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FINAL REPORT

SD 7-2 2011 Aquatic Baseline Studies - Meliadine Gold Project, Nunavut

Submitted to:

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REPORT



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Executive Summary

Agnico-Eagle Mines Limited (AEM) proposes to construct and operate a gold mine, known as the Meliadine Gold Project (Project) 25 kilometres (km) north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. The proposed Project site is located on a peninsula (the Peninsula) between the east, south, and west basins of Meliadine Lake (63°04'45"N, 92°19'38"W), on Inuit Owned Land.

Watersheds within the study area include Meliadine Lake, several small watersheds on the Peninsula (Basins A through P), Chickenhead Lake and Control Lake watersheds that drain to Meliadine Lake, and the Meliadine River (including Little Meliadine Lake). Studies were also carried out in Lake W and Horseshoe Lake that drain into Little Meliadine Lake, a few sites in the neighbouring Peter Lake and Parallel Lake watersheds, and in the Hudson Bay.

This report includes data that were collected in 2011 to supplement the 1994-2009 data set described in an Aquatics Baseline Synthesis Report (Golder 2012). The 2011 aquatics field program focused on evaluating additional areas that may be potentially affected by the recent changes in the Project design and on extending the long-term baseline information for the areas previously studied. The 2011 studies included the Meliadine Lake watershed and focussed on the Peninsula basins.

Hydrology

This section of the report was commissioned to characterize the prevailing hydroclimatic and hydrological parameters in the study area. The hydrometric program for the 2011 field season included 10 hydrometric stations. Four of these stations were automated, with sensors recording the water level every 15 minutes, while the other 6 stations were periodically monitored with manual discharge and water level measurements.

The hydrographs for Lake D1 and Lake H1 display a typical shape with a maximum flow during freshet followed by a regression to the end of the open water season. The hydrographs of Lake E1 and Lake B6 show a slightly different shape with daily variations that are visible throughout the entire open water season, and reduced seasonal water surface elevation variations compared to lakes D1 and H1. Watersheds E1 and B6 are adjacent to each other and their headwaters are in the same part of the Peninsula. This may explain the local variations in lake water levels and flows that were observed at both lakes.

The calculated water yield of the H1 watershed was much lower than that of other continuous stations as expected due to the large proportion of non-contributing area (i.e. low ratio of effective to gross drainage area). Topographic maps and watercourse data show that most of the waterbodies in the upper part of the H watershed are not connected.

Water and Sediment Quality

Selected lakes in the study area were sampled during 2 field programs in 2011: under-ice sampling in April (winter) and open-water sampling in July/August (summer). In addition, one stream in the study area was sampled during the summer field program. Samples for water quality analysis were collected during both field programs, while samples for sediment quality analysis were only collected during the open-water field program.



Most lakes of the study area are generally well-oxygenated during open water conditions, and lakes were not thermally stratified during the open-water sampling event. Dissolved oxygen concentrations were low during under ice conditions, which likely limited their use by overwintering fish. During under ice conditions, water temperature generally increased with increasing water depth, whereas specific conductance and pH were generally similar throughout the water column.

Lakes were generally characterized by low ionic strength, very soft to very hard water hardness, low alkalinity, and slightly basic pH. Major ions in lake waters were bicarbonate and calcium in both winter and summer samples. The range of total alkalinity values during open water conditions indicated that the lake waters were moderately sensitive to insensitive to acid. Measured nutrient concentrations were typical of oligotrophic waterbodies in subarctic regions. Baseline water quality parameters were less than Canadian water quality guidelines (CWQG) with the exception of some metals (i.e., copper, iron, and chromium).

Sediments were generally dominated by silt, with some clay or sand; the exception was one station in the east basin of Meliadine Lake (ML-E) that had lower fines content, and was dominated by sand. Concentrations of TOC ranged from 4.9 to 17% (average = 9.3%) in all sediments with the exception of sediment from ML-E, which had very low TOC (0.8%). The sediments from the stream were similar to the sediments from the lake stations.

Aquatic Habitat

Aquatic habitat was assessed at 7 streams, 22 lakes, and 30 ponds in July and August 2011. All sites, except for the Control Lake, were within the Peninsula watersheds. For this report, waterbodies less than 2 m in maximum depth were classified as ponds, whereas deeper waterbodies were classified as lakes. Bathymetric surveys were conducted in 16 lakes and 9 ponds.

Most of the streams surveyed were narrow (i.e., mean channel width <1.1 m) and shallow (maximum water depth <0.5 m), with instream habitat dominated by shallow runs. Other habitat types encountered included short riffles and small pools. Substrate was dominated by organic materials, primarily detritus (i.e., decaying organisms and plant material). The surveyed streams provide suitable rearing habitat for small-bodied fish (e.g., ninespine stickleback and juvenile Arctic grayling). Based on the presence of gravel and cobble substrates, streams B5-31 and B31-30 are likely used by Arctic grayling for spawning during early spring. The shallow nature of the surveyed streams precludes fish overwintering.

The lakes and ponds included in the bathymetric surveys in 2011 ranged from 1.29 ha (E5) to 106.29 ha (Control Lake) in surface area. Maximum depths exceeded 4 m in only 3 lakes (B69, E3 and Control). Shallow habitats (<2 m in depth) contributed approximately 80% of the total lake and pond surface area. Most of lake and pond volumes were confined to the upper 2 m layer of water. When the ice cover exceeds 2 m in depth, as is often the case during late winter, the under-ice water volume is greatly reduced and the lake may freeze to the bottom. This is likely a frequent occurrence in 20 of the surveyed lakes, where less than 20% of total volume is provided by zones deeper than 2 m.

In most of the lakes surveyed, coarse substrates predominated in the shallow areas (<1.5 m), mixed substrates were common from approximately 1.0 to 2.0 m depth, and fine substrates dominated areas deeper than 2.0 m. In contrast, the predominant substrates in most the ponds surveyed were organics and silt. Coarse substrates were often observed along pond margins.



Lower Trophic Levels

Samples were collected from 14 lakes and ponds within the study area in the summer of 2011 to provide baseline information on phytoplankton, zooplankton, and benthic invertebrate community composition, abundance and taxonomic richness.

The chlorophyll *a* concentration in all lakes indicated oligotrophic conditions throughout the study area. In general, the phytoplankton community biomass of each station was dominated by Chrysophyta (golden-brown algae). Zooplankton biomass was highly variable among the waterbodies in the study area and communities were dominated by either calanoid or cyclopoid copepods.

Benthic invertebrate densities in most of waterbodies sampled ranged from 1500 to 10 000 individuals/m²; however, 2 lakes had densities greater than 50 000 individuals/m². Ostracoda (ostracods) or Chironomidae (midges) were the dominant taxonomic groups. Taxonomic richness was similar among all sampled lakes and ponds. Most Simpson's diversity index values were moderate to high, indicating that most stations had a moderate to high level of diversity. Most Simpson's evenness index values were low, indicating that most stations had few taxa that were very abundant relative to other taxa.

The phytoplankton, zooplankton and benthic invertebrate communities of the sampled waterbodies were generally similar to the communities of many other lakes in the Arctic and sub-Arctic region

Fish Populations

Fish populations were studied at 18 lakes, 26 ponds, and 5 streams in the study area in July and August 2011. The primary methods used to capture fish in lakes and ponds in 2011 were fyke nets, gill nets (short duration sets), and minnow traps. Backpack electrofishing was used to collect fish from streams and ponds, while angling was used to supplement sampling in larger lakes.

The total fish catch in 2011 was 3474 fish. The catch was comprised of 8 species, 4 of which are members of the salmonid family (Arctic char, Arctic grayling, lake trout, and round whitefish). Ninespine stickleback were most prevalent followed by round whitefish, threespine stickleback, lake trout, Arctic grayling, slimy sculpin, Arctic char, and burbot.

In streams, the catch (*n*=53) was dominated by ninespine stickleback (85%), with Arctic grayling and slimy sculpin captured infrequently. In lakes, the total catch (*n*=1861) was also dominated by ninespine stickleback (94%). The remainder of the catch in lakes included round whitefish, Arctic grayling, lake trout, threespine stickleback, Arctic char, slimy sculpin and burbot. Fish were captured or observed in 23 of the 26 ponds sampled. The total fish catch in ponds (*n*=1560) was dominated by ninespine stickleback (97.7%). The only other species captured in ponds were threespine stickleback (in A2 and C7) and Arctic char (in O2).

Length frequency distributions were determined for 798 fish collected in lakes and ponds in 2011. Lake trout (*n*=27) were represented by a wide range of size-classes (37 to 705 mm in fork length); however, most were adults larger than 300 mm. The round whitefish sample (*n*=55) was composed mostly of juvenile fish between 100 and 190 mm in fork length. Ninespine stickleback (*n*=644) ranged from 18 to 84 mm in total length; however, most were within a relatively narrow size-class between 40 and 59 mm. Threespine stickleback (*n*=21) ranged from 24 to 68 mm in total length, whereas slimy sculpin (*n*=6) ranged from 39 to 94 mm in total length.



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LIST OF ACRONYMS

AB	Alberta
ALS	ALS Environmental
CCME	Canadian Council of Ministers of the Environment
CWQG	Canadian Water Quality Guidelines
Comaplex	Comaplex Minerals Corporation
CPUE	Catch-per-unit-effort
DO	Dissolved oxygen
E	East
GIS	Geographic Information System
Golder	Golder Associates Ltd.
GPS	Global positioning system
MDL	Method detection limit
MSC	Meteorological Services of Canada
N	North
N/A	Not applicable
Project	Meliadine Gold Project
PQL	Practical Quantitation Limit
Q	Discharge
QA	Quality assurance
QC	Quality control
QA/QC	Quality assurance/quality control
RL&L	R.L.&L. Environmental Services Ltd.
RPD	Relative percent difference
S	South
SD	Standard deviation
SDI	Simpson's diversity index
SE	Standard error
SEI	Simpson's evenness index
TC	Total carbon
TDP	Total dissolved phosphorus
TDS	Total dissolved solids
TIC	Total inorganic carbon
TKN	Total Kjeldahl nitrogen
TOC	Total organic carbon
TP	Total phosphorus
TSS	Total suspended solids
UTM	Universal Transverse Mercator
W	West



UNITS AND SYMBOLS

°	Degree
°C	Degrees Celsius
%	Percent
>	Greater than
≥	Greater than or equal to
<	Less than
≤	Less than or equal to
cm	Centimetre
g	Gram
h	Hour
ha	Hectare
km	Kilometre
km ²	Square kilometre
m	Metre
m ²	Square metre
m ³	Cubic metre
m ³ /s	Cubic metres per second
mg	Milligram
mg/L	Milligrams per litre
mg N/L	Milligrams per litre as nitrogen
min	Minute
mL	Millilitre
mm	Millimetre
pH	Measure of the acidity or basicity of a solution
s	Second
µg	Microgram
µg/L	Micrograms per litre
µm	Micrometre
µS/cm	MicroSiemens per centimetre



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GLOSSARY

Alkalinity	A measurement (expressed in milligrams per litre of calcium carbonate) of the capacity of water to neutralize acids. The concentration is measured based on the presence of naturally available bicarbonate, carbonate, and hydroxide ions.
Anoxia	The complete depletion of dissolved oxygen (DO) in the aquatic environment.
Baseline	A surveyed or predicted condition that serves as a reference point on which later surveys are coordinated or correlated.
Bathymetry	The measurement of underwater depth.
Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life	Guidelines established by the Canadian Council of Ministers of the Environment and used to assess the potential effects of the concentration of different water quality parameters upon aquatic life (e.g., fish, aquatic plants, and benthic invertebrates).
Concentration	Quantifiable amount of a chemical in environmental media, such as water or sediment.
Conductivity	A measure of the ability of water to carry an electrical current. This measurement is directly related to the amount of positively and negatively charged ions in the water and can be correlated with the concentration of total dissolved solids (TDS).
Dissolved oxygen	The amount of free oxygen dissolved in water, usually expressed in milligrams per litre (mg/L), parts per million (ppm), or percent of saturation (%). Adequate concentrations of dissolved oxygen are necessary for fish and other aquatic organisms.
Dissolved organic carbon (DOC)	The dissolved portion of organic carbon in water; it is made up of humic substances and partly degraded plant and animal materials.
Duplicate field sample	A second sample collected at the same time and from the same location, repeating the same collection procedure as the original sample. The sample is used to detect variability at a sampling station and to verify the field sampling method.
Duplicate laboratory sample	A field sample that is split into two samples by the laboratory and tested separately. These samples are used to assess the reproducibility of the laboratory results (i.e., laboratory method and analyses).
Ekman grab sampler	Cube-shaped mechanical device with a spring-loaded opening that is lowered to the bottom of a waterbody and triggered to close thereby collecting a sample of the bottom sediment.
Electrofishing	Use of electricity to immobilize and capture fish.
Field blank	A sample that is prepared in the field using ultrapure, distilled, or deionized water provided by the laboratory. These samples are treated in the field in the same way as the field samples. They are used to detect sample contamination during the collection, shipping, and analysis of samples.
Fyke Net	A passive capture device in which a lead net directs fish into a trap through a series of funnels. A fish can readily find its way into the trap through the funnels, but not out of it.
Grab sample	A single sample collected at a particular time and place that represents the composition of the water or sediment only at that time and place.
Groundwater	That part of the subsurface water that occurs beneath the water table, in soils and geologic formations that are fully saturated.
Hardness	A characteristic of water caused by the presence of positively charged ions such as calcium, magnesium, iron, and manganese. This parameter is expressed in milligrams per litre of calcium carbonate.
Hydrocarbons	An organic compound containing only carbon and hydrogen; there are 4 classes of hydrocarbons: alkanes, alkenes, alkynes, and aromatic.
Life History	The series of changes undergone by an organism between birth and death.



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Limnology	The study of open fresh and more rarely saline water bodies, specifically lakes and ponds (both natural and man-made), including their physical, chemical, and biological properties. Limnology traditionally is closely related to hydrobiology, which is concerned with the application of the principles and methods of physics, chemistry, geology, and geography to ecological problems.
Limnology (vertical) profile	An in situ measurement consisting of taking readings of physical parameters or samples at certain depth increments in a water column of a lake.
Matrix spike	A laboratory produced sample containing a known concentration of a given parameter to measure the accuracy of laboratory equipment.
Method blank	A laboratory grade, pure water sample that is subjected to all laboratory procedures. This is used to detect possibility of cross-contamination between samples in the laboratory.
Method detection limit (MDL)	The lowest concentration at which individual measurement results for a specific analyte are statistically different from a blank (that may be zero) with a specified confidence level for a given method and representative matrix.
Morphology	A set of linear, area, and volumetric parameters of a waterbody or watershed that describe geometric features and provide a background for a hydrologic description of a waterbody or drainage area.
Nitrate + nitrite	The sum of the concentrations of nitrate and nitrite.
Nutrients	Environmental substances (elements or compounds) such as nitrogen or phosphorus, which are necessary for the growth and development of plants and animals.
Oil and grease	The concentration of all hydrocarbons found in water, whether it is from mineral or petroleum (both artificial and natural) sources.
Oligotrophic	Trophic state classification for lakes characterized by low productivity (i.e., little aquatic plant or animal life) and low nutrient inputs (particularly total phosphorus).
Open water conditions	The period of time when the surface of a waterbody is completely free of ice.
Organic compounds	Substances composed of one or more carbon atoms.
Organochlorines	Any of the various hydrocarbon pesticides that contain chlorine.
pH	The negative log of the concentration of the hydronium ion. The pH is a measure of the acidity or alkalinity of all materials dissolved in water, expressed on a scale from 0 to 14, where 7 is neutral, values below 7 are acidic, and values over 7 are alkaline.
Phenol	A class of toxic compounds derived from benzene that can originate naturally in the aquatic environment through the decomposition of organic matter. These compounds can originate artificially through the contamination of the aquatic environment by plastics, herbicides, and disinfectants. They can also be introduced as a by-product in industrial processes.
Polycyclic Aromatic Hydrocarbons (PAH)	Organic compounds comprised of two or more aromatic rings. These compounds are by-products of combustion and can be emitted into the environment from both natural and anthropogenic sources.
Probable Effects Level (PEL)	Concentration of a chemical in sediment above which adverse effects on an aquatic organism are likely.
Quality Assurance / Quality Control procedures	Procedures used by field personnel and laboratories to ensure data quality.
Secchi Depth	A parameter used to determine the clarity of surface waters. The measurement is made with a "Secchi" disk, a black and white disk that is lowered into the water and the depth is recorded at which it is no longer visible. A secchi depth recording of 1 m indicates that the device was last visible at 1 m below the surface. High secchi depth readings indicate clearer water that allows sunlight to penetrate to greater depths. Low readings indicate turbid water which can reduce the passage of sunlight to bottom depths. Limited light penetration can be a factor in diminished aquatic plant growth beneath the surface, thus reducing the biological re-aeration at lower depths.



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Sediment	Solid material that is transported by, suspended in, or deposited from water. It originates mostly from disintegrated rocks; it also includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope soil characteristics, land usage and quantity and intensity of precipitation.
Soluble	Referring to a substance that can be easily dissolved in a solvent such as water.
Specific conductivity	(See also Conductivity). A conductivity reading normalized to a temperature of 25°C. This allows valuable comparisons to be made.
Stratification	The separation of lakes into 3 layers: well mixed top layer, middle layer (see Thermocline), and a bottom layer. In freshwater lakes, stratification usually occurs as a result of temperature effects that cause changes in water density. Stratification may also affect vertical changes in water quality.
Total dissolved solids (TDS)	The dissolved matter found in water comprised of mineral salts and small amounts of other inorganic and organic substances.
Total extractable hydrocarbons	Refers to hydrocarbons within the range of weights observed in diesel and fuel oil (i.e., C11 to C30).
Total Kjeldahl nitrogen (TKN)	The sum of organic nitrogen and ammonia.
Total organic carbon	A measure of the concentration of organic carbon in water or sediment, it is determined by the oxidation of the organic matter into carbon dioxide. Organic matter in soils, aquatic vegetation, and aquatic organisms are major sources of organic carbon.
Total petroleum hydrocarbons (TPH)	A measurement of the overall concentration of petroleum hydrocarbons found in the water.
Total suspended solids (TSS)	A measurement of the concentration of particulate matter found in water.
Total volatile hydrocarbons	Refers to hydrocarbons within the range of weights observed in gasoline (i.e., C5 to C10).
Trip blank	A water sample prepared by the laboratory and shipped to the field sampling location and then subsequently returned to the laboratory unaltered. These samples are used to detect sample contamination during preparation, preservation, or transport between field and laboratory.
Trophic state	Eutrophication is the process by which lakes are enriched with nutrients, increasing the production of rooted aquatic plants and algae. The extent to which this process has occurred is reflected in a lake's trophic classification or state: oligotrophic (nutrient poor), mesotrophic (moderately productive) and eutrophic (very productive and fertile).
Turbidity	Refers to the relative clarity of a water body. It is a measure of the extent to which light penetration in water is reduced from suspended materials such as clay, mud, organic matter, colour, or plankton.
Under ice conditions	The period of year when the lakes are partially or completely covered with ice.
Volatile	Referring to a substance that can be easily changed from solid or liquid form to a vapour.



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1.0 INTRODUCTION

1.1 Background

Agnico-Eagle Mines Limited (AEM) proposes to construct and operate a gold mine, known as the Meliadine Gold Project (Project) 25 kilometres (km) north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut (Figure 1.1-1). The proposed Project site is located on a peninsula (the Peninsula) between the east, south, and west basins of Meliadine Lake (63°04'45"N, 92°19'38"W), on Inuit Owned Land.

The study area is within the zone of continuous permafrost approximately 400 km north of the tree line with typical sub-arctic vegetation. The terrain is dominated by glacial landforms that include drumlins of glacial till, eskers consisting of gravels and sands and numerous shallow lakes. The glacial deposits form low relief ridges oriented in a northwest-southeast direction. Regional drainage patterns are controlled by these ridges and the prevailing permafrost.

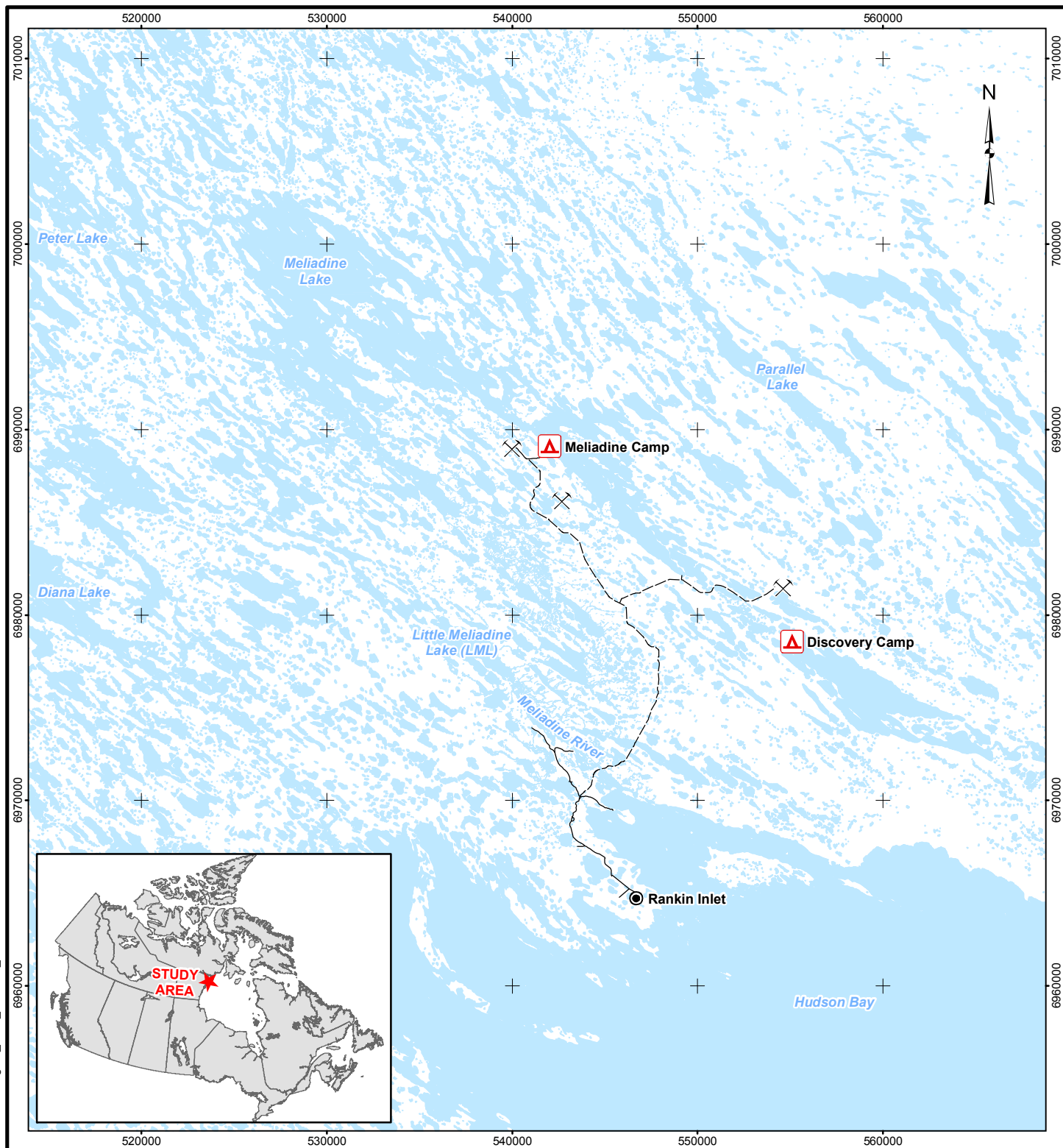
Watersheds within the study area include Meliadine Lake, several small watersheds on the Peninsula (Basins A through P), Chickenhead and Control watersheds that drain to Meliadine Lake, and the Meliadine River (including Little Meliadine Lake). Previous baseline studies were also carried out in Lake W and Horseshoe Lake that drain into Little Meliadine Lake, a few sites in the neighbouring Peter and Parallel Lake watersheds, and in the Hudson Bay.

1.1 Objectives

This report includes data that were collected in 2011 to supplement the 1994-2009 data set described in the Aquatics Baseline Synthesis Report (Golder 2012). The 2011 aquatics field program focused on evaluating additional areas that may be potentially affected by the recent changes in the Project design and on extending the long-term baseline information for the areas previously studied. Specifically, the 2011 field program focused on surveying stream, lakes and ponds that had not been previously surveyed on the Meliadine Lake peninsula. Hydrology, surface water quality, sediment quality, aquatic habitat, lower trophic levels and fish populations were investigated.

The data collected in 2011 were not combined with the previous 1994 to 2009 synthesis, where long-term means and trends were described. The integration of the 2011 data with the 1995-2009 will be provided in the Detailed Environmental Assessment Report that will form part of the Draft Environmental Impact Statement (DEIS) for the Meliadine Gold Project.

The methods used in 2011 were similar to those used until 2009 (Golder 2012). In cases where the methods differed, these differences are outlined below in the methods section for each study component.

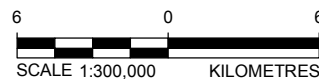


LEGEND

-  CAMP
-  PROPOSED MINE SITE
-  ROAD - EXISTING
-  PROPOSED ROAD
-  WATERCOURSE
-  WATERBODY

REFERENCE

BASE DATA OBTAINED FROM AGNICO-EAGLE MINES LTD.
DATUM: NAD83 PROJECTION: UTM ZONE 15



PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT				
TITLE		LOCATION OF THE MELIADINE GOLD PROJECT				
		PROJECT		10-1373-0076	PHASE No. 9000	
		DESIGN	AM	28 May 2012	SCALE AS SHOWN	REV. 0
		GIS	DSC	29 May 2012		
		CHECK	AM	13 Jun. 2012		
		REVIEW	JP	20 Jun. 2012		
				FIGURE 1.1-1		



2.0 HYDROLOGY

This section provides a compilation of all hydrometric field data collected during the 2011 field program along with analysis results.

The investigations conducted by Golder in 2011 covered the development of hydrographs from 2011 data collected at the following 10 hydrometric stations (Figure 2.0-1):

- Lake A8;
- Lake B2;
- Lake B6;
- Lake D1;
- Lake D7;
- Lake E1;
- Lake E4;
- Lake H1;
- Lake H20; and
- Chickenhead Lake.

Baseline data collection in 2011 expands the data set collected during previous field programs to characterize hydroclimate and hydrological parameters relevant to the Project. These data provide a basis for additional detailed hydrological modeling and analysis that may be required during the development of the DEIS for the Project.

2.1 Methods

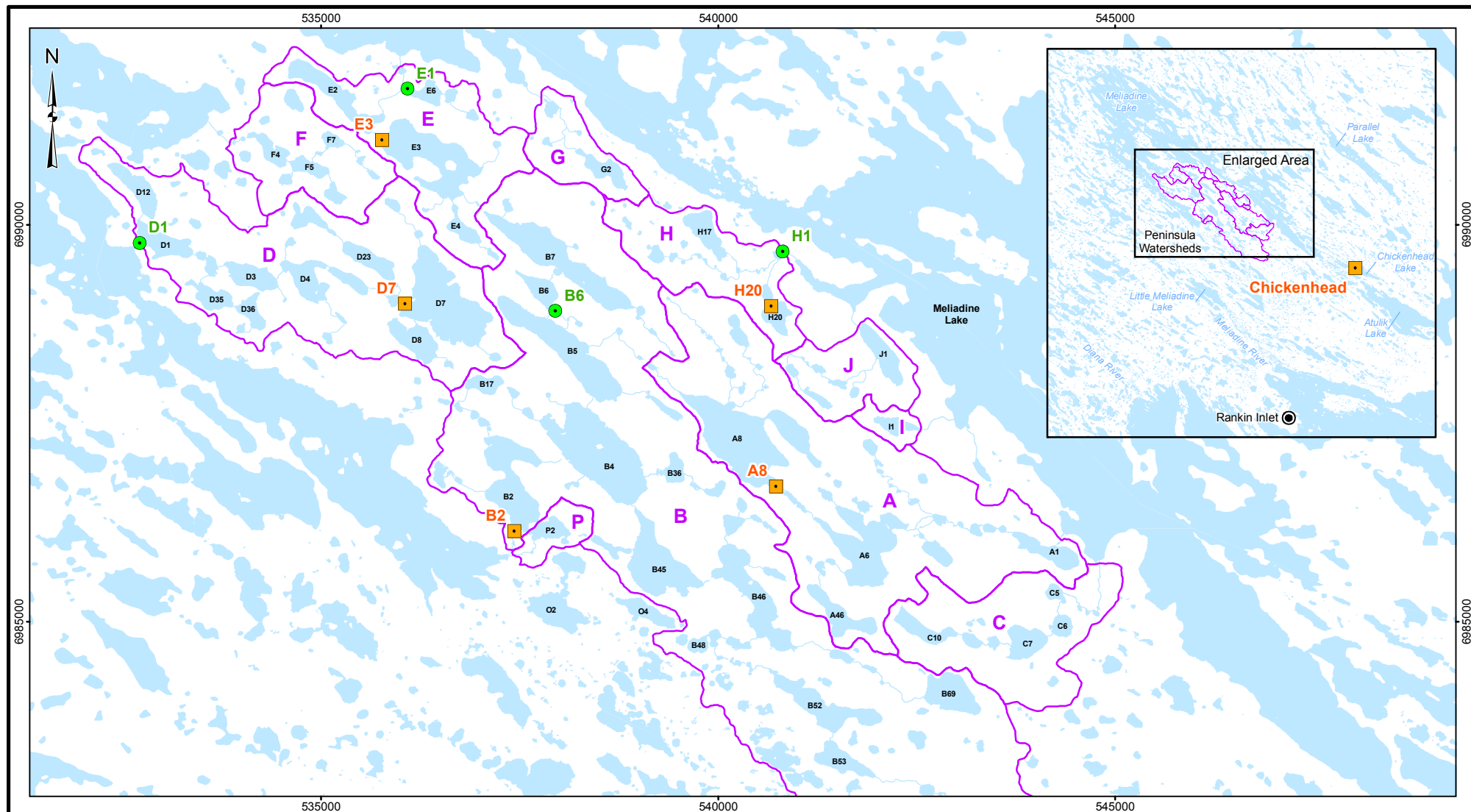
Continuous and discrete measurement hydrometric stations were established and operated between 15 June and 9 September 2011 (Figure 2.0-1). Each station was visited 4 times during this period to cover the range of water level variations during the open water season.

Continuous measurement stations were set up at Lake B6, Lake D1, Lake E1, and Lake H1. These stations were equipped with pressure transducers connected to data loggers and recorded water depths on a 15-minute interval over the monitoring period. These data were used to develop stage-discharge relationships for the lake outlets during the open water season. Manual discharge and water level measurements were also collected at these stations during each site visit.

Manual measurements of water level and discharge were also performed at Lake A8, Lake B2, Lake D7, Lake E4, Lake H20, and Chickenhead Lake to provide additional data in watersheds where project development was anticipated, to support hydrological modeling. The water level and discharge measurements performed at these locations were tied to a local benchmark during each visit.

Hydrographs of Lake B6, Lake D1, Lake E1, and Lake H1 were derived using the following methods:

- a Keller Acculevel Submersible Level Transmitter solid-state pressure transducer and Optimum Instruments DD-520 datalogger were installed at each hydrometric station. Each datalogger was programmed to record water pressure measurements at 15-minute intervals. Each station was referenced to a permanent local elevation benchmark (non-geodetic);
- the transducers were installed as early as possible during the snowmelt period, as permitted by ice conditions and site access;



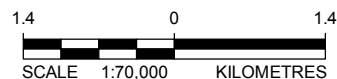
LEGEND

Hydrometric Station Location

Type Of Survey

- Automated
- Manual

- Watercourse
- Waterbody
- Watershed Boundary



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		HYDROMETRIC STATION LOCATIONS, 2011			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	DC	12 Dec. 2011	SCALE AS SHOWN
		GIS	DC	12 Dec. 2011	REV. 0
		CHECK	JL	13 Jun. 2012	FIGURE 2.0-1
		REVIEW	JP	20 Jun. 2012	



- the water surface elevations were surveyed from the permanent local elevation benchmark, and the pressure transducer readings were recorded during selected data logger downloads;
- the stream discharge measurements were performed (if applicable) according to the Water Survey of Canada standard described by Terzl et al. (1994) during the first and subsequent visits to stations with flowing water. The discharge measurements were collected at all stations in a similar manner, using a Swoffer Model 2100 current velocity meter and a top-setting wading rod.
- the dataloggers at each station were downloaded during each site visit, and pressure transducer readings coincident with each discharge measurement were noted;
- the pressure transducers and dataloggers were removed during the last visit; and
- the measured record of water surface elevations versus discharge was used to establish a stage-discharge rating curve for each station. The rating curves were then applied to the continuous record of water surface elevations, as measured by the pressure transducer and recorded by the data logger at each station, to derive a continuous record of discharges.

Some hydrometric stations have limited stage-discharge data available and therefore continuous discharges could not be derived.

The drilling activities took place in the area during the entire open water season. The water from the lakes used for the drilling activities has not been accounted for in the water yield analysis in any of the monitored watersheds.

2.3 Results

2.3.1 Lake A8

The Lake A8 hydrometric station was visited 4 times during the 2011 field program between 15 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-1; Figure 2.2-1). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-1: Site Visits to Lake A8 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m ³ /s) ^a
15 June	Measured discharge and water surface elevation.	✓	100.052	✓	0.316
10 July	Measured discharge and water surface elevation.	✓	99.943	✓	0.030
6 August	Measured discharge and water surface elevation.	✓	99.878	✓	0.001
10 September	Measured discharge and water surface elevation.	✓	99.869	✓	(a)

^a (a) = no observed flow

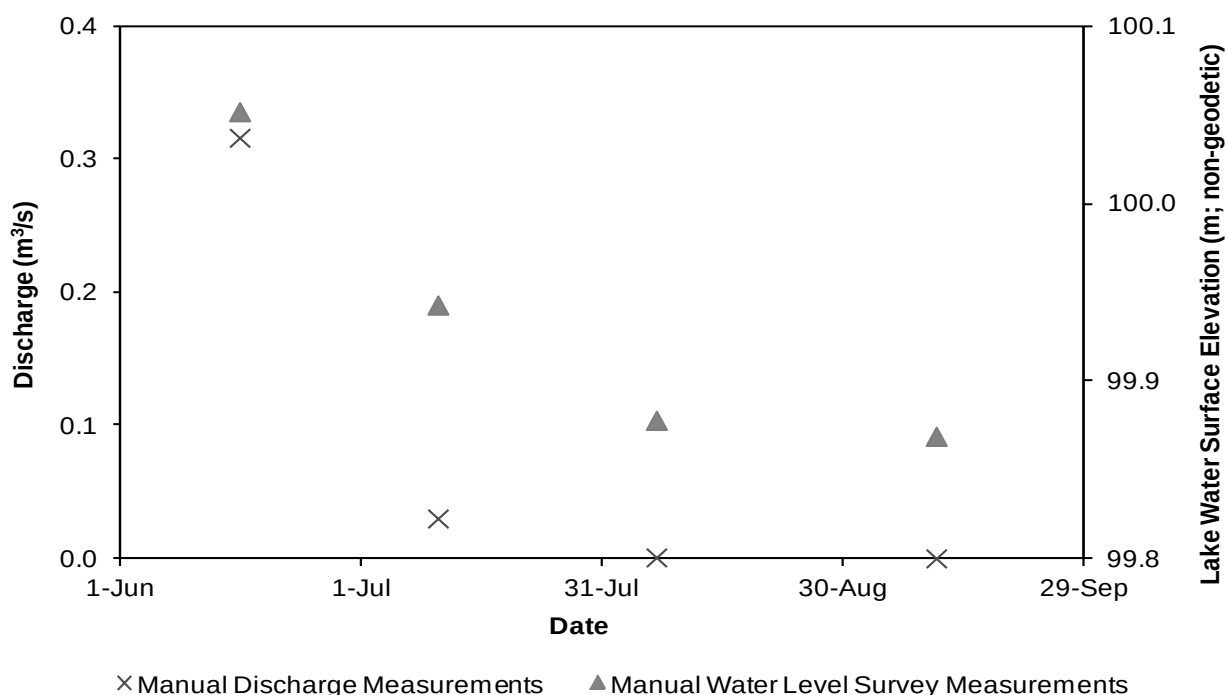


Figure 2.2-1: Manual Water Level and Discharge Measurements at Lake A8, 2011

2.3.2 Lake B6

The Lake B6 hydrometric station was visited 4 times during the 2011 field program, and a continuous hydrograph was derived for the period of 15 June to 10 September 2011, based on continuous water level data (Table 2.2-2; Figure 2.2-2). Water level measurements were also collected and the stage-discharge rating curve and mean daily data were established (Appendix A).

Table 2.2-2: Site Visits to Lake B6 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
15 June	Installed pressure transducer and data logger. Measured discharge and water surface elevation	✓	99.350	✓	0.366
9 July	Measured discharge and water surface elevation and downloaded data logger	✓	99.240	✓	0.041
6 August	Measured discharge and water surface elevation and downloaded data logger	✓	99.155	✓	0.009
10 September	Measured discharge and water surface elevation and downloaded data logger. Removed pressure transducer and data logger	✓	99.136	✓	0.001

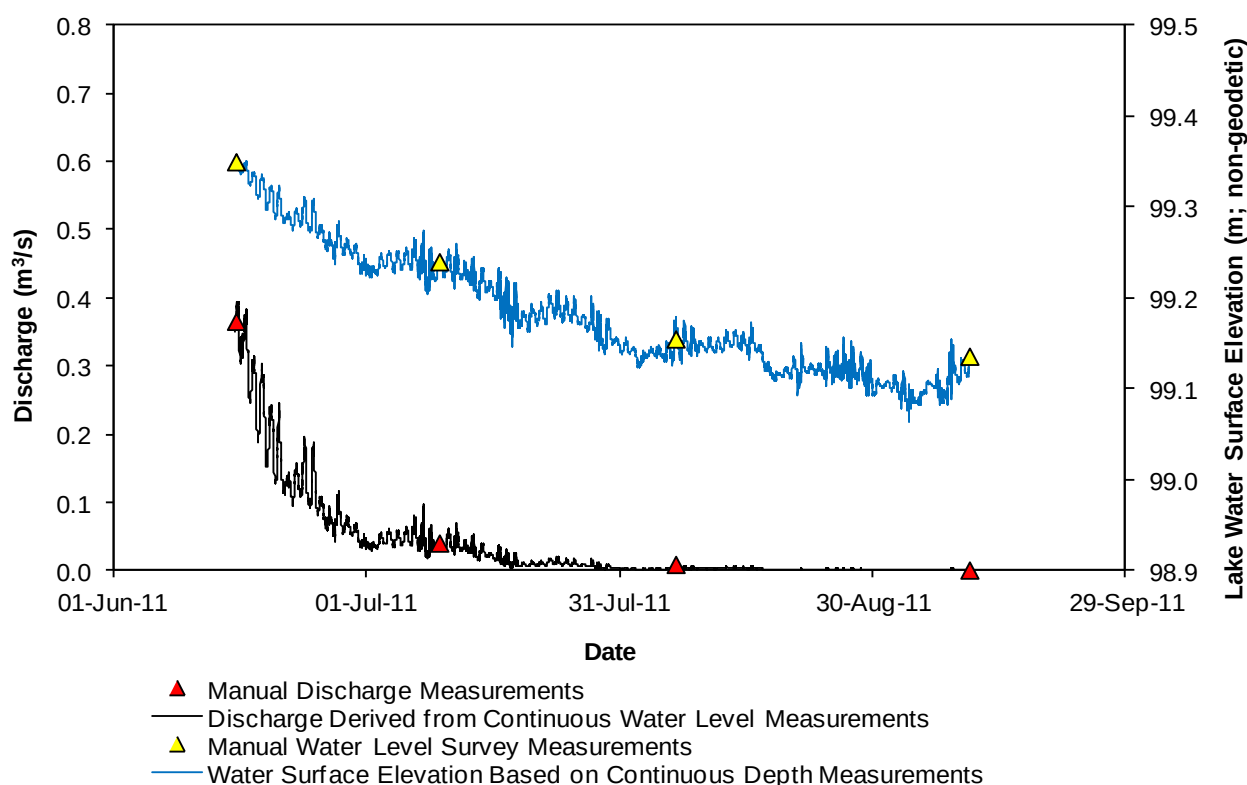


Figure 2.2-2: Hydrograph for Lake B6, 2011

2.3.3 Lake B2

The Lake B2 hydrometric station was visited 4 times during the 2011 field program between 15 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-3; Figure 2.2-3). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-3: Site Visits to Lake B2 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
15 June	Measured discharge and water surface elevation	✓	97.995	✓	2.544
9 July	Measured discharge and water surface elevation	✓	97.755	✓	0.174
6 August	Measured discharge and water surface elevation	✓	97.661	✓	0.015
10 September	Measured discharge and water surface elevation	✓	97.454	✓	0.012

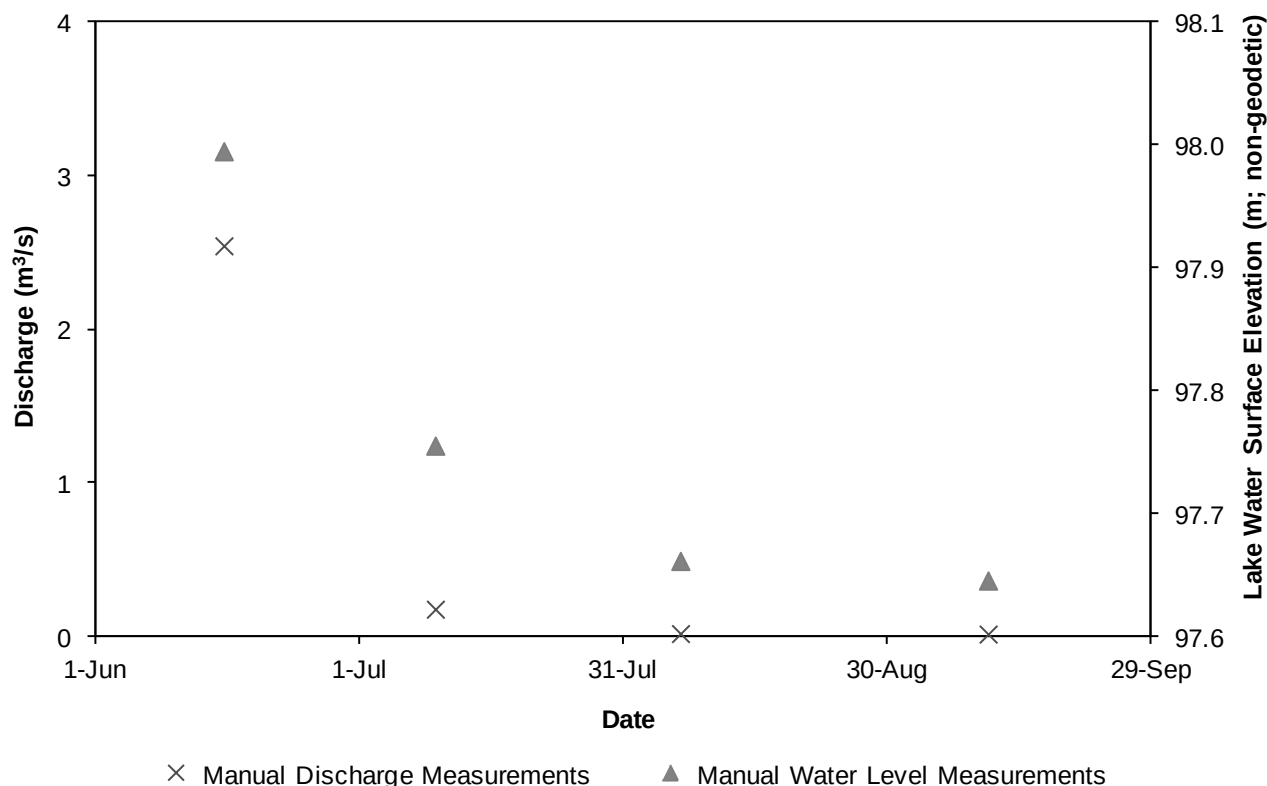


Figure 2.2-3: Manual Water Level and Discharge Measurements at Lake B2, 2011

2.3.4 Lake D7

The Lake D7 hydrometric station was visited 4 times during the 2011 field program between 15 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-4; Figure 2.2-4). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-4: Site Visits to Lake D7 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
15 June	Measured discharge and water surface elevation.	✓	99.480	✓	0.297
9 July	Measured discharge and water surface elevation.	✓	99.332	✓	0.034
6 August	Measured discharge and water surface elevation.	✓	99.222	✓	0.003
10 September	Measured discharge and water surface elevation. Measured water surface elevation was adjusted to compensate for windy conditions.	✓	99.168	✓	0.003

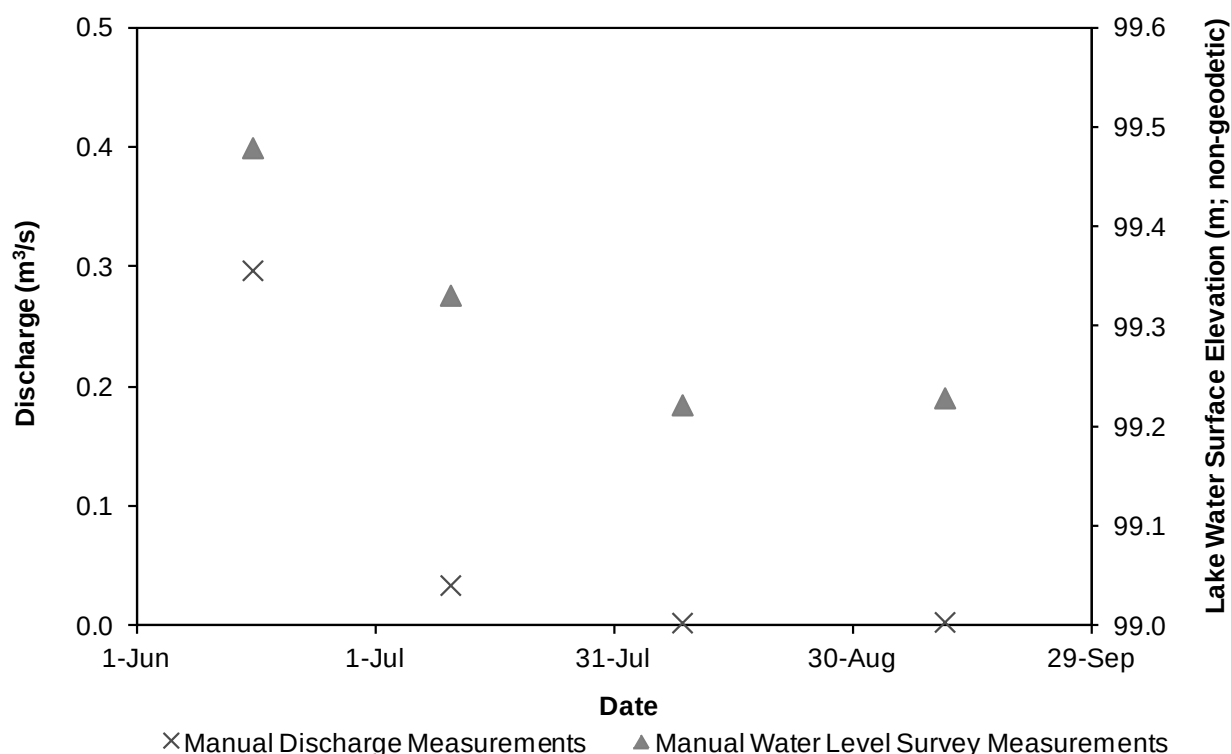


Figure 2.2-4: Manual Water Level and Discharge Measurements at Lake D7, 2011

2.3.5 Lake D1

The Lake D1 hydrometric station was visited 4 times during the 2011 field program, and a continuous hydrograph was derived for the period of 14 June to 10 September 2011 based on continuous water level data (Table 2.2-5; Figure 2.2-5). Water level measurements were also collected and the stage-discharge rating curve and mean daily data were established (Appendix A).

Table 2.2-5: Site Visits to Lake D1 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
14 June	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	99.190	✓	1.679
9 July	Measured discharge and water surface elevation and downloaded data logger.	✓	98.944	✓	0.059
6 August	Measured discharge and water surface elevation and downloaded data logger.	✓	98.824	✓	0.003
10 September	Measured discharge and water surface elevation and downloaded data logger. Removed pressure transducer and data logger.	✓	98.831	✓	0.003

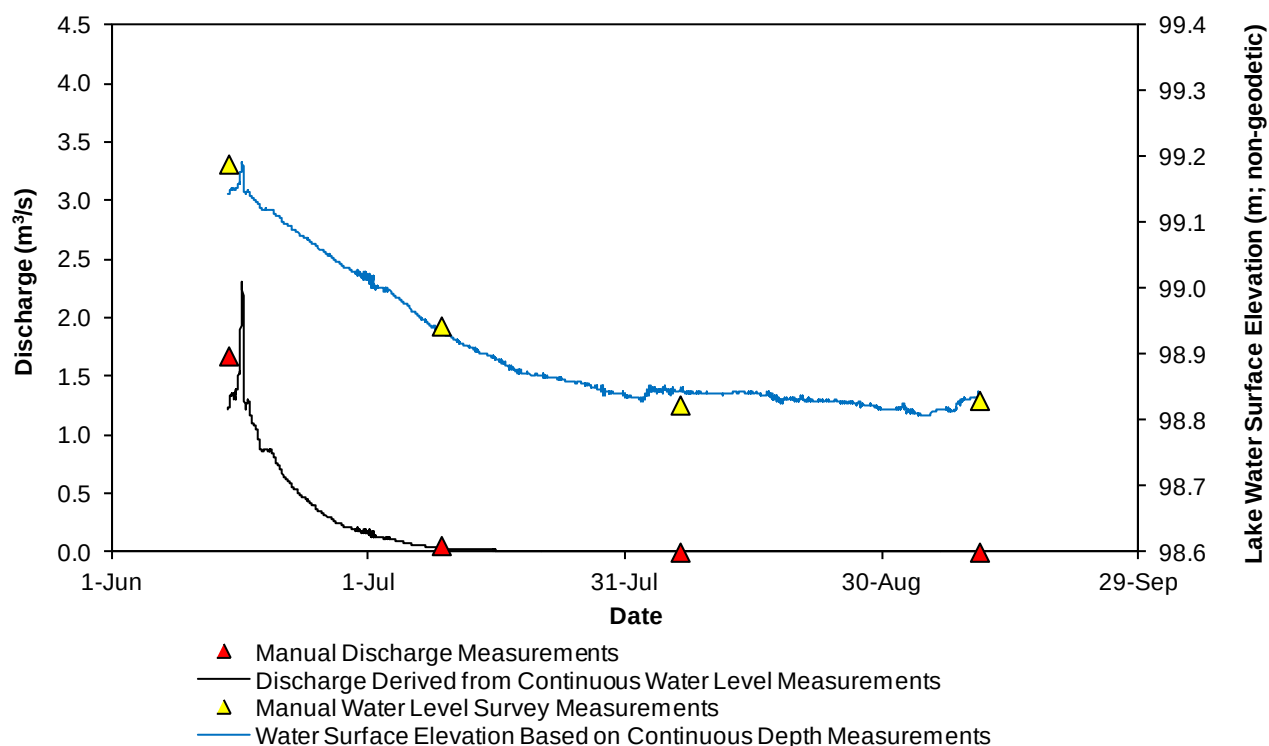


Figure 2.2-5: Hydrograph for Lake D1, 2011

2.3.6 Lake E4

The Lake E4 hydrometric station was visited 4 times during the 2011 field program between 15 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-6; Figure 2.2-6). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-6: Site Visits to Lake E4 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s) ^a
15 June	Measured discharge and water surface elevation.	✓	97.125	✓	0.062
9 July	Measured discharge and water surface elevation.	✓	96.976	✓	0.002
6 August	Measured discharge and water surface elevation.	✓	96.920	✓	(a)
10 September	Measured discharge and water surface elevation.	✓	96.902	✓	(a)

^a (a) = no observed flow



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

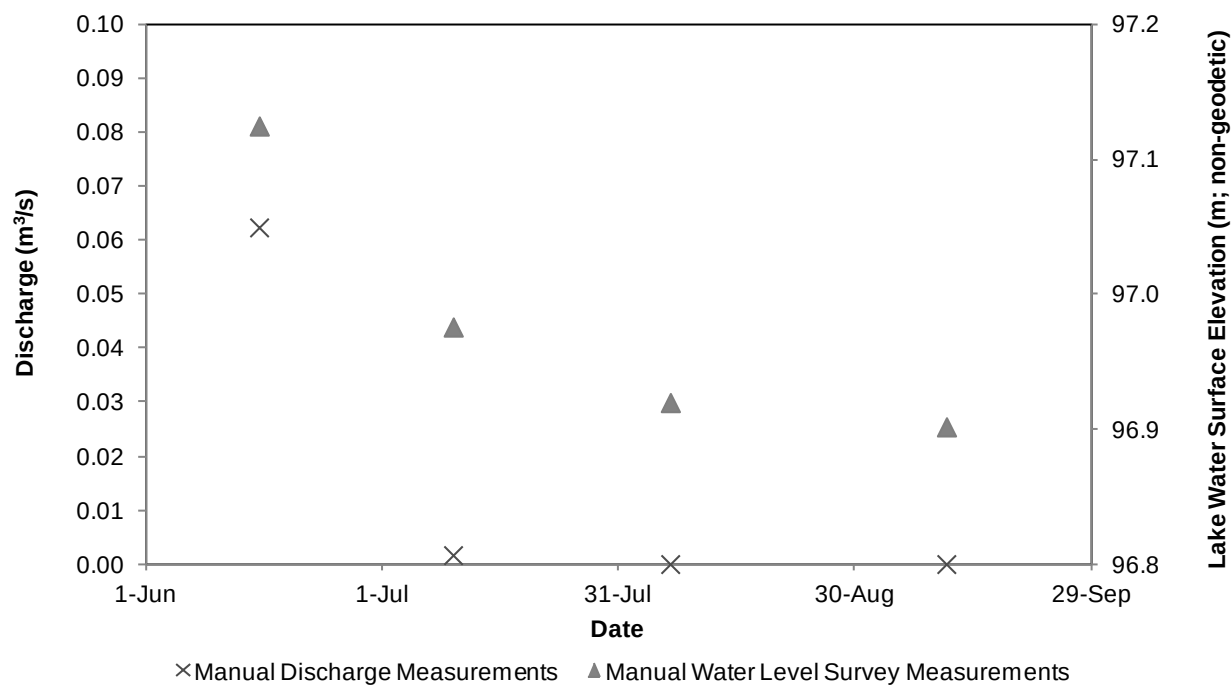


Figure 2.2-6: Manual Water Level and Discharge Measurements at Lake E4, 2011

2.3.7 Lake E1

The Lake E1 hydrometric station was visited 4 times during the 2011 field program, and a continuous hydrograph was derived for the period of 14 June to 11 September 2011 based on continuous water level data (Table 2.2-7; Figure 2.2-7). Water level measurements were also collected and the stage-discharge rating curve and mean daily discharge and water levels were established (Appendix A).

Table 2.2-7: Site Visits to Lake E1 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
14 June	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	99.445	✓	0.604
9 July	Measured discharge and water surface elevation and downloaded data logger.	✓	99.271	✓	0.018
6 August	Measured discharge and water surface elevation and downloaded data logger.	✓	99.207	✓	0.001
11 September	Measured discharge and water surface elevation and downloaded data logger. Removed transducer and data logger.	✓	99.217	✓	0.001



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

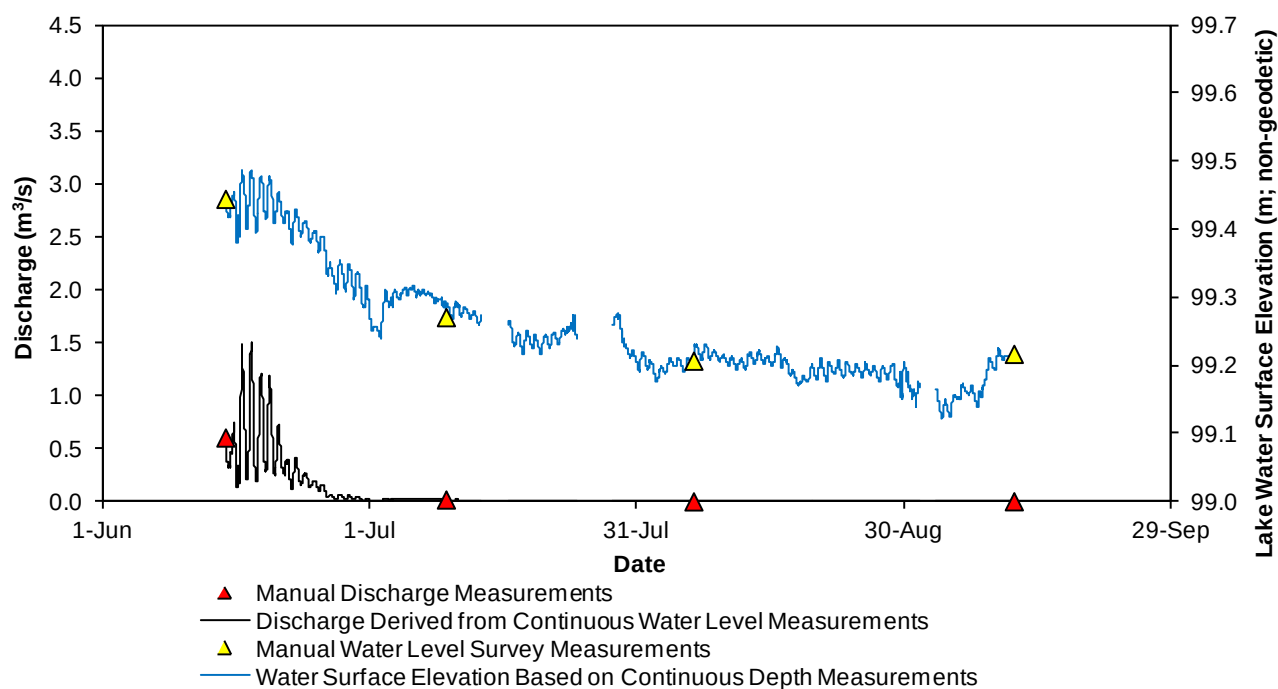


Figure 2.2-7: Hydrograph for Lake E1, 2011

2.3.8 Lake H20

The Lake H20 hydrometric station was visited 4 times during the 2011 field program between 16 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-8; Figure 2.2-8). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-8: Site Visits to Lake H20 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s) ^a
16 June	Measured discharge and water surface elevation.	✓	99.815	✓	0.019
10 July	Measured discharge and water surface elevation. Discharge estimated.	✓	99.689	✓	0.002
6 August	Measured discharge and water surface elevation.	✓	99.647	✓	(a)
10 September	Measured discharge and water surface elevation.	✓	99.598	✓	(a)

^a (a) = no observed flow



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

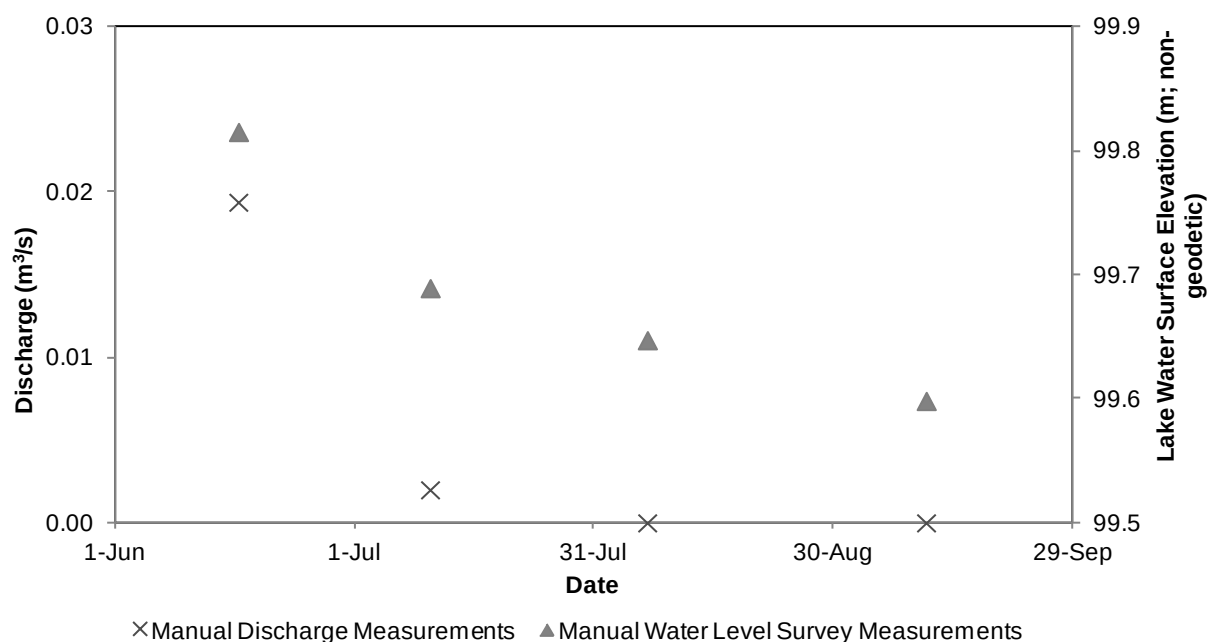


Figure 2.2-8: Manual Water Level and Discharge Measurements at Lake H20, 2011

2.3.9 Lake H1

The Lake H1 hydrometric station was visited 4 times during the 2011 field program, and a continuous hydrograph was derived for the period of 16 June to 10 September 2011 based on continuous water level data (Table 2.2-9; Figure 2.2-9). Water level measurements were also collected and the stage-discharge rating curve and mean daily data were established (Appendix A). The Lake H1 datalogger had a malfunction on 14 August 2011 and data were not recorded after this date. As such, continuous data are presented from 16 June to 14 August 2011.

Table 2.2-9: Site Visits to Lake H1 Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s) ^a
16 June	Installed pressure transducer and data logger. Measured discharge and water surface elevation.	✓	99.560	✓	0.104
9 July	Measured discharge and water surface elevation and downloaded data logger.	✓	99.402	✓	0.003
6 August	Measured discharge and water surface elevation and downloaded data logger.	✓	99.319	✓	(a)
10 September	Measured discharge and water surface elevation and downloaded data logger. Removed pressure transducer and data logger.	✓	99.398	✓	0.003

^a (a) = no observed flow

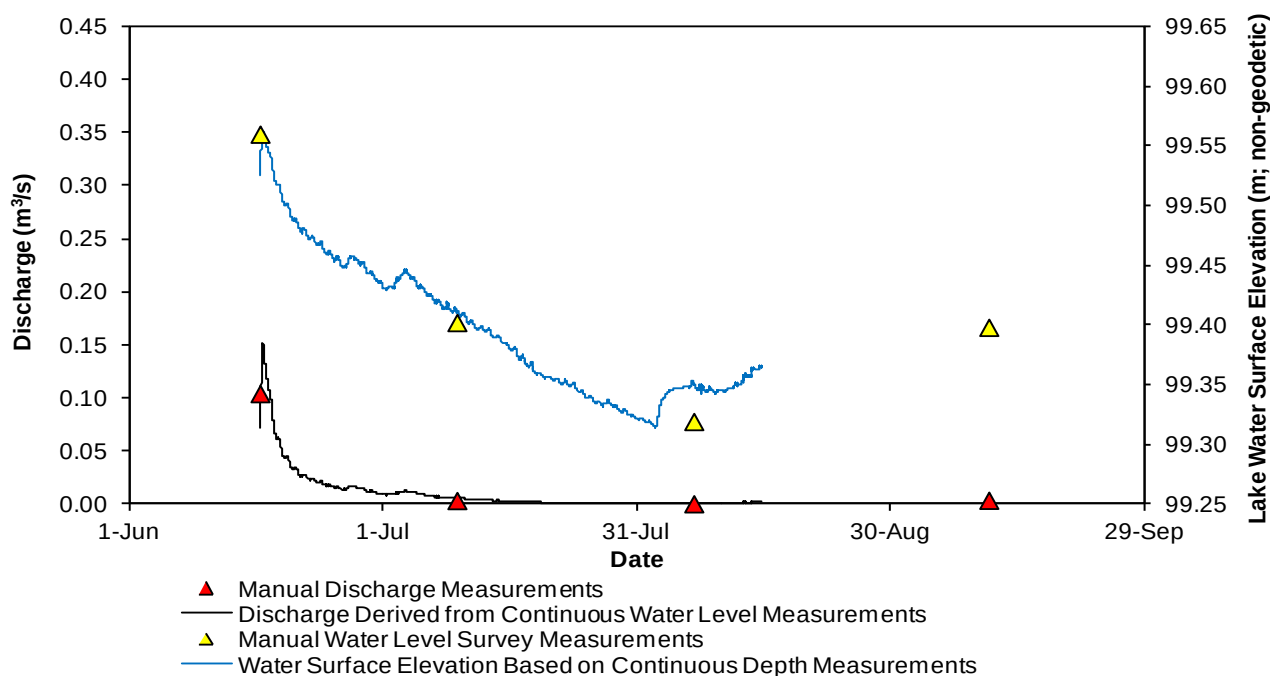


Figure 2.2-9: Hydrograph for Lake H1, 2011

2.3.10 Chickenhead Lake

The Chickenhead Lake hydrometric station was visited 4 times during the 2011 field program between 15 June and 10 September 2011, and manual water level and discharge measurements were collected (Table 2.2-10; Figure 2.2-10). Water level measurements were also collected and the stage-discharge rating curve was established (Appendix A).

Table 2.2-10: Site Visits to Chickenhead Lake Hydrometric Station, 2011

Date	Activities	Lake	Lake Water Surface Elevation (m; non-geodetic)	Outlet	Discharge (m³/s)
15 June	Measured discharge and water surface elevation.	✓	99.866	✓	0.924
9 July	Measured discharge and water surface elevation.	✓	99.688	✓	0.076
7 August	Measured discharge and water surface elevation.	✓	99.588	✓	0.003
10 September	Measured discharge and water surface elevation.	✓	99.637	✓	0.042

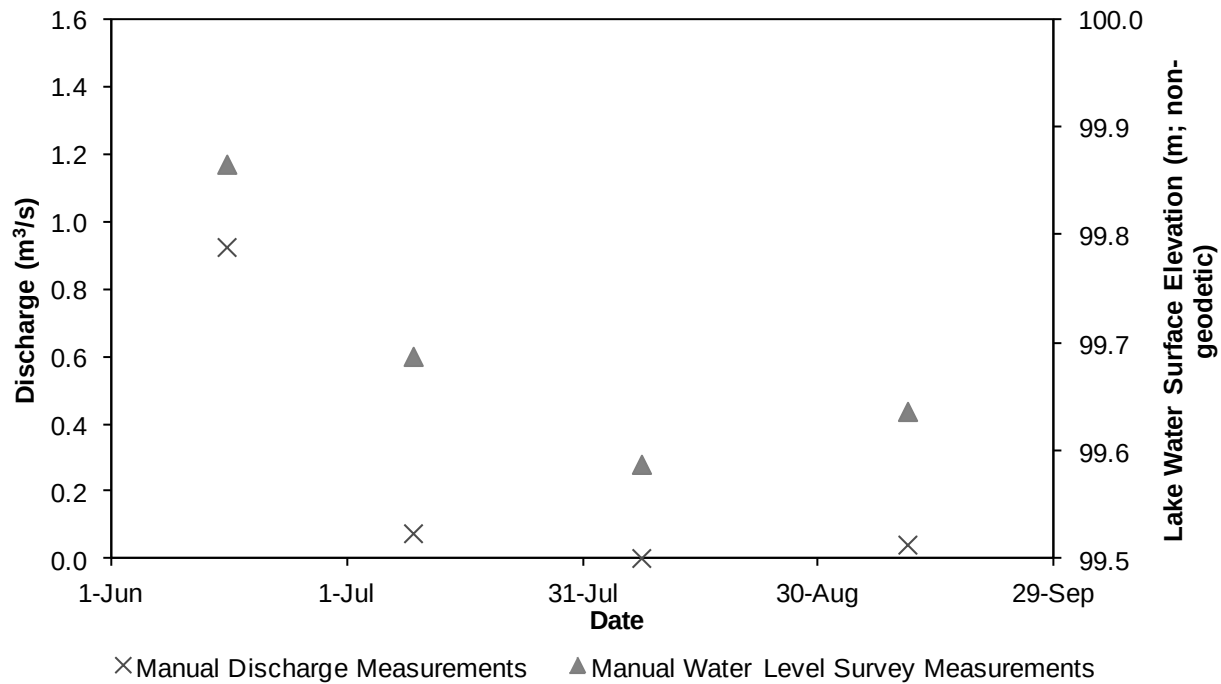


Figure 2.2-10: Manual Water Level and Discharge Measurements at Chickenhead Lake, 2011

2.4 Conclusions

The hydrometric program for the 2011 field season included 10 hydrometric stations. Four (4) of these stations were automated, with sensors recording the water level every 15 minutes, while the other 6 stations were periodically monitored with manual discharge and water level measurements. No meteorological data were collected as part of the 2011 hydrometric program.

Continuous discharge and water level hydrographs were derived for the 4 hydrometric stations with automated sensors (Lake B6, Lake D1, Lake E1 and Lake H1). The hydrographs for Lake D1 and Lake H1 display a typical shape with a maximum flow during freshet followed by a regression to the end of the open water season.

The hydrographs of Lake E1 and Lake B6 show a slightly different shape with daily variations that are visible throughout the entire open water season, and reduced seasonal water surface elevation variations compared to lakes D1 and H1. Watersheds E1 and B6 are adjacent to each other and their headwaters are in the same part of the peninsula. This may explain the local variations in lake water levels and flows that were observed at both lakes.

Daily values from each hydrograph were used to calculate the water yield at each automated station for the observation period during the 2011 open water season (Table 2.3-1).



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

Table 2.3-1: Water Yield Values for the Automated Stations in the Study Area, 2011

Watershed	Watershed Area (m ²)	Runoff Volume (m ³)	Water Yield (mm)	Period for 2011 Season
B6 Watershed	2 748 872	284 337	103.4	15 June – 10 September
E1 Watershed	3 604 107	494 117	137.1	14 June – 11 September
H1 Watershed	2 398 965	56 392	23.5	16 June – 14 August
D1 Watershed	7 725 651	1 078 238	139.6	14 June – 10 September

The calculated water yield of the H1 Watershed was much lower than that of other continuous stations as expected due to the large proportion non-contributing area (i.e. low ratio of effective to gross drainage area). Topographic maps and watercourse data show that most of the lakes and streams are not connected in the upper part of the watershed. The sensor malfunction after August 14 had little influence on the final water yield value because most of the runoff occurred during the melting period.

Manual discharge and water level measurements at Lake A8, Lake B2, Lake D7, Lake E4, Lake H20 and Chickenhead Lake provided additional data to support hydrological modeling.



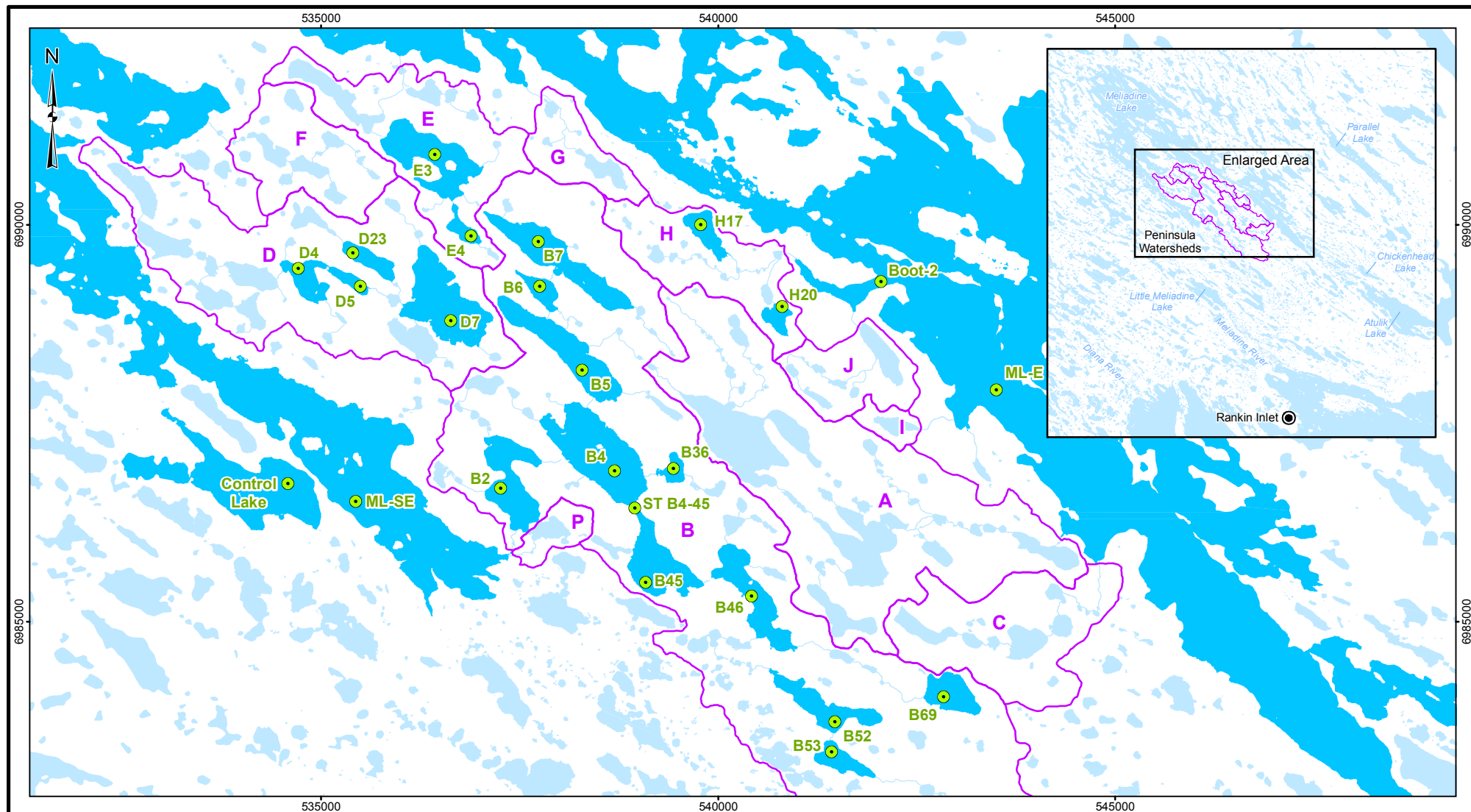
3.0 WATER QUALITY

Baseline field programs to collect background data in support of a DEIS application were performed between 1994 and 2009 (Golder 2012, Chapter 5). In 2011, additional water quality data were collected to update the background data in relation to the proposed mine design; the results of the 2011 field program are presented below. The focus of the 2011 field programs was on small lakes and one tributary on the Peninsula in Meliadine Lake (Table 3.0-1; Figure 3.0-1). Sampling locations were based on results of previous field programs, knowledge of the proposed project footprint, and requirements for data for use by other disciplines involved in the preparation of the DEIS for the Project (e.g., assessment of impacts on fish and fish habitat).

Table 3.1-1: Sampling Locations and Sampling Plan for the 2011 Field Programs

Station	NAD83, Zone 15		Winter ^a	Summer ^a
	Easting (m)	Northing (m)		
B2	537 262	6 986 682	Profile, WQ	Profile, WQ, SQ
B36	539 437	6 986 930	-	Profile, WQ, SQ
B4	538 698	6 986 905	Profile	-
B45	539 092	6 985 496	Profile, WQ	Profile, WQ, SQ
B46	540 424	6 985 324	-	Profile, WQ, SQ
B4-45 (stream)	538 951	6 986 433	-	Profile, WQ, SQ
B5	538 288	6 988 171	Profile WQ	-
B52	541 472	6 983 741	Profile	-
B53	541 432	6 983 365	Profile	-
B6	537 753	6 989 226	Profile, WQ	-
B69	542 844	6 984 060	Profile	-
B7	537 738	6 989 793	Profile, WQ	-
D4	534 829	6 989 303	-	Profile, WQ, SQ
D5	535 362	6 989 295	-	Profile, WQ, SQ
D7	536 638	6 988 797	Profile, WQ	Profile, WQ, SQ
D23	535 606	6 989 555	-	Profile, WQ, SQ
E3	536 433	6 990 886	Profile, WQ	Profile, WQ, SQ
E4	536 889	6 989 863	Profile, WQ	Profile, WQ, SQ
H17	539 843	6 989 901	-	Profile, WQ, SQ
H20	540 749	6 988 843	-	Profile, WQ, SQ
ML-E	543 374	6 987 869	-	Profile, WQ, SQ
ML-SE	535 806	6 986 383	-	Profile, WQ, SQ
Boot-2	542 025	6 989 302	-	Profile, WQ, SQ
Control Lake	534 324	6 986 637	-	Profile, WQ, SQ

^a Profile = limnology profile; WQ = water quality; SQ = sediment quality; "-" no sampling conducted



LEGEND

- Sampling Location
- Watercourse
- Sampled Waterbody
- Waterbody
- Watershed Boundary

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

1.4 0 1.4
SCALE 1:70,000 KILOMETRES

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		WATER AND SEDIMENT SAMPLING LOCATIONS, 2011			
		PROJECT NO. 10-1373-0076		FILE No.	
DESIGN	CP	12 Dec. 2011	SCALE AS SHOWN	REV.	0
GIS	CDB	12 Dec. 2011			
CHECK	CP	13 Jun. 2012			
REVIEW	JP	20 Jun. 2012			
		FIGURE 3.0-1			



3.1 Methods

Selected lakes in the study area were sampled during 2 field programs in 2011: under-ice sampling in April (winter) and open-water sampling in July/August (summer). In addition, one stream in the study area was sampled during the summer field program. Samples for water quality analysis were collected during both field programs, while samples for sediment quality analysis were only collected during the open-water field program (Table 3.0-1).

The winter program occurred between 9 and 11 April 2011, and the summer program occurred between 17 July and 1 August 2011. In total, 24 stations were sampled. Measurements of the water column profile were recorded at all stations. Water chemistry samples were collected from 8 stations in the winter program and from 16 stations in the summer program. In addition, one stream (B4-45) was sampled in the summer program.

3.1.1 Sample Collection

During the winter program, a gas powered auger was used to drill a hole through the ice at the selected sampling location on each lake. Any loose snow or ice chips were scooped out of the hole. Field measurements of snow thickness (metre [m]), ice thickness (m), and total water depth (m) were taken. General climatic conditions (air temperature, cloud cover, wind direction, wind speed, precipitation, and precipitation rate) were also recorded at each sampling station.

During the summer program, the lake sampling locations were reached via boat. Most lake stations were in the deepest area of the lakes. Stream sampling locations were reached by wading from shore. Total depth (m) and Secchi depth (m) were recorded at each station as well as general climatic conditions (air temperature, cloud cover, wind direction, wind speed, precipitation, and precipitation rate).

During both programs, in situ measurements were taken for pH (pH units), specific conductance (microSiemens per centimetre [$\mu\text{S}/\text{cm}$]), dissolved oxygen concentration (milligrams per litre [mg/L] and percent [%] saturation), and water temperature (degrees Celsius [$^{\circ}\text{C}$]). A portable water quality meter (Hydrolab Datasonde) was used to collect the measurements. Measurements were recorded at 0.5 m intervals through the water column.

Composite water samples were collected from 0.5 m below the bottom of the ice (during the winter program) or 0.5 m below the surface of the water (during the summer program), middle of the water column, and 1 m above the lake bottom (if water depth was sufficient). The samples from varying depths were mixed in a clean container before filling the lab bottles. Grab samples at 0.5 m below the water surface were collected in the streams.

Bottles provided by the analytical laboratory were filled with composite water samples in the field. Samples were also field filtered (if required) using polyethylene tubing, geopump, and filters, and field preserved (if required) with preservative, as specified by the analytical laboratory. Samples were kept cool (but not frozen) during shipping to an accredited analytical laboratory (ALS Environmental [ALS], Edmonton, Alberta) for analysis.



3.1.2 Water Quality Parameters

Water samples were collected for analysis of the following parameters:

- conventional parameters (total alkalinity, total hardness, pH, specific conductance, total dissolved solids [TDS], total suspended solids [TSS]);
- major ions (bicarbonate, carbonate, hydroxide, sulphate, chloride);
- nutrients (total carbon [TC], total organic carbon [TOC], total inorganic carbon [TIC], total Kjeldahl nitrogen [TKN], total and un-ionized ammonia, nitrate, nitrite, total phosphorus [TP], total dissolved phosphorus [TDP], orthophosphate);
- total and dissolved metals, metalloids, and non-metals¹ (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, copper, cobalt, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, strontium, thallium, tin, titanium, uranium, vanadium, zinc); and
- cyanide.

Results were compared to the Canadian water quality guidelines (CWQG) for protection of aquatic life (CCME 2011). The major categories of parameters, and additional guidance values, are provided in more detail in Chapter 5.0 of Golder (2012).

3.2 Quality Assurance / Quality Control

3.2.1 Methods

Quality assurance/quality control (QA/QC) programs in water quality studies are sampling and analytical procedures that are followed to limit the introduction of error into analytical data. Quality assurance (QA) procedures include appropriate training of sampling personnel, use of standard operating procedures when collecting the samples, appropriate sample handling and storage, use of accredited analytical laboratories, and data management systems. Quality control (QC) procedures are designed to assess data quality including potential laboratory and field contamination through use of blanks, replicates, and spiked or reference materials. The methods for the 2011 water baseline study are the same as those used in the 2008 and 2009 studies (Golder 2012).

3.2.2 Results

One trip blank, one field blank, and one field duplicate were collected during each field program. The review of the QC results is provided below by each type of QC sample. Complete QC data are included in Appendix B1.

¹ For brevity, metals, metalloids (e.g., arsenic), and non-metals (e.g., selenium) are referred to as metals henceforth.



Trip Blank

The results from the trip blank were reviewed and any detected parameters were investigated further if the concentration was above the Practical Quantitation Limit (PQL) for the parameter. The only parameter detected in the trip blank from the winter program was TIC and the concentration was less than the PQL. The value for this parameter was verified by the analytical laboratory through re-analysis. In the trip blank from the summer program, TIC, TOC, and TC were detected, but all concentrations were less than the PQL.

None of the other trip blank parameters exceeded the PQL, indicating that transport and storage of samples did not introduce contamination. The lab water used in the trip blank was thus also relatively free of contamination.

Field Blank

The results from the field blank were reviewed and any detected parameters were investigated further if the concentration was above the PQL for the parameter.

The following parameters were detected in the field blank from the winter program:

- TP, TDP, TC, TIC;
- total concentrations of barium, calcium, copper, manganese, sodium, strontium, and tin; and
- dissolved concentrations of barium, calcium, copper, sodium and tin.

Of those detected parameters, the following had concentrations greater than the PQL:

- total copper, total sodium, total tin, dissolved copper, dissolved sodium, and dissolved tin.

The concentration of dissolved copper was more than the concentration of total copper, which was verified by the analytical laboratory through re-analysis. The dissolved fraction should not be greater than the total fraction, suggesting a potential contamination problem during filtering in the field. For barium and manganese, the value reported for the dissolved fraction was also larger than the total value, but since these values were less than the PQL, this could be attributed to analytical resolution, and thus is not considered notable. The concentration of dissolved sodium was equal to the concentration of total sodium in the field blank, and the concentrations exceeded the PQL. The detectable concentrations could be attributable to field filtering; however, both dissolved and total sodium in the field sample and the duplicate sample from the winter program were below detection limits, so the higher level in the field blank could be an anomaly.

The concentration of dissolved tin was equal to the concentration of total tin in the field blank. The detectable concentrations could be attributable to field filtering; however, both dissolved and total tin in the field sample and the duplicate sample were below detection limits, so the higher level in the field blank could be an anomaly.

The following parameters were detected in the field blank from the summer program:

- TC, TIC, TOC;
- total concentrations of calcium, silicon, sodium, and tin; and
- dissolved concentrations of calcium, silicon, sodium and tin.



Of those detected parameters, the following had concentrations greater than the PQL:

- total and dissolved tin.

Total and dissolved tin were only detected in the field blank sample from the summer and were not detected in any of the field samples; thus, detected concentrations in the field blanks could be an anomaly.

Duplicate Samples

Results from the duplicate samples were compared for relative percent difference (RPD)² between reported concentrations (Appendix B1). For those parameters with percent differences greater than 20%, the reported values were compared against the PQL.

Parameters that differed by more than 20% in the duplicate samples from the winter field program were:

- TP, total aluminum, total zinc, and dissolved iron.

Of those 4 parameters, the reported concentrations for TP, total aluminum, and dissolved iron were more than the PQL in both samples.

Other than TP, none of these parameters were detected in the field blank, so contamination from sampling procedures likely did not cause the differences in concentrations. The TP concentration reported for the field sample was within the range reported for all other samples, but the TP concentration reported for the duplicate sample (B45 Dup; 0.0196 mg/L) was higher than any other value reported. The difference in TP between the duplicate samples may be due to sample contamination.

Concentrations of total aluminum and dissolved iron in the duplicate samples were within the concentration range reported for all other field samples. Given that the field blanks did not have detectable concentrations of these 2 parameters, the difference in concentration between the duplicate samples may be simply a reflection of natural variability.

Parameters that differed by more than 20% in the duplicate samples from the summer field program were:

- TOC and total boron.

For both TOC and total boron, the reported concentrations were within the PQL.

Based on the analysis of the QC data, all sample data were retained for analyses.

² Relative Percent Difference (RPD) was calculated as the absolute difference of the original and duplicate sample, divided by the average of the two.



3.3 Results

3.3.1 Field Measured Parameters

General climatic conditions during the winter program (air temperature, cloud cover, wind direction, wind speed, precipitation, and precipitation rate), along with snow depth, ice thickness, and total depth (ice and water depth combined) at each station were measured. These data are provided in Appendix B2. Six lakes were sampled on 9 April (B5, B6, B7, D7, E2 and E3) and the other six were sampled on 11 April (B2, B4, B45, B52, B53 and B69). General sampling conditions on 9 April were mild temperatures (-8 to -5°C), but with strong winds and blowing snow. Sampling was not conducted on 10 April because of blizzard conditions. General sampling conditions on 11 April were cold temperatures (-23°C) and light winds.

Total depth at the sampling locations ranged from 1.6 to 4.2 m, with ice thickness between 1.5 and 1.7 m, and free under-ice water depth between 0.1 and 2.5 m (Figure 3.3-1). Water temperature generally increased with increasing water depth, whereas specific conductance and pH were generally similar throughout the water column (Appendix B2). Specific conductance ranged from 242 to 840 $\mu\text{S}/\text{cm}$ (average concentration), and pH was neutral to slightly acidic (range from pH 6.5 to 7.4; Table 3.3-1).

Dissolved oxygen concentrations were low in most lakes and decreased with depth through the water column (Table 3.3-1, Figure 3.3-2). Concentrations were generally lower than the 6.5 mg/L coldwater species guideline (CCME 2011). Lakes B4, B45, D7, and E3 had dissolved oxygen concentrations of less than 2 mg/L throughout the water column and are considered the least likely to support all species and life stages of aquatic life. Dissolved oxygen in lakes B2, B5, B6, B7, B52, and B53 was variable throughout the water column, but was less than 6.5 mg/L. In the upper portion of the water column in lakes B69 and E3, dissolved oxygen concentrations exceeded 6.5 mg/L, but decreased to less than 6.5 mg/L in the lower portions of the water column.

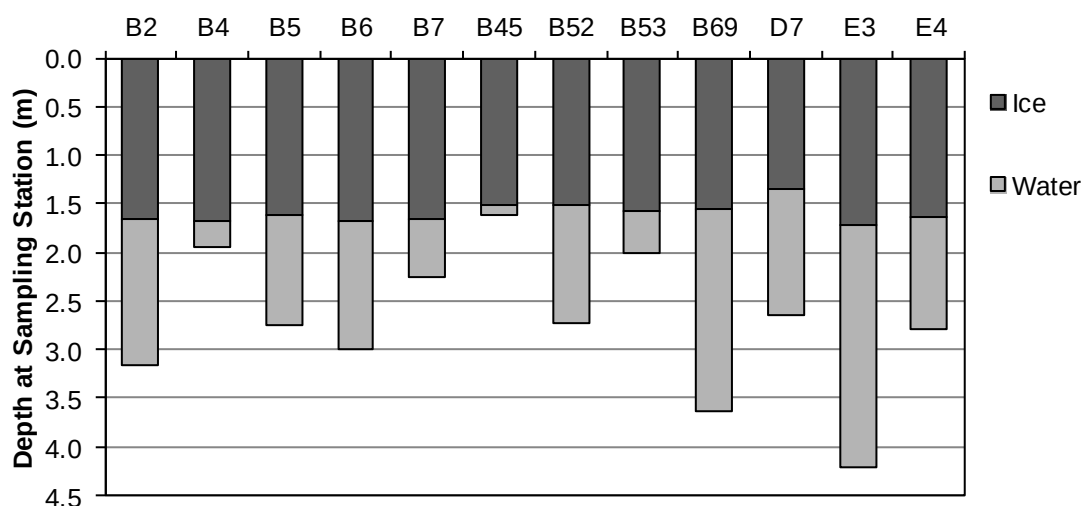


Figure 3.3-1: Ice, Water and Total Depths at Water Quality Sampling Stations, April 2011



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

Table 3.3-1: Summary of In Situ Measurements During the Winter Program, April 2011

Station	Total Depth (m)	Ice Thickness (m)	Under-ice Water Depth (m)	Average for Entire Water Column				
				Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L) ^a	Dissolved Oxygen Saturation (%)	pH
B2	3.2	1.7	1.5	0.5	452	3.2	22.8	6.7
B4	2.0	1.7	0.3	0.1	625	0.5	3.6	6.8
B5	2.8	1.6	1.1	0.6	420	4.3	30.4	6.9
B6	3.0	1.7	1.3	0.4	669	5.6	39.9	7.3
B7	2.3	1.7	0.6	0.1	559	5.3	37.2	7.4
B45	1.6	1.5	0.1	0.2	840	1.0	6.9	6.5
B52	2.7	1.5	1.2	0.7	426	2.0	14.2	7.0
B53	2.0	1.6	0.4	0.1	458	3.2	22.4	7.2
B69	3.6	1.6	2.1	1.3	243	6.1	44.2	6.5
D7	2.7	1.4	1.3	0.7	545	1.7	11.7	7.1
E3	4.2	1.7	2.5	1.6	242	6.3	43.6	7.3
E4	2.8	1.6	1.2	0.5	564	1.0	6.3	7.3

^a CCME (2011) water quality guideline for dissolved oxygen for coldwater species is 9.5 mg/L for early life stages and 6.5 mg/L for other life stages; values in bold and cells shaded grey do not meet guideline.

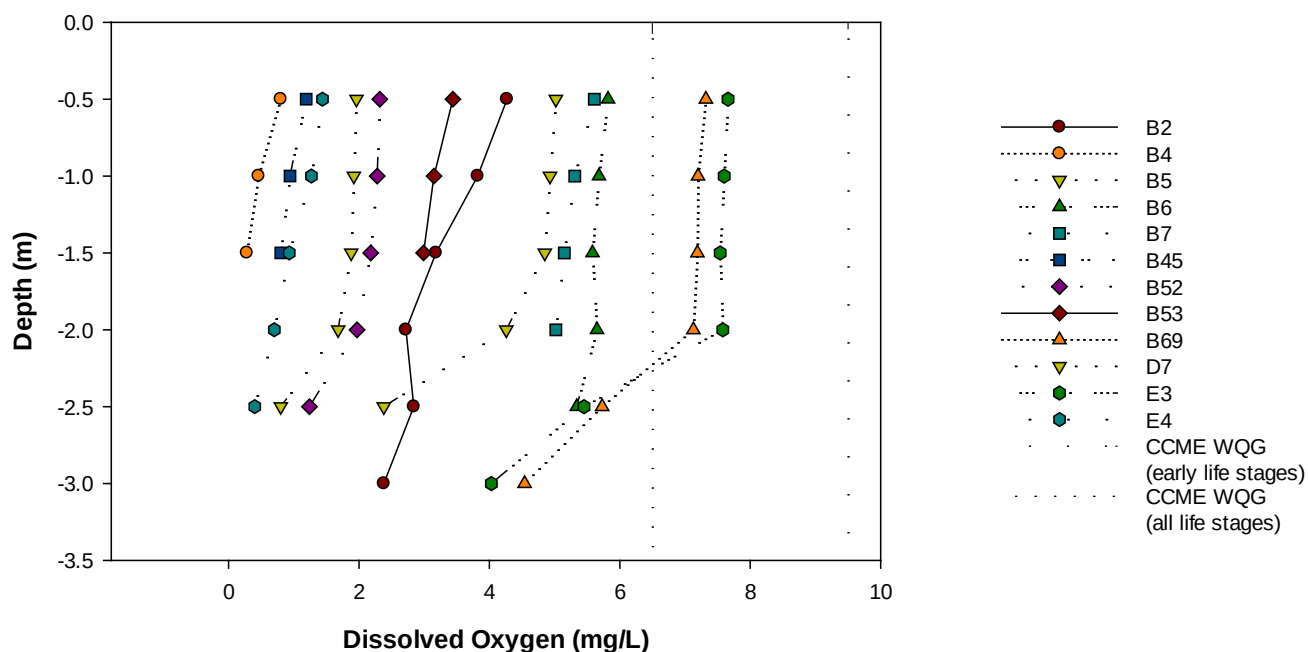


Figure 3.3-2: Under-ice Dissolved Oxygen Profiles, April 2011



2011 AQUATIC BASELINE STUDIES - MELIADINE GOLD PROJECT, NUNAVUT

For the summer field program, general climatic conditions (air temperature, cloud cover, wind direction, wind speed, precipitation, and precipitation rate), along with total depth and Secchi depth were measured. These data are provided in Appendix B3. The lakes and one stream were sampled between 17 July and 1 August 2011. General sampling conditions were 10 to 20°C, with light to strong winds, varied cloud cover, and no precipitation.

Total depth at the lake sampling locations ranged from 0.8 to 10.0 m, with clarity to the bottom at all stations except for Station Boot-2³ in Meliadine Lake where Secchi depth extended to 8.5 m (Table 3.3-2). Sampling depth at the stream station was 0.45 m with full clarity to the bottom. Limnology parameters (water temperature, specific conductance, dissolved oxygen, and pH), varied little through the water profile (Appendix B3). Dissolved oxygen concentrations were high, and were above the guideline of 9.5 mg/L in all lake stations except stations B36, B46, H17, ML-E, ML-SE, and Control Lake, and in the stream station (ST B4-45). The water was above 14°C, specific conductance was lower than in the winter months, and pH was neutral to slightly basic in all lakes, and less than neutral in the stream.

Table 3.3-2: Summary of In Situ Field Measurements During the Summer Program, July/August 2011

Station	Total Depth (m)	Secchi Depth (m)	Average for Entire Water Column				
			Water Temperature (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%) ^a	pH
B2	3.6	3.6	14.2	87	9.8	103	7.5
B36	0.8	0.8	17.5	264	9.3	105	8.0
B45	2.4	2.4	15.2	76	10.1	108	7.3
B46	2.1	2.1	19.1	124	9.4	109	7.9
ST B4-45	0.5	0.5	15.9	104	9.4	103	6.8
D4	1.6	1.6	14.6	153	9.8	-	7.7
D5	2.4	2.4	17.1	131	9.5	-	7.4
D7	2.8	2.8	15.1	134	9.8	105	8.0
D23	3.0	3.0	14.3	80	9.9	-	7.5
E3	4.6	4.6	14.3	76	9.7	-	7.5
E4	3.9	3.9	14.4	99	10.0	-	7.7
H17	1.7	1.7	17.2	98	8.8	99	7.8
H2O	1.6	1.6	18.4	173	9.5	110	7.9
ML-E	7.8	7.8	14.9	67	9.4	101	7.4
ML-SE	4.5	4.5	17.8	92	9.3	105	7.8
Boot-2	10.0	8.5	14.8	66	9.5	101	7.3
Control Lake	5.6	5.6	16.7	80	9.2	102	7.7

^a - = data not recorded

³ Station Boot-2 is located in a small bay of Meliadine Lake, north of the exploration camp.



3.3.2 Laboratory Measured Parameters

Results from both the winter and summer field programs are discussed together in this section. All data are provided in Appendix B4. Overall, surface water was neutral to slightly basic (pH 7.6 to 8.4), and the dominant ions were calcium and bicarbonate in both winter and summer samples. Total suspended solids were only detected twice at 5.0 mg/L: at lake Station B45 in winter and at stream Station B4-45 in summer (Method Detection Limit (MDL) = 3.0 mg/L). TDS concentrations ranged from 32 to 556 mg/L and were higher in the winter (average = 357 mg/L) as compared to the summer (average = 69 mg/L).

Sensitivity of lakes to acid deposition (Saffran and Trew 1996), measured as total alkalinity (CaCO_3 mg/L), ranged from moderately sensitive to insensitive (15.1 to 362 mg/L; average = 85.2 mg/L). In general, measured alkalinity was lower in the open-water samples from the summer (average = 39 mg/L) as compared to the under-ice samples from the winter (average = 183 mg/L). Highest alkalinity was recorded at Station B45 in the winter (362 mg/L) and the lowest was recorded at Station Boot-2 in the summer (15.1 mg/L).

Based on the water hardness scale (McNeely et al. 1979), lake water ranged from very soft (20.6 mg/L in Station Boot-2, summer) to very hard (394 mg/L in Station B45, winter). As for alkalinity, the sampled water was softer in the summer (average = 42 mg/L) as compared to the winter (average = 236 mg/L).

Ammonia was only detected in the winter samples (range from 0.082 to 0.529 mg N/L), and did not exceed the pH and temperature dependent CCME guideline. Nitrate and nitrite were not detected in any samples (winter and summer) at MDL of 0.050 mg N/L. TKN concentrations ranged from less than the MDL of 0.20 mg/L (stations ML-E and Boot-2, summer) to 1.88 mg/L (Station E4, winter). On average, TKN concentration was higher in the winter samples (1.1 mg/L) than in the summer samples (0.3 mg/L).

Orthophosphate was not detected in any samples, and TP and TDP were detected in all winter samples and 16 out of 17 summer samples (MDLs = 0.0010 mg/L). Concentrations of TDP ranged from less than the MDL (Station E3, summer) to 0.0079 mg/L (Station B45, winter), and TP concentrations ranged from less than the MDL (Station E3, summer) to 0.0162 mg/L (stream Station B4-45, summer). Average TP concentration was slightly higher in the winter (0.010 mg/L) than in the summer (0.008 mg/L).

Inorganic and organic carbon were detected in all samples (MDLs = 1.0 mg/L). Concentrations of TC ranged from 8 mg/L (Station Boot-2, summer) to 106 mg/L (Station B45, winter), TOC concentrations ranged from 4.4 mg/L (Station Boot-2, summer) to 28.3 mg/L (Station B45, winter), and TIC concentrations ranged from 3.8 mg/L (Station B45, summer) to 92.1 mg/L (Station B45, winter). Carbon concentrations were generally higher in the winter as compared to the summer: average concentrations were approximately 3 times higher in the winter for TC and TOC, and 5 times higher for TIC.

Metals concentrations were generally either below MDLs or below CWQGs (Appendix B4). Copper concentration exceeded the hardness-dependent CWQG of 0.00266 mg/L in one summer sample from Station B36 (0.00346 mg/L). Iron concentration exceeded the CWQG of 0.3 mg/L in 5 samples: 4 winter samples from stations B2 (0.579 mg/L), B45 (0.461 mg/L), B5 (0.61 mg/L), and E4 (0.692 mg/L); and one summer sample from stream Station B4-45 (0.421 mg/L). The CWQG for trivalent chromium (0.001 mg/L) was used to screen reported total chromium concentrations. Based on this screening, the summer sample from Station B2 had a total chromium concentration that exceeded the CWQG (0.00194 mg/L). No other metal concentrations exceeded the CWQGs.



4.0 SEDIMENT QUALITY

The results of the 1994 to 2009 sediment quality baseline studies are described in Chapter 6.0 of Golder (2012). This section provides the results of sediment quality data collected in 2011 as an update to data collected in 1994 to 2009.

4.1 Methods

4.1.1 Sample Collection

Sediment samples were collected during the summer program, after the water quality samples were collected. All sediment data are provided in Appendix C1. Sediment was collected primarily to support the benthic invertebrate community assessment, which was performed at the same sampling locations. An Ekman sampler was used to collect the grab samples (top 5 cm) at each depositional station. One grab sample was collected at each station. Contents of the sampler were transferred to sediment sampling polyethylene bags, double bagged, and labelled. Sediment samples were packed in coolers with freezer packs and delivered to an accredited analytical laboratory (ALS) as soon as possible after sampling.

4.1.2 Sediment Quality Parameters

Sediment samples were analyzed for the following:

- moisture content;
- particle size;
 - gravel, >2 mm;
 - coarse sand, 0.2 to 2 mm;
 - fine sand, 0.063 to 0.2 mm;
 - silt, 0.004 to 0.063 mm;
 - clay, <0.004 µm; and
- TC, TOC, and TIC.

4.2 Results

The sediments from the stream were similar to the sediments from the lake stations (Appendix C1). With the exception of Station ML-E (a station in the east basin of Meliadine Lake), sediments were dominated by silt (average = 66%; range = 51 to 83%), with some clay (average = 12%; range = 4.6 to 23%) or sand (average = 17%; range = 0.4 to 33%). Three sediments had small amounts of gravel (B45, E4, H17; range = 0.2 to 0.5%). Sediment from ML-E had lower fines content (3% clay and 33% silt), and was dominated by sand (64%). Concentrations of TOC ranged from 4.9 to 17% (average = 9.3%) in all sediments with the exception of sediment from ML-E, which had very low TOC (0.8%).



5.0 AQUATIC HABITAT

Aquatic habitat was surveyed at streams, lakes, and ponds in the study area in July and August 2011 (Figure 5.0-1). Investigations included ground and aerial surveys to assess habitat quality of streams and lakes, bathymetric surveys of selected lakes, collection of in-situ water quality data, and measurements of vertical distribution of temperature and dissolved oxygen in lakes. Sampling effort focused on site locations in close proximity to the proposed mine development (the Peninsula basins) and a sampling reference lake (Control Lake) located within the Meliadine Lake drainage, but outside the Peninsula.

5.1 Methods

5.1.1 Stream Habitat

In 2011, ground surveys were conducted at 7 streams within watershed Basins B, D, and E (Figure 5.0-1). The purpose of the surveys was to assess habitat suitability for fish use with special reference to fish movements and spawning and/or rearing potential. Surveys were conducted during July 2011. Methods were similar to those used in the previous surveys (Golder 2012, Section 7.1.1.1). In summary, the RL&L Environmental Services Ltd. habitat classification and coding system (Appendix D1) was used to identify and map individual habitat types. Parameters surveyed included substrate, habitat type (e.g., riffles, pools, runs), instream cover, channel width and depth, and presence of barriers to fish movement. Surveyed streams were subdivided into homogeneous reaches (i.e., stream sections that featured similar gradient, channel type, substrate, and habitat type distribution) with habitat parameters reflecting average conditions within each reach. Habitat conditions within lake inlets and outlets were also recorded.

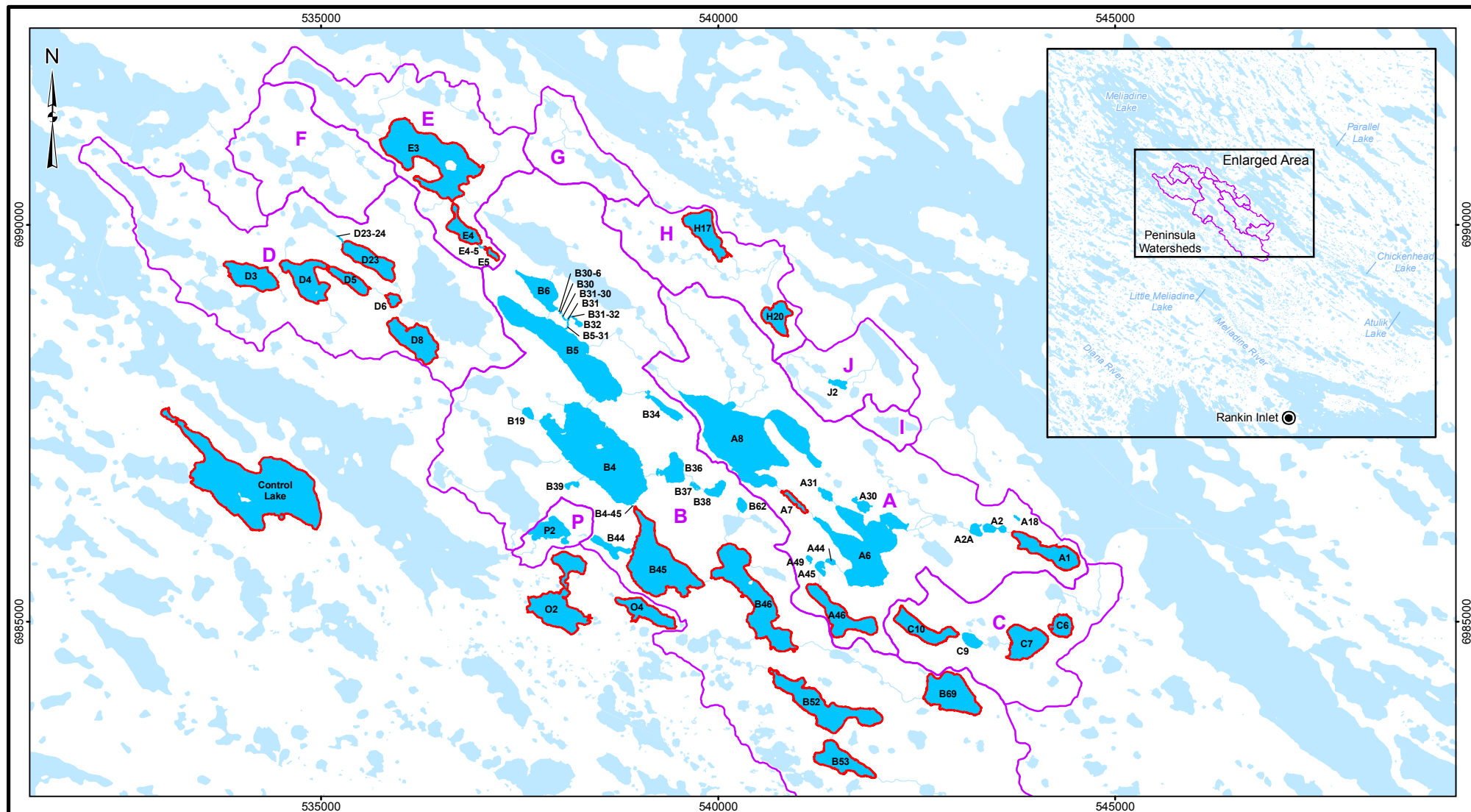
5.1.2 Lake and Pond Habitat

The waterbodies in the study area have been divided into lakes and ponds, depending on water depth. In late winter, ice thickness commonly reaches 2 m in the region, and waterbodies that are less than 2 m deep likely freeze to the bottom and do not provide overwintering habitat for fish. Waterbodies greater than 2 m deep generally do not freeze completely, but dissolved oxygen levels in the under-ice layer can become low in late winter thus providing low quality overwintering habitat for fish. Based on this, waterbodies in the study area less than 2 m deep were classified as ponds and waterbodies greater than 2 m deep were classified as lakes.

Bathymetry

Bathymetric surveys of 15 lakes and 9 ponds within the Peninsula basins (A, B, C, D, E, O, and P) and in the Control Lake (Figure 5.0-1) were conducted in 2011 to quantify water volumes and the areas of littoral habitat. Bathymetric data at these lakes and ponds were not collected during the previous studies and the surveys in 2011 were conducted to address this gap.

Methods were similar to those used in the previous surveys (Golder 2012, Section 7.1.2.2). In summary, the bathymetric surveys were carried out using a Garmin GPSMap 298 model coupled to a depth sounder that collected depth measurements and location data simultaneously. Surface area and volume calculations were obtained by using ArcGIS software. The procedure consisted of determining the volumes of each successive stratum and then summing these volumes to obtain the total volume of the lake. Bathymetric maps (Appendix D3), surface areas and volumes for different isobaths were produced for each surveyed waterbody.

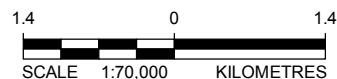


LEGEND

- Sampled Watercourse
- Watercourse
- Bathymetric Survey
- Sampled Waterbody
- Waterbody
- Watershed Boundary

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15



PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		AQUATIC HABITAT SAMPLING LOCATIONS, 2011			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	KK	12 Dec. 2011	SCALE AS SHOWN
		GIS	CDB	12 Dec. 2011	REV. 0
		CHECK	AM	13 Jun. 2012	
		REVIEW	JP	20 Jun. 2012	
		FIGURE 5.0-1			



Substrate

Substrate was evaluated in 21 lakes and 30 ponds within the Peninsula basins (A, B, C, D, E, O, and P) and in the Control Lake in 2011 (Figure 5.0-1). They included all lakes and ponds where bathymetric surveys were conducted in 2011, as well as 5 lakes (A6, A8, B4, B5 and B6) that had previous bathymetric surveys conducted in 1998, and 18 ponds that were too shallow for boat operation.

Methods were similar to those used in the previous surveys (Golder 2012, Section 7.1.2.3). In summary, substrate composition was evaluated using a combination of visual observations, underwater surveys using an Aqua-Vu[®] underwater camera, and an Ekman dredge. In areas where water depth was <1.5 m, visual surveys were used to assess substrate types. In deeper water (>1.5 m), an Aqua-Vu[®] was trolled behind a boat and the lake bottom was assessed by a biologist via a video monitor. The Ekman dredge was used to sample lake substrates at randomly chosen intervals to verify substrate composition. Pond substrates were assessed visually from the shore and by wading.

Substrate was classified into 3 categories:

- Fine area covered entirely by organics, silt, and/or sand;
- Mixed coarse substrate interspersed with large patches of organic or silt material; and
- Coarse most of the area covered by gravel, cobble and/or boulder.

The substrate data was combined with the depth information (obtained through bathymetric surveys) to classify lake and pond areas into 9 general habitat types:

- Hab 1 less than 2 m in depth, with fine substrate;
- Hab 2 less than 2 m in depth, with mixed substrate;
- Hab 3 less than 2 m in depth, with coarse substrate;
- Hab 4 between 2 and 4 m in depth, with fine substrate;
- Hab 5 between 2 and 4 m in depth, with mixed substrate;
- Hab 6 between 2 and 4 m in depth, with coarse substrate;
- Hab 7 more than 4 m in depth, with fine substrate;
- Hab 8 more than 4 m in depth, with mixed substrate; and
- Hab 9 more than 4 m in depth, with coarse substrate.



5.2 Results

5.2.1 Stream Habitat

Stream habitat was assessed at 7 small streams in Basins B, D, and E in July 2011 (Appendix D1).

Two of the surveyed streams (B31-32 and D23-24) were dry at the time of survey. Except for stream B4-45, which is a short (30 m long) and narrow (4 m wide) connection between lakes B4 and B45, mean channel widths did not exceed 1.1 m. Maximum water depth did not exceed 0.5 m at any of the surveyed streams.

Except for stream B4-45, the streams channels often separated into double or multiple braids. Stream habitats were dominated by shallow runs. Other habitat types encountered included short riffles and small pools. Substrate was dominated by organic materials, primarily detritus (i.e., decaying organisms and plant material). Coarse materials including gravel and cobble were also common (particularly in B5-31 and B31-30), whereas fine materials (i.e., silt and sand) and boulders were present in smaller amounts. Instream cover for fish was generally limited by the shallow depth. Available cover types included vegetation, boulders, and undercut banks.

The surveyed streams provide suitable rearing habitat for small-bodied fish (e.g., ninespine stickleback and juvenile Arctic grayling). Based on the presence of gravel and cobble substrates, streams B5-31 and B31-30 are likely used by Arctic grayling for spawning during early spring. The shallow nature of the surveyed streams precludes fish overwintering.

5.2.2 Lake and Pond Habitat

The 2011 lake and pond habitat investigations focused on characterizing depth and substrate characteristics of waterbodies potentially affected by mine development. The following sections summarize the results of the bathymetry surveys in 16 lakes and 9 ponds and substrate determinations in 22 lakes and 30 ponds. Detailed bathymetric maps and substrate data are provided in Appendices D2 to D4.

Bathymetry

The surveyed lakes and ponds ranged from 1.29 ha (E5) to 106.29 ha (Control Lake) in surface area (Table 5.2-1). Most were relatively shallow, with maximum depths ranging from 1.2 m in C7 to 5.9 m in Control Lake. Maximum depths were less than 2.0 m in 9 of the 25 surveyed lakes and ponds; they exceeded 4 m in only 3 lakes (B69, E3 and Control).

Table 5.2-1: Bathymetric Characteristics of Surveyed Lakes and Ponds in the Study Area, 2011

Basin	Site	Lake / Pond	Total Area (ha)	Volume (m ³ x 10 ³)	Mean Depth (m)	Maximum Depth (m)
A	A1	Lake	16.39	194.1	1.18	2.5
	A7	Pond	2.38	13.7	0.57	1.5
	A46	Lake	19.75	220.5	1.12	2.9
B	B45	Lake	47.37	591.9	1.25	2.3
	B46	Lake	44.72	329.7	0.74	2.0
	B52	Lake	33.33	329.9	0.99	3.3
	B53	Lake	15.67	195.8	1.25	2.9
	B69	Lake	25.00	406.6	1.63	5.4
C	C6	Pond	6.29	39.1	0.62	1.4



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Table 5.2-1: Bathymetric Characteristics of Surveyed Lakes and Ponds in the Study Area, 2011 (continued)

Basin	Site	Lake / Pond	Total Area (ha)	Volume (m ³ x 10 ³)	Mean Depth (m)	Maximum Depth (m)
	C7	Pond	15.95	150.3	0.94	1.2
	C10	Lake	13.86	145.7	1.05	2.9
D	D3	Lake	15.83	245.7	1.55	2.8
	D4	Pond	18.80	190.8	1.01	1.6
	D5	Lake	7.30	81.9	1.12	2.6
	D6	Pond	2.14	16.4	0.76	1.7
	D8	Lake	18.98	233.7	1.23	2.5
	D23	Lake	14.02	225.1	1.61	3.7
E	E3	Lake	56.82	880.9	1.55	4.7
	E4	Lake	8.49	90.0	1.06	3.7
	E5	Lake	1.29	11.9	0.92	3.0
H	H17	Pond	15.80	139.5	0.88	1.7
	H20	Pond	9.56	87.1	0.91	1.6
O	O2	Pond	32.67	305.5	0.93	1.6
	O4	Pond	12.73	103.3	0.81	1.8
Control	Control	Lake	106.29	2364.5	2.22	5.9

Shallow habitats (<2 m in depth) contributed approximately 80% of the total lake and pond surface area surveyed in 2011 (Figure 5.2-1).

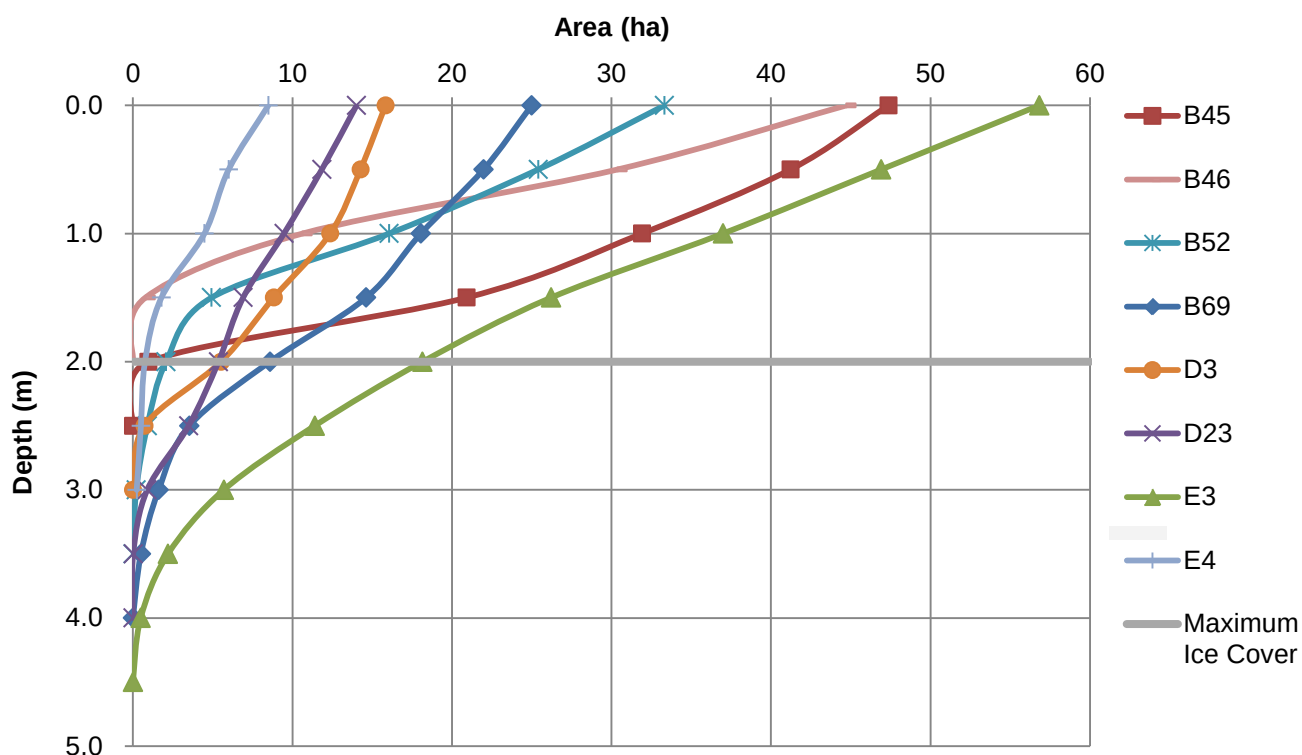


Figure 5.2-1: Depth-Area Curves for Selected Peninsula Lakes Surveyed in 2011



Total water volumes were estimated at less than 100,000 m³ in 7 of the 25 surveyed lakes and ponds (Appendix D2). The 3 largest volumes were estimated for Lake B45 (591 900 m³), Lake E3 (880 900 m³) and Control Lake (2 364 500 m³). Mean depth exceeded 1.5 m, which is considered to be the average ice thickness by the end of winter, in only 5 of the surveyed lakes (B69, D3, D23, E3 and Control).

Most of lake and pond volumes were confined to the upper 2 m layer of water. When the ice cover exceeds 2 m in depth, as is often the case during late winter (Hubert and Associates Ltd. 1996), the under-ice water volume is greatly reduced and the lake may freeze to the bottom. This is likely a frequent occurrence in 20 of the surveyed lakes, where less than 20% of total volume is provided by zones deeper than 2 m (Appendix D2). The proportions of deep water zones are higher (between 32 and 57%) in lakes B69, D3, D23, E3 and Control, and appear to be sufficient to allow fish to overwinter.

Substrate

Substrate surveys were conducted in 22 lakes and 30 ponds in 2011, mainly to collect baseline information in areas potentially affected by mine development and to provide data for the quantification of habitat units required for the No-Net-Loss Plan. Detailed data on habitat types (substrate and depth categories) within each of the surveyed 52 waterbodies are provided in Appendix D4.

In most of the lakes surveyed, coarse substrates predominated in the shallow areas (<1.5 m), mixed substrates were common from approximately 1.0 to 2.0 m depth, and fine substrates dominated areas deeper than 2.0 m. This general pattern likely develops as a result of wave action and ice scour along the shore line exposing rock and transporting fine materials to deeper water.

In contrast to lakes, the predominant substrates in most ponds were organics and silt. Shallow zones of mixed and coarse substrates were also present in most ponds, but were less common than in the lakes. Coarse substrates were often observed along pond margins.



6.0 LOWER TROPHIC LEVELS

Baseline field programs to collect background data in support of an EIS application were performed in 1997 and 1998 (Golder 2012, Chapter 8). In 2011, additional lower trophic level data were collected to update the background data in relation to the proposed mine design. The focus of the 2011 field program was on small lakes and several areas in Meliadine Lake (Figure 6.0-1). Sampling locations were based on results of previous field programs and knowledge of the proposed project footprint.

Phytoplankton

Phytoplankton are microscopic free-floating algae (Smith 1950). Summary results of phytoplankton biomass (as biovolume; $\mu\text{g/L}$) and abundance (number of cells/mL) are presented in this report; however, biomass is examined in greater detail. Both biomass and abundance are presented because abundance alone does not provide an accurate assessment of a taxon's importance. For example, taxa that are extremely numerous may have a low biomass due to the small size of individual organisms. Conversely, taxa that have large biomass (due to the large size of individual organisms) may not be numerically abundant. These large-bodied groups can contribute significantly to lake productivity. As such, they can influence the abundance of herbivores that feed on them (generally zooplankton) and can modify nutrient availability for competing plants or algae.

Zooplankton

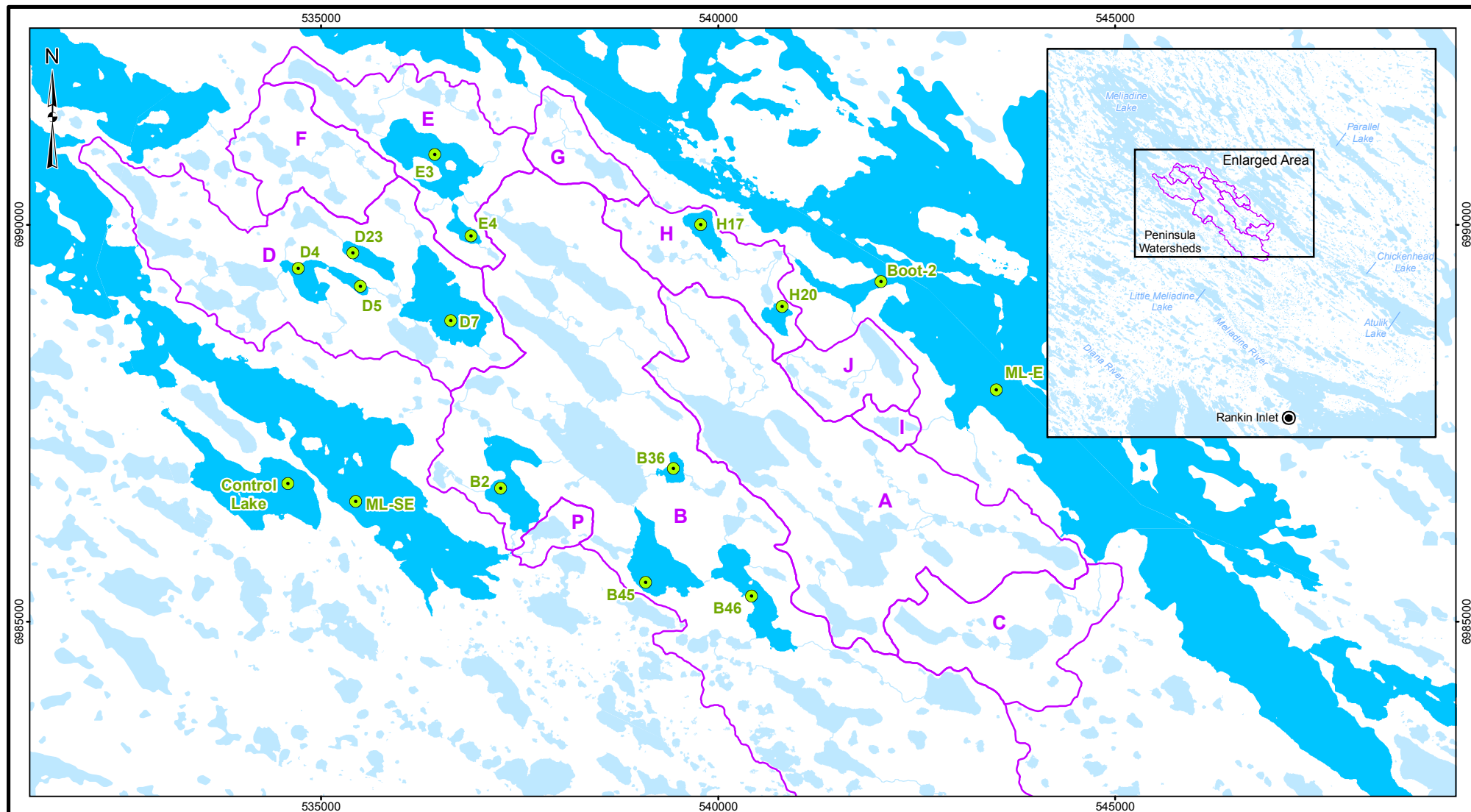
Zooplankton communities are composed of very small or microscopic animals that live in the water column (Pennak 1989; Wetzel 2001). Summary results of zooplankton biomass (mg/m^3 ; dry weight) and abundance (number of individuals/ m^3) are presented in this report because, as described previously for phytoplankton, abundance alone does not provide an accurate assessment of a taxon's importance. Zooplankton groups can contribute to lake productivity by influencing the abundance of predators that feed on them (generally other zooplankton and fish) and modifying phytoplankton communities through grazing.

Benthic Invertebrates

Benthic macroinvertebrates (referred to as "benthic invertebrates" in this report) are animals (e.g., insects, crustaceans, molluscs, worms) that exist among bottom substrata of aquatic systems. The benthic invertebrate community is useful as an indicator of pollution effects in environmental surveys, because invertebrates are typically numerous (i.e., hundreds to thousands per square metre), sedentary (i.e., generally have small home ranges), have long life cycles (a few weeks to a few years, depending on species) and respond to environmental disturbances in a predictable manner (Alberta Environment 1990; Environment Canada 1993). In addition, ecological relationships within the community are generally well understood (e.g., Hynes 1970; Resh and Rosenberg 1984; Rosenberg and Resh 1993) and invertebrates are the major food source for many fish species. For these reasons, evaluating benthic communities is regarded as a cost-effective means of assessing the overall health of the aquatic environment.

6.1 Methods

Samples were collected from lakes and ponds within the study area in the summer (i.e., the most biologically productive season) of 2011 to provide baseline information on phytoplankton, zooplankton, and benthic invertebrate community composition, abundance and taxonomic richness. A total of 16 sampling stations were established in 14 lakes and ponds, including 3 stations in Meliadine Lake (Figure 6.0-1; Table 6.1-1).

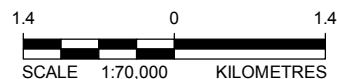


LEGEND

- Lower Trophic Level Sampling Location
- Watercourse
- Sampled Waterbody
- Waterbody
- Watershed Boundary

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15



PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		LOWER TROPHIC LEVEL SAMPLING LOCATIONS, 2011			
		PROJECT NO. 10-1373-0076		FILE No.	
DESIGN	JP	12 Dec. 2011	SCALE AS SHOWN	REV.	0
GIS	CDB	12 Dec. 2011			
CHECK	CC	13 Jun. 2012			
REVIEW	AM	20 Jun. 2012			
		FIGURE 6.0-1			



Table 6.1-1: Location of Lower Trophic Sampling Stations in the Study Area, July 2011.

Station	UTM Coordinates (NAD 83, Zone 15)	
	Easting	Northing
B2	537 262	6 986 682
B36	539 437	6 986 930
B45	539 092	6 985 496
B46	540 424	6 985 324
D4	534 716	6 989 450
D5	535 496	6 989 226
D7	536 638	6 988 797
D23	535 404	6 989 647
E3	536 433	6 990 886
E4	536 889	6 989 863
H17	539 783	6 990 002
H20	540 808	6 988 970
ML-E	543 508	6 987 924
ML-SE	535 439	6 986 519
Boot-2	542 056	6 989 289
Control Lake	534 586	6 986 744

The number of replicates per station was the same as the 1997/1998 sampling programs; one replicate per station was collected for phytoplankton and zooplankton, and 5 replicates per station were collected for benthic invertebrates (Golder 2012). Detailed descriptions of field sampling methods and laboratory procedures are provided in Golder (2012) and are summarized in the following subsections.

6.1.1 Habitat

One sediment sample consisting of a one Ekman grab was collected at each station as part of the water and sediment quality 2011 baseline program. These samples were used to assess lower trophic level habitat. Sediment samples were analyzed for moisture content, particle size distribution (% sand, silt and clay), total carbon, total organic carbon, total inorganic carbon, and concentrations of metals.

6.1.2 Phytoplankton

Field

Phytoplankton field methods were similar to those employed in 1997/1998 (Golder 2012). Samples were collected from the euphotic zone at each lake station, with one sample collected per station. The euphotic zone is equal to the depth of 1% light penetration (approximately 2 times the Secchi depth). Depth-integrated samples were collected using a Kemmerer sampler. A sample consisted of a composite of several discrete vertical



samples collected at 2-m intervals within this zone, to the bottom of the euphotic zone, or a depth of 0.5 m above the sediment surface. Grab samples were placed in a 20-L pail from which a 1-L sample was collected. Samples were placed in labelled 1-L polyethylene containers, preserved with 5% Lugol's solution, and stored in the dark.

The remaining water from the euphotic zone grabs was used for chlorophyll *a* analysis. Twenty five (25) to 400 mL of sample, depending on how much was needed to sufficiently cover the filter, was filtered onto Whatman™ GF/C filter paper, covered with anhydrous MgCO₃, and frozen.

Laboratory

Phytoplankton community samples (i.e., species composition, abundance, and biomass) were analyzed by D. Beliveau of Bio-Aquatics (2011, pers. comm.). Aliquots of the preserved phytoplankton samples were allowed to settle overnight in sedimentation chambers following the Utermöhl technique. Algal units were counted from randomly selected transects on a Wild inverted microscope; at least 50% of the settled sample was scanned for large and rare organisms. Counting units were individual cells, and all cells within a colony or filament were counted and recorded individually, which compensated for portions extending beyond the counting field. A minimum of 200 units were counted for each sample. Taxonomic identifications were based on Taft and Taft (1971), Webber (1971), and Prescott (1970).

Biovolume in cubic micrometres per millilitre ($\mu\text{m}^3/\text{mL}$) was estimated for representative cell dimensions based on geometric solids (Rott 1981). Biovolumes of colonial and filamentous taxa were based on the number of individuals within each colony or filament. Biovolume was then converted to biomass in milligrams per cubic metre (mg/m^3) wet weight, with the assumption of unit specific gravity.

Chlorophyll *a* samples were analyzed using acetone extraction according to the Moss method (Moss 1967a, b), as adapted by Alberta Environment (D. Beliveau, Bio-Aquatics, 2011, pers. comm.). Samples were analyzed on a Varian 635 spectrophotometer and final chlorophyll *a* concentrations were calculated and expressed as mg/m^3 (D. Beliveau, Bio-Aquatics, 2011, pers. comm.).

Only 15 of the 16 samples collected were processed, as one sample was lost in transit.

6.1.3 Zooplankton

Field

Zooplankton samples were collected by performing one or 2 vertical or horizontal hauls at each station. The depth of the vertical hauls encompassed the entire water column between the surface and 1 m above the lake bottom. Haul depths ranged from 3 to 4.5 m depending on the station. Horizontal hauls of approximately 6 m in length were taken from 1 m below the surface at stations that were less than 3 m deep. Zooplankton collections were made with a Wisconsin™ plankton net with a mouth diameter of 130 mm, constructed with 0.064 x 0.064 mm Nitex™ mesh, as recommended by Green (1977) to ensure adequate sampling of rotifers. Samples were preserved with 95% ethanol to yield a final concentration of 70%.

Laboratory

Prior to performing zooplankton counts, samples were allowed to settle and, if necessary, were decanted using a variable flow pump to increase the sample concentration and reduce the number of aliquots to be processed. Once an appropriate volume of sample was reached, the sample was weighed.



A 1-mL Hensen Stempel pipette was used to stir the sample to prevent heavier organisms from sinking. A 1-mL subsample was placed into a gridded Corning counting chamber. Either the coarse fraction or fine fraction count was performed, based on the density of the 1-mL subsample. To meet the target count of 200 to 400 non-rotifers (coarse fraction), and 200 rotifers (fine fraction), the subsample volume was either increased or reduced by adding or removing known volumes of sample material.

Each dish was processed completely, with up to 3-mL processed at one time depending on the density in each 1-mL subsample. Once the target count was reached, the sample was weighed to determine the final volume counted. Once numbers of organisms within each sample were established, values were converted to densities (i.e., numbers per litre) by dividing the total number of organisms in a subsample by both the subsampling factor and total volume filtered (i.e., net mouth area × depth of haul × number of hauls).

Identifications were made to the lowest feasible taxonomic level, based on taxonomic keys by Johannsen (1934), Ahlstrom (1940, 1943), Edmondson (1959), Saether (1974), Stemberger (1979), Czaika (1982), Pennak (1989), Hudson et al. (2003), Lesko et al. (2003), Alberti et al. (2007), and Thorpe and Covich (2010).

The biomass of major taxonomic groups within each sample was also determined. Lengths were recorded for the first 15 individuals of each taxon observed in the sample, unless fewer than 15 were observed. Length measurements were used to calculate weights from published length-mass regression equations (Table 6.1-2). For each taxon, a mean individual weight was calculated by averaging the estimated weights generated from the length-weight regression equation. Biomass for each taxonomic group was determined by multiplying the density (described above) in each sample by the mean individual weight for the specific taxonomic group.

Table 6.1-2: Length-Mass Regression Equations used to Calculate Zooplankton Weights

Taxon	Length-Mass Regression Formula ^a	Note/Reference
<i>Asplanchna</i> sp.	$DW=0.05 \times 0.52ab^2$	(McCauley 1984)
<i>Collotheca</i> sp.	$DW=0.05 \times 0.26ab^2$	(McCauley 1984)
Conochilidae	$DW=0.05 \times 0.26ab^2$	(McCauley 1984)
<i>Filinia</i> sp.	$DW=0.05 \times 0.52ab^2$	(McCauley 1984)
<i>Gastropus</i> sp.	$DW=0.05 \times 0.8abc$	(McCauley 1984)
<i>Kellicottia longispina</i>	$DW=0.05 \times 0.26ab^2$	(McCauley 1984)
<i>Keratella</i> 1 spine	$DW=0.05 \times 0.13ab^2$	(McCauley 1984)
<i>Keratella quadrata</i>	$DW=0.05 \times abc$	(McCauley 1984)
<i>Keratella ticinensis</i>	$DW=0.05 \times 0.13ab^2$	(McCauley 1984)
<i>Lecane</i> sp.	$DW=0.05 \times 0.4abc$	(^b)/(McCauley 1984)
<i>Monostyla</i> sp.	$DW=0.05 \times 0.4abc$	(^b)/(McCauley 1984)
Nauplii	$DW=e^{0.6977+0.469 \times \ln L}$	(McCauley 1984)
<i>Ploesoma</i> sp.	$DW=0.05 \times 0.52abc$	(McCauley 1984)
<i>Polyarthra</i> sp.	$DW=0.05 \times abc$	(McCauley 1984)
<i>Synchaeta</i> sp.	$DW=0.05 \times 0.26ab^2$	(McCauley 1984)
<i>Bosmina longirostris</i>	$DW=26.6 \times L^{3.13}$	(Dumont et al. 1975)
<i>Calanoid copepodites</i>	$DW=7.9 \times 10^{-7} \times L^{2.33}$	(Dumont et al. 1975)
Chydoridae	$DW=29.65 \times L^{3.48}$	(Dumont et al. 1975)
<i>Cyclopoid copepodites</i>	$DW=4.9 \times 10^{-8} \times L^{2.75}$	(Dumont et al. 1975)



Table 6.1-2: Length-Mass Regression Equations used to Calculate Zooplankton Weights (continued)

Taxon	Length-Mass Regression Formula ^a	Note/Reference
<i>Cyclops</i> sp.	$DW = 4.9 \times 10^{-8} \times L^{2.75}$	(Dumont et al. 1975)
<i>Daphnia longiremis</i>	$DW = 7.9 \times 10^{-7} \times L^{2.84}$	(Dumont et al. 1975)
<i>Daphnia pulex</i> complex	$DW = 7.9 \times 10^{-7} \times L^{2.84}$	(Dumont et al. 1975)
<i>Diacyclops</i> sp.	$DW = 4.9 \times 10^{-8} \times L^{2.75}$	(Dumont et al. 1975)
<i>Epischura lacustris</i>	$DW = 7.9 \times 10^{-7} \times L^{2.33}$	(Dumont et al. 1975)
<i>Hesperodiaptomus</i> sp.	$DW = 7.9 \times 10^{-7} \times L^{2.33}$	(Dumont et al. 1975)
<i>Heterocope septentrionalis</i>	$DW = 7.9 \times 10^{-7} \times L^{2.33}$	(Dumont et al. 1975)
<i>Holopedium gibberum</i>	$DW = e^{5.3976 + 2.0555 \times \ln L}$	(McCauley 1984)
<i>Leptodiaptomus</i> sp.	$DW = 7.9 \times 10^{-7} \times L^{2.33}$	(Dumont et al. 1975)
<i>Leydigia</i> sp.	$DW = 29.65 \times L^{3.48}$	(Dumont et al. 1975)

^a DW = dry weight of individual organism; L = length; Length = a, Width = b, Height = c

^b No specific formula was available. The formula for comparably shaped rotifer (*Pompholyx* sp.) was used.

To ensure that a sorting efficiency of 90% was met (i.e., no more than 10% of the total number of animals in a given sample were overlooked), 10% of the samples were chosen at random and resorted. A total of 2 samples were re-sorted with resulting efficiencies of 98.4% and 96.5%, indicating that the goal for sorting efficiency was met.

6.1.4 Benthic Invertebrates

Field

Benthic invertebrates were sampled from mid-basin locations of 0.8 to 10.0 m depth. Methods were the same as those employed in 1997/1998 (Golder 2012). Samples were preserved using 95% ethanol to yield an estimated final ethanol concentration of 70%. Water depth, temperature (°C), specific conductivity (µS/cm), dissolved oxygen (DO; mg/L), pH, sediment moisture content (%), sediment TOC (%) and substrate type were recorded at each sample location.

Laboratory

Methods were similar to those employed in 1997/1998 (Golder 2012), but had several differences. All 5 replicate samples were processed from each station and samples were only fractionated into the following components:

- a coarse fraction (greater than 1 mm); and
- a fine fraction (0.25 to 1 mm).

Invertebrates were removed from the organic material, sorted to major taxonomic groups and identified to the lowest practical taxonomic level (genus or species where possible) under a dissecting microscope (6x to 42x magnification). Keys used for identification included Baumann et al. (1977), Wiederholm (1983), Brinkhurst (1986), Pennak (1989), Clifford (1991), Merritt and Cummins (1996), and Wiggins (1998).

To ensure that a sorting efficiency of 90% was met (i.e., no more than 10% of the total number of animals in a given sample were overlooked), 10% of the samples were chosen at random and resorted. A total of 8 samples were re-sorted with resulting efficiencies ranging from 98.4% to 100%, indicating that the goal for sorting efficiency was met.



6.2 Results

6.2.1 Habitat Characteristics

Sediment quality results are discussed briefly in this section, as they pertain to physical habitat characteristics for benthic invertebrates. For a more detailed discussion of sediment quality refer to Section 4.0 in Golder (2012).

With the exception of water depth, habitat characteristics were generally similar across waterbodies. Depth ranged from 0.8 m in Lake B36 to 10.0 m in Meliadine Lake at station Boot-2 (Table 6.2-1). The Control Lake, the 3 Meliadine Lake stations, and Lake E3 had the greatest depths. Conductivity was generally low, typical of sub-Arctic and Arctic lakes, ranging between 66 and 264 $\mu\text{S}/\text{cm}$. Dissolved oxygen concentration ranged from 8.8 to 10.1 mg/L, with no indication of anoxia at any station. The pH values were near neutral to slightly basic, ranging from 7.4 to 8.0.

Sediment moisture content ranged from 42.7% to 90.5% and TOC ranged from 0.8% to 15.2%, with most stations falling between 5% and 12% (Table 6.2-1), which is considered moderate in lakes. Silt was the dominant size class at all but one station (ML-E), contributing between 33.3% and 83.2% of bottom sediment samples, by weight. Fine sand accounted for 25% to 46% of the sediments at the majority of the deeper stations and contributed as low as 0.4% at the shallower stations. Clay was also common in sediments at most stations.

6.2.2 Phytoplankton

Chlorophyll a (chl a) in the Meliadine waterbodies ranged from $0.81 \pm 0.14 \text{ mg}/\text{m}^3$ in ML-E to $3.0 \pm 1.0 \text{ mg}/\text{m}^3$ in the Control Lake (Figure 6.2-1; Appendix E1), suggesting that the lakes in the study area are oligotrophic (Wetzel 2001) (Figure 6.2-1). The majority of chl a values ranged from approximately $1.0 \text{ mg}/\text{m}^3$ to $2.0 \text{ mg}/\text{m}^3$. Phytoplankton biomass ranged from 469 $\mu\text{g}/\text{mL}$ at the Control Lake to 3168 $\mu\text{g}/\text{mL}$ at Lake D23 (Figure 6.2-1). Meliadine Lake station Boot-2 had the second lowest phytoplankton biomass at 504 $\mu\text{g}/\text{L}$.

At 12 of the 15 sampling stations with available phytoplankton data, Chrysophyta (golden brown algae) had the highest biomass (Figure 6.2-2; Appendix E1). At 10 of the 12 stations, Chrysophyta accounted for greater than 50% of the total biomass. At 2 stations (B2 and D23), Pyrrophyta (dinoflagellates) was dominant, contributing 42% and 67% of total abundance, respectively. At H20, Cyanophyta (cyanobacteria) contributed 39% of total abundance. Chlorophyta (green algae) and Cryptophyta (cryptophytes) were also abundant at most sampling stations in terms of biomass. Biomass of Bacillariophyta (diatoms) and Cyanophyta was low to moderate at most stations, and Euglenophyta (euglenoids) was present at only one station, and at a very low biomass. Generally, the composition of the phytoplankton community was similar across all sampling stations; however, the H Basin lakes and the Control Lake had a slightly more even distribution of taxonomic groups than most other stations.

Phytoplankton abundance was notably different than biomass, and there was no clear relationship between the 2 variables (Table 6.2-2). When considering phytoplankton abundance, Chrysophyta and Cyanophyta were the most abundant taxonomic groups (Appendix E1). The small size of most Cyanophyta resulted in small contributions to overall biomass, despite this being present in high densities.



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Table 6.2-1: Habitat Characteristics at Lower Trophic Sampling Stations in the Study Area, 2011

Basin/ Station ID	Water Depth (m)	Temperature (°C)	Specific Conductivity (μS/cm)	DO (mg/L)	pH	Sediment		Sediment Particle Size Distribution (weight percent)				
						Moisture Content (%)	TOC (%)	Gravel (>2 mm)	Coarse Sand (2.0- 0.2 mm)	Fine Sand (0.2- 0.063 mm)	Silt (0.063 mm- 4 μm)	Clay (<4 μm)
B Basin												
B2	3.6	14.2	87	9.8	7.6	89.6	9.9	<0.10	1.3	17.0	68.3	13.3
B36	0.8	17.5	264	9.3	8.0	65.4	7.6	<0.10	2.2	17.4	69.2	11.2
B45	2.4	15.2	77	10.1	7.5	75.4	5.9	0.5	7.4	23.4	61.9	6.9
B46	2.1	19.1	124	9.4	7.9	81.2	11.3	<0.10	1.8	8.7	75.0	14.6
D Basin												
D4	1.6	14.6	153	9.8	7.7	69.6	6.7	<0.10	0.8	0.4	83.2	15.5
D5	2.4	17.1	130	9.5	7.5	76.1	11.1	<0.10	8.6	18.8	57.7	15.0
D7	2.8	14.9	133	9.8	8.0	71.8	4.9	<0.10	6.3	24.2	63.6	6.0
D23	3.0	14.3	80	9.8	7.6	89.8	11.7	<0.10	4.8	16.8	72.6	5.9
E Basin												
E3	4.6	14.2	77	9.7	7.4	85.5	8.4	<0.10	8.9	33.2	52.6	5.4
E4	3.9	14.0	99	9.9	7.7	79.1	5.7	0.3	16.8	27.1	51.3	4.6
H Basin												
H17	1.7	17.2	97	8.8	7.8	74.2	15.2	0.2	2.8	14.1	63.7	19.2
H2O	1.6	18.4	173	9.5	7.9	70	11.9	<0.10	1.6	5.3	70.4	22.8
Meliadine Lake												
ML-E	7.8	14.7	67	9.4	7.4	42.7	0.8	<0.10	17.6	46.1	33.3	3.1
ML-SE	4.5	17.7	92	9.3	7.9	83	5.8	<0.10	3.4	25.3	60.1	11.2
Boot-2	10.0	14.6	66	9.4	7.4	84.3	7.2	<0.10	1.1	7.0	68.8	23.1
Control Lake												
Control Lake	5.6	16.7	80	9.2	7.7	90.5	9.1	<0.10	3.8	28.0	59.0	9.2

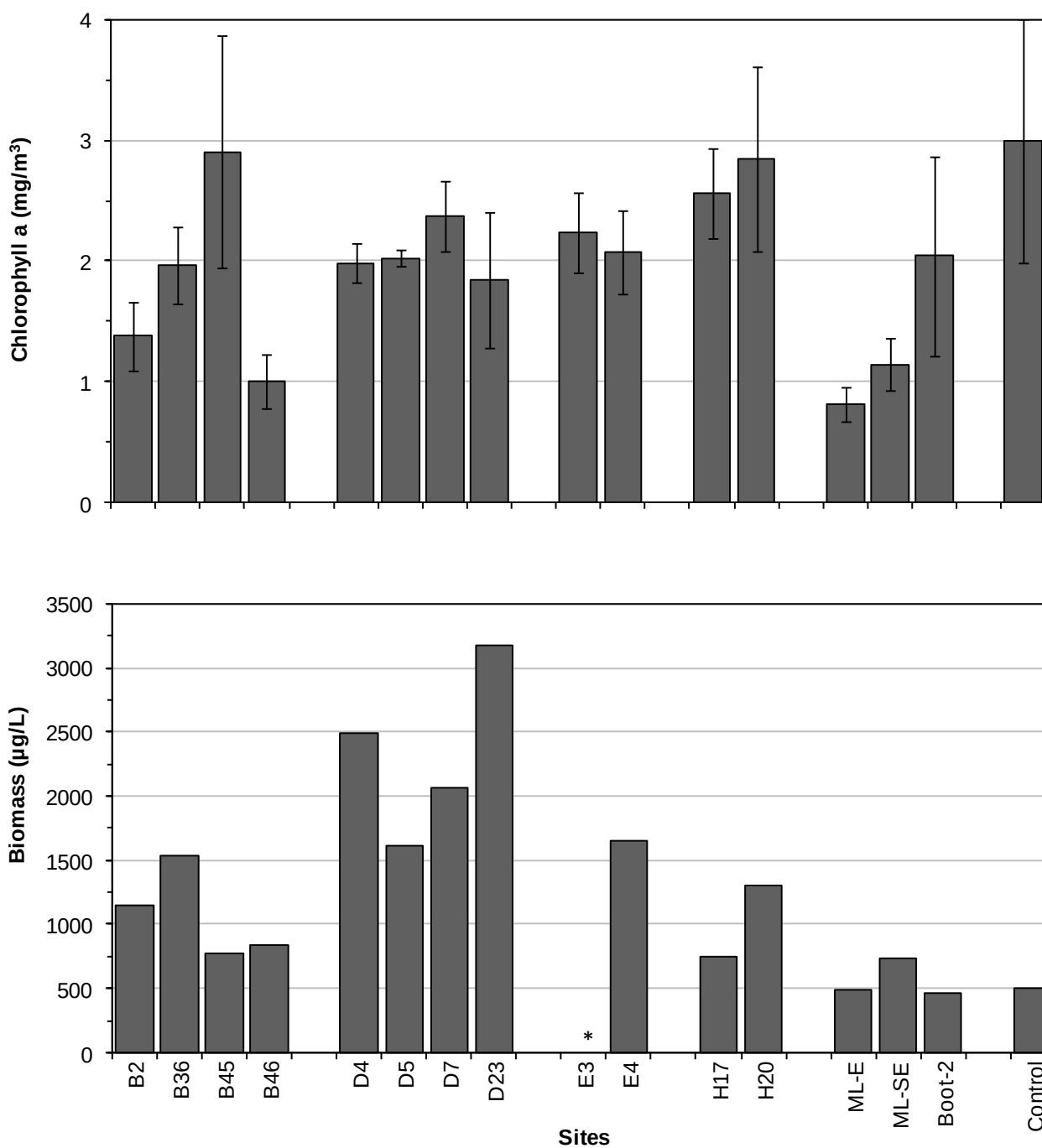


Figure 6.2-1: Chlorophyll a Concentration (top) and Phytoplankton Biomass (bottom) in the Study Area, 2011 (error bars represent 1 standard error; * = not available)



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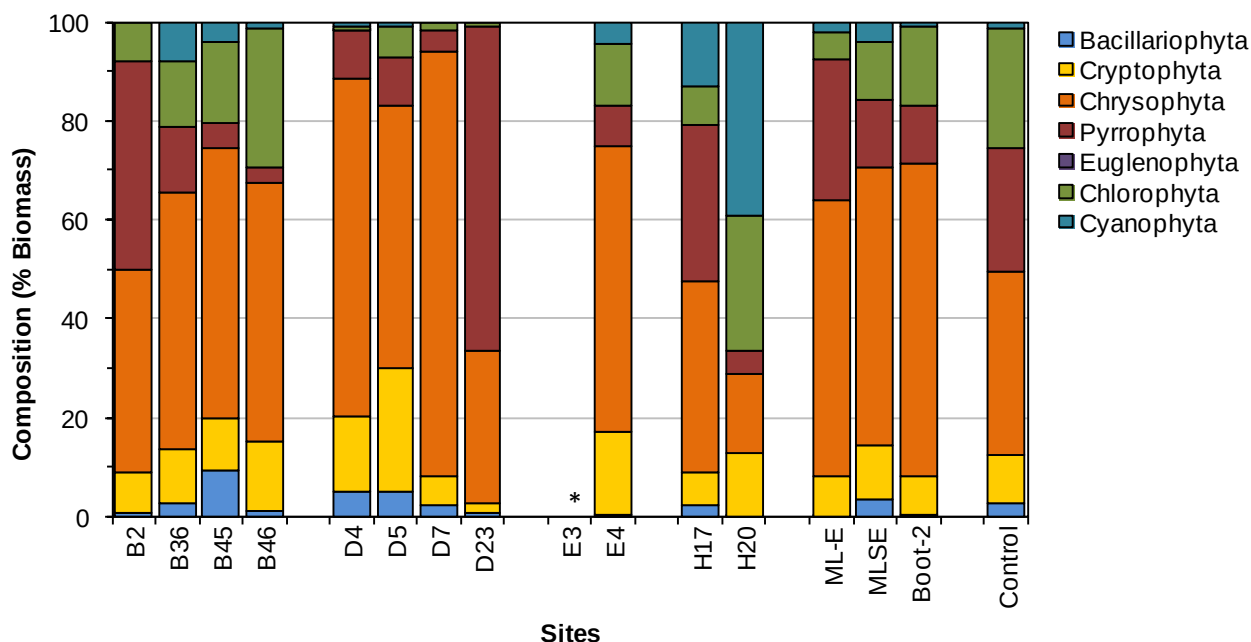


Figure 6.2-2: Phytoplankton Community Composition in the Study Area, 2011 (* = not available)

Table 6.2-2: Phytoplankton Abundance, Biovolume, and Richness in the Study Area, 2011

Basin/Lake Name	Station ID	Total Abundance (Number cells/mL)	Total Biovolume (µg/L)	Richness (Number taxa/station)
B Basin	B2	5 601	1 152	66
	B36	13 398	1 535	68
	B45	8 692	779	67
	B46	5 147	834	53
D Basin	D4	8 379	2 492	63
	D5	7 904	1 614	72
	D7	9 393	2 070	56
	D23	4 165	3 168	58
E Basin	E4	14 954	1 653	52
H Basin	H17	10 376	748	57
	H20	29 628	1 301	49
Meliadine Lake	ML-E	962	490	36
	ML-SE	4 422	733	66
	Boot-2	1 419	503	43
Control Lake	Control Lake	1 485	469	47

A total of 149 species of algae were identified in the samples collected in the study area, but the number of taxa observed at a given station ranged from 36 taxonomic groups at ML-SE, to 72 taxonomic groups at D5 (Table 6.2-2).



6.2.3 Zooplankton

Zooplankton biomass in the study area ranged from 4 mg/m³ at B36 and D5, to 255 mg/m³ at H20 (Figure 6.2-3; Table 6.2-3; Appendix E2). The majority of stations were between 50 and 125 mg/m³. Zooplankton biomass was similar at the 3 stations within Meliadine Lake.

Table 6.2-3: Zooplankton Abundance, Biomass, and Taxonomic Richness in the Study Area, 2011

Basin/Lake Name	Station ID	Abundance (Number Individuals/m ³)	Biomass (mg/m ³)	Richness (Number taxa/station)
B Basin	B2	124 399	124	12
	B36	358 981	4	8
	B45	206 235	101	11
	B46	49 302	94	9
D Basin	D4	327 957	5	11
	D5	182 433	4	11
	D7	183 637	11	12
	D23	142 611	7	13
E Basin	E3	93 577	85	14
	E4	121 916	56	13
H Basin	H17	9 543	100	9
	H20	10 209	255	8
Meliadine Lake	ML-E	13 399	49	15
	ML-SE	143 053	61	17
	Boot-2	70 104	74	16
Control Lake	Control Lake	69 333	62	15

At 7 of the 16 stations, calanoid copepods were the dominant taxonomic group, contributing at least 52% of total biomass (Figure 6.2-3; Appendix E2). Cladocera was the second most common group, contributing at least 42% of total biomass at 6 of the 16 stations. Cyclopoid copepods were the dominant group at 2 stations (ML-E and Boot-2), contributing at least 42% of total biomass at these stations. Copepoda nauplii were also common at several stations; however, Rotifera contributed less than 0.1% of total biomass at each station.

Trends in zooplankton abundance among stations were notably different from those in zooplankton biomass, and there was no clear relationship between the 2 variables (Table 6.2-3). When considering zooplankton abundance, Rotifera dominated the zooplankton community at all stations; however, due to their small size, they made very minimal contributions to the community biomass (Appendix E2).

A total of 28 zooplankton taxa were observed in the study area, but the number of taxa observed at a given station ranged from 8 taxa at stations B36 and H20, to 17 taxa at station ML-SE (Table 6.2-3).



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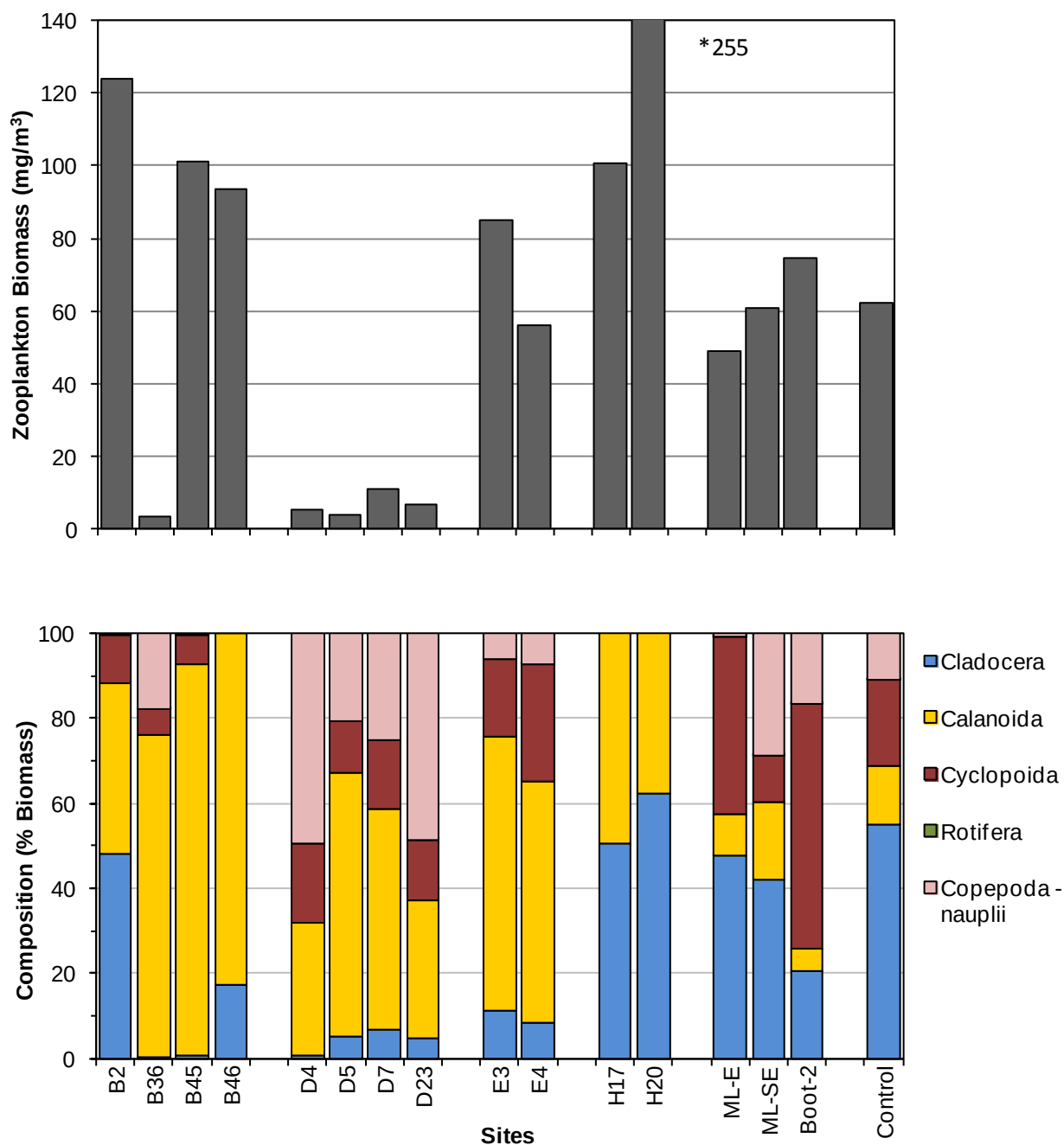


Figure 6.2-3: Zooplankton Biomass (top) and Community Composition (bottom) in the Study Area, 2011



6.2.4 Benthic Invertebrates

Benthic invertebrate abundance in the study area ranged from 322 ± 33 individuals/m² at Boot-2, to $72\,895 \pm 2948$ individuals/m² at B45, where Ostracoda (ostracods) were particularly abundant (Figure 6.2-4; Table 6.2-4; Appendix E3). The majority of stations, however, had between 1000 and 10 000 individuals/m². These abundances were low considering some lake environments have densities greater than 10^6 individuals/m² (Hynes 1970; Resh and Rosenberg 1984; Rosenberg and Resh 1993).

Overall richness (at the family level) for lakes in the study area was 31 taxa. Total richness ranged from 8 taxonomic groups at B36 and D5, to 17 taxa at ML-E (Figure 6.2-4; Table 6.2-4). Mean richness ranged from 4 ± 1 taxa at Boot-2, to 10 ± 0 taxa at ML-SE.

Composition of the benthic invertebrate community varied among stations (Figure 6.2-5; Appendix E3). Chironomidae (midges) was the dominant group at 9 of 16 stations, contributing at least 43% of total abundance at each station. Ostracoda was the second most common group, and was the dominant taxon at 5 of the 16 stations, accounting for at least 39% of total abundance at a station. Pelecypoda (fingernail clams) was most common at 2 stations, contributing at least 5% of total abundance at these stations. Other common taxonomic groups included Oligochaeta (aquatic worms), Gastropoda (snails), and harpacticoid Copepoda (Appendix E3).

Composition of the Chironomidae assemblage also varied among stations (Figure 6.2-5; Appendix E3). Tanytarsini was the dominant midge group at 6 of 16 stations, accounting for at least 27.8% of total abundance at a station. Chironomini was the second most dominant common group at 4 stations, contributing at least 33.3% of total abundance at these stations. Other common Chironomidae tribes included Orthoclaadiinae and Tanypodinae. Unidentified Chironomidae and Chironominae were also common, although these were individuals that could not be identified further due to either damage or immaturity of specimens.

Simpson's diversity index (SDI) was lowest at D5 (0.28) and highest at D4 (0.86), although most stations had values between 0.36 and 0.78, indicating moderate to high levels of diversity in the study area (Table 6.2-4). Simpson's evenness index (SEI) was lowest at D7 (0.12) and highest at the Control Lake (0.64), suggesting that these stations may have a small to moderate number of taxonomic groups that are abundant compared to other groups.



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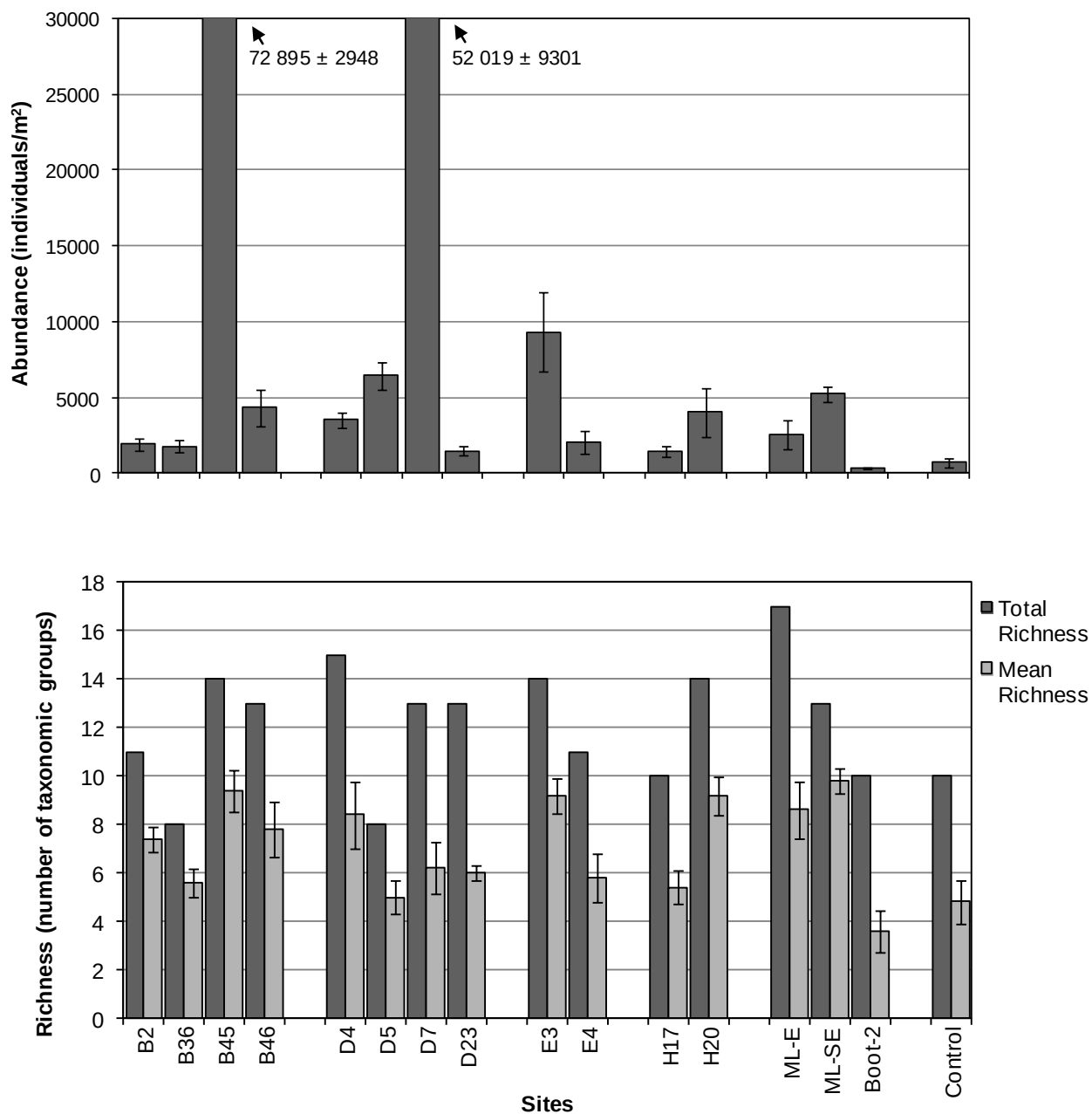


Figure 6.2-4: Benthic Invertebrate Abundance (top) and Richness (bottom) in the Study Area, 2011 (error bars represent 1 standard error)



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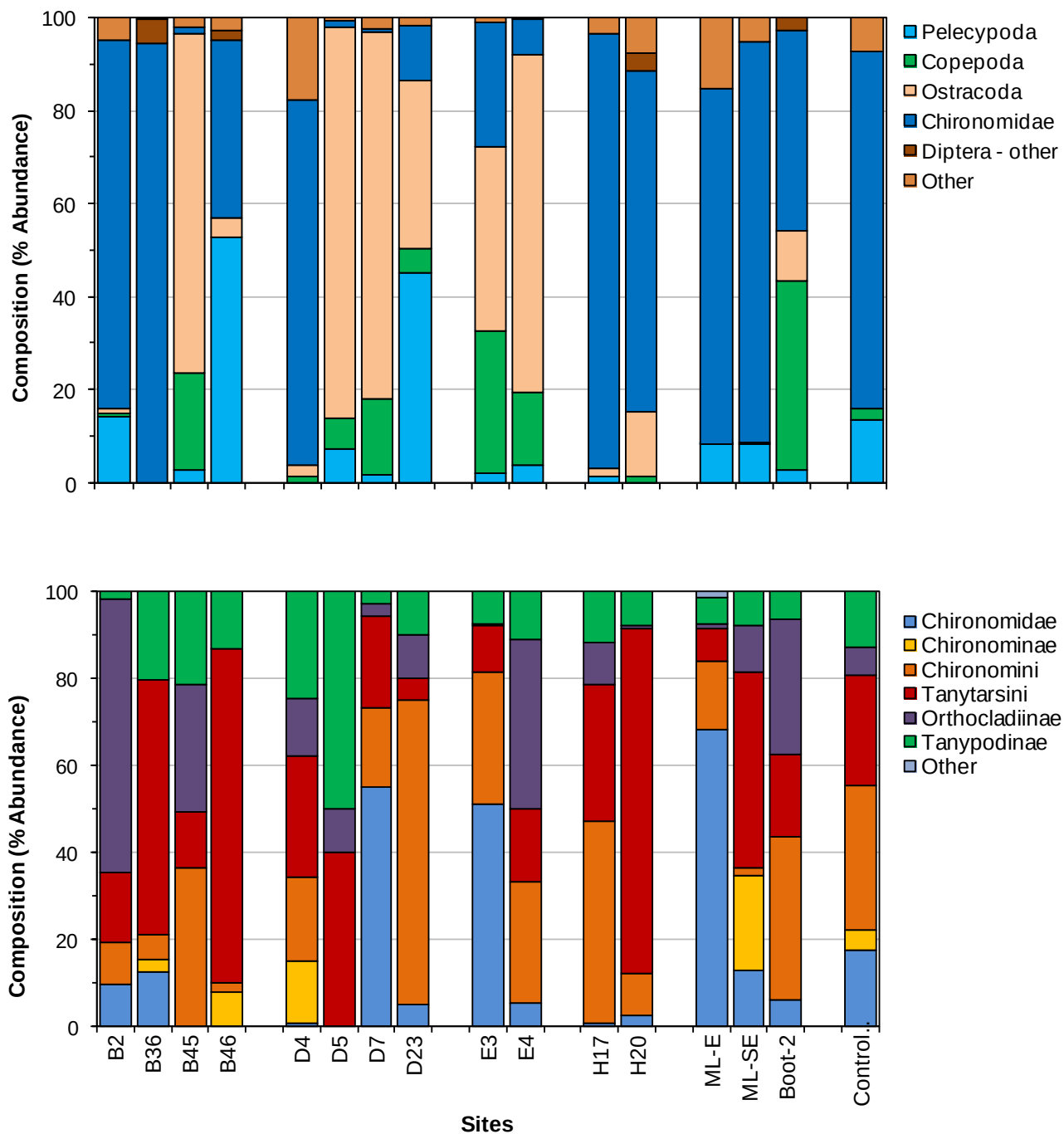


Figure 6.2-5: Benthic Invertebrate Community Composition (top) and Chironomidae Composition (bottom) in the Study Area, 2011



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Table 6.2-4: Benthic Invertebrate Abundance, Taxonomic Richness, Simpson's Diversity Index, and Simpson's Evenness Index in the Study Area, 2011

Basin/Waterbody	Station ID	Abundance (Number individuals /m ² ± 1SE)	Total Richness	Mean Richness (± 1SE)	Simpson's Diversity Index	Simpson's Evenness Index
B Basin	B2	1 922 ± 390	11	7 ± 1	0.70	0.31
	B36	1 774 ± 412	8	6 ± 1	0.64	0.34
	B45	72 895 ± 2948	14	9 ± 1	0.45	0.13
	B46	4 339 ± 1199	13	8 ± 1	0.63	0.21
D Basin	D4	3 513 ± 499	15	8 ± 1	0.86	0.48
	D5	6 443 ± 929	8	5 ± 1	0.28	0.17
	D7	52 020 ± 9301	13	6 ± 1	0.36	0.12
	D23	1 487 ± 323	13	6 ± 0	0.70	0.25
E Basin	E3	9 322 ± 2635	14	9 ± 1	0.74	0.27
	E4	2 061 ± 771	11	6 ± 1	0.55	0.20
H Basin	H17	1 443 ± 310	10	5 ± 1	0.70	0.34
	H20	4 009 ± 1607	14	9 ± 1	0.63	0.19
Meliadine Lake	ML-E	2 574 ± 958	17	9 ± 1	0.70	0.19
	ML-SE	5 217 ± 457	13	10 ± 0	0.78	0.35
	Boot-2	322 ± 33	10	4 ± 1	0.78	0.45
Control Lake	Control	713 ± 299	10	5 ± 1	0.84	0.64



7.0 FISH POPULATIONS

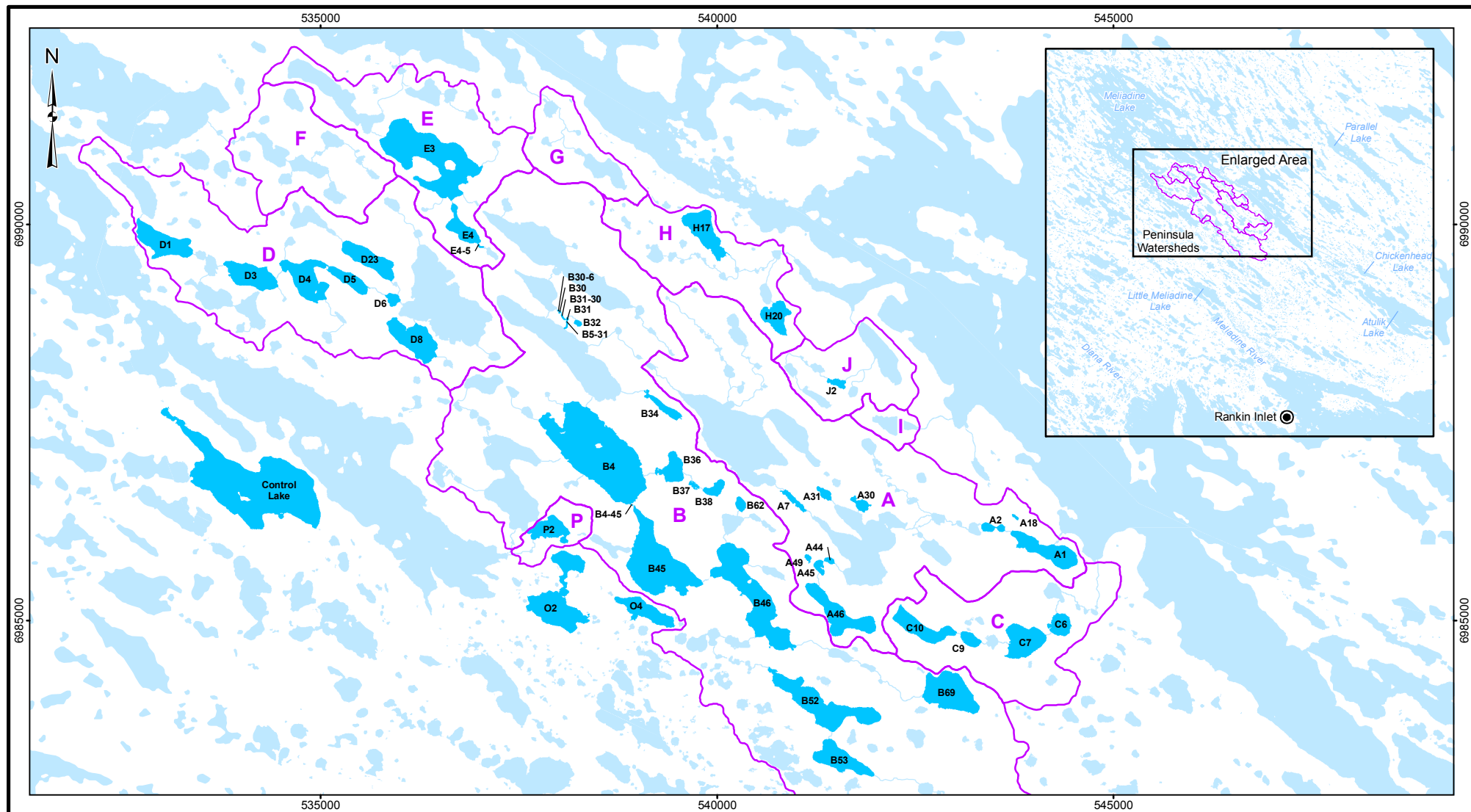
Fish populations were studied at 18 lakes, 26 ponds, and 5 streams in the study area in July and August 2011 (Figure 7.0-1). Sampling effort focused on site locations in close proximity to the proposed mine development that have not been previously sampled. The purpose of the sampling was to determine fish species presence and distribution by using a variety of fish sampling techniques. During sampling, life history data from individual fish were collected and compiled.

7.1 Methods

7.1.1 Capture Methods

Assessments of fish populations in study area waterbodies during the 2011 program were conducted using a variety of sampling methods that were similar to those employed during the previous 1997 to 2009 surveys (Golder 2012; Appendices F1 to F4). As discussed in Section 5.1.2, waterbodies in the study area that were greater than 2 m deep were classified as lakes and waterbodies less than 2 m deep were classified as ponds. The primary methods used to capture fish in lakes and ponds in 2011 were fyke nets, gill nets (short duration sets), and minnow traps. Backpack electrofishing was used to collect fish from streams and ponds, while angling was used to supplement sampling in larger lakes. Fish fence and egg sampling methods used during previous surveys were not used in 2011. Brief descriptions of fish capture methods used in 2011 are provided below.

- **Fyke nets:** A single-compartment Arctic fyke net was used in near-shore areas of 17 lakes and 7 ponds. The fyke net consisted of a trap net, two 15 m wings, and a 30 m lead to shore. The fyke net was set with the lead perpendicular to shore (wings parallel to shore) to trap all fish moving along the shoreline.
- **Gill nets:** Variable-mesh gill net sets were employed at 17 lakes and 6 ponds. Each gill net set was comprised of 2 or 3 panels (15.2 m × 1.8 m each), with mesh sizes ranging from 19 to 102 mm. Set times were kept short (generally checked or pulled every 2 h or less) to minimize capture related mortalities and stress.
- **Minnow traps:** Gee-type minnow traps, baited with cat food, were used to sample small-bodied fish in 15 lakes, 8 ponds, and 3 streams. Set durations ranged from 5.4 to 48.5 h.
- **Backpack electrofishing:** A Smith-Root Type XII backpack electrofisher was used to sample fish in 5 streams and 5 ponds. The effective electrofisher sampling time ranged from 140 to 634 s per site. The electrofisher was typically set at 300 Volts, 60 Hertz, with a 4 milliseconds pulse rate.
- **Angling:** Angling was only used on 3 occasions (Control Lake, D1, and D3) to supplement fish sampling techniques. Angling was conducted using barbless lures by casting from a boat or by trolling behind a boat.
- **Visual observations:** Visual observations were used to confirm fish presence at 8 ponds (A18, A30, A31, B37, B38, B62, C9, and J2).

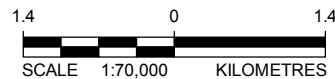


LEGEND

- Sampled Watercourse
- Watercourse
- Sampled Waterbody
- Waterbody
- Watershed Boundary

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15



PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		FISH SAMPLING LOCATIONS, 2011			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	KK	12 Dec. 2011	SCALE AS SHOWN
		GIS	CDB	12 Dec. 2011	REV. 0
		CHECK	AM	13 Jun. 2012	FIGURE 7.0-1
		REVIEW	JP	20 Jun. 2012	



7.1.2 Fish Data Collection and Analysis

Life history information was collected from all captured fish or from a subsample, if large numbers were encountered. These data included fork length, weight, and sexual maturity (if discernible through external examination) and are presented in an electronic format. Fish tissue (e.g., muscle, liver and kidney) samples were not collected during the 2011 surveys. Length-weight, and age-length relationships were not calculated due to the low number of each species caught. Relative abundance of fish was calculated in terms of catch-per-unit-effort (CPUE). The units of effort depended on the sampling method and included:

- minutes of sampling time (backpack electrofishing);
- hours of trap deployment between checks (fyke nets);
- net-units, equivalent to one net panel (27.4 m² in area) set for 24 h duration (gill nets);
- 24 h deployment of one trap (minnow traps); and
- rod-hours (angling).

To describe size distribution of the captured species at each sampling site, length-frequency tabulations were compiled using 10-mm length intervals.

7.2 Results

7.2.1 Fish Species Composition and Relative Abundance

Fish communities were sampled from 49 waterbodies in 2011, including 26 ponds, 18 lakes, and 5 streams (Figure 7.0-1; Appendices F1 to F4).

Minnow trapping was the most commonly used technique (used in 26 waterbodies for a total effort of 1595.9 h), followed by fyke netting and gill netting (Table 7.2-1).

Table 7.2-1: Summary of Fish Sampling Effort and Catch in the Study Area, 2011

Method	Waterbodies Sampled	Total Effort	Total Number of Fish Recorded
Angling	3	5.5 rod-hours	5
Backpack Electrofishing	10	3603 seconds	58
Fyke Nets	23	530.6 hours	2158
Gill Nets	23	12.3 net-units	84
Minnow Traps	26	1595.9 trap-hours	1020
Visual Observation	8	-	149

The total fish catch from the study area in 2011 (all sampling methods and locations combined) was 3474 fish (Appendix F5). The catch was comprised of 8 species, 4 of which are members of the salmonid family (Arctic char, Arctic grayling, lake trout, and round whitefish). Ninespine stickleback were most prevalent (95.4%, $n=3314$) followed by round whitefish (1.6%, $n=55$), threespine stickleback (1.3%, $n=44$), lake trout



(0.8%, $n=28$), Arctic grayling (0.7%, $n=24$), slimy sculpin (0.2%, $n=6$), Arctic char (0.1%, $n=2$), and burbot (<0.1%, $n=1$).

The number and species of fish captured reflected the amount and type of sampling effort used in each area. For example, the predominance of ninespine stickleback in lakes and ponds reflected this species' abundance in near-shore areas that were effectively sampled by fyke net and baited minnow traps.

7.2.2 Streams

In total, 5 streams (B5-31, B30-6, B31-30, B4-45, and E4-5) were sampled in 2011. All were sampled with a backpack electrofisher, and 3 sites (B30-6, B31-30, and E4-5) were also sampled with minnow traps. Fish were captured in all 5 streams (Table 7.2-2).

Table 7.2-2: Number of Fish Captured in Streams of the Study Area, 2011

Stream	Arctic Grayling	Slimy Sculpin	Ninespine Stickleback	Total
B30-6		3	15	18
B31-30	2		7	9
B4-45			3	3
B5-31	2	1	13	16
E4-5			7	7
Total	4	4	45	53

The catch ($n=53$) was dominated by ninespine stickleback (85%). Arctic grayling ($n=4$, from B5-31 and B31-30) and slimy sculpin ($n=4$, from B5-31 and B30-6) were the only other fish species captured in streams in 2011. Mean CPUE values from stream sampling in 2011 were 1.3 fish/min for backpack electrofishing and 14.6 fish/24h for minnow trapping (Appendix F4).

Arctic grayling captured in streams B5-31 and B31-30 suggests movements of this species between lakes B5 and B6, each of which have confirmed populations of Arctic grayling from previous years' sampling.

7.2.3 Lakes

In total, 17 lakes in the Peninsula basins (A, B, C, D, and E) and the Control Lake were sampled. Sampling was conducted using fyke nets (16 lakes), gill nets (17 lakes), minnow traps (15 lakes), and angling (3 lakes). Fish were captured from all sampled lakes (Table 7.2-3).

Table 7.2-3: Number of Fish Captured in Lakes of the Study Area, 2011

Lake	Arctic Char	Lake Trout	Arctic Grayling	Round Whitefish	Burbot	Slimy Sculpin	Ninespine Stickleback	Threespine Stickleback	Total
A1	1	3	1	1			7	9	22
A46							28		28
B34							338		338
B4			1				21		22
B45			2				298		300



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Table 7.2-3: Number of Fish Captured in Lakes of the Study Area, 2011 (continued)

Lake	Arctic Char	Lake Trout	Arctic Grayling	Round Whitefish	Burbot	Slimy Sculpin	Ninespine Stickleback	Threespine Stickleback	Total
B46			1				16		17
B52							328		328
B53			5				64		69
B69		2	2			1	6		11
C10							12		12
D1		4	2	10					16
D3			1						1
D5							75		75
D8							315		315
D23							146		146
E3		3		2			11		16
E4			3				42		45
Control		16	2	42	1	1	38		100
Total	1	28	20	55	1	2	1745	9	1861

The total catch ($n=1861$) was dominated by ninespine stickleback (93.8%) from 16 of the sampled lakes; they were captured mainly by fyke nets and minnow traps. Lakes D1 and D3, where ninespine stickleback were not recorded, were the only 2 lakes not sampled by fyke nets or minnow traps. The remainder of the catch included round whitefish ($n= 55$) from 4 lakes, Arctic grayling ($n=20$) from 10 lakes, lake trout ($n=28$) from 5 lakes, threespine stickleback ($n=9$) from Lake A1, Arctic char ($n=1$) from Lake A1, slimy sculpin ($n=2$) from Control Lake and Lake B69, and one burbot from Control Lake.

Lake sampling methods included angling (5.5 rod-h), fyke netting (367 h), gill netting (10.5 net-units), and minnow trapping (1160 h). Capture methods were often used in combination (e.g., fyke nets, gill nets, and minnow traps) depending on the purpose of the sampling at each lake and whether or not any fish sampling had been conducted at the lake in the past. The majority of fish (66%) were captured in fyke nets, with the remaining fish being captured by minnow traps (29%), gill nets (4.5%), and angling (0.3%).

Fyke net CPUE values ranged among lakes from 0.0 fish/h (E3) to 18.5 fish/h (B45). Gill net CPUE values ranged from 0.0 fish/net-unit (A46, B34, B46, B52, C10, D5, D8, D23, and E4) to 33.8 fish/net-unit (Control Lake). The likely reasons for high gill net CPUE values from Control Lake and D1 (18.8 fish/net-unit) include close proximity to Meliadine Lake and the abundance of round whitefish in the catches (Appendix F5).

7.2.4 Ponds

In total, 26 ponds were sampled in watershed basins A, B, C, D, H, J, O, and P in 2011 (Appendix F5). Fish were captured or observed in 23 ponds (Table 7.2-4). Although fish presence was not confirmed in Pond H17 in 2011, ninespine stickleback were captured there in 2009. Similarly, fish sampling in Pond B31 did not confirm fish presence in 2011; however, this pond is likely frequented by fish, because Arctic grayling and ninespine stickleback were captured both upstream and downstream of this pond in streams B31-30 and B5-31. The only remaining pond where fish presence has not been confirmed is Pond H20, although ninespine stickleback are likely present as suitable habitat for small bodied fish does exist in the pond.



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Table 7.2-4: Number of Fish Captured in Ponds of the Study Area, 2011

Pond	Arctic Char	Ninespine Stickleback	Threespine Stickleback	Total
A2		64	30	94
A7		257		257
A18		1		1
A30		30		30
A31		15		15
A44		1		1
A45		23		23
A49		1		1
B30		23		23
B31				0
B32		1		1
B36		143		143
B37		8		8
B38		20		20
B62		15		15
C6		69		69
C7		228	5	233
C9		40		40
D4		196		196
D6		13		13
H17				0
H20				0
J2		20		20
O2	1	55		56
O4		33		33
P2		268		268
Total	1	1524	35	1560

The total fish catch in ponds ($n=1560$) was dominated by ninespine stickleback (97.7%). The only other species captured were threespine stickleback and Arctic char. Threespine stickleback were captured only in ponds A2 and C7, located in the lower parts of the watersheds (i.e., close to Meliadine Lake). A single Arctic char juvenile (fork length of 209 mm) was captured in Pond O2, which is a large (32.7 ha) waterbody close to Meliadine Lake. Despite its large area, this waterbody was classified as a pond due to its shallow depth (maximum recorded depth was 1.6 m). Its use by Arctic char is consistent with previous results of Arctic char presence in the lowermost waterbodies of the Peninsula basins.



Pond sampling methods included backpack electrofishing (1570 s in 5 ponds), fyke nets (164 h in 7 ponds), gill nets (1.79 net-units in 6 ponds), minnow trapping (402 h in 8 ponds), and visual observations (at 8 ponds). Sampling techniques were chosen based on pond conditions (e.g., sufficient depth to set gill nets and ability to wade in soft substrate for electrofishing). Most fish (59.5%) were registered in fyke nets, with CPUE values ranging from 1.9 fish/h in Pond O4, to 14.1 fish/h in Pond C7 (Appendix F5). Minnow traps registered 29.5% of the total pond catch, with CPUE values ranging from 1.1 fish/24h (A44 and A49), to 65.7 fish/24h (B36). Only one fish (Arctic char from Pond O2) was captured by gill nets in ponds.

7.2.5 Life History

Length frequency distributions of the 798 fish measured in 2011 were established for each lake and pond (Appendices D6a and D6b).

Lake trout (n=27) were represented by a wide range of size-classes (37 to 705 mm in fork length); however, most (52%) were adults larger than 300 mm. The 4 largest lake trout were captured in Control Lake. In contrast, Arctic grayling (n=22) were represented mostly (65%) by juveniles smaller than 200 mm in fork length. One young-of-the-year Arctic grayling (31 mm on 24 July) was captured in Lake B46.

The round whitefish sample (n=55) was composed mostly (71%) of juvenile fish between 100 and 190 mm in fork length. The largest round whitefish (341 mm in fork length) was caught in Lake E3. Arctic char (n=2) were captured only in Lake A1 and Pond O2; they were 301 and 209 mm in fork length, respectively. The single captured burbot (from Control Lake) was 245 mm in total length.

Ninespine stickleback (n=644) ranged from 18 to 84 mm in total length; however, most (67%) were within a relatively narrow size-class between 40 and 59 mm (Appendix F6b). Threespine stickleback (n=21) ranged from 24 to 68 mm in total length, whereas slimy sculpin (n=6) ranged from 39 to 94 mm in total length.

Tagged fish were not captured in 2011, which was expected as most tagged fish were marked in 1999 and it would have been rare to catch these fish.



8.0 CLOSURE

We trust the information contained in this report is sufficient for your present needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours very truly,

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APPENDIX A

Hydrometrics

LAKE A8 HYDROMETRIC STATION

A8

FACTSHEET

LOCATION AND DETAILS

Located approximately 2.6 kilometres southwest of Meliadine West Camp.

Operational:	1997	1998	1999	2000	2008 10/7-16/9	2009 12/6-13/9	2011 Manual
Benchmark:	Bolt on boulder; 100.000 m (non-geodetic)				Drainage Area: 3.66 km ²		
Coordinates:	UTM: 540730 m E, 6986690 m N (NAD83, Zn15)				Lat/Long: 63°00'27" N, 92°11'44" W		
Transducer:	none				Datalogger: none		



Benchmark location (before installation of rock bolt).



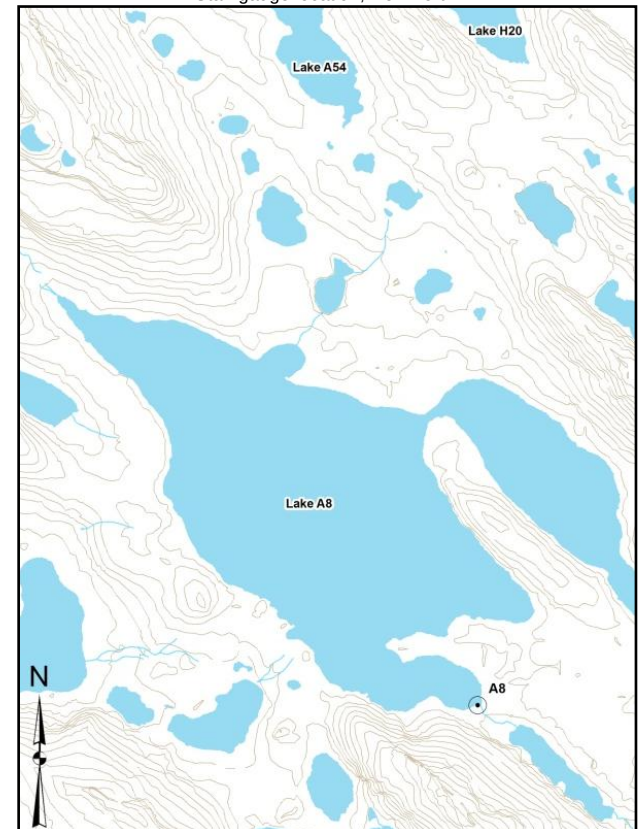
Staff gauge location, view north.



View upstream (north) to Lake A8 outlet



Downstream view at Lake A8 outlet



NTS Mapping of Area



APPENDIX A Hydrometrics

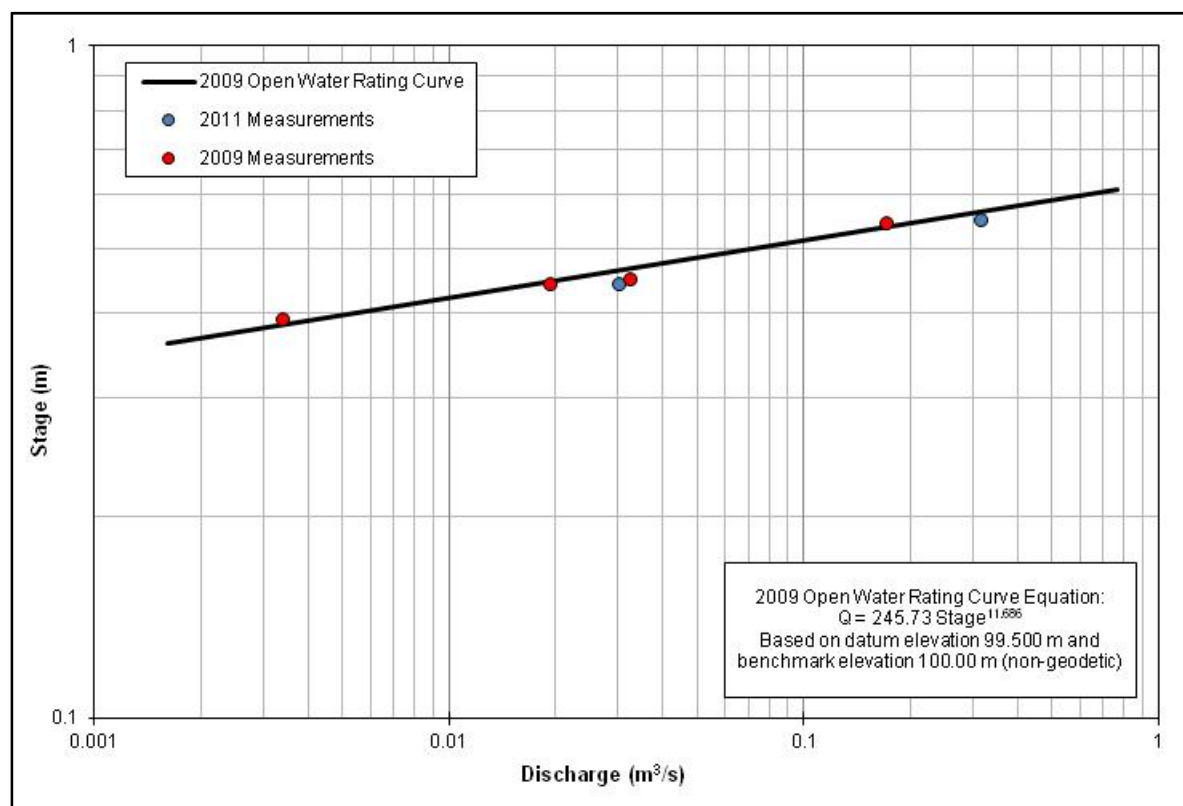


Figure A1: Stage-Discharge Rating Curve for Lake A8

Table A1: Lake A8 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading	WS Reading	BM Elevation ^a	WS Elevation ^b	Stage
15-Jun 17:30	1.560	1.508	100.000	100.052	0.552
10-Jul 10:12	1.430	1.487	100.000	99.943	0.443
06-Aug 15:20	1.528	1.650	100.000	99.878	0.378
10-Sep 11:45	1.509	1.640	100.000	99.869	0.369

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A2: Lake A8 Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		16-Jun-2011		
Waterbody:		A8 Lake		Start Time		17:15		
Crossing ID:		A8 Lake Outlet		End Time		18:03		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	540730	BM_read	1.560	Transducer SN: not installed				
North	6986690	WL_read	1.508	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	100.052	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.70	0.00			2.20	0.00		
2	0.80	0.09		0.21	2.30	0.06		0.09
3	1.00	0.14		0.21	2.40	0.01		0.25
4	1.10	0.00		0.00	2.70	0.00		0.00
5	1.00	0.00		0.00	0.50	0.00		0.00
6	1.30	0.17		0.49	0.80	0.14		0.00
7	1.50	0.15		0.55	1.10	0.20		0.05
8	1.70	0.19		0.64	1.40	0.21		0.04
9	1.90	0.15		0.75	1.55	0.15		0.10
10	2.30	0.00		0.00	1.70	0.15		0.00
11	1.10	0.00		0.00	2.10	0.31		0.00
12	1.40	0.15		0.00	2.30	0.31		0.11
13	1.55	0.16		0.00	2.60	0.00		0.00
14	1.60	0.16		0.21	0.70	0.00		0.00
15	1.70	0.16		0.26	0.90	0.06		0.00
16	1.80	0.13		0.12	1.10	0.23		0.02
17	1.95	0.00		0.00	1.30	0.33		0.11
18	0.20	0.00		0.00	1.60	0.34		0.21
19	0.40	0.11		0.14	1.90	0.34		0.25
20	0.60	0.10		0.08	2.20	0.25		0.34
21	1.20	0.07		0.00	2.50	0.20		0.32
22	1.50	0.08		0.09	2.80	0.22		0.33
23	1.8	0.00		0.00	3.10	0.21		0.26
24	2.2	0.00		0.00	3.60	0.00		0.00
25	2.3	0.07		0.00	0.30	0.00		0.00
26	2.4	0.07		0.05	0.60	0.16		0.01
27	2.6	0.05		0.00	0.90	0.22		0.05
28	2.7	0.00		0.00	1.20	0.28		0.06
29	0.8	0.00		0.00	1.50	0.18		0.12
30	1.0	0.11		0.00	1.80	0.22		0.13
31	1.1	0.10		0.05	2.30	0.08		0.02
32	1.3	0.06		0.00	2.40	0.10		0.00
33	1.4	0.00		0.00	2.90	0.00		
34	3.4	0.00		0.10	RESULTS: Q(m ³ /s) 0.316			
35	3.5	0.18		0.00				
36	3.7	0						



APPENDIX A

Hydrometrics

Table A3: Lake A8 Outlet Discharge Measurement Field Form for 10 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Jul-2011		
Waterbody:		A8 Lake		Start Time		10:12		
Crossing ID:		A8 Lake Outlet		End Time		10:45		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	540730	BM_read	1.430	Transducer SN: not installed				
North	6986690	WL_read	1.487	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.943	Crew:		DC/JE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.09	0.00		0.00				
2	0.10	0.25		0.18				
3	0.20	0.24		0.21				
4	0.30	0.20		0.26				
5	0.40	0.16		0.31				
6	0.50	0.14		0.13				
7	0.60	0.12		0.02				
8	0.70	0.15		0.15				
9	0.80	0.11		0.20				
10	0.90	0.10		0.22				
11	1.00	0.08		0.10				
12	1.05	0.00		0.00				
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m3/s) 0.030			
34								
35								



APPENDIX A

Hydrometrics

Table A4: Lake A8 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011	
Waterbody:		A8 Lake		Start Time		15:20	
Crossing ID:		A8 Lake Outlet		End Time		15:50	
BM UTM15 Location		Survey		Datalogger SN: not installed			
East	540730	BM_read	1.528	Transducer SN: not installed			
North	6986690	WL_read	1.650	Meter Type/SN: Swoffer			
Elevation	100.00	WL_Elev	99.878	Crew:		DC/RP	
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s) 0.6/0.8 Depth (m/s)
1	0.05	0.00		0.00			
2	0.20	0.13		0.01			
3	0.30	0.12		0.01			
4	0.40	0.12		0.01			
5	0.50	0.05		0.00			
6	0.70	0.00		0.00			
7							
8							
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26							
27							
28							
29							
30							
31							
32							
33					RESULTS: Q(m³/s) 0.001		
34							
35							

LAKE B6 AND OUTLET HYDROMETRIC STATION

B6

FACTSHEET

LOCATION AND DETAILS

Located approximately 4 kilometres west of Meliadine West Camp.

Operational: 2011
15/6–10/9

Benchmark: Top of boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 537946 m E, 6988878 m N (NAD83, Zn15)

Transducer: None

Drainage Area: 2.86 km²

Lat/Long: 63°01'40" N, 92°14'59" W

Datalogger: None



Lake B6, secondary outlet channel to south-west, dry in July



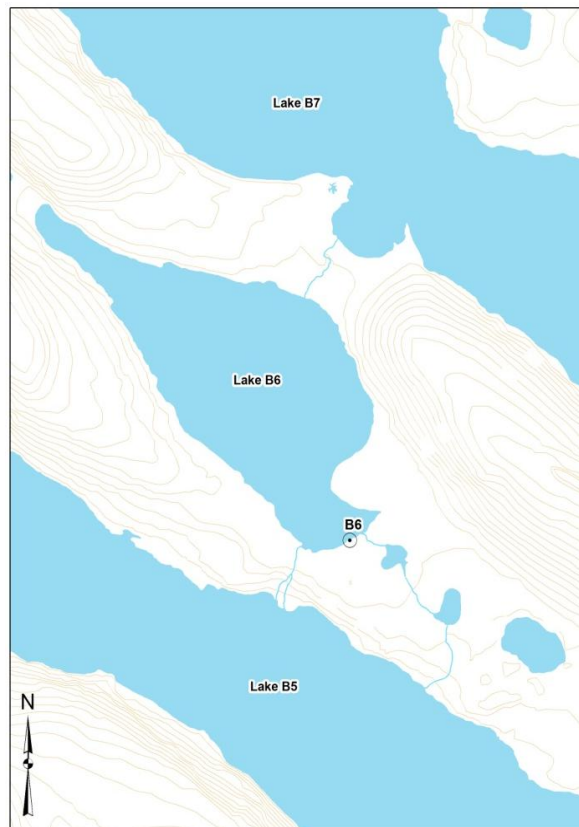
Lake B6 outlet, view downstream



Lake B6 outlet channel looking downstream.



Lake B6 outlet channel looking upstream



NTS Mapping of area



APPENDIX A Hydrometrics

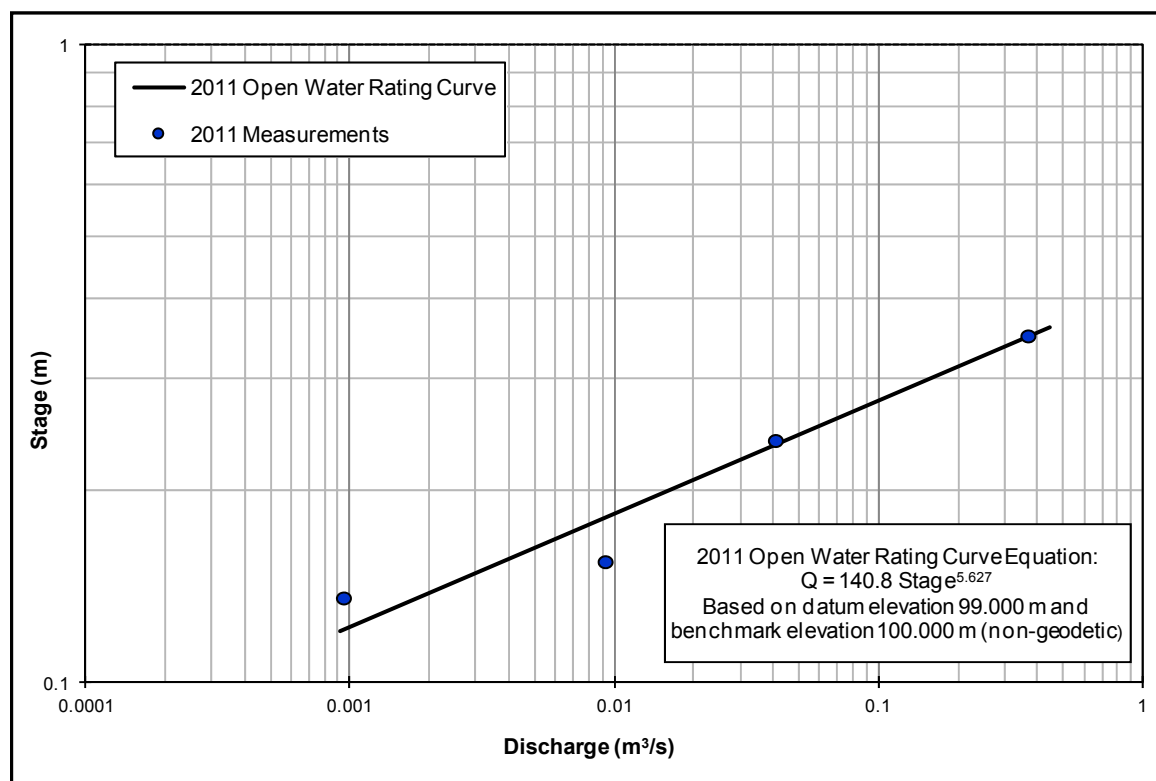


Figure A2: Stage-Discharge Rating Curve for Lake B6

Table A5: Lake B6 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Transducer Reading	Transducer Elevation	Average Transducer Elevation	Stage
15-Jun 10:54	1.275	1.925	100.000	99.350	0.195	99.155	99.070	0.350
09-Jul 13:30	0.900	1.660	100.000	99.240	0.150	99.090		0.240
06-Aug 14:00	1.021	1.866	100.000	99.155	0.116	99.039		0.155
10-Sep 10:00	1.087	1.951	100.000	99.136	0.055	99.081		0.136

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A6: Lake B6 Outlet Mean Daily Discharge (m³/s), 2011

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.032	0.004	0.001	-	-	-
2	-	-	-	-	-	-	0.043	0.002	0.001	-	-	-
3	-	-	-	-	-	-	0.054	0.003	0.001	-	-	-
4	-	-	-	-	-	-	0.058	0.003	0.001	-	-	-
5	-	-	-	-	-	-	0.061	0.003	0.001	-	-	-
6	-	-	-	-	-	-	0.065	0.005	0.001	-	-	-
7	-	-	-	-	-	-	0.059	0.005	0.001	-	-	-
8	-	-	-	-	-	-	0.046	0.005	0.002	-	-	-
9	-	-	-	-	-	-	0.047	0.004	0.001	-	-	-
10	-	-	-	-	-	-	0.052	0.004	0.001 P	-	-	-
11	-	-	-	-	-	-	0.049	0.004	-	-	-	-
12	-	-	-	-	-	-	0.043	0.005	-	-	-	-
13	-	-	-	-	-	-	0.039	0.006	-	-	-	-
14	-	-	-	-	-	-	0.034	0.005	-	-	-	-
15	-	-	-	-	-	0.086 P	0.030	0.005	-	-	-	-
16	-	-	-	-	-	0.086	0.028	0.004	-	-	-	-
17	-	-	-	-	-	0.072	0.019	0.002	-	-	-	-
18	-	-	-	-	-	0.068	0.015	0.001	-	-	-	-
19	-	-	-	-	-	0.059	0.011	0.001	-	-	-	-
20	-	-	-	-	-	0.053	0.012	0.002	-	-	-	-
21	-	-	-	-	-	0.042	0.013	0.002	-	-	-	-
22	-	-	-	-	-	0.047	0.016	0.002	-	-	-	-
23	-	-	-	-	-	0.059	0.017	0.002	-	-	-	-
24	-	-	-	-	-	0.060	0.015	0.002	-	-	-	-
25	-	-	-	-	-	0.046	0.014	0.002	-	-	-	-
26	-	-	-	-	-	0.038	0.011	0.002	-	-	-	-
27	-	-	-	-	-	0.045	0.010	0.002	-	-	-	-
28	-	-	-	-	-	0.044	0.007	0.002	-	-	-	-
29	-	-	-	-	-	0.043	0.007	0.001	-	-	-	-
30	-	-	-	-	-	0.034	0.005	0.001	-	-	-	-
31	-	-	-	-	-	-	0.004	0.001	-	-	-	-
MIN	-	-	-	-	-	0.034	0.004	0.001	0.001	-	-	-
MEAN	-	-	-	-	-	0.055	0.030	0.003	0.001	-	-	-
MAX	-	-	-	-	-	0.086	0.065	0.006	0.002	-	-	-

P = partial daily average



APPENDIX A

Hydrometrics

Table A7: Lake B6 Mean Daily Water Surface Elevation (m), 2011^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	99.225	99.152	99.115	-	-	-
2	-	-	-	-	-	-	99.236	99.142	99.108	-	-	-
3	-	-	-	-	-	-	99.247	99.150	99.098	-	-	-
4	-	-	-	-	-	-	99.249	99.151	99.099	-	-	-
5	-	-	-	-	-	-	99.252	99.151	99.113	-	-	-
6	-	-	-	-	-	-	99.255	99.159	99.116	-	-	-
7	-	-	-	-	-	-	99.250	99.161	99.104	-	-	-
8	-	-	-	-	-	-	99.239	99.160	99.131	-	-	-
9	-	-	-	-	-	-	99.241	99.157	99.129	-	-	-
10	-	-	-	-	-	-	99.245	99.157	99.128 P	-	-	-
11	-	-	-	-	-	-	99.242	99.157	-	-	-	-
12	-	-	-	-	-	-	99.237	99.162	-	-	-	-
13	-	-	-	-	-	-	99.233	99.164	-	-	-	-
14	-	-	-	-	-	-	99.227	99.161	-	-	-	-
15	-	-	-	-	-	99.268 P	99.222	99.163	-	-	-	-
16	-	-	-	-	-	99.268	99.218	99.153	-	-	-	-
17	-	-	-	-	-	99.260	99.203	99.134	-	-	-	-
18	-	-	-	-	-	99.256	99.195	99.125	-	-	-	-
19	-	-	-	-	-	99.250	99.187	99.128	-	-	-	-
20	-	-	-	-	-	99.245	99.189	99.133	-	-	-	-
21	-	-	-	-	-	99.236	99.191	99.132	-	-	-	-
22	-	-	-	-	-	99.240	99.198	99.133	-	-	-	-
23	-	-	-	-	-	99.250	99.200	99.132	-	-	-	-
24	-	-	-	-	-	99.250	99.195	99.134	-	-	-	-
25	-	-	-	-	-	99.240	99.194	99.134	-	-	-	-
26	-	-	-	-	-	99.232	99.186	99.134	-	-	-	-
27	-	-	-	-	-	99.238	99.183	99.133	-	-	-	-
28	-	-	-	-	-	99.238	99.173	99.130	-	-	-	-
29	-	-	-	-	-	99.237	99.168	99.122	-	-	-	-
30	-	-	-	-	-	99.227	99.162	99.112	-	-	-	-
31	-	-	-	-	-	-	99.157	99.115	-	-	-	-
MIN	-	-	-	-	-	99.227	99.157	99.112	99.098	-	-	-
MEAN	-	-	-	-	-	99.246	99.213	99.143	99.114	-	-	-
MAX	-	-	-	-	-	99.268	99.255	99.164	99.131	-	-	-

^a Elevation based on local benchmark elevation of 100.000 m (non-geodetic)

P = partial daily average



APPENDIX A

Hydrometrics

Table A8: Lake B6 Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		15-Jun-2011	
Waterbody:		Lake B6		Start Time		11:02	
Crossing ID:		Lake B6 Outlet		End Time		11:55	
BM UTM 15 Location		Survey		Datalogger SN: 1904			
East	537946	BM_read	1.275	Transducer SN: 920			
North	6988878	WL_read	1.925	Meter Type/SN: Swoffer			
Elevation	100.00	WL_Elev	99.350	Crew:		DC/JL	
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s) 0.6/0.8 Depth (m/s)
1	0.00	0.00					
2	0.80	0.27		0.00			
3	1.00	0.33		0.02			
4	1.20	0.37		0.03			
5	1.50	0.39		0.10			
6	1.80	0.36		0.19			
7	2.10	0.40		0.20			
8	2.40	0.29		0.20			
9	2.60	0.46		0.30			
10	2.90	0.51		0.34			
11	3.20	0.37		0.23			
12	3.50	0.23		0.41			
13	3.85	0.29		0.43			
14	4.15	0.21		0.17			
15	4.45	0.16		0.09			
16	5.35	0.28		0.19			
17	5.65	0.35		0.27			
18	5.95	0.32		0.09			
19	6.25	0.00					
20	0.60	0.00					
21	0.80	0.10		0.04			
22	1.60	0.07		0.00			
23	2.30	0.13		0.11			
24	2.60	0.00					
25	4.00	0.00					
26	4.20	0.10		0.10			
27	4.40	0.00					
28	0.30	0.00					
29	0.45	0.12		0.24			
30	0.55	0.10		0.15			
31	0.70	0.00					
32							
33					RESULTS: Q(m³/s) 0.366		
34							
35							



APPENDIX A

Hydrometrics

Table A9: Lake B6 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		09-Jul-2011		
Waterbody:		Lake B6		Start Time		13:10		
Crossing ID:		Lake B6 Outlet		End Time		13:50		
BM UTM 15 Location		Survey		Datalogger SN: 1904				
East	537946	BM_read	0.900	Transducer SN: 920				
North	6988878	WL_read	1.660	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.240	Crew:	DC/JE			
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.50	0.00		0.00				
2	0.60	0.12		0.42				
3	0.70	0.14		0.47				
4	0.80	0.14		0.52				
5	0.90	0.13		0.54				
6	1.00	0.13		0.45				
7	1.10	0.11		0.47				
8	1.20	0.08		0.41				
9	1.32	0.00		0.00				
10								
11								
12								
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32								
33					RESULTS: Q(m ³ /s) 0.041			
34								
35								



APPENDIX A

Hydrometrics

Table A10: Lake B6 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011	
Waterbody:		Lake B6		Start Time		13:40	
Crossing ID:		Lake B6 Outlet		End Time		14:10	
BM UTM 15 Location		Survey		Datalogger SN: 1904			
East	537946	BM_read	1.021	Transducer SN: 920			
North	6988878	WL_read	1.866	Meter Type/SN: Swoffer			
Elevation	100.00	WL_Elev	99.155	Crew:		DC/RP	
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s) 0.6/0.8 Depth (m/s)
1	0.10	0.00		0.00			
2	0.20	0.07		0.20			
3	0.30	0.08		0.30			
4	0.40	0.08		0.30			
5	0.50	0.08		0.20			
6	0.60	0.07		0.20			
7	0.70	0.00		0.00			
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33					RESULTS: Q(m³/s) 0.009		
34							
35							



APPENDIX A

Hydrometrics

Table A11: Lake B6 Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2009		
Waterbody:		Lake B6		Start Time		13:40		
Crossing ID:		Lake B6 Outlet		End Time		14:10		
BM UTM 15 Location		Survey		Datalogger SN: 1904				
East	537946	BM_read	1.087	Transducer SN: 920				
North	6988878	WL_read	1.951	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.136	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00						
2	0.25	0.14		0.04				
3	0.30	0.16		0.06				
4	0.35	0.11		0.03				
5	0.41	0.00						
6								
7								
8								
9								
10								
11								
12								
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18								
19								
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27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.001			
34								
35								

LAKE B2 AND OUTLET HYDROMETRIC STATION

B2 FACTSHEET

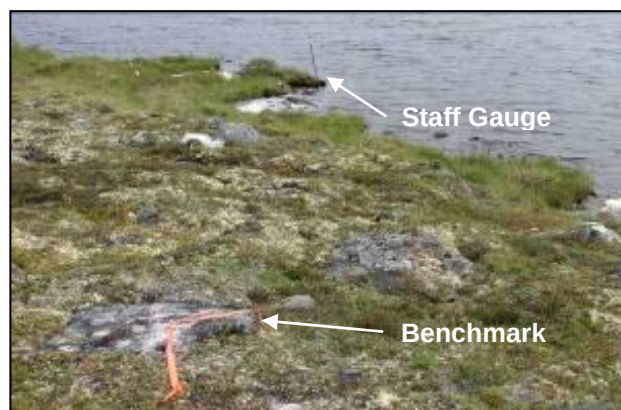
LOCATION AND DETAILS

Located approximately 5.4 kilometres southwest of Meliadine West Camp.

Operational:	1997	1998	1999	2000	2008	2009	2011
		8/6-24/9	14/6-20/9	16/6-18/9	15/6-16/9	11/6-10/9	Manual
Benchmark:	Bolt on boulder; 100.080 m (non-geodetic)				Drainage Area: 20.3 km ²		
Coordinates:	UTM: 537394 m E, 6986125 m N (NAD83, Zn15)				Lat/Long: 63°00'13" N, 92°15'43" W		
Transducer:	None				Datalogger: None		



View of Lake B2 from hydrometric station.



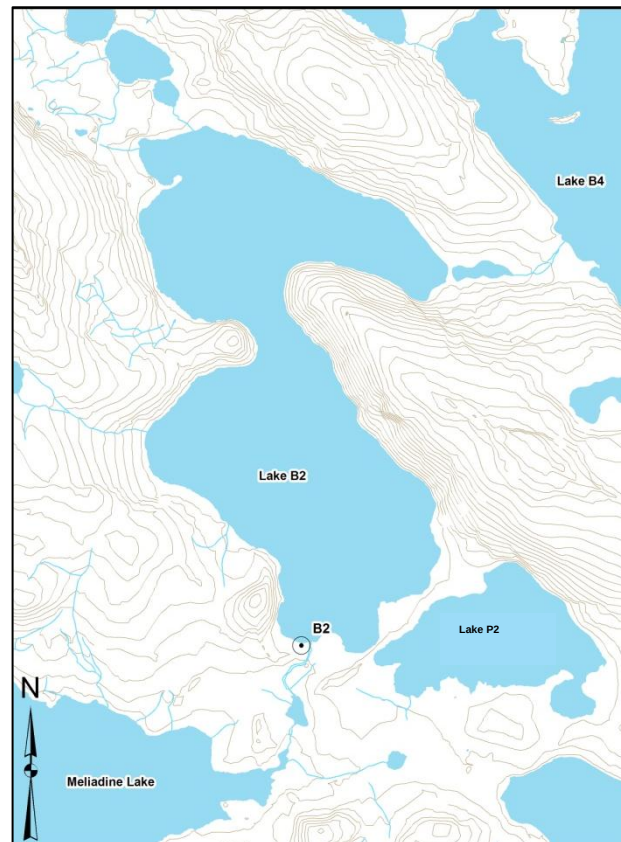
Lake B2 from benchmark



Upstream view of Lake B2 outlet



Lake B2 from outlet



NTS Mapping of area



APPENDIX A Hydrometrics

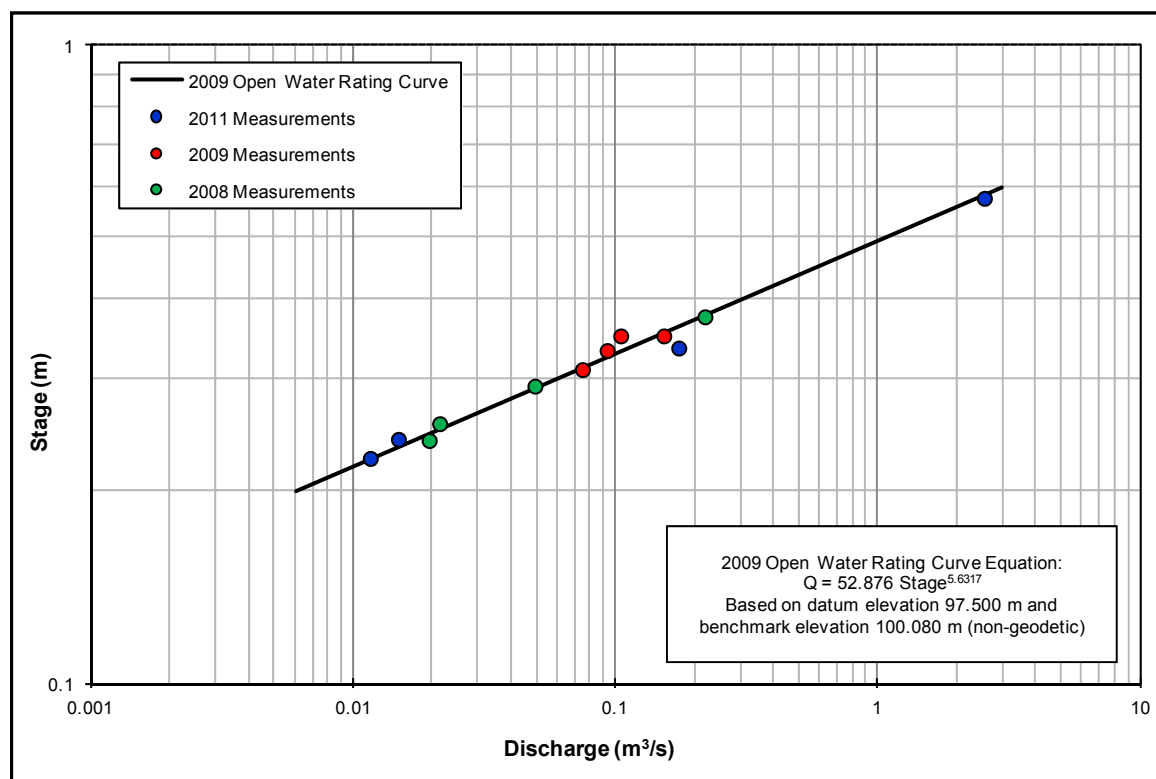


Figure A1: Stage-Discharge Rating Curve for Lake B2

Table A12: Lake B2 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Stage
15-Jun 14:00	1.065	1.851	98.781	97.995	0.565
09-Jul 15:00	0.413	2.738	100.080	97.755	0.325
06-Aug 11:45	0.263	2.682	100.080	97.661	0.231
10-Sep 11:10	0.297	2.732	100.080	97.645	0.215

^a BM = benchmark

^b WS = water surface



APPENDIX A

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Table A13: Lake B2 Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		15-Jun-2011		
Waterbody:		B2 Lake		Start Time		13:48		
Crossing ID:		B2 Lake Outlet		End Time		14:55		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	537375	BM_read	1.065	Transducer SN: not installed				
North	6986232	WL_read	1.851	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	97.995	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.00	0.00						
2	2.00	0.11		0.180				
3	5.00	0.20		0.330				
4	7.00	0.24		0.700				
5	9.00	0.14		0.300				
6	11.00	0.11		0.240				
7	13.00	0.11		0.320				
8	15.20	0.15		0.220				
9	17.20	0.22		0.050				
10	18.20	0.21		0.270				
11	19.20	0.28		0.510				
12	20.20	0.28		0.660				
13	21.20	0.30		0.870				
14	22.20	0.43		0.730				
15	23.20	0.35		0.650				
16	24.20	0.48		0.400				
17	25.20	0.25		0.300				
18	26.20	0.18		0.170				
19	27.20	0.23		0.110				
20	29.20	0.18		0.060				
21	29.60	0.00						
22	29.60	0.00						
23	30.0	0.15		0.16				
24	31.0	0.12		0.37				
25	32.0	0.12		0.22				
26	33.0	0.11		0.4				
27	34.0	0.1		0.07				
28	35.4	0.11		0.12				
29	35.8	0						
30								
31								
32								
33								
34					RESULTS: Q(m ³ /s) 2.544			
35								
36								



APPENDIX A

Hydrometrics

Table A14: Lake B2 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		9-Jul-2011		
Waterbody:		B2 Lake		Start Time		15:02		
Crossing ID:		B2 Lake Outlet		End Time		15:30		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	537375	BM_read	0.413	Transducer SN: not installed				
North	6986232	WL_read	2.738	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	97.755	Crew:		DC/JE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.35	0.00		0.00				
2	0.60	0.20		0.23				
3	0.75	0.20		0.37				
4	0.90	0.26		0.37				
5	1.05	0.27		0.57				
6	1.20	0.28		0.54				
7	1.35	0.27		0.48				
8	1.50	0.26		0.42				
9	1.65	0.25		0.45				
10	1.80	0.24		0.42				
11	1.95	0.19		0.42				
12	2.10	0.17		0.19				
13	2.50	0.13		0.11				
14	2.35	0.09		0.05				
15	2.55	0.00		0.00				
16								
17								
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29								
30								
31								
32								
33					RESULTS: Q(m3/s) 0.174			
34								
35								



APPENDIX A

Hydrometrics

Table A15: Lake B2 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011		
Waterbody:		B2 Lake		Start Time		11:45		
Crossing ID:		B2 Lake Outlet		End Time		12:15		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	537375	BM_read	0.263	Transducer SN: not installed				
North	6986232	WL_read	2.682	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	97.661	Crew:		DC/RP		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.10	0.00		0.00				
2	0.20	0.06		0.02				
3	0.40	0.10		0.03				
4	0.50	0.12		0.06				
5	0.60	0.10		0.04				
6	0.70	0.13		0.05				
7	0.80	0.13		0.08				
8	0.90	0.13		0.08				
9	1.00	0.12		0.11				
10	1.10	0.10		0.14				
11	1.20	0.10		0.17				
12	1.30	0.11		0.21				
13	1.40	0.08		0.23				
14	1.55	0.08		0.07				
15	1.70	0.08		0.05				
16	1.80	0.00		0.00				
17								
18								
19								
20								
21								
22								
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24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.015			
34								
35								



APPENDIX A

Hydrometrics

Table A16: Lake B2 Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2011		
Waterbody:		B2 Lake		Start Time		11:10		
Crossing ID:		B2 Lake Outlet		End Time		11:40		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	537375	BM_read	0.297	Transducer SN: not installed				
North	6986232	WL_read	2.732	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	97.645	Crew:		DC/RP		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00						
2	0.40	0.13		0.01				
3	0.60	0.14		0.03				
4	0.80	0.15		0.07				
5	0.90	0.13		0.07				
6	1.00	0.12		0.11				
7	1.10	0.12		0.12				
8	1.20	0.10		0.14				
9	1.30	0.10		0.18				
10	1.40	0.10		0.15				
11	1.50	0.07		0.08				
12	1.60	0.00						
13								
14								
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16								
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20								
21								
22								
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24								
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26								
27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.012			
34								
35								

LAKE D7 AND OUTLET HYDROMETRIC STATION

D7 FACTSHEET

LOCATION AND DETAILS

Located approximately 6 kilometres west of Meliadine West Camp.

Operational:	2011
	Manual

Benchmark: Top of boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 536065 m E, 6989051 m N (NAD83, Zn15)

Transducer: None

Drainage Area: 2.42 km²

Lat/Long: 63°02'10" N, 92°21'12" W

Datalogger: None



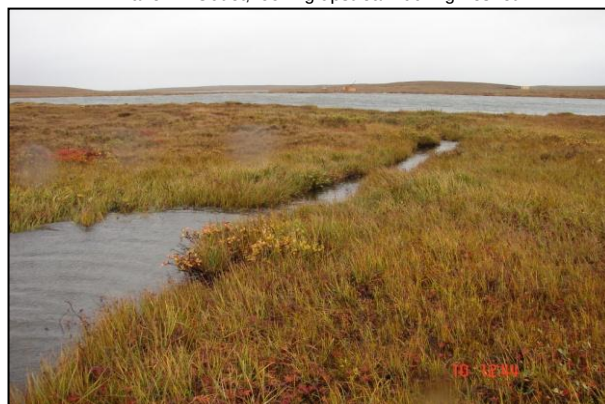
Lake D7 Outlet Channel, looking downstream at high water levels



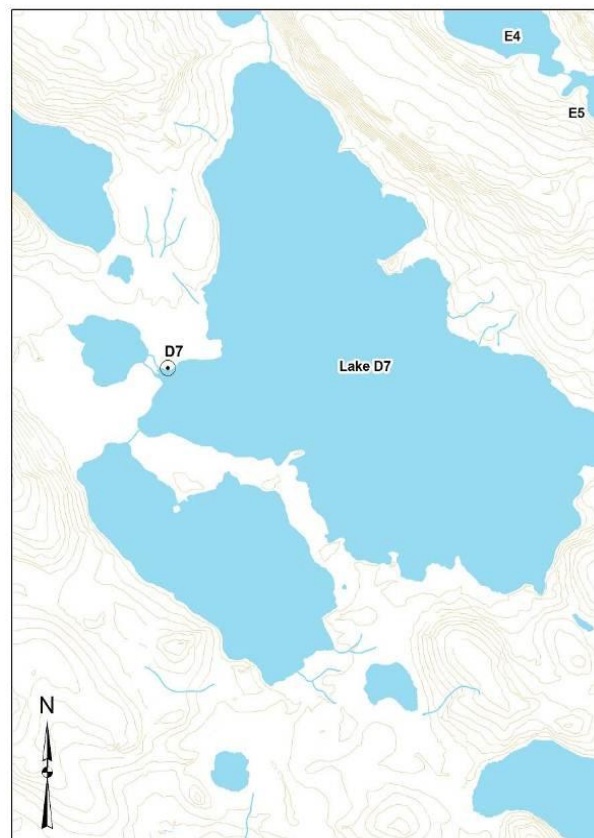
Lake D7 Outlet, channel detail looking downstream



Lake D7 Outlet, looking upstream during freshet



Lake D7 Outlet, looking downstream



NTS Mapping of Area



APPENDIX A Hydrometrics

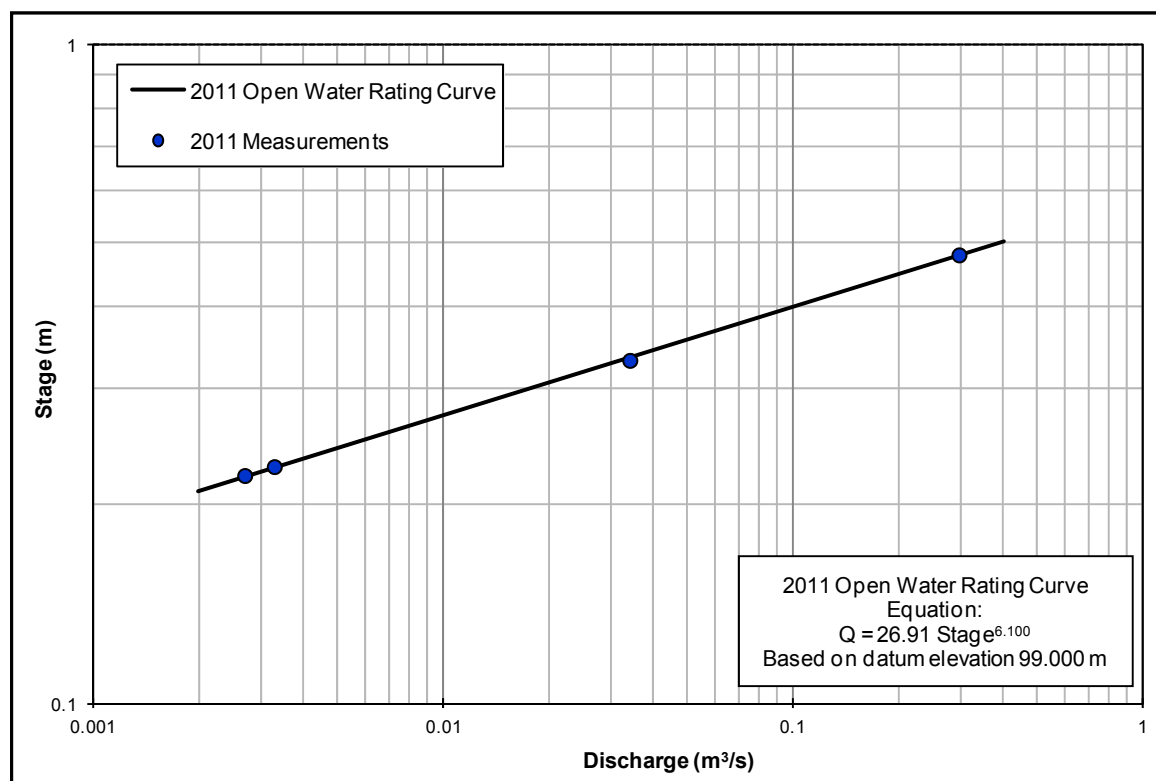


Figure A2: Stage-Discharge Rating Curve for Lake D7

Table A17: Lake D7 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Stage
15-Jun 12:50	1.240	1.760	100.000	99.480	0.480
10-Jul 09:43	1.212	1.880	100.000	99.332	0.332
08-Aug 12:50	1.170	1.948	100.000	99.222	0.222
10-Sep 12:45	0.909	1.680 ^c	100.000	99.229	0.229

^a BM = benchmark

^b WS = water surface

^c adjusted to compensate for windy conditions



APPENDIX A

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Table A18: Lake D7 Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		15-Jun-2011		
Waterbody:		D7 Lake		Start Time		12:30		
Crossing ID:		D7 Lake Outlet		End Time		12:55		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536065	BM_read	1.240	Transducer SN: not installed				
North	6989051	WL_read	1.760	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.480	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.60	0.00						
2	0.80	0.11		0.10				
3	1.00	0.16		0.09				
4	1.30	0.15		0.06				
5	1.60	0.00		0.00				
6	0.80	0.00		0.00				
7	1.10	0.12		0.02				
8	1.50	0.16		0.03				
9	1.90	0.15		0.17				
10	2.30	0.16		0.14				
11	2.60	0.16		0.11				
12	2.90	0.16		0.14				
13	3.20	0.15		0.10				
14	3.40	0.00		0.00				
15	0.40	0.00		0.00				
16	0.90	0.13		0.03				
17	1.20	0.16		0.17				
18	1.40	0.29		0.30				
19	1.60	0.44		0.68				
20	1.80	0.42		0.50				
21	2.00	0.28		0.25				
22	2.30	0.17		0.40				
23	2.70	0.15		0.10				
24	3.30	0.13		0.06				
25	3.80	0.22		0.34				
26	4.20	0.18		0.31				
27	4.80	0						
28								
29								
30								
31								
32								
33								
34					RESULTS: Q(m ³ /s) 0.297			
35								
36								



APPENDIX A

Hydrometrics

Table A19: Lake D7 Outlet Discharge Measurement Field Form for 10 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Jul-2011		
Waterbody:		D7 Lake		Start Time		09:43		
Crossing ID:		D7 Lake Outlet		End Time		10:15		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536065	BM_read	1.212	Transducer SN: not installed				
North	6989051	WL_read	1.880	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.332	Crew:		DC/JE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.35	0.00		0.00				
2	0.60	0.20		0.23				
3	0.75	0.20		0.37				
4	0.90	0.26		0.37				
5	1.05	0.27		0.57				
6	1.20	0.28		0.54				
7	1.35	0.27		0.48				
8	1.50	0.26		0.42				
9	1.65	0.25		0.45				
10	1.80	0.24		0.42				
11	1.95	0.19		0.42				
12	2.10	0.17		0.19				
13	2.50	0.13		0.11				
14	2.35	0.09		0.05				
15	2.55	0.00		0.00				
16								
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32								
33					RESULTS: Q(m3/s) 0.034			
34								
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APPENDIX A

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Table A20: Lake D7 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011		
Waterbody:		D7 Lake		Start Time		12:50		
Crossing ID:		D7 Lake Outlet		End Time		13:20		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536065	BM_read	1.170	Transducer SN: not installed				
North	6989051	WL_read	1.948	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.222	Crew:		DC/RP		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.10	0.00		0.00				
2	0.20	0.13		0.01				
3	0.30	0.17		0.07				
4	0.40	0.17		0.05				
5	0.50	0.07		0.01				
6	0.60	0.20		0.02				
7	0.73	0.00		0.00				
8								
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32								
33					RESULTS: Q(m ³ /s) 0.003			
34								
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APPENDIX A

Hydrometrics

Table A21: Lake D7 Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2011		
Waterbody:		B2 Lake		Start Time		12:45		
Crossing ID:		B2 Lake Outlet		End Time		13:05		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536065	BM_read	0.909	Transducer SN: not installed				
North	6989051	WL_read	1.740	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.169	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.25	0.00						
2	0.35	0.11		0.03				
3	0.45	0.10		0.08				
4	0.55	0.13		0.11				
5	0.65	0.12		0.06				
6	0.75	0.00		0.00				
7								
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32								
33					RESULTS: Q(m ³ /s) 0.003			
34								
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LAKE D1 AND OUTLET HYDROMETRIC STATION

D1 FACTSHEET

LOCATION AND DETAILS

Located approximately 9.5 kilometres west of Meliadine West Camp.

Operational:	2009 10/7-13/9	2011 14/6-10/9	
Benchmark:	Top of boulder; 100.000 m (non-geodetic)		
Coordinates:	UTM: 532695 m E, 6989785 m N (NAD83, Zn15)		
Transducer:	Keller Acculevel Submersible Level Transducer		
	Drainage Area:	7.73 km ²	
	Lat/Long:	63°02'10" N, 92°21'12" W	
	Datalogger:	Optimum Instruments DD-520	



Lake D1 Outlet Channel, looking downstream during freshet



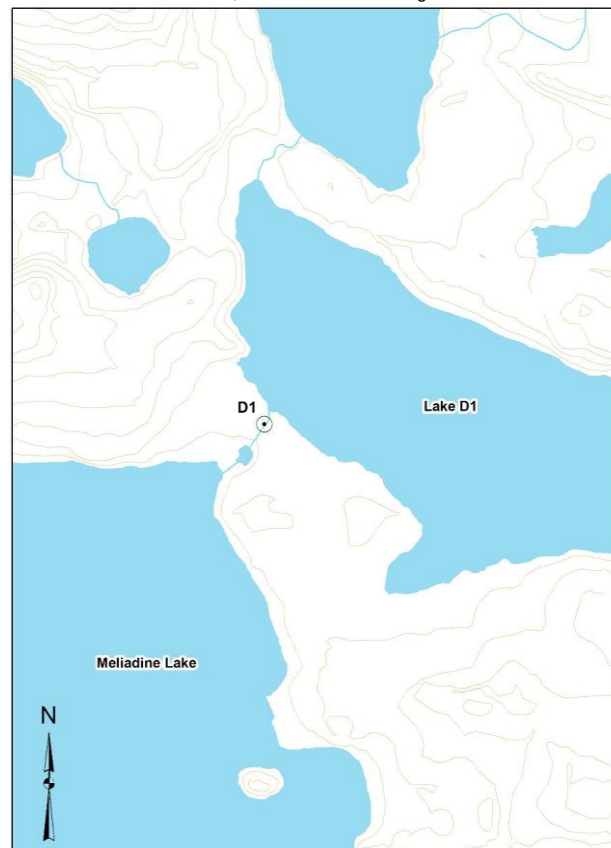
Lake D1 outlet, Channel detail looking downstream



Lake D1 Outlet Channel, looking downstream at average water level



Lake D1 Outlet, looking upstream at average water levels



NTS Mapping of area



APPENDIX A Hydrometrics

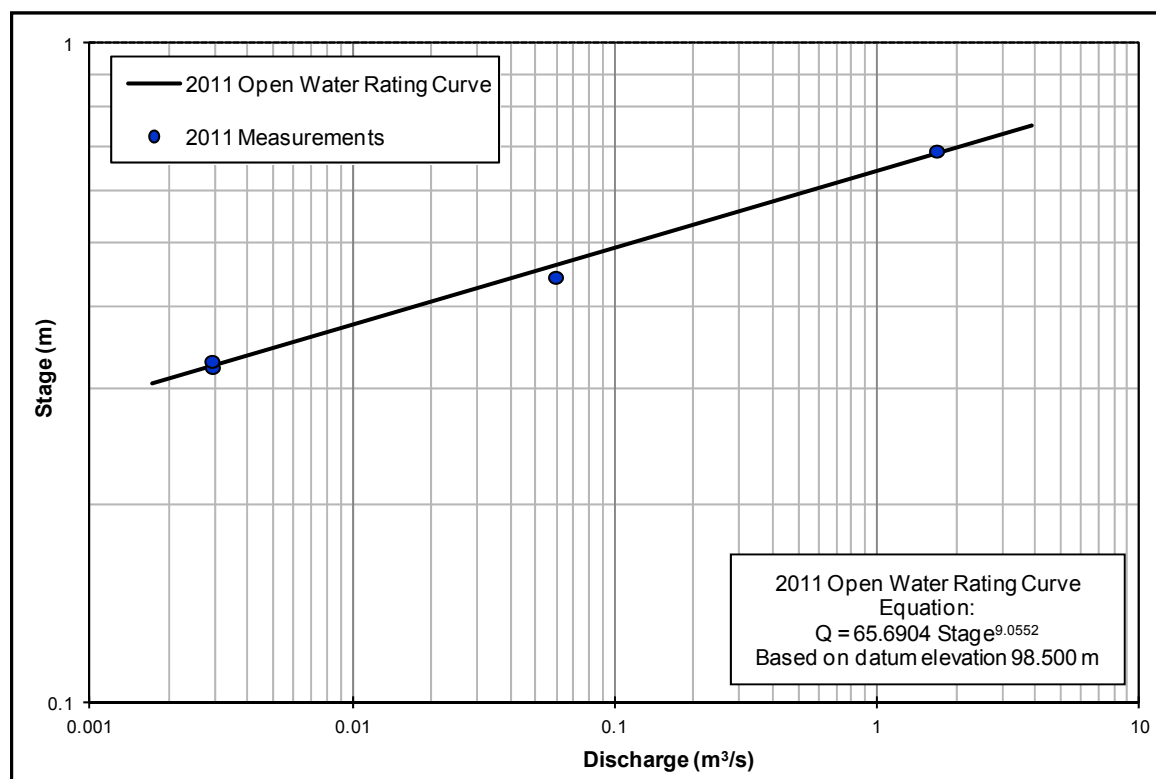


Figure A3: Stage-Discharge Rating Curve for Lake D1

Table A22: Lake D1 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Transducer Reading	Transducer Elevation	Average Transducer Elevation	Stage
14-Jun 14:45	1.010	1.820	100.000	99.190	0.369	98.821	98.776	0.690
09-Jul 11:30	0.738	1.794	100.000	98.944	0.160	98.784		0.444
06-Aug 09:30	0.852	2.028	100.000	98.824	0.066	98.758		0.324
10-Sep 09:30	0.669	1.838	100.000	98.831	0.046	98.785		0.331

^a BM = benchmark

^b WS = water surface



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Table A23: Lake D1 Outlet Mean Daily Discharge (m³/s), 2011

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.146	0.003	0.002	-	-	-
2	-	-	-	-	-	-	0.126	0.004	0.002	-	-	-
3	-	-	-	-	-	-	0.115	0.004	0.002	-	-	-
4	-	-	-	-	-	-	0.095	0.004	0.002	-	-	-
5	-	-	-	-	-	-	0.077	0.004	0.002	-	-	-
6	-	-	-	-	-	-	0.062	0.004	0.002	-	-	-
7	-	-	-	-	-	-	0.050	0.004	0.002	-	-	-
8	-	-	-	-	-	-	0.040	0.004	0.003	-	-	-
9	-	-	-	-	-	-	0.034	0.004	0.003	-	-	-
10	-	-	-	-	-	-	0.029	0.004	0.004 P	-	-	-
11	-	-	-	-	-	-	0.025	0.004	-	-	-	-
12	-	-	-	-	-	-	0.022	0.004	-	-	-	-
13	-	-	-	-	-	-	0.019	0.004	-	-	-	-
14	-	-	-	-	-	1.289 P	0.017	0.004	-	-	-	-
15	-	-	-	-	-	1.390	0.015	0.004	-	-	-	-
16	-	-	-	-	-	1.607	0.013	0.004	-	-	-	-
17	-	-	-	-	-	1.130	0.011	0.003	-	-	-	-
18	-	-	-	-	-	0.903	0.009	0.003	-	-	-	-
19	-	-	-	-	-	0.858	0.008	0.003	-	-	-	-
20	-	-	-	-	-	0.738	0.008	0.003	-	-	-	-
21	-	-	-	-	-	0.616	0.007	0.003	-	-	-	-
22	-	-	-	-	-	0.531	0.007	0.003	-	-	-	-
23	-	-	-	-	-	0.460	0.007	0.003	-	-	-	-
24	-	-	-	-	-	0.399	0.006	0.003	-	-	-	-
25	-	-	-	-	-	0.337	0.006	0.003	-	-	-	-
26	-	-	-	-	-	0.291	0.005	0.003	-	-	-	-
27	-	-	-	-	-	0.246	0.005	0.002	-	-	-	-
28	-	-	-	-	-	0.215	0.004	0.002	-	-	-	-
29	-	-	-	-	-	0.192	0.004	0.002	-	-	-	-
30	-	-	-	-	-	0.174	0.004	0.002	-	-	-	-
31	-	-	-	-	-	-	0.003	0.002	-	-	-	-
MIN	-	-	-	-	-	0.174	0.003	0.002	0.002	-	-	-
MEAN	-	-	-	-	-	0.669	0.032	0.003	0.002	-	-	-
MAX	-	-	-	-	-	1.607	0.146	0.004	0.004	-	-	-

P = partial daily average



APPENDIX A

Hydrometrics

Table A24: Lake D1 Mean Daily Water Surface Elevation (m), 2011^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	99.008	98.833	98.818	-	-	-
2	-	-	-	-	-	-	99.001	98.839	98.813	-	-	-
3	-	-	-	-	-	-	98.996	98.845	98.809	-	-	-
4	-	-	-	-	-	-	98.986	98.846	98.809	-	-	-
5	-	-	-	-	-	-	98.974	98.845	98.815	-	-	-
6	-	-	-	-	-	-	98.963	98.844	98.816	-	-	-
7	-	-	-	-	-	-	98.952	98.842	98.817	-	-	-
8	-	-	-	-	-	-	98.942	98.841	98.830	-	-	-
9	-	-	-	-	-	-	98.933	98.841	98.832	-	-	-
10	-	-	-	-	-	-	98.927	98.841	98.837 P	-	-	-
11	-	-	-	-	-	-	98.919	98.840	-	-	-	-
12	-	-	-	-	-	-	98.913	98.841	-	-	-	-
13	-	-	-	-	-	-	98.907	98.842	-	-	-	-
14	-	-	-	-	-	99.148 P	98.901	98.842	-	-	-	-
15	-	-	-	-	-	99.153	98.896	98.840	-	-	-	-
16	-	-	-	-	-	99.162	98.890	98.839	-	-	-	-
17	-	-	-	-	-	99.138	98.881	98.835	-	-	-	-
18	-	-	-	-	-	99.123	98.875	98.830	-	-	-	-
19	-	-	-	-	-	99.119	98.871	98.832	-	-	-	-
20	-	-	-	-	-	99.109	98.869	98.832	-	-	-	-
21	-	-	-	-	-	99.097	98.867	98.830	-	-	-	-
22	-	-	-	-	-	99.087	98.865	98.829	-	-	-	-
23	-	-	-	-	-	99.078	98.863	98.829	-	-	-	-
24	-	-	-	-	-	99.069	98.859	98.828	-	-	-	-
25	-	-	-	-	-	99.059	98.858	98.828	-	-	-	-
26	-	-	-	-	-	99.050	98.854	98.827	-	-	-	-
27	-	-	-	-	-	99.039	98.850	98.824	-	-	-	-
28	-	-	-	-	-	99.032	98.846	98.823	-	-	-	-
29	-	-	-	-	-	99.025	98.842	98.819	-	-	-	-
30	-	-	-	-	-	99.019	98.840	98.816	-	-	-	-
31	-	-	-	-	-	-	98.836	98.816	-	-	-	-
MIN	-	-	-	-	-	99.019	98.836	98.816	98.809	-	-	-
MEAN	-	-	-	-	-	99.089	98.903	98.834	98.820	-	-	-
MAX	-	-	-	-	-	99.162	99.008	98.846	98.837	-	-	-

^a Elevation based on local benchmark elevation of 100.000 m (non-geodetic)

P = partial daily average



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Table A25: Lake D1 Outlet Discharge Measurement Field Form for 14 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		14-Jun-2011		
Waterbody:		D1 Lake		Start Time		14:15		
Crossing ID:		D1 Lake Outlet		End Time		15:30		
BM UTM15 Location		Survey		Datalogger SN: 1900				
East	532695	BM_read	1.010	Transducer SN: 25888				
North	6989785	WL_read	1.820	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.190	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.0	0.00			36.4	0.00		
2	1.0	0.20		0.02	37.2	0.18		0.20
3	3.0	0.25		0.01	39.2	0.15		0.19
4	4.0	0.25		0.01	42.2	0.18		0.04
5	5.0	0.00		0.00	43.5	0.26		0.10
6	5.5	0.27		0.03	46.5	0.21		0.13
7	6.5	0.18		0.03	48.5	0.20		0.15
8	7.5	0.20		0.29	51.5	0.22		0.16
9	8.5	0.21		0.31	55.50	0.00		
10	9.2	0.21		0.29				
11	9.4	0.42		0.29				
12	9.7	0.44		0.55				
13	10.0	0.40		0.57				
14	10.3	0.18		0.71				
15	11.3	0.12		0.32				
16	11.7	0.38		0.40				
17	12.6	0.38		0.24				
18	13.5	0.15		0.47				
19	15.3	0.07		0.04				
20	16.6	0.15		0.04				
21	17.3	0.02		0.04				
22	18.3	0.00		0.00				
23	19.3	0.14		0.10				
24	20.3	0.00		0.00				
25	21.9	0.00		0.00				
26	23.8	0.18		0.04				
27	24.7	0.00		0.00				
28	25.7	0.15		0.18				
29	27.7	0.11		0.16				
30	28.8	0.24		0.18				
31	29.3	0.00		0.00				
32	31.3	0.23		0.12				
33	32.5	0.00		0.00	RESULTS: $Q(m^3/s)$ 1.679			
34	34.5	0.19		0.15				
35	35.7	0.15		0.04				



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Table A26: Lake D1 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		09-Jul-2011		
Waterbody:		Lake D1		Start Time		11:16		
Crossing ID:		Lake D1 Outlet		End Time		11:45		
BM UTM15 Location		Survey		Datalogger SN: 1900				
East	532695	BM_read	0.738	Transducer SN: 25888				
North	6989785	WL_read	1.794	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	98.944	Crew:		DC/JE		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.40	0.00		0.00				
2	0.50	0.14		0.15				
3	0.60	0.13		0.40				
4	0.70	0.19		0.35				
5	0.80	0.19		0.49				
6	0.90	0.17		0.51				
7	1.00	0.15		0.52				
8	1.10	0.18		0.53				
9	1.20	0.14		0.43				
10	1.30	0.13		0.41				
11	1.35	0.00		0.00				
12								
13								
14								
15								
16								
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18								
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30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.059			
34								
35								



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Table A27: Lake D1 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011		
Waterbody:		Lake D1		Start Time		09:05		
Crossing ID:		Lake D1 Outlet		End Time		09:35		
BM UTM15 Location		Survey		Datalogger SN: 1900				
East	532695	BM_read	0.852	Transducer SN: 25888				
North	6989785	WL_read	2.028	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	98.824	Crew:		DC/PE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00		0.00				
2	0.25	0.08		0.14				
3	0.35	0.09		0.13				
4	0.43	0.08		0.10				
5	0.50	0.05		0.10				
6	0.60	0.00		0.00				
7								
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30								
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32								
33					RESULTS: Q(m ³ /s) 0.003			
34								
35								



APPENDIX A

Hydrometrics

Table A28: Lake D1 Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2011		
Waterbody:		Lake D1		Start Time		09:05		
Crossing ID:		Lake D1 Outlet		End Time		09:35		
BM UTM15 Location		Survey		Datalogger SN: 1900				
East	532695	BM_read	0.669	Transducer SN: 25888				
North	6989785	WL_read	1.838	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	98.831	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.50	0.00		0.00				
2	0.55	0.10		0.11				
3	0.65	0.10		0.10				
4	0.75	0.09		0.11				
5	0.80	0.05		0.09				
6	0.90	0.00		0.00				
7								
8								
9								
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18								
19								
20								
21								
22								
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24								
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27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.003			
34								
35								

LAKE E4 AND OUTLET HYDROMETRIC STATION

E4 FACTSHEET

LOCATION AND DETAILS

Located approximately 5.5 kilometres west-northwest of Meliadine West Camp.

Operational:	2011
	Manual

Benchmark: Top of boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 536571 m E, 690158 m N (NAD83, Zn15)

Transducer: None

Drainage Area: 0.43 km²

Lat/Long: 62°02'24" N, 92°16'31" W

Datalogger: None



Lake E4 outlet channel, looking downstream during spring freshet



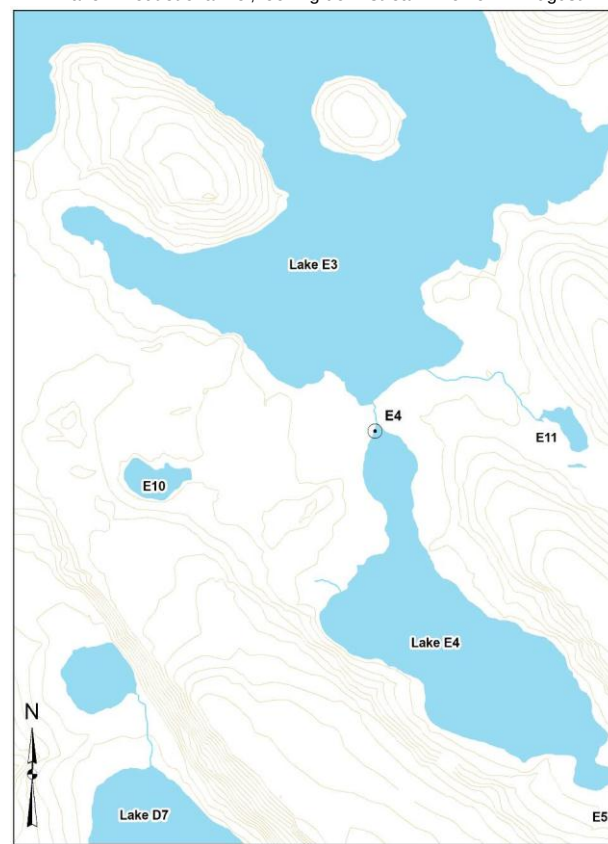
Lake E4 outlet channel, looking downstream. No flow in August.



Lake E4 outlet channel, looking upstream during spring freshet



Lake E4 outlet channel, looking downstream



NTS Mapping of Area.



APPENDIX A Hydrometrics

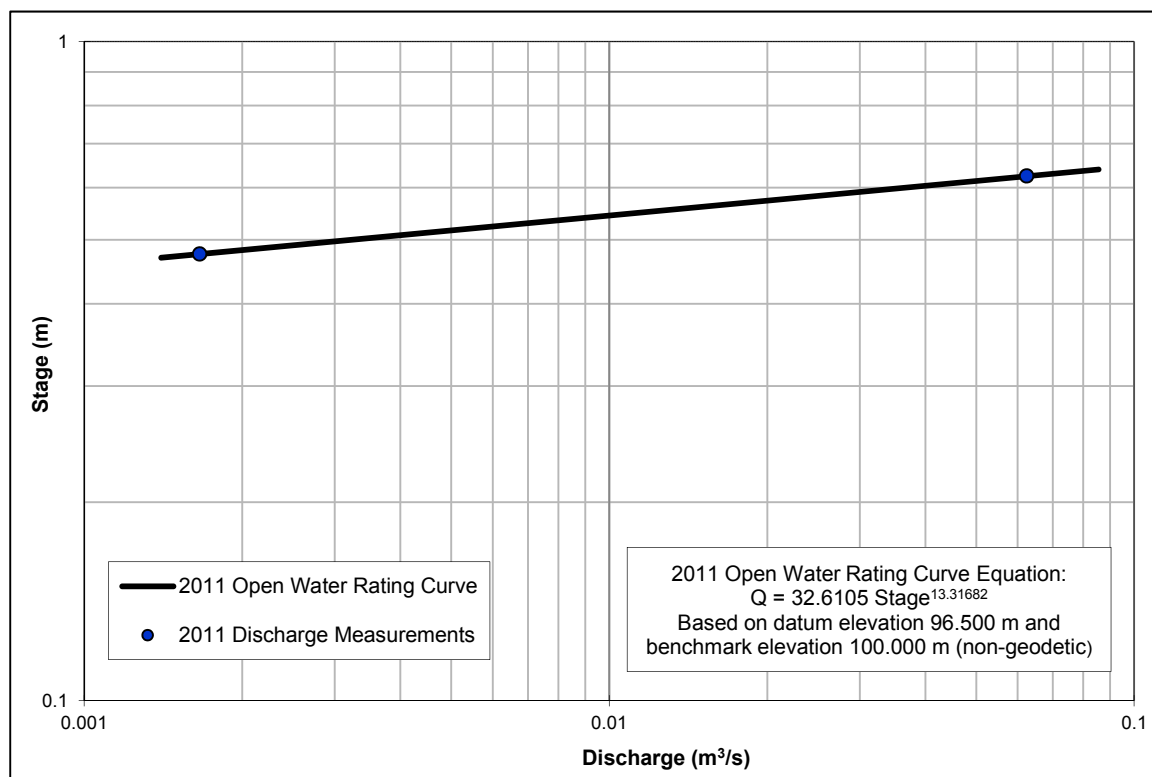


Figure A4: Stage-Discharge Measurements for Lake E4

Table A29: Lake E4 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Stage
15-Jun 09:15	0.550	3.425	100.000	97.125	0.625
10-Jul 08:40	0.29	3.314	100.000	96.976	0.476
06-Aug 13:20	0.022	3.102	100.000	96.920	0.420
10-Sep 14:20	0.129	3.227	100.000	96.902	0.402

^a BM = benchmark

^b WS = water surface



APPENDIX A

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Table A30: Lake E4 Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		15-Jun-2011		
Waterbody:		E4 Lake		Start Time		9:00		
Crossing ID:		E4 Lake Outlet		End Time		9:30		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536571	BM_read	0.55	Transducer SN: not installed				
North	6990158	WL_read	3.425	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	97.125	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.06	0.00						
2	0.09	0.11		0.06				
3	1.30	0.15		0.15				
4	1.60	0.00		0.00				
5	0.85	0.00		0.00				
6	1.10	0.17		0.08				
7	1.60	0.00		0.00				
8	0.65	0.00		0.00				
9	0.80	0.15		0.23				
10	1.00	0.17		0.23				
11	1.15	0.17		0.22				
12	1.30	0.15		0.235				
13	1.45	0.12		0.090				
14	1.70	0.00		0.000				
15	0.30	0.00		0.000				
16	0.60	0.06		0.080				
17	0.80	0.09		0.070				
18	1.10	0.00						
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34					RESULTS: Q(m ³ /s) 0.062			
35								
36								



APPENDIX A

Hydrometrics

Table A31: Lake E4 Outlet Discharge Measurement Field Form for 10 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Jul-2011		
Waterbody:		E4 Lake		Start Time		08:25		
Crossing ID:		E4 Lake Outlet		End Time		08:55		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	536571	BM_read	0.29	Transducer SN: not installed				
North	6990158	WL_read	3.314	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	96.976	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.00	0.00		0.00				
2	0.10	0.06		0.11				
3	0.20	0.00		0.00				
4								
5								
6								
7								
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19								
20								
21								
22								
23								
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25								
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27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m3/s) 0.002			
34								
35								

LAKE E1 AND OUTLET HYDROMETRIC STATION

E1 FACTSHEET

LOCATION AND DETAILS

Located approximately 6.7 kilometres northwest of Meliadine West Camp.

Operational:	2011
	14/6-11/9

Benchmark:	Top of boulder; 100.000 m (non-geodetic)
------------	--

Coordinates:	UTM: 536022 m E, 6992012 m N (NAD83, Zn15)
--------------	--

Transducer:	Keller Acculevel Submersible Level Transducer
-------------	---

Drainage Area:	3.6 km ²
----------------	---------------------

Lat/Long:	63°03'20" N, 92°17'15" W
-----------	--------------------------

Datalogger:	Optimum Instruments DD-520
-------------	----------------------------



Lake E1 outlet channel, view upstream during freshet.



Lake E1 outlet channel, view downstream.



NTS Mapping of Area



APPENDIX A Hydrometrics

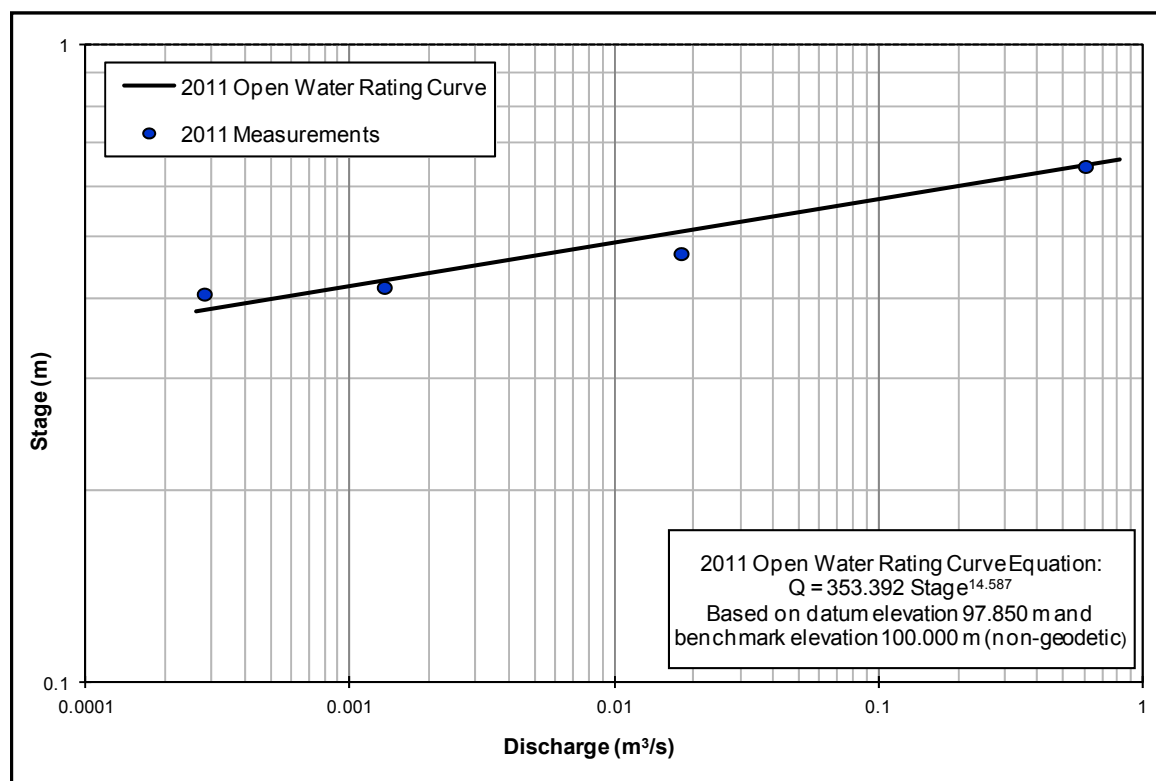


Figure A5: Stage-Discharge Rating Curve for Lake E1

Table A32: Lake E1 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Transducer Reading	Transducer Elevation	Average Transducer Elevation	Stage
14-Jun 17:45	1.375	1.930	100.000	99.445	0.489	98.956	98.812	0.645
09-Jul 12:30	1.150	1.879	100.000	99.271	0.519	98.752		0.471
06-Aug 08:00	1.155	1.948	100.000	99.207	0.432	98.775		0.407
11-Sep 08:00	1.182	1.965	100.000	99.217	0.451	98.766		0.417

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A33: Lake E1 Outlet Mean Daily Discharge (m³/s), 2011

Date	Jan	Feb	Mar	Apr	May	Jun	Jul ^a	Aug ^a	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.004	0.0006	-	-	-	-
2	-	-	-	-	-	-	0.009	0.0003	0.0001 P	-	-	-
3	-	-	-	-	-	-	0.014	0.0006	0.0001	-	-	-
4	-	-	-	-	-	-	0.016	0.0006	0.0001	-	-	-
5	-	-	-	-	-	-	0.020	0.0006	0.0001	-	-	-
6	-	-	-	-	-	-	0.017	0.0010	0.0001	-	-	-
7	-	-	-	-	-	-	0.017	0.0011	0.0001	-	-	-
8	-	-	-	-	-	-	0.013	0.0010	0.0005	-	-	-
9	-	-	-	-	-	-	0.010	0.0008	0.0008	-	-	-
10	-	-	-	-	-	-	0.009	0.0007	0.0008	-	-	-
11	-	-	-	-	-	-	0.008	0.0006	0.001 P	-	-	-
12	-	-	-	-	-	-	0.007	0.0007	-	-	-	-
13	-	-	-	-	-	-	0.005 P	0.0009	-	-	-	-
14	-	-	-	-	-	0.494 P	-	0.0007	-	-	-	-
15	-	-	-	-	-	0.469	-	0.0008	-	-	-	-
16	-	-	-	-	-	0.703	0.004 P	0.0007	-	-	-	-
17	-	-	-	-	-	0.754	0.002	0.0004	-	-	-	-
18	-	-	-	-	-	0.655	0.002	0.0002	-	-	-	-
19	-	-	-	-	-	0.690	0.002	0.0004	-	-	-	-
20	-	-	-	-	-	0.484	0.002	0.0005	-	-	-	-
21	-	-	-	-	-	0.329	0.002	0.0004	-	-	-	-
22	-	-	-	-	-	0.259	0.003	0.0005	-	-	-	-
23	-	-	-	-	-	0.220	0.004	0.0004	-	-	-	-
24	-	-	-	-	-	0.166	0.003 P	0.0004	-	-	-	-
25	-	-	-	-	-	0.129	-	0.0004	-	-	-	-
26	-	-	-	-	-	0.047	-	0.0004	-	-	-	-
27	-	-	-	-	-	0.039	-	0.0004	-	-	-	-
28	-	-	-	-	-	0.036	0.006 P	0.0004	-	-	-	-
29	-	-	-	-	-	0.027	0.003	0.0002	-	-	-	-
30	-	-	-	-	-	0.014	0.001	0.0003	-	-	-	-
31	-	-	-	-	-	-	0.001	0.0004	-	-	-	-
MIN	-	-	-	-	-	0.014	0.001	0.0001	0.0001	-	-	-
MEAN	-	-	-	-	-	0.324	0.007	0.0006	0.0004	-	-	-
MAX	-	-	-	-	-	0.754	0.020	0.0011	0.0008	-	-	-

P = partial daily average

^a July and August shown 4 decimals because of low flows.



APPENDIX A

Hydrometrics

Table A34: Lake E1 Mean Daily Water Surface Elevation (m), 2011^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	99.256	99.200	-	-	-	-
2	-	-	-	-	-	-	99.276	99.186	99.154	-	-	-
3	-	-	-	-	-	-	99.297	99.199	99.135	-	-	-
4	-	-	-	-	-	-	99.304	99.204	99.141	-	-	-
5	-	-	-	-	-	-	99.311	99.200	99.161	-	-	-
6	-	-	-	-	-	-	99.306	99.215	99.161	-	-	-
7	-	-	-	-	-	-	99.306	99.219	99.152	-	-	-
8	-	-	-	-	-	-	99.296	99.215	99.194	-	-	-
9	-	-	-	-	-	-	99.288	99.211	99.207	-	-	-
10	-	-	-	-	-	-	99.281	99.205	99.211	-	-	-
11	-	-	-	-	-	-	99.280	99.201	99.212 P	-	-	-
12	-	-	-	-	-	-	99.273	99.207	-	-	-	-
13	-	-	-	-	-	-	99.266 P	99.211	-	-	-	-
14	-	-	-	-	-	99.437 P	-	99.208	-	-	-	-
15	-	-	-	-	-	99.433	-	99.210	-	-	-	-
16	-	-	-	-	-	99.440	99.260 P	99.205	-	-	-	-
17	-	-	-	-	-	99.448	99.238	99.188	-	-	-	-
18	-	-	-	-	-	99.440	99.235	99.177	-	-	-	-
19	-	-	-	-	-	99.447	99.233	99.186	-	-	-	-
20	-	-	-	-	-	99.434	99.231	99.193	-	-	-	-
21	-	-	-	-	-	99.419	99.238	99.191	-	-	-	-
22	-	-	-	-	-	99.406	99.243	99.194	-	-	-	-
23	-	-	-	-	-	99.402	99.256	99.193	-	-	-	-
24	-	-	-	-	-	99.391	99.250 P	99.193	-	-	-	-
25	-	-	-	-	-	99.380	-	99.192	-	-	-	-
26	-	-	-	-	-	99.341	-	99.191	-	-	-	-
27	-	-	-	-	-	99.332	-	99.187	-	-	-	-
28	-	-	-	-	-	99.330	99.269 P	99.190	-	-	-	-
29	-	-	-	-	-	99.321	99.242	99.172	-	-	-	-
30	-	-	-	-	-	99.297	99.215	99.178	-	-	-	-
31	-	-	-	-	-	-	99.207	99.160	-	-	-	-
MIN	-	-	-	-	-	99.297	99.207	99.160	99.135	-	-	-
MEAN	-	-	-	-	-	99.394	99.264	99.196	99.173	-	-	-
MAX	-	-	-	-	-	99.448	99.311	99.219	99.212	-	-	-

^a Elevation based on local benchmark elevation of 100.000 m (non-geodetic)

P = partial daily average



APPENDIX A

Hydrometrics

Table A35: Lake E1 Outlet Discharge Measurement Field Form for 14 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		14-Jun-2011	
Waterbody:		E1 Lake		Start Time		17:42	
Crossing ID:		E1 Lake Outlet		End Time		18:38	
BM UTM15 Location		Survey		Datalogger SN: 949			
East	536022	BM_read	1.375	Transducer SN: 21580			
North	6992012	WL_read	1.930	Meter Type/SN: Swoffer			
Elevation	100.00	WL_Elev	99.445	Crew:		DC/JL	
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s) 0.6/0.8 Depth (m/s)
1	0.30	0.00			0.00	0.00	
2	0.80	0.14		0.34	0.20	0.10	0.33
3	1.10	0.16		0.47	0.35	0.00	
4	1.50	0.28		0.40	0.80	0.00	
5	1.70	0.33		0.72	0.90	0.12	0.46
6	1.90	0.45		0.97	1.20	0.11	0.05
7	2.20	0.37		0.86	1.60	0.10	0.46
8	2.40	0.41		0.57	2.00	0.10	0.07
9	2.60	0.37		0.46	2.25	0.16	0.49
10	2.90	0.18		0.23	2.40	0.00	
11	3.20	0.11		0.18	2.90	0.00	
12	3.60	0.13		0.13	3.00	0.10	0.11
13	3.80	0.12		0.05	3.10	0.00	
14	4.00	0.00			4.00	0.00	
15					4.20	0.13	0.10
16	0.80	0.00			4.40	0.24	0.47
17	1.10	0.05		0.30	4.55	0.26	0.69
18	1.50	0.12		0.23	4.80	0.14	0.05
19	1.80	0.17		0.44	5.00	0.00	
20	2.00	0.16		0.61			
21	2.30	0.00					
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33					RESULTS: Q(m³/s) 0.604		
34							
35							



APPENDIX A

Hydrometrics

Table A36: Lake E1 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		09-Jul-2011		
Waterbody:		E1 Lake		Start Time		12:15		
Crossing ID:		E1 Lake Outlet		End Time		12:45		
BM UTM15 Location		Survey		Datalogger SN: 949				
East	536022	BM_read	1.15	Transducer SN: 21580				
North	6992012	WL_read	1.879	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.271	Crew:		DC/JE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00		0.00				
2	0.25	0.17		0.08				
3	0.35	0.19		0.11				
4	0.45	0.19		0.14				
5	0.55	0.16		0.17				
6	0.65	0.19		0.20				
7	0.75	0.17		0.19				
8	0.85	0.13		0.11				
9	0.93	0.12		0.10				
10	1.02	0.00		0.00				
11	0.20	0.00		0.00				
12								
13								
14								
15								
16								
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18								
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20								
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29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.018			
34								
35								



APPENDIX A

Hydrometrics

Table A37: Lake E1 Outlet Discharge Measurement Field Form for 6 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		06-Aug-2011		
Waterbody:		E1 Lake		Start Time		07:44		
Crossing ID:		E1 Lake Outlet		End Time		08:15		
BM UTM15 Location		Survey		Datalogger SN: 949				
East	536022	BM_read	1.155	Transducer SN: 21580				
North	6992012	WL_read	1.948	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.207	Crew:		DC/RP		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00		0.00				
2	0.25	0.07		0.08				
3	0.30	0.00		0.00				
4								
5								
6								
7								
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29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.001			
34								
35								



APPENDIX A

Hydrometrics

Table A38: Lake E1 Outlet Discharge Measurement Field Form for 11 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		11-Sep-2011		
Waterbody:		E1 Lake		Start Time		08:04		
Crossing ID:		E1 Lake Outlet		End Time		08:40		
BM UTM15 Location		Survey		Datalogger SN: 949				
East	536022	BM_read	1.182	Transducer SN: 21580				
North	6992012	WL_read	1.965	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.217	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.30	0.00		0.00				
2	0.37	0.06		0.12				
3	0.47	0.07		0.11				
4	0.56	0.00		0.00				
5								
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7								
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21								
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27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m³/s) 0.001			
34								
35								

LAKE H20 AND OUTLET HYDROMETRIC STATION

H20 FACTSHEET

LOCATION AND DETAILS

Located approximately 1.4 kilometres west of Meliadine West Camp.

Operational:	2011
	Manual

Benchmark: Top of boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 540675 m E, 6988960 m N (NAD83, Zn15)

Transducer: None

Drainage Area: 0.3 km²

Lat/Long: 63°01'41" N, 92°11'47" W

Datalogger: None



Lake H20 outlet channel, looking upstream during spring freshet



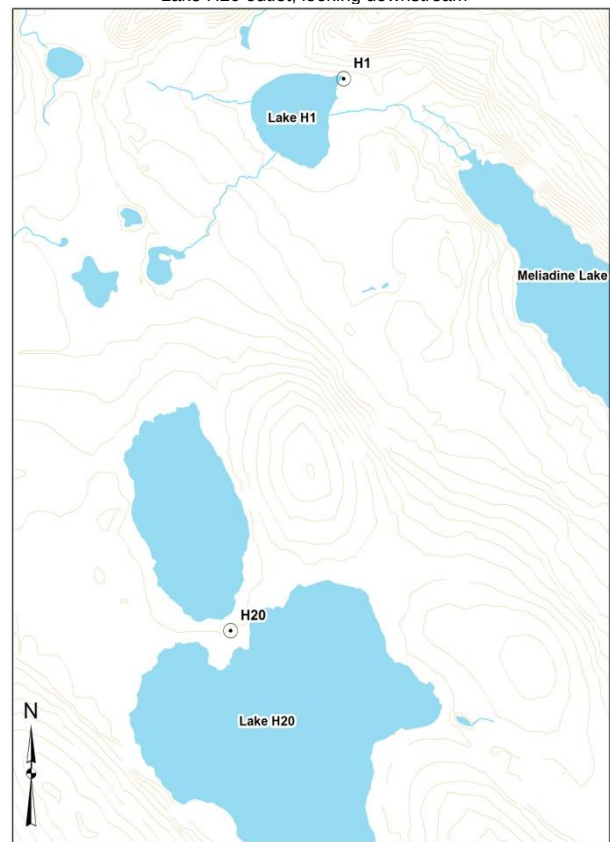
Lake H20 outlet, looking downstream



Lake H20 outlet channel, looking downstream during spring freshet.



Lake H20 outlet during spring freshet



NTS Mapping of Area



APPENDIX A Hydrometrics

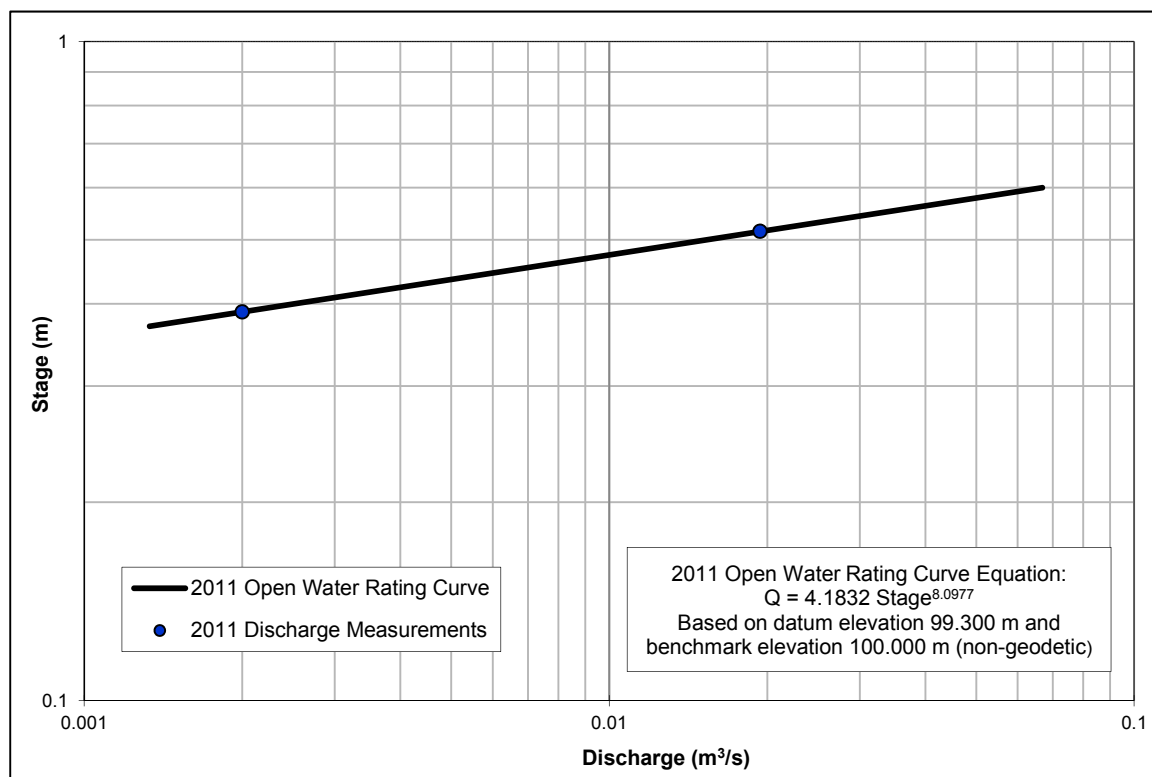


Figure A6: Stage-Discharge Measurements for Lake H20

Table A39: Lake H20 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Stage
16-Jun 11:20	1.260	1.445	100.000	99.815	0.515
10-Jul 11:45	1.294	1.605	100.000	99.689	0.389
06-Aug 16:45	1.134	1.487	100.000	99.647	0.347
10-Sep 15:15	1.147	1.549	100.000	99.598	0.298

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A40: Lake H2O Outlet Discharge Measurement Field Form for 16 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		16-Jun-2011	
Waterbody:		H2O Lake		Start Time		11:10	
Crossing ID:		H2O Lake Outlet		End Time		11:45	
BM UTM15 Location		Survey		Datalogger SN: not installed			
East	540675	BM_read	1.260	Transducer SN: not installed			
North	6988960	WL_read	1.445	Meter Type/SN: Swoffer			
Elevation	100.00	WL_Elev	99.515	Crew:		DC/JL	
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s) 0.6/0.8 Depth (m/s)
1	0.40	0.00					
2	0.60	0.10		0.060			
3	0.90	0.11		0.040			
4	1.30	0.16		0.050			
5	1.55	0.16		0.280			
6	1.70	0.11		0.240			
7	1.80	0.00					
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34					RESULTS: Q(m ³ /s) 0.019		
35							
36							



APPENDIX A

Hydrometrics

Table A41: Lake H20 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Jul-2011		
Waterbody:		H20 Lake		Start Time		11:45		
Crossing ID:		H20 Lake Outlet		End Time		12:15		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	540675	BM_read	1.294	Transducer SN: not installed				
North	6988960	WL_read	1.605	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.389	Crew:		DC/JL		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34					RESULTS: Q(m ³ /s) 0.002			
35					Water flowing through grass. Discharge estimated.			
36								

LAKE H1 AND OUTLET HYDROMETRIC STATION

H1

FACTSHEET

LOCATION AND DETAILS

Located approximately 1.3 kilometres northwest of Meliadine West Camp.

Operational:	2011
	16/6-10/9

Benchmark: Top of boulder; 100.000 m (non-geodetic)

Coordinates: UTM: 540831 m E, 6989654 m N (NAD83, Zn15)

Transducer: Keller Acculevel Submersible Level Transducer

Drainage Area: 2.4 km²

Lat/Long: 63°02'04" N, 92°11'35" W

Datalogger: Optimum Instruments DD-520



Lake H1 outlet channel, looking downstream



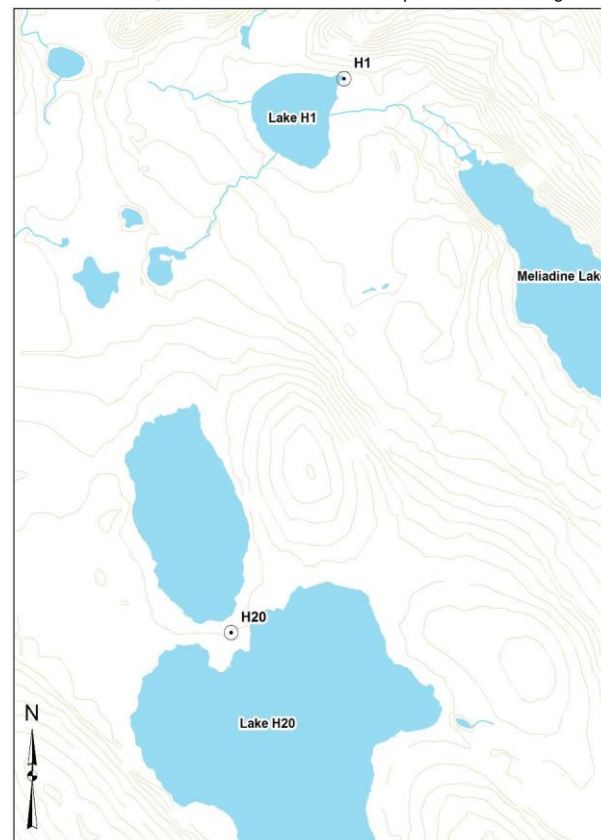
Lake H1 outlet, with water levels below the spill elevation in August.



Lake H1 outlet channel, looking upstream



Lake H1 outlet channel, looking downstream, no flow in August.



NTS Mapping of Area.



APPENDIX A Hydrometrics

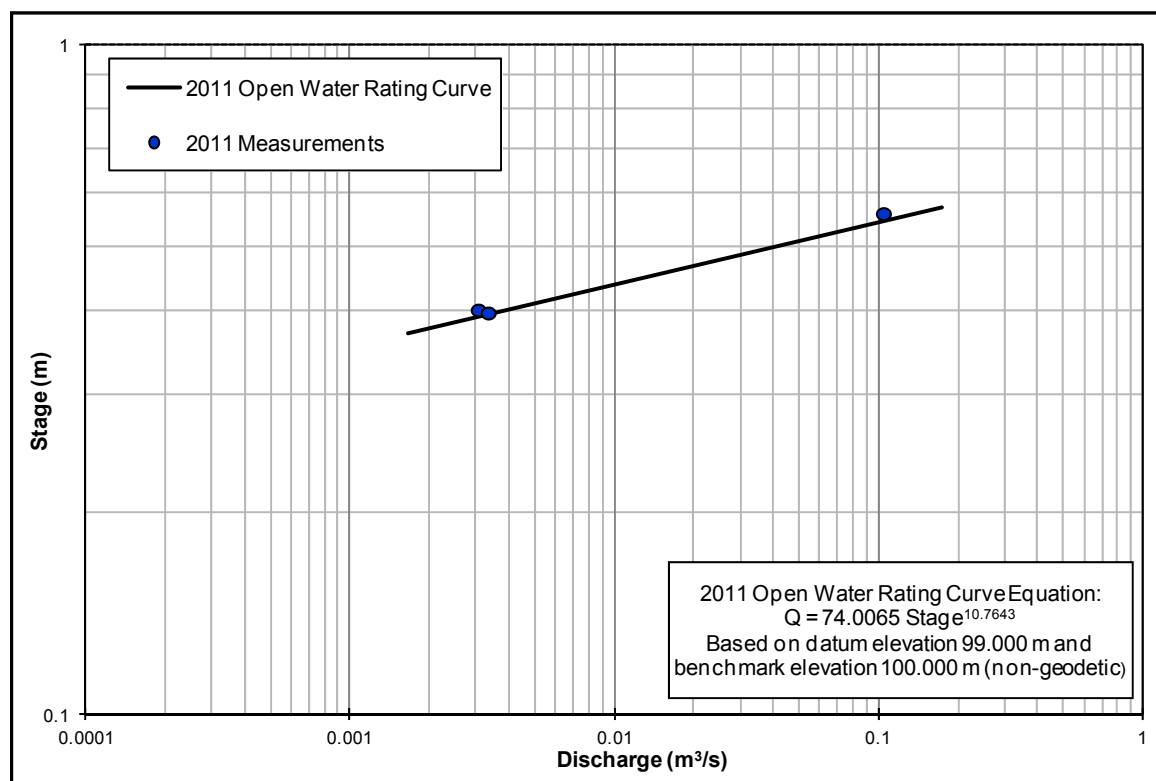


Figure A7: Stage-Discharge Rating Curve for Lake H1

Table A42: Lake H1 Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Transducer Reading	Transducer Elevation	Average Transducer Elevation	Stage
16-Jun 10:30	0.995	1.435	100.000	99.560	0.476	99.084	99.047	0.560
09-Jul 17:00	1.152	1.750	100.000	99.402	0.357	99.045		0.402
06-Aug 17:00	0.826	1.507	100.000	99.319	0.306	99.013		0.319
10-Sep 14:00	0.929	1.531	100.000	99.398				0.398

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A43: Lake H1 Outlet Mean Daily Discharge (m³/s), 2011

Date	Jan	Feb	Mar	Apr	May	Jun	Jul ^a	Aug ^a	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	0.0086	0.0001	-	-	-	-
2	-	-	-	-	-	-	0.0095	0.0001	-	-	-	-
3	-	-	-	-	-	-	0.0117	0.0001	-	-	-	-
4	-	-	-	-	-	-	0.0106	0.0001	-	-	-	-
5	-	-	-	-	-	-	0.0087	0.0001	-	-	-	-
6	-	-	-	-	-	-	0.0073	0.0001	-	-	-	-
7	-	-	-	-	-	-	0.0063	0.0001	-	-	-	-
8	-	-	-	-	-	-	0.0057	0.0001	-	-	-	-
9	-	-	-	-	-	-	0.0052	0.0001	-	-	-	-
10	-	-	-	-	-	-	0.0047	0.0001	-	-	-	-
11	-	-	-	-	-	-	0.0040	0.0003	-	-	-	-
12	-	-	-	-	-	-	0.0036	0.0009	-	-	-	-
13	-	-	-	-	-	-	0.0033	0.0012	-	-	-	-
14	-	-	-	-	-	-	0.0029	0.0014P	-	-	-	-
15	-	-	-	-	-	-	0.0025	-	-	-	-	-
16	-	-	-	-	-	0.124 P	0.0021	-	-	-	-	-
17	-	-	-	-	-	0.110	0.0017	-	-	-	-	-
18	-	-	-	-	-	0.064	0.0015	-	-	-	-	-
19	-	-	-	-	-	0.044	0.0012	-	-	-	-	-
20	-	-	-	-	-	0.033	0.0011	-	-	-	-	-
21	-	-	-	-	-	0.027	0.0010	-	-	-	-	-
22	-	-	-	-	-	0.023	0.0009	-	-	-	-	-
23	-	-	-	-	-	0.021	0.0003	-	-	-	-	-
24	-	-	-	-	-	0.017	0.0001	-	-	-	-	-
25	-	-	-	-	-	0.015	0.0001	-	-	-	-	-
26	-	-	-	-	-	0.014	0.0001	-	-	-	-	-
27	-	-	-	-	-	0.016	0.0001	-	-	-	-	-
28	-	-	-	-	-	0.014	0.0001	-	-	-	-	-
29	-	-	-	-	-	0.012	0.0001	-	-	-	-	-
30	-	-	-	-	-	0.010	0.0001	-	-	-	-	-
31	-	-	-	-	-	-	0.0001	-	-	-	-	-
MIN	-	-	-	-	-	0.010	0.0001	0.0001	-	-	-	-
MEAN	-	-	-	-	-	0.036	0.0034	0.0003	-	-	-	-
MAX	-	-	-	-	-	0.124	0.0117	0.0014	-	-	-	-

P = partial daily average

^a July and August shown with 4 decimals because of low flows.



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Table A44: Lake H1 Mean Daily Water Surface Elevation (m), 2011^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-	-	-	-	-	-	99.431	99.318	-	-	-	-
2	-	-	-	-	-	-	99.435	99.323	-	-	-	-
3	-	-	-	-	-	-	99.443	99.341	-	-	-	-
4	-	-	-	-	-	-	99.439	99.346	-	-	-	-
5	-	-	-	-	-	-	99.431	99.348	-	-	-	-
6	-	-	-	-	-	-	99.424	99.349	-	-	-	-
7	-	-	-	-	-	-	99.419	99.347	-	-	-	-
8	-	-	-	-	-	-	99.415	99.345	-	-	-	-
9	-	-	-	-	-	-	99.412	99.344	-	-	-	-
10	-	-	-	-	-	-	99.408	99.345	-	-	-	-
11	-	-	-	-	-	-	99.401	99.348	-	-	-	-
12	-	-	-	-	-	-	99.397	99.354	-	-	-	-
13	-	-	-	-	-	-	99.394	99.360	-	-	-	-
14	-	-	-	-	-	-	99.389	99.363 P	-	-	-	-
15	-	-	-	-	-	-	99.384	-	-	-	-	-
16	-	-	-	-	-	99.551 P	99.379	-	-	-	-	-
17	-	-	-	-	-	99.546	99.371	-	-	-	-	-
18	-	-	-	-	-	99.519	99.365	-	-	-	-	-
19	-	-	-	-	-	99.502	99.358	-	-	-	-	-
20	-	-	-	-	-	99.489	99.356	-	-	-	-	-
21	-	-	-	-	-	99.479	99.354	-	-	-	-	-
22	-	-	-	-	-	99.473	99.351	-	-	-	-	-
23	-	-	-	-	-	99.467	99.349	-	-	-	-	-
24	-	-	-	-	-	99.460	99.343	-	-	-	-	-
25	-	-	-	-	-	99.455	99.338	-	-	-	-	-
26	-	-	-	-	-	99.450	99.334	-	-	-	-	-
27	-	-	-	-	-	99.456	99.335	-	-	-	-	-
28	-	-	-	-	-	99.451	99.331	-	-	-	-	-
29	-	-	-	-	-	99.443	99.328	-	-	-	-	-
30	-	-	-	-	-	99.436	99.323	-	-	-	-	-
31	-	-	-	-	-	-	99.321	-	-	-	-	-
MIN	-	-	-	-	-	99.436	99.321	99.318	-	-	-	-
MEAN	-	-	-	-	-	99.478	99.379	99.345	-	-	-	-
MAX	-	-	-	-	-	99.551	99.443	99.363	-	-	-	-

^a Elevation based on local benchmark elevation of 100.000 m (non-geodetic)

P = partial daily average



APPENDIX A

Hydrometrics

Table A45: Lake H1 Outlet Discharge Measurement Field Form for 16 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		16-Jun-2011		
Waterbody:		H1 Lake		Start Time		09:50		
Crossing ID:		H1 Lake Outlet		End Time		10:40		
BM UTM15 Location		Survey		Datalogger SN: 1907				
East	540831	BM_read	0.995	Transducer SN: 14568				
North	6989654	WL_read	1.435	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.560	Crew:		DC/JL		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.10	0.00						
2	0.30	0.28		0.33				
3	0.50	0.28		0.33				
4	0.60	0.28		0.39				
5	0.75	0.25		0.37				
6	1.00	0.00		0.00				
7	1.80	0.00		0.00				
8	1.95	0.20		0.19				
9	2.10	0.21		0.34				
10	2.25	0.19		0.29				
11	2.40	0.23		0.18				
12	2.55	0.25		0.18				
13	2.70	0.23		0.20				
14	2.85	0.30		0.25				
15	3.00	0.18		0.24				
16	3.15	0.00						
17								
18								
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33					RESULTS: Q(m ³ /s) 0.104			
34								
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APPENDIX A Hydrometrics

Table A46: Lake H1 Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		09-Jul-2011		
Waterbody:		H1 Lake		Start Time		16:40		
Crossing ID:		H1 Lake Outlet		End Time		17:15		
BM UTM15 Location		Survey		Datalogger SN: 1907				
East	540831	BM_read	1.152	Transducer SN: 14568				
North	6989654	WL_read	1.750	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.402	Crew:		DC/JE		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.00	0.00		0.00				
2	0.15	0.09		0.09				
3	0.25	0.07		0.10				
4	0.35	0.08		0.05				
5	0.45	0.07		0.08				
6	0.55	0.06		0.05				
7	0.70	0.00		0.00				
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33					RESULTS: Q(m ³ /s) 0.003			
34								
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APPENDIX A Hydrometrics

Table A47: Lake H1 Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2011		
Waterbody:		H1 Lake		Start Time		13:40		
Crossing ID:		H1 Lake Outlet		End Time		14:20		
BM UTM15 Location		Survey		Datalogger SN:				
East	540831	BM_read	0.929	Transducer SN:				
North	6989654	WL_read	1.531	Meter Type/SN: Swoffer				
Elevation	100.00	WL_Elev	99.398	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.07	0.00		0.00				
2	0.15	0.08		0.14				
3	0.25	0.07		0.14				
4	0.35	0.06		0.10				
5	0.45	0.06		0.07				
6	0.70	0.00		0.00				
7								
8								
9								
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29								
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31								
32								
33					RESULTS: Q(m3/s) 0.003			
34								
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CHICKENHEAD LAKE AND OUTLET HYDROMETRIC STATION



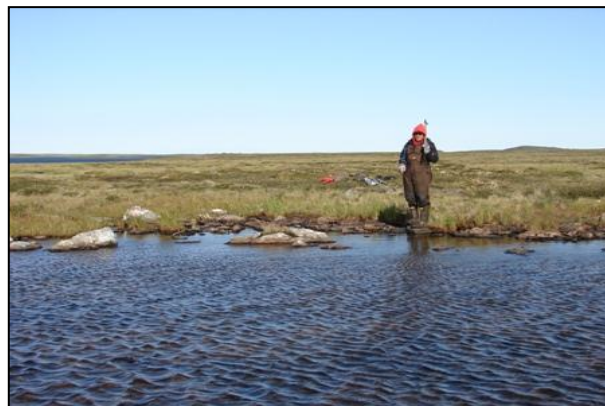
LOCATION AND DETAILS

Located approximately 14.5 kilometres southeast of Meliadine West Camp.

Operational:	2009 13/6-13/9	2011 Manual	
Benchmark:	Top of boulder; 100.000 m (non-geodetic)		
Coordinates:	UTM: 553939 m E, 6980977 m N (NAD83, Zn15)		
Transducer:	None		
	Drainage Area:	9.86 km ²	
		Lat/Long: 62°57'18" N, 92°56'20" W	
		Datalogger: None	



Chickenhead Lake, looking southeast.



Chickenhead Lake, looking north to benchmark



Chickenhead Lake Outlet, looking north.



Chickenhead Lake Outlet, looking southeast.



NTS Mapping of Area.



APPENDIX A Hydrometrics

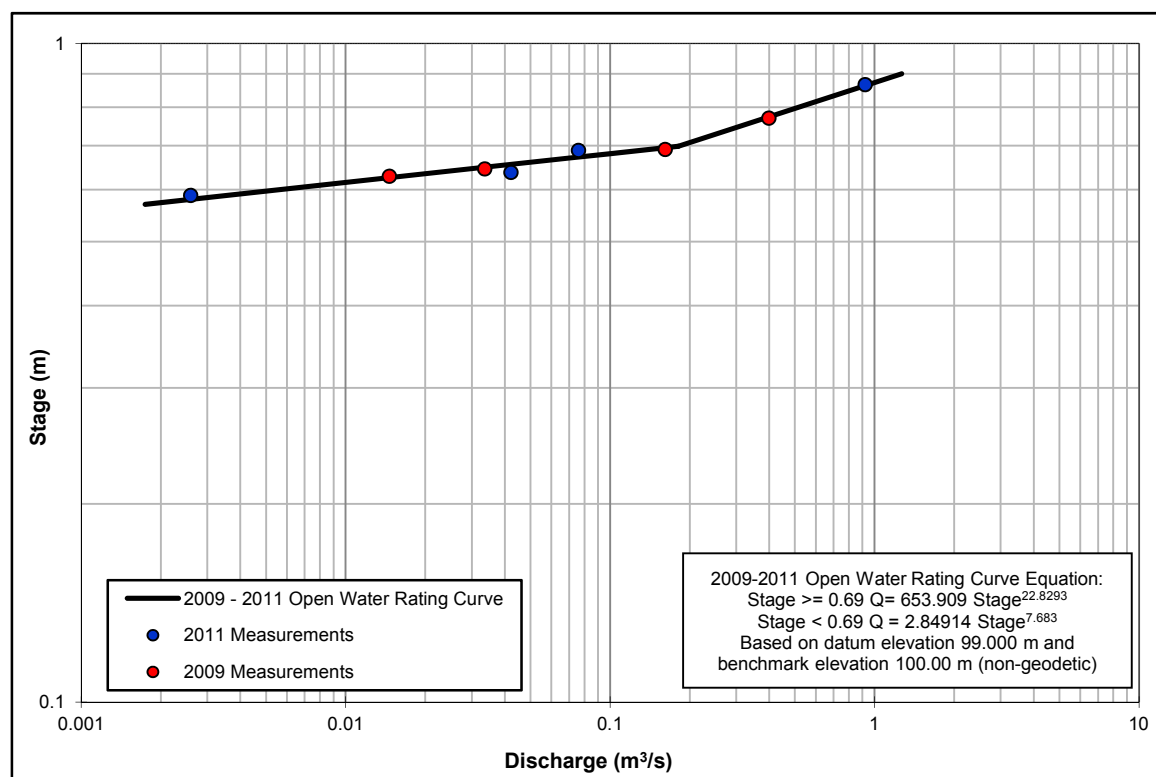


Figure A8: Stage-Discharge Rating Curve for Chickenhead Lake

Table A48: Chickenhead Lake Water Level Survey Measurements (m), 2011

Date and Time	BM Reading ^a	WS Reading ^b	BM Elevation	WS Elevation	Stage
15-Jun 15:45	1.408	1.872	100.000	99.866	0.866
09-Jul 09:25	1.097	1.739	100.000	99.688	0.688
07-Aug 11:00	1.101	1.843	100.000	99.588	0.588
10-Sep 08:05	0.970	1.663	100.000	99.637	0.637

^a BM = benchmark

^b WS = water surface



APPENDIX A

Hydrometrics

Table A49: Chickenhead Lake Outlet Discharge Measurement Field Form for 15 June 2011

Project Name:		Meliadine (10-1373-0076)		Date		15-Jun-2011		
Waterbody:		Chickenhead Lake		Start Time		15:45		
Crossing ID:		Chickenhead Lake Outlet		End Time		17:10		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	553939	BM_read	1.408	Transducer SN: not installed				
North	6980977	WL_read	1.872	Meter Type/SN: Swoffer				
Elevation	100.33	WL_Elev	99.866	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.20	0.00			0.20	0.00		
2	0.60	0.15		0.24	0.50	0.15		0.00
3	0.80	0.20		0.39	0.80	0.16		0.06
4	1.00	0.20		0.61	1.00	0.31		0.08
5	1.30	0.21		0.51	1.25	0.00		0.00
6	1.70	0.00			1.60	0.17		0.20
7	2.20	0.00			1.80	0.20		0.25
8	2.40	0.20		0.10	1.90	0.07		0.05
9	2.70	0.24		0.55	2.10	0.12		-0.06
10	3.00	0.25		0.73	2.20	0.18		0.03
11	3.30	0.15		0.26	2.40	0.22		0.13
12	3.60	0.04		0.04	2.70	0.10		0.16
13	3.90	0.07		0.04	3.00	0.08		0.33
14	4.20	0.15		0.03	3.20	0.17		0.32
15	4.50	0.30		0.27	3.50	0.11		0.17
16	4.90	0.35		0.40	3.70	0.10		0.16
17	5.30	0.40		0.47	3.90	0.00		
18	5.70	0.37		0.50				
19	6.10	0.34		0.59				
20	6.50	0.11		0.35				
21	6.80	0.10		0.20				
22	7.20	0.15		0.23				
23	7.60	0.33		0.50				
24	8.00	0.30		0.66				
25	8.40	0.27		0.35				
26	8.80	0.21		0.60				
27	9.20	0.18		0.12				
28	9.60	0.14		0.20				
29	10.00	0.15		0.03				
30	10.40	0.20		0.16				
31	10.80	0.19		0.30				
32	11.20	0.14		0.18				
33	11.40	0.00						
34					RESULTS: Q(m ³ /s) 0.924			
35								
36								



APPENDIX A

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Table A50: Chickenhead Lake Outlet Discharge Measurement Field Form for 9 July 2011

Project Name:		Meliadine (10-1373-0076)		Date		9-Jul-2011		
Waterbody:		Chickenhead Lake		Start Time		09:25		
Crossing ID:		Chickenhead Lake Outlet		End Time		10:20		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	553939	BM_read	1.097	Transducer SN: not installed				
North	6980977	WL_read	1.739	Meter Type/SN: Swoffer				
Elevation	100.33	WL_Elev	99.688	Crew:		DC/JL		
STATION Start LDB	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.50	0.00		0.00				
2	0.70	0.09		0.14				
3	0.90	0.13		0.07				
4	1.10	0.11		0.21				
5	1.20	0.12		0.27				
6	1.30	0.14		0.30				
7	1.40	0.13		0.21				
8	1.45	0.00		0.00				
9	0.30	0.00		0.00				
10	0.50	0.11		0.29				
11	0.60	0.08		0.23				
12	0.70	0.15		0.24				
13	0.80	0.18		0.32				
14	0.90	0.17		0.39				
15	1.00	0.18		0.32				
16	1.10	0.16		0.26				
17	1.20	0.16		0.27				
18	1.30	0.17		0.33				
19	1.40	0.16		0.31				
20	1.55	0.16		0.09				
21	1.70	0.00		0.00				
22	0.95	0.00		0.00				
23	1.10	0.13		0.13				
24	1.20	0.14		0.25				
25	1.30	0.13		0.21				
26	1.40	0.12		0.19				
27	1.50	0.12		0.18				
28	1.60	0.11		0.12				
29	1.70	0.00		0.00				
30								
31								
32								
33					RESULTS: Q(m3/s) 0.076			
34								
35								



APPENDIX A

Hydrometrics

Table A51: Chickenhead Lake Outlet Discharge Measurement Field Form for 7 August 2011

Project Name:		Meliadine (10-1373-0076)		Date		07-Aug-2011		
Waterbody:		Chickenhead Lake		Start Time		11:03		
Crossing ID:		Chickenhead Lake Outlet		End Time		11:30		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	553939	BM_read	1.101	Transducer SN: not installed				
North	6980977	WL_read	1.843	Meter Type/SN: Swoffer				
Elevation	100.33	WL_Elev	99.588	Crew:		DC/RP		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.10	0.00		0.00				
2	0.20	0.05		0.06				
3	0.30	0.06		0.06				
4	0.40	0.05		0.08				
5	0.50	0.07		0.12				
6	0.60	0.06		0.12				
7	0.70	0.07		0.09				
8	0.80	0.07		0.08				
9	0.95	0.00		0.00				
10								
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33					RESULTS: Q(m³/s) 0.003			
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APPENDIX A Hydrometrics

Table A52: Chickenhead Lake Outlet Discharge Measurement Field Form for 10 September 2011

Project Name:		Meliadine (10-1373-0076)		Date		10-Sep-2011		
Waterbody:		Chickenhead Lake		Start Time		08:05		
Crossing ID:		Chickenhead Lake Outlet		End Time		09:00		
BM UTM15 Location		Survey		Datalogger SN: not installed				
East	553939	BM_read	0.97	Transducer SN: not installed				
North	6980977	WL_read	1.663	Meter Type/SN: Swoffer				
Elevation	100.	WL_Elev	99.637	Crew:		DC/TG		
STATION	DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY		DISTANCE FROM LDB (m)	DEPTH (m)	VELOCITY	
Start LDB			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)			0.2 Depth (m/s)	0.6/0.8 Depth (m/s)
1	0.30	0.00		0.00				
2	0.50	0.08		0.18				
3	0.70	0.11		0.21				
4	0.90	0.13		0.28				
5	1.10	0.09		0.24				
6	1.30	0.13		0.28				
7	1.50	0.12		0.23				
8	1.70	0.08		0.25				
9	1.90	0.00		0.00				
10								
11	0.80	0.00		0.00				
12	0.90	0.09		0.08				
13	1.00	0.08		0.16				
14	1.10	0.09		0.15				
15	1.20	0.07		0.15				
16	1.30	0.07		0.15				
17	1.40	0.06		0.15				
18	1.50	0.00		0.00				
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33					RESULTS: Q(m ³ /s) 0.042			
34								
35								



APPENDIX B

Water Quality

APPENDIX B
Water Quality

Appendix B1. Summary of Water Quality Control Results, Meliadine Gold Project, April and July/August 2011

Analyte	Units	MDL	PQL	Trip Blank		Field Blank		B45 Dup	B45	RPD	ML-E DUP	ML-E	RPD
				9-Apr-11	27-Jul-11	9-Apr-11	31-Jul-11	11-Apr-11	11-Apr-11		1-Aug-11	1-Aug-11	
Conventionals													
Total Suspended Solids	mg/L	3.0	15	<3.0	<3.0	<3.0	<3.0	<3.0	5	50%	<3.0	<3.0	0%
Total Dissolved Solids (Measured)	mg/L	5.0	25	<5.0	<10	<5.0	<10	562	556	1%	39	43	10%
Total Dissolved Solids (Calculated)	mg/L	n/a	n/a	<1.0	<1.0	<1.0	<1.0	482	482	0%	34.1	34.8	2%
Alkalinity, Total (as CaCO ₃)	mg/L	5.0	25	<5.0	<5.0	<5.0	<5.0	365	362	1%	16.6	17.7	6%
Specific Conductance	µS/cm	0.20	1	<0.20	0.39	0.53	0.31	873	864	1%	69.2	69.6	1%
Hardness (as CaCO ₃)	mg/L	n/a	n/a	<1.0	<1.0	<1.0	<1.0	389	394	1%	21	21	0%
pH	pH	0.10	0.5	5.57	5.88	6.02	6.08	7.77	7.73	1%	7.69	7.69	0%
Major Ions													
Bicarbonate (HCO ₃)	mg/L	5.0	25	<5.0	<5.0	<5.0	<5.0	445	442	1%	20.3	21.5	6%
Carbonate (CO3)	mg/L	5.0	25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0%	<5.0	<5.0	0%
Chloride (Cl)	mg/L	0.50	2.5	<0.50	<0.50	<0.50	<0.50	51.1	50.6	1%	7.99	7.89	1%
Hydroxide (OH)	mg/L	5.0	25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	0%	<5.0	<5.0	0%
Sulphate (SO ₄)	mg/L	0.50	2.5	<0.50	<0.50	<0.50	<0.50	28.5	28.1	1%	3.11	3.1	0%
Ion Balance	%	n/a	n/a	Low TDS	n/a	Low TDS	n/a	98.7	101	2%	n/d	n/d	n/a
Nutrients													
Ammonia as Nitrogen	mg/L	0.050	0.25	<0.050	<0.050	<0.050	<0.050	0.083	0.082	1%	<0.050	<0.050	0%
Nitrate and Nitrite as Nitrogen	mg/L	0.071	0.355	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	0%	<0.071	<0.071	0%
Nitrate (as Nitrogen)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0%	<0.050	<0.050	0%
Nitrite (as Nitrogen)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0%	<0.050	<0.050	0%
Total Kjeldahl Nitrogen	mg/L	0.20	1	<0.20	<0.20	<0.20	<0.20	1.7	1.64	4%	<0.20	<0.20	0%
Orthophosphate-Dissolved (as P)	mg/L	0.0010	0.005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0%	<0.0010	<0.0010	0%
Phosphorus-Total Dissolved	mg/L	0.0010	0.005	<0.0010	<0.0010	0.003	<0.0010	0.0073	0.0079	8%	0.0026	0.0023	12%
Phosphorus-Total	mg/L	0.0010	0.005	<0.0010	<0.0010	0.0032	<0.0010	0.0196	0.0151	26%	0.0029	0.0028	4%
Cyanide, Total	mg/L	0.0020	0.01	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0%	<0.0020	<0.0020	0%
Total Carbon	mg/L	1.0	5	<1.0	1.1	1.2	1.4	109	106	3%	22.2	25.1	12%
Total Inorganic Carbon	mg/L	1.0	5	1.5	1.1	2	1.4	93.9	92.1	2%	4.7	4.5	4%
Total Organic Carbon	mg/L	1.0	5	<1.0	1.1	<1.0	1.1	28.9	28.3	2%	3.4	5.3	44%
Total Metals, Metalloids, and Non-Metals													
Aluminum (Al)	mg/L	0.0010	0.005	<0.0010	<0.0030	<0.0010	<0.0030	0.0075	0.0099	28%	0.0044	<0.0030	0%
Antimony (Sb)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0%	<0.00010	<0.00010	0%
Arsenic (As)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.0028	0.00275	2%	0.00035	0.00035	0%
Barium (Ba)	mg/L	0.000050	0.00025	<0.000050	<0.000050	0.000162	<0.000050	0.126	0.119	6%	0.00736	0.00742	1%
Beryllium (Be)	mg/L	0.00050	0.0025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0%	<0.00050	<0.00050	0%
Bismuth (Bi)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Boron (B)	mg/L	0.0020	0.01	<0.0020	<0.0020	<0.0020	<0.0020	0.0164	0.0159	3%	0.005	0.009	57%
Cadmium (Cd)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000013	0%	<0.000010	<0.000010	0%
Calcium (Ca)	mg/L	0.020	0.1	<0.020	<0.020	0.049	0.032	137	131	4%	6.01	6.13	2%
Chromium (Cr)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	0.00021	10%	<0.00010	<0.00010	0%
Cobalt (Co)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00078	0.00078	0%	<0.00010	<0.00010	0%
Copper (Cu)	mg/L	0.00010	0.0005	<0.00010	<0.00010	0.00076	<0.00010	0.00482	0.00468	3%	0.00081	0.0008	1%
Iron (Fe)	mg/L	0.010	0.05	<0.010	<0.010	<0.010	<0.010	0.418	0.461	10%	0.025	0.024	4%
Lead (Pb)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Lithium (Li)	mg/L	0.0050	0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.0069	0.0068	1%	<0.0050	<0.0050	0%
Magnesium (Mg)	mg/L	0.0050	0.025	<0.0050	<0.0050	<0.0050	<0.0050	14.3	13.7	4%	1.07	1.08	1%
Manganese (Mn)	mg/L	0.000050	0.00025	<0.000050	<0.000050	0.000085	<0.000050	0.443	0.432	3%	0.00378	0.00384	2%
Mercury (Hg)	mg/L	0.000020	0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0%	<0.000020	<0.000020	0%
Molybdenum (Mo)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	0.000924	0.000918	1%	0.000087	0.000105	19%
Nickel (Ni)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00534	0.005	7%	0.00064	0.00065	2%
Phosphorus (P)	mg/L	0.30	1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0%	<0.30	<0.30	0%
Potassium (K)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	<0.050	9.49	9.07	5%	0.816	0.837	3%
Selenium (Se)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	0.00021	9%	<0.00010	<0.00010	0%

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Analyte	Units	MDL	PQL	Trip Blank		Field Blank		B45 Dup	B45	RPD	ML-E DUP	ML-E	RPD
				9-Apr-11	27-Jul-11	9-Apr-11	31-Jul-11	11-Apr-11	11-Apr-11		1-Aug-11	1-Aug-11	
Silicon (Si)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	0.117	4.73	4.61	3%	0.242	0.24	1%
Silver (Ag)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0%	<0.000010	<0.000010	0%
Sodium (Na)	mg/L	0.050	0.25	<0.050	<0.050	0.26	0.136	29.2	27.9	5%	4.25	4.32	2%
Strontium (Sr)	mg/L	0.00010	0.0005	<0.00010	<0.00010	0.0001	<0.00010	0.563	0.55	2%	0.0322	0.0314	3%
Thallium (Tl)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Tin (Sn)	mg/L	0.00010	0.0005	<0.00010	<0.00010	0.00164	0.00337	<0.00010	<0.00010	0%	<0.00010	<0.00010	0%
Titanium (Ti)	mg/L	0.00030	0.0015	<0.00030	<0.00030	<0.00030	<0.00030	0.00054	0.00062	14%	0.00039	<0.00030	0%
Uranium (U)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	0.000595	0.00057	4%	0.000019	0.000019	0%
Vanadium (V)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	0.00014	0%	<0.00010	<0.00010	0%
Zinc (Zn)	mg/L	0.0010	0.005	<0.0010	<0.0030	<0.0030	<0.0030	0.002	0.0071	112%	<0.0030	<0.0030	0%
Dissolved Metals, Metalloids, and Non-Metals													
Aluminum (Al)	mg/L	0.0030	0.015	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0%	<0.0030	<0.0030	0%
Antimony (Sb)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0%	<0.00010	<0.00010	0%
Arsenic (As)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00252	0.00246	2%	0.00036	0.00038	5%
Barium (Ba)	mg/L	0.000050	0.00025	<0.000050	<0.000050	0.000166	<0.000050	0.126	0.125	1%	0.00732	0.00735	0%
Beryllium (Be)	mg/L	0.00050	0.0025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0%	<0.00050	<0.00050	0%
Bismuth (Bi)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Boron (B)	mg/L	0.0020	0.01	<0.0020	<0.0020	<0.0020	<0.0020	0.0156	0.0151	3%	0.0049	0.0047	4%
Cadmium (Cd)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	0.000011	0%	<0.000010	<0.000010	0%
Calcium (Ca)	mg/L	0.020	0.1	<0.020	<0.020	0.051	0.033	138	139	1%	6.21	6.1	2%
Chromium (Cr)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	0.00014	0%	<0.00010	<0.00010	0%
Cobalt (Co)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00074	0.00071	4%	<0.00010	<0.00010	0%
Copper (Cu)	mg/L	0.00010	0.0005	<0.00010	<0.00010	0.00079	<0.00010	0.00464	0.00454	2%	0.00079	0.00071	11%
Iron (Fe)	mg/L	0.010	0.05	<0.010	<0.010	<0.010	<0.010	0.136	0.101	30%	<0.010	0.012	0%
Lead (Pb)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Lithium (Li)	mg/L	0.0050	0.025	<0.0050	<0.0050	<0.0050	<0.0050	0.0068	0.0064	6%	<0.0050	<0.0050	0%
Magnesium (Mg)	mg/L	0.0050	0.025	<0.0050	<0.0050	<0.0050	<0.0050	14.2	14.1	1%	1.18	1.18	0%
Manganese (Mn)	mg/L	0.000050	0.00025	<0.000050	<0.000050	0.000094	0.000079	0.434	0.4	8%	0.00116	0.0013	11%
Mercury (Hg)	mg/L	0.000020	0.0001	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0%	<0.000020	<0.000020	0%
Molybdenum (Mo)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	0.000802	0.000801	0%	0.000072	0.000072	0%
Nickel (Ni)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00516	0.00508	2%	0.00062	0.00065	5%
Phosphorus (P)	mg/L	0.30	1.5	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	0%	<0.30	<0.30	0%
Potassium (K)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	<0.050	9.33	9.21	1%	0.905	0.902	0%
Selenium (Se)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.00025	0.00028	11%	<0.00010	<0.00010	0%
Silicon (Si)	mg/L	0.050	0.25	<0.050	<0.050	<0.050	0.113	4.55	4.49	1%	0.234	0.233	0%
Silver (Ag)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0%	<0.000010	<0.000010	0%
Sodium (Na)	mg/L	0.050	0.25	<0.050	<0.050	0.263	0.147	27.9	27.9	0%	4.29	4.29	0%
Strontium (Sr)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	0.513	0.506	1%	0.0321	0.0323	1%
Thallium (Tl)	mg/L	0.000050	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0%	<0.000050	<0.000050	0%
Tin (Sn)	mg/L	0.00010	0.0005	<0.00010	<0.00010	0.00164	0.00329	<0.00010	<0.00010	0%	<0.00010	<0.00010	0%
Titanium (Ti)	mg/L	0.00030	0.0015	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0%	<0.00030	<0.00030	0%
Uranium (U)	mg/L	0.000010	0.00005	<0.000010	<0.000010	<0.000010	<0.000010	0.00051	0.000494	3%	0.000015	0.000015	0%
Vanadium (V)	mg/L	0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0%	<0.00010	<0.00010	0%
Zinc (Zn)	mg/L	0.0030	0.015	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0%	0.0063	<0.0030	0%

Notes:

	detected in blank but <PQL
bold	detected in blank but >PQL
	> 25% difference but <PQL
bold&underline	> 25% difference and >PQL

MDL = method detection limit; PQL = practical quantitation limit; RPD = relative percent difference;
mg/L = milligrams per litre; < = less than; n/a = not applicable; µS/cm = microSiemens per centimetre;
n/d = no data provided; % percent; µg/L = micrograms per litre.

APPENDIX B
Water Quality

Appendix B2. Limnology Data for the Meliadine Gold Project, April 2011

Station	Date	Time	Easting	Northing	Air Temp. (°C)	Cloud Cover (%)	Wind Direction	Wind Speed	Precipitation	Precip. Rate	Ice Thickness (m)	Water Depth (m)	Total Depth (m)	Sample Depth (m)	Water Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)	pH	Lab Sample (Y/N)
B2	11-Apr-11	11:05	537262	6986682	-23	70	N	mild	snow	light	1.7	1.5	3.2	0.5	0.0	396	4.3	30.0	6.5	Y
														1.0	0.1	444	3.8	26.9	6.7	
														1.5	0.1	440	3.2	22.4	6.8	
														2.0	0.5	443	2.7	19.1	6.8	
														2.5	0.6	486	2.8	20.4	6.8	
														3.0	2.0	501	2.4	17.7	6.8	
B4	11-Apr-11	10:08	538698	6986905	-23	70	N	mild	none	n/a	1.7	0.3	2.0	0.5	0.1	562	0.8	5.6	6.9	N
														1.0	0.1	655	0.5	3.2	6.8	
														1.5	0.2	658	0.3	1.9	6.7	
B5	09-Apr-11	10:12	538288	6988171	-8	100	N/NW	strong	snow	strong	1.6	1.1	2.8	0.5	0.2	424	5.0	35.4	6.9	Y
														1.0	0.1	421	4.9	34.6	6.9	
														1.5	0.1	418	4.9	34.2	7.0	
														2.0	0.9	410	4.3	30.5	6.9	
														2.5	1.6	430	2.4	17.3	6.9	
B6	09-Apr-11	16:17	537753	6989226	-5	100	W	strong	snow	light	1.7	1.3	3.0	0.5	0.2	672	5.8	41.1	7.3	Y
														1.0	0.1	669	5.7	40.1	7.3	
														1.5	0.2	667	5.6	39.5	7.3	
														2.0	0.5	664	5.7	40.2	7.3	
														2.5	1.1	670	5.3	38.7	7.3	
B7	9-Apr-11	17:02	537738	6989793	-5	100	NW	strong	snow	strong	1.7	0.6	2.3	0.5	0.1	515	5.6	39.4	7.3	Y
														1.0	0.1	536	5.3	37.4	7.3	
														1.5	0.1	580	5.2	36.3	7.3	
														2.0	0.3	606	5.0	35.7	7.5	
B45	11-Apr-11	9:43	539092	6985496	-23	70	N	mild	none	n/a	1.5	0.1	1.6	0.5	0.2	843	1.2	8.5	6.6	Y
														1.0	0.2	844	0.9	6.6	6.5	
														1.5	0.2	833	0.8	5.6	6.5	
B52	11-Apr-11	15:01	541472	6983741	-23	70	N	mild	snow	light	1.5	1.2	2.7	0.5	0.2	426	2.3	16.3	7.0	N
														1.0	0.2	425	2.3	16.0	7.0	
														1.5	0.2	425	2.2	15.4	7.0	
														2.0	1.1	420	2.0	14.3	6.9	
														2.5	1.6	433	1.2	9.1	6.9	
B53	11-Apr-11	15:10	541432	6983365	-23	70	N	mild	snow	light	1.6	0.4	2.0	0.5	0.0	429	3.4	24.1	7.4	N
														1.0	0.1	474	3.2	22.1	7.1	
														1.5	0.1	472	3.0	21.0	7.1	
B69	11-Apr-11	14:24	542844	6984060	-23	70	N	mild	snow	light	1.6	2.1	3.6	0.5	0.2	236	7.3	51.6	6.2	N
														1.0	0.3	235	7.2	50.9	6.5	
														1.5	0.3	235	7.2	50.8	6.6	
														2.0	0.9	233	7.1	51.3	6.6	
														2.5	2.1	242	5.7	42.6	6.5	
														3.0	2.6	258	4.5	33.9	6.7	
														3.5	2.7	264	3.8	28.3	6.7	

APPENDIX B
Water Quality

Appendix B2. Limnology Data for the Meliadine Gold Project, April 2011

Station	Date	Time	Easting	Northing	Air Temp. (°C)	Cloud Cover (%)	Wind Direction	Wind Speed	Precipitation	Precip. Rate	Ice Thickness (m)	Water Depth (m)	Total Depth (m)	Sample Depth (m)	Water Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)	pH	Lab Sample (Y/N)
D7	09-Apr-11	12:03	536638	6988797	-5	100	NW	strong	snow	strong	1.4	1.3	2.7	0.5	0.2	531	2.0	13.9	7.2	Y
														1.0	0.2	530	1.9	13.5	7.2	
														1.5	0.2	525	1.9	13.3	7.2	
														2.0	1.3	536	1.7	12.0	7.1	
														2.5	1.8	603	0.8	5.9	7.1	
E3	09-Apr-11	14:35	536450	6990898	-5	100	W	strong	snow	strong	1.7	2.5	4.2	0.5	0.4	237	7.7	54.2	7.2	Y
														1.0	0.2	236	7.6	53.7	7.3	
														1.5	0.2	235	7.5	53.2	7.3	
														2.0	1.0	233	7.6	34.8	7.3	
														2.5	2.4	231	5.5	41.1	7.3	
														3.0	3.0	241	4.0	30.8	7.3	
														3.5	3.0	254	4.9	37.1	7.3	
E4	09-Apr-11	15:32	536836	6989878	-5	100	W	strong	snow	light	1.6	1.2	2.8	0.5	0.3	569	1.4	10.1	7.3	Y
														1.0	0.2	571	1.3	6.9	7.3	
														1.5	0.2	566	0.9	6.6	7.3	
														2.0	0.7	558	0.7	5.0	7.3	
														2.5	0.9	557	0.4	2.9	7.3	

Notes:

Equipment: Hydrolab Datasonde

Select dissolved oxygen values were confirmed with the Winkler method.

°C = degrees Celsius; % = percent; m = metres; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; Y = yes; N = no.

APPENDIX B
Water Quality

Appendix B3. Limnology Data for the Meliadine Gold Project, July/August 2011

Station	Date	Time	Easting	Northing	Air Temp. (°C)	Cloud Cover (%)	Wind Direction	Wind Speed	Precipitation	Total Depth (m)	Secchi Depth (m)	Sample Depth (m)	Water Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)	pH	Turbidity (NTU)	Lab Sample (Y/N)
B2	20-Jul-11	nr	537262	6986682	18	25-50	NE	moderate	nr	3.6	bottom	0.5	14.2	87	9.79	103	7.47	0.8	Y
												1.0	14.2	87	9.79	103	7.52	0.9	
												1.5	14.2	87	9.79	103	7.54	1.2	
												2.0	14.2	87	9.73	102	7.55	2.3	
												2.5	14.2	87	9.73	102	7.56	2.2	
												3.0	14.2	87	9.78	103	7.57	2.3	
												3.5	14.2	87	9.75	103	7.59	2.6	
B36	24-Jul-11	10:05	539437	6986930	20	<25	NW	moderate	none	0.8	bottom	0.5	17.5	264	9.30	105	7.96	1.9	Y
B45	21-Jul-11	14:15	539092	6985496	17	25-50	NE	moderate	none	2.4	bottom	0.5	15.2	76	10.05	108	7.09	4.5	Y
												1.0	15.2	76	10.08	108	7.28	4.2	
												1.5	15.2	76	10.07	108	7.36	4.1	
												2.0	15.2	76	10.06	108	7.41	3.9	
												2.2	15.2	77	10.05	108	7.46	3.7	
B46	24-Jul-11	nr	540424	6985324	20	<25	NW	moderate	none	2.1	bottom	0.5	19.1	124	9.34	109	7.83	1.7	Y
												1.0	19.1	124	9.36	109	7.86	1.9	
												1.5	19.1	124	9.36	109	7.87	2.1	
ST B4-45	23-Jul-11	8:30	538951	6986433	19	50	N	moderate	none	0.45	bottom	0.45	15.9	104	9.44	103	6.76	30.3	Y
D4	17-Jul-11	15:02	534716	6989450	13	90	NW	heavy	none	1.6	bottom	0.5	14.6	153	9.80	nr	7.69	1.8	Y
												1.0	14.6	153	9.80	nr	7.71	2.0	
												1.5	14.6	153	9.79	nr	7.73	2.6	
D5	17-Jul-11	14:42	535496	6989226	13	90	NW	heavy	none	2.4	bottom	0.5	17.1	131	9.56	nr	7.31	2.2	Y
												1.0	17.1	131	9.51	nr	7.45	2.4	
												1.5	17.1	130	9.51	nr	7.46	2.5	
												2.0	17.1	130	9.52	nr	7.53	2.7	
D7	22-Jul-11	nr	536638	6988797	20	<25	N	moderate	none	2.8	bottom	0.5	15.2	133	9.86	106	8.02	1.7	Y
												1.0	15.1	134	9.81	105	7.94	1.3	
												1.5	15.1	134	9.80	105	7.97	1.5	
												2.0	15.0	134	9.79	105	7.99	1.5	
												2.5	14.9	133	9.83	105	8.01	1.6	
D23	18-Jul-11	15:10	535404	6989647	15	10	NW	heavy	none	3.0	bottom	0.5	14.3	80	9.95	nr	7.49	1.4	Y
												1.0	14.3	80	9.93	nr	7.52	1.5	
												1.5	14.3	80	9.93	nr	7.53	1.7	
												2.0	14.3	80	9.92	nr	7.55	1.9	
												2.5	14.3	80	9.91	nr	7.58	2.6	
												3.0	14.3	80	9.75	nr	7.58	2.8	
E3	19-Jul-11	11:28	536836	6989878	15	10	N	light	none	4.6	bottom	0.5	14.3	76	9.76	nr	7.22	1.6	Y
												1.0	14.3	76	9.75	nr	7.37	1.6	
												1.5	14.3	77	9.75	nr	7.43	1.7	
												2.0	14.3	76	9.75	nr	7.52	1.8	
												2.5	14.3	76	9.74	nr	7.81	1.9	
												3.0	14.3	76	9.72	nr	7.60	2.2	
												3.5	14.2	77	9.72	nr	7.41	2.4	
												4.0	14.2	76	9.72	nr	7.45	2.4	
E4	19-Jul-11	16:05	536889	6989863	12	90	S	moderate	none	3.9	bottom	4.5	14.2	77	9.67	nr	7.42	3.0	Y
												0.5	14.5	99	10.00	nr	7.66	1.4	
												1.0	14.5	99	10.00	nr	7.75	1.5	
												1.5	14.5	99	10.00	nr	7.75	1.5	
												2.0	14.5	99	10.00	nr	7.74	1.7	
												2.5	14.3	99	9.90	nr	7.74	1.7	
												3.0	14.4	99	9.90	nr	7.73	1.8	
H17	27-Jul-11	nr	539783	6990002	14	25-50	S	light	nr	1.7	bottom	3.5	14.0	99	9.90	nr	7.73	1.9	Y
												0.5	17.2	98	8.86	99	7.74	0.7	
												1.0	17.2	97	8.83	99	7.77	0.6	
H2O	26-Jul-11	nr	540808	6988970	18	25-50	E	moderate	none	1.6	bottom	0.5	18.4	173	9.51	109	7.91	2.3	Y
												1.0	18.4	173	9.52	110	7.93	2.4	

APPENDIX B
Water Quality

Appendix B3. Limnology Data for the Meliadine Gold Project, July/August 2011

Station	Date	Time	Easting	Northing	Air Temp. (°C)	Cloud Cover (%)	Wind Direction	Wind Speed	Precipitation	Total Depth (m)	Secchi Depth (m)	Sample Depth (m)	Water Temp. (°C)	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)	pH	Turbidity (NTU)	Lab Sample (Y/N)
ML-E	1-Aug-11	10:55	543508	6987924	10	75-100	SE	moderate	none	7.8	bottom	0.5	14.9	67	9.50	102	7.29	0.3	Y
												1.0	14.9	67	9.49	101	7.33	0.4	
												1.5	14.9	67	9.48	101	7.35	0.6	
												2.0	14.9	67	9.48	101	7.37	0.5	
												2.5	14.9	67	9.46	101	7.38	0.9	
												3.0	14.9	67	9.47	101	7.38	0.8	
												3.5	14.9	67	9.44	101	7.37	1.0	
												4.0	14.9	67	9.45	101	7.38	1.1	
												4.5	14.9	67	9.43	101	7.39	1.3	
												5.0	14.9	67	9.43	101	7.37	1.2	
												5.5	14.9	67	9.39	100	7.37	1.3	
												6.0	14.8	67	9.39	100	7.38	1.4	
												6.5	14.8	67	9.39	100	7.37	1.6	
												7.0	14.8	67	9.38	100	7.38	1.6	
												7.5	14.7	67	9.36	100	7.38	1.7	
ML-SE	27-Jul-11	nr	535439	6986519	14	50	S	light	none	4.5	bottom	0.5	17.8	92	9.25	105	7.70	1.0	Y
												1.0	17.8	92	9.25	105	7.75	1.1	
												1.5	17.8	92	9.25	105	7.77	1.2	
												2.0	17.8	92	9.23	105	7.79	1.3	
												2.5	17.7	92	9.26	105	7.81	1.6	
												3.0	17.7	92	9.31	106	7.84	1.8	
												3.5	17.7	92	9.30	106	7.83	2.2	
												4.0	17.7	92	9.31	106	7.85	2.0	
BOOT-2	31-Jul-11	15:55	542056	6989289	nr	nr	nr	nr	nr	10.0	8.5	0.5	15.0	65	9.51	102	7.18	0.4	Y
												1.0	nr	nr	nr	nr	nr	nr	
												1.5	15.0	65	9.52	102	7.19	0.6	
												2.0	15.0	65	9.50	102	7.21	0.7	
												2.5	15.0	65	9.48	101	7.26	1.0	
												3.0	15.0	65	9.48	101	7.26	1.1	
												3.5	14.9	65	9.48	101	7.28	1.2	
												4.0	14.9	65	9.48	101	7.29	1.3	
												4.5	14.9	65	9.46	101	7.29	1.4	
												5.0	14.8	65	9.47	101	7.30	1.6	
												5.5	14.8	66	9.45	101	7.31	1.6	
												6.0	14.8	66	9.47	101	7.34	1.7	
												6.5	14.8	66	9.46	101	7.33	1.8	
												7.0	14.8	66	9.47	101	7.34	1.9	
												7.5	14.8	66	9.46	101	7.35	1.9	
												8.0	14.8	66	9.46	101	7.34	1.9	
												8.5	14.7	66	9.45	101	7.34	2.0	
												9.0	14.7	66	9.45	100	7.34	2.0	
Control Lake	29-Jul-11	15:05	534586	6986744	15	10	NW	light	none	5.6	bottom	0.5	16.8	81	9.24	103	7.57	1.3	Y
												1.0	16.7	80	9.26	103	7.61	1.3	
												1.5	16.7	80	9.26	103	7.63	1.5	
												2.0	16.7	80	9.19	102	7.64	1.6	
												2.5	16.7	80	9.23	103	7.66	1.8	
												3.0	16.7	80	9.18	102	7.67	1.8	
												3.5	16.7	80	9.20	102	7.68	1.9	
												4.0	16.7	80	9.20	102	7.69	2.0	
												4.5	16.7	80	9.18	102	7.69	2.1	
												5.0	16.7	80	9.19	102	7.70	2.2	

Notes:
 Equipment: Hydrolab Datasonde; select dissolved oxygen values were confirmed with the Winkler method.
 °C = degrees Celsius; % = percent; m = metres; µS/cm = microSiemens per centimetre; mg/L = milligrams per litre; NE = northeast; nr = not recorded; < = less than; NW = northwest; N = north, S = south; E = east; SE = southeast.

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG ^a	Sample ID ->	B2	B2	B36	B45	B45	B46	ST B4-45	B5	B6
			ALS ID ->	L994347-1	L1035657-1	L1036354-3	L994347-6	L1035657-2	L1036354-4	L1036354-2	L994347-3	L994347-4
			Date Sampled ->	11-Apr-11	20-Jul-11	24-Jul-11	11-Apr-11	21-Jul-11	24-Jul-11	23-Jul-11	9-Apr-11	9-Apr-11
			Detection Limit	water	water	water	water	water	water	water	water	water
Conventionals												
Total Suspended Solids	mg/L	-	3.0	<3.0	<3.0	<3.0	5.0	<3.0	<3.0	5.0	<3.0	<3.0
Total Dissolved Solids (Measured)	mg/L	-	5.0	283	42	170	556	32	70	68	313	448
Total Dissolved Solids (Calculated)	mg/L	-	n/a	241	45.5	143	482	40.3	64.5	54.9	247	332
Alkalinity, Total (as CaCO ₃)	mg/L	-	5.0	162	29.3	96.9	362	30.5	50	33.9	143	137
Conductivity	µS/cm	-	0.20	451	91.5	276	864	79.9	129	112	480	672
Hardness (as CaCO ₃)	mg/L	-	n/a	190	34.3	115	394	30	48.9	38.1	203	280
pH	pH	6.5-9.0	0.10	7.72	7.65	8.39	7.73	7.93	8.16	7.92	7.63	7.64
Major Ions												
Bicarbonate (HCO ₃)	mg/L	-	5.0	197	35.7	115	442	37.2	61	41.4	174	167
Carbonate (CO ₃)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	-	0.50	35.5	8.43	13.3	50.6	4.32	6.66	10.8	56.5	116
Hydroxide (OH)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ion Balance	%	-	n/a	104	-	-	101	-	-	-	101	102
Sulfate (SO ₄)	mg/L	-	0.50	14.6	2.69	21.2	28.1	2.82	4.39	3.99	11.9	9.83
Nutrients												
Ammonia as Nitrogen	mg/L	^(f)	0.050	0.128	<0.050	<0.050	0.082	<0.050	<0.050	<0.050	0.092	0.182
Nitrate and Nitrite as Nitrogen	mg/L	-	0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071
Nitrate (as Nitrogen)	mg/L	13	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (as Nitrogen)	mg/L	-	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Kjeldahl Nitrogen	mg/L	-	0.20	0.87	<0.20	0.84	1.64	0.26	0.39	0.38	0.8	0.99
Orthophosphate-Dissolved (as P)	mg/L	-	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus-Total Dissolved	mg/L	-	0.0010	0.0050	0.0056	0.0029	0.0079	0.0073	0.0012	0.0023	0.0041	0.0046
Phosphorus-Total	mg/L	-	0.0010	0.0086	0.0093	0.0149	0.0151 *	0.0129	0.0046	0.0162	0.0069	0.0084
Cyanide, Total	mg/L	-	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Carbon	mg/L	-	1.0	52	25.6	31.9	106	14.6	28.7	12.1	48.2	48.4
Total Inorganic Carbon	mg/L	-	1.0	40.3	5.1	22.6	92.1	3.8	12	8.6	36.4	34.6
Total Organic Carbon	mg/L	-	1.0	13	5.1	12.2	28.3	6.1	6.8	5.5	13.4	14.2
Total Metals, Metalloids, and Non-Metals												
Aluminum (Al)	mg/L	0.1 ^(b)	0.0010	<0.0010	0.0058	0.0259	0.0099 *	0.0065	0.0071	0.0364	<0.0010	<0.0010
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	0.005	0.00010	0.00145	0.00118	0.00405	0.00275	0.00099	0.00142	0.00237	0.00283	0.00164
Barium (Ba)	mg/L	-	0.000050	0.0592	0.0107	0.0288	0.119	0.0114	0.017	0.0142	0.0725	0.104
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	1.5	0.0020	0.0114	0.0055	0.0044	0.0159	0.0057	0.0056	0.0069	0.0069	0.0069
Cadmium (Cd)	mg/L	0.000017 ^(c1)	0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value				0.000058	0.000013	0.000037	0.000108	0.000012	0.000018	0.000014	0.000061	0.000080
Calcium (Ca)	mg/L	-	0.020	59.2	12.1	36.9	131	11.1	15.9	12.9	64.8	96.4
Chromium (Cr)	mg/L	0.001 ^(d)	0.00010	<0.00010	0.00194	0.0002	0.00021	<0.00010	<0.00010	0.00018	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	0.00010	0.00039	<0.00010	0.00014	0.00078	<0.00010	<0.00010	0.0002	0.00066	0.00022
Copper (Cu)	mg/L	0.002 ^(c2)	0.00010	0.00193	0.00098	0.00346	0.00468	0.00133	0.00144	0.00163	0.00132	0.0016
Hardness based screening value				0.0041	0.0009	0.0027	0.0076	0.0008	0.0013	0.0010	0.0043	0.0057
Iron (Fe)	mg/L	0.3	0.010	0.579	0.139	0.115	0.461	0.108	0.103	0.421	0.61	0.211
Lead (Pb)	mg/L	0.001 ^(c3)	0.000050	<0.000050	<0.000050	0.000078	<0.000050	<0.000050	<0.000050	0.000076	<0.000050	<0.000050
Hardness based screening value				0.0072	0.0008	0.0038	0.0182	0.0007	0.0013	0.0009	0.0078	0.0118
Lithium (Li)	mg/L	-	0.0050	<0.0050	<0.0050	<0.0050	0.0068	<0.0050	<0.0050	<0.0050	0.0115	0.0301
Magnesium (Mg)	mg/L	-	0.0050	7.6	1.37	5.68	13.7	1.15	1.89	1.76	8.58	9.8
Manganese (Mn)	mg/L	-	0.000050	0.378	0.00945	0.0225	0.432	0.00956	0.00728	0.0385	0.276	0.142
Mercury (Hg)	mg/L	0.026 ^(e)	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	0.073	0.000050	0.000706	0.000698	0.000559	0.000918	0.000272	0.000287	0.000361	0.000204	0.000183
Nickel (Ni)	mg/L	0.025 ^(c4)	0.00010	0.00198	0.00068	0.00207	0.005	0.00092	0.00103	0.00099	0.00256	0.00366
Hardness based screening value				0.156	0.042	0.106	0.271	0.038	0.055	0.046	0.164	0.209
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	3.81	0.844	2.12	9.07	0.982	1.45	1.05	3.66	5
Selenium (Se)	mg/L	0.001	0.00010	0.00011	<0.00010	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L	-	0.050	1.97	0.223	0.657	4.61	0.273	0.398	0.25	2.01	2.37
Silver (Ag)	mg/L	0.0001	0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	18.4	3.31	6.11	27.9	2.78	3.67	4.82	13.6	14.2
Strontium (Sr)	mg/L	-	0.00010	0.248	0.0548	0.166	0.55	0.0436	0.0696	0.0612	0.364	0.649
Thallium (Tl)	mg/L	0.0008	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	<0.00030	0.00145	0.00062	<0.00030	<0.00030	0.00213	<0.00030	<0.00030
Uranium (U)	mg/L	0.015	0.000010	0.000263	0.000034	0.000208	0.00057	0.000026	0.00004	0.000061	0.000124	0.000112
Vanadium (V)	mg/L	-	0.00010	<0.00010	0.00027	0.0003	0.00014	0.0001	0.00018	0.00037	<0.00010	<0.00010
Zinc (Zn)	mg/L	0.03	0.0010	0.0012	<0.0030	<0.0030	0.0071	0.0033	<0.0030	<0.0030	<0.0010	<0.0010

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG ^a	Sample ID ->	B2	B2	B36	B45	B45	B46	ST B4-45	B5	B6
			ALS ID ->	L994347-1	L1035657-1	L1036354-3	L994347-6	L1035657-2	L1036354-4	L1036354-2	L994347-3	L994347-4
			Date Sampled ->	11-Apr-11	20-Jul-11	24-Jul-11	11-Apr-11	21-Jul-11	24-Jul-11	23-Jul-11	9-Apr-11	9-Apr-11
			Detection Limit	water	water	water	water	water	water	water	water	water
Dissolved Metals, Metalloids, and Non-Metals												
Aluminum (Al)	mg/L	-	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	-	0.00010	0.00132	0.00101	0.00391	0.00246	0.00091	0.00131	0.00154	0.00156	0.00148
Barium (Ba)	mg/L	-	0.000050	0.0608	0.0104	0.0287	0.125	0.0114	0.018	0.0135	0.0746	0.106
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	-	0.0020	0.0123	0.0072	0.004	0.0151	0.0048	0.0045	0.0062	0.007	0.0065
Cadmium (Cd)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value	-	-	-	0.000058	0.000013	0.000037	0.000108	0.000012	0.000018	0.000014	0.000061	0.000080
Calcium (Ca)	mg/L	-	0.020	65.9 *	11.8 *	41.0 *	139 *	11.1 *	18.6 *	13.9 *	71.1 *	102 *
Chromium (Cr)	mg/L	-	0.00010	<0.00010	<0.00010	0.00011	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	0.00010	0.0004	<0.00010	<0.00010	0.00071	<0.00010	<0.00010	<0.00010	0.00054	0.00013
Copper (Cu)	mg/L	-	0.00010	0.00202	0.00077	0.00175	0.00454	0.00103	0.00135	0.00097	0.00136	0.00161
Hardness based screening value	-	-	-	0.0041	0.0009	0.0027	0.0076	0.0008	0.0013	0.0010	0.0043	0.0057
Iron (Fe)	mg/L	-	0.010	0.208	0.033	0.023	0.101 *	0.033	0.034	0.088	0.073	0.071
Lead (Pb)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Hardness based screening value	-	-	-	0.0072	0.0008	0.0038	0.0182	0.0007	0.0013	0.0009	0.0078	0.0118
Lithium (Li)	mg/L	-	0.0050	<0.0050	<0.0050	<0.0050	0.0064	<0.0050	<0.0050	<0.0050	0.0123	0.0297
Magnesium (Mg)	mg/L	-	0.0050	7.94 *	1.38 *	5.72 *	14.1 *	1.14 *	2.03 *	1.76 *	8.88 *	9.80 *
Manganese (Mn)	mg/L	-	0.000050	0.393	0.000917	0.00132	0.4	0.00226	0.00139	0.017	0.241	0.118
Mercury (Hg)	mg/L	-	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	-	0.000050	0.000667	0.000263	0.000537	0.000801	0.000234	0.000278	0.000349	0.000181	0.000178
Nickel (Ni)	mg/L	-	0.00010	0.00197	0.00056	0.00185	0.00508	0.00065	0.00101	0.00067	0.00256	0.00372
Hardness based screening value	-	-	-	0.156	0.042	0.106	0.271	0.038	0.055	0.046	0.164	0.209
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	3.88 *	0.852 *	2.16 *	9.21 *	0.969 *	1.59 *	1.04 *	3.69 *	4.86 *
Selenium (Se)	mg/L	-	0.00010	0.00011	<0.00010	<0.00010	0.00028	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L	-	0.050	2.03	0.229	0.617	4.49	0.266	0.404	0.213	2.07	2.4
Silver (Ag)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	18.4 *	3.40 *	6.25 *	27.9 *	2.83 *	3.95 *	4.93 *	13.8 *	13.8 *
Strontium (Sr)	mg/L	-	0.00010	0.249	0.052	0.168	0.506	0.0426	0.0717	0.0612	0.357	0.64
Thallium (Tl)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)	mg/L	-	0.000010	0.000251	0.00004	0.000197	0.000494	0.000022	0.00004	0.000038	0.000116	0.000106
Vanadium (V)	mg/L	-	0.00010	<0.00010	<0.00010	0.00017	0.0001	<0.00010	0.00012	0.00011	<0.00010	<0.00010
Zinc (Zn)	mg/L	-	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes:

* = Result Qualified

Bolded and shaded values exceed CWQGs.

(a) = Canadian water quality guidelines for the protection of freshwater aquatic life (CCME 2011).

(b) = The guideline for aluminum is pH-dependent and is 0.1 mg/L when pH≥6.5 and 0.005 mg/L when pH <6.5.

(c) = The guidelines for cadmium, copper, lead, and nickel are hardness-dependent.

(c1) = Guideline calculated using the equation: $10^{0.86[\log_{10}(\text{hardness}) - 3.2]} / 1000$. The minimum guideline is 0.000017 mg/L.

(c2) = Guideline calculated using the equation: $10^{0.854[\ln(\text{hardness}) - 1.465]} \times 0.2 / 1000$. The minimum guideline is 0.002 mg/L.

(c3) = Guideline calculated using the equation: $e^{1.273[\ln(\text{hardness}) - 4.705]} / 1000$. The minimum guideline is 0.001 mg/L.

(c4) = Guideline calculated using the equation: $e^{0.76[\ln(\text{hardness}) + 1.06]} / 1000$. The minimum guideline is 0.025 mg/L.

(d) = The CWQG speciation-dependent (i.e., 0.0089 mg/L for trivalent Cr and 0.001 mg/L for hexavalent Cr). The value of 0.001 mg/L was used for screening.

(e) = The guideline is for inorganic mercury.

(f) = The guideline for ammonia is dependent on pH and water temperature.

ID = identification; CWQG = Canadian water quality guidelines; mg/L = milligrams per litre; "-" = not applicable; < = less than; µS/cm = microSiemens per centimetre; % = percent.

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG ^a	Sample ID ->	B7	D4	D5	D7	D7	D23	E3	E3	E4
			ALS ID ->	L994347-5	L1034354-2	L1034354-1	L994347-2	L1036354-1	L1034354-3	L994347-7	L1034354-4	L994347-8
			Date Sampled ->	9-Apr-11	17-Jul-11	17-Jul-11	9-Apr-11	22-Jul-11	18-Jul-11	9-Apr-11	19-Jul-11	9-Apr-11
			Detection Limit	water	water	water	water	water	water	water	water	water
Conventional												
Total Suspended Solids	mg/L	-	3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (Measured)	mg/L	-	5.0	423	97	75	329	72	42	143	40	359
Total Dissolved Solids (Calculated)	mg/L	-	n/a	300	79.7	69.1	292	68.9	41.7	125	40.1	306
Alkalinity, Total (as CaCO ₃)	mg/L	-	5.0	110	51	47.2	208	50.7	33.5	97.6	31.6	248
Conductivity	µS/cm	-	0.20	617	161	138	542	139	83.8	242	80	583
Hardness (as CaCO ₃)	mg/L	-	n/a	253	56.4	50.4	219	47.2	32.3	103	31.1	247
pH	pH	6.5-9.0	0.10	7.64	8.1	8.07	7.73	8.15	7.98	7.74	7.96	7.74
Major Ions												
Bicarbonate (HCO ₃)	mg/L	-	5.0	134	62.2	57.5	254	61.9	40.9	119	38.6	302
Carbonate (CO ₃)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	-	0.50	114	13.7	10.3	38.8	9.85	4.16	12.7	4.59	32.2
Hydroxide (OH)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ion Balance	%	-	n/a	102			103			100		96.6
Sulfate (SO ₄)	mg/L	-	0.50	8.19	6.64	5.22	15.6	3.89	2.33	5.55	1.7	10.4
Nutrients												
Ammonia as Nitrogen	mg/L	^(f)	0.050	0.214	<0.050	<0.050	0.254	<0.050	<0.050	0.128	<0.050	0.529
Nitrate and Nitrite as Nitrogen	mg/L	-	0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071
Nitrate (as Nitrogen)	mg/L	13	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (as Nitrogen)	mg/L	-	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Kjeldahl Nitrogen	mg/L	-	0.20	0.91	0.53	0.45	1.21	0.28	0.33	0.7	0.27	1.88
Orthophosphate-Dissolved (as P)	mg/L	-	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus-Total Dissolved	mg/L	-	0.0010	0.0041	0.0038	0.0039	0.0346 *	0.0034	0.0021	0.0039	<0.0010	0.0061
Phosphorus-Total	mg/L	-	0.0010	0.0081	0.0112	0.0104	0.0248 *	0.0067	0.0073	0.0097	<0.0010	0.0115
Cyanide, Total	mg/L	-	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Carbon	mg/L	-	1.0	38.6	18.3	17	64	21.9	12.1 *	32.1	12	89.6
Total Inorganic Carbon	mg/L	-	1.0	28.3	9.6	14.7	52	12.2	9.2	24.2	13.9	62.1
Total Organic Carbon	mg/L	-	1.0	12	7.6	6.4	15.9	5.4	4.7	9.4	4.8	26.9
Total Metals, Metalloids, and Non-Metals												
Aluminum (Al)	mg/L	0.1 ^(b)	0.0010	0.0025	0.0093	0.0078	<0.0010	0.0055	0.0064	<0.0010	<0.0030	0.0015
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	0.005	0.00010	0.00153	0.0017	0.00105	0.00122	0.0011	0.00129	0.00099	0.00081	0.00273
Barium (Ba)	mg/L	-	0.000050	0.0841	0.0186	0.0181	0.0803	0.0164	0.0104	0.0317	0.00967	0.108
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	1.5	0.0020	0.0068	0.0093	0.0072	0.0253	0.01	0.0028	0.0036	0.0052	0.0105
Cadmium (Cd)	mg/L	0.000017 ^(c1)	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value				0.000074	0.000020	0.000018	0.000065	0.000017	0.000013	0.000034	0.000012	0.000072
Calcium (Ca)	mg/L	-	0.020	88.3	19.6	16.6	65.7	15.3	11.6	34.9	11.4	84.3
Chromium (Cr)	mg/L	0.001 ^(d)	0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Cobalt (Co)	mg/L	-	0.00010	0.00013	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00068
Copper (Cu)	mg/L	0.002 ^(c2)	0.00010	0.0012	0.001	0.00086	0.0019	0.00086	0.00083	0.00122	0.00057	0.00244
Hardness based screening value				0.0052	0.0014	0.0013	0.0046	0.0012	0.0009	0.0024	0.0009	0.0051
Iron (Fe)	mg/L	0.3	0.010	0.195	0.289	0.233	0.011 *	0.084	0.184	0.15	0.094	0.692
Lead (Pb)	mg/L	0.001 ^(c3)	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000512	<0.000050	<0.000050
Hardness based screening value				0.0104	0.0015	0.0013	0.0086	0.0012	0.0008	0.0033	0.0007	0.0101
Lithium (Li)	mg/L	-	0.0050	0.032	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0055
Magnesium (Mg)	mg/L	-	0.0050	8.06	3.12	2.66	11.7	2.93	1.45	3.94	1.28	11.5
Manganese (Mn)	mg/L	-	0.000050	0.0775	0.0159	0.0183	0.195	0.0105	0.0194	0.0503	0.0134	0.48
Mercury (Hg)	mg/L	0.026 ^(d)	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	0.073	0.000050	0.000282	0.000443	0.000373	0.000706	0.000427	0.000134	0.000295	0.000169	0.000377
Nickel (Ni)	mg/L	0.025 ^(d4)	0.00010	0.00324	0.0011	0.00099	0.00242	0.00086	0.00076	0.00204	0.00074	0.00618
Hardness based screening value				0.194	0.062	0.057	0.173	0.054	0.040	0.098	0.039	0.190
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	4.27	1.26	1.07	4.95	1.22	0.628	2.2	0.78	4.98
Selenium (Se)	mg/L	0.001	0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	0.00015
Silicon (Si)	mg/L	-	0.050	3.31	0.284	0.224	1.56	0.12	0.375	1.57	0.255	2.82
Silver (Ag)	mg/L	0.0001	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	11.2	7.33	6.24	28.5	7.5	2.69	7.2	2.66	19.4
Strontium (Sr)	mg/L	-	0.00010	0.721	0.0895	0.079	0.311	0.0763	0.0526	0.171	0.0527	0.39
Thallium (Tl)	mg/L	0.0008	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	0.00042	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)	mg/L	0.015	0.000010	0.000111	0.000081	0.000055	0.000432	0.000095	0.000017	0.00007	0.000043	0.000245
Vanadium (V)	mg/L	-	0.00010	<0.00010	0.00025	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)	mg/L	0.03	0.0010	0.0027	<0.0030	<0.0030	0.0021	0.0033	<0.0030	<0.0010	<0.0030	<0.0010

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG ^a	Sample ID ->	B7	D4	D5	D7	D7	D23	E3	E3	E4
			ALS ID ->	L994347-5	L1034354-2	L1034354-1	L994347-2	L1036354-1	L1034354-3	L994347-7	L1034354-4	L994347-8
			Date Sampled ->	9-Apr-11	17-Jul-11	17-Jul-11	9-Apr-11	22-Jul-11	18-Jul-11	9-Apr-11	19-Jul-11	9-Apr-11
			Detection Limit	water	water	water	water	water	water	water	water	water
Dissolved Metals, Metalloids, and Non-Metals												
Aluminum (Al)	mg/L	-	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	-	0.00010	0.00135	0.00131	0.00091	0.00157	0.0009	0.001	0.00089	0.0007	0.00215
Barium (Ba)	mg/L	-	0.000050	0.0865	0.0191	0.0189	0.0846	0.0159	0.0108	0.0325	0.0102	0.108
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	-	0.0020	0.0065	0.0101	0.0085	0.0256	0.0088	0.0039	0.0034	0.0033	0.01
Cadmium (Cd)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value		-		0.000074	0.000020	0.000018	0.000065	0.000017	0.000013	0.000034	0.000012	0.000072
Calcium (Ca)	mg/L	-	0.020	94.6 *	19.1 *	16.7 *	72.2 *	16.8 *	11.9 *	36.7 *	11.3 *	87.4 *
Chromium (Cr)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	0.00061
Copper (Cu)	mg/L	-	0.00010	0.00123	0.00087	0.00068	0.00225	0.00066	0.00048	0.00111	0.00048	0.00245
Hardness based screening value		-		0.0052	0.0014	0.0013	0.0046	0.0012	0.0009	0.0024	0.0009	0.0051
Iron (Fe)	mg/L	-	0.010	0.038	0.102	0.094	0.175 *	0.024	0.064	0.065	0.048	0.182
Lead (Pb)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000096	<0.000050	<0.000050
Hardness based screening value		-		0.0104	0.0015	0.0013	0.0086	0.0012	0.0008	0.0033	0.0007	0.0101
Lithium (Li)	mg/L	-	0.0050	0.0308	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056
Magnesium (Mg)	mg/L	-	0.0050	8.36 *	3.27 *	2.81 *	12.0 *	2.89 *	1.46 *	3.96 *	1.23 *	11.7 *
Manganese (Mn)	mg/L	-	0.000050	0.0639	0.00319	0.00516	0.22	0.002	0.0056	0.036	0.00316	0.468
Mercury (Hg)	mg/L	-	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	-	0.000050	0.000237	0.000428	0.000348	0.000693	0.000392	0.000119	0.000277	0.000159	0.000352
Nickel (Ni)	mg/L	-	0.00010	0.00327	0.00103	0.0009	0.00255	0.0007	0.00071	0.00208	0.00074	0.0061
Hardness based screening value		-		0.194	0.062	0.057	0.173	0.054	0.040	0.098	0.039	0.190
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	4.39 *	1.31 *	1.13 *	4.88 *	1.20 *	0.665 *	2.20 *	0.744 *	4.96 *
Selenium (Se)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00015
Silicon (Si)	mg/L	-	0.050	3.2	0.27	0.221	1.55	0.108	0.379	1.58	0.247	2.88
Silver (Ag)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	11.2 *	7.38 *	6.37 *	28.0 *	7.58 *	2.59 *	7.06 *	2.54 *	19.2 *
Strontium (Sr)	mg/L	-	0.00010	0.651	0.0846	0.0772	0.305	0.0724	0.0521	0.17	0.0552	0.382
Thallium (Tl)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)	mg/L	-	0.000010	0.000102	0.000073	0.000049	0.00041	0.000086	0.000015	0.000066	0.000022	0.000227
Vanadium (V)	mg/L	-	0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)	mg/L	-	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes:

* = Result Qualified

Bolded and shaded values exceed CWQGs.

(a) = Canadian water quality guidelines for the protection of freshwater aquatic life (CCME 2011).

(b) = The guideline for aluminum is pH-dependent and is 0.1 mg/L when pH≥6.5 and 0.005 mg/L when pH <6.5.

(c) = The guidelines for cadmium, copper, lead, and nickel are hardness-dependent.

(c1) = Guideline calculated using the equation: $10^{0.86[\log_{10}(\text{hardness}) - 3.2]} / 1000$. The minimum guideline is 0.000017 mg/L.

(c2) = Guideline calculated using the equation: $10^{0.854[\log_{10}(\text{hardness}) - 1.465]} * 0.2 / 1000$. The minimum guideline is 0.002 mg/L.

(c3) = Guideline calculated using the equation: $10^{1.273[\log_{10}(\text{hardness}) - 4.705]} / 1000$. The minimum guideline is 0.001 mg/L.

(c4) = Guideline calculated using the equation: $10^{0.76[\log_{10}(\text{hardness}) + 1.06]} / 1000$. The minimum guideline is 0.025 mg/L.

(d) = The CWQG speciation-dependent (i.e., 0.0089 mg/L for trivalent Cr and 0.001 mg/L for hexavalent Cr). The value of 0.001 mg/L was used for screening.

(e) = The guideline is for inorganic mercury.

(f) = The guideline for ammonia is dependent on pH and water temperature.

ID = identification; CWQG = Canadian water quality guidelines; mg/L = milligrams per litre; "-" = not applicable; < = less than; µS/cm = microSiemens per centimetre; % = percent.

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG ^a	Sample ID ->	E4	H17	H2O	ML-E	ML-SE	Boot-2	Control Lake
			ALS ID ->	L1034354-5	L1038799-2	L1038799-1	L1042092-1	L1038799-3	L1038806-2	L1038806-1
			Date Sampled ->	19-Jul-11	27-Jul-11	26-Jul-11	1-Aug-11	27-Jul-11	31-Jul-11	29-Jul-11
			Detection Limit	water	water	water	water	water	water	water
Conventionals										
Total Suspended Solids	mg/L	-	3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Total Dissolved Solids (Measured)	mg/L	-	5.0	61	63	136 *	43	63	45	55
Total Dissolved Solids (Calculated)	mg/L	-	n/a	51.8	49.6	84.5	34.8	46.5	32.2	41.1
Alkalinity, Total (as CaCO ₃)	mg/L	-	5.0	39.8	37.9	41.1	17.7	29.4	15.1	26.3
Conductivity	µS/cm	-	0.20	105	101	179	69.6	94.7	66.8	81.4
Hardness (as CaCO ₃)	mg/L	-	n/a	39.6	35.9	58.9	21	32.4	20.6	26.7
pH	pH	6.5-9.0	0.10	8.06	8.03	8.04	7.69	7.95	7.66	7.84
Major Ions										
Bicarbonate (HCO ₃)	mg/L	-	5.0	48.6	46.2	50.1	21.5	35.9	18.4	32.1
Carbonate (CO ₃)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride (Cl)	mg/L	-	0.50	6.6	6.33	25.4	7.89	8.83	7.74	8.21
Hydroxide (OH)	mg/L	-	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ion Balance	%	-	n/a							
Sulfate (SO ₄)	mg/L	-	0.50	2.21	1.95	3.67	3.1	2.86	2.9	1.76
Nutrients										
Ammonia as Nitrogen	mg/L	^(b)	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate and Nitrite as Nitrogen	mg/L	-	0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071
Nitrate (as Nitrogen)	mg/L	13	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (as Nitrogen)	mg/L	-	0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Kjeldahl Nitrogen	mg/L	-	0.20	0.42	0.44	0.75	<0.20	0.25	<0.20	0.25
Orthophosphate-Dissolved (as P)	mg/L	-	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus-Total Dissolved	mg/L	-	0.0010	0.0021	0.0044	0.0063	0.0023	0.0032	0.0025	0.0025
Phosphorus-Total	mg/L	-	0.0010	0.0079	0.0096	0.0121	0.0028	0.0064	0.0037	0.0043
Cyanide, Total	mg/L	-	0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Carbon	mg/L	-	1.0	14.9	19.9	28.2	25.1	12.4	8	10.1
Total Inorganic Carbon	mg/L	-	1.0	11.3	10.3	10.8	4.5	7.9	5.1	7
Total Organic Carbon	mg/L	-	1.0	6.3	7.1	12.9	5.3	4.6	4.4	4.7
Total Metals, Metalloids, and Non-Metals										
Aluminum (Al)	mg/L	0.1 ^(b)	0.0010	0.0073	0.0074	0.0172	<0.0030	0.0047	<0.0030	0.006
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	0.005	0.00010	0.00107	0.00227	0.002	0.00035	0.00058	0.00034	0.00059
Barium (Ba)	mg/L	-	0.000050	0.0161	0.0179	0.0192	0.00742	0.00962	0.00708	0.00782
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	1.5	0.0020	0.0044	0.0201	0.0064	0.009	0.0043	0.0031	0.0052
Cadmium (Cd)	mg/L	0.000017 ^(c1)	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value				0.000015	0.000014	0.000021	0.000009	0.000013	0.000009	0.000011
Calcium (Ca)	mg/L	-	0.020	13.8	11.1	18.5	6.13	10.9	6.8	9.28
Chromium (Cr)	mg/L	0.001 ^(d)	0.00010	<0.00010	<0.00010	0.00048	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L	0.002 ^(c2)	0.00010	0.00094	0.001	0.00181	0.0008	0.00073	0.0008	0.00094
Hardness based screening value				0.0011	0.0010	0.0015	0.0006	0.0009	0.0006	0.0008
Iron (Fe)	mg/L	0.3	0.010	0.156	0.148	0.24	0.024	0.041	0.024	0.052
Lead (Pb)	mg/L	0.001 ^(c3)	0.000050	<0.000050	<0.000050	0.000103	<0.000050	<0.000050	<0.000050	<0.000050
Hardness based screening value				0.0010	0.0009	0.0016	0.0004	0.0008	0.0004	0.0006
Lithium (Li)	mg/L	-	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L	-	0.0050	1.81	2.4	3.57	1.08	1.46	1.16	1.17
Manganese (Mn)	mg/L	-	0.000050	0.0194	0.00733	0.00862	0.00384	0.00769	0.00426	0.00396
Mercury (Hg)	mg/L	0.026 ^(e)	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	0.073	0.000050	0.000241	0.000564	0.000569	0.000105	0.000164	0.000073	0.000191
Nickel (Ni)	mg/L	0.025 ^(c4)	0.00010	0.00123	0.00074	0.00178	0.00065	0.00046	0.00067	0.00057
Hardness based screening value				0.047	0.044	0.064	0.029	0.041	0.029	0.035
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	0.84	1.71	1.47	0.837	1.09	0.901	1.07
Selenium (Se)	mg/L	0.001	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L	-	0.050	0.172	0.149	0.2	0.24	0.307	0.233	0.119
Silver (Ag)	mg/L	0.0001	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	3.59	4.48	8.79	4.32	4.5	4.29	4.85
Strontium (Sr)	mg/L	-	0.00010	0.0673	0.0845	0.114	0.0314	0.0473	0.031	0.0328
Thallium (Tl)	mg/L	0.0008	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	<0.00030	0.00049	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)	mg/L	0.015	0.000010	0.00003	0.000039	0.000072	0.000019	0.000033	0.000015	0.000024
Vanadium (V)	mg/L	-	0.00010	<0.00010	0.00021	0.00034	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)	mg/L	0.03	0.0010	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

APPENDIX B
Water Quality

Appendix B4. Water Quality Data for the Meliadine Gold Project, 2011

Analyte	Units	CWQG *	Sample ID ->	E4	H17	H2O	ML-E	ML-SE	Boot-2	Control Lake
			ALS ID ->	L1034354-5	L1038799-2	L1038799-1	L1042092-1	L1038799-3	L1038806-2	L1038806-1
			Date Sampled ->	19-Jul-11	27-Jul-11	26-Jul-11	1-Aug-11	27-Jul-11	31-Jul-11	29-Jul-11
			Detection Limit	water	water	water	water	water	water	water
Dissolved Metals, Metalloids, and Non-Metals										
Aluminum (Al)	mg/L	-	0.0030	<0.0030	0.0058	0.0099	<0.0030	<0.0030	<0.0030	0.0034
Antimony (Sb)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)	mg/L	-	0.00010	0.00092	0.0019	0.00176	0.00038	0.00054	0.00035	0.00056
Barium (Ba)	mg/L	-	0.000050	0.0169	0.0173	0.0201	0.00735	0.00934	0.00706	0.00799
Beryllium (Be)	mg/L	-	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	-	0.0020	0.0052	0.0205	0.0065	0.0047	0.0053	0.0045	0.0053
Cadmium (Cd)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Hardness based screening value	-	-		0.000015	0.000014	0.000021	0.000009	0.000013	0.000009	0.000011
Calcium (Ca)	mg/L	-	0.020	14.3 *	11.6 *	19.3 *	6.10 *	11.5 *	6.04 *	8.51 *
Chromium (Cr)	mg/L	-	0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper (Cu)	mg/L	-	0.00010	0.00076	0.00097	0.00143	0.00071	0.00072	0.00076	0.00074
Hardness based screening value	-	-		0.0011	0.0010	0.0015	0.0006	0.0009	0.0006	0.0008
Iron (Fe)	mg/L	-	0.010	0.058	0.083	0.096	0.012	0.021	0.011	0.015
Lead (Pb)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Hardness based screening value	-	-		0.0010	0.0009	0.0016	0.0004	0.0008	0.0004	0.0006
Lithium (Li)	mg/L	-	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Magnesium (Mg)	mg/L	-	0.0050	1.88 *	2.47 *	3.82 *	1.18 *	1.53 *	1.18 *	1.13 *
Manganese (Mn)	mg/L	-	0.000050	0.00367	0.00161	0.00537	0.0013	0.00175	0.00133	0.001
Mercury (Hg)	mg/L	-	0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Molybdenum (Mo)	mg/L	-	0.000050	0.000201	0.000566	0.000527	0.000072	0.000162	0.000069	0.000144
Nickel (Ni)	mg/L	-	0.00010	0.00114	0.00071	0.00148	0.00065	0.00044	0.00069	0.00054
Hardness based screening value	-	-		0.047	0.044	0.064	0.029	0.041	0.029	0.035
Phosphorus (P)	mg/L	-	0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	0.050	0.899 *	1.73 *	1.59 *	0.902 *	1.10 *	0.913 *	1.11 *
Selenium (Se)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)	mg/L	-	0.050	0.173	0.141	0.174	0.233	0.291	0.223	0.108
Silver (Ag)	mg/L	-	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)	mg/L	-	0.050	3.70 *	4.64 *	9.26 *	4.29 *	4.71 *	4.28 *	4.72 *
Strontium (Sr)	mg/L	-	0.00010	0.0662	0.0832	0.116	0.0323	0.046	0.0311	0.0313
Thallium (Tl)	mg/L	-	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Tin (Sn)	mg/L	-	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium (U)	mg/L	-	0.000010	0.00003	0.00004	0.000061	0.000015	0.000035	0.000015	0.000021
Vanadium (V)	mg/L	-	0.00010	<0.00010	0.00014	0.00021	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)	mg/L	-	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Notes:

* = Result Qualified

Bolded and shaded values exceed CWQGs.

(a) = Canadian water quality guidelines for the protection of freshwater aquatic life (CCME 2011).

(b) = The guideline for aluminum is pH-dependent and is 0.1 mg/L when pH≥6.5 and 0.005 mg/L when pH <6.5.

(c) = The guidelines for cadmium, copper, lead, and nickel are hardness-dependent.

(c1) = Guideline calculated using the equation: $10^{0.86[\ln(\text{hardness})-3.2]} / 1000$. The minimum guideline is 0.000017 mg/L.

(c2) = Guideline calculated using the equation: $e^{0.8545[\ln(\text{hardness})-1.465]} * 0.2 / 1000$. The minimum guideline is 0.002 mg/L.

(c3) = Guideline calculated using the equation: $e^{0.273[\ln(\text{hardness})-4.705]} / 1000$. The minimum guideline is 0.001 mg/L.

(c4) = Guideline calculated using the equation: $e^{0.768[\ln(\text{hardness})+1.06]} / 1000$. The minimum guideline is 0.025 mg/L.

(d) = The CWQG speciation-dependent (i.e., 0.0089 mg/L for trivalent Cr and 0.001 mg/L for hexavalent Cr). The value of 0.001 mg/L was used for screening.

(e) = The guideline is for inorganic mercury.

(f) = The guideline for ammonia is dependent on pH and water temperature.

ID = identification; CWQG = Canadian water quality guidelines; mg/L = milligrams per litre; "n/a" = not applicable; < = less than; µS/cm = microSiemens per centimetre; % = percent.



APPENDIX C

Sediment Quality

APPENDIX C
Sediment Quality

Appendix C1. Sediment Quality for the Meliadine Gold Project, July/August 2011

Analyte	Units	Sample ID	B2	B36	B45	B46	ST B4-45	D4	D5	D7	D23
		ALS ID	L1035657-1	L1036354-3	L1035657-2	L1036354-4	L1036354-2	L1034354-2	L1034354-1	L1036354-1	L1034354-3
		Date Sampled	20-Jul-11	24-Jul-11	21-Jul-11	24-Jul-11	23-Jul-11	17-Jul-11	17-Jul-11	22-Jul-11	18-Jul-11
		Det. Limit	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment
Moisture Content	%	0.10	89.6	65.4	75.4	81.2	87.2	69.6	76.1	71.8	89.8
Gravel (>2 mm)	%	0.10	<0.10	<0.10	0.47	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Coarse Sand (2.0 mm - 0.2 mm)	%	0.10	1.32	2.23	7.38	1.76	2.89	0.82	8.58	6.27	4.81
Fine Sand (0.2 mm - 0.063 mm)	%	0.10	17.0	17.4	23.4	8.69	9.64	0.41	18.8	24.2	16.8
Silt (0.063 mm - 4 µm)	%	0.10	68.3	69.2	61.9	75	73.8	83.2	57.7	63.6	72.6
Clay (<4 µm)	%	0.10	13.3	11.2	6.88	14.6	13.7	15.5	15.0	5.98	5.86
CaCO ₃ Equivalent	%	0.70	1.26	5.6	0.77	1.95	2.58	1.47	6.18	1.28	<0.70
Total Inorganic Carbon	%	0.10	0.15	0.67	<0.10	0.23	0.31	0.18	0.74	0.15	<0.10
Total Carbon by Combustion	%	0.10	10.1	8.3	5.9	11.5	17	6.9	11.9	5.1	11.7
Total Organic Carbon	%	0.10	9.9	7.64	5.87	11.3	16.7	6.7	11.1	4.94	11.7

Analyte	Units	Sample ID	E3	E4	H17	H2O	ML-E	ML-SE	BOOT-2	Control
		ALS ID	L1034354-4	L1034354-5	L1038799-2	L1038799-1	L1042092-1	L1038799-3	L1038806-2	L1038806-1
		Date Sampled	19-Jul-11	19-Jul-11	27-Jul-11	26-Jul-11	1-Aug-11	27-Jul-11	31-Jul-11	29-Jul-11
		Det. Limit	sediment	sediment	sediment	sediment	sediment	sediment	sediment	sediment
Moisture Content	%	0.10	85.5	79.1	74.2	70	42.7	83	84.3	90.5
Gravel (>2 mm)	%	0.10	<0.10	0.33	0.16	<0.10	<0.10	<0.10	<0.10	<0.10
Coarse Sand (2.0 mm - 0.2 mm)	%	0.10	8.87	16.8	2.79	1.55	17.6	3.44	1.05	3.84
Fine Sand (0.2 mm - 0.063 mm)	%	0.10	33.2	27.1	14.1	5.26	46.1	25.3	7.01	28
Silt (0.063 mm - 4 µm)	%	0.10	52.6	51.3	63.7	70.4	33.3	60.1	68.8	59.0
Clay (<4 µm)	%	0.10	5.40	4.56	19.2	22.8	3.08	11.2	23.1	9.18
CaCO ₃ Equivalent	%	0.70	<0.70	<0.70	<0.70	1.23	0.92	<0.70	0.74	<0.70
Total Inorganic Carbon	%	0.10	<0.10	<0.10	<0.10	0.15	0.11	<0.10	<0.10	<0.10
Total Carbon by Combustion	%	0.10	8.4	5.7	15.2	12	0.9	5.8	7.2	9.1
Total Organic Carbon	%	0.10	8.37	5.72	15.2	11.9	0.77	5.8	7.18	9.08

Notes:

Det. = detection; ID = identification; % = percent; > = greater than; < = less than; mm = millimetre; µm = micrometre.



APPENDIX D

Aquatic Habitat

APPENDIX D
Aquatic Habitat

Appendix D1. Habitat Characteristics of Streams in the Study Area, 2011

Stream	Survey Date	Reach No.	Domin. Habitat Type	Stream Size							Flooded Width (m)	Channel Type ^a (% length)				Flooded Banks (%)	Habitat Type (% length)				Depth >0.5 m (% length)	Substrate ^b (% area)					Instream Cover ^c (% area)		
				Length (m)	Area (m²)	Channel Width (m)			Depth (m)			Sin	Dou	Mul	Dis		Riffle	Run	Pool	Flat		OM	Fi	Gr	Co	Bo	UC	BG	AV
						Mean	Min.	Max.	Mean	Max.																			
B5-31	14-Jul-11	1	Run	61	21	0.4	0.1	1.1	0.2	0.4	5	0	0	100	0	0	30	60	10	0	0	10	5	50	30	5	10	5	20
		2	Run	47	52	1.1	0.2	4.5	0.3	0.5	4	70	30	0	0	0	40	50	10	0	0	30	5	20	35	10	5	10	15
		Total		108	73	0.7	0.1	4.5	0.2	0.5	4	30	13	56	0	0	34	56	10	0	0	24	5	29	34	9	6	9	16
B31-30	14-Jul-11	1	Run	102	41	0.4	0.1	1.7	0.2	0.5	6	40	20	40		10	20	75	5	0	0	30	5	15	45	5	15	5	15
B31-32	14-Jul-11	1	Dry	163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B30-6	14-Jul-11	1	Run	66	40	0.6	0.3	1.9	0.3	0.4	25	60	0	40	0	60	10	90	0	0	0	75	0	5	15	5	5	0	25
B4-45	23-Jul-11	1	Run	30	120	4.0	3.5	4.5	0.3	0.5	30	100	0	0	0	15	0	45	10	45	0	15	5	5	45	30	0	10	0
E4-5	15-Jul-11	1	Flat	46	51	1.1	0.4	6.1	0.1	0.3	24	10	70	20	0	60	0	5	0	95	0	95	0	0	3	2	0	2	20
D23-24	18-Jul-11	1	Dry	129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

^a Sin = single channel; Dou = double channel; Mul = multiple (braided) channel; Dis = dispersed channel

^b OM = organic material; Fi = fines (silt & sand, <2 mm diameter); Gr = gravel (2 - 64 mm diameter); Co = cobble (65 - 256 mm diameter); Bo = boulder (>256 mm diameter)

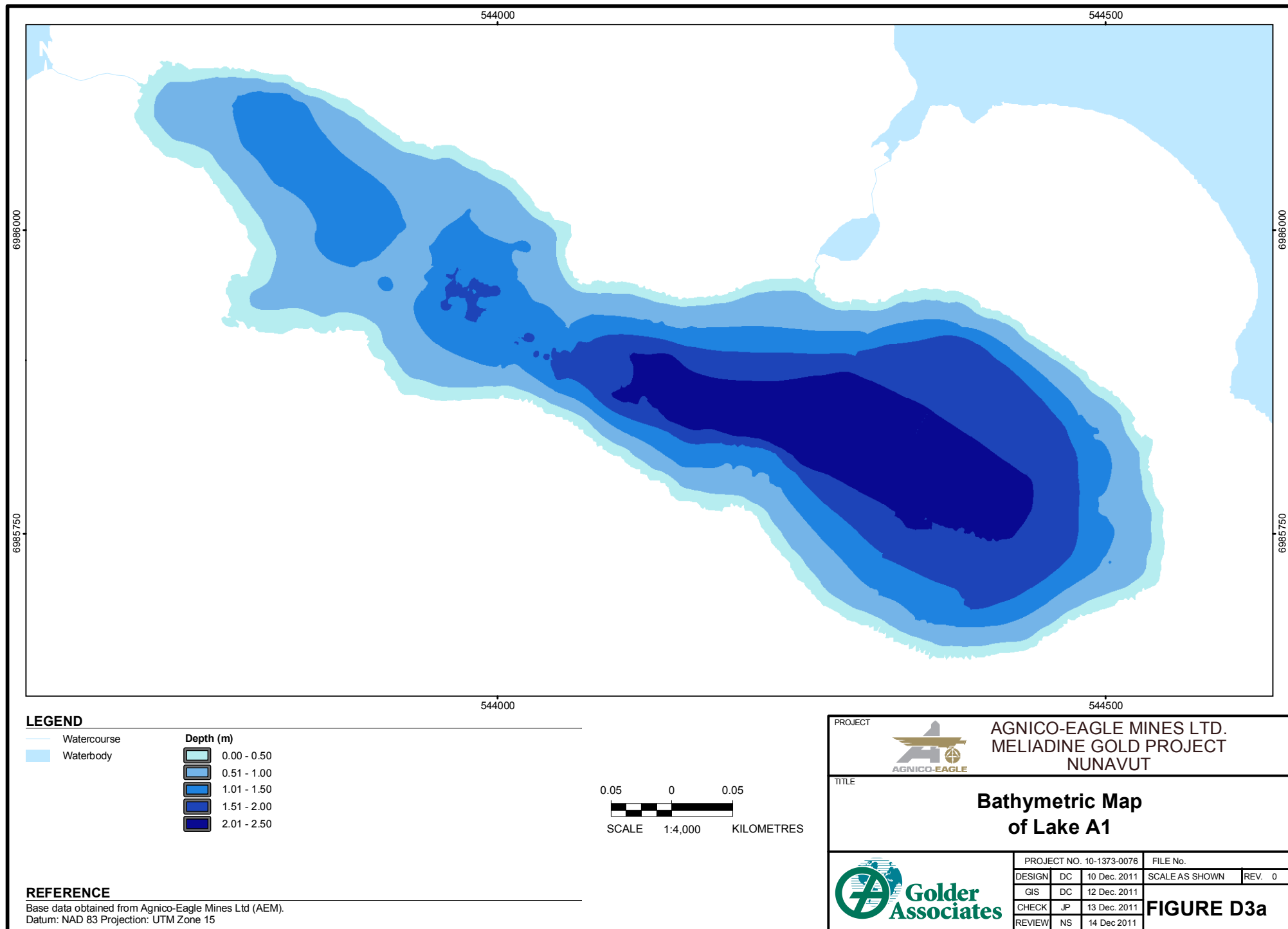
^c UC = undercut banks; BG = boulder gardens; AV = aquatic vegetation

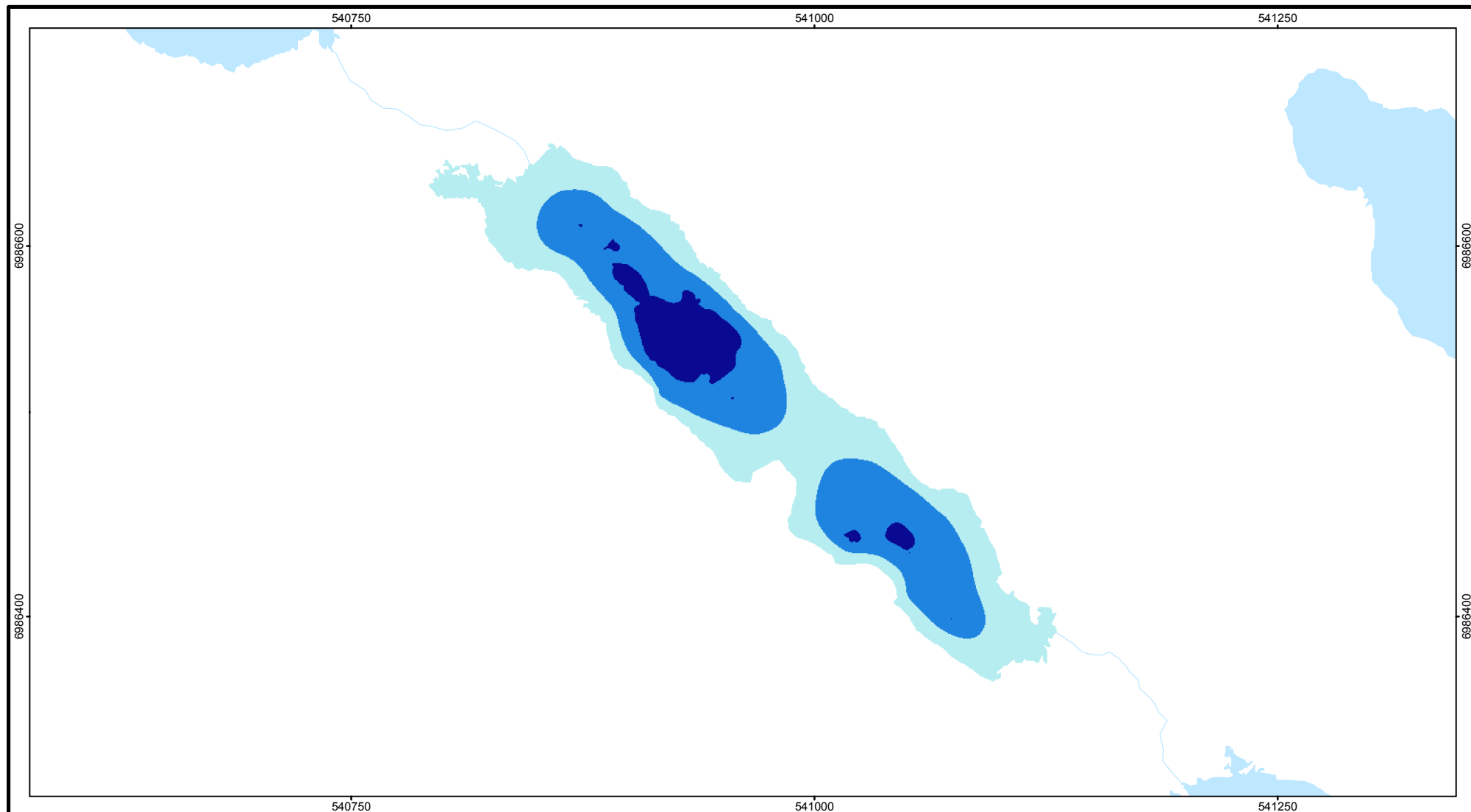
APPENDIX D
Aquatic Habitat

Appendix D2. Vertical Distribution of Lake Area and Volume in Surveyed Waterbodies of the Study Area, 2011.

Lake	Area (ha) of Water Deeper than												Percentage (%) of Total Lake Area Deeper than											
	0 m	0.5 m	1 m	1.5 m	2 m	2.5 m	3 m	3.5 m	4 m	4.5 m	5 m	5.5 m	0 m	0.5 m	1 m	1.5 m	2 m	2.5 m	3 m	3.5 m	4 m	4.5 m	5 m	5.5 m
A1	16.39	14.25	9.25	5.30	2.28	0.00							100.0	87.0	56.4	32.3	13.9	0.0						
A7	2.38	1.22	0.24										100.0	51.3	10.2									
A46	19.75	16.52	11.43	4.91	1.30	0.12							100.0	83.7	57.9	24.9	6.6	0.6						
B45	47.37	41.23	31.91	20.92	0.97								100.0	87.0	67.4	44.2	2.0							
B46	44.72	30.38	10.63	0.78									100.0	67.9	23.8	1.7								
B52	33.33	25.41	16.07	4.92	2.08	0.90	0.21						100.0	76.2	48.2	14.8	6.2	2.7	0.6					
B53	15.67	13.44	8.95	5.72	2.69	0.52							100.0	85.7	57.1	36.5	17.2	3.3						
B69	25.00	21.98	18.05	14.62	8.59	3.53	1.61	0.50	0.16	0.03			100.0	87.9	72.2	58.5	34.3	14.1	6.5	2.0	0.6	0.1		
C6	6.29	4.47	0.01										100.0	71.0	0.2									
C7	15.95	13.99	8.36										100.0	87.7	52.4									
C10	13.86	9.02	5.67	4.15	2.63	0.31							100.0	65.1	40.9	29.9	19.0	2.2						
D3	15.83	14.26	12.37	8.83	5.52	0.72							100.0	90.1	78.1	55.7	34.8	4.5						
D4	18.80	15.85	12.11	0.05									100.0	84.3	64.4	0.3								
D5	7.30	5.91	4.50	1.81	0.46								100.0	81.0	61.7	24.8	6.3							
D6	2.14	1.58	0.69	0.01									100.0	74.0	32.3	0.5								
D8	18.98	16.36	13.07	6.28	1.48	0.00							100.0	86.2	68.9	33.1	7.8	0.0						
D23	14.02	11.84	9.47	6.91	5.36	3.49	0.89	0.01					100.0	84.5	67.5	49.3	38.3	24.9	6.4	0.1				
E3	56.82	46.91	36.99	26.21	18.16	11.39	5.69	2.20	0.48	0.00			100.0	82.6	65.1	46.1	32.0	20.1	10.0	3.9	0.9	0.0		
E4	8.49	6.00	4.48	1.78	0.76	0.50	0.23	0.06					100.0	70.7	52.8	21.0	8.9	5.9	2.8	0.7				
E5	1.29	0.76	0.43	0.29	0.20	0.09	0.00						100.0	58.7	33.5	22.3	15.3	6.8	0.0					
H17	15.80	12.25	7.37	0.11									100.0	77.5	46.7	0.7								
H20	9.56	7.67	5.20	0.00									100.0	80.2	54.4	0.0								
O2	32.67	27.53	15.50	0.01									100.0	84.3	47.4	0.0								
O4	12.73	8.82	5.32	0.22									100.0	69.3	41.8	1.7								
Control	106.29	93.23	82.25	70.20	60.07	49.66	34.71	19.44	7.33	2.50	0.46	0.01	100.0	87.7	77.4	66.0	56.5	46.7	32.7	18.3	6.9	2.4	0.4	

Lake	Volume (m³ x 10³) of Water Deeper than												Percentage (%) of Total Lake Volume Deeper than											
	0 m	0.5 m	1 m	1.5 m	2 m	2.5 m	3 m	3.5 m	4 m	4.5 m	5 m	5.5 m	0 m	0.5 m	1 m	1.5 m	2 m	2.5 m	3 m	3.5 m	4 m	4.5 m	5 m	5.5 m
A1	194.15	116.48	58.15	22.26	3.55	0.00							100.0	60.0	30.0	11.5	1.8	0.0						
A7	13.66	3.98	0.31										100.0	29.1	2.3									
A46	220.47	128.51	57.24	16.84	3.28	0.18							100.0	58.3	26.0	7.6	1.5	0.1						
B45	591.94	363.35	179.83	46.03	1.01								100.0	61.4	30.4	7.8	0.2							
B46	329.72	126.15	20.68	1.26									100.0	38.3	6.3	0.4								
B52	329.94	178.06	74.58	26.51	9.92	2.76	0.36						100.0	54.0	22.6	8.0	3.0	0.8	0.1					
B53	195.79	120.56	64.81	29.11	8.12	0.60							100.0	61.6	33.1	14.9	4.1	0.3						
B69	406.57	286.28	186.57	104.90	45.70	19.07	6.83	1.95	0.47	0.03			100.0	70.4	45.9	25.8	11.2	4.7	1.7	0.5	0.1	0.0		
C6	39.09	11.70	0.00										100.0	29.9	0.0									
C7	150.27	73.11	14.53										100.0	48.6	9.7									
C10	145.73	82.85	48.21	23.83	6.68	0.44							100.0	56.9	33.1	16.4	4.6	0.3						
D3	245.74	170.32	103.36	50.08	13.62	0.74							100.0	69.3	42.1	20.4	5.5	0.3						
D4	190.76	103.42	32.56	0.00									100.0	54.2	17.1	0.0								
D5	81.95	48.72	22.61	5.91	0.57								100.0	59.4	27.6	7.2	0.7							
D6	16.35	6.95	0.97	0.01									100.0	42.5	5.9	0.0								
D8	233.71	144.62	70.35	21.02	2.94	0.00							100.0	61.9	30.1	9.0	1.3	0.0						
D23	225.08	159.79	106.48	65.41	35.20	12.16	1.56	0.01					100.0	71.0	47.3	29.1	15.6	5.4	0.7	0.0				
E3	880.90	618.05	407.71	250.79	140.50	67.66	26.39	6.65	0.84	0.00			100.0	70.2	46.3	28.5	16.0	7.7	3.0	0.8	0.1	0.0		
E4	90.00	53.92	27.63	11.52	5.62	2.57	0.72	0.04					100.0	59.9	30.7	12.8	6.2	2.9	0.8	0.0				
E5	11.91	6.84	3.88	2.13	0.92	0.19	0.00						100.0	57.4	32.6	17.9	7.7	1.6	0.0					
H17	139.49	68.04	17.70	0.03									100.0	48.8	12.7	0.0								
H20	87.13	43.57	10.64	0.00									100.0	50.0	12.2	0.0								
O2	305.46	153.22	38.72	0.00									100.0	50.2	12.7	0.0								
O4	103.28	48.13	12.92	0.09									100.0	46.6	12.5	0.1								
Control	2364.50	1862.32	1423.93	1041.56	715.99	439.92	228.48	92.88	30.10	7.15	0.69	0.01	100.0	78.8	60.2	44.0	30.3	18.6	9.7	3.9	1.3	0.3	0.0	



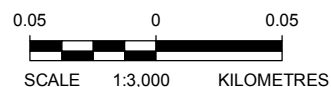


LEGEND

-  Watercourse
-  Waterbody

Depth (m)

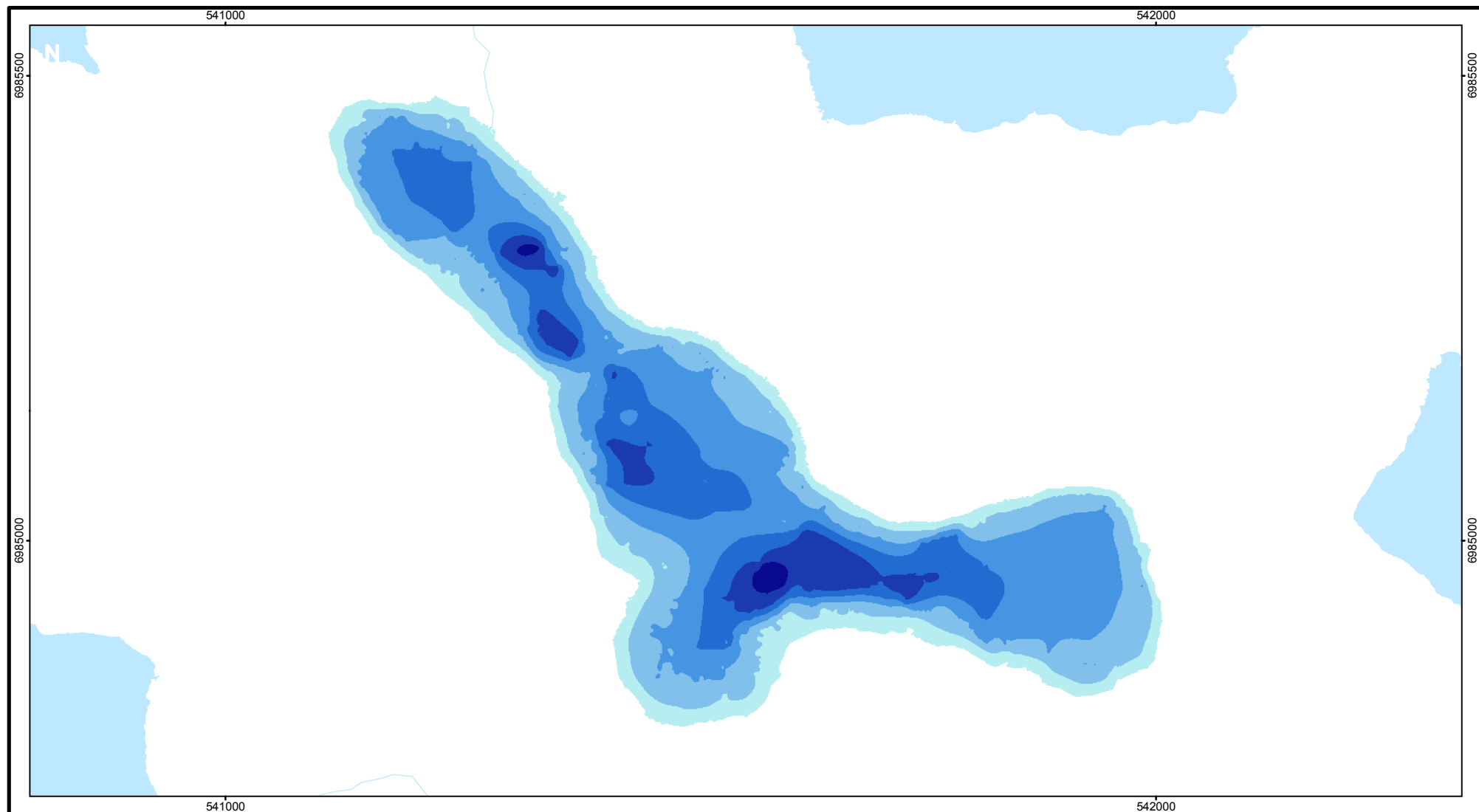
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REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

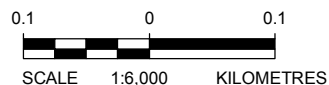
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		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3b
		REVIEW	JP	12 Jan. 2012	



LEGEND

- Watercourse
- Waterbody

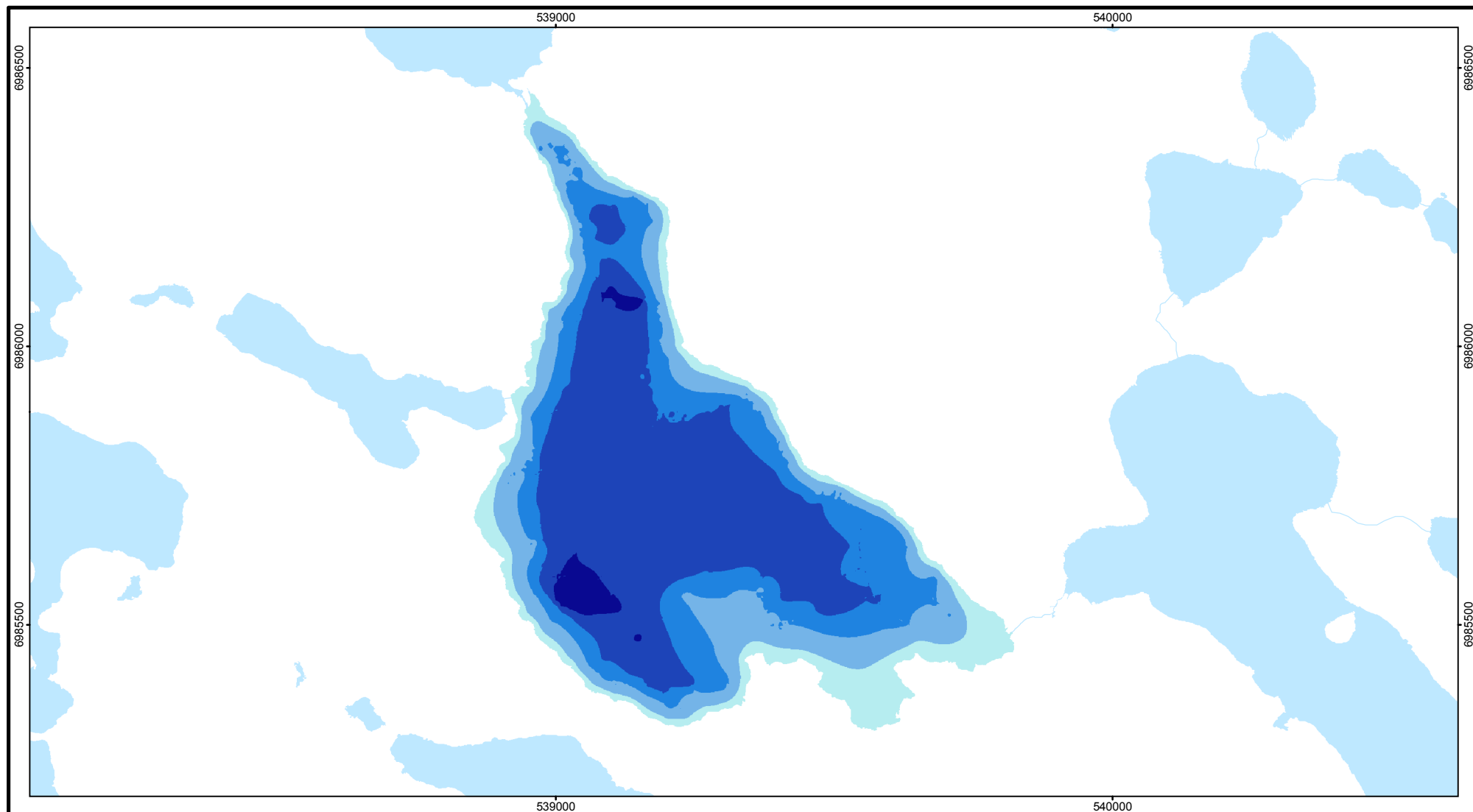
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	2.51 - 3.00



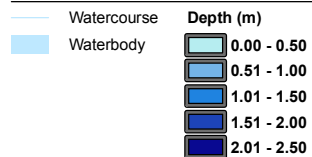
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Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

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		PROJECT NO. 10-1373-0076		FILE No.	
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		REVIEW	JP	12 Jan. 2012	



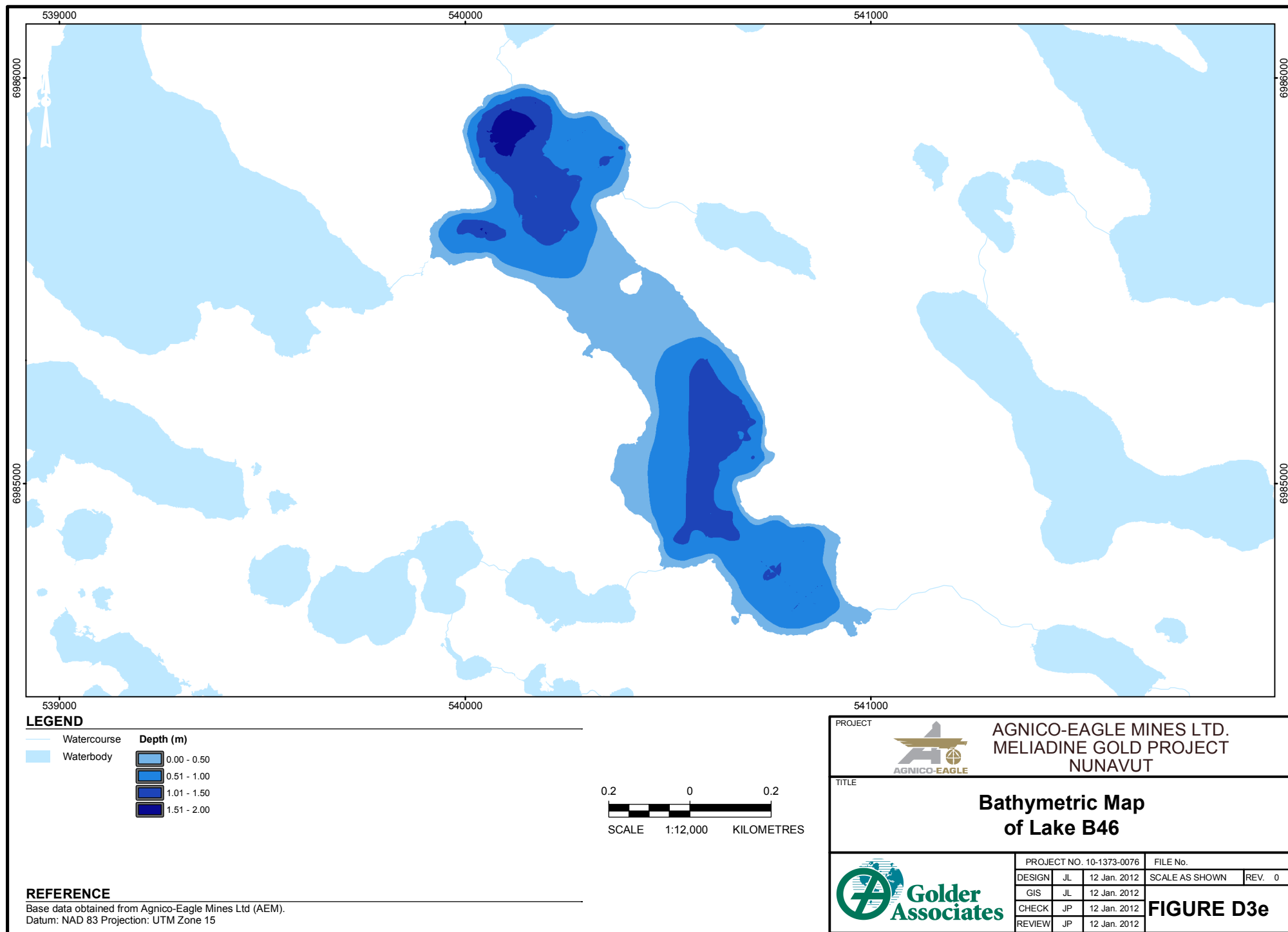
LEGEND

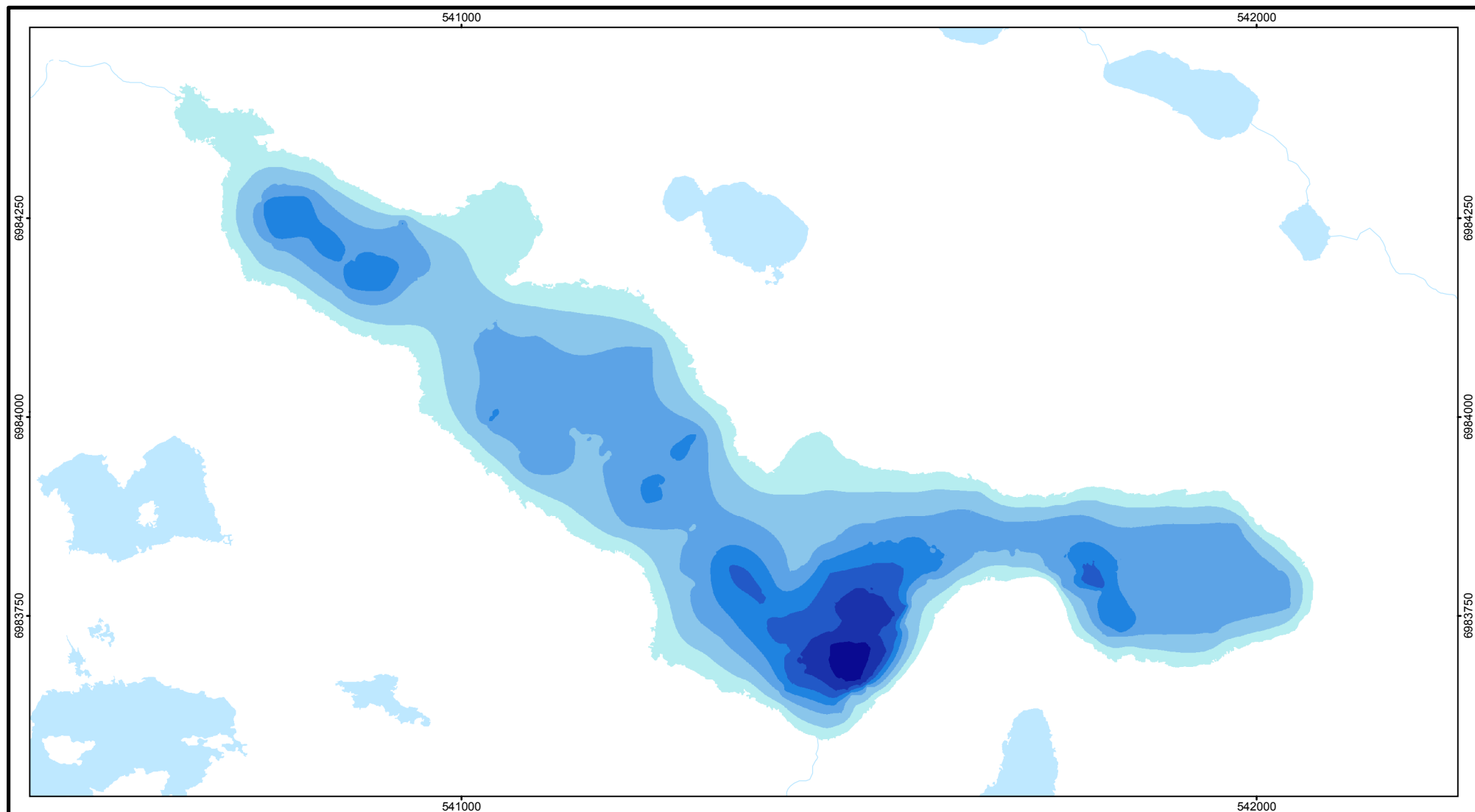


REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

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		PROJECT NO. 10-1373-0076		FILE No.	
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		REVIEW	JP	12 Jan. 2012	
		FIGURE D3d			



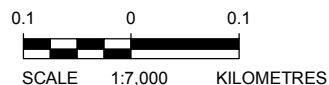


LEGEND

-  Watercourse
-  Waterbody

Depth (m)

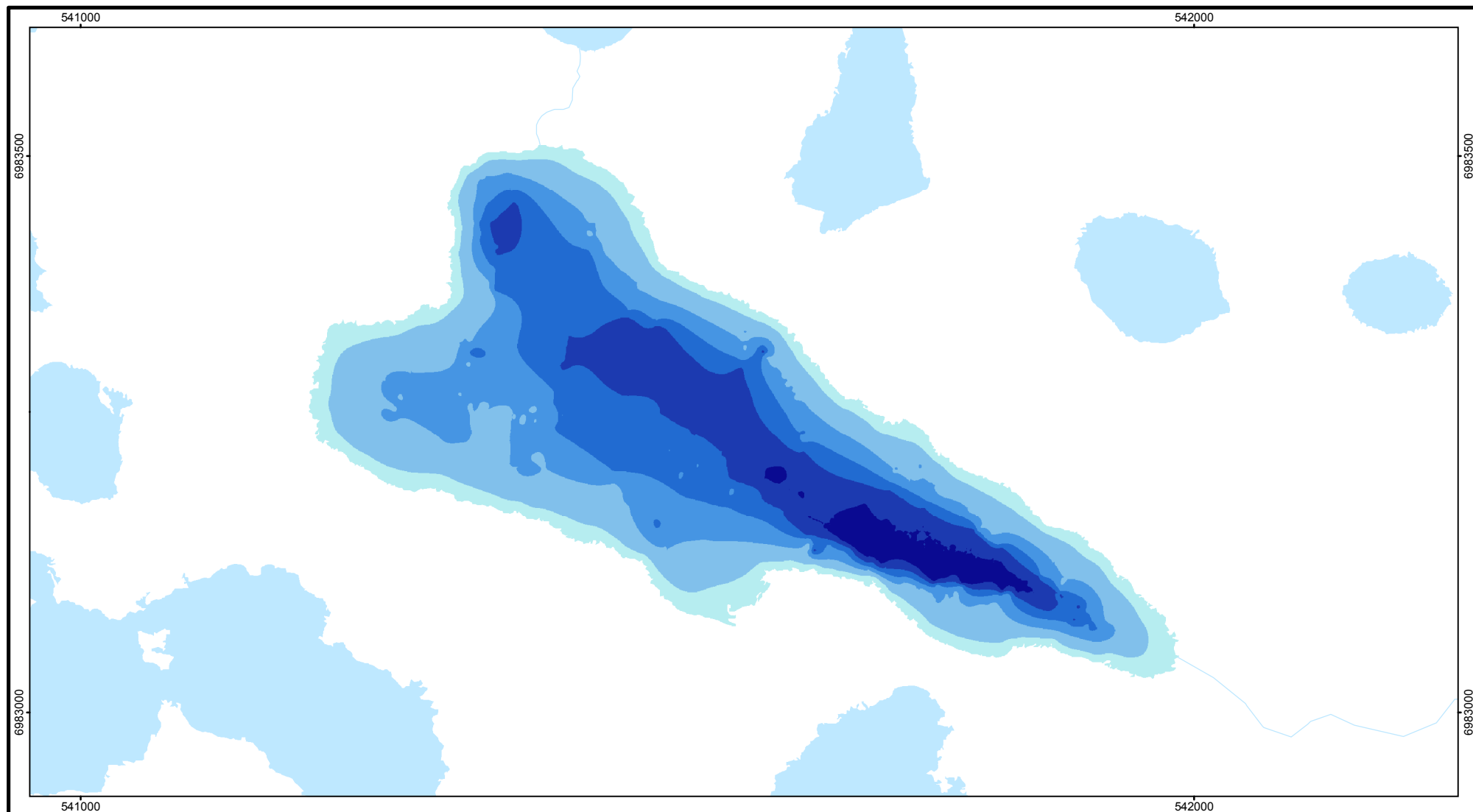
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-  1.01 - 1.50
-  1.51 - 2.00
-  2.01 - 2.50
-  2.51 - 3.00
-  3.01 - 3.50



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake B52			
		PROJECT NO. 10-1373-0076		FILE No.	
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		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	
		REVIEW	JP	12 Jan. 2012	
		FIGURE D3f			

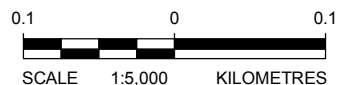


LEGEND

- Watercourse
- Waterbody

Depth (m)

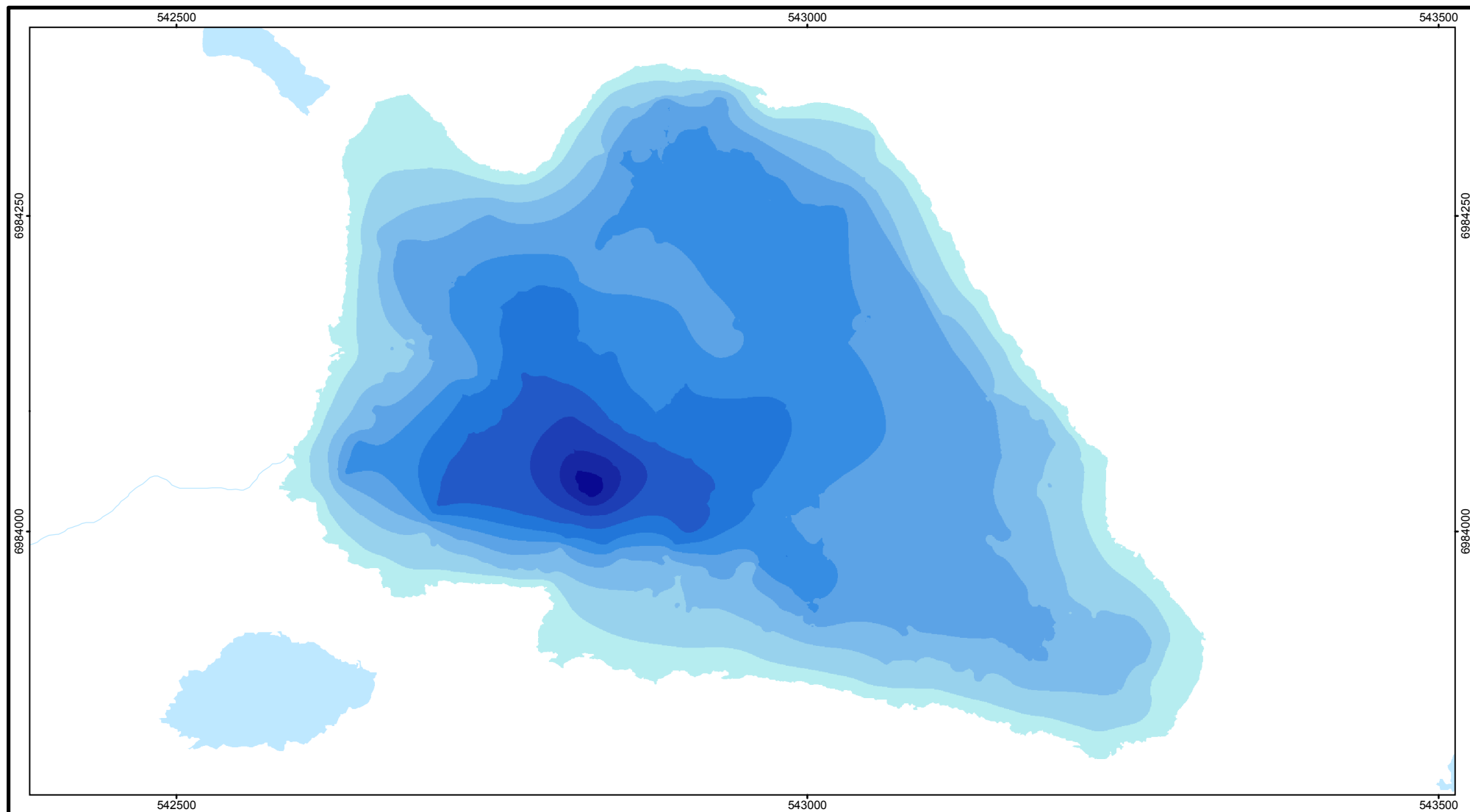
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- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake B53			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3g
		REVIEW	JP	12 Jan. 2012	

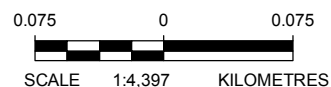


LEGEND

- Watercourse
- Waterbody

Depth (m)

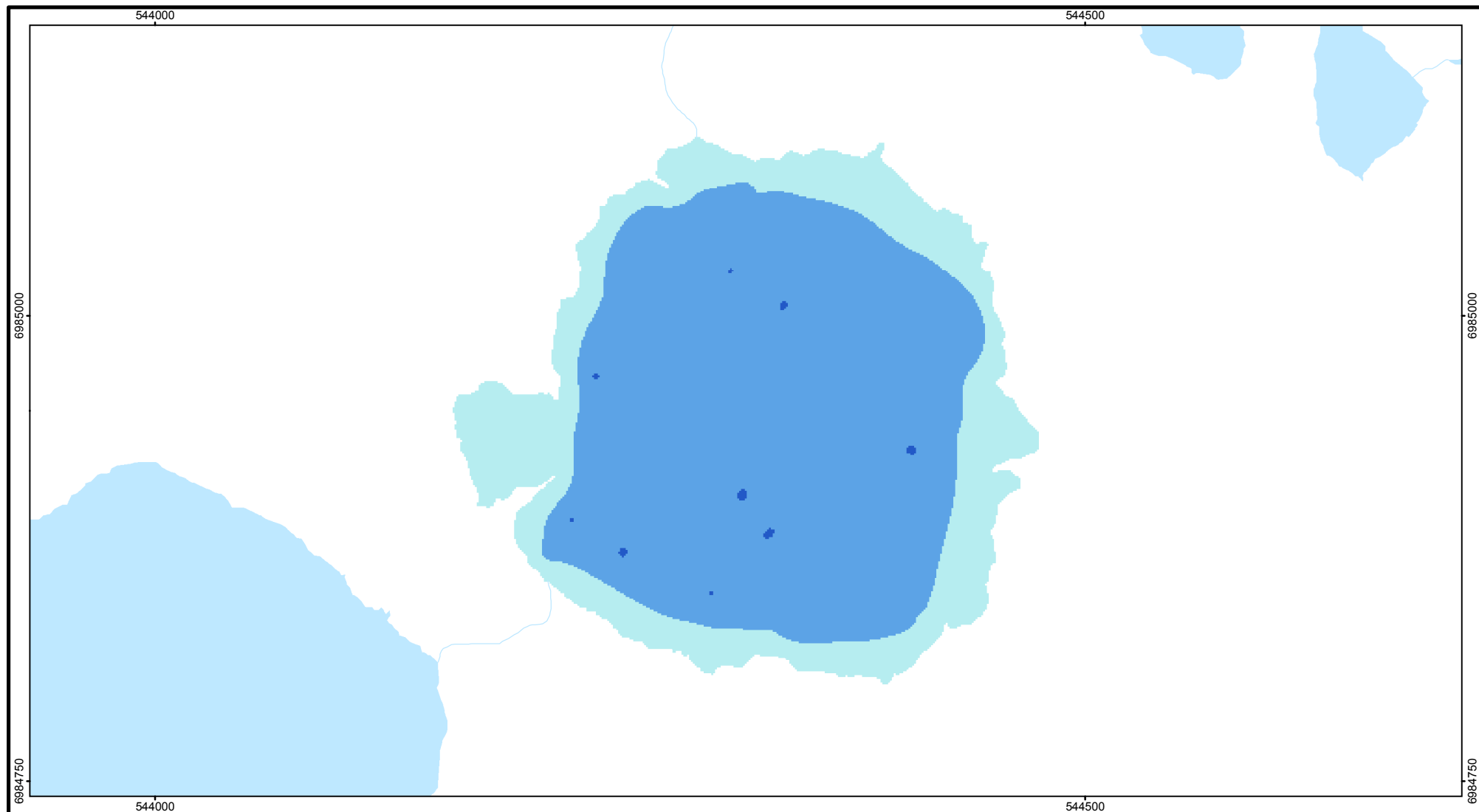
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	0.51 - 1.00		3.01 - 3.50
	1.01 - 1.50		3.51 - 4.00
	1.51 - 2.00		4.01 - 4.50
	2.01 - 2.50		4.51 - 5.00



REFERENCE

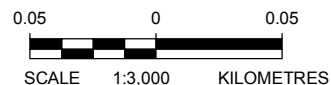
Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake B69			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
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		CHECK	JP	12 Jan. 2012	FIGURE D3h
		REVIEW	JP	12 Jan. 2012	



LEGEND

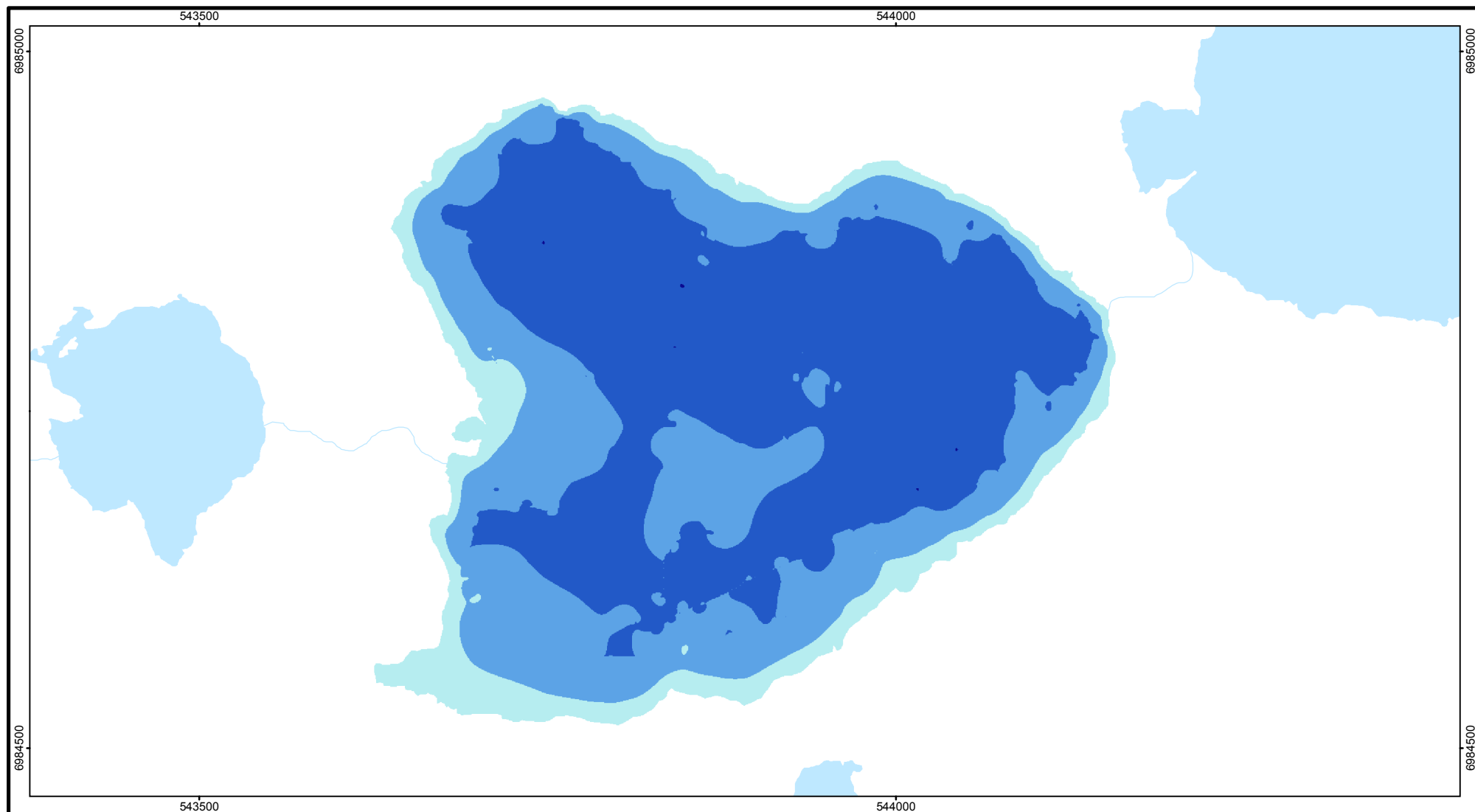
- Watercourse
 - Waterbody
- Depth (m)**
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 - 0.51 - 1.00
 - 1.01 - 1.50



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake C6			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
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		CHECK	JP	12 Jan. 2012	FIGURE D3i
		REVIEW	JP	12 Jan. 2012	

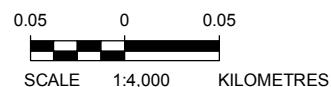


LEGEND

-  Watercourse
-  Waterbody

Depth (m)

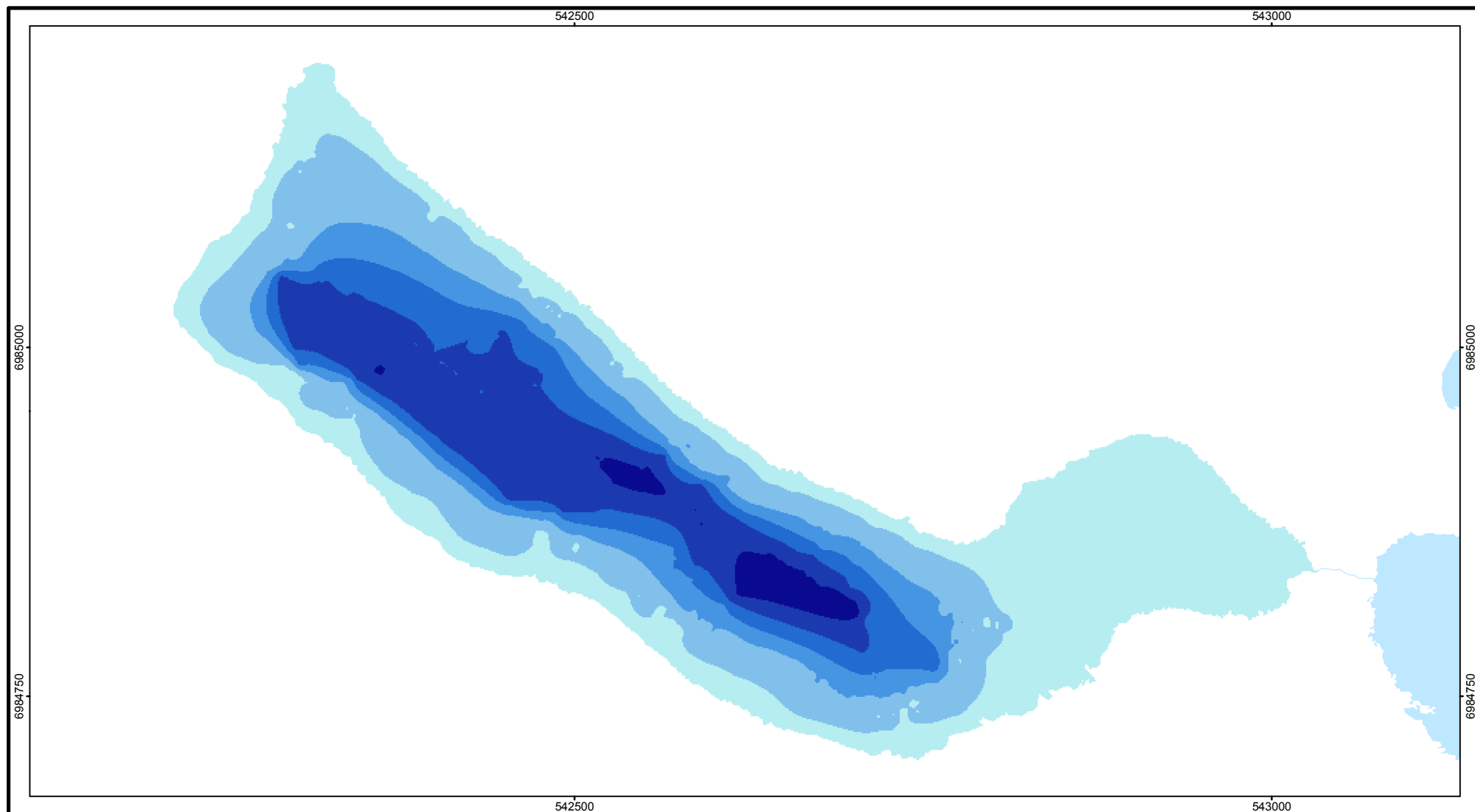
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-  1.01 - 1.50
-  1.51 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake C7			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3j
		REVIEW	JP	12 Jan. 2012	

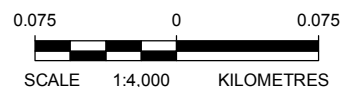


LEGEND

- Watercourse
- Waterbody

Depth (m)

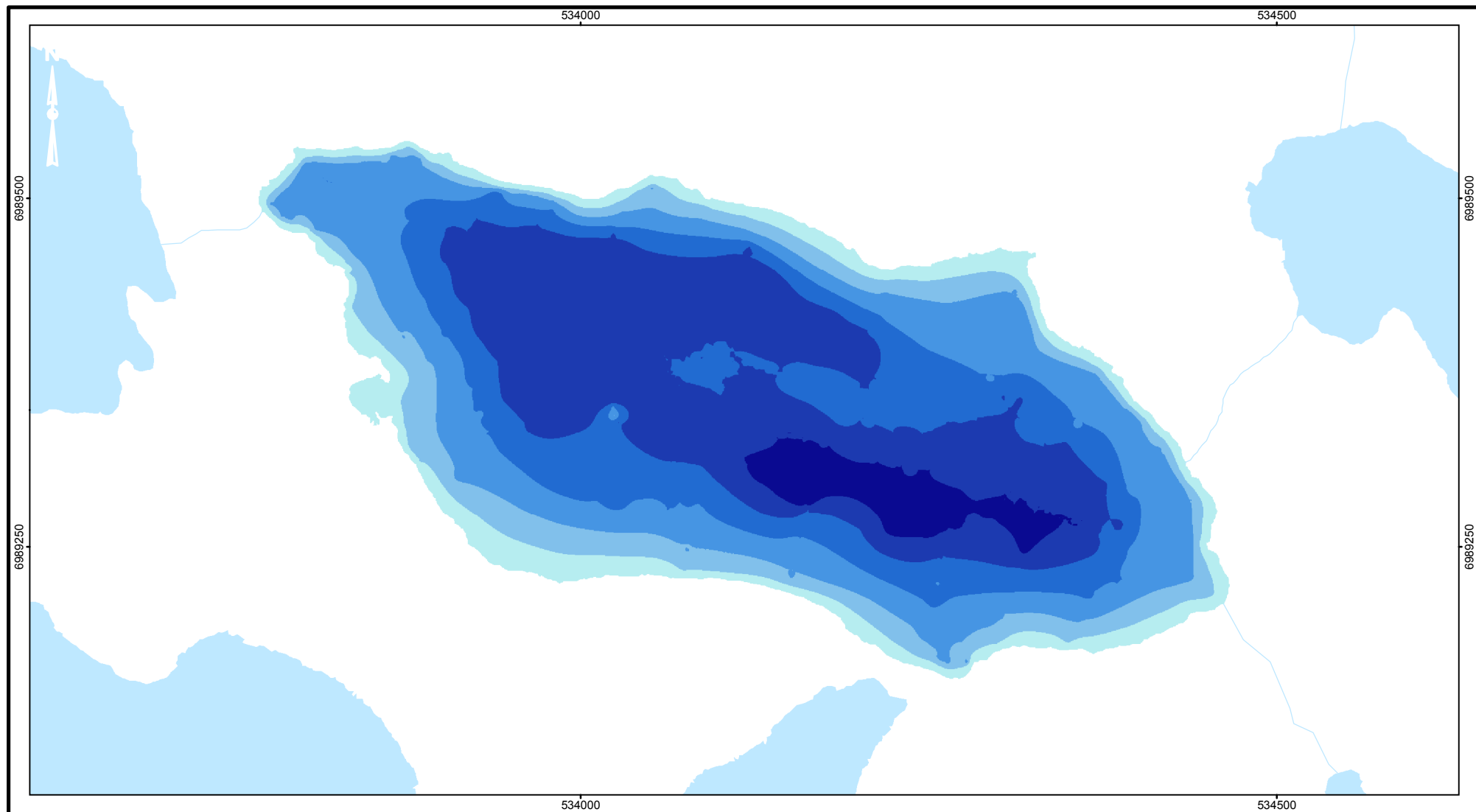
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- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake C10			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	
		REVIEW	JP	12 Jan. 2012	
		FIGURE D3k			

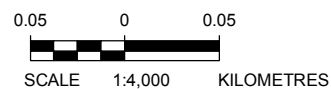


LEGEND

-  Watercourse
-  Waterbody

Depth (m)

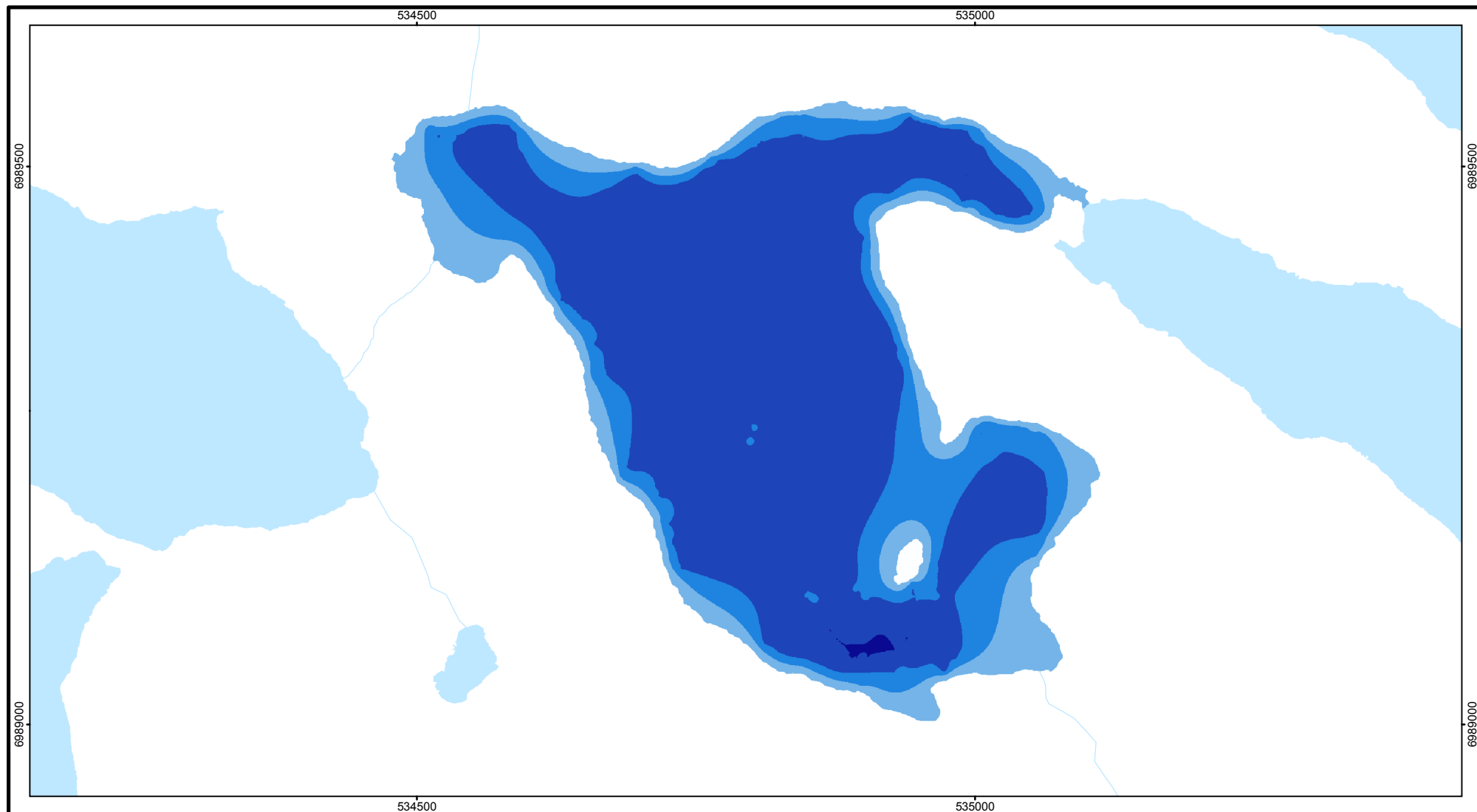
-  0.00 - 0.50
-  0.51 - 1.00
-  1.01 - 1.50
-  1.51 - 2.00
-  2.01 - 2.50
-  2.51 - 3.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake D3			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3I
		REVIEW	JP	12 Jan. 2012	

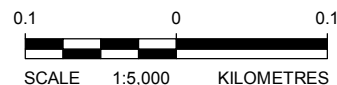


LEGEND

-  Watercourse
-  Waterbody

Depth (m)

-  0.00 - 0.50
-  0.51 - 1.00
-  1.01 - 1.50
-  1.51 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT



AGNICO-EAGLE MINES LTD.
MELIADINE GOLD PROJECT
NUNAVUT

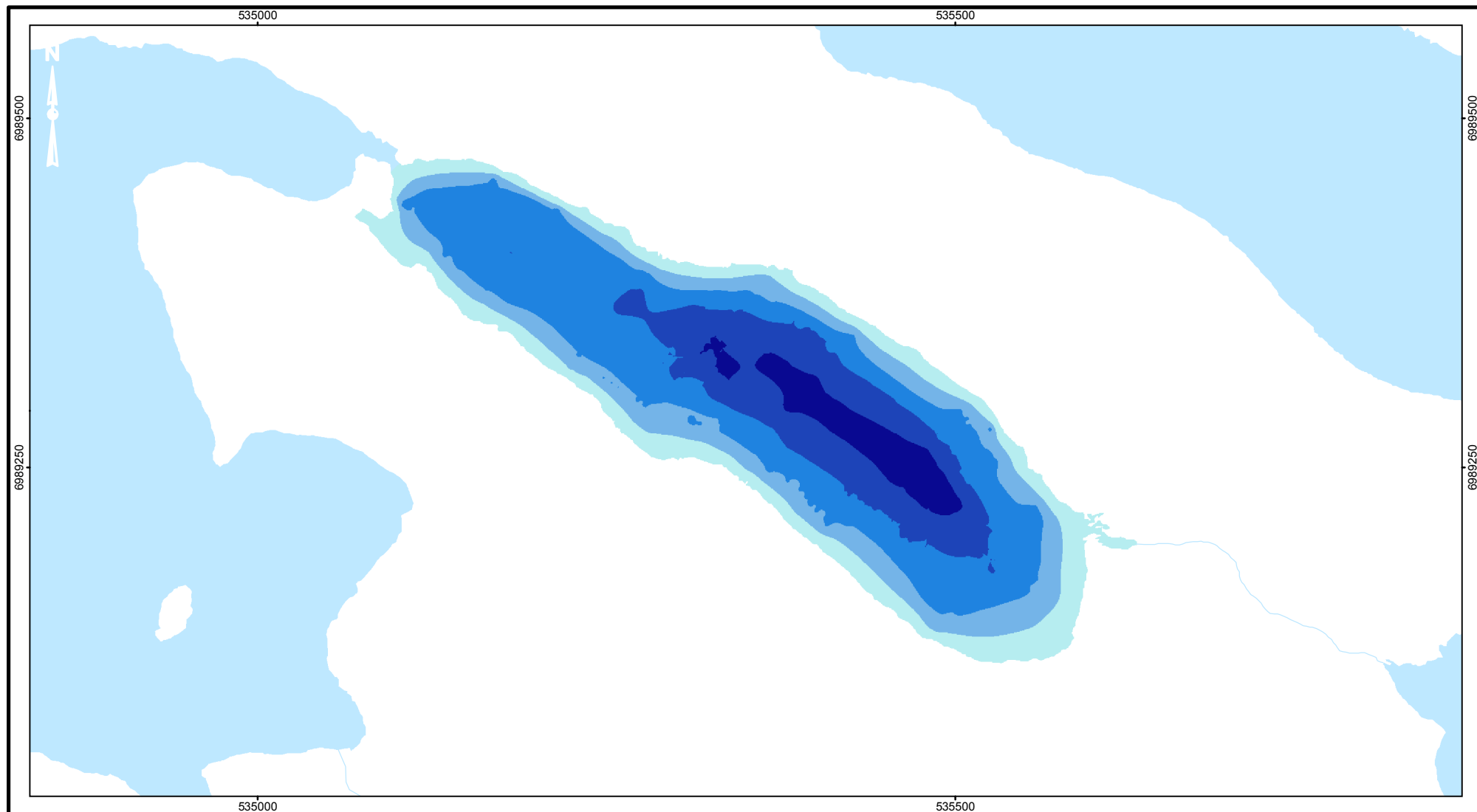
TITLE

Bathymetric Map of Lake D4



**Golder
Associates**

PROJECT NO. 10-1373-0076			FILE No.	
DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN	REV. 0
GIS	JL	12 Jan. 2012	FIGURE D3m	
CHECK	JP	12 Jan. 2012		
REVIEW	JP	12 Jan. 2012		

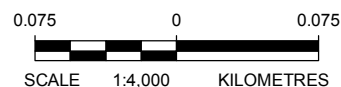


LEGEND

- Watercourse
- Waterbody

Depth (m)

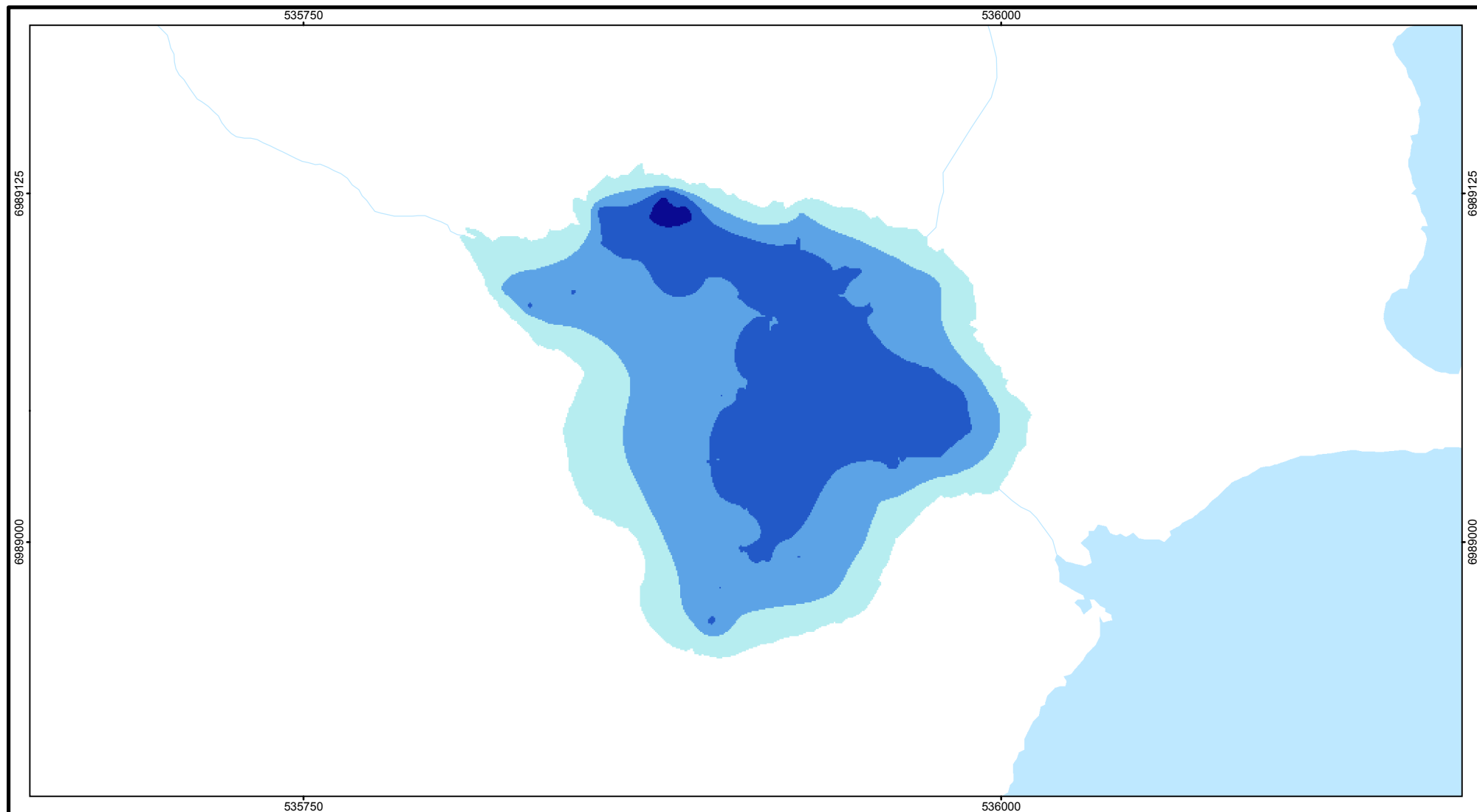
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- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake D5			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3n
		REVIEW	JP	12 Jan. 2012	

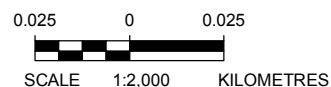


LEGEND

- Watercourse
- Waterbody

Depth (m)

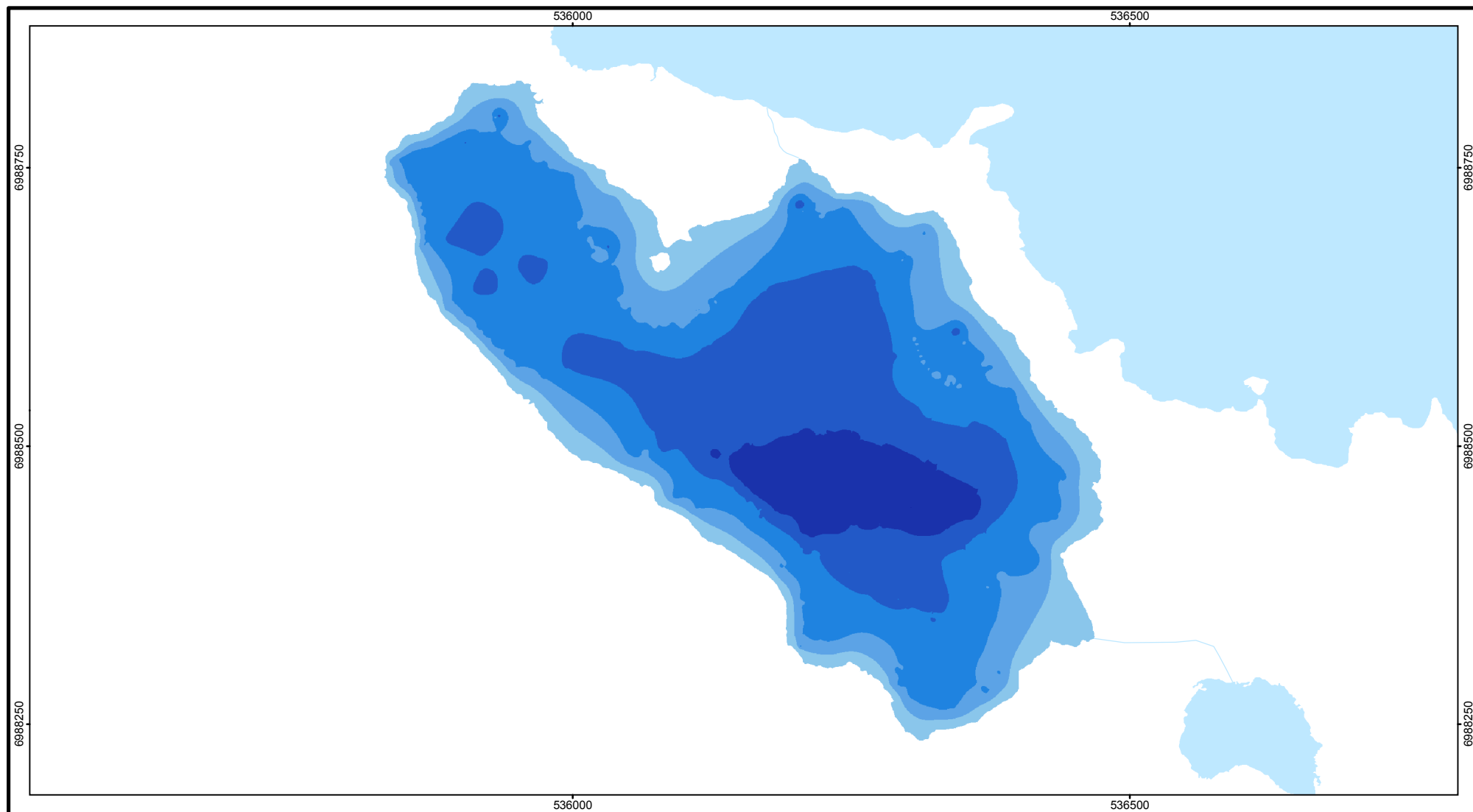
- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake D6			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3o
		REVIEW	JP	12 Jan. 2012	



LEGEND

- Watercourse
- Waterbody

Depth (m)

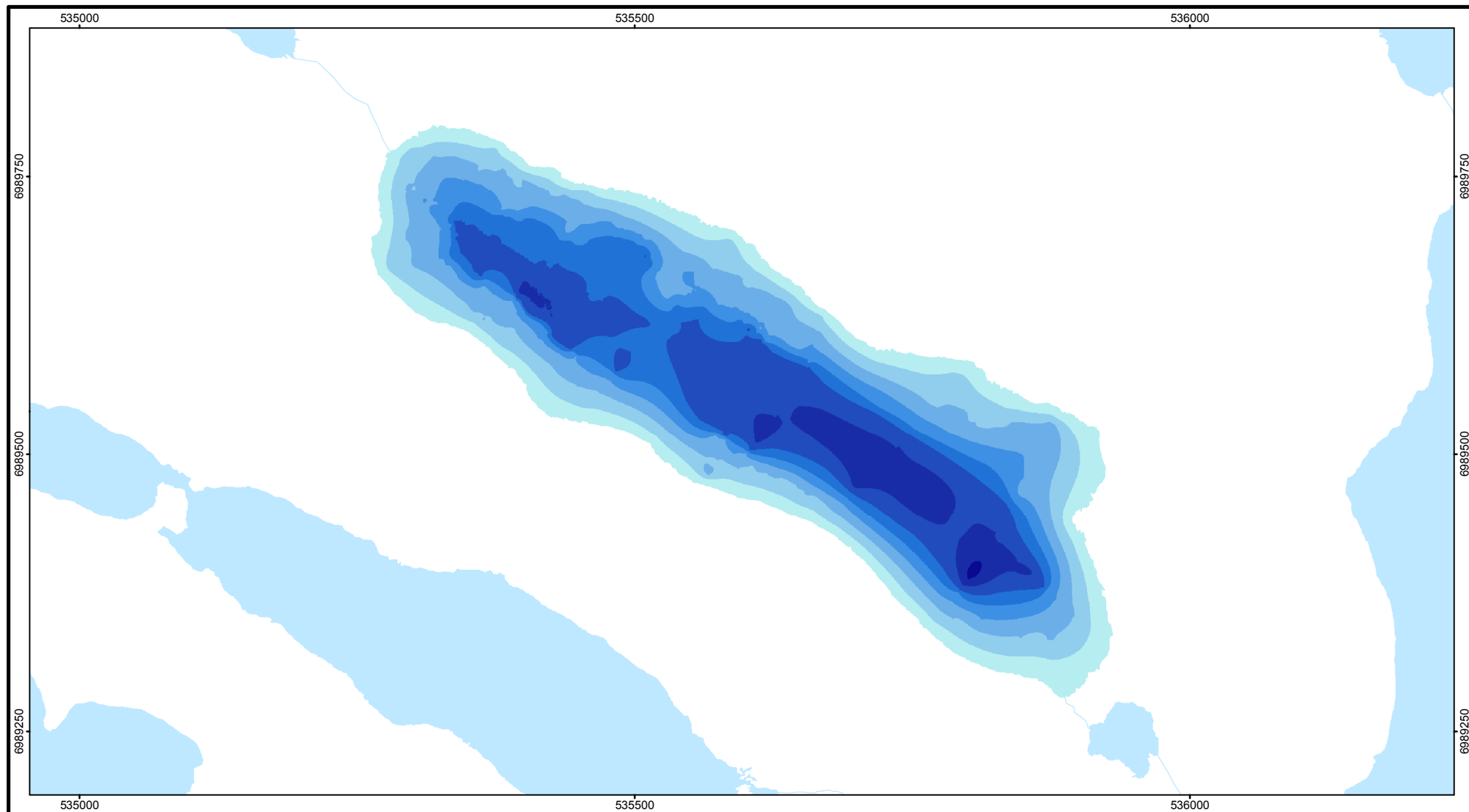
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- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake D8			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3p
		REVIEW	JP	12 Jan. 2012	



LEGEND

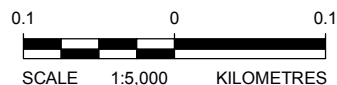
-  Watercourse
-  Waterbody

Depth (m)

-  0.00 - 0.50
-  0.51 - 1.00
-  1.01 - 1.50
-  1.51 - 2.00
-  2.01 - 2.50
-  2.51 - 3.00
-  3.01 - 3.50
-  3.51 - 4.00

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15



PROJECT



AGNICO-EAGLE MINES LTD.
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

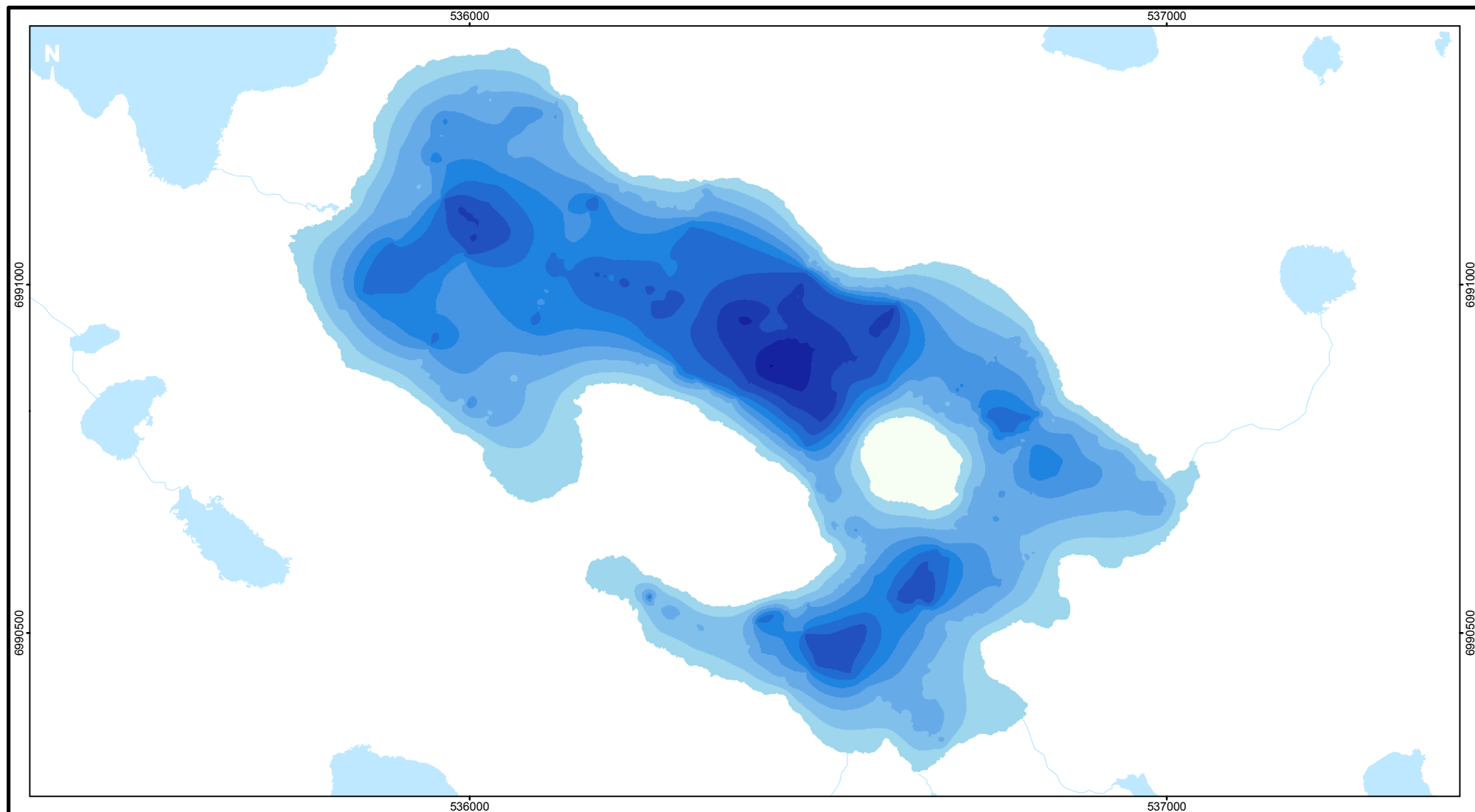
Bathymetric Map of Lake D23



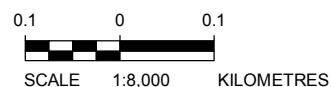
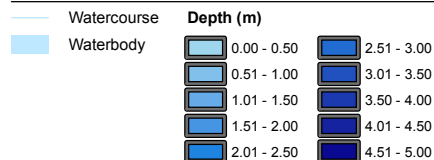
**Golder
Associates**

PROJECT NO. 10-1373-0076			FILE No.	
DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN	REV. 0
GIS	JL	12 Jan. 2012		
CHECK	JP	12 Jan. 2012		
REVIEW	JP	12 Jan. 2012		

FIGURE D3q



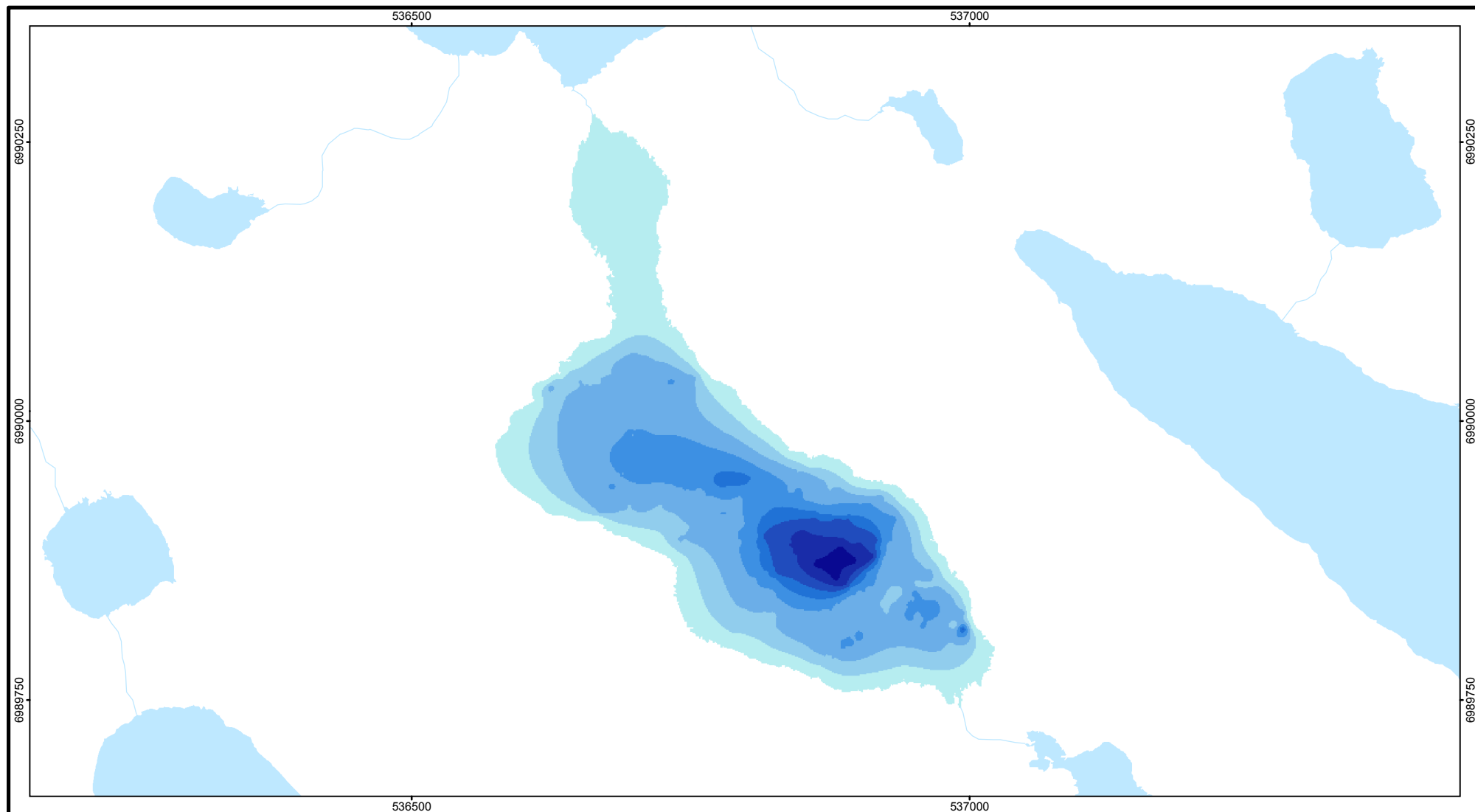
LEGEND



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake E3			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3r
		REVIEW	JP	12 Jan. 2012	



LEGEND

- Watercourse
- Waterbody

Depth (m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00

REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15



PROJECT



AGNICO-EAGLE MINES LTD.
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

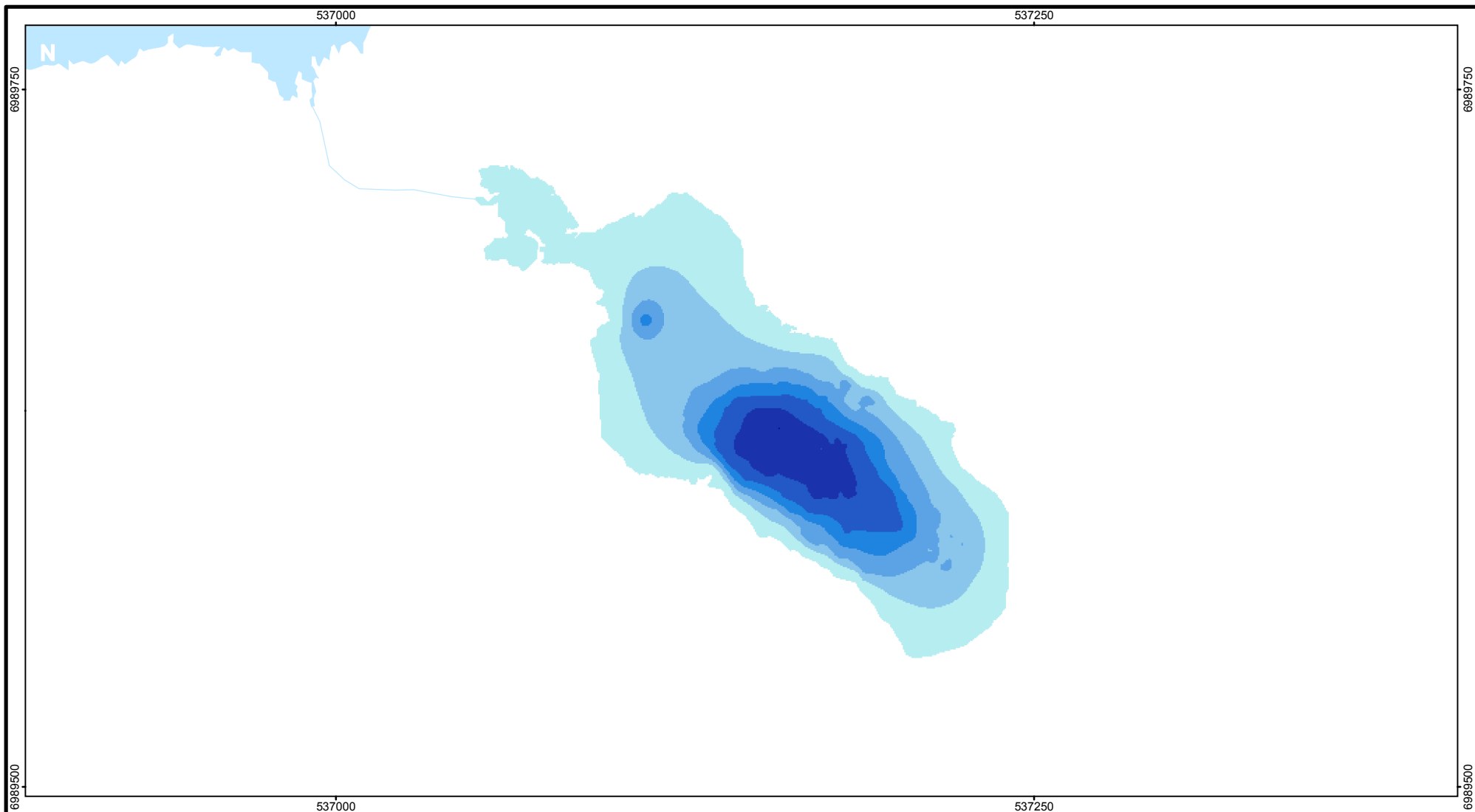
Bathymetric Map of Lake E4



**Golder
Associates**

PROJECT NO. 10-1373-0076			FILE No.	
DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN	REV. 0
GIS	JL	12 Jan. 2012		
CHECK	JP	12 Jan. 2012		
REVIEW	JP	12 Jan. 2012		

FIGURE D3s

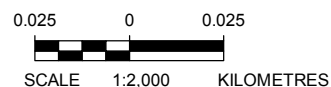


LEGEND

- Watercourse
- Waterbody

Depth (m)

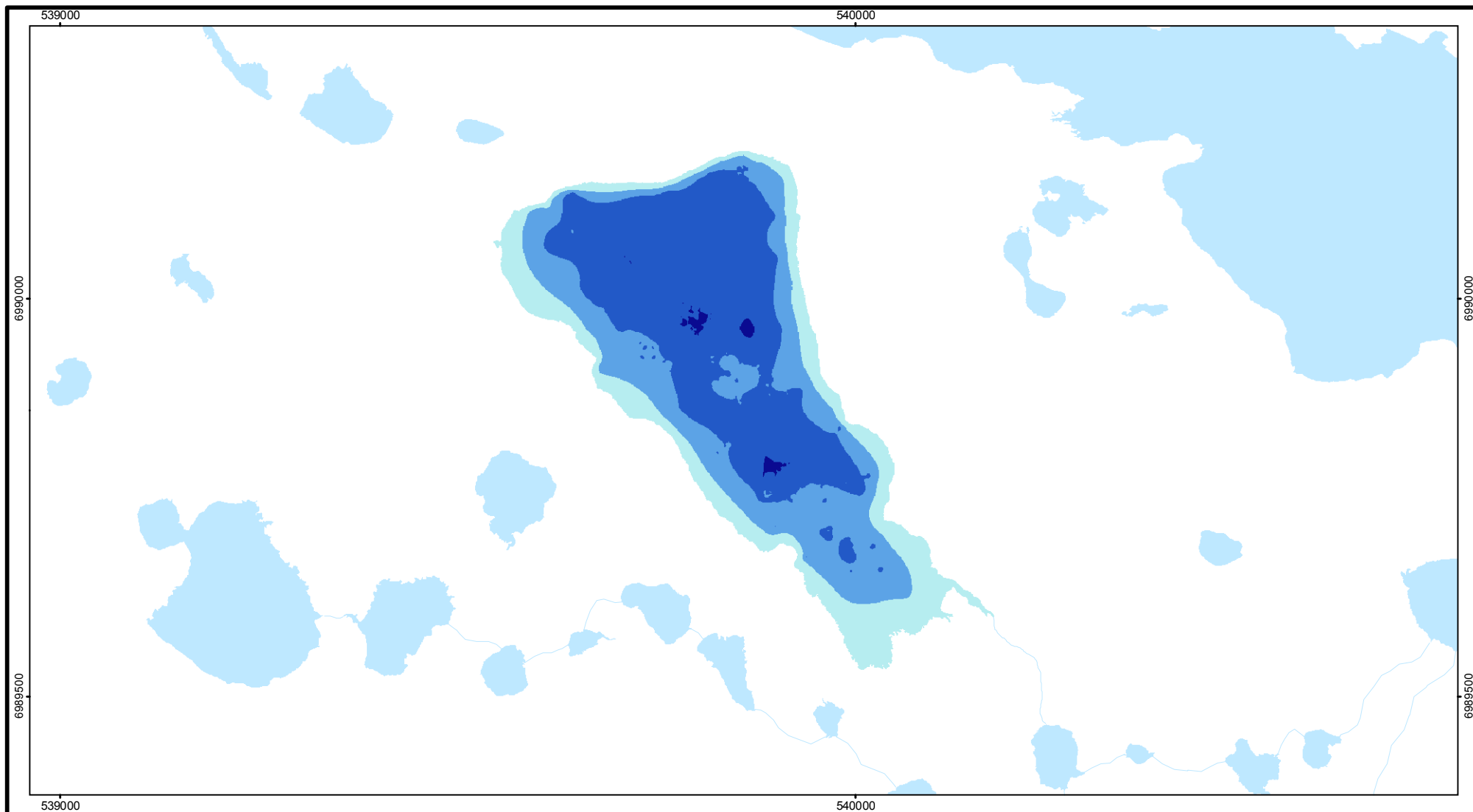
- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

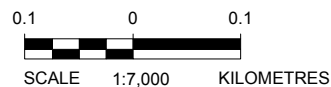
PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake E5			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3t
		REVIEW	JP	12 Jan. 2012	



LEGEND

- Watercourse
- Waterbody

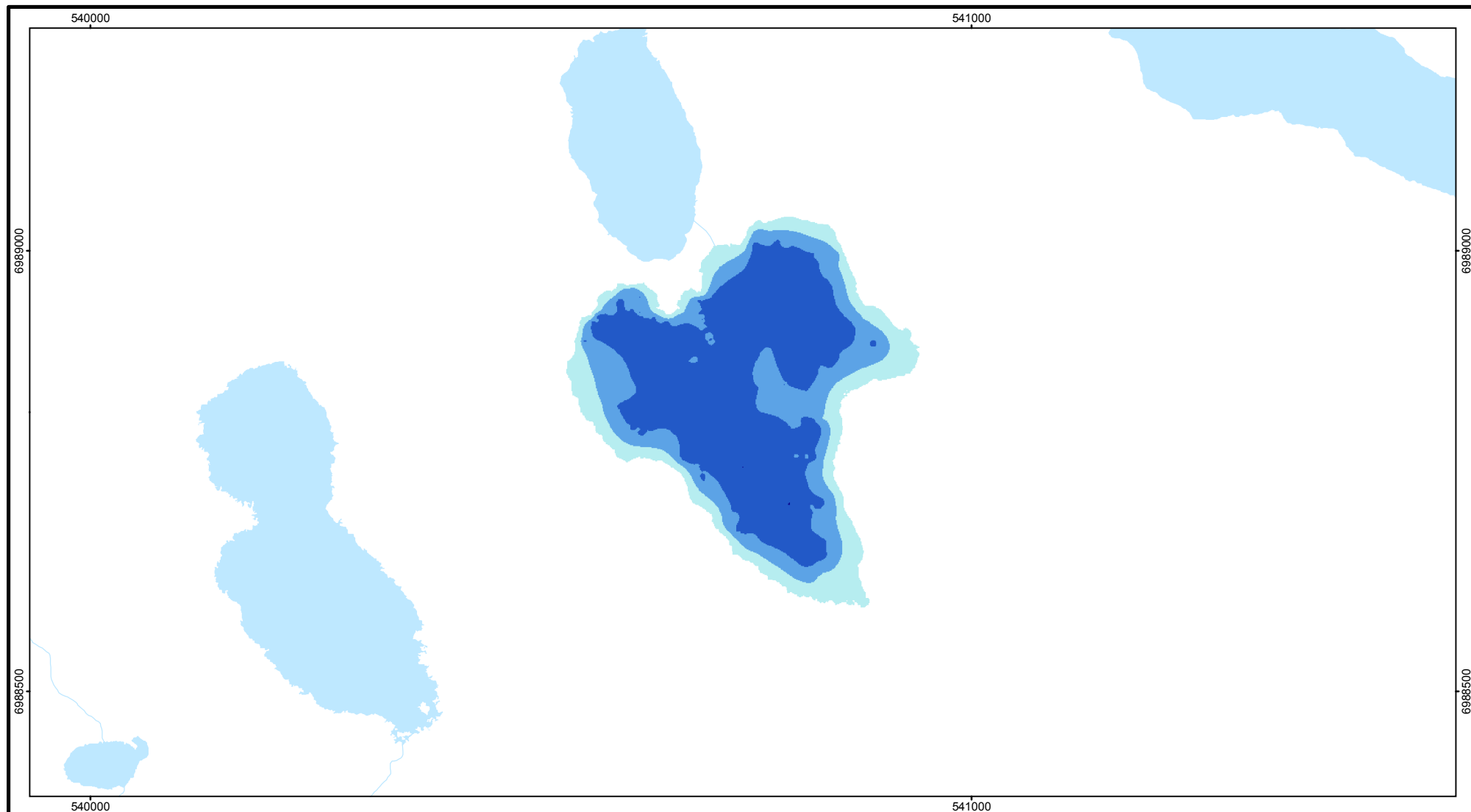
Depth (m)	
	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.50 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

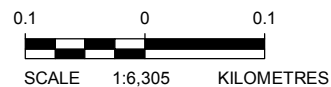
PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake H17			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3u
		REVIEW	JP	12 Jan. 2012	



LEGEND

- Watercourse
- Waterbody

Depth (m)	
	0.00 - 0.50
	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT



AGNICO-EAGLE MINES LTD.
MELIADINE GOLD PROJECT
NUNAVUT

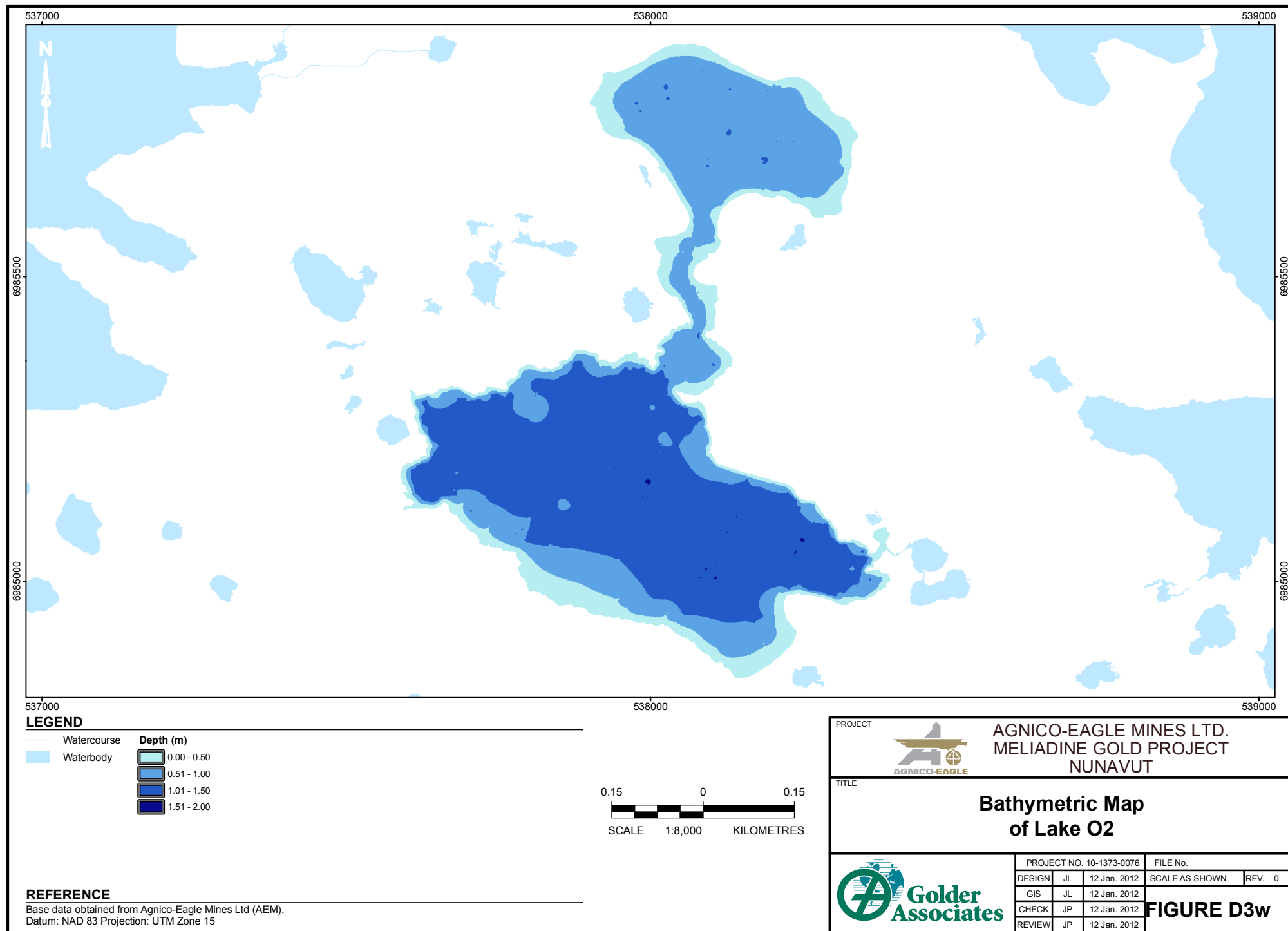
TITLE

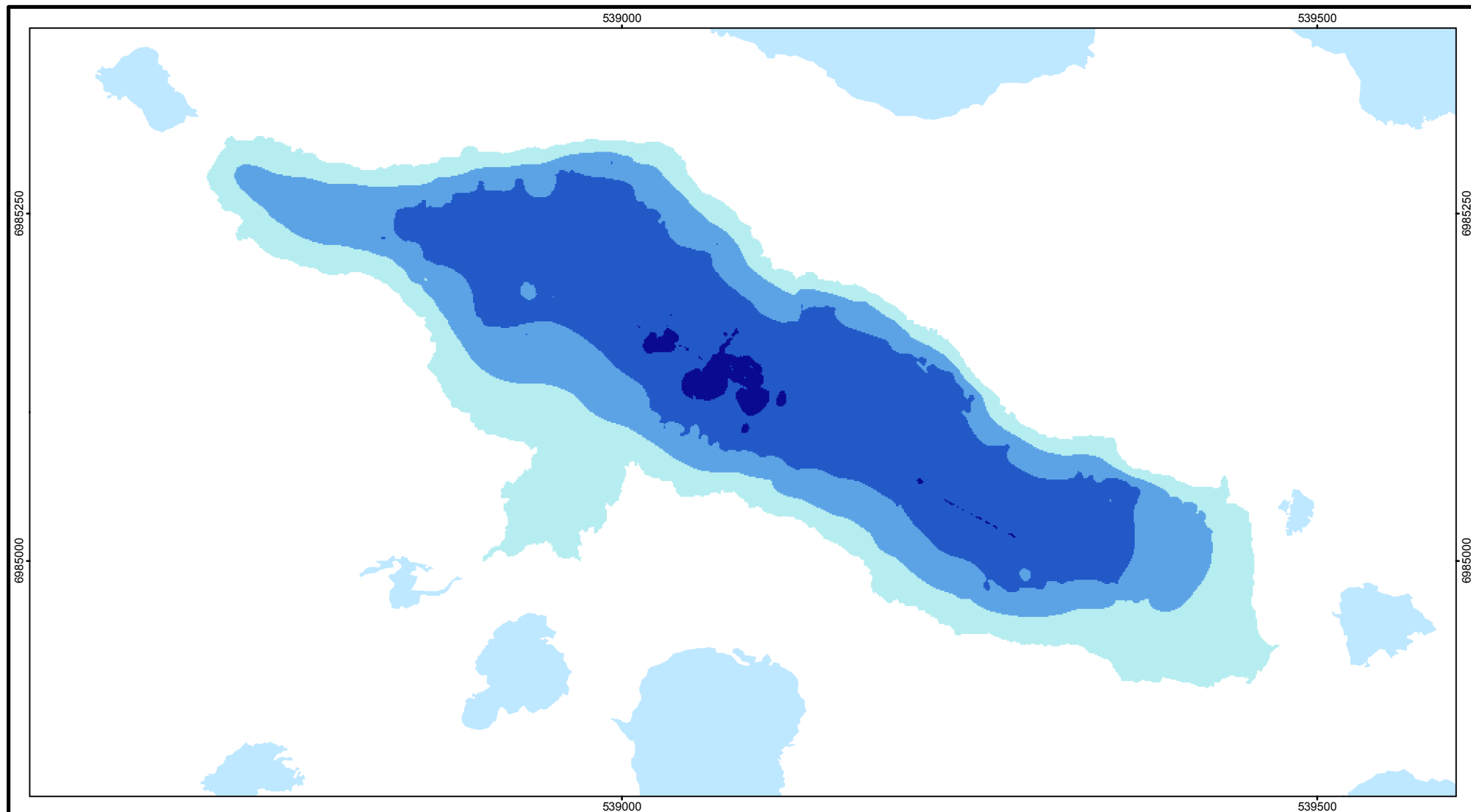
Bathymetric Map of Lake H20



**Golder
Associates**

PROJECT NO. 10-1373-0076			FILE No.	
DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN	REV. 0
GIS	JL	12 Jan. 2012	FIGURE D3v	
CHECK	JP	12 Jan. 2012		
REVIEW	JP	12 Jan. 2012		

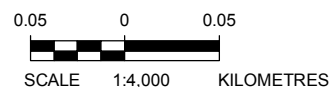




LEGEND

- Watercourse
- Waterbody

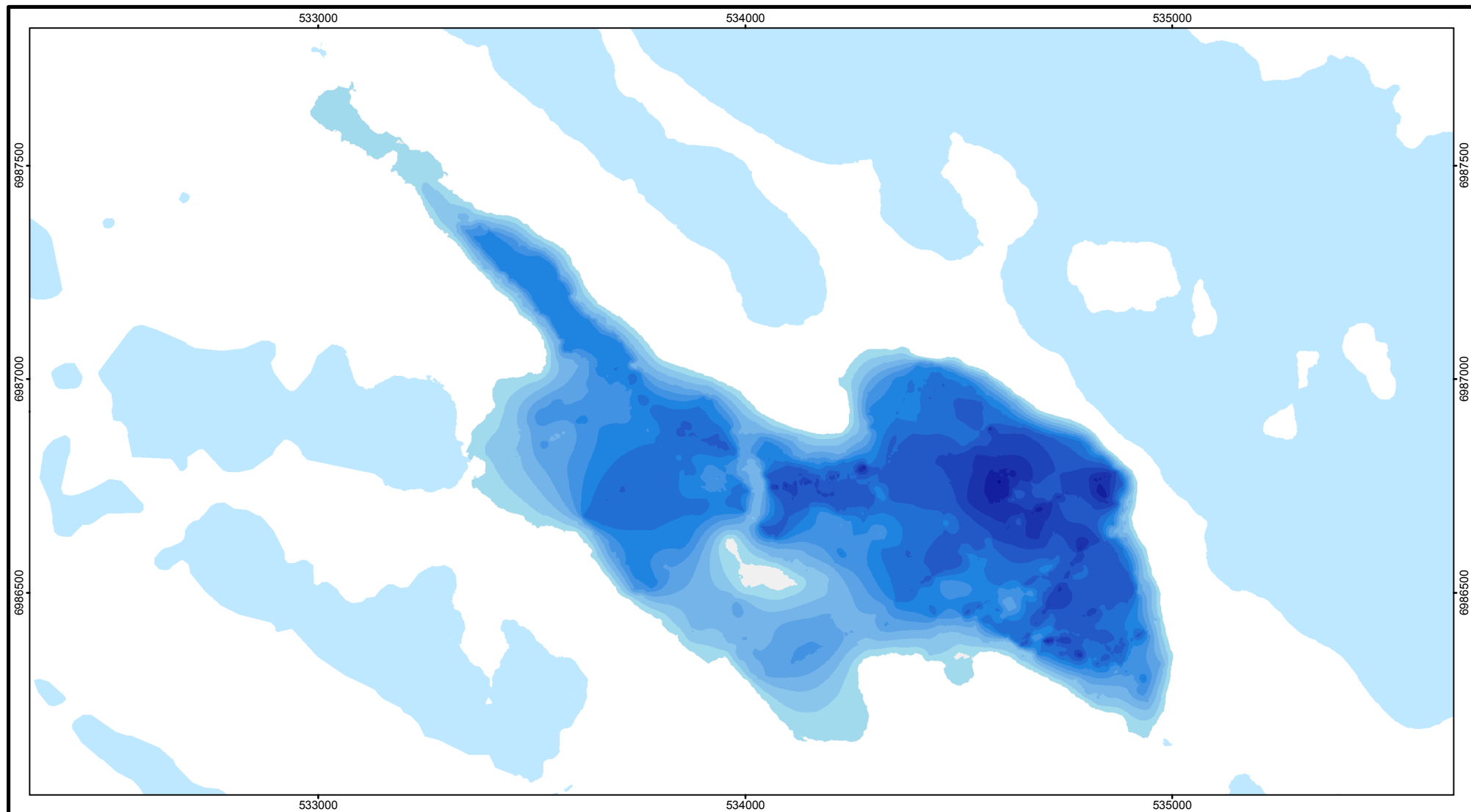
Depth (m)	
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	0.51 - 1.00
	1.01 - 1.50
	1.51 - 2.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Lake O4			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	FIGURE D3x
		REVIEW	JP	12 Jan. 2012	

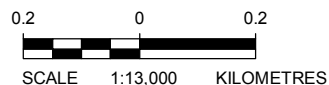


LEGEND

- Watercourse
- Waterbody

Depth (m)

 0.00 - 0.50	 3.01 - 3.50
 0.51 - 1.00	 3.51 - 4.00
 1.01 - 1.50	 4.01 - 4.50
 1.51 - 2.00	 4.51 - 5.00
 2.01 - 2.50	 5.01 - 5.50
 2.51 - 3.00	 5.51 - 6.00



REFERENCE

Base data obtained from Agnico-Eagle Mines Ltd (AEM).
Datum: NAD 83 Projection: UTM Zone 15

PROJECT		 AGNICO-EAGLE MINES LTD. MELIADINE GOLD PROJECT NUNAVUT			
TITLE		Bathymetric Map of Control Lake			
		PROJECT NO. 10-1373-0076		FILE No.	
		DESIGN	JL	12 Jan. 2012	SCALE AS SHOWN
		GIS	JL	12 Jan. 2012	REV. 0
		CHECK	JP	12 Jan. 2012	
		REVIEW	JP	12 Jan. 2012	
					FIGURE D3y

APPENDIX D
Aquatic Habitat

Appendix D4. Size and Habitat Characteristics of Lakes and Ponds in the Study Area, 2011

Site	Lake / Pond	Maximum Depth (m)	Elevation (masl)	Area (ha)	Habitat ^a Composition (% area)								
					Hab 1	Hab 2	Hab 3	Hab 4	Hab 5	Hab 6	Hab 7	Hab 8	Hab 9
A1	Lake	2.5	53.0	16.39	16	12	58	12	1	1			
A2	Pond	0.7	53.5	2.36	8	37	55						
A2a	Pond	0.8	53.6	1.95	10	40	50						
A6	Lake	4.7	59.6	55.28	6	16	67	6	4				
A7	Pond	1.5	61.1	2.38	3	7	90						
A8	Lake	4.2	62.2	90.54	5	8	55	14	10	7	1	1	
A18	Pond	0.5	58.0	0.33	55	10	35						
A30	Pond	1.7	59.9	2.52	40	25	35						
A31	Pond	1.6	60.8	1.88	45	20	35						
A44	Pond	0.8	60.9	0.82	40	10	50						
A45	Pond	0.7	61.0	1.70	5	15	80						
A46	Lake	2.9	62.5	19.75	10	18	65	5	1	1			
A49	Pond	0.5	62.4	0.59	30	15	55						
B4	Lake	2.4	56.5	85.82	5	13	79	3					
B5	Lake	3.4	58.3	56.74	5	13	50	23	9				
B6	Lake	4.0	61.9	11.80	1	11	61	25	2				
B19	Pond	1.3	58.1	1.57	70	13	17						
B30	Pond	1.1	61.7	0.09	80	10	10						
B31	Pond	1.2	60.8	0.13	80	12	8						
B32	Pond	0.9	60.5	0.60	70	15	15						
B34	Lake	2.1	61.3	4.37	13	15	70	2					
B36	Pond	0.8	57.9	7.93	80	12	8						
B37	Pond	0.6	59.3	0.85	85	10	5						
B38	Pond	1.5	60.3	3.30	50	30	20						
B39	Pond	0.8	65.0	1.18	85	10	5						
B44	Pond	0.6	57.0	4.99	45	30	25						
B45	Lake	2.3	56.5	47.37	64	15	19	2					
B46	Lake	2.0	58.7	44.72	13	57	30						
B52	Lake	3.3	61.4	33.33	19	30	45	5	1				
B53	Lake	2.9	62.3	15.67	15	30	55						
B62	Pond	1.2	60.9	1.79	75	15	10						
B69	Lake	5.4	71.3	25.00	12	22	32	25	5	3	1		
C6	Pond	1.4	59.3	6.29	85	15							
C7	Pond	1.2	60.9	15.95	30	20	50						
C9	Pond	1.7	62.8	3.43	10	20	70						
C10	Lake	2.9	62.8	13.86	10	15	60	10	5				
D3	Lake	2.8	53.9	15.83	15	23	27	28	5	2			
D4	Pond	1.6	55.5	18.80	17	22	61						
D5	Lake	2.6	55.5	7.30	16	9	69	3	2	1			
D6	Pond	1.7	56.7	2.14	9	45	46						
D8	Lake	2.5	57.1	18.98	31	23	38	6	1	1			
D23	Lake	3.7	58.2	14.02	3	10	51	32	3	1			
E3	Lake	4.7	61.8	56.82	15	23	30	25	4	2	1		
E4	Lake	3.7	62.0	8.49	10	16	60	10	3	2			
E5	Lake	3.0	62.2	1.29	9	21	57	13					
H17	Pond	1.7	64.1	15.80	20	10	70						
H20	Pond	1.6	64.2	9.56	55	20	25						
J2	Pond	1.3	65.7	1.89	75	15	10						
O2	Pond	1.6	53.8	32.67	72	12	16						
O4	Pond	1.8	57.8	12.73	25	30	45						
P2	Pond	1.5	55.3	10.36	70	15	15						
Control	Lake	5.9	54.6	106.29	7	20	18	10	35	7	3		

^a Habitat Types:

Hab 1 <2 m depth; fine substrate

Hab 2 <2 m depth; mixed substrate

Hab 3 <2 m depth; coarse substrate

Hab 4 2 - 4 m depth; fine substrate

Hab 5 2 - 4 m depth; mixed substrate

Hab 6 2 - 4 m depth; coarse substrate

Hab 7 >4 m depth; fine substrate

Hab 8 >4 m depth; mixed substrate

Hab 9 >4 m depth; coarse substrate



APPENDIX E

Lower Trophic Levels

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Taxonomic Group	B2		B36		B45		B46	
	20-Jul-11		24-Jul-11		21-Jul-11		24-Jul-11	
	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present
BACILLARIOPHYTA								
<i>Achnanthes flexella</i>								
<i>Achnanthes minutissima</i>		P	1.6			P	0.6	
<i>Achnanthes minutissima</i> v. <i>cryptocephala</i>				P	0.2			
<i>Amphora</i> sp.		P						
<i>Amphora ovata</i>				P		P		
<i>Asterionalla formosa</i>								
<i>Caloneis</i> sp.								
<i>Cocconeis</i> sp.		P						
<i>Cymatopleura solea</i>								
<i>Cymbella</i> sp.			21.6			P		
<i>Cymbella minuta</i>		P						
<i>Diatoma elongatum</i>	4.1		5.6		17.5			
<i>Diploneis</i> sp.		P						
<i>Epithemia</i> sp.						P		
<i>Eunotia</i> sp.								
<i>Fragilaria</i> sp.								
<i>Fragilaria construens</i> v. <i>venter</i>					1.9		0.9	
<i>Fragilaria crotonensis</i>						P		
<i>Frustulia</i> sp.								
<i>Gomphonema</i> sp.						P		
<i>Gyrosigma</i> sp.								
<i>Hantzschia</i> sp.								
<i>Melosira</i> sp.								
<i>Navicula</i> sp. 1		P			0.5			P
<i>Navicula</i> sp. 2 larger			1.5					
<i>Navicula cryptocephala</i>								
<i>Navicula lanceolata</i>								
<i>Navicula pupila</i>				P		P		P
<i>Navicula radiosa</i>								
<i>Nedium</i> sp.								
<i>Nitzschia</i> sp.1		P						P
<i>Nitzschia acicularis</i>								
<i>Nitzschia amphibia</i>				P				
<i>Nitzschia denticulatis</i>				P				
<i>Nitzschia filiformis</i>								
<i>Nitzschia tryblionella</i>								
<i>Pinnularia</i> sp.								
<i>Rhizosolenia longiseta</i>								
<i>Stuaroneis</i> sp.						P		
<i>Stephanodiscus astraea</i>		P						
<i>Synedra actinastroides</i>					1.0			
<i>Synedra</i> sp.								P
<i>Synedra</i> sp. Smaller	0.3		6.7				0.6	
<i>Synedra</i> sp. Larger	1.2		1.7		1.1			
<i>Synedra ulna</i>		P		P				
<i>Tabellaria</i> sp.								P
<i>Tabellaria fenestrata</i>								
<i>Tabellaria flocculosa</i>						P		
Unidentified centric small	2.6				9.5			
Unidentified centric medium			4.5		3.7		7.3	
Unidentified pennate diatom				P				P
Unidentified diatom				P				
Unidentified diatom				P				
CRYPTOPHYTA								
<i>Cryptomonas curvata</i>		P	96.2			P	73.3	
<i>Cryptomonas erosa</i>								P
<i>Cryptomonas ovata</i>			8.3		4.4			
<i>Cryptomonas reflexa</i>	3.5		57.8		34.8		8.9	
<i>Katablepharis ovalis</i>	19.8		3.8		6.7		1.6	
<i>Rhodomonas minuta</i>	70.2		1.2		36.2		25.7	
CHRYSTOPHYTA								
<i>Bitrichia longispina</i>		P			1.2		2.3	
<i>Chromulina</i> sp.	1.3							
<i>Chrysidastrum catenatum</i>	63.4		325.1					P
<i>Chrysochromulina parva</i>	14.1		0.3		143.9		8.5	
<i>Chrysoikos skujai</i>	1.9							
<i>Chrysosphaerella rodhei</i>	287.4		15.6		149.8		352.6	
<i>Dinobryon crenulatum</i>		P	77.0		1.9			
<i>Dinobryon divergens</i>		P			1.2			
<i>Dinobryon sertularia</i> v. <i>protuberans</i>		P	51.2					
<i>Dinobryon sociale</i> v. <i>americanum</i>		P	187.0		11.6		51.6	
<i>Dinobryon sociale</i> v. <i>Stipitatum</i>								
<i>Dinobryon tabellariae</i>		P	11.9		4.2			
<i>Kephyrion boreale</i>	10.3		17.0		46.0		8.7	
<i>Kephyrion obliquum</i>	5.2			P	5.8		7.9	
<i>Kephyrion spirale</i>				P				
<i>Mallomonas</i> sp.	3.6						2.0	
<i>Ochromonas</i> sp.				P				P
<i>Ochromonas stellaris</i>					11.5			
<i>Pseudokephyrion</i> sp.								
<i>Stichogloea doederleinii</i>	6.1				49.4			
<i>Uroglena volvox</i>			22.9				1.5	
Unidentified statospore	81.0					P	0.7	
PYRROPHYTA								
<i>Glenodinium</i> sp.	2.6		15.4		2.9		1.9	
<i>Gymnodinium uberrimum</i>		P	65.4		4.8			
<i>Gymnodinium helveticum</i>								
<i>Peridinium aciculiferum</i>		P	119.9		14.1		16.8	
<i>Peridinium</i> sp.	483.2			P				
unidentified cyst								

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

EUGLENOPHYTA							
Phacus sp.							
Trachelomonas sp.						P	
CHLOROPHYTA							
Ankistrodesmus convolutus		P	3.4		0.4		3.3
Ankistrodesmus falcatus v. acicularis		P	2.9		0.6		
Arthrodesmus sp.		P					
Botryococcus sp.				P	8.5		P
Chlamydomonas sp. a	6.7		0.3				4.1
Chlamydomonas sp. b							
Chodatella subsalsa		P				P	P
Closterium sp.							
Closterium sp.				P			
Coelastrum microporum		P	8.4		7.7		P
Cosmarium sp. a	9.3		2.8		5.6		P
Cosmarium sp. b				P	2.9		
Cosmarium sp. c				P			
Cosmarium sp. d				P			
Crucigenia sp.	0.7				0.4		0.8
Crucigenia rectangularis		P	2.5				47.0
Crucigenia tetrapedia	1.0				7.0		
Dictyosphaerium ehrenbergianum						P	
Elakatothrix sp.		P	0.5			P	0.6
Elakatothrix gelatinosa							
Euastrum sp					19.1		26.6
Euastrum binale						P	
Gonatozygon sp.				P			
Lagerheimia sp.		P					
Micractinium pusillum				P			
Monoraphidium sp.			0.5				
Monoraphidium capricornulum	3.5				1.0		7.6
Mougeotia sp.							
Nephrocytium limneticum		P	1.5				
Oocystis lacustris	3.7		49.0		25.5		48.9
Oocystis solitaria	32.7		63.5		8.6		53.0
Pediastrum boryanum				P		P	25.7
Pediastrum duplex		P					
Pediastrum tetras				P			P
Scenedesmus bijuga	3.5		16.3		1.4		2.8
Scenedesmus quadricauda		P				P	0.6
Scenedesmus acuminatus							
Scenedesmus arcuatus			3.4				
Scenedesmus incrassatulus		P	13.6		0.5		0.5
Sphaerocystis Schroeteri	25.9			P	17.3		15.0
Staurastrum sp. a						P	
Staurastrum sp. b				P			
Staurastrum tetracerum							
Stichococcus bacillaris		P			1.4		
Staurodesmus dejectus						P	
Tetraedron sp.							
Tetraedron arthrodesmiforme	0.3		0.1		0.1		0.1
Tetraedron caudatum		P					
Tetraedron minimum		P	2.3		1.2		0.2
Tetraedron muticum	0.7		9.8				0.4
Treubaria varia			6.6				
Xanthidium antilopaeum							
Unidentified filament #1					1.8		P
Unidentified colonial							
CYANOPHYTA							
Anabaena sp.							
Aphanothece clathrata	0.6				3.7		0.6
Aphanothece Aphanocapsa sp			4.6				
Chroococcus dispersus	0.8		6.6		13.4		4.7
Chroococcus limneticus		P	28.8		5.3		3.6
Chroococcus turgidus							
Gomphosphaeria aponina							
Gomphosphaeria naegelianum		P	76.2		8.2		0.9
Lyngbya limnetica							1.0
Merismopedia minima			6.8		0.2		1.0
Microcystis sp.							
Oscillatoria sp.							
Oscillatoria limnetica	0.5		0.8		0.1		
Phormidium mucicola							
Pseudanabaena sp.							
Total biovolume (µg/L)	1151.7		1535.2		779.5		834.4
Taxonomic richness*	66		68		67		53

*unidentified organisms were excluded from richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Taxonomic Group	D4		D5		D7		D23		E4	
	17-Jul-11		17-Jul-11		22-Jul-11		18-Jul-11		19-Jul-11	
	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present
BACILLARIOPHYTA										
<i>Achnanthes flexella</i>				P						
<i>Achnanthes minutissima</i>	0.4			P		P	1.3			
<i>Achnanthes minutissima</i> v. <i>cryptocephala</i>										
<i>Amphora</i> sp.						P				
<i>Amphora ovata</i>										
<i>Asterionalla formosa</i>										
<i>Caloneis</i> sp.										
<i>Cocconeis</i> sp.										
<i>Cymatopleura solea</i>								P		
<i>Cymbella</i> sp.				P				P		
<i>Cymbella minuta</i>		P								P
<i>Diatoma elongatum</i>	16.4		59.2		4.5		5.7			P
<i>Diploneis</i> sp.										
<i>Epithemia</i> sp.							9.9			
<i>Eunotia</i> sp.		P		P						P
<i>Fragilaria</i> sp.				P						
<i>Fragilaria construens</i> v. <i>venter</i>		P				P				
<i>Fragilaria crotonensis</i>			12.7							
<i>Frustulia</i> sp.				P						
<i>Gomphonema</i> sp.		P		P		P		P		
<i>Gyrosigma</i> sp.								P		
<i>Hantzschia</i> sp.						P				
<i>Melosira</i> sp.										
<i>Navicula</i> sp. 1		P		P		P		P	0.4	
<i>Navicula</i> sp. 2 larger						P				
<i>Navicula cryptocephala</i>						P				
<i>Navicula lanceolata</i>										
<i>Navicula pupila</i>				P		P		P		P
<i>Navicula radiosa</i>								P		
<i>Nedium</i> sp.										
<i>Nitzschia</i> sp.1				P				P		P
<i>Nitzschia acicularis</i>										
<i>Nitzschia amphibia</i>										
<i>Nitzschia denticulatis</i>								P		
<i>Nitzschia filiformis</i>				P						P
<i>Nitzschia tryblionella</i>										
<i>Pinnularia</i> sp.		P								
<i>Rhizosolenia longiseta</i>							2.2			
<i>Stuaroneis</i> sp.										
<i>Stephanodiscus astraea</i>										
<i>Synedra actinastroides</i>										
<i>Synedra</i> sp.										
<i>Synedra</i> sp. Smaller	0.3				1.3		0.8		1.0	
<i>Synedra</i> sp. Larger	16.2		8.5		19.1		2.6			P
<i>Synedra ulna</i>										
<i>Tabellaria</i> sp.										
<i>Tabellaria fenestrata</i>										
<i>Tabellaria flocculosa</i>				P	19.0			p		P
Unidentified centric small								P	2.5	
Unidentified centric medium						P				
Unidentified pennate diatom										
Unidentified diatom	1.5			P						
Unidentified diatom										
CRYPTOPHYTA										
<i>Cryptomonas curvata</i>	119.6		217.4		25.3			P	59.9	
<i>Cryptomonas erosa</i>										
<i>Cryptomonas ovata</i>	95.3		49.7			P		P	29.7	
<i>Cryptomonas reflexa</i>	133.0		17.9		53.0		38.7		126.9	
<i>Katablepharis ovalis</i>	16.1		6.2		8.5		9.3		27.6	
<i>Rhodomonas minuta</i>	12.6		2.9		39.4		15.4		37.7	
CHRYSOPHYTA										
<i>Bitrichia longispina</i>	2.9		1.8					P	2.0	
<i>Chromulina</i> sp.			1.3							
<i>Chrysidastrum catenatum</i>					4.1					P
<i>Chrysochromulina parva</i>	5.4		69.4		94.0		1.4		75.2	
<i>Chrysoikos skujai</i>	7.2		39.6		19.8		0.7		2.3	
<i>Chrysosphaerella rodhei</i>	76.4		321.9		638.2		365.6		691.8	
<i>Dinobryon crenulatum</i>	37.9		26.9		23.9					
<i>Dinobryon divergens</i>	63.3				191.2				37.4	
<i>Dinobryon sertularia</i> v. <i>protuberans</i>	12.4			P	27.2		9.1			
<i>Dinobryon sociale</i> v. <i>americanum</i>			25.9				45.2		63.6	
<i>Dinobryon sociale</i> v. <i>stipitatum</i>	347.6		143.2		396.7					
<i>Dinobryon tabellariae</i>	21.6			P	12.9			P		P
<i>Kephyrion boreale</i>	69.5		81.4		63.4		148.2			
<i>Kephyrion obliquum</i>	29.2		36.5		5.5		32.8			
<i>Kephyrion spirale</i>	0.6		1.3							
<i>Mallomonas</i> sp.	1.9			P						P
<i>Ochromonas</i> sp.										
<i>Ochromonas stellaris</i>		P		P	13.9					
<i>Pseudokephyrion</i> sp.	1.9		7.7				1.6			
<i>Stichogloea doederleinii</i>	99.5		91.9		54.8				28.2	
<i>Uroglena volvox</i>	124.4		7.6		4.1		15.1		33.7	
Unidentified statospore	64.7		2.6		229.5					
PYRROPHYTA										
<i>Glenodinium</i> sp.		P	26.2			P	17.5			P
<i>Gymnodinium uberrimum</i>				P			961.6			
<i>Gymnodinium helveticum</i>										
<i>Peridinium aciculiferum</i>	36.9		132.2		84.6		313.2		134.4	
<i>Peridinium</i> sp.	27.8						781.5			
unidentified cyst		P								

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

EUGLENOPHYTA									
<i>Phacus</i> sp.									
<i>Trachelomonas</i> sp.	3.7								
CHLOROPHYTA									
<i>Ankistrodesmus convolutus</i>			0.2		0.2		0.6		
<i>Ankistrodesmus falcatus</i> v. <i>acicularis</i>	0.6		1.2			P		P	0.9
<i>Arthrodesmus</i> sp.									
<i>Botryococcus</i> sp.		P							
<i>Chlamydomonas</i> sp. a		P							17.4
<i>Chlamydomonas</i> sp. b									
<i>Chodatella subsalsa</i>				P					
<i>Closterium</i> sp.									
<i>Closterium</i> sp.									
<i>Coelastrum microporum</i>				P					
<i>Cosmarium</i> sp. a		P	4.7		2.5				8.7
<i>Cosmarium</i> sp. b									
<i>Cosmarium</i> sp. c		P							
<i>Cosmarium</i> sp. d									
<i>Crucigenia</i> sp.				P		P			8.0
<i>Crucigenia rectangularis</i>		P		P					
<i>Crucigenia tetrapedia</i>	4.0		0.4		4.6		1.4		2.0
<i>Dictyosphaerium ehrenbergianum</i>									
<i>Elakatothrix</i> sp.				P					0.6
<i>Elakatothrix gelatinosa</i>									
<i>Euastrum</i> sp			41.4						P
<i>Euastrum binale</i>									
<i>Gonatozygon</i> sp.									
<i>Lagerheimia</i> sp.	0.2			P			0.8		0.5
<i>Micractinium pusillum</i>									
<i>Monoraphidium</i> sp.		P	1.3		1.0		7.9		
<i>Monoraphidium capricornulum</i>			1.7		1.5				
<i>Mougeotia</i> sp.									
<i>Nephrocytium limneticum</i>	1.4			P			0.2		
<i>Oocystis lacustris</i>	1.5		34.3				7.6		4.0
<i>Oocystis solitaria</i>						P		P	154.7
<i>Pediastrum boryanum</i>		P							
<i>Pediastrum duplex</i>									
<i>Pediastrum tetras</i>									
<i>Scenedesmus bijuga</i>	3.9		3.6		1.4		2.3		
<i>Scenedesmus quadricauda</i>	1.5			P	1.3		1.5		0.3
<i>Scenedesmus acuminatus</i>		P							
<i>Scenedesmus arcuatus</i>									
<i>Scenedesmus incrassatulus</i>			1.2		1.4		0.2		P
<i>Sphaerocystis Schroeteri</i>			7.7		9.8		2.6		P
<i>Staurastrum</i> sp. a						P		P	P
<i>Staurastrum</i> sp. b		P							
<i>Staurastrum tetracerum</i>				P					
<i>Stichococcus bacillaris</i>									1.5
<i>Staurodesmus dejectus</i>						P			
<i>Tetraedron</i> sp.				P	4.9		1.4		
<i>Tetraedron arthrodesmiforme</i>	3.5		3.8		2.7		1.8		0.9
<i>Tetraedron caudatum</i>						P			0.3
<i>Tetraedron minimum</i>		P	1.8		0.8			P	
<i>Tetraedron muticum</i>									P
<i>Treubaria varia</i>		P	1.1						
<i>Xanthidium antilopaeum</i>									
Unidentified filament #1	4.6			P	0.8			P	
Unidentified colonial								P	P
CYANOPHYTA									
<i>Anabaena</i> sp.									
<i>Aphanothece clathrata</i>	0.5		0.1		0.5				0.4
<i>Aphanothece Aphanocapsa</i> sp									
<i>Chroococcus dispersus</i>	8.6				2.7				1.7
<i>Chroococcus limneticus</i>	8.8			P			2.5		0.2
<i>Chroococcus turgidus</i>									
<i>Gomphosphaeria aponina</i>									
<i>Gomphosphaeria naegelianum</i>	2.2		9.2			P		P	3.3
<i>Lyngbya limnetica</i>									
<i>Merismopedia minima</i>		P	0.2						
<i>Microcystis</i> sp.		P	1.3				0.9		42.9
<i>Oscillatoria</i> sp.							2.6		
<i>Oscillatoria limnetica</i>	1.7		1.3		0.4		1.0		0.4
<i>Phormidium mucicola</i>									
<i>Pseudanabaena</i> sp.		P		P				P	
Total biovolume (µg/L)	2492.3		1613.6		2070.7		3168.4		1653.3
Taxonomic richness*	63		72		56		58		52

*unidentified organisms were excluded from richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Taxonomic Group	H17		H2O		ML-E		ML-SE		Boot-2		Control Lake	
	27-Jul-11		26-Jul-11		1-Aug-11		27-Jul-11		31-Jul-11		29-Jul-11	
	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present	Biomass	Present
BACILLARIOPHYTA												
<i>Achnanthes flexella</i>		P										
<i>Achnanthes minutissima</i>			0.1			P		P		P		
<i>Achnanthes minutissima v. cryptocephala</i>												P
<i>Amphora</i> sp.												
<i>Amphora ovata</i>				P								
<i>Asterionalla formosa</i>						P		P				
<i>Caloneis</i> sp.				P								
<i>Cocconeis</i> sp.												
<i>Cymatopleura solea</i>												
<i>Cymbella</i> sp.		P								P		P
<i>Cymbella minuta</i>												
<i>Diatoma elongatum</i>		P				P	0.9					P
<i>Diploneis</i> sp.												
<i>Epithemia</i> sp.								P				P
<i>Eunotia</i> sp.												
<i>Fragilaria</i> sp.												
<i>Fragilaria construens v. venter</i>	0.8							P				
<i>Fragilaria crotonensis</i>		P						P				
<i>Frustulia</i> sp.												
<i>Gomphonema</i> sp.		P		P								
<i>Gyrosigma</i> sp.												
<i>Hantzschia</i> sp.												
<i>Melosira</i> sp.						P						
<i>Navicula</i> sp. 1		P		P						P		
<i>Navicula</i> sp. 2 larger		P										
<i>Navicula cryptocephala</i>								P				
<i>Navicula lanceolata</i>								P				
<i>Navicula pupila</i>		P				P						
<i>Navicula radiosa</i>												
<i>Nedium</i> sp.				P								
<i>Nitzschia</i> sp.1		P		P				P				
<i>Nitzschia acicularis</i>								P				
<i>Nitzschia amphibia</i>												
<i>Nitzschia denticulatis</i>												
<i>Nitzschia filiformis</i>												
<i>Nitzschia tryblionella</i>												
<i>Pinnularia</i> sp.												
<i>Rhizosolenia longiseta</i>							3.7				0.8	
<i>Stuaroneis</i> sp.												
<i>Stephanodiscus astraea</i>						P	4.7			P	11.6	
<i>Synedra actinastroides</i>	0.6											
<i>Synedra</i> sp.												
<i>Synedra</i> sp. Smaller			0.4						0.5			
<i>Synedra</i> sp. Larger					0.2			P		P		P
<i>Synedra ulna</i>								P				
<i>Tabellaria</i> sp.												
<i>Tabellaria fenestrata</i>							13.2			p		
<i>Tabellaria flocculosa</i>		P					2.9			P		P
Unidentified centric small	14.7							P		P		P
Unidentified centric medium												P
Unidentified pennate diatom		P				P						
Unidentified diatom										P		
Unidentified diatom												
CRYPTOPHYTA												
<i>Cryptomonas curvata</i>		P					43.0			P		P
<i>Cryptomonas erosa</i>												
<i>Cryptomonas ovata</i>						P		P	5.6			
<i>Cryptomonas reflexa</i>	39.0		135.4		20.1		25.2		16.7		5.9	
<i>Katablepharis ovalis</i>	12.3		4.4		0.9		3.6		2.3		1.5	
<i>Rhodomonas minuta</i>	1.3		27.9		18.5		9.7		15.6		3.3	
CHRYSOPHYTA												
<i>Bitrichia longispina</i>		P	1.1			P		P	0.2		0.4	
<i>Chromulina</i> sp.							1.3		69.7			
<i>Chrysidastrum catenatum</i>	2.6											
<i>Chrysochromulina parva</i>			1.5		3.7		2.2		4.6		14.8	
<i>Chrysoikos skujai</i>							0.4					
<i>Chrysosphaerella rodhei</i>	14.5		82.6		113.9		153.7		26.5		42.3	
<i>Dinobryon crenulatum</i>							82.3		8.6			
<i>Dinobryon divergens</i>					39.5			P	48.0		3.2	
<i>Dinobryon sertularia v. protuberans</i>	6.9				21.9		2.6		21.6		13.5	
<i>Dinobryon sociale v. americanum</i>			2.4		56.4		33.6		89.9		75.7	
<i>Dinobryon sociale v. Stipitatum</i>	87.0						7.6					
<i>Dinobryon tabellariae</i>						P	6.7				14.3	
<i>Kephyrion boreale</i>	3.9				2.3		22.6		12.5		6.9	
<i>Kephyrion obliquum</i>							64.5					
<i>Kephyrion spirale</i>												
<i>Mallomonas</i> sp.		P				P		P				
<i>Ochromonas</i> sp.												
<i>Ochromonas stellaris</i>												
<i>Pseudokephyrion</i> sp.												
<i>Stichogloea doederleinii</i>	47.2		117.2		7.1		11.2				2.5	
<i>Uroglena volvox</i>					5.9				4.6			
Unidentified statospore					23.8		5.2		33.0			
PYRROPHYTA												
<i>Glenodinium</i> sp.	1.8			P	2.3		12.7		1.9		7.4	
<i>Gymnodinium uberrimum</i>	224.3		3.5		137.8			P		P	15.8	
<i>Gymnodinium helveticum</i>								P	46.8			
<i>Peridinium aciculiferum</i>			47.8				87.4		10.1		5.7	
<i>Peridinium</i> sp.						P						
unidentified cyst			12.1			P						

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

EUGLENOPHYTA												
<i>Phacus</i> sp.										P		
<i>Trachelomonas</i> sp.				P								
CHLOROPHYTA												
<i>Ankistrodesmus convolutus</i>	0.3		0.1				0.4					
<i>Ankistrodesmus falcatus</i> v. <i>acicularis</i>		P		P				P				
<i>Arthrodesmus</i> sp.					7.8					P		
<i>Botryococcus</i> sp.			9.7									
<i>Chlamydomonas</i> sp. a	2.7						0.2					
<i>Chlamydomonas</i> sp. b												
<i>Chodatella subsalsa</i>		P										
<i>Closterium</i> sp.												
<i>Closterium</i> sp.				P								
<i>Coelastrum microporum</i>		P		P				P				
<i>Cosmarium</i> sp. a		P		P	5.3		2.6		2.5		2.6	
<i>Cosmarium</i> sp. b				P	10.4		3.5			P		P
<i>Cosmarium</i> sp. c												
<i>Cosmarium</i> sp. d												
<i>Crucigenia</i> sp.												P
<i>Crucigenia rectangularis</i>	2.2		37.3				5.5					
<i>Crucigenia tetrapedia</i>				P	0.2		0.3			P		P
<i>Dictyosphaerium ehrenbergianum</i>				P				P				P
<i>Elakatothrix</i> sp.	1.0		1.7		0.5		0.3		0.9		1.0	
<i>Elakatothrix gelatinosa</i>											0.9	
<i>Euastrum</i> sp.												
<i>Euastrum binale</i>												
<i>Gonatozygon</i> sp.												
<i>Lagerheimia</i> sp.												
<i>Microactinium pusillum</i>												
<i>Monoraphidium</i> sp.			0.1									
<i>Monoraphidium capricornulum</i>	1.3											
<i>Mougeotia</i> sp.								P				
<i>Nephrocytium limneticum</i>	0.5							P	1.2		2.0	
<i>Oocystis lacustris</i>	22.3		18.7		0.6				0.2		7.9	
<i>Oocystis solitaria</i>	12.9			P				P			72.0	
<i>Pediastrum boryanum</i>												
<i>Pediastrum duplex</i>								P				
<i>Pediastrum tetras</i>		P										
<i>Scenedesmus bijuga</i>	0.6						0.6			P	0.2	
<i>Scenedesmus quadricauda</i>			0.1									P
<i>Scenedesmus acuminatus</i>		P										
<i>Scenedesmus arcuatus</i>												
<i>Scenedesmus incrassatulus</i>	3.5			P				P			0.9	
<i>Sphaerocystis Schroeteri</i>	12.9		284.6		0.8		74.3				25.9	
<i>Staurastrum</i> sp. a		P		P								P
<i>Staurastrum</i> sp. b												
<i>Staurastrum tetracerum</i>		P										
<i>Stichococcus bacillaris</i>								P				
<i>Staurodesmus dejectus</i>												P
<i>Tetraedron</i> sp.				P		P		P		P		P
<i>Tetraedron arthrodesmiforme</i>							0.5				0.1	
<i>Tetraedron caudatum</i>								P				
<i>Tetraedron minimum</i>		P	0.3				0.3				1.3	
<i>Tetraedron muticum</i>		P										
<i>Treubaria varia</i>												
<i>Xanthidium antilopaeum</i>									75.4			
Unidentified filament #1		P			0.8				0.9			P
Unidentified colonial												
CYANOPHYTA												
<i>Anabaena</i> sp.	15.5		128.9									
<i>Aphanothece clathrata</i>	0.5		6.6			P			0.4			
<i>Aphanothece Aphanocapsa</i> sp												
<i>Chroococcus dispersus</i>	3.3		29.9				29.9				4.4	
<i>Chroococcus limneticus</i>	4.5		12.9		2.2			P	0.2			
<i>Chroococcus turgidus</i>					8.3						1.5	
<i>Gomphosphaeria aponina</i>	27.5		136.9									
<i>Gomphosphaeria naegelianum</i>	42.8		194.8							P		P
<i>Lyngbya limnetica</i>												
<i>Merismopedia minima</i>	2.3		0.6								0.3	
<i>Microcystis</i> sp.												
<i>Oscillatoria</i> sp.		P										
<i>Oscillatoria limnetica</i>	1.7		1.0					P	0.2			
<i>Phormidium mucicola</i>								P				
<i>Pseudanabaena</i> sp.		P							3.4			
Total biovolume (µg/L)	748.0		1300.7		491.3		733.0		503.7		469.4	
Taxonomic richness*	57		49		36		66		43		47	

*unidentified organisms were excluded from richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Taxonomic Group	B2	B36	B45	B46	D4	D5	D7	D23	E3	E4	H17	H20	ML-E	ML-SE	Boot-2	Control
	20-Jul-11	24-Jul-11	21-Jul-11	24-Jul-11	17-Jul-11	17-Jul-11	22-Jul-11	18-Jul-11	19-Jul-11	19-Jul-11	27-Jul-11	26-Jul-11	1-Aug-11	27-Jul-11	31-Jul-11	29-Jul-11
COPEPODA																
Nauplii	0.7	0.6	0.3		2.7	0.8	2.8	3.3	5.1	4.0			0.5	17.6	12.4	6.8
CALANOIDA																
Copepodites	28.7	0.3	53.1	32.3	1.7	2.3	3.1	1.3	52.2	17.1	20.5	8.8	1.4	8.2	0.4	3.4
<i>Heterocope septentrionalis</i>				18.2							9.5	27.4				
<i>Epischura lacustris</i>	21.2		39.8				2.6	0.9	2.3	14.6			3.5	1.5	3.4	4.6
<i>Hesperodiaptomus</i> sp.												7.2				
<i>Leptodiaptomus</i> sp.		2.4		26.8							19.6	52.4		1.3		0.5
CYCLOPOIDA																
Copepodites	10.1	0.2	5.7		0.8	0.4	1.4	0.5	5.4	13.1			9.2	0.8	12.3	9.9
<i>Cyclops</i> sp.													0.8		4.0	
<i>Diaacyclops</i> sp.	3.7		1.2		0.2		0.4	0.5	10.3	2.6			10.2	5.8	26.6	2.7
CLADOCERA																
<i>Daphnia longiremis</i>									1.1				8.4	3.2	8.9	20.4
<i>Daphnia pulex</i> complex				16.2							50.9	159.5				
<i>Bosmina longirostris</i>	8.6		0.9		0.03	0.2	0.7	0.3	3.9	4.7			2.0	21.4	0.2	9.4
Chydoridae																
<i>Holopedium gibberum</i>	50.8								4.6				12.9	1.0	6.2	4.6
<i>Leydigia</i> sp.										0.1						
ROTIFERA																
<i>Asplanchna</i> sp.			<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01
<i>Collotheca</i> sp.																<0.01
Conochilidae	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<i>Filinia</i> sp.						<0.01										
<i>Gastropus</i> sp.	<0.01								<0.01	<0.01			<0.01	<0.01	<0.01	
<i>Kellicottia longispina</i>	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	<0.01		<0.01
<i>Keratella</i> (one spine)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<i>Keratella quadrata</i>	<0.01		<0.01						<0.01		<0.01			<0.01	<0.01	<0.01
<i>Keratella ticinensis</i>		<0.01		<0.01								<0.01			<0.01	
<i>Lecane</i> sp.														<0.01		
<i>Monostyla</i> sp.								<0.01			<0.01					
<i>Ploesoma</i> sp.					<0.01	<0.01	<0.01	<0.01		<0.01						
<i>Polyarthra</i> sp.	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01
<i>Synchaeta</i> sp.		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01			<0.01		<0.01	<0.01	<0.01	
Total Rotifers	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Biomass	113.8	3.6	101.0	93.5	5.5	3.7	11.1	6.8	84.8	56.3	100.4	255.3	48.9	60.8	74.4	62.2
Taxonomic Richness	12	8	11	9	11	11	12	13	14	13	9	8	15	17	16	15

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	B2							B36							B45						
			20-Jul-11							24-Jul-11							21-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-															578	43	578			356	136
Oligochaeta	Lumbriculidae	-																		43		9	9
	Naididae	-			43		43	17	11					43	9	9		578		1157	1157	578	259
	Tubificidae	-																					
Gastropoda	Lymnaeidae	<i>Stagnicola</i>																					
	Planorbidae	<i>Gyraulus</i>																					
	Valvatidae	<i>Valvata sincera helicoidae</i>		43	43	43	130	52	21														
Pelecypoda	Sphaeriidae	i/d	43	174	43			52	32											217	435	130	87
		<i>Pisidium</i>	174	130	43	304	435	217	69								1448	1087	3404	1565	2317	1964	412
		-	43			43	43	26	11									578	578	578		578	116
Hydracarina	Aturidae	<i>Aturus</i>																			578	116	116
	Lebertia	i/d																					
Notostraca		<i>Triops longicaudatus</i>																					
Cladocera	i/d	-																					
	Bosminidae	<i>Bosmina</i>																578		578		231	142
	Chydoridae	-																		578	578	231	142
	Daphnidae	<i>Daphnia</i>																					
	Holopedidae	<i>Holopedium gibberum</i>																					
	Sididae	<i>Sida crystallina</i>																					
Copepoda	Cyclopoida	-															1735	1778	578	2313	578	1397	349
	Calanoida	-																		578		116	116
	Harpacticoida	-				87		17	17								16770	12722	13878	13878	17926	15035	985
Ostracoda	i/d	-																					
	Candonidae	<i>Candona</i>																1735	2313	1735	1157	1388	392
	Cyclocypridae	<i>Cyclocypris</i>																					
	Cypridae	<i>Eucypris</i>	43	43				17	11								49730	57870	52043	43948	56091	51937	2461
Amphipoda	Gammaridae	<i>Gammarus lacustris</i>																					
Plecoptera	Nemouridae	<i>Nemoura</i>																					
Tricoptera	Limnephilidae	<i>Ecclisomyia</i>																		43		9	9
Coleoptera	Dytiscidae	<i>Hydrotus</i>																					
		<i>Ilybius</i>																					
Diptera		Pupae					43	9	9				43	130	35	25			578			116	116
	Ceratopogonidae	<i>Bezzia</i>								87		87	43	130	70	22							
	Chironomidae	i/d	217	217	43		261	148	53		43	217	522	261	209	93							
	Chironominae	i/d								43	43		174		52	32							
	Chironomini	i/d	130	43	87	261	217	148	40				130		26	26		622	578		578	356	145
		<i>Chironomus</i>								43		43	130	87	61	22							
		<i>Cryptochironomus</i>												43	9	9	87					17	17
		<i>Dicrotendipes</i>																					
		<i>Glyptotendipes</i>																					
		<i>Microtendipes</i>																					
	Tanytarsini	i/d		217		130	43	78	42	826	174	826	1174	1217	843	187			578	87		133	113
		<i>Paratanytarsus</i>																					
		<i>Tanytarsus</i>		391	87		348	165	85	217		43	304	130	139	56							
	Prodiamesinae	<i>Prodiamesa</i>																					
	Diamesinae	<i>Protanypus</i>																					
	Orthoclaadiinae	i/d			87	43		26	17									87				17	17
		<i>Corynocera</i>	565	522	609	1261	1652	922	227														
		<i>Eukiefferiella</i>																					
		<i>Psectocladius</i>				43		9	9								43		709	43	622	283	157
	Tanypodiinae	i/d																					
		<i>Apsectotanypus</i>																					
		<i>Procladius</i>				87	43	26	17	522	87	435	261	391	339	76	43	709	217	130		220	128
	Muscidae	<i>Limnophora</i>											43	43	17	11							
Total abundance*			1217	1783	1087	2304	3217	1922	390	1739	348	1652	2783	2348	1774	412	68700	76030	74878	64004	80861	72895	2948
Richness*			6	7	7	8	9	7	1	5	4	5	7	7	6	1	7	10	10	12	8	9	1

*non-benthic taxa excluded from abundance and richness counts.

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	B46							D4							D5						
			24-Jul-11							17-Jul-11							17-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-																					
Oligochaeta	Lumbriculidae	-	130	87		43		52	25		87		1000		217	196							
	Naididae	-	87	43				26	17	87	435	87		174	157	75							
	Tubificidae	-											348		70	70	87		43		43	35	16
Gastropoda	Lymnaeidae	<i>Stagnicola</i>								43	174				43	34							
	Planorbidae	<i>Gyraulus</i>								130	87				43	27							
	Valvatidae	<i>Valvata sincera helicoidae</i>		43	43			17	11	174	43	87	43	43	78	25							
Pelecypoda	Sphaeriidae	i/d	87	174	43	217	174	139	32														
		<i>Pisidium</i>	2478	3696	1043	1043	2478	2148	503								304	391		870	783	470	160
Hydracarina		-																					
	Aturidae	<i>Aturus</i>																					
Notostraca		i/d								87					17	17							
		<i>Triops longicaudatus</i>																					
Cladocera		-																					
	Bosminidae	<i>Bosmina</i>								87					17	17							
	Chydoridae	-																					
	Daphnidae	<i>Daphnia</i>																					
	Holopedidae	<i>Holopedium gibberum</i>																					
Copepoda	Sididae	<i>Sida crystallina</i>																					
	Cyclopoida	-	43	43	87			35	16	435					87	87		43	217	130		78	42
	Calanoida	-		130				26	26										43	43		17	11
Ostracoda	Harpacticoida	-								174		43			43	34	217	261	1130	478		417	194
		-	43					9	9														
	Candonidae	<i>Candona</i>	261	174	43		391	174	71	174	174	87			87	39				43	43	17	11
Plecoptera	Cyclocypridae	<i>Cyclocypris</i>															4130	4261	5304	8391	5000	5417	775
	Cypridae	<i>Eucypris</i>																					
	Gammaridae	<i>Gammarus lacustris</i>																					
Amphipoda																							
Plecoptera	Nemouridae	<i>Nemoura</i>		43				9	9														
Tricoptera	Limnephilidae	<i>Ecclisomyia</i>																					
Coleoptera	Dytiscidae	<i>Hydrotus</i>																					
		<i>Ilybius</i>		43				9	9														
Diptera		Pupae																					
	Ceratopogonidae	<i>Bezzia</i>	43	130	87	87	174	104	22														
	Chironomidae	i/d								87					17	17							
	Chironominae	i/d	174	174		130	174	130	34	1478	522				400	288							
	Chironomini	i/d	130					26	26	261	87	435	522	348	330	75							
		<i>Chironomus</i>								43	43	174	43	435	148	76							
		<i>Cryptochironomus</i>	43					9	9														
		<i>Dicrotendipes</i>										43			9	9							
		<i>Glyptotendipes</i>										217			43	43							
	Tanytarsini	<i>Microtendipes</i>																					
		i/d	1522	3043	130	217	1261	1235	530		957	783	1043	1043	765	197	43					9	9
		<i>Paratanytarsus</i>																					
	Tanytarsus	<i>Tanytarsus</i>		130	43			35	25									43		87		26	17
	Prodiamesinae	<i>Prodiamesa</i>																					
	Diamesinae	<i>Protanypus</i>																					
	Orthoclaadiinae	i/d									87	522			122	101							
		<i>Corynocera</i>								1217					243	243							
		<i>Eukiefferiella</i>																					
		<i>Psectocladius</i>																		43		9	9
	Tanypodiinae	i/d																					
		<i>Apsectotanypus</i>																					
		<i>Procladius</i>	261	348	174	174	130	217	39	609	1957	217	522	87	678	334	87			43	87	43	19
	Muscidae	<i>Limnophora</i>																					
Total abundance*			5261	8130	1609	1913	4783	4339	1199	4565	4652	2696	3522	2130	3513	499	4870	4957	6478	9957	5957	6443	929
Richness*			10	11	6	6	6	8	1	12	11	8	6	5	8	1	6	4	3	7	5	5	1

*non-benthic taxa excluded from abundance and richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	D7							D23							E3						
			22-Jul-11							18-Jul-11							19-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-												43	9	9				43		9	9
Oligochaeta	Lumbriculidae	-																					
	Naididae	-	2030	1739	578	1735		1216	393									43	43			17	11
	Tubificidae	-																					
Gastropoda	Lymnaeidae	Stagnicola																					
	Planorbidae	Gyraulus																					
	Valvatidae	Valvata sincera helicoidae															87		43	43	43	43	14
Pelecypoda	Sphaeriidae	i/d		261	87	43	43	87	46	43	261	87		43	87	46					43	9	9
		Pisidium	87	1043	1435	826	913	861	220	826	783	304	87	913	583	163	130		478	174	174	191	79
Hydracarina	i/d	-																	43			9	9
	Aturidae	Aturus																					
Notostraca	Lebertia	i/d																					
		Triops longicaudatus																					
Cladocera	i/d	-																					
	Bosminidae	Bosmina																					
	Chydoridae	-																					
	Daphnidae	Daphnia																					
	Holopedidae	Holopedium gibberum																					
	Sididae	Sida crystallina															43					9	9
Copepoda	Cyclopoida	-				1157	290	289	224	87			43		26	17	130	130	522		261	209	88
	Calanoida	-	580					116	116								87					17	17
	Harpacticoida	-	8410	8696	12809	6491	5510	8383	1255	87	174		130		78	35	2391	2435	5913	478	2957	2835	878
Ostracoda	i/d	-																					
	Candonidae	Candona	290	435				145	92	304		43	87		87	57							
	Cyclocypridae	Cyclocypris		870				174	174				87		17	17	43		261		435	148	87
	Cypridae	Eucypris	21097	44391	66139	47809	24577	40803	8232	1130	261	304	261	217	435	174	1609	3391	5000	478	7217	3539	1200
Amphipoda	Gammaridae	Gammarus lacustris		87				17	17			43			9	9							
Plecoptera	Nemouridae	Nemoura																					
Tricoptera	Limnephilidae	Ecclisomyia	43	43				17	11					43	9	9			43			9	9
Coleoptera	Dytiscidae	Hydrotus																					
		Ilybius																					
Diptera		Pupae															43	87	43			35	16
	Ceratopogonidae	Bezzia																					
	Chironomidae	i/d		870				174	174		43				9	9	870	1130	2000	435	2000	1287	312
	Chironominae	i/d	290					58	58	174		87	87	174	104	33	261	739	1000	130	1522	730	253
	Chironomini	Chironomus											43	43	17	11		43		43		17	11
		Cryptochironomus																	43			9	9
		Dicrotendipes																					
		Glyptotendipes																					
		Microtendipes																					
	Tanytarsini	i/d					290	58	58					43	9	9	304	609	174		261	270	100
		Paratanytarsus																					
		Tanytarsus			43			9	9														
	Prodiamesinae	Prodiamesa																					
	Diamesinae	Protanypus																					
	Orthocladiinae	i/d																43				9	9
		Corynocera																					
		Eukiefferiella																					
		Psectocladius		43				9	9		43		43		17	11							
	Tanypodiinae	i/d																					
		Apsectotanypus																43	87		130	52	25
		Procladius				43		9	9	43	43				17	11	87	87	304	43	174	139	46
	Muscidae	Limnophora																					
Total abundance*			32248	58478	81091	56948	31334	52020	9301	2609	1609	870	826	1522	1487	323	5783	8565	15435	1826	15000	9322	2635
Richness*			7	10	5	5	4	6	1	6	6	5	7	6	6	0	9	8	12	8	9	9	1

*non-benthic taxa excluded from abundance and richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	E4							H17							H20						
			19-Jul-11							27-Jul-11							26-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-									43				9	9	43	43	261	87	130	139	11
Oligochaeta	Lumbriculidae	-															130	87	261	87	130	139	32
	Naididae	-									43				9	9		435	43		130	122	82
	Tubificidae	-										43	130		35	25	87					17	17
Gastropoda	Lymnaeidae	<i>Stagnicola</i>																					
	Planorbidae	<i>Gyraulus</i>																					
	Valvatidae	<i>Valvata sincera helicoidae</i>																					
Pelecypoda	Sphaeriidae	i/d												43	9	9							
		<i>Pisidium</i>	43	87			261	78	48					43	9	9							
Hydracarina		-				43		9	9														
	Aturidae	<i>Aturus</i>																					
Notostraca	Lebertia	i/d																					
		<i>Triops longicaudatus</i>																					
Cladocera		-																					
	Bosminidae	<i>Bosmina</i>																					
	Chydoridae	-																					
	Daphnidae	<i>Daphnia</i>								43		87	43		35	16	174	217	304	87	87	174	41
	Holopedidae	<i>Holopedium gibberum</i>																					
	Sididae	<i>Sida crystallina</i>																					
Copepoda	Cyclopoida	-		43		43		17	11										130		87	43	27
	Calanoida	-								348	43	87	826	435	348	141	826	1217	870	522	1261	939	137
	Harpacticoida	-	43	261	130	739	435	322	123									87	87		87	52	21
Ostracoda		-																					
	Candonidae	<i>Candona</i>		43		87	174	61	33		43	43	43		26	11	261	1217	609	261	348	539	181
	Cyclocypridae	<i>Cyclocypris</i>	43	87	174		217	104	40									87				17	17
	Cypridae	<i>Eucypris</i>	174	1130	174	2957	2217	1330	554														
Amphipoda	Gammaridae	<i>Gammarus lacustris</i>																					
Plecoptera	Nemouridae	<i>Nemoura</i>																					
Tricoptera	Limnephilidae	<i>Ecclisomyia</i>																					
Coleoptera	Dytiscidae	<i>Hydrotus</i>															43					9	9
		<i>Ilybius</i>																					
Diptera		Pupae					43	9	9		43		43		17	11					43	9	9
	Ceratopogonidae	<i>Bezzia</i>															87	391	87	87	87	148	61
	Chironomidae	i/d				43		9	9				43		9	9		261		43	87	78	48
		Chironominae																					
		i/d		87			87	35	21	304			348	130	157	74	87	348	478	87	217	243	76
		<i>Chironomus</i>					43	9	9	783	217	609	348	391	470	100			43			9	9
		<i>Cryptochironomus</i>															43	87	43			35	16
		<i>Dicrotendipes</i>																					
		<i>Glyptotendipes</i>																					
		<i>Microtendipes</i>																					
		i/d					87	17	17	130			87	261	96	48	174	5043	1522	522	1435	1739	866
		<i>Paratanytarsus</i>																					
		<i>Tanytarsus</i>					43	9	9	217	174		1000	261	330	173	696	1609	304	174	174	591	272
	Prodiamesinae	<i>Prodiamesa</i>																					
	Diamesinae	<i>Protanypus</i>																					
		i/d								43					9	9		43				9	9
		<i>Corynocera</i>								43		87			26	17							
		<i>Eukiefferiella</i>																					
		<i>Psectocladius</i>	43	87			174	61	33	130	43		217	87	96	37			43			9	9
		i/d								130					26	26							
		<i>Apsectotanypus</i>					43	9	9														
		<i>Procladius</i>					43	9	9	43	217		174	217	130	46	174	478	217	87	217	235	65
	Muscidae	<i>Limnophora</i>																					
Total abundance*			348	1783	478	3870	3826	2061	771	1826	783	783	2391	1435	1443	310	1826	10217	3739	1348	2913	4009	1607
Richness*			5	7	3	5	9	6	1	4	7	4	7	5	5	1	9	12	9	7	9	9	1

*non-benthic taxa excluded from abundance and richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	ML-E							ML-SE						
			1-Aug-11							27-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-				87		61	43	43		87		43	87	46
Oligochaeta	Lumbriculidae	-			435		174	122	85					43	9	9
	Naididae	-			130	174	174	96	40	43		43			17	11
	Tubificidae	-														
Gastropoda	Lymnaeidae	<i>Stagnicola</i>														
	Planorbidae	<i>Gyraulus</i>														
	Valvatidae	<i>Valvata sincera heliocoidae</i>			87	43	87	43	19	435		43	217	87	157	79
Pelecypoda	Sphaeriidae	<i>i/d</i>					87	17	17							
		<i>Pisidium</i>	261	174	261	43	217	191	40	348	522	348	391	522	426	40
Hydracarina	<i>i/d</i>	-			43			9	9							
	Aturidae	<i>Aturus</i>														
	Lebertia	<i>i/d</i>				43		9	9				43		9	9
Notostraca		<i>Triops longicaudatus</i>				43		9	9							
	<i>i/d</i>	-				87		17	17							
Cladocera	Bosminidae	<i>Bosmina</i>		261	957	391	2522	826	452							
	Chydoridae	-														
	Daphnidae	<i>Daphnia</i>	43	87	1130	1217	4087	1313	737							
	Holopedidae	<i>Holopedium gibberum</i>			304	130	1217	330	229							
	Sididae	<i>Sida crystallina</i>														
Copepoda	Cyclopoida	-	478	1696	6261	4000	7217	3930	1287	391	43	87	43	304	174	73
	Calanoida	-		261	43	522	609	287	123	43				43	17	11
	Harpacticoida	-								43	43		43		26	11
Ostracoda	<i>i/d</i>	-														
	Candonidae	<i>Candona</i>														
	Cyclocypridae	<i>Cyclocypris</i>														
	Cypridae	<i>Eucypris</i>				43		9	9							
Amphipoda	Gammaridae	<i>Gammarus lacustris</i>		43	43		130	43	24							
Plecoptera	Nemouridae	<i>Nemoura</i>														
Tricoptera	Limnephilidae	<i>Ecclisomyia</i>														
Coleoptera	Dytiscidae	<i>Hydrotus</i>														
		<i>Ilybius</i>														
Diptera		Pupae			87		87	35	21	130	130	43	43		70	26
	Ceratopogonidae	<i>Bezzia</i>														
	Chironomidae	<i>i/d</i>	304	43	4043	348	1957	1339	756	609	783	478	478	522	574	57
	Chironominae	<i>i/d</i>								1435	652	348	913	1609	991	236
	Chironomini	<i>i/d</i>	565	87	87	174	304	243	90			87		43	26	17
		<i>Chironomus</i>		261				52	52	43		43	87		35	16
		<i>Cryptochironomus</i>	43					9	9					43	9	9
		<i>Dicrotendipes</i>														
		<i>Glyptotendipes</i>														
		<i>Microtendipes</i>					43	9	9							
	Tanytarsini	<i>i/d</i>		130	130		130	78	32	1000	1522	696	1130		870	255
		<i>Paratanytarsus</i>								174				130	61	38
		<i>Tanytarsus</i>	130		174		43	70	35	1435	1348	826	957	913	1096	123
	Prodiamesinae	<i>Prodiamesa</i>					87	17	17							
	Diamesinae	<i>Protanypus</i>	43					9	9							
	Orthocladiinae	<i>i/d</i>					43	9	9	43				261	61	51
		<i>Corynocera</i>								217		217		1087	304	202
		<i>Eukiefferiella</i>									174	174	217		113	47
		<i>Psectocladius</i>					43	9	9							
	Tanypodiinae	<i>i/d</i>														
		<i>Apsectotanypus</i>														
		<i>Procladius</i>	87	87	261		174	122	44	391	174	261	348	565	348	66
	Muscidae	<i>Limnophora</i>														
Total abundance*			1435	826	5696	1000	3913	2574	958	6261	5478	3652	4826	5870	5217	457
Richness*			6	6	10	9	12	9	1	11	8	10	10	10	10	0

*non-benthic taxa excluded from abundance and richness counts

APPENDIX E
Lower Trophic Levels

Appendix E1. Phytoplankton Biomass (µg/L) and Presence in Lakes and Ponds of the Study Area, 2011

Major Group	Family/ Subfamily/ Tribe	Genus	Boot-2							Control Lake						
			31-Jul-11							29-Jul-11						
			Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Mean	SE
Nematoda	-	-														
Oligochaeta	Lumbriculidae	-														
	Naididae	-											87		17	17
	Tubificidae	-														
Gastropoda	Lymnaeidae	<i>Stagnicola</i>														
	Planorbidae	<i>Gyraulus</i>														
	Valvatidae	<i>Valvata sincera heliocoidae</i>								43			87	43	35	16
Pelecypoda	Sphaeriidae	<i>i/d</i>														
		<i>Pisidium</i>			43			9	9	87	43		43		17	11
		-											261		78	48
Hydracarina	<i>i/d</i>															
	Aturidae	<i>Aturus</i>														
	Lebertia	<i>i/d</i>														
Notostraca		<i>Triops longicaudatus</i>														
Cladocera	<i>i/d</i>	-														
	Bosminidae	<i>Bosmina</i>		43				9	9		43				9	9
	Chydoridae	-														
	Daphnidae	<i>Daphnia</i>														
	Holopedidae	<i>Holopedium gibberum</i>														
	Sididae	<i>Sida crystallina</i>														
Copepoda	Cyclopoida	-	522	130	435	348	130	313	79	130	261	130	43		113	45
	Calanoida	-		43			43	17	11		130	43			35	25
	Harpacticoida	-		217	43	130	261	130	50		43			43	17	11
Ostracoda	<i>i/d</i>	-														
	Candonidae	<i>Candona</i>				87		17	17							
	Cyclocypridae	<i>Cyclocypris</i>														
	Cypridae	<i>Eucypris</i>	87					17	17							
Amphipoda	Gammaridae	<i>Gammarus lacustris</i>														
Plecoptera	Nemouridae	<i>Nemoura</i>														
Tricoptera	Limnephilidae	<i>Ecclisomyia</i>														
Coleoptera	Dytiscidae	<i>Hydrotus</i>														
		<i>Ilybius</i>														
Diptera		Pupae														
	Ceratopogonidae	<i>Bezzia</i>				43		9	9							
	Chironomidae	<i>i/d</i>	43					9	9	304		43	130		96	57
	Chironominae	<i>i/d</i>												130	26	26
	Chironomini	<i>i/d</i>	87	43	87			43	19	87	130	43	391		130	69
		<i>Chironomus</i>			43			9	9		87		130	43	52	25
		<i>Cryptochironomus</i>														
		<i>Dicrotendipes</i>														
		<i>Glyptotendipes</i>														
		<i>Microtendipes</i>														
	Tanytarsini	<i>i/d</i>	87		43			26	17	391			261		130	82
		<i>Paratanytarsus</i>														
		<i>Tanytarsus</i>								43					9	9
	Prodiamesinae	<i>Prodiamesa</i>														
	Diamesinae	<i>Protanypus</i>														
	Orthocladiinae	<i>i/d</i>								130					26	26
		<i>Corynocera</i>														
		<i>Eukiefferiella</i>	87		87			35	21							
		<i>Psectocladius</i>		43				9	9	43					9	9
	Tanypodiinae	<i>i/d</i>														
		<i>Apsectotanypus</i>								130			43		35	25
		<i>Procladius</i>	43					9	9	43			130		35	25
	Muscidae	<i>Limnophora</i>														
Total abundance*			435	304	348	261	261	322	33	1304	304	130	1565	261	713	299
Richness*			6	3	5	3	1	4	1	7	3	3	7	4	5	1

*non-benthic taxa excluded from abundance and richness counts



APPENDIX F

Fish Populations

APPENDIX F

Fish Populations

Appendix F1. Backpack Electrofishing Sampling Locations, Effort, and Catch Data for Streams and Ponds in the Study Area, 2011

Basin	Site	Stream or Pond	Date / Time		Location (15V)		Sampling Effort		Water Temp. (°C)	Cond. (µS/cm)	pH (units)	Number of Fish Captured or Observed				Total CPUE (fish/min)
					Easting	Northing	(m)	(s)				Arctic Grayling	Slimy Sculpin	Ninespine Stickleback	Total	
B	B30	Pond	14-Jul-11	15:50	538034	6988885	68	140	19.2	168	7.1			3	3	1.29
B	B31	Pond	14-Jul-11	16:30	538108	6988785	-	174	21.5	169	6.9				0	0.00
B	B32	Pond	14-Jul-11	16:32	538212	6988801	75	302	-	-	-			1	1	0.20
B	B36	Pond	24-Jul-11	08:10	539292	6986910	127	517	17.5	264	8.0			5	5	0.58
B	B30-6	Stream	14-Jul-11	13:54	538016	6988899	60	197	-	-	-		3	6	9	2.74
B	B5-31	Stream	14-Jul-11	12:12	538076	6988694	130	474	-	-	-	2	1	13	16	2.03
B	B31-30	Stream	14-Jul-11	12:49	538088	6988797	115	460	-	-	-	2		2	4	0.52
B	B4-45	Stream	23-Jul-11	07:50	538949	6986434	53	634	15.9	104	6.8			3	3	0.28
D	D6	Pond	16-Jul-11	10:20	539535	6987601	-	437	15.1	147	7.8			13	13	1.78
E	E4-5	Stream	15-Jul-11	10:00	537046	6989719	-	268	-	-	-			4	4	0.90

APPENDIX F

Fish Populations

Appendix F2. Gill Net Locations, Effort, and Catch Data for the Study Area, 2011

Lake	Set # ^a	UTM (Zone 15V)		Mesh Sizes (mm)	Net Panels	Set Date / Time		Soak Time (h)	Effort ^a (net-unit)	Water Temp (°C)	Number of Fish Captured					CPUE (fish/ net-unit)
		Easting	Northing								Arctic Char	Lake Trout	Arctic Grayling	Round Whitefish	Total	
A1	1	544423	6985733	38-51-102	3	03-Aug-11	08:10	3.0	0.38	-	1	2			3	8.0
A1	2	544246	6985815	19-38-102	3	03-Aug-11	08:30	3.0	0.38	-		1		1	2	5.3
A46	1	541368	6985267	19-38-102	3	06-Aug-11	08:00	1.5	0.19	-					0	0.0
B34	1	539244	6987731	19-38-102	3	23-Jul-11	11:35	1.0	0.13	-					0	0.0
B45	1	539236	6985878	19-38-102	3	21-Jul-11	10:30	5.2	0.65	15.2			1		1	1.5
B45	2	539161	6985613	38-102	2	21-Jul-11	10:45	5.0	0.42	15.2					0	0.0
B46	1	540019	6985618	38-102	2	24-Jul-11	12:15	2.0	0.17	19.1					0	0.0
B46	2	540047	6985867	19-38-102	3	24-Jul-11	12:30	2.0	0.25	19.1					0	0.0
B52	1	541404	6983658	19-38-102	3	25-Jul-11	09:15	2.1	0.26	-					0	0.0
B52	2	541759	6983831	38-102	2	25-Jul-11	09:20	2.3	0.19	-					0	0.0
B53	1	541804	6983164	19-38-102	3	25-Jul-11	12:20	2.0	0.25	-			1		1	4.0
B53	2	541514	6983352	38-102	2	25-Jul-11	12:35	2.1	0.17	-			3		3	17.3
B69	1	542677	6984220	19-38-102	3	26-Jul-11	08:40	2.2	0.27	-		2	1		3	11.1
B69	2	543000	6983938	38-102	2	26-Jul-11	08:50	2.3	0.19	-					0	0.0
C7	1	543798	6984845	19-38-102	3	06-Aug-11	14:55	1.0	0.13	-					0	0.0
C10	1	542579	6984859	19-38-102	3	06-Aug-11	12:50	0.8	0.09	-					0	0.0
Control	1	534889	6986321	19-38-102	3	27-Jul-11	14:50	1.6	0.20	-		1			1	5.1
Control	2	534538	6986431	38-102	2	27-Jul-11	14:55	1.7	0.14	-		2			2	14.4
Control	1	534444	6987030	38-51-102	3	29-Jul-11	08:15	5.3	0.66	16.8		1		2	3	4.6
Control	2	534231	6986810	19-38-102	3	29-Jul-11	08:25	5.3	0.67	16.8		2		40	42	63.0
D1	1	533130	6989662	19-38-102	3	30-Jul-11	12:35	3.4	0.43	-		1	2	9	12	28.1
D1	2	533230	6989682	38-51-102	3	30-Jul-11	12:45	3.3	0.42	-		3		1	4	9.6
D3	1	534089	6989303	19-38-102	3	30-Jul-11	08:30	3.0	0.38	-			1		1	2.7
D3	2	534382	6989259	38-51-102	3	30-Jul-11	08:45	2.7	0.33	-					0	0.0
D4	1	534704	6989471	19-38-102	3	17-Jul-11	13:22	1.4	0.17	14.6					0	0.0
D4	2	534812	6989146	38-102	2	17-Jul-11	13:27	1.4	0.12	14.6					0	0.0
D5	1	535460	6989224	38-102	2	16-Jul-11	13:21	1.8	0.15	17.1					0	0.0
D5	2	535297	6989322	19-38-102	3	16-Jul-11	13:29	1.9	0.23	17.1					0	0.0
D8	1	536177	6988435	19-38-102	3	22-Jul-11	10:30	3.7	0.46	-					0	0.0
D8	2	536164	6988643	38-102	2	22-Jul-11	10:40	3.6	0.30	-					0	0.0
D23	1	535338	6989714	19-38-102	3	18-Jul-11	11:54	3.5	0.44	14.3					0	0.0
D23	2	535622	6989604	38-102	2	18-Jul-11	12:00	3.5	0.29	14.3					0	0.0
E3	1	536706	6990609	19-38-102	3	19-Jul-11	08:44	5.1	0.63	14.3		3		2	5	7.9
E3	2	536841	6990739	38-102	2	19-Jul-11	08:56	5.0	0.42	14.3					0	0.0
E4	1	536837	6989864	19-38-102	3	15-Jul-11	13:20	1.5	0.19	-					0	0.0
E4	2	536909	6989872	38-102	2	15-Jul-11	13:30	1.6	0.13	-					0	0.0
H17	1	539902	6989740	19-38-102	3	27-Jul-11	08:15	2.1	0.26	17.2					0	0.0
H17	2	539799	6989963	38-102	2	27-Jul-11	09:20	1.2	0.10	17.2					0	0.0
H20	1	540795	6988674	38-102	2	26-Jul-11	13:55	1.4	0.12	18.4					0	0.0
O2	1	537940	6985244	19-38-102	3	07-Aug-11	11:05	2.8	0.34	-	1				1	2.9
O2	2	537786	6985263	38-51-102	3	07-Aug-11	11:15	2.8	0.34	-					0	0.0
O4	1	539083	6985173	19-38-102	3	07-Aug-11	14:40	1.7	0.21	-					0	0.0

^a Effort of 1 net-unit is equivalent to one net panel (27.4 m² in total area) set for 24 h duration.

APPENDIX F

Fish Populations

Appendix F3. Fyke Net Locations, Effort and Catch Data for the Study Area, 2011

Site	UTM (Zone 15V)		Set Period				Effort (h)	Water Temp (°C)	Number of Fish Captured						CPUE (fish/h)
	Easting	Northing	Start Date/Time		End Date/Time				Lake Trout	Arctic Grayling	Burbot	Ninespine Stickleback	Threespine Stickleback	Total	
A1	543800	6986116	02-Aug-11	09:20	03-Aug-11	09:20	24.0	-		1		7	9	17	0.7
A2	543453	6986193	02-Aug-11	10:05	03-Aug-11	12:10	26.1	-				59	25	84	3.2
A46	541279	6985414	04-Aug-11	09:00	05-Aug-11	07:50	22.8	-				11		11	0.5
B4	538915	6986518	20-Jul-11	16:00	21-Jul-11	08:15	16.3	-		1		19		20	1.2
B34	539493	6987603	22-Jul-11	17:10	23-Jul-11	09:35	16.4	-				282		282	17.2
B45	539035	6986348	20-Jul-11	17:00	21-Jul-11	09:00	16.0	15.2		1		295		296	18.5
B46	540687	6985087	23-Jul-11	16:30	24-Jul-11	11:20	18.8	-		1		14		15	0.8
B52	541485	6983629	24-Jul-11	17:10	25-Jul-11	10:55	17.8	-				198		198	11.2
B53	541741	6983224	25-Jul-11	14:10	26-Jul-11	07:40	17.5	-		1		42		43	2.5
B69	543039	6984287	25-Jul-11	16:25	26-Jul-11	10:15	17.8	-		1		2		3	0.2
C6	544238	6984877	06-Aug-11	16:20	07-Aug-11	09:00	16.7	-				69		69	4.1
C7	544131	6984822	06-Aug-11	16:00	07-Aug-11	08:30	16.5	-				228	5	233	14.1
C10	542567	6984933	05-Aug-11	16:50	06-Aug-11	12:30	19.7	-				12		12	0.6
Control	534902	6986722	27-Jul-11	15:10	28-Jul-11	09:10	18.0	-	1		1	30		32	1.8
Control	534647	6986365	27-Jul-11	15:40	29-Jul-11	10:35	42.9	-	4	2		7		13	0.3
D4	534853	6989546	17-Jul-11	17:02	18-Jul-11	10:55	17.9	14.6				186		186	10.4
D5	535537	6989266	16-Jul-11	11:58	17-Jul-11	10:41	22.7	-				55		55	2.4
D8	536206	6988710	22-Jul-11	13:30	23-Jul-11	15:40	26.2	-				183		183	7.0
D23	535307	6989790	18-Jul-11	16:25	20-Jul-11	08:35	40.2	-				37		37	0.9
E3	536653	6990334	18-Jul-11	17:56	19-Jul-11	08:00	14.1	-						0	0.0
E4	536989	6989832	15-Jul-11	16:22	16-Jul-11	07:50	15.5	-		3		10		13	0.8
O2	538193	6984949	07-Aug-11	14:05	08-Aug-11	08:30	18.4	-				55		55	3.0
O4	539158	6985182	07-Aug-11	16:00	08-Aug-11	09:50	17.8	-				33		33	1.9
P2	537931	6986088	08-Aug-11	11:30	10-Aug-11	14:00	50.5	-				268		268	5.3

APPENDIX F
Fish Populations

Appendix F4. Minnow Trap Locations, Effort, and Catch Data for the Study Area, 2011

Site	Set Date / Time	Soak Time (h)	No. Traps Set	Effort (trap-h)	UTM (Zone 15V)		Water Temp (°C)	Number of Fish Captured					CPUE (fish/ 24h)
					Easting	Northing		Arctic Grayling	Slimy Sculpin	Ninespine Stickleback	Threespine Stickleback	Total	
A1	02-Aug-11 09:30	23.7	1	23.7	543780	6986135	-					0	0.0
A1	02-Aug-11 09:30	23.7	1	23.7	543792	6986135	-					0	0.0
A1	02-Aug-11 09:30	23.7	1	23.7	543840	6986123	-					0	0.0
A2	02-Aug-11 10:25	25.3	1	25.3	543629	6986179	-			4	1	5	4.7
A2	02-Aug-11 10:25	25.4	1	25.4	543584	6986214	-			1	4	5	4.7
A2	02-Aug-11 10:25	25.6	1	25.6	543527	6986178	-					0	0.0
A7	31-Jul-11 08:15	24.1	1	24.1	540893	6986542	-			43		43	42.9
A7	31-Jul-11 08:20	24.0	1	24.0	540880	6986577	-			42		42	42.0
A7	31-Jul-11 08:35	23.8	1	23.8	540882	6986646	-			45		45	45.5
A7	31-Jul-11 08:40	23.7	1	23.7	540975	6986546	-			42		42	42.6
A7	31-Jul-11 08:45	23.6	1	23.6	540945	6986582	-			42		42	42.7
A7	31-Jul-11 08:50	23.5	1	23.5	540921	6986519	-			43		43	43.9
A44	04-Aug-11 09:45	22.4	1	22.4	541388	6985745	-			1		1	1.1
A45	04-Aug-11 09:40	22.7	1	22.7	541319	6985764	-			23		23	24.4
A46	04-Aug-11 09:15	22.3	1	22.3	541315	6985413	-			7		7	7.6
A46	04-Aug-11 09:15	22.3	1	22.3	541301	6985422	-			10		10	10.8
A46	04-Aug-11 09:15	22.3	1	22.3	541278	6985444	-					0	0.0
A49	04-Aug-11 09:55	22.6	1	22.6	541173	6985822	-			1		1	1.1
B4	20-Jul-11 16:00	16.7	1	16.7	538924	6986483	-			1		1	1.4
B4	20-Jul-11 16:00	16.7	1	16.7	538973	6986508	-			1		1	1.4
B4	20-Jul-11 16:00	16.7	1	16.7	538997	6986545	-					0	0.0
B30	14-Jul-11 11:22	5.6	1	5.6	538001	6988891	-			20		20	85.2
B30-6	14-Jul-11 11:20	6.0	1	6.0	537972	6988929	-			5		5	20.0
B30-6	14-Jul-11 11:21	5.8	1	5.8	537985	6988918	-			4		4	16.5
B31-30	14-Jul-11 11:23	5.4	1	5.4	538039	6988861	-			5		5	22.2
B34	22-Jul-11 17:15	16.7	1	16.7	539516	6987632	-			33		33	47.5
B34	22-Jul-11 17:15	16.7	1	16.7	539535	6987601	-					0	0.0
B34	22-Jul-11 17:15	16.7	1	16.7	539528	6987575	-			23		23	33.1
B36	23-Jul-11 17:20	16.8	1	16.8	539321	6986862	17.5			132		132	188.2
B36	23-Jul-11 17:20	16.8	1	16.8	539335	6986936	17.5					0	0.0
B36	23-Jul-11 17:20	16.8	1	16.8	539396	6986971	17.5			6		6	8.6
B45	20-Jul-11 16:45	16.3	1	16.3	538974	6986435	15.2			3		3	4.4
B45	20-Jul-11 16:45	16.3	1	16.3	539019	6986398	15.2					0	0.0
B45	20-Jul-11 16:45	16.3	1	16.3	539068	6986341	15.2					0	0.0
B46	23-Jul-11 16:45	23.3	1	23.3	540730	6985034	19.1					0	0.0
B46	23-Jul-11 16:45	23.3	1	23.3	540730	6985035	19.1			2		2	2.1
B46	23-Jul-11 16:45	23.3	1	23.3	540706	6985017	19.1					0	0.0
B52	24-Jul-11 17:15	17.8	1	17.8	541516	6983635	-			3		3	4.0
B52	24-Jul-11 17:17	17.8	1	17.8	541448	6983603	-			64		64	86.1
B52	24-Jul-11 17:20	17.8	1	17.8	541426	6983609	-			63		63	84.8
B53	25-Jul-11 14:20	17.6	1	17.6	541701	6983275	-					0	0.0
B53	25-Jul-11 14:20	17.6	1	17.6	541744	6983263	-			10		10	13.6
B53	25-Jul-11 14:20	17.6	1	17.6	541764	6983244	-			12		12	16.4
B69	25-Jul-11 16:35	18.1	1	18.1	543092	6984274	-		1	2		3	4.0
B69	25-Jul-11 16:35	18.1	1	18.1	543062	6984310	-			2		2	2.7
B69	25-Jul-11 16:35	18.1	1	18.1	542979	6984345	-					0	0.0
Control	27-Jul-11 15:15	48.5	1	48.5	534914	6986734	16.8			1		1	0.5
Control	27-Jul-11 15:15	48.5	1	48.5	534895	6986683	16.8				1	1	0.5
Control	27-Jul-11 15:15	48.5	1	48.5	534910	6986650	16.8					0	0.0
Control	27-Jul-11 15:45	43.0	1	43.0	534630	6986341	16.8					0	0.0
Control	27-Jul-11 15:45	43.0	1	43.0	534660	6986328	16.8					0	0.0
Control	27-Jul-11 15:45	43.0	1	43.0	534681	6986314	16.8					0	0.0
D4	17-Jul-11 17:31	17.7	1	17.7	534878	6989559	14.6			8		8	10.9
D4	17-Jul-11 17:32	17.7	1	17.7	534898	6989555	14.6					0	0.0
D4	17-Jul-11 17:33	17.7	1	17.7	534919	6989556	14.6			2		2	2.7
D5	16-Jul-11 15:41	19.4	1	19.4	535574	6989227	17.1			6		6	7.4
D5	16-Jul-11 15:42	19.4	1	19.4	535558	6989250	17.1			14		14	17.3
D5	16-Jul-11 15:42	19.4	1	19.4	535529	6989293	17.1					0	0.0
D8	22-Jul-11 13:40	26.2	1	26.2	536267	6988729	-			132		132	121.1
D8	22-Jul-11 13:43	26.2	1	26.2	536213	6988754	-					0	0.0
D8	22-Jul-11 13:47	26.1	1	26.1	536180	6988732	-					0	0.0
D23	18-Jul-11 13:05	43.8	1	43.8	535292	6989783	14.3			26		26	14.3
D23	18-Jul-11 13:05	43.8	1	43.8	535307	6989790	14.3			65		65	35.7
D23	18-Jul-11 13:06	43.7	1	43.7	535322	6989798	14.3			18		18	9.9
E3	18-Jul-11 18:05	20.5	1	20.5	536632	6990320	14.3			11		11	12.9
E3	18-Jul-11 18:07	20.4	1	20.4	536691	6990340	14.3					0	0.0
E3	18-Jul-11 18:09	20.4	1	20.4	536714	6990350	14.3					0	0.0
E4	15-Jul-11 13:04	19.3	1	19.3	537017	6989807	-			9		9	11.2
E4	15-Jul-11 13:05	19.3	1	19.3	536999	6989833	-			23		23	28.6
E4-5	15-Jul-11 09:46	22.8	1	22.8	537038	6989719	-			3		3	3.2

APPENDIX F
Fish Populations

Appendix F5. Summary of Fish Sampling Effort and Catch Data in the Study Area, 2011

Basin	Site	Waterbody Type	Sampling Method ^a	Date	Sampling Effort	Number of Fish Captured ^b									Total CPUE
						ARCH	LKTR	ARGR	RNWH	BURB	SLSC	NNST	THST	Total	
A	A1	Lake	FN	03-Aug-11	24.0 h			1				7	9	17	0.7 fish/h
A	A1	Lake	GN	03-Aug-11	0.76 net-units	1	3		1					5	6.6 fish/net-unit
A	A1	Lake	MT	03-Aug-11	71.1 trap-h									0	0.0 fish/24h
A	A2	Pond	FN	03-Aug-11	26.1 h							59	25	84	3.2 fish/h
A	A2	Pond	MT	03-Aug-11	76.3 trap-h							5	5	10	3.1 fish/24h
A	A7	Pond	MT	01-Aug-11	142.7 trap-h							257		257	43.2 fish/24h
A	A18	Pond	OB	02-Aug-11	- -							1		1	- -
A	A30	Pond	OB	05-Aug-11	- -							30		30	- -
A	A31	Pond	OB	05-Aug-11	- -							15		15	- -
A	A44	Pond	MT	05-Aug-11	22.4 trap-h							1		1	1.1 fish/24h
A	A45	Pond	MT	05-Aug-11	22.7 trap-h							23		23	24.3 fish/24h
A	A46	Lake	FN	05-Aug-11	22.8 h							11		11	0.5 fish/h
A	A46	Lake	GN	06-Aug-11	0.19 net-units									0	0.0 fish/net-unit
A	A46	Lake	MT	05-Aug-11	66.9 trap-h							17		17	6.1 fish/24h
A	A49	Pond	MT	05-Aug-11	22.6 trap-h							1		1	1.1 fish/24h
B	B4	Lake	FN	21-Jul-11	16.3 h			1				19		20	1.2 fish/h
B	B4	Lake	MT	21-Jul-11	50.1 trap-h							2		2	1.0 fish/24h
B	B4-45	Stream	EF	23-Jul-11	634 s							3		3	0.3 fish/min
B	B5-31	Stream	EF	14-Jul-11	474 s			2			1	13		16	2.0 fish/min
B	B30	Pond	EF	14-Jul-11	140 s							3		3	1.3 fish/min
B	B30	Pond	MT	14-Jul-11	11.8 trap-h							20		20	40.7 fish/24h
B	B30-6	Stream	EF	14-Jul-11	197 s						3	6		9	2.7 fish/min
B	B30-6	Stream	MT	14-Jul-11	11.8 trap-h							9		9	18.3 fish/24h
B	B31	Pond	EF	14-Jul-11	174 s									0	0.0 fish/min
B	B31-30	Stream	EF	14-Jul-11	460 s			2				2		4	0.5 fish/min
B	B31-30	Stream	MT	14-Jul-11	5.4 trap-h							5		5	22.2 fish/24h
B	B32	Pond	EF	14-Jul-11	302 s							1		1	0.2 fish/min
B	B34	Lake	FN	23-Jul-11	16.4 h							282		282	17.2 fish/h
B	B34	Lake	GN	23-Jul-11	0.13 net-units									0	0.0 fish/net-unit
B	B34	Lake	MT	23-Jul-11	50.1 trap-h							56		56	26.8 fish/24h
B	B36	Pond	EF	24-Jul-11	517 s							5		5	0.6 fish/min
B	B36	Pond	MT	24-Jul-11	50.4 trap-h							138		138	65.7 fish/24h
B	B37	Pond	OB	05-Aug-11	- -							8		8	- -
B	B38	Pond	OB	05-Aug-11	- -							20		20	- -
B	B45	Lake	FN	21-Jul-11	16.0 h			1				295		296	18.5 fish/h
B	B45	Lake	GN	21-Jul-11	1.07 net-units			1						1	0.9 fish/net-unit
B	B45	Lake	MT	21-Jul-11	48.9 trap-h							3		3	1.5 fish/24h
B	B46	Lake	FN	24-Jul-11	18.8 h			1				14		15	0.8 fish/h
B	B46	Lake	GN	24-Jul-11	0.42 net-units									0	0.0 fish/net-unit
B	B46	Lake	MT	24-Jul-11	69.9 trap-h							2		2	0.7 fish/24h
B	B52	Lake	FN	25-Jul-11	17.8 h							198		198	11.1 fish/h
B	B52	Lake	GN	25-Jul-11	0.45 net-units									0	0.0 fish/net-unit
B	B52	Lake	MT	25-Jul-11	53.4 trap-h							130		130	58.4 fish/24h
B	B53	Lake	FN	26-Jul-11	17.5 h			1				42		43	2.5 fish/h
B	B53	Lake	GN	25-Jul-11	0.42 net-units			4						4	9.5 fish/net-unit
B	B53	Lake	MT	26-Jul-11	52.8 trap-h							22		22	10.0 fish/24h
B	B62	Pond	OB	05-Aug-11	- -							15		15	- -
B	B69	Lake	FN	26-Jul-11	17.8 h			1				2		3	0.2 fish/h
B	B69	Lake	GN	26-Jul-11	0.46 net-units		2	1						3	6.5 fish/net-unit
B	B69	Lake	MT	26-Jul-11	54.3 trap-h						1	4		5	2.2 fish/24h
C	C6	Pond	FN	07-Aug-11	16.7 h							69		69	4.1 fish/h
C	C7	Pond	FN	07-Aug-11	16.5 h							228	5	233	14.1 fish/h
C	C7	Pond	GN	06-Aug-11	0.13 net-units									0	0.0 fish/net-unit
C	C9	Pond	OB	06-Aug-11	- -							40		40	- -
C	C10	Lake	FN	06-Aug-11	19.7 h							12		12	0.6 fish/h
C	C10	Lake	GN	06-Aug-11	0.09 net-units									0	0.0 fish/net-unit
Control	Control	Lake	AL	29-Jul-11	2.5 rod-h		5							5	2.0 fish/rod-h
Control	Control	Lake	FN	28-Jul-11	18.0 h		1			1		30		32	1.8 fish/h
Control	Control	Lake	FN	29-Jul-11	42.9 h		4	2				7		13	0.3 fish/h
Control	Control	Lake	GN	27-Jul-11	0.34 net-units		3							3	8.8 fish/net-unit
Control	Control	Lake	GN	29-Jul-11	1.33 net-units		3		42					45	33.8 fish/net-unit
Control	Control	Lake	MT	29-Jul-11	274.5 trap-h						1	1		2	0.2 fish/24h

APPENDIX F
Fish Populations

Appendix F5. Summary of Fish Sampling Effort and Catch Data in the Study Area, 2011

Basin	Site	Waterbody Type	Sampling Method ^a	Date	Sampling Effort	Number of Fish Captured ^b									Total	Total CPUE
						ARCH	LKTR	ARGR	RNWH	BURB	SLSC	NNST	THST			
D	D1	Lake	AL	30-Jul-11	1.5 rod-h										0	0.0 fish/rod-h
D	D1	Lake	GN	30-Jul-11	0.85 net-units		4	2	10						16	18.8 fish/net-unit
D	D3	Lake	AL	30-Jul-11	1.5 rod-h										0	0.0 fish/rod-h
D	D3	Lake	GN	30-Jul-11	0.71 net-units			1							1	1.4 fish/net-unit
D	D4	Pond	FN	18-Jul-11	17.9 h							186			186	10.4 fish/h
D	D4	Pond	GN	17-Jul-11	0.29 net-units										0	0.0 fish/net-unit
D	D4	Pond	MT	18-Jul-11	53.1 trap-h							10			10	4.5 fish/24h
D	D5	Lake	FN	16-Jul-11	22.7 h							55			55	2.4 fish/h
D	D5	Lake	GN	16-Jul-11	0.38 net-units										0	0.0 fish/net-unit
D	D5	Lake	MT	16-Jul-11	58.2 trap-h							20			20	8.2 fish/24h
D	D6	Pond	EF	16-Jul-11	437 s							13			13	1.8 fish/min
D	D8	Lake	FN	23-Jul-11	26.2 h							183			183	7.0 fish/h
D	D8	Lake	GN	23-Jul-11	0.76 net-units										0	0.0 fish/net-unit
D	D8	Lake	MT	23-Jul-11	78.5 trap-h							132			132	40.4 fish/24h
D	D23	Lake	FN	20-Jul-11	40.2 h							37			37	0.9 fish/h
D	D23	Lake	GN	18-Jul-11	0.73 net-units										0	0.0 fish/net-unit
D	D23	Lake	MT	20-Jul-11	131.3 trap-h							109			109	19.9 fish/24h
E	E3	Lake	FN	19-Jul-11	14.1 h										0	0.0 fish/h
E	E3	Lake	GN	19-Jul-11	1.05 net-units		3		2						5	4.8 fish/net-unit
E	E3	Lake	MT	19-Jul-11	61.3 trap-h							11			11	4.3 fish/24h
E	E4	Lake	FN	16-Jul-11	15.5 h			3				10			13	0.8 fish/h
E	E4	Lake	GN	15-Jul-11	0.32 net-units										0	0.0 fish/net-unit
E	E4	Lake	MT	16-Jul-11	38.6 trap-h							32			32	19.9 fish/24h
E	E4-5	Stream	EF	15-Jul-11	268 s							4			4	0.9 fish/min
E	E4-5	Stream	MT	16-Jul-11	22.8 trap-h							3			3	3.2 fish/24h
H	H17	Pond	GN	27-Jul-11	0.36 net-units										0	0.0 fish/net-unit
H	H20	Pond	GN	26-Jul-11	0.12 net-units										0	0.0 fish/net-unit
J	J2	Pond	OB	09-Aug-11	- -							20			20	- -
O	O2	Pond	FN	08-Aug-11	18.4 h							55			55	3.0 fish/h
O	O2	Pond	GN	07-Aug-11	0.68 net-units		1								1	1.5 fish/net-unit
O	O4	Pond	FN	08-Aug-11	17.8 h							33			33	1.9 fish/h
O	O4	Pond	GN	07-Aug-11	0.21 net-units										0	0.0 fish/net-unit
P	P2	Pond	FN	08-Aug-11	50.5 h							268			268	5.3 fish/h
All Methods/Sites Combined				2011	-	2	28	24	55	1	6	3314	44	3474	-	

^a AL = angling; EF = backpack electrofishing; FN = fyke net; GN = gill nets; MT = minnow traps; OB = observed

^b ARCH = Arctic char; LKTR = lake trout; ARGR = Arctic grayling; RNWH = round whitefish; BURB = burbot; SLSC = slimy sculpin; NNST = Ninespine Stickleback; THST = Threespine Stickleback

APPENDIX F
Fish Populations

Appendix F6b. Length-Frequency (count) of Ninespine Stickleback, Threespine Stickleback and Slimy Sculpin Captured in the Study Area, 2011

Total Length (mm)	Number of Fish Captured per Site																																															
	Ninespine Stickleback																								Threespine Stickleback				Slimy Sculpin																			
	A1	A2	A7	A44	A45	A46	A49	B4	B5-31	B30-6	B31-30	B30	B32	B34	B36	B4-45	B45	B46	B52	B53	B69	C7	C10	D23	D4	D5	D6	D8	E3	E4	E4-5	O2	O4	P2	Control	Total	A1	A2	C7	Total	B30-6	B5-31	B69	Control	Total			
0 - 9																																																
10 - 19															2																				2													
20 - 29					1										2											2									2	7	2		2									
30 - 39	2							2	3	1									2				2	13	8	14	5	2		2	1	3	1	8	3	72	5	2		7		1				1		
40 - 49	4	9	11		1		1	8	6	8	5	16		1			4		1	6				13	8	37	5	14	5	18	2	4	1	9	3	200	1	3		4								
50 - 59	1	4	13	1	4	4		9	2	6	1	3	1	17	3	3	16	8	15	13	3	2	9	9	9	16	3	9	5	19	3	5	7	1	5	229	1	3	1	5	3		1			4		
60 - 69		2	6		5	18		1	2		1	4		7	13		7	6	9	2	1	12	1	2	1	5			1	3	1	2	6	3		121		2	1	3								
70 - 79						3									2				1			1				1					1		1		10													
80 - 89							1								1																		1		3													
90 - 99																																														1		1
Total	7	15	30	1	10	26	1	21	13	15	7	23	1	25	23	3	27	16	26	21	4	15	12	37	26	75	13	25	11	42	7	15	15	23	13	644	9	10	2	21	3	1	1	1	6			

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