

**FINAL
REPORT ON**

**BASELINE HYDROLOGY
FOR THE PROPOSED
NICO PROJECT**

Submitted to:

**Fortune Minerals Limited
Suite 1902, 140 Fullarton Street
London, Ontario
N6A 5P2**

Prepared by:

**Golder Associates Ltd.
#300, 10525 – 170th Street
Edmonton, Alberta
T5P 4W2**

December 2010

08-1373-0017.2000

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1 INTRODUCTION.....	1
2 STUDY AREAS.....	2
2.1 REGIONAL STUDY AREA	2
2.2 LOCAL STUDY AREA.....	2
2.3 PROPOSED NICO PROJECT ACCESS ROAD (NPAR) STUDY AREA	2
3 METHODS	5
4 CLIMATE.....	6
4.1 DATA SOURCES	6
4.1.1 NICO Project Climate Station	6
4.1.2 Regional Climate Stations.....	6
4.2 CLIMATIC PARAMETERS	11
4.3 CLIMATE DEPENDENT HYDROLOGICAL PROCESSES.....	12
4.3.1 Actual Evapotranspiration	12
4.3.2 Lake Evaporation	13
5 HYDROLOGY	16
5.1 DATA SOURCES	16
5.1.1 NICO Project Hydrometric Data.....	16
5.1.2 Regional Hydrometric Data.....	16
5.2 REGIONAL DRAINAGE	16
5.3 LOCAL DRAINAGE	19
5.4 CLIMATIC WATER BALANCE	20
5.5 HYDROMETRIC MONITORING	22
5.5.1 Hydrometric Monitoring Methods	22
5.5.2 Hydrometric Monitoring Locations	26
5.5.3 Field Data.....	31
5.5.4 Flow Data	36
5.6 LONG TERM FLOW RECORD FOR DRAINAGES WITHIN THE BURKE AND LOU WATERSHEDS.....	42
5.6.1 Correlation From Baker Creek to the Burke Creek (B-1) and Lou Creek (L-1).....	42
5.6.2 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks.....	44
5.7 LONG TERM FLOW RECORD FOR THE MARIAN RIVER	45
5.8 LOCAL INFILTRATION ANALYSIS.....	49
5.9 REGIONAL FLOOD MAGNITUDE AND FREQUENCY.....	52
6 SUMMARY	53
6.1 STUDY AREAS	53
6.2 CLIMATE	54
6.2.1 Methods	54
6.2.2 Results	54
6.3 SURFACE WATER HYDROLOGY	56
6.3.1 Local Drainage.....	56
6.3.2 Water Balance.....	56
6.3.3 Long Term Flow Record Derivation	57

6.3.4	Flood Magnitude and Frequency	60
7	REFERENCES.....	62
8	GLOSSARY	63
8.1	ABBREVIATIONS AND ACRONYMS	63
8.2	UNITS OF MEASURE	63

LIST OF TABLES

Table 4-1	Regional Climate Station Information	8
Table 4-2	Monthly and Annual Actual Evapotranspiration (mm)	13
Table 4-3	Monthly and Annual Lake Evaporation (mm)	14
Table 5-1	Selected Regional Hydrometric Stations	18
Table 5-2	Sub-basins within the Lou and Burke Lake Drainages	19
Table 5-3	Stream Discharge Monitoring Cross-sections	26
Table 5-4	Lake Stage Monitoring Locations	28
Table 5-5	Staff Gauge Elevations and Benchmark Locations, NICO Project Area	33
Table 5-6	Instantaneous Discharge Measurements in m ³ /s, NICO Project Area	34
Table 5-7	Observed Water Elevations	35
Table 5-8	B-1 (Burke Creek) Daily Average Discharge (m ³ /s).....	38
Table 5-9	L-1 (Lou Creek) Daily Average Discharge (m ³ /s)	39
Table 5-10	M-1 (Marian River) Daily Average Discharge (m ³ /s).....	40
Table 5-11	Measurement Periods and Maximum Daily Average Discharges at B-1, L-1, and M-1	42
Table 5-12	Results of Infiltration Analysis.....	51
Table 5-12	Results of Flood Frequency Analysis	52
Table 6-1	Summary of Monthly and Annual Mean Climatic Parameters, NICO Project Area	55
Table 6-4	Annual Maximum Flood (m ³ /s) at Specific Return Intervals (year).....	61

LIST OF FIGURES

Figure 2-1	Hydrology Regional Study Area for the NICO Project	3
Figure 2-2	Hydrology Local Study Area for the NICO Project.....	4
Figure 4-1	Selected Regional Meteorological Stations	7
Figure 4-2	Mean Monthly Total Precipitation – Yellowknife Airport and Snare Rapids (1993 to 2004).....	9
Figure 4-3	Mean Monthly Total Precipitation – Yellowknife Airport and Gamètì Airport (2001 to 2007).....	10
Figure 4-4	Mean Monthly Air Temperature – Yellowknife Airport and Gamètì Airport (2001 to 2007).....	10
Figure 5-1	Sub-basins in the Lou Lake and Burke Lake Watersheds	17
Figure 5-2	Flow Diagram for Sub-basins in the Lou Lake Drainage	21
Figure 5-3	Flow Diagram for Sub-basins in the Burke Lake Drainage	22
Figure 5-4	Hydrometric Monitoring Locations at the NICO Project.....	25
Figure 5-5	Stream Discharge Measurement Locations on the Proposed NICO Project Access Road.....	27
Figure 5-6	B-1 (Burke Creek) Hydrograph.....	36

Figure 5-7	L-1 (Lou Creek) Hydrograph.....	37
Figure 5-8	M-1 (Marian River) Hydrograph.....	37
Figure 5-9	Relationship Between Average Daily Discharge (m ³ /s) for Burke Creek and Baker Creek.....	43
Figure 5-10	Relationship Between Average Daily Discharge (m ³ /s) for Lou Creek and Baker Creek.....	44
Figure 5-11	Marian River Drainage Area.....	46
Figure 5-12	Relationship Between Average Daily Discharge (m ³ /s) for Marian River and Cameron River.....	47
Figure 5-13	Measured and Calculated Hydrographs for the Marian River.....	48
Figure 6-1	B-1 (Burke Creek) Hydrograph.....	58
Figure 6-2	L-1 (Lou Creek) Hydrograph.....	59
Figure 6-3	M-1 (Marian River) Hydrograph.....	59
Figure 6-4	Water Level Measurements for Lakes in the Project Area.....	60

LIST OF APPENDICES

- Appendix I Long-Term Climate Data
- Appendix II Stage-Discharge Relationships
- Appendix III Site Photos
- Appendix IV Long Term Discharge Data

1 INTRODUCTION

Fortune Minerals Limited (Fortune) is proposing to develop the NICO Cobalt-Gold-Bismuth-Copper Project (Project) and a proposed NICO Project Access Road (NPAR) in the Northwest Territories (NWT). The Baseline Hydrology Report describes hydrological conditions at the NICO Project. This report provides baseline information for the purposes of developer's assessment report (DAR) and as a design basis for engineered structures. Hydrological data include estimated streamflow volumes, temporal, and spatial distribution of runoff, flow directions, and identification of watershed boundaries in the Project area.

Climate parameters have been used to estimate actual evapotranspiration from ground surface and evaporation from free water surface for water balance purposes, along with prediction of normal ranges and extreme precipitation potential. Regional climate data are compiled as a basis for water balance calculations. The analysis uses existing long-term regional data, and short-term field data collected at the Project to document hydrologic and climate conditions.

Local streamflow and water level data were collected at 13 streams and 7 waterbodies between 2005 and 2008. In the spring of 2005, the approximate extents of the watershed boundaries defined in the Project study area and flow directions were verified during a reconnaissance survey. Surface water hydrology data collected in the Project study area include:

- watershed drainage boundary delineation and verification;
- periodic lake surface elevation (stage) measurement;
- continuous stream stage measurement through the open water period;
- periodic instantaneous stream discharge and stream stage measurement;
- and
- a winter discharge measurement.

Additional climatic information is discussed in the "Existing Air Quality and Meteorological Studies Baseline Report" (Golder 2010a). Additionally, information pertaining to lake volume, bathymetric surveys, and ice thickness is discussed in the Aquatics Baseline Report (Golder 2010b).

2 STUDY AREAS

2.1 REGIONAL STUDY AREA

The Project is situated in the NWT at a latitude 63°33' North and a longitude of 116°45' West (Figure 2-1). Situated northwest of the northern arm of Great Slave Lake, the Project is approximately 50 kilometres (km) northeast of Whati and 160 km northwest of Yellowknife, NWT.

The Project intersects both the Lou Lake and Burke Lake watersheds. Both drainage systems discharge water to the southwest to the Marian River. The Marian River generally flows towards the south joining first with the Emile River and second with the La Martre River. The Marian River drains into Marian Lake, which drains to the North Arm of Great Slave Lake. Great Slave is drained by the MacKenzie River, which discharges to the Beaufort Sea.

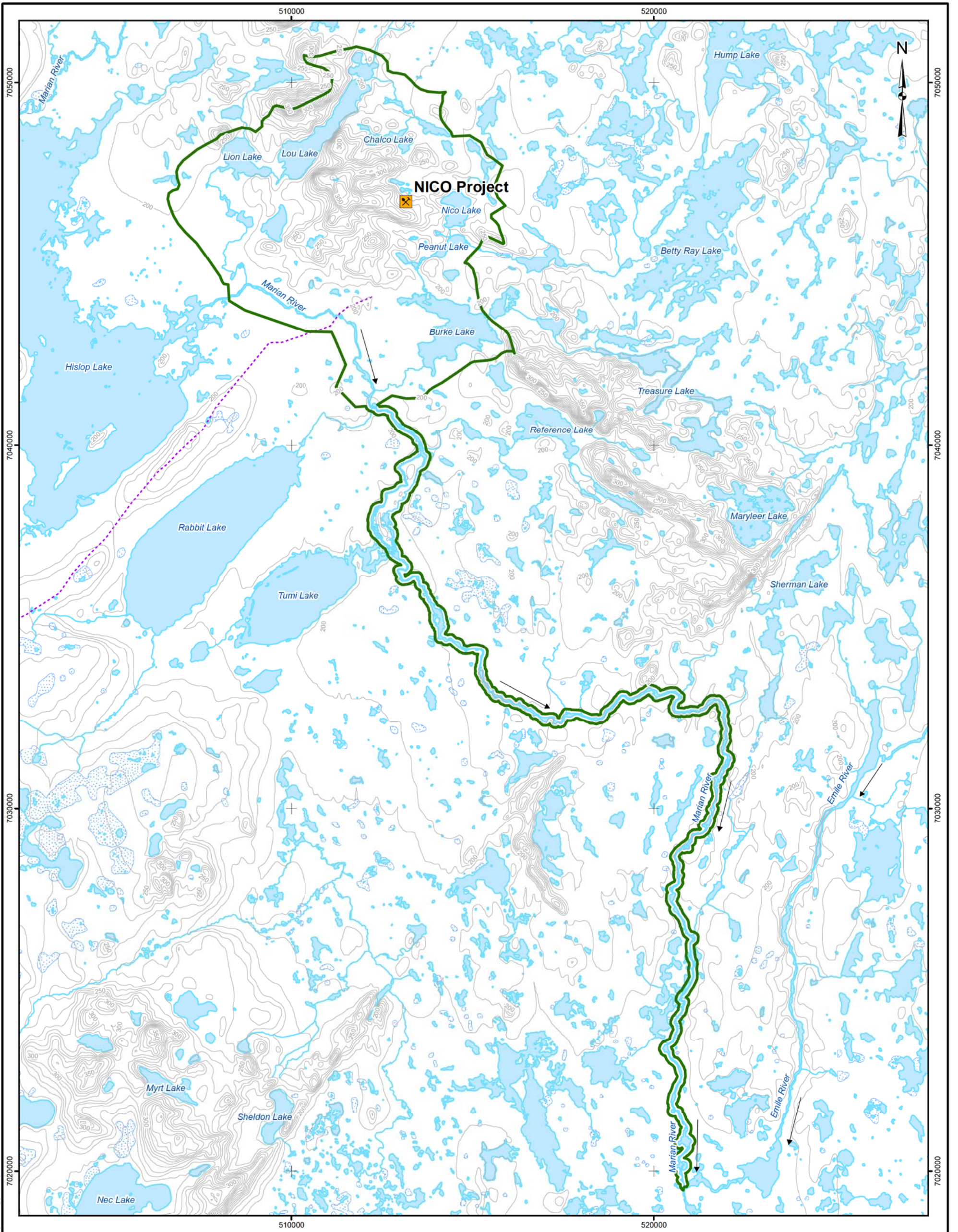
The regional study area (RSA) for the Project was selected to encompass the local study area (LSA), as defined below, and extend along the Marian River from its connection to the Project to its junction with the Emile River. The boundary of the RSA exterior to the LSA, which follows the Marian River, will include the Marian River channel and floodplain width up to 100 m on either side of the channel to encompass possible flooded areas during peak flow conditions (Figure 2-1).

2.2 LOCAL STUDY AREA

The Project is expected to directly affect the Lou Lake and Burke Lake watersheds, as well as the Marian River. The proposed LSA for hydrology includes portions of the Burke Lake and Lou Lake watersheds draining to the Marian River (Figure 2-2). These portions are anticipated to reflect the areas of the drainage that may be affected by the Project. The LSA covers an approximate area of 56.9 square kilometres (km²). In comparison, the Burke Lake and Lou Lake watersheds, including contributing upstream drainage areas, are approximately 90.8 and 58.5 km², respectively.

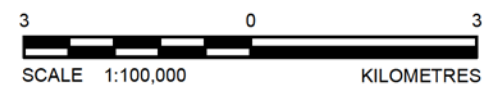
2.3 PROPOSED NICO PROJECT ACCESS ROAD (NPAR) STUDY AREA

The proposed NPAR is anticipated to extend 27 km from the Project to the existing winter road between Behchoko and Gamètì. The NPAR is anticipated to cross 5 streams. The hydrology study area for the NPAR encompasses the points along the road that may require the installation of a cross-drainage structure.



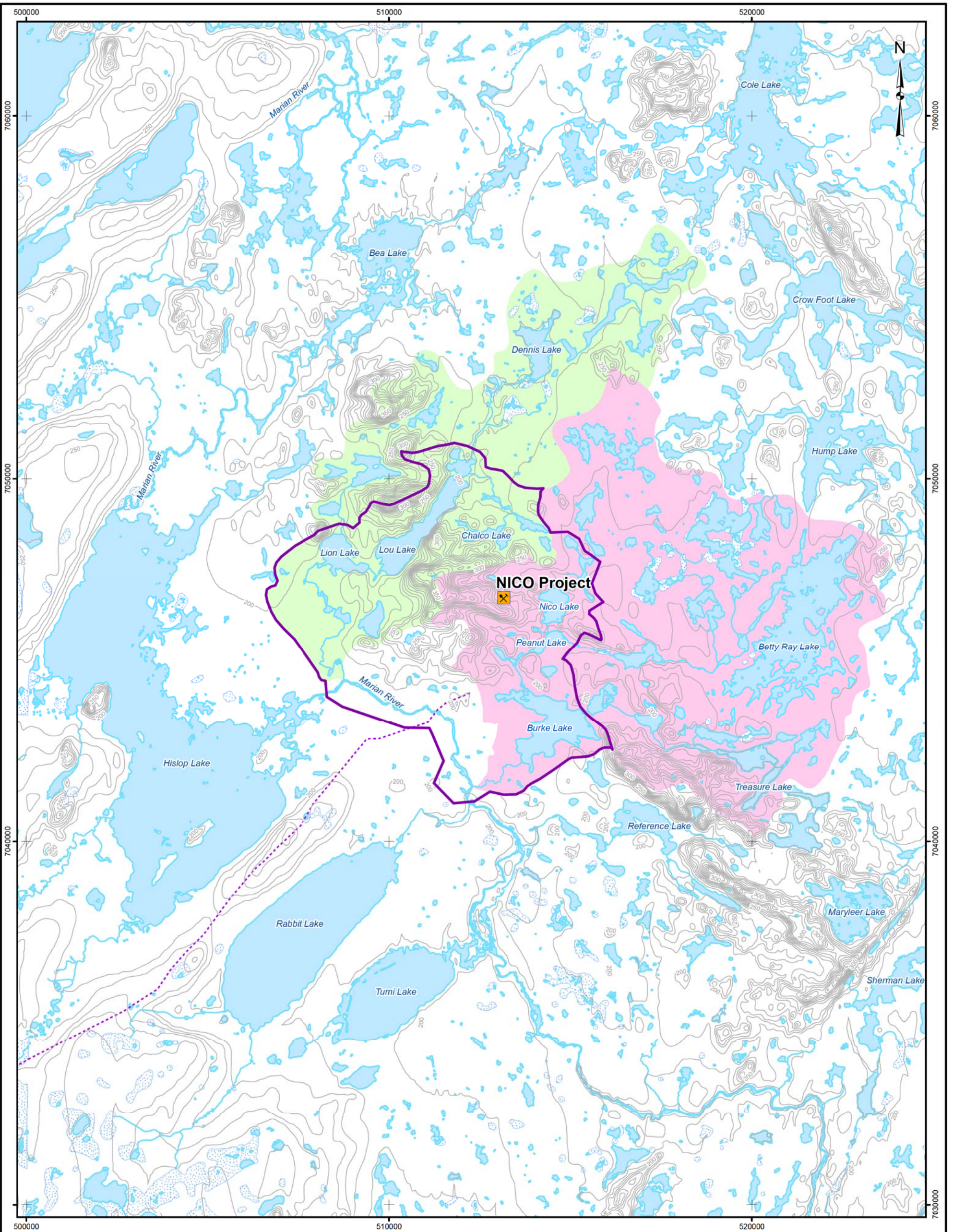
- LEGEND**
- NICO PROJECT
 - CONTOUR (10 METRE INTERVAL)
 - PROPOSED NICO PROJECT ACCESS ROAD
 - WATERCOURSE
 - WATERBODY
 - WETLAND
 - FLOW DIRECTION
 - REGIONAL STUDY AREA BOUNDARY

REFERENCE
 Base data obtained from GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT			
FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT			
TITLE			
HYDROLOGY REGIONAL STUDY AREA FOR THE NICO PROJECT			
FILE No. B-Hydro1-006-GIS			
		SCALE AS SHOWN	REV. 0
 Golder Associates Edmonton, Alberta	DESIGN	TL	01 Jan. 2009
	GIS	CW	30 Sep. 2009
	CHECK	LY	09 Dec. 2010
	REVIEW	GA	09 Dec. 2010

FIGURE: 2-1



LEGEND

- NICO PROJECT
 - CONTOUR (10 METRE INTERVAL)
 - PROPOSED NICO PROJECT ACCESS ROAD
 - WATERCOURSE
 - WATERBODY
 - WETLAND
 - LOCAL STUDY AREA BOUNDARY
- WATERSHED**
- BURKE LAKE
 - LOU LAKE

Waterbody	Area (ha)
Burke Lake	234.07
Chalco Lake	32.76
Lion Lake	84.61
Lou Lake	204.68
Nico Lake	51.00
Peanut Lake	23.18

REFERENCE

Base data obtained from GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT		FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT	
TITLE		HYDROLOGY LOCAL STUDY AREA FOR THE NICO PROJECT	
FILE No. B-Hydro1-001-GIS			
		PROJECT No. 08-1373-0017	SCALE AS SHOWN
DESIGN	TL	01 Jan. 2009	REV. 0
GIS	CW	30 Nov. 2009	
CHECK	LY	09 Dec. 2010	
REVIEW	GA	09 Dec. 2010	



FIGURE: 2-2

3 METHODS

The general method adopted for describing the baseline hydrological conditions at the Project is as follows:

- describe the local and regional data collected for the Project, including a discussion of accuracy, limitations, and adequacy as appropriate;
- present a summary of the Project data;
- evaluate regional hydrology and climate data in terms of suitability for describing general conditions at the Project site and utilizing these data, where appropriate, to provide long-term records as a basis for further analysis, or directly to provide a description of expected normal and extreme hydrological and climatic conditions; and
- present the baseline characteristics for the Project as derived from the local and regional datasets.

Specific methods and procedures are discussed in the applicable sections for each parameter.

4 CLIMATE

The Project area has a sub-arctic climate characterized by long cold winters and short cool summers. Average daily temperatures typically fall to below freezing in October and remain at sub-zero levels until late April or early May.

The nearest long-term climate record is from Environment Canada's climate station at the Yellowknife Airport, which indicates mean annual total precipitation of 280.7 millimetres (mm) with the majority of precipitation, approximately 60 percent (%), occurring from June to October (Environment Canada 2008a). An undercatch corrected dataset is available for the Yellowknife airport which provides a mean annual total precipitation of 343.5 mm. The undercatch corrected data is discussed in Section 4.2.

4.1 DATA SOURCES

4.1.1 NICO Project Climate Station

Meteorological data have been collected at the Project from October 2004 to August 2008. A climate station was installed at the site to collect temperature, wind speed, wind direction, solar radiation, relative humidity, and rainfall data. A summary of the meteorological data collected at the Project is provided in the "Existing Air Quality and Meteorological Studies Baseline Report" (Golder 20010a).

The currently available climate data for the Project meteorological station cover a period less than 5 years (2004 to 2008) and does not provide winter precipitation data. Consequently, regional data have been used to assess the hydrological conditions at the site.

4.1.2 Regional Climate Stations

Climate data are available from regional Environment Canada – Meteorological Service of Canada (MSC) climate stations. Figure 4-1 shows the location of the Project and the surrounding climate stations. Basic information for the regional climate stations is summarized in Table 4-1 (Environment Canada 2008a).



LEGEND

-  NICO PROJECT
-  TERRITORIAL CAPITAL
-  POPULATED PLACE
-  HIGHWAY
-  EXISTING ALL-WEATHER ROAD
-  EXISTING WINTER ROAD
-  PROPOSED ALL-LAND WINTER ROAD ROUTE
-  PROPOSED NICO PROJECT ACCESS ROAD
-  TERRITORIAL/PROVINCIAL BOUNDARY
-  WATERCOURSE
-  WATERBODY
-  METEOROLOGICAL STATION

REFERENCE

Base data obtained from Atlas of Canada, DMTI and ESRI.
 Projection: Canada Lambert Conformal Conic



PROJECT	FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT		
TITLE	SELECTED REGIONAL METEOROLOGICAL STATIONS		
FILE No. B-HydroL-002-GIS			
DESIGN	TL	16 Dec. 2008	SCALE AS SHOWN
GIS	CW	30 Sep. 2009	REV. 0
CHECK	LY	09 Dec. 2010	FIGURE: 4-1
REVIEW	GA	09 Dec. 2010	



I:\CLIENTS\FORTUNE_MINERALS\08-1373-0017\Mapping\MXD\Hydrology\B-HydroL-002-GIS.mxd

Table 4-1 Regional Climate Station Information

Station Name	MSC Station No.	Latitude North	Longitude West	Distance from Project (km)	Period of Record
Colomac Mine	2200822	64° 25.2'	115° 06.0'	126	1989 to 1991
Frank Channel	2202250	62° 46.8'	115° 57.0'	97	1974 to 1975
Gamèti Airport	2203361	64° 07.2'	117° 18.6'	68	2000 to 2008
Horn Plateau	2202516	62° 07.8'	118° 07.2'	173	1974 to 1974
Indin River	2202552	64° 23.4'	115° 01.2'	126	1991 to 2004
Lac La Martre (Whati)	2202678	63° 07.8'	117° 15.0'	53	1994 to 2008
Rae Lakes (Gamèti)	2203359	64° 06.6'	117° 19.8'	67	1994 to 2008
Snare Rapids	2203700	63° 31.2'	116° 00.0'	39	1947 to 2000
Yellowknife Airport	2204100	62° 27.6'	114° 26.4'	171	1953 to 2008

Source: Environment Canada 2008a

MSC = Meteorological Service of Canada

As observed in the period of record (Table 4-1), long-term data are available for 2 stations –Yellowknife Airport and Snare Rapids. Yellowknife Airport is the only climate station that remains active with a full suite of measured parameters. Precipitation data used in this report are from the Yellowknife Airport but have been adjusted for undercatch of precipitation falling as snow.

The Yellowknife Airport meteorological station is approximately 171 km from the Project. To determine whether the data collected at Yellowknife Airport can be applied, without any adjustment, to the Project, a visual comparison method between Yellowknife station and closer stations to the Project for precipitation and temperature was undertaken. The visual inspection involved the assessment of monthly mean value and calculation of the normal 95% confidence interval based on the sample size of the variable of interest (Smith 2008) from the locations being compared. When a confidence interval for either mean overlapped the other mean, the null hypothesis of equal means was accepted; otherwise the null hypothesis of equal means was rejected.

Gamèti Airport and Snare Rapids are located close to the Project and geographically represent similar conditions as the Project (Figure 4-1). A visual test of the mean monthly total precipitation at Yellowknife Airport and Snare Rapids was performed to verify a statistical similarity between the 2 stations (Figure 4-2). Figure 4-3 visually tests mean monthly total precipitation between Yellowknife Airport and Gamèti Airport. A visual test indicates statistical similarity for mean monthly air temperature between Yellowknife Airport and Gamèti Airport (Figure 4-4). Snare Rapids air temperature data were not available for analysis. The null hypothesis of equal means accepts that the mean monthly total precipitations and average air temperatures are generally similar

between the indicated site and Yellowknife Airport (Figure 4-2, 4-3, and 4-4). The data compared between Yellowknife Airport, Gamèti Airport, and Snare Rapids represents coincident data years between Yellowknife and the indicated site. This indicates that climate data from the Yellowknife Airport can generally be accepted for use in analysis at the Project without correction.

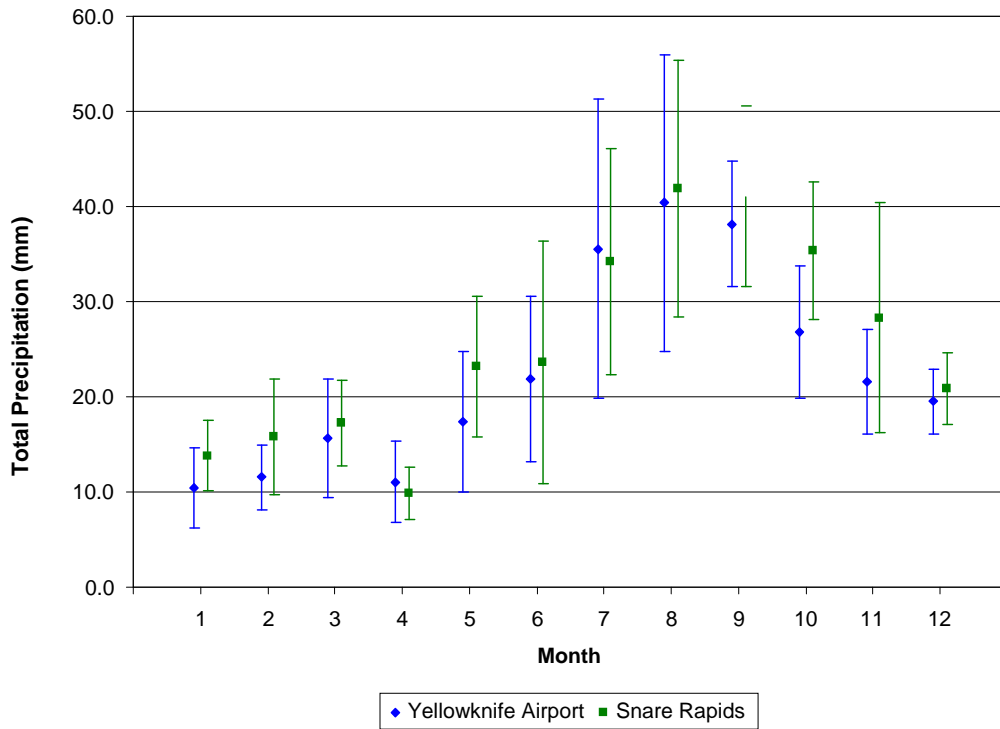


Figure 4-2 Mean Monthly Total Precipitation – Yellowknife Airport and Snare Rapids (1993 to 2004)

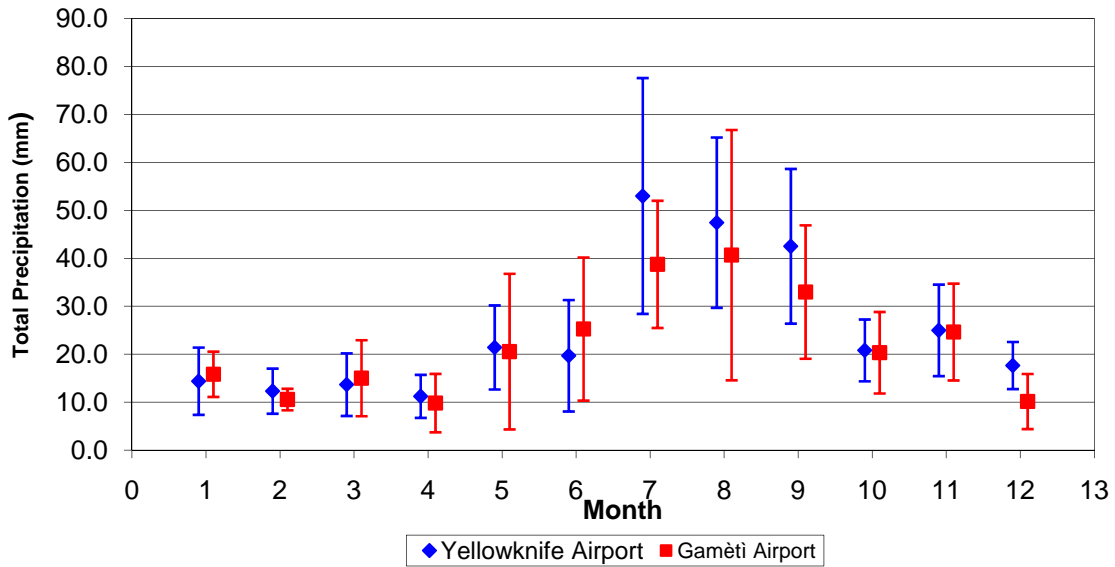


Figure 4-3 Mean Monthly Total Precipitation – Yellowknife Airport and Gamètì Airport (2001 to 2007)

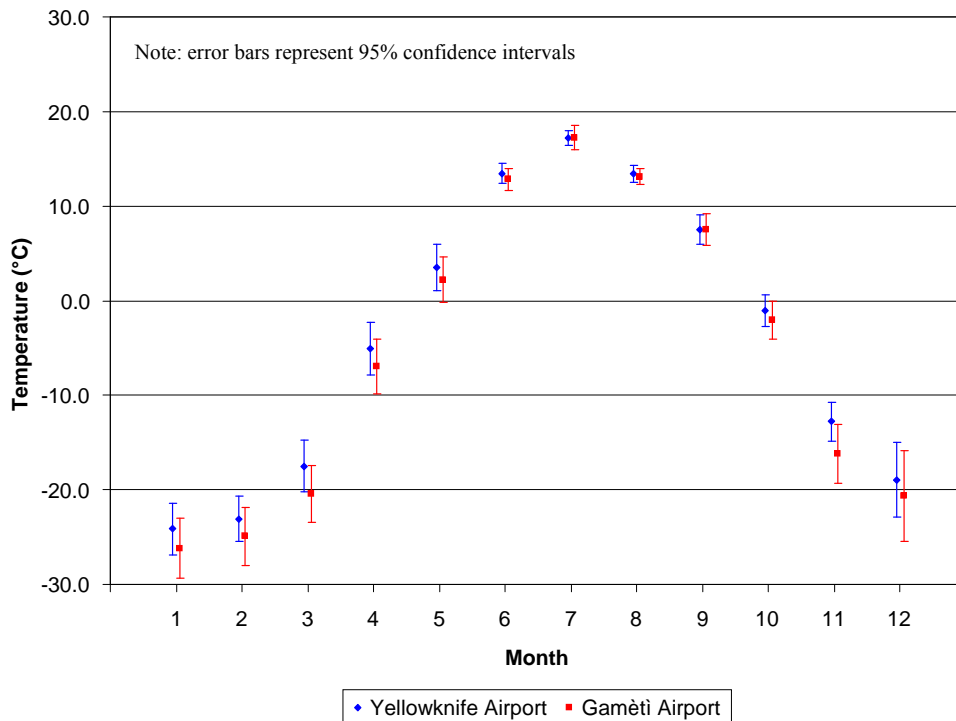


Figure 4-4 Mean Monthly Air Temperature – Yellowknife Airport and Gamètì Airport (2001 to 2007)

4.2 CLIMATIC PARAMETERS

To calculate water balance components, such as evapotranspiration and lake evaporation, a number of climatic parameters are required. The following parameters are required in any climatic water balance calculation:

- precipitation;
- air temperature;
- relative humidity;
- wind speed;
- net radiation; and
- soil heat flux.

Precipitation, air temperature, relative humidity, and wind speed were available from the Environment Canada's Yellowknife Airport meteorological station. Precipitation data were available on a monthly basis from 1943 to 2007 as Corrected Precipitation, where the raw data collected at the station was adjusted to correct for precipitation undercatch by the collection system (Environment Canada 2008b). Undercatch describes the non-collection of precipitation as affected by wind or other climatic factors. These data are included in Appendix I, Table I-1. Appendix I, Tables I-2 and I-3 present the corrected rainfall and snowfall data, respectively. The median total precipitation is 336.2 mm, while the 25th and 75th percentiles are 298.9 mm and 395.0 mm, respectively. The wettest year on record is 1974 (506.4 mm), whereas the driest is 1949 (194.9 mm). Most rainfall occurs in July, August, and September, and maximum snowfall is in late fall and early winter. On an annual basis, slightly more precipitation occurs as rain rather than snow. The maximum monthly rainfall over the 65 year period of record is 152.4 mm (August 1969), whereas the highest snowfall in one month is 95 mm (water equivalent), which occurred in November 2006.

Appendix I, Table I-4 presents the Intensity-Duration-Frequency (IDF) curve for the Yellowknife Airport. The IDF curve is not based on the Corrected Precipitation; however, extreme precipitation events are more common during warmer months when undercatch is less problematic.

Air temperature, relative humidity, and wind speed data are collected at the Yellowknife Airport and are available in hourly increments. Appendix I, Tables I-5, I-6 and I-7 provide daily average air temperature, relative humidity, and wind speed data from 1953 to 2007 on a monthly basis.

The nearest available long-term record of net radiation was collected in Norman Wells (65° 16.8'N, 126° 48.0'W), approximately 520 km from the Project, intermittently from 1984 to 1999. In the record, there are 10 useable years of data from 1985 to 1992, 1998, and 1999. Daily average net radiation data from Norman Wells can be found in Appendix I, Table I-8 reported on a monthly basis.

Soil heat flux will vary throughout the year as a function of heat storage due to ground cover. The Project occurs in a Taiga region, which corresponds to a soil heat flux of approximately 6% of the net radiation contributing to soil heat (Granger 1999).

4.3 CLIMATE DEPENDENT HYDROLOGICAL PROCESSES

4.3.1 Actual Evapotranspiration

Evapotranspiration is defined as the moisture loss from land surfaces as a result of climatic and terrestrial processes such as transpiration. Potential evapotranspiration refers to the maximum amount of moisture that can be lost to the atmosphere and can be considered similar to lake evaporation as a free water surface is required. Actual evapotranspiration reflects the actual moisture loss to the atmosphere as a result of climatic process. Granger and Gray (1989) proposed a semi-empirical form of the Penman-Montieth equation, which has been termed the “GD Relationship.” The equation appears as follows:

$$ET = \frac{\Delta \cdot G \cdot (R_n - Q_g) + \gamma \cdot G \cdot E_a}{\Delta \cdot G + \gamma} \quad \text{[Equation 4-1]}$$

Where: ET – daily actual evapotranspiration;
 Δ – slope of the saturation vapour pressure curve;
 G – dimensionless relative evaporation parameter;
 R_n – net solar radiation;
 Q_g – soil heat flux;
 γ – psychrometric constant; and
 E_a – drying power of the air.

Actual evapotranspiration was calculated for the Project based on the available datasets. The record is limited by the amount of net radiation data available, which provides approximately 10 years of actual evapotranspiration estimates. The average annual evapotranspiration is approximately 209.3 mm with the majority of the process occurring during May, June, and July (Table 4-2). In this analysis it was assumed that evapotranspiration processes are negligible from December until May due to snow and ice cover.

Table 4-2 Monthly and Annual Actual Evapotranspiration (mm)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1985	0.0	0.0	0.0	0.0	45.8	56.8	52.9	36.4	13.3	2.0	3.5	0.0	210.7
1986	0.0	0.0	0.0	0.0	62.1	60.3	56.3	36.1	12.7	0.8	5.2	0.0	233.5
1987	0.0	0.0	0.0	0.0	58.0	59.2	61.0	33.9	14.1	2.4	2.1	0.0	230.7
1988	0.0	0.0	0.0	0.0	51.4	65.7	55.6	37.2	13.4	2.4	2.0	0.0	227.7
1989	0.0	0.0	0.0	0.0	47.4	58.6	60.7	36.1	14.9	2.2	4.4	0.0	224.3
1990	0.0	0.0	0.0	0.0	44.2	55.5	55.0	36.4	12.7	1.5	6.2	0.0	211.5
1991	0.0	0.0	0.0	0.0	49.9	62.3	48.4	35.3	15.5	3.1	3.0	0.0	217.5
1992	0.0	0.0	0.0	0.0	54.0	65.3	59.6	32.9	8.0	0.4	2.8	0.0	223.0
1998	0.0	0.0	0.0	0.0	40.1	49.9	40.4	24.4	10.5	1.7	0.5	0.0	167.5
1999	0.0	0.0	0.0	0.0	0.0	51.3	43.3	33.6	13.8	4.3	0.0	0.0	146.3
Mean	0.0	0.0	0.0	0.0	45.3	58.5	53.3	34.2	12.9	2.1	3.0	0.0	209.3

4.3.2 Lake Evaporation

Lake evaporation refers to the loss of moisture from a free water surface to the atmosphere. Lake evaporation was calculated for the Project using a revised Meyer formulation proposed by the Prairie Farm Rehabilitation Administration (Prairie Farm Rehabilitation Administration 2002). The formulation is dependent on an estimation of the temperature at the surface of the waterbody and appears as follows:

$$EG = C \cdot K \cdot (V_w - V_a) \cdot [1 + 6.2139 \cdot (10^{-2}) \cdot W] \cdot [1 + 3.28084 \cdot (10^{-5}) \cdot A] \quad [\text{Equation 4-2}]$$

- where: EG – monthly gross evaporation;
 C – coefficient dependent on the number of observations of relative humidity or vapour pressure in one 24-hour period;
 K – metric conversion factor of 0.750062;
 V_w – mean monthly saturated vapour pressure corresponding to the temperature of the water at the surface of the waterbody;
 V_a – mean monthly actual vapour pressure of the atmosphere;
 W – mean monthly wind speed; and
 A – elevation.

Lake evaporation was calculated for the Project using the available datasets. This calculation did not require the use of net radiation and as such has a much longer record. The average annual lake evaporation is approximately 478.5 mm, with the greatest amount of lake evaporation occurring in the summer months (Table 4-3). It is assumed that lake evaporation processes are negligible during

the ice covered season, which is assumed to include the months of November until May. This value is close to lake evaporation results derived from evaporation pan data for Yellowknife collected over the period 1966 to 1995. The Yellowknife mean annual lake evaporation value is 468 mm, based on the most recent climate normals period of 1971 to 2000, with a standard deviation of about 10%.

Table 4-3 Monthly and Annual Lake Evaporation (mm)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1953	0.0	0.0	0.0	0.0	0.0	120.9	147.3	111.7	49.1	13.1	0.0	0.0	442.1
1954	0.0	0.0	0.0	0.0	0.0	125.0	136.4	122.9	69.4	14.4	0.0	0.0	468.2
1955	0.0	0.0	0.0	0.0	0.0	114.1	162.7	124.2	79.6	16.8	0.0	0.0	497.4
1956	0.0	0.0	0.0	0.0	0.0	104.0	156.4	134.3	64.1	23.1	0.0	0.0	481.9
1957	0.0	0.0	0.0	0.0	0.0	117.5	153.6	137.4	76.4	17.7	0.0	0.0	502.6
1958	0.0	0.0	0.0	0.0	0.0	125.7	155.2	102.8	55.8	13.4	0.0	0.0	452.9
1959	0.0	0.0	0.0	0.0	0.0	120.4	148.5	105.0	66.3	21.3	0.0	0.0	461.5
1960	0.0	0.0	0.0	0.0	0.0	132.8	170.4	119.2	73.6	18.6	0.0	0.0	514.6
1961	0.0	0.0	0.0	0.0	0.0	148.2	168.2	123.6	78.0	21.8	0.0	0.0	539.8
1962	0.0	0.0	0.0	0.0	0.0	112.7	163.5	123.6	74.1	14.3	0.0	0.0	488.2
1963	0.0	0.0	0.0	0.0	0.0	113.2	144.5	108.5	67.2	10.8	0.0	0.0	444.1
1964	0.0	0.0	0.0	0.0	0.0	119.3	174.4	124.0	53.4	10.9	0.0	0.0	482.0
1965	0.0	0.0	0.0	0.0	0.0	113.8	145.5	130.9	73.9	14.6	0.0	0.0	478.6
1966	0.0	0.0	0.0	0.0	0.0	110.8	158.1	131.7	64.0	19.3	0.0	0.0	483.9
1967	0.0	0.0	0.0	0.0	0.0	112.2	148.2	129.3	70.2	10.2	0.0	0.0	470.0
1968	0.0	0.0	0.0	0.0	0.0	107.7	158.3	143.8	65.4	13.0	0.0	0.0	488.2
1969	0.0	0.0	0.0	0.0	0.0	135.6	164.9	109.3	67.0	16.3	0.0	0.0	493.1
1970	0.0	0.0	0.0	0.0	0.0	130.4	162.4	116.7	70.9	21.7	0.0	0.0	502.1
1971	0.0	0.0	0.0	0.0	0.0	139.3	168.0	123.0	75.7	13.2	0.0	0.0	519.2
1972	0.0	0.0	0.0	0.0	0.0	117.4	158.3	114.8	73.1	21.5	0.0	0.0	485.0
1973	0.0	0.0	0.0	0.0	0.0	149.9	164.3	135.3	75.5	16.3	0.0	0.0	541.4
1974	0.0	0.0	0.0	0.0	0.0	128.7	157.3	121.6	75.6	26.6	0.0	0.0	509.8
1975	0.0	0.0	0.0	0.0	0.0	128.7	168.7	124.4	74.4	19.2	0.0	0.0	515.4
1976	0.0	0.0	0.0	0.0	0.0	106.5	160.8	124.6	66.1	26.1	0.0	0.0	484.2
1977	0.0	0.0	0.0	0.0	0.0	148.0	172.1	141.6	55.3	17.9	0.0	0.0	534.9
1978	0.0	0.0	0.0	0.0	0.0	124.5	142.9	131.2	67.6	20.5	0.0	0.0	486.7
1979	0.0	0.0	0.0	0.0	0.0	122.3	183.2	129.7	68.5	17.8	0.0	0.0	521.6
1980	0.0	0.0	0.0	0.0	0.0	116.0	154.9	129.0	81.1	17.7	0.0	0.0	498.6
1981	0.0	0.0	0.0	0.0	0.0	127.1	152.6	133.6	69.5	21.6	0.0	0.0	504.4
1982	0.0	0.0	0.0	0.0	0.0	108.5	170.4	125.3	68.9	19.1	0.0	0.0	492.2
1983	0.0	0.0	0.0	0.0	0.0	106.5	124.8	98.8	67.5	16.8	0.0	0.0	414.4
1984	0.0	0.0	0.0	0.0	0.0	117.5	118.8	122.1	65.9	26.4	0.0	0.0	450.7
1985	0.0	0.0	0.0	0.0	0.0	118.2	155.2	105.9	75.3	18.6	0.0	0.0	473.2

Table 4-3 Monthly and Annual Lake Evaporation (mm) (continued)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1986	0.0	0.0	0.0	0.0	0.0	104.6	155.0	118.3	61.7	17.2	0.0	0.0	456.8
1987	0.0	0.0	0.0	0.0	0.0	111.4	170.0	129.1	59.0	16.0	0.0	0.0	485.5
1988	0.0	0.0	0.0	0.0	0.0	93.0	140.7	113.5	68.6	22.0	0.0	0.0	437.9
1989	0.0	0.0	0.0	0.0	0.0	109.7	144.2	112.1	63.0	18.7	0.0	0.0	447.8
1990	0.0	0.0	0.0	0.0	0.0	125.9	159.1	108.7	67.8	23.8	0.0	0.0	485.2
1991	0.0	0.0	0.0	0.0	0.0	115.6	173.5	138.6	69.9	24.0	0.0	0.0	521.6
1992	0.0	0.0	0.0	0.0	0.0	108.4	158.0	142.5	65.2	18.1	0.0	0.0	492.3
1993	0.0	0.0	0.0	0.0	0.0	146.0	153.7	118.9	75.1	16.4	0.0	0.0	510.1
1994	0.0	0.0	0.0	0.0	0.0	126.5	189.9	152.6	65.0	11.6	0.0	0.0	545.6
1995	0.0	0.0	0.0	0.0	0.0	123.2	146.6	120.4	68.8	18.2	0.0	0.0	477.3
1996	0.0	0.0	0.0	0.0	0.0	122.9	150.1	103.8	61.1	21.6	0.0	0.0	459.5
1997	0.0	0.0	0.0	0.0	0.0	99.1	133.7	115.6	57.2	21.8	0.0	0.0	427.4
1998	0.0	0.0	0.0	0.0	0.0	106.0	161.9	110.7	54.9	11.8	0.0	0.0	445.3
1999	0.0	0.0	0.0	0.0	0.0	114.0	153.4	134.2	80.0	23.0	0.0	0.0	504.7
2000	0.0	0.0	0.0	0.0	0.0	112.0	148.8	109.1	67.7	17.2	0.0	0.0	454.9
2001	0.0	0.0	0.0	0.0	0.0	125.0	143.5	108.0	60.6	15.1	0.0	0.0	452.2
2002	0.0	0.0	0.0	0.0	0.0	108.8	127.1	97.6	58.1	17.8	0.0	0.0	409.4
2003	0.0	0.0	0.0	0.0	0.0	93.0	145.4	106.0	66.0	12.3	0.0	0.0	422.7
2004	0.0	0.0	0.0	0.0	0.0	118.4	152.8	115.6	65.3	18.0	0.0	0.0	470.1
2005	0.0	0.0	0.0	0.0	0.0	107.9	137.8	120.7	56.5	16.2	0.0	0.0	439.0
2006	0.0	0.0	0.0	0.0	0.0	110.1	133.1	100.0	49.4	16.0	0.0	0.0	408.6
2007	0.0	0.0	0.0	0.0	0.0	117.3	144.5	104.7	53.6	20.1	0.0	0.0	440.1
Mean	0.0	0.0	0.0	0.0	0.0	118.6	154.4	120.7	66.8	18.0	0.0	0.0	478.5

5 HYDROLOGY

5.1 DATA SOURCES

5.1.1 NICO Project Hydrometric Data

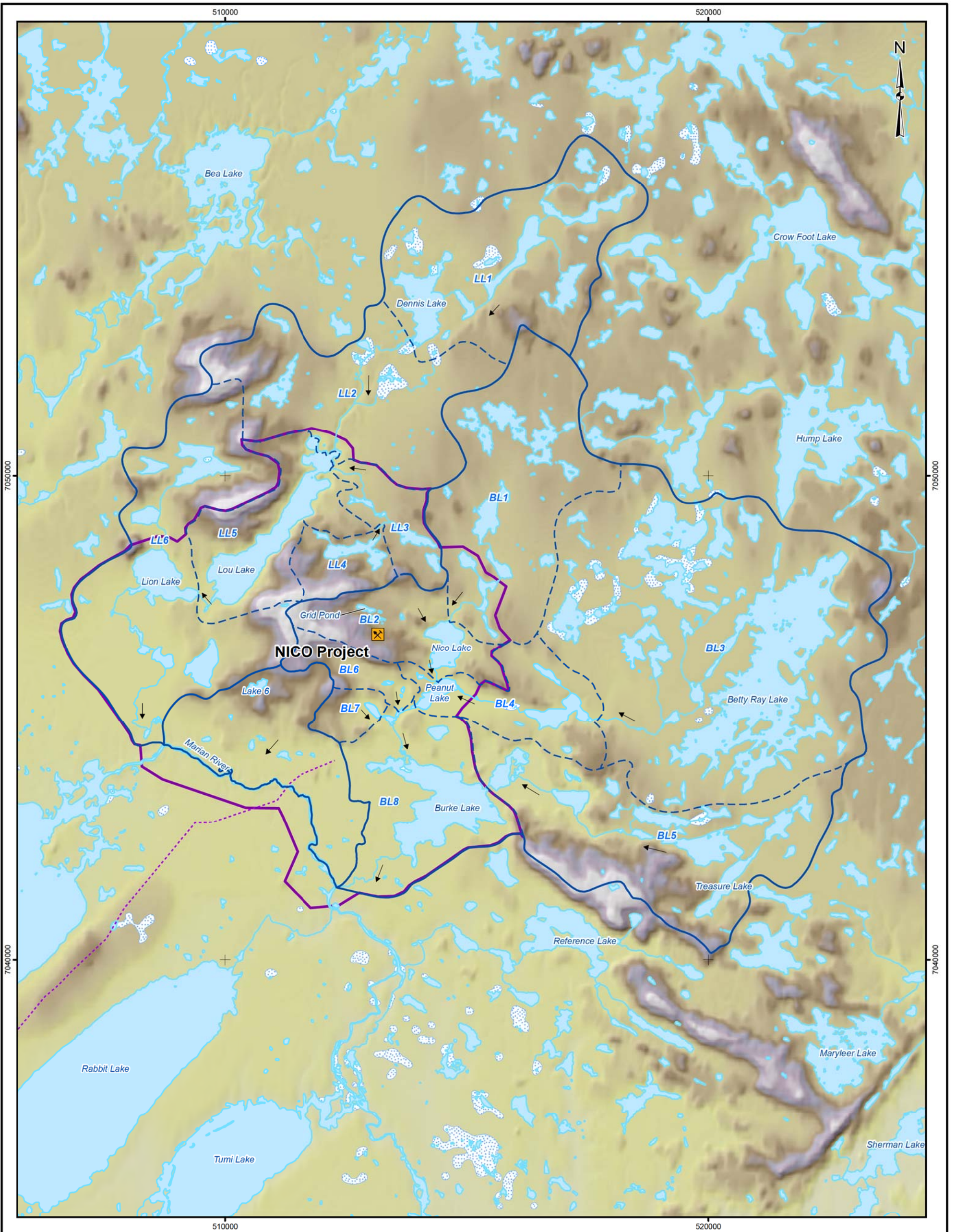
Hydrometric data collection at the Project commenced in 2005. Hydrometric measurement field programs occurred 3 times in each of 2005, 2006, and 2007 and twice in 2008. The first measurement program in 2005 included watershed reconnaissance and station establishment and all field programs, with the exception of the winter monitoring in 2008, included discharge measurements, continuous stream stage recording during the open water period, and lake stage measurements at up to 13 streams and 7 waterbodies, most of which occur in the Burke Lake and Lou Lake watersheds (Figure 5-1). The winter monitoring in 2008 consisted only of discharge monitoring at streams that were observed to be flowing and measurable. The majority of the sites established for data collection fall within the LSA; however, there are sites exterior that flow into the LSA.

5.1.2 Regional Hydrometric Data

Water Survey of Canada operates a network of hydrometric stations throughout the region. Though many stations have been operated in the vicinity of the Project, few have long-term records and even less currently in operation. Table 5-1 provides information for selected stations within the vicinity of the Project (Environment Canada 2008c). None of the regional hydrometric stations are located with the RSA.

5.2 REGIONAL DRAINAGE

The Project occurs within the Marian River drainage, which eventually drains into Great Slave Lake. Downstream of the Project, the Marian River combines with the Emile River and the La Martre River. A number of large lakes occur in the Marian River system upstream of the Project, which may provide a substantial level of attenuation in the drainage system.



LEGEND

- NICO PROJECT
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY
- WETLAND
- SURFACE WATER FLOW DIRECTION
- MAJOR DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY
- LOCAL STUDY AREA BOUNDARY

Waterbody	Area (ha)
Nico Lake	50.554
Pond 8	0.507
Chalco Lake	32.758
Peanut Lake	20.939
Pond 12	1.724
Lou Lake	199.369
Burke Lake	231.036

REFERENCE

Base data obtained from GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT			
FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT			
TITLE			
SUB-BASINS IN THE LOU LAKE AND BURKE LAKE WATERSHEDS			
FILE No. B-Hydro1-003-GIS			
PROJECT No. 08-1373-0017		SCALE AS SHOWN	REV. 0
DESIGN	TL	16 Dec. 2008	FIGURE: 5-1
GIS	SK	26 Nov. 2010	
CHECK	LY	09 Dec. 2010	
REVIEW	GA	09 Dec. 2010	
Golder Associates Edmonton, Alberta			

Table 5-1 Selected Regional Hydrometric Stations

Station Number	Station Name	Drainage Area (km ²)	Years in Operation	Number of Years	Latitude	Longitude	Mean Annual Discharge (m ³ /s)	Mean Annual Unit Area Discharge (m ³ /s/km ²)
07SB013	Baker Creek at outlet of Lower Martin Lake	121	1983 to 2009	27	62° 30' 48"	114° 24' 35"	0.265	0.0022
07SA004	Indin River above Chalco Lake	1520	1977 to 2009	33	64° 23' 15"	115° 1' 18"	7.92	0.0052
10PA002	Yamba River below Daring Lake	2012	2000 to 2009	10	64° 48' 24"	111° 40' 41"	16.7	0.0083
07SB010	Cameron River below Reid Lake	3630	1975 to 2009	35	62° 29' 27"	113° 31' 23"	6.46	0.0018
10PA001	Coppermine River below Desteffany Lake	6116	1998 to 2009	12	64° 36' 56"	111° 57' 16"	28.9	0.0047
07SA002	Snare River below Ghost River	13300	1947 to 2009	63	63° 58' 26"	115° 25' 59"	59.6	0.0045
07TA001	La Martre River below outlet of Lac La Martre	13900	1975 to 2009	35	63° 6' 29"	116° 58' 26"	33.6	0.0024
10PB001	Coppermine River at outlet of Point Lake	19200	1965 to 2006	42	65° 24' 57"	114° 0' 28"	110	0.0057
10JA002	Camsell River at outlet of Clut Lake	32100	1933 to 2008	76	65° 35' 54"	117° 45' 29"	104	0.0032

5.3 LOCAL DRAINAGE

Two local drainage areas collect runoff from the Project area and both flow south to the Marian River (Figure 5-1). These drainages are referred to as the Burke Lake and Lou Lake watersheds. The Burke Lake and Lou Lake watersheds have been divided into sub-basins based on topographic divides, with smaller divisions in the area where Project facilities are expected to be constructed.

Sub-basins contributing flow to Burke Lake and the Burke Lake outlet are labelled BL1 to BL8, while sub-basins contributing to Lou Lake and the Lou Lake outlet are labelled LL1 to LL6. Drainage direction from one sub-basin to another is indicated by arrows (Figure 5-1). The total drainage area of the Lou Lake watershed is 58.5 km² at the confluence with the Marian River. Similarly, the total drainage area of the Burke Lake watershed is 90.8 km² at the Marian River confluence (Table 5-2).

The surface areas of lakes in the area that are of interest to the Project are provided in Figure 5-1. Proposed mining facilities, including an open pit, haul roads, service roads, access road, tailings management areas, and the portal to underground workings, are expected to occur primarily in sub-basins BL2 and BL6. The existing exploration camp is on the east shore of Lou Lake, though the permanent camp may be relocated farther from this lake.

Table 5-2 Sub-basins within the Lou and Burke Lake Drainages

Lou Lake Drainage		Burke Lake Drainage	
Sub-Basin Identifier	Sub-basin Area (km ²)	Sub-Basin Identifier	Sub-basin Area (km ²)
LL1	15.12	BL1	14.84
LL2	12.92	BL2	5.23
LL3	3.01	BL3	36.54
LL4	2.48	BL4	5.77
LL5	7.43	BL5	15.98
LL6	17.51	BL6	1.98
-	-	BL7	1.26
-	-	BL8	9.25
Total	58.47	Total	90.84

The headwater of the Lou Lake drainage is sub-basin LL1 that flows into sub-basin LL2 and then into Lou Lake. Sub-basin LL4 flows into sub-basin LL3 that also flows into Lou Lake. Sub-basin LL5 collects water from all points upstream of the Lou Lake outlet, and sub-basin LL6 accounts for the additional

contributing area downstream of sub-basin LL5 to the Marian River confluence (Figure 5-1).

Discharge from sub-basins BL1 and BL2 flows into Nico Lake and then downstream to Peanut Lake. Discharge from sub-basin BL3 flows into sub-basin BL4, which in turn flows into Peanut Lake. Discharge from sub-basins BL6 and BL7 combine with discharge from Peanut Lake and flow into Burke Lake. Discharge from sub-basin BL5 also flows into Burke Lake. Sub-basin BL8 includes Burke Lake and flows to the Marian River (Figure 5-1). Discharge from the Lou Lake outlet and Burke Lake outlet contribute a very small portion of the total Marian River discharge.

5.4 CLIMATIC WATER BALANCE

A climatic water balance was calculated to predict the anticipated mean annual discharges from each of the basins. This approach uses total precipitation, actual evapotranspiration, lake evaporation, and spatial parameters, including, land and lake surface areas to estimate mean annual discharge from each sub-basin. The resultant 'outflow' of a sub-basin is treated as an input into the next downstream sub-basin to finally estimate the cumulative discharge to the Marian River. The period of assessment for the water balance calculation is limited to 10 years that correspond to the shortest period of record for the climatic parameters used in the assessment. In this case, the limiting dataset is net radiation, where available data cover the period 1985 to 1992, 1998, and 1999 (Section 4.3).

The main assumptions made in calculating this water balance are as follows:

- seepage losses to groundwater systems are considered to be negligible; and
- storage within soil layers is considered to be stationary over the long-term.

To calculate the mean annual outflow from the Burke Lake and Lou Lake watersheds, runoff evaluated as net precipitation is calculated by apportioning precipitation to the sub-basin and removing evaporation from lake surface and evapotranspiration from land surface.

Flow diagrams (Figure 5-2 and Figure 5-3) describe the runoff generated in each of the sub-basins in the Lou Lake and Burke Lake watersheds. Unit area runoff (UAR) is calculated as cubic metres per second per square kilometre ($\text{m}^3/\text{s}/\text{km}^2$) for the most downstream sub-basin prior to discharging to the Marian River. The estimated UAR for sub-basin LL6 is $0.0045 \text{ m}^3/\text{s}/\text{km}^2$. From the Burke Creek drainage, the UAR is $0.0040 \text{ m}^3/\text{s}/\text{km}^2$ leaving BL8.

As a check on the validity of the runoff estimates, a comparison with regional flow data was performed. The Indin River hydrometric station (07SA004) is located approximately 125 km northeast of the Project and has discharge data covering the period 1977 to present. The Emile River station (07TB001) is located approximately 42 km northeast of the Project and was operated from 1978 to 1997. Long-term runoff values for the Indin and Emile Rivers are 0.0052 m³/s/km² and 0.0033 m³/s/km², respectively (Environment Canada 2008c). Estimated runoff values for the Project are within the range of the regional hydrometric stations.

Average Annual Corrected Precipitation (mm):	389.1
Average Annual Evapotranspiration (mm):	209.3
Average Annual Lake Evaporation (mm):	475.0

Sub-basin:	LL1
Area (m ²):	15115247
Lake Area (m ²):	2595214
Lake Area (%):	17.2
Inflow (m ³ /s):	0
Precipitation onto lakes (m ³ /s):	0.032
Runoff to lakes (m ³ /s):	0.071
Lake Evaporation (m ³ /s):	0.039
Outflow (m ³ /s):	0.064

Sub-basin:	LL4
Area (m ²):	2483806
Lake Area (m ²):	361065
Lake Area (%):	14.5
Inflow (m ³ /s):	0
Precipitation onto lakes (m ³ /s):	0.004
Runoff to lakes (m ³ /s):	0.012
Lake Evaporation (m ³ /s):	0.005
Outflow (m ³ /s):	0.011



Sub-basin:	LL2
Area (m ²):	12924429
Lake Area (m ²):	456415
Lake Area (%):	3.5
Inflow (m ³ /s):	0.064
Precipitation onto lakes (m ³ /s):	0.006
Runoff to lakes (m ³ /s):	0.071
Lake Evaporation (m ³ /s):	0.007
Outflow (m ³ /s):	0.134

Sub-basin:	LL3
Area (m ²):	3006159
Lake Area (m ²):	325163
Lake Area (%):	10.8
Inflow (m ³ /s):	0.011
Precipitation onto lakes (m ³ /s):	0.004
Runoff to lakes (m ³ /s):	0.015
Lake Evaporation (m ³ /s):	0.005
Outflow (m ³ /s):	0.025



Sub-basin:	LL5
Area (m ²):	6464047
Lake Area (m ²):	1988264
Lake Area (%):	30.8
Inflow (m ³ /s):	0.160
Precipitation onto lakes (m ³ /s):	0.025
Runoff to lakes (m ³ /s):	0.025
Lake Evaporation (m ³ /s):	0.030
Outflow (m ³ /s):	0.180



Sub-basin:	LL6
Area (m ²):	17512563
Lake Area (m ²):	2285468
Lake Area (%):	13.1
Inflow (m ³ /s):	0.180
Precipitation onto lakes (m ³ /s):	0.028
Runoff to lakes (m ³ /s):	0.087
Lake Evaporation (m ³ /s):	0.034
Outflow (m ³ /s):	0.260
Unit Discharge (m ³ /s/km ²)	0.0045

Figure 5-2 Flow Diagram for Sub-basins in the Lou Lake Drainage

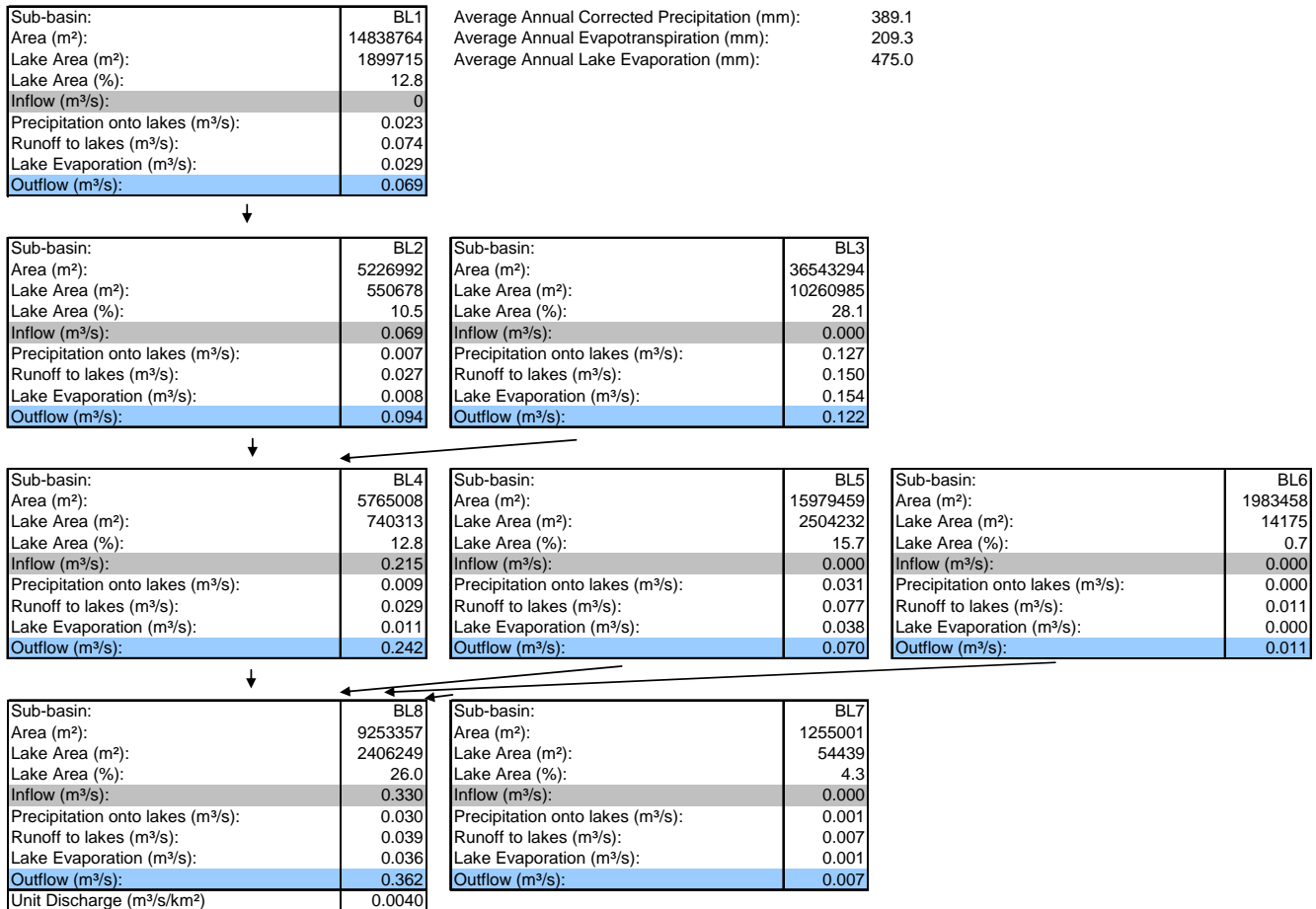


Figure 5-3 Flow Diagram for Sub-basins in the Burke Lake Drainage

5.5 HYDROMETRIC MONITORING

5.5.1 Hydrometric Monitoring Methods

5.5.1.1 Site Selection

A reconnaissance level evaluation of streams to verify assumptions about drainage directions and contributing watersheds was conducted, from the air, during the 2005 spring field program. Streams were also evaluated to identify potential channel sections where streamflow monitoring stations could be established.

General criteria for establishing flow monitoring stations are straight channel sections, which exhibit good stream bank control, stable streambeds, and moderate channel gradients. Areas likely affected by backwater from downstream obstructions, such as beaver dams, should be avoided. Stable channel cross-sections that would likely maintain most flow ranges within the channel are best suited for stage-discharge measurements. In addition, channel sections that exhibit uniform flow are preferred to highly turbulent rapids, as discharge measurements will be more accurate.

The entire length of each proposed stream was assessed from the air, and the most suitable streamflow monitoring stations were identified based on the above criteria. Beaver dams are numerous in the Project area, and often backflood the streams. They were a source of error for the rating curves calculated at some flow monitoring stations since stream stage was strongly influenced by the height of the beaver dam rather than stream discharge. Also, low gradient stream sections where flooding was likely were avoided. In most cases, stream cross-sections were located where the channel gradient was moderate and flows were confined to a single channel.

The criteria for establishing lake stage monitoring stations are less stringent and require typically calm regions of the lake near areas suitable to establish a permanent benchmark.

5.5.1.2 Stream Discharge Measurement

Stream discharge measurements were performed using a Swiffer 2100, Price 1210 AA, Price Mini, or Marsh-McBirney Flo-Mate Model 2000 current meter. All meters are calibrated annually by the National Calibration Service of Environment Canada and are periodically checked against each other during the year. Stream discharge measurements and calculations are based on the mid-section method (Terzi 1981).

Stream discharge measurements at selected monitoring cross-sections were accomplished by measuring the distance across the stream using a tag line or measuring tape, which is extended across the channel perpendicular to the direction of the current. Steel pins were driven into the left and right stream banks so that repeated measurements were made at the same cross-section. By convention, the banks of a stream are always referred to as left and right when facing downstream.

Prior to discharge measurements, boulders, woody debris, and aquatic plant materials were removed to improve the measuring section of the stream. The streams were then divided into equally spaced measurement points for depth and

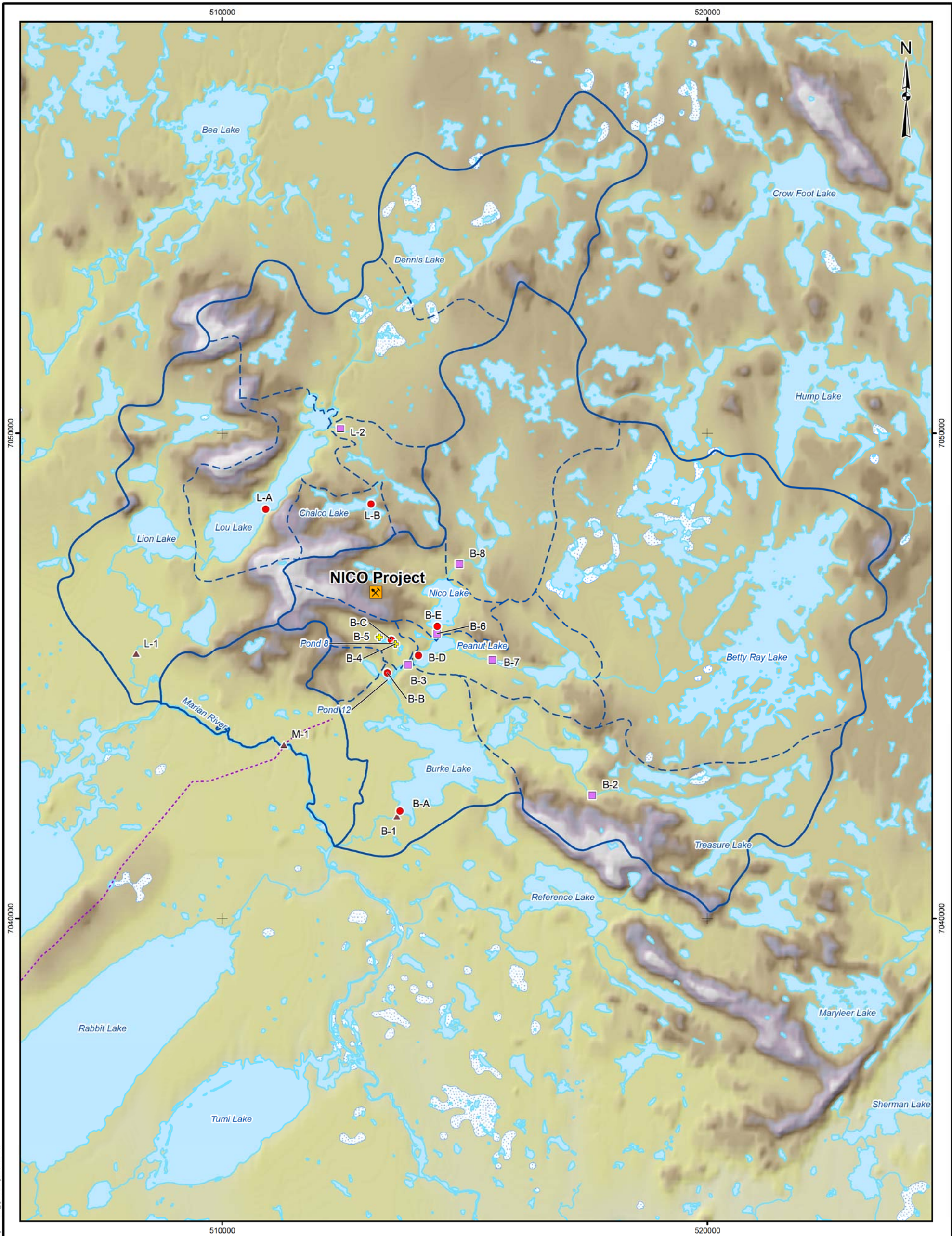
velocity, with each interval approximately 1/20 (5%) of the stream width. Measurements were made at 0.6 times the depth (60% of depth from the surface) for depths less than or equal to 0.75 m and at 0.2 and 0.8 times the depth (20% and 80% of depth from the surface) for depths greater than 0.75 m.

Enamel plated staff gauges, 1.0 m in length, were installed near the discharge measurement cross-section to record stage. Staff gauges were read at the same time discharges were measured so that stage-discharge rating curves could be developed for each cross-section. The top of the enamel plated staff gauge was surveyed to a nearby benchmark to maintain continuity of data over time. Benchmarks are usually large boulders or rock outcrops of unknown elevation but arbitrarily assigned a value of 100.000 m. Staff gauges are resurveyed each spring to account for movement caused by winter ice cover.

5.5.1.3 Continuous Water Level Recorders

Water levels were recorded using a temperature compensated pressure transducer called Leveloggers, which are manufactured by Solinst. Leveloggers were used to record the stream stage at Station B-1, Station L-1, and Station M-1 (Figure 5-4). The Levelogger units are a self-contained cigar sized stainless steel cylinder containing temperature and pressure sensors, a datalogger and a battery. The Levelogger reads total pressure as a combination of water pressure and barometric pressure. A second unit (Barologger; installed near Station B-1), which records barometric pressure, was installed outside the water in open air. The barometric pressure was subtracted from the total pressure recorded by the Levelogger, leaving only the head level of the water represented in the data. The compensated data were used for all subsequent analysis. The Leveloggers and Barologger were programmed to collect data at 30 minute intervals. Custom built brackets were used to mount the sensors in the streams.

The recorded stage readings were related to the staff gauge readings based on calculated offsets from regular stage-discharge measurements. Water level data from the Leveloggers are converted to discharges via the stage-discharge rating curve that is developed for each monitoring station.



LEGEND

- NICO PROJECT
- PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY
- WETLAND
- CROSS-SECTION LOCATION
- STAFF GAUGE LOCATION
- STAFF GAUGE AND CROSS-SECTION LOCATION
- STAFF GAUGE, CROSS-SECTION, AND DATALOGGER LOCATION
- MAJOR DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY

REFERENCE

Base data obtained from GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT		FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT		
TITLE		HYDROMETRIC MONITORING LOCATIONS AT THE NICO PROJECT		
 Golder Associates Edmonton, Alberta		FILE No. B-Hydro1-004-GIS		
		PROJECT No. 08-1373-0017	SCALE AS SHOWN	REV. 0
DESIGN	TL	16 Dec. 2008	FIGURE: 5-4	
GIS	CW	30 Nov. 2009		
CHECK	LY	09 Dec. 2010		
REVIEW	GA	09 Dec. 2010		

5.5.2 Hydrometric Monitoring Locations

The regular streamflow monitoring programs at the Project consisted of instantaneous discharge measurements at 11 locations and water level monitoring at 7 waterbodies in the area (Figure 5-4). All regular monitoring locations are in the Burke Lake and Lou Lake watersheds with the exception of the Marian River stream discharge monitoring station.

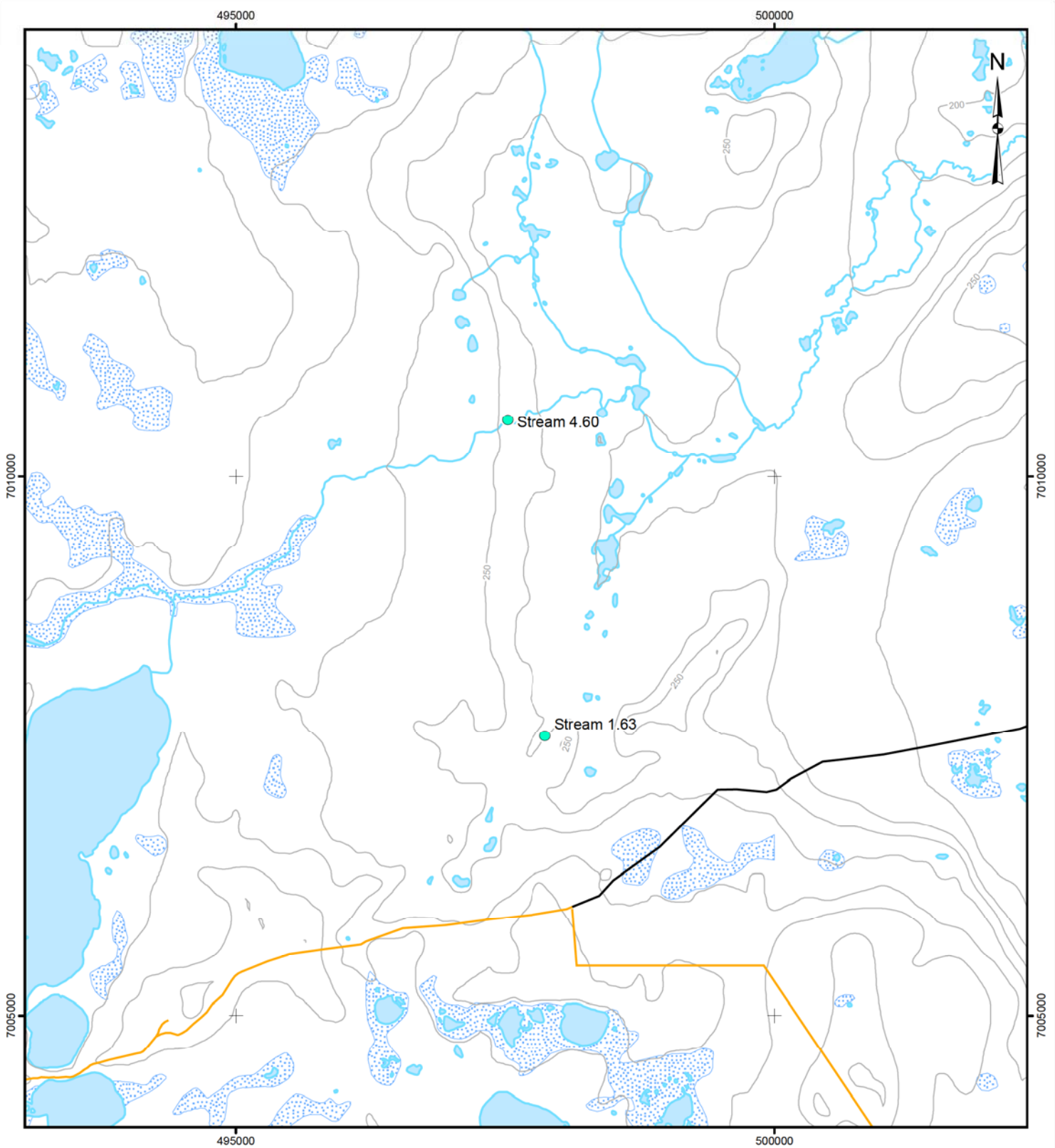
Two additional stream discharge measurements were performed at locations on the NPAR in the spring of 2005. These locations were at Creek 1.63 and Creek 4.60 (Figure 5-5). These locations currently fall out of the vicinity of the NPAR.

Stream discharge measurements were performed at a specific cross-section at the discharge monitoring stations that were established for long-term monitoring. Stream discharge monitoring locations and drainage areas are indicated in Table 5-3.

Table 5-3 Stream Discharge Monitoring Cross-sections

Cross-Section Identifier	Sub-Basin Identifier	Description	Drainage Area Upstream of Cross-Section (km ²)	Latitude	Longitude
B-1	BL8	Burke Lake outflow	89.5	63° 30' 25.3"	116° 43' 36.4"
B-2	BL5	Burke Lake inflow	10.2	63° 30' 38.6"	116° 38' 45.3"
B-3	BL4	Peanut Lake outflow	62.4	63° 32' 5.9"	116° 43' 19.2"
B-4	BL6	Pond 8 outlet	1.7	63° 32' 19.6"	116° 43' 37.8"
B-5	BL6	Pond 10 inlet	1.5	63° 32' 24.6"	116° 44' 1.7"
B-6	BL2	Nico Lake outflow	20.1	63° 32' 26.6"	116° 42' 36.0"
B-7	BL4	Peanut Lake inflow	40.7	63° 32' 8.8"	116° 41' 13.1"
B-8	BL1	Nico Lake inflow	14.6	63° 33' 12.9"	116° 42' 1.8"
L-1	LL6	Lou Lake outflow	56.3	63° 32' 13.8"	116° 50' 4.8"
L-2	LL3	Lou Lake inflow	5.3	63° 34' 43.3"	116° 44' 58.5"
M-1	-	Marian River	2770	63° 31' 12.9"	116° 46' 25.6"

I:\CLIENTS\FORTUNE_MINERALS\08-1373-0017\Mapping\MXD\Hydrology\B-Hydro-005-GIS.mxd

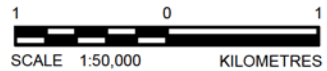


LEGEND

- CONTOUR (10 METRE INTERVAL)
- EXISTING ALL-WEATHER ROAD
- EXISTING WINTER ROAD
- - - PROPOSED NICO PROJECT ACCESS ROAD
- WATERCOURSE
- WATERBODY
- WETLAND
- STREAM DISCHARGE MEASUREMENT LOCATION

REFERENCE

Base data obtained from GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT FORTUNE MINERALS LIMITED NICO DEVELOPERS ASSESSMENT REPORT			
TITLE STREAM DISCHARGE MEASUREMENT LOCATIONS ON THE PROPOSED NICO PROJECT ACCESS ROAD			
FILE No. B-Hydro-005-GIS			
PROJECT No.	08-1373-0017	SCALE AS SHOWN	REV. 0
DESIGN	TL	16 Dec. 2008	FIGURE: 5-5
GIS	CW	30 Sep. 2009	
CHECK	LY	09 Dec. 2010	
REVIEW	GA	09 Dec. 2010	



Stage levels were monitored at selected lakes and ponds in the vicinity of the proposed mining operations. Staff gauges were installed at each station in early 2005 and typically re-surveyed in the spring of 2006, 2007, and 2008 (Table 5-4). A staff gauge was not installed at Station L-B until 2007. Due to poor spring site conditions, sometimes the staff gauge was not re-surveyed until the summer program. In these instances, the water elevation was surveyed directly.

Table 5-4 Lake Stage Monitoring Locations

Sub-Basin	Monitoring Location Identifier	Waterbody	Latitude	Longitude
BL8	B-A	Burke Lake	63° 30' 31.4"	116° 43' 32.8"
BL8	B-B	Pond 12	63° 32' 0.5"	116° 43' 50.1"
BL6	B-C	Pond 8	63° 32' 22.6"	116° 43' 43.0"
BL4	B-D	Peanut Lake	63° 32' 12.2"	116° 43' 3.3"
BL2	B-E	Nico Lake	63° 32' 31.6"	116° 42' 35.2"
LL5	L-A	Lou Lake	63° 33' 49.8"	116° 46' 51.4"
LL4	L-B	Chalco Lake	63° 33' 53.0"	116° 44' 13.2"

5.5.2.1 Stream Discharge Station Descriptions

B-1, Burke Creek (Appendix III, Photos 1 and 2)

Station B-1 is located on Burke Creek, immediately downstream of Burke Lake in the BL8 drainage. Runoff from sub-drainages BL1 to BL8 passes through the monitoring cross-section. The channel at the monitoring station has a bedrock bottom with some cobble and occasional boulders. The channel gradient is moderate with both bedrock and organic banks. The highest measured discharge occurred on 5 June 2006 and the streambed width at the cross-section at that time was 4.5 m; the average cross-sectional depth was 0.35 m. A continuous water level recorder and a staff gauge were installed near the right bank of the channel.

B-2, Burke Lake Inflow (Appendix III, Photos 3 and 4)

Station B-2 is located on an unnamed stream that discharges to the northeast side of Burke Lake. The stream drains Treasure Lake in the BL5 drainage. The channel at the station has a gravel bottom, moderate gradient, and bedrock banks. Streambed width is approximately 1.6 m and the average cross-sectional depth, as measured on 4 June 2006, was 0.40 m. A staff gauge is installed at the cross-section.

A debris jam was observed immediately downstream of the gauging station at B-2 on 22 September 2006. The jam consisted primarily of leafy material and

resultant sediment. The obstruction was cleared from the stream channel but may have altered the rating curve for the cross-section.

B-3, Peanut Creek (Appendix III, Photos 5 and 6)

Station B-3 is located on Peanut Creek, which is downstream of Peanut Lake and upstream of Burke Lake in the BL8 sub-basin. The channel at the station has a cobble bottom, low slope, and organic banks. Streambed width was approximately 3.2 m, and the average cross-sectional depth in the channel on 4 June 2006 was 0.44 m. Water levels are recorded from a staff gauge.

Stage and discharge measurements recorded during the 2005 to 2007 baseline program indicated that the station at B-3 may, at times, experience a backwater effect due to a beaver pond downstream. Ground-truthing during July 2006 indicated that the flow monitoring site has potential to backwater due to elevated water levels in Pond 11, resulting from beaver activity. Beaver dams are common in the pond areas between Peanut Lake and Burke Lake; the ponded water resulted in greater depths coincident with lower discharges ultimately decreasing the validity between the depth and flow relationship at B-3.

B-4, Pond 8 Outlet (Appendix III, Photos 7 and 8)

Station B-4 is located on a small unnamed stream, flowing from Pond 8 in the BL8 drainage to Peanut Creek. The channel at the station has a soft organic bottom, low gradient, and indistinct organic banks. The channel width is variable with flow controlled by a large upstream beaver dam at the outlet of Pond 10. On 20 September 2005, the highest measured discharge was coincident with a surface width of 0.6 m and an average cross-sectional depth of 0.12 m. No staff gauge was installed at B-4 because flows were not confined to a single channel.

B-5, Pond 10 Inlet (Appendix III, Photos 9 and 10)

Station B-5 is located on an unnamed creek, flowing into Pond 10 in the BL6 drainage. The channel station has a soft organic bottom, low gradient, and low organic banks. The streambed width was approximately 0.50 m as measured on 6 June 2006, while the average cross-sectional depth was 0.12 m. No staff gauge was installed at B-5.

B-6, Nico Creek (Appendix III, Photos 11 and 12)

Streamflow monitoring station B-6 is located on Nico Creek, downstream of Nico Lake in the BL4 drainage. The channel cross-section has a cobble bottom, moderate slope, and high organic banks. The stream width during the maximum measured discharge was approximately 2.1 m as measured on 4 June 2006, while the average cross-sectional channel depth was 0.34 m.

B-7, Peanut Lake Inflow (Appendix III, Photos 13 and 14)

Station B-7 is located on a small unnamed stream, flowing into Peanut Lake from the BL4 drainage. The channel cross-section is characterized by a cobble streambed with aquatic macrophytes, low channel gradient, and low organic banks. Bank full width was exceeded during the spring freshet of 2006 with the creek margins extending into the flood plain. The main channel measured approximately 6.75 m wide with braided channels extending to 27.50 m from the left channel margin. The average cross-sectional depth in the main channel was approximately 0.53 m as measured on 6 June 2006. A staff gauge has been installed near the cross-section. Downstream debris was removed from the channel in September 2007.

B-8, Nico Lake Inflow (Appendix III, Photos 15 and 16)

Station B-8 is located on an unnamed stream, flowing to Nico Lake from the BL1 drainage area. The channel station has a bedrock and cobble bottom, moderate slope, and high organic banks. The stream width and average cross-sectional depth during the maximum measured discharge taken on 4 June 2006 were 1.2 m and 0.28 m, respectively. A staff gauge has been installed at the cross-section.

L-1, Lou Creek (Appendix III, Photos 17 and 18)

Station L-1 is located on Lou Creek, downstream of Lou Lake. Runoff from drainages LL1 to LL6 passes through the L-1 cross-section. Numerous beaver dams occur along the stream length between Lou Lake and the Marian River. The channel station has a cobble bottom and moderate gradient with bedrock and stable organic banks. The stream width is approximately 2.5 m as measured on 5 June 2006, and the average cross-sectional depth was 0.47 m. A side channel was observed carrying additional flow approximately 0.9 m from the right bank. A staff gauge and a continuous water level recorder have been installed near the cross-section.

Stage and discharge measurements recorded during the surface water monitoring programs indicated that the station at L-1 may have, at times, experienced a backwater effect. The ponded water resulted in greater depths coincident with lower discharges ultimately decreasing the correlation between depth and flow at L-1. The ponding is likely related to a downstream beaver dam.

L-2, Lou Lake Inflow (Appendix III, Photos 19 and 20)

Station L-2 is located on an unnamed stream, which collects runoff from drainages LL4 and LL3, including Chalco Lake. The channel station has soft substrate, low slope, and low organic banks. The stream width was approximately 2.6 m with an average cross-sectional depth of 0.27 m as

measured on 5 June 2006. A staff gauge has been installed at the cross-section for stage measurements.

M-1, Marian River (Appendix III, Photos 21 and 22)

Station M-1 is located on the Marian River between the Lou Lake and Burke Lake tributary inflows. The monitoring cross-section is located at the head of a rapids section. The streambed is stable, and consists of bedrock, and occasional boulders. The channel gradient is moderate but increases through the downstream rapids section. The stream width is approximately 37.5 m as measured on 6 June 2006 while the average cross-sectional depth was 1.32 m. A staff gauge and continuous water level recorder were installed at the Marian River flow monitoring station.

5.5.3 Field Data

Discharges are calculated based on measurements collected at each monitoring station during the data collection period. Each time the stream discharge is measured, the staff gauge reading is recorded, and a relationship between the stream water level, or stage, and the discharge associated with that water level is developed. The relationship is described by the stage-discharge rating curve and equation, which are determined using regression analysis. The reliability of the curve improves over time as more stage-discharge points are added.

Staff gauge readings are a relative measurement of the stage height. The stage height must be converted to an elevation relative to a local benchmark to maintain a consistent datum. Table 5-5 provides the benchmark information and the top-of-staff-gauge elevation at each station. Tables 5-6 and 5-7 present the staff gauge readings and corresponding measured discharges, respectively. The stage-discharge relationships are presented graphically in Appendix II. The relationship between stage and discharge is reasonable with the exception of Stations B-3 and L-1, where stage height is not closely associated with discharge. It appears that the stream-cross-sections may have experienced a backwater effect from beaver activity or a debris jam. Thus the increase in stage is not necessarily related to increased discharge but rather the backwater effect in which the water level is related to the crest of a downstream obstruction.

Though discharge measurements have been taken regularly from 2005 to 2008, the stage-discharge relationships should still be considered preliminary. It is apparent that discharges measured in the spring of 2006 are substantially larger than the 2005, 2007, and 2008 spring measurements; however, this does not indicate whether 2005, 2007, and 2008 were statistically low or if 2006 was statistically high. The majority of the discharge through the stations occurs as a

function of snowmelt rather than high rainfall volumes throughout the year. Future stage and discharge measurements will assist in improving the rating curves and increase the reliability for stage to discharge conversions.

Discharge measurements along the AWAR at Creek 1.63 and Creek 4.60 (Figure 5-5) were performed during the 2005 spring monitoring program. On June 14, 2005, discharges at Creek 1.63 and Creek 4.60 were measured at 0.050 m³/s and 1.182 m³/s, respectively.

Table 5-5 Staff Gauge Elevations and Benchmark Locations, NICO Project Area

Station	Description	2005 Top of Staff Gauge Elevation - Local Datum (m)	2006 Top of Staff Gauge Elevation - Local Datum (m)	2007 Top of Staff Gauge Elevation - Local Datum (m)	2008 Top of Staff Gauge Elevation - Local Datum (m)	Benchmark Information
Streams						
B-1	Burke Creek	99.785	99.792	99.691	99.721	Large boulder at left side of falls, 10 m upstream from cross-section
B-2	Burke Lake Inflow	99.255	99.260	99.268	99.269	Rock 15 m upslope from cross-section on painted rock
B-3	Peanut Creek	99.807	99.807	99.810	99.860	Rock 5 m downstream of cross-section on right side of channel
B-4	Pond 8 Outlet	No Staff Gauge Installed	No Staff Gauge Installed	No Staff Gauge Installed	No Staff Gauge Installed	
B-5	Pond 10 Inlet	No Staff Gauge Installed	No Staff Gauge Installed	No Staff Gauge Installed	No Staff Gauge Installed	
B-6	Nico Creek	98.626	98.593	98.592	98.587	Rock 4 m from right bank
B-7	Peanut Lake Inflow	99.730	99.787	99.744	99.750	Large rock at right channel margin
B-8	Nico Lake Inflow	99.300	99.290	99.288	Ice Covered – Not Able to Survey	Bedrock on right bank approximately 5 m upstream of cross-section
L-1	Lou Creek	97.490	97.492	97.491	97.487	Very large boulder at 15 m northwest of cross-section
L-2	Lou Lake Inflow	98.829	98.870	99.048	98.971	Cut post 20 m from right bank
M-1	Marion River	98.953	99.407	98.979	Staff Gauge Damaged – Did Not Survey	Large rock above waterline on left side of channel 10 m downstream of cross-section
Waterbodies						
B-A	Burke Lake	100.275	100.149	100.193	Not surveyed due to safety concerns (Wildlife)	Large rock north of staff gauge on lake shore (11 V 513728 7042088 NAD 27 Canada)
B-B	Pond 12	99.407	99.439	99.415	99.444	Rock on shoreline
B-C	Pond 8	98.868	98.887	98.863	98.829	Benchmark is borehole casing

Table 5-5 Staff Gauge Elevations and Benchmark Locations, NICO Project Area (continued)

Station	Description	2005 Top of Staff Gauge Elevation - Local Datum (m)	2006 Top of Staff Gauge Elevation - Local Datum (m)	2007 Top of Staff Gauge Elevation - Local Datum (m)	2008 Top of Staff Gauge Elevation - Local Datum (m)	Benchmark Information
						at outlet of Pond 9 on left side
B-D	Peanut Lake	98.572	98.473	98.450	98.251	Rock upslope from staff gauge
B-E	Nico Lake	100.593	100.604	100.833	100.831	Rock next to staff gauge
L-A	Lou Lake	97.363	97.283	97.304	97.404	Bedrock along shoreline
L-B	Chalco Lake	Water Elevation Survey	Water Elevation Survey	100.491	100.492	Large rock at shoreline

Table 5-6 Instantaneous Discharge Measurements in m³/s, NICO Project Area

Station	Description	2005			2006			2007			2008	
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Winter	Spring
B-1	Burke Creek	0.6440	0.0093	0.0576	1.3842	0.0703	0.0764	0.0185	0.2265	0.0154	0.0671	0.0305
B-2	Burke Lake Inflow	0.1306	0.0038	0.0073	0.1600	0.0015	0.0387	0.0035	0.0045	0.0002	NM	0.0011
B-3	Peanut Creek	0.2510	0.0678	0.0654	0.8337	0.0912	0.0575	0.1886	0.1569	0.0337	0.0359	0.0514
B-4	Pond 8 Outlet	0.0091	0.0018	0.0171	0.0165	0.0088	0.0101	0.0031	0.0007	0.0006	NM	0.0005
B-5	Pond 10 Inlet	0.0042	NM	0.0089	0.0138	0.0038	0.0037	0.0029	0.0026	0.0001	NM	0.0008
B-6	Nico Creek	0.1141	0.0303	0.0080	0.1747	0.0107	0.0088	0.0688	0.0273	0.0041	NM	0.0200
B-7	Peanut Lake Inflow	0.0763	0.0254	0.0331	0.7952	0.0437	0.0508	0.0620	0.0654	0.0184	NM	0.0089
B-8	Nico Lake Inflow	0.0373	0.0048	0.0071	0.1120	0.0027	0.0032	0.0076	0.0050	0.0009	NM	0.0067
L-1	Lou Creek	0.4795	0.0039	0.0293	0.9247	0.0042	0.0214	0.1092	0.0513	0.0078	NM	0.1411
L-2	Lou Lake Inflow	0.0590	0.0048	0.0045	0.1032	0.0035	0.0050	0.0071	0.0089	0.0010	NM	0.0216
M-1	Marion River	11.504	6.621	5.310	42.946	13.934	12.155	10.376	6.953	2.877	2.730	6.374

NM = no measurement

Table 5-7 Observed Water Elevations

Station	Description	Benchmark Relative Water Surface Elevation (m)									
		2005			2006			2007			2008
		Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring
Streams											
B-1	Burke Creek	99.207	98.868	99.011	99.298	98.982	99.046	98.923	99.061	98.969	98.942
B-2	Burke Lake Inflow	98.785	98.267	98.443	98.823	98.272	98.421	98.293	98.309	98.277	98.309
B-3	Peanut Creek	99.054	99.055	99.121	99.281	99.169	99.135	99.001	98.978	98.905	98.912
B-4	Pond 8 Outlet	Stage Not Recorded									
B-5	Pond 10 Inlet	Stage Not Recorded									
B-6	Nico Creek	98.084	97.846	97.724	98.115	97.764	97.715	97.950	97.801	97.693	97.839
B-7	Peanut Lake Inflow	99.300	99.142	99.169	99.823	99.233	99.230	99.250	99.282	99.161	99.063
B-8	Nico Lake Inflow	98.523	98.323	98.384	98.596	98.268	98.294	98.329	98.304	98.268	98.313
L-1	Lou Creek	96.994	96.736	96.785	97.183	96.807	96.818	96.830	96.771	96.717	96.845
L-2	Lou Lake Inflow	98.137	97.945	97.971	98.414	98.042	98.082	98.174	98.189	98.148	98.268
M-1	Marion River	98.576	98.422	98.369	99.442	98.741	98.550	98.551	98.406	98.289	98.393
Waterbodies											
B-A	Burke Lake	99.238	99.270	99.371	99.702	99.606	99.620	99.542	99.612	99.601	99.533
B-B	Pond 12	98.977	98.991	99.009	99.032	99.037	99.043	98.986	98.974	98.932	98.833
B-C	Pond 8	98.471	98.600	98.720	98.501	98.443	98.395	98.441	98.397	98.408	98.430
B-D	Peanut Lake	98.272	98.170	98.249	98.158	97.931	98.073	97.645	97.616	97.528	97.501
B-E	Nico Lake	99.945	99.652	99.574	100.071	99.710	99.613	100.004	99.758	99.630	99.957
L-A	Lou Lake	96.703	96.619	96.657	96.770	96.578	96.585	96.663	96.768	96.752	96.716
L-B	Chalco Lake	99.606	99.484	99.526	99.595	99.470	99.496	99.586	99.531	99.461	99.586

N/A = not available

5.5.4 Flow Data

Prior to freeze-up, the Barologger and Levelloggers were removed and downloaded. Levelloggers were removed for the winter since they can be damaged if frozen into the ice. The stage-discharge curves for Stations B-1, L-1, and M-1 that were developed over the duration of the baseline monitoring programs were used to generate flow data from recorded stream stage. In total, 48 stage measurements per day were recorded at each of the 3 monitoring stations.

Figures 5-6, 5-7 and 5-8 illustrate the continuous discharge record for B-1, L-1 and M-1 during the 2005, 2006, 2007 and 2008 baseline monitoring programs. Tables 5-8, 5-9, and 5-10 present the daily average discharges for the same sites and period of record.

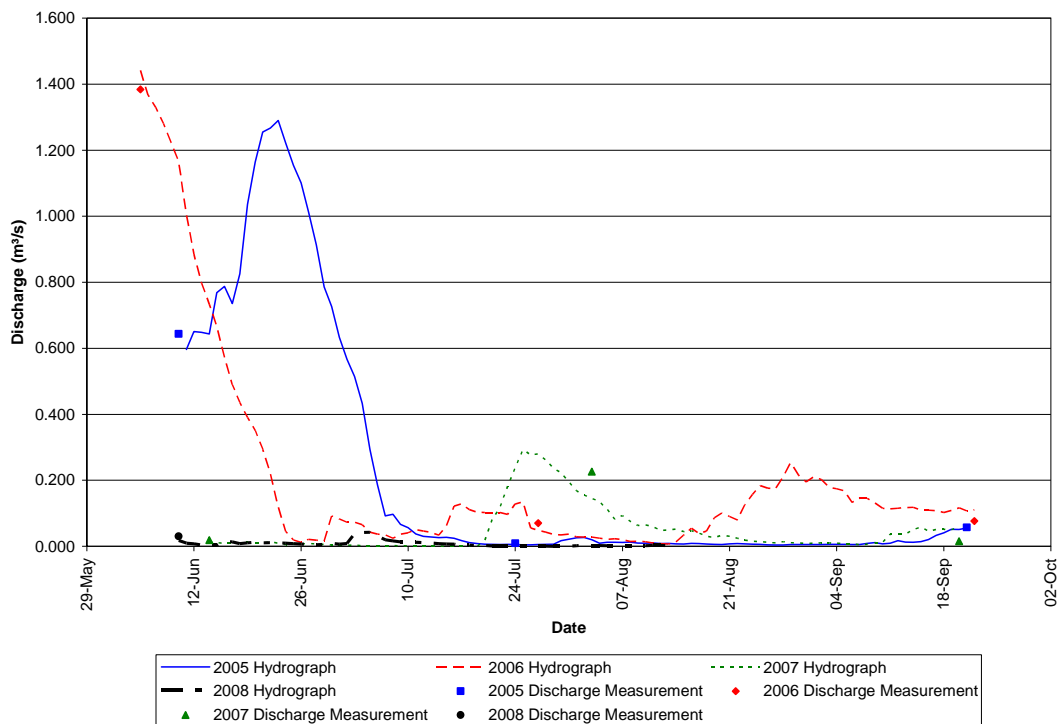


Figure 5-6 B-1 (Burke Creek) Hydrograph

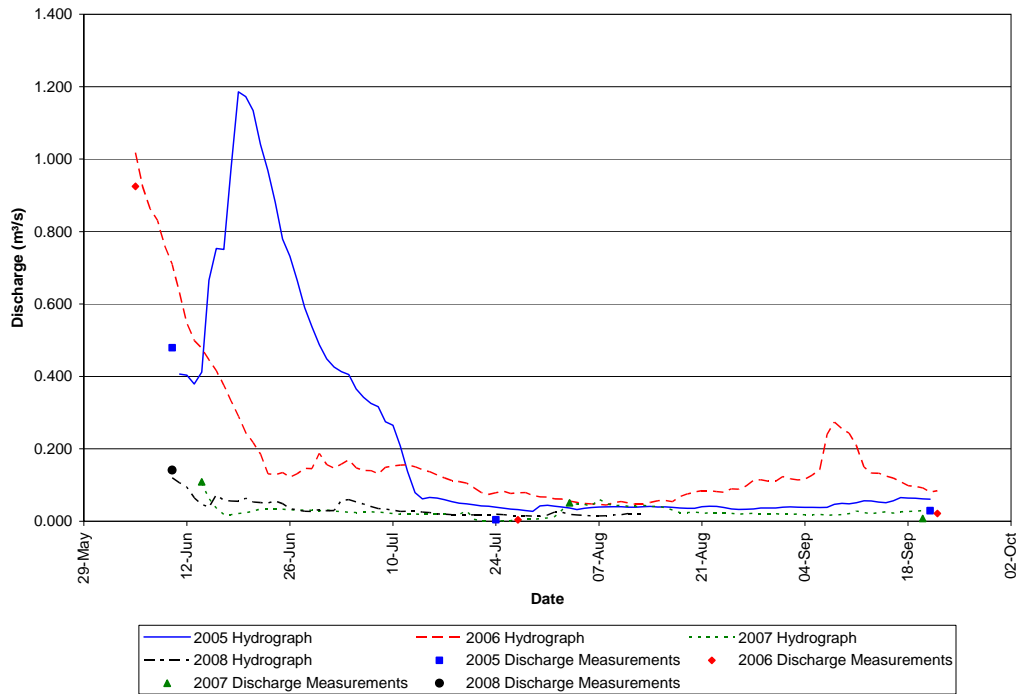


Figure 5-7 L-1 (Lou Creek) Hydrograph

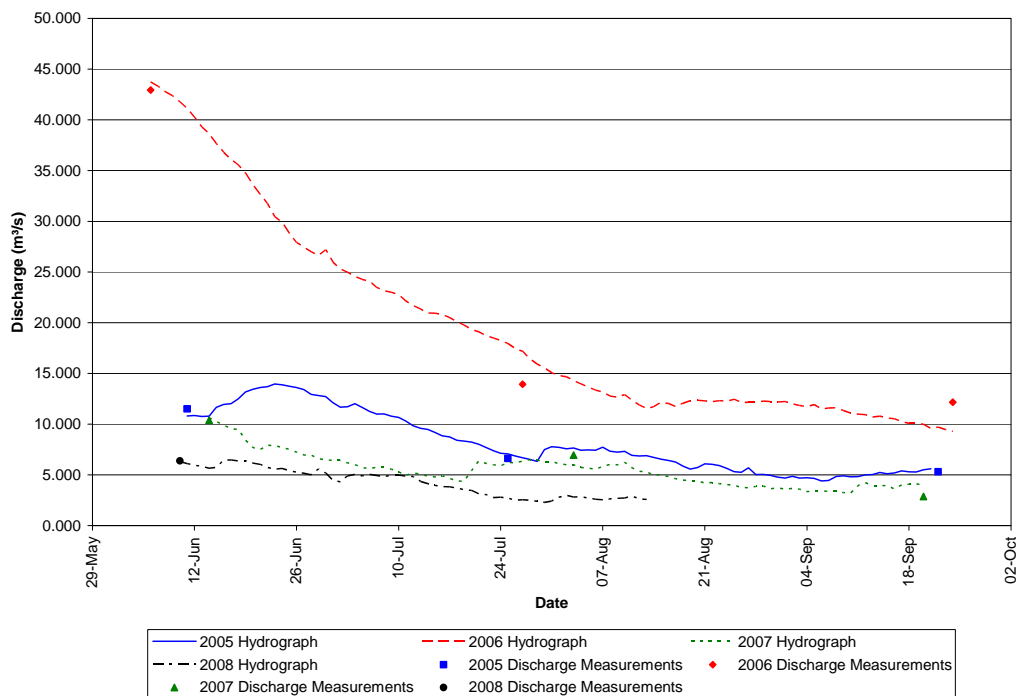


Figure 5-8 M-1 (Marian River) Hydrograph

Table 5-8 B-1 (Burke Creek) Daily Average Discharge (m³/s)

Day	2005				2006				2007				2008		
	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug
1		0.633	0.026	0.005		0.082	0.029	0.210		0.004	0.168	0.009		0.006	0.001
2		0.566	0.027	0.005		0.073	0.028	0.203		0.003	0.155	0.010		0.009	0.003
3		0.515	0.020	0.006		0.073	0.028	0.179		0.003	0.145	0.011		0.038	0.002
4		0.433	0.009	0.006		0.065	0.025	0.174		0.002	0.134	0.010		0.042	0.002
5		0.294	0.012	0.006	1.442	0.043	0.022	0.168		0.001	0.113	0.008		0.043	0.002
6		0.187	0.012	0.005	1.367	0.037	0.023	0.133		0.002	0.082	0.007		0.031	0.002
7		0.093	0.012	0.005	1.330	0.035	0.021	0.145		0.002	0.093	0.005		0.020	0.001
8		0.097	0.013	0.009	1.280	0.024	0.015	0.145		0.002	0.076	0.006		0.016	0.001
9		0.067	0.010	0.011	1.224	0.036	0.015	0.131		0.002	0.063	0.011		0.013	0.001
10		0.056	0.009	0.008	1.165	0.041	0.014	0.115		0.001	0.065	0.011	0.017	0.013	0.001
11	0.596	0.037	0.010	0.009	1.007	0.050	0.010	0.113		0.001	0.059	0.037	0.009	0.012	0.003
12	0.651	0.030	0.008	0.017	0.885	0.046	0.008	0.115		0.001	0.048	0.037	0.008	0.011	0.003
13	0.649	0.028	0.009	0.013	0.796	0.042	0.007	0.118		0.001	0.050	0.037	0.004	0.010	0.002
14	0.643	0.026	0.008	0.012	0.734	0.034	0.013	0.118	0.013	0.000	0.052	0.050	0.003	0.008	
15	0.768	0.028	0.007	0.014	0.665	0.061	0.034	0.110	0.010	0.000	0.044	0.058	0.003	0.007	
16	0.787	0.025	0.009	0.020	0.573	0.122	0.054	0.109	0.010	0.000	0.048	0.045	0.015	0.006	
17	0.736	0.017	0.008	0.033	0.490	0.129	0.039	0.108	0.009	0.000	0.040	0.051	0.013	0.004	
18	0.826	0.011	0.007	0.041	0.435	0.111	0.046	0.102	0.010	0.000	0.030	0.051	0.008	0.004	
19	1.036	0.008	0.006	0.051	0.390	0.104	0.086	0.109	0.012	0.000	0.027	0.050	0.011	0.003	
20	1.164	0.006	0.005	0.051	0.351	0.102	0.101	0.116	0.010	0.017	0.033	0.059	0.012	0.002	
21	1.255	0.006	0.008	0.055	0.293	0.102	0.090	0.107	0.010	0.082	0.030		0.010	0.001	
22	1.267	0.005	0.008		0.219	0.103	0.080	0.111	0.013	0.117	0.025		0.011	0.001	
23	1.290	0.006	0.008		0.120	0.096	0.125		0.009	0.182	0.019		0.010	0.001	
24	1.221	0.005	0.007		0.045	0.128	0.157		0.005	0.237	0.015		0.009	0.001	
25	1.154	0.005	0.006		0.020	0.135	0.184		0.006	0.293	0.014		0.008	0.001	
26	1.101	0.005	0.005		0.012	0.055	0.176		0.007	0.277	0.012		0.007	0.000	
27	1.012	0.005	0.004		0.021	0.048	0.174		0.009	0.280	0.011		0.005	0.000	
28	0.913	0.006	0.004		0.019	0.043	0.210		0.007	0.261	0.014		0.005	0.000	
29	0.786	0.006	0.005		0.016	0.036	0.253		0.006	0.236	0.011		0.007	0.000	
30	0.726	0.017	0.005		0.092	0.034	0.216		0.004	0.223	0.010		0.009	0.000	
31		0.022	0.005			0.037	0.195			0.195	0.009			0.000	

Table 5-9 L-1 (Lou Creek) Daily Average Discharge (m³/s)

Day	2005				2006				2007				2008		
	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug
1		0.449	0.041	0.039		0.156	0.062	0.123		0.031	0.014	0.018		0.029	0.025
2		0.426	0.039	0.040		0.147	0.061	0.117		0.028	0.032	0.019		0.030	0.025
3		0.413	0.037	0.039		0.158	0.056	0.114		0.027	0.050	0.020		0.057	0.020
4		0.405	0.032	0.038		0.169	0.052	0.116		0.025	0.048	0.018		0.060	0.017
5		0.366	0.036	0.039	1.018	0.147	0.049	0.127		0.024	0.046	0.018		0.054	0.016
6		0.343	0.038	0.038	0.923	0.141	0.048	0.143		0.025	0.043	0.019		0.048	0.015
7		0.326	0.039	0.039	0.862	0.140	0.047	0.239		0.026	0.061	0.017		0.041	0.015
8		0.317	0.040	0.047	0.830	0.131	0.045	0.274		0.025	0.049	0.017		0.035	0.016
9		0.275	0.040	0.050	0.760	0.149	0.050	0.256		0.024	0.043	0.018		0.034	0.017
10		0.265	0.041	0.048	0.709	0.152	0.055	0.243		0.022	0.045	0.021	0.120	0.031	0.018
11	0.406	0.208	0.039	0.051	0.631	0.155	0.051	0.208		0.019	0.041	0.028	0.106	0.027	0.021
12	0.404	0.138	0.039	0.057	0.547	0.156	0.047	0.150		0.019	0.041	0.024	0.094	0.028	0.022
13	0.379	0.079	0.040	0.056	0.500	0.151	0.047	0.133		0.020	0.044	0.022	0.065	0.028	0.020
14	0.412	0.062	0.041	0.053	0.478	0.142	0.052	0.133	0.106	0.020	0.041	0.023	0.047	0.026	
15	0.666	0.066	0.039	0.051	0.446	0.137	0.057	0.125	0.063	0.019	0.042	0.026	0.038	0.024	
16	0.753	0.064	0.040	0.057	0.415	0.128	0.058	0.119	0.036	0.020	0.037	0.023	0.073	0.021	
17	0.751	0.060	0.039	0.066	0.375	0.120	0.054	0.109	0.019	0.019	0.031	0.026	0.058	0.020	
18	0.974	0.054	0.037	0.064	0.332	0.113	0.068	0.099	0.018	0.018	0.024	0.027	0.056	0.018	
19	1.186	0.050	0.036	0.063	0.289	0.109	0.075	0.096	0.021	0.019	0.024	0.028	0.056	0.018	
20	1.173	0.048	0.036	0.062	0.244	0.105	0.081	0.092	0.024	0.028	0.026	0.030	0.064	0.019	
21	1.134	0.046	0.040	0.061	0.217	0.093	0.084	0.080	0.028	0.005	0.022		0.053	0.018	
22	1.040	0.042	0.041		0.185	0.080	0.084	0.084	0.034	0.001	0.023		0.052	0.017	
23	0.969	0.041	0.041		0.131	0.074	0.082		0.034	0.000	0.023		0.051	0.018	
24	0.881	0.039	0.038		0.129	0.079	0.080		0.033	0.001	0.022		0.057	0.019	
25	0.779	0.036	0.034		0.134	0.083	0.090		0.033	0.001	0.022		0.049	0.018	
26	0.732	0.034	0.033		0.121	0.077	0.089		0.032	0.002	0.020		0.035	0.016	
27	0.665	0.032	0.033		0.131	0.079	0.097		0.031	0.004	0.021		0.031	0.015	
28	0.591	0.030	0.034		0.146	0.079	0.114		0.031	0.005	0.022		0.028	0.015	
29	0.537	0.028	0.037		0.145	0.071	0.115		0.030	0.006	0.022		0.027	0.014	
30	0.488	0.043	0.037		0.187	0.067	0.111		0.029	0.007	0.021		0.032	0.014	
31		0.044	0.037			0.067	0.110			0.009	0.021			0.017	

Table 5-10 M-1 (Marian River) Daily Average Discharge (m³/s)

Day	2005				2006				2007				2008		
	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Jun	Jul	Aug
1		12.110	7.726	4.690		25.969	14.810	12.236		6.412	6.115	3.621		4.464	2.805
2		11.662	7.580	4.869		25.296	14.665	12.019		6.427	5.998	3.653		4.317	2.984
3		11.719	7.642	4.689		24.960	14.287	11.829		6.176	5.977	3.584		4.904	2.808
4		12.019	7.419	4.721		24.552	13.968	11.743		5.993	5.744	3.338		5.042	2.831
5		11.647	7.457	4.642		24.266	13.636	11.933		5.722	5.667	3.417		4.893	2.729
6		11.261	7.425	4.400	43.723	24.099	13.348	11.497		5.608	5.550	3.425		5.039	2.605
7		10.990	7.735	4.435	43.306	23.471	13.161	11.600		5.742	5.838	3.391		4.945	2.542
8		11.009	7.341	4.855	42.785	23.169	12.771	11.618		5.736	6.040	3.392		4.829	2.636
9		10.783	7.244	4.899	42.377	23.013	12.652	11.330		5.559	5.975	3.259		4.971	2.697
10		10.657	7.319	4.809	41.775	22.790	12.915	11.105		5.290	6.245	3.209	6.301	4.974	2.727
11	10.805	10.296	6.934	4.834	41.135	22.127	12.359	10.991		4.935	5.700	3.927	6.106	4.873	2.903
12	10.848	9.831	6.852	4.989	40.266	21.694	11.893	10.938		5.189	5.361	4.216	5.961	4.822	2.635
13	10.746	9.585	6.903	5.034	39.303	21.340	11.547	10.701		5.044	5.279	3.919	5.835	4.350	2.577
14	10.788	9.466	6.710	5.239	38.651	20.965	11.725	10.797	10.637	4.889	5.000	3.913	5.655	4.138	
15	11.644	9.177	6.545	5.101	37.656	20.941	12.148	10.615	10.242	4.786	5.018	3.941	5.736	3.965	
16	11.944	8.857	6.412	5.194	36.822	20.791	12.027	10.529	9.908	4.902	4.833	3.594	6.442	3.843	
17	12.007	8.735	6.257	5.390	36.103	20.498	11.724	10.263	9.546	4.645	4.621	4.002	6.478	3.828	
18	12.482	8.421	5.862	5.298	35.565	20.106	12.060	10.071	9.482	4.384	4.478	4.079	6.388	3.695	
19	13.163	8.314	5.563	5.276	34.772	19.743	12.303	10.070	8.428	4.362	4.433	4.117	6.397	3.544	
20	13.435	8.222	5.718	5.497	33.591	19.340	12.363	9.988	7.690	5.411	4.418	3.986	6.159	3.463	
21	13.610	8.007	6.095	5.595	32.689	19.097	12.283	9.581	7.507	6.372	4.188		6.031	3.124	
22	13.689	7.708	6.032		31.762	18.727	12.212	9.713	7.918	6.121	4.241		5.748	3.051	
23	13.958	7.397	5.914		30.455	18.492	12.306	9.471	7.888	5.994	4.136		5.552	2.757	
24	13.889	7.140	5.650		29.893	18.244	12.278	9.282	7.694	5.885	4.046		5.624	2.792	
25	13.728	7.061	5.322		28.832	17.937	12.457		7.513	6.210	3.974		5.422	2.704	
26	13.606	6.859	5.244		27.912	17.439	12.132		7.242	6.204	3.754		5.274	2.499	
27	13.397	6.696	5.680		27.458	17.193	12.169		6.963	6.352	3.733		5.159	2.539	
28	12.935	6.534	5.025		26.992	16.427	12.162		6.934	6.501	3.862		5.014	2.507	
29	12.817	6.337	5.045		26.622	15.928	12.263		6.576	6.454	3.899		5.584	2.396	
30	12.707	7.490	4.950		27.186	15.549	12.231		6.492	6.308	3.648		5.168	2.284	
31		7.769	4.768			15.055	12.172			6.307	3.695			2.409	

Through all four years of monitoring, downstream obstructions appeared to have had a backwater effect on the station at L-1 (Lou Creek) at various times in the year typically when the water levels were low. The downstream obstruction affecting L-1 resulted in increased stage through the cross-section of the hydrometric station. The increased stage resulted in spurious stage heights associated with the measured discharges. These stage heights led to questionable data points on the stage-discharge relationship when flow levels were low. A small amount of standing water remains in the channel when the discharge is near 0 m³/s. To correct the stage-discharge relationship, certain points were rejected and an additional low-flow point was created that is associated with the lowest recorded stage on the Levelogger. The stage-discharge curve is reliable over most of the flow range at this location.

At Station B-1, 2 upstream beaver dams at the outlet of Burke Lake were first observed during the second field program in 2005. Intense stream flow during the freshet of 2006 damaged the upstream obstruction; however, the dam remained sound during 2007 holding back the snowmelt runoff in Burke Lake. Sometime in late July 2007, the obstruction was damaged allowing a large volume of water to leave Burke Lake creating a late peak in the hydrograph through the station at B-1 (Figure 5-6). This late peak may not accurately represent the hydrographs in the stations upstream of B-1 because of attenuation in Burke Lake resulting from the beaver dam.

The 2005 mean daily discharge from B-1 (Burke Creek) (0.219 m³/s) and the L-1 (Lou Creek) (0.213 m³/s) contributed approximately 2.7% and 2.6%, respectively, of the measured flow of 8.14 m³/s in the M-1 (Marian River). The 2006 mean daily discharges were 0.205 m³/s and 0.181 m³/s for B-1 and L-1, respectively representing 1.1% and 0.9% of the mean annual discharge through M-1 (19.5 m³/s). In 2007 the mean daily discharges through B-1 and L-1 represented 0.9% (0.049 m³/s) and 0.5% (0.026 m³/s) of the discharge through M-1 (5.46 m³/s). The 2008 mean daily discharges through B-1 (0.008 m³/s) and L-1 (0.026 m³/s) represented 0.2% and 0.6% of the 4.24 m³/s reported through M-1. The mean daily discharges reported represent the measurement period as specified in Table 5-11. The maximum daily average discharges for each station are also provided in Table 5-11.

Table 5-11 Measurement Periods and Maximum Daily Average Discharges at B-1, L-1, and M-1

Year	B-1 Record Coverage	B-1 Peak Daily Discharge (m ³ /s)	L-1 Record Coverage	L-1 Peak Daily Discharge (m ³ /s)	M-1 Record Coverage	M-1 Peak Daily Discharge (m ³ /s)
2005	11 June to 21 September	1.290	11 June to 21 September	1.186	11 June to 21 September	13.958
2006	5 June to 22 September	1.442	5 June to 22 September	1.018	5 June to 24 September	43.723
2007	14 June to 20 September	0.293	14 June to 20 September	0.106	14 June to 20 September	10.637
2008	10 June to 13 August	0.043	10 June to 13 August	0.120	10 June to 13 August	6.478

5.6 LONG TERM FLOW RECORD FOR DRAINAGES WITHIN THE BURKE AND LOU WATERSHEDS

A long term monthly flow record has been correlated to the site from the WSC Baker Creek Hydrometric station (07SB013). As indicated in Table 5-1, Baker Creek has a 24 year record and a contributing drainage area of 121 km². The purpose of a long term flow record is to provide a better understanding of the baseline condition of flows at the NICO Project by estimating flows over a longer period of time to capture a wider range of flows.

5.6.1 Correlation From Baker Creek to the Burke Creek (B-1) and Lou Creek (L-1)

The Burke Lake and Lou Lake watersheds have been divided into sub basins based on topographic divides, with the smallest divisions in the area where Project facilities are expected to be constructed. The outlets of the Burke and Lou Lake watersheds have been monitored from 2005 to 2008. The smaller drainages upstream of the outlets can be estimated using regression relationships from hydrometric data and/or unit area runoff ratios. To provide a long term data set for Burke and Lou Creeks the measured data in each of the streams was correlated to Baker Creek for coincident average daily discharges.

The data used in the correlation from Baker Creek to Burke and Lou Creeks is from the collection periods of 2005, 2006, and 2007. The data collected in 2008 is not used because it does not contain data related to the freshet. When the available daily records for 2005 to 2007 are compared from Burke and Lou Creeks to Baker Creek there is an observed lag between the spring freshet peak flow in 2005 where Burke and Lou Creeks have a delay relative to Baker Creek.

As the peak flow was not observed in 2006 and 2007 this delay could not be generalized making it difficult to infer the long term daily variation in these streams. However, a delay of 10 days appears to provide an acceptable relationship between Baker Creek and Burke and Lou Creeks as discussed below.

Data for 2005, 2006, and 2007 was evaluated for the period of 5 June to 20 September for Baker Creek and Burke and Lou Creeks. The window of time from 5 June to 20 September is available for all datasets and has been selected to incorporate repeated years of data on each day. However, due to the 10 day delay the data collected from 26 May to 10 September is used for Baker Creek. The daily average discharge values for all 3 years in the noted timeframes are plotted for each of Burke Creek and Lou Creek versus Baker Creek. A delay of 10 days provides the best fit plot for both Burke Creek and Lou Creek as compared to Baker Creek. It can be hypothesized that the delay in timing is a product of a higher latitude at the Project site as compared to Baker Creek. Figures 5-9 and 5-10 present the relationship between Burke Creek and Baker Creek and Lou Creek and Baker Creek, respectively.

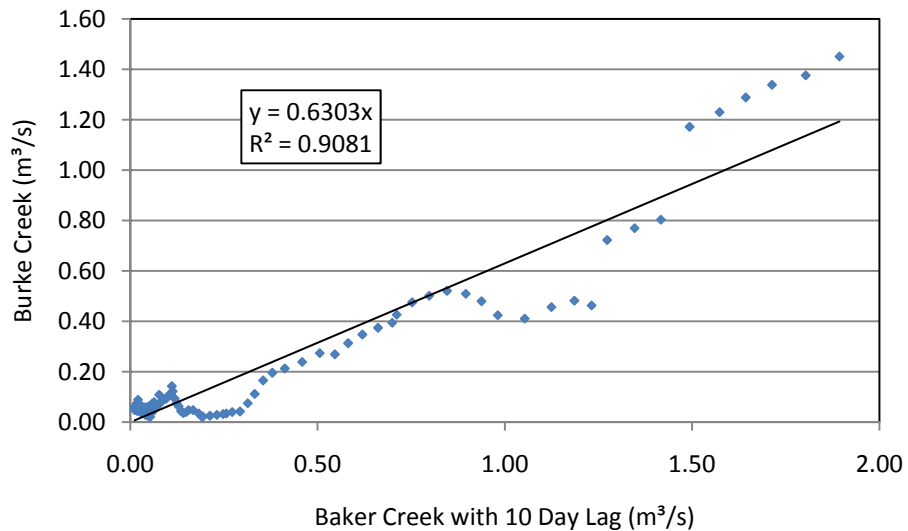


Figure 5-9 Relationship Between Average Daily Discharge (m³/s) for Burke Creek and Baker Creek

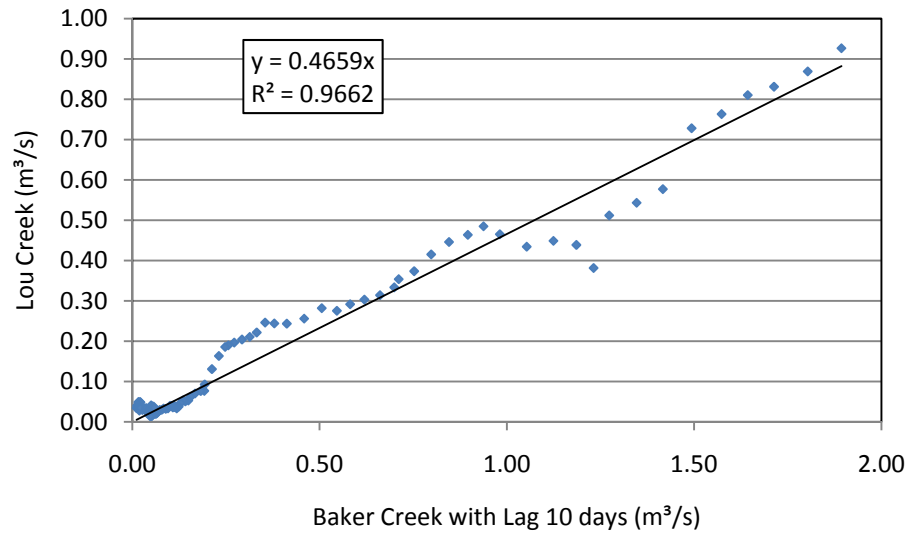


Figure 5-10 Relationship Between Average Daily Discharge (m³/s) for Lou Creek and Baker Creek

As presented in Figures 5-9 and 5-10 the relationships between Baker Creek and Burke and Lou Creeks are defined by the following equations:

$$Q_{i-\text{Burke Creek}} = 0.6303 * Q_{(i-10)\text{-Baker Creek}} \quad r^2 = 0.91 \text{ [Equation 5-1]}$$

$$Q_{i-\text{Lou Creek}} = 0.4659 * Q_{(i-10)\text{-Baker Creek}} \quad r^2 = 0.96 \text{ [Equation 5-2]}$$

Using Equations 5-1 and 5-2 a long term record has been derived for Burke and Lou Creeks from Baker Creek. This record constitutes 24 years of generally continuous data where no record is available for some of the winter months in earlier years of the data set (up to 2001).

5.6.2 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks

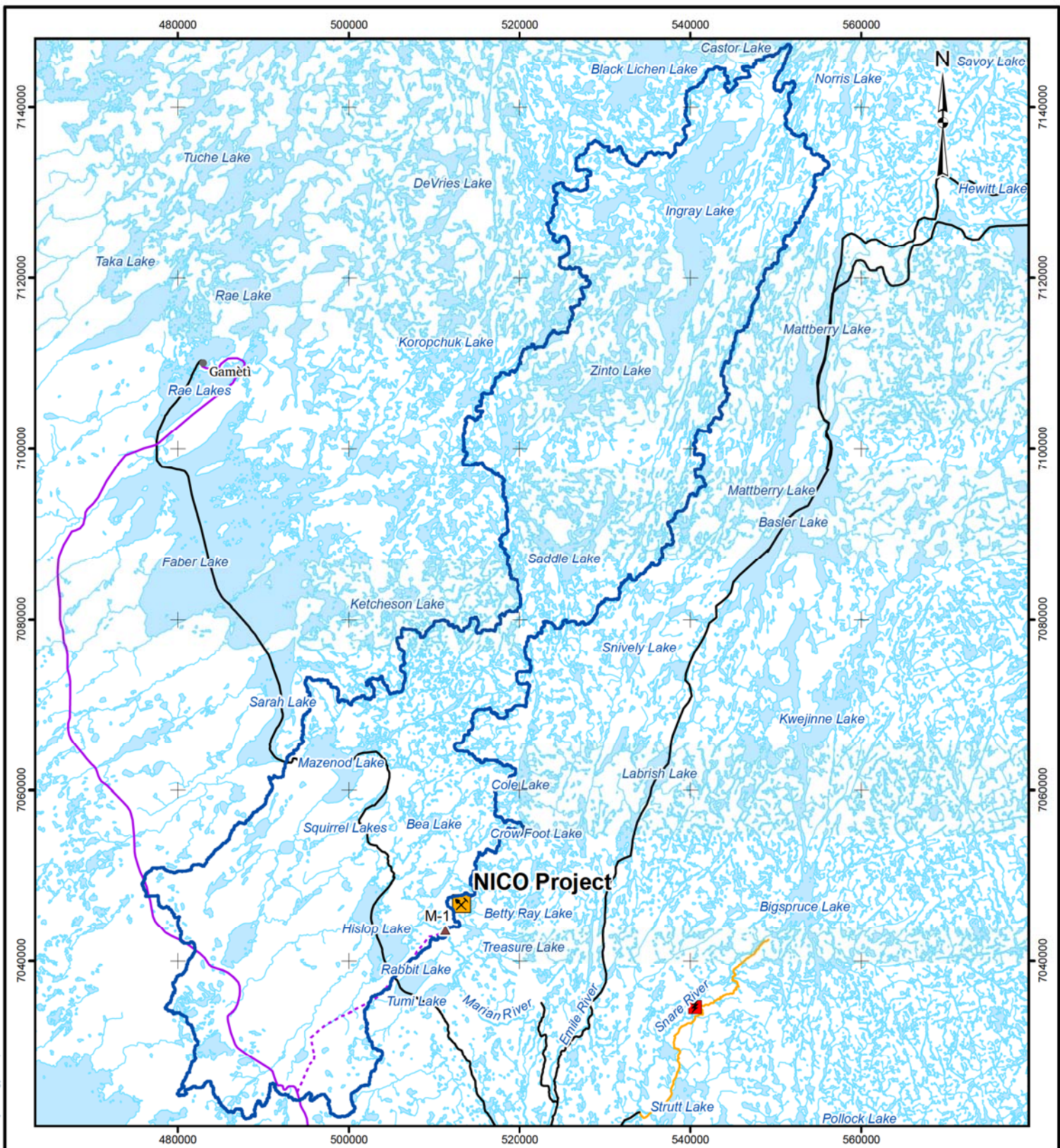
Long term discharge records have been generated through regression analysis and/or unit area runoff assessment for watersheds upstream of Burke and Lou Creeks. The target watersheds are presented in Figure 5-1. The assessment method for the drainages upstream of Burke and Lou Creeks required evaluation of the local reporting drainage area and proximity to hydrometric gauging stations (Figure 5-4). Table 5-12 presents the watersheds outlined in Figure 5-1 and the corresponding gauging station that was used to create the long term

record of data. As shown on Figure 5-4, the flow monitoring stations in the respective sub-watersheds, was not usually at the watershed outlet, but rather at a location further upstream or downstream where physical conditions were more suitable for hydrometric measurements. In most cases, instantaneous discharge measurements from the corresponding gauging station were pro-rated on a unit area basis to the outlet of the drainage area in question. A linear regression analysis was then performed on the area-rated discharge data with respect to either Burke or Lou Creek. The result of the linear regression analysis was used to create the long term record for the drainage area when the coefficient of determination was sufficiently high ($r^2 > 0.8$). When the coefficient of determination is lower than 0.8, an unit area ratio was used to calculate the long term discharge record. The long term discharge records presented as monthly average values for the upstream watersheds are included in Appendix IV, Table IV-1.













5.7 LONG TERM FLOW RECORD FOR THE MARIAN RIVER

A long term discharge record for the Marian River has been developed through a regression analysis with the Cameron River near Yellowknife. The Cameron River has a drainage area of 3630 km², 32 years of data and is currently operational.

The drainage area of the Marian River is approximately 2770 km² (Table 5-3; Figure 5-11) and generally flows from north to south towards the site. Similar to the smaller drainages within the Burke and Lou Watersheds, a regression analysis to the Cameron River was performed using measured data from the hydrometric station established at the Marian River. The Marian River was gauged during similar periods as Burke and Lou Creeks (2005 to 2008) and the coincident daily average discharges for all four years was plotted against the Cameron River without a delay in the timing of the hydrograph. A delay in the timing does not appear to be necessary for the Marian River-Cameron River regression. The regression analysis is presented in Figure 5-12.

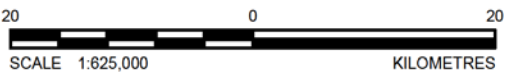


LEGEND

-  NICO PROJECT
-  POPULATED PLACE
-  SNARE HYDRO LOCATION
-  HIGHWAY
-  EXISTING ALL-WEATHER ROAD
-  EXISTING WINTER ROAD
-  PROPOSED ALL-LAND WINTER ROAD ROUTE
-  PROPOSED NICO PROJECT ACCESS ROAD
-  WATERCOURSE
-  WATERBODY
-  MONITORING STATION
-  MARIAN RIVER DRAINAGE

REFERENCE

Base data obtained from Atlas of Canada, DMTI and GeoGratis.
 Projection: UTM Zone 11 Datum: NAD 83



PROJECT		FORTUNE MINERALS LIMITED																					
PROJECT		NICO DEVELOPERS ASSESSMENT REPORT																					
TITLE		MARIAN RIVER DRAINAGE AREA																					
		<table border="1" style="font-size: small;"> <tr> <td colspan="2">FILE No. B-Hydrol-007-GIS</td> <td>SCALE AS SHOWN</td> <td>REV. 0</td> </tr> <tr> <td>DESIGN</td> <td>TL</td> <td>01 Dec. 2010</td> <td></td> </tr> <tr> <td>GIS</td> <td>JH</td> <td>07 Dec. 2010</td> <td></td> </tr> <tr> <td>CHECK</td> <td>LY</td> <td>09 Dec. 2010</td> <td></td> </tr> <tr> <td>REVIEW</td> <td>GA</td> <td>09 Dec. 2010</td> <td></td> </tr> </table>		FILE No. B-Hydrol-007-GIS		SCALE AS SHOWN	REV. 0	DESIGN	TL	01 Dec. 2010		GIS	JH	07 Dec. 2010		CHECK	LY	09 Dec. 2010		REVIEW	GA	09 Dec. 2010	
FILE No. B-Hydrol-007-GIS		SCALE AS SHOWN	REV. 0																				
DESIGN	TL	01 Dec. 2010																					
GIS	JH	07 Dec. 2010																					
CHECK	LY	09 Dec. 2010																					
REVIEW	GA	09 Dec. 2010																					
		FIGURE: 5-11																					

I:\CLIENTS\FORTUNE_MINERALS\08-1373-0017\Mapping\MXD\Hydrology\B-Hydrol-007-GIS.mxd

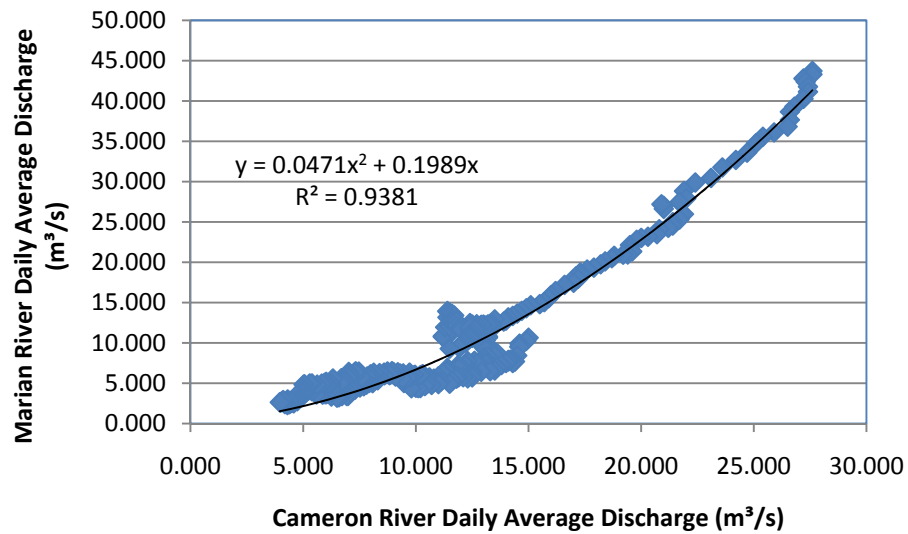


Figure 5-12 Relationship Between Average Daily Discharge (m³/s) for Marian River and Cameron River

As presented in Figure 5-12, the regression analysis provided a polynomial equation as the best fit line of the relationship between the Marian River and the Cameron River. The general fit of the line is good ($R^2 > 0.93$); however, there may be a tendency for this equation to over predict higher flow regimes due to the nature of a polynomial equation. The highest recorded daily discharge for the Cameron River in the 32 year record is 56.7 m³/s (17 June 1991) which would correspond to 163 m³/s for the Marian River. The highest measured discharge on the Marian River was 43.0 m³/s during the 4 years of monitoring. It is also plausible that the equation may under predict lower flows. This is evident during the winter measurement where the measured discharge of 2.73 m³/s is approximately 3 times higher than the calculated discharge of 0.885 m³/s from the Cameron River on the same day. In general, the polynomial expression from the Cameron River daily discharge to the Marian River provides a reasonable representation of discharge in the Marian River (Figure 5-13). The long term monthly average discharge record for the Marian River is included in Appendix IV, Table IV-2.

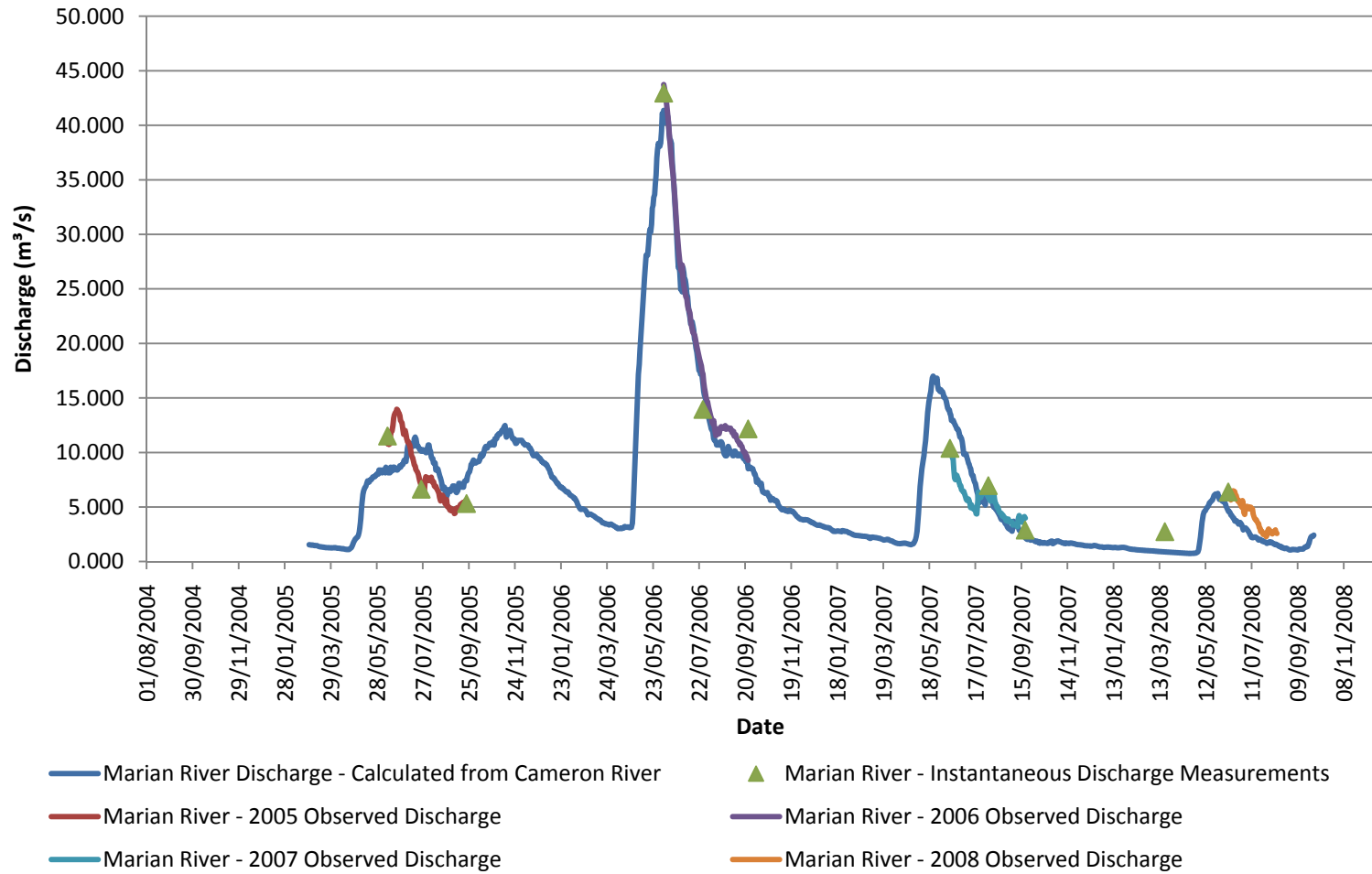


Figure 5-13 Measured and Calculated Hydrographs for the Marian River

5.8 LOCAL INFILTRATION ANALYSIS

Estimates of local infiltration at a site provide a background understanding of the interaction between the climatic water balance and hydrogeological conditions. Infiltration can be a difficult parameter to measure as there are many variables to consider including antecedent soil moisture, hydraulic conductivity, and composition of the medium, storage capacities in local depressions and vegetated cover. As a result, estimates of infiltration can be coarse without intensive study and instrumentation to monitor moisture flux in the ground surface.

To provide an estimate of infiltration an assessment was performed by comparing the discharge from the climatic water balance to the actual measured discharge in the Burke and Lou Watersheds. In the assessment of the climatic water balance (Section 5.4) infiltration was assumed to be negligible. Selected years of the climatic water balance were compared to hydrological years that are provided in the long term record (Section 5.6). The infiltration analysis was performed using a hydrological year where the beginning of the year coincides with the accumulation of snowfall; in this case the hydrological year is assumed to begin in October of each year. As in the climatic water balance the limiting parameter is the lack of net radiation data. Net radiation data that was used in Section 5.6 covered the years of 1984 to 1992, 1998, and 1999. The availability of net radiation data limits the infiltration assessment to nine hydrological years.

The infiltration analysis was performed by annual assessment of the climate balance using a hydrological year. The summation of losses and gains of water in the watersheds was evaluated using evapotranspiration and lake evaporation calculations to provide the discharge of water leaving the watershed. This assessment assumes that the change in storage within the watershed is negligible. The Burke and Lou watersheds are assessed separately at their respective outlets at BL8 and LL6, respectively.

The results of the infiltration analysis are presented in Table 5-12. This assessment indicates maximum infiltration estimates of approximately 109 mm and 76.0 mm for the Burke and Lou watersheds, respectively. However, there are 2 limitations of the analysis which must be considered in review of these estimates:

- 1) There is no assumed storage in the watersheds such as would result from the construction of beaver dams at the outlets of the watersheds; and

- 2) Discharge from the watersheds which is affected by infiltration during the precipitation event may not appear in the hydrograph until the beginning of the next hydrological year.

These limitations would affect this assessment as follows. Storage would reduce the discharge leaving the watersheds and would increase the value of infiltration in this assessment. Discharge affected by infiltration that does not appear on the hydrograph until the next hydrological year may have a positive or negative effect on the estimate of infiltration by reflecting too high or too low of a discharge both in the current hydrological year and in the next hydrological year.

Given these limitations it is important to consider that this estimate of infiltration is likely high and should be considered as a high level assessment. Additionally, hydrological years 1, 3, 4 and 6 have 9 or fewer months of measured discharge as reported in the long term record which would also indicate greater infiltration. The results of this assessment indicate that infiltration for the Burke Watershed may range from near zero to as high as 83 mm (Year 9) while infiltration for the Lou Watershed may range from near zero to as high as 61 mm (Year 9).

Table 5-12 Results of Infiltration Analysis

Hydrological Year	Start of Hydrological Year	Total Precipitation (mm)	Lake Evaporation (mm)	Actual Evapotranspiration (mm)	Burke Drainage (BL8)			Lou Drainage (LL6)		
					Discharge from Correlated Record (mm)	Water Balance Discharge (mm)	Deficit (mm)	Discharge from Correlated Record (mm)	Water Balance Discharge (mm)	Deficit (mm)
1	Oct-84	396.3	480.9	205.2	102.0	133.0	30.9	77.2	95.1	17.9
2	Oct-85	395.9	458.3	232.9	54.9	115.4	60.5	41.5	81.9	40.4
3	Oct-86	343.1	486.6	232.1	13.0	58.4	45.4	9.8	47.0	37.2
4	Oct-87	488.0	431.9	227.8	108.0	215.3	107.3	81.7	144.4	62.7
5	Oct-88	325.7	451.1	222.2	43.0	56.2	13.1	32.6	44.6	12.1
6	Oct-89	404.3	480.1	210.5	28.2	136.9	108.7	21.3	97.3	76.0
7	Oct-90	454.5	521.4	219.2	128.4	171.2	42.8	97.1	120.3	23.3
8	Oct-91	382.9	498.2	226.1	97.9	100.0	2.1	74.05	74.08	0.03
9	Oct-98	344.8	493.4	144.2	44.6	127.7	83.1	33.7	94.7	60.9

5.9 REGIONAL FLOOD MAGNITUDE AND FREQUENCY

The purpose of predicting flood magnitude and frequency is primarily for engineering design requirements, such as culvert sizing or deriving appropriate capacities for ditches or reservoirs. Information about the average frequency of flows of a particular magnitude is an important consideration in decision making for mining operations. The objective of flood frequency and magnitude estimates is to assign probabilities to peak flows of a given size.

A flood magnitude and frequency analysis was conducted for the Marian River long term data (Section 5.7) and for each of the individual watersheds described in Section 5.6. The peak discharges for each station were estimated and fitted to a probability distribution (Log-Pearson III) to calculate flood magnitude and frequency. The results of the probability analysis are presented in Table 5-12.

Table 5-12 Results of Flood Frequency Analysis

Return Period (years)	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8	LL1	LL2	LL3	LL4	LL5	LL6	M1
2	0.09	0.15	0.50	0.64	0.09	0.02	0.01	1.15	0.10	0.23	0.10	0.02	0.59	0.87	9.84
5	0.18	0.29	1.02	1.24	0.19	0.05	0.02	2.35	0.20	0.45	0.20	0.03	1.21	1.78	31.09
10	0.25	0.40	1.45	1.76	0.27	0.07	0.02	3.34	0.28	0.63	0.28	0.04	1.72	2.53	55.28
20	0.33	0.53	1.92	2.33	0.36	0.10	0.03	4.42	0.37	0.84	0.37	0.06	2.27	3.34	87.73
50	0.45	0.73	2.59	3.20	0.49	0.13	0.04	5.97	0.50	1.15	0.51	0.08	3.07	4.52	145.47
100	0.55	0.91	3.14	3.94	0.59	0.16	0.05	7.25	0.60	1.42	0.62	0.10	3.72	5.48	202.13

6 SUMMARY

Fortune Minerals Limited (Fortune) is proposing to develop the NICO Cobalt-Gold-Bismuth-Copper Project (Project) and a proposed NICO Project Access Road (NPAR) in the Northwest Territories (NWT). This section summarizes surface water hydrological conditions at the Project, with emphasis on methods and key findings for both baseline climatic conditions and streamflow. These data will be used to support the developer's assessment report (DAR) and as a design basis for engineered structures.

Hydrological data include estimated streamflow volumes, temporal, and spatial distribution of runoff, flow directions, and identification of watershed boundaries in the Project area. Climate parameters derived from regional data have been used to estimate actual evaporation and evaporation from free water surface for water balance purposes, along with prediction normal ranges and extreme precipitation potential.

Local streamflow and water level data were collected at 13 streams and seven waterbodies between 2005 and 2008. In the spring of 2005, the approximate extents of the watershed boundaries defining in the Project were verified during an initial reconnaissance survey. Surface water hydrology data collected in the Project LSA include:

- watershed drainage boundary delineation and verification;
- lake water level measurement;
- continuous stream water level (stage) measurement;
- instantaneous stream discharge and stream stage measurement; and
- winter discharge measurement.

The Project occurs within both the Lou Lake and Burke Lake watersheds. Both drainage systems discharge water to the southwest towards the Marian River. The Marian River generally flows towards the south joining first with the Emile River, and second with the La Martre River. The Marian River drains into Marian Lake, which drains to the North Arm of Great Slave Lake. Great Slave is drained by the MacKenzie River, which discharges to the Beaufort Sea.

6.1 STUDY AREAS

The hydrology regional study area (RSA) and local study areas (LSA) have been determined for the project and are shown in Figures 2-1 and 2-2, respectively.

The LSA includes portions of the Burke and Lou Lake watersheds that are likely to contain some project infrastructure and may be affected by the development of the Project. The LSA includes streams draining Burke and Lou lakes to the Marian River and the section of the Marian River that occurs between the two outlet streams.

The RSA for the Project directly encompasses the LSA, but extends downstream along the Marian River to the confluence with the Emile River. The Marian River discharges to Marian Lake, which drains to Great Slave Lake.

6.2 CLIMATE

6.2.1 Methods

The climate for the LSA was characterized using data from the nearest long-term climate station; that is, the Yellowknife Airport. Yellowknife Airport precipitation and temperature data were compared to coincident data from Snare Rapids (located 39 km east of the Project) and Gamèti Airport (located 68 km northwest of the Project). The visual inspection involves the monthly mean value and calculation of the normal 95% confidence interval based on the sample size of the variable of interest from the locations being compared (Smith 2008). When a confidence interval for either mean overlaps the other mean, the null hypothesis of equal means is accepted. Based on this assessment, it was concluded that the Yellowknife Airport data would be suitable for use in the LSA. Local climate data were collected at the Project location's meteorological station between 2004 and 2008; however, winter precipitation data were not collected in the winter.

Yellowknife Airport is the only climate station that remains active with a full suite of measured parameters. In addition, precipitation data from the Yellowknife Airport are available with corrections that account for precipitation gauge undercatch to provide a more accurate measurement for precipitation.

6.2.2 Results

Climatic parameters are used for numerous Project development purposes. These include calculation of water balance, extreme precipitation events and the normal of monthly and annual precipitation and temperature. Water balance calculations require the estimates of lake evaporation and actual evapotranspiration.

Monthly and annual means of selected climatic parameters are provided in Tables 6-1. Long-term mean precipitation for the Project area over the 65 year period of record was 343.5 mm; 25th and 75th percentiles, which would indicate a

dry or wet year, were 299 mm and 395 mm. The wettest year on record was 1974 (506.4 mm), whereas the driest was 1949 (194.9 mm). Most rainfall occurs in July, August, and September whereas maximum snowfall occurs in late fall and early winter (Table 6-1). On an annual basis, slightly more precipitation occurs as rain rather than snow. The maximum monthly rainfall is 152.4 mm (August 1969), whereas the highest snowfall in one month is 95 mm (water equivalent), which occurred in November 2006. For extreme precipitation, intensity-duration-frequency (IDF) analysis using data from the Yellowknife Airport indicates that a 1:100 year, 24 hour storm would yield 83.6 mm of rain.

Climatic parameters used for water balance calculations are also provided in Table 6-1. Parameters derived from Yellowknife Airport for the years 1953 to 2007 included precipitation adjusted for undercatch, air temperature, relative humidity, and wind speed. Lake evaporation was calculated using the modified Meyer formula (PFRA 2002) and estimates were partly based on Yellowknife data.

Actual evapotranspiration was calculated using the method of Granger and Gray (1989) and was limited to an 11 year period as net radiation was the limiting input variable. Net radiation, which was used for evapotranspiration calculations, was recorded at the climate station at Norman Wells, which is the nearest source of long-term net radiation. Soil heat flux, used in the estimate of actual evapotranspiration from land surfaces was assumed to be 6% of net radiation.

Table 6-1 Summary of Monthly and Annual Mean Climatic Parameters, NICO Project Area

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rainfall (mm)	0.3	0.3	0.2	2.8	15.7	25.0	40.1	44.1	32.1	15.2	1.6	0.4	177.9
Snowfall (water equivalent) (mm)	21.2	19.3	18.8	11.6	4.8	0.2	0.0	0.1	3.9	23.6	35.5	26.6	165.5
Total Precipitation (mm)	21.5	19.5	19.0	14.5	20.5	25.2	40.1	44.1	36.0	38.8	37.1	27.1	343.5
Actual Evapotranspiration (mm)	0.0	0.0	0.0	0.0	45.3	58.5	53.3	34.2	12.9	2.1	3.0	0.0	209.3
Lake Evaporation (mm)	0.0	0.0	0.0	0.0	0.0	118.6	154.4	120.7	66.8	18.0	0.0	0.0	478.5
Temperature (°C)	-27.0	-23.8	-17.6	-5.9	4.7	13.2	16.6	14.0	6.8	-1.5	-13.7	-22.8	-4.7
Relative Humidity (%)	69.2	68.8	66.6	65.6	59.2	55.9	59.6	68.1	75.2	82.4	80.3	72.5	68.6
Wind Speed (km/h)	12.4	12.9	14.0	15.3	15.7	15.5	14.5	14.4	15.4	15.9	14.5	12.4	14.4
Net Radiation (MJ/m ²)	-1.41	-1.69	2.50	-1.49	9.49	11.02	9.25	6.01	2.45	-0.81	-1.43	-1.27	n/a

MJ/m² = megajoules per square metre

6.3 SURFACE WATER HYDROLOGY

Surface water hydrology was characterized for the basins located in the LSA (i.e., Burke Lake, Lou Lake, and Marian River watersheds). As part of the hydrology study, basin drainage areas were delineated, flow from the basins was estimated using a water balance method, hydrometric and lake level monitoring was completed for the years 2005 to 2008, and flood magnitudes and frequencies were estimated for the basins. The majority of the monitoring sites occurred within the LSA; however, there are other sites included in the monitoring program that flow into the RSA.

6.3.1 Local Drainage

Two local drainage areas collect runoff from the Project area and both flow south to the Marian River. These drainages are referred to as the Burke Lake and Lou Lake watersheds and they drain areas of 90.8 km² and 58.5 km², respectively. Flow from the Lou Lake and Burke Lake drainages contribute a very small portion of the Marian River discharge. The Burke Lake and Lou Lake watersheds have been further divided into sub-basins based on topographic divides, with the smallest divisions in the area where Project facilities are expected to be constructed.

6.3.2 Water Balance

6.3.2.1 Methods

A climatic water balance was calculated to predict the mean annual discharges from each of the basins. This approach uses total precipitation, actual evapotranspiration, lake evaporation, and spatial parameters including land and lake surface areas to estimate mean annual discharge from each sub-basin. The approach assumes that seepage losses to (or gains from) groundwater are negligible and that water storage in soils is static.

6.3.2.2 Results

The calculated mean annual discharge from the Lou Lake drainage to the Marian River is 0.260 m³/s and the discharge from the Burke Lake drainage is 0.362 m³/s. On a per unit area runoff (UAR) basis (cubic metres per second per square kilometre in watershed), this translates to 0.0045 m³/s/km² from the Lou Lake drainage and 0.0040 m³/s/km² from the Burke Lake drainage. These results are similar to UAR results for regional hydrometric stations. For example, the UAR for the Indin River hydrometric station, located 125 km northeast of the Project

area, is $0.0052 \text{ m}^3/\text{s}/\text{km}^2$, and the UAR for the Emile River, located 42 km east of the Project area, is $0.0033 \text{ m}^3/\text{s}/\text{km}^2$.

6.3.3 Long Term Flow Record Derivation

6.3.3.1 Methods

Hydrometric monitoring field investigations usually occurred during the open-water seasons for the years 2005 to 2008; however, one field investigation occurred during the winter of 2008. Lake levels were surveyed from 2005 to 2008 at seven waterbodies. Hydrometric monitoring at up to 11 streamflow monitoring stations involved taking coincident measurements of stage and discharge during each field visit.

Stage (water level) was measured using staff gauges installed in the streams, and these were surveyed once each year relative to local benchmarks at each site. Continuous stage recording using water level sensors occurred during the open water season in streams draining Burke Lake, downstream of Lou Lake, and in the Marian River. Stage data from the loggers were converted to discharge using the stage-discharge data pairs (i.e., rating curves), so that a daily flow record was developed for each monitoring station.

The data collected at the Project was then correlated to long term data at Baker Creek for the smaller drainages and the Cameron River for the Marian River. The correlation provided estimates of long term daily average discharge at the watersheds delineated around the Project.

6.3.3.2 Results

Figures 6-1, 6-2, and 6-3 illustrate the measured hydrographs over the period 2005 to 2008 for Burke Creek, Lou Creek, and the Marian River respectively. Instantaneous discharge measurements using a current meter are also shown in the figures. The Marian River had the largest flows, followed by Burke Creek, which drains Burke Lake to the Marian River and Lou Creek, which flows from Lou Lake to the Marian River. Flows in 2006 were substantially higher than in other years, likely due to the large amount of snow that fell over the previous winter. The discharge peak for 2006 may not have been measured since they were receding when the first measurements were collected. Flows were lower in 2007 and 2008 than the other years measured, and reflect dry conditions in the area. 2008 was a particularly dry year and forest fires were widespread in the early summer, including forested areas in the vicinity of the Project.

Although discharge measurements have been taken regularly from 2005 to 2008, the stage-discharge relationships should still be considered preliminary. The majority of the discharge through the stations occurs as a function of snowmelt rather than high rainfall volumes throughout the year.

The long term data correlated to the site indicates that discharges at the outlet of the Burke (BL8) and Lou (LL6) drainages could exceed 5.0 and 4.0 m³/s, respectively. The long term data for the Marian River indicates that discharges in the system could exceed the 43.0 m³/s discharge recorded in 2006; however, the correlation to the Cameron River may over estimate discharge in larger flood events.

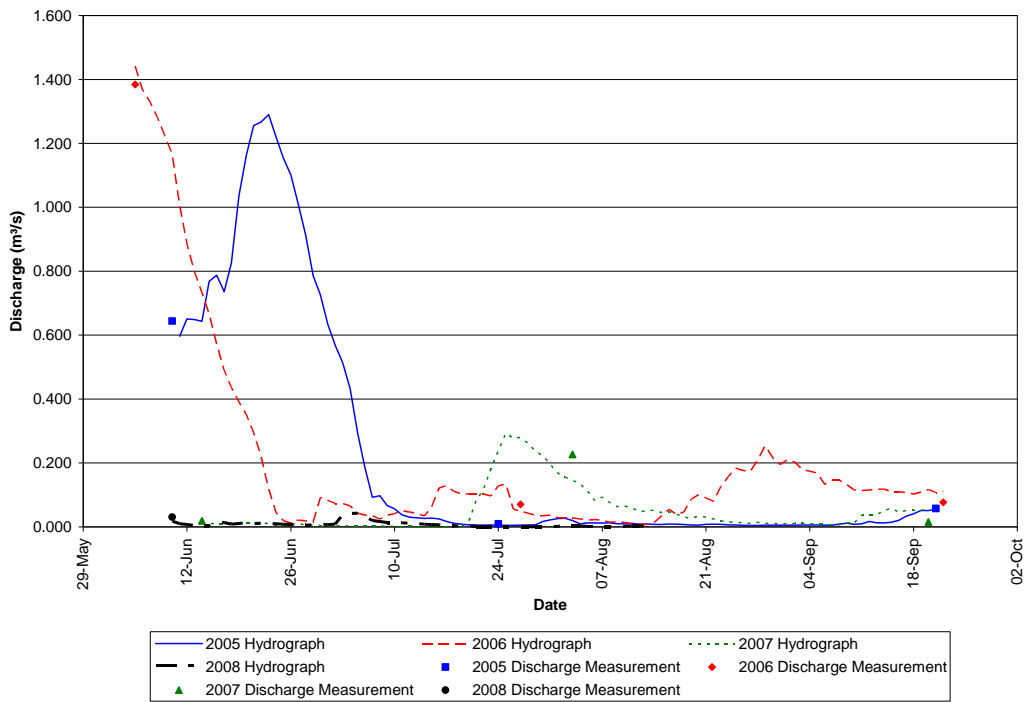


Figure 6-1 B-1 (Burke Creek) Hydrograph

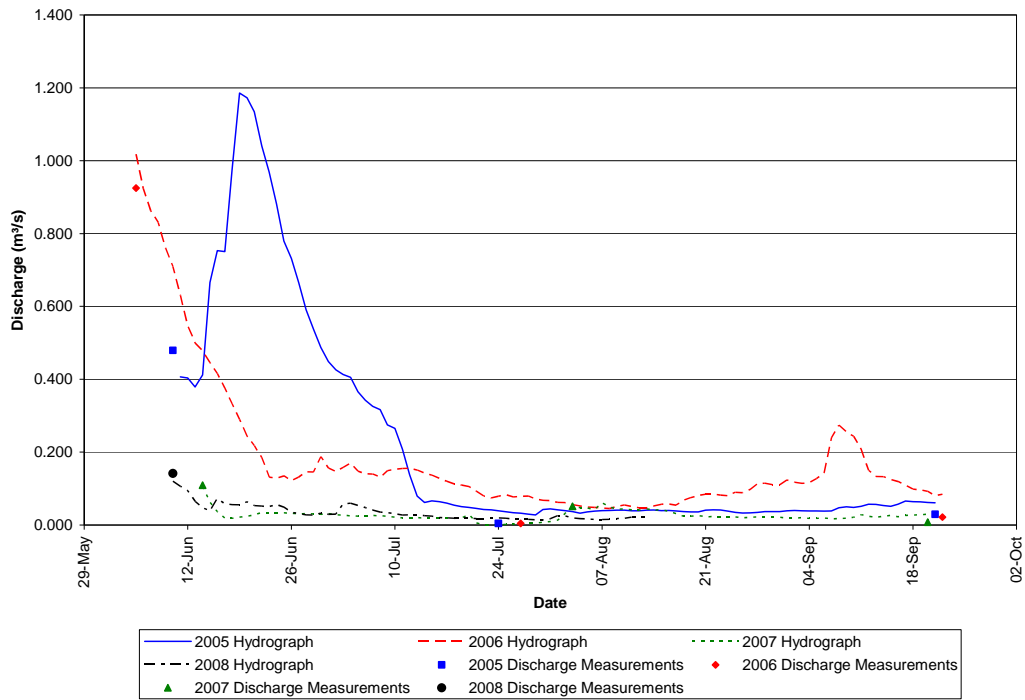


Figure 6-2 L-1 (Lou Creek) Hydrograph

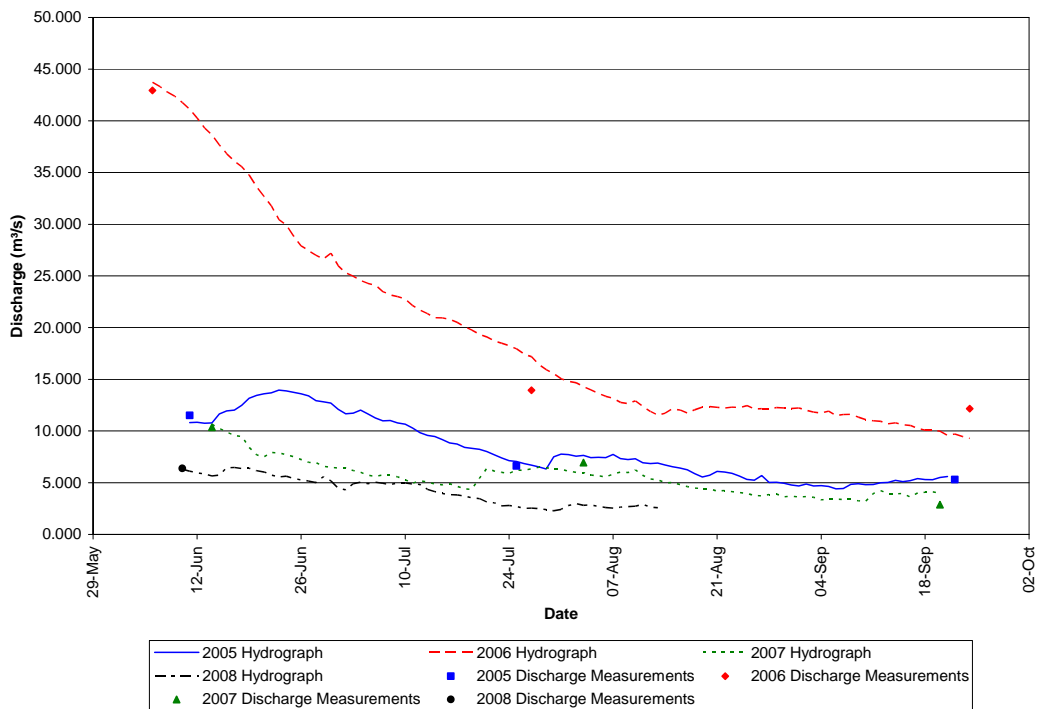


Figure 6-3 M-1 (Marian River) Hydrograph

Figure 6-4 indicates the results of lake level monitoring in the LSA over the period 2005 to 2008. Water levels receded in Peanut Lake beginning in 2006 and continuing through 2008, but they increased in Burke Lake over the same time period. Burke Lake is located immediately downstream of Peanut Lake. The most probable reason for these water level patterns was failure in a beaver dam that was controlling the water level in Peanut Lake, combined with the construction of a new beaver dam at the outlet of Burke Lake. In general, extensive beaver activity in the area has a strong influence on water levels and stream discharges.

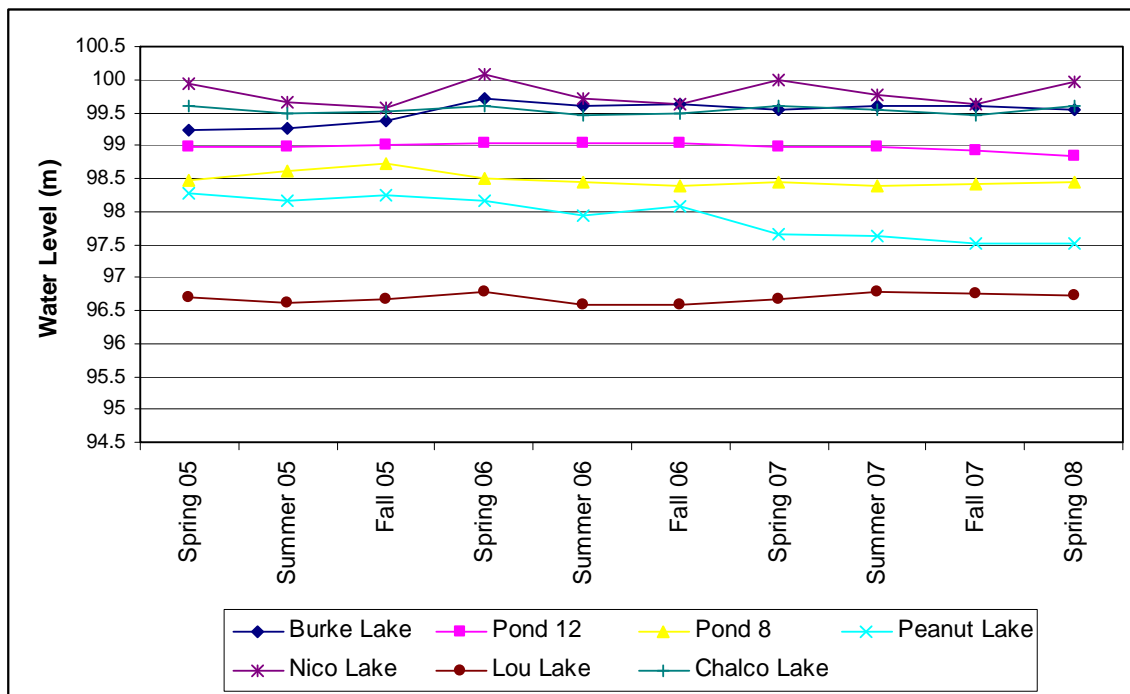


Figure 6-4 Water Level Measurements for Lakes in the Project Area

6.3.4 Flood Magnitude and Frequency

6.3.4.1 Methods

Annual peak daily discharges for each of the watersheds in the Project area were estimated and fit to a probability distribution (Log-Pearson III) to calculate flood magnitude and frequency. The flood magnitudes and frequencies can be used in evaluation of structural design for stream crossings and other engineered structures.

6.3.4.2 Results

Results of the flood magnitude and frequency analysis for streamflow monitoring stations at all of the watershed outlets are provided in Table 6-4. This assessment is based on correlated data to the site and as such discharge monitoring should be undertaken during operations to confirm flood magnitudes.

Table 6-4 Annual Maximum Flood (m³/s) at Specific Return Intervals (year)

Return Period (years)	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8	LL1	LL2	LL3	LL4	LL5	LL6	M1
2	0.09	0.15	0.50	0.64	0.09	0.02	0.01	1.15	0.10	0.23	0.10	0.02	0.59	0.87	9.84
5	0.18	0.29	1.02	1.24	0.19	0.05	0.02	2.35	0.20	0.45	0.20	0.03	1.21	1.78	31.09
10	0.25	0.40	1.45	1.76	0.27	0.07	0.02	3.34	0.28	0.63	0.28	0.04	1.72	2.53	55.28
20	0.33	0.53	1.92	2.33	0.36	0.10	0.03	4.42	0.37	0.84	0.37	0.06	2.27	3.34	87.73
50	0.45	0.73	2.59	3.20	0.49	0.13	0.04	5.97	0.50	1.15	0.51	0.08	3.07	4.52	145.47
100	0.55	0.91	3.14	3.94	0.59	0.16	0.05	7.25	0.60	1.42	0.62	0.10	3.72	5.48	202.13

7 REFERENCES

- Environment Canada. 2008a. National Climate Data and Information Archive. Accessed online on 13 December 2008. http://www.climate.weatheroffice.ec.gc.ca/Welcome_e.html. Government of Canada.
- Environment Canada. 2008b. Historical Adjusted Climate Database for Canada. Accessed online on 14 December 2008. <http://www.cccma.bc.ec.gc.ca/hccd/index.shtml>. Government of Canada.
- Environment Canada. 2008c. Water Survey Canada – Data Products and Services. Accessed online on 15 December 2008. http://www.wsc.ec.gc.ca/products/main_e.cfm?cname=products_e.cfm. Government of Canada.
- Golder (Golder Associates Ltd.). 2008a. Existing Air Quality and Meteorological Studies Baseline Report for the Proposed NICO Project. In Draft.
- Golder. 2008b. Aquatics Baseline Report for the Proposed NICO Project. In Draft.
- Granger, R.J. 1999. Partitioning of Energy During the Snow-free Season at the Wolf Creek Research Basin. National Water Research Institute, Environment Canada. Saskatoon, Saskatchewan.
- Granger, R.J., and D.M. Gray. 1989. Evaporation from Natural Nonsaturated Surfaces. *Journal of Hydrology* 111: 21-29. Elsevier Science Publishers B.V., Amsterdam.
- Prairie Farm Rehabilitation Administration. 2002. Gross Evaporation for the 30-Year Period (1971-2000) in the Canadian Prairies. Technical Service. Hydrology Report No. 143.
- Smith, R.W. 2008. Visual Hypothesis Testing with Confidence Intervals. Accessed online on 13 December, 2008. <http://www2.sas.com/proceedings/sugi22/STATS/PAPER270.PDF>. EcoAnalysis Inc. Ojai, CA.
- Terzi, R.A. 1981. Hydrometric Field Manual. Measurement of Streamflow. Inland Waters Directorate. Water Resources Branch, Environment Canada. Ottawa, Canada.

8 GLOSSARY

8.1 ABBREVIATIONS AND ACRONYMS

AWAR	all-weather access road
EA	environmental assessment
Fortune	Fortune Minerals Limited
Golder	Golder Associates Ltd.
IDF	intensity-duration-frequency
LSA	local study area
MSC	Meteorological Service of Canada
NWT	Northwest Territories
Project	Fortune Minerals NICO Project
RSA	regional study area
UAR	unit area runoff

8.2 UNITS OF MEASURE

%	percent
°C	degrees Celsius
cm	centimetre
km	kilometre
km ²	square kilometres
km/h	kilometres per hour
m	metre
m ³ /s	cubic metres per second
m ³ /s/km ²	cubic metres per second per square kilometre
MJ/m ²	megajoules per square metre
mm	millimetre

APPENDIX I
LONG-TERM CLIMATE DATA

Table I-1 Monthly Corrected Total Precipitation Data (mm) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1943	31.2	25.1	25.4	29.5	29.5	9.8	47.9	25.0	14.7	33.9	13.4	17.1	302.5
1944	13.8	5.9	2.1	2.3	27.3	49.4	17.1	42.3	8.9	32.8	18.2	-	220.1
1945	7.8	15.5	24.6	11.9	5.6	14.2	52.5	9.5	34.5	40.6	4.1	36.8	257.6
1946	32.4	12.9	14.7	12.0	26.5	1.4	18.6	25.7	10.2	39.5	19.0	27.0	239.9
1947	25.7	18.8	7.1	4.2	5.3	5.4	17.2	28.7	25.6	20.8	21.2	14.9	194.9
1948	12.0	12.4	4.2	2.0	6.1	22.9	94.3	48.4	57.4	8.6	25.7	15.0	309.0
1949	13.9	6.9	16.3	19.6	14.0	25.0	8.1	22.7	22.8	42.4	36.3	8.7	236.7
1950	8.1	17.6	4.5	7.0	12.5	38.4	23.4	36.2	30.1	26.2	8.8	35.2	248.0
1951	8.5	9.1	8.9	6.1	23.5	37.5	25.6	28.4	36.3	28.4	16.6	23.1	252.0
1952	9.1	19.4	15.2	20.3	29.8	13.3	39.0	57.1	62.0	23.3	21.3	23.4	333.2
1953	10.9	11.9	5.7	3.1	10.9	13.3	28.3	81.2	27.6	28.9	24.5	27.0	273.3
1954	12.5	10.5	23.4	4.8	6.1	12.6	68.9	31.1	43.0	16.1	49.1	28.1	306.2
1955	13.8	13.5	8.6	24.2	6.9	15.4	48.4	13.6	17.5	14.2	28.0	17.0	221.1
1956	18.1	18.4	10.4	5.1	20.6	16.7	29.9	45.0	41.3	33.9	29.7	24.3	293.4
1957	19.2	19.3	14.1	13.2	66.3	53.0	79.3	14.6	42.5	17.0	35.1	37.3	410.9
1958	28.9	18.5	21.2	28.7	32.0	3.0	28.5	130.6	55.7	53.1	31.2	57.4	488.8
1959	10.5	16.4	54.3	28.0	11.2	6.4	70.2	46.1	53.1	76.6	44.7	40.1	457.6
1960	14.7	25.1	24.0	5.2	28.7	16.9	47.8	49.0	40.6	75.3	54.1	23.0	404.4
1961	45.5	27.1	27.6	12.9	2.8	6.6	65.2	22.5	42.5	65.9	42.8	27.1	388.5
1962	33.3	15.4	9.7	3.8	6.9	34.1	38.0	55.6	8.1	19.7	50.4	29.3	304.3
1963	32.5	22.3	15.4	9.3	4.8	33.4	60.1	46.8	27.3	15.1	42.3	13.1	322.4
1964	18.6	20.6	9.1	14.5	16.6	7.7	5.5	13.7	59.4	28.5	24.4	11.3	229.9
1965	11.4	10.2	6.6	17.3	2.8	42.0	42.5	19.5	7.7	32.0	61.7	20.7	274.4
1966	12.5	7.0	27.7	24.1	19.8	36.3	18.8	8.1	29.5	47.6	35.3	29.9	296.6
1967	12.6	22.8	19.1	4.0	11.5	24.6	19.7	8.0	15.2	107.4	36.1	18.0	299.0
1968	32.0	19.4	8.8	17.1	18.4	16.9	16.1	18.4	68.5	29.0	40.2	14.1	298.9
1969	14.7	12.4	13.6	29.3	26.2	14.5	20.9	152.4	17.1	11.4	32.9	23.9	369.3
1970	17.9	27.5	21.4	16.3	20.5	15.8	40.8	92.9	31.4	30.0	17.1	29.8	361.4
1971	27.7	15.6	21.7	15.0	24.1	14.5	15.7	69.0	28.0	45.6	52.5	17.5	346.9
1972	12.4	20.4	28.9	27.1	6.0	17.5	39.9	34.0	38.9	54.6	33.4	21.1	334.2
1973	20.7	16.5	32.2	12.3	12.8	16.1	27.2	132.2	18.6	52.5	63.7	29.6	434.4
1974	25.9	14.8	20.5	7.7	31.3	38.7	80.0	65.1	53.3	61.9	38.5	68.6	506.3
1975	18.3	14.7	11.3	12.9	16.7	3.6	12.7	89.9	26.3	60.9	32.1	36.8	336.2
1976	26.4	21.1	18.7	12.1	19.9	42.7	28.2	40.3	47.3	18.3	20.1	16.8	311.9
1977	24.0	25.6	11.7	8.9	39.7	10.2	26.6	22.5	19.0	38.0	46.6	23.6	296.4
1978	11.9	7.2	17.4	26.5	10.9	25.3	81.7	7.9	40.1	49.7	31.5	36.4	346.5
1979	11.9	5.6	20.9	19.0	34.7	6.1	25.3	45.9	19.2	60.1	34.3	20.6	303.6
1980	38.2	12.4	4.1	7.0	63.6	15.2	13.0	34.0	41.8	38.9	40.8	14.1	323.1
1981	21.1	24.4	12.8	23.5	4.3	40.6	27.0	39.6	46.6	60.5	34.2	15.5	350.1
1982	3.6	40.9	5.4	6.3	47.8	17.0	13.4	12.4	66.1	26.3	29.9	34.5	303.6
1983	35.4	11.8	22.5	9.4	31.4	14.8	51.2	35.0	32.6	36.1	40.4	11.0	331.6

Table I-1 Monthly Corrected Total Precipitation Data (mm) for Yellowknife Airport (continued)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1984	22.6	43.0	21.0	10.9	9.3	74.6	65.9	31.7	17.4	46.6	37.0	15.9	395.9
1985	19.6	50.1	14.3	33.1	28.7	12.0	61.5	49.1	28.4	54.6	51.3	24.9	427.6
1986	23.2	20.7	27.2	8.7	21.4	50.1	24.0	77.1	12.7	31.1	17.8	34.1	348.1
1987	28.9	51.7	12.2	13.6	7.2	52.3	11.4	31.9	50.9	41.3	62.0	31.7	395.1
1988	24.9	22.3	10.3	28.2	22.5	76.2	112.2	18.7	37.7	27.8	68.5	19.7	469.0
1989	38.6	7.7	19.0	1.7	23.4	31.9	49.2	12.1	26.1	36.7	59.6	30.2	336.2
1990	30.7	16.4	13.1	16.5	7.1	11.7	75.0	89.9	17.4	53.1	28.3	42.1	401.3
1991	34.2	23.9	28.0	19.3	35.6	65.6	20.2	66.8	37.4	60.1	48.1	22.1	461.3
1992	43.7	22.2	35.4	19.8	18.2	36.8	27.7	11.8	37.0	37.1	40.3	17.1	347.1
1993	11.2	31.2	22.0	7.7	44.4	3.9	72.4	18.6	46.3	25.0	28.8	50.7	362.2
1994	16.3	12.9	36.7	7.6	16.3	22.9	30.7	6.5	24.0	36.0	52.9	31.2	294.0
1995	22.9	22.5	57.2	12.8	5.7	14.6	30.3	17.1	37.3	27.4	27.8	48.4	324.0
1996	12.2	25.5	23.7	30.1	9.7	37.8	15.5	51.0	63.9	26.2	31.7	28.0	355.3
1997	28.9	9.0	34.6	4.2	31.1	37.5	23.9	31.6	50.9	43.2	43.3	25.6	363.8
1998	28.5	21.9	6.0	27.3	0.3	46.3	13.8	59.5	48.3	59.2	28.3	22.0	361.4
1999	25.2	26.2	22.6	15.6	25.6	13.1	20.9	42.1	44.0	36.8	36.8	34.8	343.7
2000	8.9	15.4	15.2	12.5	13.0	46.4	43.9	92.3	30.1	59.5	55.7	14.3	407.2
2001	29.9	12.5	43.7	8.2	40.6	6.4	63.2	82.1	55.1	25.8	38.5	44.5	450.5
2002	8.2	31.5	13.6	6.4	20.5	20.3	107.3	55.9	33.2	38.6	21.5	38.0	395.0
2003	11.4	11.2	21.7	15.9	33.0	37.9	13.1	60.0	26.6	18.1	44.4	43.1	336.4
2004	19.5	19.7	8.9	20.4	10.9	5.7	26.6	7.8	44.6	45.8	37.7	25.7	273.3
2005	41.4	32.8	24.1	21.6	9.5	43.9	48.2	65.9	86.3	33.7	57.1	22.2	486.7
2006	23.6	20.3	27.2	23.6	37.4	33.1	44.4	55.9	23.4	14.7	95.2	20.4	419.2
2007	45.9	25.9	27.8	11.4	26.5	6.7	93.1	30.4	55.1	-	-	-	322.8
Mean	21.5	19.5	19.0	14.5	20.5	25.2	40.1	44.1	36.0	38.8	37.1	27.1	343.5

Source: Environment Canada 2008b

Table I-2 Monthly Corrected Rainfall Data (mm) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1943	0.0	0.0	0.0	3.1	29.1	9.6	47.9	25.0	13.8	25.2	0.0	0.0	153.7
1944	0.0	0.0	0.0	0.9	26.0	49.4	17.1	42.3	8.6	24.9	0.0	0.3	169.5
1945	0.0	0.0	0.0	0.0	5.0	14.2	52.5	9.5	34.5	34.9	0.0	0.0	150.6
1946	0.0	0.0	0.0	11.2	24.1	1.4	18.6	25.7	7.2	0.3	0.0	0.0	88.5
1947	0.0	0.0	0.0	0.0	4.7	5.4	17.2	28.7	25.6	18.3	0.0	0.0	99.9
1948	0.0	0.0	0.0	0.3	6.1	22.9	94.3	48.4	55.7	7.0	0.0	0.0	234.7
1949	0.0	0.0	0.0	0.9	13.1	25.0	8.1	22.7	22.8	22.4	0.6	0.0	115.6
1950	0.0	0.0	0.0	2.8	4.5	38.2	23.4	36.2	29.3	4.7	0.3	0.5	139.9
1951	0.0	0.0	0.0	3.1	15.4	37.1	25.4	28.4	35.3	14.9	0.3	0.0	159.9
1952	0.0	0.0	0.3	11.3	29.6	13.3	39.0	57.1	48.9	11.5	1.9	0.0	212.9
1953	0.0	0.0	0.5	1.6	9.0	13.3	28.3	81.2	26.5	25.2	1.9	0.0	187.5

**Table I-2 Monthly Corrected Rainfall Data (mm) for Yellowknife Airport
(continued)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1954	0.0	0.0	0.0	0.0	5.5	12.6	68.9	31.1	41.0	5.8	11.0	0.0	175.9
1955	0.0	0.0	0.0	1.2	5.4	15.4	48.4	13.6	17.1	10.8	0.3	0.0	112.2
1956	0.0	0.0	0.0	0.3	19.9	16.7	29.9	45.0	20.2	4.4	1.8	0.3	138.5
1957	0.0	0.0	0.3	4.5	60.1	51.5	79.3	14.6	40.8	4.1	0.6	0.0	255.8
1958	0.0	0.0	1.0	5.3	30.4	2.8	28.5	130.6	55.3	5.2	3.0	1.1	263.2
1959	0.0	0.0	0.3	3.1	6.4	6.2	70.2	46.1	51.2	7.6	3.7	0.9	195.7
1960	0.0	0.6	0.0	0.9	24.5	16.9	47.8	49.0	40.2	15.7	1.2	0.6	197.4
1961	0.0	0.9	0.3	2.1	1.3	6.6	65.2	22.5	23.0	14.0	2.4	0.0	138.3
1962	0.6	0.0	0.0	0.0	1.2	34.1	38.0	55.6	7.9	12.7	2.5	0.8	153.4
1963	0.3	0.6	0.3	3.9	4.2	33.4	60.1	46.8	26.4	9.3	5.8	2.1	193.2
1964	0.3	0.3	0.0	0.9	15.5	7.7	5.5	13.7	50.8	16.2	0.6	0.0	111.5
1965	0.0	0.0	0.0	0.9	1.7	41.4	42.5	19.5	4.5	8.7	0.8	0.3	120.3
1966	0.0	0.0	0.3	0.5	18.7	36.3	18.8	8.1	25.6	20.1	0.3	0.0	128.7
1967	0.0	0.0	0.0	0.0	4.5	20.8	19.7	7.8	14.8	57.6	1.7	0.3	127.2
1968	0.9	1.2	0.3	0.6	7.4	16.9	16.1	18.4	67.9	15.1	2.6	0.0	147.4
1969	0.0	0.0	0.0	5.2	19.9	14.5	20.9	152.4	13.9	6.2	5.5	1.9	240.4
1970	0.3	0.0	0.0	2.9	6.1	12.5	40.8	92.9	29.8	13.2	3.7	0.3	202.5
1971	0.3	0.0	0.3	1.6	20.9	14.5	15.7	69.0	25.6	29.3	0.6	0.0	177.8
1972	0.0	0.0	1.1	0.3	5.0	17.5	39.9	34.0	25.4	7.5	1.8	0.0	132.5
1973	0.6	0.3	0.0	0.6	12.8	16.1	27.2	132.2	18.6	33.5	0.7	0.0	242.6
1974	0.0	0.0	0.0	0.6	25.5	38.5	80.0	64.9	40.5	11.5	3.0	0.6	265.1
1975	0.0	0.0	0.0	6.8	13.1	3.6	12.7	89.9	21.4	14.3	0.9	1.2	163.9
1976	0.0	0.3	0.0	8.5	19.1	42.7	28.2	40.3	47.1	8.2	3.2	0.6	198.2
1977	1.3	2.4	1.2	1.2	36.0	10.2	26.6	22.3	19.0	23.0	1.2	0.0	144.4
1978	0.0	0.3	0.3	6.1	5.7	24.9	81.7	7.9	40.1	20.6	0.9	0.0	188.5
1979	0.0	0.0	0.3	0.6	10.9	6.1	25.3	45.9	17.9	19.9	3.6	0.6	131.1
1980	0.0	0.3	0.0	4.7	51.4	15.2	13.0	34.0	28.3	27.6	2.1	0.6	177.2
1981	1.5	0.9	0.0	0.6	3.8	40.4	27.0	39.4	45.7	37.7	2.0	0.6	199.6
1982	0.0	0.3	0.0	2.6	32.5	15.8	13.4	10.5	66.1	10.3	0.6	0.3	152.4
1983	0.6	0.0	0.3	1.8	19.6	14.6	51.2	35.0	13.2	13.5	2.5	0.0	152.3
1984	0.3	0.6	1.2	1.4	7.3	74.4	65.9	31.7	14.4	10.7	0.9	0.0	208.8
1985	0.9	0.0	0.0	1.4	21.0	12.0	61.5	49.1	20.6	8.6	0.0	5.2	180.3
1986	0.6	0.9	0.0	0.0	18.2	49.9	24.0	77.1	11.7	17.3	0.3	0.6	200.6
1987	0.0	1.2	0.0	5.5	6.3	52.3	11.4	31.5	50.7	7.0	0.9	1.8	168.6
1988	0.0	0.3	0.3	2.3	20.8	76.2	112.2	18.7	36.9	14.7	1.8	0.6	284.8
1989	0.0	0.0	0.0	0.0	21.0	31.9	49.2	12.1	20.4	21.5	0.3	0.9	157.3
1990	0.9	0.6	0.6	6.9	3.2	11.2	75.0	89.9	17.2	13.5	0.3	0.0	219.3
1991	0.0	1.5	0.0	0.6	33.4	65.6	20.0	66.8	37.0	26.8	0.0	0.8	252.5
1992	0.6	0.0	0.6	1.8	8.4	36.8	27.7	11.6	31.1	15.6	2.0	0.0	136.2
1993	0.6	0.3	4.0	0.3	35.2	3.9	72.4	18.6	45.0	1.8	1.2	0.6	183.9
1994	0.0	0.0	0.6	0.9	13.2	22.9	30.7	6.5	23.8	19.1	1.3	0.0	119.0

Table I-2 Monthly Corrected Rainfall Data (mm) for Yellowknife Airport (continued)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1995	0.3	0.3	0.3	0.0	5.2	14.6	30.3	17.1	36.9	22.9	0.3	0.0	128.2
1996	0.0	0.9	0.0	15.1	6.9	37.8	15.5	51.0	63.1	8.2	0.0	0.0	198.5
1997	1.1	0.3	0.0	0.3	20.3	37.5	23.9	31.6	45.2	11.9	1.2	0.0	173.3
1998	0.9	1.5	0.0	11.4	0.3	46.3	13.8	59.5	48.3	32.1	3.3	0.0	217.4
1999	0.6	0.3	0.6	0.6	17.8	13.1	20.9	42.1	38.6	5.1	3.0	0.6	143.3
2000	0.3	0.0	0.3	10.1	4.5	46.4	43.9	92.3	24.9	7.9	3.0	0.0	233.6
2001	0.0	0.0	0.0	4.7	29.9	6.4	63.2	82.1	55.1	5.5	2.4	0.0	249.3
2002	0.0	0.0	0.0	0.6	2.0	20.3	107.3	55.9	26.7	11.9	3.8	2.1	230.6
2003	0.6	0.0	0.0	6.8	17.1	37.9	13.1	60.0	26.6	10.8	0.0	0.7	173.6
2004	0.0	0.0	0.3	0.6	6.6	5.7	26.6	7.8	23.9	6.3	0.6	0.0	78.4
2005	0.0	0.0	0.0	5.2	8.7	43.9	48.2	65.9	77.4	9.4	1.2	0.3	260.2
2006	6.3	0.0	0.0	2.8	37.4	33.1	44.4	55.9	23.4	8.5	0.0	0.0	211.8
2007	0.0	0.0	0.0	1.4	23.1	6.7	93.1	30.4	41.9	-	-	-	196.6
Mean	0.3	0.3	0.2	2.8	15.7	25.0	40.1	44.1	32.1	15.2	1.6	0.4	177.9

Source: Environment Canada 2008b

Table I-3 Monthly Corrected Snowfall Data (mm) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1943	31.2	25.1	25.4	26.3	0.4	0.2	0.0	0.0	0.9	8.7	13.4	17.1	148.7
1944	13.8	5.9	2.1	1.4	1.3	0.0	0.0	0.0	0.2	7.9	18.2	-	50.8
1945	7.8	15.5	24.6	11.9	0.6	0.0	0.0	0.0	0.0	5.8	4.1	36.8	107.1
1946	32.4	12.9	14.7	0.8	2.4	0.0	0.0	0.0	2.9	39.2	19.0	27.0	151.3
1947	25.7	18.8	7.1	4.2	0.7	0.0	0.0	0.0	0.0	2.5	21.2	14.9	95.1
1948	12.0	12.4	4.2	1.7	0.0	0.0	0.0	0.0	1.7	1.6	25.7	15.0	74.3
1949	13.9	6.9	16.3	18.7	0.8	0.0	0.0	0.0	0.0	20.0	35.7	8.7	121.0
1950	8.1	17.6	4.5	4.1	8.1	0.2	0.0	0.0	0.8	21.5	8.5	34.7	108.1
1951	8.5	9.1	8.9	3.0	8.2	0.4	0.2	0.0	1.0	13.5	16.3	23.1	92.2
1952	9.1	19.4	14.9	8.9	0.2	0.0	0.0	0.0	13.1	11.8	19.4	23.4	120.2
1953	10.9	11.9	5.2	1.5	1.9	0.0	0.0	0.0	1.1	3.7	22.6	27.0	85.8
1954	12.5	10.5	23.4	4.8	0.6	0.0	0.0	0.0	2.0	10.3	38.1	28.1	130.3
1955	13.8	13.5	8.6	23.0	1.5	0.0	0.0	0.0	0.4	3.4	27.7	17.0	108.9
1956	18.1	18.4	10.4	4.8	0.6	0.0	0.0	0.0	21.0	29.5	27.9	24.0	154.7
1957	19.2	19.3	13.8	8.7	6.3	1.5	0.0	0.0	1.7	12.8	34.5	37.3	155.1
1958	28.9	18.5	20.1	23.4	1.6	0.2	0.0	0.0	0.4	47.9	28.2	56.3	225.5
1959	10.5	16.4	54.0	24.8	4.9	0.2	0.0	0.0	1.9	69.0	41.0	39.2	261.9
1960	14.7	24.5	24.0	4.3	4.2	0.0	0.0	0.0	0.4	59.6	52.9	22.4	207.0
1961	45.5	26.2	27.3	10.8	1.5	0.0	0.0	0.0	19.5	51.8	40.4	27.1	250.1
1962	32.7	15.4	9.7	3.8	5.7	0.0	0.0	0.0	0.2	7.0	47.8	28.5	150.8
1963	32.2	21.7	15.1	5.4	0.6	0.0	0.0	0.0	0.8	5.8	36.6	11.0	129.2
1964	18.3	20.3	9.1	13.6	1.0	0.0	0.0	0.0	8.6	12.3	23.8	11.3	118.3

**Table I-3 Monthly Corrected Snowfall Data (mm) for Yellowknife Airport
(continued)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1965	11.4	10.2	6.6	16.4	1.0	0.6	0.0	0.0	3.2	23.3	60.9	20.4	154.0
1966	12.5	7.0	27.4	23.6	1.1	0.0	0.0	0.0	3.9	27.5	35.0	29.9	167.9
1967	12.6	22.8	19.1	4.0	7.0	3.8	0.0	0.2	0.4	49.8	34.4	17.7	171.8
1968	31.1	18.2	8.5	16.5	11.0	0.0	0.0	0.0	0.6	13.8	37.6	14.1	151.4
1969	14.7	12.4	13.6	24.2	6.3	0.0	0.0	0.0	3.3	5.2	27.4	22.0	129.1
1970	17.6	27.5	21.4	13.4	14.5	3.3	0.0	0.0	1.6	16.7	13.5	29.5	159.0
1971	27.4	15.6	21.4	13.4	3.3	0.0	0.0	0.0	2.4	16.3	51.9	17.5	169.2
1972	12.4	20.4	27.8	26.8	1.0	0.0	0.0	0.0	13.5	47.0	31.6	21.1	201.6
1973	20.1	16.2	32.2	11.7	0.0	0.0	0.0	0.0	0.0	19.0	63.0	29.6	191.8
1974	25.9	14.8	20.5	7.1	5.8	0.2	0.0	0.2	12.9	50.4	35.5	68.0	241.3
1975	18.3	14.7	11.3	6.1	3.6	0.0	0.0	0.0	4.9	46.5	31.2	35.6	172.2
1976	26.4	20.8	18.7	3.6	0.8	0.0	0.0	0.0	0.2	10.2	16.9	16.2	113.8
1977	22.7	23.1	10.5	7.7	3.7	0.0	0.0	0.2	0.0	15.0	45.4	23.6	151.9
1978	11.9	6.9	17.1	20.4	5.2	0.4	0.0	0.0	0.0	29.1	30.6	36.4	158.0
1979	11.9	5.6	20.6	18.4	23.7	0.0	0.0	0.0	1.3	40.2	30.7	20.0	172.4
1980	38.2	12.1	4.1	2.4	12.2	0.0	0.0	0.0	13.5	11.3	38.8	13.5	146.1
1981	19.5	23.5	12.8	22.8	0.4	0.2	0.0	0.2	0.9	22.8	32.1	14.9	150.1
1982	3.6	40.6	5.4	3.7	15.2	1.2	0.0	2.0	0.0	15.9	29.3	34.2	151.1
1983	34.8	11.8	22.1	7.6	11.7	0.2	0.0	0.0	19.4	22.6	37.9	11.0	179.1
1984	22.3	42.4	19.8	9.5	1.9	0.2	0.0	0.0	3.0	35.9	36.1	15.9	187.0
1985	18.7	50.1	14.3	31.8	7.6	0.0	0.0	0.0	7.8	46.0	51.3	19.7	247.3
1986	22.6	19.8	27.2	8.7	3.3	0.2	0.0	0.0	1.1	13.9	17.5	33.5	147.8
1987	28.9	50.5	12.2	8.0	0.8	0.0	0.0	0.4	0.2	34.3	61.1	29.9	226.3
1988	24.9	22.0	10.0	25.9	1.7	0.0	0.0	0.0	0.9	13.0	66.7	19.1	184.2
1989	38.6	7.7	19.0	1.7	2.4	0.0	0.0	0.0	5.7	15.2	59.3	29.3	178.9
1990	29.8	15.8	12.5	9.5	3.9	0.4	0.0	0.0	0.2	39.5	28.0	42.1	181.7
1991	34.2	22.4	28.0	18.7	2.2	0.0	0.2	0.0	0.4	33.3	48.1	21.3	208.8
1992	43.1	22.2	34.8	18.1	9.8	0.0	0.0	0.2	5.9	21.5	38.3	17.1	211.0
1993	10.6	30.9	18.0	7.4	9.1	0.0	0.0	0.0	1.3	23.2	27.6	50.1	178.2
1994	16.3	12.9	36.1	6.7	3.1	0.0	0.0	0.0	0.2	16.9	51.6	31.2	175.0
1995	22.6	22.2	56.9	12.8	0.4	0.0	0.0	0.0	0.4	4.5	27.5	48.4	195.7
1996	12.2	24.6	23.7	15.0	2.8	0.0	0.0	0.0	0.8	18.0	31.7	28.0	156.8
1997	27.8	8.7	34.6	3.9	10.8	0.0	0.0	0.0	5.7	31.3	42.1	25.6	190.5
1998	27.6	20.4	6.0	15.9	0.0	0.0	0.0	0.0	0.0	27.1	25.0	22.0	144.0
1999	24.6	25.9	22.0	15.0	7.8	0.0	0.0	0.0	5.4	31.7	33.8	34.2	200.4
2000	8.6	15.4	14.8	2.3	8.5	0.0	0.0	0.0	5.2	51.5	52.6	14.3	173.2
2001	29.9	12.5	43.7	3.4	10.7	0.0	0.0	0.0	0.0	20.3	36.1	44.5	201.1
2002	8.2	31.5	13.6	5.8	18.5	0.0	0.0	0.0	6.5	26.7	17.7	35.9	164.4
2003	10.8	11.2	21.7	9.1	15.9	0.0	0.0	0.0	0.0	7.3	44.4	42.4	162.8
2004	19.5	19.7	8.6	19.8	4.3	0.0	0.0	0.0	20.7	39.5	37.1	25.7	194.9
2005	41.4	32.8	24.1	16.4	0.8	0.0	0.0	0.0	8.9	24.3	55.9	21.9	226.5

Table I-3 Monthly Corrected Snowfall Data (mm) for Yellowknife Airport (continued)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2006	17.3	20.3	27.2	20.8	0.0	0.0	0.0	0.0	0.0	6.2	95.2	20.4	207.4
2007	45.9	25.9	27.8	10.0	3.5	0.0	0.0	0.0	13.2	-	-	-	126.3
Mean	21.2	19.3	18.8	11.6	4.8	0.2	0.0	0.1	3.9	23.6	35.5	26.6	165.5

Source: Environment Canada 2008b

Table I-4 Intensity-Duration-Frequency Summary for Yellowknife Airport

Duration	Return Period (Years)						Years of Data
	2	5	10	25	50	100	
5 minute	3.7	5.7	7.1	8.8	10.1	11.3	27
10 minute	5.2	8.1	10.0	12.4	14.1	15.9	27
15 minute	6.1	9.5	11.7	14.5	16.6	18.6	27
30 minute	7.9	12.1	14.9	18.4	21.0	23.6	27
1 hour	9.6	14.5	17.7	21.8	24.8	27.8	28
2 hour	12.3	18.4	22.4	27.5	31.2	34.9	28
6 hour	18.8	28.7	35.3	43.6	49.7	55.8	28
12 hour	22.6	34.6	42.6	52.6	60.1	67.5	28
24 hour	27.4	42.4	52.4	65.0	74.3	83.6	28

Source: Environment Canada 2008a

Table I-5 Daily Average Air Temperature (°C) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1953	-30.4	-19.0	-14.6	-5.3	5.5	11.5	15.6	15.7	8.5	0.1	-7.3	-20.9	-3.4
1954	-32.5	-22.9	-16.2	-15.8	4.8	13.3	17.0	16.9	7.4	-0.8	-8.7	-20.7	-4.9
1955	-26.2	-27.5	-24.7	-6.1	5.5	15.5	16.7	14.1	6.1	0.2	-19.2	-27.0	-6.1
1956	-26.8	-27.0	-16.4	-9.2	3.2	13.0	17.5	13.2	4.9	-5.6	-12.0	-26.6	-6.0
1957	-24.6	-28.6	-16.3	-7.3	2.6	10.2	15.3	15.7	7.6	-1.3	-14.6	-24.8	-5.5
1958	-20.2	-28.9	-14.5	-6.3	5.4	11.4	16.2	14.4	7.8	-0.5	-15.6	-26.0	-4.7
1959	-31.3	-23.6	-17.3	-8.4	0.0	10.0	15.8	10.1	5.8	-5.2	-15.7	-16.5	-6.4
1960	-28.0	-23.3	-21.1	-4.8	4.0	14.5	15.8	14.1	6.7	-2.7	-17.2	-21.7	-5.3
1961	-26.5	-23.6	-19.8	-11.6	2.6	15.7	17.3	14.5	4.3	-5.0	-15.2	-30.9	-6.5
1962	-28.1	-28.7	-20.3	-8.1	2.0	13.8	15.7	14.2	7.7	0.7	-15.8	-22.3	-5.8
1963	-31.5	-25.1	-22.1	-4.7	4.5	13.8	15.9	15.5	6.5	2.5	-13.1	-22.7	-5.0
1964	-27.5	-21.1	-27.2	-10.2	4.6	12.5	18.4	14.5	5.9	-0.3	-13.8	-26.2	-5.9
1965	-28.7	-33.3	-17.5	-4.6	5.8	11.3	16.7	13.9	3.0	-1.4	-15.6	-23.0	-6.1
1966	-37.0	-25.9	-16.8	-12.0	5.3	14.0	16.1	14.5	8.3	-4.7	-23.9	-21.2	-6.9
1967	-27.5	-28.1	-23.9	-10.2	2.5	10.2	15.6	14.4	8.4	-0.2	-10.4	-19.8	-5.7
1968	-31.2	-21.7	-14.2	-9.1	2.5	11.8	13.8	12.0	6.5	0.1	-11.6	-26.1	-5.6

**Table I-5 Daily Average Air Temperature (°C) for Yellowknife Airport
(continued)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1969	-33.5	-20.3	-16.7	-3.3	4.0	10.0	14.9	12.7	5.6	-0.3	-13.8	-14.6	-4.6
1970	-27.1	-24.8	-17.9	-3.6	4.8	13.8	16.5	13.3	5.5	-0.7	-14.0	-26.3	-5.0
1971	-31.8	-23.3	-16.5	-4.0	7.7	15.4	16.2	14.0	7.5	0.4	-13.9	-27.3	-4.6
1972	-31.1	-29.6	-17.0	-10.5	4.7	13.5	16.2	15.1	2.9	-4.3	-15.2	-26.6	-6.8
1973	-24.8	-25.6	-16.8	-5.4	11.0	15.6	18.2	14.0	8.7	0.8	-14.9	-24.2	-3.6
1974	-29.7	-26.9	-22.9	-6.2	4.4	14.1	15.9	12.2	4.1	-5.8	-10.9	-20.2	-6.0
1975	-32.9	-24.6	-20.2	-2.3	6.7	15.9	18.2	14.2	8.1	-2.2	-16.7	-25.2	-5.1
1976	-28.3	-25.6	-20.3	1.4	8.7	12.6	16.9	15.3	9.4	-0.6	-9.2	-25.2	-3.7
1977	-24.8	-15.6	-15.2	-3.5	7.7	13.9	16.0	11.8	8.6	0.5	-14.0	-30.1	-3.7
1978	-24.9	-17.3	-18.1	-7.5	4.1	11.9	13.2	12.7	7.4	-3.0	-15.8	-24.7	-5.2
1979	-24.6	-35.7	-21.9	-9.9	3.6	11.3	19.0	12.9	7.2	-1.3	-6.9	-17.5	-5.3
1980	-26.9	-18.5	-17.1	-0.9	7.5	13.5	15.8	14.8	5.0	1.7	-12.1	-30.0	-3.9
1981	-15.2	-21.1	-12.2	-9.2	8.1	12.9	16.6	16.6	6.5	-1.9	-9.6	-20.3	-2.4
1982	-36.9	-24.9	-20.8	-7.0	3.1	12.0	17.0	12.3	7.2	-1.0	-21.8	-26.3	-7.3
1983	-25.9	-26.5	-19.3	-5.1	-1.0	13.0	16.5	14.5	5.2	-1.6	-5.7	-26.0	-5.2
1984	-27.6	-19.2	-16.8	-0.4	7.3	13.6	16.8	15.3	5.7	-4.1	-16.6	-30.8	-4.7
1985	-23.0	-30.9	-15.8	-7.1	5.9	12.4	14.5	11.3	5.2	-3.2	-19.0	-21.4	-5.9
1986	-25.5	-22.1	-17.8	-8.4	5.7	10.8	16.8	13.7	7.4	-1.3	-19.1	-18.5	-4.9
1987	-18.3	-17.3	-17.4	-2.9	6.0	13.0	16.6	11.7	8.4	-0.2	-12.7	-14.4	-2.3
1988	-27.7	-26.3	-12.9	-4.8	0.7	12.7	15.7	15.1	7.0	-1.8	-16.7	-23.0	-5.1
1989	-29.0	-18.6	-22.9	-6.4	3.8	13.5	17.3	17.0	7.1	-1.2	-20.2	-25.4	-5.4
1990	-28.2	-28.7	-13.4	-4.5	4.8	13.1	16.7	12.1	6.8	-3.4	-20.3	-28.8	-6.1
1991	-26.5	-23.5	-18.3	-4.3	7.2	13.4	17.4	15.1	6.2	-5.9	-16.9	-23.8	-5.0
1992	-24.3	-24.2	-14.5	-7.9	4.3	11.4	15.6	13.3	3.4	-1.6	-9.0	-23.0	-4.7
1993	-22.4	-22.1	-11.2	-3.3	4.1	12.3	15.2	14.1	6.0	-1.2	-13.0	-21.9	-3.6
1994	-32.8	-30.0	-13.3	-6.2	7.4	14.5	19.3	16.1	8.5	1.3	-12.1	-20.2	-4.0
1995	-20.2	-23.6	-18.7	-6.2	5.1	15.5	14.5	13.2	7.6	-1.1	-15.3	-23.2	-4.4
1996	-29.3	-21.5	-19.8	-5.8	3.7	14.3	17.9	14.4	9.1	-4.1	-13.4	-23.5	-4.8
1997	-27.2	-21.7	-20.4	-5.1	3.2	13.4	18.0	15.7	9.6	-4.4	-9.2	-15.9	-3.7
1998	-28.0	-16.8	-14.7	0.3	9.5	15.3	19.2	15.7	8.6	2.4	-6.7	-18.8	-1.2
1999	-26.1	-16.2	-11.0	-3.4	5.2	13.5	15.0	15.1	7.7	-1.0	-9.0	-20.2	-2.5
2000	-24.4	-17.2	-13.0	-6.2	5.2	13.9	18.8	12.8	5.7	-1.3	-10.9	-28.3	-3.7
2001	-17.9	-22.7	-15.7	-4.7	4.5	14.0	17.6	13.9	10.1	-1.9	-11.0	-21.3	-2.9
2002	-25.1	-23.2	-21.2	-10.8	0.5	13.9	16.2	12.2	7.5	-3.4	-11.1	-14.0	-4.9
2003	-26.1	-28.0	-18.9	-2.5	5.2	12.5	17.8	14.2	8.3	2.3	-12.8	-17.5	-3.8
2004	-29.2	-21.0	-18.8	-8.0	-1.2	11.8	17.4	12.0	5.5	-3.7	-14.4	-26.5	-6.3
2005	-25.9	-22.3	-14.8	-2.2	3.1	12.5	15.5	12.8	5.7	0.4	-8.9	-13.2	-3.1
2006	-21.6	-17.2	-10.7	-1.9	8.0	16.3	16.6	15.3	9.8	-0.7	-16.9	-14.5	-1.5
2007	-21.0	-24.5	-19.7	-2.8	5.6	13.7	18.7	12.2	4.6	0.1	-12.1	-23.6	-4.1
Mean	-27.0	-23.8	-17.6	-5.9	4.7	13.2	16.6	14.0	6.8	-1.5	-13.7	-22.8	-4.7

Source: Environment Canada 2008a

Table I-6 Daily Average Relative Humidity (%) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1953	92.3	90.9	86.5	77.0	60.6	58.3	65.8	76.8	84.2	86.9	89.9	79.1	79.0
1954	74.5	75.9	75.1	69.5	63.3	55.0	69.3	67.3	78.3	86.7	87.5	84.7	73.9
1955	79.5	73.8	70.8	75.9	64.0	60.3	62.5	71.3	74.2	83.3	77.4	72.0	72.1
1956	74.8	70.7	74.5	69.7	66.4	67.5	62.6	70.7	82.1	85.4	84.1	79.0	74.0
1957	79.4	76.9	77.2	75.5	64.8	61.1	65.1	65.6	78.0	84.7	83.0	77.4	74.1
1958	79.1	76.1	78.8	78.5	65.6	57.3	61.7	75.2	80.7	86.4	87.3	82.3	75.7
1959	77.6	77.7	78.5	73.9	66.9	58.3	67.9	79.1	81.2	85.6	88.0	88.4	76.9
1960	79.1	80.6	78.4	71.9	71.2	54.7	59.3	73.1	77.4	86.2	83.3	83.6	74.9
1961	81.3	83.6	79.2	73.3	64.7	51.3	61.9	70.6	73.4	85.3	85.4	80.7	74.2
1962	80.9	79.1	76.4	70.3	61.5	62.5	63.3	69.2	73.6	83.7	81.4	80.5	73.5
1963	77.6	79.4	74.4	76.6	59.6	61.3	68.4	74.9	78.4	83.7	88.6	81.3	75.4
1964	72.2	76.0	64.3	76.3	68.9	56.8	54.5	68.2	83.0	88.8	88.6	85.7	73.6
1965	85.5	82.3	79.8	75.2	59.2	62.5	64.1	67.0	72.5	87.3	86.4	85.9	75.7
1966	81.6	81.8	78.7	74.6	70.3	60.8	61.3	66.7	77.9	88.2	84.1	85.5	76.0
1967	82.0	80.4	80.7	74.8	66.0	61.2	65.1	68.4	73.4	89.3	88.8	85.4	76.3
1968	80.6	85.0	79.3	74.4	73.5	63.0	61.4	66.1	79.4	86.4	87.1	67.9	75.3
1969	65.2	71.3	64.1	69.3	56.7	48.8	60.5	75.6	74.5	82.3	76.7	77.0	68.5
1970	62.0	62.2	57.7	64.0	57.8	55.6	57.9	70.4	74.1	75.4	74.6	62.4	64.5
1971	55.1	60.4	69.2	61.1	56.1	49.5	56.3	68.5	74.6	85.1	84.9	68.6	65.8
1972	66.7	63.4	71.7	66.4	60.6	58.7	57.7	69.3	70.6	82.8	82.7	70.0	68.4
1973	70.0	67.2	65.3	64.3	52.8	49.6	60.7	67.0	70.5	81.8	75.8	65.0	65.8
1974	61.6	60.8	57.6	63.5	58.2	56.2	63.9	68.4	71.1	79.6	82.6	70.7	66.2
1975	60.9	64.3	58.6	64.8	58.5	50.3	53.5	66.0	69.5	80.5	73.0	69.4	64.1
1976	61.0	62.5	60.1	62.3	55.0	59.9	56.3	63.6	71.6	73.1	79.7	63.5	64.1
1977	65.3	69.5	59.6	57.4	55.3	45.8	48.0	58.6	77.7	79.2	75.1	62.3	62.8
1978	63.2	61.8	54.7	58.0	57.9	53.3	62.4	61.7	74.9	82.5	75.4	71.3	64.8
1979	67.6	60.5	59.0	66.1	56.0	53.4	51.5	64.1	72.2	82.4	81.9	70.8	65.5
1980	62.0	63.5	58.3	58.8	56.3	55.6	57.0	60.4	65.2	78.4	73.7	59.1	62.4
1981	67.2	61.5	61.2	55.4	44.9	47.4	60.6	62.3	73.4	79.3	79.5	70.0	63.6
1982	57.5	60.5	63.4	64.7	67.0	55.0	49.7	61.3	71.9	78.1	64.4	60.3	62.8
1983	63.4	66.2	63.8	60.4	53.3	55.8	64.3	72.4	72.8	82.6	82.9	62.8	66.7
1984	59.2	71.7	61.4	59.9	44.7	55.1	69.3	68.3	70.1	78.0	73.6	63.1	64.5
1985	66.4	58.6	61.7	62.8	55.8	53.2	58.1	73.9	72.8	83.7	72.2	68.9	65.7
1986	63.7	68.6	64.9	62.2	64.3	61.8	57.4	66.0	75.9	83.3	70.0	69.7	67.3
1987	67.1	67.0	58.4	61.1	54.7	57.6	52.6	64.1	79.6	84.0	76.9	72.5	66.3
1988	63.3	64.8	66.0	60.8	54.9	67.5	63.4	70.5	75.4	76.8	74.0	67.1	67.0
1989	61.6	63.2	54.4	53.7	52.4	58.5	62.3	67.6	75.7	80.8	71.2	68.6	64.2
1990	64.4	59.2	61.5	63.9	53.4	50.4	57.1	72.8	74.9	78.7	71.0	64.3	64.3
1991	64.6	63.6	64.4	69.6	57.6	60.1	55.6	64.1	75.7	83.0	79.9	69.8	67.3
1992	71.6	69.8	66.1	64.1	61.2	61.6	56.5	64.9	76.8	84.1	87.3	71.7	69.7
1993	70.4	65.2	66.3	63.8	57.0	46.9	59.0	65.5	70.1	83.3	78.8	70.5	66.4
1994	67.0	60.1	64.9	59.2	53.8	48.4	48.5	56.4	75.2	84.4	79.0	71.4	64.0

**Table I-6 Daily Average Relative Humidity (%) for Yellowknife Airport
(continued)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1995	71.8	62.0	61.3	56.6	51.2	52.4	57.5	65.9	73.1	80.2	73.4	62.1	64.0
1996	56.4	66.6	61.2	61.8	58.1	53.1	60.5	73.9	79.9	81.2	80.1	70.1	66.9
1997	63.6	67.7	60.8	63.1	58.8	63.7	65.0	69.6	78.8	82.1	81.6	69.6	68.7
1998	53.4	58.6	50.0	55.5	46.9	59.6	53.6	70.1	78.1	81.9	86.7	75.8	64.2
1999	66.4	72.1	67.7	64.2	60.3	53.2	52.5	58.8	64.7	73.0	77.2	66.0	64.7
2000	62.6	60.5	55.6	52.5	58.3	52.5	57.8	67.4	73.4	82.0	84.0	61.9	64.0
2001	62.7	50.2	62.3	57.1	61.2	46.3	61.8	73.9	74.5	85.1	84.2	74.2	66.1
2002	73.2	62.3	61.1	63.4	57.0	57.2	68.1	76.0	79.1	84.1	86.8	85.2	71.1
2003	73.2	66.5	67.5	66.4	59.8	59.0	55.8	69.5	71.3	79.9	82.9	78.0	69.2
2004	67.6	71.6	64.1	61.0	57.1	48.6	54.3	62.8	75.2	83.4	82.3	67.3	66.3
2005	67.3	69.7	67.9	69.9	58.4	55.1	59.0	67.7	79.2	80.9	81.5	76.7	69.4
2006	64.3	73.1	69.4	66.5	61.9	57.1	61.9	70.4	78.0	81.9	82.2	86.2	71.1
2007	75.5	66.7	64.1	64.7	63.1	47.6	56.7	66.0	78.0	74.8	67.3	55.2	65.0
Mean	69.2	68.8	66.6	65.6	59.2	55.9	59.6	68.1	75.2	82.4	80.3	72.5	68.6

Source: Environment Canada 2008a

Table I-7 Daily Average Wind Speed (km/h) for Yellowknife Airport

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1953	11.7	14.5	18.9	18.4	17.6	18.1	16.8	18.4	14.1	18.9	15.3	14.2	16.4
1954	15.7	18.8	18.0	16.2	14.7	16.5	16.5	14.3	19.0	17.8	16.5	13.7	16.5
1955	13.1	16.5	15.8	18.6	17.1	16.8	17.8	17.3	20.3	19.4	16.9	15.9	17.1
1956	12.9	14.7	17.8	18.1	18.0	19.3	16.4	19.6	18.2	20.5	20.0	15.0	17.5
1957	18.1	19.4	15.7	16.0	18.9	19.3	17.8	16.7	22.5	19.0	17.4	17.5	18.2
1958	13.3	10.4	14.0	17.7	17.2	18.8	15.9	14.0	14.2	15.6	12.2	12.2	14.6
1959	17.2	12.9	14.9	19.8	18.5	18.5	18.4	16.5	19.0	18.4	17.2	19.0	17.5
1960	14.4	13.5	15.4	18.5	17.6	17.9	17.8	17.1	20.0	19.2	16.4	13.9	16.8
1961	14.2	13.2	15.2	17.2	18.1	18.9	18.4	16.6	19.0	19.3	15.8	13.2	16.6
1962	17.6	14.0	15.4	17.9	16.6	18.1	18.8	15.7	17.5	16.7	16.8	16.3	16.8
1963	18.6	12.7	12.9	17.6	19.2	17.4	17.8	15.7	17.7	16.9	17.9	10.1	16.2
1964	9.6	10.7	13.3	16.2	15.5	16.3	14.8	15.2	13.5	16.1	15.0	13.6	14.2
1965	14.7	11.0	13.2	16.8	16.0	18.8	15.2	16.2	16.8	17.1	13.4	11.3	15.1
1966	12.3	13.8	18.9	16.3	20.1	16.3	16.3	16.2	16.4	19.0	12.2	12.1	15.8
1967	10.6	13.7	13.7	15.3	16.9	17.7	16.5	16.7	15.9	15.5	15.2	17.2	15.4
1968	12.3	14.0	15.3	15.3	16.6	17.1	17.2	19.3	17.5	17.6	16.3	11.9	15.9
1969	13.3	13.7	12.6	16.3	14.6	17.5	17.7	15.8	14.6	14.9	18.1	13.1	15.2
1970	14.7	13.3	15.9	14.6	17.5	18.2	15.1	14.7	16.2	13.6	13.1	12.3	14.9
1971	16.0	14.0	14.8	16.6	18.9	15.8	15.5	15.1	19.1	16.0	13.3	11.2	15.5
1972	14.0	15.8	14.1	18.0	15.1	16.8	14.3	13.5	15.5	16.9	14.8	10.6	15.0
1973	13.1	13.3	15.8	18.4	18.0	18.2	16.7	17.3	16.1	17.3	15.0	12.7	16.0
1974	15.0	14.5	16.7	17.2	17.6	18.0	17.7	15.0	16.6	19.7	14.8	14.2	16.4

Table I-7 Daily Average Wind Speed (km/h) for Yellowknife Airport (continued)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1975	13.3	13.9	14.7	14.2	14.3	13.6	13.3	14.0	14.9	13.7	11.7	9.9	13.5
1976	12.0	11.9	11.6	13.7	16.8	14.7	13.8	12.6	12.9	16.6	14.8	12.5	13.7
1977	10.1	12.4	15.2	14.4	16.7	16.4	12.5	15.1	12.0	14.6	15.5	10.1	13.7
1978	11.2	16.9	13.1	15.6	15.6	16.0	14.7	13.8	15.5	16.7	12.4	10.0	14.3
1979	11.9	7.0	12.7	15.6	15.3	15.7	14.4	14.6	14.0	15.4	13.1	14.5	13.7
1980	11.7	13.7	12.9	15.4	15.7	14.4	13.5	12.0	15.5	16.0	16.9	11.3	14.1
1981	12.9	10.8	12.8	14.6	13.3	13.1	14.6	13.6	15.2	16.3	15.3	12.7	13.8
1982	8.9	13.5	11.9	14.2	13.8	12.6	12.4	12.4	14.0	12.4	11.7	9.7	12.3
1983	11.9	12.2	10.5	12.6	13.4	12.2	10.9	11.0	13.9	13.4	14.5	11.1	12.3
1984	13.4	12.6	12.6	13.7	15.2	14.5	12.3	14.8	11.7	19.2	13.1	12.9	13.8
1985	12.4	13.0	13.2	14.6	13.8	14.1	14.6	13.8	17.4	14.9	14.2	12.4	14.0
1986	11.7	12.7	14.3	16.3	15.2	15.6	13.4	12.6	13.4	15.6	12.7	11.8	13.8
1987	12.9	13.1	13.9	14.5	15.4	14.5	13.8	14.8	15.3	17.9	17.0	10.6	14.5
1988	13.0	14.0	13.3	16.9	15.0	15.5	13.9	13.9	16.2	14.2	15.2	11.8	14.4
1989	14.0	17.3	14.2	12.7	17.2	14.5	13.7	11.9	13.8	14.9	15.0	12.8	14.3
1990	12.7	14.2	15.5	15.2	14.2	14.2	14.0	14.0	15.4	17.1	14.7	13.4	14.6
1991	13.4	12.6	13.2	14.5	16.3	17.2	15.7	16.1	16.9	19.1	17.8	12.6	15.5
1992	11.3	12.6	16.4	18.0	15.6	16.6	13.9	17.9	15.1	17.6	16.4	15.8	15.6
1993	13.6	17.2	14.5	13.2	17.8	17.6	14.5	12.4	15.6	14.5	15.1	13.1	14.9
1994	8.4	11.5	14.2	12.9	14.8	12.7	13.9	14.5	14.8	14.9	16.5	13.8	13.6
1995	10.5	14.0	13.5	13.0	14.1	13.7	12.6	13.2	14.8	13.4	14.6	11.9	13.3
1996	11.7	9.8	14.8	14.4	14.4	14.5	13.8	13.4	17.3	15.6	13.4	11.0	13.7
1997	13.6	8.8	12.3	15.4	13.1	14.8	13.1	13.9	14.6	16.5	13.4	14.0	13.6
1998	10.7	11.0	12.9	12.6	15.5	13.9	11.8	13.0	12.1	13.7	11.2	11.3	12.5
1999	9.7	11.5	12.1	13.3	13.2	12.6	11.6	12.3	14.2	12.5	11.9	12.1	12.2
2000	9.7	9.9	11.1	11.9	13.5	11.6	11.8	11.2	14.3	13.8	9.1	9.2	11.4
2001	9.2	9.9	13.6	13.8	14.3	11.5	13.3	14.5	12.9	13.0	14.3	10.1	12.5
2002	6.8	10.4	11.9	12.8	12.8	13.4	13.5	12.6	14.0	13.7	11.3	9.3	11.9
2003	10.3	8.3	11.5	12.8	12.2	10.3	10.5	11.4	12.5	10.2	10.6	10.7	10.9
2004	9.6	9.8	12.0	12.2	12.9	12.2	11.2	10.9	14.3	12.8	11.6	11.4	11.7
2005	11.3	9.1	11.4	14.0	16.6	12.3	11.2	14.3	12.5	14.3	13.7	9.8	12.6
2004	5.6	13.1	14.2	13.7	13.3	13.2	11.4	10.3	9.9	12.7	11.3	8.4	11.4
2005	9.7	9.6	10.8	13.2	11.9	10.6	10.5	9.6	10.2	11.5	13.2	8.2	10.7
Mean	12.4	12.9	14.0	15.3	15.7	15.5	14.5	14.4	15.4	15.9	14.5	12.4	14.4

Source: Environment Canada 2008a

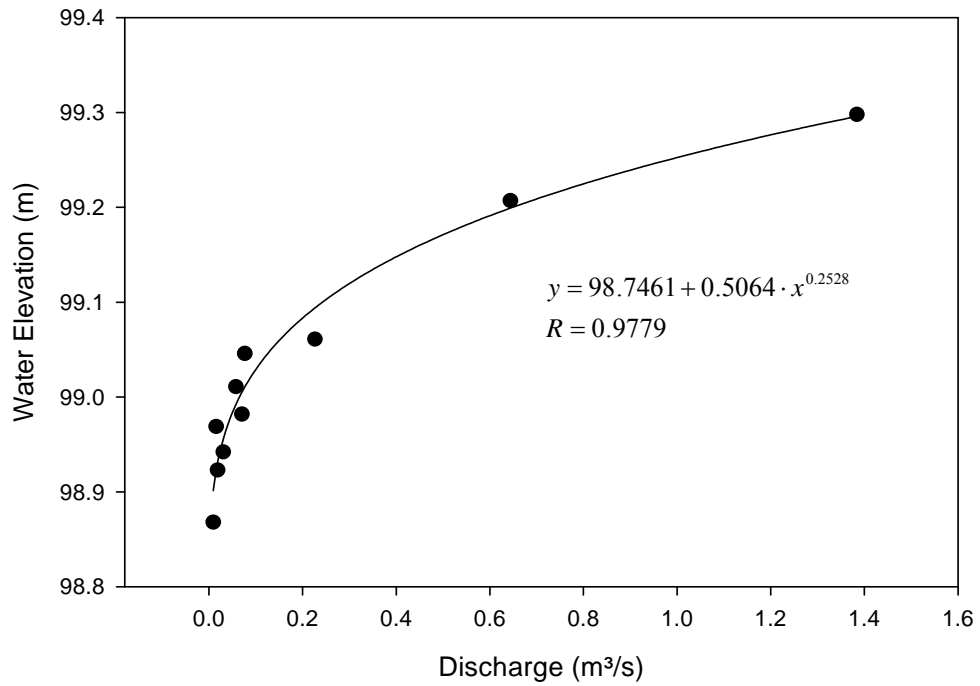
Table I-8 Daily Average Net Radiation (MJ/m²) at Norman Wells

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1984	-	-	-	-	-	-	-	-	-	-	-1.41	-1.32
1985	-1.18	-1.46	0.37	-1.13	9.14	11.69	9.33	6.62	2.59	-0.76	-1.87	-1.22
1986	-1.19	-1.64	0.28	-1.48	11.12	11.92	10.16	6.60	2.52	-0.73	-1.98	-0.82
1987	-1.43	-1.59	0.80	-2.15	10.85	12.62	10.75	6.94	2.87	-0.47	-1.23	-0.97
1988	-1.59	-2.47	3.49	-1.31	9.80	11.37	9.43	6.48	2.39	-0.77	-1.23	-1.59
1989	-1.79	-2.10	3.95	-1.94	9.22	10.41	10.83	6.12	2.82	-0.73	-1.37	-1.16
1990	-1.15	-1.93	4.44	-1.37	9.98	10.92	9.34	6.29	2.30	-0.94	-1.76	-1.89
1991	-2.06	-1.67	2.89	-0.95	9.22	11.32	8.14	7.15	3.09	-1.09	-1.23	-1.66
1992	-0.78	-1.36	1.54	-1.71	10.13	11.76	10.50	7.09	1.14	-1.60	-1.41	-1.25
1993	-1.41	-	4.53	-1.74	8.32	11.13	8.43	4.37	2.37	-1.03	-1.23	-1.00
1994	-1.90	-1.46	1.27	-1.26	8.47	10.22	8.49	4.15	3.05	-	-	-
1995	-	-	-	-	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-	-	-	-	-1.36
1998	-1.25	-1.19	3.98	-1.73	8.10	9.30	8.00	4.46	1.98	-0.93	-1.03	-0.94
1999	-1.16	-	-	-1.15	-	9.61	7.63	5.81	2.33	0.16	-	-
Mean	-1.41	-1.69	2.50	-1.49	9.49	11.02	9.25	6.01	2.45	-0.81	-1.43	-1.27

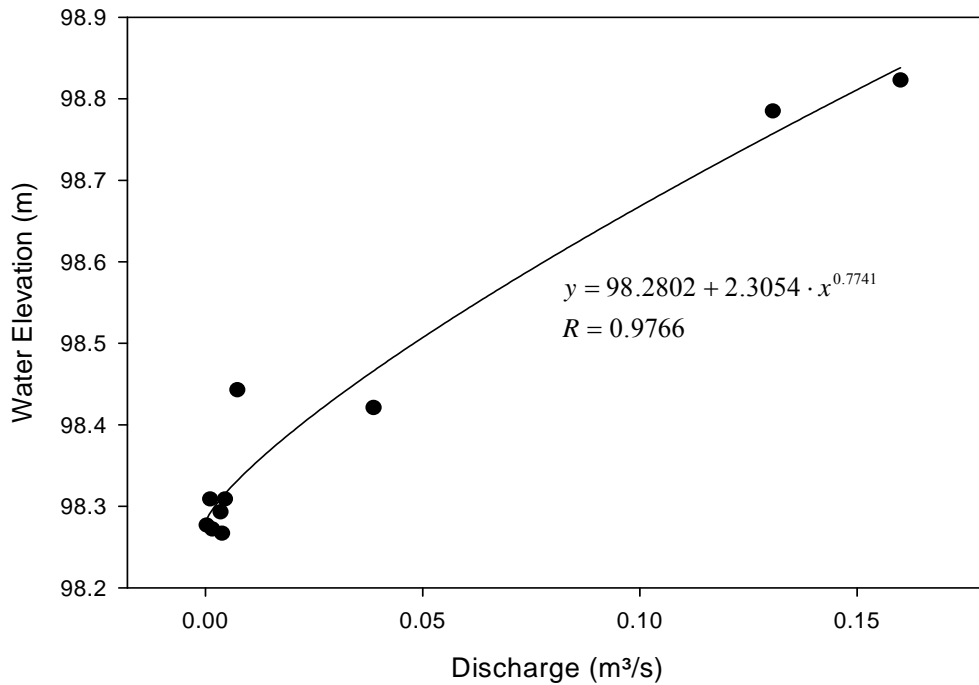
MJ/m² = megajoules per square metre

Source: Environment Canada 2008a

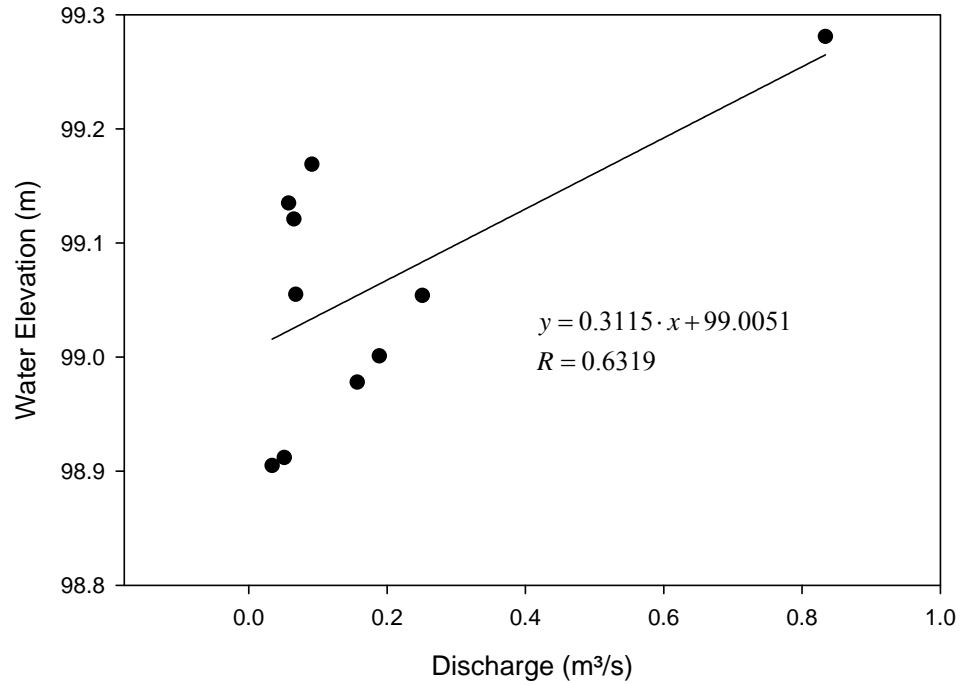
APPENDIX II
STAGE-DISCHARGE RELATIONSHIPS



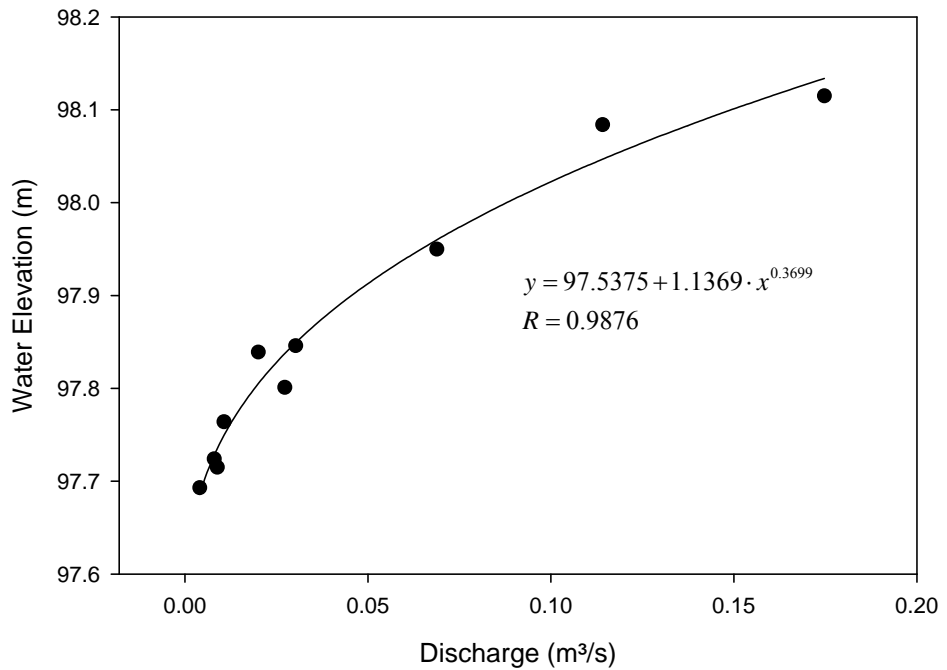
B-1 (Burke Creek) Stage-Discharge Relationship



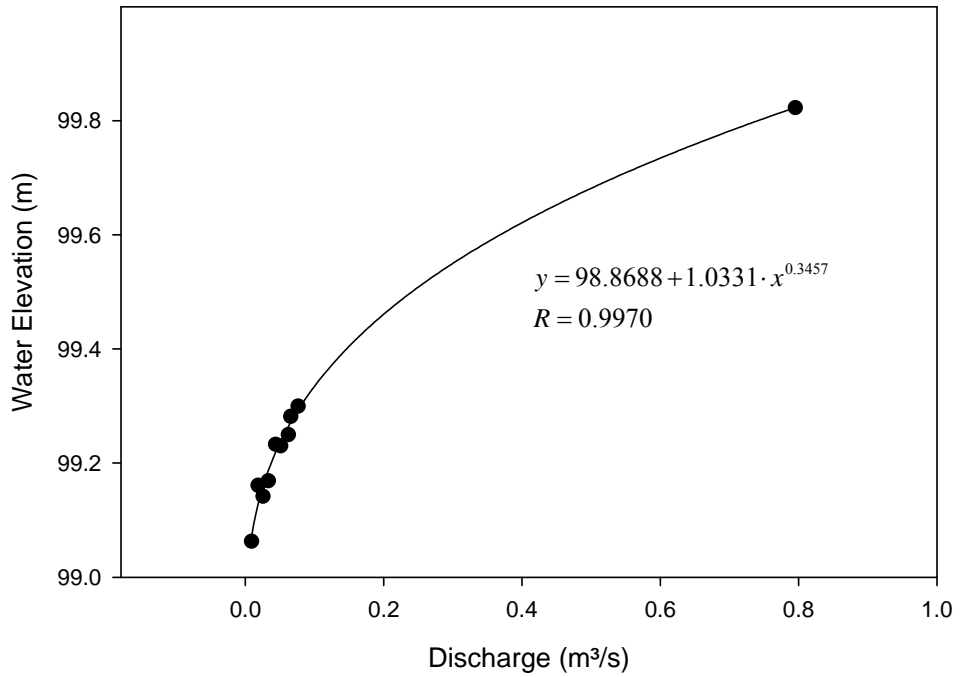
B-2 (Burke Lake Inflow) Stage-Discharge Relationship



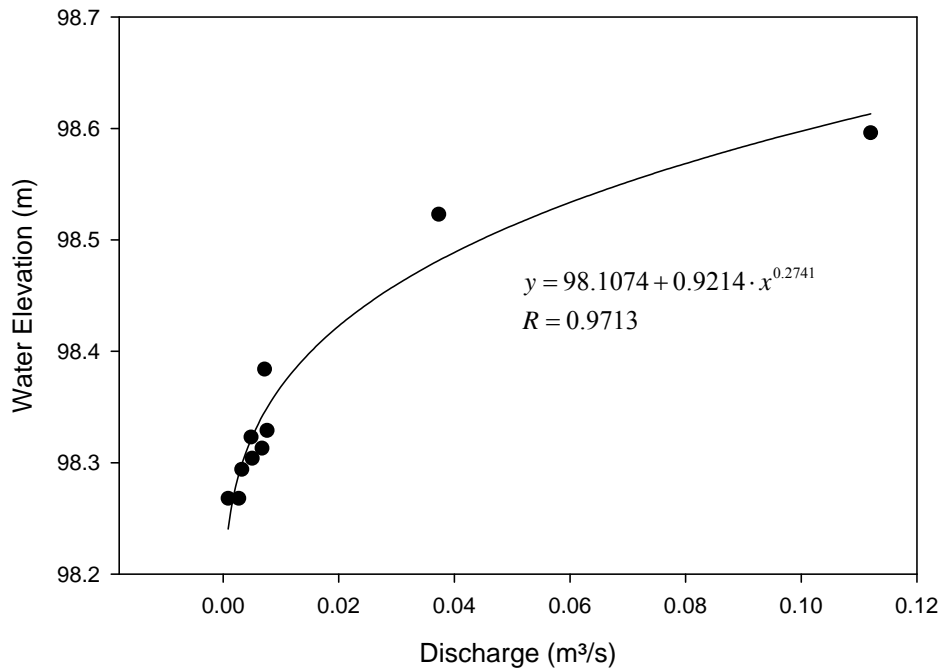
B-3 (Peanut Creek) Stage-Discharge Relationship



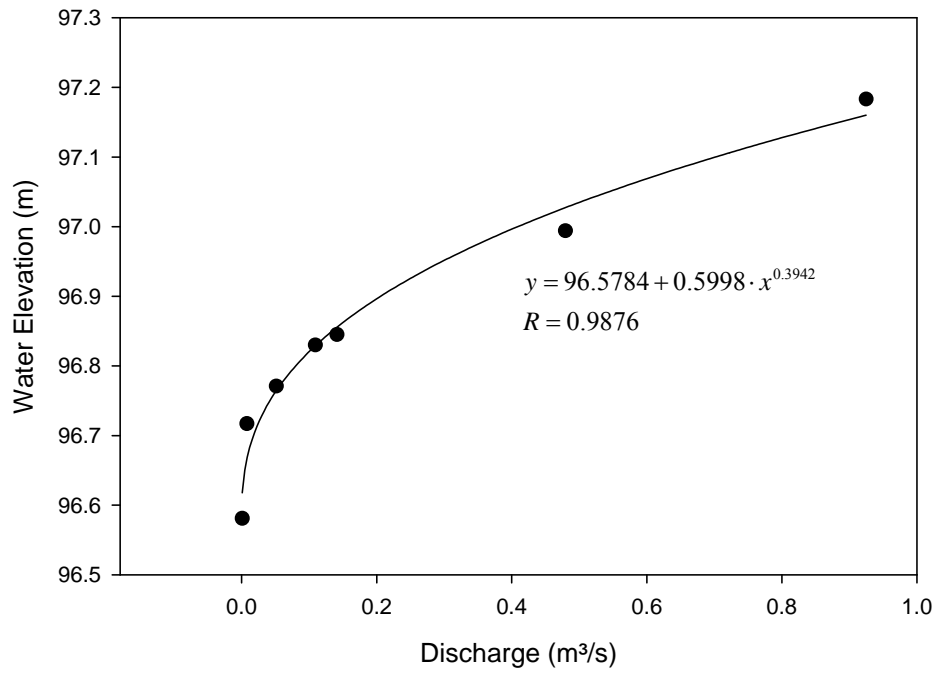
B-6 (Nico Creek) Stage-Discharge Relationship



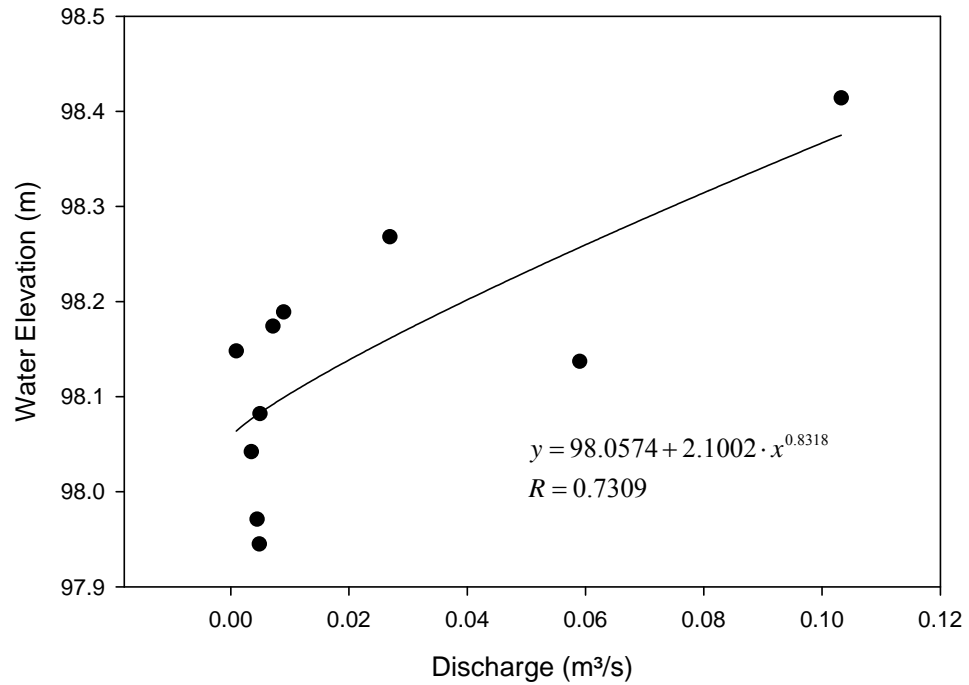
B-7 (Burke Lake Inflow) Stage-Discharge Relationship



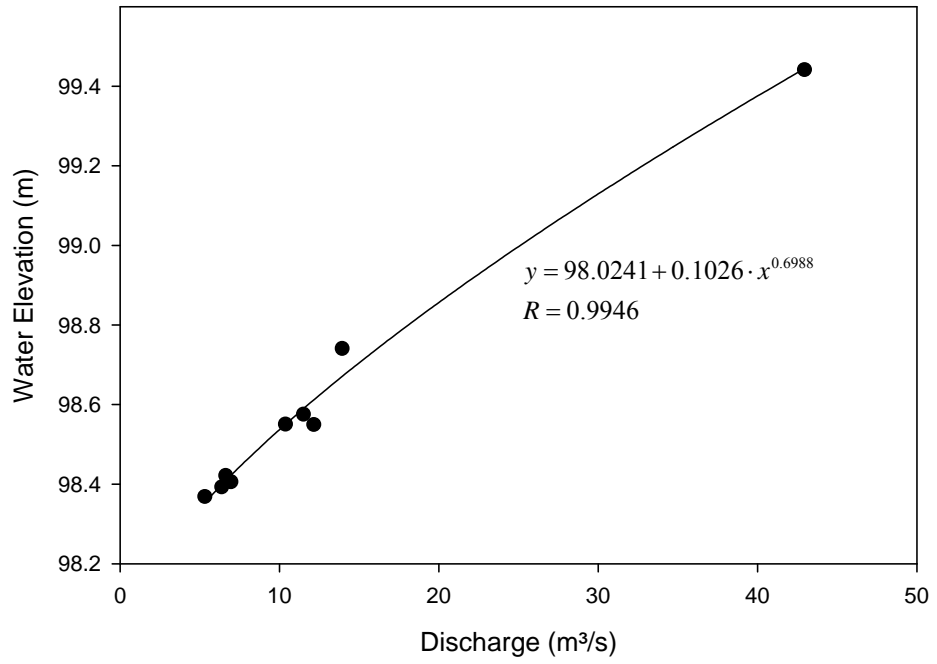
B-8 (Nico Lake Inflow) Stage-Discharge Relationship



L-1 (Lou Creek) Stage-Discharge Relationship



L-2 (Lou Lake Inflow) Stage-Discharge Relationship



M-1 (Marian River) Stage-Discharge Relationship

APPENDIX III
SITE PHOTOS



Photo 1 B-1 (Burke Creek) 27 July 2006 - Facing Upstream



Photo 2 B-1 (Burke Creek) 14 June 2007 - Discharge Measurement Cross-Section



Photo 3 B-2 (Burke Lake Inflow) 4 June 2006 - Facing Downstream



Photo 4 B-2 (Burke Lake Inflow) 3 August 2007 - Discharge Measurement Cross-Section



Photo 5 B-3 (Peanut Creek) 27 July 2006 - Discharge Measurement Cross-Section



Photo 6 B-3 (Peanut Creek) 19 September 2007 - Discharge Measurement Cross-Section



Photo 7 B-4 (Pond 8 Outlet) 4 June 2006 - Discharge Measurement Cross-Section



Photo 8 B-4 (Pond 8 Outlet) 19 September 2007 - Discharge Measurement



Photo 9 B-5 (Pond 10 Inlet) 23 September 2006 - Discharge Measurement Cross-Section



Photo 10 B-5 (Pond 10 Inlet) 4 August 2007 - Discharge Measurement Cross-Section



Photo 11 B-6 (Nico Creek) 4 June 2006 - Discharge Measurement Cross-Section



Photo 12 B-6 (Nico Creek) 3 August 2007 - Facing Downstream



Photo 13 B-7 (Peanut Lake Inflow) 6 June 2006 - Discharge Measurement Cross-Section



Photo 14 B-7 (Peanut Lake Inflow) 15 June 2007 - Discharge Measurement Cross-Section



Photo 15 B-8 (Nico Lake Inflow) 4 June 2006 - Discharge Measurement Cross-Section



Photo 16 B-8 (Nico Lake Inflow) 15 June 2007 - Discharge Measurement Cross-Section



Photo 17 L-2 (Lou Creek) 5 June 2006 - Facing Downstream



Photo 18 L-1 (Lou Creek) 14 June 2007 - Facing Upstream



Photo 19 L-2 (Chalco Creek) 5 June 2006 - Facing Upstream



Photo 20 L-2 (Chalco Creek) 20 September 2007 - Discharge Measurement
Cross-Section



Photo 21 M-1 (Marian River) 6 June 2006 - Discharge Measurement Cross-Section



Photo 22 M-1 (Marian River) 14 June 2007 - Discharge Measurement Cross-Section

APPENDIX IV
LONG TERM DISCHARGE DATA

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Jan-83	0.0001	0.0205	0.0024	0.0072	0.0003	0.0005	0.0000	0.0169	0.0003	0.0478	0.0001	0.0000	0.0036	0.0006
Feb-83	0.0006	0.0218	0.0029	0.0073	0.0040	0.0059	0.0006	0.0177	0.0034	0.0515	0.0006	0.0002	0.0036	0.0077
Mar-83	0.0034	0.0278	0.0057	0.0077	0.0208	0.0306	0.0031	0.0215	0.0175	0.0683	0.0033	0.0009	0.0038	0.0404
Apr-83	0.0026	0.0261	0.0049	0.0076	0.0159	0.0234	0.0023	0.0204	0.0134	0.0634	0.0025	0.0007	0.0038	0.0309
May-83	0.0039	0.0291	0.0063	0.0077	0.0243	0.0358	0.0036	0.0223	0.0205	0.0718	0.0039	0.0010	0.0039	0.0474
Jun-83	0.0251	0.0758	0.0276	0.0107	0.1550	0.2281	0.0229	0.0518	0.1308	0.2026	0.0246	0.0066	0.0054	0.3017
Jul-83	0.0108	0.0441	0.0131	0.0087	0.0663	0.0977	0.0098	0.0318	0.0560	0.1139	0.0105	0.0028	0.0044	0.1291
Aug-83	0.0055	0.0324	0.0078	0.0080	0.0337	0.0496	0.0050	0.0244	0.0284	0.0812	0.0053	0.0014	0.0040	0.0656
Sep-83	0.0028	0.0266	0.0051	0.0076	0.0172	0.0253	0.0025	0.0207	0.0145	0.0647	0.0027	0.0007	0.0038	0.0335
Oct-83	0.0018	0.0244	0.0041	0.0074	0.0111	0.0164	0.0016	0.0193	0.0094	0.0586	0.0018	0.0005	0.0037	0.0217
Nov-83	0.0020	0.0248	0.0043	0.0075	0.0123	0.0181	0.0018	0.0196	0.0104	0.0598	0.0020	0.0005	0.0037	0.0240
Dec-83	0.0034	0.0279	0.0057	0.0077	0.0210	0.0308	0.0031	0.0215	0.0177	0.0685	0.0033	0.0009	0.0038	0.0408
Jan-84	0.0034	0.0278	0.0057	0.0077	0.0208	0.0306	0.0031	0.0215	0.0175	0.0683	0.0033	0.0009	0.0038	0.0405
Feb-84	0.0029	0.0267	0.0052	0.0076	0.0176	0.0259	0.0026	0.0208	0.0148	0.0651	0.0028	0.0007	0.0038	0.0342
Mar-84	0.0023	0.0255	0.0046	0.0075	0.0143	0.0211	0.0021	0.0200	0.0121	0.0619	0.0023	0.0006	0.0038	0.0279
Apr-84	0.0046	0.0306	0.0069	0.0078	0.0284	0.0418	0.0042	0.0232	0.0240	0.0759	0.0045	0.0012	0.0039	0.0553
May-84	0.0459	0.1216	0.0484	0.0135	0.2829	0.4164	0.0417	0.0808	0.2387	0.3305	0.0449	0.0120	0.0068	0.5506
Jun-84	0.0205	0.0655	0.0229	0.0100	0.1262	0.1858	0.0186	0.0453	0.1065	0.1738	0.0200	0.0054	0.0050	0.2457
Jul-84	0.0027	0.0264	0.0050	0.0076	0.0167	0.0246	0.0025	0.0206	0.0141	0.0642	0.0026	0.0007	0.0038	0.0325
Aug-84	0.0014	0.0236	0.0038	0.0074	0.0089	0.0131	0.0013	0.0188	0.0075	0.0564	0.0014	0.0004	0.0037	0.0174
Sep-84	0.0006	0.0218	0.0029	0.0073	0.0039	0.0057	0.0006	0.0177	0.0033	0.0514	0.0006	0.0002	0.0036	0.0076
Oct-84	0.0003	0.0210	0.0026	0.0072	0.0018	0.0027	0.0003	0.0172	0.0015	0.0493	0.0003	0.0001	0.0036	0.0035
Nov-84	0.0004	0.0213	0.0027	0.0073	0.0025	0.0036	0.0004	0.0174	0.0021	0.0500	0.0004	0.0001	0.0036	0.0048
Dec-84	0.0004	0.0212	0.0027	0.0072	0.0022	0.0033	0.0003	0.0173	0.0019	0.0497	0.0004	0.0001	0.0036	0.0043
Jan-85	0.0001	0.0207	0.0024	0.0072	0.0007	0.0011	0.0001	0.0170	0.0006	0.0482	0.0001	0.0000	0.0036	0.0014
Feb-85														
Mar-85														

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Apr-85														
May-85	0.1614	0.3763	0.1645	0.0295	0.9953	1.4650	0.1468	0.2418	0.8399	1.0434	0.1580	0.0422	0.0149	1.9373
Jun-85	0.1191	0.2830	0.1220	0.0236	0.7343	1.0809	0.1083	0.1828	0.6197	0.7823	0.1166	0.0312	0.0119	1.4294
Jul-85	0.0159	0.0555	0.0183	0.0094	0.0980	0.1443	0.0145	0.0390	0.0827	0.1456	0.0156	0.0042	0.0047	0.1908
Aug-85	0.0007	0.0219	0.0030	0.0073	0.0043	0.0063	0.0006	0.0178	0.0036	0.0518	0.0007	0.0002	0.0036	0.0084
Sep-85	0.0002	0.0207	0.0025	0.0072	0.0010	0.0014	0.0001	0.0170	0.0008	0.0485	0.0002	0.0000	0.0036	0.0019
Oct-85	0.0001	0.0206	0.0024	0.0072	0.0006	0.0009	0.0001	0.0169	0.0005	0.0481	0.0001	0.0000	0.0036	0.0012
Nov-85	0.0002	0.0208	0.0025	0.0072	0.0012	0.0017	0.0002	0.0171	0.0010	0.0487	0.0002	0.0000	0.0036	0.0023
Dec-85	0.0003	0.0211	0.0026	0.0072	0.0020	0.0029	0.0003	0.0172	0.0016	0.0495	0.0003	0.0001	0.0036	0.0038
Jan-86	0.0003	0.0211	0.0026	0.0072	0.0020	0.0029	0.0003	0.0173	0.0017	0.0495	0.0003	0.0001	0.0036	0.0039
Feb-86	0.0002	0.0208	0.0025	0.0072	0.0011	0.0017	0.0002	0.0171	0.0010	0.0486	0.0002	0.0000	0.0036	0.0022
Mar-86														
Apr-86														
May-86	0.0615	0.1560	0.0641	0.0157	0.3791	0.5581	0.0559	0.1025	0.3199	0.4268	0.0602	0.0161	0.0079	0.7380
Jun-86	0.0819	0.2010	0.0846	0.0185	0.5050	0.7433	0.0745	0.1310	0.4262	0.5528	0.0802	0.0214	0.0093	0.9830
Jul-86	0.0151	0.0538	0.0175	0.0093	0.0934	0.1374	0.0138	0.0379	0.0788	0.1409	0.0148	0.0040	0.0047	0.1817
Aug-86	0.0006	0.0217	0.0029	0.0073	0.0037	0.0054	0.0005	0.0176	0.0031	0.0512	0.0006	0.0002	0.0036	0.0072
Sep-86	0.0004	0.0212	0.0027	0.0073	0.0022	0.0033	0.0003	0.0173	0.0019	0.0497	0.0004	0.0001	0.0036	0.0044
Oct-86	0.0002	0.0207	0.0025	0.0072	0.0009	0.0014	0.0001	0.0170	0.0008	0.0484	0.0001	0.0000	0.0036	0.0018
Nov-86	0.0002	0.0208	0.0025	0.0072	0.0010	0.0015	0.0002	0.0170	0.0009	0.0485	0.0002	0.0000	0.0036	0.0020
Dec-86														
Jan-87														
Feb-87														
Mar-87														
Apr-87														
May-87	0.0202	0.0650	0.0226	0.0100	0.1246	0.1834	0.0184	0.0450	0.1052	0.1722	0.0198	0.0053	0.0050	0.2425

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Jun-87	0.0163	0.0563	0.0187	0.0094	0.1004	0.1478	0.0148	0.0395	0.0847	0.1479	0.0159	0.0043	0.0047	0.1954
Jul-87	0.0011	0.0229	0.0034	0.0074	0.0069	0.0101	0.0010	0.0184	0.0058	0.0544	0.0011	0.0003	0.0037	0.0134
Aug-87	0.0001	0.0207	0.0024	0.0072	0.0007	0.0011	0.0001	0.0170	0.0006	0.0482	0.0001	0.0000	0.0036	0.0014
Sep-87														
Oct-87														
Nov-87														
Dec-87														
Jan-88														
Feb-88														
Mar-88														
Apr-88														
May-88	0.0099	0.0422	0.0123	0.0086	0.0611	0.0899	0.0090	0.0306	0.0515	0.1086	0.0097	0.0026	0.0043	0.1188
Jun-88	0.1121	0.2676	0.1150	0.0227	0.6913	1.0175	0.1019	0.1731	0.5834	0.7392	0.1098	0.0293	0.0114	1.3456
Jul-88	0.0740	0.1835	0.0767	0.0174	0.4561	0.6714	0.0673	0.1199	0.3849	0.5039	0.0724	0.0194	0.0088	0.8879
Aug-88	0.1103	0.2637	0.1132	0.0224	0.6805	1.0017	0.1003	0.1706	0.5743	0.7284	0.1080	0.0289	0.0113	1.3246
Sep-88	0.0096	0.0417	0.0120	0.0085	0.0595	0.0876	0.0088	0.0302	0.0502	0.1070	0.0094	0.0025	0.0043	0.1158
Oct-88	0.0020	0.0249	0.0043	0.0075	0.0126	0.0185	0.0019	0.0196	0.0106	0.0601	0.0020	0.0005	0.0037	0.0244
Nov-88	0.0031	0.0272	0.0054	0.0076	0.0191	0.0281	0.0028	0.0211	0.0161	0.0666	0.0030	0.0008	0.0038	0.0372
Dec-88	0.0096	0.0416	0.0120	0.0085	0.0594	0.0874	0.0088	0.0302	0.0501	0.1069	0.0094	0.0025	0.0043	0.1156
Jan-89	0.0083	0.0388	0.0107	0.0084	0.0514	0.0757	0.0076	0.0284	0.0434	0.0989	0.0082	0.0022	0.0042	0.1000
Feb-89	0.0057	0.0329	0.0080	0.0080	0.0350	0.0516	0.0052	0.0247	0.0296	0.0826	0.0056	0.0015	0.0040	0.0682
Mar-89	0.0017	0.0241	0.0040	0.0074	0.0103	0.0151	0.0015	0.0191	0.0087	0.0578	0.0016	0.0004	0.0037	0.0200
Apr-89	0.0015	0.0236	0.0038	0.0074	0.0090	0.0133	0.0013	0.0188	0.0076	0.0565	0.0014	0.0004	0.0037	0.0176
May-89	0.0392	0.1068	0.0417	0.0126	0.2417	0.3557	0.0356	0.0714	0.2039	0.2893	0.0384	0.0103	0.0063	0.4704
Jun-89	0.0463	0.1226	0.0489	0.0136	0.2858	0.4207	0.0421	0.0814	0.2412	0.3335	0.0454	0.0121	0.0068	0.5563
Jul-89	0.0073	0.0365	0.0096	0.0082	0.0450	0.0663	0.0066	0.0270	0.0380	0.0925	0.0071	0.0019	0.0041	0.0876

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Aug-89	0.0011	0.0228	0.0034	0.0074	0.0068	0.0100	0.0010	0.0183	0.0057	0.0543	0.0011	0.0003	0.0037	0.0132
Sep-89	0.0001	0.0205	0.0024	0.0072	0.0004	0.0006	0.0001	0.0169	0.0003	0.0479	0.0001	0.0000	0.0036	0.0008
Oct-89														
Nov-89														
Dec-89														
Jan-90														
Feb-90														
Mar-90														
Apr-90	0.0140	0.0512	0.0163	0.0091	0.0861	0.1268	0.0127	0.0363	0.0727	0.1337	0.0137	0.0037	0.0046	0.1676
May-90	0.0229	0.0710	0.0253	0.0104	0.1414	0.2081	0.0208	0.0488	0.1193	0.1890	0.0224	0.0060	0.0052	0.2752
Jun-90	0.0403	0.1094	0.0429	0.0128	0.2488	0.3663	0.0367	0.0731	0.2100	0.2965	0.0395	0.0106	0.0064	0.4844
Jul-90	0.0038	0.0289	0.0062	0.0077	0.0236	0.0348	0.0035	0.0221	0.0200	0.0712	0.0038	0.0010	0.0039	0.0460
Aug-90	0.0007	0.0221	0.0031	0.0073	0.0046	0.0068	0.0007	0.0178	0.0039	0.0521	0.0007	0.0002	0.0037	0.0090
Sep-90	0.0007	0.0218	0.0030	0.0073	0.0040	0.0059	0.0006	0.0177	0.0034	0.0515	0.0006	0.0002	0.0036	0.0078
Oct-90	0.0013	0.0233	0.0036	0.0074	0.0081	0.0119	0.0012	0.0186	0.0068	0.0556	0.0013	0.0003	0.0037	0.0157
Nov-90	0.0072	0.0362	0.0095	0.0082	0.0441	0.0650	0.0065	0.0268	0.0372	0.0917	0.0070	0.0019	0.0041	0.0859
Dec-90	0.0088	0.0397	0.0111	0.0084	0.0540	0.0795	0.0080	0.0290	0.0456	0.1015	0.0086	0.0023	0.0042	0.1051
Jan-91	0.0031	0.0272	0.0054	0.0076	0.0191	0.0282	0.0028	0.0211	0.0162	0.0667	0.0030	0.0008	0.0038	0.0373
Feb-91	0.0023	0.0255	0.0046	0.0075	0.0144	0.0212	0.0021	0.0201	0.0121	0.0619	0.0023	0.0006	0.0038	0.0280
Mar-91	0.0027	0.0264	0.0050	0.0076	0.0168	0.0247	0.0025	0.0206	0.0141	0.0643	0.0027	0.0007	0.0038	0.0326
Apr-91	0.0020	0.0249	0.0044	0.0075	0.0126	0.0186	0.0019	0.0197	0.0107	0.0601	0.0020	0.0005	0.0037	0.0246
May-91	0.1293	0.3055	0.1323	0.0251	0.7973	1.1736	0.1176	0.1971	0.6729	0.8453	0.1266	0.0338	0.0126	1.5520
Jun-91	0.1793	0.4159	0.1826	0.0320	1.1059	1.6280	0.1631	0.2668	0.9333	1.1541	0.1756	0.0469	0.0161	2.1528
Jul-91	0.0385	0.1052	0.0410	0.0125	0.2373	0.3493	0.0350	0.0704	0.2002	0.2849	0.0377	0.0101	0.0063	0.4618
Aug-91	0.0007	0.0220	0.0030	0.0073	0.0046	0.0067	0.0007	0.0178	0.0039	0.0521	0.0007	0.0002	0.0037	0.0089
Sep-91	0.0001	0.0207	0.0024	0.0072	0.0007	0.0011	0.0001	0.0170	0.0006	0.0482	0.0001	0.0000	0.0036	0.0015

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Oct-91	0.0003	0.0212	0.0027	0.0072	0.0022	0.0032	0.0003	0.0173	0.0018	0.0497	0.0003	0.0001	0.0036	0.0042
Nov-91	0.0139	0.0510	0.0163	0.0091	0.0856	0.1260	0.0126	0.0361	0.0722	0.1331	0.0136	0.0036	0.0046	0.1666
Dec-91	0.0093	0.0408	0.0116	0.0085	0.0572	0.0842	0.0084	0.0297	0.0483	0.1047	0.0091	0.0024	0.0042	0.1113
Jan-92	0.0067	0.0351	0.0090	0.0081	0.0411	0.0605	0.0061	0.0261	0.0347	0.0886	0.0065	0.0017	0.0041	0.0800
Feb-92	0.0066	0.0349	0.0089	0.0081	0.0406	0.0597	0.0060	0.0260	0.0342	0.0881	0.0064	0.0017	0.0041	0.0789
Mar-92	0.0061	0.0339	0.0085	0.0080	0.0378	0.0557	0.0056	0.0254	0.0319	0.0853	0.0060	0.0016	0.0040	0.0736
Apr-92	0.0041	0.0295	0.0065	0.0078	0.0255	0.0376	0.0038	0.0226	0.0216	0.0731	0.0041	0.0011	0.0039	0.0497
May-92	0.1164	0.2771	0.1193	0.0233	0.7179	1.0567	0.1059	0.1791	0.6058	0.7658	0.1140	0.0305	0.0117	1.3973
Jun-92	0.1112	0.2657	0.1141	0.0226	0.6860	1.0097	0.1012	0.1719	0.5789	0.7339	0.1089	0.0291	0.0114	1.3353
Jul-92	0.0114	0.0456	0.0138	0.0088	0.0706	0.1039	0.0104	0.0328	0.0596	0.1181	0.0112	0.0030	0.0044	0.1374
Aug-92	0.0003	0.0210	0.0026	0.0072	0.0017	0.0025	0.0002	0.0172	0.0014	0.0492	0.0003	0.0001	0.0036	0.0033
Sep-92														
Oct-92														
Nov-92														
Dec-92														
Jan-93														
Feb-93														
Mar-93														
Apr-93														
May-93	0.0620	0.1571	0.0646	0.0158	0.3822	0.5627	0.0564	0.1032	0.3226	0.4300	0.0607	0.0162	0.0079	0.7441
Jun-93	0.0622	0.1575	0.0648	0.0158	0.3835	0.5644	0.0565	0.1035	0.3236	0.4312	0.0609	0.0163	0.0079	0.7464
Jul-93	0.0017	0.0240	0.0040	0.0074	0.0102	0.0150	0.0015	0.0191	0.0086	0.0577	0.0016	0.0004	0.0037	0.0198
Aug-93	0.0004	0.0213	0.0027	0.0073	0.0026	0.0038	0.0004	0.0174	0.0022	0.0501	0.0004	0.0001	0.0036	0.0050
Sep-93	0.0001	0.0206	0.0024	0.0072	0.0005	0.0007	0.0001	0.0169	0.0004	0.0480	0.0001	0.0000	0.0036	0.0009
Oct-93	0.0001	0.0205	0.0024	0.0072	0.0003	0.0005	0.0000	0.0169	0.0003	0.0478	0.0001	0.0000	0.0036	0.0006
Nov-93														

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Dec-93														
Jan-94														
Feb-94														
Mar-94														
Apr-94														
May-94	0.0362	0.1002	0.0387	0.0122	0.2232	0.3286	0.0329	0.0673	0.1884	0.2709	0.0354	0.0095	0.0061	0.4345
Jun-94	0.0251	0.0758	0.0276	0.0107	0.1549	0.2280	0.0228	0.0518	0.1307	0.2025	0.0246	0.0066	0.0054	0.3015
Jul-94	0.0022	0.0253	0.0046	0.0075	0.0138	0.0204	0.0020	0.0199	0.0117	0.0613	0.0022	0.0006	0.0038	0.0269
Aug-94	0.0002	0.0209	0.0025	0.0072	0.0013	0.0020	0.0002	0.0171	0.0011	0.0489	0.0002	0.0001	0.0036	0.0026
Sep-94														
Oct-94														
Nov-94														
Dec-94														
Jan-95														
Feb-95														
Mar-95														
Apr-95														
May-95	0.0092	0.0406	0.0115	0.0085	0.0566	0.0832	0.0083	0.0296	0.0477	0.1041	0.0090	0.0024	0.0042	0.1101
Jun-95	0.0135	0.0501	0.0158	0.0091	0.0831	0.1223	0.0123	0.0356	0.0701	0.1307	0.0132	0.0035	0.0045	0.1618
Jul-95	0.0008	0.0222	0.0031	0.0073	0.0050	0.0073	0.0007	0.0179	0.0042	0.0525	0.0008	0.0002	0.0037	0.0097
Aug-95	0.0001	0.0206	0.0024	0.0072	0.0006	0.0009	0.0001	0.0169	0.0005	0.0481	0.0001	0.0000	0.0036	0.0012
Sep-95														
Oct-95														
Nov-95														
Dec-95														
Jan-96														

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Feb-96														
Mar-96														
Apr-96														
May-96	0.0139	0.0510	0.0162	0.0091	0.0854	0.1258	0.0126	0.0361	0.0721	0.1330	0.0136	0.0036	0.0046	0.1663
Jun-96	0.0184	0.0611	0.0208	0.0097	0.1137	0.1674	0.0168	0.0425	0.0960	0.1613	0.0181	0.0048	0.0049	0.2213
Jul-96	0.0039	0.0290	0.0062	0.0077	0.0240	0.0354	0.0035	0.0222	0.0203	0.0716	0.0038	0.0010	0.0039	0.0468
Aug-96														
Sep-96														
Oct-96	0.0002	0.0207	0.0025	0.0072	0.0009	0.0014	0.0001	0.0170	0.0008	0.0484	0.0001	0.0000	0.0036	0.0018
Nov-96	0.0002	0.0209	0.0025	0.0072	0.0013	0.0019	0.0002	0.0171	0.0011	0.0488	0.0002	0.0001	0.0036	0.0026
Dec-96														
Jan-97														
Feb-97	0.0038	0.0289	0.0062	0.0077	0.0237	0.0349	0.0035	0.0222	0.0200	0.0712	0.0038	0.0010	0.0039	0.0462
Mar-97	0.0072	0.0363	0.0096	0.0082	0.0446	0.0656	0.0066	0.0269	0.0376	0.0921	0.0071	0.0019	0.0041	0.0868
Apr-97	0.0062	0.0341	0.0085	0.0081	0.0383	0.0563	0.0056	0.0255	0.0323	0.0858	0.0061	0.0016	0.0040	0.0745
May-97	0.0045	0.0304	0.0068	0.0078	0.0278	0.0410	0.0041	0.0231	0.0235	0.0754	0.0044	0.0012	0.0039	0.0542
Jun-97	0.0090	0.0401	0.0113	0.0084	0.0552	0.0813	0.0081	0.0293	0.0466	0.1027	0.0088	0.0023	0.0042	0.1075
Jul-97	0.0113	0.0453	0.0136	0.0088	0.0695	0.1024	0.0103	0.0325	0.0587	0.1171	0.0110	0.0030	0.0044	0.1354
Aug-97	0.0040	0.0292	0.0063	0.0078	0.0247	0.0363	0.0036	0.0224	0.0208	0.0722	0.0039	0.0010	0.0039	0.0481
Sep-97														
Oct-97	0.0006	0.0217	0.0029	0.0073	0.0038	0.0055	0.0006	0.0176	0.0032	0.0513	0.0006	0.0002	0.0036	0.0073
Nov-97	0.0012	0.0231	0.0035	0.0074	0.0076	0.0112	0.0011	0.0185	0.0064	0.0551	0.0012	0.0003	0.0037	0.0148
Dec-97	0.0053	0.0321	0.0076	0.0079	0.0326	0.0480	0.0048	0.0242	0.0275	0.0801	0.0052	0.0014	0.0040	0.0634
Jan-98	0.0084	0.0389	0.0107	0.0084	0.0517	0.0761	0.0076	0.0285	0.0437	0.0993	0.0082	0.0022	0.0042	0.1007
Feb-98	0.0104	0.0434	0.0128	0.0086	0.0643	0.0947	0.0095	0.0313	0.0543	0.1119	0.0102	0.0027	0.0043	0.1252
Mar-98	0.0091	0.0406	0.0115	0.0085	0.0564	0.0830	0.0083	0.0295	0.0476	0.1039	0.0090	0.0024	0.0042	0.1098

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Apr-98	0.0067	0.0352	0.0090	0.0081	0.0413	0.0608	0.0061	0.0261	0.0348	0.0888	0.0066	0.0018	0.0041	0.0804
May-98	0.0403	0.1092	0.0428	0.0128	0.2484	0.3656	0.0366	0.0730	0.2096	0.2960	0.0394	0.0105	0.0064	0.4835
Jun-98	0.0186	0.0613	0.0210	0.0098	0.1145	0.1685	0.0169	0.0427	0.0966	0.1620	0.0182	0.0049	0.0049	0.2228
Jul-98	0.0024	0.0258	0.0047	0.0075	0.0150	0.0221	0.0022	0.0202	0.0127	0.0625	0.0024	0.0006	0.0038	0.0292
Aug-98	0.0001	0.0206	0.0024	0.0072	0.0007	0.0010	0.0001	0.0170	0.0006	0.0482	0.0001	0.0000	0.0036	0.0013
Sep-98	0.0001	0.0205	0.0024	0.0072	0.0003	0.0005	0.0000	0.0169	0.0003	0.0478	0.0001	0.0000	0.0036	0.0006
Oct-98	0.0001	0.0207	0.0024	0.0072	0.0007	0.0011	0.0001	0.0170	0.0006	0.0482	0.0001	0.0000	0.0036	0.0014
Nov-98	0.0005	0.0214	0.0028	0.0073	0.0029	0.0043	0.0004	0.0175	0.0025	0.0504	0.0005	0.0001	0.0036	0.0057
Dec-98	0.0048	0.0309	0.0071	0.0079	0.0294	0.0433	0.0043	0.0234	0.0248	0.0769	0.0047	0.0012	0.0039	0.0572
Jan-99	0.0129	0.0488	0.0152	0.0090	0.0794	0.1169	0.0117	0.0348	0.0670	0.1270	0.0126	0.0034	0.0045	0.1546
Feb-99	0.0113	0.0453	0.0136	0.0088	0.0695	0.1023	0.0102	0.0325	0.0587	0.1170	0.0110	0.0029	0.0044	0.1353
Mar-99	0.0078	0.0376	0.0101	0.0083	0.0481	0.0708	0.0071	0.0277	0.0406	0.0957	0.0076	0.0020	0.0041	0.0937
Apr-99	0.0058	0.0333	0.0082	0.0080	0.0359	0.0529	0.0053	0.0249	0.0303	0.0835	0.0057	0.0015	0.0040	0.0700
May-99	0.0122	0.0472	0.0145	0.0089	0.0750	0.1104	0.0111	0.0338	0.0633	0.1225	0.0119	0.0032	0.0044	0.1460
Jun-99	0.0580	0.1484	0.0606	0.0152	0.3579	0.5269	0.0528	0.0977	0.3021	0.4057	0.0568	0.0152	0.0076	0.6968
Jul-99	0.0130	0.0490	0.0153	0.0090	0.0800	0.1178	0.0118	0.0349	0.0675	0.1276	0.0127	0.0034	0.0045	0.1558
Aug-99	0.0031	0.0271	0.0054	0.0076	0.0189	0.0278	0.0028	0.0211	0.0159	0.0664	0.0030	0.0008	0.0038	0.0367
Sep-99	0.0011	0.0228	0.0034	0.0073	0.0067	0.0098	0.0010	0.0183	0.0056	0.0542	0.0011	0.0003	0.0037	0.0130
Oct-99	0.0006	0.0217	0.0029	0.0073	0.0035	0.0052	0.0005	0.0176	0.0030	0.0510	0.0006	0.0001	0.0036	0.0068
Nov-99	0.0006	0.0218	0.0029	0.0073	0.0038	0.0057	0.0006	0.0177	0.0032	0.0513	0.0006	0.0002	0.0036	0.0075
Dec-99	0.0008	0.0222	0.0031	0.0073	0.0051	0.0075	0.0008	0.0180	0.0043	0.0526	0.0008	0.0002	0.0037	0.0100
Jan-00	0.0006	0.0217	0.0029	0.0073	0.0037	0.0055	0.0006	0.0176	0.0031	0.0512	0.0006	0.0002	0.0036	0.0073
Feb-00	0.0002	0.0209	0.0025	0.0072	0.0015	0.0022	0.0002	0.0171	0.0013	0.0490	0.0002	0.0001	0.0036	0.0030
Mar-00														
Apr-00														
May-00	0.0055	0.0326	0.0079	0.0080	0.0341	0.0502	0.0050	0.0245	0.0288	0.0816	0.0054	0.0014	0.0040	0.0664

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Jun-00	0.0029	0.0269	0.0053	0.0076	0.0181	0.0267	0.0027	0.0209	0.0153	0.0656	0.0029	0.0008	0.0038	0.0353
Jul-00	0.0004	0.0214	0.0027	0.0073	0.0027	0.0039	0.0004	0.0174	0.0023	0.0502	0.0004	0.0001	0.0036	0.0052
Aug-00														
Sep-00														
Oct-00	0.0001	0.0207	0.0024	0.0072	0.0008	0.0012	0.0001	0.0170	0.0007	0.0483	0.0001	0.0000	0.0036	0.0016
Nov-00	0.0040	0.0293	0.0064	0.0078	0.0249	0.0366	0.0037	0.0224	0.0210	0.0724	0.0039	0.0011	0.0039	0.0484
Dec-00	0.0138	0.0508	0.0161	0.0091	0.0849	0.1250	0.0125	0.0360	0.0716	0.1324	0.0135	0.0036	0.0046	0.1652
Jan-01	0.0127	0.0483	0.0150	0.0089	0.0781	0.1150	0.0115	0.0345	0.0659	0.1257	0.0124	0.0033	0.0045	0.1521
Feb-01	0.0082	0.0384	0.0105	0.0083	0.0504	0.0741	0.0074	0.0282	0.0425	0.0979	0.0080	0.0021	0.0042	0.0981
Mar-01	0.0075	0.0370	0.0099	0.0082	0.0464	0.0683	0.0068	0.0273	0.0392	0.0939	0.0074	0.0020	0.0041	0.0903
Apr-01	0.0054	0.0323	0.0077	0.0079	0.0332	0.0488	0.0049	0.0243	0.0280	0.0807	0.0053	0.0014	0.0040	0.0646
May-01	0.0659	0.1657	0.0685	0.0163	0.4062	0.5979	0.0599	0.1086	0.3428	0.4539	0.0645	0.0172	0.0082	0.7906
Jun-01	0.1589	0.3709	0.1621	0.0291	0.9801	1.4427	0.1445	0.2384	0.8271	1.0282	0.1556	0.0416	0.0147	1.9078
Jul-01	0.0122	0.0472	0.0145	0.0089	0.0751	0.1105	0.0111	0.0338	0.0634	0.1226	0.0119	0.0032	0.0044	0.1461
Aug-01	0.0009	0.0224	0.0032	0.0073	0.0057	0.0084	0.0008	0.0181	0.0048	0.0532	0.0009	0.0002	0.0037	0.0111
Sep-01	0.0122	0.0474	0.0146	0.0089	0.0754	0.1111	0.0111	0.0339	0.0637	0.1230	0.0120	0.0032	0.0045	0.1469
Oct-01	0.0314	0.0895	0.0338	0.0115	0.1934	0.2846	0.0285	0.0605	0.1632	0.2410	0.0307	0.0082	0.0058	0.3764
Nov-01	0.0185	0.0612	0.0209	0.0098	0.1142	0.1681	0.0168	0.0426	0.0963	0.1617	0.0181	0.0048	0.0049	0.2222
Dec-01	0.0148	0.0531	0.0172	0.0092	0.0914	0.1346	0.0135	0.0375	0.0771	0.1390	0.0145	0.0039	0.0046	0.1779
Jan-02	0.0120	0.0469	0.0144	0.0089	0.0742	0.1092	0.0109	0.0336	0.0626	0.1218	0.0118	0.0031	0.0044	0.1445
Feb-02	0.0085	0.0392	0.0109	0.0084	0.0527	0.0776	0.0078	0.0287	0.0445	0.1002	0.0084	0.0022	0.0042	0.1026
Mar-02	0.0070	0.0359	0.0094	0.0082	0.0433	0.0637	0.0064	0.0266	0.0365	0.0908	0.0069	0.0018	0.0041	0.0842
Apr-02	0.0056	0.0328	0.0080	0.0080	0.0348	0.0512	0.0051	0.0247	0.0294	0.0823	0.0055	0.0015	0.0040	0.0678
May-02	0.0085	0.0391	0.0108	0.0084	0.0524	0.0771	0.0077	0.0286	0.0442	0.0999	0.0083	0.0022	0.0042	0.1020
Jun-02	0.0744	0.1845	0.0771	0.0175	0.4590	0.6757	0.0677	0.1206	0.3874	0.5068	0.0729	0.0195	0.0088	0.8935
Jul-02	0.0114	0.0455	0.0137	0.0088	0.0702	0.1034	0.0104	0.0327	0.0593	0.1178	0.0111	0.0030	0.0044	0.1367

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Aug-02	0.0458	0.1215	0.0484	0.0135	0.2826	0.4160	0.0417	0.0807	0.2385	0.3303	0.0449	0.0120	0.0068	0.5501
Sep-02	0.0555	0.1427	0.0581	0.0149	0.3420	0.5035	0.0504	0.0941	0.2887	0.3898	0.0543	0.0145	0.0075	0.6658
Oct-02	0.0208	0.0663	0.0232	0.0101	0.1284	0.1890	0.0189	0.0458	0.1083	0.1759	0.0204	0.0054	0.0051	0.2499
Nov-02	0.0173	0.0586	0.0197	0.0096	0.1068	0.1572	0.0157	0.0409	0.0901	0.1543	0.0170	0.0045	0.0048	0.2079
Dec-02	0.0144	0.0521	0.0167	0.0092	0.0886	0.1304	0.0131	0.0368	0.0748	0.1362	0.0141	0.0038	0.0046	0.1725
Jan-03	0.0116	0.0460	0.0140	0.0088	0.0715	0.1052	0.0105	0.0330	0.0603	0.1190	0.0113	0.0030	0.0044	0.1391
Feb-03	0.0093	0.0410	0.0117	0.0085	0.0575	0.0847	0.0085	0.0298	0.0485	0.1051	0.0091	0.0024	0.0043	0.1120
Mar-03	0.0077	0.0374	0.0101	0.0083	0.0476	0.0701	0.0070	0.0276	0.0402	0.0952	0.0076	0.0020	0.0041	0.0928
Apr-03	0.0068	0.0354	0.0091	0.0081	0.0420	0.0618	0.0062	0.0263	0.0354	0.0895	0.0067	0.0018	0.0041	0.0817
May-03	0.0593	0.1512	0.0619	0.0154	0.3657	0.5383	0.0539	0.0995	0.3086	0.4134	0.0581	0.0155	0.0077	0.7119
Jun-03	0.0749	0.1856	0.0776	0.0175	0.4620	0.6800	0.0681	0.1212	0.3899	0.5098	0.0734	0.0196	0.0088	0.8993
Jul-03	0.0204	0.0653	0.0228	0.0100	0.1255	0.1848	0.0185	0.0452	0.1059	0.1731	0.0199	0.0053	0.0050	0.2444
Aug-03	0.0036	0.0283	0.0059	0.0077	0.0221	0.0325	0.0033	0.0218	0.0186	0.0696	0.0035	0.0009	0.0038	0.0430
Sep-03	0.0021	0.0249	0.0044	0.0075	0.0127	0.0187	0.0019	0.0197	0.0107	0.0602	0.0020	0.0005	0.0037	0.0248
Oct-03	0.0011	0.0228	0.0034	0.0073	0.0066	0.0097	0.0010	0.0183	0.0056	0.0541	0.0010	0.0003	0.0037	0.0128
Nov-03	0.0008	0.0221	0.0031	0.0073	0.0048	0.0071	0.0007	0.0179	0.0041	0.0523	0.0008	0.0002	0.0037	0.0094
Dec-03	0.0013	0.0232	0.0036	0.0074	0.0079	0.0116	0.0012	0.0186	0.0067	0.0554	0.0013	0.0003	0.0037	0.0154
Jan-04	0.0045	0.0304	0.0069	0.0078	0.0280	0.0412	0.0041	0.0231	0.0236	0.0755	0.0044	0.0012	0.0039	0.0544
Feb-04	0.0080	0.0380	0.0103	0.0083	0.0492	0.0724	0.0073	0.0279	0.0415	0.0967	0.0078	0.0021	0.0042	0.0958
Mar-04	0.0084	0.0389	0.0107	0.0084	0.0517	0.0762	0.0076	0.0285	0.0437	0.0993	0.0082	0.0022	0.0042	0.1007
Apr-04	0.0068	0.0354	0.0091	0.0081	0.0418	0.0616	0.0062	0.0263	0.0353	0.0894	0.0066	0.0018	0.0041	0.0814
May-04	0.0060	0.0337	0.0084	0.0080	0.0372	0.0547	0.0055	0.0252	0.0314	0.0847	0.0059	0.0016	0.0040	0.0724
Jun-04	0.0193	0.0630	0.0217	0.0099	0.1193	0.1756	0.0176	0.0438	0.1006	0.1668	0.0189	0.0051	0.0049	0.2321
Jul-04	0.0243	0.0741	0.0268	0.0106	0.1500	0.2209	0.0221	0.0507	0.1266	0.1976	0.0238	0.0064	0.0053	0.2921
Aug-04	0.0029	0.0269	0.0053	0.0076	0.0182	0.0267	0.0027	0.0209	0.0153	0.0657	0.0029	0.0008	0.0038	0.0353
Sep-04	0.0001	0.0207	0.0024	0.0072	0.0009	0.0013	0.0001	0.0170	0.0007	0.0484	0.0001	0.0000	0.0036	0.0017

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Oct-04	0.0003	0.0210	0.0026	0.0072	0.0016	0.0024	0.0002	0.0172	0.0014	0.0491	0.0003	0.0001	0.0036	0.0031
Nov-04	0.0004	0.0213	0.0027	0.0073	0.0026	0.0039	0.0004	0.0174	0.0022	0.0501	0.0004	0.0001	0.0036	0.0051
Dec-04	0.0007	0.0219	0.0030	0.0073	0.0041	0.0060	0.0006	0.0177	0.0035	0.0516	0.0007	0.0002	0.0036	0.0080
Jan-05	0.0068	0.0353	0.0091	0.0081	0.0417	0.0613	0.0061	0.0262	0.0352	0.0892	0.0066	0.0018	0.0041	0.0811
Feb-05	0.0109	0.0443	0.0132	0.0087	0.0669	0.0985	0.0099	0.0319	0.0565	0.1145	0.0106	0.0028	0.0044	0.1302
Mar-05	0.0087	0.0396	0.0111	0.0084	0.0538	0.0792	0.0079	0.0290	0.0454	0.1013	0.0085	0.0023	0.0042	0.1047
Apr-05	0.0052	0.0318	0.0075	0.0079	0.0319	0.0470	0.0047	0.0240	0.0270	0.0795	0.0051	0.0014	0.0040	0.0622
May-05	0.0245	0.0745	0.0270	0.0106	0.1513	0.2227	0.0223	0.0510	0.1277	0.1989	0.0240	0.0064	0.0053	0.2944
Jun-05	0.0556	0.1430	0.0582	0.0149	0.3428	0.5045	0.0505	0.0943	0.2893	0.3905	0.0544	0.0145	0.0075	0.6672
Jul-05	0.0150	0.0535	0.0174	0.0093	0.0925	0.1361	0.0136	0.0377	0.0780	0.1400	0.0147	0.0039	0.0046	0.1800
Aug-05	0.0038	0.0287	0.0061	0.0077	0.0232	0.0342	0.0034	0.0221	0.0196	0.0708	0.0037	0.0010	0.0039	0.0452
Sep-05	0.0072	0.0364	0.0096	0.0082	0.0447	0.0657	0.0066	0.0269	0.0377	0.0922	0.0071	0.0019	0.0041	0.0869
Oct-05	0.0698	0.1743	0.0725	0.0168	0.4304	0.6335	0.0635	0.1141	0.3632	0.4782	0.0683	0.0183	0.0085	0.8378
Nov-05	0.0605	0.1539	0.0631	0.0156	0.3732	0.5493	0.0550	0.1012	0.3150	0.4209	0.0593	0.0158	0.0078	0.7264
Dec-05	0.0343	0.0960	0.0368	0.0119	0.2115	0.3114	0.0312	0.0646	0.1785	0.2591	0.0336	0.0090	0.0060	0.4117
Jan-06	0.0211	0.0669	0.0235	0.0101	0.1300	0.1913	0.0192	0.0462	0.1097	0.1775	0.0206	0.0055	0.0051	0.2530
Feb-06	0.0153	0.0542	0.0177	0.0093	0.0945	0.1391	0.0139	0.0382	0.0797	0.1420	0.0150	0.0040	0.0047	0.1839
Mar-06	0.0115	0.0457	0.0138	0.0088	0.0707	0.1041	0.0104	0.0328	0.0597	0.1183	0.0112	0.0030	0.0044	0.1377
Apr-06	0.0099	0.0423	0.0123	0.0086	0.0613	0.0903	0.0090	0.0307	0.0518	0.1089	0.0097	0.0026	0.0043	0.1194
May-06	0.1312	0.3097	0.1342	0.0253	0.8091	1.1910	0.1193	0.1997	0.6828	0.8571	0.1285	0.0343	0.0128	1.5749
Jun-06	0.0877	0.2138	0.0905	0.0193	0.5409	0.7962	0.0798	0.1391	0.4565	0.5887	0.0859	0.0229	0.0097	1.0529
Jul-06	0.0130	0.0491	0.0154	0.0090	0.0803	0.1183	0.0118	0.0350	0.0678	0.1279	0.0128	0.0034	0.0045	0.1564
Aug-06	0.0024	0.0256	0.0047	0.0075	0.0146	0.0215	0.0021	0.0201	0.0123	0.0621	0.0023	0.0006	0.0038	0.0284
Sep-06	0.0006	0.0217	0.0029	0.0073	0.0038	0.0055	0.0006	0.0177	0.0032	0.0513	0.0006	0.0002	0.0036	0.0073
Oct-06	0.0003	0.0212	0.0026	0.0072	0.0021	0.0031	0.0003	0.0173	0.0018	0.0496	0.0003	0.0001	0.0036	0.0041
Nov-06	0.0004	0.0214	0.0027	0.0073	0.0027	0.0040	0.0004	0.0174	0.0023	0.0502	0.0004	0.0001	0.0036	0.0053

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Dec-06	0.0046	0.0306	0.0070	0.0078	0.0286	0.0421	0.0042	0.0233	0.0242	0.0761	0.0045	0.0012	0.0039	0.0557
Jan-07	0.0090	0.0403	0.0114	0.0084	0.0555	0.0817	0.0082	0.0294	0.0469	0.1031	0.0088	0.0024	0.0042	0.1081
Feb-07	0.0152	0.0538	0.0175	0.0093	0.0935	0.1376	0.0138	0.0379	0.0789	0.1410	0.0148	0.0040	0.0047	0.1819
Mar-07	0.0129	0.0489	0.0153	0.0090	0.0796	0.1172	0.0117	0.0348	0.0672	0.1272	0.0126	0.0034	0.0045	0.1550
Apr-07	0.0088	0.0398	0.0112	0.0084	0.0543	0.0799	0.0080	0.0291	0.0458	0.1018	0.0086	0.0023	0.0042	0.1057
May-07	0.0384	0.1051	0.0409	0.0125	0.2368	0.3486	0.0349	0.0703	0.1999	0.2845	0.0376	0.0100	0.0063	0.4610
Jun-07	0.0522	0.1356	0.0548	0.0144	0.3222	0.4742	0.0475	0.0896	0.2719	0.3699	0.0512	0.0137	0.0072	0.6271
Jul-07	0.0043	0.0298	0.0066	0.0078	0.0264	0.0388	0.0039	0.0228	0.0223	0.0739	0.0042	0.0011	0.0039	0.0514
Aug-07	0.0007	0.0220	0.0030	0.0073	0.0045	0.0066	0.0007	0.0178	0.0038	0.0520	0.0007	0.0002	0.0037	0.0087
Sep-07	0.0006	0.0218	0.0029	0.0073	0.0038	0.0056	0.0006	0.0177	0.0032	0.0513	0.0006	0.0002	0.0036	0.0074
Oct-07	0.0060	0.0337	0.0084	0.0080	0.0372	0.0547	0.0055	0.0252	0.0314	0.0847	0.0059	0.0016	0.0040	0.0723
Nov-07	0.0147	0.0528	0.0171	0.0092	0.0905	0.1333	0.0134	0.0373	0.0764	0.1381	0.0144	0.0038	0.0046	0.1762
Dec-07	0.0144	0.0521	0.0168	0.0092	0.0887	0.1305	0.0131	0.0368	0.0748	0.1362	0.0141	0.0038	0.0046	0.1726
Jan-08	0.0116	0.0460	0.0140	0.0088	0.0715	0.1052	0.0105	0.0330	0.0603	0.1190	0.0113	0.0030	0.0044	0.1391
Feb-08	0.0085	0.0391	0.0108	0.0084	0.0524	0.0771	0.0077	0.0286	0.0442	0.0999	0.0083	0.0022	0.0042	0.1019
Mar-08	0.0065	0.0347	0.0088	0.0081	0.0399	0.0587	0.0059	0.0258	0.0336	0.0874	0.0063	0.0017	0.0041	0.0776
Apr-08	0.0059	0.0335	0.0083	0.0080	0.0365	0.0537	0.0054	0.0251	0.0308	0.0840	0.0058	0.0015	0.0040	0.0711
May-08	0.0240	0.0733	0.0264	0.0105	0.1480	0.2178	0.0218	0.0503	0.1249	0.1956	0.0235	0.0063	0.0053	0.2881
Jun-08	0.0513	0.1336	0.0539	0.0143	0.3165	0.4658	0.0467	0.0883	0.2671	0.3641	0.0502	0.0134	0.0072	0.6160
Jul-08	0.0108	0.0443	0.0132	0.0087	0.0667	0.0982	0.0098	0.0319	0.0563	0.1143	0.0106	0.0028	0.0044	0.1299
Aug-08	0.0020	0.0248	0.0043	0.0075	0.0122	0.0179	0.0018	0.0196	0.0103	0.0597	0.0019	0.0005	0.0037	0.0237
Sep-08	0.0004	0.0212	0.0027	0.0073	0.0024	0.0035	0.0003	0.0173	0.0020	0.0499	0.0004	0.0001	0.0036	0.0046
Oct-08	0.0516	0.1342	0.0542	0.0143	0.3183	0.4685	0.0469	0.0888	0.2686	0.3660	0.0505	0.0135	0.0072	0.6195
Nov-08	0.0487	0.1279	0.0513	0.0139	0.3005	0.4424	0.0443	0.0847	0.2536	0.3482	0.0477	0.0127	0.0070	0.5850
Dec-08	0.0283	0.0829	0.0308	0.0111	0.1748	0.2573	0.0258	0.0563	0.1475	0.2224	0.0278	0.0074	0.0056	0.3402
Jan-09	0.0175	0.0590	0.0199	0.0096	0.1080	0.1589	0.0159	0.0412	0.0911	0.1555	0.0171	0.0046	0.0048	0.2102

Table IV-1 Long Term Discharge Record for Watersheds Upstream of Burke and Lou Creeks (continued)

Date	LL1	LL2	LL3	LL4	LL5	LL6	BL1	BL2	BL3	BL4	BL5	BL6	BL7	BL8
Feb-09	0.0126	0.0483	0.0150	0.0089	0.0780	0.1148	0.0115	0.0344	0.0658	0.1255	0.0124	0.0033	0.0045	0.1518
Mar-09	0.0101	0.0426	0.0124	0.0086	0.0620	0.0913	0.0091	0.0308	0.0524	0.1096	0.0099	0.0026	0.0043	0.1208
Apr-09	0.0104	0.0433	0.0127	0.0086	0.0640	0.0942	0.0094	0.0313	0.0540	0.1115	0.0102	0.0027	0.0043	0.1245
May-09	0.0684	0.1712	0.0710	0.0166	0.4217	0.6207	0.0622	0.1121	0.3559	0.4694	0.0669	0.0179	0.0084	0.8208
Jun-09	0.0885	0.2156	0.0913	0.0194	0.5459	0.8036	0.0805	0.1402	0.4607	0.5938	0.0867	0.0232	0.0098	1.0627
Jul-09	0.0368	0.1016	0.0393	0.0123	0.2270	0.3341	0.0335	0.0681	0.1916	0.2746	0.0360	0.0096	0.0062	0.4418
Aug-09	0.0129	0.0489	0.0153	0.0090	0.0796	0.1172	0.0117	0.0348	0.0672	0.1272	0.0126	0.0034	0.0045	0.1550
Sep-09	0.0021	0.0249	0.0044	0.0075	0.0127	0.0187	0.0019	0.0197	0.0107	0.0602	0.0020	0.0005	0.0037	0.0247
Oct-09	0.0014	0.0235	0.0037	0.0074	0.0088	0.0129	0.0013	0.0188	0.0074	0.0563	0.0014	0.0004	0.0037	0.0170
Nov-09	0.0125	0.0481	0.0149	0.0089	0.0774	0.1139	0.0114	0.0343	0.0653	0.1249	0.0123	0.0033	0.0045	0.1506
Dec-09	0.0197	0.0638	0.0221	0.0099	0.1213	0.1786	0.0179	0.0442	0.1024	0.1689	0.0193	0.0051	0.0050	0.2362

Table IV-2 Long Term Flow Record for the Marian River

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1975							5.219	3.977	6.489	4.783	4.104	3.353
1976	2.729	2.092	1.459	1.261	5.727	5.849	2.421	1.087	0.661	0.441	0.368	0.334
1977	0.282	0.237	0.201	0.181	0.374	0.265	0.116	0.055	0.086	0.178	0.289	0.397
1978	0.371	0.265	0.216	0.183	0.559	0.518	0.772	1.051	0.746	0.718	0.541	0.431
1979	0.331	0.209	0.130	0.091	0.426	2.236	1.981	1.270	0.945	0.927	0.886	0.768
1980	0.631	0.517	0.406	0.342	1.627	11.303	6.479	2.883	1.484	1.149	1.028	0.894
1981	0.690	0.532	0.438	0.378	0.637	0.786	1.009	0.829	0.631	0.593	0.588	0.547
1982	0.464	0.343	0.311	0.256	0.852	8.653	9.795	3.216	1.774	1.277	0.978	0.778
1983	0.733	0.598	0.435	0.341	0.544	1.357	1.654	6.162	8.871	10.767	11.933	8.208
1984	5.011	3.509	2.423	3.149	13.540	19.239	25.541	12.801	5.874	4.309	3.687	2.728
1985	2.053	1.579	1.300	1.374	14.714	39.741	22.980	8.811	4.468	3.091	2.694	2.321
1986	1.900	1.504	1.209	1.135	4.532	37.202	53.761	19.532	8.180	4.107	2.408	1.730
1987	1.577	1.388	1.251	0.926	1.498	1.170	0.652	0.361	0.403	0.479	0.551	0.615
1988	0.634	0.458	0.360	0.384	0.666	6.884	22.733	28.569	13.935	10.667	8.700	6.451
1989	4.905	4.095	2.995	2.137	5.512	6.153	5.666	5.971	2.960	2.268	1.998	1.889
1990	1.339	1.050	0.928	0.778	1.576	3.669	4.901	6.130	5.160	5.025	4.944	4.585
1991	3.392	2.550	1.793	1.590	19.384	124.251	86.631	20.092	9.411	6.485	4.472	3.488
1992	3.155	2.602	2.098	1.842	15.969	42.741	32.966	11.050	4.489	2.590	1.879	1.466
1993	1.123	0.956	1.003	1.005	5.876	10.719	10.150	7.677	4.209	2.035	1.418	1.117
1994	0.893	0.669	0.613	0.583	0.923	1.086	0.781	0.406	0.342	0.337	0.409	0.462
1995	0.384	0.367	0.340	0.245	0.601	0.862	0.642	0.354	0.350	0.380	0.379	0.385
1996	0.386	0.334	0.217	0.188	0.414	0.727	1.022	1.082	1.231	1.353	1.087	0.950
1997	0.833	0.687	0.559	0.430	0.652	3.164	6.977			1.472	1.104	0.940
1998	0.822	0.687	0.597	0.783	3.006	2.008	1.266	0.866	0.937	1.322	3.378	4.227
1999	3.034	2.363	1.744	1.488	12.138	24.687	20.465	7.170	3.672	2.491	1.883	1.585
2000	1.244	1.012	0.923	1.028	5.412	8.170	5.949	2.786	2.862	3.238	4.620	3.828
2001	2.808	2.128	1.631	1.471	35.633	89.358	40.940	17.320	12.608	7.556	4.705	3.309
2002	2.405	1.732	1.321	1.044	2.224	3.588	3.408	10.026	12.348	10.522	7.026	4.747
2003	3.576	2.210	1.601	2.377	8.100	8.571	6.729	4.059	3.132	2.889	2.324	1.935
2004	1.688	1.345	1.135	0.977	1.118	3.760	2.466	3.641	1.755	1.855	2.007	1.876
2005	1.660	1.583	1.376	1.289	6.221	8.449	10.295	8.198	7.305	10.119	11.599	10.133
2006	7.545	5.299	3.780	3.709	27.439	35.159	20.514	11.202	9.431	6.531	4.619	3.579
2007	2.885	2.410	2.076	1.678	11.945	13.439	7.471	4.614	2.625	1.769	1.682	1.426
2008	1.289	1.070	0.907	0.780	4.585	4.320	2.275	1.430	1.418	4.947	10.114	7.527
2009	4.467	2.948	2.016	1.523	6.216	6.464	10.582	8.310	6.227	6.584	5.433	4.065