2014 SUPPLEMENTAL BENTHIC INVERTEBRATE BASELINE REPORT FOR THE JAY PROJECT

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April 2015

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Abbreviations

Abbreviation	Definition
AEMP	Aquatic Effects Monitoring Program
BSA	baseline study area
Diavik Mine	Diavik Diamond Mine
Dominion Diamond	Dominion Diamond Ekati Corporation
DDMI	Diavik Diamond Mines Inc.
e.g.	for example
Ekati Mine	Ekati Diamond Mine
et al.	and more than one additional author
Golder	Golder Associates Ltd.
i.e.	that is
NAD	North American Datum
NWT	Northwest Territories
Project	Jay Project
QA	quality assurance
QC	quality control
SDI	Simpson's diversity index
SEI	Simpson's evenness index
TOC	total organic carbon
UTM	Universal Transverse Mercator

Units of Measure

Unit	Definition
%	percent
µm	micrometre
µS/cm	microSiemens per centimetre
°C	degrees Celsius
cm	centimetre
km	kilometre
km^2	square kilometre
m	metre
m/s	metres per second
masl	metres above sea level
mm	millimetre
n	number of replicates
no.	number
org/m^2	number organisms per square metre
taxa/station	number of taxa per station

1 INTRODUCTION

1.1 Background

Dominion Diamond Corporation (Dominion Diamond) is a Canadian-owned and Northwest Territories (NWT) based mining company that mines, processes, and markets Canadian diamonds from the Ekati Diamond Mine (Ekati Mine). Dominion Diamond also markets Canadian diamonds from its 40 percent (%) ownership of the Diavik Diamond Mine (Diavik Mine). The existing Ekati Mine is located approximately 200 kilometres (km) south of the Arctic Circle and 300 km northeast of Yellowknife, NWT (Map 1.1-1).

Dominion Diamond is proposing to develop the Jay kimberlite pipe (Jay pipe) located beneath Lac du Sauvage. The proposed Jay Project (Project) will be an extension of the Ekati Mine, which is a large, stable, and successful mining operation that has been operating for 16 years. Most of the infrastructure required to support the development of the Jay pipe and to process the kimberlite currently exist at the Ekati Mine. The Project is located in the southeastern portion of the Ekati claim block approximately 25 km from the main facilities and approximately 7 km to the northeast of the Misery Pit, in the Lac de Gras watershed (Map 1.1-2).

Benthic invertebrate baseline field programs were completed in 2013 to support an environmental assessment. The Benthic Invertebrate Baseline Report for the Jay Project (Annex X) of the Developer's Assessment Report (DAR; Dominion Diamond 2014) summarized the data collected during 2013, and existing historical baseline data, to characterize benthic invertebrates in lakes within the baseline study area (BSA).

The purpose of the 2014 benthic invertebrate field program was to supplement existing baseline data for lakes in the BSA, in particular for stations in Lac du Sauvage and key regions of Lac de Gras, which could potentially be affected by the Jay Project. This report summarizes the supplemental baseline benthic invertebrate data collected from lakes in the BSA in fall 2014.

LEGEND

- JAY PROJECT
- EXISTING MINE OR PROJECT
- TERRITORIAL CAPITAL
- POPULATED PLACE
- HIGHWAY
- ALL-SEASON ROAD
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- TERRITORIAL/PROVINCIAL BOUNDARY
- TREELINE
- WATERCOURSE
- WATERBODY

150 0 150

SCALE 1:6,000,000 KILOMETRES

REFERENCE

WATER OBTAINED FROM ATLAS OF CANADA
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
PROJECTION: CANADA LAMBERT CONFORMAL CONIC

DOCUMENT

BENTHIC INVERTEBRATE BASELINE REPORT

PROJECT

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

LOCATION OF THE JAY PROJECT

Golder Associates

PROJECT		13-1328-0041	FILE No. B_JC_Aqua_045_GIS
DESIGN	CG	24/07/14	SCALE AS SHOWN REV. 0
GIS	ANK	08/09/14	
CHECK	CG	08/09/14	MAP 1.1-1
REVIEW	SM	08/09/14	

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\13-1328-0041 Jay & Lynx EA\Aquatics\Baseline\B_JC_Aqua_045_GIS.mxd

LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- KIMBERLITE PIPE
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (10 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

BENTHIC INVERTEBRATE BASELINE REPORT

3 0 3

SCALE 1:150,000 KILOMETRES

PROJECT

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

EKATI PROPERTY MAP

Golder Associates

PROJECT		13-1328-0041	FILE No. B_JC_Aqua_046_GIS	
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GIS	ANK	08/09/14	MAP 1.1-2	
CHECK	CG	08/09/14		
REVIEW	SM	08/09/14		

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1.2 Study Area

1.2.1 Physical Setting

The Project is situated within the Lac du Sauvage drainage basin, which is a component of the larger Lac de Gras drainage basin (Map 1.1-2). The Lac de Gras drainage basin has moderate topographic relief with a maximum elevation of approximately 500 metres above sea level (masl) and a minimum elevation of approximately 416 masl along the lake shoreline. Lac de Gras, which is immediately downstream of Lac du Sauvage, has a large surface area, provides large inflow storage, and maintains steady outflows. Outflow from Lac de Gras discharges to the Coppermine River, which drains into the Arctic Ocean at Coronation Gulf.

The Lac de Gras basin is situated in the physiographic region of the Canadian Shield and has land features characteristic of glaciated terrain, including crag and lee drumlins, eskers, and kettle lakes. The maze of small lakes, wetlands, and creeks in the basin indicate poorly drained conditions. The total area of these small waterbodies is approximately 1,425 square kilometres (km^2); the remaining upland area is approximately 2,135 km^2. The upland areas are generally well-drained, although periodic ice jams at outlets of small lakes and wetlands increase downstream flood peak discharges and influence flood characteristics.

The study area lies in the sub-Arctic region of the Canadian Shield, an area of continuous permafrost characterized by typical tundra vegetation. Lichens, mosses, heather, and dwarf shrub species dominate on the higher, well-drained areas, whereas sedges and grasses are more predominant in the poorly drained areas and along creeks and lakeshores.

1.2.2 Baseline Study Area

The 2014 benthic invertebrate community BSA included two lakes:

- Lac du Sauvage: Aa, Ab, Ac, Ad, and Ae basins; and,
- Lac de Gras: upper East Bay[1] (Far Field 2 [FF2]).

The basin naming convention used for the 2014 baseline program remains unchanged from 2013. This convention was adopted during the DAR process by all technical disciplines (i.e., hydrology, water quality, aquatic health, and fish and fish habitat). Further information regarding the physical setting of the Project and the baseline study area is available in the benthic invertebrate baseline report (Annex XIII of the DAR).

1.3 Objectives

The objectives of the benthic invertebrate baseline program were the following:

- to collect additional baseline data on benthic invertebrate communities in Lac du Sauvage and Lac de Gras during fall; and,

[1] The upper East Bay is the Far Field 2 (FF2) area sampled as part of the Diavik Mine Aquatic Effects Monitoring Program. For the 2014 supplemental baseline, these stations were sampled, and the same FF2 station identifiers used by Diavik were applied to the samples collected from these stations. The results included in this report are independent of any Diavik monitoring.

- to characterize year-to-year variability in benthic invertebrate communities in the lakes that were re-sampled in 2014.

Section 2 describes the methods for the collection and analysis of benthic invertebrate community data in the 2014 baseline program. Sampling methods during the 2014 baseline program followed protocols used in 2013. The results of the 2014 benthic invertebrate community sampling program are provided in Section 3, along with a comparison of the 2014 data to the results of the 2013 field program.

2 METHODS

2.1 Sampling Locations and Timing

Benthic invertebrate samples and supporting data were collected in fall 2014, between September 3 and September 14, from the following waterbodies and depths (Map 2.1-1; Table 2.1-1):

- 27 stations in Lac du Sauvage (7 shallow, 7 mid-depth, 8 deep, and 5 littoral stations); and,
- 5 deep stations in Lac de Gras.

Depth categories were defined as follows:

- shallow (3 to 5.5 metres [m]);
- mid-depth (5.6 to 9 m);
- deep (greater than 9 m); and,
- littoral (near-shore and less than 1 m).

Sediment quality samples were also collected at the shallow, mid-depth, and deep water locations. Sampling methods used to collect sediment samples are described in the 2014 Water and Sediment Quality Supplemental Baseline Report (Dominion Diamond 2015).

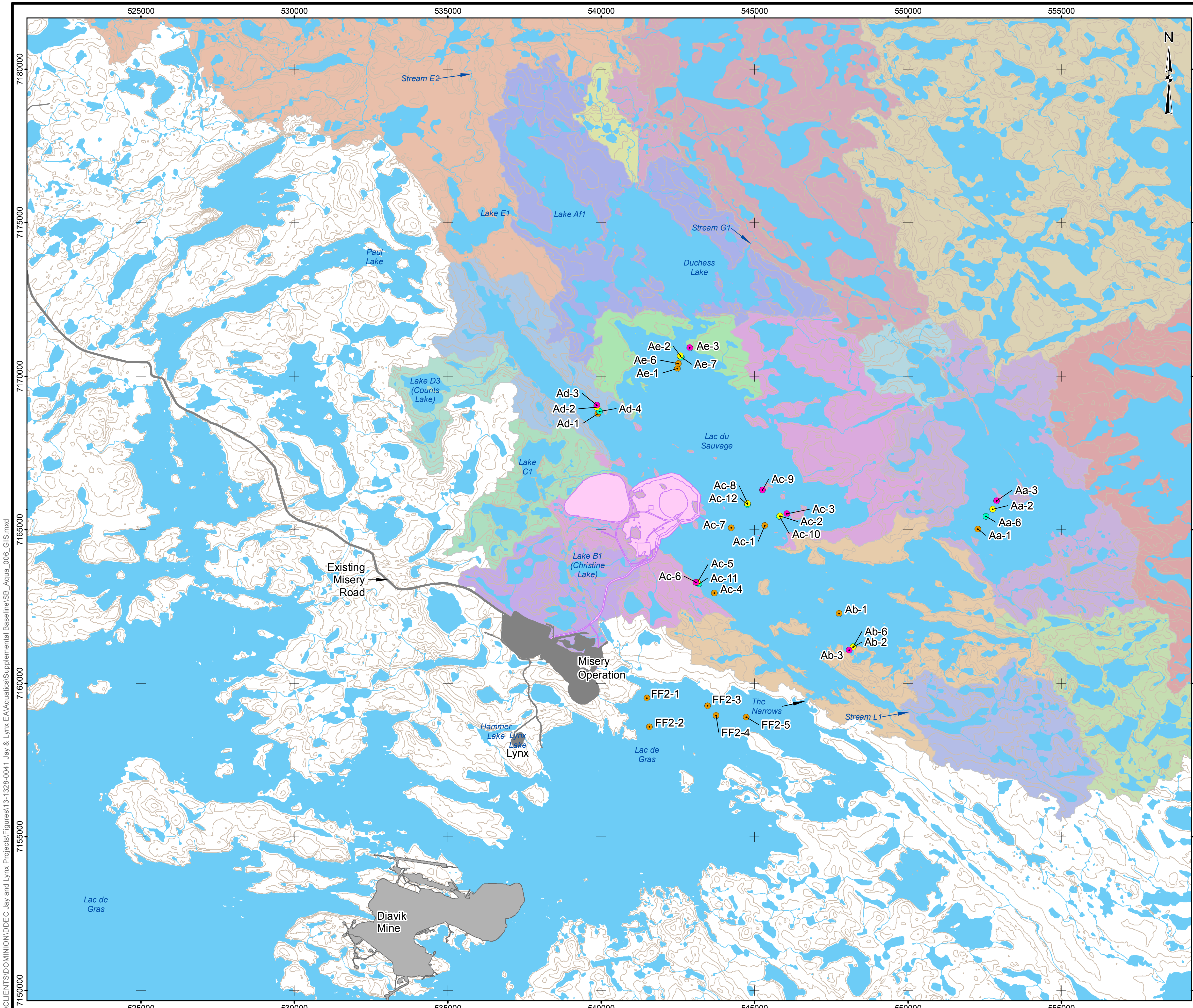
Table 2.1-1 Open-Water and Littoral Benthic Invertebrate Sampling Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Sub-Basin	Location in Sub-Basin	Station	Date Sampled	UTM Coordinates		Sample Depth Category	Mean Depth (m)	Kick-net Samples	Ekman Grab Samples	Sediment Quality Samples
					Easting (m)	Northing (m)					
Lac du Sauvage	Aa	—	Aa-1	12-Sep-2014	552282	7165025	deep	11.1	—	X	X
			Aa-6	12-Sep-2014	552546	7165438	mid-depth	8.0	—	X	X
			Aa-2	12-Sep-2014	552773	7165665	shallow	5.3	—	X	X
			Aa-3	12-Sep-2014	552900	7165940	littoral	0.3	X	—	—
	Ab	—	Ab-1	11-Sep-2014	547766	7162266	deep	12.6	—	X	X
			Ab-6	11-Sep-2014	548229	7161205	mid-depth	7.8	—	X	X
			Ab-2	11-Sep-2014	548215	7161177	shallow	5.2	—	X	X
			Ab-3	11-Sep-2014	548095	7161077	littoral	0.2	X	—	—
	Ac	Northeast	Ac-1	11-Sep-2014	545339	7165138	deep	12.5	—	X	X
			Ac-10	9-Sep-2014	545819	7165433	mid-depth	7.4	—	X	X
			Ac-2	9-Sep-2014	545832	7165447	shallow	5.2	—	X	X
			Ac-3	9-Sep-2014	546058	7165524	littoral	0.2	X	—	—
			Ac-7	9-Sep-2014	544247	7165068	deep	12.6	—	X	X
			Ac-12	11-Sep-2014	544776	7165818	mid-depth	6.5	—	X	X
			Ac-8	11-Sep-2014	544777	7165855	shallow	4.9	—	X	X
			Ac-9	9-Sep-2014	545265	7166294	littoral	0.2	X	—	—
		Southwest	Ac-4	9-Sep-2014	543695	7162938	deep	12.4	—	X	X
			Ac-11	10-Sep-2014	543185	7163231	mid-depth	8.1	—	X	X
			Ac-5	10-Sep-2014	543149	7163287	shallow	4.2	—	X	X
			Ac-6	10-Sep-2014	543092	7163291	littoral	0.3	X	—	—
	Ad	—	Ad-1	5-Sep-2014	539898	7168781	deep	12.6	—	X	X
			Ad-4	5-Sep-2014	539949	7168851	mid-depth	7.6	—	X	X
			Ad-2	8-Sep-2014	539868	7168991	shallow	4.9	—	X	X
			Ad-3	8-Sep-2014	539868	7169057	littoral	0.5	X	—	—

Table 2.1-1 Open-Water and Littoral Benthic Invertebrate Sampling Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Sub-Basin	Location in Sub-Basin	Station	Date Sampled	UTM Coordinates		Sample Depth Category	Mean Depth (m)	Kick-net Samples	Ekman Grab Samples	Sediment Quality Samples
					Easting (m)	Northing (m)					
Lac du Sauvage	Ae	—	Ae-1	8-Sep-2014	542494	7170252	deep	12.4	—	X	X
			Ae-6	8-Sep-2014	542520	7170406	deep	12.6	—	X	X
			Ae-7	8-Sep-2014	542619	7170623	mid-depth	5.9	—	X	X
			Ae-2	8-Sep-2014	542589	7170664	shallow	5.5	—	X	X
			Ae-3	8-Sep-2014	542895	7170927	littoral	0.3	X	—	—
Lac de Gras	—	—	FF2-1	14-Sep-2014	541500	7159522	deep	21.3	—	X	X
			FF2-2	14-Sep-2014	541583	7158573	deep	19.0	—	X	X
			FF2-3	14-Sep-2014	543478	7159267	deep	19.5	—	X	X
			FF2-4	14-Sep-2014	543752	7158945	deep	19.5	—	X	X
			FF2-5	14-Sep-2014	544734	7158898	deep	19.3	—	X	X

Note: Universal Transverse Mercator (UTM) coordinates are North American Datum (NAD) 83, Zone 12.
m = metre; X = sample collected; — = not applicable; Sep = September.



LEGEND

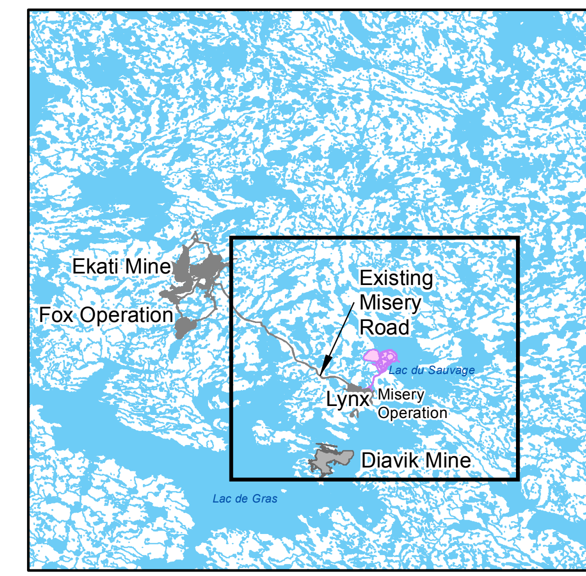
- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY

STATION DEPTH CATEGORIES

- DEEP STATION
- LITTORAL STATION
- MID-DEPTH STATION
- SHALLOW STATION

BASIN

Aa, Ab, Ac, Ad, Ae, Af, B, C, D, E, F, F2, G, H, I, J, K, L



REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

2014 BENTHIC INVERTEBRATE SUPPLEMENTAL BASELINE REPORT

2.5 0 2.5
SCALE 1:125,000 KILOMETRES

PROJECT
DOMINION DIAMOND
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

BENTHIC INVERTEBRATE COMMUNITY SAMPLING LOCATIONS, 2014

Golder Associates

PROJECT		13-1328-0041	FILE No. SB_Aqua_006_GIS	
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GIS	JE	06/04/15	MAP 2.1-1	
CHECK	VM	06/04/15		
REVIEW	ZK	06/04/15		

2.2 Field Methods

2.2.1 Open-Water Stations

Benthic invertebrate samples were collected from shallow, mid-depth, and deep sampling stations according to standard operating procedures (unpublished file information), which were based on relevant scientific literature (Alberta Environment 1990; Klemm et al. 1990; Environment Canada 1993; Rosenberg and Resh 1993). At each station, a standard Ekman grab (15.24 centimetre [cm] × 15.24 cm: bottom sampling area of 0.0232 square metre [m²]) was used from an anchored boat to collect benthic invertebrate samples. Five individual Ekman grab samples were collected and combined into a composite sample at each station; each composite sample was sieved through a 250-micrometre (µm) mesh screen in the field. Material retained in the mesh was placed in a separate 500-millilitre (mL) sample bottle and preserved in 70% ethanol. Benthic invertebrate samples were shipped to EcoAnalysts Inc. (EcoAnalysts) in Moscow, Idaho (USA), for taxonomic identification and enumeration of invertebrates.

At each station, three to five additional Ekman grab samples were collected and combined into a composite sample for sediment chemistry analysis. The top 5 cm of sediment was removed from the grab using a plastic spoon and was placed in sample jars provided by the analytical laboratory. Care was taken to avoid collecting sediment in direct contact with the metal sides of the Ekman grab. Sediment samples were shipped to ALS Environmental (ALS) in Edmonton, Alberta, for analyses.

2.2.2 Littoral Stations

Benthic invertebrate samples were collected from the littoral sampling stations according to standard operating procedures (unpublished file information). At each littoral station, a kick-net equipped with a 500 µm mesh screen was used to sample along a combined distance of 6 to 9 m, for 90 to 120 seconds at a water depth of less than 1 m. The area of collection (distance) and time to sample were dependent on the productivity of the station and were adjusted accordingly to avoid over-collection. This kick-net method was repeated three times; the collected material was placed in a single jar to create a composite sample at each littoral station. Benthic invertebrate samples were shipped to EcoAnalysts for taxonomic identification and enumeration of invertebrates.

2.3 Supporting Environmental Variables

The following supporting environmental information was recorded at each station during the benthic invertebrate survey:

- weather conditions, such as air temperature, wind velocity, and wind direction;
- habitat description, including visual estimates of bottom substrates (i.e., percentage of substrate represented by each category) at littoral stations and bottom sediment-related information (i.e., texture, colour, odour, particle size) at depositional stations;
- water depth;

- field measurements of conductivity and water temperature using a YSI-650 multi-meter; vertical profiles were measured at lake stations and spot measurements were recorded at littoral stations; and,
- benthic invertebrate sample-related information (sampler type, sieve mesh size, sampler fullness, preservative).

Additional details of field water quality methods are provided in the 2014 Water and Sediment Quality Supplemental Monitoring Report for the Jay Project (Dominion Diamond 2015). Water quality profile data for open-water stations in Lac du Sauvage and Lac de Gras are provided in this report in Appendix A.

Substrate composition (as a percentage) was evaluated visually at each littoral station. Substrate categories were as follows:

- boulder (greater than 256 millimetres [mm]);
- large cobble (128 to 256 mm);
- small cobble (64 to 128 mm);
- large gravel (16 to 64 mm);
- small gravel (2 to 16 mm); and,
- fine sediment (i.e., sand silt clay; less than 2 mm).

The proportion of benthic algal cover was visually evaluated at littoral stations. Benthic algal cover was qualitatively categorized as follows:

- none (benthic algae absent, bare substrate);
- low;
- moderate; and,
- high.

2.4 Laboratory Methods

2.4.1 Benthic Invertebrate Sample Sorting, Enumeration, and Identification

Benthic invertebrate samples collected from open-water areas (shallow, mid-depth and deep stations) using the Ekman grab were processed by fractionating samples into 250 µm, 500 µm, and 1,000 µm size fractions (EcoAnalysts 2013). Kick-net samples collected from littoral stations were processed using 500 µm, and 1,000 µm size fractions, reflecting the mesh size of the kick-net (500 µm) used to collect the samples.

Benthic invertebrate samples were initially processed to remove preservative and remaining fine sediment. Samples with high inorganic content were elutriated to separate the organic material from the inorganic material before sorting. The inorganic material was checked for shelled or cased invertebrates, which may have been too heavy to elutriate; this heavier material was included in the remaining sample.

Samples containing large amount of organic material or organisms were prepared for subsampling. It was determined that the subsampling of the organisms per each of the three size fractions (250 um, 500 um, and 1 mm) would be conducive to maintaining the schedule of performance for the sample set in the taxonomy lab while not significantly impacting the data for the sample itself (EcoAnalysts 2013). The initial sort of the organisms from Site Aa-6 collected using the Ekman grab on September 12, 2014 yielded an unusually high abundance of benthic invertebrates. Therefore, each of the three size fractions (250 µm, 500 µm, and 1,000 µm) was subsampled. The organic material and other contents in the sieve were evenly distributed in the bottom of a Caton subsampling tray (Caton 1991) with a two-inch grid, equipped with a 250 µm mesh screen (EcoAnalysts 2013). A grid cell was randomly selected and its contents were transferred to a Petri dish for sorting under a dissecting microscope. Additional grid cells were selected until the target number of 300 organisms was reached. When the target number of organisms was reached, the last grid cell selected was still sorted in its entirety (i.e., the target number of organisms was exceeded). No other samples required subsampling.

Invertebrates were identified to the lowest practical taxonomic level, typically genus or species, by qualified taxonomists using recognized taxonomic keys (Appendix B). Exceptions included the Nematoda, and Ostracoda, which were identified to major group.

Organisms that could not be identified to the desired taxonomic level, such as immature or damaged specimens, were reported as a separate category at the lowest taxonomic level possible, typically family. Organisms requiring detailed microscopic examination, such as midges (Chironomidae) and aquatic worms (Oligochaeta), were mounted on microscope slides using an appropriate mounting medium. The most common taxa were distinguishable based on gross morphology and required only a few slide mounts (five to ten) for verification. A vouchered synoptic reference collection of benthic invertebrate specimens was created for the 2013 samples, and new taxa found in 2014 were added to the reference collection.

2.4.2 Sediment Quality Samples

Sediment samples were shipped to ALS in Edmonton, Alberta, for analyses of the following parameters at deep stations:

- physical parameters: particle size distribution, and percent moisture;
- organic and inorganic carbon: inorganic carbon, total carbon, and total organic carbon (TOC);
- nutrients: available nitrate, available phosphate, available phosphorus, and available nitrogen; and,

- total metals[2]: aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, sulfur, thallium, tin, titanium, uranium, vanadium, and zinc.

Particle size distribution was analyzed as a percentage (by weight) of the total sediment according to the following size classification:

- sand (greater than 0.05 mm to 2.0 mm);
- silt (0.002 mm to 0.05 mm); and,
- clay (less than 0.002 mm).

For stations that were only sampled as part of the benthic invertebrate program in 2014 (i.e., Lac du Sauvage mid-depth and shallow stations), TOC and particle size distribution were the only parameters analyzed by the laboratory.

2.5 Data Analysis

Habitat data were summarized in tabular format to allow comparisons of areas of similar habitat type (i.e., open-water or littoral) in the BSA.

Raw invertebrate abundance data were screened during the preparation of data for analysis. Nematodes were removed from 500 µm mesh size fractions because they are meiofauna and the resulting data from this size fraction are unreliable (Environment Canada 2012). Similarly, ostracods were excluded from the 500 µm mesh fraction for the same reason.

The following benthic invertebrate summary variables were calculated:

- mean total invertebrate density (number of organisms per square metre [org/m^2]);
- total taxonomic richness at the lowest taxonomic level (number of taxa per station [taxa/station]);
- total taxonomic richness at the family level (number of taxa per station [taxa/station]);
- Simpson's diversity index (SDI);
- Simpson's evenness index (SEI); and,
- community composition as percentages of major taxa.

These variables were calculated for both the 500 µm and 250 µm mesh datasets generated using the Ekman grab, because historical data in Lac du Sauvage and Lac de Gras were collected using both mesh sizes during sampling and sample processing. The 500 µm mesh data are shown in this report to allow comparisons with the recent baseline data and the Diavik Mine Aquatic Effects Monitoring Program (AEMP) data (DDMI 2014). Summary variables for the 250 µm mesh dataset are provided in Appendix C.

[2] For the purposes of this report, the term "total metals" includes metalloids such as arsenic and non-metals such as selenium.

For the littoral stations, samples were qualitative; therefore, summary variables were limited to total taxonomic richness and community composition.

Density was calculated as org/m^2 for each station. This calculation was based on the bottom area of the Ekman grab (0.0232 m^2) multiplied by 5 (0.116 m^2) to represent the total area of five grabs. Richness is the total number of taxa/station at the lowest practical taxonomic level of identification. Family level richness was also calculated. Richness provides an indication of the diversity of benthic invertebrates in an area; a higher richness value typically indicates a more healthy and balanced community.

For interpretation purposes, benthic invertebrate densities and richness values were categorized as follows:

- low: density less than 5,000 org/m^2 and richness less than 10 taxa/station;
- moderate: density ranging from 5,000 to 50,000 org/m^2, and richness ranging from 10 to 40 taxa/station; and,
- high: density greater than 50,000 org/m^2 and richness greater than 40 taxa/station.

The SDI measures the proportional distribution of organisms in the community, taking into account the taxonomic richness and how evenly the total density is distributed among these taxa. Certain conditions may favour one organism over another, resulting in the community being dominated by a few taxa, which is reflected in decreased diversity (Simpson 1949). The SDI values range between zero and one, where lower values indicate a less diverse community and higher values indicate a more diverse community. The SDI was calculated using the formula provided by Krebs (Krebs 1999):

$$D = 1 - \sum_{i=1}^{S} (p_i)^2$$

Where:

SDI = Simpson’s diversity index;

S = the total number of taxa; and,

p_i = the proportion of the ith taxon.

The SEI is a measure of how evenly the total invertebrate density is distributed among the taxa present at the station. The SEI is included along with the SDI to provide context as to whether taxonomic richness or the distribution of total density among taxa is driving the SDI values. The SEI is also expressed as a value between one and zero, with one representing high evenness (i.e., equal numbers of all taxa present in a sample) and zero representing low evenness (i.e., a high degree of dominance by one or a few organisms). The SEI values were calculated using the following formula (Smith and Wilson 1996):

$$SEI = 1/\sum_{i=1}^{S}(p_i)^2 \ /S$$

Where:

SEI = Simpson's evenness index;

p_i = the proportion of the i^{th} taxon; and,

S = the total number of taxa.

For the open-water stations, the relationship between selected habitat variables and benthic invertebrate community variables was visually evaluated using scatter plots. Spearman rank correlation analysis was used to test the strengths of the relationships. Spearman rank correlation coefficients were calculated using SYSTAT 13 (SYSTAT 2009). Correlations were identified as significant at P<0.05, P<0.01, and P<0.001.

Mesh size used during sampling and sample processing influences the types of organisms present in benthic invertebrate samples and their relative abundances. As an initial step to understand the effect of laboratory mesh size on benthic invertebrate data collected in the BSA, the 250 µm and 500 µm mesh datasets were compared using ratios (Appendix D). The ratio of the mean total number of organisms collected at a station in the 250 µm dataset to the number of organisms in the 500 µm fraction was calculated for major taxa and major groups of the Chironomidae.

2.6 Quality Assurance and Quality Control

2.6.1 Field

Quality assurance and quality control (QA/QC) procedures are an important aspect of field or laboratory testing programs. Following QA/QC practices results in field sampling, data entry, data analysis, and report preparation that produce technically sound and scientifically defensible results.

Detailed specific work instructions outlining each field task were provided to the field personnel before the field program. Samples were collected by experienced personnel and were labelled, preserved, and shipped according to internal technical procedures for benthic invertebrate sampling, and approved specific work instructions (unpublished file information). Field equipment, such as water quality meters, were regularly calibrated according to the manufacturer's recommendations. Benthic invertebrate samples were accompanied by a chain-of-custody form.

Field data were recorded on standardized field data sheets or in a bound field book, according to standardized field record-keeping procedures.

2.6.2 Data Entry and Screening

Benthic invertebrate data (Appendix E and Appendix F) were received from the taxonomy laboratory in Microsoft Excel spreadsheet format, with data entry already verified. Unusual abundance values were validated before data summary and analysis.

Field data entered into electronic format underwent a 100% transcription and validity check by a second person not involved in the initial data entry process. All calculated values, tables, and summary figures generated from the datasets underwent an additional QA/QC verification by a second person not involved in the initial calculations.

2.6.3 Laboratory

Quality control procedures consisted of verifying the sorting efficiency of each benthic invertebrate sample; results are presented in Appendix G. Sorting efficiency was verified by an individual other than the original sorter, by re-sorting at least 20% of the sorted material of every sample (EcoAnalysts 2013). The data quality objective was a minimum removal of 90% of the organisms in the sample. If the estimate of sorting efficiency was less than 90%, the sample was re-sorted until this data quality objective was met.

3 RESULTS

3.1 Lac du Sauvage

3.1.1 Open-Water Stations

3.1.1.1 Habitat Variables

Habitat data for open-water stations sampled at shallow, mid-depth, and deep areas in Lac du Sauvage are summarized in Table 3.1-1; water quality profile data for Lac du Sauvage are provided in Appendix A, Table A-1. Additional water quality data, including field profile summaries, at stations sampled for both benthic invertebrates and water quality, are provided in the 2014 Water and Sediment Quality Supplemental Baseline Report (Dominion Diamond 2015).

Conductivity, dissolved oxygen (DO) and pH values were similar among stations in Lac du Sauvage and uniform through the water column at the time of benthic invertebrate sampling (Table 3.1-1; DO and pH data are provided in Appendix A). Water temperature was variable among stations, ranging from 3.7 degrees Celsius (°C) to 8.2°C at the surface, and from 3.7°C to 8.1°C at the bottom of the water column. No thermal stratification was evident (Figure 3.1-1). Variation in water temperature was likely the result of weather conditions at time of sampling. Overall, the in situ water quality parameters were similar to other Arctic tundra lakes located north of Yellowknife (Pienitz et al. 1997).

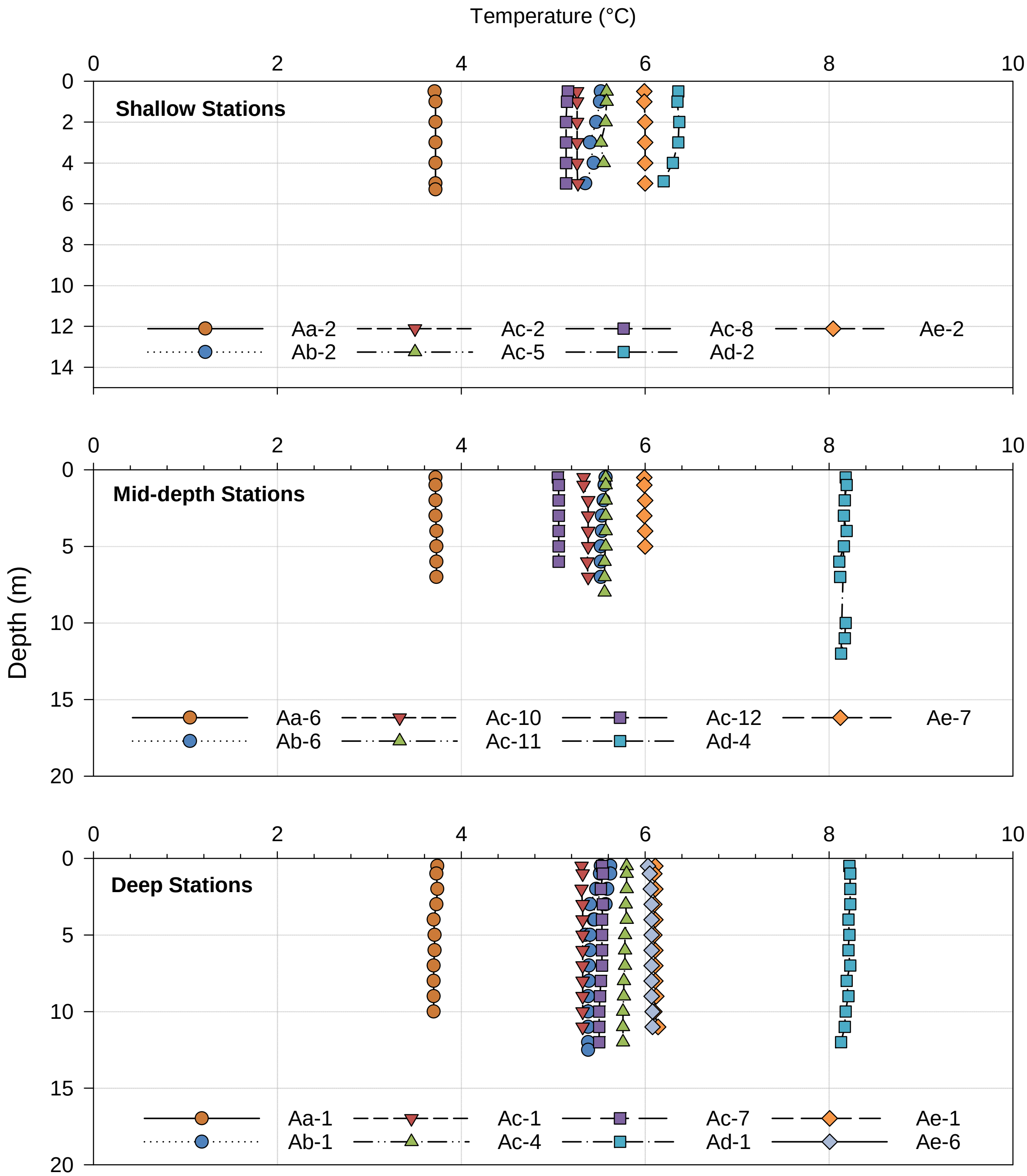
Detailed sediment chemistry results for deep stations are provided in the 2014 Water and Sediment Quality Supplemental Baseline Report (Dominion Diamond 2015). TOC and sediment particle size distribution were measured at all stations sampled for benthic invertebrates and the results are presented in Tables 3.2-1 and 3.2-3. The proportions of TOC and sediment particle size distribution were similar among stations (Table 3.1-1). TOC was low at all stations, ranging from 0.5% to 2.6%. The predominant substrate consisted of silt, ranging from 56.2% to 93.0% silt at all stations, with the exception of Station Ac-5, which had sediments dominated by sand (71.2%).

Table 3.1-1 Summary of Habitat Variables for Open-Water Stations in Lac du Sauvage, September 2014

Depth Category	Station	Station Depth (m)	Field Water Quality				Sediment Composition			
			Conductivity (µS/cm)		Temperature (°C)		Total Organic Carbon (%)	Sand (%)	Silt (%)	Clay (%)
			Surface	Bottom	Surface	Bottom				
Shallow	Aa-2	5.3	15	15	3.7	3.7	2.6	4	93	3
	Ab-2	5.2	15	15	5.5	5.4	1.3	38	56	6
	Ac-2	5.2	15	15	5.3	5.3	1.1	21	71	8
	Ac-5	4.2	15	15	5.6	5.6	0.5	71	27	2
	Ac-8	4.9	15	15	5.2	5.1	0.9	13	78	10
	Ad-2	4.9	15	15	6.4	6.2	2.3	1	91	8
	Ae-2	5.5	15	15	6.0	6.0	0.7	2	92	6
	Mean	**5.0**	**15**	**15**	**5.4**	**5.3**	**1.3**	**21**	**73**	**6**
Mid-depth	Aa-6	8.0	15	15	3.7	3.7	1.1	4	92	4
	Ab-6	7.8	15	15	5.6	5.5	2.1	34	60	6
	Ac-10	7.4	15	15	5.3	5.4	1.2	2	89	9
	Ac-11	8.1	15	15	5.6	5.6	1.3	15	77	8
	Ac-12	6.5	15	15	5.1	5.1	1.1	7	84	9
	Ad-4	7.6	15	15	8.2	8.1	2.4	4	91	5
	Ae-7	5.9	15	15	6.0	6.0	0.9	2	92	7
	Mean	**7.3**	**15**	**15**	**5.6**	**5.6**	**1.4**	**10**	**84**	**7**
Deep	Aa-1	11.1	15	15	3.7	3.7	0.9	7	90	3
	Ab-1	12.6	15	15	5.6	5.4	1.7	3	88	9
	Ac-1	12.5	15	15	5.3	5.3	1.4	2	88	11
	Ac-4	12.4	15	15	5.8	5.8	1.6	1	86	13
	Ac-7	12.6	15	15	5.5	5.5	1.2	1	86	12
	Ad-1	12.6	15	15	8.2	8.1	1.1	2	91	7
	Ae-1	12.4	15	15	6.1	6.1	0.7	1	92	7
	Ae-6	12.6	15	15	6.0	6.1	0.8	1	91	8
	Mean	**12.4**	**15**	**15**	**5.8**	**5.8**	**1.2**	**2**	**89**	**9**

m = metre; µS/cm = microSiemens per centimetre; °C = degree Celsius; % = percent.

Figure 3.1-1 Field Temperature Profiles from Open-water Stations in Lac du Sauvage, September 2014



m = metre; °C = degree Celsius.

3.1.1.2 Benthic Invertebrate Community Variables

Raw benthic invertebrate abundance data collected in 2014 in Lac du Sauvage are provided in Appendix E, Table E-1. Benthic community variables are illustrated in Figures 3.2-2 through 3.2-6, with a summary provided in Table 3.1-2. For the purposes of this report, benthic community variables were summarized for the 500 µm mesh dataset. Community variables were also calculated for the 250 µm mesh data set, and are provided in Appendix C.

Table 3.1-2 Summary of Benthic Invertebrate Community Variables for Shallow, Mid-depth, and Deep Stations in Lac du Sauvage, September 2014

Depth Category	Station	Community Variables					
		Total Density (org/m^2)	Total Richness (LTL)	Total Richness (Family)	SDI	SEI	Relative Density of Chironomidae (%)
Shallow	Aa-2	5,172	27	7	0.92	0.45	80.2
	Ab-2	1,647	25	9	0.91	0.47	70.7
	Ac-2	1,397	23	6	0.86	0.30	85.2
	Ac-5	3,879	28	9	0.86	0.26	74.9
	Ac-8	905	17	7	0.89	0.52	65.7
	Ad-2	5,647	30	11	0.91	0.36	80.6
	Ae-2	11,190	37	9	0.90	0.28	93.5
	Mean	**4,262**	**27**	**8**	**0.89**	**0.38**	**78.7**
Mid-depth	Aa-6	2,966	28	7	0.92	0.48	76.7
	Ab-6	1,957	22	7	0.90	0.44	72.7
	Ac-10	845	24	8	0.89	0.39	78.6
	Ac-11	1,224	22	7	0.85	0.31	79.6
	Ac-12	1,534	23	6	0.85	0.30	81.5
	Ad-4	5,043	31	9	0.91	0.37	79.7
	Ae-7	4,017	35	11	0.89	0.27	88.0
	Mean	**2,512**	**26**	**8**	**0.89**	**0.36**	**79.5**
Deep	Aa-1	5,466	26	5	0.86	0.28	70.7
	Ab-1	2,621	26	10	0.84	0.24	69.4
	Ac-1	1,431	19	4	0.90	0.50	74.1
	Ac-4	716	10	3	0.55	0.22	97.6
	Ac-7	1,259	17	3	0.83	0.34	95.9
	Ad-1	4,647	34	11	0.90	0.29	88.3
	Ae-1	2,026	21	5	0.84	0.29	90.2
	Ae-6	1,095	16	3	0.79	0.29	90.6
	Mean	**2,407**	**21**	**6**	**0.81**	**0.31**	**84.6**

org/m^2 = number of organisms per square metre; SEI = Simpson's evenness index; SDI = Simpson's diversity index; LTL = lowest taxonomic level; % = percent.

Total Density and Total Richness

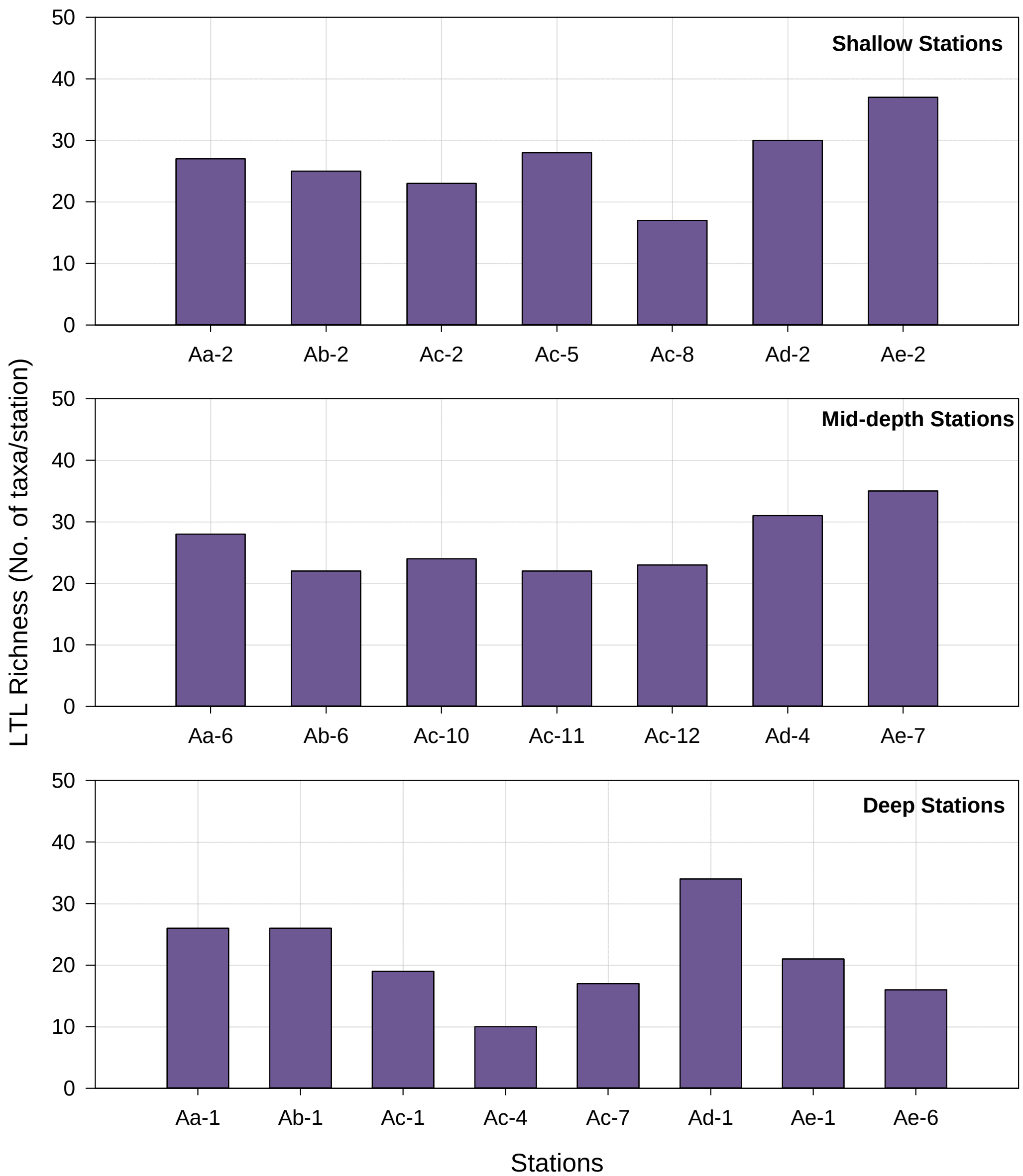
In 2014, total benthic invertebrate density varied within similar ranges at the mid-depth and deep stations (845 to 5,043 org/m^2 and 716 to 5,466 org/m^2, respectively) (Table 3.1-2; Figure 3.1-2). Although the overall density was considered low, it was highest at the shallow stations, ranging from 905 to 11,190 org/m^2. The highest density of 11,190 org/m^2 was observed at the shallow station Ae-2 and was double that of any other density values observed during the 2014 program. Total benthic invertebrate density at shallow and mid-depth stations in Lac du Sauvage was low to moderate overall, and was generally lower at deep stations.

Figure 3.1-2 Mean Total Benthic Invertebrate Density at Open-Water Stations in Lac du Sauvage, September 2014

org/m^2 = number of organisms per square metre.

Total richness (at the lowest taxonomic level) was moderate, ranging from 17 to 37 taxa/station at shallow stations, 22 to 35 taxa/station at mid-depth stations, and from 10 to 34 taxa/station at deep stations (Figure 3.1-3). A similar pattern was observed in total family richness, which was highest at the mid-depth and shallow stations, with a slightly lower value at the deep stations (Table 3.1-2).

Figure 3.1-3 Total Benthic Invertebrate Richness at the Lowest Taxonomic Level at Open-Water Stations in Lac du Sauvage, September 2014



LTL = lowest taxonomic level; No. of taxa/station = number of taxa per station.

Simpson's Diversity and Evenness Indices

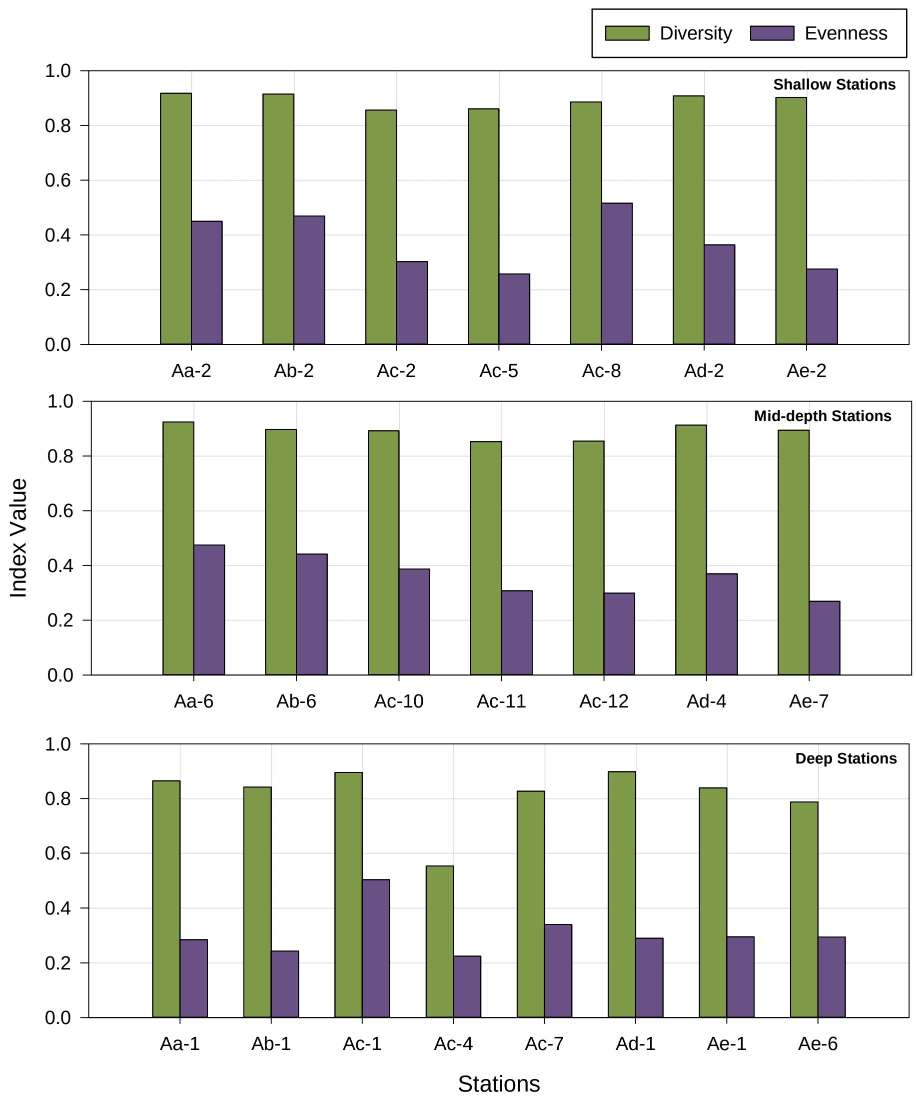
The SDI values were high at all lake stations in Lac du Sauvage, ranging from 0.86 to 0.92 at shallow stations, from 0.85 to 0.92 at mid-depth stations, and from 0.55 to 0.90 at deep stations (Table 3.1-2; Figure 3.1-4). Overall, the SDI values were all above 0.83 with the exception of the deep station Ac-4

(0.55) indicating a less diverse community. This is consistent with the low density and richness observed at this station.

SEI was variable among open-water stations in Lac du Sauvage, but was generally low, ranging from 0.26 to 0.52 at shallow stations, from 0.27 to 0.48 at mid-depth stations, and from 0.22 to 0.50 at deep stations (Figure 3.1-4).

SEI was slightly lower at deep stations compared to shallow and mid-depth stations. Overall, diversity values for Lac du Sauvage indicated a diverse benthic invertebrate community; however, SEI values indicated that a few taxa accounted for the majority of the density at each station.

Figure 3.1-4 Simpson's Diversity and Evenness Indices for the Benthic Invertebrate Community Collected at Open-Water Stations in Lac du Sauvage, September 2014

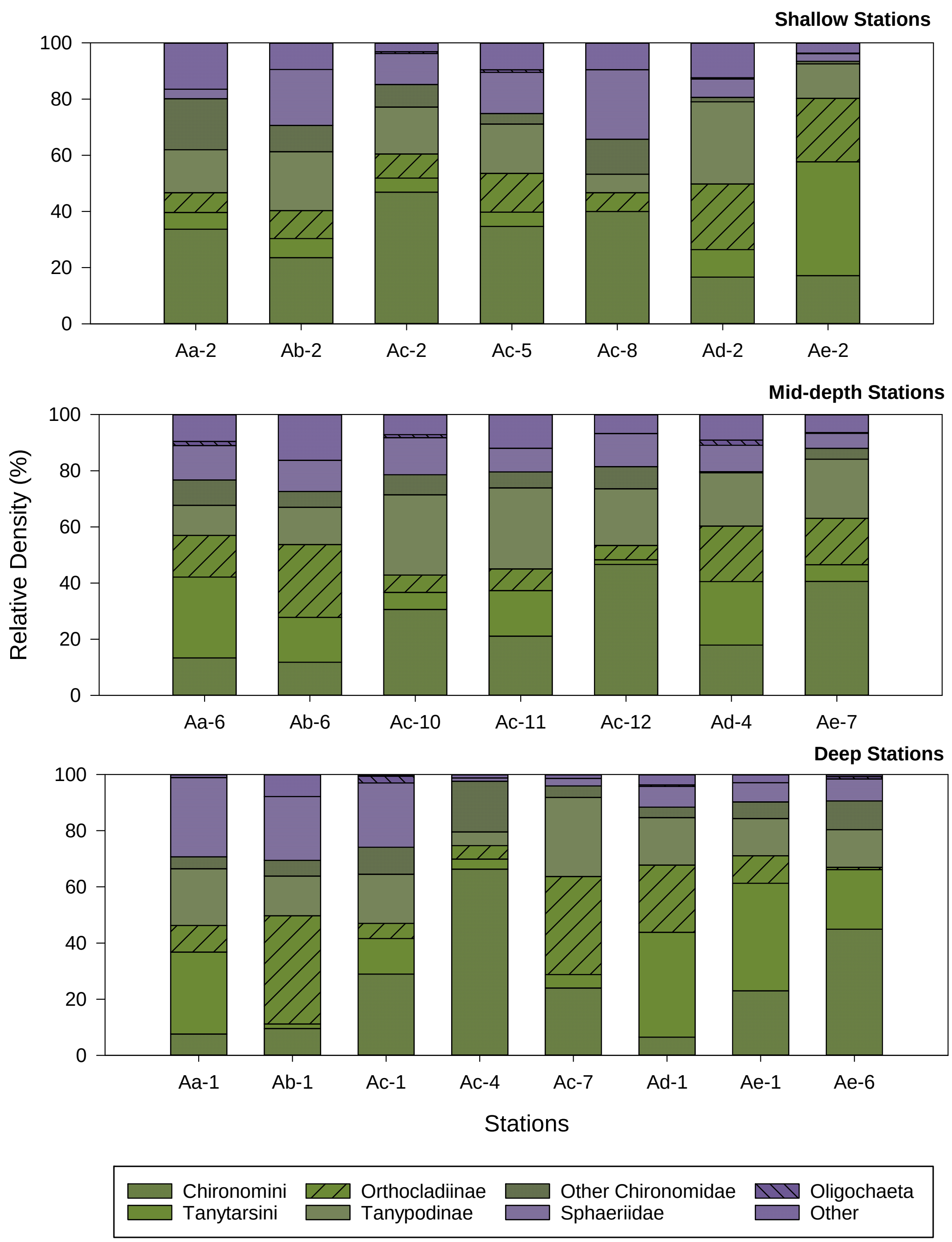


Community Composition

Chironomidae (non-biting midges) dominated the benthic invertebrate communities at all stations in Lac du Sauvage, with the various chironomid subfamilies and tribes collectively accounting for 65.7% to 93.5% of the total density at shallow stations, for 72.7% to 88.0% of the total density at mid-depth stations, and for 69.4% to 97.6% of the total density at the deep stations (Table 3.1-2; Figure 3.1-5). The Chironomini tribe was the dominant chironomid group at the majority of stations and depth categories, with a large portion of the remaining chironomid density consisting of representatives from the subfamilies Orthocladiinae and Tanypodinae. Dominance of the benthic invertebrate community by Chironomidae is commonly observed in sub-Arctic lakes (Beaty et al. 2006; Northington et al. 2010).

The remaining portion of the community was primarily composed of either molluscs (Sphaeriidae: fingernail clams or pea clams, and Gastropoda: snails), or water mites in the subclass Acari. Deep stations had fewer Gastropod and Acari taxa compared to shallow and mid-depth stations, consistent with the typical habitat associations of these taxa.

Figure 3.1-5 Relative Density of Major Benthic Invertebrate Taxa Collected at Open-Water Stations in Lac du Sauvage, September 2014



Note: The "Other" taxa category includes Gastropoda (snails) and the subclass Acari (water mites).

3.1.2 Littoral Stations

3.1.2.1 Habitat Variables

Conductivity, DO and pH was similar among littoral stations in Lac du Sauvage, but water temperatures were variable among stations (Table 3.1-3; ; DO and pH data are provided in Appendix A). Variation in water temperature was likely the result of weather conditions at time of sampling. The in situ water quality parameters were similar to other Arctic tundra lakes located north of Yellowknife (Pienitz et al. 1997) and similar to measurements at stations located in open-water areas of Lac du Sauvage. Littoral stations were characterized by low benthic algal cover, with the exception of Stations Ab-3 and Ac-3, which had moderate benthic algal cover. Most littoral stations had cobble-gravel or cobble-boulder substrates, with the exception of stations Ac-9 and Ad-3, where large cobbles were absent, but the proportion of boulders was higher compared to other littoral stations.

Table 3.1-3 Habitat Data for Littoral Stations in Lac du Sauvage, September 2014

Station	Field Water Quality		Benthic Algal Cover[a]	Substrate Composition (%)[a]				
	Specific Conductivity (µS/cm)	Temperature (°C)		Small Gravel	Large Gravel	Small Cobble	Large Cobble	Boulder
Aa-3	16	2.7	low	0	10	30	50	10
Ab-3	15	5.6	moderate	0	20	0	50	30
Ac-3	15	5.1	moderate	0	20	20	20	40
Ac-6	16	6.1	none	0	10	20	40	30
Ac-9	15	5.6	low	0	20	30	0	50
Ad-3	16	1.8	low	0	10	30	0	60
Ae-3	15	3.5	low	10	10	40	20	20
Mean	**15**	**4.3**	**-**	**1**	**14**	**24**	**26**	**34**

a) Visual field estimate.
µS/cm = microSiemens per centimetre; °C = degree Celsius; % = percent.

3.1.2.2 Benthic Invertebrate Community Variables

Raw benthic invertebrate abundance data for littoral stations in Lac du Sauvage are provided in Appendix E, Table E-2. The community variables are illustrated in Figures 3.1-6 through 3.1-8, with a summary provided in Table 3.1-4. Littoral benthic invertebrate samples were qualitative (i.e., number of invertebrates cannot be related to a unit bottom area); therefore, invertebrate abundances are not discussed below.

Total Richness

Total richness at the lowest taxonomic level was moderate at littoral stations in Lac du Sauvage, ranging from 19 to 26 taxa/station (Table 3.1-4; Figure 3.1-6). Family level richness varied between 8 and 14 families (Table 3.1-4). Spatial variation in richness did not appear to be related to habitat variation.

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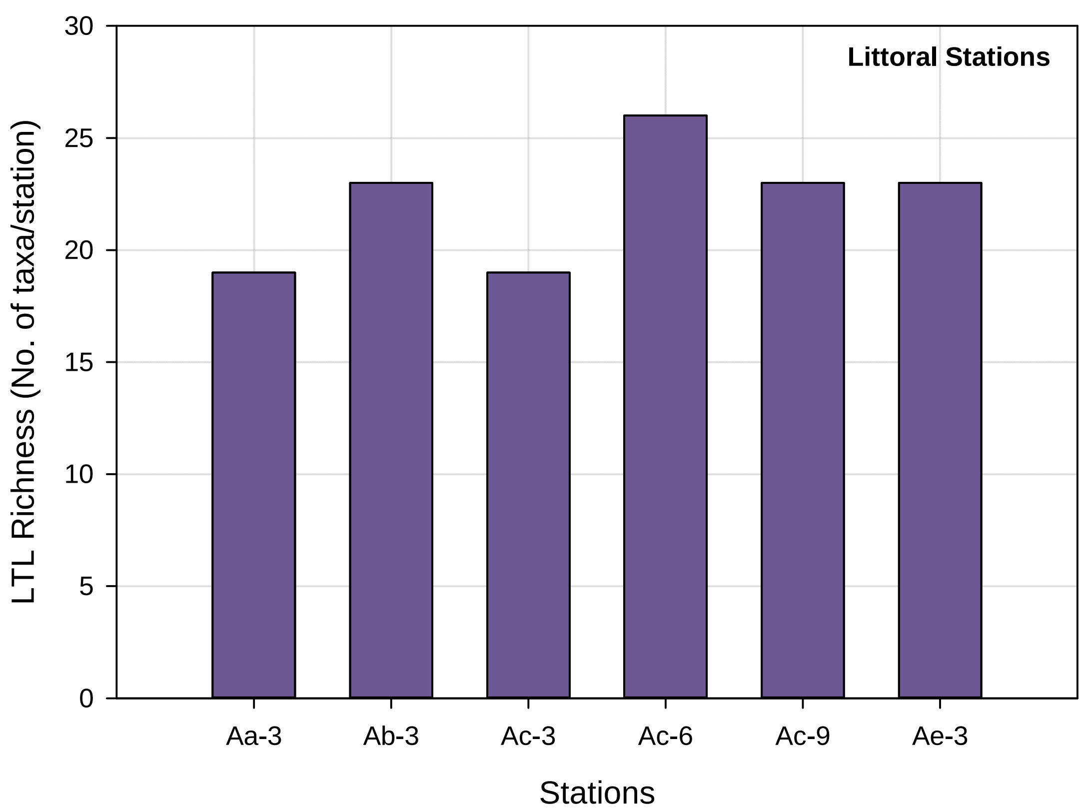
Table 3.1-4 Summary of Benthic Invertebrate Community Variables for Littoral Stations in Lac du Sauvage, September 2014

Station	Community Variables			
	Total Abundance (org/sample)	Total Richness (LTL)	Total Richness (Family)	Relative Abundance of Chironomidae (%)
Aa-3	164	19	8	68.3
Ab-3	127	23	12	69.3
Ac-3	70	19	9	64.3
Ac-6	108	26	13	48.1
Ac-9	147	23	14	43.5
Ae-3	172	23	11	70.3
Mean	**131**	**22**	**11**	**60.7**

org/sample = number of organisms per sample; LTL = lowest taxonomic level; % = percent.

Figure 3.1-6 Total Benthic Invertebrate Richness at the Lowest Taxonomic Level at Littoral Stations in Lac du Sauvage, September 2014



LTL = lowest taxonomic level; No. of taxa/station = number of taxa per sample.

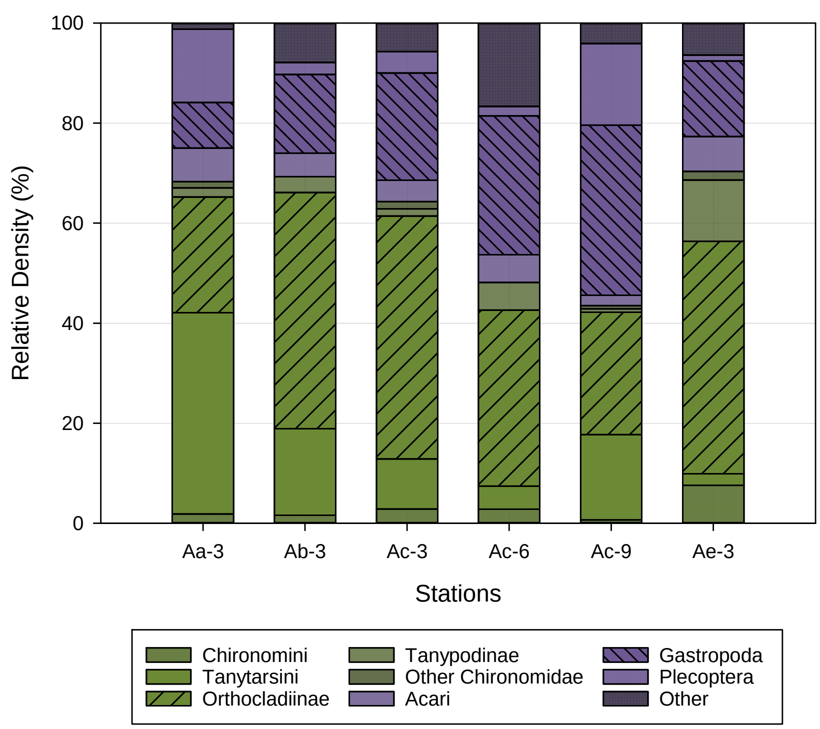
Community Composition

Unlike the open-water stations in Lac du Sauvage, Chironomidae represented a smaller percentage of the benthic invertebrate communities at the littoral stations in Lac du Sauvage, with the various chironomid tribes collectively accounting for 43.5% to 70.3% of the total abundance (Table 3.1-4; Figure 3.1-7). The subfamily Orthocladiinae was the dominant chironomid group at littoral stations, with the exception of Station Aa-3, where the Tanytarsini tribe was dominant.

The remainder of the benthic invertebrate community at the littoral stations consisted of organisms in the order Plecoptera (stoneflies), order Ephemeroptera (mayflies), order Trichoptera (caddisflies), class Gastropoda (family Valvatidae, snails), class Hydrozoa (freshwater polyps), or the subclass Acari. The Acari and Gastropoda generally accounted for the majority of the remaining proportion of the benthic invertebrate community, with the exception of Station Aa-3, where the order Plecoptera accounted for 14.6% of the community.

The benthic invertebrate community at the littoral stations of Lac du Sauvage had a lower percentage of Chironomidae and higher percentage of other taxa compared to shallow, mid-depth, and deep stations. The Chironomidae were dominated by the Orthocladiinae at littoral stations, compared to dominance by the Chironomini, Tanytarsini, and Tanypodinae at the shallow, mid-depth, and deep stations.

Figure 3.1-7 Relative Abundances of Major Benthic Invertebrate Taxa at Littoral Stations in Lac du Sauvage, September 2014



Note: The "Other" taxa category includes Oligochaeta (worms) , Trichoptera (caddisflies), Ephemeroptera (mayflies) and Coleoptera (beetles) .

3.1.3 2013 and 2014 Baseline Data Comparison

The following similarities and differences were observed between the benthic invertebrate communities from the 2013 and 2014 sampling programs in Lac du Sauvage:

- Total benthic invertebrate density in 2014 was within the range of variability observed in 2013.
- Invertebrate density and richness were observed to decrease with increasing depth in both years.
- Chironomidae (non-biting midges) dominated benthic invertebrate communities at all open-water stations in Lac du Sauvage in both years.
- The relative abundance of Sphaeriidae (formerly referred to as Pisidiidae) was generally higher in 2013 compared to 2014.
- Total richness was moderate at the littoral stations in both 2013 and 2014, and spatial variation in richness did not appear to be due to differences in habitat characteristics.
- The benthic invertebrate community at littoral stations continue to be dominated by the Chironomidae and Gastropoda. Over both sampling years, the Chironomidae at the littoral stations were dominated by the subfamily Orthocladiinae; this group was a smaller component of the deeper water Chironomidae assemblage.
- The Acari and Plecoptera were present in higher numbers at littoral stations compared to the open-water stations in both 2013 and 2014.

3.2 Lac de Gras

3.2.1 Open-Water Stations

3.2.1.1 Habitat Variables

Habitat data for stations sampled at deep (greater than 9 m) stations in an open-water area of Lac de Gras are summarized in Table 3.2-1. Water quality profile data for Lac de Gras stations are provided in Appendix A, Table A-2.

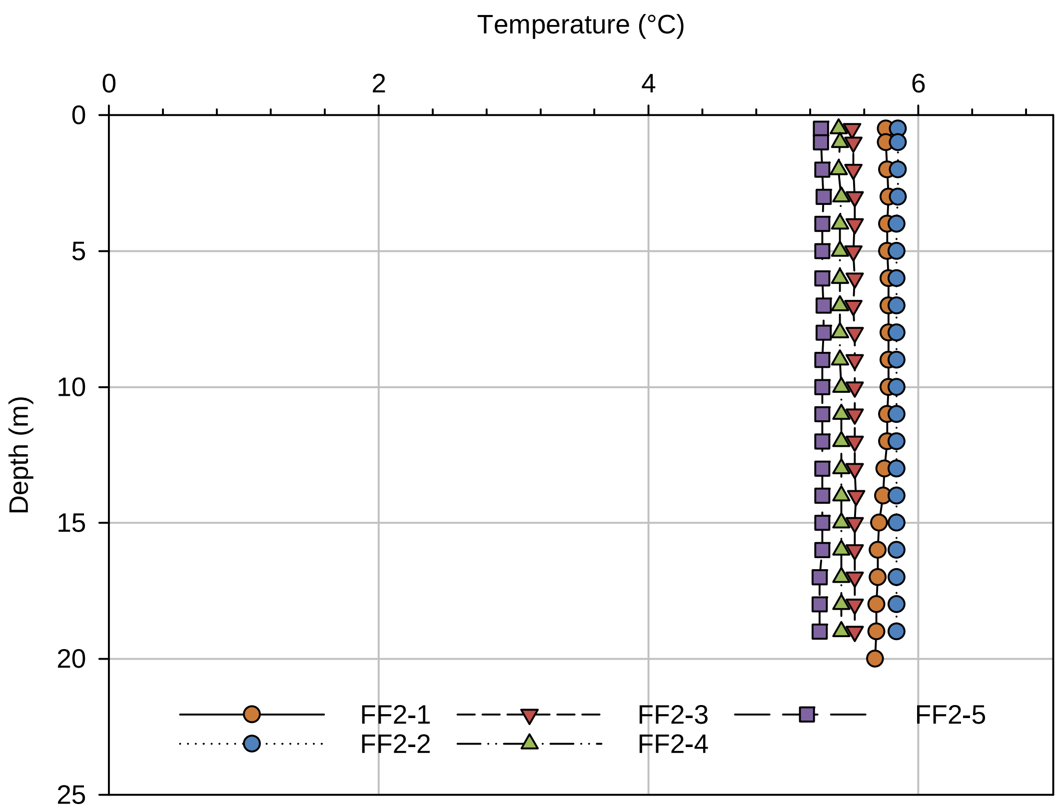
Field water quality was similar at the stations sampled in Lac de Gras (Table 3.2-1). Conductivity was nearly uniform among stations, and varied little between surface and bottom waters (29 to 33 µS/cm). Water temperature was also similar among stations, ranging from 5.3°C to 5.9°C, and decreased little with depth (Figure 3.2-1). Total organic carbon content of bottom sediments was low at all stations, ranging from 1.4% to 2.0%. Sediments at all stations consisted predominantly of silt, which accounted for 87.5% to 92.7% of sediment composition.

Table 3.2-1 Summary of Habitat Variables for Open-Water Stations in Lac de Gras, September 2014

Depth Category	Station	Sample Depth (m)	Field Water Quality				Sediment Composition			
			Conductivity (µS/cm)		Temperature (°C)		Total Organic Carbon (%)	Sand (%)	Silt (%)	Clay (%)
			Surface	Bottom	Surface	Bottom				
Deep	FF2-1	21.3	29	33	5.8	5.7	2.0	6	88	7
	FF2-2	19.0	29	29	5.9	5.8	2.0	6	88	6
	FF2-3	19.5	29	31	5.5	5.5	1.7	7	88	5
	FF2-4	19.5	29	29	5.4	5.4	1.8	3	91	6
	FF2-5	19.3	29	29	5.3	5.3	1.4	2	93	5
	Mean	**19.7**	**29**	**30**	5.6	5.6	1.8	5	89	6

m = metre; µS/cm = microSiemens per centimetre; °C = degree Celsius; % = percent.

Figure 3.2-1 Field Temperature Profiles for Open-water Stations in Lac de Gras, September 2014



m = metre; °C = degrees Celsius.

3.2.1.2 Benthic Invertebrate Community

Raw abundance data for the benthic invertebrate samples collected in Lac de Gras are provided in Appendix E, Table E-1. Community variables are illustrated in Figures 3.2-2 through 3.2-6, with a summary provided in Table 3.2-2. For the purposes of this report, benthic community variables were summarized for the 500 µm mesh dataset. Community variables were also calculated for the 250 µm mesh data set, and are provided in Appendix C.

Table 3.2-2 Summary of Benthic Invertebrate Community Variables for Open-Water Stations in Lac de Gras, September 2014

Depth Category	Station	Community Variables					
		Total Density (org/m²)	Total Richness (LTL)	Total Richness (Family)	SDI	SEI	Relative Density of Chironomidae (%)
Deep	FF2-1	216	6	3	0.51	0.34	88.0
	FF2-2	1,233	13	4	0.65	0.22	88.1
	FF2-3	1,716	18	6	0.75	0.23	86.9
	FF2-4	2,397	17	6	0.68	0.18	90.3
	FF2-5	1,647	17	4	0.66	0.17	86.9
	Mean	**1,441**	**14**	**5**	**0.65**	**0.23**	**88.0**

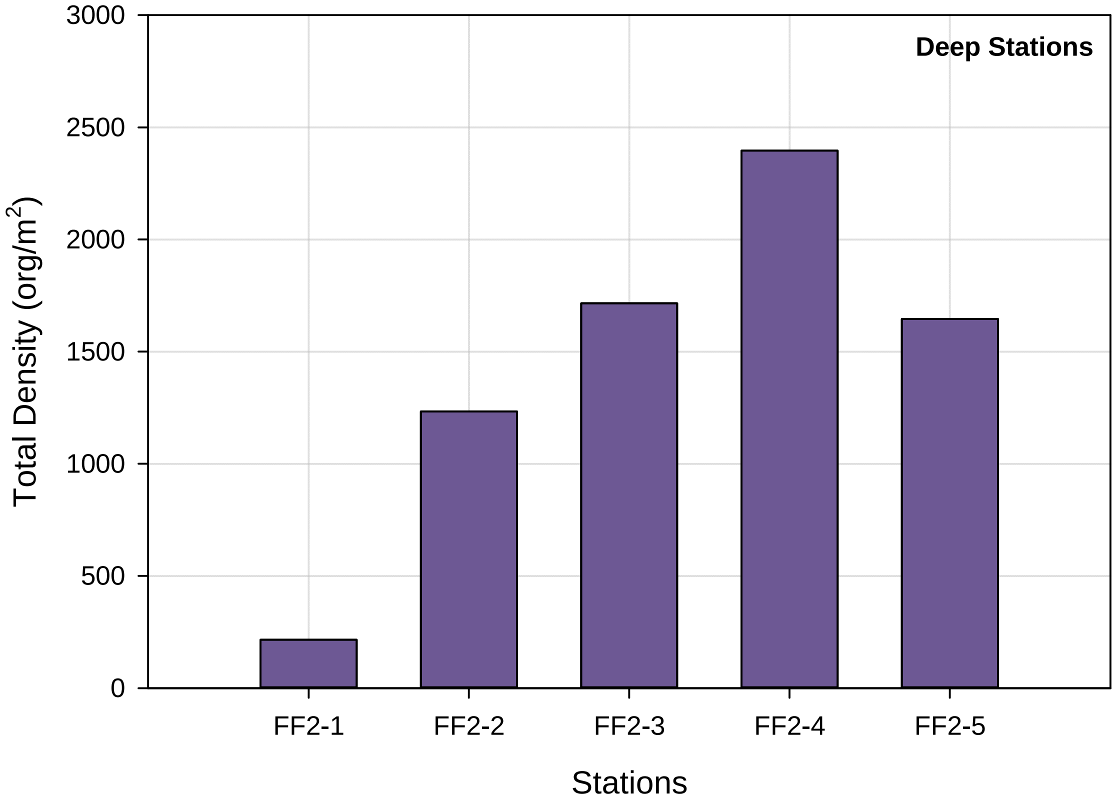
org/m² = number of organisms per square metre; SEI = Simpson's evenness index; SDI = Simpson's diversity index; LTL = lowest taxonomic level.

Total Density and Total Richness

In 2014, benthic invertebrate sampling was completed in the existing Far-field 2 (FF2) area of Lac de Gras, as delineated for the Diavik Mine AEMP (DDMI 2014). Total benthic invertebrate densities at the deep stations in Lac de Gras were low, ranging from 216 to 2,397 org/m², with an unusually low abundance value at Station FF2-1 (Table 3.2-2; Figure 3.2-2).

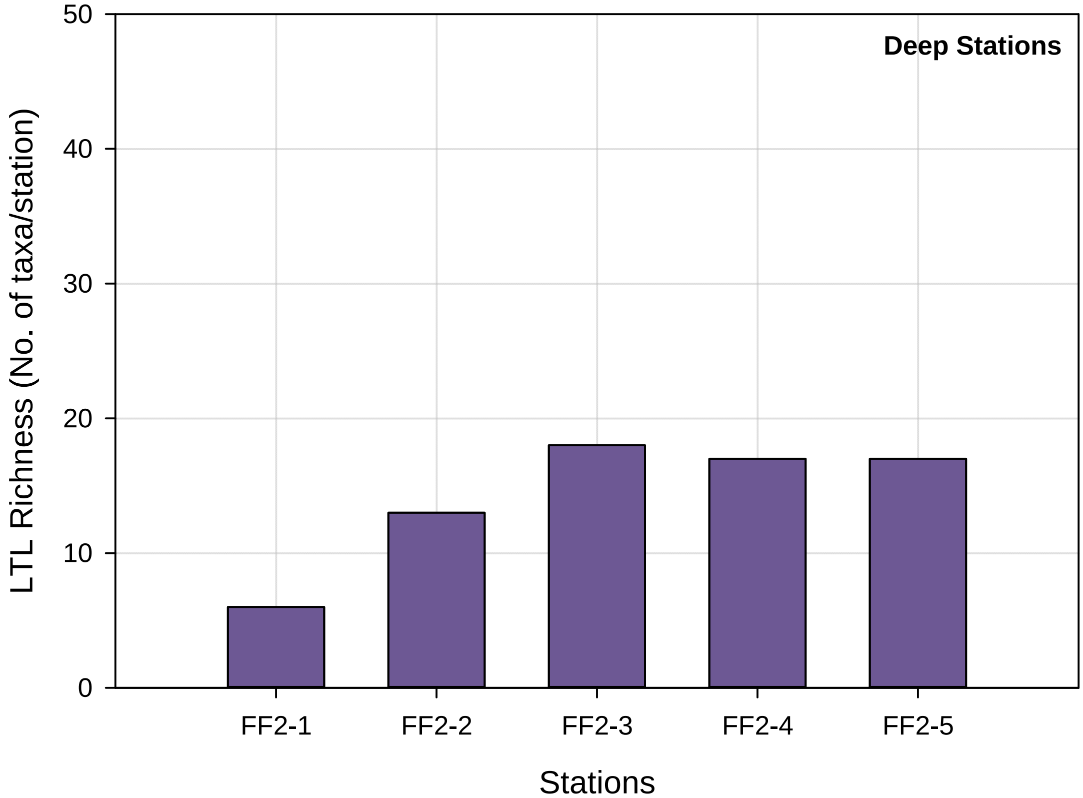
Overall, total richness (at the lowest taxonomic level) was low, ranging from 6 to 18 taxa/station (Table 3.2-2; Figure 3.2-3). Family level richness ranged from 3 to 6 families (Table 3.2-2). The lowest richness was observed at Station FF2-1, where invertebrate density was also unusually low. In general, total density and total richness were higher in Lac du Sauvage compared to Lac de Gras, which may reflect the shallower sampling depths in Lac du Sauvage (4.2 to 12.6 m), compared to Lac de Gras (19.0 to 21.3 m).

Figure 3.2-2 Total Benthic Invertebrate Density (org/m^2) at FF2 Stations in Lac de Gras, September 2014



org/m^2 = number of organisms per square metre.

Figure 3.2-3 Total Benthic Invertebrate Richness at the Lowest Taxonomic Level at FF2 Stations in Lac de Gras, September 2014



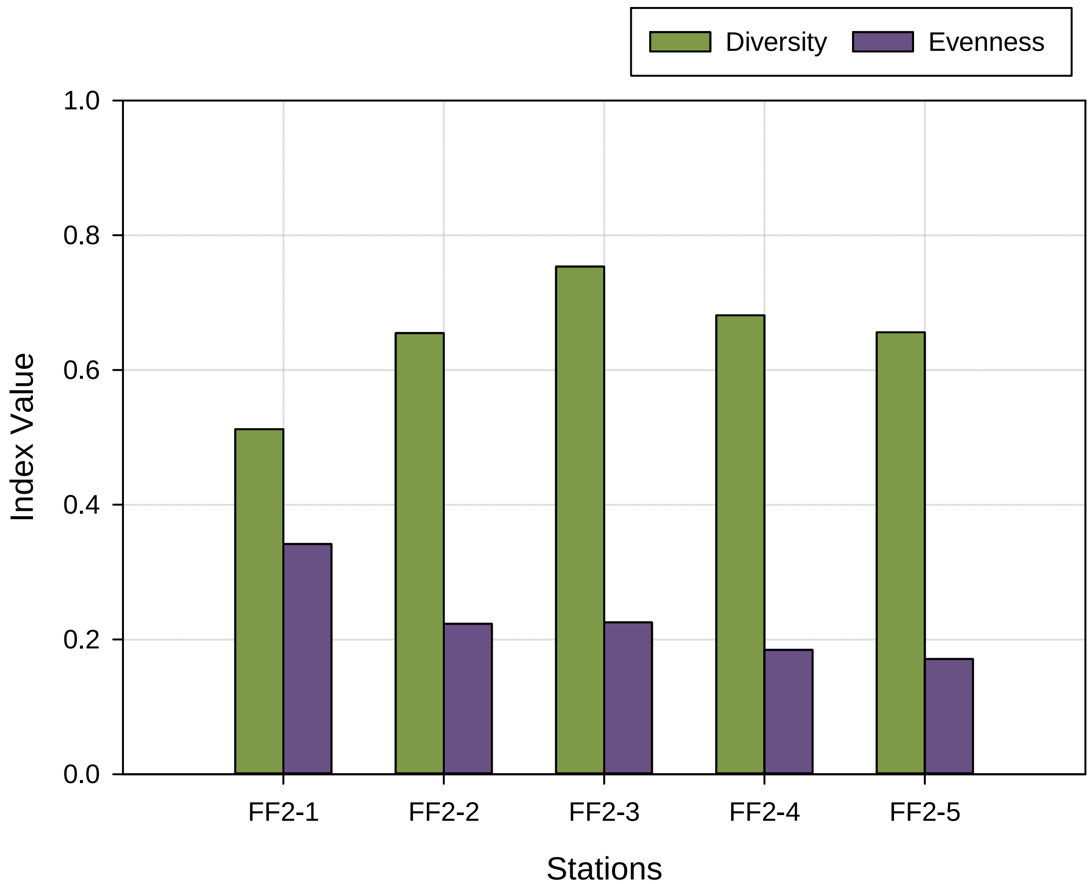
No. of taxa/station = number of taxa per station; LTL = lowest taxonomic level.

Simpson's Diversity and Evenness Indices

The SDI values were lower at the FF2 stations sampled in Lac de Gras (0.51 to 0.75; Table 3.2-2; Figure 3.2-4) compared to deep stations sampled in Lac du Sauvage (0.55 to 0.90). Evenness was low at all FF2 stations, ranging from 0.17 to 0.34 (Table 3.2-2; Figure 3.2-4). The highest evenness value was observed at station FF2-1; this station had a moderate SEI value of 0.34 and the lowest SDI value of 0.51 among the FF2 stations.

Overall, the index values indicate that the deep water benthic invertebrate community at Lac de Gras was less diverse than that of Lac du Sauvage. The low SEI values indicate that a few taxa accounted for the majority of the taxa richness at each station. These results are consistent with sampling a deeper area of Lac de Gras (19.0 to 21.3 m), compared to the stations sampled in Lac du Sauvage (4.2 to 12.6 m).

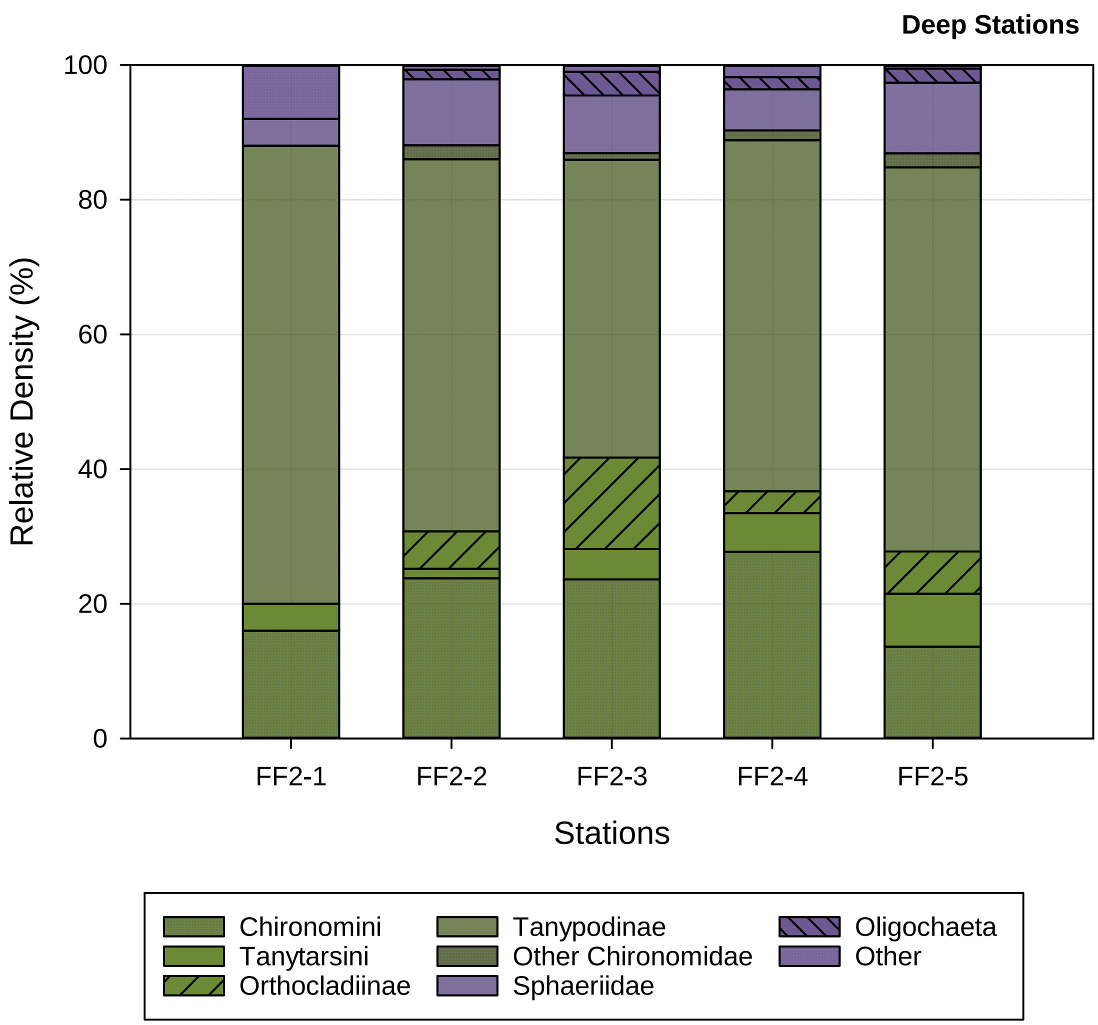
Figure 3.2-4 Simpson's Diversity and Evenness Indices for the Benthic Invertebrate Community Collected at FF2 Stations in Lac de Gras, September 2014



Community Composition

The benthic invertebrate community in Lac de Gras was strongly dominated by the Chironomidae (Figure 3.2-5). The Chironomidae accounted for 88.0% to 90.3% of the total density, with the subfamily Tanypodinae and the Chironomini tribe being the most dominant chironomid groups. The family Sphaeriidae and Acari accounted for a large proportion of the non-Chironomid taxa present in the Lac de Gras stations, ranging from 9.7% to 13.1% of the total density. Taxa present were similar among stations (Figure 3.2-5), with the exception of a higher relative density of Acari present at Station FF2-1 and the absence of Orthocladiinae and Oligochaeta.

Figure 3.2-5 Relative Density of Major Benthic Invertebrate Taxa Collected at FF2 Stations in Lac de Gras, September 2014



The "Other" taxa category includes Gastropoda (snails) or the subclass Acari (water mites).

3.2.2 Comparison to Previous Studies

The 2014 results were qualitatively compared to previous data collected in the FF2 area of Lac de Gras. Lac de Gras has been the focus of the benthic invertebrate component of the Diavik Mine AEMP, and the most recent data are available from the 2013 AEMP annual report (DDMI 2014). The following similarities and differences were observed between the benthic invertebrate communities from the 2014 program and previous sampling in the FF2 area:

- The mean total benthic invertebrate density in the FF2 area of Lac de Gras has increased since 2001 but remains low. Low invertebrate densities were also observed in 2014 in the FF2 area.

- Low to moderate taxonomic richness has consistently been observed in the FF2 area of Lac de Gras.
- Relative density of major taxonomic groups was similar in 2014 compared to previous years. The benthic invertebrate communities at FF2 stations have been consistently dominated by chironomids during all sampling events. Other groups including Oligochaeta, Sphaeriidae and Acari have typically represented a large proportion of non-Chironomid taxa in this area.

3.3 Effect of Habitat Variation at Open-Water Stations

The following physical factors varied sufficiently among open-water stations to potentially contribute to among-station variation in benthic invertebrate community structure:

- Water depth varied from 4.2 to 21.3 m.
- TOC varied from 0.5% to 2.6%.
- The percentages of sand, silt, and clay in bottom sediments varied from 0.7% to 71.2%, 26.5% to 93.0%, and 2.4% to 13.2%, respectively. For the purposes of the following analysis, silt and clay percentages were combined as percent fines.

These variables were included in a Spearman rank correlation analysis of the entire data set (Lac du Sauvage and Lac de Gras open-water stations), excluding littoral stations, to investigate the influence of habitat variation on benthic invertebrate community variables. Scatter plots of habitat variables and community variables with significant correlations are presented below (Figure 3.3-1).

Significant correlations were detected between water depth and family richness, LTL richness, SDI, SEI, Sphaeriidae density, and Gastropoda density (Table 3.3-1). These correlations were negative in direction, indicating that community variables decreased in value with increasing water depth. Visual examination of the scatter plots for Sphaeriidae and Gastropoda densities with depth, did not indicate strong negative relationships (Figure 3.3-1).

A general trend of decreasing benthic invertebrate diversity with increasing water depth was apparent in both 2013 and 2014. However, in 2014, no significant correlation was observed between total benthic invertebrate density and water depth.

Table 3.3-1 Spearman Rank Correlations between Benthic Invertebrate Community Variables and Selected Habitat Variables at Open-Water Stations in the Jay Project Baseline Study Area, September 2014

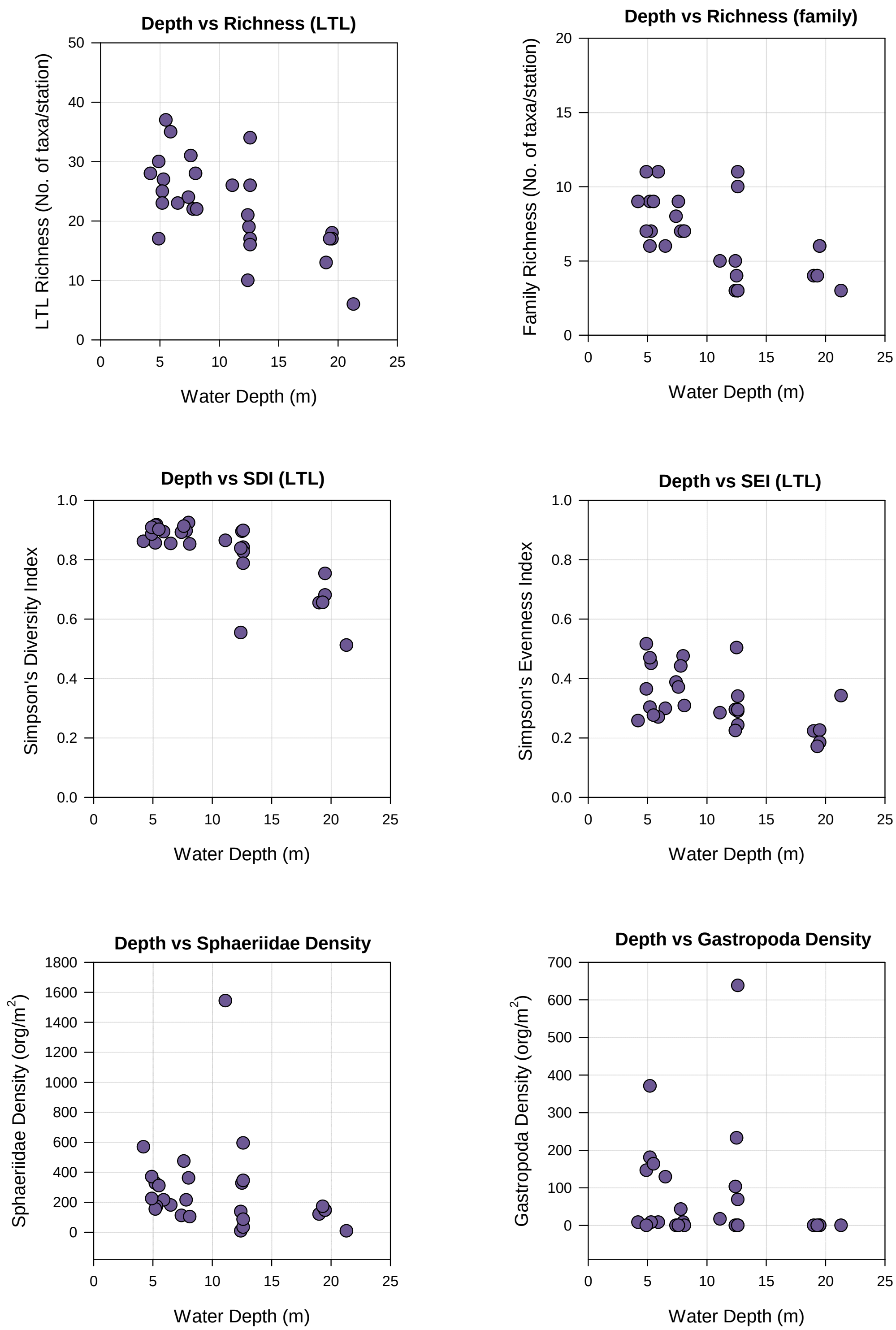
Community Variable	Spearman Correlation Coefficient (r_s)		
	Water Depth	TOC	Fines
Total Density	-0.299	-0.021	0.037
Total Richness – Family	**-0.573****	-0.037	-0.149
Total Richness – LTL	**-0.584****	-0.195	-0.050
Simpson's Diversity Index	**-0.782*****	-0.255	-0.316
Simpson's Evenness Index	**-0.614*****	-0.001	-0.120

Table 3.3-1 Spearman Rank Correlations between Benthic Invertebrate Community Variables and Selected Habitat Variables at Open-Water Stations in the Jay Project Baseline Study Area, September 2014

Community Variable	Spearman Correlation Coefficient (r_s)		
	Water Depth	TOC	Fines
Chironomidae density	-0.236	-0.021	0.124
Sphaeriidae Density	**-0.433***	-0.103	-0.248
Gastropoda Density	**-0.405***	-0.207	-0.242
Acari Density	-0.353	-0.282	-0.191

Notes:
Critical value (alpha = 0.05, n = 27, 2-tailed test) = 0.382.
Critical value (alpha = 0.01, n = 27, 2-tailed test) = 0.491.
Critical value (alpha = 0.001, n = 27, 2-tailed test) = 0.608.
Significant correlations (**bold**) are denoted as: * = P<0.05, ** = P<0.01, and *** P<0.001.

Figure 3.3-1 Scatter-Plots of Water Depth versus Selected Benthic Invertebrate Community Variables at Lake Stations, September 2014



3.4 Quality Assurance and Quality Control

Sorting efficiency for benthic invertebrate samples met the requirement of 90% removal of organisms in the initial sample sort for most samples. Results for the two habitat types were as follows:

- For open-water samples (shallow, mid-depth, and deep stations), sorting efficiency ranged from 66% to 100% removal in the initial sort. Sample Ad-4 had 66% recovery in the 1 mm fraction after the initial sort but recovery increased to 92% after the third re-sort. All other samples had sorting efficiency values above 93% in the initial sort. Detailed QC results are provided in Appendix G, Table G-1.
- For littoral samples, sorting efficiency was 100% removal for all samples in the initial sort. Detailed QC results are provided in Appendix G, Table G-2.

4 SUMMARY

This baseline report provides a summary of existing benthic invertebrate communities in Lac du Sauvage and Lac de Gras, near the proposed Jay Project, from 2014 sampling. The objectives of this report were to provide additional benthic community data to support baseline characterization of Lac du Sauvage and Lac de Gras. A comparison to data collected during the 2013 benthic invertebrate baseline program provided a qualitative evaluation of among-year variability in benthic invertebrate communities in Lac du Sauvage.

The benthic invertebrate communities in Lac du Sauvage and Lac de Gras were typical of sub-Arctic systems. The species composition and low densities reported by the present study and previous studies are indicative of oligotrophic systems (i.e., low productivity and short growing seasons: Hynes 1970; Resh and Rosenberg 1984; Hershey 1992; Welch et al. 1988; Jorgenson et al. 1992).

4.1 Lac du Sauvage

Benthic invertebrate stations were located in littoral, shallow, mid-depth, and deep habitat. Field water quality parameters varied little with depth, indicating that the lake was well mixed at the time of sampling.

The benthic invertebrate community at the open-water stations of Lac du Sauvage was characterized by variable total density and richness, both ranging from low to moderate. Total density and total richness were within the ranges expected for sub-Arctic lakes. Simpson's diversity index values at lake stations were moderate to high, indicating a diverse benthic invertebrate community. Evenness was variable and ranged from low to moderate, indicating that a few taxa accounted for the majority of the total density.

The benthic invertebrate community was dominated by midges (family Chironomidae). The Bivalve family Sphaeriidae (fingernail clams and pea clams), and the subclass Acari (water mites) were also present at the majority of stations. Dominance of the benthic invertebrate community by the Chironomidae at shallow, mid-depth, and deep stations is common in sub-Arctic lakes (Beaty et al. 2006; Northington et al. 2010).

The littoral areas (near-shore and less than 1 m) of Lac du Sauvage were characterized by a lower total density and taxonomic richness, compared to deeper stations. Although the relative density of Chironomidae was still high at littoral stations, it was lower than those observed in the open-water stations. However, these areas were sampled by different methods (littoral stations: kick-net; open water stations: Ekman grab); therefore, data and are not directly comparable. The remainder of the benthic invertebrate community in the littoral areas included Acari, Plecoptera (stoneflies), Trichoptera (caddisflies), other Diptera and Gastropoda. At some littoral stations, Gastropoda and Acari accounted for a large proportion of total density.

The differences in community structure between the littoral stations and the open-water stations of the BSA may be attributed to natural variation and differences in the physical habitat sampled (e.g., water depth, wave action, and substrate composition).

4.2 Lac de Gras

Lac de Gras has been the focus of the Diavik Mine AEMP, and the most recent data are available from the 2013 AEMP annual report (DDMI 2014). As part of the 2014 benthic invertebrate baseline program, five deep stations were sampled in far-field exposure area (FF2) defined by the Diavik Mine AEMP design.

The benthic invertebrate communities of Lac de Gras were characterized by generally low but variable total density and low to moderate richness. Diversity values indicated that the benthic invertebrate community was less diverse than that observed in Lac du Sauvage. The benthic invertebrate communities at the FF2 stations in Lac de Gras were dominated by Chironomidae with the subfamily Tanypodinae and the Chironomini tribe being the dominant groups. Other groups, such as the bivalve family Sphaeriidae, oligochaetes, and Acari accounted for a large proportion of the non-chironomid taxa present at the Lac de Gras stations. The differences observed in the benthic invertebrate communities between lakes are likely a reflection of the deeper stations sampled in Lac de Gras. Lac de Gras is a larger, deeper lake, and was sampled at a target depth of 20 m, compared to Lac du Sauvage, which was sampled at depths ranging from 4.2 to 12.6 m.

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6 GLOSSARY

Term	Definition
Abundance	The number of individuals in a given area or sample.
Baseline	A surveyed or predicted condition that serves as a reference point with which later surveys are coordinated or correlated.
Benthic Invertebrates	Animals without backbones that live on river and lake bottoms. The term "benthic" refers to the bottom.
Conductivity	A measure of the resistance of a solution to electrical flow; an indirect measure of the salinity of the water.
Density	The number of individuals per unit area.
Diversity	A numerical index that measures the proportional distribution of organisms in the community.
Drainage Basin	A region of land that eventually contributes water to a river or lake.
Drumlins	A long narrow hill, made up of till, which points in the direction of glacier movement
Ekman Grab	Cube-shaped mechanical device with a spring-loaded opening that is lowered to the bottom of a waterbody and triggered to close to collect a sample of the bottom sediments.
Enumeration	The act of counting individuals.
Eskers	Long, narrow bodies of sand and gravel deposited by a subglacial stream running between ice walls or in an ice tunnel, left behind after melting of the ice of a retreating glacier.
Grab Sample	A single sample collected at a particular time and place that represents the composition of the material sampled (e.g., water) only at that time and place.
Habitat	The physical location or type of environment in which an organism or biological population lives or occurs.
Hydrology	The study of flowing water and effects of flowing water on the Earth's surface, in the soil and underlying rocks, and in the atmosphere.
Kettle Lake	A steep-sided bowl or basin-shaped hole or depression in glacial drift deposits, especially outwash or kame, believed to have formed by the melting of a large, detached block of stagnant ice (left behind by a retreating glacier) that had been wholly or partly buried in the glacial drift. Kettles commonly lack surface drainage and may contain a lake or swamp.
Kimberlite	Igneous rocks that originate deep in the Earth's mantle and intrude the Earth's crust. These rocks typically form narrow pipe-like deposits that sometimes contain diamonds.
Kimberlite Pipe	A more or less vertical, cylindrical body of kimberlite that resulted from the forcing of the kimberlite material to the Earth's surface.
Lichens	Any complex organism of the group Lichenes, composed of a fungus in symbiotic union with an alga and having a greenish, grey, yellow, brown, or blackish thallus that grows in leaflike, crustlike, or branching forms on rocks, trees, and other surfaces.
Littoral	The shallow, near-shore area of a lake.
Mainstem	The main portion of a watercourse extending continuously upstream from its mouth, but not including any tributary watercourses.
Mean	Arithmetic average value in a distribution.
Nutrients	Environmental substances (elements or compounds) such as nitrogen or phosphorus, which are necessary for the growth and development of plants and animals.
Permafrost	Permanently frozen subsoil occurring throughout the polar regions.
pH	A measure of the acidity or alkalinity of water.
Plankton	Small, often microscopic, plants (phytoplankton) and animals (zooplankton) that live in the open water column of lakes. They are an important food source for many larger animals.
Relative Density	The proportional representation of each species in a sample or a community.
Richness	The number of different types of animals present in a sample or at a location.

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Term	Definition
Sedges	A grass-like plant with a triangular stem often growing in wet areas. Sedge wetland habitats are typically wet sedge meadows and other sedge associations of non-tussock plant species. Sedge species such as *Carex aquatilis* and *C. bigelowii*, and cotton-grass (*Eriophorum angustifolium*) are the dominant vegetation types. Plant species occupy wet, low lying sites where standing water is present throughout much of the growing season.
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. Major factors are degree of slope, length of slope soil characteristics, land usage, and quantity and intensity of precipitation.
Simpson's Diversity Index	An index used to measure diversity, to quantify the biodiversity of a habitat. It takes into account the number of species present, as well as the relative abundance of each species. It represents the probability that two randomly selected individuals in the habitat will not belong to the same species.
Simpson's Evenness Index	An index use to measure how evenly the total invertebrate density is distributed among the taxa present at a station.
Substrate	The bottom of a waterbody, usually consisting of sediments of various particle sizes (e.g., sand, silt, clay, gravel, cobble, boulder) and organic material (e.g., living or dead plant material).
Taxon	A group of organisms at the same level of the standard biological classification system; the plural of taxon is taxa.
Thermal stratification	Horizontal layers of differing densities produced in a lake by temperature changes at different depths.
Total Metals	Metallic elements that have been digested in strong acid before analysis, including suspended, dissolved, and colloidal forms.
Total Organic Carbon	Total organic carbon is composed of both dissolved and particulate forms. Total organic carbon is often calculated as the difference between total carbon and total inorganic carbon. Total organic carbon has a direct relationship with both biochemical and chemical oxygen demands, and varies with the composition of organic matter present in the water. Organic matter in soils, aquatic vegetation, and aquatic organisms are major sources of organic carbon.
Total Richness	The total number of different taxa occupying a given area.
Tundra	A vast, mostly flat, treeless Arctic region of Europe, Asia, and North America in which the subsoil is permanently frozen. The dominant vegetation is low-growing stunted shrubs, mosses, and lichens.
Upland	Forested or non-forested areas of the landscape with non-saturated and non-peat-forming soils. Excludes bogs, fens, swamps, and marshes. Areas where the soil is not saturated for extended periods, as indicated by vegetation and soils.
Waterbody	An area of water such as a river, stream, lake, or sea.
Wetland	Land having the water table at, near, or above the land surface or which is saturated for a long enough period to promote wetlands or aquatic processes, as indicated by hydric soils, hydrophytic vegetation, and various kinds of biological activity adapted to the wet environment.

APPENDIX A

FIELD WATER QUALITY PROFILE DATA

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Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Aa-2	12-Sep-14	5.3	0.5	3.7	15	14.0	7.3
			1	3.7	15	14.0	7.3
			2	3.7	15	14.0	7.3
			3	3.7	15	14.0	7.2
			4	3.7	15	14.0	7.2
			5	3.7	15	14.1	7.2
			5.3	3.7	15	14.0	7.2
Aa-6	12-Sep-14	8.0	0.5	3.7	15	13.2	7.2
			1	3.7	15	13.2	7.1
			2	3.7	15	13.2	7.1
			3	3.7	15	13.2	7.1
			4	3.7	15	13.2	7.1
			5	3.7	15	13.2	7.1
			6	3.7	15	13.2	7.1
			7	3.7	15	13.2	7.1
Aa-1	12-Sep-14	11.1	0.5	3.7	15	14.7	7.1
			1	3.7	15	14.7	7.1
			2	3.7	15	14.7	7.1
			3	3.7	15	14.7	7.1
			4	3.7	15	14.6	7.0
			5	3.7	15	14.6	7.0
			6	3.7	15	14.6	7.0
			7	3.7	15	14.4	7.0
			8	3.7	15	14.5	7.0
			9	3.7	15	14.4	7.0
			10	3.7	15	14.5	7.0

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ab-2	11-Sep-14	5.2	0.5	5.5	15	10.9	7.1
			1	5.5	15	10.9	7.1
			2	5.5	15	10.9	7.1
			3	5.4	15	10.9	7.1
			4	5.4	15	10.8	7.1
			5	5.4	15	10.8	7.1
Ab-1	11-Sep-14	12.6	0.5	5.6	15	10.5	7.1
			1	5.6	15	10.5	7.1
			2	5.6	15	10.5	7.1
			3	5.6	15	10.5	7.1
			4	5.5	15	10.5	7.1
			5	5.4	15	10.5	7.1
			6	5.4	15	10.5	7.1
			7	5.4	15	10.5	7.1
			8	5.4	15	10.5	7.1
			9	5.4	15	10.5	7.1
			10	5.4	15	10.4	7.1
			11	5.4	15	10.4	7.1
			12	5.4	15	10.4	7.1
			12.5	5.4	15	10.4	7.1
Ab-6	11-Sep-14	7.8	0.5	5.6	15	10.5	7.2
			1	5.6	15	10.6	7.1
			2	5.6	15	10.6	7.1
			3	5.5	15	10.6	7.1
			4	5.5	15	10.6	7.1
			5	5.5	15	10.7	7.1

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
			6	5.5	15	10.7	7.1
			7	5.5	15	10.7	7.1
Ac-5	10-Sep-14	4.2	0.5	5.6	15	12.6	7.2
			1	5.6	15	12.6	7.2
			2	5.6	15	12.6	7.2
			3	5.5	15	12.6	7.2
			4	5.6	15	12.5	7.2
Ac-11	10-Sep-14	8.1	0.5	5.6	15	13.9	7.3
			1	5.6	15	13.9	7.2
			2	5.6	15	13.8	7.2
			3	5.6	15	13.8	7.2
			4	5.6	15	13.8	7.2
			5	5.6	15	13.7	7.1
			6	5.6	15	13.6	7.1
			7	5.6	15	13.6	7.1
			8	5.6	15	13.5	7.1
Ac-10	9-Sep-14	7.4	0.5	5.3	15	16.0	7.3
			1	5.3	15	15.9	7.3
			2	5.4	15	15.9	7.2
			3	5.4	15	15.9	7.2
			4	5.4	15	15.9	7.2
			5	5.4	15	15.8	7.2
			6	5.4	15	15.8	7.2
			7	5.4	15	15.7	7.2

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Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ac-8	11-Sep-14	4.9	0.5	5.2	15	11.4	7.2
			1	5.2	15	11.4	7.2
			2	5.1	15	11.4	7.2
			3	5.1	15	11.4	7.2
			4	5.1	15	11.4	7.2
			5	5.1	15	11.4	7.2
Ac-7	9-Sep-14	12.6	0.5	5.5	15	15.5	8.0
			1	5.5	15	15.4	8.0
			2	5.5	15	15.4	7.9
			3	5.5	15	15.4	7.8
			4	5.5	15	15.3	7.8
			5	5.5	15	15.3	7.7
			6	5.5	15	15.2	7.7
			7	5.5	15	15.2	7.6
			8	5.5	15	15.2	7.6
			9	5.5	15	15.1	7.6
			10	5.5	15	15.1	7.6
			11	5.5	15	15.0	7.5
			12	5.5	15	8.1	7.1
Ac-2	9-Sep-14	5.2	0.5	5.3	15	14.5	7.5
			1	5.3	15	14.4	7.4
			2	5.3	15	14.4	7.4
			3	5.3	15	14.4	7.4
			4	5.3	15	14.3	7.4
			5	5.3	15	14.2	7.3

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Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ac-4	9-Sep-14	12.4	0.5	5.8	15	14.6	7.2
			1	5.8	15	14.6	7.1
			2	5.8	15	14.5	7.1
			3	5.8	15	14.5	7.1
			4	5.8	15	14.4	7.1
			5	5.8	15	14.3	7.1
			6	5.8	15	14.3	7.1
			7	5.8	15	14.3	7.1
			8	5.8	15	14.2	7.1
			9	5.8	15	14.2	7.1
			10	5.8	15	14.2	7.1
			11	5.8	15	14.2	7.1
			12	5.8	15	14.1	7.1
Ac-1	11-Sep-14	12.5	0.5	5.3	15	15.2	8.1
			1	5.3	15	15.1	8.0
			2	5.3	15	15.0	7.9
			3	5.3	15	14.9	7.8
			4	5.3	15	14.9	7.8
			5	5.3	15	14.8	7.8
			6	5.3	15	14.8	7.8
			7	5.3	15	14.8	7.7
			8	5.3	15	14.7	7.6
			9	5.3	15	14.7	7.6
			10	5.3	15	14.7	7.6
			11	5.3	15	14.7	7.6

DOMINION DIAMOND

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ad-1	5-Sep-14	12.6	0.5	8.2	15	14.4	7.6
			1	8.2	15	14.3	7.5
			2	8.2	15	14.1	7.4
			3	8.2	15	14.0	7.4
			4	8.2	15	14.0	7.4
			5	8.2	15	14.0	7.4
			6	8.2	15	14.0	7.4
			7	8.2	15	13.9	7.4
			8	8.2	15	13.9	7.4
			9	8.2	15	13.9	7.3
			10	8.2	15	13.9	7.3
			11	8.2	15	13.9	7.3
			12	8.1	15	13.9	7.3
Ad-4	5-Sep-14	7.6	0.5	8.2	15	13.6	7.9
			1	8.2	15	13.6	7.8
			2	8.2	15	13.5	7.8
			3	8.2	15	13.5	7.8
			4	8.2	15	13.5	7.7
			5	8.2	15	13.4	7.7
			6	8.1	15	13.4	7.7
			7	8.1	15	13.4	7.6

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ad-2	8-Sep-14	4.9	0.5	6.4	15	13.2	7.8
			1	6.4	15	13.3	7.7
			2	6.4	15	13.3	7.7
			3	6.4	15	13.3	7.6
			4	6.3	15	13.3	7.6
			4.9	6.2	15	13.3	7.6
Ae-6	8-Sep-14	12.6	0.5	6.0	15	12.2	7.4
			1	6.1	15	12.1	7.4
			2	6.1	15	12.1	7.4
			3	6.1	15	12.1	7.3
			4	6.1	15	12.0	7.3
			5	6.1	15	12.0	7.3
			6	6.1	15	12.0	7.2
			7	6.1	15	11.9	7.2
			8	6.1	15	12.0	7.2
			9	6.1	15	11.9	7.2
			10	6.1	15	11.9	7.2
			11	6.1	15	11.9	7.2

DOMINION DIAMOND

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ae-1	8-Sep-14	12.4	0.5	6.1	15	12.3	7.6
			1	6.1	15	12.3	7.5
			2	6.1	15	12.3	7.4
			3	6.1	15	12.3	7.5
			4	6.1	15	12.3	7.4
			5	6.1	15	12.2	7.4
			6	6.1	15	12.2	7.4
			7	6.1	15	12.2	7.4
			8	6.1	15	12.2	7.4
			9	6.1	15	12.2	7.4
			10	6.1	15	12.2	7.3
			11	6.1	15	11.9	7.0
Ae-2	8-Sep-14	5.5	0.5	6.0	15	11.7	7.2
			1	6.0	15	11.7	7.2
			2	6.0	15	11.7	7.2
			3	6.0	15	11.6	7.2
			4	6.0	15	11.6	7.2
			5	6.0	15	11.6	7.2
Ae-7	8-Sep-14	5.9	0.5	6.0	15	12.0	7.2
			1	6.0	15	12.0	7.2
			2	6.0	15	11.9	7.2
			3	6.0	15	11.8	7.2
			4	6.0	15	11.8	7.2
			5	6.0	15	11.8	7.2

Table A-1 Field Water Quality Profile Data for Lac du Sauvage, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
Ac-12	11-Sep-14	6.5	0.5	5.1	15	12.5	7.4
			1	5.1	15	12.5	7.4
			2	5.1	15	12.5	7.3
			3	5.1	15	12.5	7.3
			4	5.1	15	12.5	7.3
			5	5.1	15	12.5	7.3
			6	5.1	15	12.5	7.3

ID = identifier; m = metre; °C = degree Celsius; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre.

Table A-2 Field Water Quality Profile Data for Lac de Gras, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
FF2-1	14-Sep-14	21.3	0.5	5.8	29	11.5	7.3
			1	5.8	29	11.6	7.3
			2	5.8	29	11.6	7.3
			3	5.8	29	11.5	7.2
			4	5.8	29	11.3	7.3
			5	5.8	29	11.3	7.2
			6	5.8	29	11.3	7.2
			7	5.8	29	11.3	7.2
			8	5.8	29	11.3	7.2
			9	5.8	29	11.3	7.2
			10	5.8	29	11.3	7.1
			11	5.8	29	11.3	7.1
			12	5.8	29	11.3	7.1
			13	5.8	29	11.3	7.1
			14	5.7	29	11.3	7.1
			15	5.7	29	11.3	7.1
			16	5.7	29	11.2	7.1
			17	5.7	29	11.3	7.1
			18	5.7	29	11.2	7.1
			19	5.7	29	11.3	7.1
			20	5.7	33	11.2	7.1

Table A-2 Field Water Quality Profile Data for Lac de Gras, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
FF2-2	14-Sep-14	19	0.5	5.9	29	12.1	7.3
			1	5.9	29	12.1	7.3
			2	5.9	29	12.2	7.3
			3	5.9	29	12.1	7.3
			4	5.8	29	12.1	7.3
			5	5.8	29	12.1	7.3
			6	5.8	29	12.1	7.3
			7	5.8	29	12.0	7.3
			8	5.8	29	12.1	7.3
			9	5.8	29	12.1	7.3
			10	5.8	29	12.1	7.2
			11	5.8	29	12.0	7.2
			12	5.8	29	12.0	7.2
			13	5.8	29	12.1	7.1
			14	5.8	29	12.0	7.1
			15	5.8	29	12.0	7.1
			16	5.8	29	12.0	7.1
			17	5.8	29	12.0	7.1
			18	5.8	29	12.0	7.1
			19	5.8	29	12.0	7.1

Table A-2 Field Water Quality Profile Data for Lac de Gras, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
FF2-3	14-Sep-14	19.5	0.5	5.5	29	12.2	7.5
			1	5.5	29	12.2	7.4
			2	5.5	29	12.2	7.4
			3	5.5	29	12.2	7.4
			4	5.5	29	12.2	7.4
			5	5.5	29	12.2	7.4
			6	5.5	29	12.2	7.4
			7	5.5	29	12.2	7.3
			8	5.5	29	12.2	7.3
			9	5.5	29	12.2	7.3
			10	5.5	29	12.2	7.2
			11	5.5	29	12.2	7.1
			12	5.5	29	12.2	7.1
			13	5.5	29	12.2	7.1
			14	5.5	29	12.1	7.1
			15	5.5	29	12.1	7.1
			16	5.5	31	12.1	7.0
			17	5.5	31	12.0	7.0
			18	5.5	31	12.0	7.1
			19	5.5	31	11.9	7.1

Table A-2 Field Water Quality Profile Data for Lac de Gras, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
FF2-4	14-Sep-14	19.5	0.5	5.4	29	12.4	7.7
			1	5.4	29	12.4	7.7
			2	5.4	29	12.5	7.6
			3	5.4	29	12.5	7.6
			4	5.4	29	12.5	7.6
			5	5.4	29	12.6	7.5
			6	5.4	29	12.6	7.5
			7	5.4	29	12.6	7.5
			8	5.4	29	12.6	7.5
			9	5.4	29	12.6	7.4
			10	5.4	29	12.6	7.4
			11	5.4	29	12.6	7.4
			12	5.4	29	12.6	7.4
			13	5.4	29	12.6	7.4
			14	5.4	29	12.6	7.4
			15	5.4	29	12.6	7.4
			16	5.4	29	12.6	7.4
			17	5.4	29	12.6	7.4
			18	5.4	29	12.6	7.5
			19	5.4	29	12.6	7.5

Table A-2 Field Water Quality Profile Data for Lac de Gras, Benthic Invertebrate Community Baseline Study Area, September 2014

Station ID	Date	Maximum Depth (m)	Profile Depth (m)	Water Temperature (°C)	Specific Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH
FF2-5	14-Sep-14	19.3	0.5	5.3	29	12.3	8.2
			1	5.3	29	12.3	8.1
			2	5.3	29	12.3	8.0
			3	5.3	29	12.3	7.9
			4	5.3	29	12.3	7.8
			5	5.3	29	12.3	7.7
			6	5.3	29	12.3	7.7
			7	5.3	29	12.3	7.7
			8	5.3	29	12.2	7.8
			9	5.3	29	12.3	7.8
			10	5.3	29	12.3	7.8
			11	5.3	29	12.3	7.8
			12	5.3	29	12.3	7.8
			13	5.3	29	12.2	7.9
			14	5.3	29	12.3	7.8
			15	5.3	29	12.2	7.9
			16	5.3	29	12.3	7.9
			17	5.3	29	12.2	7.9
			18	5.3	29	12.3	7.9
			19	5.3	29	12.3	7.9

ID = identifier; m = metre; °C = degree Celsius; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre.

APPENDIX B

ECOANALYSTS, INC.
TAXONOMIC REFERENCE LIST

B1 INTRODUCTION

The following is a standard list of taxonomic keys and references used by EcoAnalysts, Inc. (EcoAnalysts) for identifying macroinvertebrates. EcoAnalysts frequently uses more than 200 individual articles, papers, and handbooks to identify invertebrates to the genus and species level.

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APPENDIX C

SUMMARY OF BENTHIC INVERTEBRATE COMMUNITY VARIABLES FOR THE 250 µM MESH DATASET

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C1 Lac du Sauvage

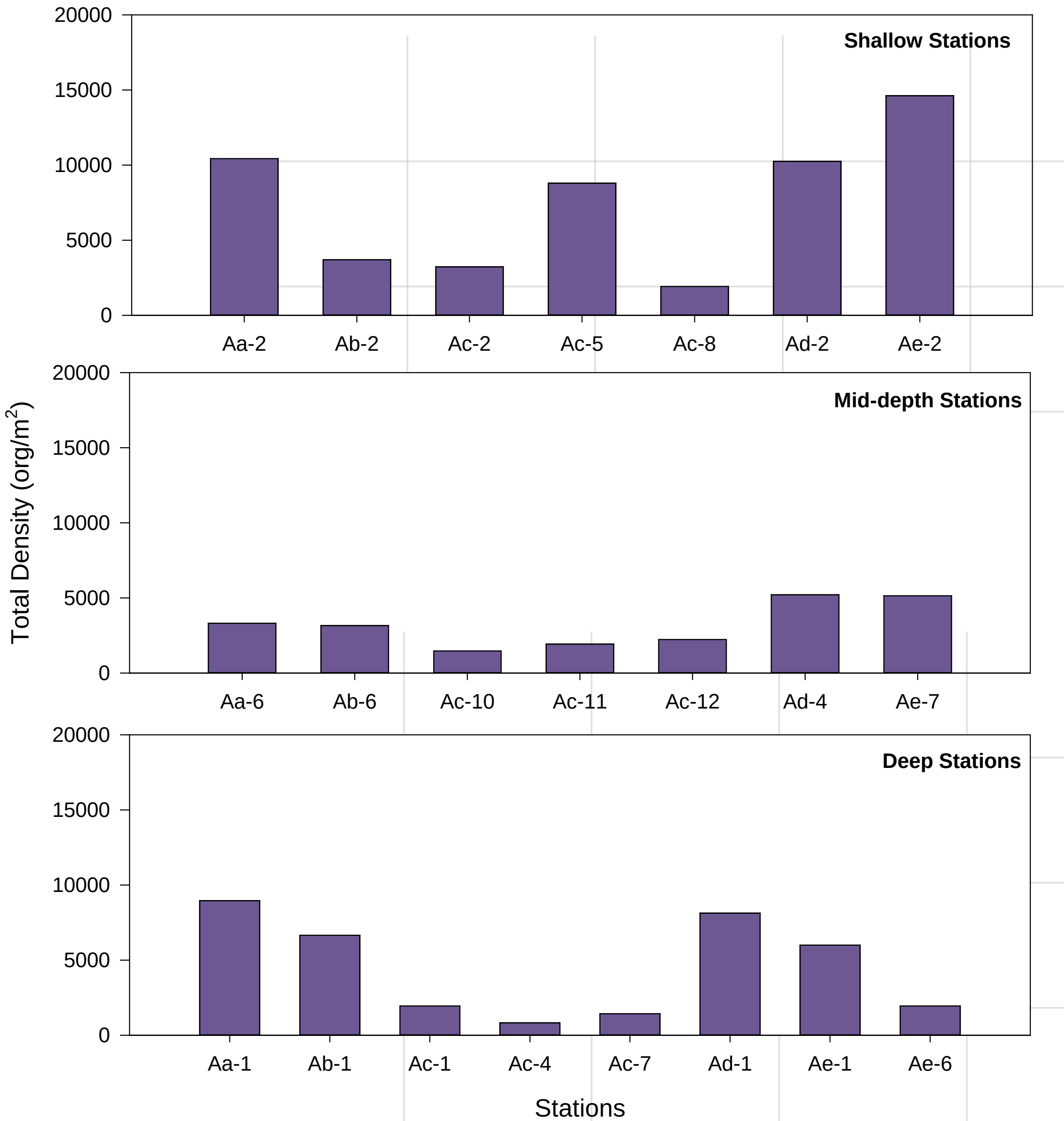
Raw benthic invertebrate abundance data for shallow, mid-depth, and deep stations in Lac du Sauvage are provided in Appendix E, Benthic Invertebrate Taxonomy Data, Table E1-1. The community variables are illustrated in Figures C1-1 through C1-5, with a summary provided in Table C1-1.

Table C1-1 Summary of Community Variables for Benthic Invertebrate Community Data (250-µm Mesh Analysis) Collected from Shallow, Mid-depth and Deep Stations in Lac du Sauvage, September 2014

Station ID	Sample Depth	Community Variables									
		Total Density (org/m²)		Total Richness (LTL)		TotalRichness (Family)		SDI		SEI	
		500 µm	250 µm	500 µm	250 µm	500 µm	250 µm	500 µm	250 µm	500 µm	250 µm
Aa-2	Shallow	5,172	8,957	27	27	7	8	0.92	0.85	0.45	0.24
Ab-2		1,647	6,655	25	30	9	13	0.91	0.80	0.47	0.17
Ac-2		1,397	1,948	23	22	6	7	0.86	0.91	0.30	0.51
Ac-5		3,879	828	28	11	9	5	0.86	0.80	0.26	0.45
Ac-8		905	1,440	17	20	7	7	0.89	0.82	0.52	0.28
Ad-2		5,647	8,129	30	33	11	12	0.91	0.87	0.36	0.23
Ae-2		11,190	5,991	37	27	9	8	0.90	0.87	0.28	0.29
Aa-6	Mid-depth	2,966	3,319	28	28	7	8	0.92	0.92	0.48	0.44
Ab-6		1,957	3,164	22	31	7	10	0.90	0.90	0.44	0.31
Ac-10		845	1,474	24	24	8	9	0.89	0.91	0.39	0.48
Ac-11		1,224	1,931	22	26	7	10	0.85	0.91	0.31	0.41
Ac-12		1,534	2,233	23	28	6	9	0.85	0.92	0.30	0.45
Ad-4		5,043	5,216	31	26	9	10	0.91	0.90	0.37	0.39
Ae-7		4,017	5,147	35	34	11	13	0.89	0.91	0.27	0.33
Aa-1	Deep	5,466	8,957	26	27	5	8	0.86	0.85	0.28	0.24
Ab-1		2,621	6,655	26	30	10	13	0.84	0.80	0.24	0.17
Ac-1		1,431	1,948	19	22	4	7	0.90	0.91	0.50	0.51
Ac-4		716	828	10	11	3	5	0.55	0.80	0.22	0.45
Ac-7		1,259	1,440	17	20	3	7	0.83	0.82	0.34	0.28
Ad-1		4,647	8,129	34	33	11	12	0.90	0.87	0.29	0.23
Ae-1		2,026	5,991	21	27	5	8	0.84	0.87	0.29	0.29
Ae-6		1,095	1,948	16	20	3	7	0.79	0.88	0.29	0.43

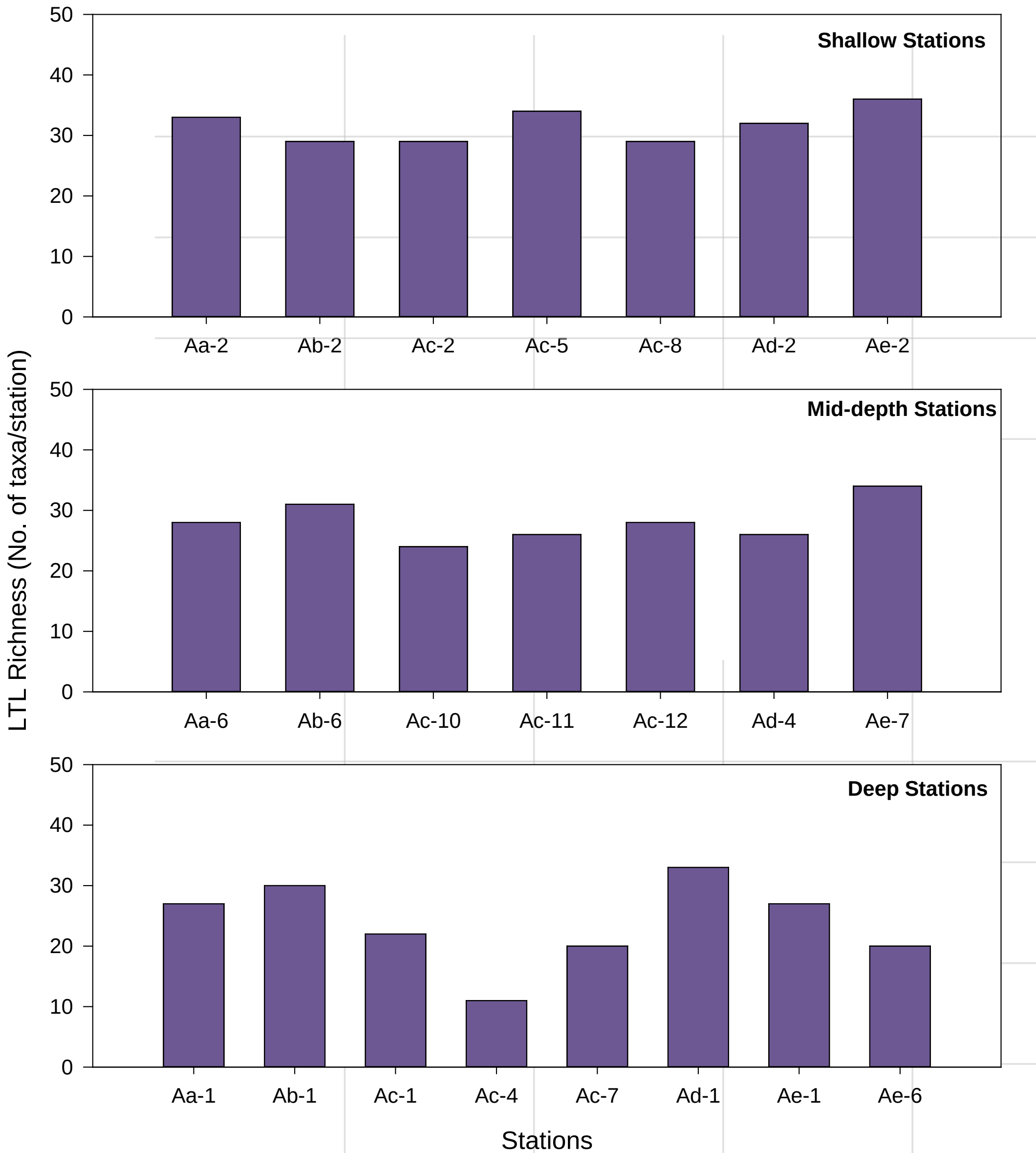
ID = identifier; org/m^2 = number of organisms per square metre; SEI = Simpson's evenness index; SDI = Simpson's diversity index; LTL = lowest taxonomic level.

Figure C1-1 Total Benthic Invertebrate Density (250-µm Mesh Analysis) at Open-Water Stations in Lac du Sauvage, September 2014



org/m² = number of organisms per square metre.

Figure C1-2 Total Benthic Invertebrate Richness to the Lowest Taxonomic Level (250-µm Mesh Analysis) at Open-Water Stations in Lac du Sauvage, September 2014



No. of taxa/station = number of taxa per station.

Figure C1-3 Simpson's Diversity and Evenness Indices for the Benthic Invertebrate Community (250-µm Mesh Analysis) at Open-Water Stations in Lac du Sauvage, September 2014

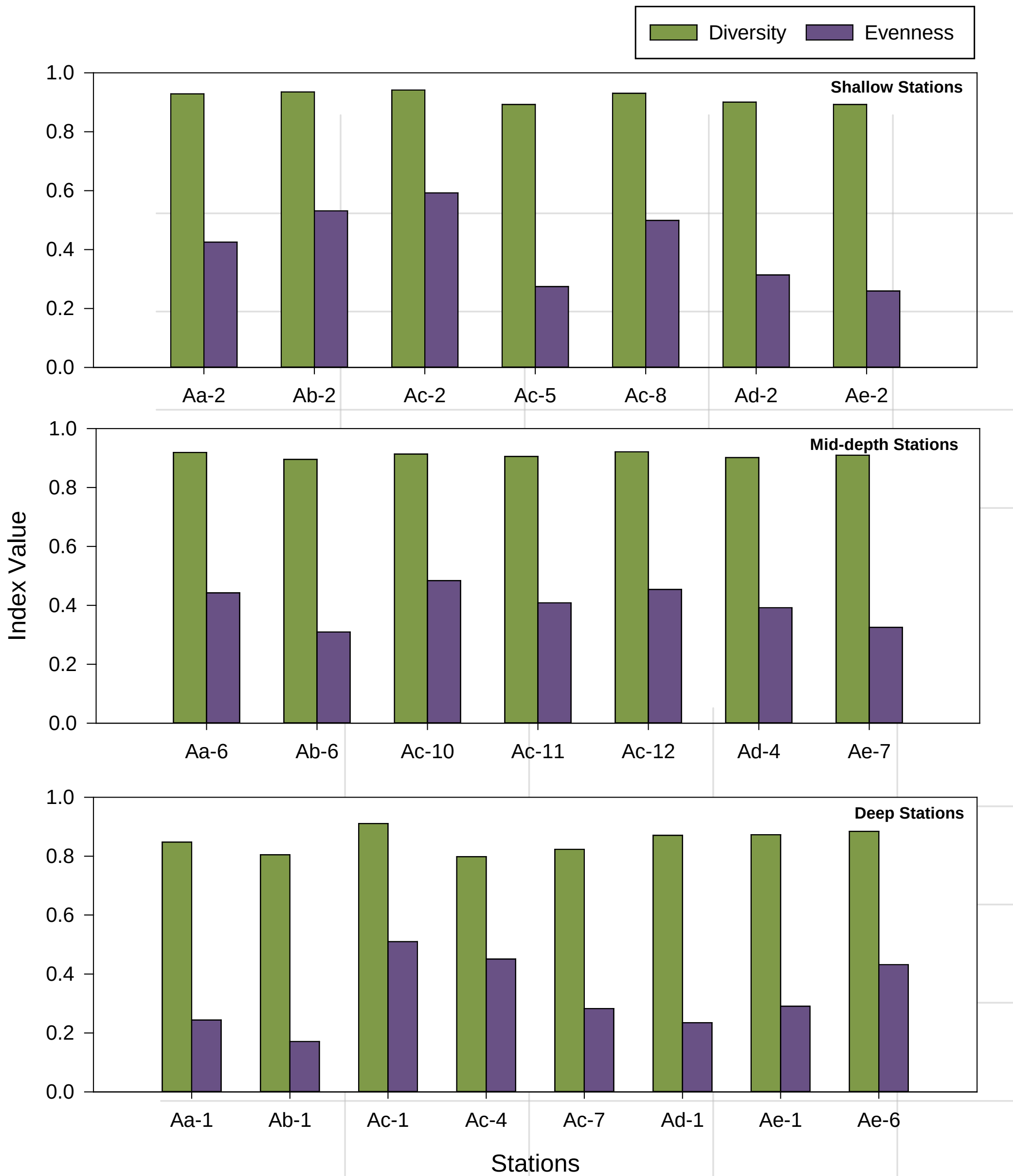
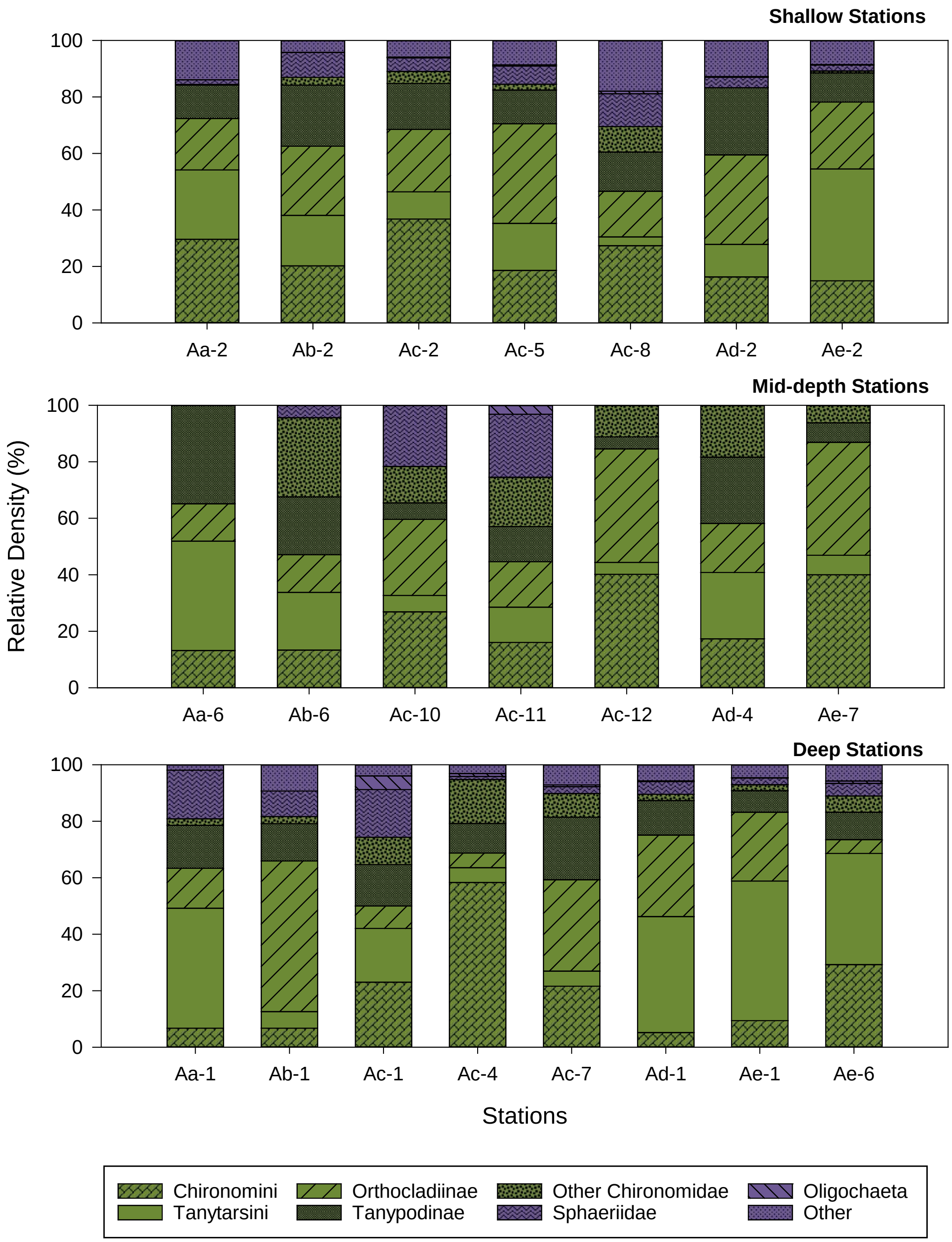


Figure C1-4 Relative Densities of Major Benthic Invertebrate Taxa (250-µm Mesh Analysis) at Open-Water Stations in Lac du Sauvage, September 2014



The "Other" taxa category includesGastropoda (snails) or the subclass Acari (water mites).

C2 Lac de Gras

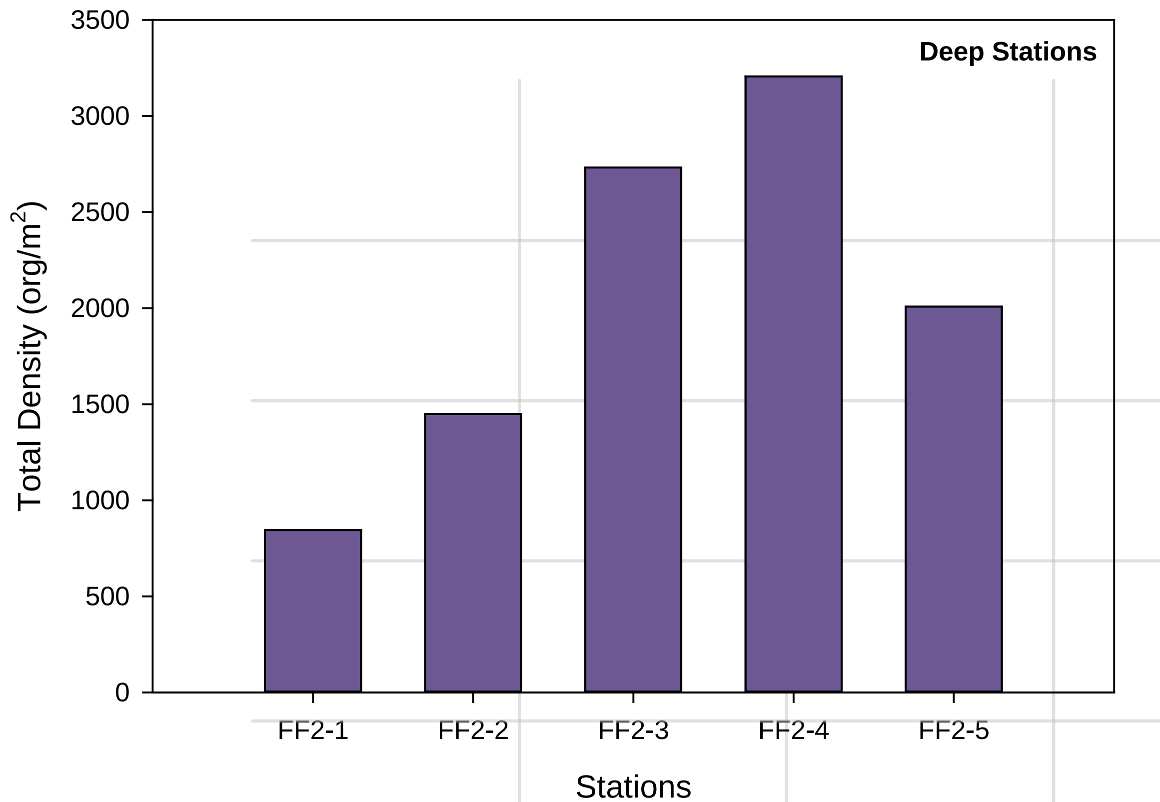
Raw abundance data for the benthic invertebrate samples collected in Lac de Gras are provided in Appendix E, Table E1-1. The community variables are illustrated in Figures C2-1 through C2-5 with a summary provided in Table C2-1.

Table C2-1 Summary of Community Variables for the Benthic Invertebrate Community Data (250-µm Mesh Analysis) Collected from the Deep Stations in Lac de Gras, September 2014

Station ID	Sample depth	Community Metrics									
		Total Density (org/m^2)		Total Richness (LTL)		Total Richness (Family)		SDI (LTL)		SEI (LTL)	
		500 µm	250 µm	500 µm	250 µm	500 µm	250 µm	500 µm	250 µm	500 µm	250 µm
FF2-1	Deep	216	845	6	12	3	4	0.51	0.56	0.34	0.56
FF2-2		1,233	1,448	13	14	4	5	0.65	0.61	0.22	0.61
FF2-3		1,716	2,733	18	21	6	9	0.75	0.78	0.23	0.78
FF2-4		2,397	3,207	17	22	6	8	0.68	0.71	0.18	0.71
FF2-5		1,647	2,009	17	18	4	7	0.66	0.66	0.17	0.66

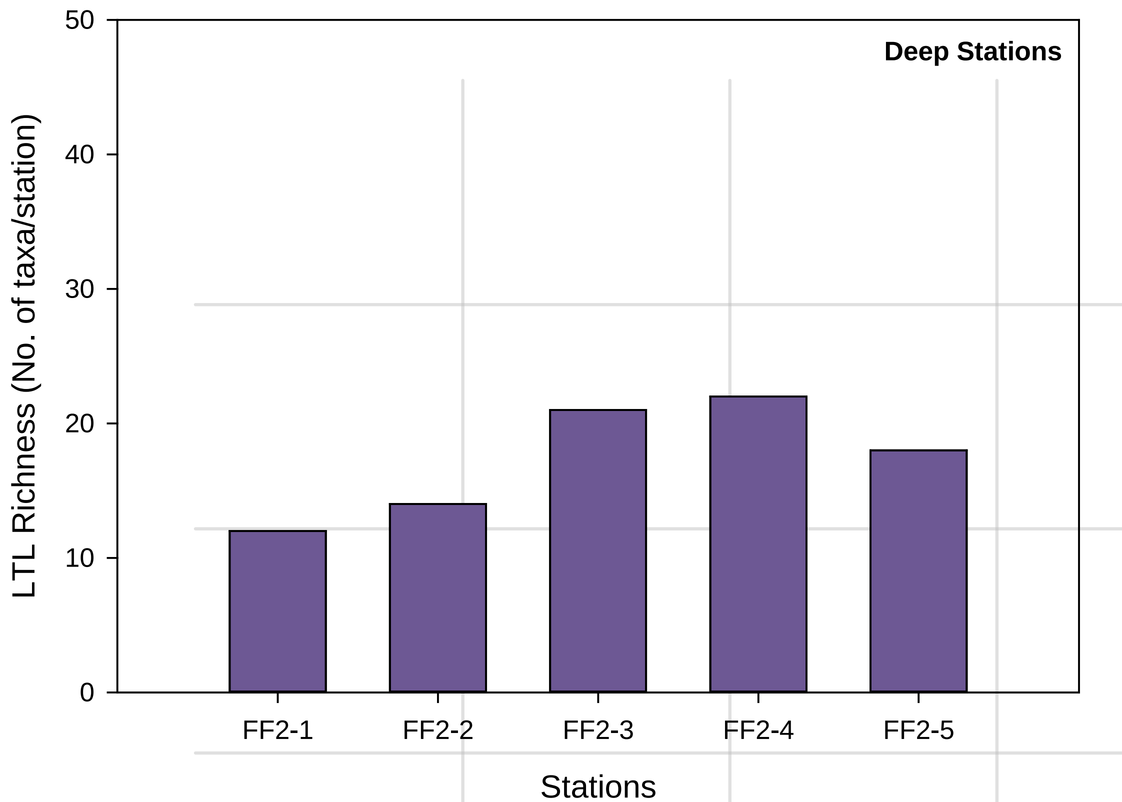
ID = identifier; org/m^2 = number of organisms per square metre; SEI = Simpson's evenness index; SDI = Simpson's diversity index; LTL = lowest taxonomic level.

Figure C2-1 Total Benthic Invertebrate Density (250-µm Mesh Analysis) in the FF2 Area of Lac de Gras, September 2014



org/m^2 = number of organisms per square metre.

Figure C2-2 Total Benthic Invertebrate Richness to the Lowest Taxonomic Level (250-µm Mesh Analysis) in the FF2 Area of Lac de Gras, September 2014



No. of taxa/station = number of taxa per station.

Figure C2-3 Simpson's Diversity and Evenness Indices for the Benthic Invertebrate Community (250-µm Mesh Analysis) in the FF2 Area of Lac de Gras, September 2014

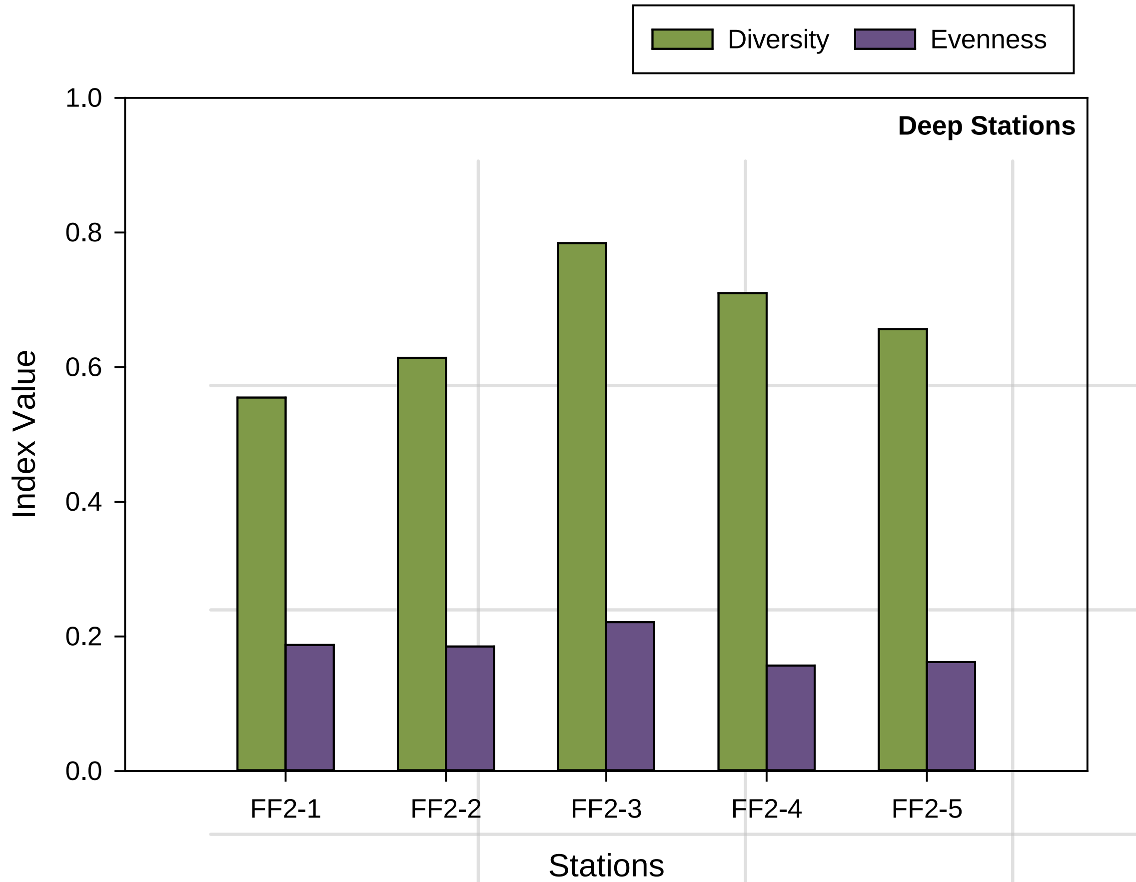
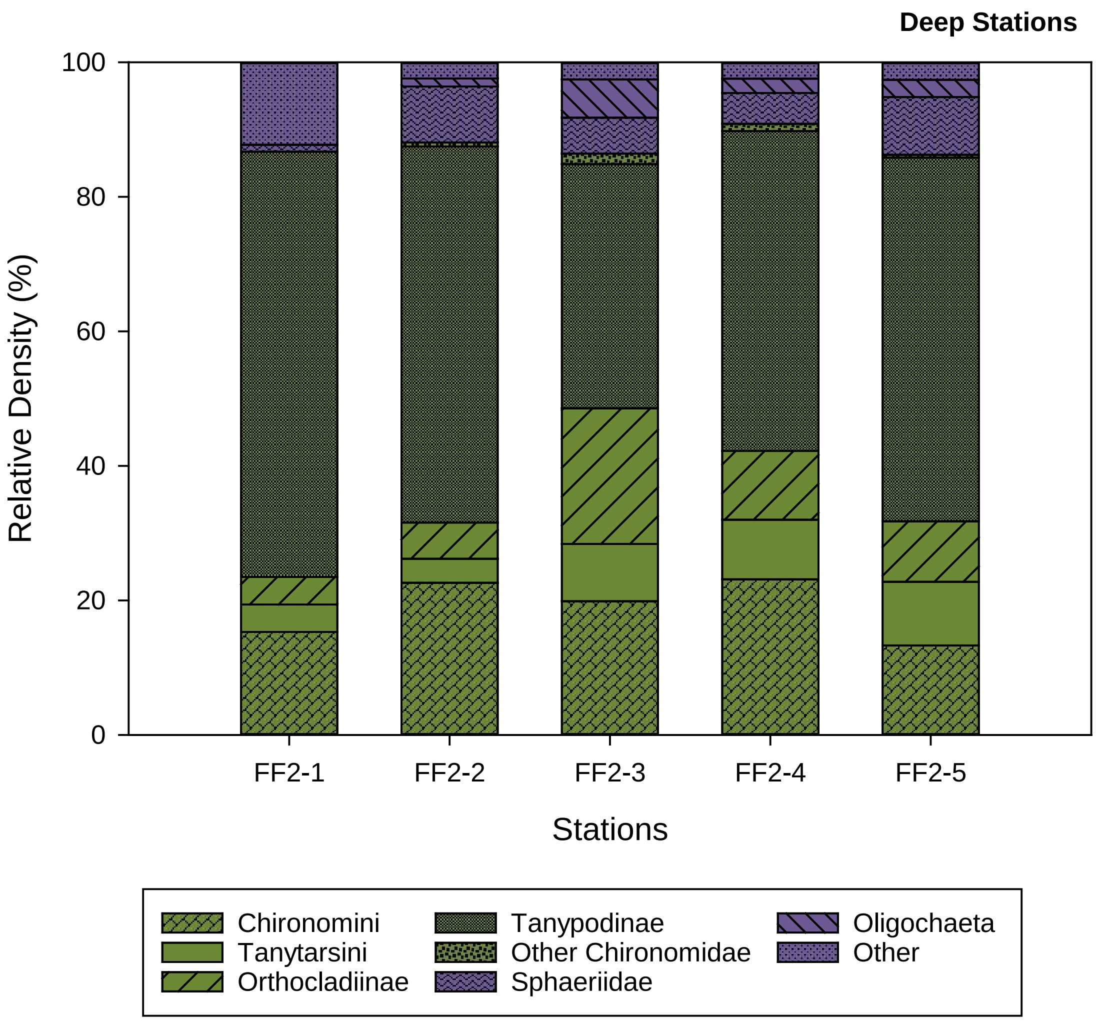


Figure C2-4 Total Relative Densities of Major Benthic Invertebrate Taxa (250-µm Mesh Analysis) in the FF2 Area of Lac de Gras, September 2014



The "Other" taxa category includes Gastropoda (snails) or the subclass Acari (water mites).

APPENDIX D

MESH SIZE COMPARISON

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Abbreviations

Abbreviation	Definition
Dominion Diamond	Dominion Diamond Ekati Corporation
i.e.,	that is
N	number of ratios included in the calculation of summary statistics
n/a	not applicable

Units of Measure

Unit	Definition
µm	micrometre
mm	millimetre
org/m^2	number of organisms per square metre

D1 INTRODUCTION

The benthic invertebrate samples collected in 2013 from Lac du Sauvage were sieved through a 250 µm mesh in the field, but were mistakenly sieved through a 500 micrometre (µm) mesh (i.e., larger mesh opening) in the laboratory. As a result of this error, a reduced sample size was included in the mesh size comparison for 2013. In 2014, the mesh size comparison was repeated to supplement the mesh size comparisons completed in 2013. Taxonomy samples collected at open-water stations in Lac du Sauvage and Lac de Gras during the 2014 baseline survey were field-sieved through a 250 µm mesh net. These samples were processed in the laboratory using 500 µm and 250 µm mesh screens and results for the two mesh sizes were compared to aid in the selection of the appropriate mesh size for future monitoring. The following sections describe the methods used for sample processing and the results for the mesh size comparison.

D2 METHODS

The samples were sieved through 1 millimetre (mm), 500 µm, and 250 µm mesh screens in the laboratory. Benthic invertebrates were identified and enumerated separately in each size fraction. The numbers of organisms retained by the 1 mm and 500 µm screens were combined to form the 500 µm dataset, which included all organisms larger than 500 µm in size. The number of organisms in each entire sample (i.e., total numbers retained by all three screens) is referred to as the 250 µm dataset. The ratio of the number of organisms in the 250 µm dataset divided by those in 500 µm dataset was calculated for densities of major invertebrate groups, chironomid sub-groups, and total density to evaluate the effect of mesh size used during sample processing on benthic invertebrate abundance.

D3 RESULTS

Differences were observed between the benthic invertebrate community results obtained using the two different mesh sizes during sample processing. On average, mean total density was 2.3 times greater in the 250 µm dataset compared to the 500 µm dataset (Table D-1). Densities of small organisms, such as Acari, Nematoda, Oligochaeta, and Chironomidae were 4.5, 27.0, 1.3 and 1.8 times greater, respectively, in the 250 µm dataset compared to the 500 µm dataset. Gastropoda and Sphaeriidae densities were the same in both datasets (ratios of 1.0), consistent with the larger size of these organisms. The greatest variability in the ratio was observed for Nematoda (roundworms), reflecting the small size of these organisms.

Densities in major chironomid groups also generally reflected the size of organisms in these groups (Table D-2). The lowest mean ratio (0.9) was for the subfamily, Diamesinae indicating that most organisms in this group were retained by the 500 µm screen during sample processing. The tribe Tanytarsini and subfamily Orthocladiinae had higher ratios (2.5 and 3.4 respectively), suggesting that over half of the total individuals in these groups were retained by the 500 µm screen.

Table D-1 Mesh Size Comparison for Major Taxonomic Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density							
				Acari	Sphaeriidae	Chironomidae	Gastropoda	Nematoda	Oligochaeta	Other	Total
Lac du Sauvage	Aa-1	500 µm	org/m²	43	1543	3862	17	78	0	0	5543
		250 µm		155	1543	7241	17	4371	0	207	13534
		Ratio	n/a	3.6	1.0	1.9	1.0	56.3	-	-	2.4
	Aa-2	500 µm	org/m²	147	172	4147	638	569	0	26	5707
		250 µm		724	172	8819	647	13034	0	60	23466
		Ratio	n/a	4.9	1.0	2.1	1.0	22.9	-	2.3	4.1
	Aa-6	500 µm	org/m²	52	362	2276	233	2991	43	9	5966
		250 µm		78	362	2603	233	5466	43	9	8793
		Ratio	n/a	1.5	1.0	1.1	1.0	1.8	1.0	1.0	1.5
	Ab-1	500 µm	org/m²	86	595	1819	103	0	0	86	2690
		250 µm		500	603	5431	103	0	0	86	6724
		Ratio	n/a	5.8	1.0	3.0	1.0	-	-	1.0	2.5
	Ab-2	500 µm	org/m²	78	328	1164	69	0	0	78	1716
		250 µm		78	328	3224	69	2155	0	86	5940
		Ratio	n/a	1.0	1.0	2.8	1.0	-	-	1.1	3.5
	Ab-6	500 µm	org/m²	310	216	1422	0	0	0	60	2009
		250 µm		431	216	2491	0	1741	0	60	4940
		Ratio	n/a	1.4	1.0	1.8	-	-	-	1.0	2.5
	Ac-1	500 µm	org/m²	9	328	1060	0	17	34	17	1466
		250 µm		78	328	1448	0	750	95	86	2784
		Ratio	n/a	9.0	1.0	1.4	-	43.5	2.8		1.9
	Ac-10	500 µm	org/m²	43	112	664	0	9	9	69	905
		250 µm		216	112	1112	0	983	9	78	2509
		Ratio	n/a	5.0	1.0	1.7	-	114.0	1.0	1.1	2.8

DOMINION DIAMOND

Table D-1 Mesh Size Comparison for Major Taxonomic Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density							Total
				Acari	Sphaeriidae	Chironomidae	Gastropoda	Nematoda	Oligochaeta	Other	
Lac du Sauvage	Ac-11	500 µm	org/m²	121	103	974	9	0	0	34	1241
		250 µm		353	103	1440	9	121	9	52	2086
		Ratio	n/a	2.9	1.0	1.5	1.0	-	-	1.5	1.7
	Ac-12	500 µm	org/m²	43	181	1250	43	9	0	26	1552
		250 µm		181	181	1802	43	310	0	26	2543
		Ratio	n/a	4.2	1.0	1.4	1.0	36.0	-	1.0	1.6
	Ac-2	500 µm	org/m²	43	155	1190	0	43	9	86	1526
		250 µm		190	155	2879	0	3802	9	216	7250
		Ratio	n/a	4.4	1.0	2.4	-	88.2	1.0	2.5	4.8
	Ac-4	500 µm	org/m²	9	9	698	0	0	9	9	1888
		250 µm		26	9	784	0	1155	9	121	2103
		Ratio	n/a	3.0	1.0	1.1	-	-	1.0	14.0	1.1
	Ac-5	500 µm	org/m²	129	569	2905	129	26	34	724	4517
		250 µm		509	569	7440	129	3914	34	733	13328
		Ratio	n/a	3.9	1.0	2.6	1.0	151.3	1.0	1.0	3.0
	Ac-7	500 µm	org/m²	9	34	1207	0	26	0	17	1293
		250 µm		95	34	1293	0	26	0	17	1466
		Ratio	n/a	11.0	1.0	1.1	-	1.0	-	1.0	1.1
	Ac-8	500 µm	org/m²	52	224	595	9	17	17	34	948
		250 µm		293	224	1336	9	207	17	52	2138
		Ratio	n/a	5.7	1.0	2.2	1.0	12.0	1.0	1.5	2.3
	Ad-1	500 µm	org/m²	138	345	4103	9	190	26	121	4931
		250 µm		431	362	7276	9	1526	26	181	9810
		Ratio	n/a	3.1	1.1	1.8	1.0	8.0	1.0	1.5	2.0
	Ad-2	500 µm	org/m²	302	371	4552	371	612	26	4267	10500
		250 µm		905	371	8543	379	5724	26	17362	33310
		Ratio	n/a	3.0	1.0	1.9	1.0	9.4	1.0	4.1	3.2
	Ad-4	500 µm	org/m²	241	474	4017	181	603	95	4388	10000
		250 µm		241	474	4190	181	664	95	4603	10448
		Ratio	n/a	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0
	Ae-1	500 µm	org/m²	52	138	1828	9	0	0	17	2043
Lac du Sauvage	Ae-1	250 µm		267	138	5569	9	552	9	60	6603
		Ratio	n/a	5.2	1.0	3.0	1.0	-	-	3.5	3.2
	Ae-2	500 µm	org/m²	207	310	10457	147	500	17	233	11871
		250 µm		1043	310	13043	147	4078	17	940	19578

Table D-1 Mesh Size Comparison for Major Taxonomic Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density							Total
				Acari	Sphaeriidae	Chironomidae	Gastropoda	Nematoda	Oligochaeta	Other	Total
		Ratio	n/a	5.0	1.0	1.2	1.0	8.2	1.0	4.0	1.6
	Ae-6	500 µm	org/m²	9	86	991	0	34	17	9	1147
		250 µm		112	86	1733	0	302	17	86	2336
		Ratio	n/a	13.0	1.0	1.7	-	8.8	1.0	10.0	2.0
	Ae-7	500 µm	org/m²	78	216	3534	164	371	9	138	4509
		250 µm		207	216	4534	164	8000	9	138	13267
		Ratio	n/a	2.7	1.0	1.3	1.0	21.6	1.0	1.0	2.9
Lac de Gras	FF2-1	500 µm	org/m²	17	9	190	0	17	0	9	241
		250 µm		86	9	733	0	52	0	9	888
		Ratio	n/a	5.0	1.0	3.9	-	3.0	-	1.0	3.7
	FF2-2	500 µm	org/m²	9	121	1086	0	60	9	9	1293
		250 µm		34	121	1276	0	164	9	26	1629
		Ratio	n/a	4.0	1.0	1.2	-	2.7	1.0	3.0	1.3
	FF2-3	500 µm	org/m²	17	147	1491	0	86	60	147	1948
		250 µm		69	147	2362	0	112	155	172	3017
		Ratio	n/a	4.0	1.0	1.6	-	1.3	2.6	1.2	1.5
	FF2-4	500 µm	org/m²	43	147	2164	0	78	43	43	2517
		250 µm		78	147	2914	0	112	69	155	3474
		Ratio	n/a	1.8	1.0	1.3	-	1.4	1.6	3.6	1.4
	FF2-5	500 µm	org/m²	9	172	1431	0	138	34	0	1784
		250 µm		52	172	1733	0	181	52	103	2293
		Ratio	n/a	6.0	1.0	1.2	-	1.3	1.5	-	1.3
Mean Ratio				4.5	1.0	1.8	1.0	27.0	1.3	2.7	2.3
Minimum Ratio				1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Maximum Ratio				13.0	1.1	3.9	1.0	151.3	2.8	14.0	4.8
N				27	27	27	15	22	17	24	27

Note: Data are mean densities calculated from individual Ekman grabs collected at each station.

org/m² = number of organisms per square metre; µm = micrometre; n/a = not applicable; - = unable to calculate ratio between total and 500 µm fractions, because no individuals were present in the 500 µm fraction (i.e., division by zero); N = number of ratios included in the calculation of summary statistics.

Table D-2 Mesh Size Comparison for Chironomidae Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density					
				Chironomini	Tanytarsini	Diamesinae	Orthocladiinae	Prodiamesinae	Tanypodinae
Lac du Sauvage	Aa-1	500 µm	org/m²	414	1672	0	517	155	1103
		250 µm		603	3802	0	1267	207	1362
		Ratio	n/a	1.5	2.3	-	2.5	1.3	1.2
	Aa-2	500 µm	org/m²	1741	1224	9	362	17	793
		250 µm		3095	2560	9	1905	17	1233
		Ratio	n/a	1.8	2.1	1.0	5.3	1.0	1.6
	Aa-6	500 µm	org/m²	397	1095	0	440	26	319
		250 µm		440	1284	0	534	26	319
		Ratio	n/a	1.1	1.2	-	1.2	1.0	1.0
	Ab-1	500 µm	org/m²	250	52	0	1009	138	371
		250 µm		448	388	0	3552	164	879
		Ratio	n/a	1.8	7.5	-	3.5	1.2	2.4
	Ab-2	500 µm	org/m²	388	164	0	164	103	345
		250 µm		750	664	0	905	103	802
		Ratio	n/a	1.9	4.1	-	5.5	1.0	2.3
	Ab-6	500 µm	org/m²	233	310	0	509	112	259
		250 µm		422	647	9	888	164	362
		Ratio	n/a	1.8	2.1	-	1.7	1.5	1.4
	Ac-1	500 µm	org/m²	414	198	43	78	121	207
		250 µm		448	371	43	155	147	284
		Ratio	n/a	1.1	1.9	1.0	2.0	1.2	1.4
	Ac-10	500 µm	org/m²	259	52	35	52	60	207
		250 µm		397	86	35	190	60	345
		Ratio	n/a	1.5	1.7	1.0	3.7	1.0	1.7
	Ac-11	500 µm	org/m²	259	198	43	95	69	310
		250 µm		310	241	43	336	78	431
		Ratio	n/a	1.2	1.2	1.0	3.5	1.1	1.4
	Ac-12	500 µm	org/m²	716	34	26	78	112	284
		250 µm		897	95	26	328	129	328
		Ratio	n/a	1.3	2.8	1.0	4.2	1.2	1.2

Table D-2 Mesh Size Comparison for Chironomidae Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density					
				Chironomini	Tanytarsini	Diamesinae	Orthocladiinae	Prodiamesinae	Tanypodinae
Lac du Sauvage	Ac-2	500 µm	org/m²	655	95	0	121	86	224
		250 µm		1190	310	9	716	129	526
		Ratio	n/a	1.8	3.3	-	5.9	1.5	2.3
	Ac-4	500 µm	org/m²	474	26	0	34	129	34
		250 µm		483	43	0	43	129	86
		Ratio	n/a	1.0	1.7	-	1.3	1.0	2.5
	Ac-5	500 µm	org/m²	1345	216	0	534	129	638
		250 µm		1638	1466	43	3103	138	1052
		Ratio	n/a	1.2	6.8	-	5.8	1.1	1.6
	Ac-7	500 µm	org/m²	302	60	0	440	52	293
		250 µm		310	78	60	466	60	319
		Ratio	n/a	1.0	1.3	-	1.1	1.2	1.1
	Ac-8	500 µm	org/m²	362	0	0	60	112	52
		250 µm		526	60	-	310	164	267
		Ratio	n/a	1.5	-	1.0	5.1	1.5	5.2
	Ad-1	500 µm	org/m²	302	1750	0	1112	155	767
		250 µm		422	3336	17	2345	164	991
		Ratio	n/a	1.4	1.9	-	2.1	1.1	1.3
	Ad-2	500 µm	org/m²	940	638	0	1319	0	1655
		250 µm		1672	1181	0	3250	0	2440
		Ratio	n/a	1.8	1.9	-	2.5	-	1.5
	Ad-4	500 µm	org/m²	905	1155	0	1000	0	957
		250 µm		905	1224	0	1103	0	957
		Ratio	n/a	1.0	1.1	-	1.1	-	1.0
	Ae-1	500 µm	org/m²	466	793	0	198	103	250
		250 µm		560	2966	17	1457	112	457
		Ratio	n/a	1.2	3.7	-	7.3	1.1	1.8
	Ae-2	500 µm	org/m²	1922	4569	0	2526	69	1336
		250 µm		2181	5793	35	3466	69	1500
		Ratio	n/a	1.1	1.3	-	1.4	1.0	1.1

Table D-2 Mesh Size Comparison for Chironomidae Groups for Selected Benthic Invertebrate Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station	Dataset	Units	Density					
				Chironomini	Tanytarsini	Diamesinae	Orthocladiinae	Prodiamesinae	Tanypodinae
Lac du Sauvage	Ae-6	500 µm	org/m²	491	233	0	9	112	147
		250 µm		569	767	0	95	112	190
		Ratio	n/a	1.2	3.3	-	11.0	1.0	1.3
	Ae-7	500 µm	org/m²	1629	293	9	664	95	845
		250 µm		2060	353	9	966	112	1034
		Ratio	n/a	1.3	1.2	1.0	1.5	1.2	1.2
Lac de Gras	FF2-1	500 µm	org/m²	34	9	0	0	0	147
		250 µm		129	34	0	34	0	534
		Ratio	n/a	3.8	4.0	-	-	-	3.6
	FF2-2	500 µm	org/m²	293	43	9	69	0	672
		250 µm		328	52	9	78	0	810
		Ratio	n/a	1.1	1.2	1.0	1.1	-	1.2
	FF2-3	500 µm	org/m²	405	95	43	233	0	716
		250 µm		543	233	43	552	0	991
		Ratio	n/a	1.3	2.5	1.0	2.4	-	1.4
	FF2-4	500 µm	org/m²	664	172	35	78	0	1216
		250 µm		741	284	35	328	0	1526
		Ratio	n/a	1.1	1.7	1.0	4.2	-	1.3
	FF2-5	500 µm	org/m²	224	155	0	103	9	940
		250 µm		267	190	0	181	9	1086
		Ratio	n/a	1.2	1.2	-	1.8	1.0	1.2
Mean Ratio				1.4	2.5	1.0	3.4	1.1	1.7
Minimum Ratio				1.0	1.1	1.0	1.1	1.0	1.0
Maximum Ratio				3.8	7.5	1.0	11.0	1.5	5.2
N				27	26	16	26	21	27

Note: Data are mean densities calculated from individual Ekman grabs collected at each station.

org/m^2 = number of organisms per square metre; µm = micrometre; n/a = not applicable; - = unable to calculate ratio between total and 500 µm fractions, because no individuals were present in the 500 µm fraction (i.e., division by zero); N = number of ratios included in the calculation of summary statistics.

D4 SUMMARY

Similar to the results of the mesh size comparison of the 2013 data, the results for 2014 continue to indicate that using a 250 µm mesh sieve in the field results in more representative samples for smaller invertebrates, such as Acari, Nematoda, Chironomidae, and Oligochaeta, which is consistent with expectations. There were no differences in numbers of larger invertebrates between the 250 µm the 500 µm datasets. On average, total invertebrate density in the 250 µm dataset was about double the total density in the 500 µm dataset.

APPENDIX E

RAW TAXONOMIC DATA

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part A

						Lac du Sauvage													
						Aa-1	Aa-2	Aa-6	Ab-1	Ab-2	Ab-6	Ac-1	Ac-10	Ac-11	Ac-12	Ac-2	Ac-4	Ac-5	Ac-7
Family	Subfamily	Tribe	Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp
-	-	-	-	67	59490	507	1512	634	58	241	202	87	114	14	36	441	134	454	28
Piscicolidae	-	-	*Cystobranchus salmositicus*	1385	-		1												
Enchytraeidae	-	-	-	9	68510														
Lumbriculidae	-	-	-	6	68440			3				4	1			1		3	
Naididae	-	-	*Nais* sp.	51	68946														
	-	-	*Vejdovskyella intermedia*	66	69015														
Tubificidae	-	-	*Rhyacodrilus* sp.	2695	68839														
	-	-	(with cap. setae)	1347	68585			1			2	4		1			1		
	-	-	(without cap. setae)	1348	68585			1				3						1	1
-	-	-	-	77	69459		34												
Physidae	-	-	*Physa* sp.	93	76677														
Planorbidae	-	-	*Gyraulus* sp.	96	76592	1			1										
	-	-	-	95	76591				2										
Valvatidae	-	-	*Valvata lewisi*	1175	70359					3					2				
	-	-	*Valvata* sp.	110	70346	1	41	27	9	5				1	3			15	
Sphaeriidae	-	-	*Pisidium* sp.	103	81400	107	8	24	12	18	6	12	8	3	8	7	1	11	2
	-	-	-	101	112737	72	12	16	58	20	19	26	5	9	13	11		53	2
	-	-	*Sphaerium* sp.	104	81391			2										2	
-	-	-	-	126	82754		14		1							6	1	4	1
(Oribatei)	-	-	-	3229	83544		6												
Acalyptonotidae	-	-	*Acalyptonotus* sp.	3488	83508														
Arrenuridae	-	-	*Arrenurus* sp.	3080	82862				1	1	1					1			
Aturidae	-	-	*Aturidae*	3146	82973	1	4		41		4	7	7	13	7	4		13	9
Halacaridae	-	-	-	3174	82771	10	41	3								1			
Hygrobatidae	-	-	*Hygrobates* sp.	3040	83297				1		4	1		3				2	
Lebertiidae	-	-	*Lebertia* sp.	2992	83034	6	9	4	9	1	26		14	17	13	8	2	38	1
Limnesiidae	-	-	*Limnesia* sp.	3132	83051					1									
Oxidae	-	-	*Oxus* sp.	3005	83244				3	3	5		3	3		2		2	
Pionidae	-	-	*Piona* sp.	3102	83350		6		2					2					
	-	-	-	3100	83330	1	4	2		3	10	1	1	3	1				
-	-	-	-	121	84195	24	7	1	10	10	7	10	7	4	1	25	14	72	2
-	-	-	-	511	115095														
Apataniidae	-	-	*Apatania* sp.	603	115935				1									1	
Hydroptilidae	-	-	*Agraylea* sp.	571	115635		8				1								
Phryganeidae	-	-	*Agrypnia* sp.	1757	115882														
	-	-	-	640	115867					1			1		1				
Chironomidae	Chironominae	Chironomini	-	926	129229	2		7			1							1	
			Chironomus sp.	930	129254	8	18	3				3	5		23	5			6
			Cladopelma sp.	931	129350	3													
			Dicrotendipes fumidus	940	129436														
			Dicrotendipes lobiger	8226	129443		26	6	1	3			3			6			
			Dicrotendipes sp.	944	129428	6	87	13	11	20	1		2		6	18		2	
			Microtendipes pedellus gr.	956	-	13	80	13		8	1	10	6	4	3	1	1		8

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part A

Family	Subfamily	Tribe	Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Lac du Sauvage													
						Aa-1	Aa-2	Aa-6	Ab-1	Ab-2	Ab-6	Ac-1	Ac-10	Ac-11	Ac-12	Ac-2	Ac-4	Ac-5	Ac-7
						Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp
			Microtendipes rydalensis gr.	955	-														1
			Pagastiella sp.	1368	129561	2													
			Parachironomus sp.	964	129564	7	54	5	4	7	3	2	3	2		21		4	1
			Paracladopelma sp.	966	129597	6			1		6	1	1	2	3	3		5	
			Paratendipes sp.	970	129623										1				
			Phaenopsectra sp.	973	129637						1								
			Polypedilum scalaenum gr.	983	-	2	2	1	3	8	14	3	6		3	12	1	20	2
			Sergentia sp.	1422	129739	4	62												
			Stictochironomus sp.	996	129785	17	30	3	32	41	22	33	20	28	65	72	54	158	18
		Tanytarsini	*Cladotanytarsus* sp.	1006	129873	62		1	1			15		2	1	1		3	1
			Constempellina sp.	1007	129884											1		7	
			Corynocera sp.	2297	129887	17	5	31	1	6	2							1	
			Micropsectra sp.	1054	129890	37	28	16	5	24	46			16		3		119	1
			Micropsectra/Tanytarsus sp.	1012	-														
			Paratanytarsus sp.	1015	129935	16	176	36	3	10		2		1	1	9		4	
			Stempellinella sp.	1023	129969	14	1			3	1			1				1	
			-	1003	129872	29	40	6	20	20	16	5	2	3	6	7	2	17	1
			Tanytarsus sp.	1029	129978	266	47	59	15	14	10	21	8	5	3	15	3	18	6
	Diamesinae	Diamesini	*Potthastia longimana gr.*	817	-		1				1								
	Diamesinae	Protanypini	*Protanypus* sp.	2230	128431							5	4	5	3	1		5	7
	Orthocladiinae	-	*Abiskomyia* sp.	2239	128458														
		-	*Corynoneura* sp.	838	128563		5												
		-	*Cricotopus* sp.	853	128575	2	33	1		12	3		2		4	12		2	
		-	*Heterotanytarsus* sp.	2253	128734														
		-	*Heterotrissocladius marcidus gr.*	865	-	77	22	20	14	40	82	13	5	6	12	25	3	211	47
		-	*Heterotrissocladius subpilosus gr.*	866	-														
		-	*Hydrobaenus* sp.	868	128750					2	2				1	2		50	
		-	*Nanocladius* sp.	878	128844			1											
		-	-	826	128457			1		1				3		2		3	
		-	*Orthocladius Complex*	1031	-		57	21	81	7						9			
		-	*Paracladius* sp.	891	128956										2			2	
		-	*Parakiefferiella* sp.	894	128968		35	1	10	5	3	1				7		13	
		-	*Psectrocladius* sp.	1036	129018	60	44	11	10	7	8		1	1	1	7		43	1
		-	*Pseudosmittia* sp.	906	129071				1									1	
		-	*Tvetenia bavarica gr.*	920	-		1												
		-	*Zalutschia* sp.	924	129213	8	24	6	296	31	5	4	14	29	18	19	2	35	6
	Prodiamesinae	-	*Monodiamesa* sp.	822	128440	24	2	3	19	12	19	17	7	9	15	15	15	16	7
	Tanypodinae	Pentaneurini	*Ablabesmyia (Karelia)* sp.	3756	-		11	1	10	2									
			Ablabesmyia sp.	772	128079	27	56	10	42	43	18	10	8	9	5	12	2	51	
			-	798	128078		1											1	
			Thienemannimyia gr. sp.	805	-		20	1	1	15	3	1		2	1	17		22	2
		Procladiini	*Procladius* sp.	799	128277	131	55	25	49	33	21	22	32	39	32	32	8	48	35
Empididae	-	-	-	709	135830				1				2	2	1			13	
Psychodidae	-	-	*Pericoma/Telmatoscopus* sp.	722	-														1
Tipulidae	-	-	*Dicranota* sp.	751	121027										1				

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part A

Family	Subfamily	Tribe	Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Lac du Sauvage													
						Aa-1	Aa-2	Aa-6	Ab-1	Ab-2	Ab-6	Ac-1	Ac-10	Ac-11	Ac-12	Ac-2	Ac-4	Ac-5	Ac-7
						Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp
-	-	-	-	67	59490	507	1512	634	58	241	202	87	114	14	36	441	134	454	28
Enchytraeidae	-	-	-	9	68510														
Lumbriculidae	-	-	-	6	68440			3				4	1			1		3	
Naididae	-	-	*Nais* sp.	51	68946														
	-	-	*Vejdovskyella intermedia*	66	69015														
Tubificidae	-	-	*Rhyacodrilus* sp.	2695	68839														
	-	-	(with cap. setae)	1347	68585			1			2	4		1			1		
	-	-	(without cap. setae)	1348	68585			1				3						1	1
						1570	**2730**	**1020**	**840**	**681**	**576**	**323**	**292**	**242**	**296**	**841**	**244**	**1547**	**197**

Note:
Abundance data are reported as number of organisms per sample.
Dataset includes organisms retained by 1 millimetre (mm), 500 µm, and 250 µm mesh screens.
a) Taxonomic serial number associated with the final taxon in the Ecoanalysts, Inc. database.
b) Taxonomic serial numbers associated with the final taxon that are associated with the ITIS TSN or uBio TSN systems.
c) Removed from analyses.
EcoA_TIN = EcoAnalysts, Inc. taxonomic identification number; ITIS = Integrated Taxonomic Information System taxonomic serial number; uBio TSN = taxonomic name server; mm = millimetre; µm = micrometre; sp. = species; gr. = group; w/ = with; w/o = without;
- = not identified to this taxonomic level.

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part B

						Lac du Sauvage							Lac de Gras					
						Ac-8	Ad-1	Ad-2	Ad-4	Ae-1	Ae-2	Ae-6	Ae-7	FF2-1	FF2-2	FF2-3	FF2-4	FF2-5
Family	Subfamily	Tribe	Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp	Comp
-	-	-	-	67	59490	24	177	664	77	64	473	35	928	6	19	13	13	21
Piscicolidae	-	-	*Cystobranchus salmositicus*	1385	-													
Enchytraeidae	-	-	-	9	68510											10	3	2
Lumbriculidae	-	-	-	6	68440		2	2	6		2		1		2	6	4	4
Naididae	-	-	*Nais* sp.	51	68946												1	
	-	-	*Vejdovskyella intermedia*	66	69015											1		
Tubificidae	-	-	*Rhyacodrilus* sp.	2695	68839		1											
	-	-	(with cap. setae)	1347	68585	1			2	1		1				1		
	-	-	(without cap. setae)	1348	68585	1		1	3			1						
-	-	-	-	77	69459													
Physidae	-	-	*Physa* sp.	93	76677			1										
Planorbidae	-	-	*Gyraulus* sp.	96	76592													
	-	-	-	95	76591			1					1					
Valvatidae	-	-	*Valvata lewisi*	1175	70359			20	7	1	8		6					
	-	-	*Valvata* sp.	110	70346	1	1	22	14		9		12					
Sphaeriidae	-	-	*Pisidium* sp.	103	81400	12	8	10	18	4	17	4	5			2	3	
	-	-	-	101	112737	13	34	33	37	12	18	5	20	1	14	15	14	20
	-	-	*Sphaerium* sp.	104	81391	1					1	1						
-	-	-	-	126	82754			10	2			5						1
(Oribatei)	-	-	-	3229	83544													
Acalyptonotidae	-	-	*Acalyptonotus* sp.	3488	83508					1		1					2	
Arrenuridae	-	-	*Arrenurus* sp.	3080	82862		1	1	3				2					
Aturidae	-	-	*Aturidae*	3146	82973	8	20	1		20		5	12	10	3	5	4	4
Halacaridae	-	-	-	3174	82771			63			4		2					
Hygrobatidae	-	-	*Hygrobates* sp.	3040	83297		3								1			
Lebertiidae	-	-	*Lebertia* sp.	2992	83034	22	16	2	1	9	104	2	2			2	3	1
Limnesiidae	-	-	*Limnesia* sp.	3132	83051													
Oxidae	-	-	*Oxus* sp.	3005	83244	3	7			1	1		1	2		1		
Pionidae	-	-	*Piona* sp.	3102	83350				22				5					
	-	-	-	3100	83330	1	3	28			12							
-	-	-	-	121	84195	3	18	2014	534	7	105	10	15	1	3	20	18	12
-	-	-	-	511	115095	1												
Apataniidae	-	-	*Apatania* sp.	603	115935													
Hydroptilidae	-	-	*Agraylea* sp.	571	115635						1							
Phryganeidae	-	-	*Agrypnia* sp.	1757	115882			1	2									
	-	-	-	640	115867	1		2	2		2		1					
Chironomidae	Chironominae	Chironomini	-	926	129229			1										
			Chironomus sp.	930	129254	10		46	11	1	5	1	1					
			Cladopelma sp.	931	129350													
			Dicrotendipes fumidus	940	129436						1	1	1					
			Dicrotendipes lobiger	8226	129443	2		2			9		28					
			Dicrotendipes sp.	944	129428	8	2	59	26		55		52				1	
			Microtendipes pedellus gr.	956	-	7	4			5	11	3	18	9	28	58	73	20
			Microtendipes rydalensis gr.	955	-										2			
			Pagastiella sp.	1368	129561													

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part B

						Lac du Sauvage							Lac de Gras					
						Ac-8	Ad-1	Ad-2	Ad-4	Ae-1	Ae-2	Ae-6	Ae-7	FF2-1	FF2-2	FF2-3	FF2-4	FF2-5
Family	**Subfamily**	**Tribe**	**Taxon**	**EcoA_TIN [a]**	**ITIS/uBio [b]**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**
			Parachironomus sp.	964	129564	2	7	79	32	3	26	2	15	2				1
			Paracladopelma sp.	966	129597	1	10			4	2							
			Paratendipes sp.	970	129623													
			Phaenopsectra sp.	973	129637													
			Polypedilum scalaenum gr.	983	-	4	1	1		5	24	2	3			1		
			Sergentia sp.	1422	129739			2	25			1	1					
			Stictochironomus sp.	996	129785	27	25	4	11	47	120	56	120	4	8	4	12	10
		Tanytarsini	*Cladotanytarsus* sp.	1006	129873	2	103	1	1	260	257	63	8			3		
			Constempellina sp.	1007	129884		11		1	5	16							2
			Corynocera sp.	2297	129887													
			Micropsectra sp.	1054	129890	1	140	3	1	18	103	4	4			8	14	4
			Micropsectra/Tanytarsus sp.	1012	-				6									
			Paratanytarsus sp.	1015	129935		2	26	3	2	6		6		3	2	4	3
			Stempellinella sp.	1023	129969		12	2	4		1		4			2	3	1
			-	1003	129872	3	8	37	12	28	22	7	5					2
			Tanytarsus sp.	1029	129978	1	111	68	114	31	267	15	14	4	3	12	12	10
	Diamesinae	Diamesini	*Potthastia longimana gr.*	817	-								1					
	Diamesinae	Protanypini	*Protanypus* sp.	2230	128431	1	2			2	4				1	5	4	
	Orthocladiinae	-	*Abiskomyia* sp.	2239	128458									1	2			
		-	*Corynoneura* sp.	838	128563			3	2									
		-	*Cricotopus* sp.	853	128575	7	1	2	11		15		2					
		-	*Heterotanytarsus* sp.	2253	128734						1							
		-	*Heterotrissocladius marcidus gr.*	865	-	4	188	3	3	76	177	8	8	1	4	59	31	14
		-	*Heterotrissocladius subpilosus gr.*	866	-										1	3	3	5
		-	*Hydrobaenus* sp.	868	128750	1				2	12		3					
		-	*Nanocladius* sp.	878	128844						1							
		-	-	826	128457		1	18		3	7	1	3					
		-	*Orthocladius Complex*	1031	-			138	44		11		11		2		1	1
		-	*Paracladius* sp.	891	128956	2			1		1							
		-	*Parakiefferiella* sp.	894	128968		18	1		78	17			1		1	1	
		-	*Psectrocladius* sp.	1036	129018	2	15	171	8	3	9	1	9					
		-	*Pseudosmittia* sp.	906	129071													
		-	*Tvetenia bavarica gr.*	920	-													
		-	*Zalutschia* sp.	924	129213	20	49	41	59	7	151	1	76	1		1	2	1
	Prodiamesinae	-	*Monodiamesa* sp.	822	128440	19	19			13	8	13	13					1
	Tanypodinae	Pentaneurini	*Ablabesmyia (Karelia)* sp.	3756	-		1	49	22		2		23					
			Ablabesmyia sp.	772	128079	7	21	217	64	5	52	4	39	1			2	2
			-	798	128078		1											
			Thienemannimyia gr. sp.	805	-	2	1	3		3	13		4					
		Procladiini	*Procladius* sp.	799	128277	22	91	14	25	45	107	18	54	61	94	115	175	124
Empididae	-	-	-	709	135830	3	3				4		1					
Psychodidae	-	-	*Pericoma/Telmatoscopus* sp.	722	-													
Tipulidae	-	-	*Dicranota* sp.	751	121027													
-	-	-	-	67	59490	24	177	664	77	64	473	35	928	6	19	13	13	21
Enchytraeidae	-	-	-	9	68510											10	3	2

Table E-1 Raw Benthic Invertebrate Abundance Data (250 µm mesh greater) for the Open Water Stations in the Jay Project Baseline Study Area, September 2014

Part B

						Lac du Sauvage							Lac de Gras					
						Ac-8	Ad-1	Ad-2	Ad-4	Ae-1	Ae-2	Ae-6	Ae-7	FF2-1	FF2-2	FF2-3	FF2-4	FF2-5
Family	**Subfamily**	**Tribe**	**Taxon**	**EcoA_TIN [a]**	**ITIS/uBio [b]**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**	**Comp**
Lumbriculidae	-	-	-	6	68440		2	2	6		2		1		2	6	4	4
Naididae	-	-	*Nais* sp.	51	68946												1	
	-	-	*Vejdovskyella intermedia*	66	69015											1		
Tubificidae	-	-	*Rhyacodrilus* sp.	2695	68839		1											
	-	-	(with cap. setae)	1347	68585	1			2	1		1				1		
	-	-	(without cap. setae)	1348	68585	1		1	3			1						
						250	**1138**	**3867**	**1216**	**766**	**2274**	**271**	**1540**	**105**	**190**	**350**	**403**	**266**

Note:

Abundance data are reported as number of organisms per sample.

Dataset includes organisms retained by 1 millimetre (mm), 500 µm, and 250 µm mesh screens.

a) Taxonomic serial number associated with the final taxon in the Ecoanalysts, Inc. database.

b) Taxonomic serial numbers associated with the final taxon that are associated with the ITIS TSN or uBio TSN systems.

c) Removed from analyses.

EcoA_TIN = EcoAnalysts, Inc. taxonomic identification number; ITIS = Integrated Taxonomic Information System taxonomic serial number; uBio TSN = taxonomic name server; mm = millimetre; µm = micrometre; sp. = species; gr. = group; w/ = with; w/o = without;

- = not identified to this taxonomic level.

Table E-2 Raw Benthic Invertebrate Abundance Data for the Littoral Stations in Lakes in the Jay Project Baseline Study Area, September 2014

Major Group	Family	Subfamily	Tribe	Final Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Lac Du Sauvage					
							Aa-3	Ab-3	Ac-3	Ac-6	Ac-9	Ae-3
							Comp	Comp	Comp	Comp	Comp	Comp
Hydrozoa	Hydridae	-	-	*Hydra* sp.	1	50845	1	4			1	1
Nematoda [c]	-	-	-	-	67	59490	5			1		
Oligochaeta	Lumbriculidae	-	-	*Lumbriculidae*	6	68440			3		1	
Gastropoda	-	-	-	-	77	69459					1	
	Lymnaeidae	-	-	*Fossaria* sp.	87	-				1		
		-	-	*Lymnaeidae*	85	76483				8	2	
	Physidae	-	-	*Physa* sp.	93	76677			1	3	2	2
	Planorbidae	-	-	*Gyraulus* sp.	96	76592	1	1	4	8	8	9
		-	-	*Planorbidae*	95	76591	9	14	8	8	24	8
	Valvatidae	-	-	*Valvata* sp.	110	70346	5	5	2	2	13	7
	Naididae	-	-	*Nais* sp.	51	68946	1			1		
		-	-	*Slavina appendiculata*	62	68856				1		
		-	-	*Uncinais uncinata*	3232	68990		1		2	1	
Acari	(Oribatei)	-	-	-	3229	83544	1					
	Hygrobatidae	-	-	*Hygrobates* sp.	3040	83297	6	3	1		2	5
	Lebertiidae	-	-	*Lebertia* sp.	2992	83034	4	3	2	6	1	6
	Pionidae	-	-	-	3100	83330						1
Ostracoda [c]	-	-	-	-	121	84195	3	5		6		4
Ephemeroptera	Ameletidae	-	-	*Ameletus* sp.	261	100996					1	
Plecoptera	Capniidae	-	-	*Capniidae*	308	102643				1		
	Nemouridae	-	-	-	333	102517	24	2	1		19	2
		-	-	*Nemoura* sp.	339	102526		1	2		5	
	Perlodidae	-	-	*Skwala* sp.	398	103102				1		
Trichoptera	Hydroptilidae	-	-	*Agraylea* sp.	571	115635		2	1	9	1	9
	Limnephilidae	-	-	*Hesperophylax* sp.	617	116001				1		
Coleoptera	Dytiscidae	Colymbetinae	-	*Colymbetinae*	3917	678403				1		
		Hydroporinae	-	*Oreodytes* sp.	435	112314		1		1		
Diptera	Chironomidae	Chironominae	Chironomini	*Cryptochironomus* sp.	934	129368						1
				Demicryptochironomus sp.	939	129421		1				1
				Dicrotendipes sp.	944	129428	1				1	1
				Paracladopelma sp.	966	129597				1		
				Stictochironomus sp.	996	129785	2	1	2	2		10
			Tanytarsini	-	1003	129872	2		2		1	
				Paratanytarsus sp.	1015	129935	63	16	5	1	22	4
				Tanytarsus sp.	1029	129978	1	6		4	2	
		Diamesinae	Diamesini	*Potthastia longimana gr.*	817	-	2		1		1	3
		Orthocladiinae	-	*Corynoneura* sp.	838	128563		1		2	2	
			-	*Cricotopus* sp.	853	128575	23	27	15	14	10	8
			-	*Heterotrissocladius marcidus gr.*	865	-		6		4	3	1
			-	*Nanocladius* sp.	878	128844	1					
			-	*Orthocladius* sp.	890	128874			1			
			-	*Psectrocladius* sp.	1036	129018	8	5	8	5	9	2
			-	*Pseudosmittia* sp.	906	129071	1		2	4		2
			-	*Synorthocladius* sp.	915	129161		1	1	1		
			-	*Zalutschia* sp.	924	129213	5	20	7	8	12	67

Table E-2 Raw Benthic Invertebrate Abundance Data for the Littoral Stations in Lakes in the Jay Project Baseline Study Area, September 2014

Major Group	Family	Subfamily	Tribe	Final Taxon	EcoA_TIN [a]	ITIS/uBio [b]	Lac Du Sauvage					
							Aa-3	Ab-3	Ac-3	Ac-6	Ac-9	Ae-3
							Comp	Comp	Comp	Comp	Comp	Comp
		Tanypodinae	Pentaneurini	-	798	128078				2		
				Ablabesmyia (Karelia) sp.	3756	-		1				
				Thienemannimyia gr. sp.	805	-				2	1	1
			Procladiini	*Procladius* sp.	799	128277	3	3	1	2		20
	Empididae	-	-	-	709	135830		1		2		1
	Tipulidae	-	-	*Tipula* sp.	764	119037		1			1	
Total							172	132	70	115	147	176

Note:
Abundance data are reported as number of organisms per sample.
Dataset includes organisms retained by the 1 millimetre (mm) and 500 µm mesh sizes.
a) Taxonomic serial number associated with the final taxon in the Ecoanalysts, Inc. database.
b) Taxonomic serial numbers associated with the final taxon that are associated with the ITIS TSN or uBio TSN systems.
c) Removed from analyses.
EcoA_TIN = EcoAnalysts, Inc. taxonomic identification number; ITIS = Integrated Taxonomic Information System taxonomic serial number; uBio TSN = taxonomic name server; mm = millimetre; µm = micrometre; sp. = species; gr. = group; w/ = with; w/o = without;
- = not identified to this taxonomic level.

APPENDIX F

BENTHIC INVERTEBRATE TAXA, 2014

Tables

Table F-1 Benthic Invertebrate Taxa Documented Open Water Stations in Lac du Sauvage, September 2014

Major Group	Family	Subfamily	Tribe	Genus/Species	Lac du Sauvage																					
					Deep								Mid-depth							Shallow						
					Aa-1	Ab-1	Ac-1	Ac-4	Ac-7	Ad-1	Ae-1	Ae-6	Aa-6	Ab-6	Ac-10	Ac-11	Ac-12	Ad-4	Ae-7	Aa-2	Ab-2	Ac-2	Ac-5	Ac-8	Ad-2	Ae-2
Annelida	Piscicolidae	-	-	*Cystobranchus salmositicus*	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oligochaeta	Enchytraeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lumbriculidae	-	-	-	-	-	X	-	-	-	X	X	-	-	X	-	X	-	-	X	X	X	-	X	-	X
	Tubificidae	-	-	*Rhyacodrilus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
		-	-	(with cap. setae)	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
		-	-	(without cap. setae)	-	-	X	-	-	-	-	-	-	-	-	-	X	-	-	-	X	X	-	-	X	-
Gastropoda	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Physidae	-	-	*Physa* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
	Planorbidae	-	-	*Gyraulus* sp.	X	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	*Planorbidae*	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
	Valvatidae	-	-	*Valvata lewisi*	-	-	-	-	X	-	-	-	-	X	-	-	-	-	-	-	X	X	X	X	-	X
		-	-	*Valvata* sp.	X	X	X	X	X	-	-	-	X	X	-	-	X	-	X	X	X	X	-	X	-	X
Bivalvia	Sphaeriidae	-	-	*Pisidium* sp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		-	-	-	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X
		-	-	*Sphaerium* sp.	-	-	X	-	-	-	-	-	-	-	-	-	X	-	X	-	-	-	-	X	X	-
Acari	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	X	-	-	X	-
	Acalyptonotidae	-	-	*Acalyptonotus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Arrenuridae	-	-	*Arrenurus* sp.	-	-	-	X	X	-	-	-	-	-	X	-	-	-	-	X	X	X	-	-	-	X
	Aturidae	-	-	*Aturidae*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
	Halacaridae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
	Hygrobatidae	-	-	*Hygrobates* sp.	-	-	-	-	-	X	X	-	X	-	-	-	X	-	-	X	-	-	-	-	-	-
	Lebertiidae	-	-	*Lebertia* sp.	X	X	X	X	X	X	-	X	X	X	X	X	X	-	X	X	X	X	X	X	-	-
	Limnesiidae	-	-	*Limnesia* sp.	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oxidae	-	-	*Oxus* sp.	-	-	-	X	X	X	-	X	X	-	X	-	X	-	X	X	-	-	X	-	-	X
	Pionidae	-	-	*Piona* sp.	-	X	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	X	-	-	-	X
		-	-	-	-	X	X	-	X	X	-	-	-	X	-	-	-	-	X	X	X	-	-	X	-	-
Trichoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
	Apataniidae	-	-	*Apatania* sp.	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hydroptilidae	-	-	*Agraylea* sp.	-	X	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
	Phryganeidae	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X	-	X
		-	-	*Agrypnia* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-
Diptera	Chironomidae	Chironominae	-	*Paratanytarsus* sp.	X	X	X	X	X	-	X	-	-	X	X	-	X	-	-	X	X	X	X	X	-	X
			Chironomini	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
				Chironomus sp.	X	X	X	-	-	-	X	X	-	X	X	-	-	X	X	-	X	X	X	X	X	X
				Cladopelma sp.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Dicrotendipes fumidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X
				Dicrotendipes lobiger	-	X	X	X	X	-	-	X	-	-	X	-	-	-	X	-	X	-	-	X	-	X
				Dicrotendipes sp.	X	X	X	X	X	X	-	-	-	-	X	-	X	-	-	-	X	X	-	X	-	X
				Microtendipes pedellus gr.	X	X	X	-	X	X	X	X	X	X	-	X	-	X	X	X	-	-	X	X	X	X

Table F-1 Benthic Invertebrate Taxa Documented Open Water Stations in Lac du Sauvage, September 2014

Major Group	Family	Subfamily	Tribe	Genus/Species	Lac du Sauvage																					
					Deep								Mid-depth							Shallow						
					Aa-1	Ab-1	Ac-1	Ac-4	Ac-7	Ad-1	Ae-1	Ae-6	Aa-6	Ab-6	Ac-10	Ac-11	Ac-12	Ad-4	Ae-7	Aa-2	Ab-2	Ac-2	Ac-5	Ac-8	Ad-2	Ae-2
Diptera	Chironomidae			*Pagastiella* sp.	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				Parachironomus sp.	X	X	X	X	-	-	X	-	X	-	X	-	X	X	-	X	X	X	X	X	-	X
				Paracladopelma sp.	X	-	-	-	-	X	X	X	X	X	X	-	-	-	-	X	-	-	X	X	-	-
				Polypedilum scalaenum gr.	X	-	X	X	X	X	X	X	-	X	X	X	X	X	X	X	-	-	X	X	X	X
				Sergentia sp.	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X	X
				Stictochironomus sp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
			Tanytarsini	-	X	X	X	-	-	X	-	-	X	X	-	-	X	-	-	-	X	X	-	X	-	X
				Tanytarsus sp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X
				Stempellinella sp.	X	X	-	-	X	X	-	-	X	-	-	-	-	-	-	X	X	X	-	X	-	X
				Micropsectra sp.	-	X	X	X	X	X	-	-	X	-	X	-	X	X	-	X	X	X	X	X	X	X
				Corynocera sp.	X	-	X	-	-	X	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
				Constempellina sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	X	-	-
				Cladotanytarsus sp.	X	-	X	-	-	-	X	-	X	-	-	-	-	-	-	X	X	X	X	X	X	X
		Diamesinae	Diamesini	*Potthastia longimana gr.*	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
		-	-	*Agrypnia* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-
		Orthocladiinae	-	*Abiskomyia* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	*Corynoneura* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-
			-	*Cricotopus* sp.	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	-	X	-	X
			-	*Heterotanytarsus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
			-	*Heterotrissocladius marcidus gr.*	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X	X
			-	*Heterotrissocladius subpilosus gr.*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			-	*Hydrobaenus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	-	X
			-	*Nanocladius* sp.	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-
			-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	X	X	-	-	-	-	-
			-	*Orthocladius Complex*	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	X	-	X
			-	*Paracladius* sp.	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	X	-	X	-	-
			-	*Parakiefferiella* sp.	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	-	-	-	X	-	-
			-	*Psectrocladius* sp.	X	X	X	X	X	X	-	-	-	X	X	-	X	X	X	X	X	X	-	X	-	X
			-	*Zalutschia* sp.	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X
		Prodiamesinae	-	*Monodiamesa* sp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X
		Tanypodinae	Pentaneurini	*Ablabesmyia (Karelia)* sp.	-	X	X	X	X	-	-	-	-	-	-	-	-	-	-	X	X	X	-	X	-	X
				Ablabesmyia sp.	X	X	X	X	X	X	X	X	X	X	X	-	X	-	-	X	X	X	X	X	X	X
				Thienemannimyia gr. sp.	-	X	X	-	X	-	-	-	X	X	X	-	X	X	-	X	X	-	-	X	-	X
			Procladiini	*Procladius* sp.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
				Protanypus sp.	-	-	-	-	-	-	X	X	X	X	X	-	X	X	X	X	-	-	X	X	-	-
	Empididae	-	-	-	-	-	-	X	-	-	-	X	X	X	-	-	X	-	X	X	-	-	-	X	-	X
	Psychodidae	-	-	*Pericoma/Telmatoscopus* sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
	Tipulidae	-	-	*Dicranota* sp.	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-

X = present; - = not identified to this taxonomic level; sp. = species; gr. = group.

Table F-2 Benthic Invertebrate Taxa Documented at Littoral Stations in Lac du Sauvage, September 2014

Major Group	Family	Subfamily	Tribe	Genus/Species	Lac du Sauvage					
					Station Aa-3	Station Ab-3	Station Ac-3	Station Ac-6	Station Ac-9	Station Ae-3
Acari	(Oribatei)	-	-	-	X	-	-	-	-	-
	Hygrobatidae	-	-	*Hygrobates* sp.	X	X	X	-	X	X
	Lebertiidae	-	-	*Lebertia* sp.	X	X	X	X	X	X
	Pionidae	-	-	-	-	-	-	-	-	X
Coleoptera	Dytiscidae	Colymbetinae	-	-	-	-	-	X	-	-
		Hydroporinae	-	*Oreodytes* sp.	-	X	-	X	-	-
Diptera	Chironomidae	Chironominae	Chironomini	*Cryptochironomus* sp.	-	-	-	-	-	X
				Demicryptochironomus sp.	-	X	-	-	-	X
				Dicrotendipes sp.	X	-	-	-	X	X
				Paracladopelma sp.	-	-	-	X	-	-
				Stictochironomus sp.	X	X	X	X	-	X
			Tanytarsini	*Paratanytarsus* sp.	X	X	X	X	X	X
				-	X	-	X	-	X	-
				Tanytarsus sp.	X	X	-	X	X	-
		Diamesinae	Diamesini	*Potthastia longimana gr.*	X	-	X	-	X	X
		Orthocladiinae	-	*Corynoneura* sp.	-	X	-	X	X	-
			-	*Cricotopus* sp.	X	X	X	X	X	X
			-	*Heterotrissocladius marcidus gr.*	-	X	-	X	X	X
			-	*Nanocladius* sp.	X	-	-	-	-	-
			-	*Orthocladius* sp.	-	-	X	-	-	-
			-	*Psectrocladius* sp.	X	X	X	X	X	X
			-	*Pseudosmittia* sp.	X	-	X	X	-	X
			-	*Synorthocladius* sp.	-	X	X	X	-	-
			-	*Zalutschia* sp.	X	X	X	X	X	X
		Tanypodinae	Pentaneurini	*Ablabesmyia (Karelia)* sp.	-	X	-	-	-	-
				-	-	-	-	X	-	-
				Thienemannimyia gr. sp.	-	-	-	X	X	X
			Procladiini	*Procladius* sp.	X	X	X	X	-	X
	Empididae	-	-	-	-	X	-	X	-	X
	Tipulidae	-	-	*Tipula* sp.	-	X	-	-	X	-
Ephemeroptera	Ameletidae	-	-	*Ameletus* sp.	-	-	-	-	X	-
Gastropoda	-	-	-	-	-	-	-	-	X	-
	Lymnaeidae	-	-	*Fossaria* sp.	-	-	-	X	-	-
		-	-	-	-	-	-	X	X	-
	Physidae	-	-	*Physa* sp.	-	-	X	X	X	X
	Planorbidae	-	-	*Gyraulus* sp.	X	X	X	X	X	X
		-	-	-	X	X	X	X	X	X
	Valvatidae	-	-	*Valvata* sp.	X	X	X	X	X	X
Hydrozoa	Hydridae	-	-	*Hydra* sp.	X	X	-	-	X	X

Table F-2 Benthic Invertebrate Taxa Documented at Littoral Stations in Lac du Sauvage, September 2014

Major Group	Family	Subfamily	Tribe	Genus/Species	Lac du Sauvage					
					Station Aa-3	Station Ab-3	Station Ac-3	Station Ac-6	Station Ac-9	Station Ae-3
Oligochaeta	Lumbriculidae	-	-	-	-	-	X	-	X	-
Oligochaeta	Naididae	-	-	*Nais* sp.	X	-	-	X	-	-
		-	-	*Slavina appendiculata*	-	-	-	X	-	-
		-	-	*Uncinais uncinata*	-	X	-	X	X	-
Plecoptera	Capniidae	-	-	-	-	-	-	X	-	-
	Nemouridae	-	-	*Nemoura* sp.	-	X	X	-	X	-
		-	-	-	X	X	X	-	X	X
	Perlodidae	-	-	*Skwala* sp.	-	-	-	X	-	-
Trichoptera	Hydroptilidae	-	-	*Agraylea* sp.	-	X	X	X	X	X
	Limnephilidae	-	-	*Hesperophylax* sp.	-	-	-	X	-	-

X = present; - = not identified to this taxonomic level; sp. = species; gr. = group.

Table F-3 Benthic Invertebrate Taxa Documented at Open Water Stations in Lac de Gras, September 2014

Major Group	Family	Subfamily	Tribe	Genus Species	Lac de Gras				
					Deep Stations				
					FF2-1	FF2-2	FF2-3	FF2-4	FF2-5
Acari	-	-	-	-	-	-	-	-	-
	Acalyptonotidae	-	-	*Acalyptonotus* sp.	-	-	-	X	-
	Arrenuridae	-	-	*Arrenurus* sp.	-	-	-	-	-
	Aturidae	-	-	*Aturidae*	-	-	-	-	-
	Halacaridae	-	-	-	-	-	-	-	-
	Hygrobatidae	-	-	*Hygrobates* sp.	-	X	-	-	-
	Lebertiidae	-	-	*Lebertia* sp.	-	-	X	X	X
	Limnesiidae	-	-	*Limnesia* sp.	-	-	-	-	-
	Oxidae	-	-	*Oxus* sp.	X	-	X	-	-
	Pionidae	-	-	*Piona* sp.	-	-	-	-	-
		-	-	*Pionidae*	-	-	-	-	-
Annelida	Piscicolidae	-	-	*Cystobranchus salmositicus*	-	-	-	-	-
Bivalvia	Sphaeriidae	-	-	*Pisidium* sp.	-	-	X	X	-
		-	-	-	X	X	X	X	X
		-	-	*Sphaerium* sp.	-	-	-	-	-
Diptera	Chironomidae	Chironominae	-	*Paratanytarsus* sp.	-	X	X	X	X
			Chironomini	-	-	-	-	-	-
				Chironomus sp.	-	-	-	-	-
				Cladopelma sp.	-	-	-	-	-
				Dicrotendipes fumidus	-	-	-	-	-
				Dicrotendipes lobiger	-	-	-	-	-
				Dicrotendipes sp.	-	-	-	-	-
				Microtendipes pedellus gr.	X	X	X	X	X
				Pagastiella sp.	-	-	-	-	-
				Parachironomus sp.	-	-	-	-	-
				Paracladopelma sp.	-	-	-	-	-
				Polypedilum scalaenum gr.	-	-	-	-	-
				Sergentia sp.	-	-	-	-	-
				Stictochironomus sp.	X	X	X	X	X
			Tanytarsini	-	-	-	-	-	X
				Tanytarsus sp.	X	X	X	X	X
				Stempellinella sp.	-	-	X	X	X
				Micropsectra sp.	-	-	X	X	X
				Corynocera sp.	-	-	-	-	-
				Constempellina sp.	-	-	-	-	X
				Cladotanytarsus sp.	-	-	-	-	-
		Diamesinae	Diamesini	*Potthastia longimana gr.*	-	-	-	-	-
		Orthocladiinae	-	*Abiskomyia* sp.	-	X	-	-	-
			-	*Corynoneura* sp.	-	-	-	-	-

Table F-3 Benthic Invertebrate Taxa Documented at Open Water Stations in Lac de Gras, September 2014

Major Group	Family	Subfamily	Tribe	Genus Species	Lac de Gras Deep Stations FF2-1	FF2-2	FF2-3	FF2-4	FF2-5
Diptera	Chironomidae	Orthocladiinae	-	*Cricotopus* sp.	-	-	-	-	-
			-	*Heterotanytarsus* sp.	-	-	-	-	-
			-	*Heterotrissocladius marcidus gr.*	-	X	X	X	X
			-	*Heterotrissocladius subpilosus gr.*	-	X	X	-	X
			-	*Hydrobaenus* sp.	-	-	-	-	-
			-	*Nanocladius* sp.	-	-	-	-	-
			-	-	-	-	-	-	-
			-	*Orthocladius Complex*	-	X	-	X	X
			-	*Paracladius* sp.	-	-	-	-	-
			-	*Parakiefferiella* sp.	-	-	X	-	-
			-	*Psectrocladius* sp.	-	-	-	-	-
			-	*Zalutschia* sp.	-	-	X	-	X
		Prodiamesinae	-	*Monodiamesa* sp.	-	-	-	-	X
		Tanypodinae	Pentaneurini	*Ablabesmyia (Karelia)* sp.	-	-	-	-	-
				Ablabesmyia sp.	-	-	-	X	X
				Thienemannimyia gr. sp.	-	-	-	-	-
			Procladiini	*Procladius* sp.	X	X	X	X	X
				Protanypus sp.	-	X	X	X	-
	Empididae	-	-	-	-	-	-	-	-
	Psychodidae	-	-	*Pericoma/Telmatoscopus* sp.	-	-	-	-	-
	Tipulidae	-	-	*Dicranota* sp.	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-
	Physidae	-	-	*Physa* sp.	-	-	-	-	-
	Planorbidae	-	-	*Gyraulus* sp.	-	-	-	-	-
		-	-	*Planorbidae*	-	-	-	-	-
	Valvatidae	-	-	*Valvata lewisi*	-	-	-	-	-
		-	-	*Valvata* sp.	-	-	-	-	-
Oligochaeta	Enchytraeidae	-	-	-	-	-	-	X	-
	Lumbriculidae	-	-	-	-	X	X	X	X
	Tubificidae	-	-	*Rhyacodrilus* sp.	-	-	-	-	-
		-	-	(with cap. setae)	-	-	X	-	-
		-	-	(without cap. setae)	-	-	-	-	-
Trichoptera	-	-	-	-	-	-	-	-	-
	Apataniidae	-	-	*Apatania* sp.	-	-	-	-	-
	Hydroptilidae	-	-	*Agraylea* sp.	-	-	-	-	-
	Phryganeidae	-	-	-	-	-	-	-	-
		-	-	*Agrypnia* sp.	-	-	-	-	-

X = present; - = not identified to this taxonomic level; sp. = species; gr. = group.

APPENDIX G

BENTHIC INVERTEBRATE TAXONOMY QUALITY CONTROL DATA

Tables

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Aa-1	09/12/2014	250 µm	11/20/2014	6868.03-1	100.00	Fine Organic	0.15	<0.01	12/08/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-1	09/12/2014	500 µm	11/20/2014	6868.04-1	100.00	Fine Organic	0.15	<0.01	12/09/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-1	09/12/2014	1 mm	11/20/2014	6868.05-1	100.00	Fine Organic	0.15	<0.01	12/16/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-2	09/12/2014	250 µm	11/25/2014	6868.03-2	100.00	Fine Organic	1.20	0.15	12/08/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-2	09/12/2014	500 µm	11/25/2014	6868.04-2	100.00	Fine Organic	1.20	0.15	12/10/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-2	09/12/2014	1 mm	11/25/2014	6868.05-2	100.00	Fine Organic	1.20	0.20	12/10/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	250 µm	12/05/2014	6868.03-3	25.00	Fine Organic	0.15	0.15	12/08/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	500 µm	12/03/2014	6868.04-3	12.50	Fine Organic	0.25	0.25	12/16/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	1 mm	12/01/2014	6868.05-3	12.50	Fine Organic	0.40	0.40	12/15/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	250 µm	11/26/2014	6868.03-4	100.00	Inorganic	0.50	0.08	12/09/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	500 µm	11/26/2014	6868.04-4	100.00	Inorganic	0.50	0.05	12/10/2014	95.45	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	1 mm	11/26/2014	6868.05-4	100.00	Inorganic	0.50	0.05	12/10/2014	98.40	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	250 µm	12/01/2014	6868.03-5	100.00	Fine Organic	0.35	0.10	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	500 µm	12/01/2014	6868.04-5	100.00	Fine Organic	0.35	0.05	12/10/2014	92.86	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	1 mm	12/01/2014	6868.05-5	100.00	Fine Organic	0.35	0.08	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	250 µm	12/01/2014	6868.03-6	100.00	Inorganic	0.45	0.08	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	500 µm	12/01/2014	6868.04-6	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	1 mm	12/01/2014	6868.05-6	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	250 µm	12/02/2014	6868.03-7	100.00	Inorganic	0.45	0.05	12/14/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	500 µm	12/02/2014	6868.04-7	100.00	Inorganic	0.45	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	1 mm	12/02/2014	6868.05-7	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	250 µm	12/04/2014	6868.03-13	100.00	Inorganic	0.20	0.03	12/05/2014	97.19	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	500 µm	12/04/2014	6868.04-13	100.00	Inorganic	0.20	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	1 mm	12/04/2014	6868.05-13	100.00	Inorganic	0.20	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	250 µm	12/05/2014	6868.03-14	100.00	Inorganic	0.20	<0.01	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	500 µm	12/05/2014	6868.04-14	100.00	Inorganic	0.20	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	1 mm	12/05/2014	6868.05-14	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-12	09/11/2014	250 µm	12/05/2014	6868.03-15	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-12	09/11/2014	500 µm	12/05/2014	6868.04-15	100.00	Inorganic	0.20	<0.01	12/10/2014	100.00	N/A	N/A

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Ac-12	09/11/2014	1 mm	12/05/2014	6868.05-15	100.00	Inorganic	0.20	0.03	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	250 µm	12/02/2014	6868.03-8	100.00	Inorganic	0.25	0.03	12/14/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	500 µm	12/02/2014	6868.04-8	100.00	Inorganic	0.25	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	1 mm	12/02/2014	6868.05-8	100.00	Inorganic	0.25	0.03	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-4	09/09/2014	250 µm	12/03/2014	6868.03-9	100.00	Inorganic	0.15	<0.01	12/17/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-4	09/09/2014	500 µm	12/03/2014	6868.04-9	100.00	Inorganic	0.15	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-4	09/09/2014	1 mm	12/03/2014	6868.05-9	100.00	Inorganic	0.15	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	250 µm	12/03/2014	6868.03-10	100.00	Inorganic	0.75	0.03	12/05/2014	95.08	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	500 µm	12/03/2014	6868.04-10	100.00	Inorganic	0.75	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	1 mm	12/03/2014	6868.05-10	100.00	Inorganic	0.75	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	250 µm	12/03/2014	6868.03-11	100.00	Inorganic	0.15	0.03	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	500 µm	12/03/2014	6868.04-11	100.00	Inorganic	0.15	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	1 mm	12/03/2014	6868.05-11	100.00	Inorganic	0.15	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	250 µm	12/04/2014	6868.03-12	100.00	Inorganic	0.20	0.03	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	500 µm	12/04/2014	6868.04-12	100.00	Inorganic	0.20	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	1 mm	12/04/2014	6868.05-12	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	250 µm	12/08/2014	6868.03-16	100.00	Inorganic	0.15	0.15	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	500 µm	12/08/2014	6868.04-16	100.00	Inorganic	0.25	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	1 mm	12/05/2014	6868.05-16	100.00	Fine Organic	0.15	0.15	12/11/2014	95.65	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	250 µm	12/17/2014	6868.03-17	100.00	Filamentous Algae	1.40	0.15	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	500 µm	12/17/2014	6868.04-17	100.00	Filamentous Algae	1.40	0.20	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	1 mm	12/17/2014	6868.05-17	100.00	Filamentous Algae	1.40	0.30	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	250 µm	12/11/2014	6868.03-18	100.00	Vegetation	0.15	0.15	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	500 µm	12/11/2014	6868.04-18	100.00	Vegetation	0.15	0.15	12/13/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	1 mm	12/11/2014	6868.05-18	100.00	Vegetation	2.00	2.00	12/23/2014	66.33	85.97	92.39
Lac du Sauvage	Ae-1	09/08/2014	250 µm	12/12/2014	6868.03-19	100.00	Inorganic	0.20	0.20	12/17/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-1	09/08/2014	500 µm	12/12/2014	6868.04-19	100.00	Inorganic	0.10	0.10	12/13/2014	100.00	N/A	N/A

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Ae-1	09/08/2014	1 mm	12/12/2014	6868.05-19	100.00	Inorganic	0.05	0.05	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	250 µm	12/29/2014	6868.03-20	100.00	Inorganic	0.01	0.01	12/30/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	500 µm	12/29/2014	6868.04-20	100.00	Inorganic	0.01	0.01	12/30/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	1 mm	12/16/2014	6868.05-20	100.00	Vegetation	0.15	0.15	12/19/2014	96.39	N/A	N/A
Lac du Sauvage	Ae-6	09/08/2014	250 µm	12/17/2014	6868.03-21	100.00	Inorganic	0.15	<0.01	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-6	09/08/2014	500 µm	12/17/2014	6868.04-21	100.00	Inorganic	0.15	<0.01	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-6	09/08/2014	1 mm	12/17/2014	6868.05-21	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	250 µm	12/18/2014	6868.03-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	500 µm	12/18/2014	6868.04-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	1 mm	12/18/2014	6868.05-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	250 µm	12/19/2014	6868.03-23	100.00	Inorganic	0.20	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	500 µm	12/19/2014	6868.04-23	100.00	Inorganic	0.20	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	1 mm	12/19/2014	6868.05-23	100.00	Inorganic	0.20	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	250 µm	12/19/2014	6868.03-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	500 µm	12/19/2014	6868.04-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	1 mm	12/19/2014	6868.05-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	250 µm	12/21/2014	6868.03-25	100.00	Inorganic	0.06	0.02	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	500 µm	12/21/2014	6868.04-25	100.00	Inorganic	0.06	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	1 mm	12/21/2014	6868.05-25	100.00	Inorganic	0.06	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	250 µm	12/21/2014	6868.03-26	100.00	Inorganic	0.13	0.02	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	500 µm	12/21/2014	6868.04-26	100.00	Inorganic	0.13	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	1 mm	12/21/2014	6868.05-26	100.00	Inorganic	0.13	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	250 µm	12/22/2014	6868.03-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	500 µm	12/22/2014	6868.04-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	1 mm	12/22/2014	6868.05-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-1	09/12/2014	250 µm	11/20/2014	6868.03-1	100.00	Fine Organic	0.15	<0.01	12/08/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-1	09/12/2014	500 µm	11/20/2014	6868.04-1	100.00	Fine Organic	0.15	<0.01	12/09/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-1	09/12/2014	1 mm	11/20/2014	6868.05-1	100.00	Fine Organic	0.15	<0.01	12/16/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-2	09/12/2014	250 µm	11/25/2014	6868.03-2	100.00	Fine Organic	1.20	0.15	12/08/2014	100.00	N/A	N/A

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Aa-2	09/12/2014	500 µm	11/25/2014	6868.04-2	100.00	Fine Organic	1.20	0.15	12/10/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-2	09/12/2014	1 mm	11/25/2014	6868.05-2	100.00	Fine Organic	1.20	0.20	12/10/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	250 µm	12/05/2014	6868.03-3	25.00	Fine Organic	0.15	0.15	12/08/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	500 µm	12/03/2014	6868.04-3	12.50	Fine Organic	0.25	0.25	12/16/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-6	09/12/2014	1 mm	12/01/2014	6868.05-3	12.50	Fine Organic	0.40	0.40	12/15/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	250 µm	11/26/2014	6868.03-4	100.00	Inorganic	0.50	0.08	12/09/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	500 µm	11/26/2014	6868.04-4	100.00	Inorganic	0.50	0.05	12/10/2014	95.45	N/A	N/A
Lac du Sauvage	Ab-1	09/11/2014	1 mm	11/26/2014	6868.05-4	100.00	Inorganic	0.50	0.05	12/10/2014	98.40	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	250 µm	12/01/2014	6868.03-5	100.00	Fine Organic	0.35	0.10	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	500 µm	12/01/2014	6868.04-5	100.00	Fine Organic	0.35	0.05	12/10/2014	92.86	N/A	N/A
Lac du Sauvage	Ab-2	09/11/2014	1 mm	12/01/2014	6868.05-5	100.00	Fine Organic	0.35	0.08	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	250 µm	12/01/2014	6868.03-6	100.00	Inorganic	0.45	0.08	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	500 µm	12/01/2014	6868.04-6	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-6	09/11/2014	1 mm	12/01/2014	6868.05-6	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	250 µm	12/02/2014	6868.03-7	100.00	Inorganic	0.45	0.05	12/14/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	500 µm	12/02/2014	6868.04-7	100.00	Inorganic	0.45	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-1	09/11/2014	1 mm	12/02/2014	6868.05-7	100.00	Inorganic	0.45	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	250 µm	12/04/2014	6868.03-13	100.00	Inorganic	0.20	0.03	12/05/2014	97.19	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	500 µm	12/04/2014	6868.04-13	100.00	Inorganic	0.20	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-10	09/09/2014	1 mm	12/04/2014	6868.05-13	100.00	Inorganic	0.20	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	250 µm	12/05/2014	6868.03-14	100.00	Inorganic	0.20	<0.01	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	500 µm	12/05/2014	6868.04-14	100.00	Inorganic	0.20	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-11	09/10/2014	1 mm	12/05/2014	6868.05-14	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-12	09/11/2014	250 µm	12/05/2014	6868.03-15	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-12	09/11/2014	500 µm	12/05/2014	6868.04-15	100.00	Inorganic	0.20	<0.01	12/10/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-12	09/11/2014	1 mm	12/05/2014	6868.05-15	100.00	Inorganic	0.20	0.03	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	250 µm	12/02/2014	6868.03-8	100.00	Inorganic	0.25	0.03	12/14/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	500 µm	12/02/2014	6868.04-8	100.00	Inorganic	0.25	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-2	09/09/2014	1 mm	12/02/2014	6868.05-8	100.00	Inorganic	0.25	0.03	12/11/2014	100.00	N/A	N/A

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Ac-4	09/09/2014	250 µm	12/03/2014	6868.03-9	100.00	Inorganic	0.15	<0.01	12/17/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-4	09/09/2014	500 µm	12/03/2014	6868.04-9	100.00	Inorganic	0.15	<0.01	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-4	09/09/2014	1 mm	12/03/2014	6868.05-9	100.00	Inorganic	0.15	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	250 µm	12/03/2014	6868.03-10	100.00	Inorganic	0.75	0.03	12/05/2014	95.08	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	500 µm	12/03/2014	6868.04-10	100.00	Inorganic	0.75	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-5	09/10/2014	1 mm	12/03/2014	6868.05-10	100.00	Inorganic	0.75	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	250 µm	12/03/2014	6868.03-11	100.00	Inorganic	0.15	0.03	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	500 µm	12/03/2014	6868.04-11	100.00	Inorganic	0.15	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-7	09/09/2014	1 mm	12/03/2014	6868.05-11	100.00	Inorganic	0.15	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	250 µm	12/04/2014	6868.03-12	100.00	Inorganic	0.20	0.03	12/05/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	500 µm	12/04/2014	6868.04-12	100.00	Inorganic	0.20	<0.01	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-8	09/11/2014	1 mm	12/04/2014	6868.05-12	100.00	Inorganic	0.20	0.03	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	250 µm	12/08/2014	6868.03-16	100.00	Inorganic	0.15	0.15	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	500 µm	12/08/2014	6868.04-16	100.00	Inorganic	0.25	0.05	12/11/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-1	09/05/2014	1 mm	12/05/2014	6868.05-16	100.00	Fine Organic	0.15	0.15	12/11/2014	95.65	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	250 µm	12/17/2014	6868.03-17	100.00	Filamentous Algae	1.40	0.15	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	500 µm	12/17/2014	6868.04-17	100.00	Filamentous Algae	1.40	0.20	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-2	09/08/2014	1 mm	12/17/2014	6868.05-17	100.00	Filamentous Algae	1.40	0.30	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	250 µm	12/11/2014	6868.03-18	100.00	Vegetation	0.15	0.15	12/12/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	500 µm	12/11/2014	6868.04-18	100.00	Vegetation	0.15	0.15	12/13/2014	100.00	N/A	N/A
Lac du Sauvage	Ad-4	09/05/2014	1 mm	12/11/2014	6868.05-18	100.00	Vegetation	2.00	2.00	12/23/2014	66.33	85.97	92.39
Lac du Sauvage	Ae-1	09/08/2014	250 µm	12/12/2014	6868.03-19	100.00	Inorganic	0.20	0.20	12/17/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-1	09/08/2014	500 µm	12/12/2014	6868.04-19	100.00	Inorganic	0.10	0.10	12/13/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-1	09/08/2014	1 mm	12/12/2014	6868.05-19	100.00	Inorganic	0.05	0.05	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	250 µm	12/29/2014	6868.03-20	100.00	Inorganic	0.01	0.01	12/30/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	500 µm	12/29/2014	6868.04-20	100.00	Inorganic	0.01	0.01	12/30/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-2	09/08/2014	1 mm	12/16/2014	6868.05-20	100.00	Vegetation	0.15	0.15	12/19/2014	96.39	N/A	N/A

Table G-1 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Shallow, Mid-Depth, and Deep Stations in Lakes the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Sub-sampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Ae-6	09/08/2014	250 µm	12/17/2014	6868.03-21	100.00	Inorganic	0.15	<0.01	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-6	09/08/2014	500 µm	12/17/2014	6868.04-21	100.00	Inorganic	0.15	<0.01	12/18/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-6	09/08/2014	1 mm	12/17/2014	6868.05-21	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	250 µm	12/18/2014	6868.03-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	500 µm	12/18/2014	6868.04-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-7	09/08/2014	1 mm	12/18/2014	6868.05-22	100.00	Inorganic	0.30	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	250 µm	12/19/2014	6868.03-23	100.00	Inorganic	0.20	0.03	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	500 µm	12/19/2014	6868.04-23	100.00	Inorganic	0.20	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-1	09/14/2014	1 mm	12/19/2014	6868.05-23	100.00	Inorganic	0.20	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	250 µm	12/19/2014	6868.03-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	500 µm	12/19/2014	6868.04-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-2	09/14/2014	1 mm	12/19/2014	6868.05-24	100.00	Inorganic	0.15	<0.01	12/19/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	250 µm	12/21/2014	6868.03-25	100.00	Inorganic	0.06	0.02	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	500 µm	12/21/2014	6868.04-25	100.00	Inorganic	0.06	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-3	09/14/2014	1 mm	12/21/2014	6868.05-25	100.00	Inorganic	0.06	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	250 µm	12/21/2014	6868.03-26	100.00	Inorganic	0.13	0.02	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	500 µm	12/21/2014	6868.04-26	100.00	Inorganic	0.13	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-4	09/14/2014	1 mm	12/21/2014	6868.05-26	100.00	Inorganic	0.13	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	250 µm	12/22/2014	6868.03-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	500 µm	12/22/2014	6868.04-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A
Lac du Sauvage	FF2-5	09/14/2014	1 mm	12/22/2014	6868.05-27	100.00	Inorganic	0.05	0.01	12/22/2014	100.00	N/A	N/A

ID = identifier; mm = millimetre; µm = micrometre; < = less than; % = percent; L = litre; n/a; not applicable; QC = quality control; Aug = August; Sep = September; Nov = November; Dec = December; Ecoanylists = Econaylists Inc.

Table G-2 Quality Control Re-sort Data for Benthic Invertebrate Samples Collected at Littoral Stations in the Jay Project Baseline Study Area, September 2014

Waterbody	Station ID	Sampling Date	Size Fraction	Sort Date	EcoAnalyst Sample ID	% Subsampled	Primary Matrix	Estimated Pre-rinse	Estimated Post-rinse	QC Date	Estimated % Recovery 1	Estimated % Recovery 2	Estimated % Recovery 3
Lac du Sauvage	Aa-3	41894	500 µm	11/24/2014	6868.01-1	100.00	Coarse Organic	0.03	0.01	11/29/2014	100.00	N/A	N/A
Lac du Sauvage	Aa-3	41894	1 mm	11/24/2014	6868.02-1	100.00	Coarse Organic	0.03	0.01	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-3	41893	500 µm	11/24/2014	6868.01-2	100.00	Filamentous Algae	0.05	0.02	11/29/2014	100.00	N/A	N/A
Lac du Sauvage	Ab-3	41893	1 mm	11/24/2014	6868.02-2	100.00	Filamentous Algae	0.05	0.03	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-3	41891	500 µm	11/24/2014	6868.01-3	100.00	Filamentous Algae	0.04	0.02	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-3	41891	1 mm	11/24/2014	6868.02-3	100.00	Filamentous Algae	0.04	0.02	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-6	41892	500 µm	11/24/2014	6868.01-4	100.00	Filamentous Algae	0.04	0.01	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-6	41892	1 mm	11/24/2014	6868.02-4	100.00	Filamentous Algae	0.04	0.03	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-9	41891	500 µm	11/25/2014	6868.01-5	100.00	Inorganic	0.07	0.02	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ac-9	41891	1 mm	11/25/2014	6868.02-5	100.00	Filamentous Algae	0.07	0.03	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-3	41890	500 µm	11/25/2014	6868.01-6	100.00	Inorganic	0.05	0.03	12/02/2014	100.00	N/A	N/A
Lac du Sauvage	Ae-3	41890	1 mm	11/25/2014	6868.02-6	100.00	Inorganic	0.05	0.02	12/02/2014	100.00	N/A	N/A

ID = identifier; mm = millimetre; µm = micrometre; < = less than; % = percent; L = litre; n/a; not applicable; QC = quality control; Aug = August; Sep = September; Nov = November; Dec = December; EcoAnalysts = EcoAnalysts Inc.