



# Keeyask Generation Project Aquatic Effects Monitoring Plan

## Benthic Macroinvertebrate Monitoring Report

AEMP-2017-08



# **KEEYASK GENERATION PROJECT**

## **AQUATIC EFFECTS MONITORING PLAN**

REPORT #AEMP-2017-08

### **BENTHIC MACROINVERTEBRATE MONITORING IN THE NELSON RIVER, 2016: YEAR 3 CONSTRUCTION**

Prepared for

Manitoba Hydro

By

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June 2017



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# SUMMARY

## Background

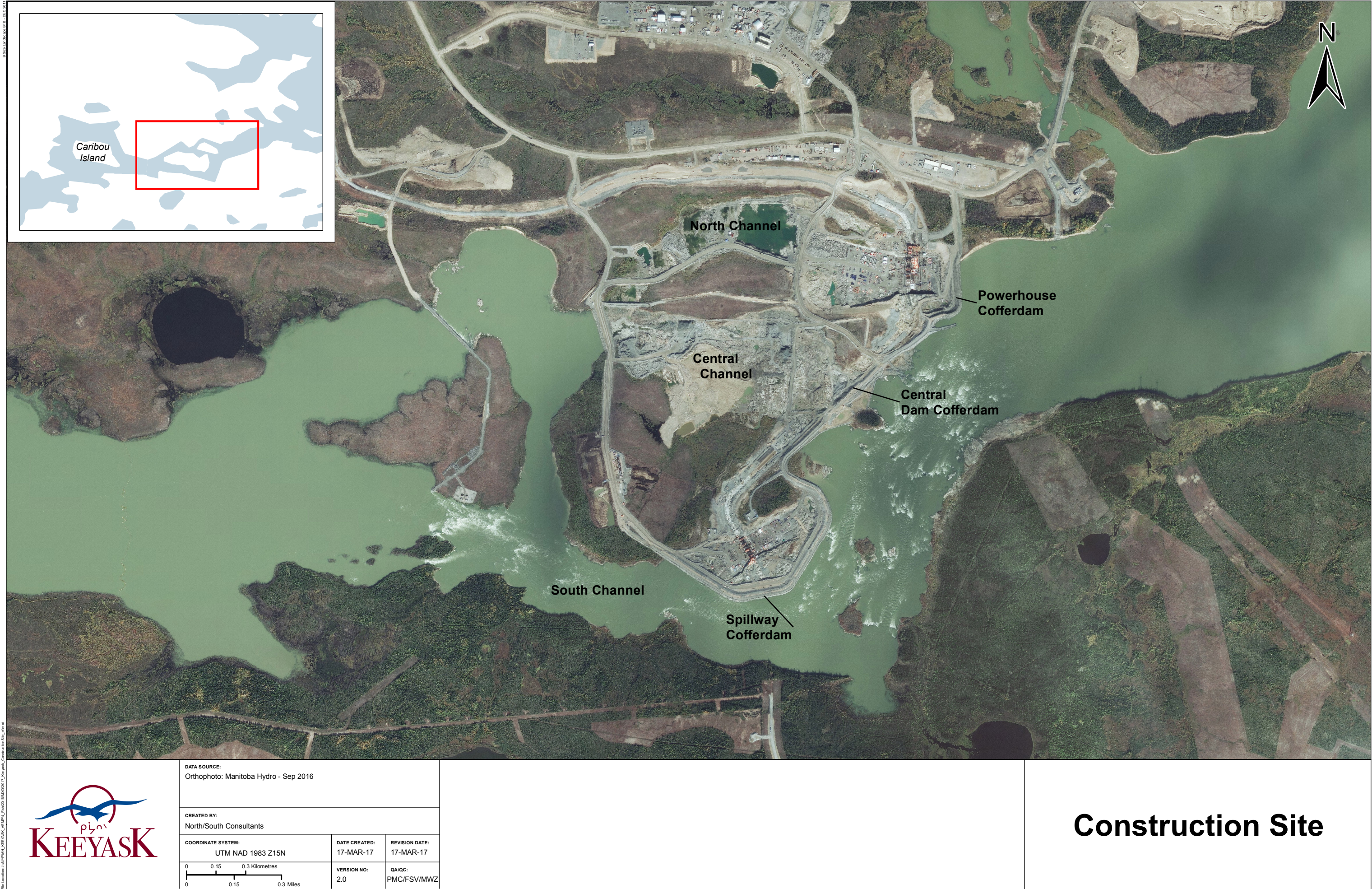
The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the Keeyask Generating Station (GS) on the environment. Besides measuring the accuracy of the predictions made and actual effects of the GS on the environment, monitoring results will provide information on how construction and operation of the GS will affect the environment and if more needs to be done to reduce harmful effects.

Construction of the Keeyask GS began in mid-July 2014. During 2014 and 2015, cofferdams were constructed that blocked the north and central channels and a portion of the south channel of Gull Rapids (see map below). In 2016 there was little in-stream construction prior to the completion of field studies in fall: the central portion of the Central Dam Cofferdam was widened in April/May and work on the Tailrace Summer Level Cofferdam was started on August 4 and 5 and then stopped until October. With so little in-stream construction activity prior to completing field work in the fall, possible construction-related impacts to the aquatic environment during this period were limited to indirect effects (e.g., potential impacts to water quality from discharge at the cofferdam, runoff from disturbed terrestrial areas).

Benthic macroinvertebrates (BMIs) are tiny animals without backbones, such as insect larvae and clams, which live in, or on, the bottom sediments of lakes and rivers. The BMI community is an important part of the overall plan to monitor the effects of construction and operation of the Keeyask GS on the aquatic environment. BMIs are often used to determine the health of lakes and rivers, and are used in monitoring programs all over the world. For example, observing the changes in the numbers of mayflies, which is one of many different kinds of BMIs, is very helpful because these insects spend the early part of their lives in the bottom sediments and are sensitive to changes in the environment. BMIs are also a valuable food source for fish, including Lake Sturgeon, and important in describing the quality of habitat for fish.

This report describes the results of the BMI community monitoring conducted during fall 2016 (third year of construction at Gull Rapids). Samples were collected upstream of construction activities in Split Lake, immediately downstream of construction activities in the Nelson River, and farther downstream in Stephens Lake.





File Location: \\ATYON\KEEYASK\KEEYASK\_16030\WMA\2017\_Keeyask\_ConstructionSite\_4.mxd



DATA SOURCE: Orthophoto: Manitoba Hydro - Sep 2016		
CREATED BY: North/South Consultants		
COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 17-MAR-17	REVISION DATE: 17-MAR-17
0 0.15 0.3 Kilometres 0 0.15 0.3 Miles	VERSION NO: 2.0	QA/QC: PMC/FSV/MWZ

# Construction Site

Map of instream structures at the Keeyask generating station site, September 2016.



## Why is the study being done?

The study is being done to address a key question:

*Are construction activities changing the numbers and/or kinds of BMIs living in the bottom sediments of the Nelson River downstream of the Keeyask GS into Stephens Lake in comparison to either upstream and/or pre-construction conditions?*

When construction work for a GS is done in a lake or river, sediments (the mud at the bottom of a lake or river) often get disturbed and mixed into the water; sediments mixed in the water will travel downstream with the current and eventually settle to the bottom. To understand if the numbers and kinds of BMIs changed downstream of the construction site, BMIs were sampled at locations in the Nelson River and Stephens Lake. Negative effects of increased sediments in the water may include decreases in the numbers of fingernail clams and mayflies.

## What was done?

BMIs were collected in late August to early September of 2016 (Year 3 of construction) in three areas downstream of Gull Rapids. The areas were approximately 3 kilometres (km) (near-field), 11 km (mid-field area), and 25 km (far-field area) downstream of the construction site at Gull Rapids (see map below). Within each sampling area, BMIs were sampled from both nearshore (close to the shoreline in shallow water) and offshore (far from the shoreline in deeper water) habitat types. Five stations were sampled with a dredge (see photo below) to collect bottom sediments and BMIs in these two habitat types.



**Collecting a benthic macroinvertebrate grab with an Ekman dredge**

BMIs were also sampled in Split Lake as an example of conditions within an area unaffected by construction to monitor natural year-to-year differences. Due to logistical issues, samples were not collected from nearshore habitat in Split Lake in 2016.



**What was found?****Nearshore Habitat**

- In comparison to pre-construction, there was a decreased variety of BMIs, and the number of mayflies and the proportion of mayflies, stoneflies, and caddisflies in the BMI community were lower at 11 km downstream of Gull Rapids.
- In comparison to 2014 and 2015, the total number of BMIs in the nearshore habitat 25 km downstream of Gull Rapids, as well as the densities of mayflies and fingernail clams, were greatly decreased.

**Offshore Habitat**

- No negative effects were observed compared to pre-construction (2013) or other construction years (2014 and 2015) at any of the three locations in Stephens Lake.

**What does it mean?**

In 2016, there were negative changes to the BMIs in the nearshore habitat of Stephens Lake at 11 km and 25 km downstream of Gull Rapids. As changes were not seen at the sites 3 km downstream of Gull Rapids, which is closest to the construction site at Gull Rapids, there probably is another reason for the changes farther downstream. The changes at 11 km downstream may have been caused by low water levels on Stephens Lake that left some of the sites dry for part of the summer, while samples at 25 km downstream included more rocks than in previous years, and rocks contain fewer bugs than mud.

**What will be done next?**

BMI monitoring will be conducted in late August of 2017 (Year 4 of construction). Results of monitoring conducted in 2017 will be compared to pre-construction results and presented in the Year 4 construction report.

# ACKNOWLEDGEMENTS

We would like to thank Manitoba Hydro for the opportunity and resources to conduct this study. Kelvin Kitchekeesik of Tataskweyak Cree Nation is thanked for his assistance in conducting the field work.

The collection of biological samples described in this report was authorized by Manitoba Sustainable Development, Fisheries Branch, under terms of the Scientific Collection Permit #08-16.



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# 1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt (MW) hydroelectric generating station at Gull (Keeyask) Rapids on the lower Nelson River in northern Manitoba. The Project is approximately 725 kilometres (km) northeast of Winnipeg, 35 km upstream of the existing Kettle Generating Station, where Gull Lake flows into Stephens Lake, 60 km east of the community of Split Lake, 180 km east-northeast of Thompson and 30 km west of Gillam (Map 1). Construction of the Project began in July 2014.

The *Keeyask Generation Project: Response to EIS Guidelines*, completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project. Technical supporting information for the aquatic environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement: Aquatic Environment Supporting Volume* (AE SV). As part of the licencing process for the Project, an *Aquatic Effects Monitoring Plan* (AEMP) was developed detailing the monitoring activities of various components of the aquatic environment including the focus of this report, specifically monitoring the benthic macroinvertebrate (BMI) community, for the construction and operation phases of the Project.

Construction monitoring of the BMI community specifically addresses the biological effects of increases in total suspended solids (TSS) due to in-stream work on the Nelson River (Map 2). Monitoring of BMI occurred immediately downstream of instream construction activities where effects, should they be measureable, would be greatest. Locations farther downstream in Stephens Lake were also sampled. Benthic macroinvertebrates were also assessed upstream of construction in waterbodies unaffected by the Project (Split Lake and the Burntwood River) using data collected as part of Manitoba and Manitoba Hydro's Coordinated Aquatic Monitoring Program (CAMP).

The key questions during construction phase monitoring are:

- *To what degree will benthic invertebrate abundance and/or community composition change during construction activities in comparison to either upstream or pre-project conditions?*
- *Are there any unexpected effects on benthic macroinvertebrates that may be related to GS construction activities?*

Unlike water or sediment, where protection of aquatic life guidelines may be used to develop triggers or thresholds for an assessment of effects, there are no universal benchmarks for BMI metrics such as abundance and diversity. Rather, the magnitude of change or difference relative to expected conditions is used to establish an appropriate benchmark for biological variables. Based on guidance provided in the Metal Mining Environmental Effects Monitoring document (EC 2012) and scientific literature, experience with other AEMPs (e.g., Azimuth 2012), and power analysis utilizing CAMP data for a regional waterbody, an effect size of  $\pm 50$  percent (%)

change in the mean of a metric (in comparison to reference areas and/or pre-construction data) was chosen as most appropriate to use (*i.e.*, realistically achievable with a well-designed program) for the AEMP.

The following report presents the results of BMI monitoring completed in the fall of 2016 during Year 3 of construction. Results are assessed using the framework summarized in Section 3.4.2 and detailed in the AEMP.

## 2.0 STUDY SETTING

The study area for the 2016 BMI construction monitoring program included Split Lake, downstream of Gull Rapids on the Nelson River, and Stephens Lake (Map 1).

The Burntwood River flows in a south-easterly direction from First Rapids for approximately 35 km prior to emptying into the western arm of Split Lake (Map 1). It is unknown if First Rapids represents a natural barrier to upstream fish passage, however, it is assumed to be under high flow conditions. Hard substrates predominate in the main channel, while loose fine sediments and associated macrophyte growth occur in many off-current areas. The hydrology of the Burntwood River has been affected by the Churchill River Diversion (CRD). Outflow from the Burntwood River to Split Lake prior to CRD was estimated at 90.0 m<sup>3</sup>/s at First Rapids, and increased nearly 10-fold following diversion to 849.0 m<sup>3</sup>/s.

Split Lake is immediately downstream of the Kelsey GS at the confluence of the Burntwood and Nelson rivers (Map 3). Due to large inflows from the Nelson and Burntwood rivers, the lake has a detectable current in several locations. Split Lake has maximum and mean depths of 28.0 m and 3.9 m respectively, at a water surface elevation of 167.0 m above sea level (ASL) (Lawrence *et al.* 1999). The surface area of Split Lake was determined to be 26,100 hectare (ha) (excluding islands), with a total shoreline length, including islands, of 940.0 km (Lawrence *et al.* 1999). The numerous islands in Split Lake represent 411.6 km of the total shoreline.

Gull Rapids is located approximately 3 km downstream of Caribou Island on the Nelson River (Map 4). Two large islands and several small islands occur within the rapids, prior to the river narrowing. The rapids are approximately 2 km in length, and the river elevation drops approximately 11 m along its 2 km length. A summary of 2015/2016 construction activities at Gull Rapids is provided in Section 2.1.

Just below Gull Rapids, the Nelson River enters Stephens Lake. Stephens Lake was formed in 1971 by construction of the Kettle GS. Between Gull Rapids and Stephens Lake there is an approximately 6 km long reach of the Nelson River that, although affected by water regulation at the Kettle GS, remains riverine habitat with moderate velocity (Map 4). Construction of the Kettle GS flooded Moose Nose Lake (which formed the north arm of Stephens Lake) and several other small lakes that previously drained into the Nelson River, as well as the old channels of the Nelson River that now lie within the southern portion of the lake. Major tributaries to Stephens Lake include the North and South Moswakot rivers, which enter the north arm of the lake. Looking Back Creek is a second order stream that also drains into the north arm of Stephens Lake. Kettle GS is located approximately 40 km downstream of Gull Rapids.



## 2.1 CONSTRUCTION SUMMARY

Construction of the Keeyask GS began in mid-July 2014 with the construction of cofferdams in the north and central channels of Gull Rapids. These cofferdams resulted in the dewatering of the north and central channels and the diversion of all flow to the south channel. Construction of the spillway cofferdam, which extends into the south channel of Gull Rapids, was completed in 2015.

Work began to construct the Tailrace Summer Level Cofferdam on August 4 and 5, 2016 and then was suspended until October. Work also took place to widen the central portion of the Central Dam Cofferdam (Map 2) in late April and early May. With so little in-stream construction activity prior to completing field work in the fall, possible construction-related impacts to the aquatic environment during this period were limited to indirect effects (e.g., potential impacts to water quality from discharge at the cofferdam, runoff from disturbed terrestrial areas).

Split Lake outflows from late 2015 to the end of June 2016 were relatively high, generally ranging between 3,500-4,000 m<sup>3</sup>/s. The 75<sup>th</sup> percentile flow for Split Lake outflow is approximately 3,500 m<sup>3</sup>/s. Flow increased sharply in July 2016, reaching a peak of 4,700 m<sup>3</sup>/s in August, before declining. Water levels varied in conjunction with flow, however, some winter staging was apparent from December to May. During the winter of 2015/2016, water levels rose to approximately 155.5 m ASL. Water level on Gull Lake ranged from 154 – 155 m ASL for most of the open-water season.

## 3.0 METHODS

The following sections provide a description of the study design, sampling sites, field and laboratory methods, and data analysis methods for the BMI construction monitoring program.

### 3.1 STUDY DESIGN

The AEMP sampling design is comparable to the current CAMP design, such that data generated by the latter program will be used to augment AEMP reporting. Sampling areas (*i.e.*, polygons) were stratified by water depth and constrained by other aquatic habitat attributes (*e.g.*, substrate type, presence/absence of aquatic plants, water velocity, *etc.*) such that sampling areas represent the predominant habitat types(s). Sampling downstream of the construction site follows a gradient design: it extends from the area of maximum predicted sediment deposition at inlet of Stephens Lake, where effects are most likely (near-field), out into the south basin of the lake (mid-field and far-field sites). Sampling conducted in 2013 (pre-construction/baseline) was based on the sampling design refined during AEMP development in an attempt to minimize the inherent variability within the benthic invertebrate data. As such, 2013 results are directly comparable to data collected in 2014 (Year 1 of construction), 2015 (Year 2), and 2016 (Year 3). The construction monitoring program is designed to facilitate comparisons of BMI metrics spatially (*i.e.*, upstream and downstream of construction activities) to delineate Project-related effects. Specifically, the program is designed to facilitate statistical comparisons of community metrics in reference areas to those monitored downstream of construction activities (*i.e.*, areas that are predicted to be most affected by the Project). The overall objectives of monitoring during the construction period are to determine if instream activities result in or contribute to exceedances of the benchmark and to confirm predictions in the AE SV.

### 3.2 SAMPLING LOCATIONS

Benthic macroinvertebrate sampling was conducted in late August/September from 2013-2016 (Table 1). Reference sites upstream of the Project area are sampled under CAMP (Split Lake is sampled annually and the Burntwood River is sampled on a 3-year rotational basis; Map 3) and AEMP monitoring sites downstream of Gull Rapids into Stephens Lake (at approximately 3 km, 11 km, and 25 km downstream of the construction site; Map 4) are sampled annually. In 2016, the nearshore habitat in Split Lake was not sampled (Year 3 construction) for logistical reasons. Results from the Burntwood River are not discussed in this report but will be examined again in the 2017 after a second year of data had been collected.

Within each sampling polygon, samples were collected from the nearshore in predominantly wetted (PW) habitat and in the deeper offshore (OS) habitat. For PW habitat, water depths of

between 1 and 3 m, areas with consistent water movement (*i.e.*, standing water, low water velocity), and homogeneous substrate were targeted; areas with aquatic macrophyte beds were avoided. For the OS, sampling sites were constrained by the same habitat attributes, with the exception of water depth, which was between 3 and 10 m. The spatial extent of a polygon was at least 100 m x 100 m, and large enough to adequately accommodate five replicate stations. For pre-construction and construction monitoring, the locations of the five replicate stations were established by field crews and selected based on specific habitat attributes (*i.e.*, water depth, substrate type, absence of aquatic plants, water velocity) and the spatial separation criteria outlined in Metal Mining Technical Guidance for Environmental Effects Monitoring (EEM; EC 2012). By EEM definition, a replicate station is a specific, fixed sampling location within an area that can be recognized, re-sampled, and defined quantitatively (*e.g.*, UTM position and a written description). The geographic extent of each replicate station was minimally 10 m x 10 m and separated from other replicate stations by at least 20 m. Within the habitat type(s), a replicate station consisted of three (construction) to five (pre-construction) randomly collected benthic invertebrate sub-samples; the sub-samples were composited to provide an estimate of the benthic community at each station. Field sub-samples were collected using a random number table and from designated sampling locations around an anchored boat within the 10 m x 10 m replicate station area.

### 3.3 FIELD SAMPLING AND LABORATORY METHODS

#### 3.3.1 SUPPORTING *IN SITU* MEASUREMENTS AND SEDIMENT SAMPLING

Supporting environmental variables measured/recorded at each replicate station included:

- Water temperature (using a hand-held thermometer for water surface measurement);
- UTM position (using a hand-held GPS receiver);
- Water transparency (using a Secchi disk);
- Water velocity (using a Swoffer current velocity meter at approximately 20 centimetre [cm] below water surface or visually estimated);
- Riparian vegetation (photographic record and visual description);
- Aquatic macrophytes (description of relative abundance and dominant type); and
- Dominant and secondary substrate types.

An additional benthic grab was taken at each replicate station and sub-sampled with a 5 cm diameter core tube (0.002 square metre [m<sup>2</sup>] surface area) to provide a sample of approximately 100 millilitre (mL) of sediment to characterize the general type of sediments in terms of total

organic carbon (TOC) content and particle size composition. Sediment samples were sent frozen in coolers to the North/South Consultants Inc. (NSC) laboratory (Winnipeg, MB) and stored frozen/cold pending submission to the analytical laboratory. Sediment laboratory analyses were conducted by ALS Laboratory Group (ALS; Winnipeg, MB).

Supporting environmental variables measured/recorded at each sub-sample/grab site included:

- Water depth (using a hand-held depth sounder or metered benthic dredge rope);
- Presence/absence of aquatic macrophytes in sub-sample; and
- Substrate composition (visual description e.g., percent cobble, gravel, silt, etc.).

### 3.3.2 BENTHIC MACROINVERTEBRATES

Benthic invertebrates were sampled at sites using either a petite Ponar dredge or an Ekman dredge (both with 0.023 m<sup>2</sup> opening). All sites were accessed by boat.

At each site within a replicate station, one benthic invertebrate sample was retrieved to the surface and carefully sieved through a 500 micrometre (or micron; µm) mesh rinsing bag. An acceptable sample required that the jaws be completely closed upon retrieval. If the jaws were not completely closed, the sample was discarded into a bucket (and disposed of once sampling was completed) and the procedure was repeated. All sampling equipment was rinsed before sampling at the next site. All material retained by the screen, including invertebrates, was transferred to labelled plastic jars and fixed with 10% formaldehyde. Fixed samples were shipped to the NSC laboratory (Winnipeg, MB) for processing.

At the laboratory, samples from all locations were rinsed with water through a 500 µm sieve and sorted under a 3X magnifying lamp. The invertebrates were transferred to 70% ethanol prior to being identified to the appropriate taxonomic level. A Leica Mz125 microscope (maximum 100x magnification) and reference texts from Clifford (1991), Merritt and Cummins (1996), Peckarsky *et al.* (1990), Smith (2001), Stewart and Stark (2002), and Wiggins (2004) were used for taxonomic identification. Scientific names used followed the Integrated Taxonomic Information System (ITIS 2016) classification. Invertebrates were identified to major group (subclass, order, or family) and Ephemeroptera were identified to genus. All invertebrate identification and enumeration was performed by an invertebrate taxonomist at NSC.

All samples were processed following NSC's Quality Assurance/Quality Control (QA/QC) guidelines (Appendix 1). All sorted samples were checked by a second laboratory technician (QA/QC technician). Additional invertebrates collected during the QA/QC process were combined with the original sample, but counted separately. Sorting efficiency must be ≥ 95%. The QA/QC technician checked on a tray-by-tray basis so that the sample was handled as few times as possible; the QA/QC technician sorted any remaining invertebrates from the tray and recorded the number of missed invertebrates per tray. The QA/QC technician also checked the bench sheet data to ensure it matched the sample data. Ten percent (10%) of the in-house

identifications were randomly selected and re-identified by a second in-house taxonomist for QA/QC. The accuracy of the sample subset was assessed for identification and enumeration. The target overall accuracy level for in-house invertebrate identifications and enumeration was 95%. Corrected identifications and enumeration values were used in place of any data discrepancies. For the 2016 BMI monitoring program, the overall percent identification error at the family-level was 0% for three of the 30 individual samples collected under Keeyask construction monitoring.

All sorted samples will be retained and archived for the duration of the construction phase should further identification be required. A reference collection of benthic invertebrates will be maintained to ensure taxonomic consistency throughout the monitoring program duration.

## **3.4 DATA ANALYSIS**

### **3.4.1 SUPPORTING SEDIMENTS**

Summary statistics (mean, standard deviation [ $\pm$ SD], standard error [ $\pm$ SE], median, minimum, and maximum, coefficient of variation [COV (%)], and mean  $\pm$ 50%) were calculated to characterize the general type of sediments observed in each aquatic habitat type sampled within a polygon. To facilitate such calculations, any parameters measured below the analytical detection limit were assigned a value of one-half the detection limit. All parameters were reviewed and comparisons to  $\pm$ 50% difference in the mean of a metric in comparison to reference locations, and/or pre-construction and Year 1 and 2 data were done to identify any potential physical habitat differences among sampling locations. For each parameter that was greater than 50% different, a statistical comparison was undertaken within that specific habitat type to determine if the difference was statistically significant (as described in Section 3.4.2).

### **3.4.2 BENTHIC MACROINVERTEBRATES**

To prepare data for analysis, abundance of invertebrates was converted to density (number of invertebrates per square metre [individuals/m<sup>2</sup>]) by dividing the total number of invertebrates by the area of the sampling device (0.023 m<sup>2</sup>). The mean, standard deviation ( $\pm$ SD), standard error ( $\pm$ SE), median, minimum, maximum, COV (%), and mean  $\pm$ 50% were calculated to characterize each aquatic habitat type sampled within a polygon for each waterbody.

Benthic invertebrate community descriptors were calculated for each replicate station and habitat type. Composition metrics included:

- Total macroinvertebrate density;



- Densities and relative proportions of major groups. (non-Insecta: Oligochaeta, Amphipoda, Bivalvia, Gastropoda; Insecta: Chironomidae, Ephemeroptera, Plecoptera, Trichoptera);
- Percent Ephemeroptera;
- Percent Ephemeroptera, Plecoptera, and Trichoptera (EPT) (EPT index; Sullivan *et al.* 2004);
- Percent of total organisms made up of Oligochaeta and Chironomidae; and,
- Ratio of EPT to Chironomidae.

Richness measures included:

- Total taxonomic richness (family-level; total number of invertebrate families within a habitat polygon; Barbour *et al.* 1999; Klemm *et al.* 2002; Resh *et al.* 1997); and,
- EPT richness (family-level; total number of families of Ephemeroptera, Plecoptera, and Trichoptera within a habitat polygon).

Diversity indices included:

- Simpson's Diversity Index (EC 2012; Magurran 1988, 2004; Mandaville 2002).

The AEMP identified the following BMI community metrics (which are sensitive to environmental change) and a benchmark to focus the monitoring program and provide a framework for adaptive management:

- Total macroinvertebrate abundance;
- Total taxonomic richness; and
- Simpson's Diversity Index.

Results of the BMI monitoring program are subject to the steps outlined in Figure 1. This framework prescribes data analysis methods and other tasks to be undertaken based on results of the monitoring program. Step 1 of the framework entails comparison of the mean values of replicate samples for metrics to the benchmark identified in the AEMP. If the benchmark is not exceeded, the assessment would proceed to Response Level 1: trend analysis. If the benchmark is exceeded, the assessment would proceed to Step 2: determination of whether there is a statistical difference between upstream and downstream areas (*i.e.*, control-impact) and/or relative to pre-construction conditions (before-after). If a statistical difference is not observed, the assessment would proceed to Response Level 1. Where statistical differences are identified, the assessment would proceed to Step 3, in which a determination of cause (*i.e.*, is the difference Project-related?) would be undertaken.

All metrics were reviewed and compared to the benchmark (*i.e.*,  $\pm 50\%$  change in the mean of a metric in comparison to each previous year of monitoring data) to identify the potential for effects on the BMI community. For each metric that exceeded the benchmark, a statistical comparison between every year of data was undertaken. Prior to statistical analyses, macroinvertebrate metrics were tested for normality and homogeneity of variances and where

the assumptions were met, were compared through a t-test or an Analysis of Variance (ANOVA) with Bonferroni pairwise comparison ( $\alpha=0.05$ ). Where these assumptions were not met, non-parametric analyses were applied such as the Mann-Whitney U-test or Kruskal-Wallis test followed by Dunn's multiple pairwise comparisons procedure ( $\alpha=0.05$ ). When data are non-normal, non-parametric tests are more powerful than parametric ones, *i.e.*, non-parametric analyses may be able to detect significant differences in the data when parametric analyses would not (Zar 1999). Non-parametric analyses are performed on ranks of the data and therefore do not require transformation of data; thus, all analyses are performed on the raw data. All analyses were performed using a current version of XLStat.

## 4.0 RESULTS

### 4.1 SUPPORTING SEDIMENTS

Sediment data for individual replicate stations sampled in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction) and 2016 (Year 3 construction) are presented in Appendix 2. As noted in the preceding section, the nearshore habitat in Split Lake was not sampled in 2016 and it was therefore not possible to compare trends observed in Split Lake's nearshore habitat to what was observed in Stephens Lake's nearshore habitat.

#### 4.1.1 NEARSHORE HABITAT

##### 4.1.1.1 TOC (%)

The benchmark (*i.e.*, a  $\pm 50\%$  change in the mean of a metric in comparison to pre-construction data) was exceeded at Stephens Lake 3 km in 2016 when the mean TOC (%) of sediments was significantly more than  $+50\%$  higher than the measured mean in 2013 (pre-construction) (Table 2), but within  $\pm 50\%$  of the 2014 (Year 1 construction) and 2015 (Year 2 construction) means. Mean TOC (%) content measured in nearshore habitat at 11 km in 2016 was more than  $+50\%$  higher than the pre-construction mean, (but not significantly so), and was within  $\pm 50\%$  of the 2014 and 2015 means. TOC of sediments for nearshore habitat at Stephens Lake 25 km in 2016 was higher than  $+50\%$  of the 2014 and 2015 means, but the differences were not statistically significant.

##### 4.1.1.2 SAND (%)

Mean sand (%) at Stephens Lake 3 km in 2016 was more than  $+50\%$  higher than pre-construction and 2014 means, but these differences were not statistically significant, and the 2016 mean was within  $\pm 50\%$  of the 2015 mean (Table 3). Sand content at 11 km was more than  $+50\%$  higher in 2016 than in all previous years of sampling, but once again the increase was not statistically significant. In 2016, sand content of sediments in nearshore habitat at 25 km was within  $\pm 50\%$  of the 2014 and 2015 means.

##### 4.1.1.3 SILT (%)

Mean silt (%) in 2016 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means at Stephens Lake 3 km (Table 4). At Stephens Lake 11 km, the 2016 mean was within  $\pm 50\%$  of the 2014 mean, but more than  $-50\%$  less than the pre-construction and 2015 means, with the

difference from the 2015 mean being statistically significant. Silt content of sediments in nearshore habitat at 25 km was within  $\pm 50\%$  of the 2014 and 2015 means.

#### **4.1.1.4 CLAY (%)**

Mean clay (%) in 2016 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means at Stephens Lake 3 km and 11 km (Table 5). Clay content of sediments in nearshore habitat at 25 km was also within  $\pm 50\%$  of the 2014 and 2015 means.

### **4.1.2 OFFSHORE HABITAT**

#### **4.1.2.1 TOC (%)**

The benchmark was exceeded at Stephens Lake 3 km, where the TOC content of offshore sediments was within  $\pm 50\%$  of the 2015 mean, but it was more than +50% higher than the measured means in 2013 and 2014, with the difference from the 2013 mean being significant (Table 6). Mean TOC content measured in offshore habitat at Stephens Lake 11 km in 2016 was more than +50% higher than the measured means in all previous years of sampling, and was significantly higher than the 2013 and 2015 means. TOC content of sediments for offshore habitat at Stephens Lake 25 km, followed a similar pattern, with the mean TOC content in 2016 being more than +50% higher than the 2014 and 2015 means.

In 2016, mean TOC (%) in offshore habitat in Split Lake was more than +50% higher than the pre-construction, 2014 and 2015 means, and this difference was significant compared to 2013 and 2015 means (Table 6).

#### **4.1.2.2 SAND (%)**

Mean sand (%) in 2016 was more than +50% higher than the pre-construction mean and 2015 means (significantly higher than the 2013 mean), but within  $\pm 50\%$  of the 2014 mean at Stephens Lake 3 km (Table 7). Similar variability was seen at Stephens Lake 11 km, where the 2016 mean % sand in offshore habitat was more than +50% higher than the 2013 and 2014 means (significantly more than 2014), but within  $\pm 50\%$  of the 2015 mean. In 2016, sand content of sediments in offshore habitat at 25 km was significantly higher than +50% of the 2014 and 2015 means.

In 2016, mean sand (%) in offshore habitat was within  $\pm 50\%$  of the pre-construction, 2014, and 2015 means at Split Lake (Table 7).

#### 4.1.2.3 SILT (%)

Mean silt (%) in 2016 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means at Stephens Lake 3 km and 11 km (Table 8). Silt content of sediments in offshore habitat at 25 km was within  $\pm 50\%$  of the 2014 and 2015 means.

Mean silt (%) in the offshore habitat in Split Lake in 2016 was within  $\pm 50\%$  of the pre-construction, 2014, and 2015 means (Table 8).

#### 4.1.2.4 CLAY (%)

Mean clay (%) in samples from Stephens Lake 3 km in 2016 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means (Table 9). Clay content at 11 km was within  $\pm 50\%$  of the 2013 and 2014 means, but was significantly more than  $+50\%$  higher than the 2015 mean. Similar to what was seen at 11 km, mean clay content of sediments in offshore habitat at 25 km was within  $\pm 50\%$  of the 2014 mean, but significantly more than  $+50\%$  higher than the 2015 mean.

Mean clay (%) in offshore habitat in 2016 was within  $\pm 50\%$  of the 2014 mean at Split Lake but exceeded the 2013 and 2015 means (although not significantly so) (Table 9).

## 4.2 BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrate data for individual replicate stations sampled in 2013, 2014, 2015 and 2016 are presented in Appendix 2. Summary statistics by habitat type for metrics not presented in the following sections are provided in Appendix 3.

Differences between the BMI communities in Split Lake (reference) and Stephens Lake (impact) were noted for the pre-construction program (Zrum and Gill 2015). For example, the mean total macroinvertebrate density in offshore habitat at the 3 km and 11 km downstream sites in Stephens Lake in 2013 was more than 50% lower than the mean total macroinvertebrate density in offshore habitat in Split Lake in the same year, a difference that already exceeded the benchmark and construction had yet to begin. As such, assessment of construction effects could not be based on a direct upstream/downstream comparison; instead, the identification of potential effects of construction-related activities on the downstream benthos was based on changes over time within a given polygon. However, data collected from the reference waterbodies can be used to identify changes in BMI metrics that occur in waterbodies throughout the study area and are therefore likely result from changes in environmental conditions that are not related to construction (e.g., water temperature).

## **4.2.1 KEY METRICS**

### **4.2.1.1 TOTAL MACROINVERTEBRATE ABUNDANCE**

#### **4.2.1.1.1 NEARSHORE HABITAT**

At Stephens Lake 3 km, mean total macroinvertebrate density measured in nearshore habitat in 2016 was within  $\pm 50\%$  of the pre-construction mean and the 2014 and 2015 means; density at 11 km was significantly lower than  $-50\%$  of the 2013 mean, but within  $\pm 50\%$  of 2014 and 2015 (Table 10). Total macroinvertebrate density in nearshore habitat at 25 km was lower than  $-50\%$  of the 2014 and 2015 means, but only significantly lower than 2015.

#### **4.2.1.1.2 OFFSHORE HABITAT**

The macroinvertebrate density measured in offshore habitat in Stephens Lake 3 km was within  $\pm 50\%$  of the pre-construction mean, but it was more than  $-50\%$  lower than the 2014 mean and more than  $+50\%$  higher than the 2015 mean (although these difference were not statistically significant). Density in 2016 was within  $\pm 50\%$  of the 2013, 2014 and 2015 means at 11 km downstream (Table 11), and within  $\pm 50\%$  of the 2014 and 2015 means at 25 km.

In 2016, the mean total invertebrate density measured in offshore habitat in Split Lake was below the 2013 and 2014  $-50\%$  means (a significant difference in both cases) but within  $\pm 50\%$  the 2015 mean (Table 11).

### **4.2.1.2 TOTAL TAXONOMIC RICHNESS**

#### **4.2.1.2.1 NEARSHORE HABITAT**

Mean total taxonomic richness (at the family level) measured in nearshore habitat in 2016 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means at Stephens Lake 3 km and 11 km (Table 12). Similarly, total richness at 25 km was within  $\pm 50\%$  of the 2014 and 2015 means.

#### **4.2.1.2.2 OFFSHORE HABITAT**

Mean total richness measured in offshore habitat in 2016 at Stephens Lake 3 km was within  $\pm 50\%$  of the pre-construction and 2014 means, while it was more than  $+50\%$  higher than the 2015 mean, but this difference was not statistically significant (Table 13). At Stephens Lake 11 km, total richness was within  $\pm 50\%$  of the 2013, 2014 and 2015 means; similarly, total richness at 25 km was also within  $\pm 50\%$  of the 2014 and 2015 means.

In 2016, the mean total taxonomic richness measured in offshore habitat in Split Lake was within  $\pm 50\%$  of means from 2013 to 2015 (Table 13).

### 4.2.1.3 SIMPSON'S DIVERSITY INDEX

#### 4.2.1.3.1 NEARSHORE HABITAT

Mean Simpson's diversity measured in nearshore habitat in 2016 at Stephens Lake 3 km was within  $\pm 50\%$  of the pre-construction and 2014 means, but it was more than +50% higher than the 2015 mean (Table 14). At Stephens Lake 11 km, diversity was within  $\pm 50\%$  of the 2013, 2014 and 2015 means; similarly, diversity at 25 km was within  $\pm 50\%$  of the 2014 and 2015 means.

#### 4.2.1.3.2 OFFSHORE HABITAT

The index was within the benchmark value ( $\pm 50\%$ ) of the pre-construction, 2014, and 2015 means at Stephens Lake 3 km (Table 15). At Stephens Lake 11 km in 2016, diversity was more than +50% higher than the pre-construction mean, but this was not a statistically significant difference, and was within  $\pm 50\%$  of the 2014 and 2015 means. Diversity at 25 km in 2015 was within  $\pm 50\%$  of the 2014 mean, and although only 0.01% more than +50% mean in 2015, analyses indicated that this difference was significant.

In 2016, the mean Simpson's diversity index measured in offshore habitat in Split Lake was within  $\pm 50\%$  of means from 2013 to 2015 (Table 15).

## 4.2.2 ADDITIONAL METRICS

Benthic macroinvertebrate metrics expected to be negatively affected by increases in TSS include a decrease in Ephemeroptera (mayfly) abundance, % EPT (% mayfly, stonefly, and caddisfly), and Pisidiidae (fingernail clam) abundance; as such, they are presented in the following sections.

### 4.2.2.1 NEARSHORE HABITAT

#### 4.2.2.1.1 EPHEMEROPTERA ABUNDANCE

Mean mayfly density measured in nearshore habitat in 2016 at Stephens Lake 3 km was more than +50% higher than the pre-construction mean, and more than -50% lower than the 2014 mean, but not significantly so in either case (Table 16). The 2016 mean at Stephens Lake 3 km was significantly more than +50% higher than the 2015 mean. Similar to what was seen in 2015, the mean mayfly density at Stephens Lake 11 km in 2016 was significantly less than -50% of the pre-construction mean. It was also more than -50% lower than the 2014 mean (but not significantly). At Stephens Lake 25 km, mayfly density in 2016 was more than -50% lower than the 2014 and 2015 means, but it was only significantly lower than the 2015 mean.



#### **4.2.2.1.2 PERCENT EPT**

In nearshore habitat at Stephens Lake 3 km in 2016, percent EPT was within  $\pm 50\%$  of the pre-construction mean, but was more than -50% lower than 2014 mean and more than +50% higher than the 2015 mean (Table 17), but only significantly different from the 2015 mean. At Stephens Lake 11 km, % EPT in 2016 was within  $\pm 50\%$  of the 2015 mean but was more than -50% lower than the pre-construction and 2014 means, with the difference between 2013 and 2016 being significant. At 25 km, the 2016 mean %EPT was within  $\pm 50\%$  of the 2014 mean, but was more than -50% less than the 2015 mean (but not significantly so).

#### **4.2.2.1.3 PISIDIIDAE ABUNDANCE**

In nearshore habitat at Stephens Lake 3 km, mean fingernail clam density in 2016 was within  $\pm 50\%$  of the pre-construction mean, but was more than +50% higher than the 2014 and 2015 means, although these differences were not statistically significant (Table 18). At Stephens Lake 11 km, fingernail clam density in 2015 was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means. At Stephens Lake 25 km, density was significantly more than -50% less than the 2014 and 2015 means.

### **4.2.2.2 OFFSHORE HABITAT**

#### **4.2.2.2.1 EPHEMEROPTERA ABUNDANCE**

Mean mayfly density at Stephens Lake 3 km was within  $\pm 50\%$  of the pre-construction and 2014 means, and was significantly more than +50% higher than the 2015 mean, as mayflies were absent at 3 km in 2015 (Table 19). In 2016, mean mayfly density at Stephens Lake 11 km was less than -50% of the pre-construction mean (but not significantly), and was within  $\pm 50\%$  of the 2014 and 2015 means. At Stephens Lake 25 km, mean mayfly density in 2016 was within  $\pm 50\%$  of the 2014 mean, but was significantly more than +50% higher than the 2015 mean.

Mean mayfly density measured in offshore habitat in 2016 in Split Lake was more than -50% less than that of the pre-construction mean and higher than the +50% mean in 2015; neither were significant differences (Table 19). Abundance was within the 2014  $\pm 50\%$  mean.

#### **4.2.2.2.2 PERCENT EPT**

The % EPT in Stephens Lake offshore habitat at 3 km was within  $\pm 50\%$  of the pre-construction and 2015 means, and more than +50% higher than the 2014 mean (but not significantly so) (Table 20). At Stephens Lake 11 km, % EPT was within  $\pm 50\%$  of the pre-construction, 2014 and 2015 means. At Stephens Lake 25 km, mean density in 2016 was within  $\pm 50\%$  of the pre-construction mean, and significantly more than +50% higher than the 2015 mean.

Mean % EPT in offshore habitat in 2016 in Split Lake was within the pre-construction  $\pm 50\%$  mean and was significantly higher than the +50% mean in both 2014 and 2015 (Table 20).

#### 4.2.2.2.3 PISIDIIDAE ABUNDANCE

The density was more than +50% higher than the pre-construction and 2014 means at Stephens Lake 3 km, but these differences were not significant (Table 21). The 2016 mean was significantly higher than the 2015 mean, since fingernail clams were absent at 3 km. Fingernail clams were absent from 11 km downstream in all years of sampling, and absent from 25 km in all years except 2014 (although there were not significantly more in 2014), and appear to be rare in the offshore habitat of Stephens Lake.

In Split Lake offshore habitat, mean fingernail clam density in 2016 was more than -50% lower than pre-construction, 2014, and 2015; however the change was only significantly different in 2013 and 2014 (Table 21).

## 5.0 DISCUSSION

While statistically significant in some cases, the changes in substrate composition (% TOC, sand, silt and clay) measured in 2016 are not thought to have affected the BMI community. This is because the majority of observed differences were too small to be relevant, such as the less than 2% increase in the proportion of TOC in samples collected from nearshore habitat at 3 km downstream between 2013 and 2016 (Table 2). In the remaining instances where a significant change was detected, the patchy nature of the substrate at the sampling sites appears to be responsible for the perceived shift. For example, at 3 km downstream, the increased proportion of sand in offshore habitat in 2016 can be traced back to a single grab that contained a much higher proportion of sand than the other four grabs (Table 7; Appendix 2).

The effects observed at the 3 km site in 2015 (decreased diversity, decreased mayfly and fingernail clam densities, and decreased %EPT in the nearshore, and decreased total invertebrate abundance, total richness and decreased mayfly density in the offshore relative to the pre-construction means) appear to have been temporary, as they were not detected by 2016 sampling (Table 22). Observed changes to the metrics expected to be negatively affected by increases in TSS indicate no significant negative effects in the nearshore or offshore 3 km downstream of Stephens Lake compared to baseline 2013 data or the first year of construction (2014) (Table 22).

Results from 2016 indicated there were localized negative changes in the benthos in Stephens Lake at nearshore sites located 11 km and 25 km downstream of the construction site (Tables 23 and 24). At 11 km downstream of the construction site, the decrease in total invertebrate density and mayfly density that was observed in 2015 persisted in 2016, as the mean in 2016 was significantly more than -50% lower than the baseline mean (Table 23). A significant decline in % EPT was also observed in 2016. Upon closer examination, the measured nearshore decrease in mean total invertebrate density at 11 km downstream in 2016 was largely attributable to the observed decrease in mayfly density, which was similar to the decrease in mean total invertebrate density relative to 2013 (Appendix 2).

The total densities of BMIs and mayflies in samples collected from nearshore habitat at 25 km downstream in 2016 was lower than -50% of the 2014 means and significantly lower than the 2015 means (Table 24). A significant decrease (more than -50% lower than the 2014 and 2015 means) in fingernail clam density was also observed within this habitat type at 25 km downstream in 2016. In the reference waterbody, Split Lake, fingernail clam density in 2016 also showed a significant decrease below the -50% benchmark when compared to 2013 Split Lake pre-project data (Table 25). Although mayfly densities also decreased in Split Lake in 2016, this decrease was not found to be a significant.

The patterns of change (*i.e.*, no negative effect at the 3 km site) suggest that the differences observed at 11 km and 25 km downstream were not likely to have been related to construction,

but instead resulted from other factors. Low water levels on Stephens Lake in the mid-summer of 2016 would have exposed a portion of the 11 km downstream nearshore sampling site, which would have reduced the density of invertebrates (Figure 8). Invertebrate abundance in samples collected 25 km downstream was also low compared to previous years of monitoring; this difference may be due to the heterogeneity of substrate at this location with sampling in some years being conducted in an area with a more rocky substrate (Table 1 and Table 10).

In addition, if increases in TSS resulting from construction were to negatively impact the BMI community downstream of Gull Rapids, these impacts would be apparent in offshore habitat as well as nearshore habitat. As changes in the BMI metrics expected to be negatively affected by increases in TSS were not detected in offshore habitat at 3 km, 11 km or 25 km downstream in 2016, (i.e., they either remained within benchmarks or increased in comparison to previous years of sampling), the nearshore effects seen at 11 km and 25 km downstream are unlikely to have resulted from construction (Tables 22, 23 and 24 respectively).

Turbidity monitoring conducted under the Keeyask Generation Project Physical Environment Monitoring Program (PEMP) along the mainstem of the Nelson River showed that turbidity in 2016 was generally similar at the outlet of Clark Lake and the inlet of Gull Lake. Turbidity upstream of Gull Rapids and at the entrance to Stephens Lake was generally similar, both being somewhat greater than upstream. Turbidity immediately upstream of the Kettle GS was generally lower than at the other four locations. Overall, turbidity was generally greater than in 2015, likely due to higher flows, but the range of conditions observed was comparable to what was recorded in the pre-construction period (2008) (Manitoba Hydro 2017). Turbidity monitoring conducted under the Sediment Management Plan (SMP) in the open water season of 2016 indicated no substantive change in turbidity between a site immediately upstream of the construction area and sites in Stephens Lake 1.5 and 9 km downstream of the construction site, indicating that sediment inputs at the construction site were not causing detectable increases in turbidity (and by inference, TSS) in the mainstem of the Nelson River (Manitoba Hydro 2017).

Water quality monitoring data collected under the AEMP in 2016 did not detect any exceedances of the TSS guidelines or other substantive changes to water quality as a result of construction (Martens and Cooley 2017).

## 5.1 KEY QUESTIONS

Two key questions were considered.

*To what degree will benthic invertebrate abundance and/or community composition change during construction activities in comparison to either upstream or pre-project conditions?*

The AE SV (KHLP 2012) considered the following pathways of effect during construction of the Project:

- Changes to water quality, such as increases in concentration of TSS and related variables (e.g., turbidity). However, it was expected that measures to protect water quality would reduce the likelihood of any measurable effects on the BMI community; and
- Deposition of sediments in Stephens Lake. This was not expected to affect BMI as the total amount of sediments deposited was predicted to be very small (less than 0.6 cm thickness over the period of construction) and the composition of bottom substrate would not be changed.

Results indicate that the negative effects observed at 3 km downstream of Gull Rapids in 2015 were temporary, as they did not persist in 2016. At 11 km downstream in 2016 there were negative changes to the following BMI metrics in nearshore habitat: total abundance, mayfly density, and % EPT. In addition, total abundance, mayfly density, and fingernail clam density significantly decreased in nearshore habitat at 25 km downstream. However, a lack of observed effects at 3 km downstream suggested that these changes were unlikely to have resulted from TSS increases from construction; instead, they may have resulted from water-level fluctuations on Stephens Lake during the 2016 open-water season and/or from differences in the composition of sampled substrate between years. Turbidity monitoring conducted by Manitoba Hydro indicated that there were no marked effects related to construction in 2016.

*Are there any unexpected effects on benthic macroinvertebrates that may be related to GS construction activities?*

To date, BMI monitoring during construction has not detected any unexpected effects that may be related to instream construction activities.

## 6.0 SUMMARY AND CONCLUSIONS

Benthic macroinvertebrates were sampled in late August to early September of 2016 (Year 3 of construction) in one area of Split Lake and in three areas downstream of Gull Rapids and into Stephens Lake to monitor the potential effects of construction. The three areas in Stephens Lake were located approximately 3 km (near-field area), 11 km (mid-field area), and 25 km (far-field area) downstream of Gull Rapids. Within each sampling area, BMIs were sampled from both nearshore (close to the shoreline in shallow water) and offshore (further from the shoreline in deeper water) habitat types. Five stations were sampled with a bottom dredge to collect bottom sediments and BMIs in each of these two habitat types. Samples were also collected in the offshore habitat of Split Lake as a reference area.

Results from 2016 indicated there were negative changes in the benthos in nearshore habitat at 11 km and 25 km downstream of Gull Rapids:

- In comparison to pre-construction, there was a decreased variety of BMIs, and the number of mayflies and the proportion of mayflies, stoneflies, and caddisflies in the BMI community were lower at 11 km downstream of Gull Rapids.
- In comparison to 2014 and 2015, the total number of BMIs, as well as the densities of mayflies and fingernail clams in the nearshore habitat 25 km downstream of Gull Rapids were greatly decreased.

As construction-related changes were not detected at 3 km downstream, where BMIs either remained within benchmarks or increased in 2016 in comparison to 2013, it was concluded that the effects observed at 11 km and 25 km downstream were not likely to have been related to construction. Turbidity monitoring in 2016 also indicated that the observed changes in the BMI community at 11 km and 25 km downstream were unlikely to have resulted from instream construction activities, as long-term increases in turbidity were not recorded. Instead, decreases observed at 11 km downstream in 2016 may have resulted from low water levels on Stephens Lake during July 2016 that dewatered a portion of the sampling area, and/or natural variations in the type of substrate sampled between years (*i.e.*, the 2016 grabs included gravel) at 25 km downstream.

The key questions related to BMI monitoring during construction are addressed below:

- *To what degree will benthic invertebrate abundance and/or community composition change during construction activities in comparison to either upstream or pre-project conditions?*

Results indicate that the negative effects observed at 3 km downstream of Gull Rapids in 2015 were temporary, as they did not persist in 2016. At 11 km downstream in 2016 there were negative changes to the following BMI metrics in nearshore habitat: total abundance, mayfly density, and % EPT. In addition, total abundance, mayfly density, and fingernail clam density significantly decreased in nearshore habitat at 25 km downstream. However, a lack

of observed effects at 3 km downstream suggested that these changes were unlikely to have resulted from TSS increases from construction; instead, they may have resulted from water-level fluctuations on Stephens Lake during the 2016 open-water season and/or from differences in the composition of sampled substrate between years. Turbidity monitoring conducted by Manitoba Hydro indicated that there were no marked effects related to construction in 2016.

- *Are there any unexpected effects on benthic macroinvertebrates that may be related to GS construction activities?*

BMI monitoring during construction has not detected any unexpected effects that may be related to instream construction.

Based on the analyses completed to date, no change to monitoring activity is anticipated. BMI monitoring will be conducted in late August of 2017 (Year 4 of construction) as set out in the AEMP. Results of monitoring conducted in 2017 will be compared to pre-construction results and presented in the Year 4 construction report.



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## TABLES

**Table 1: Coordinates and supporting habitat variables measured at benthic macroinvertebrate monitoring sites sampled in 2013 (pre-construction)<sup>a,b</sup>, 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Waterbody	Site ID	Habitat Type	Sample Date	Study Year	UTM (NAD 83)			Water Temp. (°C)	Water Velocity (m/sec)	Mean Water Depth (m)	Mean Secchi Depth (m)	Substrate Description
					Zone	Easting	Northing					
Burntwood River <sup>c</sup>	BURNT-PW	NRSH-PW	19-Aug-14	2014	14	645413	6224249	18	0.17	2.5	0.45	clay
Burntwood River	BURNT-OS	OFFSH	19-Aug-14	2014	14	646090	6224449	18	0.32	8.3	0.35	clay/OM
Split Lake	SPLIT-PW	NRSH-PW	23-Aug-14	2014	14	673602	6232992	17	0	2.6	0.30	clay
Split Lake	SPLIT-PW	NRSH-PW	23-Aug-15	2015	14	673607	6232997	16	-	1.1	0.60	clay/OM
Split Lake	SPLIT-OS	OFFSH	22-Aug-13	2013	14	678461	6233976	17	0	7.4	0.46	clay
Split Lake	SPLIT-OS	OFFSH	23-Aug-14	2014	14	678466	6233977	18	0	7.8	0.52	clay
Split Lake	SPLIT-OS	OFFSH	23-Aug-15	2015	14	678468	6233975	16	-	5.9	0.60	clay
Split Lake	SPLIT-OS	OFFSH	27-Aug-16	2016	14	678463	6233981	18	0.07	7.0	0.50	clay/silt
Stephens Lake	STL3KM-PW	NRSH-PW	25-Sep-13	2013	15	365672	6248917	14	0	2.8	0.33	clay
Stephens Lake	STL3KM-PW	NRSH-PW	16-Sep-14	2014	15	365666	6248912	10	0	2.8	0.30	silt/OM
Stephens Lake	STL3KM-PW	NRSH-PW	20-Aug-15	2015	15	365666	6248914	16	-	2.3	-	clay/OM/gravel
Stephens Lake	STL3KM-PW	NRSH-PW	10-Sep-16	2016	15	365664	6248906	15	0.05	2.5	0.40	silt/clay/OM
Stephens Lake	STL3KM-OS	OFFSH	25-Sep-13	2013	15	366128	6248908	14	0.02	6.1	0.30	clay
Stephens Lake	STL3KM-OS	OFFSH	16-Sep-14	2014	15	366127	6248901	10	0	6.0	0.30	silt/clay
Stephens Lake	STL3KM-OS	OFFSH	20-Aug-15	2015	15	366125	6248901	16	-	5.3	-	clay
Stephens Lake	STL3KM-OS	OFFSH	10-Sep-16	2016	15	366122	6248910	15	0.08	5.6	0.40	silt/clay
Stephens Lake	STL11KM-PW	NRSH-PW	26-Sep-13	2013	15	376454	6248753	11	0	2.4	0.58	clay
Stephens Lake	STL11KM-PW	NRSH-PW	16-Sep-14	2014	15	376451	6248753	10	0	2.2	0.30	silt/clay/OM
Stephens Lake	STL11KM-PW	NRSH-PW	21-Aug-15	2015	15	376445	6248747	16	-	2.1	-	clay
Stephens Lake	STL11KM-PW	NRSH-PW	10-Sep-16	2016	15	376455	6248750	15	0.05	1.7	0.43	sand/OM/silt

**Table 1: Coordinates and supporting habitat variables measured at benthic macroinvertebrate monitoring sites sampled in 2013 (pre-construction)<sup>a,b</sup>, 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Waterbody	Site ID	Habitat Type	Sample Date	Study Year	UTM (NAD 83)			Water Temp. (°C)	Water Velocity (m/sec)	Mean Water Depth (m)	Mean Secchi Depth (m)	Substrate Description
					Zone	Easting	Northing					
Stephens Lake	STL11KM-OS	OFFSH	26-Sep-13	2013	15	376340	6248573	11	0	6.9	0.70	clay
Stephens Lake	STL11KM-OS	OFFSH	16-Sep-14	2014	15	376354	6248567	10	0	6.8	0.30	clay
Stephens Lake	STL11KM-OS	OFFSH	20-Aug-15	2015	15	376351	6248567	16	-	6.3	-	clay
Stephens Lake	STL11KM-OS	OFFSH	10-Sep-16	2016	15	376360	6248559	15	0.03	6.7	0.41	silt
Stephens Lake	STL25KM-PW	NRSH-PW	17-Sep-14	2014	15	386545	6247951	10	0	2.5	0.35	silt/clay
Stephens Lake	STL25KM-PW	NRSH-PW	08-Sep-15	2015	15	386545	6247952	15.5	-	1.6	0.50	sand/clay/OM
Stephens Lake	STL25KM-PW	NRSH-PW	10-Sep-16	2016	15	386569	6247952	15	0.07	2.1	0.40	gravel/sand/silt/OM
Stephens Lake	STL25KM-OS	OFFSH	17-Sep-14	2014	15	385548	6248048	10	0	9.1	0.35	clay
Stephens Lake	STL25KM-OS	OFFSH	21-Aug-15	2015	15	385549	6248050	16	-	8.9	-	clay
Stephens Lake	STL25KM-OS	OFFSH	10-Sep-16	2016	15	385559	6248050	15	0.06	9.1	0.42	silt/OM

a. Stephens Lake sites 25 km downstream added after 2013 to address concerns with unanticipated downstream effects.

b. Split Lake predominantly wetted was not added to CAMP sampling in 2013.

c. Burntwood River sites during construction are only sampled on three year rotational cycle with CAMP.

OS = offshore.

PW = predominantly wetted.

OM = organic matter.

**Table 2: Summary statistics for total organic carbon (TOC, %) content measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Total Organic Carbon (TOC, %)					
n	5	5	5	5	5	5
Mean	2.17	2.51	1.28	2.38	3.03	2.46
Minimum	1.51	1.67	1.13	1.67	0.89	1.49
Maximum	3.97	3.26	1.48	3.13	6.83	3.43
Median	1.65	2.67	1.25	2.28	1.36	2.48
Standard deviation (n-1)	1.05	0.61	0.16	0.61	2.68	0.92
Standard error of the mean	0.47	0.27	0.07	0.27	1.20	0.41
COV (%)	48.24	24.25	12.33	25.47	88.62	37.33
+50% Mean	3.26	3.77	1.92	3.56	4.54	3.69
-50% Mean	1.09	1.26	0.64	1.19	1.51	1.23
Benchmark Exceedance (temporal comparison)	-	No	-	Yes	Yes (2013)	Yes (2013)
Significant Inter-annual Difference	N/A	N/A	N/A	No	No	Yes (2013)

**Table 2: Summary statistics for total organic carbon (TOC, %) content measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Total Organic Carbon (TOC, %)						
n	5	5	5	5	5	5	4
Mean	1.86	2.51	2.64	2.84	1.16	0.84	3.82
Minimum	0.49	1.26	1.04	1.65	0.35	0.24	0.69
Maximum	3.61	5.60	3.78	4.42	2.52	1.80	7.11
Median	1.68	1.64	2.87	2.90	0.40	0.74	3.67
Standard deviation (n-1)	1.13	1.78	1.03	1.11	1.08	0.59	3.21
Standard error of the mean	0.50	0.80	0.46	0.50	0.48	0.26	1.85
COV (%)	60.39	70.98	39.12	39.08	93.80	70.04	84.03
+50% Mean	2.80	3.77	3.96	4.26	1.73	1.26	5.74
-50% Mean	0.93	1.26	1.32	1.42	0.58	0.42	1.91
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (2013)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	N/A	N/A	No	N/A	N/A	No



**Table 3: Summary statistics for sand (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Sand (%)					
n	5	5	5	5	5	5
Mean	39.30	36.68	11.22	10.18	16.10	18.46
Minimum	25.90	24.50	9.38	3.46	7.40	7.40
Maximum	55.00	58.20	12.60	18.20	30.60	49.10
Median	40.60	29.60	11.40	9.60	12.20	11.80
Standard deviation (n-1)	10.78	13.62	1.41	5.43	9.82	17.27
Standard error of the mean	4.82	6.09	0.63	2.43	4.39	7.72
COV (%)	27.42	37.14	12.61	53.33	61.01	93.55
+50% Mean	58.95	55.02	16.82	15.27	24.15	27.69
-50% Mean	19.65	18.34	5.61	5.09	8.05	9.23
Benchmark Exceedance (temporal comparison)	-	No	-	No	Yes (2014)	Yes (2013 and 2014)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	No	No

**Table 3: Summary statistics for sand (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Sand (%)						
n	5	5	5	5	5	5	4
Mean	38.84	41.86	25.93	66.90	74.86	68.44	68.17
Minimum	4.01	10.60	1.22	35.50	54.00	16.00	42.90
Maximum	75.70	55.50	65.00	91.50	90.40	88.60	95.70
Median	49.60	52.90	18.80	68.80	74.10	78.20	65.90
Standard deviation (n-1)	30.62	19.27	26.92	20.05	15.76	30.10	26.47
Standard error of the mean	13.69	8.62	12.04	8.97	7.05	13.46	15.28
COV (%)	78.83	46.04	103.81	29.98	21.05	43.98	38.84
+50% Mean	58.26	62.79	38.89	100.35	112.29	102.66	102.25
-50% Mean	19.42	20.93	12.96	33.45	37.43	34.22	34.08
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	No	N/A	N/A	N/A

**Table 4: Summary statistics for silt (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Silt (%)					
n	5	5	5	5	5	5
Mean	41.32	45.76	41.46	49.96	38.70	29.20
Minimum	30.00	29.80	38.20	42.10	20.30	15.90
Maximum	49.10	57.60	42.80	61.20	51.10	41.30
Median	40.20	46.60	42.80	50.80	40.40	30.70
Standard deviation (n-1)	7.54	10.77	2.04	7.67	12.53	10.45
Standard error of the mean	3.37	4.82	0.91	3.43	5.60	4.67
COV (%)	18.25	23.53	4.91	15.36	32.37	35.78
+50% Mean	61.98	68.64	62.19	74.94	58.05	43.80
-50% Mean	20.66	22.88	20.73	24.98	19.35	14.60
Benchmark Exceedance (temporal comparison)	-	No	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A

**Table 4: Summary statistics for silt (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Silt (%)						
n	5	5	5	5	5	5	4
Mean	46.58	41.72	62.06	21.66	14.80	15.48	21.30
Minimum	16.50	34.90	26.50	4.20	4.72	7.68	2.60
Maximum	71.60	51.40	87.70	46.60	27.40	25.10	35.50
Median	40.30	36.10	70.30	18.20	17.70	15.40	25.80
Standard deviation (n-1)	24.17	8.67	26.49	15.45	9.66	7.12	16.91
Standard error of the mean	10.81	3.88	11.85	6.91	4.32	3.19	9.76
COV (%)	51.90	20.77	42.69	71.32	65.29	46.03	79.37
+50% Mean	69.87	62.58	93.09	32.49	22.20	23.21	31.95
-50% Mean	23.29	20.86	31.03	10.83	7.40	7.74	10.65
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (2013 and 2015)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	Yes (2015)	N/A	N/A	N/A

**Table 5: Summary statistics for clay (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Clay (%)					
n	5	5	5	5	5	5
Mean	19.38	17.54	47.32	39.82	45.22	52.32
Minimum	15.00	12.00	44.60	35.30	36.80	35.00
Maximum	25.00	24.00	52.40	48.60	58.30	66.60
Median	19.10	16.40	45.80	38.20	43.90	52.90
Standard deviation (n-1)	3.60	5.50	3.37	5.16	8.82	12.72
Standard error of the mean	1.61	2.46	1.51	2.31	3.94	5.69
COV (%)	18.57	31.33	7.13	12.96	19.50	24.30
+50% Mean	29.07	26.31	70.98	59.73	67.83	78.48
-50% Mean	9.69	8.77	23.66	19.91	22.61	26.16
Benchmark Exceedance (temporal comparison)	-	No	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A



**Table 5: Summary statistics for clay (%) measured in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction, 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Clay (%)						
n	5	5	5	5	5	5	4
Mean	14.58	16.39	12.01	11.48	10.34	16.09	10.53
Minimum	7.82	8.36	8.46	4.40	4.18	2.94	1.70
Maximum	25.00	37.90	16.50	17.90	27.20	58.90	21.60
Median	11.90	12.20	10.90	13.40	6.88	6.43	8.30
Standard deviation (n-1)	6.96	12.17	3.88	5.27	9.55	24.04	10.14
Standard error of the mean	3.11	5.44	1.73	2.36	4.27	10.75	5.85
COV (%)	47.74	74.25	32.27	45.88	92.42	149.42	96.23
+50% Mean	21.88	24.59	18.01	17.22	15.51	24.13	15.80
-50% Mean	7.29	8.20	6.00	5.74	5.17	8.04	5.27
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	Yes (2014)	No
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	No	N/A

**Table 6: Summary statistics for total organic carbon (TOC, %) content measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Total Organic Carbon (TOC, %)							
n	5	5	5	5	5	5	5	5
Mean	1.07	1.28	1.28	2.07	1.12	1.47	2.36	3.15
Minimum	1.01	1.10	1.08	1.90	0.75	0.77	0.27	2.21
Maximum	1.15	1.34	1.53	2.19	1.59	2.43	4.98	5.37
Median	1.05	1.32	1.24	2.13	1.16	1.51	2.23	2.50
Standard deviation (n-1)	0.05	0.10	0.16	0.12	0.32	0.65	2.02	1.49
Standard error of the mean	0.02	0.05	0.07	0.05	0.14	0.29	0.90	0.74
COV (%)	4.99	7.91	12.75	5.81	28.18	44.58	85.43	47.37
+50% Mean	1.60	1.92	1.92	3.11	1.68	2.20	3.55	4.72
-50% Mean	0.53	0.64	0.64	1.04	0.56	0.73	1.18	1.57
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (all)	-	No	Yes (both)	Yes (2013 and 2014)
Significant Inter-annual Difference	N/A	N/A	N/A	Yes (2013 and 2015)	N/A	N/A	No	Yes (2013)

**Table 6: Summary statistics for total organic carbon (TOC, %) content measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Total Organic Carbon (TOC, %)						
n	5	5	5	5	5	5	5
Mean	1.24	2.21	1.28	3.44	2.03	2.09	3.82
Minimum	1.11	1.27	1.19	3.25	1.88	2.00	3.57
Maximum	1.36	5.71	1.40	3.53	2.23	2.22	4.16
Median	1.23	1.30	1.22	3.48	2.01	2.09	3.82
Standard deviation (n-1)	0.10	1.96	0.11	0.11	0.14	0.08	0.22
Standard error of the mean	0.04	0.88	0.05	0.05	0.06	0.04	0.10
COV (%)	7.71	88.75	8.23	3.30	6.82	3.99	5.84
+50% Mean	1.86	3.31	1.91	5.15	3.04	3.14	5.72
-50% Mean	0.62	1.10	0.64	1.72	1.01	1.05	1.91
Benchmark Exceedance (temporal comparison)	-	Yes	No (both)	Yes (all)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	No	N/A	Yes (2013 and 2015)	N/A	N/A	Yes (both)

**Table 7: Summary statistics for sand (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Sand (%)							
n	5	5	5	5	5	5	5	5
Mean	18.58	18.52	16.18	13.24	2.05	15.17	3.57	12.56
Minimum	17.60	14.80	11.90	7.70	1.08	2.18	0.51	2.40
Maximum	19.50	24.20	22.10	18.40	3.51	45.20	8.79	33.50
Median	19.00	17.70	15.20	13.80	1.90	9.63	3.54	8.90
Standard deviation (n-1)	0.83	3.61	4.24	3.97	0.90	17.50	3.35	12.21
Standard error of the mean	0.37	1.62	1.90	1.78	0.40	7.83	1.50	5.46
COV (%)	4.48	19.51	26.21	30.00	43.99	115.35	93.85	97.20
+50% Mean	27.87	27.78	24.27	19.86	3.08	22.76	5.36	18.84
-50% Mean	9.29	9.26	8.09	6.62	1.03	7.59	1.79	6.28
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	Yes	Yes (both)	Yes (2013 and 2015)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	No	No	Yes (2013)

**Table 7: Summary statistics for sand (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Sand (%)						
n	5	5	5	5	5	5	5
Mean	0.47	0.29	0.90	0.82	0.18	0.30	1.22
Minimum	0.27	0.11	0.61	0.50	0.11	0.20	0.50
Maximum	0.57	0.48	1.43	1.50	0.31	0.38	4.10
Median	0.50	0.29	0.88	0.50	0.14	0.28	0.50
Standard deviation (n-1)	0.12	0.15	0.33	0.46	0.08	0.07	1.61
Standard error of the mean	0.05	0.07	0.15	0.21	0.04	0.03	0.72
COV (%)	24.94	52.13	36.88	56.15	46.98	24.48	131.96
+50% Mean	0.70	0.44	1.35	1.23	0.27	0.45	1.83
-50% Mean	0.23	0.15	0.45	0.41	0.09	0.15	0.61
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2013 and 2014)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	N/A	Yes (both)	Yes (2014)	N/A	Yes	Yes (both)



**Table 8: Summary statistics for silt (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Silt (%)							
n	5	5	5	5	5	5	5	5
Mean	61.40	53.42	65.82	56.02	37.20	50.08	51.14	46.86
Minimum	50.50	50.00	58.70	53.90	21.50	30.60	27.20	32.10
Maximum	79.70	56.60	77.70	58.40	52.30	61.30	65.60	59.90
Median	55.60	53.50	62.40	56.20	40.20	51.80	49.50	50.90
Standard deviation (n-1)	11.69	2.51	8.37	2.05	12.84	12.40	15.58	10.76
Standard error of the mean	5.23	1.12	3.74	0.92	5.74	5.55	6.97	4.81
COV (%)	19.04	4.70	12.71	3.65	34.51	24.77	30.47	22.96
+50% Mean	92.10	80.13	98.73	84.03	55.80	75.12	76.71	70.29
-50% Mean	30.70	26.71	32.91	28.01	18.60	25.04	25.57	23.43
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 8: Summary statistics for silt (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Silt (%)						
n	5	5	5	5	5	5	5
Mean	72.48	66.28	89.48	67.62	72.66	87.36	60.14
Minimum	68.10	59.90	77.10	66.70	66.20	82.30	55.70
Maximum	75.70	68.60	98.50	70.10	76.70	94.30	63.60
Median	73.70	67.40	89.50	67.20	72.30	85.90	60.60
Standard deviation (n-1)	3.36	3.61	8.96	1.42	4.33	4.57	2.84
Standard error of the mean	1.50	1.61	4.01	0.64	1.94	2.04	1.27
COV (%)	4.63	5.44	10.01	2.10	5.96	5.23	4.72
+50% Mean	108.72	99.42	134.22	101.43	108.99	131.04	90.21
-50% Mean	36.24	33.14	44.74	33.81	36.33	43.68	30.07
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 9: Summary statistics for clay (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction, 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Clay (%)							
n	5	5	5	5	5	5	5	5
Mean	20.00	28.04	17.96	30.74	60.76	34.76	45.28	40.58
Minimum	2.72	20.90	10.30	27.60	46.10	24.20	30.80	33.90
Maximum	30.40	31.40	24.70	38.40	75.00	38.60	68.60	47.80
Median	25.30	28.80	18.80	29.00	57.60	36.50	42.40	40.20
Standard deviation (n-1)	10.94	4.16	6.03	4.48	12.15	6.02	14.91	6.54
Standard error of the mean	4.89	1.86	2.70	2.00	5.43	2.69	6.67	2.93
COV (%)	54.67	14.83	33.56	14.57	20.00	17.31	32.93	16.13
+50% Mean	30.01	42.06	26.94	46.11	91.14	52.14	67.92	60.87
-50% Mean	10.00	14.02	8.98	15.37	30.38	17.38	22.64	20.29
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (2013 and 2015)	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	N/A	N/A	No	N/A	N/A	N/A	N/A

**Table 9: Summary statistics for clay (%) measured in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction, 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Clay (%)						
n	5	5	5	5	5	5	5
Mean	27.04	33.44	9.62	31.46	27.14	12.35	38.82
Minimum	23.70	31.20	0.53	28.50	23.10	5.36	36.10
Maximum	31.70	40.00	22.20	32.80	33.60	17.30	40.20
Median	25.80	32.10	9.66	31.80	27.60	13.90	39.30
Standard deviation (n-1)	3.50	3.69	9.19	1.72	4.33	4.58	1.59
Standard error of the mean	1.57	1.65	4.11	0.77	1.94	2.05	0.71
COV (%)	12.94	11.04	95.57	5.46	15.95	37.08	4.10
+50% Mean	40.56	50.16	14.43	47.19	40.71	18.53	58.23
-50% Mean	13.52	16.72	4.81	15.73	13.57	6.18	19.41
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2015)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes (both)	Yes (2015)	N/A	Yes	Yes (2015)

**Table 10: Summary statistics for total macroinvertebrate abundance (density, no. per m<sup>2</sup>) nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Total Invertebrate Density (no. per m <sup>2</sup> )					
n	5	5	5	5	5	5
Mean	689.64	3119.23	1204.99	1480.26	1136.89	1647.62
Minimum	403.97	1110.92	727.15	476.11	216.41	706.95
Maximum	865.65	8281.39	1523.55	2351.69	3015.35	3202.91
Median	721.38	2221.84	1263.85	1514.89	807.94	1428.32
Standard deviation (n-1)	179.74	2926.29	301.52	851.38	1159.93	949.34
Standard error of the mean	80.38	1308.68	134.84	380.75	518.74	424.56
COV (%)	26.06	93.81	25.02	57.52	102.03	57.62
+50% Mean	1034.45	4678.84	1807.48	2220.39	1705.33	2471.43
-50% Mean	344.82	1559.61	602.49	740.13	568.44	823.81
Benchmark Exceedance (temporal comparison)	-	Yes	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	Yes	N/A	N/A	N/A	N/A



**Table 10: Summary statistics for total macroinvertebrate abundance (density, no. per m<sup>2</sup>) nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM-2013	STL11KM-2014	STL11KM-2015	STL11KM-2016	STL25KM-2014	STL25KM-2015	STL25KM-2016
Metric	Total Invertebrate Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	4
Mean	3034.97	1751.50	1321.56	1128.23	2461.33	4175.32	302.98
Minimum	1566.83	1428.32	1009.93	721.38	1168.63	1457.18	72.14
Maximum	4241.69	2495.96	1803.44	1558.17	4429.25	8685.36	490.54
Median	3298.13	1529.32	1284.05	995.50	2669.09	3202.91	324.62
Standard deviation (n-1)	1081.24	445.22	320.12	385.43	1320.63	2725.34	219.44
Standard error of the mean	483.55	199.11	143.16	172.37	590.61	1218.81	109.72
COV (%)	35.63	25.42	24.22	34.16	53.66	65.27	72.43
+50% Mean	4552.46	2627.25	1982.34	1692.35	3692.00	6262.98	454.47
-50% Mean	1517.49	875.75	660.78	564.12	1230.67	2087.66	151.49
Benchmark Exceedance (temporal comparison)	-	No	Yes (2013)	Yes (2013)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	N/A	Yes	Yes	N/A	No	Yes (2015)

**Table 11: Summary statistics for total macroinvertebrate abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Total Invertebrate Density (no. per m <sup>2</sup> )							
n	5	5	5	5	5	5	5	5
Mean	7978.42	8973.92	3433.75	2392.08	1101.11	1465.84	184.67	675.21
Minimum	4039.70	6174.98	3000.92	1962.14	709.83	403.97	43.28	447.25
Maximum	10806.21	11311.17	3938.71	2957.64	1679.36	2683.52	346.26	1197.48
Median	8281.39	9060.48	3477.03	2221.84	900.28	1428.32	158.70	577.10
Standard deviation (n-1)	2521.25	2377.87	348.06	423.64	415.67	841.05	135.50	301.67
Standard error of the mean	1127.54	1063.42	155.66	189.46	185.89	376.13	60.60	134.91
COV (%)	31.60	26.50	10.14	17.71	37.75	57.38	73.37	44.68
+50% Mean	11967.62	13460.87	5150.62	3588.12	1651.66	2198.75	277.01	1012.81
-50% Mean	3989.21	4486.96	1716.87	1196.04	550.55	732.92	92.34	337.60
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2013 and 2014)	-	No	Yes (both)	Yes (2014 and 2015)
Significant Inter-annual Difference	N/A	N/A	Yes (both)	Yes (2013 and 2014)	N/A	N/A	Yes (2014)	No

**Table 11:** Summary statistics for total macroinvertebrate abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Total Invertebrate Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	5
Mean	1878.46	1488.92	1249.42	1073.41	2767.20	2594.07	2014.08
Minimum	0.00	1139.77	894.51	504.96	2135.27	1255.19	995.50
Maximum	2778.74	1890.00	1702.45	1976.57	3231.76	3433.75	2871.08
Median	2198.75	1312.90	1125.35	865.65	2856.65	2452.68	2293.98
Standard deviation (n-1)	1079.20	340.56	313.38	578.87	447.53	899.00	848.14
Standard error of the mean	482.63	152.30	140.15	258.88	200.14	402.04	379.30
COV (%)	57.45	22.87	25.08	53.93	16.17	34.66	42.11
+50% Mean	2817.69	2233.38	1874.13	1610.11	4150.80	3891.10	3021.12
-50% Mean	939.23	744.46	624.71	536.70	1383.60	1297.03	1007.04
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 12: Summary statistics for total richness (Family-level) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Total Richness (Family level)					
n	5	5	5	5	5	5
Mean	7.60	10.60	9.40	7.80	5.80	8.00
Minimum	6.00	8.00	8.00	6.00	2.00	7.00
Maximum	10.00	12.00	11.00	10.00	11.00	9.00
Median	7.00	11.00	9.00	8.00	5.00	8.00
Standard deviation (n-1)	1.52	1.52	1.14	1.79	3.70	0.71
Standard error of the mean	0.68	0.68	0.51	0.80	1.66	0.32
COV (%)	19.95	14.31	12.13	22.93	63.82	8.84
+50% Mean	11.40	15.90	14.10	11.70	8.70	12.00
-50% Mean	3.80	5.30	4.70	3.90	2.90	4.00
Benchmark Exceedance (temporal comparison)	-	No	-	No	No (both)	No
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A

**Table 12: Summary statistics for total richness (Family-level) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Total Richness (Family level)						
n	5	5	5	5	5	5	4
Mean	9.40	7.20	7.60	8.20	8.20	9.40	5.25
Minimum	8.00	6.00	6.00	5.00	5.00	7.00	3.00
Maximum	12.00	9.00	10.00	10.00	11.00	13.00	6.00
Median	9.00	7.00	7.00	8.00	8.00	8.00	6.00
Standard deviation (n-1)	1.67	1.30	1.52	2.05	2.39	2.88	1.50
Standard error of the mean	0.75	0.58	0.68	0.92	1.07	1.29	0.75
COV (%)	17.80	18.11	19.95	24.99	29.12	30.65	28.57
+50% Mean	14.10	10.80	11.40	12.30	12.30	14.10	7.88
-50% Mean	4.70	3.60	3.80	4.10	4.10	4.70	2.63
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No	-	No	No
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A



**Table 13: Summary statistics for total richness (Family-level) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Total Richness (Family level)							
n	5	5	5	5	5	5	5	5
Mean	8.60	8.80	9.60	7.80	7.40	5.40	2.80	5.20
Minimum	7.00	7.00	8.00	6.00	5.00	3.00	2.00	3.00
Maximum	10.00	10.00	11.00	10.00	10.00	7.00	5.00	9.00
Median	9.00	9.00	9.00	8.00	8.00	6.00	2.00	4.00
Standard deviation (n-1)	1.52	1.30	1.34	1.79	2.30	1.52	1.30	2.39
Standard error of the mean	0.68	0.58	0.60	0.80	1.03	0.68	0.58	1.07
COV (%)	17.63	14.82	13.98	22.93	31.11	28.08	46.57	45.91
+50% Mean	12.90	13.20	14.40	11.70	11.10	8.10	4.20	7.80
-50% Mean	4.30	4.40	4.80	3.90	3.70	2.70	1.40	2.60
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	Yes (2013)	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No

**Table 13: Summary statistics for total richness (Family-level) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Total Richness (Family level)						
n	5	5	5	5	5	5	5
Mean	4.80	5.00	4.20	6.00	4.20	4.00	5.00
Minimum	0.00	3.00	3.00	3.00	3.00	3.00	4.00
Maximum	6.00	6.00	6.00	9.00	5.00	5.00	6.00
Median	6.00	5.00	4.00	7.00	5.00	4.00	5.00
Standard deviation (n-1)	2.68	1.22	1.10	2.45	1.10	0.71	1.00
Standard error of the mean	1.20	0.55	0.49	1.10	0.49	0.32	0.45
COV (%)	55.90	24.49	26.08	40.82	26.08	17.68	20.00
+50% Mean	7.20	7.50	6.30	9.00	6.30	6.00	7.50
-50% Mean	2.40	2.50	2.10	3.00	2.10	2.00	2.50
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 14: Summary statistics for Simpson's diversity index in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Simpson's Diversity Index					
n	5	5	5	5	5	5
Mean	0.73	0.65	0.69	0.65	0.31	0.64
Minimum	0.64	0.51	0.57	0.53	0.04	0.45
Maximum	0.81	0.77	0.79	0.71	0.67	0.78
Median	0.77	0.67	0.69	0.68	0.24	0.68
Standard deviation (n-1)	0.08	0.09	0.10	0.07	0.28	0.13
Standard error of the mean	0.04	0.04	0.04	0.03	0.12	0.06
COV (%)	10.74	14.42	14.40	10.95	88.93	20.09
+50% Mean	1.10	0.98	1.03	0.98	0.46	0.96
-50% Mean	0.37	0.33	0.34	0.33	0.15	0.32
Benchmark Exceedance (temporal comparison)	-	No	-	No	Yes (both)	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	Yes (2013)	Yes (2015)

**Table 14: Summary statistics for Simpson's diversity index in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Simpson's Diversity Index						
n	5	5	5	5	5	5	4
Mean	0.57	0.68	0.69	0.71	0.71	0.74	0.69
Minimum	0.48	0.62	0.64	0.60	0.60	0.70	0.65
Maximum	0.69	0.73	0.76	0.77	0.76	0.79	0.77
Median	0.56	0.68	0.67	0.76	0.73	0.74	0.68
Standard deviation (n-1)	0.09	0.04	0.05	0.08	0.07	0.04	0.06
Standard error of the mean	0.04	0.02	0.02	0.03	0.03	0.02	0.03
COV (%)	16.29	6.23	6.89	10.66	9.45	5.17	7.95
+50% Mean	0.85	1.02	1.03	1.06	1.06	1.12	1.04
-50% Mean	0.28	0.34	0.34	0.35	0.35	0.37	0.35
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 15: Summary statistics for Simpson's diversity index in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Simpson's Diversity Index							
n	5	5	5	5	5	5	5	5
Mean	0.64	0.57	0.55	0.54	0.50	0.53	0.35	0.52
Minimum	0.48	0.48	0.36	0.30	0.37	0.51	0.09	0.26
Maximum	0.76	0.61	0.71	0.66	0.59	0.57	0.60	0.71
Median	0.69	0.59	0.64	0.58	0.54	0.52	0.32	0.54
Standard deviation (n-1)	0.12	0.05	0.16	0.15	0.11	0.02	0.19	0.20
Standard error of the mean	0.05	0.02	0.07	0.07	0.05	0.01	0.08	0.09
COV (%)	18.67	9.05	29.89	26.97	21.36	4.61	53.47	37.61
+50% Mean	0.96	0.85	0.82	0.81	0.75	0.79	0.53	0.78
-50% Mean	0.32	0.28	0.27	0.27	0.25	0.26	0.18	0.26
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)	No (all)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Table 15: Summary statistics for Simpson's diversity index in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Simpson's Diversity Index						
n	5	5	5	5	5	5	5
Mean	0.30	0.40	0.59	0.54	0.53	0.40	0.60
Minimum	0.24	0.16	0.48	0.36	0.50	0.29	0.51
Maximum	0.32	0.52	0.64	0.64	0.56	0.59	0.65
Median	0.31	0.44	0.60	0.54	0.53	0.31	0.61
Standard deviation (n-1)	0.04	0.14	0.07	0.11	0.02	0.13	0.06
Standard error of the mean	0.02	0.06	0.03	0.05	0.01	0.06	0.03
COV (%)	11.92	35.73	11.46	20.62	4.12	33.16	9.37
+50% Mean	0.44	0.60	0.88	0.81	0.80	0.59	0.90
-50% Mean	0.15	0.20	0.29	0.27	0.27	0.20	0.30
Benchmark Exceedance (temporal comparison)	-	No	Yes (2013)	Yes (2013)	-	No	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes (2013)	No	N/A	N/A	Yes (2015)



**Table 16: Summary statistics for Ephemeroptera abundance (density, no. per m<sup>2</sup>) in nearshore habitat in 2013 (pre-construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Ephemeroptera Density (no. per m <sup>2</sup> )					
n	5	5	5	5	5	5
Mean	193.33	432.83	64.06	496.31	11.54	112.53
Minimum	158.70	201.99	34.63	57.71	0.00	43.28
Maximum	245.27	923.36	103.88	923.36	43.28	173.13
Median	187.56	360.69	69.25	634.81	0.00	115.42
Standard deviation (n-1)	37.62	289.09	27.10	356.57	18.81	55.32
Standard error of the mean	16.83	129.29	12.12	159.46	8.41	24.74
COV (%)	19.46	66.79	42.30	71.84	162.98	49.15
+50% Mean	289.99	649.24	96.09	744.46	17.31	168.80
-50% Mean	96.66	216.41	32.03	248.15	5.77	56.27
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (all)
Significant Inter-annual Difference	N/A	No	N/A	No	Yes (2014)	Yes (2015)

**Table 16: Summary statistics for Ephemeroptera abundance (density, no. per m<sup>2</sup>) in nearshore habitat in 2013 (pre-construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Ephemeroptera Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	4
Mean	1944.25	718.49	432.83	230.84	346.26	1197.48	57.71
Minimum	787.74	216.41	259.70	0.00	201.99	432.83	0.00
Maximum	3003.81	1226.34	591.53	548.25	649.24	1587.03	216.41
Median	2328.60	822.37	461.68	129.85	245.27	1486.03	7.21
Standard deviation (n-1)	908.57	416.33	127.01	250.93	186.72	497.49	106.02
Standard error of the mean	406.33	186.19	56.80	112.22	83.51	222.48	53.01
COV (%)	46.73	57.94	29.34	108.70	53.93	41.54	183.71
+50% Mean	2916.38	1077.74	649.24	346.26	519.39	1796.23	86.57
-50% Mean	972.13	359.25	216.41	115.42	173.13	598.74	28.86
Benchmark Exceedance (temporal comparison)	-	Yes	Yes (2013)	Yes (2013 and 2014)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	No	Yes	Yes (2013)	N/A	Yes	Yes (2015)

**Table 17: Summary statistics for percent EPT (EPT index) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Percent EPT (EPT Index)					
n	5	5	5	5	5	5
Mean	31.11	18.41	7.43	31.11	0.80	9.73
Minimum	22.00	10.56	3.80	12.12	0.00	1.35
Maximum	50.00	27.27	13.10	42.86	3.06	16.25
Median	28.33	20.13	6.82	32.91	0.00	10.74
Standard deviation (n-1)	10.88	7.22	3.75	12.14	1.33	5.54
Standard error of the mean	4.87	3.23	1.68	5.43	0.59	2.48
COV (%)	34.98	39.21	50.42	39.03	165.29	56.92
+50% Mean	46.67	27.62	11.15	46.66	1.21	14.60
-50% Mean	15.56	9.21	3.72	15.55	0.40	4.87
Benchmark Exceedance (temporal comparison)	-	No	-	Yes	Yes (both)	Yes(2014 and 2015)
Significant Inter-annual Difference	N/A	N/A	N/A	No	Yes (2014)	Yes (2015)

**Table 17: Summary statistics for percent EPT (EPT index) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent EPT (EPT Index)						
n	5	5	5	5	5	5	4
Mean	62.14	39.77	35.70	19.60	19.58	32.28	11.76
Minimum	51.38	15.69	14.40	4.00	5.54	17.61	0.00
Maximum	71.63	53.77	47.30	45.71	49.45	47.27	44.12
Median	63.66	49.13	45.71	14.49	15.34	29.73	1.47
Standard deviation (n-1)	9.55	16.92	15.09	17.64	17.32	10.91	21.61
Standard error of the mean	4.27	7.56	6.75	7.89	7.74	4.88	10.81
COV (%)	15.37	42.53	42.26	90.01	88.45	33.80	183.71
+50% Mean	93.21	59.65	53.54	29.40	29.37	48.42	17.65
-50% Mean	31.07	19.88	17.85	9.80	9.79	16.14	5.88
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (2013 and 2014)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	Yes (2013)	N/A	No	No

**Table 18: Summary statistics for Pisidiidae abundance (density, no. per m<sup>2</sup>) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT-2014	SPLIT-2015	STL3KM-2013	STL3KM-2014	STL3KM-2015	STL3KM-2016
Metric	Pisidiidae Density (no. per m <sup>2</sup> )					
n	5	5	5	5	5	5
Mean	23.08	256.81	27.70	8.66	8.66	25.97
Minimum	0.00	0.00	8.66	0.00	0.00	0.00
Maximum	57.71	1024.35	51.94	28.86	28.86	57.71
Median	14.43	72.14	25.97	0.00	0.00	28.86
Standard deviation (n-1)	21.88	432.27	16.65	12.90	12.90	25.81
Standard error of the mean	9.79	193.32	7.45	5.77	5.77	11.54
COV (%)	94.79	168.32	60.11	149.07	149.07	99.38
+50% Mean	34.63	385.21	41.55	12.98	12.98	38.95
-50% Mean	11.54	128.40	13.85	4.33	4.33	12.98
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (2013)	Yes (2014 and 2015)
Significant Inter-annual Difference	N/A	No	N/A	No	No	No

**Table 18: Summary statistics for Pisidiidae abundance (density, no. per m<sup>2</sup>) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Pisidiidae Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	4
Mean	119.46	129.85	121.19	150.05	409.74	458.80	39.68
Minimum	25.97	28.86	28.86	43.28	187.56	72.14	0.00
Maximum	242.38	173.13	274.12	476.11	1038.78	894.51	100.99
Median	138.50	144.28	72.14	72.14	274.12	360.69	28.86
Standard deviation (n-1)	90.46	57.71	105.82	183.52	355.98	311.35	44.66
Standard error of the mean	40.45	25.81	47.33	82.07	159.20	139.24	22.33
COV (%)	75.72	44.44	87.32	122.31	86.88	67.86	112.57
+50% Mean	179.19	194.77	181.79	225.07	614.61	688.19	59.51
-50% Mean	59.73	64.92	60.60	75.02	204.87	229.40	19.84
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	Yes (both)



**Table 19: Summary statistics for Ephemeroptera abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Ephemeroptera Density (no. per m <sup>2</sup> )							
n	5	5	5	5	5	5	5	5
Mean	1281.16	643.47	219.30	493.42	64.06	54.82	0.00	72.14
Minimum	375.12	346.26	129.85	274.12	8.66	0.00	0.00	14.43
Maximum	1587.03	1038.78	360.69	649.24	95.22	100.99	0.00	187.56
Median	1558.17	533.82	173.13	490.54	69.25	43.28	0.00	28.86
Standard deviation (n-1)	520.83	277.07	95.92	144.06	36.01	40.03	0.00	77.02
Standard error of the mean	232.92	123.91	42.90	64.42	16.10	17.90	0.00	34.45
COV (%)	40.65	43.06	43.74	29.20	56.21	73.02	-	106.77
+50% Mean	1921.75	965.20	328.95	740.13	96.09	82.24	0.00	108.21
-50% Mean	640.58	321.73	109.65	246.71	32.03	27.41	0.00	36.07
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2013 and 2015)	-	No	Yes (both)	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes (2013)	No	N/A	N/A	Yes (2013)	Yes (2015)

**Table 19: Summary statistics for Ephemeroptera abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Ephemeroptera Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	5
Mean	1563.37	1093.61	605.96	655.01	831.02	282.78	577.10
Minimum	0.00	937.79	490.54	331.83	692.52	187.56	375.12
Maximum	2276.66	1240.77	663.67	1082.06	966.64	375.12	807.94
Median	1817.87	1038.78	620.38	678.09	851.22	331.83	562.67
Standard deviation (n-1)	894.76	133.56	68.44	311.88	115.24	88.70	193.30
Standard error of the mean	400.15	59.73	30.61	139.48	51.54	39.67	86.44
COV (%)	57.23	12.21	11.29	47.61	13.87	31.37	33.49
+50% Mean	2345.05	1640.41	908.93	982.51	1246.54	424.17	865.65
-50% Mean	781.68	546.80	302.98	327.50	415.51	141.39	288.55
Benchmark Exceedance (temporal comparison)	-	No	Yes (2013)	Yes (2013)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes	No	N/A	Yes	Yes (2015)

**Table 20: Summary statistics for percent EPT (EPT index) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Percent EPT (EPT Index)							
n	5	5	5	5	5	5	5	5
Mean	19.60	8.09	8.14	23.09	8.34	5.14	23.62	12.23
Minimum	5.23	4.14	6.58	13.70	2.11	0.00	0.00	2.22
Maximum	41.79	13.08	10.26	29.87	14.63	10.67	66.67	29.03
Median	17.47	8.44	7.11	23.94	8.25	5.83	20.00	5.71
Standard deviation (n-1)	13.44	3.61	1.87	6.10	4.43	4.19	26.53	12.34
Standard error of the mean	6.01	1.61	0.84	2.73	1.98	1.87	11.87	5.52
COV (%)	68.57	44.63	23.02	26.43	53.15	81.38	112.32	100.88
+50% Mean	29.40	12.14	12.21	34.63	12.51	7.72	35.43	18.35
-50% Mean	9.80	4.05	4.07	11.54	4.17	2.57	11.81	6.12
Benchmark Exceedance (temporal comparison)	-	Yes	Yes (2013)	Yes (2014 and 2015)	-	No	Yes (both)	Yes (2014)
Significant Inter-annual Difference	N/A	No	No	Yes (2014 and 2015)	N/A	N/A	No	No

**Table 20: Summary statistics for percent EPT (EPT index) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent EPT (EPT Index)						
n	5	5	5	5	5	5	5
Mean	66.65	75.29	50.75	62.76	30.29	13.20	30.99
Minimum	0.00	64.89	35.59	50.98	27.44	5.49	20.10
Maximum	87.40	91.14	69.35	78.33	34.46	27.59	37.68
Median	81.93	74.16	46.94	64.04	28.13	10.92	32.08
Standard deviation (n-1)	37.33	10.22	13.06	10.68	3.54	8.72	6.56
Standard error of the mean	16.70	4.57	5.84	4.77	1.58	3.90	2.93
COV (%)	56.01	13.57	25.73	17.01	11.68	66.02	21.17
+50% Mean	99.98	112.94	76.12	94.15	45.44	19.80	46.48
-50% Mean	33.33	37.65	25.37	31.38	15.15	6.60	15.49
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	Yes	Yes (2015)

**Table 21: Summary statistics for Pisidiidae abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016
Metric	Pisidiidae Density (no. per m <sup>2</sup> )							
n	5	5	5	5	5	5	5	5
Mean	888.73	753.12	352.03	86.57	1.73	11.54	0.00	23.08
Minimum	331.83	259.70	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	1125.35	1240.77	750.23	302.98	8.66	43.28	0.00	57.71
Median	981.07	649.24	447.25	0.00	0.00	0.00	0.00	14.43
Standard deviation (n-1)	325.60	418.20	327.51	133.41	3.87	18.81	0.00	26.21
Standard error of the mean	145.61	187.02	146.47	59.66	1.73	8.41	0.00	11.72
COV (%)	36.64	55.53	93.03	154.11	223.61	162.98	-	113.54
+50% Mean	1333.10	1129.67	528.05	129.85	2.60	17.31	0.00	34.63
-50% Mean	444.37	376.56	176.02	43.28	0.87	5.77	0.00	11.54
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (all)	-	Yes	Yes (both)	Yes (all)
Significant Inter-annual Difference	N/A	N/A	No	Yes (2013 and 2014)	N/A	No	No	Yes (2015)

**Table 21: Summary statistics for Pisidiidae abundance (density, no. per m<sup>2</sup>) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction) (continued).**

Site	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Pisidiidae Density (no. per m <sup>2</sup> )						
n	5	5	5	5	5	5	5
Mean	0.00	0.00	0.00	0.00	2.89	0.00	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.00	0.00	0.00	0.00	14.43	0.00	0.00
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard deviation (n-1)	0.00	0.00	0.00	0.00	6.45	0.00	0.00
Standard error of the mean	0.00	0.00	0.00	0.00	2.89	0.00	0.00
COV (%)	-	-	-	-	223.61	-	-
+50% Mean	0.00	0.00	0.00	0.00	4.33	0.00	0.00
-50% Mean	0.00	0.00	0.00	0.00	1.44	0.00	0.00
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	Yes	Yes (2014)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	No	No

**Table 22: Summary of benchmark exceedances (compared to 2013 baseline) for metrics expected to be negatively affected by increases in TSS at 3 km downstream in Stephens Lake.**

Metric	Nearshore			Offshore		
	+50%	-50%	sig.	+50%	-50%	sig.
<b>Total Invertebrate Density</b>						
2014	N	N	-	N	N	-
2015	N	N	-		Y	N
2016	N	N	-	N	N	-
<b>Total Taxonomic Richness</b>						
2014	N	N	-	N	N	-
2015	N	N	-		Y	Y
2016	N	N	-	N	N	-
<b>Simpson's Diversity Index</b>						
2014	N	N	-	N	N	-
2015		Y	Y	N	N	-
2016	N	N	-	N	N	-
<b>Ephemeroptera Density</b>						
2014	Y		Y	N	N	-
2015		Y	N		Y	Y
2016	Y		N	N	N	-
<b>Percent EPT</b>						
2014	Y		Y	N	N	-
2015		Y	N	Y		N
2016	N	N	-	N	N	-
<b>Pisidiidae Density</b>						
2014	N	N	-	Y		N
2015		Y	N		Y	N
2016	N	N	-	Y		N

Y = yes, the benchmark was exceeded (or the exceedance was statistically significant).

N = no, the benchmark was not exceeded (or the exceedance was not statistically significant).



**Table 23: Summary of benchmark exceedances (compared to 2013 baseline) for metrics expected to be negatively affected by increases in TSS at 11 km downstream in Stephens Lake.**

Key Metrics	Nearshore			Offshore		
	+50%	-50%	sig.	+50%	-50%	sig.
<b>Total Invertebrate Density</b>						
2014	N	N	-	N	N	-
2015		Y	Y	N	N	-
2016		Y	Y	N	N	-
<b>Total Taxonomic Richness</b>						
2014	N	N	-	N	N	-
2015	N	N	-	N	N	-
2016	N	N	-	N	N	-
<b>Simpson's Diversity Index</b>						
2014	N	N	-	N	N	-
2015	N	N	-		Y	Y
2016	N	N	-	N	N	-
<b>Ephemeroptera Density</b>						
2014	N	N	-	N	N	-
2015		Y	Y		Y	Y
2016		Y	Y		Y	N
<b>Percent EPT</b>						
2014	N	N	-	N	N	-
2015	N	N	-	N	N	-
2016		Y	Y	N	N	-
<b>Pisidiidae Density</b>						
2014	N	N	-	N	N	-
2015	N	N	-	N	N	-
2016	N	N	-	N	N	-

Y = yes, the benchmark was exceeded (or the exceedance was statistically significant).

N = no, the benchmark was not exceeded (or the exceedance was not statistically significant).

**Table 24: Comparison of Year 3 construction (2016) benthic macroinvertebrate monitoring results against Year 1 (2014) and Year 2 (2015) results for metrics expected to be negatively affected by increases in TSS at 25 km downstream in Stephens Lake.**

Key Metrics	Nearshore 2016		Offshore 2016	
	2014	2015	2014	2015
Total Invertebrate Density	↓	↓	✓	✓
Total Taxonomic Richness	✓	✓	✓	✓
Simpson's Diversity Index	✓	✓	✓	↑
Ephemeroptera density	↓	↓	✓	↑
% EPT	✓	↓	✓	↑
Pisidiidae density	↓	↓	↓	✓

✓ = 2016 mean was within the  $\pm 50\%$  benchmark compared to the 2014 or 2015 mean.

↑ = 2016 mean represented an increase of more than 50% over the 2014 or 2015 mean (difference was not statistically significant).

↓ = 2016 mean represented a decrease of more than 50% below the 2014 or 2015 mean (difference was not statistically significant).

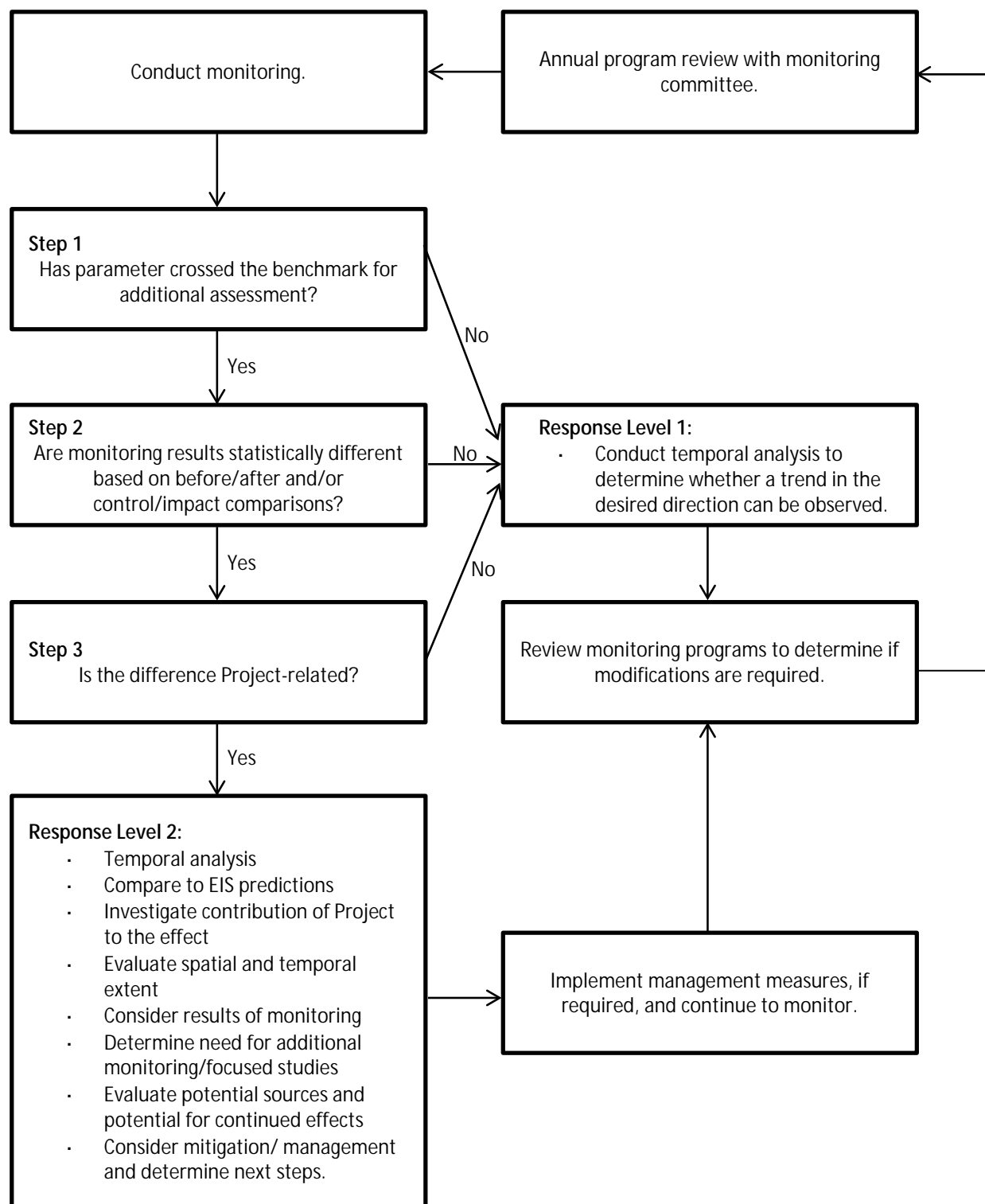
↑ = 2016 mean represented an increase of more than 50% over the 2014 or 2015 mean (difference was statistically significant).

↓ = 2016 mean represented a decrease of more than 50% below the 2014 or 2015 mean (difference was statistically significant).

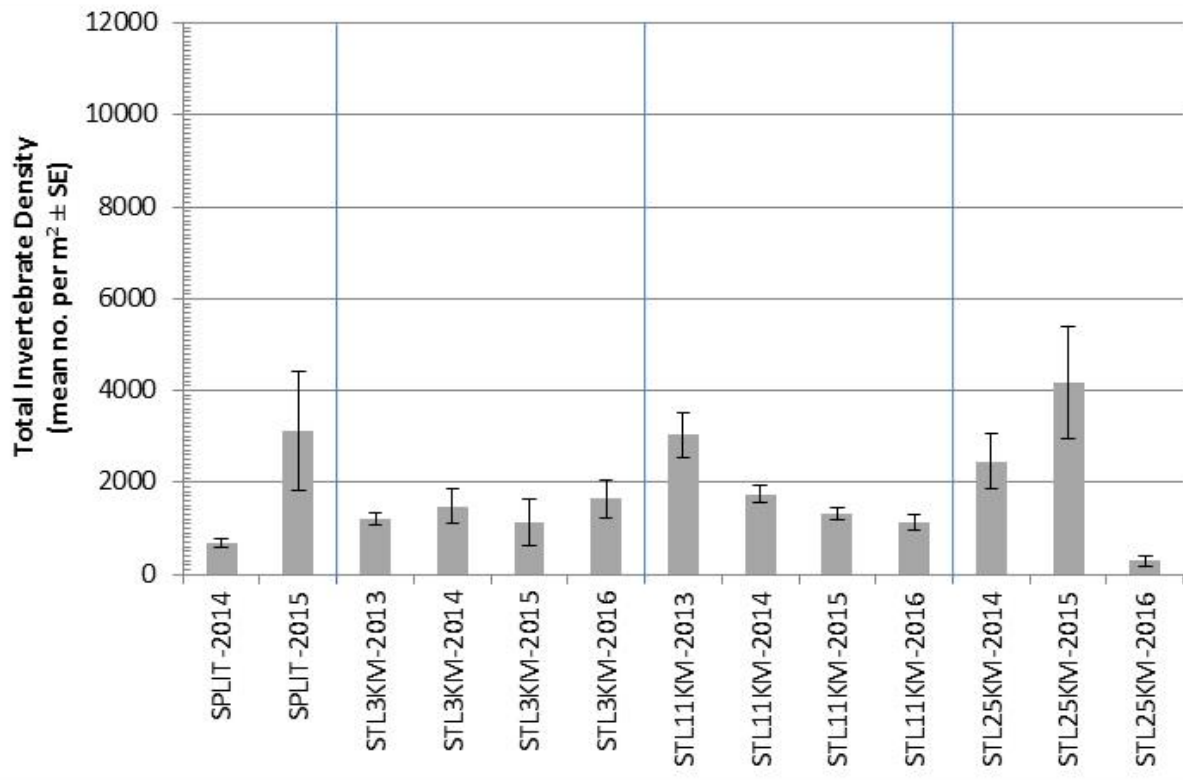
**Table 25: Summary of offshore benchmark exceedances in the reference waterbody Split Lake (compared to 2013 baseline).**

<b>Key Metrics</b>	<b>+50%</b>	<b>-50%</b>	<b>sig.</b>
<b>Total Invertebrate Density</b>			
2014	N	N	-
2015		<b>Y</b>	N
2016	N	N	-
<b>Total Taxonomic Richness</b>			
2014	N	N	-
2015	N	N	-
2016	N	N	-
<b>Simpson's Diversity Index</b>			
2014	N	N	-
2015	N	N	-
2016	N	N	-
<b>Ephemeroptera Density</b>			
2014	N	N	-
2015		<b>Y</b>	<b>Y</b>
2016		<b>Y</b>	N
<b>Percent EPT</b>			
2014		<b>Y</b>	N
2015	N	<b>Y</b>	N
2016	N	N	-
<b>Pisidiidae Density</b>			
2014	N	N	-
2015		<b>Y</b>	N
2016		<b>Y</b>	<b>Y</b>

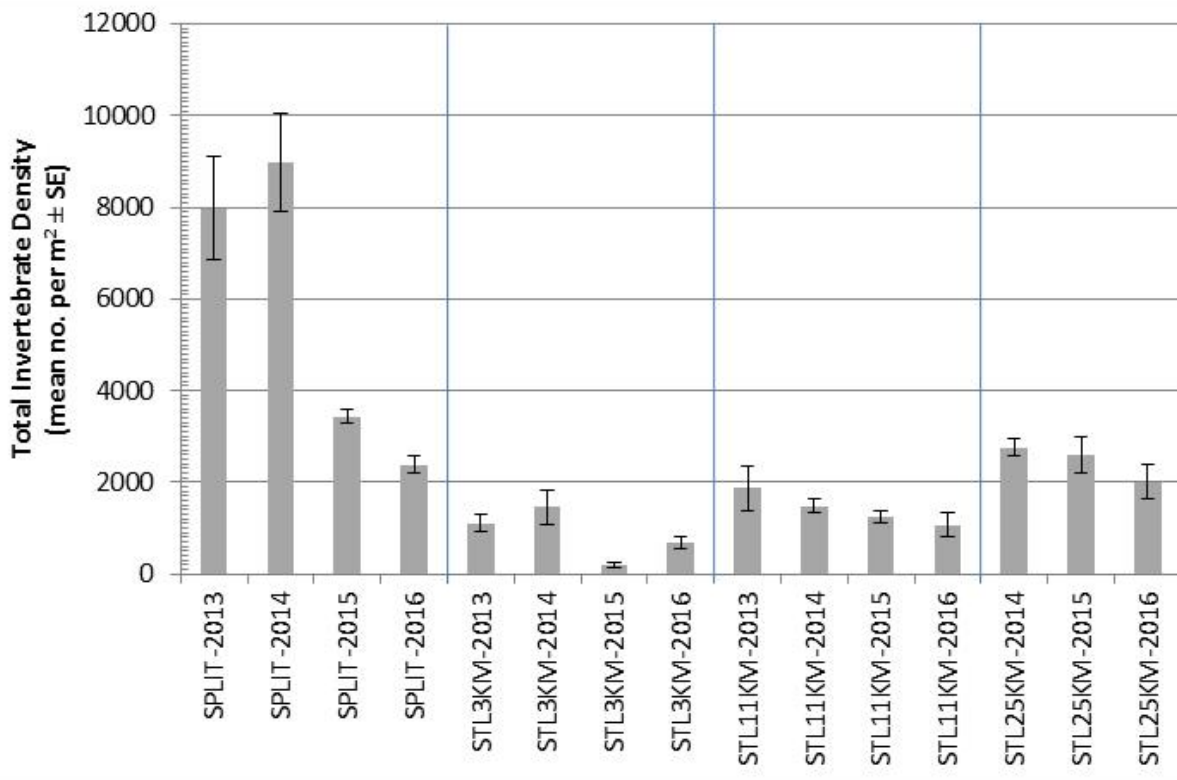
## FIGURES



**Figure 1: Benthic macroinvertebrate response framework.**

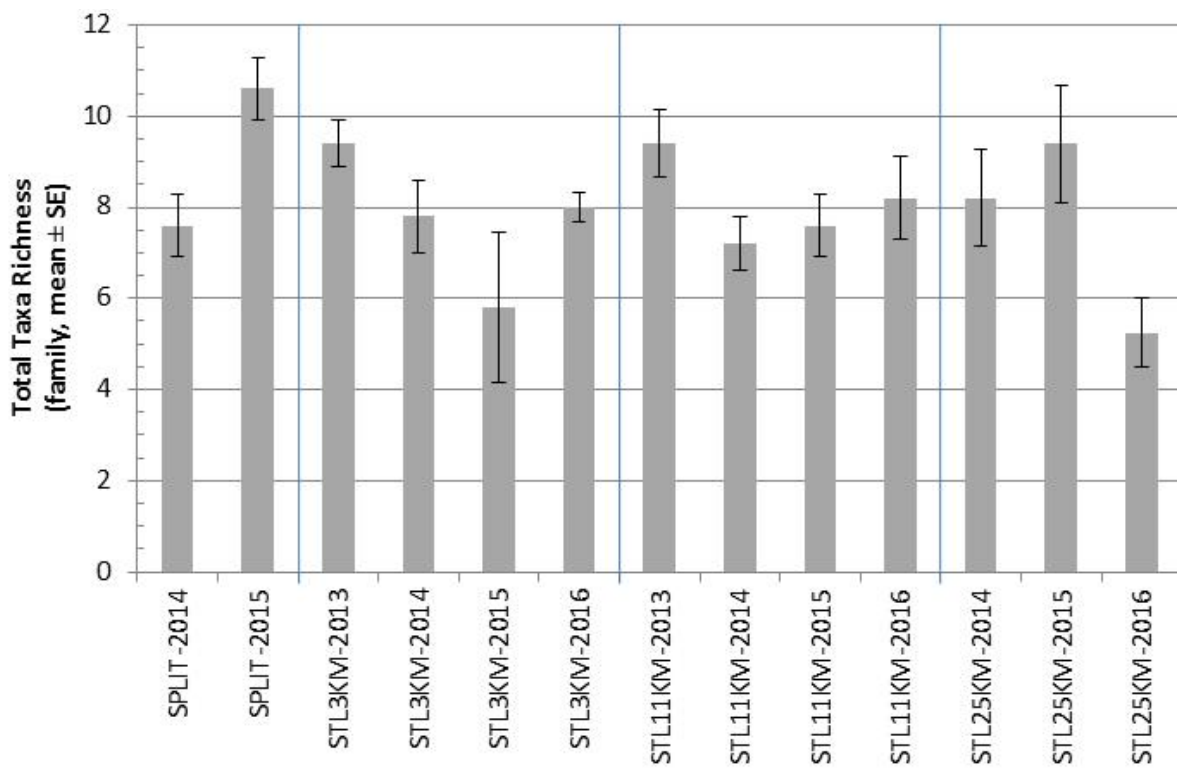


**Figure 2:** Total macroinvertebrate abundance (density, mean no. per m<sup>2</sup> ± SE) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).

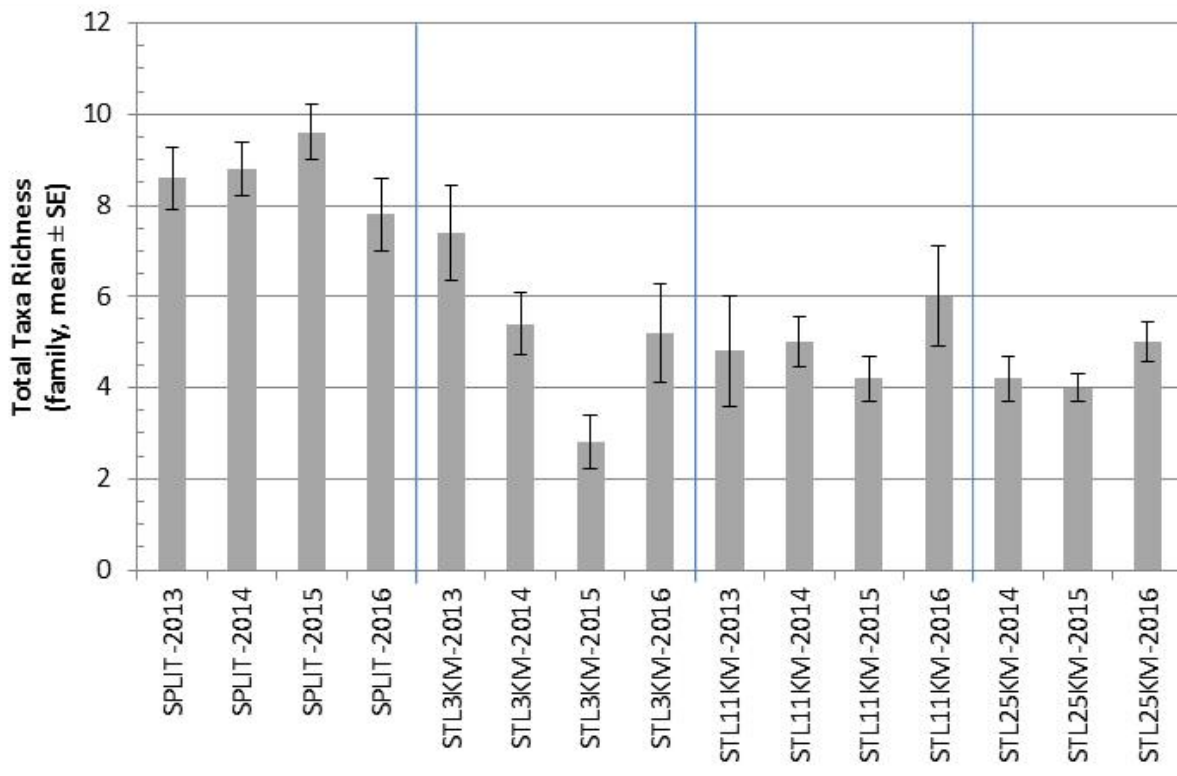


**Figure 3:** Total macroinvertebrate abundance (density, mean no. per m<sup>2</sup> ± SE) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).

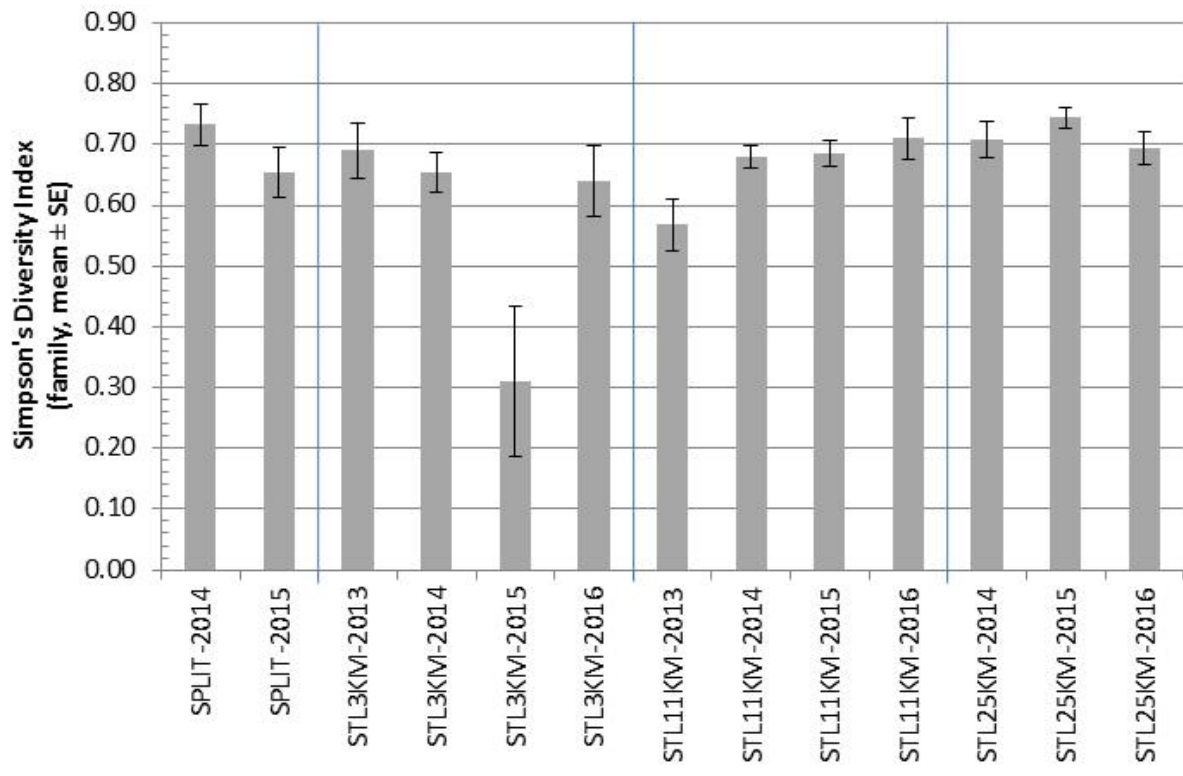




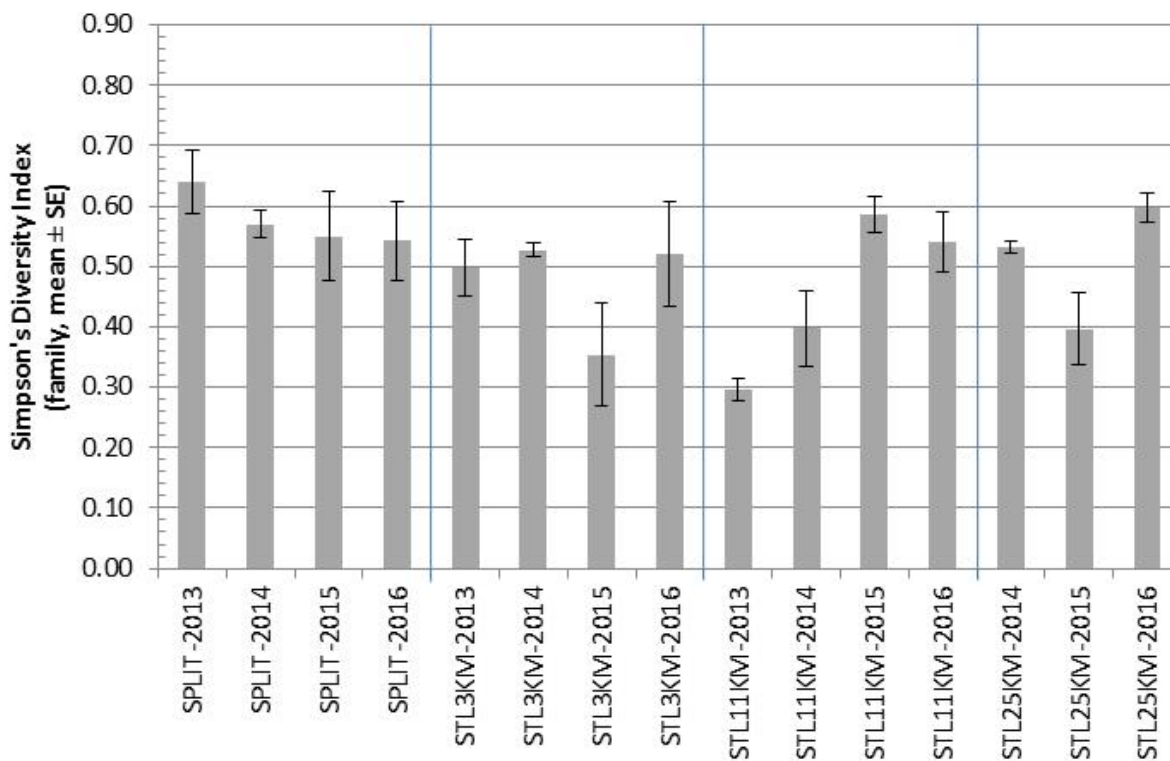
**Figure 4:** Total richness (Family-level, mean  $\pm$  SE) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).



**Figure 5:** Total richness (Family-level, mean  $\pm$  SE) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).



**Figure 6:** Simpson's diversity index (mean  $\pm$  SE) in nearshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).



**Figure 7:** Simpson's diversity index (mean ± SE) in offshore habitat in 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).

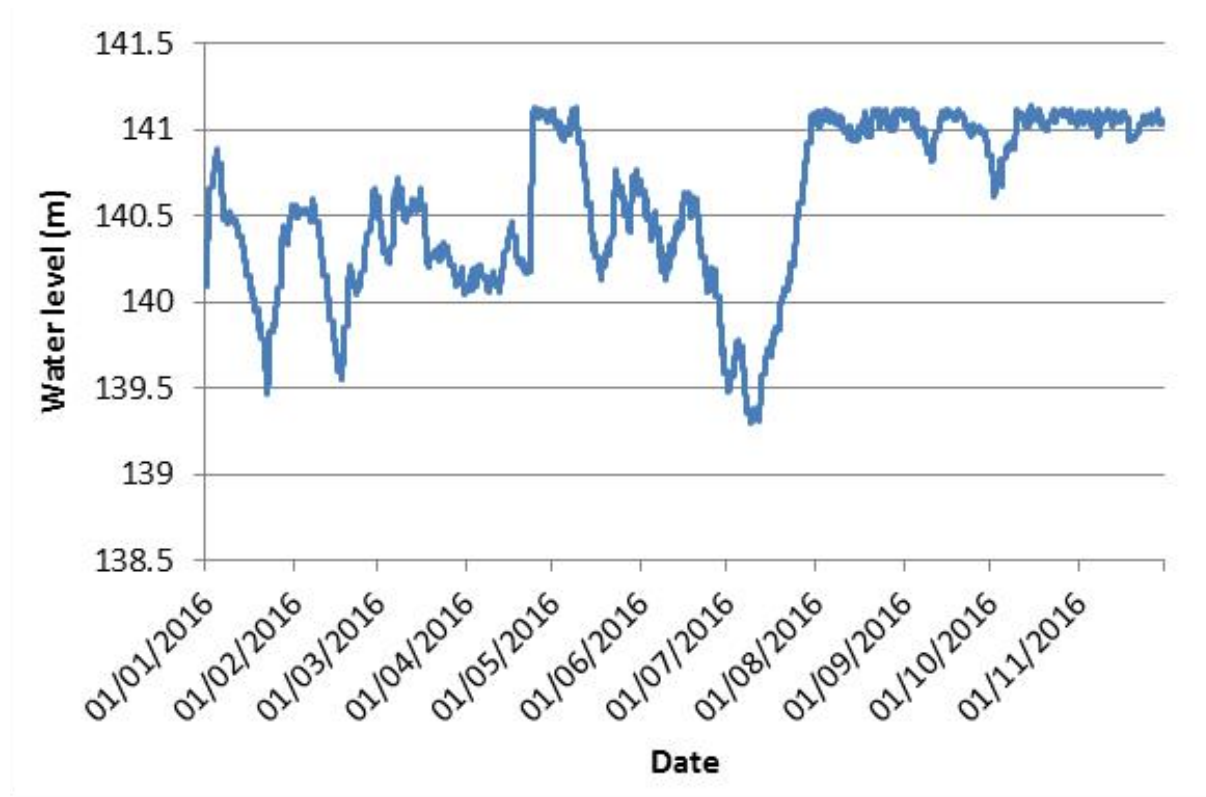
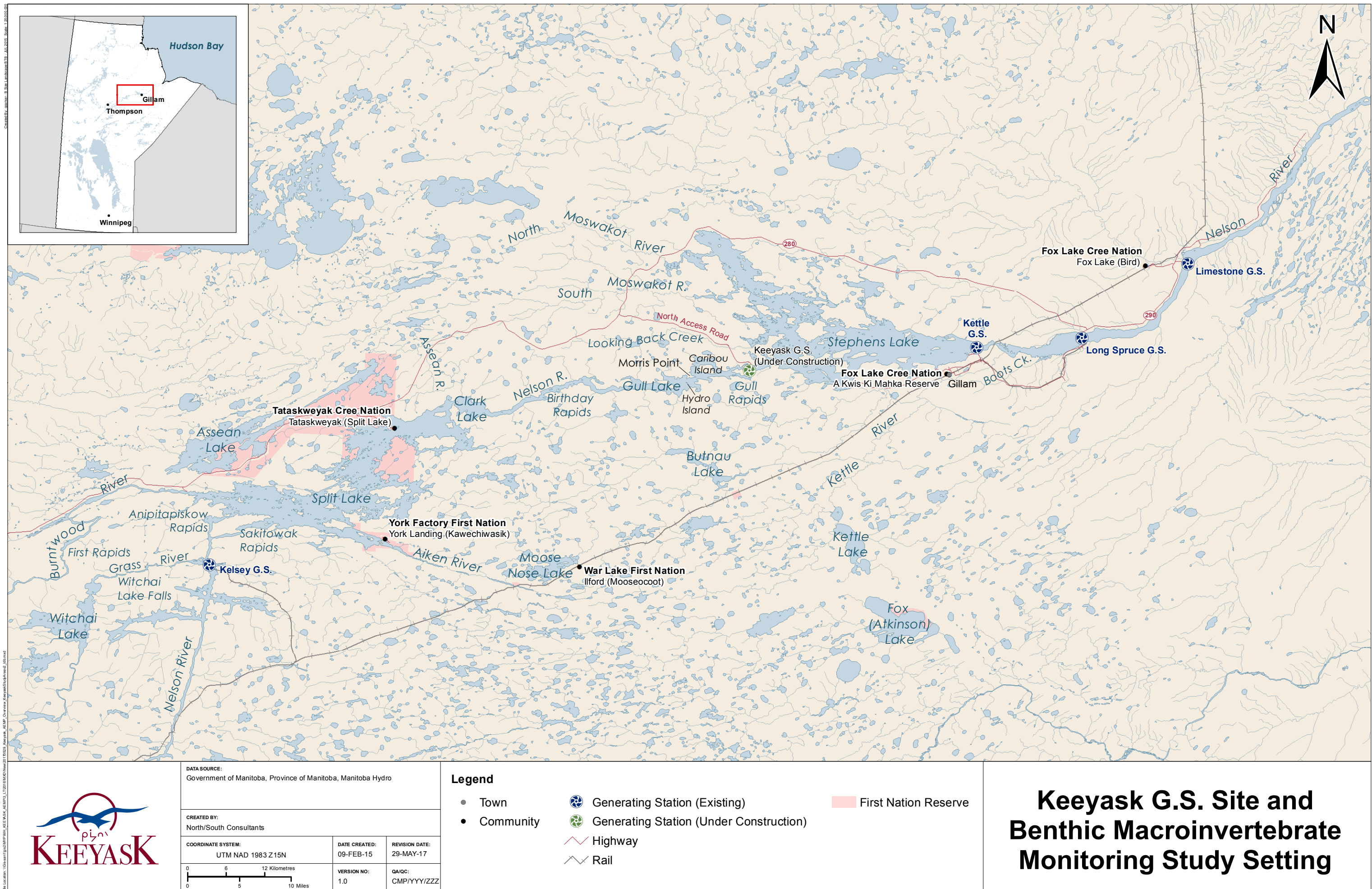


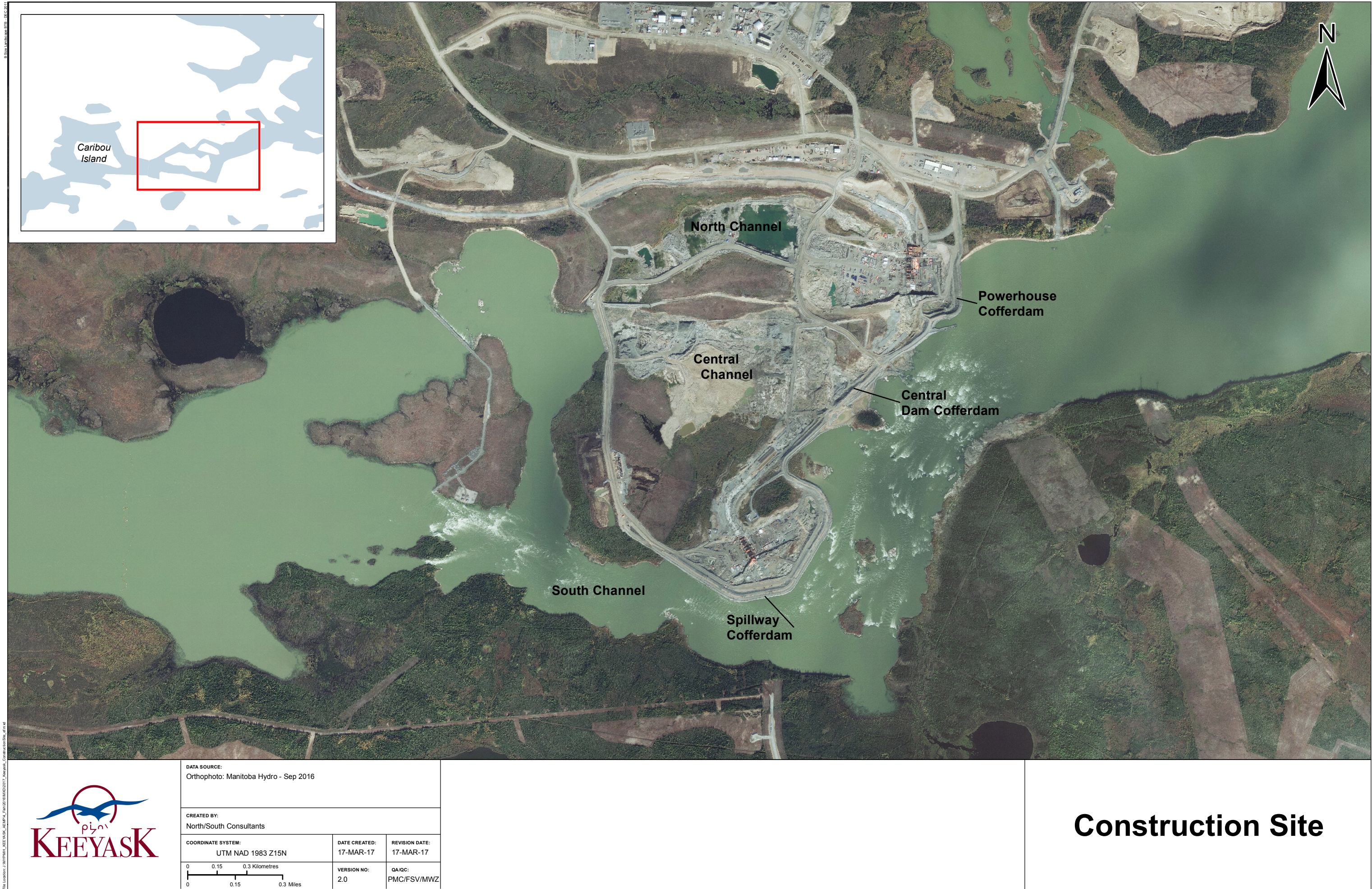
Figure 8. Stephens Lake water level (mASL), 2016.

## MAPS



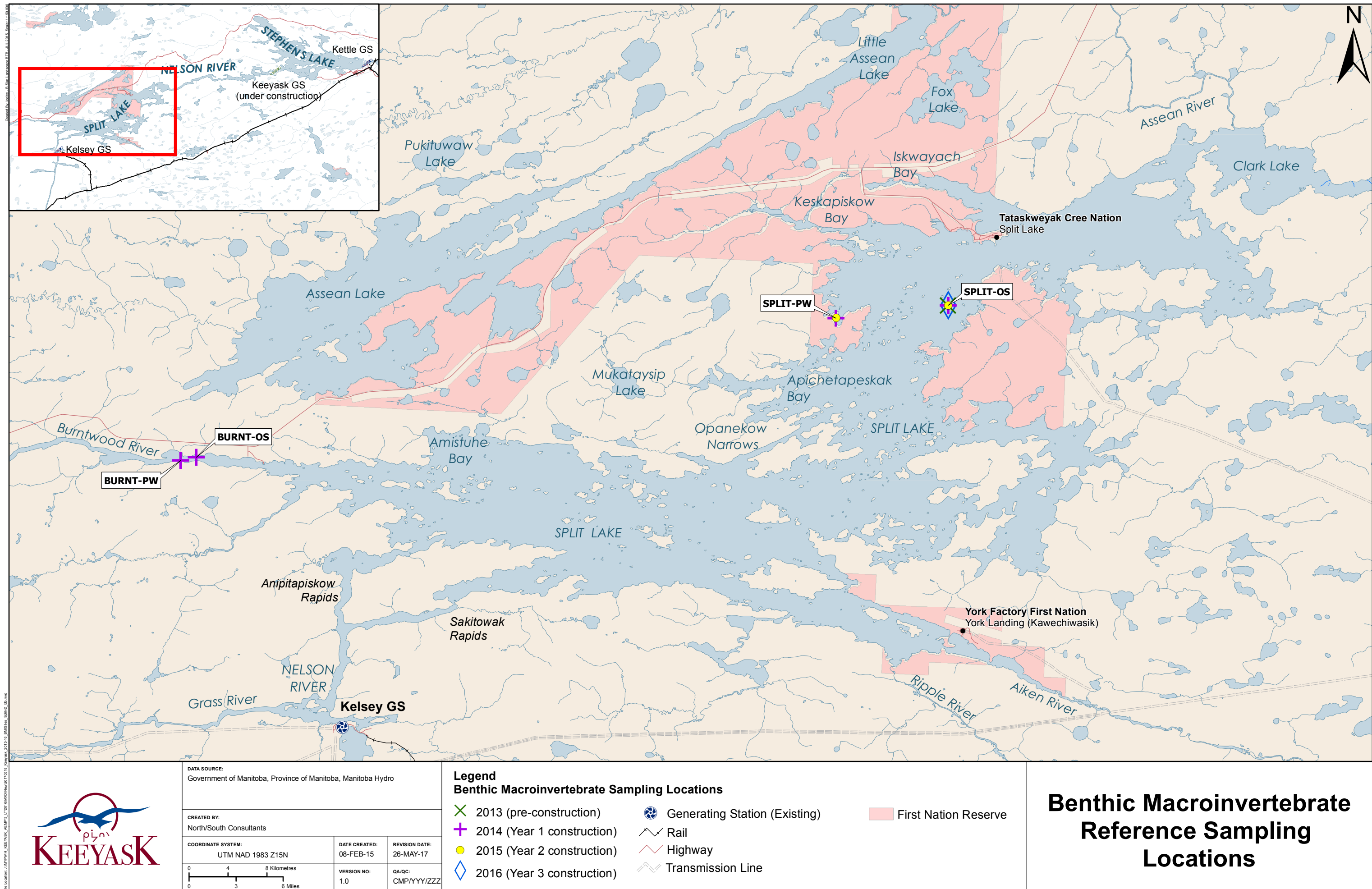




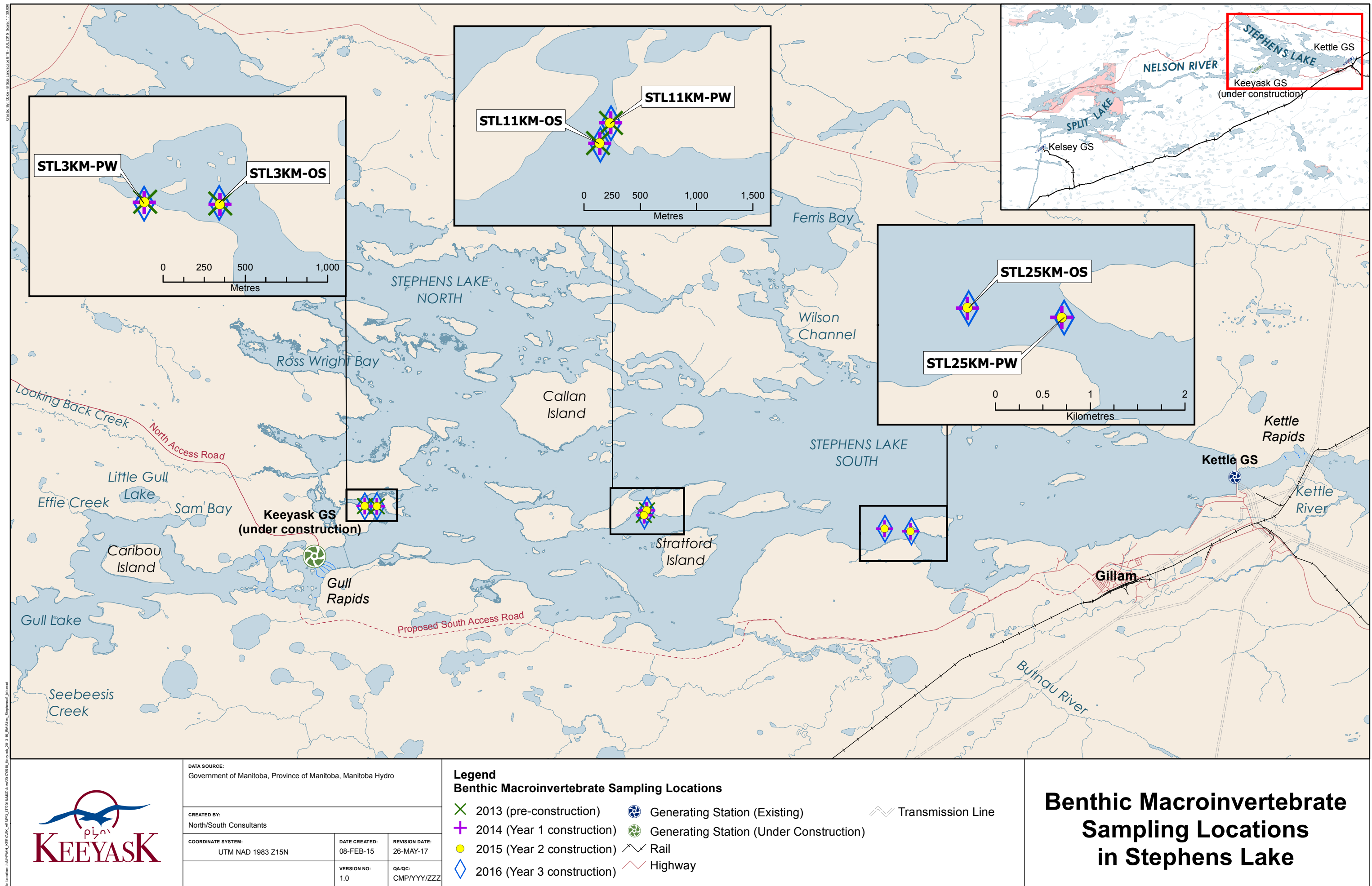


Map 2: Map of intream structures at the Keeyask Generating Station site, September 2016.





**Map 3: Benthic macroinvertebrate sampling locations in Stephens Lake, 2013 (pre-construction), 2014 (Year 1 construction), 2015 (Year 2 construction), and 2016 (Year 3 construction).**



# APPENDICES

## **APPENDIX 1:**

# **QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) PROCEDURES FOR AQUATIC MACROINVERTEBRATE SAMPLE PROCESSING**

Detailed sample processing protocols are developed on a by-project-basis depending on the specific needs of each client. The following provides an overview of standard QA/QC procedures employed for each project.

### **Large &/or Rare Search for Samples Requiring Sub-Sampling**

- Sample is washed and sieved using appropriate sized mesh;
- Entire sample is scanned for large &/or rare invertebrates in an appropriately sized tray. This scan is conducted on a per sample basis to avoid under-representing taxa that tend to occur singly or in few numbers that may be missed as a result of sub-sampling;
- Large organisms tend to occur in small numbers (e.g., Belostomatidae, crayfish); these organisms are rare in relation to the overall number of organisms in the sample being processed. Based on the overall number of organisms in the sample, if an organism tends to occur rarely with respect to the rest of the organisms in the sample, this organism is removed (or more, if >1) and retained in a separate vial for taxonomic identification; and
- Large &/or rare organisms are not included in the split correction and this is indicated clearly on the bench sheet. It is noted that there is a separate vial containing large &/or rare organisms.

### **Sample Processing**

#### **Sub-Sampling**

- Most samples are sub-sampled (unless requested by the client) to decrease processing time. A minimum of 300 organisms processed ensures the inclusion of more rare taxa and permits comparisons of richness among sites;
- The entire sample is examined in a large tray and estimate the number of splits necessary to produce the appropriate number of aliquots needed to achieve a 300-organism target;
- If a sample contains >300 organisms, large &/or rare invertebrates and any small fish are removed from the whole sample before sub-sampling (see above);
- When >300 organisms are present, the sample is split into halves. In order to reduce any bias created by the mixing/splitting process, the well-cleaned and mixed sample is split using a 1.0 or 4.0 L [specific to sample volume] Folsom Plankton Splitter. Each sub-sample is subsequently sorted until at least 300 animals are counted. When the 300-organism count



is achieved part way through a sub-sample, the remainder of this fraction is sorted so that a known fraction is sorted. All splitting information is recorded on the bench sheet.

- In sparse samples (*i.e.*, containing ~300 animals or less), the entire sample is processed;
- To be counted, a specimen must have enough intact body parts to permit its identification to the targeted level, and it must have a head (this prevents a body and detached head from being counted as two animals);
- Larval exuviae (exoskeleton remains), and empty shells (snails and clams) and cases (caddisflies) are not counted in the 300-fixed count. If there are no “live” molluscs in the sample, a few empty shells are set aside for identification; these are placed into vial with the large &/or rare specimens;
- The taxa Porifera, Nemata, Copepoda, Cladocera, Rotifera, Platyhelminthes, Ostracoda, and non-aquatic (terrestrial) taxa are not included in the 300 organism count because they are not considered as part of the benthic macroinvertebrate community. Typically, they are counted and their numbers recorded on the bench sheet.

### Sorting Samples

- Sorting aquatic samples involves removing aquatic macroinvertebrates from organic and inorganic materials within each sample;
- All sorting is conducted with a 3x desktop magnifier or stereomicroscope [specific to Project];
- All sorted samples are checked by a 2nd laboratory technician (QA/QC technician);
- Any additional invertebrates collected during the QA/QC process are combined with the original sample, but counted separately;
- Sorting efficiency must be  $\geq 95\%$ . The QA/QC technician checks on a tray-by-tray basis so that the sample is handled as few times as possible; the QA/QC technician will sort any remaining invertebrates from the tray and record the number of missed invertebrates per tray;
- The QA/QC technician will also check the bench sheet data to ensure it matches the sample data; and
- Sorted invertebrate samples are stored in 70% ethanol prior to delivery to the taxonomist.

### Verification of Taxonomic Identification

- NSC taxonomists regularly communicate with external taxonomic specialists to ensure accuracy and consistency.

### Sample Identifications

- Samples are identified to the appropriate taxonomic level [specific to client] by an in-house or external taxonomist. Ten percent (10%) of the in-house identifications are randomly

selected and sent to an external taxonomy specialist for QA/QC. The accuracy of the sample subset is assessed for identification and enumeration; all unknown invertebrates are sent to an external specialist; incorrect identifications and/or enumeration discrepancies are noted on the laboratory datasheet;

- The target overall accuracy level for in-house invertebrate identifications and enumeration is 95% at the Family level and 90% at the Genus level. Corrected identifications and enumeration values received from the external taxonomist are used in place of in-house data discrepancies. If the average error rate of audited samples is outside the target, the entire project must be re-identified by someone other than the original taxonomist.

## Data Processing

- Data from field books and laboratory bench sheets are entered into an MS Excel® data template;
- Data templates specify the Project Name, Study Area, Site Location/Description, GPS coordinates (Global Positioning System), Site Label, Sampling Date, Time of Day, Gear Type, Sieve Mesh Size in Field/Laboratory, Presence or Absence of Vegetation/Algae, Water Temperature, Water Depth, Velocity, Substrate Type, Number of Splits, Taxonomic List, Life Stage, and Enumeration List;
- A 2nd and 3rd technician sequentially verify all entered data and formulae to original field book and laboratory bench sheets (*i.e.*, verification is done twice) and a final verification is conducted by the project biologist and/or report author.

## APPENDIX 2:

### MEANS OF BENTHIC MACROINVERTEBRATE METRICS AND SUPPORTING SEDIMENT RESULTS BY REPLICATE STATION FOR 2013 (PRE-CONSTRUCTION), 2014 (YEAR 1 CONSTRUCTION), 2015 (YEAR 2 CONSTRUCTION), AND 2016 (YEAR 3 CONSTRUCTION)

Note: results for each site continue over four pages.

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP1	2.6	808	14	115	0	144
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP2	2.9	721	0	0	29	29
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP3	2.6	649	144	0	14	58
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP4	2.4	866	29	0	58	202
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP5	2.5	404	14	0	14	14
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R1	0.9	2323	29	87	43	115
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R2	1.1	2222	159	14	144	29
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R3	1.2	1111	289	0	72	43
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R4	1.0	1659	43	0	0	289
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R5	1.1	8281	1039	0	1024	390
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP1	3.0	1264	164	9	35	338
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP2	2.8	1524	26	0	26	866
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP3	3.1	727	17	0	52	216
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP4	2.6	1143	35	0	9	511
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP5	2.5	1368	156	0	17	883
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP1	3.0	779	0	0	0	43
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP2	3.1	476	58	0	29	87



Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP3	3.0	2352	231	0	0	289
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP4	2.7	2280	101	0	0	188
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP5	2.2	1515	144	14	14	231
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R1	2.4	216	14	0	0	0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R2	2.8	3015	14	14	29	14
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R3	2.7	231	29	0	0	72
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R4	2.2	1414	101	0	14	245
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R5	1.4	808	0	0	0	14
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R1	2.6	1428	0	14	0	87
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R2	2.8	707	29	0	29	144
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R3	2.7	1154	159	14	58	101
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R4	2.6	1746	87	0	43	317
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R5	1.8	3203	87	0	0	851
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP1	3.0	3298	78	0	242	416
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP2	2.2	2329	130	0	156	649
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP3	2.2	3740	312	9	139	641
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP4	2.1	1567	78	0	26	476
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP5	2.6	4242	130	0	35	286
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP1	3.4	1832	58	29	173	390
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP2	2.1	1529	58	0	144	433

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP3	2.0	2496	115	0	159	808
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP4	1.9	1472	0	0	29	606
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP5	1.5	1428	144	0	144	43
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R1	3.5	1443	14	87	188	274
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R2	1.8	1010	0	0	274	115
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R3	2.2	1284	43	0	29	144
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R4	1.8	1068	29	0	43	87
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R5	1.1	1803	115	0	72	216
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R1	2.7	1558	101	29	476	361
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R2	1.6	851	14	0	101	664
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R3	1.2	721	130	29	58	188
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R4	1.9	1515	130	0	43	87
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R5	1.2	995	260	0	72	29
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP1	2.9	1169	14	43	188	707
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP2	2.5	2669	462	0	332	1039
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP3	1.9	2727	245	0	274	1197
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP4	3.2	1313	188	0	216	159
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP5	2.3	4429	476	14	1039	2539
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R1	2.0	1457	43	14	620	260
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R2	1.3	4357	375	0	361	1068

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R3	1.0	3203	130	0	72	1573
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R4	2.4	3174	346	0	346	433
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R5	1.1	8685	346	29	895	3347
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R1	3.5	491	43	14	43	0
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R2	1.5	0	0	0	0	0
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R3	1.5	491	14	0	101	101
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R4	3.1	72	0	29	14	0
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R5	1.3	159	0	14	0	72
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP1	7.0	4040	14	1544	332	130
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP2	6.3	9248	29	1818	1125	4069
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP3	9.1	7517	58	1919	1111	2626
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP4	6.4	10806	0	895	895	6983
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP5	8.3	8281	29	895	981	5800
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP1	7.2	6175	29	1371	260	3506
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP2	6.8	7012	29	1212	649	4415
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP3	9.3	11311	58	2308	1125	6983
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP4	6.9	11311	29	1241	1241	6896
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP5	8.9	9060	0	1789	491	6233
Split Lake	OFFSH	2015	reference	SPLIT-OS-R1	6.1	3939	14	2193	534	87
Split Lake	OFFSH	2015	reference	SPLIT-OS-R2	5.9	3506	0	1601	750	202
Split Lake	OFFSH	2015	reference	SPLIT-OS-R3	6.5	3477	29	2684	0	29
Split Lake	OFFSH	2015	reference	SPLIT-OS-R4	5.7	3001	29	1616	447	58
Split Lake	OFFSH	2015	reference	SPLIT-OS-R5	5.4	3246	14	2583	29	87
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP1	6.9	1962	43	1226	0	14
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP2	6.2	2958	29	1573	303	58
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP3	9.4	2222	29	1385	0	0
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP4	6.2	2712	29	1457	130	173
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP5	6.3	2106	43	1746	0	0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP1	6.3	1394	0	9	0	744

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP2	6.0	710	9	0	0	164
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP3	6.0	822	0	0	0	424
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP4	6.2	900	17	0	0	121
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP5	6.2	1679	35	0	9	156
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP1	6.5	404	0	0	14	216
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP2	6.1	1082	14	29	0	202
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP3	6.1	1428	0	43	0	491
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP4	5.1	2684	29	14	43	1630
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP5	6.3	1731	0	14	0	1111
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R1	5.7	159	0	0	0	29
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R2	5.2	346	0	14	0	14
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R3	5.3	43	0	0	0	0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R4	4.9	72	0	0	0	0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R5	5.4	303	0	0	0	0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R1	6.0	505	0	43	0	433
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R2	5.2	1197	29	29	14	620
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R3	5.7	447	0	43	0	202
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R4	4.9	649	0	0	43	491
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R5	6.0	577	0	0	58	361
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP1	6.6	2190	0	130	0	52

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP2	7.3	2225	9	130	0	9
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP3	7.1	2779	26	69	0	9
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP4	7.2	2199	35	69	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP5	6.6	0	0	0	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP1	6.4	1284	0	202	0	43
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP2	6.8	1818	14	361	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP3	6.5	1890	14	433	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP4	7.6	1140	0	72	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP5	6.9	1313	0	72	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R1	5.9	1702	0	765	0	29
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R2	6.3	1111	0	491	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R3	6.6	1414	0	433	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R4	6.8	895	0	115	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R5	6.1	1125	0	159	0	0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R1	6.3	736	0	231	0	115
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R2	6.3	1977	14	317	0	115
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R3	7.2	505	0	87	0	14
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R4	6.8	1284	0	332	0	14
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R5	7.2	866	0	144	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP1	9.1	2857	0	1616	14	0

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Water Depth	Total Invertebrate Density	Oligochaeta Density	Amphipoda Density	Pisidiidae Density	Gastropoda Density
Units					meters	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP2	9.2	3102	14	2020	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP3	8.6	3232	43	2034	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP4	9.5	2135	0	1226	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP5	9.2	2510	0	1544	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R1	9.0	3434	0	2871	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R2	8.5	2453	0	2005	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R3	8.6	3419	14	2813	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R4	9.3	1255	0	707	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R5	8.9	2409	0	1659	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R1	9.4	2294	0	1298	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R2	8.9	1241	0	548	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R3	5.8	2871	0	1544	0	29
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R4	9.6	995	0	447	0	0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R5	9.4	2669	0	1702	0	0

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP1	274	216	0	14	231	0.84
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP2	390	159	0	0	159	0.41
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP3	159	159	0	14	173	1.09
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP4	231	245	0	0	245	1.06
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP5	144	188	0	14	202	1.40
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R1	1601	202	0	43	245	0.2
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R2	1241	433	0	14	447	0.4
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R3	361	245	0	58	303	0.8
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R4	822	361	0	14	375	0.5
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R5	4386	923	0	29	952	0.2
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP1	398	69	0	43	113	0.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP2	398	104	0	0	104	0.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP3	208	69	0	26	95	0.5
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP4	390	43	0	9	52	0.1
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP5	190	35	0	17	52	0.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP1	491	202	0	14	216	0.4
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP2	245	58	0	0	58	0.2
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP3	837	923	0	14	938	1.1
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP4	1183	664	0	87	750	0.6
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP5	462	635	0	14	649	1.4
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R1	188	0	0	0	0	-
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R2	2886	14	0	14	29	0.0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R3	115	0	0	0	0	-
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R4	952	43	0	0	43	0.0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R5	794	0	0	0	0	-

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R1	1039	115	0	0	115	0.1
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R2	346	72	0	14	87	0.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R3	447	159	0	29	188	29.0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R4	895	173	0	14	188	0.2
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R5	1962	43	0	0	43	0.0
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP1	173	2329	0	9	2337	13.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP2	147	1229	0	9	1238	8.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP3	225	2372	0	9	2381	10.6
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP4	147	788	0	17	805	5.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP5	718	3004	0	35	3038	4.2
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP1	216	952	0	0	952	4.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP2	58	822	0	0	822	14.3
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP3	188	1226	0	0	1226	6.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP4	606	216	0	14	231	0.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP5	606	375	0	29	404	0.7
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R1	519	361	0	0	361	0.7
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R2	87	462	0	0	462	5.3
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R3	433	592	0	0	592	1.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R4	346	491	0	14	505	1.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R5	1039	260	0	0	260	0.3



Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R1	101	447	0	0	447	4.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R2	14	29	0	14	43	3.0
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R3	289	0	0	29	29	0.1
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R4	433	548	0	144	693	1.6
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R5	491	130	0	14	144	0.3
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP1	0	202	0	0	202	-
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP2	505	231	0	43	274	0.5
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP3	491	404	0	14	418	0.9
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP4	101	649	0	0	649	6.4
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP5	101	245	0	0	245	2.4
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R1	72	433	0	0	433	6.0
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R2	808	1587	0	29	1616	2.0
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R3	462	952	0	0	952	2.1
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R4	534	1486	0	14	1500	2.8
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R5	2395	1529	0	0	1529	0.6
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R1	173	216	0	0	216	1.3
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R2	0	0	0	0	0	-
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R3	260	14	0	0	14	0.1
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R4	29	0	0	0	0	-
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R5	58	0	0	0	0	-

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP1	216	1587	0	101	1688	7.8
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP2	462	1558	0	58	1616	3.5
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP3	418	1298	0	58	1356	3.2
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP4	346	1587	0	87	1674	4.8
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP5	144	375	0	58	433	3.0
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP1	159	808	0	0	808	5.1
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP2	72	534	0	58	592	8.2
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP3	231	491	0	87	577	2.5
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP4	173	1039	0	58	1096	6.3
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP5	144	346	0	29	375	2.6
Split Lake	OFFSH	2015	reference	SPLIT-OS-R1	563	361	0	43	404	0.7
Split Lake	OFFSH	2015	reference	SPLIT-OS-R2	592	130	0	101	231	0.4
Split Lake	OFFSH	2015	reference	SPLIT-OS-R3	404	159	0	72	231	0.6
Split Lake	OFFSH	2015	reference	SPLIT-OS-R4	505	274	0	29	303	0.6
Split Lake	OFFSH	2015	reference	SPLIT-OS-R5	245	173	0	58	231	0.9
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP1	159	491	0	29	519	3.3
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP2	231	592	0	43	635	2.8
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP3	115	462	0	202	664	5.8
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP4	159	649	0	0	649	4.1
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP5	0	274	0	14	289	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP1	493	69	0	43	113	0.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP2	424	95	0	9	104	0.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP3	364	9	0	9	17	0.0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP4	684	52	0	26	78	0.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP5	1324	95	0	43	139	0.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP1	173	0	0	0	0	0.0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP2	721	101	0	14	115	0.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP3	794	87	0	14	101	0.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP4	909	43	0	14	58	0.1

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP5	505	43	0	58	101	0.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R1	87	0	0	43	43	0.5
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R2	289	0	0	14	14	0.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R3	0	0	0	29	29	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R4	58	0	0	14	14	0.3
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R5	289	0	0	0	0	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R1	0	29	0	0	29	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R2	202	188	0	72	260	1.3
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R3	58	115	0	14	130	2.3
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R4	101	14	0	0	14	0.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R5	144	14	0	0	14	0.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP1	173	1801	0	0	1801	10.4
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP2	242	1818	0	0	1818	7.5
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP3	390	2277	0	0	2277	5.8
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP4	164	1922	0	0	1922	11.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP5	0	0	0	0	0	-
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP1	72	938	0	14	952	13.2
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP2	188	1241	0	0	1241	6.6
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP3	216	1226	0	0	1226	5.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP4	29	1039	0	0	1039	36.0

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP5	173	1024	0	0	1024	5.9
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R1	289	606	0	0	606	2.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R2	101	491	0	0	491	4.9
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R3	317	664	0	0	664	2.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R4	144	620	0	0	620	4.3
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R5	303	649	0	0	649	2.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R1	14	375	0	0	375	26.0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R2	375	1082	0	0	1082	2.9
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R3	43	332	0	0	332	7.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R4	87	808	0	14	822	9.5
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R5	43	678	0	0	678	15.7
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP1	245	967	0	0	967	3.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP2	216	851	0	0	851	3.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP3	231	909	0	0	909	3.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP4	173	736	0	0	736	4.3
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP5	274	693	0	0	693	2.5
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R1	188	375	0	0	375	2.0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R2	260	188	0	0	188	0.7
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R3	404	188	0	0	188	0.5
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R4	202	332	0	14	346	1.7

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Chironomidae Density	Ephemeroptera Density	Plecoptera Density	Trichoptera Density	EPT Density	Ratio of EPT to Chironomidae
Units					no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	no. per m <sup>2</sup>	-
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R5	390	332	0	14	346	0.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R1	245	736	0	0	736	3.0
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R2	274	404	0	14	418	1.5
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R3	707	563	0	14	577	0.8
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R4	159	375	0	0	375	2.4
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R5	115	808	0	29	837	7.3

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP1	26.8	28.6	35.7	8	2	0.77
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP2	22.0	22.0	54.0	6	1	0.64
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP3	24.4	26.7	46.7	10	2	0.81
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP4	28.3	28.3	30.0	7	1	0.78
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP5	46.4	50.0	39.3	7	2	0.65
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R1	8.70	10.56	70.19	11	2	0.51
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R2	19.48	20.13	62.99	11	2	0.64
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R3	22.08	27.27	58.44	11	1	0.77
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R4	21.74	22.61	52.17	8	1	0.67
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R5	11.15	11.50	65.51	12	2	0.67
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP1	5.48	8.9	44.52	11	3	0.79
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP2	6.82	6.8	27.84	8	1	0.61
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP3	9.52	13.1	30.95	9	3	0.78
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP4	3.79	4.5	37.12	10	3	0.69
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP5	2.53	3.8	25.32	9	2	0.57
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP1	25.93	27.8	62.96	6	2	0.53
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP2	12.12	12.1	63.64	6	1	0.68
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP3	39.26	39.9	45.40	9	2	0.70
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP4	29.11	32.9	56.33	10	4	0.64
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP5	41.90	42.9	40.00	8	2	0.71
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R1	0.00	0.00	93.33	3	0	0.24
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R2	0.48	0.96	96.17	8	1	0.08
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R3	0.00	0.00	62.50	5	0	0.67
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R4	3.06	3.06	74.49	11	2	0.52

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R5	0.00	0.00	98.21	2	0	0.04
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R1	8.08	8.08	72.73	7	1	0.45
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R2	10.20	12.24	53.06	9	2	0.72
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R3	13.75	16.25	52.50	8	2	0.78
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R4	9.92	10.74	56.20	8	2	0.68
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R5	1.35	1.35	63.96	8	1	0.58
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP1	70.60	70.9	7.61	8	3	0.48
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP2	52.79	53.2	11.90	8	2	0.63
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP3	63.43	63.7	14.35	9	2	0.56
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP4	50.28	51.4	14.36	10	3	0.69
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP5	70.82	71.6	20.00	12	5	0.48
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP1	51.97	52.0	14.96	8	1	0.66
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP2	53.77	53.8	7.55	6	1	0.62
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP3	49.13	49.1	12.14	7	2	0.71
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP4	14.71	15.7	41.18	6	2	0.68
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP5	26.26	28.3	52.53	9	3	0.73
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R1	25.00	25.00	37.00	7	1	0.76
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R2	45.71	45.71	8.57	6	1	0.69
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R3	46.07	46.07	37.08	7	1	0.67

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R4	45.95	47.30	35.14	8	1	0.67
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R5	14.40	14.40	64.00	10	1	0.64
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R1	28.70	28.70	12.96	8	1	0.77
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R2	3.39	5.08	3.39	10	2	0.60
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R3	0.00	4.00	58.00	8	2	0.76
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R4	36.19	45.71	37.14	10	3	0.76
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R5	13.04	14.49	75.36	5	2	0.67
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP1	17.28	17.28	1.23	8	2	0.76
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP2	8.65	10.27	36.22	10	4	0.76
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP3	14.81	15.34	26.98	11	2	0.73
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP4	49.45	49.45	21.98	5	1	0.69
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP5	5.54	5.54	13.03	7	1	0.60
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R1	29.70	29.70	7.92	7	1	0.70
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R2	36.42	37.09	27.15	12	2	0.77
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R3	29.73	29.73	18.47	7	1	0.74
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R4	46.82	47.27	27.73	8	1	0.72
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R5	17.61	17.61	31.56	13	2	0.79
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R1	44.12	44.12	44.12	6	2	0.71
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R2	0.00	0.00	0.00	0	0	-



Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R3	2.94	2.94	55.88	6	1	0.65
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R4	0.00	0.00	40.00	3	0	0.65
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R5	0.00	0.00	36.36	6	0	0.77
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP1	39.29	41.79	5.71	10	3	0.69
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP2	16.85	17.47	5.30	10	2	0.72
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP3	17.27	18.04	6.33	9	2	0.76
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP4	14.69	15.49	3.20	7	2	0.55
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP5	4.53	5.23	2.09	7	2	0.48
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP1	13.08	13.08	3.04	8	1	0.61
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP2	7.61	8.44	1.44	10	3	0.56
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP3	4.34	5.10	2.55	10	3	0.60
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP4	9.18	9.69	1.79	9	2	0.59
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP5	3.82	4.14	1.59	7	2	0.48
Split Lake	OFFSH	2015	reference	SPLIT-OS-R1	9.16	10.26	14.65	11	1	0.64
Split Lake	OFFSH	2015	reference	SPLIT-OS-R2	3.70	6.58	16.87	11	1	0.71
Split Lake	OFFSH	2015	reference	SPLIT-OS-R3	4.56	6.64	12.45	9	1	0.39
Split Lake	OFFSH	2015	reference	SPLIT-OS-R4	9.13	10.10	17.79	8	1	0.65
Split Lake	OFFSH	2015	reference	SPLIT-OS-R5	5.33	7.11	8.00	9	1	0.36
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP1	25.00	26.47	10.29	6	2	0.54
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP2	20.00	21.46	8.78	9	2	0.66
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP3	20.78	29.87	6.49	10	4	0.58
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP4	23.94	23.94	6.91	8	1	0.64
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP5	13.01	13.70	2.05	6	2	0.30
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP1	4.97	8.07	35.40	9	3	0.59
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP2	13.41	14.63	60.98	8	3	0.59
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP3	1.05	2.11	44.21	5	2	0.54
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP4	5.77	8.65	77.88	5	2	0.40
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP5	5.67	8.25	80.93	10	3	0.37
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP1	0.00	0.00	42.86	3	0	0.53

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP2	9.33	10.67	68.00	6	2	0.51
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP3	6.06	7.07	55.56	5	2	0.57
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP4	1.61	2.15	34.95	7	2	0.52
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP5	2.50	5.83	29.17	6	2	0.51
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R1	0.00	27.27	54.55	3	0	0.60
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R2	0.00	4.17	83.33	5	0	0.30
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R3	0.00	66.67	0.00	2	0	0.45
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R4	0.00	20.00	80.00	2	0	0.32
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R5	0.00	0.00	95.24	2	0	0.09
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R1	5.71	5.71	0.00	3	1	0.26
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R2	15.66	21.69	19.28	9	2	0.71
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R3	25.81	29.03	12.90	6	2	0.70
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R4	2.22	2.22	15.56	4	1	0.40
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R5	2.50	2.50	25.00	4	1	0.54
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP1	82.21	82.21	7.91	6	1	0.31
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP2	81.71	81.71	11.28	6	1	0.32
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP3	81.93	81.93	14.95	6	1	0.31
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP4	87.40	87.40	9.06	6	2	0.24
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP5	0.00	0.00	0.00	0	0	-

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP1	73.03	74.16	5.62	6	2	0.44
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP2	68.25	68.25	11.11	6	1	0.49
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP3	64.89	64.89	12.21	5	1	0.52
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP4	91.14	91.14	2.53	3	1	0.16
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP5	78.02	78.02	13.19	5	1	0.37
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R1	35.59	35.59	16.95	6	1	0.64
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R2	44.16	44.16	9.09	4	1	0.60
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R3	46.94	46.94	22.45	3	1	0.64
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R4	69.35	69.35	16.13	4	1	0.48
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R5	57.69	57.69	26.92	4	1	0.58
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R1	50.98	50.98	1.96	4	1	0.62
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R2	54.74	54.74	19.71	9	1	0.64
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R3	65.71	65.71	8.57	7	1	0.54
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R4	62.92	64.04	6.74	7	2	0.54
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R5	78.33	78.33	5.00	3	1	0.36
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP1	33.84	33.84	8.59	5	1	0.56
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP2	27.44	27.44	7.44	5	1	0.50
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP3	28.13	28.13	8.48	5	1	0.52
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP4	34.46	34.46	8.11	3	1	0.55

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Percent Ephemeroptera	Percent EPT (EPT Index)	Percent of Oligochaeta and Chironomidae	Total Richness (Family-level)	EPT Richness (Family-level)	Simpson's Diversity Index
Units					%	%	%	-	-	-
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP5	27.59	27.59	10.92	3	1	0.53
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R1	10.92	10.92	5.46	4	1	0.29
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R2	7.65	7.65	10.59	3	1	0.31
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R3	5.49	5.49	12.24	4	1	0.31
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R4	26.44	27.59	16.09	4	1	0.59
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R5	13.77	14.37	16.17	5	1	0.48
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R1	32.08	32.08	10.69	5	1	0.59
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R2	32.56	33.72	22.09	4	2	0.65
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R3	19.60	20.10	24.62	6	2	0.61
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R4	37.68	37.68	15.94	4	1	0.63
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R5	30.27	31.35	4.32	6	2	0.51

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
Units					%	%	%	%
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP1	3.97	25.9	49.1	25.0
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP2	1.51	55.0	30.0	15.0
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP3	2.21	40.6	40.0	19.4
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP4	1.65	33.6	47.3	19.1
Split Lake	NRSH-PW	2014	reference	SPLIT-PW-REP5	1.51	41.4	40.2	18.4
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R1	2.67	24.5	53.0	22.5
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R2	3.26	29.3	46.6	24.0
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R3	2.78	29.6	57.6	12.8
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R4	1.67	41.8	41.8	16.4
Split Lake	NRSH-PW	2015	reference	SPLIT-PW-R5	2.17	58.2	29.8	12.0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP1	1.48	12.6	42.8	44.6
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP2	1.13	11.4	42.8	45.8
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP3	1.14	9.4	38.2	52.4
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP4	1.25	10.2	40.7	49.1
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL3KM-PW-REP5	1.41	12.5	42.8	44.7
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP1	1.96	3.5	61.2	35.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP2	1.67	11.8	50.8	37.3
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP3	3.13	7.8	43.5	48.6
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP4	2.84	9.6	52.2	38.2
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL3KM-PW-REP5	2.28	18.2	42.1	39.7
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R1	6.83	7.4	48.7	43.9
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R2	0.89	30.6	20.3	49.1
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R3	1.16	21.6	40.4	38.0
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R4	4.89	12.2	51.1	36.8
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-3KM-PW-R5	1.36	8.7	33.0	58.3

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
Units					%	%	%	%
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R1	3.32	10.6	36.5	52.9
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R2	1.59	49.1	15.9	35
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R3	3.43	13.4	41.3	45.2
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R4	1.49	11.8	21.6	66.6
Stephens Lake 3 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-3KM-PW-R5	2.48	7.4	30.7	61.9
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP1	1.97	4.0	71.0	25.0
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP2	0.49	75.7	16.5	7.8
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP3	1.57	54.6	33.5	11.9
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP4	1.68	49.6	40.3	10.1
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2013	impact	STL11KM-PW-REP5	3.61	10.3	71.6	18.1
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP1	2.47	35.7	51.0	13.3
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP2	1.26	52.9	34.9	12.2
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP3	1.59	54.6	35.2	10.2
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP4	1.64	55.5	36.1	8.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL11KM-PW-REP5	5.60	10.6	51.4	37.9
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R1	2.35	1.2	83.1	15.7
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R2	1.04	65.0	26.5	8.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R3	3.78	3.8	87.7	8.5
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R4	3.16	18.8	70.3	10.9
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-11KM-PW-R5	2.87	40.8	42.7	16.5

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
Units					%	%	%	%
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R1	4.42	35.5	46.6	17.9
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R2	2.9	68.8	17.7	13.6
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R3	1.65	91.5	4.2	4.4
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R4	3.28	70.3	21.6	8.1
Stephens Lake 11 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-11KM-PW-R5	1.94	68.4	18.2	13.4
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP1	0.36	54.0	18.8	27.2
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP2	2.52	74.1	17.7	8.3
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP3	0.35	90.4	5.4	4.2
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP4	2.15	65.7	27.4	6.9
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2014	impact	STL25KM-PW-REP5	0.40	90.1	4.7	5.2
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R1	0.74	16.0	25.1	58.9
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R2	0.90	78.2	15.4	6.4
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R3	0.24	87.4	9.7	2.9
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R4	1.80	72.0	19.5	8.5
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2015	impact	STL-25KM-PW-R5	0.53	88.6	7.7	3.7
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R1	7.11	42.9	35.5	21.6
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R2	-	-	-	-
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R3	0.69	95.7	2.6	1.7
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R4	3.67	65.9	25.8	8.3
Stephens Lake 25 km downstream of Gull Rapids	NRSH-PW	2016	impact	STL-25KM-PW-R5	-	-	-	-

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
					%	%	%	%
Units								
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP1	1.08	17.8	66.0	16.2
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP2	1.15	17.6	79.7	2.7
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP3	1.04	19.0	50.5	30.4
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP4	1.01	19.5	55.2	25.3
Split Lake	OFFSH	2013	reference	SPLIT-OS-REP5	1.05	19.0	55.6	25.4
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP1	1.34	19.5	50.0	30.5
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP2	1.31	14.8	56.6	28.6
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP3	1.32	17.7	53.5	28.8
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP4	1.10	24.2	54.8	20.9
Split Lake	OFFSH	2014	reference	SPLIT-OS-REP5	1.33	16.4	52.2	31.4
Split Lake	OFFSH	2015	reference	SPLIT-OS-R1	1.53	11.9	77.7	10.3
Split Lake	OFFSH	2015	reference	SPLIT-OS-R2	1.31	18.8	58.7	22.5
Split Lake	OFFSH	2015	reference	SPLIT-OS-R3	1.08	22.1	59.0	18.8
Split Lake	OFFSH	2015	reference	SPLIT-OS-R4	1.24	12.9	62.4	24.7
Split Lake	OFFSH	2015	reference	SPLIT-OS-R5	1.24	15.2	71.3	13.5
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP1	2.13	18.4	54.0	27.6
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP2	2.00	14.8	56.2	29.0
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP3	1.90	7.7	53.9	38.4
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP4	2.15	11.5	57.6	30.9
Split Lake	OFFSH	2016	reference	SPLIT-OS-REP5	2.19	13.8	58.4	27.8
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP1	1.16	1.1	45.3	53.7
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP2	0.75	2.1	40.2	57.6
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP3	1.59	3.5	21.5	75.0
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP4	1.16	1.7	52.3	46.1
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2013	impact	STL3KM-OS-REP5	0.93	1.9	26.7	71.4
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP1	1.67	14.8	46.8	38.5
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP2	2.43	9.6	51.8	38.6
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP3	0.77	45.2	30.6	24.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP4	0.96	2.2	61.3	36.5
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2014	impact	STL3KM-OS-REP5	1.51	4.1	59.9	36.0



Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
					%	%	%	%
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R1	3.75	0.5	64.6	34.9
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R2	4.98	3.5	65.6	30.8
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R3	2.23	8.8	48.8	42.4
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R4	0.27	0.8	49.5	49.7
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2015	impact	STL-3KM-OS-R5	0.59	4.3	27.2	68.6
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R1	2.47	11.8	40.4	47.8
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R2	5.37	6.2	59.9	33.9
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R3	2.53	8.9	50.9	40.2
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R4	-	2.4	51	46.6
Stephens Lake 3 km downstream of Gull Rapids	OFFSH	2016	impact	STL-3KM-OS-R5	2.21	33.5	32.1	34.4
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP1	1.11	0.5	73.7	25.8
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP2	1.36	0.5	75.7	23.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP3	1.23	0.6	75.1	24.3
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP4	1.20	0.5	69.8	29.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2013	impact	STL11KM-OS-REP5	1.30	0.3	68.1	31.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP1	1.48	0.5	67.4	32.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP2	5.71	0.1	59.9	40.0
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP3	1.30	0.4	67.3	32.3
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP4	1.28	0.3	68.6	31.2
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2014	impact	STL11KM-OS-REP5	1.27	0.2	68.2	31.6

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
Units					%	%	%	%
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R1	1.38	1.4	97.5	1.1
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R2	1.22	0.9	89.5	9.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R3	1.40	1.0	98.5	0.5
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R4	1.19	0.6	84.8	14.6
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2015	impact	STL-11KM-OS-R5	1.19	0.6	77.1	22.2
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R1	3.48	1.1	67.2	31.7
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R2	3.51	1.5	70.1	28.5
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R3	3.41	0.5	67.4	31.8
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R4	3.25	0.5	66.7	32.5
Stephens Lake 11 km downstream of Gull Rapids	OFFSH	2016	impact	STL-11KM-OS-R5	3.53	0.5	66.7	32.8
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP1	1.88	0.1	76.7	23.1
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP2	1.93	0.2	76.6	23.2
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP3	2.23	0.3	71.5	28.2
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP4	2.01	0.1	66.2	33.6
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2014	impact	STL25KM-OS-REP5	2.09	0.1	72.3	27.6
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R1	2.04	0.3	89.1	10.6
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R2	2.09	0.4	94.3	5.4
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R3	2.22	0.2	85.2	14.6
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R4	2.11	0.3	85.9	13.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2015	impact	STL-S-OS-R5	2.00	0.4	82.3	17.3

Waterbody/ Site Location	Habitat Type	Study Year	Site Type	Site ID	Total Organic Carbon	Sand	Silt	Clay
Units					%	%	%	%
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R1	3.68	0.5	60.1	39.6
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R2	3.57	0.5	60.7	38.9
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R3	4.16	4.1	55.7	40.2
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R4	3.85	0.5	63.6	36.1
Stephens Lake 25 km downstream of Gull Rapids	OFFSH	2016	impact	STL-25KM-OS-R5	3.82	0.5	60.6	39.3



## APPENDIX 3: SUMMARY STATISTICS FOR ADDITIONAL METRICS BY HABITAT TYPE FOR 2013 (PRE-CONSTRUCTION), 2014 (YEAR 1 CONSTRUCTION), AND 2015 (YEAR 2 CONSTRUCTION)

### *Nearshore Habitat*

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Water Depth (m)												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	2.60	1.07	2.79	2.81	2.30	2.50	2.41	2.18	2.10	1.72	2.55	1.56	2.35
Minimum	2.40	0.93	2.50	2.23	1.37	1.80	2.14	1.47	1.13	1.20	1.90	1.03	1.30
Maximum	2.90	1.17	3.08	3.07	2.80	2.80	3.00	3.43	3.50	2.70	3.20	2.40	3.50
Median	2.60	1.10	2.82	3.03	2.40	2.60	2.18	2.00	1.83	1.60	2.50	1.27	2.30
Standard deviation (n-1)	0.19	0.09	0.25	0.36	0.58	0.40	0.37	0.74	0.87	0.62	0.51	0.62	1.11
Standard error of the mean	0.08	0.04	0.11	0.16	0.26	0.18	0.17	0.33	0.39	0.28	0.23	0.28	0.56
COV (%)	7.20	8.27	9.11	12.69	25.06	16.00	15.36	34.12	41.56	36.17	19.91	39.73	47.32
+50% Mean	3.90	1.60	4.18	4.22	3.45	3.75	3.62	3.27	3.15	2.58	3.82	2.34	3.53
-50% Mean	1.30	0.53	1.39	1.41	1.15	1.25	1.21	1.09	1.05	0.86	1.27	0.78	1.18
Benchmark Exceedance (temporal comparison)	-	Yes	-	No	No (both)	No (all)	-	No	No (both)	No (all)	-	No	Yes (2015)
Significant Inter-annual Difference	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM -2013	STL11KM -2014	STL11KM -2015	STL11KM- 2016	STL25KM -2014	STL25KM -2015	STL25KM -2016
Metric	Oligochaeta Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	40.40	311.63	79.64	106.76	31.74	72.14	145.43	75.02	40.40	126.96	277.01	248.15	14.43
Minimum	0.00	28.86	17.31	0.00	0.00	0.00	77.91	0.00	0.00	14.43	14.43	43.28	0.00
Maximum	144.28	1038.78	164.47	230.84	100.99	158.70	311.63	144.28	115.42	259.70	476.11	375.12	43.28
Median	14.43	158.70	34.63	100.99	14.43	86.57	129.85	57.71	28.86	129.85	245.27	346.26	7.21
Standard deviation (n-1)	58.96	419.71	73.81	87.52	40.03	61.21	96.47	56.25	44.93	88.00	194.74	151.11	20.40
Standard error of the mean	26.37	187.70	33.01	39.14	17.90	27.37	43.14	25.16	20.10	39.35	87.09	67.58	10.20
COV (%)	145.95	134.68	92.68	81.98	126.13	84.85	66.34	74.98	111.23	69.31	70.30	60.89	141.42
+50% Mean	60.60	467.45	119.46	160.15	47.61	108.21	218.14	112.53	60.60	190.44	415.51	372.23	21.64
-50% Mean	20.20	155.82	39.82	53.38	15.87	36.07	72.71	37.51	20.20	63.48	138.50	124.08	7.21
Benchmark Exceedance (temporal comparison)	-	Yes	-	No	Yes (both)	Yes (2015)	-	No	Yes (2013)	Yes (2014 and 2015)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	Yes	N/A	N/A	No	No	N/A	N/A	No	No	N/A	N/A	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM -2013	STL11KM -2014	STL11KM -2015	STL11KM- 2016	STL25KM -2014	STL25KM -2015	STL25KM -2016
Metric	Amphipoda Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	23.08	20.20	1.73	2.89	2.89	5.77	1.73	5.77	17.31	11.54	11.54	8.66	14.43
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	115.42	86.57	8.66	14.43	14.43	14.43	8.66	28.86	86.57	28.86	43.28	28.86	28.86
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.43
Standard deviation (n-1)	51.62	37.62	3.87	6.45	6.45	7.90	3.87	12.90	38.71	15.80	18.81	12.90	11.78
Standard error of the mean	23.08	16.83	1.73	2.89	2.89	3.53	1.73	5.77	17.31	7.07	8.41	5.77	5.89
COV (%)	223.61	186.26	223.61	223.61	223.61	136.93	223.61	223.61	223.61	136.93	162.98	149.07	81.65
+50% Mean	34.63	30.30	2.60	4.33	4.33	8.66	2.60	8.66	25.97	17.31	17.31	12.98	21.64
-50% Mean	11.54	10.10	0.87	1.44	1.44	2.89	0.87	2.89	8.66	5.77	5.77	4.33	7.21
Benchmark Exceedance (temporal comparison)	-	No	-	Yes	Yes (2013)	Yes (all)	-	Yes	Yes (both)	Yes (2013 and 2014)	-	No	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	No	No	No	N/A	No	No	No	N/A	N/A	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM -2013	STL11KM -2014	STL11KM -2015	STL11KM -2016	STL25KM -2014	STL25KM -2015	STL25KM -2016
Metric	Gastropoda Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	89.45	173.13	562.67	167.36	69.25	300.09	493.42	455.91	167.36	265.47	1128.23	1335.99	43.28
Minimum	14.43	28.86	216.41	43.28	0.00	86.57	285.66	43.28	86.57	28.86	158.70	259.70	0.00
Maximum	201.99	389.54	882.96	288.55	245.27	851.22	649.24	807.94	274.12	663.67	2539.24	3347.18	100.99
Median	57.71	115.42	510.73	187.56	14.43	144.28	476.11	432.83	144.28	187.56	1038.78	1067.64	36.07
Standard deviation (n-1)	80.59	159.03	303.16	101.30	102.22	321.54	154.49	283.57	76.75	255.78	883.35	1239.66	51.35
Standard error of the mean	36.04	71.12	135.58	45.30	45.71	143.80	69.09	126.81	34.32	114.39	395.05	554.39	25.67
COV (%)	90.09	91.86	53.88	60.53	147.61	107.15	31.31	62.20	45.86	96.35	78.29	92.79	118.63
+50% Mean	134.18	259.70	844.01	251.04	103.88	450.14	740.13	683.86	251.04	398.20	1692.35	2003.98	64.92
-50% Mean	44.73	86.57	281.34	83.68	34.63	150.05	246.71	227.95	83.68	132.73	564.12	667.99	21.64
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (2014 and 2015)	-	No	Yes (both)	Yes (2015)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	No	N/A	No	Yes (2013)	No	N/A	N/A	No	No	N/A	N/A	Yes (both)



***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Chironomidae Density (no. per m <sup>3</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	239.50	1682.25	316.83	643.47	986.84	937.79	282.20	334.72	484.76	265.47	239.50	854.11	129.85
Minimum	144.28	360.69	190.44	245.27	115.42	346.26	147.16	57.71	86.57	14.43	0.00	72.14	28.86
Maximum	389.54	4385.96	398.20	1183.06	2885.50	1962.14	718.49	605.96	1038.78	490.54	504.96	2394.97	259.70
Median	230.84	1240.77	389.54	490.54	793.51	894.51	173.13	216.41	432.83	288.55	100.99	533.82	115.42
Standard deviation (n-1)	99.23	1580.94	107.70	368.62	1122.69	642.63	245.96	254.72	349.49	205.71	239.38	900.62	106.67
Standard error of the mean	44.37	707.02	48.17	164.85	502.08	287.39	110.00	113.91	156.30	92.00	107.06	402.77	53.34
COV (%)	41.43	93.98	33.99	57.29	113.77	68.53	87.16	76.10	72.10	77.49	99.95	105.45	82.15
+50% Mean	359.25	2523.37	475.24	965.20	1480.26	1406.68	423.30	502.08	727.15	398.20	359.25	1281.16	194.77
-50% Mean	119.75	841.12	158.41	321.73	493.42	468.89	141.10	167.36	242.38	132.73	119.75	427.05	64.92
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (2013)	-	No	Yes (2013)	No (all)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	Yes	N/A	No	No	No	N/A	N/A	No	N/A	N/A	No	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Plecoptera Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard deviation (n-1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard error of the mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COV (%)	-	-	-	-	-	-	-	-	-	-	-	-	-
+50% Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-50% Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benchmark Exceedance (temporal comparison)	N/A	N/A	N/A	N/A	N/A	No (all)	N/A	N/A	N/A	No (all)	N/A	N/A	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM -2013	STL11KM -2014	STL11KM -2015	STL11KM -2016	STL25KM -2014	STL25KM -2015	STL25KM -2016
Metric	Trichoptera Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	8.66	31.74	19.04	25.97	2.89	11.54	15.58	8.66	2.89	40.40	11.54	8.66	0.00
Minimum	0.00	14.43	0.00	0.00	0.00	0.00	8.66	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	14.43	57.71	43.28	86.57	14.43	28.86	34.63	28.86	14.43	144.28	43.28	28.86	0.00
Median	14.43	28.86	17.31	14.43	0.00	14.43	8.66	0.00	0.00	14.43	0.00	0.00	0.00
Standard deviation (n-1)	7.90	18.81	16.65	34.45	6.45	12.07	11.29	12.90	6.45	58.96	18.81	12.90	0.00
Standard error of the mean	3.53	8.41	7.45	15.40	2.89	5.40	5.05	5.77	2.89	26.37	8.41	5.77	0.00
COV (%)	91.29	59.27	87.43	132.64	223.61	104.58	72.44	149.07	223.61	145.95	162.98	149.07	-
+50% Mean	12.98	47.61	28.57	38.95	4.33	17.31	23.37	12.98	4.33	60.60	17.31	12.98	0.00
-50% Mean	4.33	15.87	9.52	12.98	1.44	5.77	7.79	4.33	1.44	20.20	5.77	4.33	0.00
Benchmark Exceedance (temporal comparison)	-	Yes	-	No	Yes (both)	Yes (2014 and 2015)	-	No	Yes (both)	Yes (all)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	No	N/A	N/A	No	No	N/A	N/A	No	Yes (2015)	N/A	N/A	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	EPT Density (no. per m <sup>2</sup> )												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	201.99	464.57	83.10	522.28	14.43	124.08	1959.83	727.15	435.71	271.24	357.80	1206.14	57.71
Minimum	158.70	245.27	51.94	57.71	0.00	43.28	805.06	230.84	259.70	28.86	201.99	432.83	0.00
Maximum	245.27	952.22	112.53	937.79	43.28	187.56	3038.43	1226.34	591.53	692.52	649.24	1615.88	216.41
Median	201.99	375.12	95.22	649.24	0.00	115.42	2337.26	822.37	461.68	144.28	274.12	1500.46	7.21
Standard deviation (n-1)	36.78	282.98	29.10	370.85	20.40	63.38	913.45	406.10	128.80	289.52	182.04	505.33	106.02
Standard error of the mean	16.45	126.55	13.01	165.85	9.12	28.35	408.51	181.61	57.60	129.48	81.41	225.99	53.01
COV (%)	18.21	60.91	35.02	71.01	141.42	51.08	46.61	55.85	29.56	106.74	50.88	41.90	183.71
+50% Mean	302.98	696.85	124.65	783.41	21.64	186.11	2939.75	1090.72	653.57	406.86	536.70	1809.21	86.57
-50% Mean	100.99	232.28	41.55	261.14	7.21	62.04	979.92	363.57	217.86	135.62	178.90	603.07	28.86
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (2014 and 2015)	-	Yes	Yes (2013)	Yes (2013 and 2014)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	Yes	N/A	No	Yes (2014)	Yes (2015)	N/A	No	Yes	Yes (2013)	N/A	Yes	Yes (2015)

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Ratio of EPT to Chironomidae												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	0.96	0.41	0.28	0.77	0.01	5.92	8.44	5.25	1.82	1.88	42.45	2.70	0.65
Minimum	0.41	0.15	0.13	0.24	0.00	0.02	4.23	0.38	0.25	0.10	0.54	0.64	0.06
Maximum	1.40	0.84	0.46	1.41	0.05	29.00	13.50	14.25	5.33	4.43	201.99	6.00	1.25
Median	1.06	0.36	0.27	0.63	0.00	0.21	8.41	4.40	1.37	1.60	2.43	2.06	0.65
Standard deviation (n-1)	0.37	0.27	0.12	0.48	0.02	12.90	3.77	5.66	2.03	1.84	89.22	2.00	0.84
Standard error of the mean	0.16	0.12	0.05	0.22	0.01	5.77	1.68	2.53	0.91	0.82	39.90	0.90	0.60
COV (%)	38.27	66.71	41.16	63.17	177.55	218.01	44.63	107.85	111.26	97.52	210.18	74.12	129.39
+50% Mean	1.44	0.61	0.42	1.15	0.02	8.88	12.66	7.87	2.73	2.83	63.67	4.05	0.98
-50% Mean	0.48	0.20	0.14	0.38	0.01	2.96	4.22	2.62	0.91	0.94	21.22	1.35	0.33
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (all)	-	No	Yes (both)	Yes (2013 and 2014)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	Yes	N/A	No	Yes (2014)	No (all)	N/A	N/A	No	Yes (2013)	N/A	No	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent Ephemeroptera												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	29.60	16.63	5.63	29.67	0.71	8.66	61.58	39.17	35.43	16.27	19.15	32.06	11.76
Minimum	22.00	8.70	2.53	12.12	0.00	1.35	50.28	14.71	14.40	0.00	5.54	17.61	0.00
Maximum	46.43	22.08	9.52	41.90	3.06	13.75	70.82	53.77	46.07	36.19	49.45	46.82	44.12
Median	26.79	19.48	5.48	29.11	0.00	9.92	63.43	49.13	45.71	13.04	14.81	29.73	1.47
Standard deviation (n-1)	9.71	6.26	2.72	11.87	1.33	4.57	9.69	17.62	14.84	15.75	17.58	10.69	21.61
Standard error of the mean	4.34	2.80	1.22	5.31	0.60	2.04	4.33	7.88	6.64	7.04	7.86	4.78	10.81
COV (%)	32.80	37.66	48.32	40.03	188.12	52.79	15.73	44.98	41.88	96.84	91.81	33.33	183.71
+50% Mean	44.40	24.94	8.44	44.50	1.06	12.99	92.37	58.75	53.14	24.40	28.72	48.08	17.65
-50% Mean	14.80	8.31	2.81	14.83	0.35	4.33	30.79	19.58	17.71	8.13	9.57	16.03	5.88
Benchmark Exceedance (temporal comparison)	-	No	-	Yes	Yes (both)	Yes (all)	-	No	No (both)	Yes (all)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	N/A	No	Yes (2014)	Yes (2015)	N/A	N/A	N/A	Yes (2013)	N/A	No	No

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent of Oligochaeta + Chironomidae												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	41.13	61.86	33.15	53.67	84.94	59.69	13.64	25.67	36.36	37.37	19.89	22.57	44.09
Minimum	30.00	52.17	25.32	40.00	62.50	52.50	7.61	7.55	8.57	3.39	1.23	7.92	36.36
Maximum	54.00	70.19	44.52	63.64	98.21	72.73	20.00	52.53	64.00	75.36	36.22	31.56	55.88
Median	39.29	62.99	30.95	56.33	93.33	56.20	14.35	14.96	37.00	37.14	21.98	27.15	42.06
Standard deviation (n-1)	9.39	6.88	7.74	10.58	15.70	8.60	4.50	19.92	19.61	30.08	13.38	9.49	8.48
Standard error of the mean	4.20	3.08	3.46	4.73	7.02	3.85	2.01	8.91	8.77	13.45	5.98	4.24	4.24
COV (%)	22.84	11.12	23.34	19.72	18.48	14.41	32.95	77.62	53.94	80.49	67.29	42.03	19.22
+50% Mean	61.70	92.79	49.73	80.50	127.41	89.54	20.47	38.50	54.54	56.06	29.83	33.85	66.14
-50% Mean	20.57	30.93	16.58	26.83	42.47	29.85	6.82	12.83	18.18	18.69	9.94	11.28	22.05
Benchmark Exceedance (temporal comparison)	-	Yes	-	Yes	Yes (both)	Yes (2013)	-	Yes	Yes (2013)	Yes (2013)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	Yes	N/A	No	Yes (both)	Yes (2013)	N/A	No	No	No	N/A	N/A	Yes (2014)

***Nearshore Habitat – continued.***

Site	SPLIT- 2014	SPLIT- 2015	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	EPT Richness (Family level)												
n	5	5	5	5	5	5	5	5	5	5	5	5	4
Mean	1.60	1.60	2.40	2.20	0.60	1.60	3.00	1.80	1.00	2.00	2.00	1.40	0.75
Minimum	1.00	1.00	1.00	1.00	0.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00	0.00
Maximum	2.00	2.00	3.00	4.00	2.00	2.00	5.00	3.00	1.00	3.00	4.00	2.00	2.00
Median	2.00	2.00	3.00	2.00	0.00	2.00	3.00	2.00	1.00	2.00	2.00	1.00	0.50
Standard deviation (n-1)	0.55	0.55	0.89	1.10	0.89	0.55	1.22	0.84	0.00	0.71	1.22	0.55	0.96
Standard error of the mean	0.24	0.24	0.40	0.49	0.40	0.24	0.55	0.37	0.00	0.32	0.55	0.24	0.48
COV (%)	34.23	34.23	37.27	49.79	149.07	34.23	40.82	46.48	0.00	35.36	61.24	39.12	127.66
+50% Mean	2.40	2.40	3.60	3.30	0.90	2.40	4.50	2.70	1.50	3.00	3.00	2.10	1.13
-50% Mean	0.80	0.80	1.20	1.10	0.30	0.80	1.50	0.90	0.50	1.00	1.00	0.70	0.38
Benchmark Exceedance (temporal comparison)	-	No	-	No	Yes (both)	Yes (2015)	-	No	Yes (2013)	Yes (2015)	-	No	Yes (2014)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	Yes (2013)	No	N/A	N/A	Yes	Yes	N/A	N/A	No



**Offshore Habitat**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Water Depth (m)														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	7.42	7.82	5.91	7.00	6.14	6.02	5.31	5.56	6.95	6.84	6.33	6.76	9.13	8.84	8.62
Minimum	6.30	6.80	5.40	6.20	5.98	5.10	4.90	4.90	6.58	6.40	5.90	6.30	8.63	8.47	5.80
Maximum	9.10	9.30	6.47	9.40	6.30	6.47	5.73	6.00	7.28	7.57	6.77	7.20	9.53	9.33	9.60
Median	7.00	7.20	5.90	6.30	6.16	6.13	5.33	5.70	7.06	6.83	6.33	6.80	9.17	8.87	9.40
Standard deviation (n-1)	1.23	1.19	0.41	1.37	0.13	0.53	0.30	0.49	0.33	0.45	0.35	0.45	0.32	0.34	1.60
Standard error of the mean	0.55	0.53	0.18	0.61	0.06	0.24	0.13	0.22	0.15	0.20	0.16	0.20	0.14	0.15	0.71
COV (%)	16.60	15.17	6.90	19.61	2.12	8.88	5.62	8.87	4.71	6.61	5.49	6.67	3.54	3.90	18.53
+50% Mean	11.13	11.73	8.86	10.50	9.21	9.03	7.97	8.34	10.42	10.26	9.50	10.14	13.69	13.26	12.93
-50% Mean	3.71	3.91	2.95	3.50	3.07	3.01	2.66	2.78	3.47	3.42	3.17	3.38	4.56	4.42	4.31
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No (all)	-	No	No (both)	No (all)	-	No	No (both)	No (all)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM -2013	STL3KM -2014	STL3KM -2015	STL3KM- 2016	STL11KM -2013	STL11KM -2014	STL11KM -2015	STL11KM -2016	STL25KM -2014	STL25KM -2015	STL25KM -2016
Metric	Oligochaeta Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	25.97	28.86	17.31	34.63	12.12	8.66	0.00	5.77	13.85	5.77	0.00	2.89	11.54	2.89	0.00
Minimum	0.00	0.00	0.00	28.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	57.71	57.71	28.86	43.28	34.63	28.86	0.00	28.86	34.63	14.43	0.00	14.43	43.28	14.43	0.00
Median	28.86	28.86	14.43	28.86	8.66	0.00	0.00	0.00	8.66	0.00	0.00	0.00	0.00	0.00	0.00
Standard deviation (n-1)	21.40	20.40	12.07	7.90	14.49	12.90	0.00	12.90	15.73	7.90	0.00	6.45	18.81	6.45	0.00
Standard error of the mean	9.57	9.12	5.40	3.53	6.48	5.77	0.00	5.77	7.03	3.53	0.00	2.89	8.41	2.89	0.00
COV (%)	82.40	70.71	69.72	22.82	119.52	149.07	-	223.61	113.54	136.93	-	223.61	162.98	223.61	-
+50% Mean	38.95	43.28	25.97	51.94	18.18	12.98	0.00	8.66	20.78	8.66	0.00	4.33	17.31	4.33	0.00
-50% Mean	12.98	14.43	8.66	17.31	6.06	4.33	0.00	2.89	6.93	2.89	0.00	1.44	5.77	1.44	0.00
Benchmark Exceedance (temporal comparison)	-	No	No (both)	Yes (2015)	-	No	Yes (both)	Yes (2013 and 2015)	-	Yes	Yes (both)	Yes (2013 and 2015)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	N/A	N/A	No	N/A	N/A	No	No	N/A	No	No	No	N/A	No	No

***Offshore Habitat – continued.***

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Amphipoda Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	1413.90	1584.14	2135.27	1477.38	1.73	20.20	2.89	23.08	79.64	227.95	392.43	222.18	1688.02	2011.20	1108.03
Minimum	894.51	1211.91	1601.45	1226.34	0.00	0.00	0.00	0.00	0.00	72.14	115.42	86.57	1226.34	706.95	447.25
Maximum	1918.86	2308.40	2683.52	1745.73	8.66	43.28	14.43	43.28	129.85	432.83	764.66	331.83	2034.28	2871.08	1702.45
Median	1543.74	1370.61	2192.98	1457.18	0.00	14.43	0.00	28.86	69.25	201.99	432.83	230.84	1615.88	2005.42	1298.48
Standard deviation (n-1)	493.60	465.99	514.46	195.60	3.87	16.45	6.45	21.88	53.85	164.94	265.13	106.80	342.48	895.53	576.51
Standard error of the mean	220.75	208.40	230.07	87.47	1.73	7.36	2.89	9.79	24.08	73.76	118.57	47.76	153.16	400.49	257.82
COV (%)	34.91	29.42	24.09	13.24	223.61	81.44	223.61	94.79	67.62	72.36	67.56	48.07	20.29	44.53	52.03
+50% Mean	2120.84	2376.21	3202.91	2216.07	2.60	30.30	4.33	34.63	119.46	341.93	588.64	333.28	2532.03	3016.79	1662.05
-50% Mean	706.95	792.07	1067.64	738.69	0.87	10.10	1.44	11.54	39.82	113.98	196.21	111.09	844.01	1005.60	554.02
Benchmark Exceedance (temporal comparison)	-	No	Yes (2013)	No (all)	-	Yes	Yes (both)	Yes (2013 and 2015)	-	Yes	Yes (both)	Yes (2013)	-	No	No (both)
Significant Inter-annual Difference	N/A	N/A	No	N/A	N/A	No	N	No	N/A	No	Yes (2013)	No	N/A	N/A	N/A

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Gastropoda Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	3921.40	5606.53	92.34	49.05	322.02	730.03	8.66	421.28	13.85	8.66	5.77	51.94	0.00	0.00	5.77
Minimum	129.85	3505.89	28.86	0.00	121.19	201.99	0.00	201.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	6982.92	6982.92	201.99	173.13	744.46	1630.31	28.86	620.38	51.94	43.28	28.86	115.42	0.00	0.00	28.86
Median	4068.56	6232.69	86.57	14.43	164.47	490.54	0.00	432.83	8.66	0.00	0.00	14.43	0.00	0.00	0.00
Standard deviation (n-1)	2691.54	1563.89	65.80	73.28	265.36	623.61	12.90	155.19	21.73	19.36	12.90	58.25	0.00	0.00	12.90
Standard error of the mean	1203.69	699.39	29.43	32.77	118.67	278.89	5.77	69.40	9.72	8.66	5.77	26.05	0.00	0.00	5.77
COV (%)	68.64	27.89	71.26	149.39	82.40	85.42	149.07	36.84	156.87	223.61	223.61	112.15	-	-	223.61
+50% Mean	5882.10	8409.80	138.50	73.58	483.03	1095.05	12.98	631.93	20.78	12.98	8.66	77.91	0.00	0.00	8.66
-50% Mean	1960.70	2803.27	46.17	24.53	161.01	365.02	4.33	210.64	6.93	4.33	2.89	25.97	0.00	0.00	2.89
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2013 and 2014)	-	Yes	Yes (both)	Yes (2015)	-	No	Yes (2013)	Yes (all)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	N/A	Yes (2014)	Yes (2013 and 2014)	N/A	No	Yes (2014)	Yes (2015)	N/A	N/A	No	Yes (2015)	N/A	N/A	N

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Chironomidae Density (no. per m <sup>3</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	317.41	155.82	461.68	132.73	657.89	620.38	144.28	100.99	193.91	135.62	230.84	112.53	227.95	288.55	300.09
Minimum	144.28	72.14	245.27	0.00	363.57	173.13	0.00	0.00	0.00	28.86	100.99	14.43	173.13	187.56	115.42
Maximum	461.68	230.84	591.53	230.84	1324.45	908.93	288.55	201.99	389.54	216.41	317.41	375.12	274.12	403.97	706.95
Median	346.26	158.70	504.96	158.70	493.42	721.38	86.57	100.99	173.13	173.13	288.55	43.28	230.84	259.70	245.27
Standard deviation (n-1)	134.18	57.17	140.62	84.99	391.56	290.17	135.34	77.69	141.00	80.72	100.48	149.03	37.34	102.53	236.28
Standard error of the mean	60.01	25.57	62.89	38.01	175.11	129.77	60.53	34.75	63.06	36.10	44.93	66.65	16.70	45.85	105.67
COV (%)	42.28	36.69	30.46	64.03	59.52	46.77	93.81	76.93	72.71	59.52	43.53	132.43	16.38	35.53	78.73
+50% Mean	476.11	233.73	692.52	199.10	986.84	930.57	216.41	151.49	290.86	203.43	346.26	168.80	341.93	432.83	450.14
-50% Mean	158.70	77.91	230.84	66.37	328.95	310.19	72.14	50.50	96.95	67.81	115.42	56.27	113.98	144.28	150.05
Benchmark Exceedance (temporal comparison)	-	Yes	Yes (2014)	Yes (2013 and 2015)	-	No	Yes (both)	Yes (2013 and 2014)	-	No	Yes (2014)	Yes (2015)	-	No	No
Significant Inter-annual Difference	N/A	No	Yes	Yes (2015)	N/A	N/A	Yes (2013)	Yes (2013 and 2014)	N/A	N/A	No	No	N/A	N/A	N/A

***Offshore Habitat – continued.***

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Plecoptera Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard deviation (n-1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Standard error of the mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COV (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
+50% Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-50% Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benchmark Exceedance (temporal comparison)	-	No	No	No	-	No	No	No	-	No	No	No	-	No	No
Significant Inter-annual Difference	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Trichoptera Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	72.14	46.17	60.60	57.71	25.97	20.20	20.20	17.31	0.00	2.89	0.00	2.89	0.00	5.77	11.54
Minimum	57.71	0.00	28.86	0.00	8.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	100.99	86.57	100.99	201.99	43.28	57.71	43.28	72.14	0.00	14.43	0.00	14.43	0.00	14.43	28.86
Median	57.71	57.71	57.71	28.86	25.97	14.43	14.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.43
Standard deviation (n-1)	20.40	32.90	27.75	82.25	17.31	21.88	16.45	31.28	0.00	6.45	0.00	6.45	0.00	7.90	12.07
Standard error of the mean	9.12	14.71	12.41	36.78	7.74	9.79	7.36	13.99	0.00	2.89	0.00	2.89	0.00	3.53	5.40
COV (%)	28.28	71.26	45.80	142.52	66.67	108.33	81.44	180.66	-	223.61	-	223.61	-	136.93	104.58
+50% Mean	108.21	69.25	90.89	86.57	38.95	30.30	30.30	25.97	0.00	4.33	0.00	4.33	0.00	8.66	17.31
-50% Mean	36.07	23.08	30.30	28.86	12.98	10.10	10.10	8.66	0.00	1.44	0.00	1.44	0.00	2.89	5.77
Benchmark Exceedance (temporal comparison)	-	No	No (both)	No	-	No	No (both)	No	-	Yes	Yes (2014)	Yes (2013 and 2015)	-	Yes	Yes (both)
Significant Inter-annual Difference	N/A	N/A	N/A	n/a	N/A	N/A	N/A	n/a	N/A	No	No	No	N/A	Yes	Yes (2014)

***Offshore Habitat – continued.***

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	EPT Density (no. per m <sup>2</sup> )														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	1353.30	689.64	279.89	551.13	90.03	75.02	20.20	89.45	1563.37	1096.49	605.96	657.89	831.02	288.55	588.64
Minimum	432.83	375.12	230.84	288.55	17.31	0.00	0.00	14.43	0.00	952.22	490.54	331.83	692.52	187.56	375.12
Maximum	1688.02	1096.49	403.97	663.67	138.50	115.42	43.28	259.70	2276.66	1240.77	663.67	1082.06	966.64	375.12	836.80
Median	1615.88	591.53	230.84	634.81	103.88	100.99	14.43	28.86	1817.87	1038.78	620.38	678.09	851.22	346.26	577.10
Standard deviation (n-1)	531.71	274.20	76.07	157.52	46.05	47.19	16.45	106.71	894.76	129.45	68.44	313.71	115.24	92.94	198.71
Standard error of the mean	237.79	122.63	34.02	70.44	20.59	21.11	7.36	47.72	400.15	57.89	30.61	140.30	51.54	41.57	88.87
COV (%)	39.29	39.76	27.18	28.58	51.15	62.91	81.44	119.29	57.23	11.81	11.29	47.68	13.87	32.21	33.76
+50% Mean	2029.95	1034.45	419.84	826.70	135.04	112.53	30.30	134.18	2345.05	1644.74	908.93	986.84	1246.54	432.83	882.96
-50% Mean	676.65	344.82	139.95	275.57	45.01	37.51	10.10	44.73	781.68	548.25	302.98	328.95	415.51	144.28	294.32
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2013 and 2015)	-	No	Yes (both)	Yes (2015)	-	No	Yes (2013)	Yes (2013)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes (2013)	No	N/A	N/A	Yes (2013)	No	N/A	N/A	Yes	No	N/A	Yes	Yes (2015)



**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Ratio of EPT to Chironomidae														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	4.47	4.94	0.64	3.97	0.15	0.11	5.96	0.94	8.86	13.48	3.10	12.34	3.72	1.16	2.99
Minimum	3.00	2.50	0.39	2.75	0.05	0.00	0.00	0.10	5.84	5.67	2.09	2.88	2.53	0.46	0.82
Maximum	7.80	8.20	0.94	5.75	0.24	0.20	29.00	2.25	11.68	36.00	4.86	26.00	4.25	2.00	7.25
Median	3.50	5.09	0.60	3.68	0.11	0.13	0.25	0.71	8.95	6.62	2.14	9.50	3.94	0.89	2.36
Standard deviation (n-1)	1.99	2.45	0.20	1.31	0.09	0.08	12.88	1.03	2.66	12.97	1.37	8.90	0.68	0.66	2.52
Standard error of the mean	0.89	1.10	0.09	0.66	0.04	0.04	5.76	0.51	1.33	5.80	0.61	3.98	0.30	0.30	1.13
COV (%)	44.46	49.56	31.57	33.06	57.53	72.00	216.13	108.93	30.08	96.20	44.08	72.12	18.28	57.32	84.25
+50% Mean	6.71	7.42	0.97	5.95	0.22	0.17	8.94	1.42	13.29	20.22	4.65	18.52	5.58	1.74	4.49
-50% Mean	2.24	2.47	0.32	1.98	0.07	0.06	2.98	0.47	4.43	6.74	1.55	6.17	1.86	0.58	1.50
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2015)	-	No	Yes (both)	Yes (all)	-	Yes	Yes (both)	Yes (2015)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	N/A	Yes (both)	Yes (2015)	N/A	N/A	No	No	N/A	No	Yes (both)	Yes (2015)	N/A	Yes	No

***Offshore Habitat – continued.***

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent Ephemeroptera														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	18.52	7.61	6.38	20.55	6.18	3.90	0.00	10.38	66.65	75.07	50.75	62.54	30.29	12.85	30.44
Minimum	4.53	3.82	3.70	13.01	1.05	0.00	0.00	2.22	0.00	64.89	35.59	50.98	27.44	5.49	19.60
Maximum	39.29	13.08	9.16	25.00	13.41	9.33	0.00	25.81	87.40	91.14	69.35	78.33	34.46	26.44	37.68
Median	16.85	7.61	5.33	20.78	5.67	2.50	0.00	5.71	81.93	73.03	46.94	62.92	28.13	10.92	32.08
Standard deviation (n-1)	12.71	3.79	2.59	4.70	4.49	3.76	0.00	10.20	37.33	10.26	13.06	10.65	3.54	8.22	6.66
Standard error of the mean	5.68	1.70	1.16	2.10	2.01	1.68	0.00	4.56	16.70	4.59	5.84	4.76	1.58	3.68	2.98
COV (%)	68.60	49.84	40.62	22.88	72.66	96.41	-	98.27	56.01	13.67	25.73	17.04	11.68	63.98	21.87
+50% Mean	27.79	11.41	9.57	30.82	9.26	5.85	0.00	15.57	99.98	112.60	76.12	93.81	45.44	19.28	45.65
-50% Mean	9.26	3.80	3.19	10.27	3.09	1.95	0.00	5.19	33.33	37.53	25.37	31.27	15.15	6.43	15.22
Benchmark Exceedance (temporal comparison)	-	Yes	Yes (2013)	Yes (2014 and 2015)	-	No	Yes (both)	Yes (all)	-	No	No (both)	No (all)	-	Yes	Yes (2015)
Significant Inter-annual Difference	N/A	No	No	Yes (2014 and 2015)	N/A	N/A	Yes (2013)	Yes (2015)	N/A	N/A	N/A	N/A	N/A	Yes	Yes (2015)

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	Percent of Oligochaeta + Chironomidae														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	4.53	2.08	13.95	6.91	59.88	46.11	62.62	14.55	8.64	8.93	18.31	8.40	8.71	12.11	15.53
Minimum	2.09	1.44	8.00	2.05	35.40	29.17	0.00	0.00	0.00	2.53	9.09	1.96	7.44	5.46	4.32
Maximum	6.33	3.04	17.79	10.29	80.93	68.00	95.24	25.00	14.95	13.19	26.92	19.71	10.92	16.17	24.62
Median	5.30	1.79	14.65	6.91	60.98	42.86	80.00	15.56	9.06	11.11	16.95	6.74	8.48	12.24	15.94
Standard deviation (n-1)	1.80	0.68	3.92	3.11	20.08	15.74	38.02	9.31	5.53	4.63	6.76	6.78	1.32	4.44	8.29
Standard error of the mean	0.81	0.31	1.75	1.39	8.98	7.04	17.00	4.17	2.47	2.07	3.02	3.03	0.59	1.99	3.71
COV (%)	39.75	32.87	28.09	45.03	33.54	34.13	60.71	64.02	63.98	51.78	36.94	80.71	15.11	36.66	53.36
+50% Mean	6.79	3.12	20.93	10.36	89.82	69.16	93.94	21.82	12.96	13.40	27.46	12.59	13.06	18.16	23.30
-50% Mean	2.26	1.04	6.98	3.45	29.94	23.05	31.31	7.27	4.32	4.47	9.15	4.20	4.35	6.05	7.77
Benchmark Exceedance (temporal comparison)	-	Yes	Yes (both)	Yes (all)	-	No	No (both)	Yes (all)	-	No	Yes (both)	Yes (2015)	-	No	Yes (2014)
Significant Inter-annual Difference	N/A	No	Yes (2014)	Yes (2014)	N/A	N/A	N/A	Yes (2013 and 2015)	N/A	N/A	No	No	N/A	N/A	No

**Offshore Habitat – continued.**

Site	SPLIT- 2013	SPLIT- 2014	SPLIT- 2015	SPLIT- 2016	STL3KM- 2013	STL3KM- 2014	STL3KM- 2015	STL3KM- 2016	STL11KM- 2013	STL11KM- 2014	STL11KM- 2015	STL11KM- 2016	STL25KM- 2014	STL25KM- 2015	STL25KM- 2016
Metric	EPT Richness (Family level)														
n	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mean	2.20	2.20	1.00	2.20	2.60	1.60	0.00	1.40	1.00	1.20	1.00	1.20	1.00	1.00	1.60
Minimum	2.00	1.00	1.00	1.00	2.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	3.00	3.00	1.00	4.00	3.00	2.00	0.00	2.00	2.00	2.00	1.00	2.00	1.00	1.00	2.00
Median	2.00	2.00	1.00	2.00	3.00	2.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00
Standard deviation (n-1)	0.45	0.84	0.00	1.10	0.55	0.89	0.00	0.55	0.71	0.45	0.00	0.45	0.00	0.00	0.55
Standard error of the mean	0.20	0.37	0.00	0.49	0.24	0.40	0.00	0.24	0.32	0.20	0.00	0.20	0.00	0.00	0.24
COV (%)	20.33	38.03	0.00	49.79	21.07	55.90	-	39.12	70.71	37.27	0.00	37.27	0.00	0.00	34.23
+50% Mean	3.30	3.30	1.50	3.30	3.90	2.40	0.00	2.10	1.50	1.80	1.50	1.80	1.50	1.50	2.40
-50% Mean	1.10	1.10	0.50	1.10	1.30	0.80	0.00	0.70	0.50	0.60	0.50	0.60	0.50	0.50	0.80
Benchmark Exceedance (temporal comparison)	-	No	Yes (both)	Yes (2015)	-	No	Yes (both)	Yes (2015)	-	No	No (both)	No (all)	-	No	Yes (both)
Significant Inter-annual Difference	N/A	N/A	Yes (both)	Yes (2015)	N/A	N/A	Yes (2013)	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes (both)