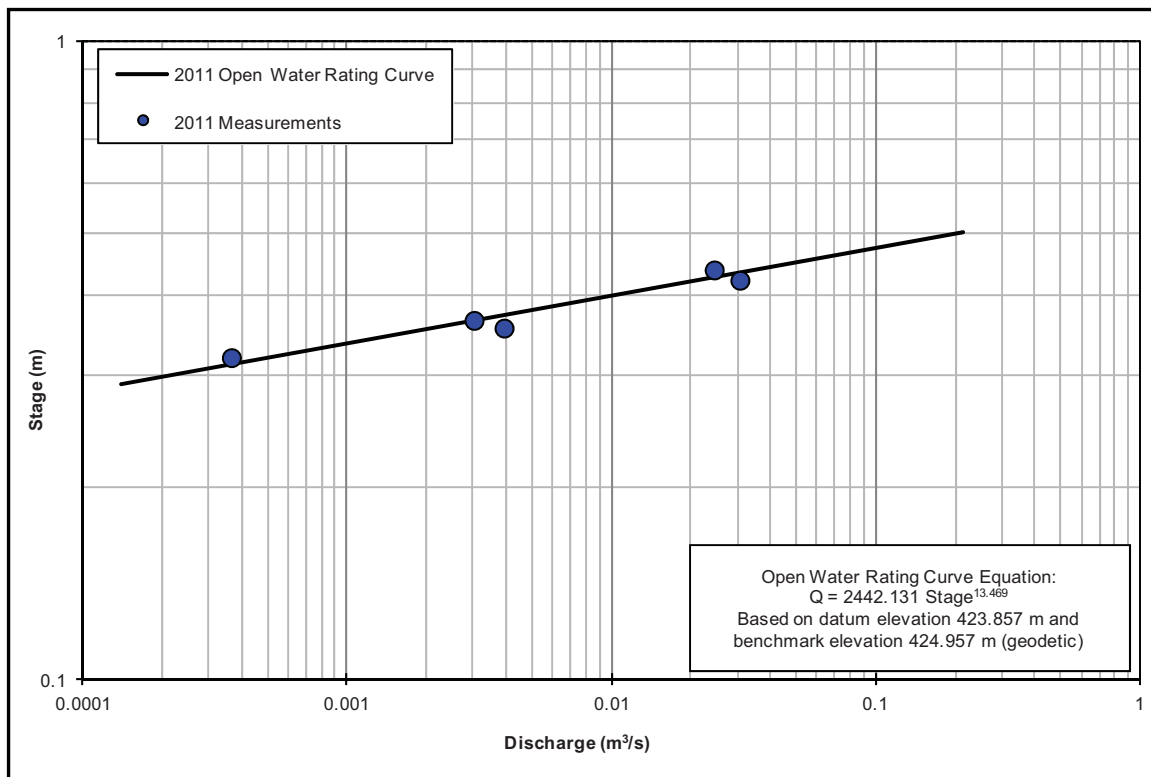
9.0 LAKE N18 AND OUTFLOW

LAKE N18 STATION BENCHMARK ELEVATION 424.957 m (geodetic)
DATUM ELEVATION 423.857 m (geodetic)

Table A-51: 2011 Hydrometric Data at Lake N18 and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
26-May-2011 14:10	0.634	1.295	424.957	424.296	0.433	423.863	423.853	0.439	0.024
08-Jun-2011 10:00	1.085	1.762	424.957	424.280	0.417	423.863		0.423	0.031
21-Jul-2011 12:21	424.957	424.213	424.957	424.213	0.349	423.864		0.356	0.004
21-Aug-2011 14:30	1.136	1.916	424.957	424.177	0.305	423.872		0.320	0.0004
15-Sep-2011 15:40	1.200	1.934	424.957	424.223	0.344	423.879		0.366	0.003

Figure A-9: 2011 Stage-Discharge Rating Curve for Lake N18 and Outflow Station





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Table A-52: Lake N18 and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	0.037	0.004	0.001	0.0012	-	-	-
2	-	-	-	-	-	0.035	0.004	0.001	0.0014	-	-	-
3	-	-	-	-	-	0.031	0.005	0.001	0.0018	-	-	-
4	-	-	-	-	-	0.027	0.004	0.001	0.0021	-	-	-
5	-	-	-	-	-	0.022	0.004	0.001	0.0026	-	-	-
6	-	-	-	-	-	0.019	0.003	0.001	0.0029	-	-	-
7	-	-	-	-	-	0.018	0.003	0.001	0.0032	-	-	-
8	-	-	-	-	-	0.018	0.003	0.001	0.0027	-	-	-
9	-	-	-	-	-	0.020	0.003	0.001	0.0030	-	-	-
10	-	-	-	-	-	0.019	0.003	0.001	0.0034	-	-	-
11	-	-	-	-	-	0.019	0.002	0.001	0.0038	-	-	-
12	-	-	-	-	-	0.019	0.003	0.001	0.0034	-	-	-
13	-	-	-	-	-	0.018	0.005	0.000	0.0036	-	-	-
14	-	-	-	-	-	0.017	0.006	0.000	0.0045	-	-	-
15	-	-	-	-	-	0.017	0.005	0.000	0.003 P	-	-	-
16	-	-	-	-	-	0.016	0.004	0.001	-	-	-	-
17	-	-	-	-	-	0.015	0.004	0.001	-	-	-	-
18	-	-	-	-	-	0.014	0.004	0.001	-	-	-	-
19	-	-	-	-	-	0.012	0.004	0.001	-	-	-	-
20	-	-	-	-	-	0.011	0.004	0.001	-	-	-	-
21	-	-	-	-	-	0.010	0.003	0.001	-	-	-	-
22	-	-	-	-	-	0.009	0.003	0.001	-	-	-	-
23	-	-	-	-	-	0.007	0.003	0.002	-	-	-	-
24	-	-	-	-	-	0.006	0.003	0.002	-	-	-	-
25	-	-	-	-	-	0.005	0.002	0.002	-	-	-	-
26	-	-	-	-	0.030 P	0.003	0.002	0.002	-	-	-	-
27	-	-	-	-	0.032	0.003	0.002	0.002	-	-	-	-
28	-	-	-	-	0.035	0.004	0.001	0.002	-	-	-	-
29	-	-	-	-	0.036	0.004	0.001	0.002	-	-	-	-
30	-	-	-	-	0.036	0.005	0.001	0.001	-	-	-	-
31	-	-	-	-	0.036	-	0.001	0.001	-	-	-	-
MIN	-	-	-	-	0.030	0.003	0.001	0.000	0.0012	-	-	-
MEAN	-	-	-	-	0.034	0.015	0.003	0.001	0.0029	-	-	-
MAX	-	-	-	-	0.036	0.037	0.006	0.002	0.0045	-	-	-

Note: P – partial daily discharge.



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Table A-53: Lake N18 and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	424.296	424.228	424.201	424.197	-	-	-
2	-	-	-	-	-	424.294	424.229	424.197	424.201	-	-	-
3	-	-	-	-	-	424.290	424.233	424.197	424.207	-	-	-
4	-	-	-	-	-	424.285	424.229	424.196	424.211	-	-	-
5	-	-	-	-	-	424.280	424.225	424.196	424.217	-	-	-
6	-	-	-	-	-	424.275	424.223	424.194	424.220	-	-	-
7	-	-	-	-	-	424.273	424.221	424.192	424.222	-	-	-
8	-	-	-	-	-	424.273	424.220	424.190	424.218	-	-	-
9	-	-	-	-	-	424.277	424.219	424.184	424.221	-	-	-
10	-	-	-	-	-	424.275	424.216	424.184	424.225	-	-	-
11	-	-	-	-	-	424.274	424.215	424.182	424.227	-	-	-
12	-	-	-	-	-	424.274	424.218	424.179	424.224	-	-	-
13	-	-	-	-	-	424.272	424.236	424.176	424.226	-	-	-
14	-	-	-	-	-	424.271	424.242	424.174	424.231	-	-	-
15	-	-	-	-	-	424.270	424.237	424.172	424.225 P	-	-	-
16	-	-	-	-	-	424.270	424.231	424.179	-	-	-	-
17	-	-	-	-	-	424.267	424.230	424.183	-	-	-	-
18	-	-	-	-	-	424.264	424.228	424.178	-	-	-	-
19	-	-	-	-	-	424.261	424.232	424.178	-	-	-	-
20	-	-	-	-	-	424.258	424.231	424.179	-	-	-	-
21	-	-	-	-	-	424.256	424.224	424.185	-	-	-	-
22	-	-	-	-	-	424.252	424.221	424.201	-	-	-	-
23	-	-	-	-	-	424.246	424.219	424.204	-	-	-	-
24	-	-	-	-	-	424.241	424.216	424.209	-	-	-	-
25	-	-	-	-	-	424.231	424.212	424.208	-	-	-	-
26	-	-	-	-	424.289 P	424.221	424.210	424.206	-	-	-	-
27	-	-	-	-	424.291	424.222	424.204	424.208	-	-	-	-
28	-	-	-	-	424.294	424.229	424.201	424.206	-	-	-	-
29	-	-	-	-	424.295	424.232	424.197	424.205	-	-	-	-
30	-	-	-	-	424.295	424.237	424.192	424.198	-	-	-	-
31	-	-	-	-	424.295		424.189	424.194		-		-
MIN	-	-	-	-	424.289	424.221	424.189	424.172	424.197	-	-	-
MEAN	-	-	-	-	424.293	424.262	424.220	424.191	424.218	-	-	-
MAX	-	-	-	-	424.295	424.296	424.242	424.209	424.231	-	-	-

Note: P – partial daily average.



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Table A-54: Discharge Sheet - Lake N18 Outlet, 26 May 2011

Project Name:		Gahcho Kue (11-1365-0001)			Date		26-May-2011	
Waterbody:		N18 Lake			Start Time		13:40	
Crossing ID:		N18 Lake Outlet			End Time		14:40	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1901	
East	586826	BM_read	0.684	Gauge	Transducer SN:		39692	
North	7039189	WL_read	1.295	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	424.957	WL_Elev	424.346		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.5	0.00						
2	0.7	0.13		0.13				
3	0.8	0.09		0.17				
4	1.0	0.21		0.22				
5	1.1	0.25		0.16				
6	1.2	0.25		0.09				
7	1.3	0.17		0.16				
8	1.4	0.20		0.12				
9	1.5	0.09		0.15				
10	1.6	0.00						
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.024	
34						A(m ²)	0.161	
35								



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Table A-55: Discharge Sheet - Lake N18 Outlet, 8 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		8-June-2011	
Waterbody:		N18 Lake			Start Time		09:50	
Crossing ID:		N18 Lake Outlet			End Time		10:26	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1903	
East	586826	BM_read	1.110	Gauge	Transducer SN:		39692	
North	7039189	WL_read	1.762	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	424.957	WL_Elev	424.305		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.35	0.00						
2	0.50	0.11		0.17				
3	0.65	0.06		0.18				
4	0.80	0.16		0.32				
5	0.90	0.20		0.33				
6	1.00	0.24		0.21				
7	1.10	0.20		0.16				
8	1.20	0.16		0.20				
9	1.30	0.10		0.17				
10	1.40	0.00						
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.031	
34						A(m ²)	0.136	
35								



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Table A-56: Discharge Sheet - Lake N18 Outlet, 21 July 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-July-2011	
Waterbody:		N18 Lake			Start Time		12:50	
Crossing ID:		N18 Lake Outlet			End Time		14:35	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1903	
East	586826	BM_read	424.957	Gauge	Transducer SN:		21914	
North	7039189	WL_read	424.213	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	424.957	WL_Elev	425.701		Crew:	DC/PC		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.02	0		0.00				
2	0.1	0.09		0.32				
3	0.2	0.03		0.22				
4	0.3	0.03		0.22				
5	0.4	0		0.00				
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.004	
34						A(m ²)	0.01	
35								



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Table A-57: Discharge Sheet - Lake N18 Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sept-2011	
Waterbody:		N18 Lake			Start Time		15:30	
Crossing ID:		N18 Lake Outlet			End Time		15:55	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1901	
East	586826	BM_read	1.200	Gauge	Transducer SN:		39692	
North	7039189	WL_read	1.934	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	424.957	WL_Elev	424.223		Crew:	DC		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	(m)	(m)	(m/s)	(m/s)	(m)	(m)	(m/s)	(m/s)
1	0.10	0.00						
2	0.20	0.07		0.25				
3	0.25	0.17		0.20				
4	0.30	0.00						
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.003	
34						A(m ²)	0.01	
35								

KIRK LAKE AND OUTFLOW HYDROMETRIC STATION

KIRK LAKE FACTSHEET

LOCATION AND DETAILS

Located on the west bank of Kirk Lake, 200 m from the lake outlet, approximately 40 kilometres north of Kennady Lake Exploration Camp.

Operational in 2011 from 25 May to 15 September

Benchmark: Bolt on boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 598397 m E, 7076449 m N (NAD83, Zn12)

Lat/Long: 63°48'06" N, 109°00'08" W

Transducer: Keller Acculevel Submersible
Level Transducer

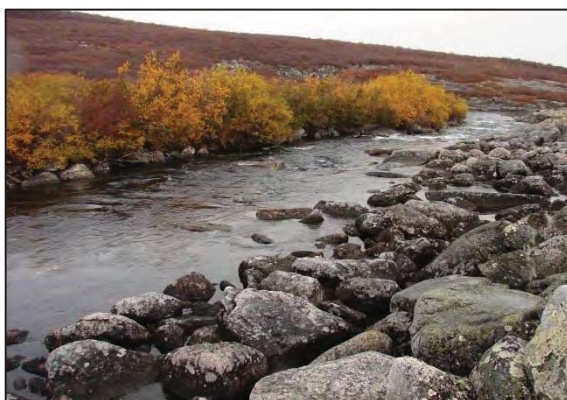
Datalogger: Optimum Instruments DD-520



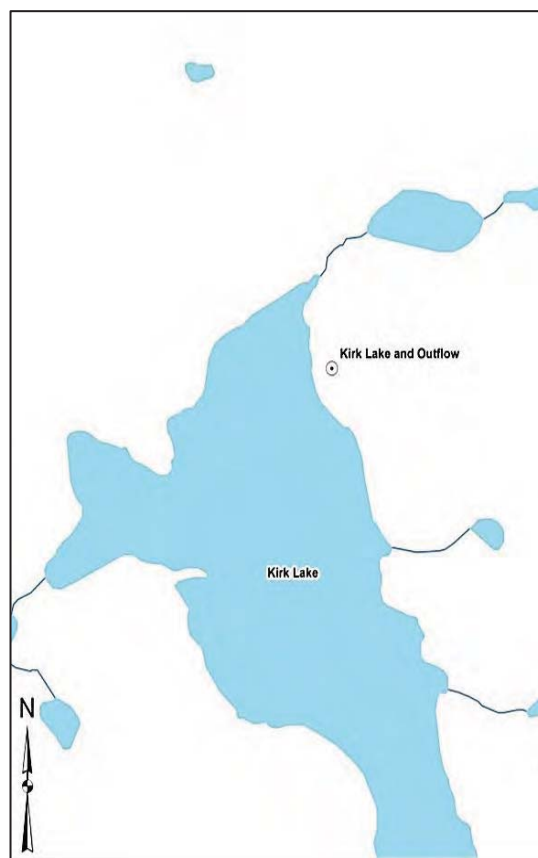
Kirk Lake panorama – upstream view towards lake from the outlet channel



Downstream view of the outlet channel during melting period



Downstream view from the discharge location



NTS Mapping of the Area



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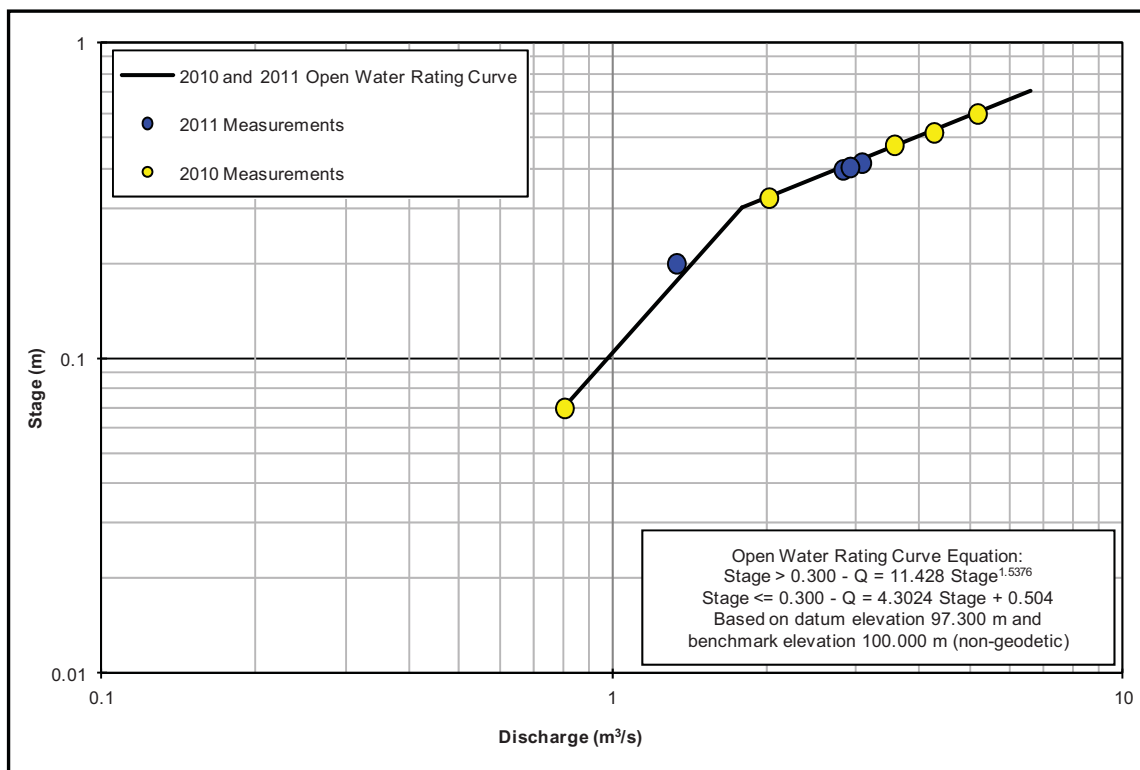
10.0 KIRK LAKE AND OUTFLOW

KIRK LAKE STATION BENCHMARK ELEVATION 100.000 m (non-geodetic)
 DATUM ELEVATION 97.300 m (non-geodetic)

Table A-58: 2011 Hydrometric Data at Kirk Lake and Outflow Station

Date and Time	Benchmark Reading [m]	Water Surface Reading [m]	Benchmark Elevation [m]	Water Surface Elevation [m]	Transducer Reading [m]	Transducer Elevation [m]	Mean Transducer Elevation [m]	Stage [m]	Measured Discharge [m ³ /s]
25-May-2011 12:20	0.098	2.698	100.000	97.500	1.304	96.096	96.080	0.200	1.331
07-Jun-2011 11:30	0.077	2.460	100.000	97.717	1.552	96.065		0.417	3.072
18-Aug-2011 17:00	0.223	2.526	100.000	97.697	1.558	96.139	96.133	0.397	2.820
15-Sep-2011 15:00	0.284	2.580	100.000	97.704	1.577	96.127		0.404	2.912

Figure A-10: 2011 Stage-Discharge Rating Curve for Kirk Lake and Outflow Station





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Table A-59: Kirk Lake and Outflow, 2011 Mean Daily Discharge (m³/s)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	4.006	-	-	2.3519	-	-	-
2	-	-	-	-	-	4.225	-	-	2.4704	-	-	-
3	-	-	-	-	-	4.372	-	-	2.6955	-	-	-
4	-	-	-	-	-	4.487	-	-	2.5384	-	-	-
5	-	-	-	-	-	4.575	-	-	2.5126	-	-	-
6	-	-	-	-	-	4.652	-	-	2.5501	-	-	-
7	-	-	-	-	-	4.734	-	-	2.6791	-	-	-
8	-	-	-	-	-	4.816	-	-	2.4317	-	-	-
9	-	-	-	-	-	4.922	-	-	2.4429	-	-	-
10	-	-	-	-	-	4.991	-	-	2.3861	-	-	-
11	-	-	-	-	-	5.068	-	-	2.4640	-	-	-
12	-	-	-	-	-	5.139	-	-	2.2936	-	-	-
13	-	-	-	-	-	5.213	-	-	2.4658	-	-	-
14	-	-	-	-	-	5.288	-	-	2.752 P	-	-	-
15	-	-	-	-	-	5.368	-	-	-	-	-	-
16	-	-	-	-	-	5.431	-	-	-	-	-	-
17	-	-	-	-	-	5.485	-	-	-	-	-	-
18	-	-	-	-	-	5.546	-	2.795 P	-	-	-	-
19	-	-	-	-	-	5.616 P	-	2.791	-	-	-	-
20	-	-	-	-	-	-	-	2.717	-	-	-	-
21	-	-	-	-	-	-	-	2.863	-	-	-	-
22	-	-	-	-	-	-	-	3.010	-	-	-	-
23	-	-	-	-	-	-	-	2.884	-	-	-	-
24	-	-	-	-	-	-	-	2.874	-	-	-	-
25	-	-	-	-	2.712 P	-	-	2.800	-	-	-	-
26	-	-	-	-	2.835	-	-	2.756	-	-	-	-
27	-	-	-	-	3.022	-	-	2.826	-	-	-	-
28	-	-	-	-	3.206	-	-	2.743	-	-	-	-
29	-	-	-	-	3.374	-	-	2.736	-	-	-	-
30	-	-	-	-	3.582	-	-	2.434	-	-	-	-
31	-	-	-	-	3.797	-	-	2.210	-	-	-	-
MIN	-	-	-	-	2.712	4.006	0.000	2.210	2.2936	-	-	-
MEAN	-	-	-	-	3.218	4.944	0.000	2.746	2.5024	-	-	-
MAX	-	-	-	-	3.797	5.616	0.000	3.010	2.7518	-	-	-

Note: P – partial daily discharge.



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Table A-60: Kirk Lake and Outflow, 2011 Mean Daily Water Surface Elevation (m, non-geodetic)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-	-	-	-	-	97.645	-	-	97.658	-	-	-
2	-	-	-	-	-	97.671	-	-	97.669	-	-	-
3	-	-	-	-	-	97.689	-	-	97.691	-	-	-
4	-	-	-	-	-	97.703	-	-	97.676	-	-	-
5	-	-	-	-	-	97.714	-	-	97.673	-	-	-
6	-	-	-	-	-	97.723	-	-	97.677	-	-	-
7	-	-	-	-	-	97.733	-	-	97.689	-	-	-
8	-	-	-	-	-	97.743	-	-	97.665	-	-	-
9	-	-	-	-	-	97.755	-	-	97.667	-	-	-
10	-	-	-	-	-	97.764	-	-	97.661	-	-	-
11	-	-	-	-	-	97.773	-	-	97.669	-	-	-
12	-	-	-	-	-	97.782	-	-	97.652	-	-	-
13	-	-	-	-	-	97.790	-	-	97.669	-	-	-
14	-	-	-	-	-	97.799	-	-	97.696 P	-	-	-
15	-	-	-	-	-	97.809	-	-	-	-	-	-
16	-	-	-	-	-	97.817	-	-	-	-	-	-
17	-	-	-	-	-	97.823	-	-	-	-	-	-
18	-	-	-	-	-	97.830	-	97.700 P	-	-	-	-
19	-	-	-	-	-	97.839 P	-	97.700	-	-	-	-
20	-	-	-	-	-	-	-	97.693	-	-	-	-
21	-	-	-	-	-	-	-	97.706	-	-	-	-
22	-	-	-	-	-	-	-	97.720	-	-	-	-
23	-	-	-	-	-	-	-	97.708	-	-	-	-
24	-	-	-	-	-	-	-	97.707	-	-	-	-
25	-	-	-	-	97.489 P	-	-	97.701	-	-	-	-
26	-	-	-	-	97.504	-	-	97.697	-	-	-	-
27	-	-	-	-	97.527	-	-	97.703	-	-	-	-
28	-	-	-	-	97.549	-	-	97.695	-	-	-	-
29	-	-	-	-	97.569	-	-	97.695	-	-	-	-
30	-	-	-	-	97.594	-	-	97.666	-	-	-	-
31	-	-	-	-	97.620	-	-	97.643	-	-	-	-
MIN	-	-	-	-	97.489	97.645	0.000	97.643	97.652	-	-	-
MEAN	-	-	-	-	97.550	97.758	0.000	97.695	97.672	-	-	-
MAX	-	-	-	-	97.620	97.839	0.000	97.720	97.696	-	-	-

Note: P – partial daily average.



APPENDIX A

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Table A-61: Discharge Sheet - Kirk Lake Outlet, 25 May 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		25-May-2011	
Waterbody:		Kirk Lake			Start Time		9:15	
Crossing ID:		Kirk Lake Outlet			End Time		10:00	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1658	
East	598397	BM_read	0.098	Gauge	Transducer SN:		21581	
North	7076449	WL_read	2.698	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.400		Crew:	DC/DG		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.25	0.00						
2	0.40	0.09		0.238				
3	0.80	0.14		0.338				
4	1.10	0.27		0.390				
5	1.30	0.52		0.290				
6	1.80	0.42		0.472				
7	2.20	0.65		0.280				
8	2.70	0.69		0.536				
9	3.00	0.69		0.539				
10	3.30	0.72		0.573				
11	2.70	0.61		0.616				
12	4.20	0.42		0.411				
13	4.50	0.40		0.241				
14	4.80	0.02		0.183				
15	5.20	0.22		0.082				
16	5.80	0.08		0.241				
17	6.40	0.00		0.000				
18	6.60	0.00		0.000				
19	6.85	0.12		0.107				
20	7.35	0.09		0.043				
21	7.65	0.11		0.155				
22	8.05	0.00						
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	1.331	
34						A(m ²)	3.02	
35								



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Table A-62: Discharge Sheet - Kirk Lake Outlet, 7 June 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		7-Jun-2011	
Waterbody:		Kirk Lake			Start Time		11:00	
Crossing ID:		Kirk Lake Outlet			End Time		12:13	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1658	
East	598397	BM_read	0.077	Gauge	Transducer SN:		21581	
North	7076449	WL_read	2.460	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.617		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.0	0.00						
2	0.5	0.33		0.210				
3	0.9	0.51		0.442				
4	1.3	0.62		0.482				
5	1.7	0.59		0.643				
6	2.1	0.66		0.756				
7	2.6	0.72		1.097				
8	3.0	0.80		1.308				
9	3.2	0.82		1.265				
10	3.8	0.80		0.960				
11	4.2	0.90		0.677				
12	4.5	0.65		0.814				
13	4.8	0.72		0.564				
14	5.2	0.66		0.564				
15	5.5	0.44		0.430				
16	5.9	0.70		0.354				
17	6.3	0.53		0.296				
18	6.9	0.22		0.168				
19	7.9	0.20		0.198				
20	8.7	0.22		0.064				
21	9.6	0.12		0.015				
22	10.3	0.00		0.000				
23	10.9	0.15		0.082				
24	11.3	0.00						
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	3.072	
34						A(m ²)	4.84	
35								



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Table A-63: Discharge Sheet - Kirk Lake Outlet, 18 August 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		18-Aug-2011	
Waterbody:		Kirk Lake			Start Time		16:15	
Crossing ID:		Kirk Lake Outlet			End Time		17:30	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1658	
East	598397	BM_read	0.223	Gauge	Transducer SN:		21581	
North	7076449	WL_read	2.526	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.697		Crew:	DC/CB		
STATION	DISTANCE		VELOCITY		DISTANCE		VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.0	0.00		0.00				
2	0.5	0.30		0.22				
3	1.0	0.62		0.39				
4	1.5	0.69		0.60				
5	2.0	0.65		0.88				
6	2.5	0.77	0.96	0.73				
7	3.0	0.82	1.17	0.86				
8	3.5	0.46		1.24				
9	3.9	0.43		1.34				
10	4.2	0.93	1.21	0.69				
11	4.7	0.46		0.86				
12	5.2	0.63		0.39				
13	5.7	0.62		0.37				
14	6.2	0.55		0.40				
15	6.6	0.05		0.37				
16	7.1	0.05		0.36				
17	7.7	0.21		0.23				
18	8.0	0.00		0.00				
19	8.5	0.00		0.00				
20	9.0	0.13		0.33				
21	9.3	0.17		0.13				
22	9.8	0.00		0.00				
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	2.82	
34						A(m ²)	4.02	
35								



APPENDIX A

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Table A-64: Discharge Sheet - Kirk Lake Outlet, 15 September 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		15-Sep-2011	
Waterbody:		Kirk Lake			Start Time		14:30	
Crossing ID:		Kirk Lake Outlet			End Time		15:36	
BM UTM12 Location		Survey		Staff	Datalogger SN:		1658	
East	598397	BM_read	0.284	Gauge	Transducer SN:		21581	
North	7076449	WL_read	2.58	-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	100	WL_Elev	97.704		Crew:	DC/CB		
STATION	DISTANCE	VELOCITY			DISTANCE	VELOCITY		
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.0	0.00		0.00				
2	0.5	0.13		0.27				
3	0.8	0.50		0.34				
4	1.3	0.61		0.46				
5	1.8	0.73	0.64	0.28				
6	2.3	0.70	0.83	0.62				
7	2.8	0.78	1.01	0.81				
8	3.3	0.80	1.24	0.87				
9	3.8	0.48		1.21				
10	4.3	0.45		1.02				
11	4.8	0.55		1.01				
12	5.3	0.80	0.9	0.36				
13	5.7	0.50		0.59				
14	6.2	0.61		0.35				
15	6.7	0.55		0.32				
16	7.0	0.05		0.26				
17	7.8	0.06		0.22				
18	8.1	0.28		0.35				
19	9.3	0.30		0.23				
20	9.9	0.10		0.06				
21	11.5	0.00		0.00				
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	2.912	
34						A(m ²)	4.56	
35								



11.0 MISCELLANEOUS SITES

Discharge data were collected opportunistically for Kennady Lake, while doing other tasks from the hydrology program (e.g., bathymetry or lake shoreline surveys). These measurements are presented below.



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11.1 Kennady Lake (Area 8) Outlet

Table A-65: Discharge Sheet - Kennady Lake Outlet, 21 July 2011

Project Name:		Gahcho Kué (11-1365-0001)			Date		21-Jul-2011	
Waterbody:		Kennady Lake			Start Time			
Crossing ID:		Kennady Lake Outlet			End Time			
UTM12 Location		Survey		Staff	Datalogger SN:			
East	593227	BM_read		Gauge	Transducer SN:			
North	7038409	WL_read		-	Meter Type/SN: Marsh McBirney-2005856			
Elevation	-	WL_Elev			Crew:	DC/PC		
STATION	DISTANCE	VELOCITY			DISTANCE	DEPTH	VELOCITY	
Start	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth	FROM LDB	DEPTH	0.2 Depth	0.6/0.8 Depth
LDB	[m]	[m]	[m/s]	[m/s]	[m]	[m]	[m/s]	[m/s]
1	0.2	0		0				
2	0.3	0.06		0.02				
3	0.4	0.12		0.13				
4	0.55	0.25		0.12				
5	0.7	0.18		0.13				
6	0.9	0.05		0.07				
7	1	0.05		0.02				
8	12.3	0		0				
9	0.3	0		0				
10	0.8	0.13		0.34				
11	1.5	0.06		0.21				
12	1.8	0.22		0.23				
13	2.2	0.22		0.32				
14	2.8	0.22		0.22				
15	0.3	0.23		0.27				
16	0.3	0.27		0.09				
17	0.3	0.2		0.01				
18	0.3	0		0				
19	0.1	0		0				
20	0.3	0.05		0.05				
21	0.02	0.08		0.02				
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS:	Q (m ³ /s)	0.256	
34						A (m ²)	0.38	
35								



APPENDIX B

Snow-Course Survey 2011



APPENDIX B

2011 Climate and Hydrology Supplemental Monitoring Report

2011 SNOW COURSE SURVEY RAW DATA

Table B-1: Snow Survey Plots

Plot CR-1 Date: 5-Apr-11				Plot CR-2 Date: 5-Apr-11				Plot CR-3 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
25	1.99	1.83	0.262	20	2.08	1.83	0.251	35	2.12	1.83	0.209
31	2.14	1.83	0.266	25	2.01	1.83	0.191	35	2.19	1.83	0.260
Average:			0.264	Average:			0.221	Average:			0.235

Plot LK-1 Date: 5-Apr-11				Plot LK-2 Date: 6-Apr-11				Plot LK-3 Date: 7-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
21	2.12	1.83	0.255	10	1.94	1.83	0.221	15	1.93	1.83	0.129
16	1.96	1.83	0.156	10	1.97	1.83	0.281	15	1.96	1.83	0.168
Average:			0.206	Average:			0.251	Average:			0.148

Plot LE-1 Date: 4-Apr-11				Plot LE-2 Date: 5-Apr-11				Plot LE-3 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
140	4.08	1.83	0.330	46	2.59	1.83	0.312	64	2.62	1.83	0.238
125	3.78	1.83	0.320	43	2.42	1.83	0.253	60	2.65	1.83	0.264
114	3.35	1.83	0.274								
Average:			0.308	Average:			0.283	Average:			0.251

Plot LE-4 Date: 7-Apr-11				Plot LE-5 Date: 7-Apr-11				Plot LE-6 Date: 8-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
60	2.69	1.83	0.272	40	2.33	1.83	0.258	77	2.63	1.83	0.289
58	2.69	1.83	0.282	31	2.22	1.83	0.235	78	3.14	1.83	0.328
Average:			0.277	Average:			0.246	Average:			0.309

Plot LS -1 Date: 5-Apr-11				Plot LS-2 Date: 5-Apr-11				Plot LS-3 Date: 5-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
24	1.96	1.83	0.130	28	2.15	1.83	0.321	48	2.48	1.83	0.317
23	1.95	1.83	0.135	29	2.27	1.83	0.305	62	2.43	1.83	0.301
Average:			0.133	Average:			0.313	Average:			0.309



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Table B-1: Snow Survey Plots (continued)

Plot LS-4 Date: 6-Apr-11				Plot LS-5 Date: 7-Apr-11				Plot LS-6 Date: 8-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
42	2.14	1.83	0.186	35	2.19	1.83	0.250	33	1.98	1.83	0.193
45	2.28	1.83	0.226	40	2.13	1.83	0.246	45	2.34	1.83	0.219
Average:			0.206	Average:			0.248	Average:			0.206

Plot NE-1 Date: 5-Apr-11				Plot NE-2 Date: 6-Apr-11				Plot NE-3 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
84	2.96	1.83	0.283	80	2.73	1.83	0.271	101	88	3.29	1.83
80	3.08	1.83	0.297	140	2.98	1.83	0.277	125	42	2.33	1.83
Average:			0.290	Average:			0.274	Average:			0.257

Plot NE-5 Date: 8-Apr-11				Plot NW-1 Date: 6-Apr-11				Plot NW-2 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
154	4.34	1.83	0.326	66	2.08	1.83	0.205	70	2.53	1.83	0.230
150	4.27	1.83	0.326	60	2.09	1.83	0.188	80	2.65	1.83	0.221
Average:			0.326	Average:			0.196	Average:			0.225

Plot NW-3 Date: 6-Apr-11				Plot NW-4 Date: 7-Apr-11				Plot SW-1 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
45	2.25	1.83	0.199	57	2.4	1.83	0.239	104	3.36	1.83	0.307
43	2.19	1.83	0.180	58	2.49	1.83	0.259	99	3.10	1.83	0.241
Average:			0.190	Average:			0.249	Average:			0.274

Plot SW-2 Date: 6-Apr-11				Plot SE-1 Date: 5-Apr-11				Plot SE-2 Date: 6-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
98	2.74	1.83	0.245	>280	4.09	1.83	0.337	201	4.22	1.83	0.337
98	3.12	1.83	0.291	256	3.86	1.83	0.333	200	2.52	1.83	0.290
Average:			0.268	Average:			0.335	Average:			0.313



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Table B-1: Snow Survey Plots (continued)

Plot SE-3 Date: 7-Apr-11				Plot SE-4 Date: 8-Apr-11			
Depth	Wgt	Tare	Density	Depth	Wgt	Tare	Density
[cm]	[kg]	[kg]	[g/cm ³]	[cm]	[kg]	[kg]	[g/cm ³]
>305	3.05	1.83	0.259	132	4.24	1.83	0.329
310	2.79	1.83	0.251	134	4.06	1.83	0.310
Average:				Average:			0.319



APPENDIX B

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Table B-2: Proportions of Terrain Type in Surveyed Watersheds

Watershed Name	Crest	Lake Edge	Lake	Low Slope	NE Slope 10° - 33°	NE Slope > 33°	NW Slope 10° - 33°	NW Slope > 33°	SE Slope 10° - 33°	SE Slope > 33°	SW Slope 10° - 33°	Total Area
L2	2.54%	28.06%	8.51%	55.94%	1.05%	0.00%	1.29%	0.00%	2.35%	0.01%	0.24%	100%
L1a	2.88%	23.69%	4.79%	61.87%	1.30%	0.04%	1.25%	0.03%	3.47%	0.13%	0.56%	100%
L1	1.02%	20.40%	4.86%	68.17%	0.75%	0.00%	1.65%	0.00%	2.87%	0.01%	0.27%	100%
A1	1.44%	18.84%	19.24%	56.64%	0.87%	0.02%	0.95%	0.00%	1.77%	0.07%	0.17%	100%
D7	2.48%	27.03%	15.72%	50.28%	0.91%	0.00%	1.40%	0.00%	1.65%	0.01%	0.51%	100%
B1	1.99%	18.13%	5.07%	70.19%	0.52%	0.00%	1.34%	0.02%	2.47%	0.10%	0.16%	100%
K5	1.83%	19.35%	22.50%	53.79%	0.28%	0.00%	1.06%	0.00%	0.88%	0.00%	0.31%	100%
C1	3.01%	10.23%	0.98%	80.78%	0.99%	0.00%	0.07%	0.00%	3.89%	0.02%	0.02%	100%
J1	3.12%	24.31%	19.21%	51.93%	0.25%	0.00%	0.08%	0.00%	0.97%	0.10%	0.04%	100%
D1	3.03%	15.73%	12.62%	65.16%	0.67%	0.02%	0.98%	0.02%	1.58%	0.02%	0.18%	100%
K2	1.27%	18.19%	28.73%	47.86%	0.65%	0.01%	2.50%	0.00%	0.58%	0.00%	0.20%	100%
I1	2.03%	18.99%	11.43%	65.29%	0.45%	0.00%	0.18%	0.00%	1.46%	0.00%	0.17%	100%
D10	3.08%	34.64%	3.03%	52.84%	0.65%	0.00%	0.63%	0.00%	4.71%	0.00%	0.41%	100%
K4	1.43%	17.62%	25.33%	49.76%	1.18%	0.01%	1.56%	0.04%	2.88%	0.02%	0.17%	100%
H1	3.10%	16.73%	4.73%	72.90%	1.09%	0.00%	0.47%	0.02%	0.49%	0.00%	0.48%	100%
E1	1.40%	20.34%	10.30%	63.46%	1.35%	0.04%	0.99%	0.08%	1.93%	0.01%	0.11%	100%
G1	2.23%	14.56%	3.70%	75.50%	1.30%	0.02%	1.39%	0.00%	0.94%	0.00%	0.35%	100%
Ea	1.25%	1.85%	0.00%	81.33%	3.76%	0.01%	9.41%	0.00%	2.33%	0.00%	0.06%	100%
F1	1.98%	21.90%	1.14%	51.62%	5.60%	0.33%	8.01%	0.07%	4.35%	0.03%	4.97%	100%
K1	1.28%	13.76%	51.65%	30.73%	0.63%	0.00%	0.46%	0.00%	1.39%	0.00%	0.10%	100%
K3	0.84%	17.25%	41.02%	32.49%	1.23%	0.05%	3.83%	0.09%	2.79%	0.04%	0.37%	100%



APPENDIX C

Climate Data 2011



APPENDIX C

2011 Climate and Hydrology Supplemental Monitoring Report

2011 Climate Data Compilation For Gk Climate Station

Table C1-1: 2011 Daily Mean Temperatures

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	-	-	-	-	-	8.3	8.6	14.5	4.4	-	-	-	-
2	-	-	-	-	-	-2.9	7.3	10.6	5.8	-	-	-	-
3	-	-	-	-	-	-2.8	16.8	11.7	8.7	-	-	-	-
4	-	-	-	-	-	-1.2	16.2	13.6	10.9	-	-	-	-
5	-	-	-	-	-	1.2	12.4	16.1	8.1	-	-	-	-
6	-	-	-	-	-	0.4	13.9	17.9	8.1	-	-	-	-
7	-	-	-	-	-	2.2	15.9	17.7	13.9	-	-	-	-
8	-	-	-	-	-	2.6	16.4	17.5	11.4	-	-	-	-
9	-	-	-	-	-	2.8	16.9	15.3	9.1	-	-	-	-
10	-	-	-	-	-	6.8	18.0	13.5	9.9	-	-	-	-
11	-	-	-	-	-	6.0	19.6	12.7	5.0	-	-	-	-
12	-	-	-	-	-	8.6	17.3	11.6	1.5	-	-	-	-
13	-	-	-	-	-	8.0	17.0	12.7	3.5	-	-	-	-
14	-	-	-	-	-	8.1	14.2	12.8	6.3	-	-	-	-
15	-	-	-	-	-	12.4	13.3	11.4	6.2	-	-	-	-
16	-	-	-	-	-	13.5	12.5	10.8	-	-	-	-	-
17	-	-	-	-	-	12.2	14.9	11.5	-	-	-	-	-
18	-	-	-	-	-	14.3	16.9	8.7	-	-	-	-	-
19	-	-	-	-	-	15.5	12.1	7.3	-	-	-	-	-
20	-	-	-	-	-	17.6	12.7	8.0	-	-	-	-	-
21	-	-	-	-	-	17.5	14.7	10.6	-	-	-	-	-
22	-	-	-	-	-	14.6	16.8	15.0	-	-	-	-	-
23	-	-	-	-	-	14.4	17.8	12.9	-	-	-	-	-
24	-	-	-	-	-	14.9	16.9	14.2	-	-	-	-	-
25	-	-	-	-	-	9.9	17.8	12.6	-	-	-	-	-
26	-	-	-	-	5.9	5.0	19.0	10.6	-	-	-	-	-
27	-	-	-	-	0.7	5.8	13.5	11.1	-	-	-	-	-
28	-	-	-	-	3.9	9.7	14.3	10.4	-	-	-	-	-
29	-	-	-	-	5.7	11.2	16.2	9.0	-	-	-	-	-
30	-	-	-	-	7.7	13.8	12.9	8.7	-	-	-	-	-
31	-	-	-	-	7.5	-	14.3	6.3	-	-	-	-	-
Minimum	-	-	-	-	0.7	-2.9	7.3	6.3	1.5	-	-	-	-
Mean	-	-	-	-	5.2	8.4	15.1	12.2	7.5	-	-	-	-
Maximum	-	-	-	-	7.7	17.6	19.6	17.9	13.9	-	-	-	-



APPENDIX C

2011 Climate and Hydrology Supplemental Monitoring Report

Table C1-2: Daily Total Precipitation

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	0.1	0	8.1	0.9	-	-	-
2	-	-	-	-	-	2.4	0.5	5.3	0.7	-	-	-
3	-	-	-	-	-	0	0	0	2.9	-	-	-
4	-	-	-	-	-	0	0	0	5.9	-	-	-
5	-	-	-	-	-	0	0	0	0.1	-	-	-
6	-	-	-	-	-	0	0	0	0	-	-	-
7	-	-	-	-	-	0	0	0.1	0	-	-	-
8	-	-	-	-	-	4	0	0	0	-	-	-
9	-	-	-	-	-	0	0	0	3.1	-	-	-
10	-	-	-	-	-	0	0.5	0	3.7	-	-	-
11	-	-	-	-	-	0.2	0	0	0.9	-	-	-
12	-	-	-	-	-	0	9.2	0	0	-	-	-
13	-	-	-	-	-	0	4.4	0	0	-	-	-
14	-	-	-	-	-	0	12.4	0	0	-	-	-
15	-	-	-	-	-	0	0	0	0	-	-	-
16	-	-	-	-	-	0	0	0	-	-	-	-
17	-	-	-	-	-	0	0	0	-	-	-	-
18	-	-	-	-	-	0	0.1	0	-	-	-	-
19	-	-	-	-	-	0	9.5	1.6	-	-	-	-
20	-	-	-	-	-	0	0.1	0	-	-	-	-
21	-	-	-	-	-	0	0	0.2	-	-	-	-
22	-	-	-	-	-	0	0	0	-	-	-	-
23	-	-	-	-	-	0	0	1	-	-	-	-
24	-	-	-	-	-	0	0	0	-	-	-	-
25	-	-	-	-	-	0	0	0.1	-	-	-	-
26	-	-	-	-	0.5	0.1	0	0.3	-	-	-	-
27	-	-	-	-	0	4.1	0	0	-	-	-	-
28	-	-	-	-	0	1.3	0	0	-	-	-	-
29	-	-	-	-	0	3.9	0	0	-	-	-	-
30	-	-	-	-	0	0	0.2	0.5	-	-	-	-
31	-	-	-	-	0		4	7.2	-	-	-	-
Sum	-	-	-	-	0.5	16.1	40.9	24.4	18.2	-	-	-



APPENDIX D

Reference Lakes Flow Paths Surveys 2011



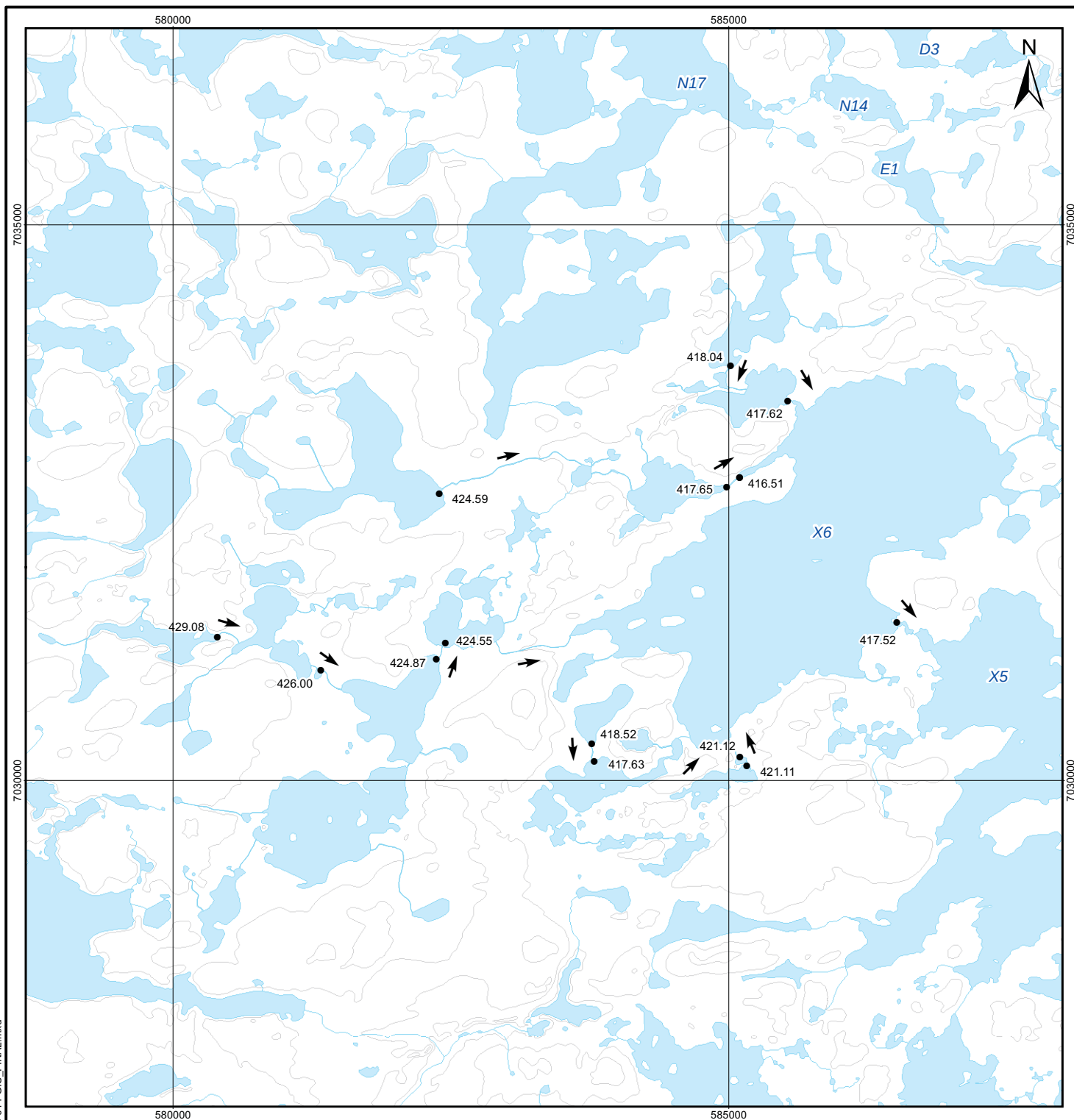
APPENDIX D

2011 Climate and Hydrology Supplemental Monitoring Report

REFERENCE LAKES FLOW PATHS SURVEY

The two proposed reference lakes were surveyed on 19 August 2011. The maps with the flow paths and water level elevations are presented in Figure D-1 for Lake X6 and Figure D-2 for Reference Lake.

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LEGEND

- Watercourse
- Waterbody
- Contour (10m interval)
- Surveyed Water Level Elevation
- ↑ Drainage Direction

NOTES

Elevation data was collected on 19 August , 2011.
Base data source: National Topographic Base Data (NTDB) 1:50,000

GAHCHO KUÉ PROJECT

Flow Paths to Lake X6

PROJECTION: UTM Zone 12 DATUM: NAD83

Scale: 1:50,000
500 250 0 500
Metres

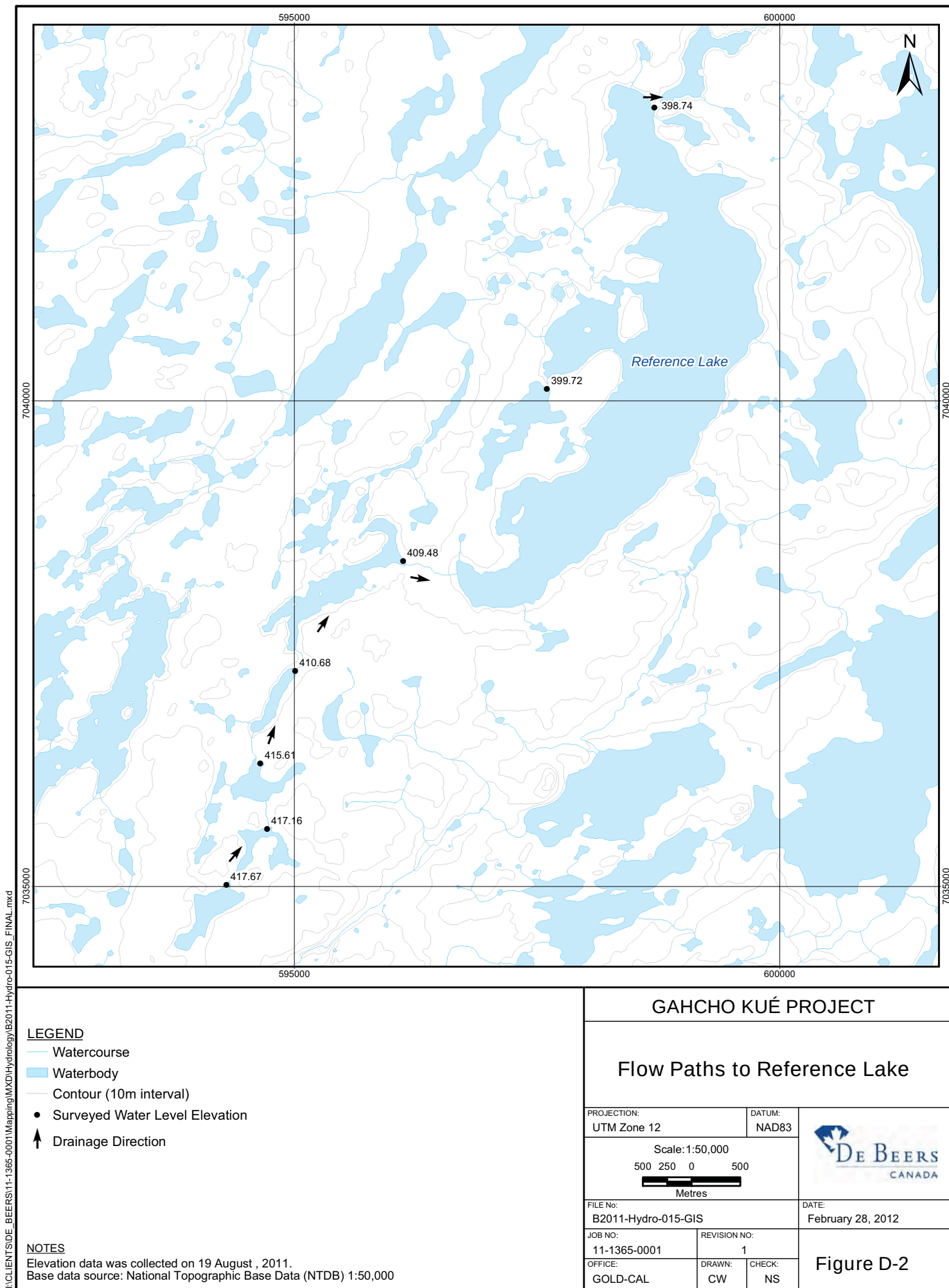


FILE No: B2011-Hydro-014-GIS DATE: February 28, 2012

JOB NO: 11-1365-0001 REVISION NO: 1

OFFICE: GOLD-CAL DRAWN: CW CHECK: NS

Figure D-1



LEGEND

- Watercourse
- Waterbody
- Contour (10m interval)
- Surveyed Water Level Elevation
- ↑ Drainage Direction

NOTES

Elevation data was collected on 19 August , 2011.
Base data source: National Topographic Base Data (NTDB) 1:50,000

GAHCHO KUÉ PROJECT

Flow Paths to Reference Lake

PROJECTION: UTM Zone 12 DATUM: NAD83

Scale: 1:50,000
500 250 0 500
Metres



FILE No: B2011-Hydro-015-GIS DATE: February 28, 2012

JOB NO: 11-1365-0001	REVISION NO: 1	Figure D-2
OFFICE: GOLD-CAL	DRAWN: CW CHECK: NS	



APPENDIX E

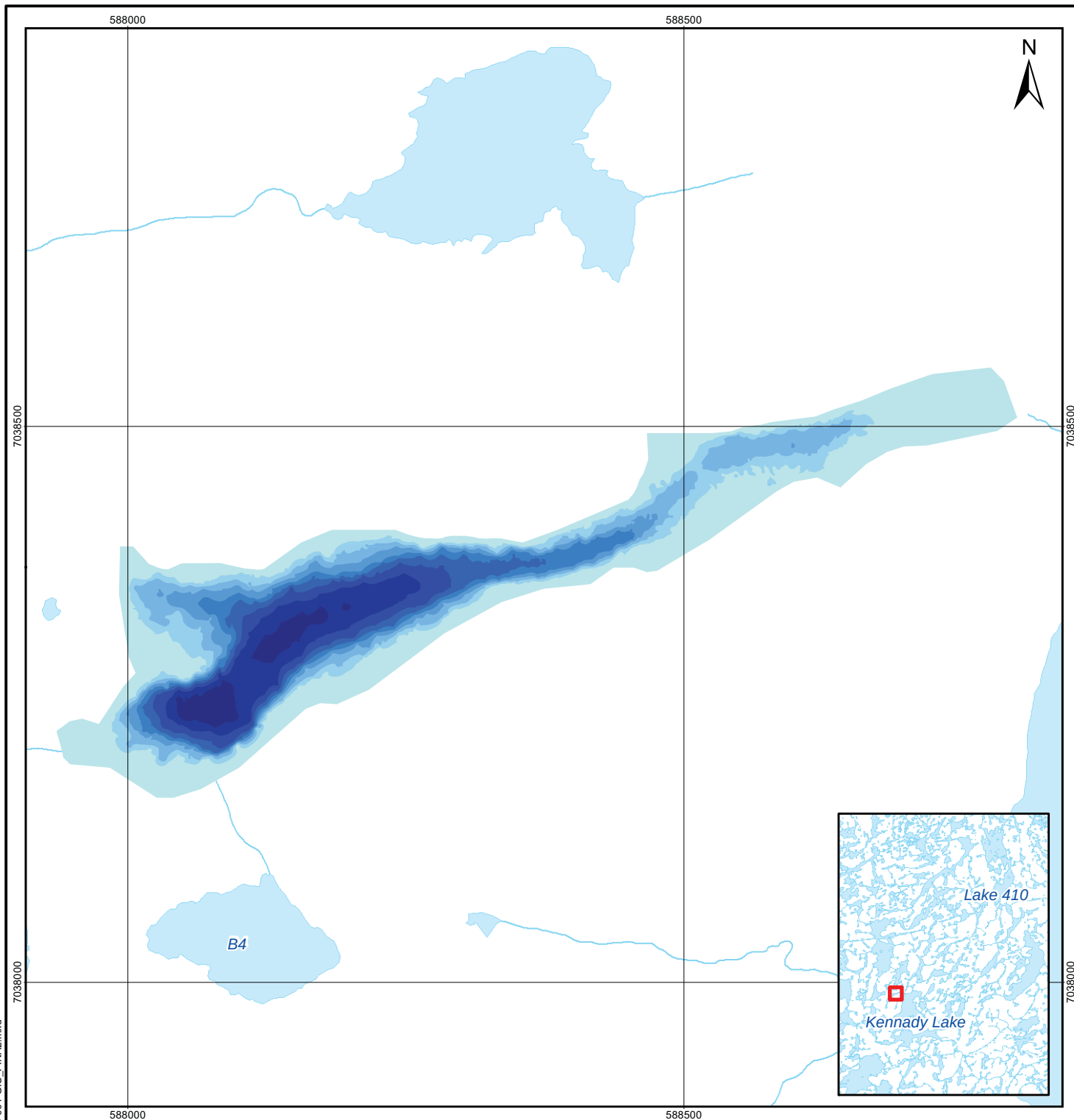
Lake Bathymetry Surveys 2011



APPENDIX E

2011 Climate and Hydrology Supplemental Monitoring Report

2011 LAKE BATHYMETRY SURVEYS



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00
	2.01 - 2.50
	2.51 - 3.00
	3.01 - 3.50
	3.51 - 4.00
	4.01 - 4.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

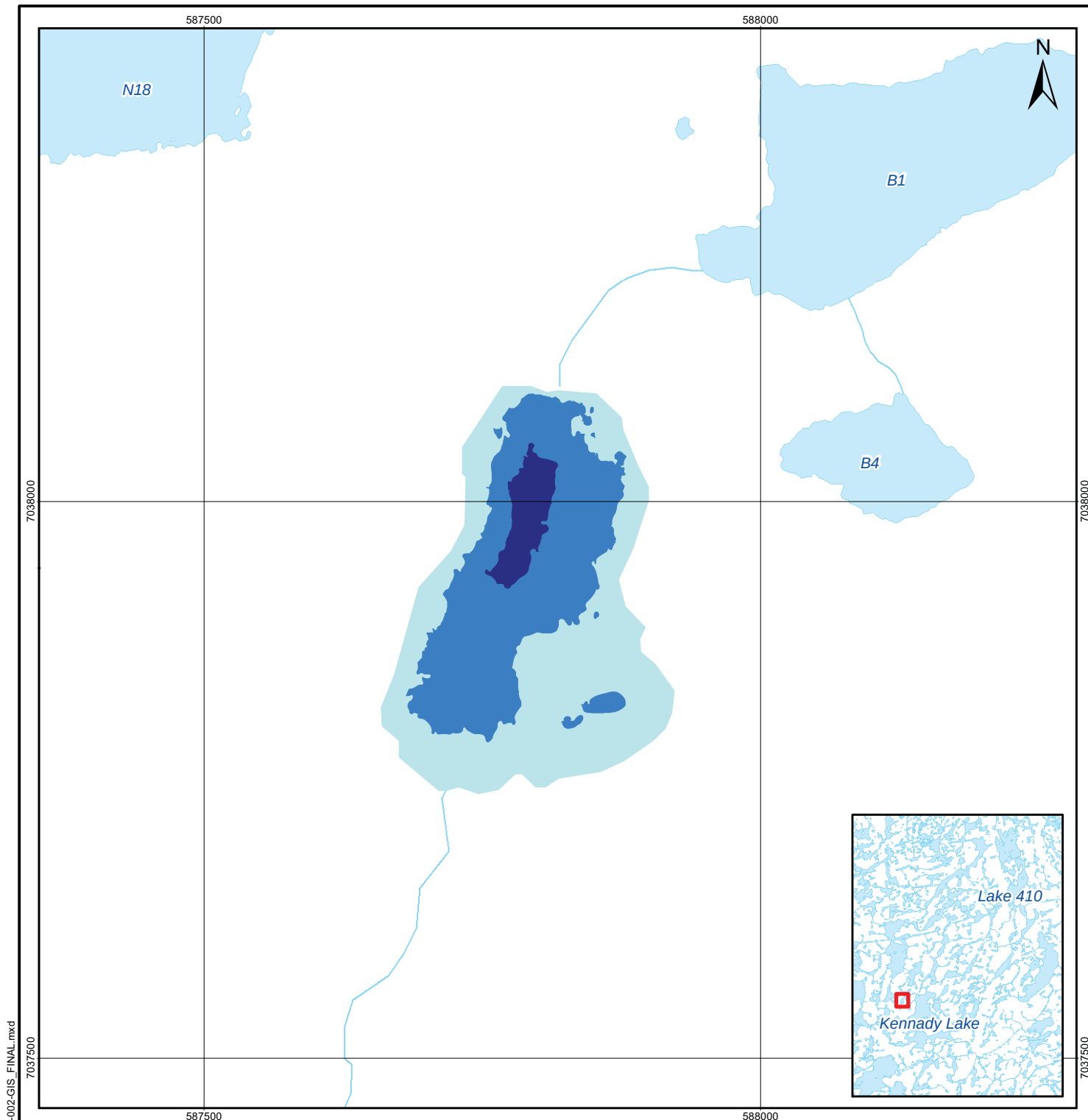
Bathymetric Map of Lake B1

PROJECTION: UTM Zone 12	DATUM: NAD83
Scale: 1:5,000	
100 50 0 100	
Metres	



FILE No: B2011-Hydro-001-GIS	DATE: February 28, 2012
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JOB NO: 11-1365-0001	REVISION NO: 1	Figure E-1
OFFICE: GOLD-CAL	DRAWN: GI CHECK: NS	



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

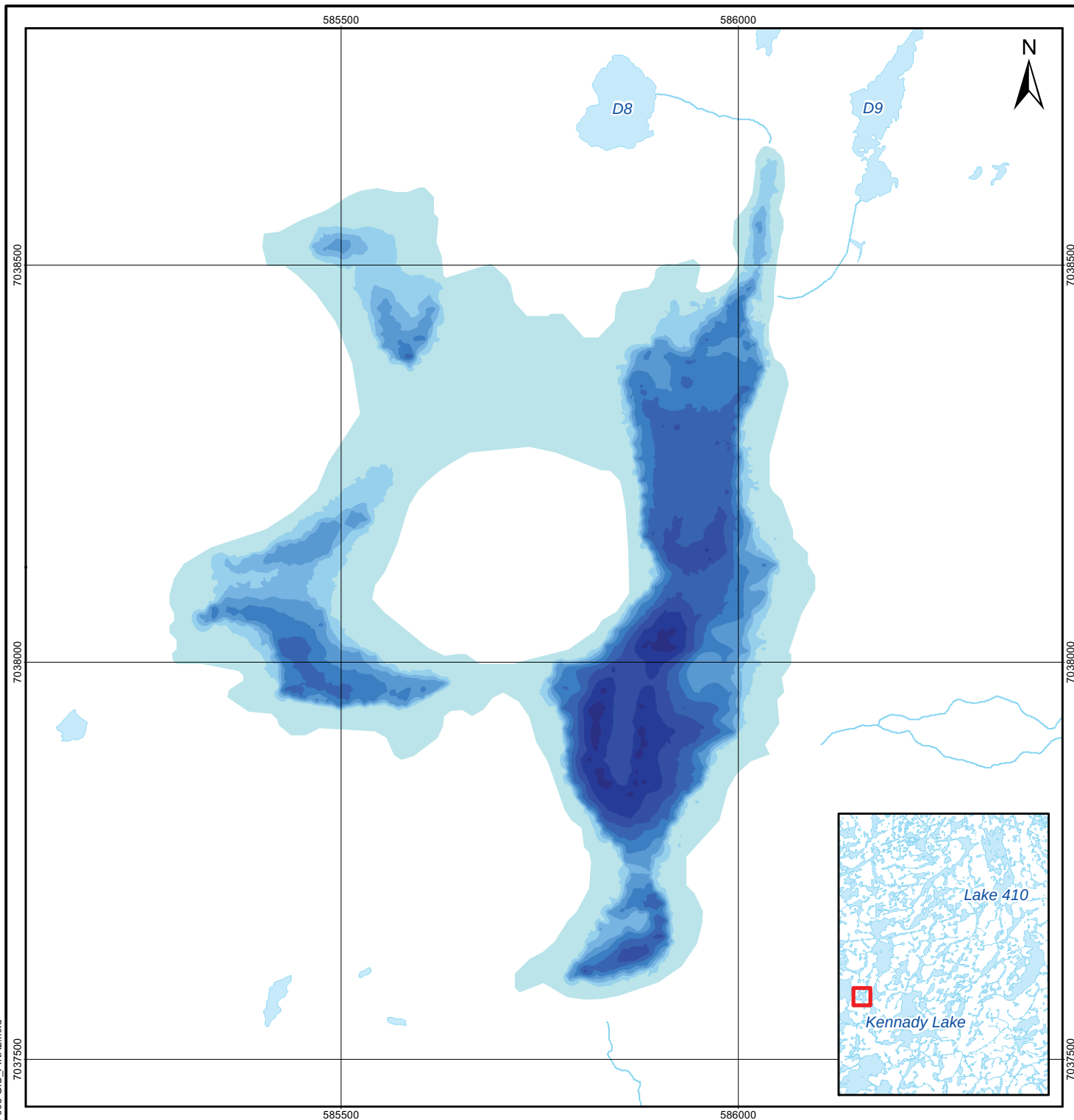
Bathymetric Map of Lake B2

PROJECTION: UTM Zone 12	DATUM: NAD83
Scale: 1:5,000	
100 50 0 100	
Metres	



FILE No: B2011-Hydro-002-GIS	DATE: February 28, 2012
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JOB NO: 11-1365-0001	REVISION NO: 1	Figure E-2
OFFICE: GOLD-CAL	DRAWN: GI CHECK: NS	



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00
	2.01 - 2.50
	2.51 - 3.00
	3.01 - 3.50
	3.51 - 4.00
	4.01 - 4.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake D7

PROJECTION: UTM Zone 12 DATUM: NAD83

Scale: 1:7,000
100 50 0 100
Metres

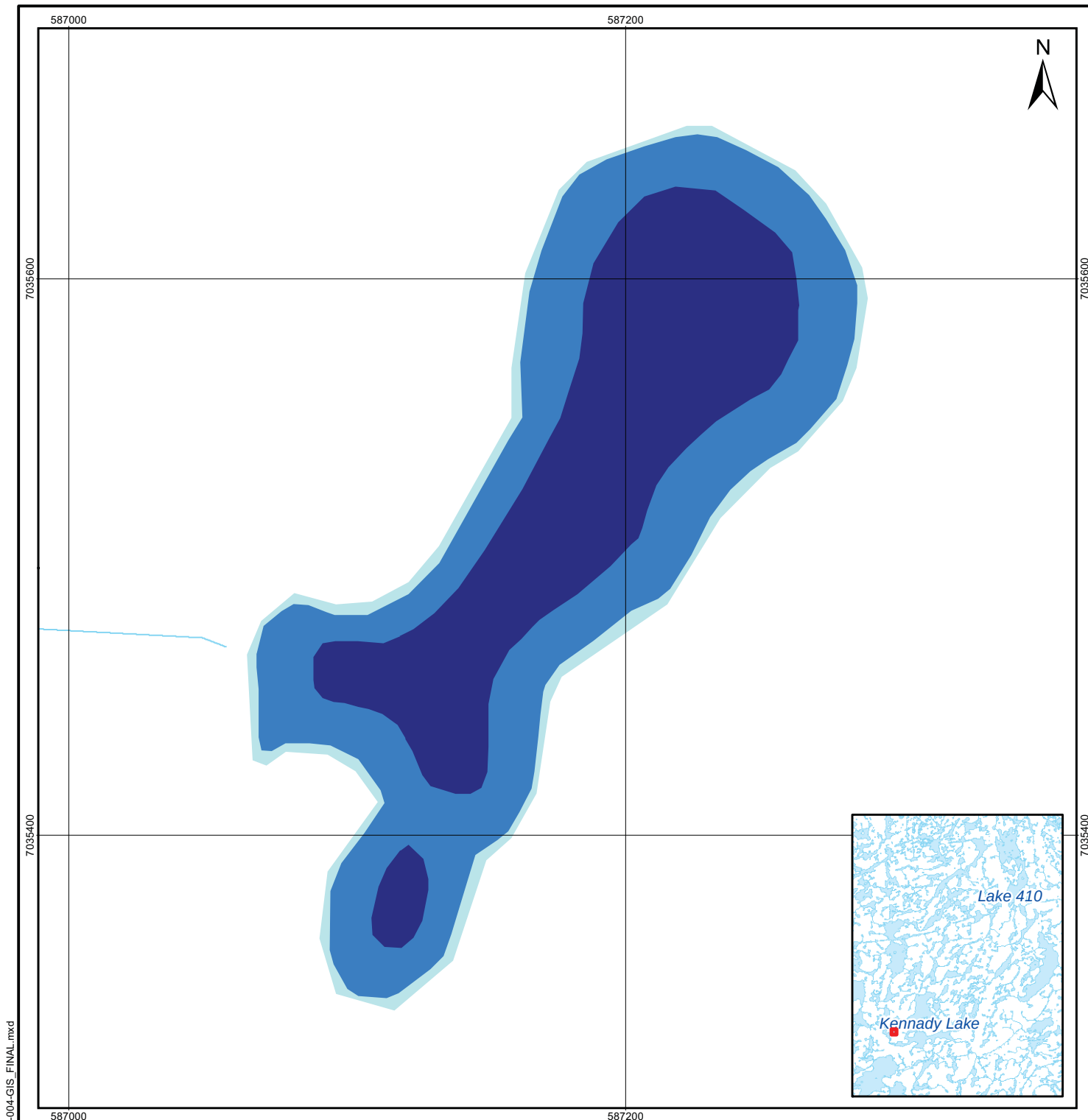


FILE No: B2011-Hydro-003-GIS DATE: February 28, 2012

JOB NO: 11-1365-0001 REVISION NO: 1

OFFICE: GOLD-CAL DRAWN: GI CHECK: NS

Figure E-3



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.20
	0.21 - 0.40
	0.41 - 0.60

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake E2

PROJECTION: UTM Zone 12 DATUM: NAD83

Scale: 1:2,000
40 20 0 40
Metres



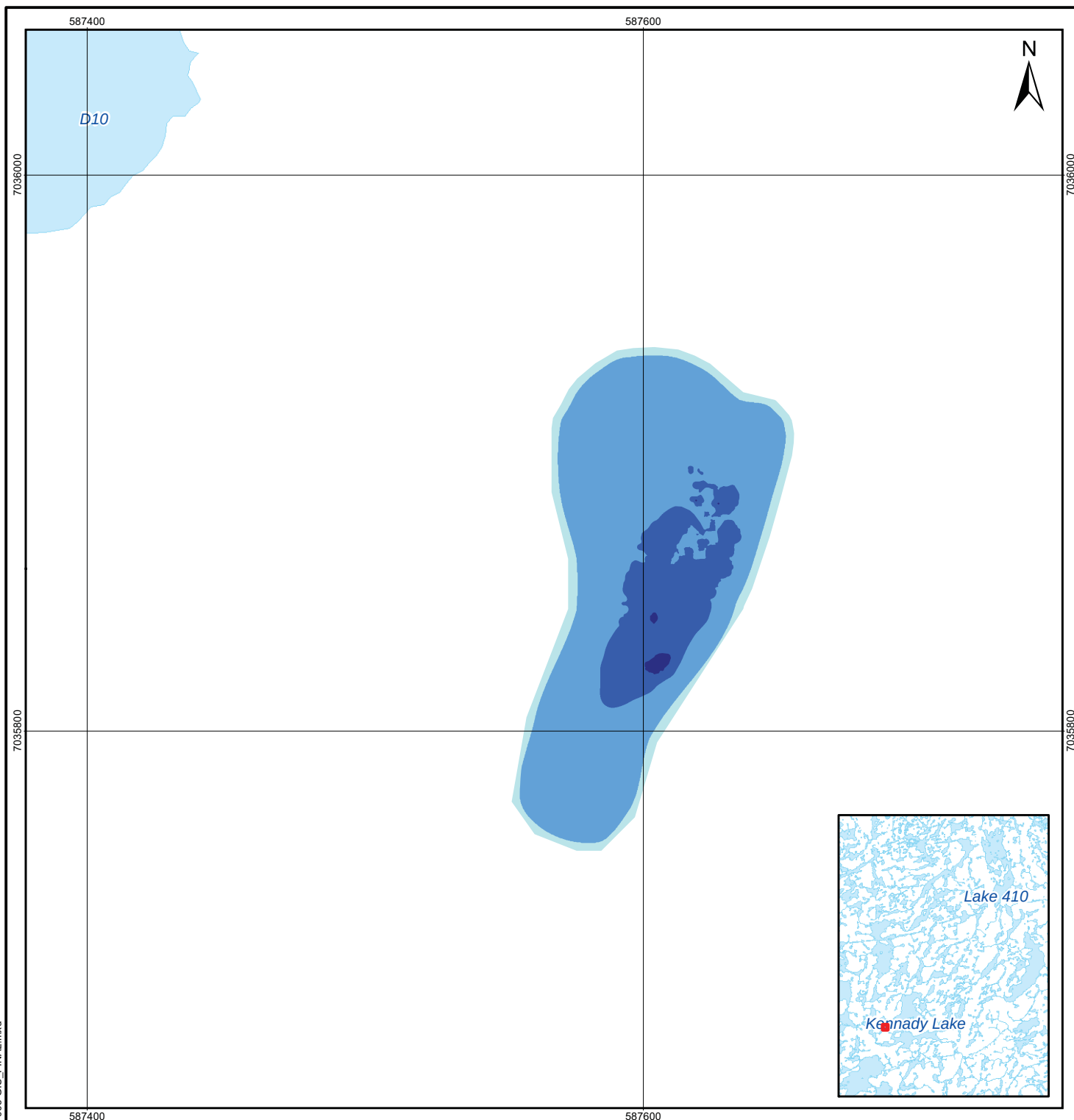
FILE No: B2011-Hydro-004-GIS DATE: February 28, 2012

JOB NO: 11-1365-0001 REVISION NO: 1

OFFICE: GOLD-CAL DRAWN: GI CHECK: NS

Figure E-4

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LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.20
	0.21 - 0.40
	0.41 - 0.60
	0.61 - 0.80

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake E3

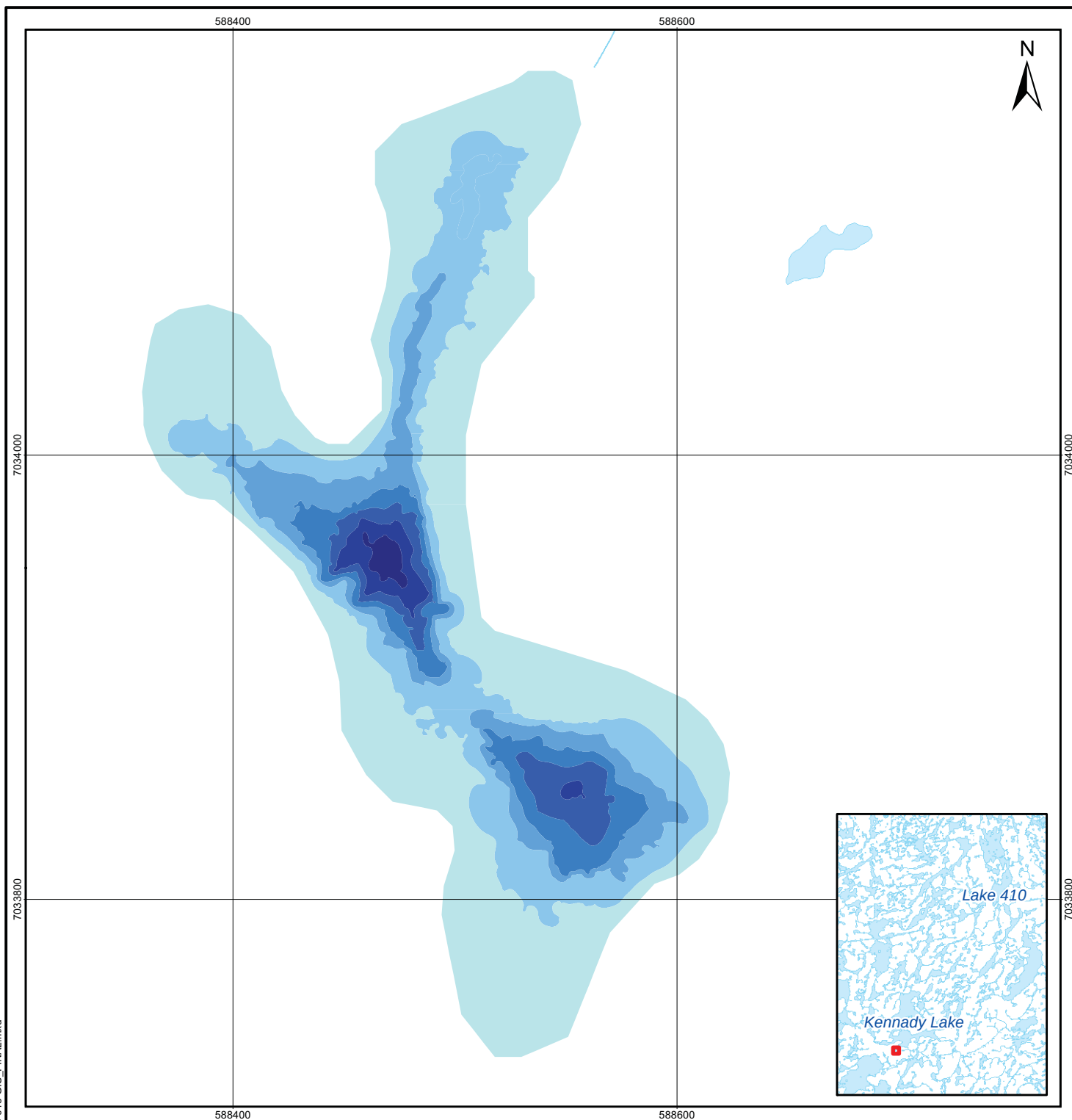
PROJECTION:	DATUM:
UTM Zone 12	NAD83
Scale: 1:2,000	
40	20 0 40
Metres	



FILE No:	DATE:
B2011-Hydro-005-GIS	February 28, 2012

JOB NO:	REVISION NO:
11-1365-0001	1
OFFICE:	DRAWN: CHECK:
GOLD-CAL	GI NS

Figure E-5



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 1.00
	1.01 - 2.00
	2.01 - 3.00
	3.01 - 4.00
	4.01 - 5.00
	5.01 - 6.00
	6.01 - 7.00

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake F1

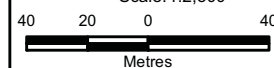
PROJECTION:

UTM Zone 12

DATUM:

NAD83

Scale: 1:2,500



FILE No:

B2011-Hydro-013-GIS

DATE:

February 28, 2012

JOB NO:

11-1365-0001

REVISION NO:

1

OFFICE:

GOLD-CAL

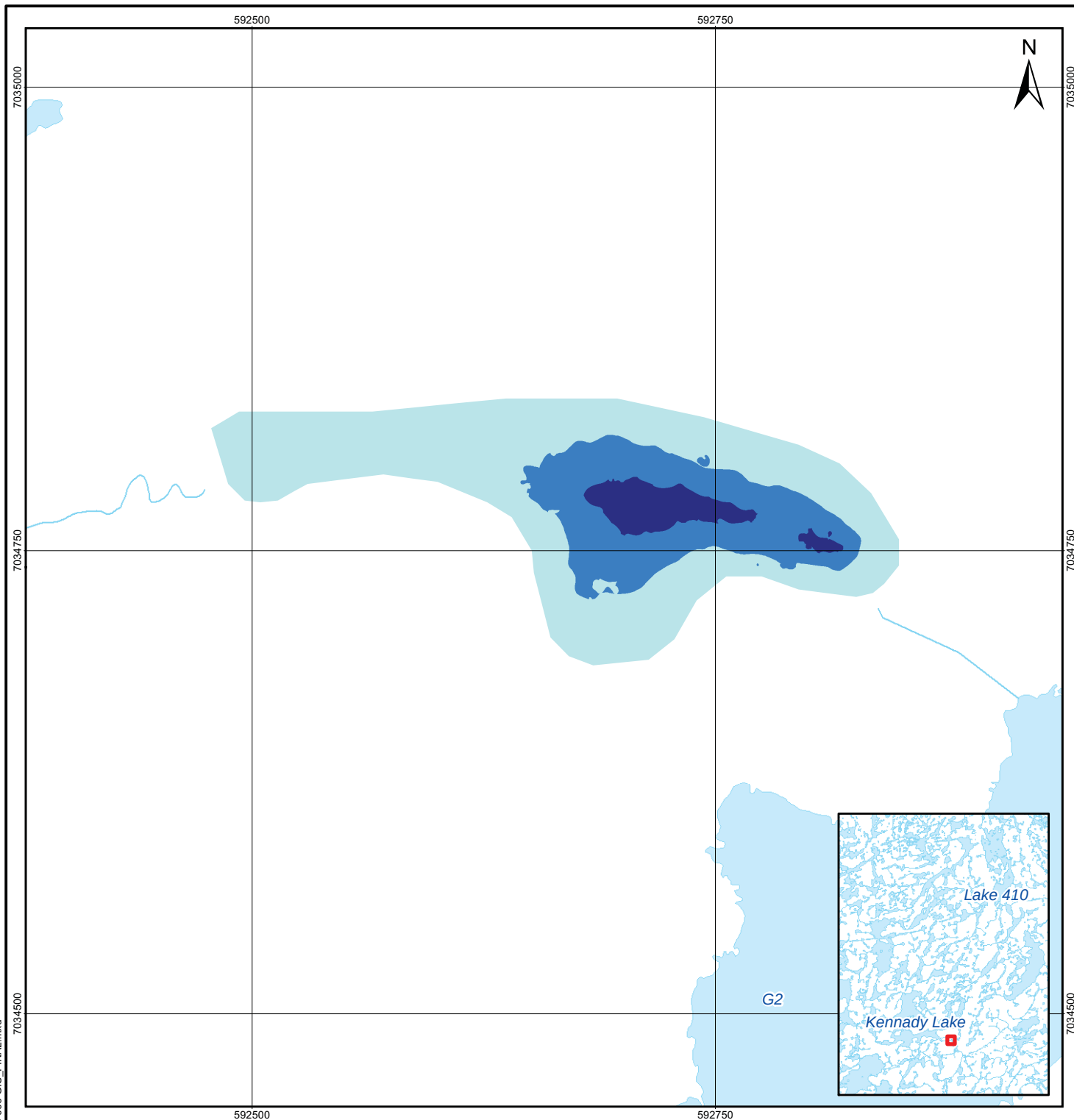
DRAWN:

SG

CHECK:

NS

Figure E-6



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake G1

PROJECTION: UTM Zone 12 DATUM: NAD83

Scale: 1:3,000
50 25 0 50
Metres



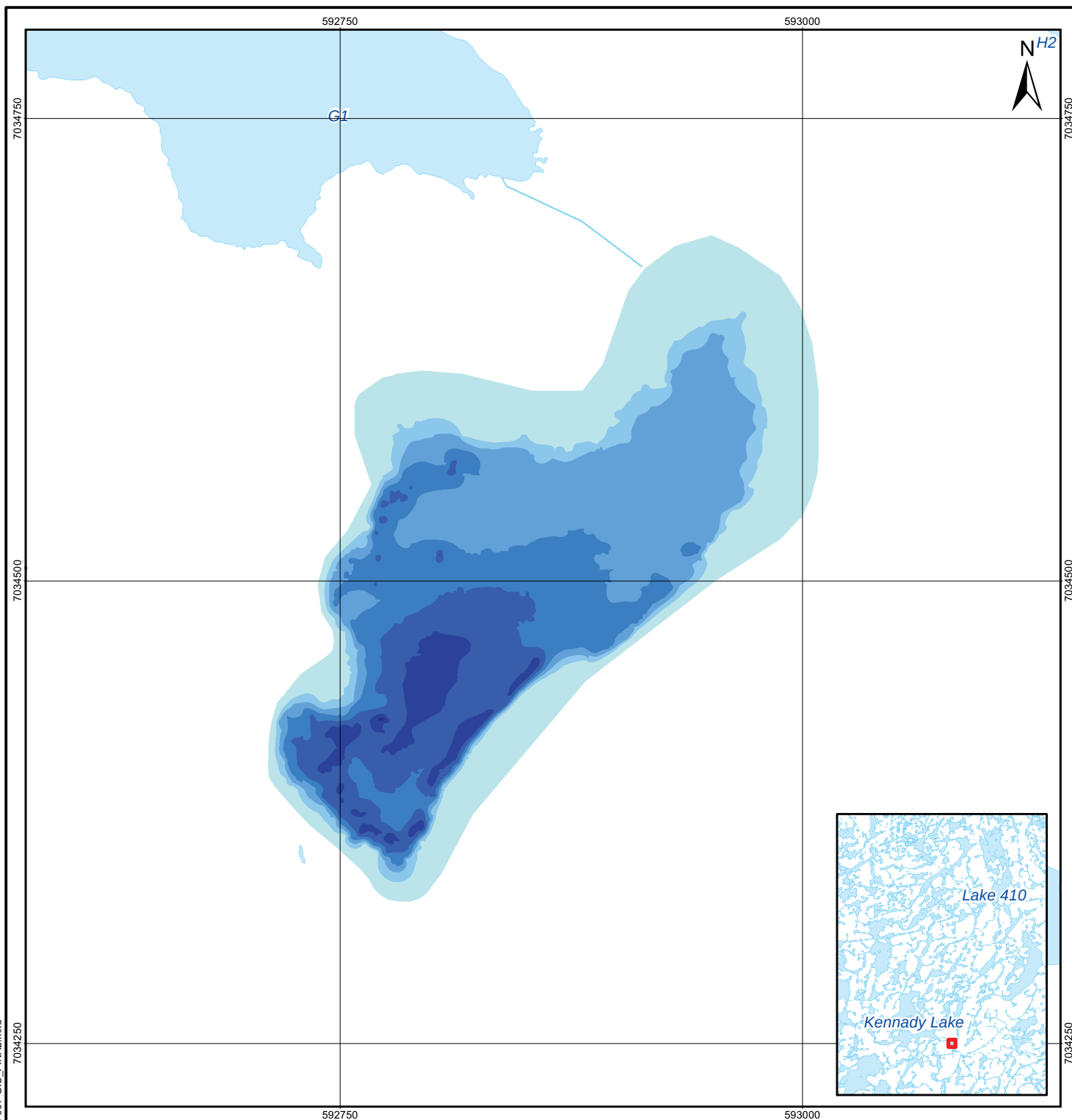
FILE No: B2011-Hydro-006-GIS DATE: February 28, 2012

JOB NO: 11-1365-0001 REVISION NO: 1

OFFICE: GOLD-CAL DRAWN: GI CHECK: NS

Figure E-7

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LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00
	2.01 - 2.50
	2.51 - 3.00
	3.01 - 3.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake G2

PROJECTION: UTM Zone 12
DATUM: NAD83

Scale: 1:3,000
50 25 0 50
Metres



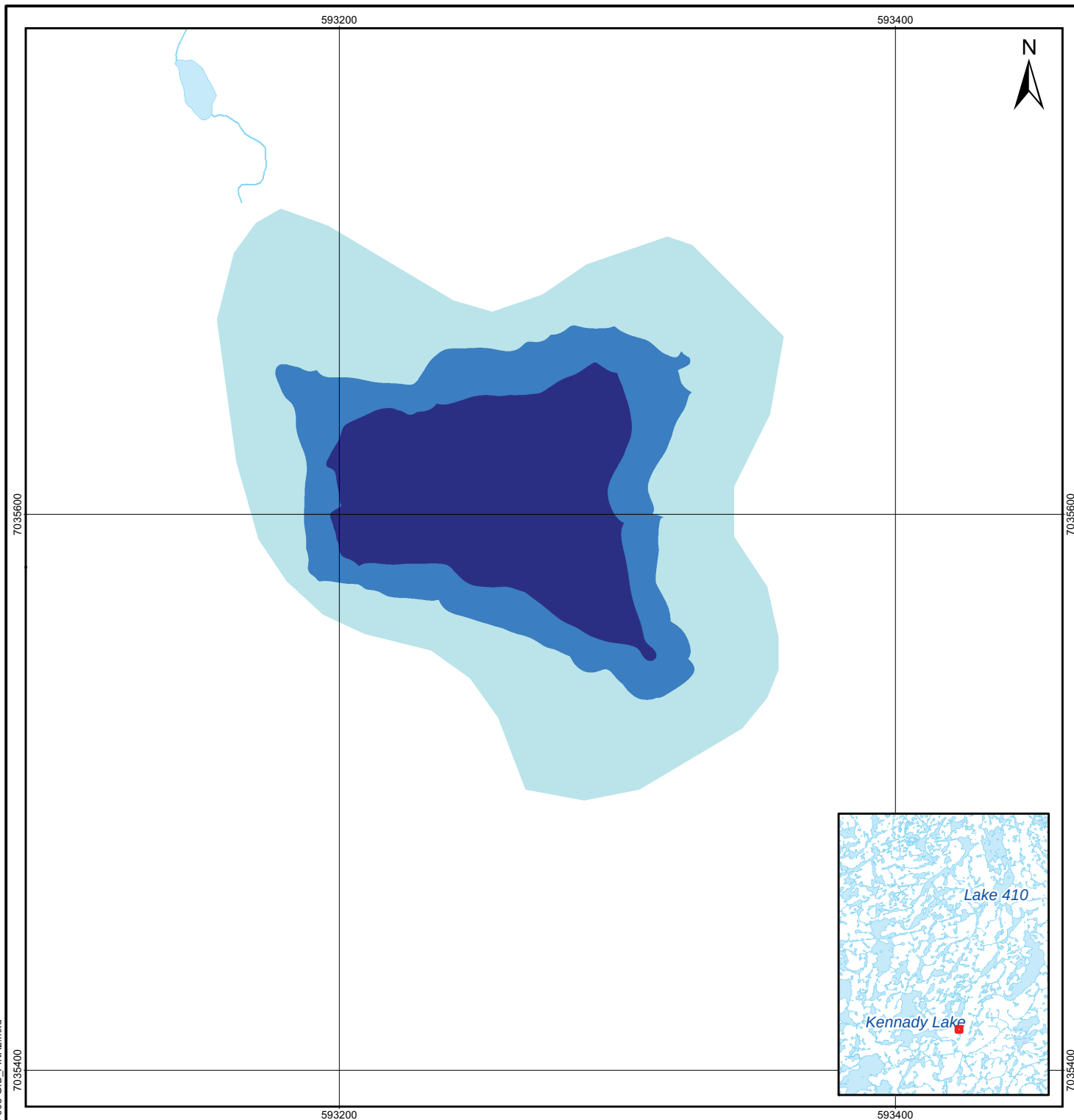
FILE No: B2011-Hydro-007-GIS
DATE: February 28, 2012

JOB NO: 11-1365-0001
REVISION NO: 1

OFFICE: GOLD-CAL
DRAWN: GI
CHECK: NS

Figure E-8

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LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake H1a

PROJECTION: UTM Zone 12	DATUM: NAD83
Scale: 1:2,000	
40 20 0 40	
Metres	

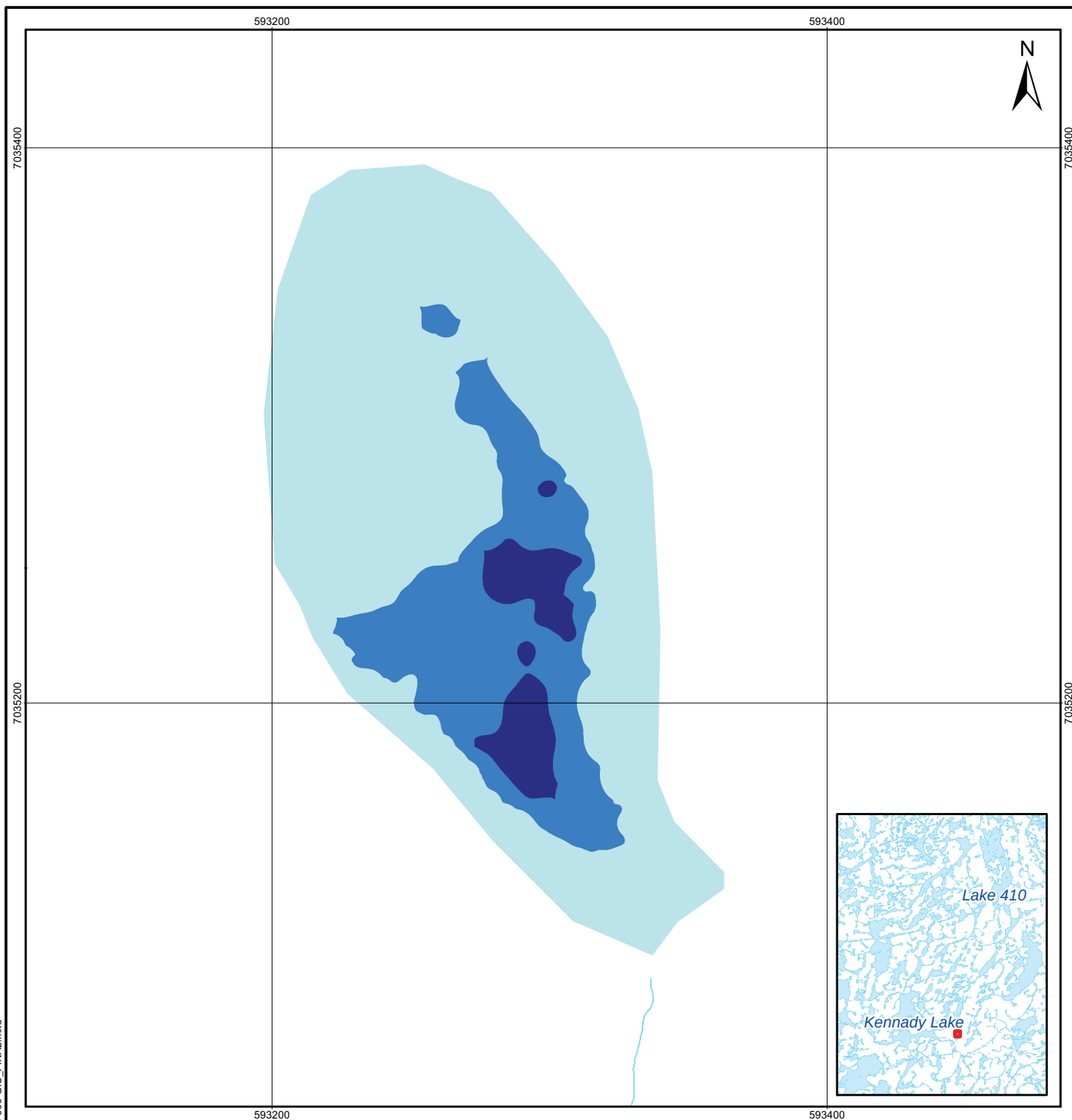


FILE No: B2011-Hydro-008-GIS	DATE: February 28, 2012
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JOB NO: 11-1365-0001	REVISION NO: 1
OFFICE: GOLD-CAL	DRAWN: GI
	CHECK: NS

Figure E-9

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LEGEND

Watercourse	Water Depth (m)
Waterbody	0.000000 - 1.500000
	1.500001 - 2.000000
	2.000001 - 2.500000

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake H1b

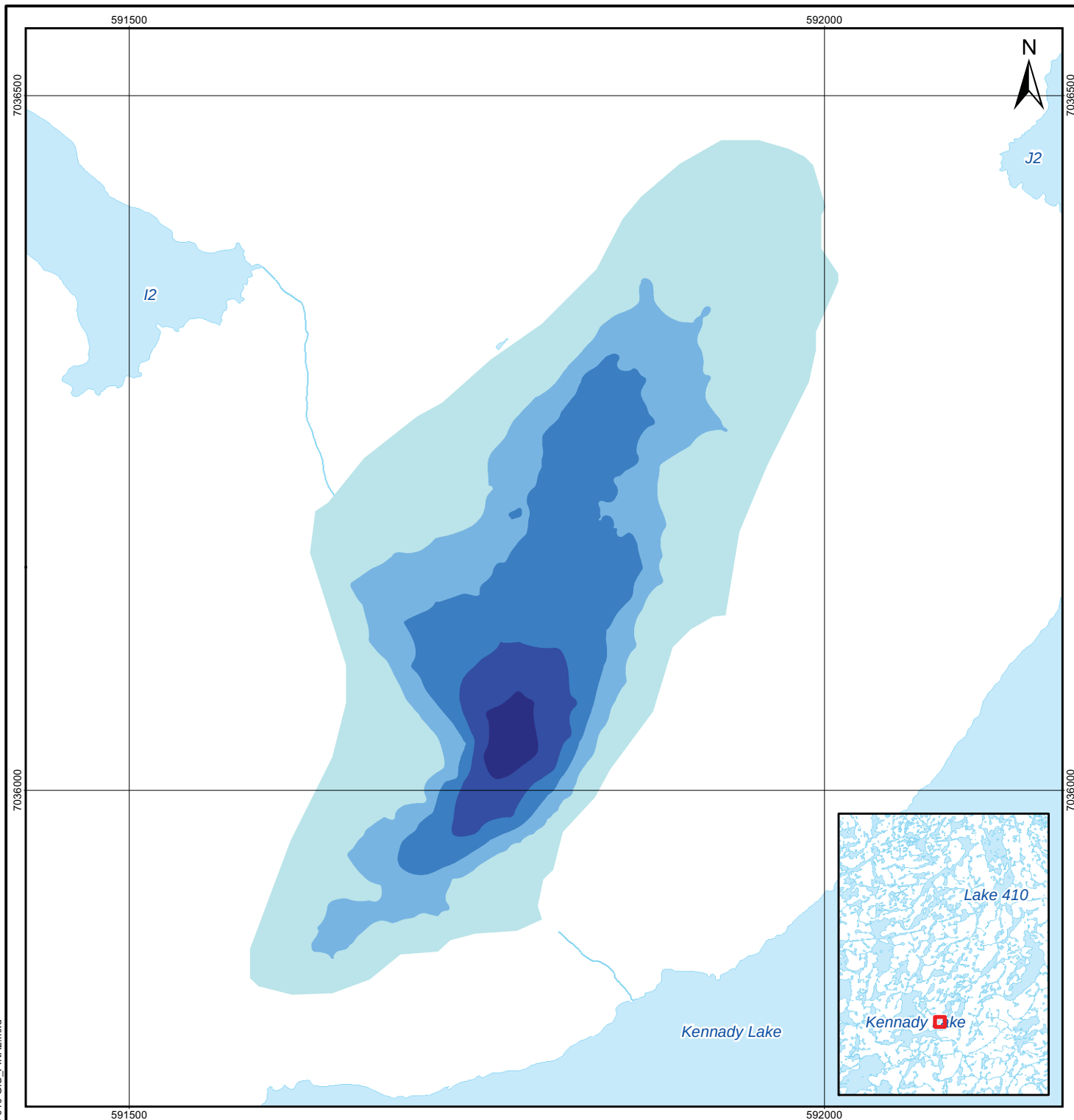
PROJECTION:	DATUM:
UTM Zone 12	NAD83
Scale: 1:2,000	
40 20 0 40	
Metres	



FILE No:	DATE:
B2011-Hydro-009-GIS	February 28, 2012

JOB NO:	REVISION NO:
11-1365-0001	1
OFFICE:	DRAWN: CHECK:
GOLD-CAL	GI NS

Figure E-10



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 2.00
	2.01 - 4.00
	4.01 - 6.00
	6.01 - 8.00
	8.01 - 10.00

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake I1

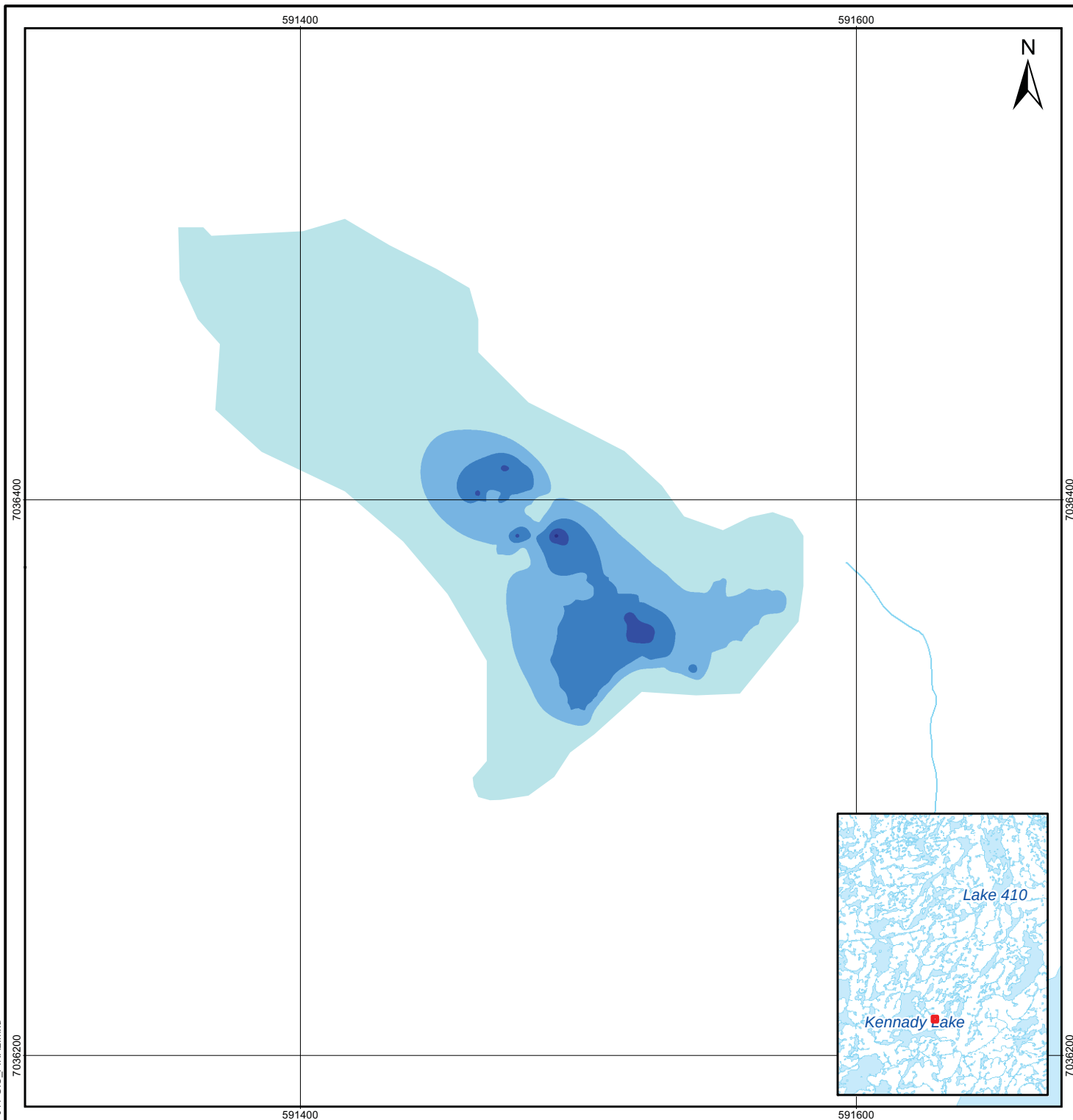
PROJECTION: UTM Zone 12	DATUM: NAD83
Scale: 1:4,000	



FILE No: B2011-Hydro-010-GIS	DATE: February 28, 2012
JOB NO: 11-1365-0001	REVISION NO: 1
OFFICE: GOLD-CAL	DRAWN: GI
	CHECK: NS

Figure E-11

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LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.40
	0.41 - 0.60
	0.61 - 0.80
	0.81 - 1.00
	1.01 - 1.20

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake I2

PROJECTION:	DATUM:
UTM Zone 12	NAD83
Scale: 1:2,000	
40 20 0 40	
Metres	

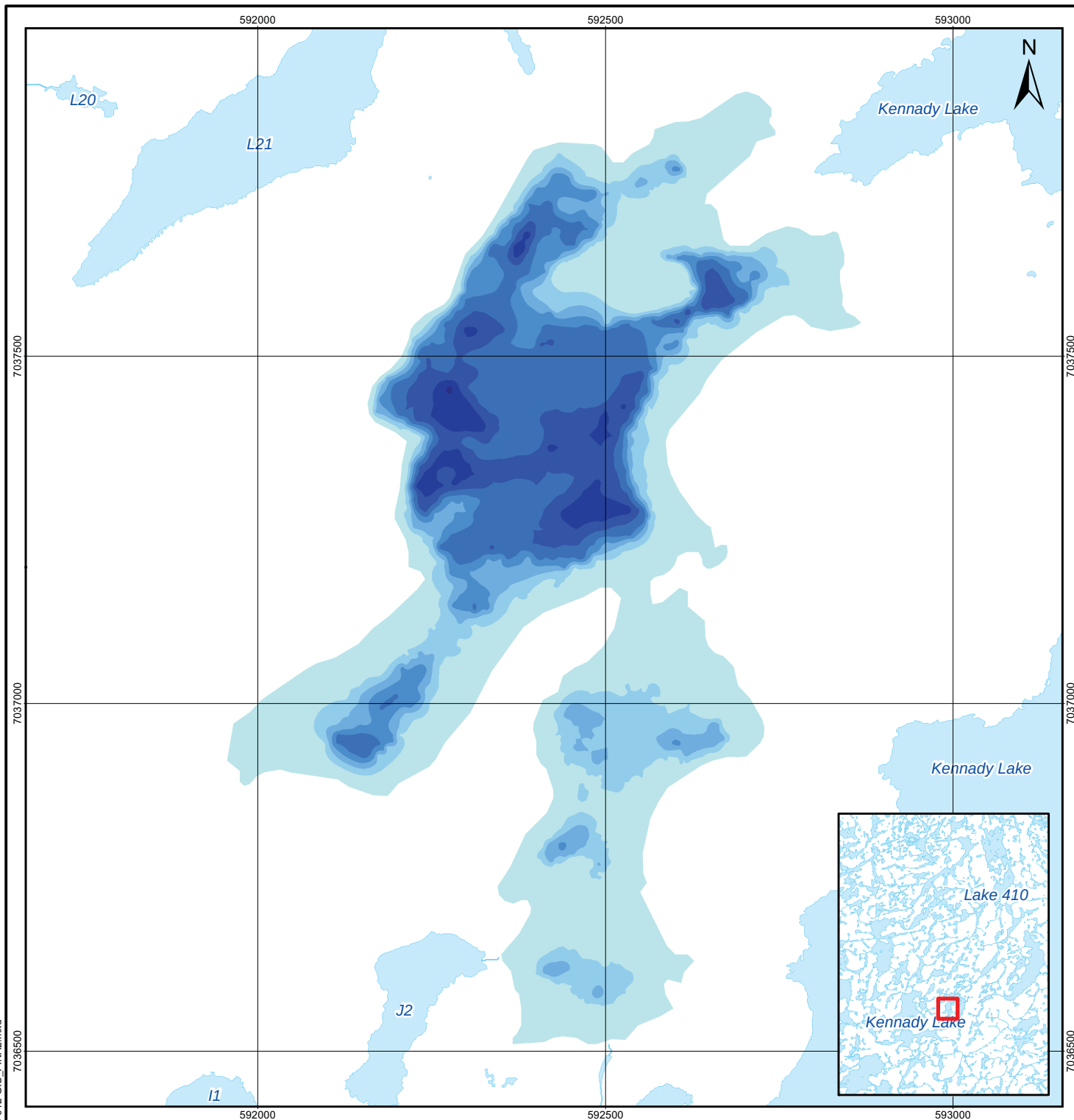


FILE No:	DATE:
B2011-Hydro-011-GIS	February 28, 2012

JOB NO:	REVISION NO:
11-1365-0001	1
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Figure E-12

I:\CLIENTSIDE\BEERS\11-1365-0001\Mapping\MXD\Hydrology\B2011-Hydro-012-GIS_FINAL.mxd



LEGEND

Watercourse	Water Depth (m)
Waterbody	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00
	2.01 - 2.50
	2.51 - 3.00
	3.01 - 3.50
	3.51 - 4.00

NOTES

Bathymetry data was collected between 15 July 2011 and 24 July 2011.
Base Data Source: Eagle Mapping Ltd.

GAHCHO KUÉ PROJECT

Bathymetric Map of Lake J1

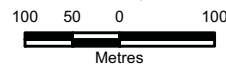
PROJECTION:

UTM Zone 12

DATUM:

NAD83

Scale: 1:8,000



FILE No:

B2011-Hydro-012-GIS

DATE:

February 28, 2012

JOB NO:

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Figure E-13

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