Keeyask Generation Project

Aquatic Effects Monitoring Plan

Water Quality Monitoring Report

AEMP-2016-07

KEEYASK

Manitoba Conservation and Water Stewardship Client File 5550.00
Manitoba Environment Act Licence No. 3107

2015 - 2016

KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING PLAN

REPORT #AEMP-2016-07

RESULTS OF WATER QUALITY MONITORING IN THE NELSON RIVER, 2015: YEAR 2 OF CONSTRUCTION

Prepared for

Manitoba Hydro

By

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June 2016

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SUMMARY

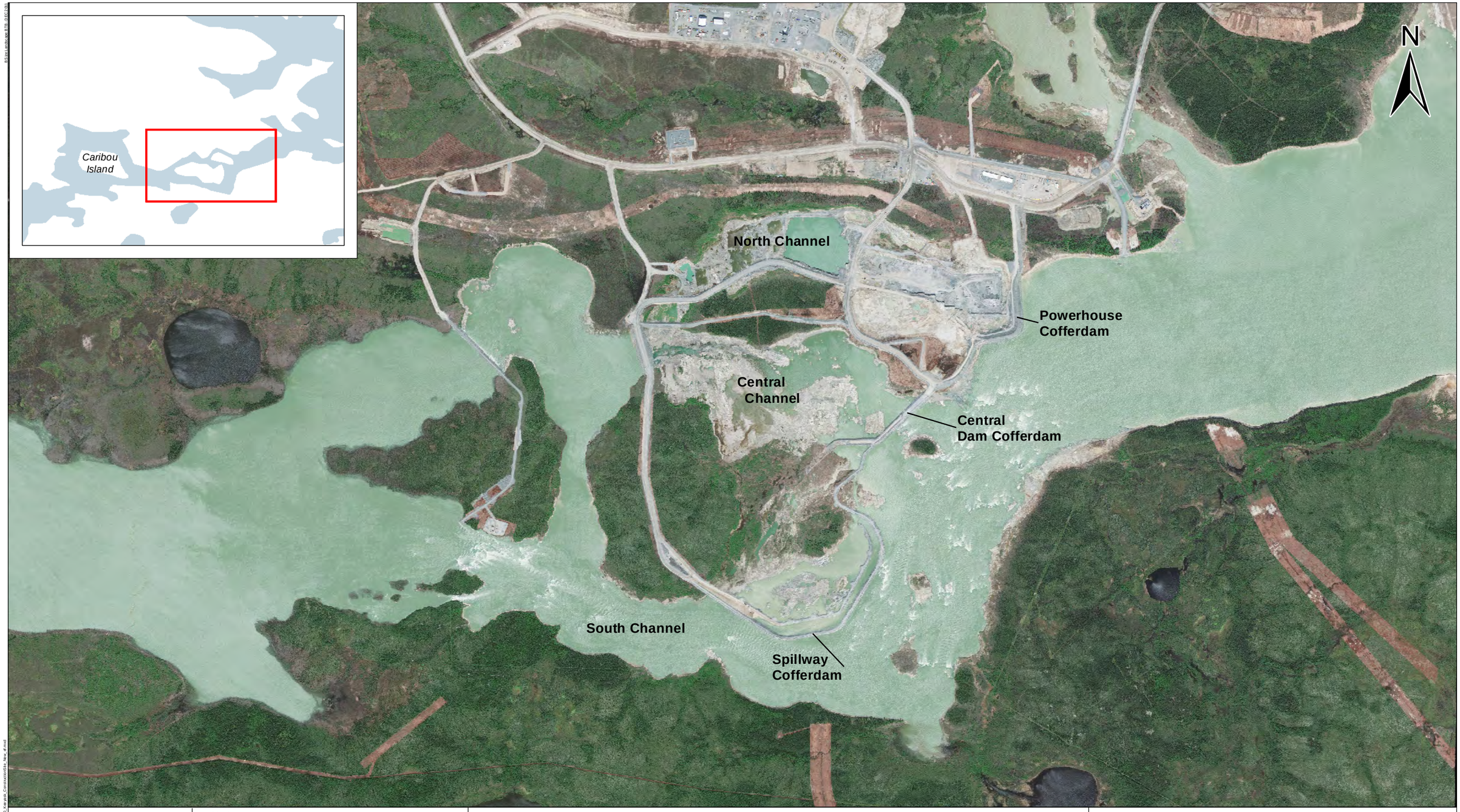
BACKGROUND

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 predications 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 August and September, the flow in the north and central channels of Gull Rapids was blocked off and all the flow was diverted to the south channel. Cofferdams were constructed in the north and central channels and these channels were dewatered by fall (see construction site map below). The combination of high natural flows in the Nelson River and diversion of flow resulted in water levels on Gull Lake increasing about 1.3 m at the water level monitoring site at Caribou Island. The rise in water levels resulted in flooding along the shoreline and in low-lying areas. During the winter, a cofferdam was constructed extending into the south channel. During the spring of 2015, flows in the Nelson River decreased and water level on Gull Lake went down to pre-construction high water levels.

Water quality is a key part of the monitoring program because it determines whether water is suitable to support aquatic life, including fish. Many human activities, including the construction and operation of the GS, can affect water quality.

This report describes the results of water quality monitoring conducted during the second year of construction at Gull Rapids. Samples were collected at sites in the Nelson River upstream of construction and at sites in Stephens Lake downstream of construction (the “local study area”) to see whether the water quality changed as it passed the construction site. One sampling period also included sampling at sites further downstream from Stephens Lake up to the Nelson River estuary (the “regional study area”) to make sure that changes to water quality did not occur further downstream than predicted. Monitoring included parameters such as suspended solids (such as sand and clay, *etc*.) and turbidity (*i.e.*, “muddiness of the water”) that are expected to increase during construction. The program also measured other substances that are not expected to increase, but are measured just in case.



KEEYASK

DATA SOURCE:
Orthophoto: Manitoba Hydro - June 21, 2015

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-FEB-10	30-MAY-16
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Construction Site

Map of instream structures at the Keeyask Generating Station site, June 2015.

WHY IS THE MONITORING BEING DONE?

The monitoring is being done to address one main question:

Are construction activities changing water quality near Gull Rapids and in Stephens Lake to the point that fish and other aquatic life may be harmed?

The main effect of constructing the GS is that it can lead to more sand, silt, clay and other "suspended solids" entering the Nelson River, which may impair water quality. This can be caused by building structures such as cofferdams in the river, or loss of soils and other material from the land, caused by clearing vegetation or flooding shorelines. Construction may also result in the release of other potentially harmful substances, such as fuels and oils used in construction equipment (hydrocarbons), to the river. Water quality monitoring will determine whether construction is causing changes to water quality that could harm aquatic life and determine if additional measures are required to prevent effects from occurring in the future.

Suspended solids concentrations in the water are measured continuously downstream during construction and the results are relayed to the work site so that construction activities can be adjusted if the suspended solids become too high. These results are reported annually under the *Keeyask Generation Project Sediment Management Plan for In-Stream Construction* (SMP).

The water quality monitoring described in this report is much broader than what is done for the SMP. It examines water quality over a much larger area and measures other aspects of water quality besides suspended solids, such as nutrients (which are necessary for aquatic life), metals, and oil and gas (*i.e.*, hydrocarbons).

WHAT WAS DONE?

In 2015, water quality sampling was conducted five times in the local study area upstream of Gull Rapids and in Stephens Lake in late March/early April (winter period), and late June, July, August, and September (open-water period). Sampling in the regional study area between Stephens Lake and the Nelson River estuary was conducted once in mid-June. Samples were collected to measure a number of substances in the water, including:

- total suspended solids and turbidity;
- pH;
- oxygen;
- nutrients (compounds that may increase the amount of algae present);
- chlorophyll *a* (representing the amount of algae);
- metals and major ions (some of which are essential to aquatic life but some may also be harmful to aquatic life); and
- hydrocarbons.

Filling water quality sample bottles.

During monitoring in the local study area, samples were collected in three areas of the Nelson River and Stephens Lake. One area was at Gull Rapids ("upstream area") and serves as a reference for conditions in the Nelson River upstream of construction (see local study area map below). The second area was in Stephens Lake approximately 9 km downstream of the construction activities ("near-field area"). This represents an area where some effects on water quality from construction are expected. The third area was also in Stephens Lake, approximately 25 km downstream of the construction site ("far-field area"). This area was used to determine whether effects observed at the near-field area extended farther downstream.

Five sites were sampled in each of the upstream, near-field, and far-field areas to make sure enough samples were taken so the results would give an accurate account of what was happening at a given location.

Sampling in the regional study area took place at eight sites, including the north arm of Stephens Lake; one site immediately upstream of each of the Kettle, Long Spruce, and Limestone GSs; and four sites downstream of the Limestone GS along the Nelson River (see regional study area map below). Monitoring along the Nelson River was originally planned to coincide with construction of the spillway cofferdam when the EIS predicted a peak concentration of sediments in the water. Because construction plans changed and this cofferdam was built during the winter, sampling was delayed to the start of the open-water season. Individual samples were collected from each site in June 2015.

KEEYASK

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	09-FEB-15	10-JUN-16
0 1 2 Kilometres / 0 1 2 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

Legend

- Open-water Sampling Area
- Ice-cover Sampling Area
- Generating Station (Existing)
- Generating Station (Under Construction)
- Keeyask Principal Structures
- Highway
- Rail
- First Nation Reserve

Water Quality Sampling Areas

Overview

Map of the local study area. Green areas show the locations of the upstream, near-field, and far-field sampling areas during the open-water season; blue areas show the locations during winter (the far-field area was identical during open-water and winter). Five sites were sampled in each area.

KEEYASK

DATA SOURCE:
Government of Canada, Province of Manitoba, North/South Consultants

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	05-MAY-10	06-JUN-16
0 5.5 11 Kilometres / 0 4.5 9 Miles	VERSION NO: 2.0	QA/QC: PMC/FSV/MWZ

Legend

- Regional Water Quality Sites
- Generating Station (Existing)
- Generating Station (Potential)
- Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

Regional Study Area Monitoring

Map of the regional study area. Eight sampling sites were located between Stephens Lake and the Nelson River estuary.

WHAT WAS FOUND?

Water quality was similar upstream and downstream of the construction activities and along the length of the Nelson River, indicating there was minimal effect of construction on water quality and its suitability for aquatic life.

Data logger site within the near-field sampling area, June, 2015.

WHAT DOES IT MEAN?

The information collected so far during the project indicates that construction activities have had a minimal effect on water quality and its suitability to support aquatic life.

WHAT WILL BE DONE NEXT?

Water quality monitoring will be continued in 2016. Results of monitoring conducted in 2016 will be presented in the Year 3 construction report.

ACKNOWLEDGEMENTS

We would like to thank Manitoba Hydro for the opportunity and resources to conduct this study.

The following members of Tataskweyak Cree Nation (TCN) and Fox Lake Cree Nation (FLCN) are thanked for their local expertise and assistance in conducting the field work: Leslie Flett, Saul Mayham, Jonathan G. Kitchekeesik Jr., and Michael John Garson of TCN, and Jimmy Lockhart Jr. of FLCN. We would also like to thank Clayton Flett and Douglas Kitchekeesik of TCN and Ray Mayham of FLCN for arranging logistic support and personnel needed to conduct the fieldwork.

The collection of biological samples described in this report was authorized by Manitoba Conservation and Water Stewardship, Fisheries Branch, under terms of the Scientific Collection Permit #17-15.

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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 licensing 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, water quality.

During the construction phase, the primary effect of the Project on water quality was predicted to be related to increases in total suspended solids (TSS), notably in relation to river management and cofferdam placement/removal. The primary mechanism for monitoring effects of construction activities on TSS/turbidity in the Nelson River is through monitoring that is being conducted under the *Keeyask Generation Project Sediment Management Plan for In-Stream Construction* (SMP) and the *Keeyask Generation Project Physical Environment Monitoring Plan* (PEMP), which include monitoring of TSS and turbidity in the Nelson River. TSS data collected under the SMP and PEMP are reported in the annual reports associated with those plans. Other pathways of effects (*i.e.*, discharge of point sources) are expected to result in highly localized and negligible to small effects on water quality, including TSS (*e.g.*, discharge of concrete batch plant effluent). The water quality monitoring program implemented during construction is intended to monitor effects on a broader array of water quality parameters in addition to TSS. This program, therefore, provides the means to monitor for potential unforeseen effects.

The study area for the water quality component of the AEMP during the construction period is composed of a local study area (LSA), which includes the reach of the Nelson River upstream of Gull Rapids and the southern area of Stephens Lake (Map 2), and a regional study area (RSA) which includes the lower Nelson River downstream of Stephens Lake to Gillam Island, as well as additional sites in Stephens Lake (Map 3). The 2015 (Year 2) construction water quality monitoring program included monitoring in both the LSA and RSA. As described in the AEMP (Table 2-6), monitoring in the RSA is to be conducted during periods when TSS is predicted to be elevated due to construction.

Key questions presented in the AEMP to be answered about water quality during construction of the Keeyask GS are:

- Has the Project resulted in exceedances of water quality objectives or guidelines for the protection of aquatic life?
- What are the magnitude and spatial extent of effects of construction on water quality?

The objectives of monitoring during the construction period are to: determine if the Project caused or contributed to exceedances of benchmarks; determine the spatial and temporal extent of effects; confirm predictions presented in the AE SV; and, monitor for unforeseen effects. The overall objective of construction monitoring is to record the net effect of various construction activities on a suite of water quality parameters along the mainstem of the Nelson River.

The AEMP identified key indicators and benchmarks for the water quality monitoring program to focus the program and provide an adaptive management framework (AMF, Table 1). Key indicators were identified as those most likely to be affected by the Project, for which there is the greatest risk for direct effects on aquatic life, and for which there are objectives or guidelines for the protection of aquatic life (PAL). Benchmarks were identified based on baseline water quality conditions; Manitoba Water Quality Standards, Objectives, and Guidelines (MWQSOGs) for PAL (MWS 2011); and the Canadian Council of Ministers of the Environment (CCME) phosphorus guidance framework for freshwater systems (CCME 1999; updated to 2014[1]). Monitoring was also designed to include measurement of additional parameters for which no benchmarks were developed (Table 2).

The construction monitoring program is designed to facilitate comparisons of water quality spatially (*i.e.*, upstream versus downstream of construction activities) to delineate Project-related effects. Specifically, the program is designed to facilitate statistical comparisons of water quality in a reference area to water quality monitored downstream of construction activities. The reference area is an area located upstream of Project activities in the lower Nelson River (*i.e.*, upstream of Gull Rapids).

An AMF was developed for the water quality monitoring program, as presented in the AEMP. In brief, the framework entails initially comparing monitoring results to pre-established benchmarks (Step 1). If a benchmark is not exceeded, the assessment would proceed to Response Level 1 – trend analysis. If a 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). If a statistical difference is not observed, the assessment would proceed to Response Level 1. Where statistical differences are identified for key indicators, the assessment would proceed to Step 3, in which a determination of cause (*i.e.*, is the difference Project-related) would be undertaken (see Figure 1).

[1] All applicable guidelines were those current at that time of AEMP development, although it is recognized that the documents have since been updated.

Construction of the Keeyask GS began in mid-July 2014. During August and September, the flow in the north and central channels of Gull Rapids was blocked off and all the flow was diverted to the south channel. Cofferdams were constructed in the north and central channels and these channels were dewatered by fall (Map 4). The combination of high natural flows in the Nelson River and diversion of flow resulted in water levels on Gull Lake increasing about 1.3 m at the water level monitoring site at Caribou Island. The rise in water levels resulted in flooding along the shoreline and in low-lying areas. During the winter, a cofferdam was constructed extending into the south channel. During the spring of 2015, flows in the Nelson River decreased and water level on Gull Lake decreased to the pre-construction high water level.

The following report presents the results of water quality monitoring completed in the ice-cover and open-water seasons of 2015 during Year 2 of construction. Results are assessed using the adaptive management framework as summarized above and detailed in the AEMP.

2.0 THE KEEYASK STUDY SETTING

The study area encompasses an approximately 220 km long reach of the Nelson River from Clark Lake to Gillam Island on the lower Nelson River. This section of river offers a diversity of physical habitat conditions, including a variety of substrate types, and variable water depths (ranging from 0 to 30 m) and velocities.

Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of Gull Rapids (Map 1). Current is restricted to the main section of the lake, with off-current bays outside the main channel. The Assean River is the only major tributary to Clark Lake, and flows into the north side. Downstream from the outlet of Clark Lake, the Nelson River narrows and water velocity increases for a 3 km stretch, known as Long Rapids. For the next 7 km, the river widens, and water velocity decreases.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids (Map 1). The drop in elevation from the upstream to downstream side of Birthday Rapids is approximately 2 m. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake is characterized as a large, somewhat uniform channel with medium to high water velocities. There are a few large bays with reduced water velocity and a number of small tributaries that drain into the Nelson River.

Gull Lake is a section of the Nelson River where the river widens, with moderate to low water velocity. Gull Lake is herein defined as the reach of the Nelson River beginning approximately 17 km upstream of Gull Rapids and 14 km downstream of Birthday Rapids (*i.e.*, where the river widens to the north into a bay around a large point of land; Maps 1 and 3), and extending to the downstream end of Caribou Island, approximately 3 km upstream of Gull Rapids. Gull Lake has three distinct basins, the first extending from the upstream end of the lake downstream approximately 6 km to a large island; the second extending from the large island to Morris Point (a constriction in the river immediately upstream of Caribou Island); and the third extending from Morris Point to the downstream end of Caribou Island (Map 3).

Gull Rapids is located approximately 3 km downstream of Caribou Island on the Nelson River (Map 1). 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 2014/2015 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. 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 (Map 1). Kettle GS is located approximately 40 km downstream of Gull Rapids.

Long Spruce Forebay was formed in 1979 by the construction of the Long Spruce GS. It is a 16 km reach of the Nelson River extending from Long Spruce GS upstream to Kettle GS (Manitoba Hydro Public Affairs 1999). Kettle River and Boots Creek are the only major tributaries flowing into Long Spruce Forebay, with both tributaries entering the forebay on the south shore.

The Limestone GS was completed in 1992, and the forebay encompasses the 23 km long reach of the Nelson River between the Long Spruce GS and the Limestone GS (Manitoba Hydro Public Affairs 1998). Unlike Long Spruce GS, the Limestone Forebay is contained within the existing riverbank and ranges from a riverine environment in the upstream portion, to more of a lake-like environment just upstream of Limestone GS. There are four main tributaries that flow into Limestone Forebay: Wilson Creek and Brooks Creek both enter from the south shoreline of the forebay, while Sky Pilot Creek and Leslie Creek enter from the north shore.

Similar to the section of the Nelson River between Split Lake and Stephens Lake, the Nelson River below the Limestone GS is also characterized by narrow sections with swiftly flowing water and wider more lacustrine sections created by the forebays of the Long Spruce and Limestone GSs. The Nelson River below the Limestone GS is extensively affected by discharge regulation, with diurnal fluctuations in discharge and stage changes varying on the order of 1 m (Manitoba Hydro 1994). There are three main tributaries (and numerous smaller ones) that flow into the mainstem of the Nelson River between the Limestone GS and Gillam Island: the Limestone and Weir rivers enter from the north shore, while the Angling River enters from the south shore. All three rivers are perennial in nature.

2.1 2014/2015 CONSTRUCTION SUMMARY

Construction of the Keeyask GS began in mid-July 2014 with the construction of the Quarry Cofferdam in the north channel of Gull Rapids. In August, the North Channel Rock Groin and North Channel Cofferdam were constructed to divert flow from the north and central channels of Gull Rapids to the south channel. The north and central channels were gradually dewatered by late fall 2014. The Stage 1 Powerhouse Cofferdam was constructed in the fall to permit excavation of the powerhouse. Construction of the Central Dam Cofferdam rock groins began the fall of 2014 and was completed the summer of 2015. During the winter of 2014/15 high flows in the Nelson River and partial failure of the ice boom resulted in high water levels in Gull Rapids which required some cofferdams to be raised. The North Channel Rock Groin was extended into the south channel of Gull Rapids during the winter 2014/15 to raise the water level on Gull Lake to promote the formation of a stable ice cover. The groin extension was partially removed in 2015. Construction of the spillway cofferdam, which extends into the south channel of Gull Rapids, began in early winter 2015 and was completed by late summer.

Dewatering of the spillway cofferdam occurred in summer/fall 2015. The configuration of cofferdams as of mid-summer 2015 is shown on Map 4.

During July and August 2015, additional ice booms were installed in Gull Lake so that a stable ice cover would develop upstream of the construction site (as noted above, the previous ice boom had partially failed during the winter of 2014/2015). Map 5 illustrates the location of the new ice booms, which are held in place by anchors drilled into the bedrock below the river bottom.

Due to high flows in the Nelson River (almost a 1:20 year flow event) and the construction of the North Channel Rock Groin, water levels in Gull Lake rose to between 155 m ASL and 156 m ASL during late summer 2014. This resulted in water levels above the existing environment 95th percentile water level for open-water (154.2 m ASL) until the following spring (Manitoba Hydro 2015). Open-water levels on Gull Lake in the existing environment were as high as 155 m and surpassed 156 m during winter on occasion. The amount of land inundated during the 2014-2015 period is not known, but based on estimates of flooded areas expected in the later stages of construction (as presented in the Environmental Impact Statement), this area likely included the nearshore areas of much of Gull Lake and some localized areas in and around Gull Rapids, as well as low-lying areas that extended further inland. Water levels during the open-water season of 2015 declined due to lower discharge in the Nelson River. Water levels on Gull Lake ranged from 154 m ASL to 155 m ASL in 2015, and inundated areas were likely confined to localized sections of low-lying areas around Gull Lake.

3.0 METHODS

The following provides a description of the study design, sampling sites, sampling methods, and data analysis methods.

3.1 STUDY DESIGN

The construction monitoring program is designed to facilitate comparisons of water quality spatially (*i.e.*, upstream and downstream of construction activities) to delineate Project-related effects. Specifically, the program is designed to facilitate statistical comparisons of water quality in a reference area to water quality monitored downstream of construction activities (*i.e.*, areas that are predicted to be most affected by the Project); this area is defined as the local study area. Sampling in the LSA includes monitoring at replicate sites upstream and downstream of construction activities.

The AEMP also indicates that water quality will be periodically monitored at single stations downstream of Stephens Lake to the Nelson River estuary (*i.e.*, in the RSA) during periods where TSS was predicted to be increased by more than 5 mg/L above background during the construction period.

The objective of monitoring during the construction period is to determine if the Project caused or contributed to exceedances of benchmarks and to confirm predictions in the AE SV.

3.2 SAMPLING SITES

3.2.1 LOCAL STUDY AREA

The construction water quality monitoring program incorporates monitoring at replicate sampling sites immediately upstream and downstream of construction activities within the LSA (Maps 6-8) in each year of construction as follows:

- Upstream Area: the Nelson River upstream of Gull Rapids. This area served as the reference area;
- Near-Field Area: this area is located approximately 9 km downstream of all construction activities in Stephens Lake; and
- Far-Field Area: this area is located approximately 25 km downstream of construction activities in Stephens Lake.

Five replicate sites were sampled in each of the sampling areas (*i.e.*, sampling polygons) during the open-water season. During the ice-cover season, sites were relocated to areas with sufficient ice formation to facilitate safe access; five replicate stations were sampled in the upstream and far-field polygons but four sites were accessed in the near-field polygon due to logistical constraints. Universal Transverse Mercator (UTM) coordinates for the water quality sites are provided in Table 3.

The locations of the replicate stations were defined differently for the upstream area and the downstream near-field and far-field areas due to the lack of detailed bathymetric information for Stephens Lake. As there are detailed bathymetry data for the area upstream of Gull Rapids, the polygon boundary was defined based on open-water depths (> 5 m in depth at the 50th percentile water level), distance from shore (*i.e.*, > 100 m from shore), and length (*i.e.*, 250 m in length).

Due to the lack of detailed bathymetry for the two downstream sampling areas, these polygons were defined based on distance from shorelines. Specifically, the polygons were located 250 m from shorelines (including islands) and were 250 m in length.

These boundaries were identified to ensure sites were located in relatively deep areas even under low water levels and to avoid nearshore areas where localized differences in water quality may occur (*e.g.*, localized shoreline erosion), while also being sufficiently large to accommodate five sampling sites with sufficient separation (*i.e.*, minimum of 20 m separation between sites).

Turbidity loggers were concurrently deployed in the upstream (1 site) and near-field (2 sites) areas as part of the SMP, and the water quality monitoring sites were established to include sampling in the vicinity of the logger locations, as indicated in Maps 6 and 7.

3.2.2 REGIONAL STUDY AREA

Eight sites within the RSA were identified in the AEMP based on sampling conducted during the baseline monitoring in 2001-2004 and 2009 (Map 3). Monitoring sites included Stephens Lake North; one site slightly upstream of each of the Kettle, Long Spruce, and Limestone GSs; and four additional sites downstream of the Limestone GS along the Nelson River. The lateral location of each site was maintained within the middle of the river and/or within deep areas of each forebay. UTM coordinates for the RSA sites are provided in Table 3.

3.3 SAMPLING METHODS

Monitoring in the LSA was conducted four times during the open-water season in 2015: June 22-23, July 27-28, August 23-24, and, September 23-24; sampling was also conducted during the ice-cover season on March 31 and April 2. Sites were accessed by boat during the open-

water season and by helicopter and on foot during winter. Sampling within the RSA was conducted on June 16, 2015 and all sites were accessed via fixed-wing aircraft.

UTMs were recorded at each site using a hand-held Global Positioning System (GPS) unit and total water depth was measured using a HawkEye H22PX handheld depth sounder. General information recorded at each site included:

- Date and time of sample collection;
- Cloud cover and precipitation, including the occurrence of precipitation prior to sampling where possible;
- Sampling equipment used;
- Site conditions and/or observations relevant to the sampling program;
- Any deviations from field sampling protocols; and,
- Snow and ice thickness (ice-cover season only).

Sampling consisted of collection of *in situ* water quality measurements and collection of grab samples for laboratory analysis, as described below.

3.3.1 *IN SITU* MEASUREMENTS

Secchi disk depth was measured during the open-water season at the near-field and far-field locations; velocities were too high for reliable measurement of Secchi disk depth in the upstream area. Secchi disk depth was measured from the shady side of the boat by lowering the disk until it was no longer visible; the disk was then lowered approximately 1 m deeper than the previous reading, and raised until it was visible again. The Secchi disk depth was recorded as the average of the two readings.

In situ measurements of dissolved oxygen (DO), turbidity, pH, specific conductance, turbidity, and temperature were collected at each sampling site in each season using a YSI EXO2 water quality multi-meter. *In situ* parameters were measured at 1.0 m or 0.5 m intervals (for sites > 5.0 m and < 5.0 m, respectively) at each site in the near-field and far-field sampling areas, beginning with a near surface measurement (*i.e.*, 0.3 m). High velocities in the upstream sampling area during the open-water season precluded measurement of *in situ* parameters across the water column and measurements were limited to near-surface depths.

3.3.2 SAMPLING FOR LABORATORY ANALYSES

At each site, grab samples of surface water were collected for laboratory analysis. Laboratory parameters included “routine” parameters (*e.g.*, nutrients, TSS, pH), total metals, and total mercury at all sites. Benzene, toluene, ethylbenzene, and xylene (BTEX), and F1-F4

hydrocarbons were also measured in the upstream and near-field areas to monitor for potential hydrocarbon contamination downstream of construction activities.

With the exception of sample collection for ultra-trace mercury, sampling during the open-water season was conducted by wearing gloves and submerging each sample bottle (provided by the analytical laboratory) to elbow depth (*i.e.*, approximately 0.3 m depth) then uncapping, filling, recapping, and retrieving the bottle to the surface, where preservatives were added as required. During the ice-cover season, near-surface water was collected using a Kemmerer water sampler deployed approximately 0.3 m below the ice; the sampler was retrieved to the surface and sample bottles were filled and preserved as instructed by the analytical laboratory while wearing nitrile gloves. During all seasons, samples for ultra-trace mercury were collected using the "clean hands-dirty hands" protocol (U.S. Environmental Protection Agency 1996). All sample bottles were filled with minimal headspace, except where instructed, to prevent chemical alteration and loss of compounds. Samples were subsequently kept cool (but not frozen) and in the dark until submission to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory (ALS Laboratories, Winnipeg).

3.4 QUALITY ASSURANCE / QUALITY CONTROL

The quality control/quality assurance (QA/QC) program included application of standard procedures to limit sample contamination in the field, submission of QA/QC samples to the analytical laboratory, and QA/QC verifications of the water quality meter.

3.4.1 GENERAL QA / QC

Standard procedures for the control of sample contamination were adhered to throughout the sampling program, including:

- Use of gloves during sampling;
- Collecting samples facing in an upstream direction to minimize sample contamination. Where possible, sites were also approached moving in an upstream direction to avoid site disturbance and contamination;
- Avoiding contact with the insides of sample bottles, including lids;
- Limiting exposure of the insides of sample bottles to the atmosphere;
- Regular cleaning, calibration, inspection, and accuracy verifications of field meters and equipment; and,
- Adherence to sampling protocols wherever possible.

3.4.2 TRIPLICATE SAMPLES

The sampling program incorporated the collection of one triplicate sample at a randomly selected sampling site during each sample collection period. The triplicates were collected at the same location and as close in time as practically feasible. Triplicate samples were identified with the Site ID followed by “A”, “B”, or “C”.

3.4.3 FIELD BLANKS

One field blank was submitted to the analytical laboratory (ALS Laboratories) during each sampling period. Field blanks were prepared by filling one set of sample bottles (provided by the analytical laboratory) with deionized water (also provided by the analytical laboratory) in the field and treating the blanks in exactly the same manner as environmental samples.

Bottles were blindly labeled (*i.e.*, bottles were labelled as TF-2), stored and transported according to sampling and handling protocols, and submitted along with environmental samples.

3.4.4 TRIP BLANKS

One trip blank was also submitted to the analytical laboratory (ALS Laboratories) during each sampling period. Trip blanks were prepared by the analytical laboratory by filling one set of sample bottles with deionized water and adding preservatives where appropriate.

The trip blank samples were transported to the field site, using the same handling and transport protocols as for environmental samples, and submitted along with environmental samples to the analytical laboratory for analysis. Trip blanks were treated similarly to field blanks but the bottles were not opened at any point in the field and thus were not exposed to the environment. Trip blanks were also blindly labelled (*i.e.*, as TF-1).

3.4.5 WATER QUALITY METER QA/QC

The water quality meter was calibrated and inspected prior to departure for the field for each sampling trip. In the field, the functioning and accuracy of the meter was also assessed at the end of each sampling day by verifying the values in standards of known values for turbidity, pH, and specific conductance. Any discrepancies from the standard values were documented in the field notes.

3.5 DATA ANALYSIS

Prior to analysis, all environmental data were evaluated qualitatively for potential outliers and transcription or analytical errors. Suspect results were noted and requests were made to the analytical laboratory to verify the values through verification of reporting accuracy.

QA/QC samples were assessed according to standard criteria to evaluate precision and identify potential sample contamination issues (British Columbia Ministry of Environment, Lands, and Parks [BCMELP] 1998). Field and trip blank results were evaluated for evidence of sample contamination. Blank results that exceeded five times the analytical detection limit (DL) were considered to be indicative of sample contamination and/or laboratory error. Percent relative standard deviation (PRSD) was calculated for triplicate samples as follows:

PRSD = Standard deviation of the triplicate values/Mean of the triplicate values x 100.

Precision of the QA/QC samples was evaluated using the “rule of thumb” criteria for precision of 18% for triplicate samples (BCMELP 1998). Where one or more of the measurements being compared were less than five times the analytical DL, an analysis of precision was not undertaken, in accordance with guidance provided in BCMELP (1998).

Mean and standard error (SE) were also calculated for all five sampling sites within each sampling area during each sampling period. Results that were reported below the analytical DL were assigned a value of one half the DL.

As summarized in Section 1.0, and detailed in the AEMP, results of the water quality monitoring program are to be subject to the steps identified within the AMF (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 AMF entails comparison of the mean values of replicate samples for key indicators measured during a single sampling period to the benchmarks identified in the AEMP. If a benchmark is not exceeded, the assessment would proceed to Response Level 1 – trend analysis. If a 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 baseline conditions (before-after). If a statistical difference is not observed, the assessment would proceed to Response Level 1. Where statistical differences are identified for key indicators, the assessment would proceed to Step 3, in which a determination of cause (*i.e.*, is the difference Project-related) would be undertaken.

For data collected in 2015, means (for polygons in the LSA) or individual measurements (for sites in the RSA) for key indicators were first compared to benchmarks (Table 1). For each key indicator measured in the LSA that exceeded a benchmark, a statistical comparison between upstream and downstream sampling areas was undertaken during the respective sampling period. Data subject to statistical analyses, as per the AMF, were non-normally distributed and were therefore compared using a non-parametric Kruskal-Wallis test (α = 0.05). For each key

indicator measured in the RSA at a concentration above the benchmark, a qualitative analysis was undertaken to compare values along the length of the river.

Hydrocarbon data were screened upon receipt of results from the analytical laboratory to identify if there was any indication of potential contamination; results were evaluated for occurrence of detections and comparisons to MWQSOGs for PAL (MWS 2011; Table 4) where available.

In addition to the key water quality indicators, monitoring results for other water quality parameters (*e.g.,* parameters for which there are no PAL objectives or guidelines but may be indicative of general changes in water quality, such as conductivity; Table 2) were also summarized to provide supporting information regarding potential effects of construction and to assist with development of trend monitoring over the long-term. Data collected under the Coordinated Aquatic Monitoring Program (CAMP) during the winter, spring, summer, and fall 2015 are also included for broader spatial and temporal context of water quality conditions in on- and off-system waterbodies in the region. CAMP sampling sites included Assean (off-system), Split, and Stephens lakes as well as the lower Nelson River downstream of the Limestone GS.

4.0 RESULTS

Results of the water quality monitoring program for the 2015 open-water season are summarized below, and presented in Tables 1 and 2, and Figures 2-73. Raw data are provided in Appendix 1 and results of the QA/QC samples are presented in Appendix 2.

4.1 KEY INDICATORS

4.1.1 NUTRIENTS

Mean ammonia, nitrate/nitrite, and total phosphorus (TP) concentrations measured in the upstream, near-field, and far-field areas of the LSA, and individual measurements from sites in the RSA were within the benchmark values during each of the sampling events in March/April (winter), June, July, August, and September (Table 1; Figures 2-7).

4.1.2 CHLOROPHYLL *a*

Mean chlorophyll *a* concentrations measured in the upstream, near-field, and far-field areas of the LSA, and individual measurements from sites in the RSA in March/April, June, July and September were below the benchmark of 10.00 µg/L (Table 1; Figures 8 and 9). In August, the mean chlorophyll *a* concentration measured in all three LSA polygons (upstream, near-field, far-field were above the benchmark (13.6, 14.9, and 12.8 µg/L, respectively). Concentrations in the downstream reaches were not statistically different than those in the upstream area; however, the near-field polygon had significantly higher chlorophyll *a* than was measured in the far-field polygon.

4.1.3 TOTAL SUSPENDED SOLIDS

Mean TSS concentrations measured in the near-field, and far-field areas of the LSA in June, July, August, and September were within the benchmark values, which are defined as an increase above the mean upstream TSS concentration (*i.e.*, background conditions) of 25 mg/L for a short-term (*i.e.*, 1 day) duration and 5 mg/L for a long-term (*i.e.*, 30-day) duration (Table 1; Figures 10 and 11). The mean TSS measured in the near-field polygon in March/April 2015 (11.65 mg/L) exceeded the 30-day (chronic) PAL objective (9.2 mg/L; derived from TSS measured at that time in the upstream polygon). Statistical analysis indicated that the concentrations in the near-field area were significantly higher than those upstream. Specifically, TSS exceeded the long-term benchmark, but not the short-term benchmark, at two sites in the near-field area; one was a marginal exceedance (9.4 mg/L) but the other TSS result (19.6 mg/L

from site NF-6; Map 7) was notably higher. TSS in the far-field area was not statistically different from either the upstream or near-field areas.

TSS measured in June 2015 during the RSA program indicated that TSS at sites downstream of the Limestone GS were higher than upstream sites (*i.e.,* Stephens Lake near the Kettle GS and the Long Spruce and Limestone Forebays; Figure 11). Pre-Project water quality studies also noted occasional increases in TSS in the lower Nelson River (Keeyask Hydropower Limited Partnership 2012).

4.1.4 pH

Mean laboratory and *in situ* pH measurements collected in the upstream, near-field, and far-field areas of the LSA, and individual measurements from sites in the RSA were within the benchmark values during each of the sampling events in March/April, June, July, August, and September (Table 1; Figures 12 and 13).

4.1.5 DISSOLVED OXYGEN

Mean DO measured in the upstream, near-field, and far-field areas of the LSA, and individual measurements from sites in the RSA were within the benchmark values during each of the sampling events in March/April, June, July, August, and September (Table 1; Figures 14 and 15).

4.1.6 METALS

Mean concentrations of total metals measured in the upstream, near-field, and far-field areas of the LSA, and individual measurements from sites in the RSA, were within the benchmark values during each of the sampling events in March/April, June, July, August, and September, including: aluminum, arsenic, boron, cadmium, chromium, copper, iron, lead, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, and zinc (Table 1; Figures 16-45).

4.1.7 HYDROCARBONS AND BTEX

F1-F4 hydrocarbons and BTEX were below the analytical detection limits in nearly all samples collected from the upstream and near-field areas during each of the sampling events in March/April, June, July, August, and September (Table A1-7). The one exception was a sample from an upstream replicate site in June where most parameters were not detected but F3 (C16-C34), F4 (C34-C50), and total (C6-C50) hydrocarbons were detected. As the analytical laboratory surrogate (*i.e.,* a quality control parameter measured by the laboratory) for these

parameters was also reported beyond the acceptable range limits (*i.e.,* measurement of 147.5% compared to acceptable range of 60-140%), the results for this sample are deemed unreliable. As all other results were below detection and the DLs were lower than PAL guidelines, all measurements were within the PAL guidelines (Table 4). Monitoring results indicate that construction activities did not affect hydrocarbon concentrations in the local study area.

4.2 ADDITIONAL PARAMETERS

Results for parameters that are not key indicators are presented as follows: dissolved phosphorous (Figures 46 and 47), total nitrogen (Figures 48 and 49), total organic carbon (Figures 50 and 51), *in situ* and laboratory turbidity (Figures 52 and 53), true colour (Figures 54 and 55), *in situ* and laboratory specific conductance (Figures 56 and 57), total dissolved solids (Figures 58 and 59), hardness (Figures 60 and 61), and major ions (chloride, sulphate, calcium, magnesium, potassium, and sodium; Figures 62-73).

5.0 DISCUSSION

With three exceptions (chlorophyll *a* in August and TSS in the LSA in winter), the concentrations of all the key indicators were within the benchmark values during the March/April, June, July, August, and September sampling events. As per Step 1 of the AMF, no further analysis was conducted for parameters within the benchmarks.

Mean chlorophyll *a* concentrations measured in August in all three LSA areas were marginally above the benchmark of 10.00 µg/L, which triggered additional analyses of data under Step 2 of the AMF. Statistical comparisons indicated that chlorophyll *a* was not significantly different between the upstream and downstream areas, but that significantly higher chlorophyll *a* concentrations were measured in the near-field area compared to the far-field area. As no significant difference was noted between the upstream and downstream locations, the observed difference was not likely due to the Project and no further analysis was required. Upstream chlorophyll *a* data were also examined for Split Lake samples collected under CAMP approximately two weeks before and three weeks after the August sampling and chlorophyll *a* concentrations were within the typical range observed at this site.

Mean TSS measured in the near-field polygon in winter 2015 was also marginally above the benchmark (site-specific PAL of 9.2 mg/L) and concentrations were significantly higher than those in the upstream area. As significant differences were found between the upstream and downstream reaches, additional actions were triggered under Step 3 of the AMF (*i.e.*, determination if the observed difference was likely to be Project-related).

Consideration of other related water quality parameters suggest that observed difference in winter TSS was not likely due to the Project as the elevated mean TSS in the near-field polygon was due to an extremely high concentration measured at one particular site, which was located closer to shore than the other sites.

In June during sampling within the RSA, individual measurements of TSS from four sites on the Nelson River downstream of the Limestone GS were higher than upstream sites sampled on the same day. Concentrations were within those measured during the baseline surveys conducted in June 2002-2004 and 2009 (Badiou and Cooley 2005; Badiou *et al.* 2005, 2007; Savard *et al.* 2010); spikes in TSS were also occasionally observed in the downstream area during the pre-Project studies. Pre-Project water quality studies also noted occasional increases in TSS in the lower Nelson River (Keeyask Hydropower Limited Partnership 2012).

F1-F4 hydrocarbons and BTEX were below the analytical DLs in nearly all samples collected from the upstream, near-field, and far-field areas during each of the sampling events. The one exception was a sample from the upstream area in June, where laboratory quality control indicates that the results were unreliable. All remaining results were within the MWQSOG PALs and there does not appear to be any evidence that construction affected hydrocarbon concentrations in the LSA.

6.0 SUMMARY AND CONCLUSIONS

Key questions presented in the AEMP to be answered about water quality during construction of the Keeyask GS are:

- Has the Project resulted in exceedances of water quality objectives or guidelines for the protection of aquatic life?
- What are the magnitude and spatial extent of effects of construction on water quality?

Water quality measured in the local and regional study areas along the lower Nelson River indicated that conditions measured during the ice-cover and open-water seasons of 2015 were generally similar upstream and downstream of the construction activities. Specifically, any upstream to downstream differences in water quality were consistent with spatial trends observed during baseline studies or, in one instance, a potential localized effect associated with the proximity of a site to the shoreline.

Overall, there was minimal effect of the Project on water quality in the region in 2015, and information collected thus far indicates that construction activities have not affected water quality and its suitability to support aquatic life.

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TABLES

Table 1: Benchmark values and means of key water quality parameters measured during the water quality monitoring program, 2015.

Indicator	Unit	Benchmark	March / April			June		
			Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field
Ammonia	(mg N/L)	0.841	<0.010	0.016	0.018	<0.010	<0.010	0.012
Nitrate/ Nitrite	(mg N/L)	2.93	0.0539	0.0521	0.0562	<0.0051	<0.0051	<0.0051
Total Phosphorous	(mg/L)	0.058	0.0290	0.0323	0.0320	0.0410	0.0370	0.0348
Chlorophyll *a*	(ug/L)	10.0	1.58	1.43	1.48	5.64	6.11	5.25
Total Suspended Solids	(mg/L)	5/25 mg/L higher than upstream	4.19	11.65	8.08	13.67	9.24	8.04
Laboratory pH		6.5/9.0	8.46	8.43	8.41	8.16	8.22	8.20
Dissolved Oxygen	(mg/L)	6.5/9.5[1]	14.19	14.17	14.54	10.17	10.56	10.54
Aluminum	(mg/L)	1.98	0.398	0.623	0.633	1.15	0.832	0.821
Arsenic	(mg/L)	0.150	0.00113	0.00107	0.00095	0.00108	0.00103	0.00101
Boron	(mg/L)	1.5	0.02753	0.02575	0.02800	0.02947	0.02900	0.03140
Cadmium	(mg/L)	0.00032	<0.000010	<0.000010	<0.000010	<0.000010	0.0000	0.0000
Chromium	(mg/L)	0.102	<0.0010	<0.0010	0.0010	0.0018	0.0014	0.0014
Copper	(mg/L)	0.0112	0.0017	0.0016	0.0044*	0.0019	0.0020	0.0019
Iron	(mg/L)	1.45	0.369	0.553	0.584	0.895	0.786	0.760
Lead	(mg/L)	0.00416	0.000187	0.000245	0.000260	0.000471	0.000515	0.000380
Mercury	(mg/L)	0.000026	0.0000015	<0.0000010	<0.0000010	0.0000017	0.0000014	0.0000017
Molybdenum	(mg/L)	0.073	0.00069	0.00067	0.00073	0.00062	0.00067	0.00064
Nickel	(mg/L)	0.062	<0.0020	<0.0020	0.0029*	0.0022	<0.0020	<0.0020
Selenium	(mg/L)	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silver	(mg/L)	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Thallium	(mg/L)	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	(mg/L)	0.0330	0.00080	0.00071	0.00074	0.00069	0.00067	0.00066
Zinc	(mg/L)	0.143	0.00179	0.00330	0.00432	0.00929	0.01044	0.01556

*One result for each copper (0.0148 mg/L) and nickel (0.0103 mg/L) were considered outliers for the far-field polygon in winter.

Table 1: Benchmark values and means of key water quality parameters measured during the water quality monitoring program, 2015 (continued).

Indicator	Unit	Benchmark	July			August		
			Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field
Ammonia	(mg N/L)	0.841	<0.010	<0.010	0.012	<0.010	<0.010	0.005
Nitrate/ Nitrite	(mg N/L)	2.93	<0.0051	<0.0051	<0.0051	0.0094	0.0124	0.0072
Total Phosphorous	(mg/L)	0.058	0.0391	0.0298	0.0274	0.0388	0.0384	0.0368
Chlorophyll *a*	(ug/L)	10.0	4.98	6.94	6.29	13.6	14.9	12.8
Total Suspended Solids	(mg/L)	5/25 mg/L higher than upstream	6.64	6.68	4.24	12.6	11.2	9.08
Laboratory pH		6.5/9.0	8.36	8.24	8.23	8.27	8.29	8.26
Dissolved Oxygen	(mg/L)	6.5/9.5[1]	9.14	9.58	9.46	9.63	10.09	9.76
Aluminum	(mg/L)	1.98	0.791	0.666	0.580	0.916	0.685	0.738
Arsenic	(mg/L)	0.150	0.00124	0.00119	0.00117	0.00143	0.00137	0.00133
Boron	(mg/L)	1.5	0.02800	0.02440	0.02340	0.02480	0.02607	0.02580
Cadmium	(mg/L)	0.00032	<0.000010	<0.000010	<0.000010	<0.000010	0.0000	<0.000010
Chromium	(mg/L)	0.102	0.0013	<0.0010	<0.0010	0.0014	0.0010	<0.0010
Copper	(mg/L)	0.0112	0.0019	0.0018	0.0018	0.0019	0.0017	0.0017
Iron	(mg/L)	1.45	0.677	0.554	0.428	0.746	0.598	0.596
Lead	(mg/L)	0.00416	0.000362	0.000259	0.000208	0.000351	0.000299	0.000276
Mercury	(mg/L)	0.000026	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010	<0.0000010
Molybdenum	(mg/L)	0.073	0.00067	0.00071	0.00068	0.00064	0.00065	0.00062
Nickel	(mg/L)	0.062	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Selenium	(mg/L)	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silver	(mg/L)	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Thallium	(mg/L)	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	(mg/L)	0.0330	0.00069	0.00071	0.00070	0.00064	0.00065	0.00062
Zinc	(mg/L)	0.143	0.00768	0.00630	0.00644	0.00208	0.00100	<0.0020

Table 1: Benchmark values and means of key water quality parameters measured during the water quality monitoring program, 2015 (continued).

Indicator	Unit	Benchmark	September			Open-water Season		
			Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field
Ammonia	(mg N/L)	0.841	0.0140	0.014	0.012	<0.010	<0.010	<0.010
Nitrate/ Nitrite	(mg N/L)	2.93	0.0447	0.0474	0.0481	<0.0051	<0.0051	<0.0051
Total Phosphorous	(mg/L)	0.058	0.0364	0.0338	0.0314	0.0280	0.0280	0.0280
Chlorophyll *a*	(ug/L)	10.0	4.27	4.37	4.01	9.35	5.45	5.19
Total Suspended Solids	(mg/L)	5/25 mg/L higher than upstream	13.41	8.96	7.20	5.00	4.40	4.20
Laboratory pH		6.5/9.0	8.19	8.16	8.15	8.20	8.23	8.25
Dissolved Oxygen	(mg/L)	6.5/9.5[1]	10.92	11.34	10.80	9.97	10.39	10.14
Aluminum	(mg/L)	1.98	0.840	0.773	0.730	0.574	0.587	0.530
Arsenic	(mg/L)	0.150	0.00133	0.00135	0.00131	0.00117	0.00117	0.00120
Boron	(mg/L)	1.5	0.02847	0.02900	0.02760	0.02300	0.02400	0.02300
Cadmium	(mg/L)	0.00032	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium	(mg/L)	0.102	0.0013	0.0013	0.0011	<0.0010	<0.0010	<0.0010
Copper	(mg/L)	0.0112	0.0017	0.0018	0.0017	0.0017	0.0019	0.0018
Iron	(mg/L)	1.45	0.715	0.678	0.618	0.410	0.460	0.410
Lead	(mg/L)	0.00416	0.000363	0.000348	0.000310	0.000203	0.000209	0.000195
Mercury	(mg/L)	0.000026	0.0000016	0.0000014	0.0000012	<0.0000010	<0.0000010	<0.0000010
Molybdenum	(mg/L)	0.073	0.00068	0.00069	0.00064	0.00068	0.00070	0.00068
Nickel	(mg/L)	0.062	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Selenium	(mg/L)	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Silver	(mg/L)	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Thallium	(mg/L)	0.0008	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium	(mg/L)	0.0330	0.00071	0.00071	0.00067	0.00070	0.00069	0.00069
Zinc	(mg/L)	0.143	0.00219	0.00202	<0.0020	0.00920	0.00770	0.00660

Table 2: Mean values of additional parameters measured during the water quality monitoring program, 2015.

Indicator	Unit	March / April			June			July		
		Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field
Total Nitrogen	(mg/L)	0.525	0.522	0.518	0.317	0.395	0.393	0.344	0.385	0.365
Dissolved Organic Carbon	(mg/L)	6.85	6.85	6.36	5.39	5.62	5.62	8.46	8.64	8.36
In situ Turbidity	(NTU)	6.63	9.18	10.8	18.7	17.1	16.7	42.2	12.0	10.5
Laboratory Turbidity	(NTU)	9.41	11.8	14.9	26.6	21.8	21.2	20.2	16.6	14.0
In situ Specific Conductance	(µS/cm)	338	-	359	322	321	318	309	306	308
Laboratory Conductivity	(µmhos/cm)	364	355	355	303	309	303	320	311	313
Total Dissolved Solids	(mg/L)	201	199	194	194	195	196	185	184	171
True Color	(TCU)	13.7	14.0	10.2	14.0	15.8	17.8	15.4	7.56	9.08
In situ pH		8.01	8.24	-	8.30	8.31	8.30	8.48	8.54	8.55
Hardness as $CaCO_3$	(mg/L)	139	136	137	144	126	123	132	126	123
Chloride	(mg/L)	18.4	17.3	18.2	16.1	16.3	16.0	17.0	17.5	17.4
Sulphate	(mg/L)	36.8	34.5	36.2	31.5	31.9	31.4	32.4	33.3	33.1
Calcium	(mg/L)	33.0	31.6	32.2	35.4	30.3	29.2	31.1	29.8	29.3
Magnesium	(mg/L)	13.8	13.8	13.9	13.4	12.3	12.3	13.1	12.6	12.2
Potassium	(mg/L)	2.97	3.04	3.01	3.04	2.70	2.66	2.89	2.76	2.75
Sodium	(mg/L)	19.3	18.7	19.0	17.6	16.7	16.3	18.7	18.0	17.5

Table 2: Mean values of additional parameters measured during the water quality monitoring program, 2015 (continued).

Indicator	Unit	August			September			Open-water Season		
		Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field	Upstream	Near-Field	Far-Field
Total Nitrogen	(mg/L)	0.479	0.624	0.581	0.463	0.333	0.193	0.393	0.363	0.363
Dissolved Organic Carbon	(mg/L)	9.96	9.67	9.64	13.7	12.8	12.3	8.20	8.60	8.30
In situ Turbidity	(NTU)	14.7	14.3	13.3	14.7	14.4	13.8	22.6	14.4	13.6
Laboratory Turbidity	(NTU)	22.4	19.7	18.0	21.7	21.1	19.5	13.7	14.1	13.8
In situ Specific Conductance	(µS/cm)	300	302	300	312	316	309	311	311	309
Laboratory Conductivity	(µmhos/cm)	297	304	290	306	307	303	314	315	315
Total Dissolved Solids	(mg/L)	190	183	185	183	208	220	164	184	175
True Color	(TCU)	18.9	18.8	19.4	19.1	18.3	17.4	9.90	8.40	9.60
In situ pH		8.51	8.51	8.47	8.40	8.41	8.40	8.42	8.44	8.43
Hardness as $CaCO_3$	(mg/L)	127	129	127	129	130	127	122	127	124
Chloride	(mg/L)	15.6	15.9	15.6	16.4	17.0	16.4	17.4	17.5	17.5
Sulphate	(mg/L)	29.5	30.0	29.5	30.5	31.6	30.6	33.1	33.4	33.2
Calcium	(mg/L)	30.3	31.1	30.4	31.2	31.4	30.5	28.9	29.8	29.2
Magnesium	(mg/L)	12.5	12.4	12.4	12.5	12.6	12.3	12.1	12.8	12.3
Potassium	(mg/L)	2.79	2.63	2.65	2.68	2.71	2.66	2.75	2.78	2.72
Sodium	(mg/L)	16.3	15.7	15.3	16.6	17.1	15.9	17.2	17.5	17.7

Table 3: Coordinates of water quality monitoring sites sampled in 2015.

Region	Site ID	Zone	Northing	Easting
Local Study Area				
Upstream	US-1	15V	359563	6246182
	US-2	15V	359505	6246054
	US-3	15V	359362	6246133
	US-4	15V	359386	6246181
	US-5	15V	359437	6246065
	US-6	15V	356920	6245415
	US-7	15V	356919	6245500
	US-8	15V	356919	6245436
	US-9	15V	356858	6245491
	US-10	15V	356879	6245496
Near-field	NF-1	15V	373752	6247202
	NF-2	15V	373915	6245451
	NF-3	15V	373832	6247136
	NF-4	15V	374307	6245232
	NF-5	15V	373817	6247475
	NF-6	15V	374333	6244975
	NF-7	15V	374371	6245254
	NF-8	15V	374351	6245250
	NF-9	15V	374324	6245253
Far-field	FF-1	15V	388131	6250842
	FF-2	15V	388235	6249838
	FF-3	15V	388356	6249136
	FF-4	15V	388166	6249639
	FF-5	15V	388373	6250442
Regional Study Area				
Stephens Lake-North Arm	STL-N	15V	510972	6309091
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	15V	491781	6309273
Long Spruce Forebay	LNR-3	15V	458807	6288148
Limestone Forebay	LNR-4	15V	451001	6282615
Nelson River upstream of the proposed Conawapa GS	LNR-5	15V	431684	6263092
Nelson River downstream of the proposed Conawapa GS	LNR-6	15V	415415	6251278
Nelson River downstream of Deer Island	LNR-7	15V	398883	6250049
Nelson River upstream of Gillam Island	LNR-8	15V	362235	6262609

Table 4: Manitoba water quality guidelines for the protection of aquatic life for hydrocarbons.

Parameter	Guideline
Benzene	0.370 mg/L
Ethylbenzene	0.090 mg/L
Toluene	0.002 mg/L

FIGURES

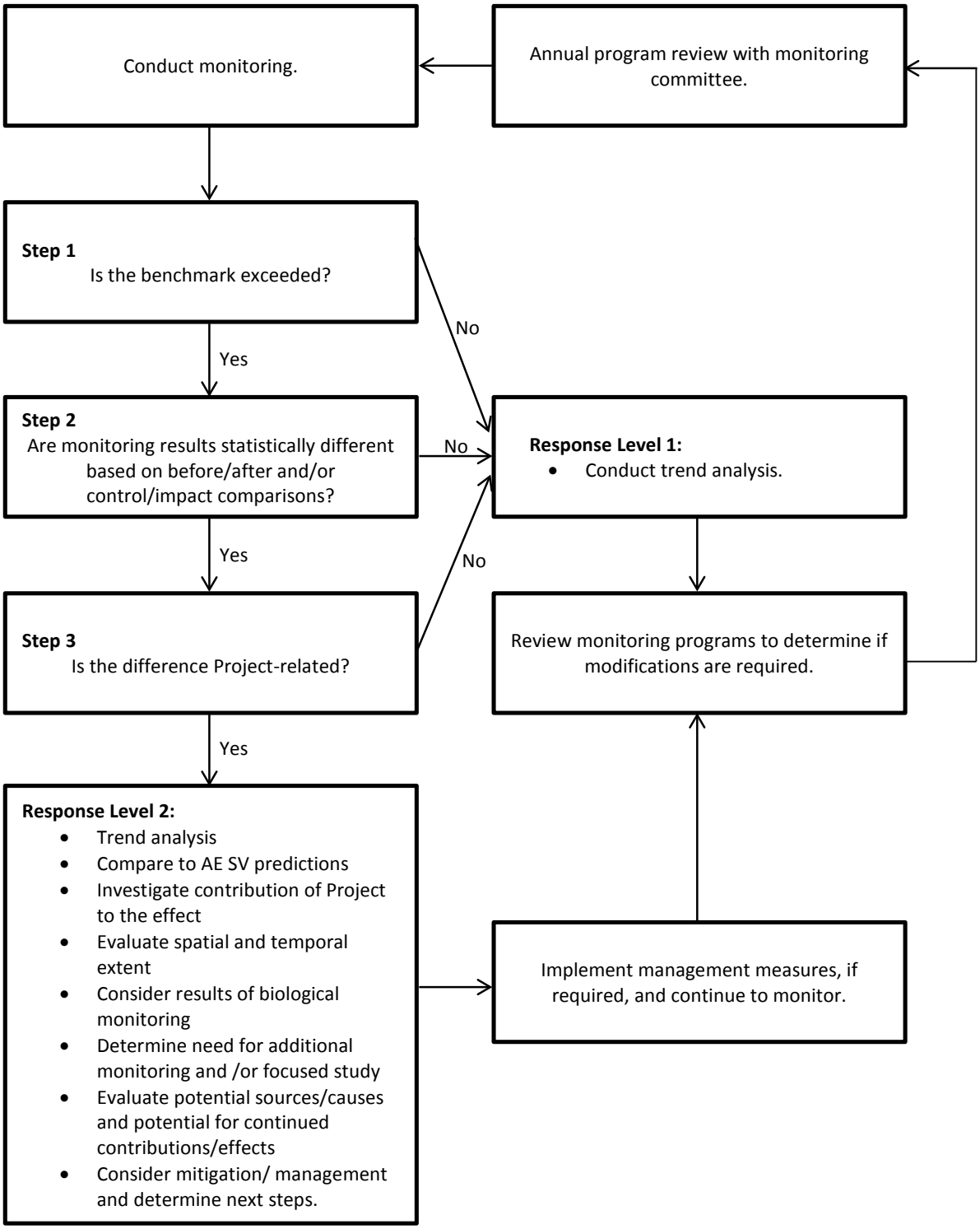


Figure 1: Water quality assessment management framework (AMF).

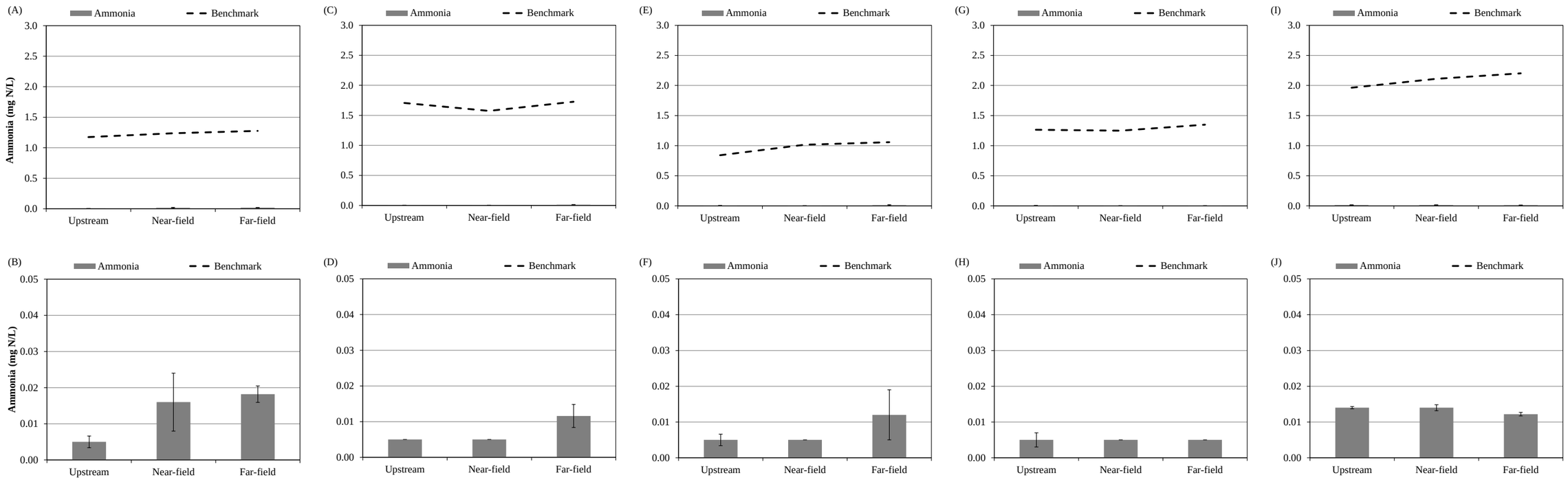


Figure 2: **Mean (± SE) ammonia concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

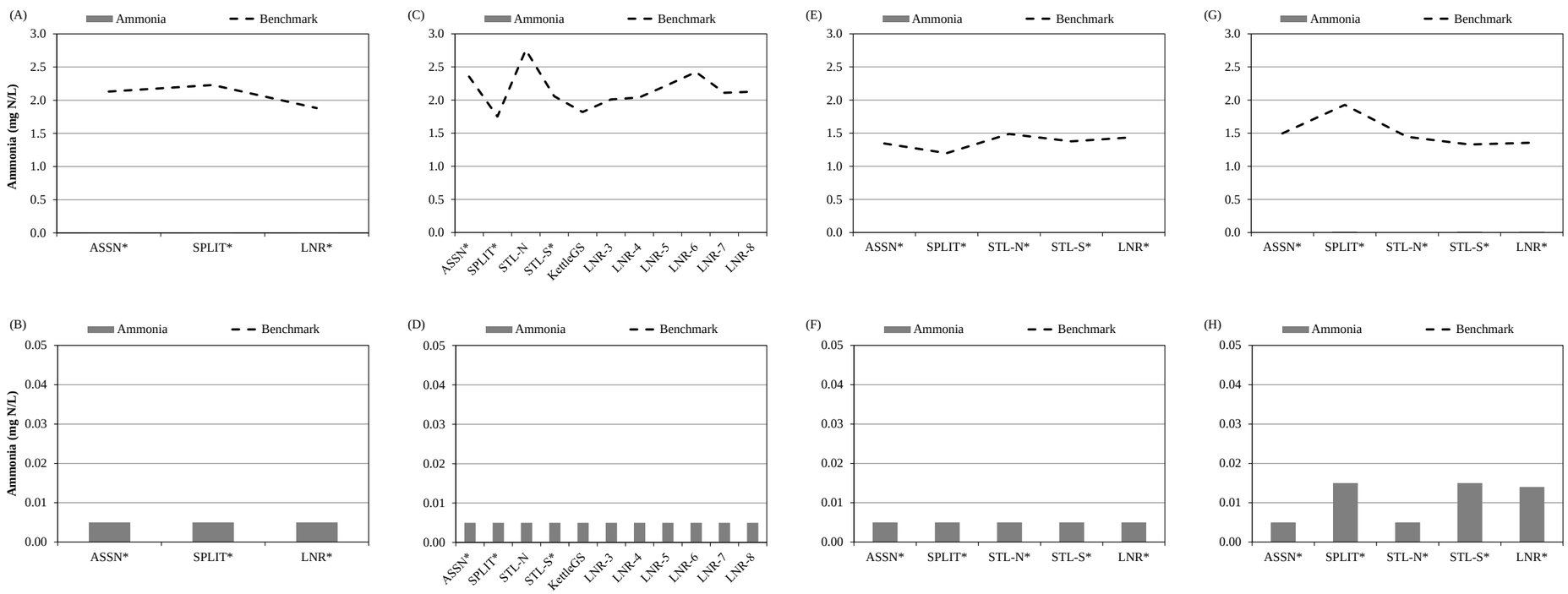


Figure 3: Ammonia concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.

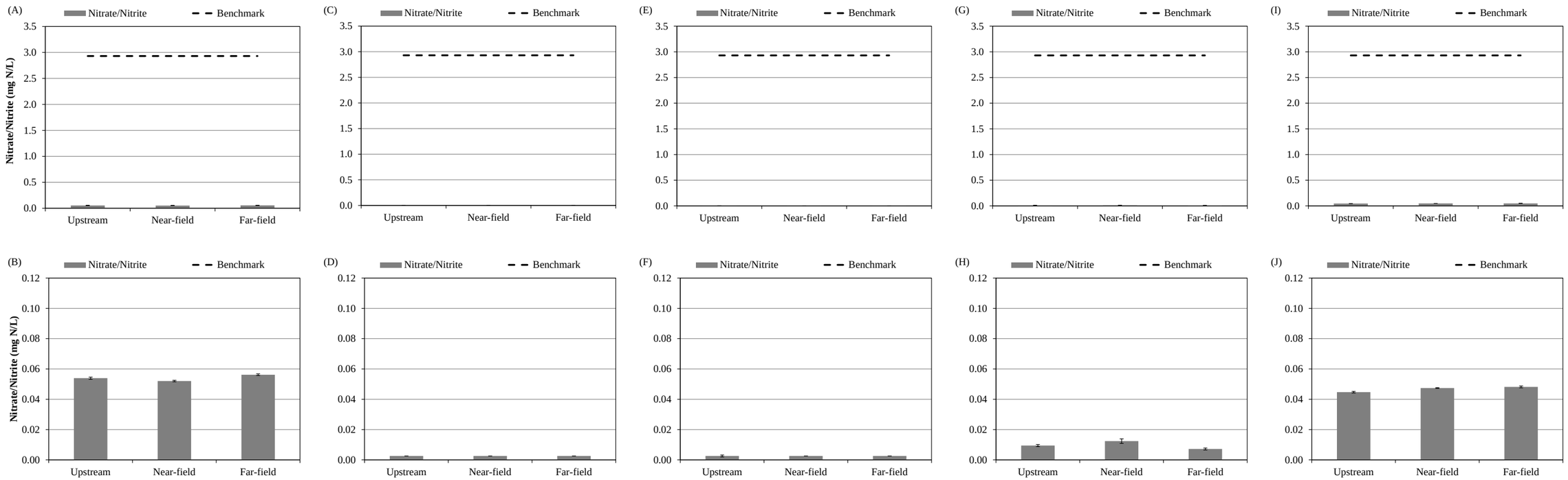


Figure 4: **Mean (± SE) nitrate/nitrite concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

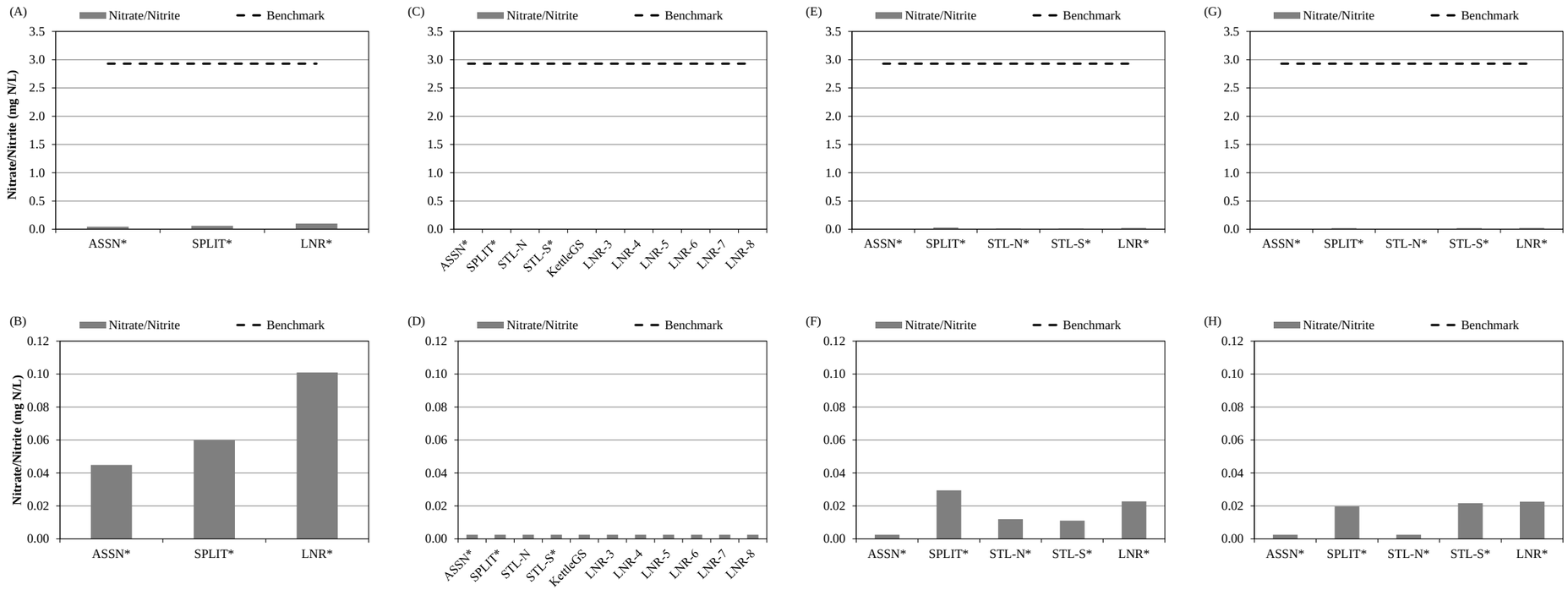


Figure 5: **Nitrate/nitrite concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.**

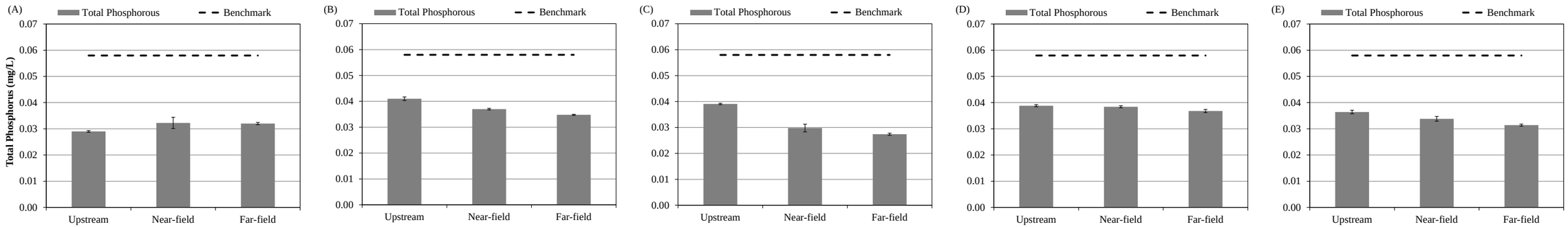


Figure 6: **Mean (± SE) concentrations of total phosphorous measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

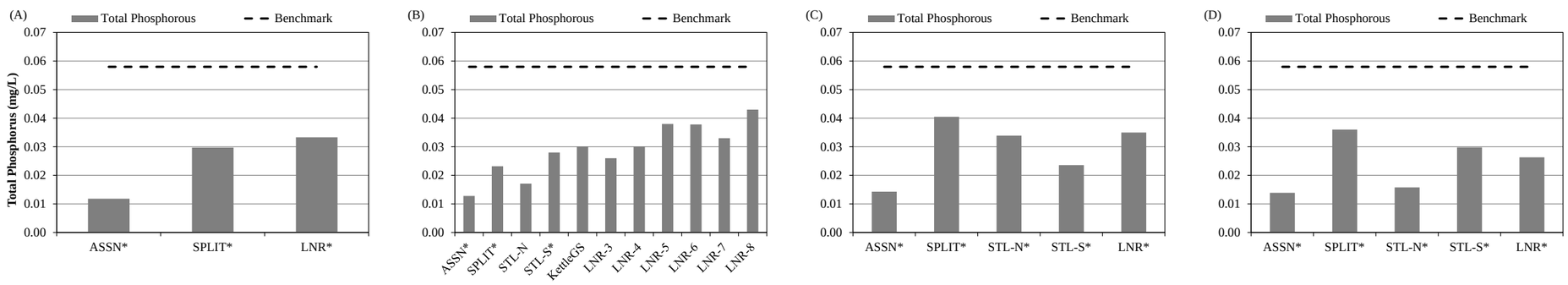


Figure 7: **Total phosphorous concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

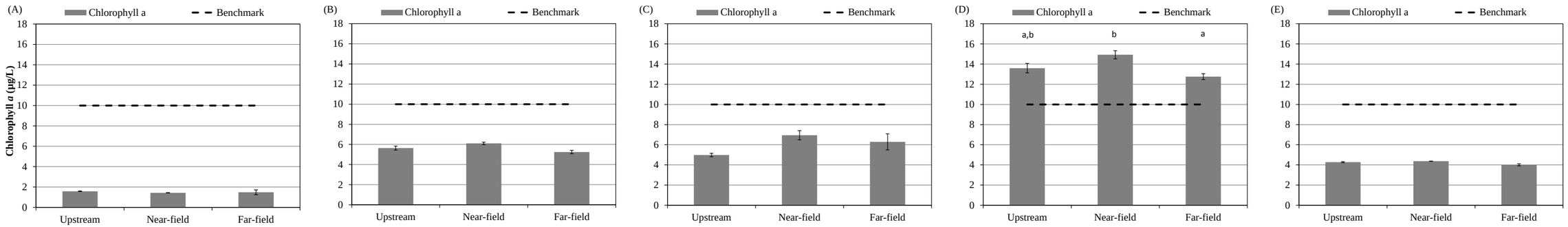


Figure 8: **Mean (± SE) chlorophyll *a* concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015. Letters in (D) indicate significantly (α = 0.05) different results between sampling areas.**

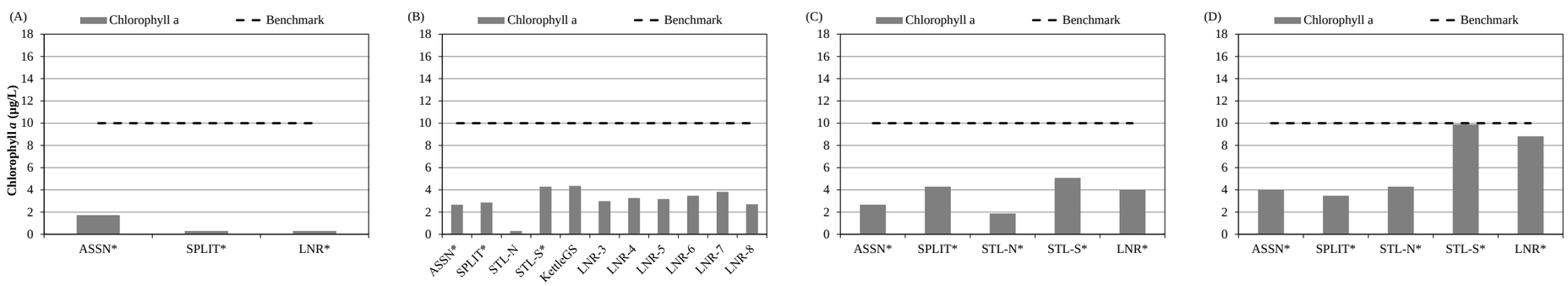


Figure 9: **Chlorophyll *a* concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

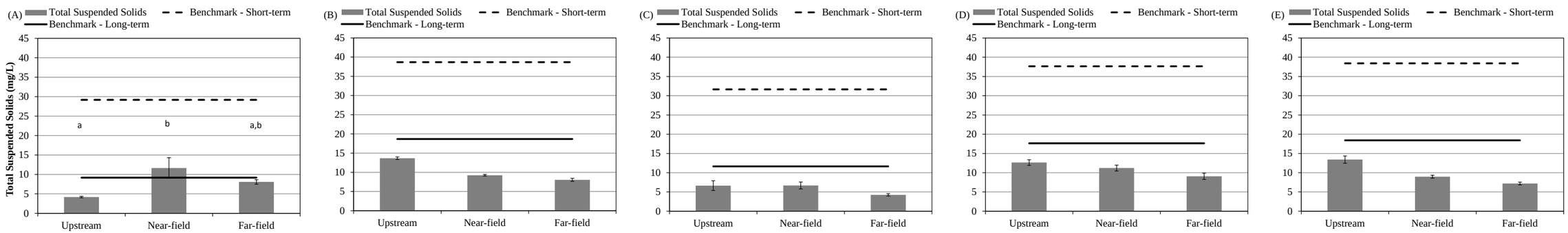


Figure 10: **Mean (± SE) total suspended solid concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015. Letters in (A) indicate significantly (α = 0.05) different results between sampling areas..**

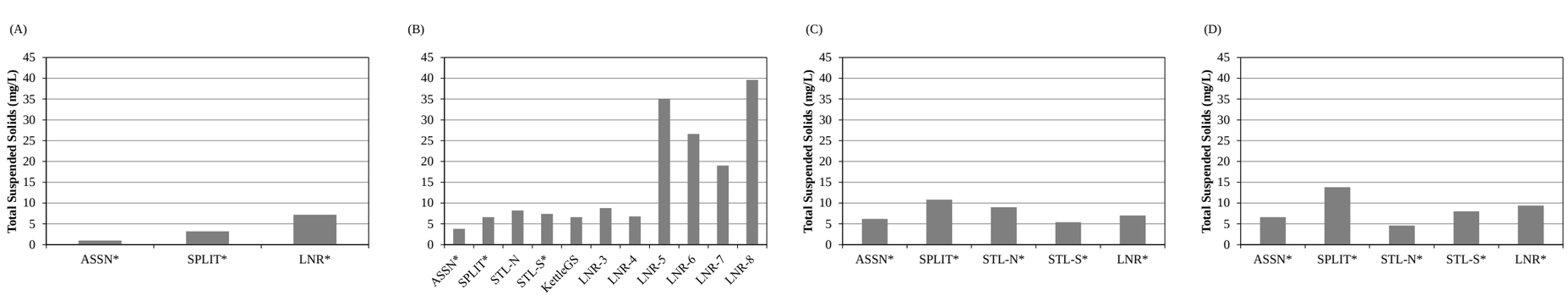
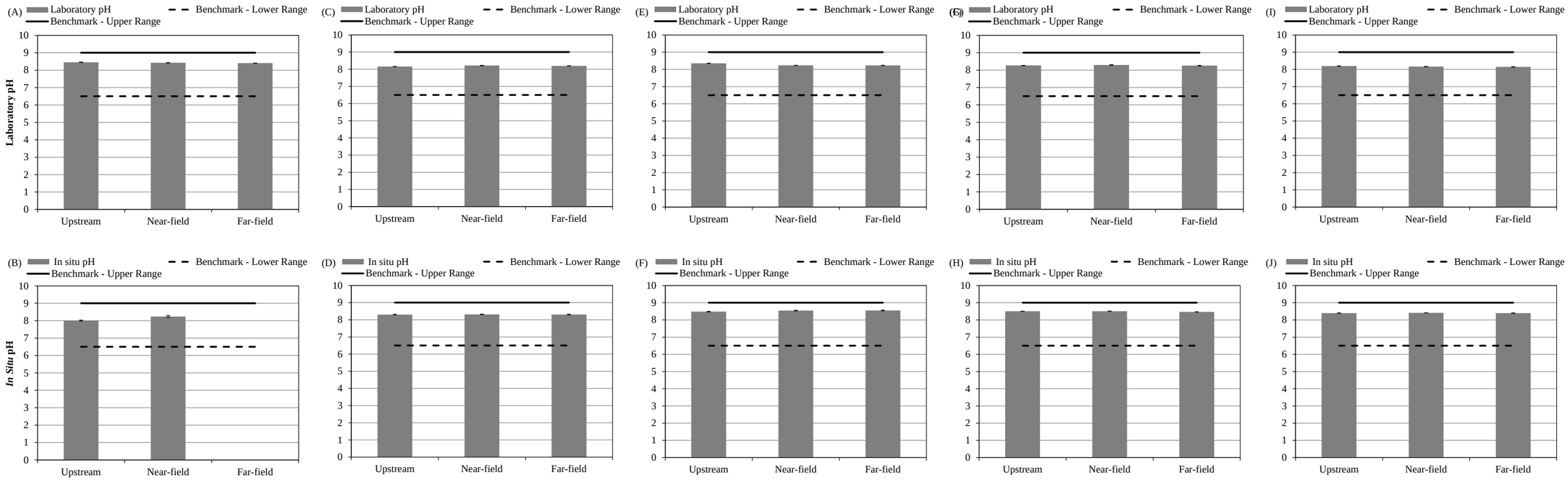


Figure 11: **Total suspended solid concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**



In situ pH results are missing for the far-field polygon in winter due to a malfunction of the multi-meter.

Figure 12: Mean (± SE) laboratory (top) and *in situ* (bottom) pH measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015.

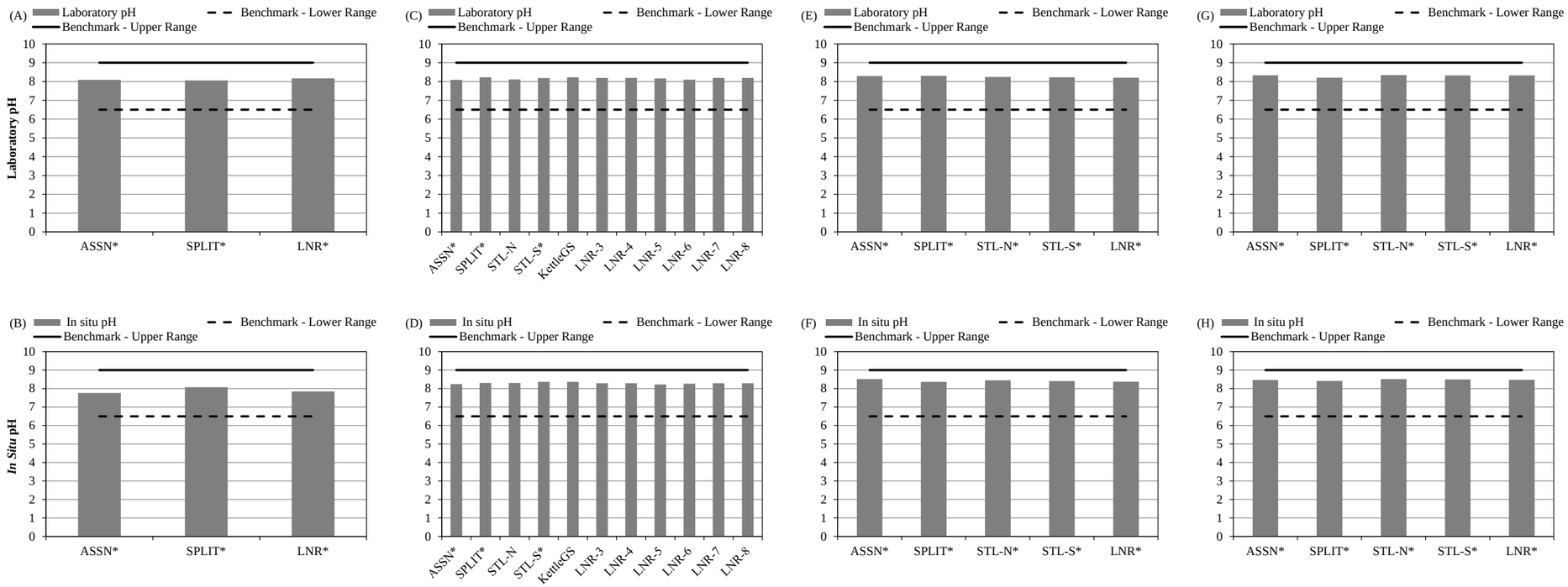


Figure 13: Laboratory (top) and *in situ* (bottom) pH measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

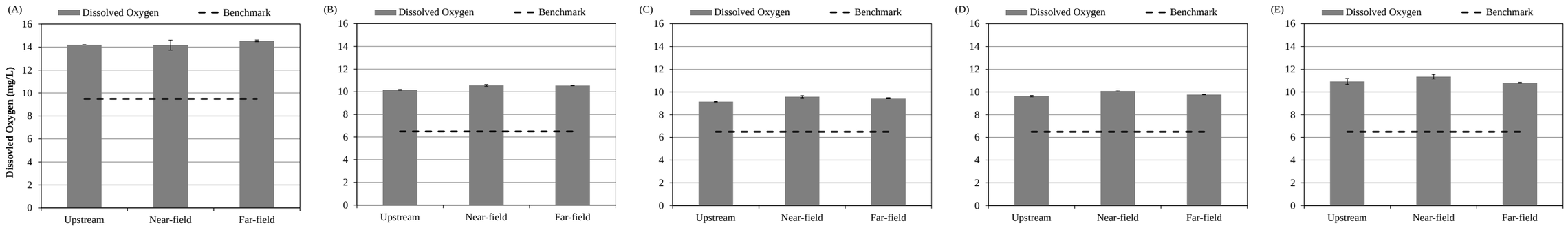
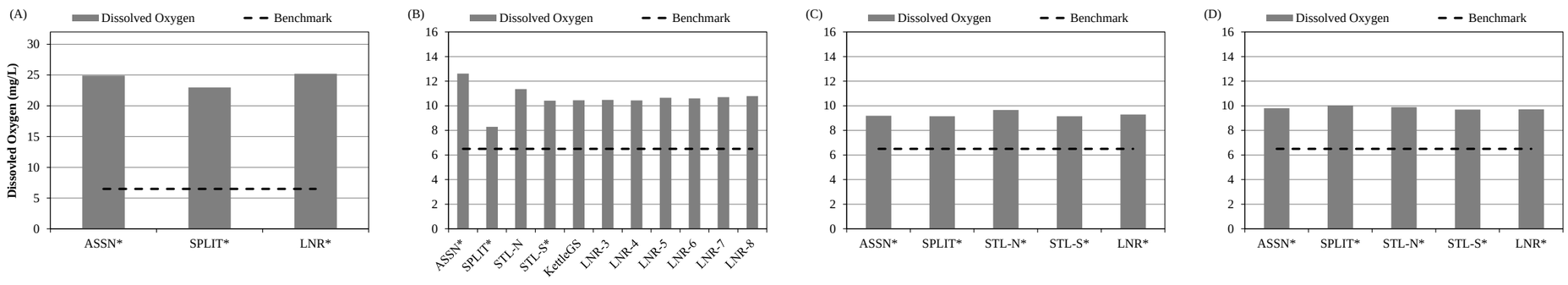


Figure 14: Mean (± SE) dissolved oxygen concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.



DO results measured in winter under CAMP are considered suspect. Note the difference in scale on (A).

Figure 15: Dissolved oxygen concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

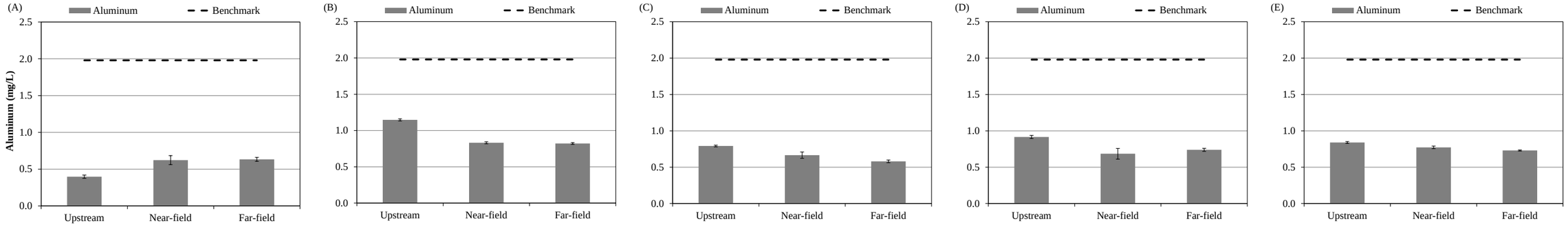


Figure 16: Mean (± SE) aluminum concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

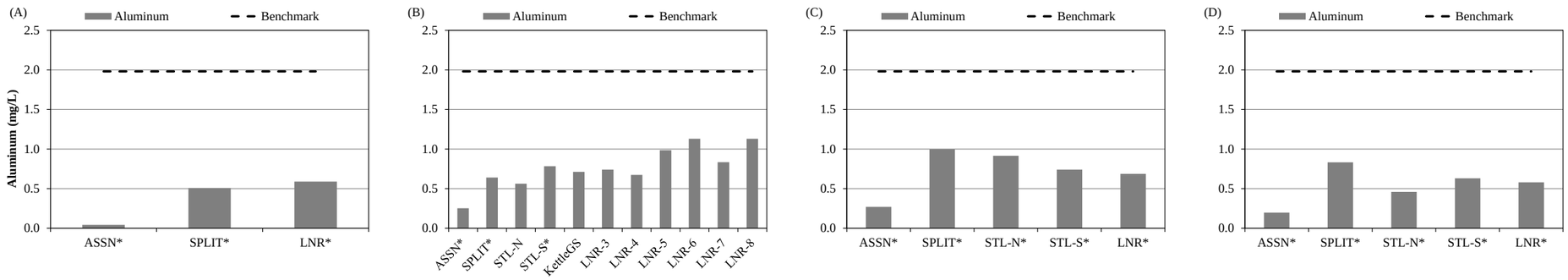


Figure 17: Aluminum concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

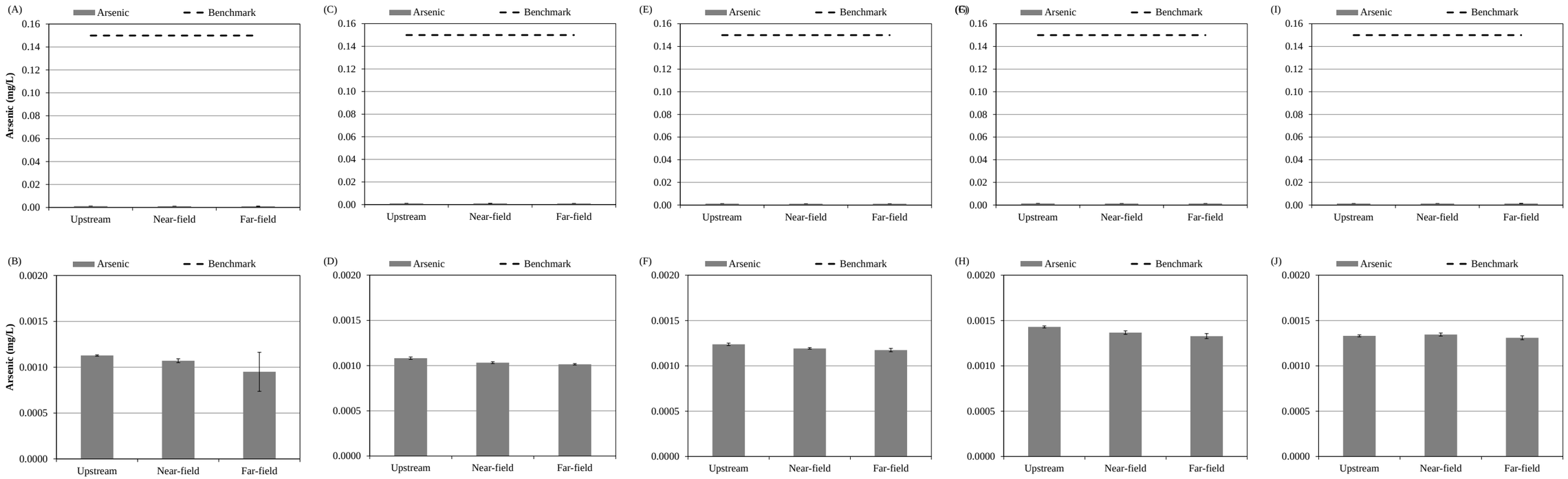


Figure 18: **Mean (± SE) arsenic concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

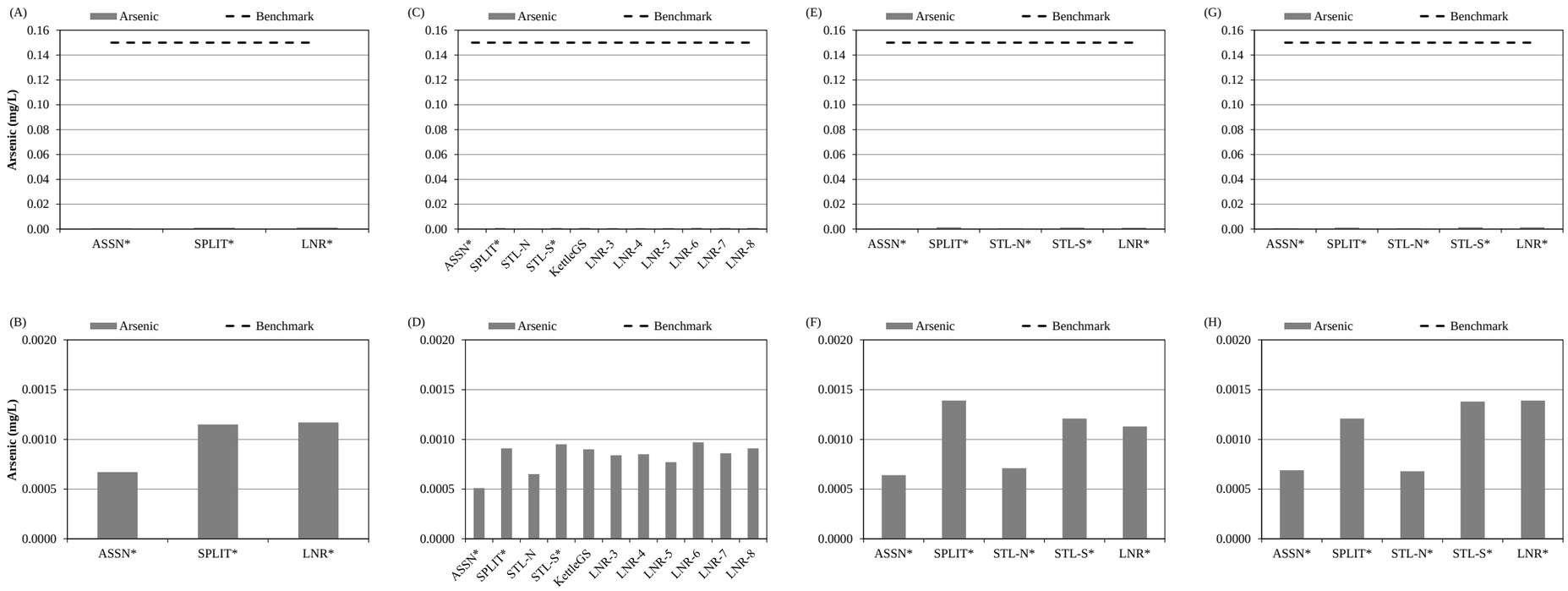


Figure 19: Arsenic concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.

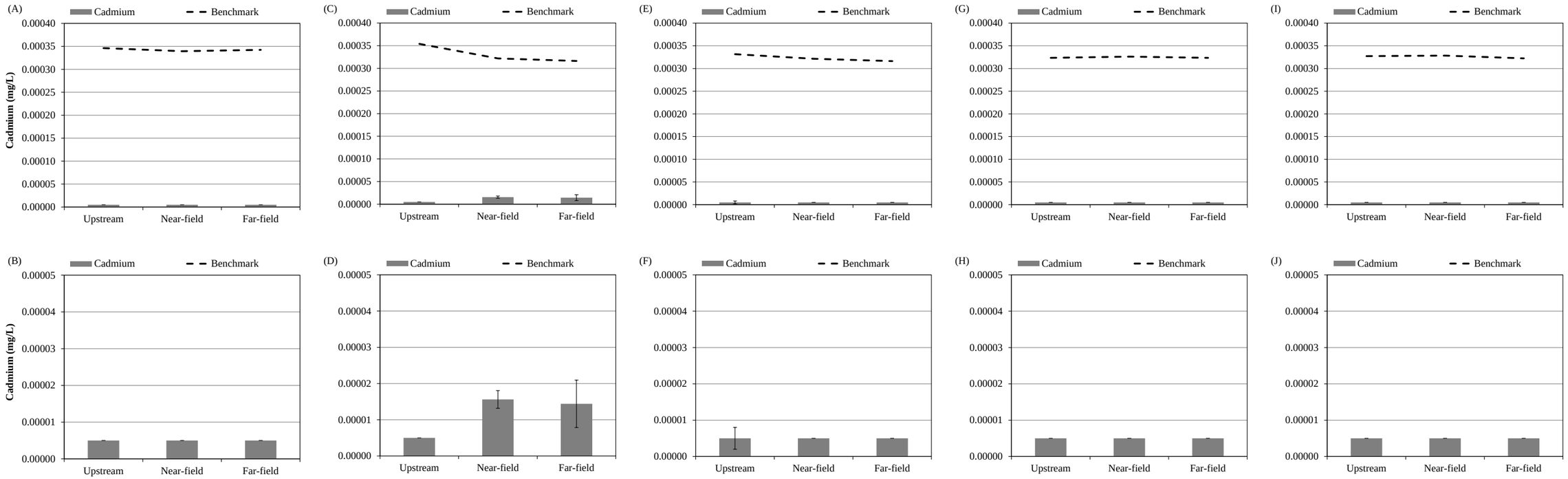


Figure 20: **Mean (± SE) cadmium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

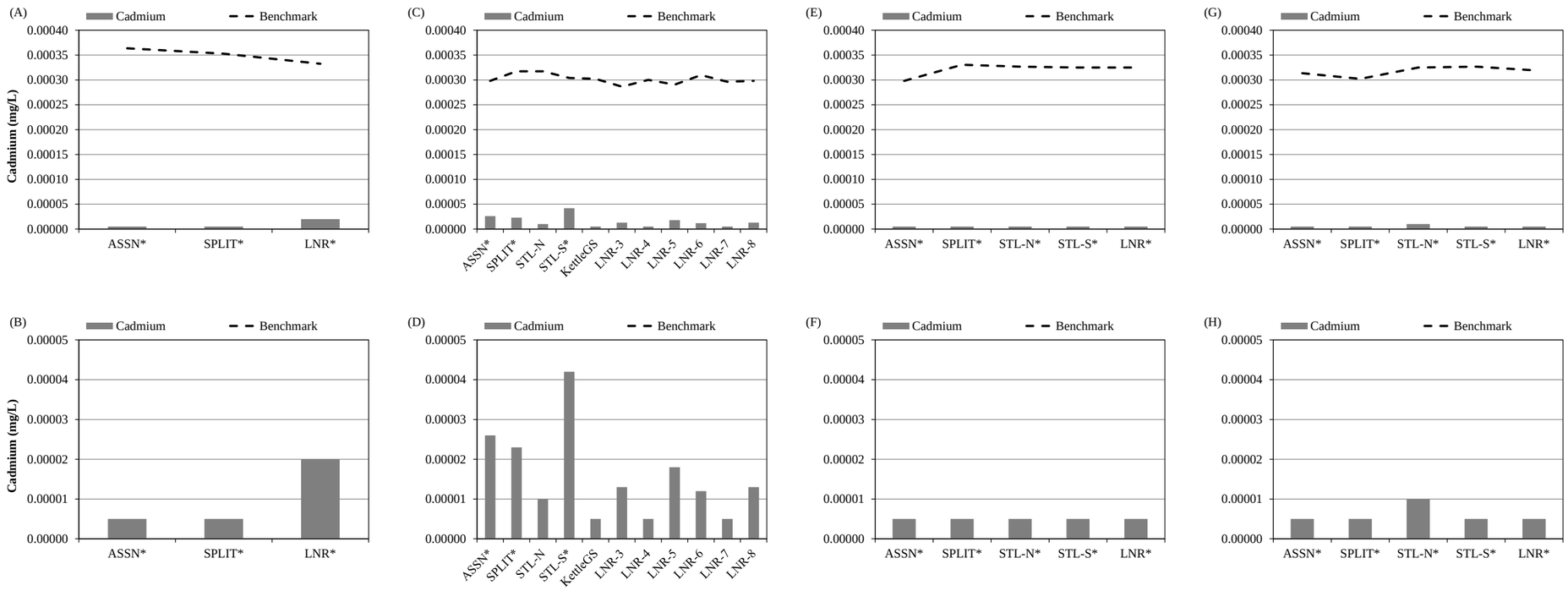


Figure 21: **Cadmium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.**

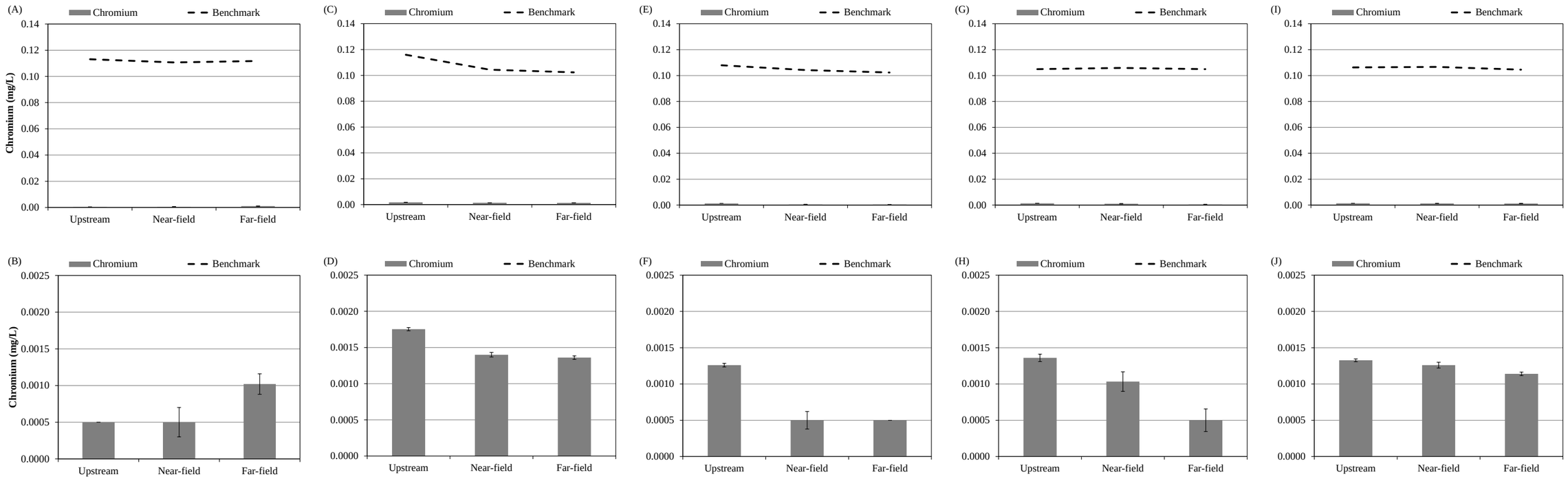


Figure 22: **Mean (± SE) chromium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

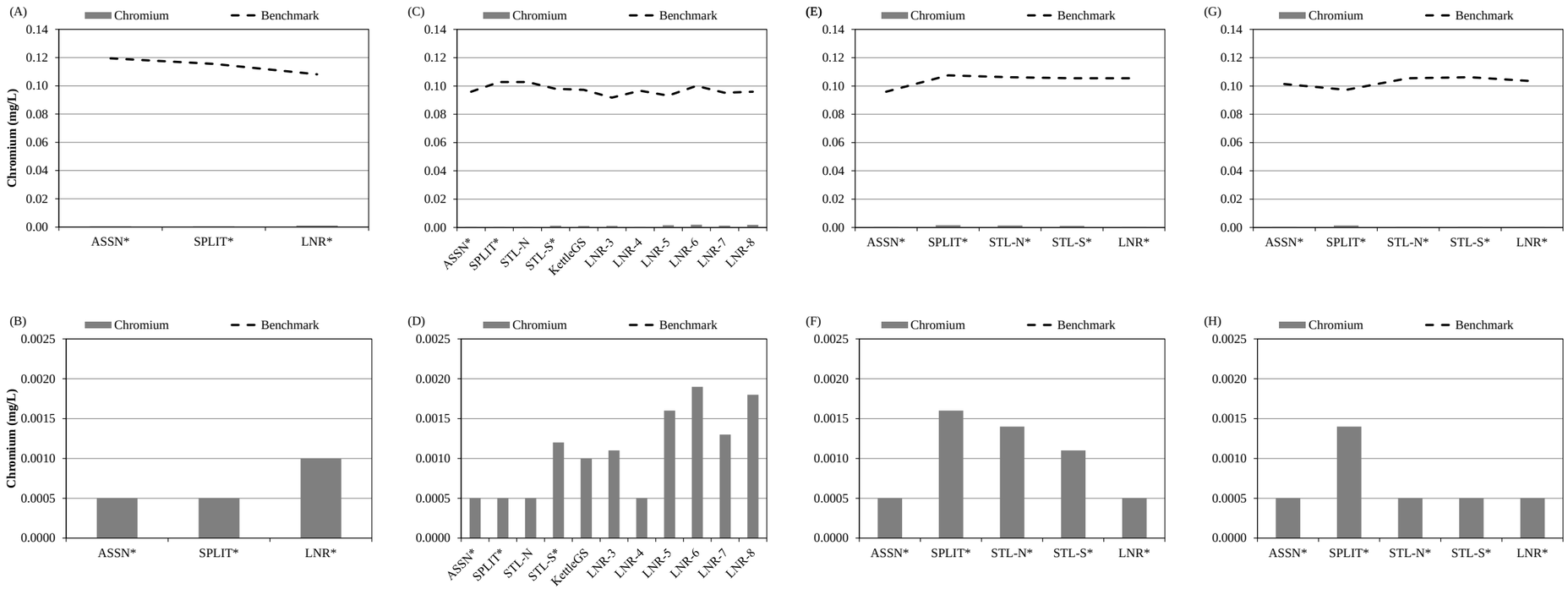
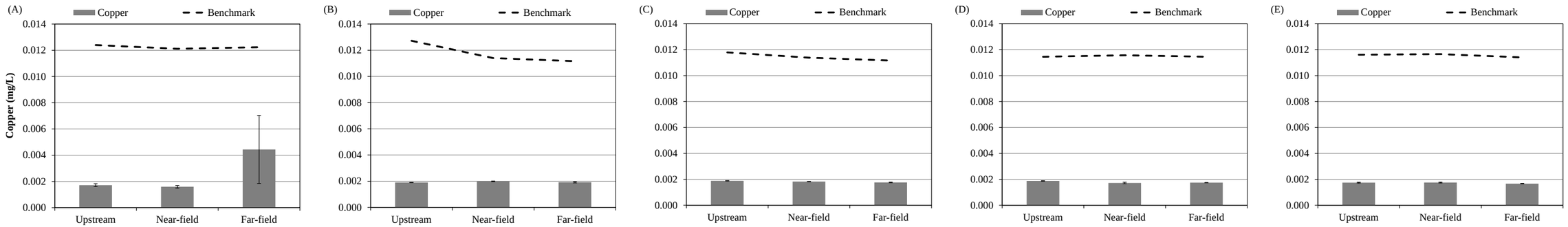


Figure 23: Chromium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.



One copper result (0.0148 mg/L) from the far-field polygon in winter was considered an outlier.

Figure 24: Mean (± SE) copper concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

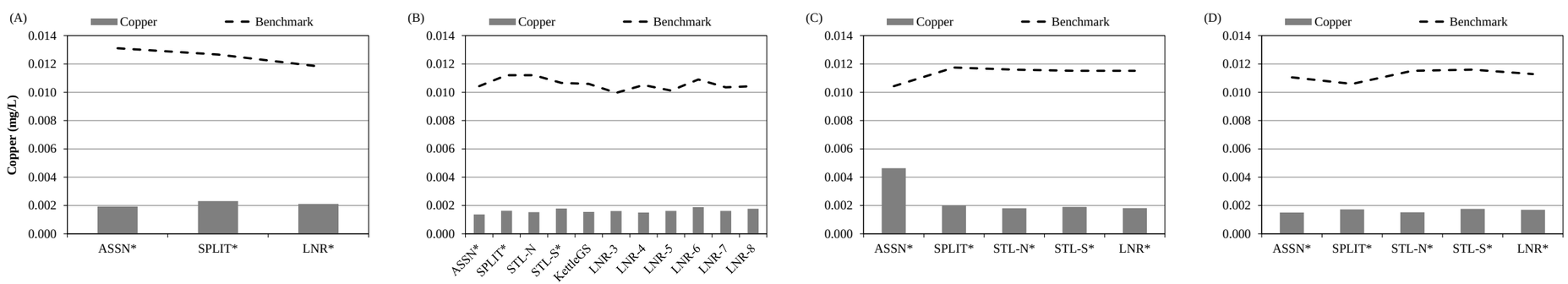


Figure 25: Copper concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

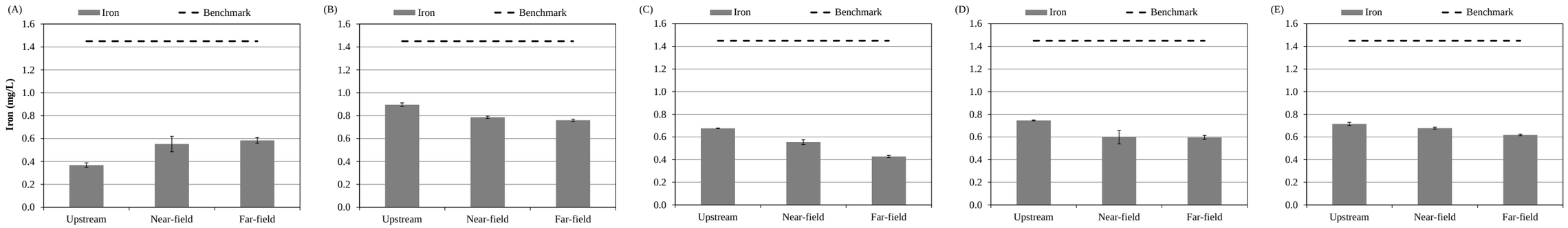


Figure 26: Mean (± SE) iron concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

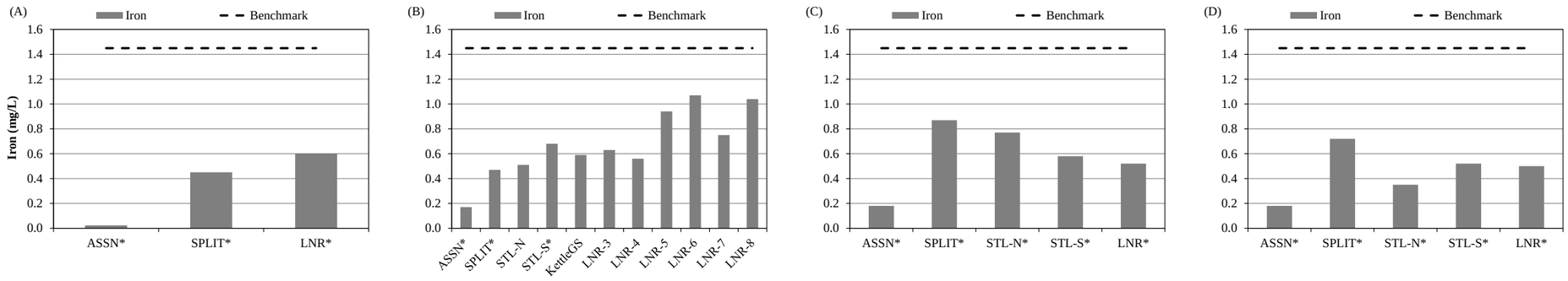


Figure 27: Iron concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

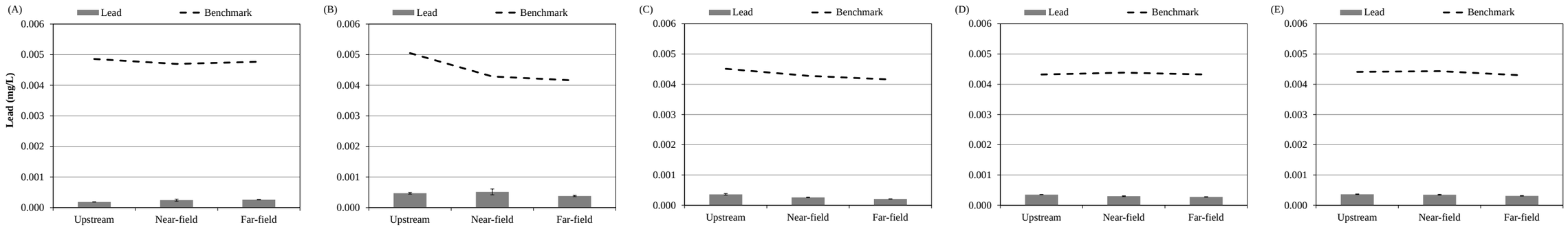


Figure 28: Mean (± SE) lead concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

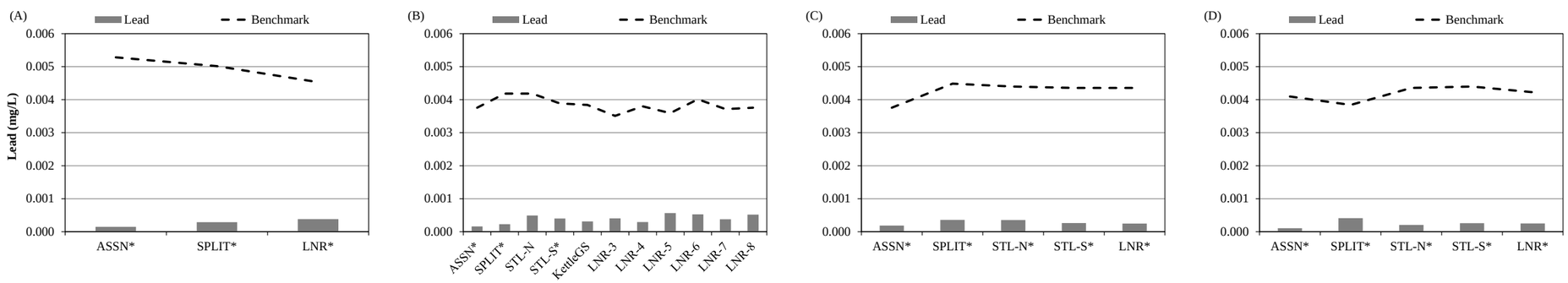


Figure 29: Lead concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

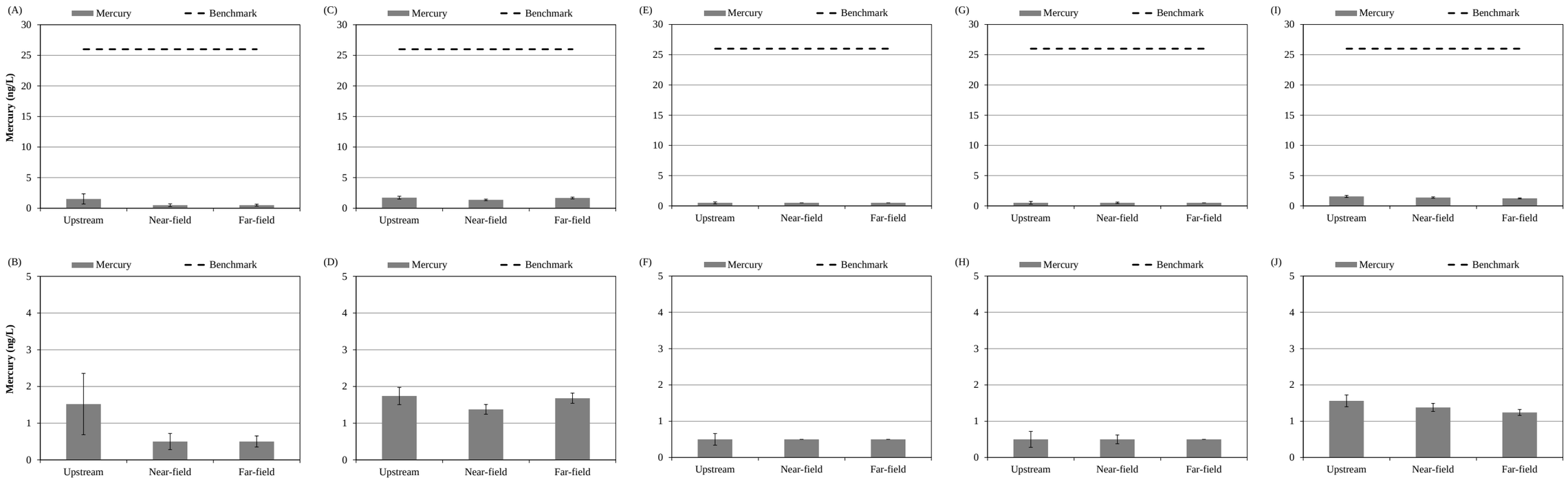


Figure 30: **Mean (± SE) mercury concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

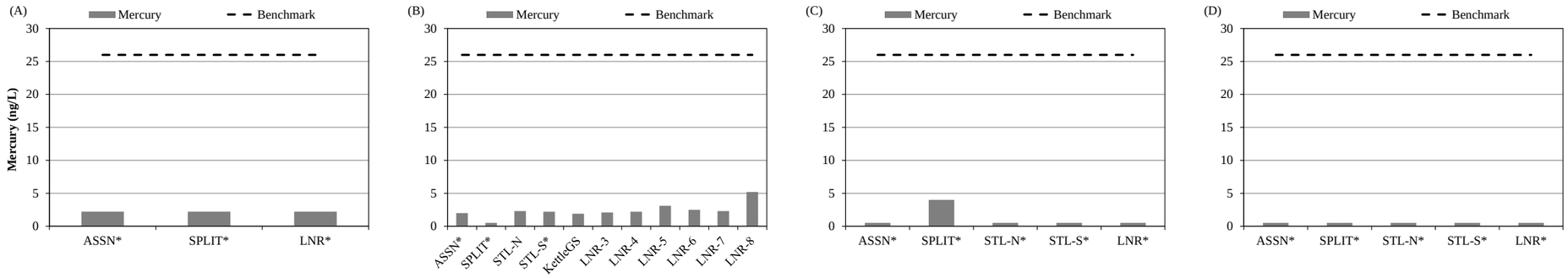


Figure 31: Mercury concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

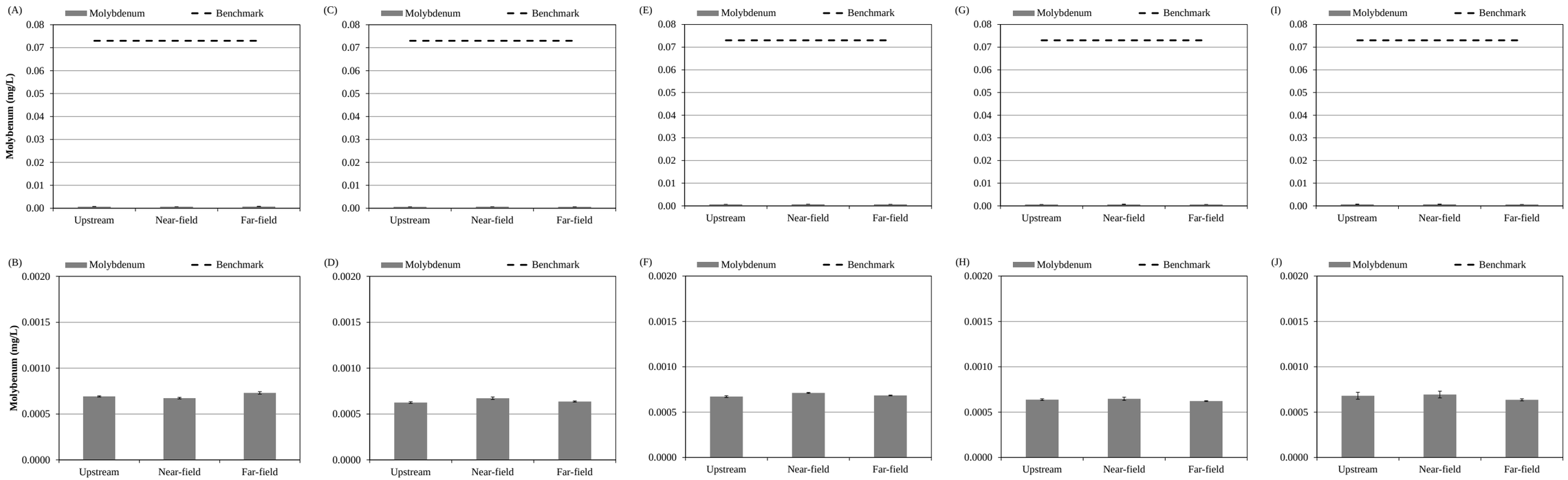


Figure 32: **Mean (± SE) molybdenum concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

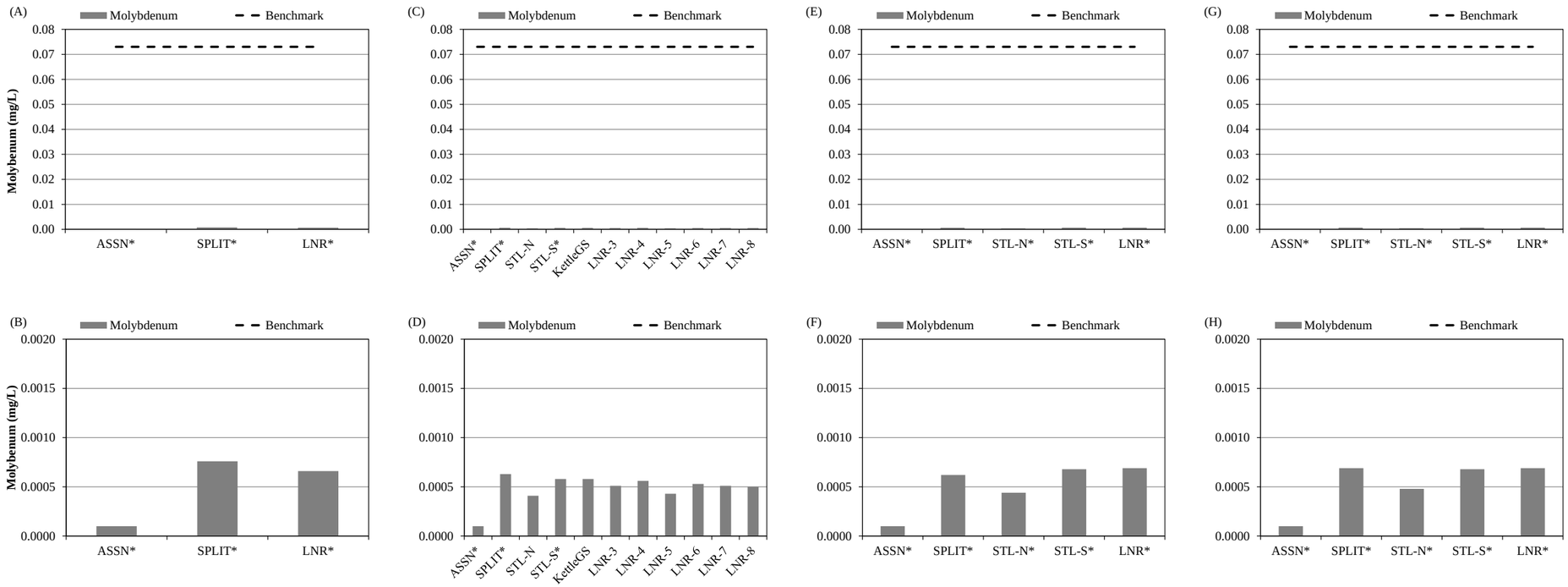
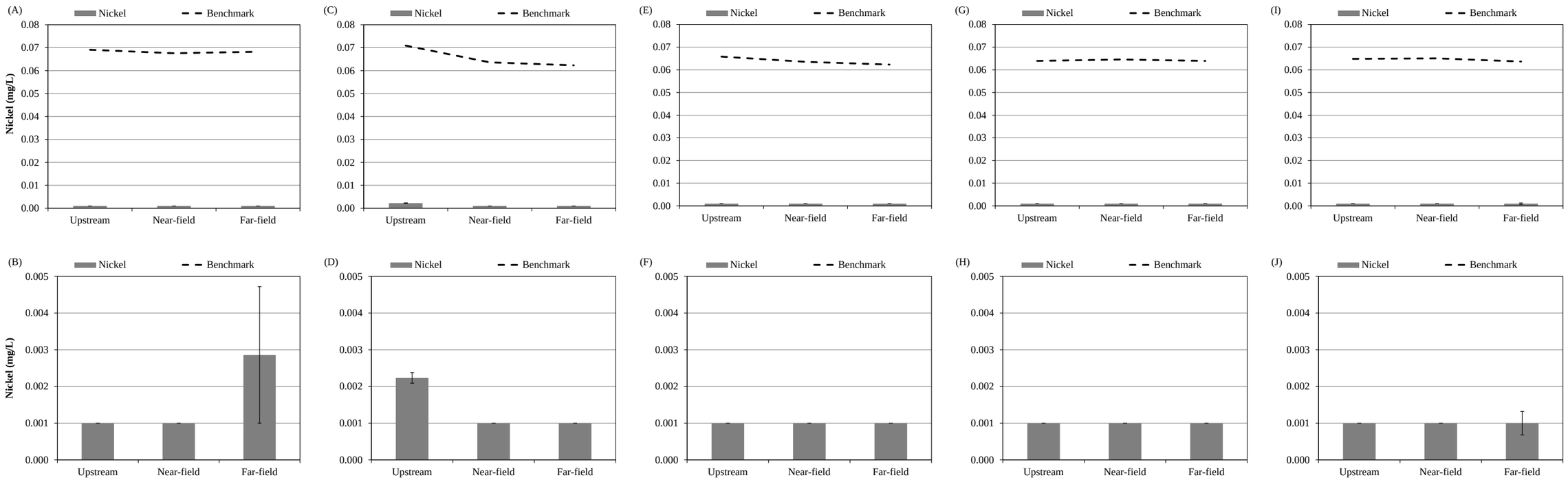


Figure 33: Molybdenum concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.



One nickel result (0.0103 mg/L) from the far-field polygon in winter was considered an outlier.

Figure 34: Mean (± SE) nickel concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.

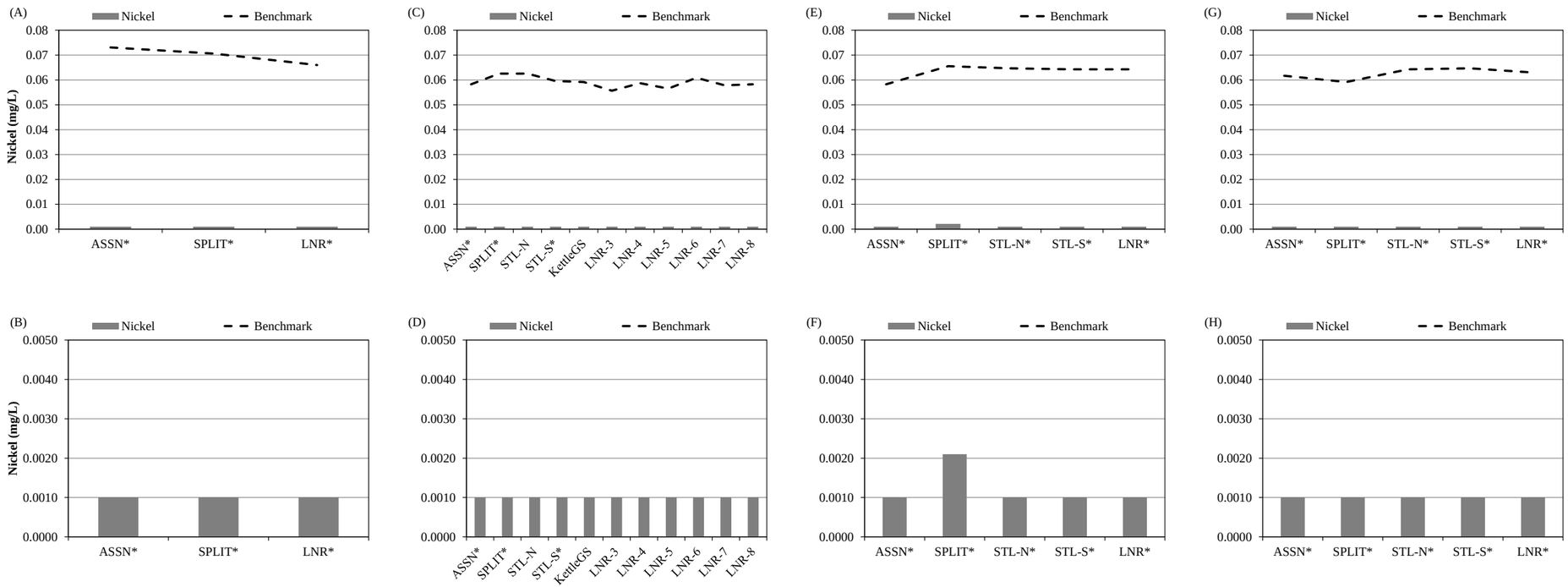


Figure 35: **Nickel concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.**

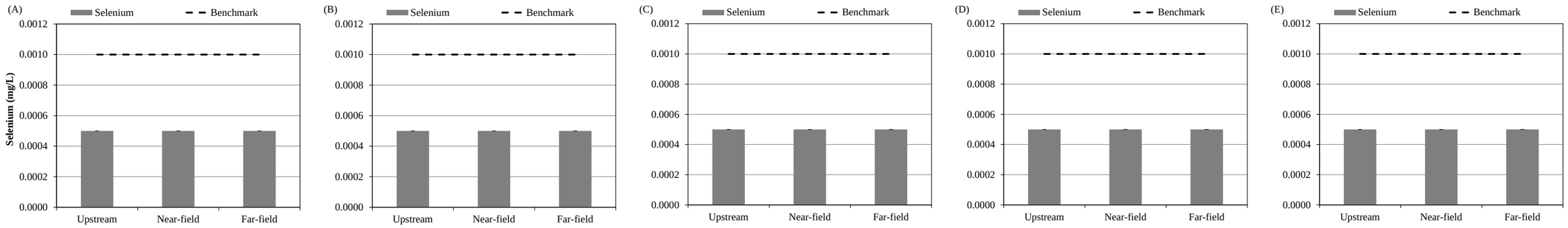


Figure 36: Mean (± SE) selenium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

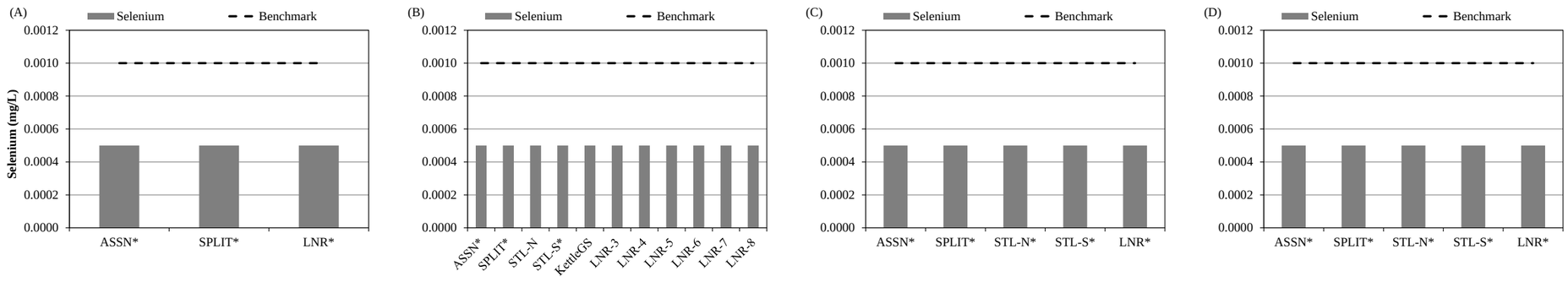


Figure 37: Selenium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

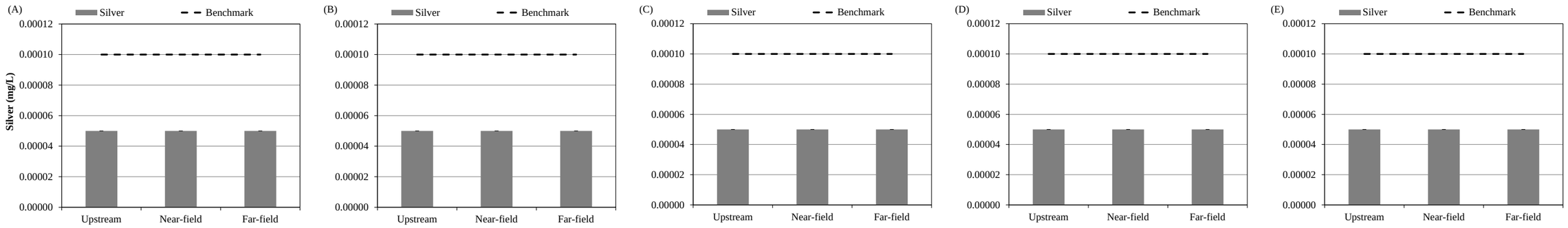


Figure 38: Mean (± SE) silver concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

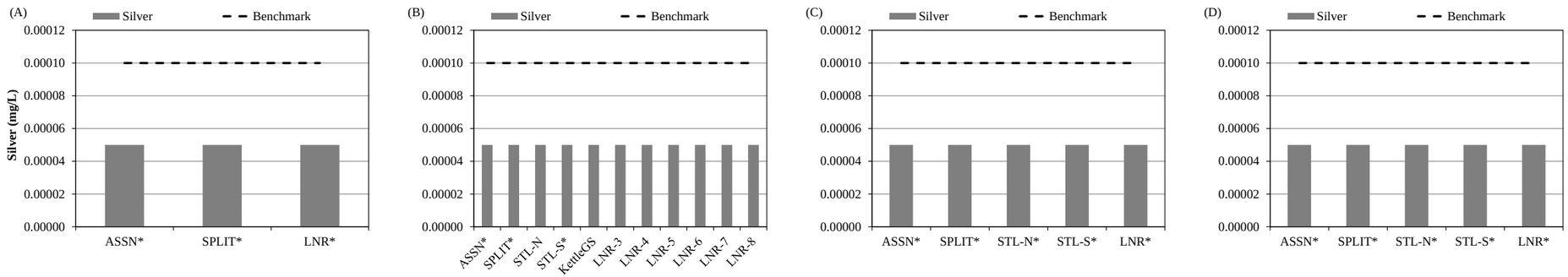


Figure 39: Silver concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

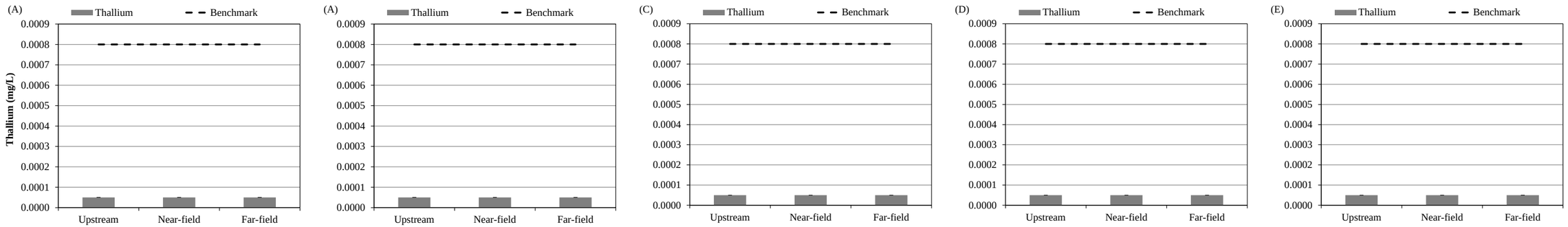


Figure 40: Mean (± SE) thallium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

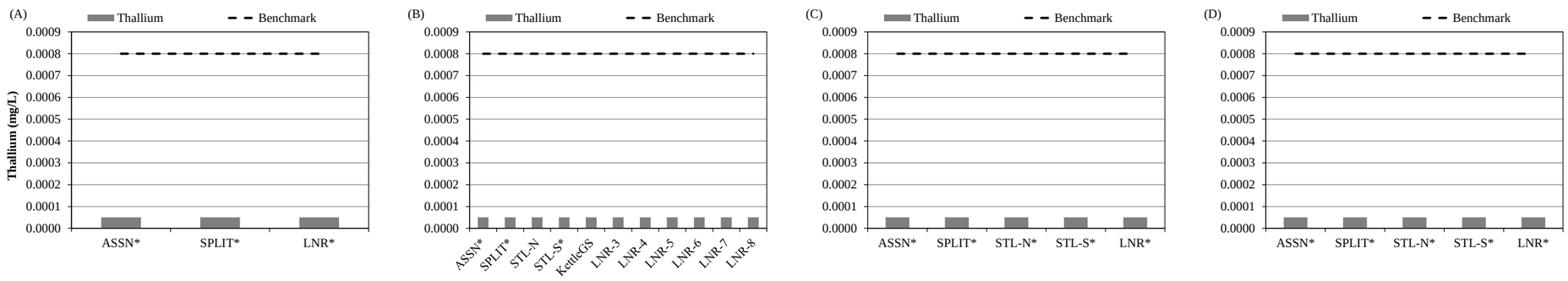


Figure 41: Thallium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

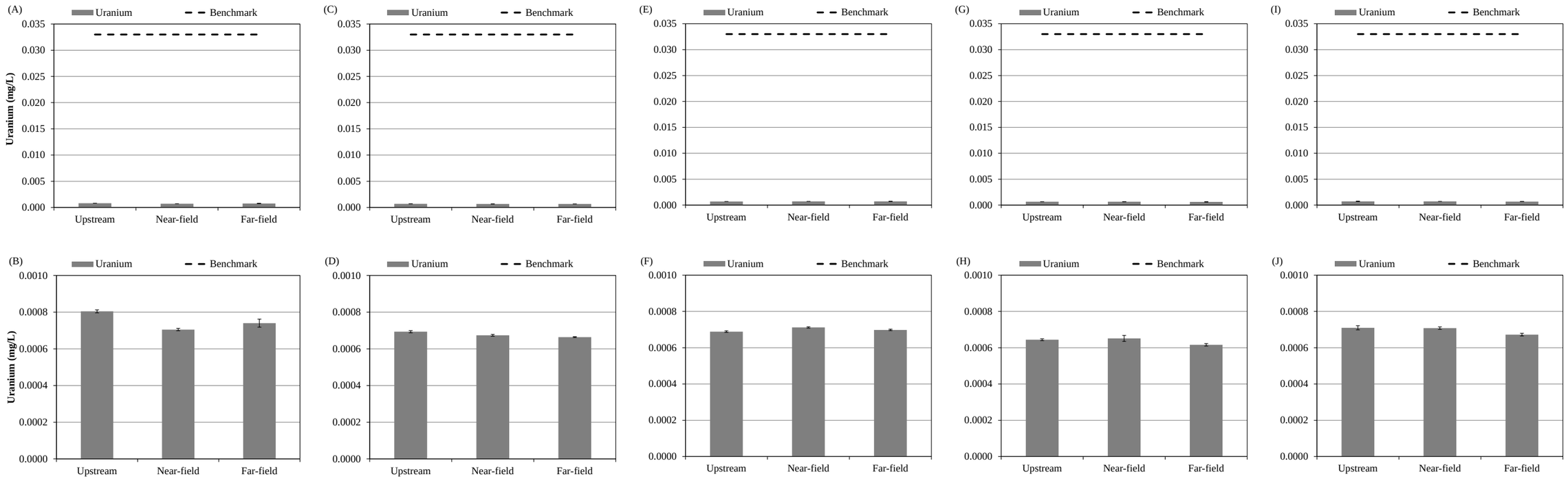


Figure 42: **Mean (± SE) uranium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

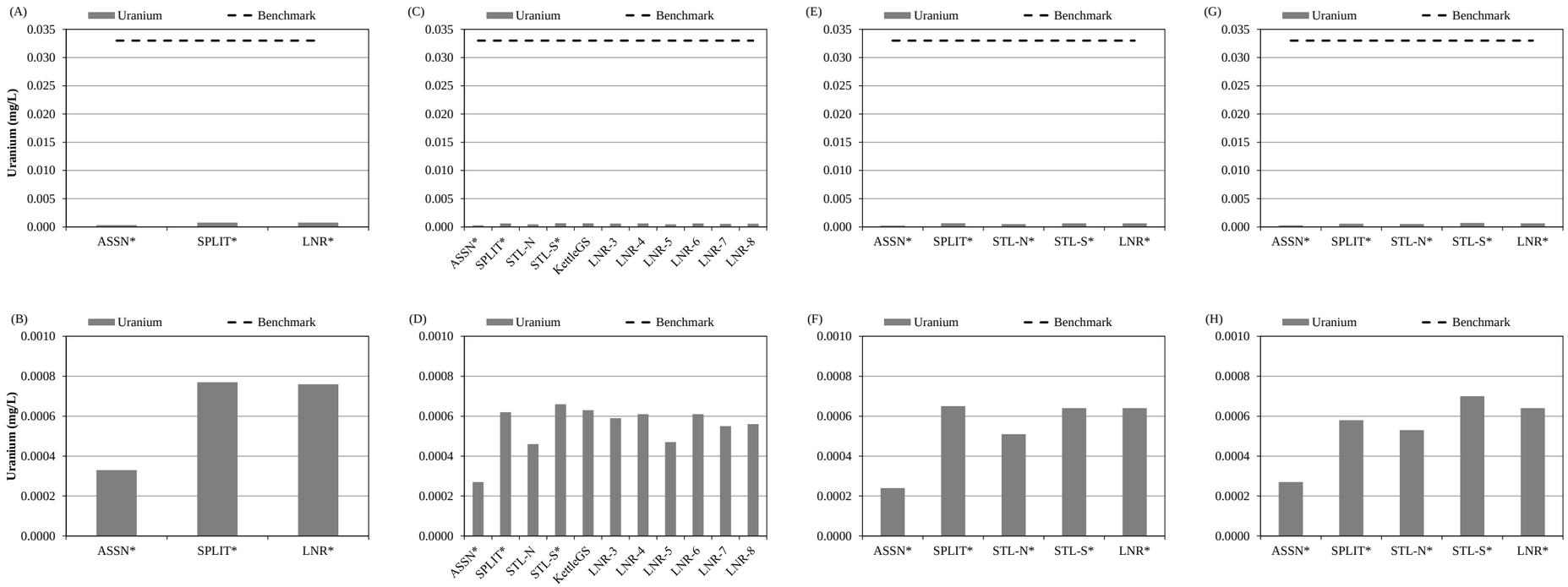


Figure 43: Uranium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.

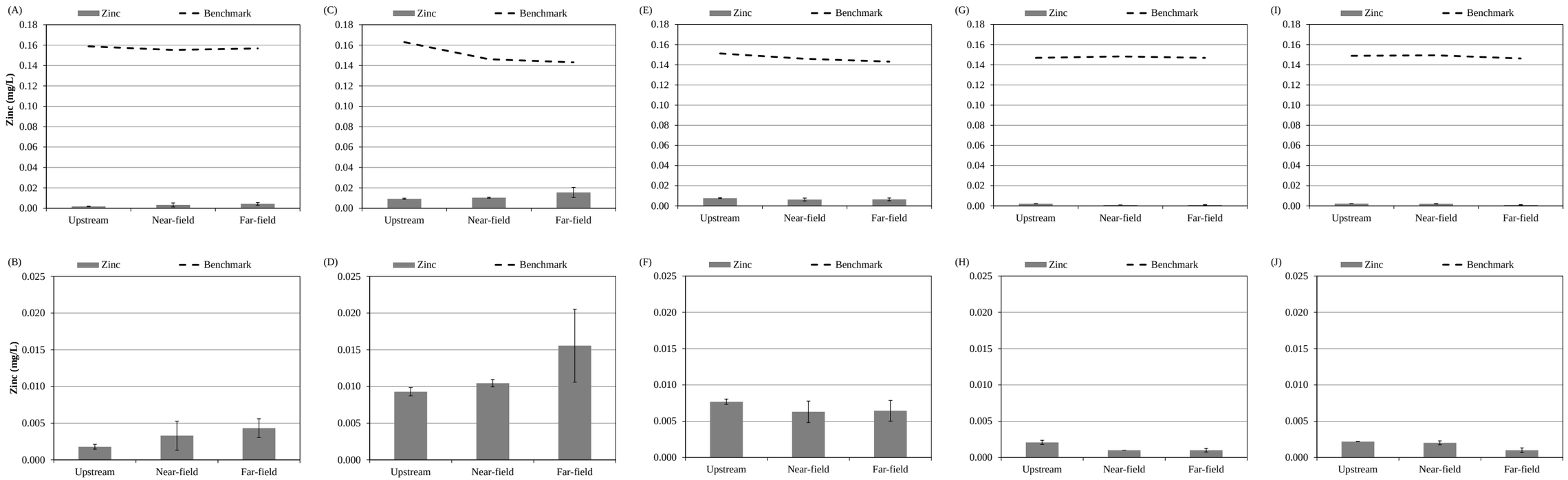


Figure 44: **Mean (± SE) zinc concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

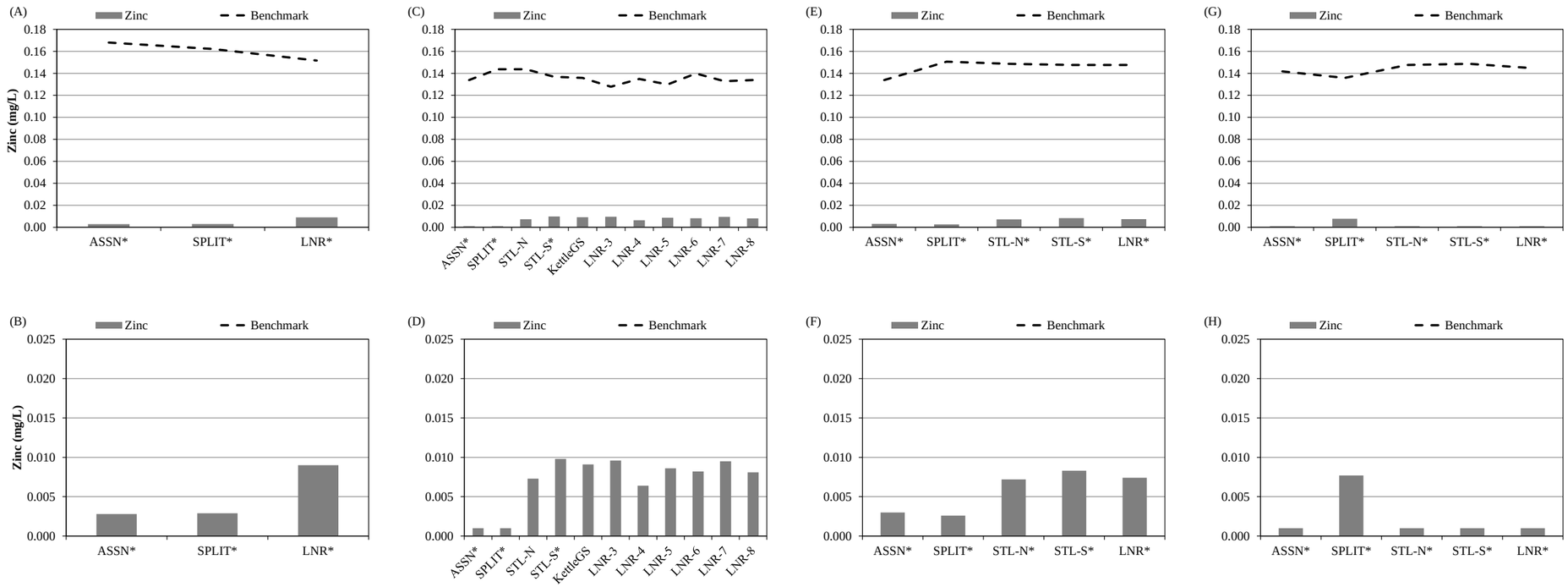


Figure 45: Zinc concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Scales are plotted with comparison to benchmark values on top and the differences in mean values on the bottom. Note: Split Lake was always sampled one week earlier or later than the other sites.

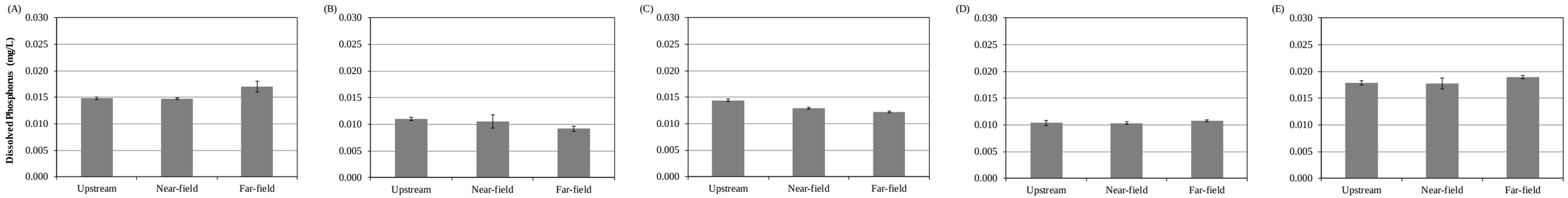


Figure 46: **Mean (± SE) dissolved phosphorous concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015. Scales are plotted to show the comparison of the data to benchmark values on the top, and the differences in mean values on the bottom.**

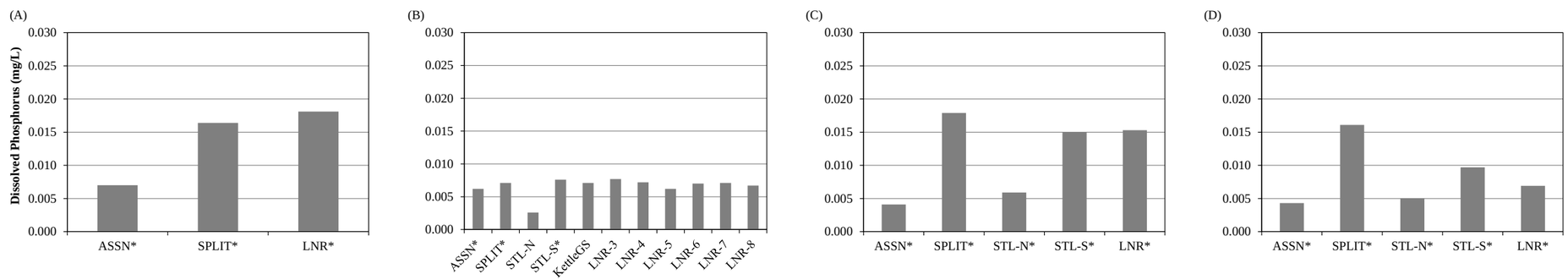


Figure 47: **Dissolved phosphorous concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

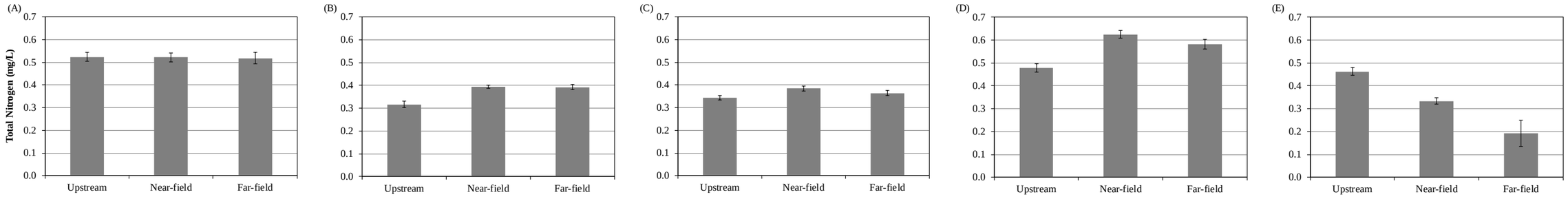


Figure 48: **Mean (± SE) concentrations of total nitrogen measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

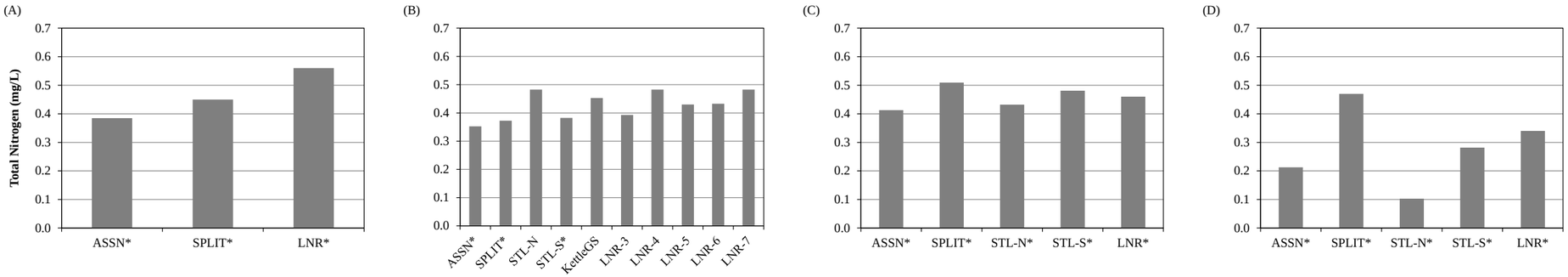


Figure 49: **Total nitrogen concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

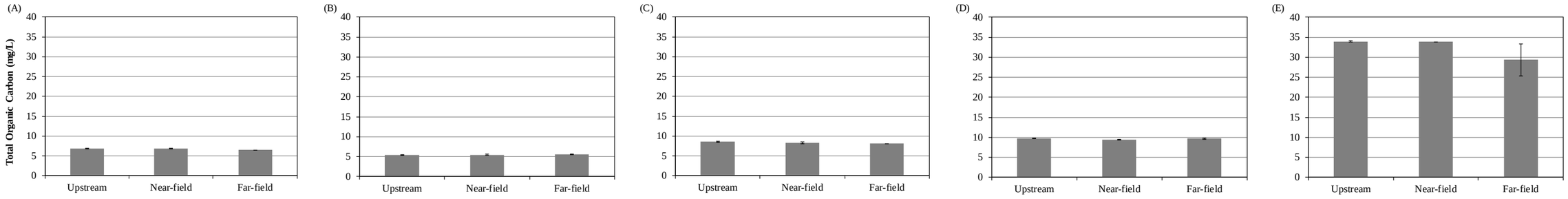


Figure 50: **Mean (± SE) concentrations of total organic carbon measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

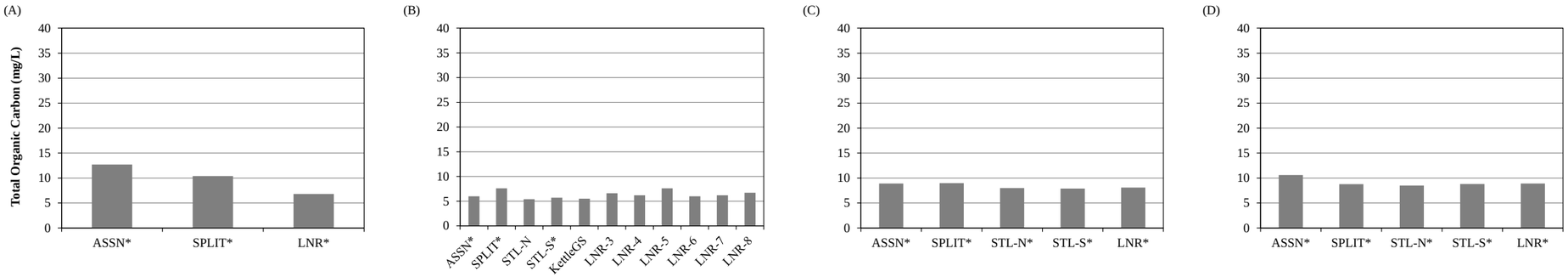
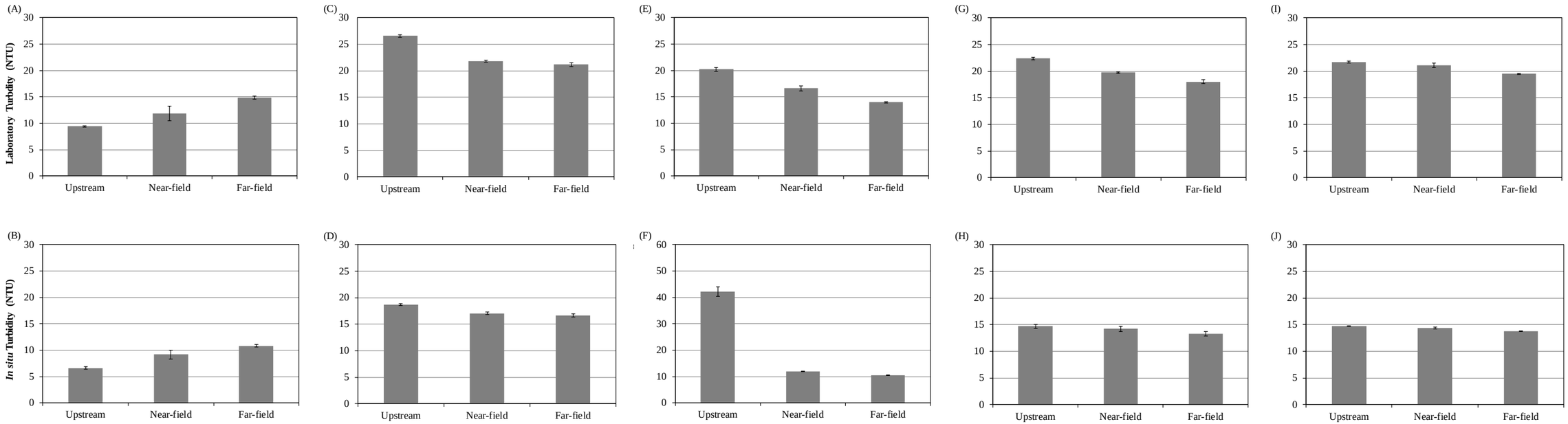


Figure 51: **Total organic carbon concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**



Note the difference scale on (F). *In situ* turbidity measured in the upstream polygon in July may be suspect as the values do not correspond with those measured in the laboratory.

Figure 52: Mean (± SE) laboratory (top) and *in situ* (bottom) turbidity measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015.

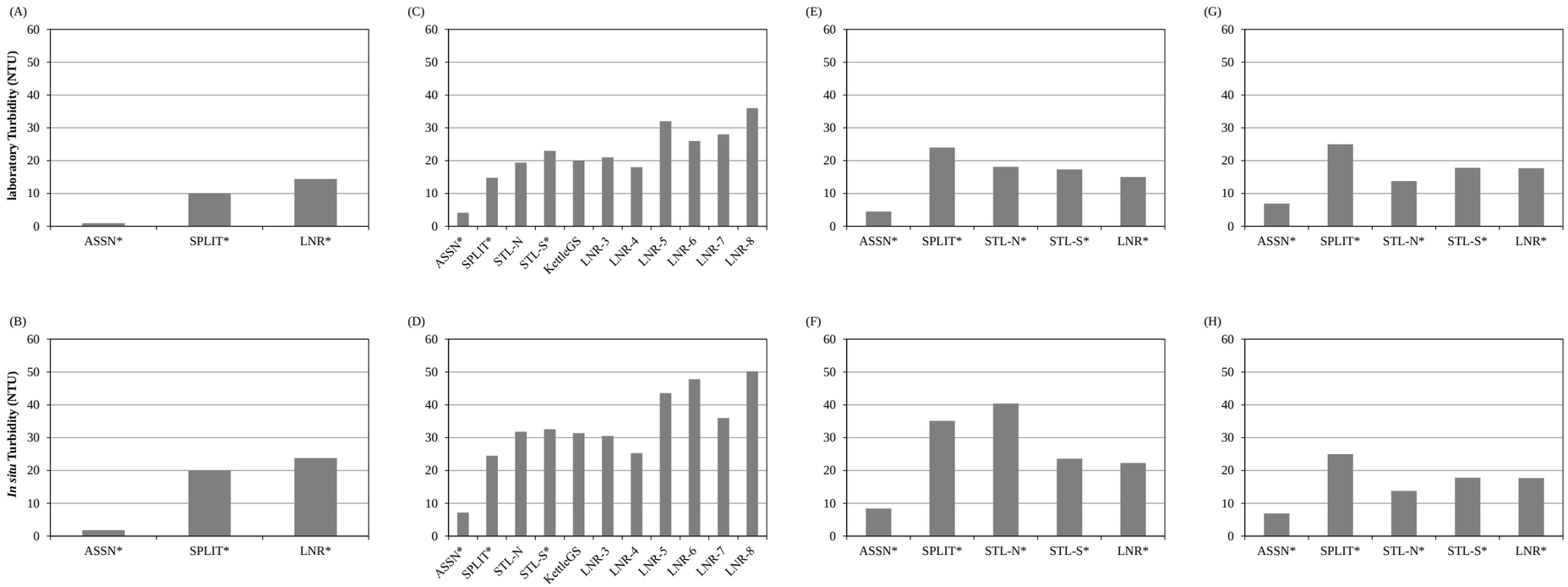


Figure 53: Laboratory (top) and *in situ* (bottom) turbidity measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

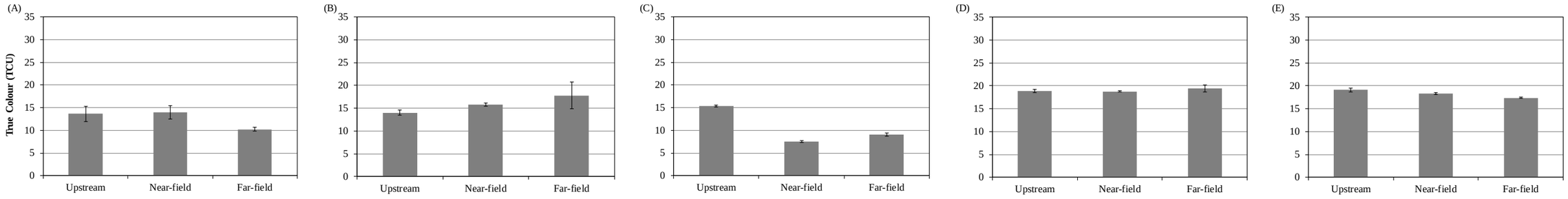


Figure 54: **Mean (± SE) colour measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

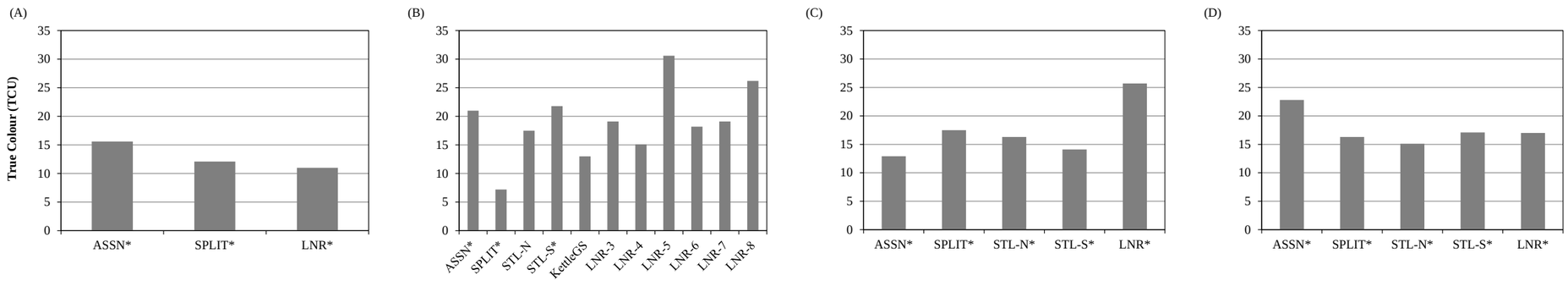
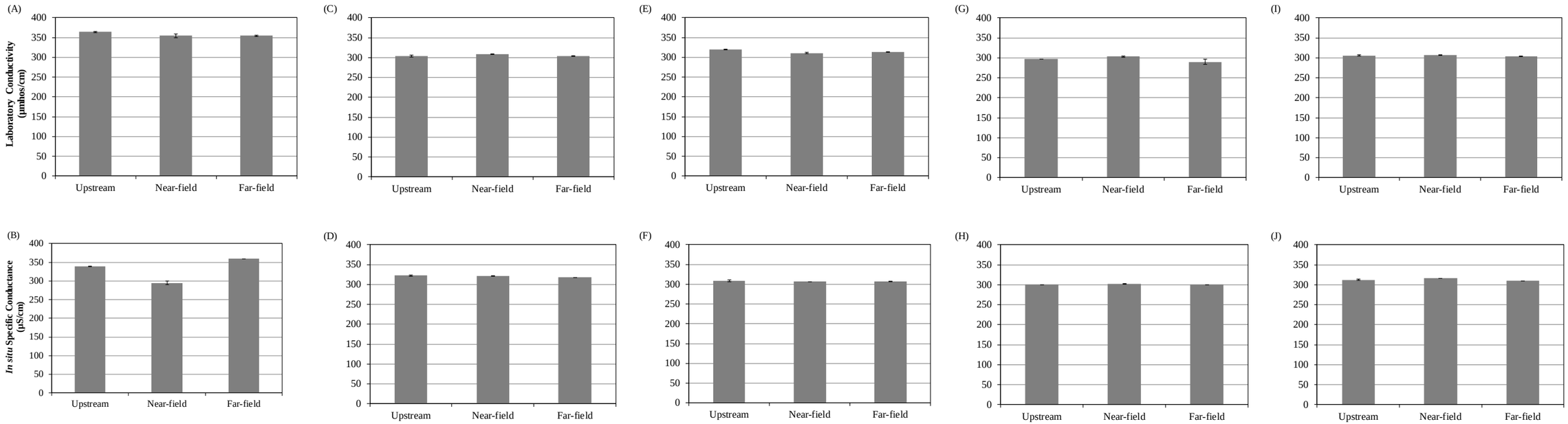


Figure 55: **True colour concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**



Two outliers (143 and 192 µS/cm) were removed from the analysis of *in situ* specific conductance for the near-field polygon in winter as the values varied dramatically from those measured in the laboratory.

Figure 56: Mean (± SE) laboratory (top) and *in situ* (bottom) specific conductance measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A,B), June 22-23 (C,D), July 27-28 (E,F), August 23-25 (G,H), and September 23-24 (I,J), 2015.

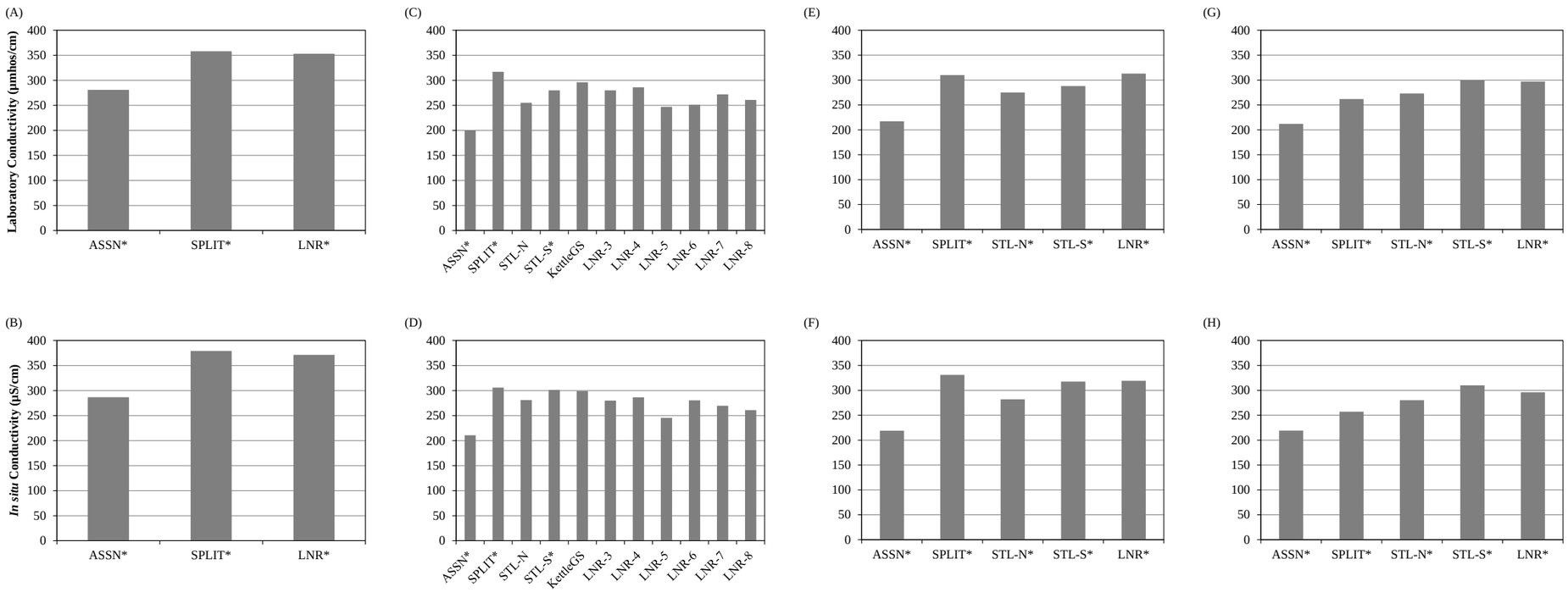


Figure 57: Laboratory (top) and *in situ* (bottom) conductivity measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A,B), June 9-17 (C,D), August 3-11 (E,F), and September 8-16 (G,H), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

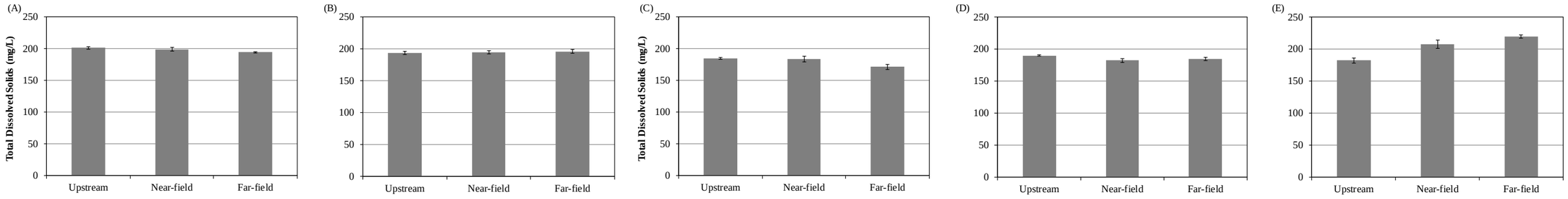


Figure 58: **Mean (± SE) concentrations of total dissolved solids measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

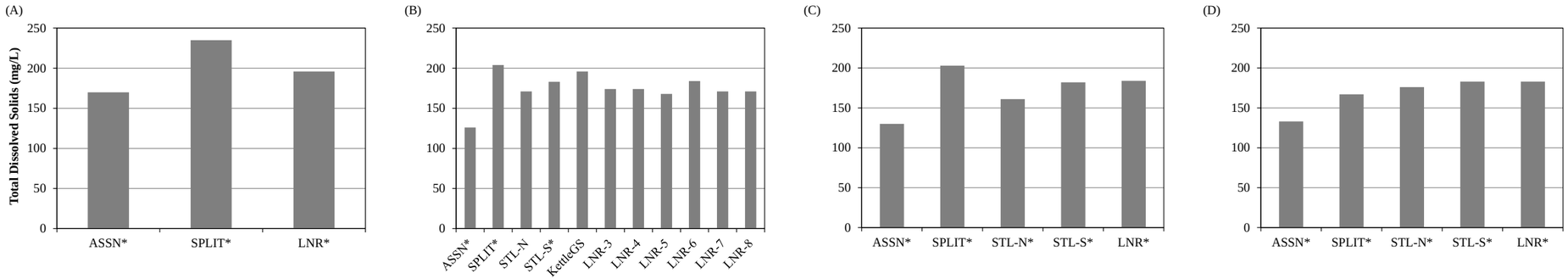


Figure 59: **Total dissolved solids concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

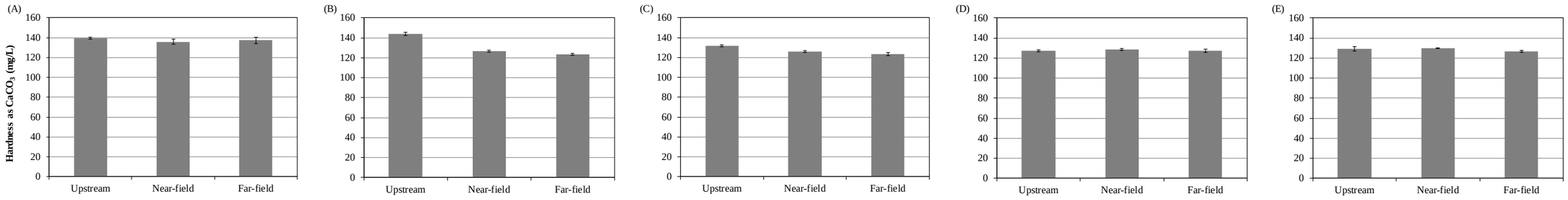


Figure 60: **Mean (± SE) hardness measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

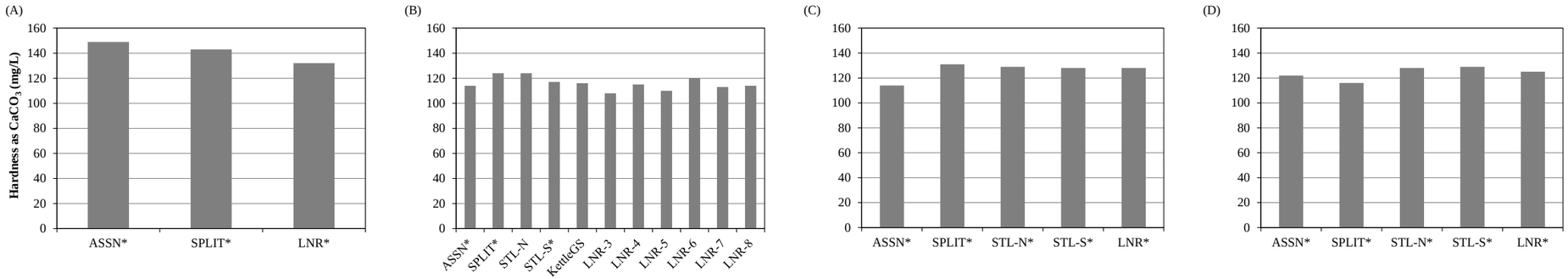


Figure 61: **Hardness measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

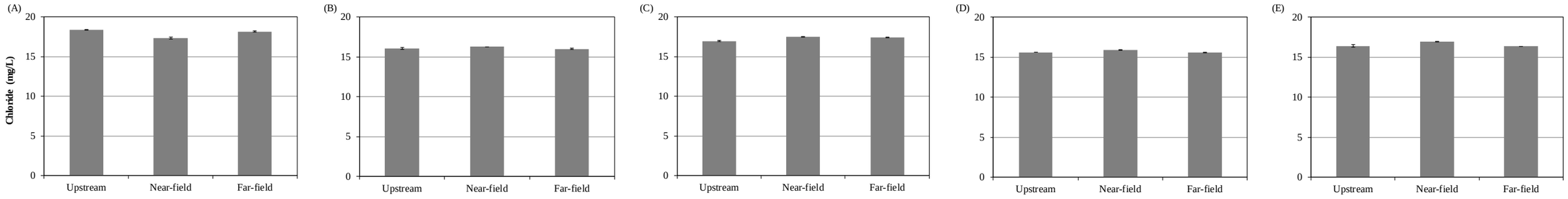


Figure 62: **Mean (± SE) chloride concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

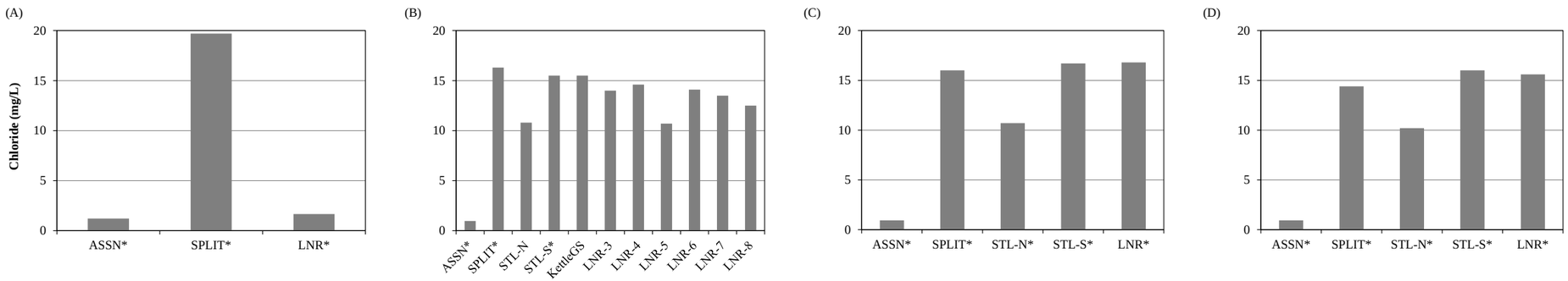


Figure 63: **Chloride concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

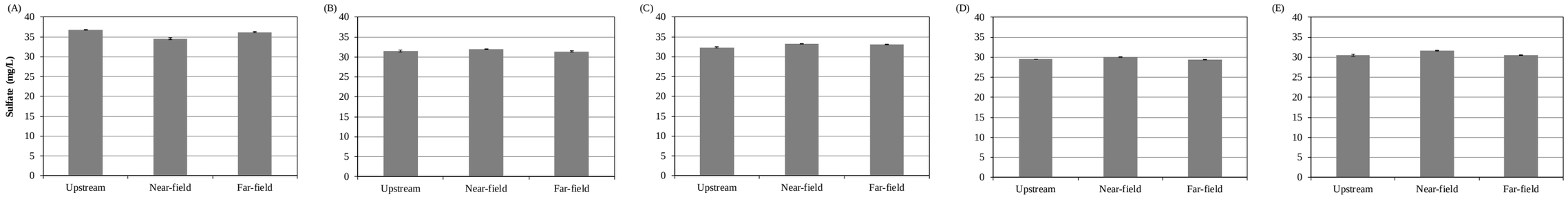


Figure 64: **Mean (± SE) sulfate concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

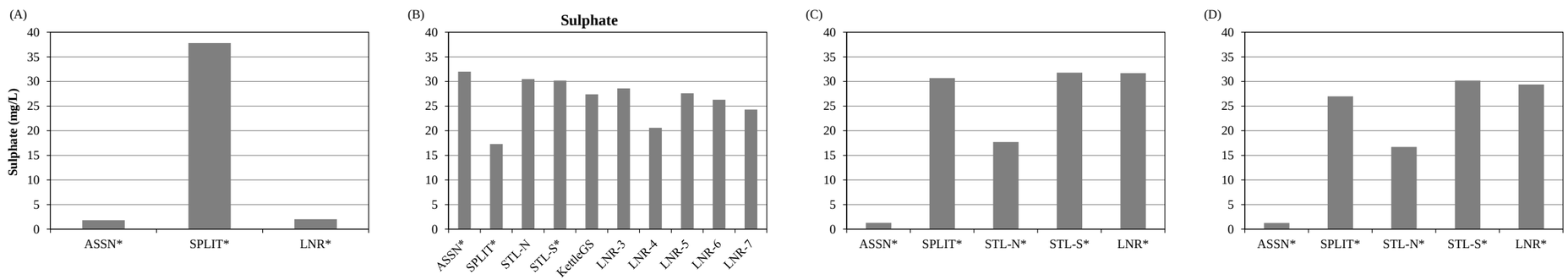


Figure 65: **Sulfate concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

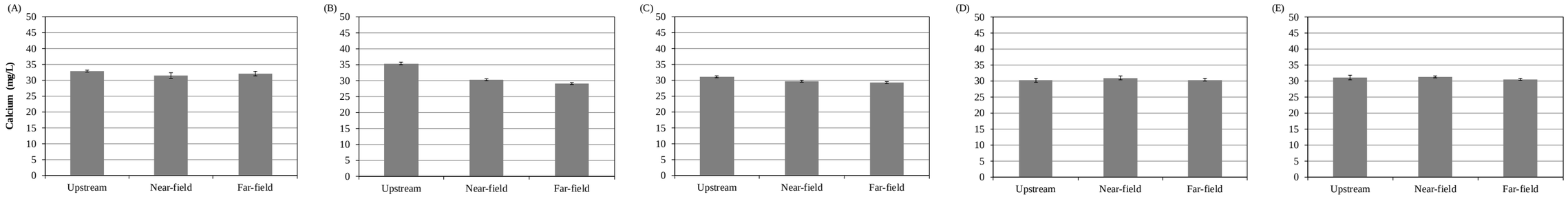


Figure 66: **Mean (± SE) calcium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

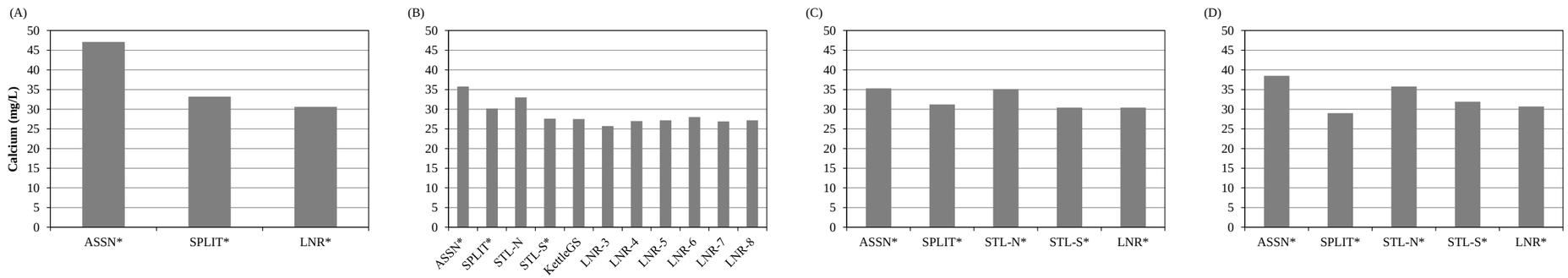


Figure 67: **Calcium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

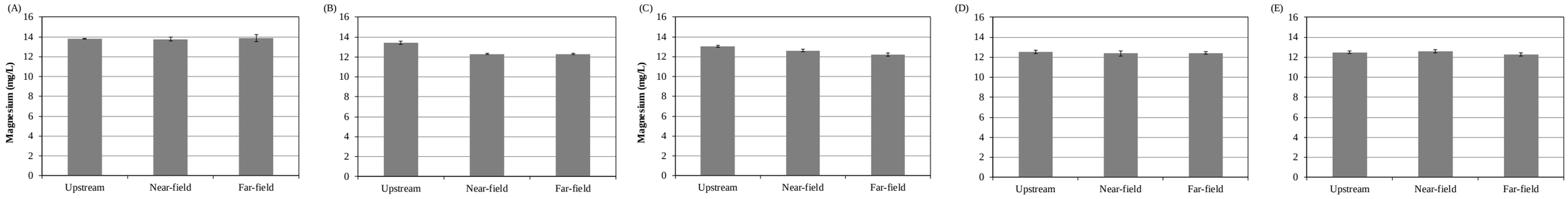


Figure 68: Mean (± SE) magnesium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

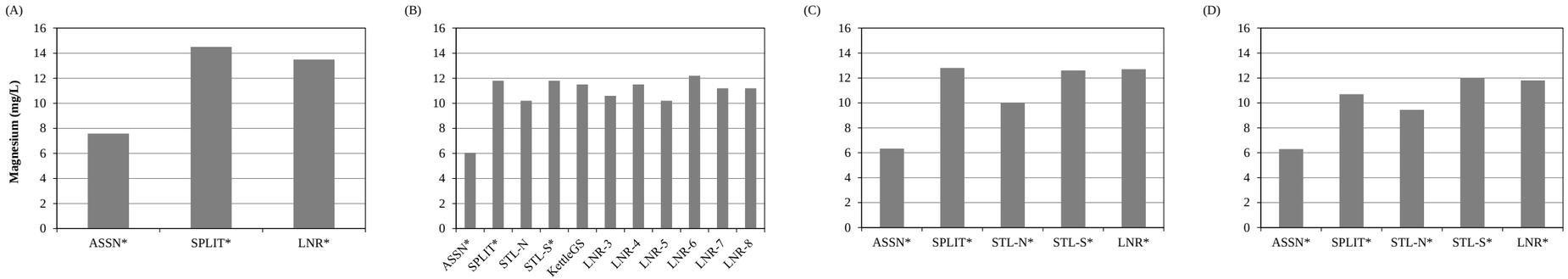


Figure 69: Magnesium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

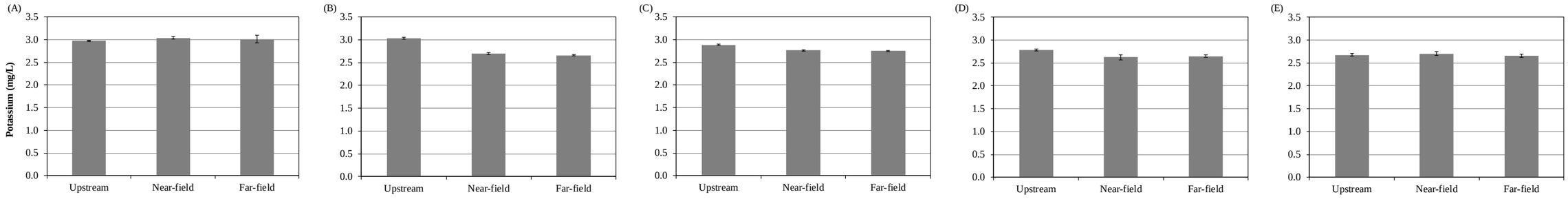


Figure 70: Mean (± SE) potassium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.

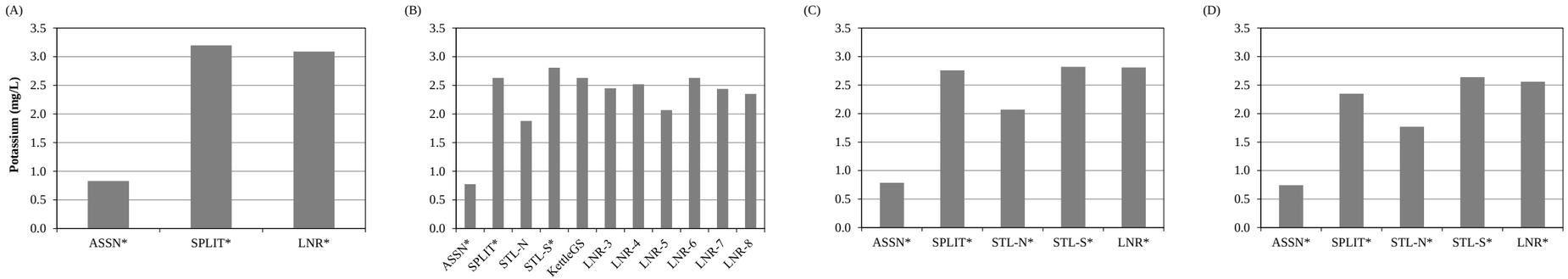


Figure 71: Potassium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.

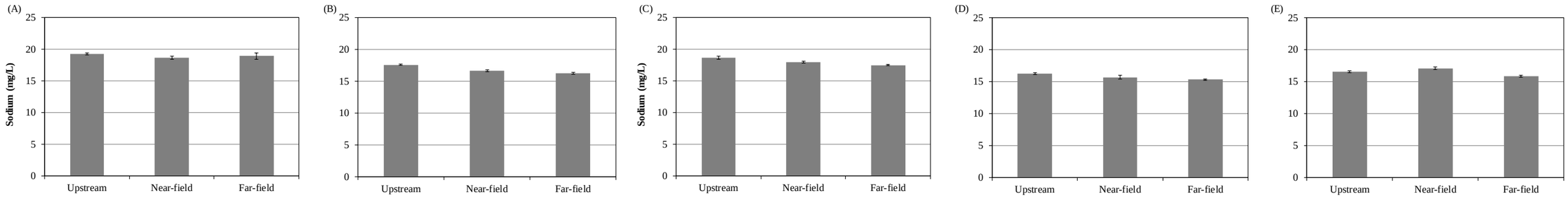


Figure 72: **Mean (± SE) sodium concentrations measured in the upstream, near-field, and far-field areas of the Nelson River near the Keeyask GS on March 31/April 2 (A), June 22-23 (B), July 27-28 (C), August 23-25 (D), and September 23-24 (E), 2015.**

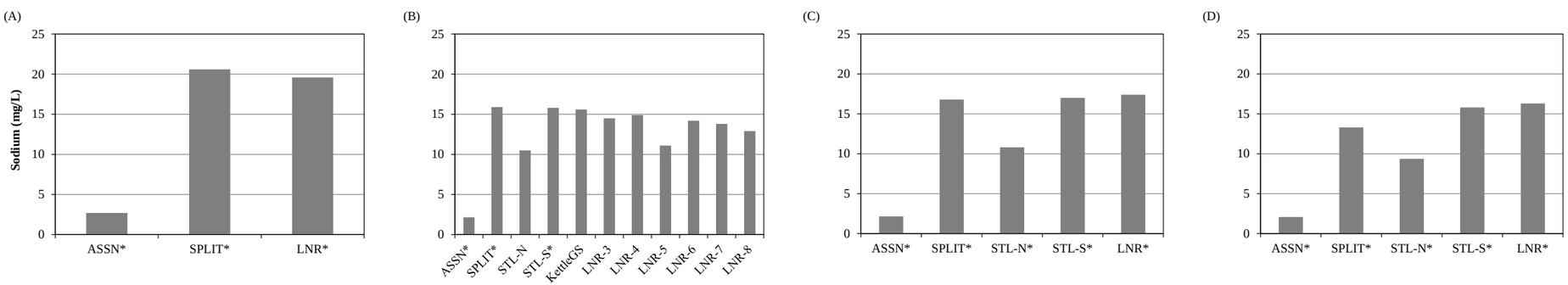


Figure 73: **Sodium concentrations measured in the Keeyask regional study area under CAMP (denoted with asterisk) or Keeyask on March 4-6 (A), June 9-17 (B), August 3-11 (C), and September 8-16 (D), 2015. Note: Split Lake was always sampled one week earlier or later than the other sites.**

MAPS

KEEYASK

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	09-FEB-15	02-JUN-16
0 6 12 Kilometres / 0 5 10 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

Legend

- Town
- Community
- Generating Station (Existing)
- Generating Station (Under Construction)
- Generating Station (Potential)
- Highway
- Rail
- First Nation Reserve

Keeyask Study Area

Map 1: Map of the Keeyask study area showing hydroelectric development.

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	09-FEB-15	10-JUN-16
0 1 2 Kilometres / 0 1 2 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

Legend

- Open-water Sampling Area
- Ice-cover Sampling Area
- Generating Station (Existing)
- Generating Station (Under Construction)
- Keeyask Principal Structures
- Highway
- Rail
- First Nation Reserve

Water Quality Sampling Areas

Overview

Map 2: Overview of water quality monitoring areas in the Keeyask local study area during the ice-cover and open-water seasons, 2015.

KEEYASK

DATA SOURCE:
Government of Canada, Province of Manitoba, North/South Consultants

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	05-MAY-10	06-JUN-16
0 5.5 11 Kilometres / 0 4.5 9 Miles	VERSION NO: 2.0	QA/QC: PMC/FSV/MWZ

Legend

- Regional Water Quality Sites
- Generating Station (Existing)
- Generating Station (Potential)
- Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

Regional Study Area Monitoring

Map 3: Water quality sampling locations in the regional study area.

KEEYASK

DATA SOURCE:
Orthophoto: Manitoba Hydro - June 21, 2015

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-FEB-10	30-MAY-16
0 0.15 0.3 Kilometres / 0 0.15 0.3 Miles	VERSION NO: 2.0	QA/QC: PMC/FSV/MWZ

Construction Site

Map 4: Instream structures at the Keeyask Generating Station site, June 2015.

KEEYASK

DATA SOURCE:
Manitoba Hydro; Government of Manitoba; Government of Canada:
Imagery - 2010 Keeyask 10cm and 1999 Gull 1m (Black an White)

CREATED BY:
Manitoba Hydro - GIS Studies

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	22-MAY-15	06-JAN-16
0 0.4 0.8 Kilometres / 0 0.3 0.6 Miles	VERSION NO: 1.0	QA/QC:

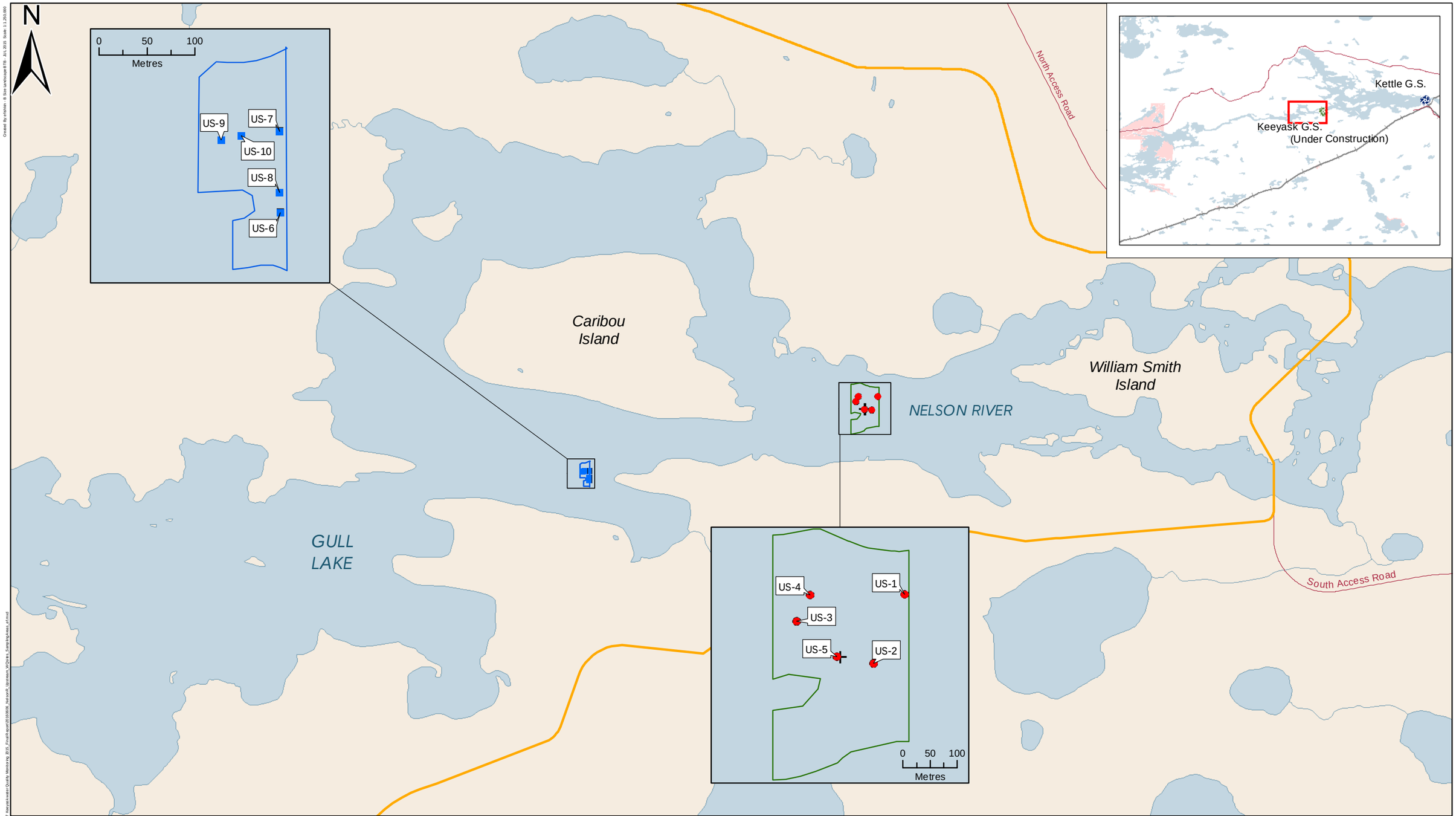
Legend

Ice Boom

Infrastructure

Keeyask GS
Ice Boom Locations

Map 5: Locations where ice booms were installed at the Keeyask Generating Station site, July to August 2015.



KEEYASK

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z14N	09-FEB-15	08-JUN-16
0 0.45 0.9 Kilometres / 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

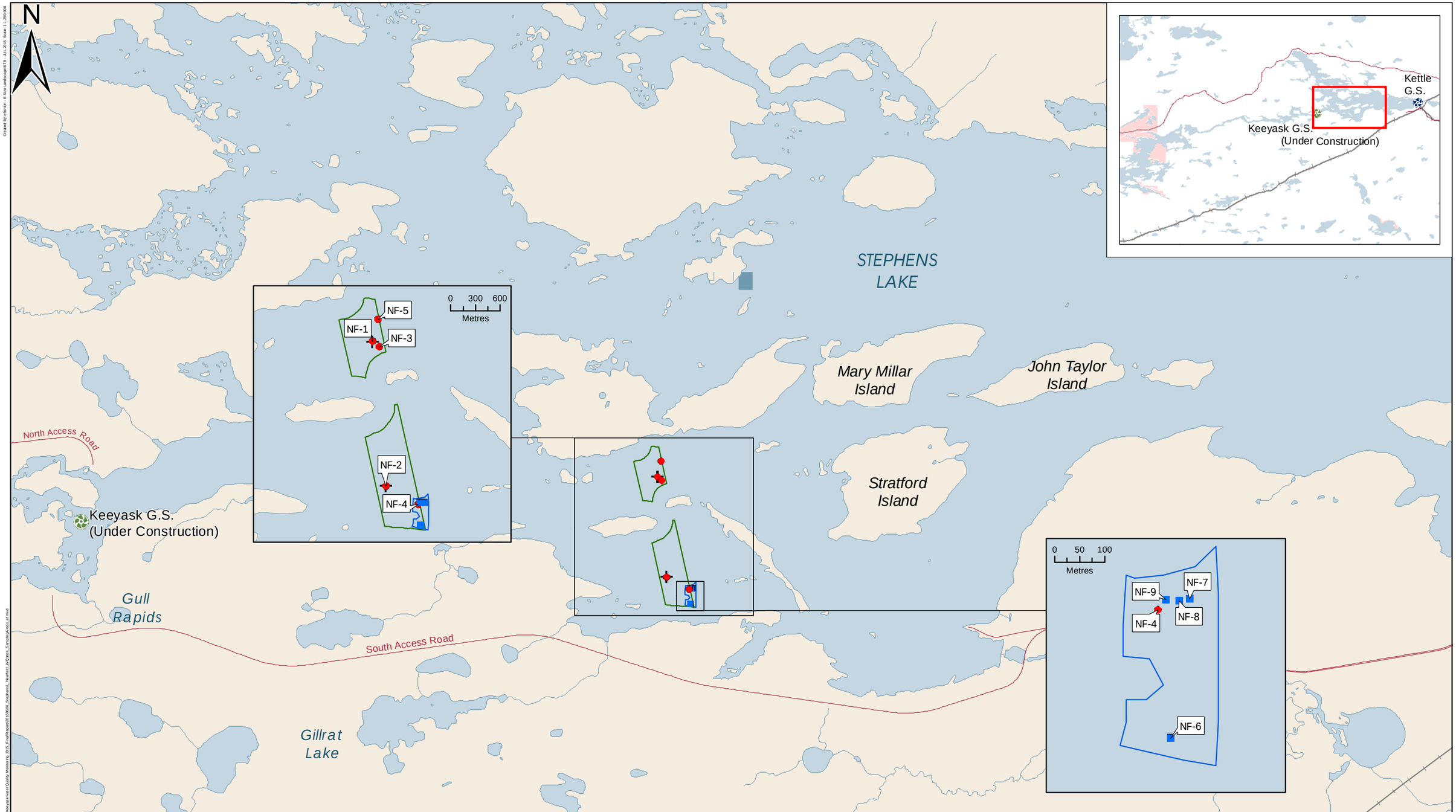
Legend

- Turbidity Logger
- **Water Quality Sampling Sites**
  - Open-water Replicate Sites
  - Ice-cover Replicate Sites
- Open-water Sampling Area
- Ice-cover SamplingArea
- Generating Station (Existing)
- Generating Station (Under Construction)
- Keeyask Principal Structures
- Highway
- Rail
- First Nation Reserve

Water Quality Monitoring Sites

Nelson River - Upstream

Map 6: Water quality sampling locations in the upstream reference area during the ice-cover and open-water seasons, 2015.



KEEYASK

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z14N	09-FEB-15	08-JUN-16
0 0.45 0.9 Kilometres / 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

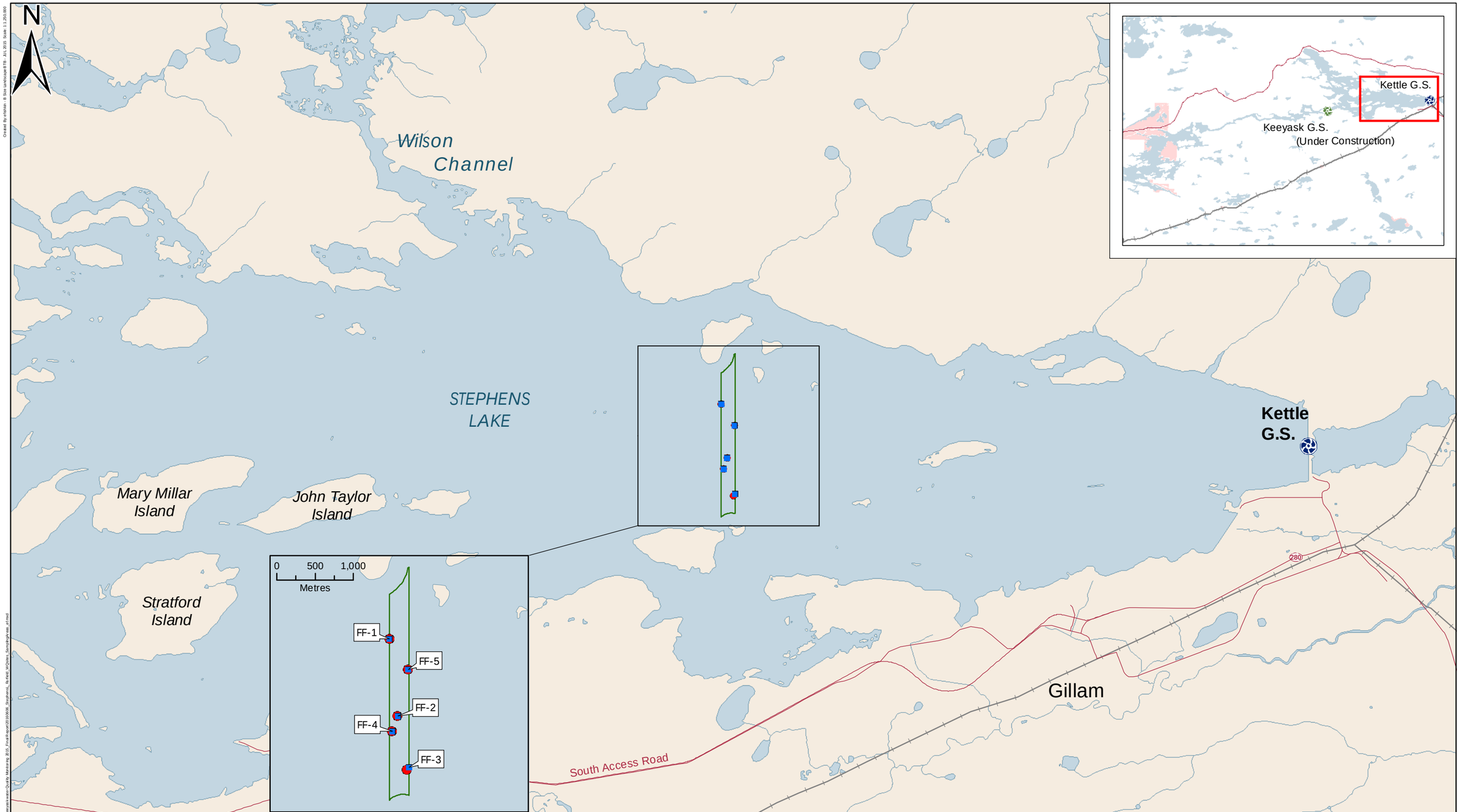
Legend

- Turbidity Logger
- **Water Quality Sampling Sites**
  - Open-water Replicate Sites
  - Ice-cover Replicate Sites
- Open-water Sampling Area
- Ice-cover SamplingArea
- Generating Station (Existing)
- Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

Water Quality Monitoring Sites

Stephens Lake - Nearfield

Map 7: Water quality sampling locations in the near-field sampling area of Stephens Lake during the ice-cover and open-water seasons, 2015.



KEEYASK

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z14N	09-FEB-15	08-JUN-16
0 0.45 0.9 Kilometres / 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

Legend

- Open-water Replicate Sites
- Ice-cover Replicate Sites
- Ice-cover and Open-water Sampling Area
- Generating Station (Existing)
- Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

Water Quality Monitoring Sites

Stephens Lake - Farfield

Map 8: Water quality sampling locations in the far-field sampling area of Stephens Lake during the ice-cover and open-water seasons, 2015.

APPENDICES

APPENDIX 1:
RESULTS OF WATER QUALITY MONITORING, 2015

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect.

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Snow Thickness (m)	Ice Thickness (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Nelson River Upstream # 6	US-6	2-Apr-15	9:40	3.8	0.20	1.00	0.3	-0.017	7.94	14.19	97.1	338.5	5.87	-	-
							1.0	-0.019	7.94	14.21	97.2	338.5	7.62	-	
							1.5	-0.020	7.94	14.23	97.2	338.4	6.61	-	
							2.0	-0.020	7.94	14.20	97.2	338.4	6.80	-	
							2.5	-0.020	7.93	14.23	97.4	338.5	6.45	-	
Nelson River Upstream # 7	US-7	2-Apr-15	11:21	3.9	0.25	1.05	0.3	-0.025	8.01	14.21	97.3	338.3	6.78	-	-
							1.0	-0.024	8.01	14.22	97.3	337.8	7.32	-	
							1.5	-0.024	8.00	14.22	97.3	337.5	6.34	-	
							2.0	-0.024	8.00	14.22	97.3	337.5	6.49	-	
							2.5	-0.024	8.00	14.22	97.3	337.5	6.55	-	
Nelson River Upstream # 8	US-8	2-Apr-15	11:00	3.4	0.30	1.00	0.3	-0.024	7.99	14.17	97.0	337.9	6.82	-	-
							1.0	-0.023	7.99	14.19	97.1	337.9	6.40	-	
							1.5	-0.023	7.99	14.20	97.1	337.8	6.91	-	
							2.0	-0.023	7.99	14.20	97.2	337.8	7.05	-	
Nelson River Upstream # 9	US-9	2-Apr-15	12:40	4.0	0.45	1.05	0.3	-0.022	8.09	14.19	97.2	336.8	7.33	-	-
							1.0	-0.021	8.06	14.27	97.6	337.0	7.42	-	
							1.5	-0.021	8.04	14.27	97.6	336.9	6.72	-	
							2.0	-0.021	8.04	14.26	97.6	337.2	6.77	-	
							2.5	-0.022	8.03	14.22	97.5	337.2	6.48	-	
Nelson River Upstream # 10	US-10	2-Apr-15	11:51	3.9	0.20	1.05	0.3	-0.020	8.01	14.20	97.2	340.5	6.37	-	-
							1.0	-0.020	8.01	14.23	97.4	339.2	7.31	-	
							1.5	-0.020	8.00	14.33	97.4	337.1	7.08	-	
							2.0	-0.020	8.00	14.23	97.3	337.2	6.73	-	
							2.5	-0.020	8.00	14.22	97.3	337.4	6.50	-	
Stephens Lake - Nearfield # 6	NF-6	2-Apr-15	14:41	5.7	0.35	1.12	0.3	-0.035	8.33	14.50	99.2	286.4	11.69	-	-
							1.0	-0.033	8.32	14.45	98.8	284.5	12.44	-	
							1.5	-0.030	8.26	14.42	98.7	286.7	10.55	-	
							2.0	-0.032	8.31	14.44	98.7	283.6	13.56	-	
							2.5	-0.032	8.27	14.43	98.7	283.8	12.67	-	
							3.0	-0.032	8.30	14.42	98.6	283.6	12.41	-	
							3.5	-0.032	8.28	14.40	98.5	282.8	11.77	-	
							4.0	-0.033	8.29	14.41	98.7	282.0	13.47	-	
Stephens Lake - Nearfield # 7	NF-7	2-Apr-15	16:50	4.5	0.25	1.21	0.3	-0.033	8.07	14.94	101.4	*192.4*	7.90	-	-
							1.0	-0.032	8.09	14.36	97.5	*193.4*	7.91	-	
							1.5	-0.032	8.12	13.96	95.2	*193.1*	8.37	-	
							2.0	-0.032	8.14	13.79	94.1	*192.7*	8.27	-	
							2.5	-0.033	8.15	13.62	93.1	*192.6*	8.15	-	
							3.0	-0.033	8.16	13.53	92.5	*192.7*	7.86	-	
Stephens Lake - Nearfield # 8	NF-8	2-Apr-15	14:15	5.2	0.20	1.13	0.3	-0.036	8.29	14.46	98.9	303.1	7.60	-	-
							1.0	-0.036	8.27	14.44	98.8	304.2	7.49	-	
							2.0	-0.034	8.24	14.43	98.7	307.8	8.24	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Snow Thickness (m)	Ice Thickness (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Stephens Lake - Nearfield # 8	NF-8	2-Apr-15	14:15	5.2	0.20	1.13	3.0	-0.033	8.24	14.42	98.6	308.9	7.73	-	
							4.0	-0.033	8.23	14.41	98.5	309.1	7.88	-	
Stephens Lake - Nearfield # 9	NF-9	2-Apr-15	16:18	4.7	0.30	1.10	0.3	-0.037	8.27	12.77	87.2	*143.1*	9.54	-	-
							1.0	-0.034	8.29	12.68	86.2	*147.4*	9.86	-	
							1.5	-0.034	8.30	12.62	86.2	*148.4*	12.59	-	
							2.0	-0.033	8.31	12.55	85.8	*146.0*	11.65	-	
							2.5	-0.034	8.32	12.60	86.2	*146.4*	10.47	-	
							3.0	-0.034	8.32	12.66	86.5	*148.2*	11.17	-	
							3.5	-0.034	8.31	12.63	86.2	*151.8*	15.12	-	
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	9:24	22.4	0.35	1.16	0.3	*0.039*	*9.16*	14.25	98.0	359.4	11.29	-	-
							1.0	-0.006	*8.31*	14.65	100.3	358.3	10.07	-	
							1.5	-0.003	*8.06*	14.67	100.4	358.2	11.83	-	
							2.0	-0.008	*7.87*	14.68	100.5	358.3	10.25	-	
							2.5	-0.008	*7.73*	14.67	100.4	358.3	10.36	-	
							3.0	-0.008	*7.66*	14.67	100.4	358.4	11.25	-	
							3.5	-0.008	*7.60*	14.67	100.4	358.4	11.78	-	
							4.0	-0.009	*7.56*	14.67	100.4	358.3	11.06	-	
							4.5	-0.009	*7.53*	14.67	100.4	358.4	10.85	-	
							5.0	-0.008	*7.50*	14.67	100.4	358.3	11.25	-	
							6.0	-0.009	*7.46*	14.66	100.3	358.4	10.51	-	
							7.0	-0.009	*7.43*	14.65	100.3	358.4	10.60	-	
							8.0	-0.009	*7.41*	14.64	100.2	358.4	10.69	-	
							9.0	-0.009	*7.40*	14.63	100.1	358.4	10.58	-	
							10.0	-0.009	*7.38*	14.64	100.1	358.5	10.37	-	
							11.0	-0.009	*7.37*	14.61	100.0	358.5	10.96	-	
							12.0	-0.009	*7.36*	14.60	99.9	358.5	10.25	-	
							13.0	-0.010	*7.34*	14.59	99.9	358.4	10.80	-	
							14.0	-0.009	*7.33*	14.58	99.8	358.4	10.86	-	
							15.0	-0.010	*7.33*	14.57	99.8	358.4	10.55	-	
							16.0	-0.011	*7.32*	14.57	99.7	358.4	11.37	-	
							17.0	-0.011	*7.31*	14.56	99.7	358.4	10.76	-	
							18.0	-0.010	*7.30*	14.55	99.6	358.4	9.95	-	
							19.0	-0.010	*7.30*	14.54	99.5	358.4	10.64	-	
							20.0	-0.010	*7.29*	14.53	99.4	358.4	14.44	-	
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	15.4	0.15	1.20	0.3	-0.005	*6.75*	14.66	100.4	359.6	10.10	-	-
							1.0	-0.010	*6.79*	14.72	100.8	359.1	10.52	-	
							2.0	-0.012	*6.80*	14.72	100.7	359.1	11.17	-	
							3.0	-0.013	*6.80*	14.71	100.6	359.1	10.94	-	
							4.0	-0.014	*6.81*	14.70	100.6	359.1	11.11	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Snow Thickness (m)	Ice Thickness (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	15.4	0.15	1.20	5.0	-0.014	*6.81*	14.69	100.5	359.1	10.90	-	
							6.0	-0.014	*6.82*	14.68	100.4	359.2	12.22	-	
							7.0	-0.014	*6.82*	14.67	100.4	359.2	11.60	-	
							8.0	-0.014	*6.83*	14.66	100.3	359.2	10.84	-	
							9.0	-0.014	*6.83*	14.64	100.2	359.2	10.93	-	
							10.0	-0.015	*6.83*	14.64	100.2	359.2	11.04	-	
							11.0	-0.014	*6.84*	14.62	100.1	359.2	12.93	-	
							12.0	-0.014	*6.84*	14.61	100.0	359.2	12.47	-	
							13.0	-0.014	*6.84*	14.60	100.0	359.2	10.79	-	
							14.0	-0.014	*6.85*	14.59	99.9	359.2	11.24	-	
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	13:10	25.3	0.30	1.10	0.3	-0.016	*6.62*	14.67	100.4	359.7	10.86	-	-
							1.0	-0.017	*6.67*	14.73	100.8	359.7	11.17	-	
							2.0	-0.017	*6.70*	14.74	100.9	359.8	12.81	-	
							3.0	-0.017	*6.71*	14.74	100.9	359.8	11.18	-	
							4.0	-0.017	*6.71*	14.73	100.8	359.8	10.71	-	
							5.0	-0.017	*6.72*	14.72	100.8	359.8	11.20	-	
							6.0	-0.017	*6.74*	14.71	100.7	359.8	11.15	-	
							7.0	-0.017	*6.74*	14.70	100.6	359.9	11.05	-	
							8.0	-0.017	*6.75*	14.70	100.6	359.8	10.82	-	
							9.0	-0.017	*6.75*	14.69	100.5	359.9	11.22	-	
							10.0	-0.017	*6.75*	14.68	100.4	359.8	11.17	-	
							11.0	-0.017	*6.76*	14.67	100.4	359.9	11.19	-	
							12.0	-0.018	*6.76*	14.66	100.3	359.9	11.26	-	
							13.0	-0.017	*6.77*	14.65	100.2	*300.0*	11.27	-	
							14.0	-0.017	*6.77*	14.64	100.2	359.9	11.23	-	
							15.0	-0.018	*6.77*	14.62	100.1	359.9	11.01	-	
							16.0	-0.017	*6.78*	14.62	100.0	360.0	11.11	-	
							17.0	-0.018	*6.78*	14.60	99.9	360.0	10.99	-	
							18.0	-0.017	*6.79*	14.59	99.9	360.0	11.27	-	
							19.0	-0.017	*6.79*	14.59	99.8	360.0	11.22	-	
							20.0	-0.017	*6.80*	14.58	99.8	360.1	11.16	-	
							22.0	-0.018	*6.80*	14.55	99.6	360.1	10.64	-	
							24.0	-0.018	*6.81*	14.53	99.4	360.1	12.59	-	
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	13.2	0.25	1.15	0.3	-0.011	*6.75*	14.50	99.5	359.4	11.49	-	-
							1.0	-0.013	*6.76*	14.66	100.4	359.4	12.95	-	
							2.0	-0.013	*6.77*	14.69	100.5	359.4	12.33	-	
							3.0	-0.014	*6.78*	14.70	100.6	359.4	10.92	-	
							4.0	-0.014	*6.78*	14.69	100.6	359.4	10.83	-	
							5.0	-0.014	*6.79*	14.68	100.5	359.4	12.10	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Snow Thickness (m)	Ice Thickness (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	13.2	0.25	1.15	6.0	-0.014	*6.79*	14.68	100.5	359.3	12.44	-	
							7.0	-0.014	*6.80*	14.67	100.4	359.4	10.85	-	
							8.0	-0.014	*6.80*	14.66	100.4	359.4	11.06	-	
							9.0	-0.014	*6.80*	14.65	100.3	359.4	10.56	-	
							10.0	-0.014	*6.81*	14.65	100.2	359.4	11.86	-	
							11.0	-0.014	*6.83*	14.63	100.1	359.4	10.74	-	
							12.0	-0.013	*6.82*	14.62	100.1	359.5	14.24	-	-
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	10:31	11.9	0.30	1.16	0.3	-0.013	*6.71*	14.60	100.0	359.3	10.31	-	
							1.0	-0.012	*6.80*	14.69	100.6	358.9	10.35	-	
							2.0	-0.012	*6.82*	14.70	100.6	358.9	10.43	-	
							3.0	-0.012	*6.85*	14.70	100.6	358.9	10.46	-	
							4.0	-0.012	*6.87*	14.70	100.6	358.9	10.33	-	
							5.0	-0.012	*6.88*	14.69	100.5	358.8	10.52	-	
							6.0	-0.012	*6.89*	14.68	100.5	358.9	10.31	-	
							7.0	-0.012	*6.90*	14.67	100.4	358.9	13.02	-	
							8.0	-0.012	*6.91*	14.67	100.4	358.9	10.14	-	
							9.0	-0.012	*6.92*	14.65	100.3	358.9	12.23	-	
							10.0	-0.011	*6.93*	14.65	100.2	358.9	12.43	-	
Nelson River Upstream # 1	US-1	23-Jun-15	10:20	11.7	n/a	n/a	0.3	15.32	8.25	10.12	101.0	323.2	18.04	-	0.45
Nelson River Upstream # 2	US-2	23-Jun-15	10:44	5.5	n/a	n/a	0.3	15.35	8.29	10.07	100.7	324.1	19.03	-	0.45
Nelson River Upstream # 3	US-3	23-Jun-15	12:00	10.7	n/a	n/a	0.3	15.38	8.32	10.31	102.7	320.0	18.86	-	-
Nelson River Upstream # 4	US-4	23-Jun-15	11:33	11.3	n/a	n/a	0.3	15.34	8.34	10.20	101.9	319.6	18.79	-	0.40
Nelson River Upstream # 5	US-5	23-Jun-15	11:03	9.7	n/a	n/a	0.3	15.32	8.31	10.15	101.3	324.3	18.69	-	0.45
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	11:27	18.1	n/a	n/a	0.3	14.92	8.30	10.39	102.8	321.0	17.00	-	0.45
							1.0	14.92	8.29	10.39	102.9	321.3	19.17	-	
							2.0	14.94	8.29	10.38	102.9	321.3	17.32	-	
							3.0	14.91	8.29	10.38	102.8	321.3	16.01	-	
							4.0	14.90	8.28	10.37	102.7	321.3	18.30	-	
							5.0	14.89	8.29	10.35	102.5	321.4	17.57	-	
							6.0	14.89	8.28	10.34	102.4	321.6	17.58	-	
							7.0	14.89	8.28	10.33	102.3	321.7	17.60	-	
							8.0	14.89	8.28	10.33	102.2	321.6	19.62	-	
							9.0	14.89	8.27	10.32	102.1	321.7	16.51	-	
							10.0	14.89	8.28	10.31	102.1	321.6	16.21	-	
							11.0	14.89	8.28	10.31	102.1	321.7	17.44	-	
							12.0	14.89	8.28	10.30	102.0	321.7	17.07	-	
							13.0	14.89	8.28	10.29	101.9	321.7	17.20	-	
							14.0	14.89	8.28	10.28	101.7	321.8	18.75	-	
							15.0	14.89	8.28	10.27	101.7	321.8	17.92	-	
							16.0	14.89	8.28	10.26	101.6	321.8	16.17	-	
							17.0	14.80	8.27	10.24	101.6	321.4	17.01	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	13:01	14.1	n/a	n/a	0.3	15.03	8.30	10.76	106.8	321.8	16.35	-	0.45
							1.0	15.05	8.32	10.65	105.7	322.0	16.71	-	
							2.0	15.03	8.31	10.56	104.7	322.0	17.53	-	
							3.0	15.01	8.30	10.50	104.1	321.9	18.04	-	
							4.0	14.99	8.30	10.46	103.6	322.0	18.31	-	
							5.0	14.91	8.30	10.44	103.3	321.9	17.26	-	
							6.0	14.85	8.30	10.40	102.9	321.9	17.43	-	
							7.0	14.81	8.29	13.38	102.5	321.9	17.42	-	
							8.0	14.79	8.29	10.35	102.2	321.8	17.33	-	
							9.0	14.77	8.29	10.33	102.0	321.8	17.72	-	
							10.0	14.76	8.28	10.30	101.7	321.8	-	-	
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	12:05	18.3	n/a	n/a	0.3	15.10	8.34	10.61	105.5	321.6	17.27	-	0.45
							1.0	15.05	8.31	10.50	104.4	321.6	16.41	-	
							2.0	15.04	8.31	10.47	103.8	321.6	17.26	-	
							3.0	15.00	8.30	10.42	103.3	321.7	17.80	-	
							4.0	14.96	8.30	10.41	103.2	321.6	17.06	-	
							5.0	14.95	8.30	10.39	102.9	321.6	17.53	-	
							6.0	14.91	8.29	10.37	102.7	321.6	17.18	-	
							7.0	14.91	8.29	10.35	102.6	321.7	17.33	-	
							8.0	14.91	8.29	10.34	102.5	321.7	17.30	-	
							9.0	14.91	8.29	10.34	102.4	321.6	17.38	-	
							10.0	14.91	8.29	10.32	102.2	321.6	17.25	-	
							11.0	14.91	8.29	10.32	102.2	321.6	17.41	-	
							12.0	14.91	8.29	10.30	102.0	321.6	17.49	-	
							13.0	14.91	8.29	10.30	102.0	321.6	17.44	-	
							14.0	14.91	8.29	10.29	101.9	321.6	17.21	-	
							15.0	14.91	8.29	10.28	101.8	321.6	17.37	-	
							16.0	14.90	8.29	10.27	101.7	321.6	17.60	-	
							17.0	14.90	8.29	10.27	101.7	321.7	17.18	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	12:35	5.9	n/a	n/a	0.3	15.01	8.35	10.64	105.5	321.5	17.81	-	0.45
							1.0	14.96	8.32	10.54	104.5	321.6	17.41	-	
							2.0	14.92	8.31	10.48	103.8	321.7	17.53	-	
							3.0	14.92	8.30	10.44	103.4	321.7	18.27	-	
							4.0	14.96	8.30	10.42	103.2	321.7	17.19	-	
							5.0	14.89	8.31	10.40	103.0	321.7	17.45	-	
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	11:10	16.1	n/a	n/a	0.3	14.84	8.27	10.41	102.9	321.3	16.89	-	0.45
							1.0	14.86	8.26	10.37	102.6	321.6	19.50	-	
							2.0	14.86	8.26	10.35	102.4	321.7	15.66	-	
							3.0	14.86	8.27	10.34	102.3	321.7	16.80	-	
							4.0	14.85	8.26	10.33	102.2	321.6	17.49	-	
							5.0	14.83	8.25	10.33	102.1	321.5	17.48	-	
							6.0	14.80	8.25	10.32	102.0	321.3	16.91	-	
							7.0	14.77	8.25	10.32	101.9	321.2	18.21	-	
							8.0	14.77	8.25	10.31	101.8	321.1	16.26	-	
							9.0	14.75	8.25	10.31	101.7	321.0	19.31	-	
							10.0	14.73	8.25	10.31	101.7	320.9	16.39	-	
							11.0	14.72	8.25	10.30	101.6	320.9	16.20	-	
							12.0	14.71	8.25	10.30	101.5	320.9	17.06	-	
							13.0	14.72	8.25	10.28	101.4	320.9	16.63	-	
							14.0	14.69	8.26	10.29	101.4	320.8	16.54	-	
							15.0	14.66	8.26	10.29	101.3	320.9	16.74	-	
							16.0	14.60	8.25	10.27	101.0	320.8	16.50	-	
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	22.8	n/a	n/a	0.3	13.90	8.22	10.54	102.0	318.4	17.69	-	0.40
							1.0	13.89	8.22	10.47	101.4	317.4	16.85	-	
							2.0	13.89	8.26	10.47	101.4	317.3	16.77	-	
							3.0	13.88	8.24	10.46	101.3	316.9	16.72	-	
							4.0	13.85	8.21	10.45	101.2	316.2	16.83	-	
							5.0	13.85	8.20	10.45	101.1	316.0	17.02	-	
							6.0	13.84	8.17	10.43	101.0	315.8	17.07	-	
							7.0	13.82	8.15	10.43	100.9	315.4	17.07	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	22.8	n/a	n/a	8.0	13.81	8.16	10.42	100.7	315.3	17.25	-	
							9.0	13.81	8.17	10.41	100.6	315.2	17.32	-	
							10.0	13.80	8.20	10.39	100.5	315.1	17.43	-	
							11.0	13.78	8.16	10.37	100.2	314.8	17.65	-	
							12.0	13.76	8.15	10.37	100.2	314.6	17.23	-	
							13.0	13.73	8.25	10.35	99.9	314.3	17.15	-	
							14.0	13.91	8.23	10.37	100.5	315.8	16.90	-	
							15.0	13.91	8.21	10.37	100.5	315.7	17.16	-	
							16.0	13.90	8.20	10.36	100.2	315.7	17.80	-	
							17.0	13.34	8.16	10.26	97.8	311.7	17.96	-	
							18.0	13.03	8.13	10.21	96.9	310.8	18.05	-	
							19.0	12.95	8.12	10.17	96.4	310.1	18.19	-	
							20.0	12.87	8.10	10.12	95.6	309.8	19.09	-	
							22.0	12.70	8.08	10.01	93.3	308.9	22.31	-	
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	9:07	17.3	n/a	n/a	0.3	14.05	8.33	10.56	102.3	317.7	16.48	-	0.45
							1.0	14.07	8.31	10.47	101.9	317.9	17.93	-	
							2.0	14.07	8.30	10.44	101.6	318.0	16.60	-	
							3.0	14.07	8.30	10.42	101.4	318.0	16.91	-	
							4.0	14.06	8.29	10.41	101.2	318.0	17.03	-	
							5.0	14.06	8.29	10.39	101.0	318.0	16.91	-	
							6.0	14.05	8.29	10.38	100.9	318.0	17.47	-	
							7.0	14.02	8.28	10.37	100.7	317.9	17.46	-	
							8.0	13.98	8.28	10.35	100.5	317.9	17.26	-	
							9.0	13.96	8.27	10.35	100.4	317.9	16.22	-	
							10.0	13.96	8.27	10.34	100.3	317.9	16.72	-	
							11.0	13.94	8.27	10.33	100.2	317.9	16.82	-	
							12.0	13.93	8.26	10.32	100.0	317.9	17.33	-	
							13.0	13.93	8.26	10.31	99.9	318.0	17.49	-	
							14.0	13.92	8.26	10.31	99.9	317.9	17.47	-	
							15.0	13.92	8.26	10.29	99.8	317.9	17.50	-	
							16.0	13.92	8.25	10.28	99.6	318.0	17.64	-	
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	26.7	n/a	n/a	0.3	14.42	8.32	10.48	102.6	318.3	15.77	-	0.45
							1.0	14.40	8.31	10.46	102.6	318.3	16.00	-	
							2.0	14.41	8.31	10.46	102.5	318.3	15.98	-	
							3.0	14.40	8.31	10.45	102.3	318.3	15.85	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Snow Thickness (m)	Ice Thickness (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	26.7	n/a	n/a	4.0	14.39	8.30	10.43	102.1	318.3	16.56	-	
							5.0	14.39	8.30	10.42	102.1	318.3	15.85	-	
							6.0	14.38	8.29	10.41	102.0	318.3	16.72	-	
							7.0	14.36	8.29	10.41	101.9	318.3	16.26	-	
							8.0	14.36	8.29	10.40	101.8	318.3	15.90	-	
							9.0	14.35	8.29	10.40	101.7	318.3	16.01	-	
							10.0	14.33	8.29	10.39	101.7	318.2	16.49	-	
							11.0	14.34	8.23	10.38	101.5	318.3	15.85	-	
							12.0	14.31	8.27	10.36	101.1	318.2	17.32	-	
							13.0	14.29	8.27	10.34	101.1	318.1	16.56	-	
							14.0	14.31	8.28	10.34	101.1	318.2	17.47	-	
							15.0	14.26	8.26	10.32	101.1	318.2	16.58	-	
							16.0	14.26	8.26	10.30	100.5	318.2	16.75	-	
							17.0	14.22	8.25	10.28	100.1	318.2	17.29	-	
							18.0	14.09	8.24	10.25	99.7	318.0	15.99	-	
							19.0	14.08	8.24	10.23	99.5	318.0	18.16	-	
							20.0	14.08	8.23	10.21	99.2	318.0	18.85	-	
							22.0	14.01	8.22	10.17	98.6	317.9	19.41	-	
							24.0	13.94	8.21	10.13	98.2	317.8	20.17	-	
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	9:28	13.4	n/a	n/a	0.3	14.21	8.33	10.56	103.0	318.1	16.75	-	0.45
							1.0	14.22	8.31	10.49	102.2	318.1	17.41	-	
							2.0	14.22	8.31	10.45	102.0	318.1	17.68	-	
							3.0	14.22	8.30	10.43	101.8	318.1	16.69	-	
							4.0	14.22	8.30	10.42	101.7	318.1	16.89	-	
							5.0	14.22	8.30	10.41	101.6	318.1	16.83	-	
							6.0	14.22	8.29	10.40	101.5	318.2	16.83	-	
							7.0	14.21	8.29	10.40	101.4	318.2	16.76	-	
							8.0	14.21	8.29	10.39	101.4	318.2	16.60	-	
							9.0	14.21	8.29	10.38	101.3	318.2	17.45	-	
							10.0	14.21	8.29	10.38	101.3	318.2	15.03	-	
							11.0	14.21	8.28	10.37	101.2	318.2	16.86	-	
							12.0	14.20	8.28	10.36	101.1	318.2	17.28	-	
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	13.4	n/a	n/a	0.3	13.95	8.32	10.57	102.2	316.2	16.61	-	0.45
							1.0	13.97	8.30	10.45	101.3	316.6	16.67	-	
							2.0	13.97	8.30	10.43	101.3	316.6	17.85	-	
							3.0	13.96	8.29	10.41	101.0	316.3	16.77	-	
							4.0	13.97	8.29	10.39	100.8	316.5	17.06	-	
							5.0	13.97	8.29	10.38	100.7	316.3	16.98	-	
							6.0	13.96	8.26	10.37	100.6	316.0	15.53	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	13.4	n/a	n/a	7.0	13.96	8.28	10.37	100.6	315.8	17.06	-	
							8.0	13.95	8.28	10.37	100.5	315.6	17.38	-	
							9.0	13.92	8.28	10.36	100.4	315.2	17.46	-	
							10.0	13.89	8.27	10.35	100.3	314.9	17.84	-	
							11.0	13.88	8.27	10.34	100.1	314.8	17.87	-	
							12.0	13.87	8.26	10.33	100.0	314.7	17.83	-	
							13.0	13.86	8.26	10.31	100.0	314.7	18.32	-	
Nelson River Upstream # 1	US-1	27-Jul-15	12:51	10.8	n/a	n/a	0.3	20.68	8.42	9.15	101.8	318.2	36.59	-	-
Nelson River Upstream # 2	US-2	27-Jul-15	13:22	6.5	n/a	n/a	0.3	20.63	8.45	9.03	100.6	309.8	42.81	-	-
Nelson River Upstream # 3	US-3	27-Jul-15	14:42	10.0	n/a	n/a	0.3	20.86	8.51	9.15	102.4	305.6	47.50	144.5	-
Nelson River Upstream # 4	US-4	27-Jul-15	14:23	11.9	n/a	n/a	0.3	20.74	8.53	9.16	102.1	305.2	41.62	124.0	-
Nelson River Upstream # 5	US-5	27-Jul-15	13:43	8.9	n/a	n/a	0.3	20.64	8.49	9.23	102.8	307.0	42.27	118.8	-
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	11:09	18.4	n/a	n/a	0.3	21.31	8.57	9.78	110.7	306.1	11.82	-	0.60
							1.0	21.33	8.55	9.85	111.3	306.3	12.19	-	
							2.0	21.15	8.47	9.58	106.3	306.3	12.68	-	
							3.0	20.79	8.41	9.30	103.8	306.3	13.03	-	
							4.0	20.78	8.39	8.23	103.2	306.3	13.10	-	
							5.0	20.78	8.38	9.21	102.9	306.4	13.09	-	
							6.0	20.77	8.37	9.20	102.7	306.4	13.21	-	
							7.0	20.77	8.36	9.18	102.6	306.4	13.13	-	
							8.0	20.76	8.35	9.17	102.4	306.6	13.23	-	
							9.0	20.76	8.34	9.16	102.6	306.6	13.40	-	
							10.0	20.76	8.33	9.15	102.2	306.6	12.97	-	
							11.0	20.76	8.32	9.13	102.0	306.7	13.05	-	
							12.0	20.76	8.32	9.13	102.0	306.7	13.16	-	
							13.0	20.76	8.31	9.13	102.0	306.6	13.41	-	
							14.0	20.76	8.31	9.12	101.8	306.8	13.90	-	
							15.0	20.76	8.30	9.11	101.7	306.8	13.19	-	
							16.0	20.76	8.30	9.10	101.7	306.8	13.74	-	
							17.0	20.76	8.30	9.09	101.5	306.8	13.64	-	
							18.0	20.76	8.29	9.08	101.4	306.8	13.53	-	
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	13.0	n/a	n/a	0.3	21.05	8.57	9.48	106.6	307.0	11.85	-	0.73
							1.0	21.04	8.52	9.50	106.7	307.2	11.52	-	
							2.0	20.92	8.47	9.39	104.8	307.3	11.76	-	
							3.0	20.74	8.42	9.21	102.8	307.3	11.94	-	
							4.0	20.73	8.40	9.18	102.4	307.3	12.26	-	
							5.0	20.73	8.39	9.16	102.3	307.3	11.57	-	
							6.0	20.73	8.38	9.16	102.2	307.3	12.21	-	
							7.0	20.28	8.37	9.14	102.0	307.3	12.34	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	13.0	n/a	n/a	8.0	20.73	8.35	9.13	101.9	307.4	12.24	-	
							9.0	20.72	8.34	9.12	101.8	307.4	12.30	-	
							10.0	20.72	8.33	9.11	101.7	307.4	12.09	-	
							11.0	20.71	8.33	9.10	101.5	307.6	12.19	-	
							12.0	20.68	8.32	9.07	101.1	307.6	11.71	-	
							13.0	20.53	8.30	8.98	100.0	307.9	20.92	-	
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	11:29	18.6	n/a	n/a	0.3	21.34	8.57	9.82	111.1	305.6	12.30	-	0.60
							1.0	21.25	8.51	9.75	109.3	306.0	12.66	-	
							2.0	21.07	8.45	9.51	106.0	306.2	12.91	-	
							3.0	20.80	8.38	9.27	103.5	306.2	12.76	-	
							4.0	20.78	8.36	9.20	102.8	306.3	13.02	-	
							5.0	20.77	8.35	9.17	102.5	306.4	13.69	-	
							6.0	20.77	8.34	9.17	102.5	306.5	14.03	-	
							7.0	20.76	8.32	9.16	102.3	306.5	13.31	-	
							8.0	20.77	8.31	9.15	102.2	306.4	12.72	-	
							9.0	20.76	8.30	9.14	102.1	306.5	13.09	-	
							10.0	20.76	8.30	9.13	102.1	306.6	13.17	-	
							11.0	20.76	8.29	9.13	102.0	306.5	13.61	-	
							12.0	20.76	8.29	9.12	101.9	306.5	12.90	-	
							13.0	20.76	8.29	9.12	101.9	306.5	12.57	-	
							14.0	20.76	8.29	9.11	101.8	306.5	12.99	-	
							15.0	20.76	8.29	9.11	101.7	306.5	13.35	-	
							16.0	20.76	8.29	9.10	101.7	306.5	13.57	-	
							17.0	20.76	8.28	9.09	101.6	306.5	14.22	-	
							18.0	20.76	8.28	9.08	101.4	306.6	13.30	-	
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	11:56	5.8	n/a	n/a	0.3	21.03	8.52	9.41	105.7	306.9	11.57	-	0.65
							1.0	21.08	8.44	9.35	104.2	307.5	11.32	-	
							2.0	20.81	8.41	9.25	103.0	307.6	11.37	-	
							3.0	20.74	8.39	9.19	102.6	307.6	11.87	-	
							4.0	20.73	8.38	9.16	102.3	307.6	11.77	-	
							5.0	20.72	8.37	9.14	102.0	307.6	11.74	-	
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	18.3	n/a	n/a	0.3	21.09	8.48	9.39	105.5	306.8	12.37	-	0.65
							1.0	21.07	8.46	9.37	104.5	306.9	12.73	-	
							2.0	20.79	8.42	9.24	103.1	306.9	13.10	-	
							3.0	20.76	8.41	9.28	102.8	306.9	13.11	-	
							4.0	20.76	8.38	9.18	102.5	306.9	12.71	-	
							5.0	20.76	8.38	9.17	102.4	306.9	13.00	-	
							6.0	20.76	8.38	9.16	102.4	306.9	12.82	-	
							7.0	20.75	8.37	9.15	102.2	306.9	10.85	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	18.3	n/a	n/a	8.0	20.73	8.37	9.13	102.0	306.9	10.68	-	
							9.0	20.71	8.36	9.11	101.7	307.0	13.85	-	
							10.0	20.73	8.35	9.11	101.6	307.0	13.85	-	
							11.0	20.70	8.35	9.08	101.2	307.0	12.78	-	
							12.0	20.68	8.34	9.05	101.0	307.0	12.11	-	
							13.0	20.67	8.33	9.04	100.8	307.0	12.45	-	
							14.0	20.66	8.33	9.03	100.7	307.0	12.71	-	
							15.0	20.65	8.32	9.02	100.5	307.0	14.08	-	
							16.0	20.64	8.31	9.02	100.5	307.1	12.44	-	
							17.0	20.61	8.30	9.00	100.1	307.0	10.09	-	
							18.0	20.52	8.28	8.88	98.5	307.2	11.42	-	
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	10:01	22.9	n/a	n/a	0.3	20.83	8.56	9.54	106.8	305.7	10.33	-	0.60
							1.0	20.71	8.51	9.43	104.6	305.9	10.62	-	
							2.0	20.48	8.47	9.33	103.4	305.4	10.92	-	
							3.0	20.39	8.43	9.20	102.0	305.6	11.30	-	
							4.0	20.37	8.40	9.14	101.2	305.9	11.35	-	
							5.0	20.37	8.39	9.12	101.1	305.8	11.28	-	
							6.0	20.37	8.37	9.10	100.9	305.8	11.89	-	
							7.0	20.36	8.36	9.09	100.8	306.3	11.45	-	
							8.0	20.34	8.35	9.09	100.7	306.5	11.32	-	
							9.0	20.34	8.34	9.09	100.7	306.6	11.54	-	
							10.0	20.33	8.33	9.08	100.6	306.6	11.51	-	
							11.0	20.31	8.33	9.07	100.3	306.6	11.76	-	
							12.0	20.22	8.31	9.01	100.1	306.9	12.44	-	
							13.0	20.00	8.27	8.88	96.8	307.3	13.64	-	
							14.0	19.44	8.24	8.75	94.9	308.4	13.42	-	
							15.0	19.26	8.22	8.71	94.4	308.3	12.69	-	
							16.0	19.21	8.20	8.68	93.9	308.5	12.73	-	
							17.0	19.14	8.19	8.66	93.6	308.6	12.97	-	
							18.0	19.08	8.18	8.62	93.0	308.5	13.99	-	
							19.0	19.01	8.17	8.59	92.5	308.6	14.64	-	
							20.0	18.40	8.11	8.14	86.2	309.4	19.85	-	
							22.0	18.10	8.06	7.84	82.4	309.9	26.00	-	
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	15.9	n/a	n/a	0.3	20.76	8.60	9.52	106.3	306.7	10.11	-	0.65
							1.0	20.61	8.54	9.56	106.4	306.9	10.62	-	
							2.0	20.52	8.52	9.54	105.9	306.8	10.84	-	
							3.0	20.51	8.50	9.52	105.8	306.7	10.72	-	
							4.0	20.52	8.48	9.49	105.5	306.8	10.91	-	
							5.0	20.47	8.46	9.43	104.6	307.1	12.01	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	15.9	n/a	n/a	6.0	20.43	8.45	9.39	104.2	307.0	11.00	-	
							7.0	20.37	8.43	9.31	103.2	306.9	11.24	-	
							8.0	20.38	8.42	9.30	103.1	307.0	10.90	-	
							9.0	20.37	8.41	9.29	103.0	307.0	11.22	-	
							10.0	20.32	8.38	9.23	102.8	307.1	11.51	-	
							11.0	20.31	8.36	9.13	101.0	307.2	11.75	-	
							12.0	20.27	8.35	9.09	100.6	307.3	11.64	-	
							13.0	20.25	8.34	9.06	100.1	307.4	12.12	-	
							14.0	20.25	8.33	9.05	100.1	307.3	12.65	-	
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	9:17	25.9	n/a	n/a	0.3	20.71	8.58	9.39	105.0	307.9	11.01	-	0.60
							1.0	20.68	8.51	9.39	104.2	308.2	11.47	-	
							2.0	20.58	8.46	9.26	103.1	308.1	11.45	-	
							3.0	20.57	8.43	9.22	102.6	308.1	11.99	-	
							4.0	20.56	8.41	9.18	102.1	308.2	12.79	-	
							5.0	20.55	8.40	9.15	101.8	308.2	11.85	-	
							6.0	20.53	8.39	9.15	101.7	308.3	11.47	-	
							7.0	20.51	8.38	9.14	101.6	308.2	11.56	-	
							8.0	20.50	8.38	9.13	101.5	308.1	11.67	-	
							9.0	20.50	8.37	9.12	101.3	308.2	11.62	-	
							10.0	20.49	8.36	9.10	101.1	308.1	11.59	-	
							11.0	20.48	8.35	9.08	100.8	308.1	11.42	-	
							12.0	20.47	8.34	9.06	100.6	308.0	11.64	-	
							13.0	20.46	8.34	9.05	100.5	308.1	11.77	-	
							14.0	20.46	8.33	9.03	100.2	308.0	12.13	-	
							15.0	20.36	8.31	8.96	98.7	307.9	12.08	-	
							16.0	20.14	8.30	8.88	98.0	307.7	12.01	-	
							17.0	20.13	8.29	8.86	97.5	307.8	12.06	-	
							18.0	19.67	8.26	8.73	95.0	308.7	12.84	-	
							19.0	19.44	8.23	8.67	94.2	308.7	13.38	-	
							20.0	19.27	8.21	8.55	92.3	309.7	14.37	-	
							22.0	18.96	8.14	8.25	88.0	311.3	16.55	-	
							24.0	18.53	8.11	7.99	85.0	310.6	20.69	-	
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	13.4	n/a	n/a	0.3	20.71	8.55	9.41	105.8	307.4	10.28	-	0.75
							1.0	20.90	8.51	9.45	105.3	307.4	11.05	-	
							2.0	20.50	8.46	9.30	103.2	307.4	11.35	-	
							3.0	20.46	8.43	9.25	102.6	307.3	11.76	-	
							4.0	20.44	8.41	9.21	102.1	307.3	11.88	-	
							5.0	20.42	8.40	9.16	101.7	307.4	11.79	-	
							6.0	20.42	8.38	9.13	101.3	307.3	11.69	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	13.4	n/a	n/a	7.0	20.40	8.37	9.10	101.0	307.4	12.30	-	
							8.0	20.39	8.36	9.08	100.6	307.5	12.23	-	
							9.0	20.38	8.35	9.06	100.4	307.5	12.74	-	
							10.0	20.36	8.34	9.04	100.2	307.5	13.72	-	
							11.0	20.35	8.33	9.02	100.0	307.5	13.57	-	
							12.0	20.32	8.33	9.01	99.8	307.5	15.93	-	
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8:29	12.1	n/a	n/a	0.3	20.53	8.46	9.44	105.1	310.0	10.61	-	0.75
							1.0	20.50	8.47	9.41	104.4	308.8	10.90	-	
							2.0	20.42	8.47	9.33	103.4	307.5	11.19	-	
							3.0	20.40	8.46	9.27	102.8	307.2	11.20	-	
							4.0	20.39	8.46	9.24	102.4	307.2	11.93	-	
							5.0	20.38	8.46	9.20	101.9	307.1	11.87	-	
							6.0	20.37	8.45	9.17	101.6	307.1	11.45	-	
							7.0	20.37	8.44	9.16	101.6	307.1	11.39	-	
							8.0	20.37	8.44	9.15	101.4	307.1	11.20	-	
							9.0	20.35	8.44	9.12	101.1	307.2	11.50	-	
							10.0	20.33	8.43	9.10	100.8	307.3	11.66	-	
							11.0	20.30	8.42	9.07	100.3	307.5	12.28	-	
							12.0	20.23	8.39	9.00	100.0	307.8	12.83	-	
Nelson River Upstream # 1	US-1	23-Aug-15	11:39	11.8	n/a	n/a	0.3	16.75	8.52	9.83	102.2	300.2	13.35	319	0.50
							1.0	16.81	8.52	9.60	99.1	300.3	14.99	318	
							2.0	16.78	8.51	9.56	98.6	300.1	15.12	316	
							3.0	16.80	8.51	9.54	98.4	300.2	15.55	314	
							4.0	16.82	8.51	9.52	98.2	300.2	15.06	313	
							5.0	16.84	8.51	9.51	98.2	300.2	14.93	313	
							6.0	16.81	8.51	9.51	98.1	300.1	13.78	314	
							7.0	16.82	8.50	9.50	98.0	300.1	15.11	314	
							8.0	16.81	8.50	9.50	98.0	300.1	15.00	314	
							9.0	16.81	8.49	9.50	97.9	300.1	15.05	315	
							10.0	16.82	8.48	9.49	97.9	300.1	15.00	316	
							11.0	16.83	8.48	9.48	97.8	300.2	15.00	316	
Nelson River Upstream # 2	US-2	23-Aug-15	12:08	6.6	n/a	n/a	0.3	17.03	8.49	9.66	100.2	299.8	15.1	323.5	-
							1.0	17.04	8.49	9.53	98.7	299.9	15.4	322.8	
							2.0	17.04	8.49	9.49	98.4	299.9	14.8	320.5	
							3.0	17.04	8.50	9.47	98.2	299.9	14.7	318	
							4.0	17.04	8.50	9.46	98.1	299.9	14.9	317	
							5.0	17.04	8.48	9.45	98.0	299.9	15.2	315	
Nelson River Upstream # 3	US-3	23-Aug-15	12:35	8.9	n/a	n/a	0.3	16.94	8.52	9.57	99.0	300.2	14.86	317.4	0.50
							1.0	16.92	8.51	9.54	98.6	300.3	14.96	313.6	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Nelson River Upstream # 3	US-3	23-Aug-15	12:35	8.9	n/a	n/a	2.0	16.93	8.51	9.53	98.5	300.3	14.19	309.7	
							3.0	16.93	8.51	9.53	98.5	300.3	15.01	308.9	
							4.0	16.92	8.51	9.52	98.4	300.3	15.10	308.6	
							5.0	16.94	8.51	9.50	98.3	300.2	15.01	309.0	
							6.0	16.94	8.50	9.49	98.2	300.2	14.97	309.7	
							7.0	16.94	8.50	9.49	98.2	300.3	14.16	310.1	
							8.0	16.94	8.49	9.48	98.0	300.3	15.66	311.0	
Nelson River Upstream # 4	US-4	23-Aug-15	13:05	11.5	n/a	n/a	0.3	16.87	8.51	9.61	99.2	299.6	15.06	316.0	0.50
							1.0	16.87	8.51	9.54	98.5	299.7	14.82	311.2	
							2.0	16.91	8.51	9.53	98.4	299.8	14.32	308	
							3.0	16.89	8.51	9.52	98.3	299.9	14.97	306.6	
							4.0	16.84	8.51	9.51	98.2	299.7	15.14	306.7	
							5.0	16.83	8.50	9.50	98.1	299.7	15.30	307.0	
							6.0	16.82	8.50	9.50	98.0	299.7	15.23	307.2	
							7.0	16.84	8.50	9.50	98.0	299.7	14.70	307.3	
							8.0	16.84	8.50	9.49	97.9	299.8	14.86	307.4	
							9.0	16.82	8.50	9.48	97.8	299.7	14.88	307.6	
							10.0	16.84	8.49	9.47	97.7	299.7	15.40	308.5	
Nelson River Upstream # 5	US-5	23-Aug-15	13:30	8.3	n/a	n/a	0.3	17.00	8.50	9.46	98.0	299.2	15.00	297.7	0.50
							1.0	17.01	8.50	9.46	97.9	299.3	14.50	298.0	
							2.0	17.01	8.50	9.44	97.8	299.2	14.97	299.0	
							3.0	17.01	8.49	9.43	97.7	299.2	15.12	299.6	
							4.0	17.00	8.50	9.43	97.7	299.1	14.88	299.9	
							5.0	17.00	8.49	9.43	97.7	299.3	15.27	300.8	
							6.0	17.00	8.49	9.42	97.6	299.2	15.41	301.6	
							7.0	16.99	8.48	9.42	97.5	299.3	15.35	302.3	
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8:45	20.3	n/a	n/a	0.3	16.51	8.52	10.04	102.9	302.8	14.11	302.8	0.45
							1.0	16.51	8.52	10.03	102.8	302.8	12.61	302.8	
							2.0	16.51	8.51	10.02	102.7	302.8	14.09	302.8	
							3.0	16.51	8.51	9.98	102.3	302.8	13.95	302.8	
							4.0	16.51	8.51	9.97	102.2	302.9	14.25	302.9	
							5.0	16.51	8.50	9.95	102.0	302.9	12.47	302.9	
							6.0	16.51	8.51	9.95	102.0	302.8	14.15	302.8	
							7.0	16.50	8.51	9.96	102.1	302.8	14.45	302.8	
							8.0	16.50	8.50	9.94	101.9	302.9	13.27	302.9	
							9.0	16.50	8.50	9.92	101.6	302.8	13.42	302.8	
							10.0	16.50	8.50	9.91	101.6	302.8	13.69	302.8	
							11.0	16.50	8.50	9.90	101.5	302.9	14.02	302.9	
							12.0	16.51	8.50	9.90	101.5	302.9	13.38	302.9	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8:45	20.3	n/a	n/a	13.0	16.50	8.50	9.89	101.3	302.9	13.39	302.9	
							14.0	16.50	8.50	9.88	101.3	302.9	14.36	302.9	
							15.0	16.50	8.50	9.87	101.1	302.9	14.31	302.9	
							16.0	16.50	8.50	9.86	101.0	302.9	11.80	302.9	
							17.0	16.50	8.50	9.85	100.9	302.9	13.14	302.9	
							18.0	16.50	8.50	9.84	100.8	302.9	14.60	302.9	
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	7:35	11.1	n/a	n/a	0.3	16.19	8.48	10.37	106.6	299.7	15.65	306.3	0.48
							1.0	16.37	8.50	10.05	102.7	301.7	13.42	307.4	
							2.0	16.37	8.51	9.97	101.9	301.8	13.59	287.3	
							3.0	16.37	8.50	9.96	101.8	301.8	13.21	287.1	
							4.0	16.38	8.50	9.95	101.7	301.8	13.49	287.4	
							5.0	16.38	8.50	9.93	101.5	301.8	14.09	287.5	
							6.0	16.38	8.50	9.92	101.4	301.8	14.37	287.6	
							7.0	16.38	8.50	9.92	101.4	301.8	14.14	287.4	
							8.0	16.38	8.50	9.90	101.3	301.7	13.52	287.0	
							9.0	16.38	8.50	9.90	101.2	301.8	13.49	286.9	
							10.0	16.37	8.50	9.89	101.1	301.8	14.05	286.9	
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	8:10	19.3	n/a	n/a	0.3	16.48	8.52	10.03	102.7	302.6	14.90	313.5	0.48
							1.0	16.49	8.51	10.00	102.5	302.6	13.63	310.2	
							2.0	16.49	8.51	9.99	102.3	302.6	13.99	308.1	
							3.0	16.49	8.52	9.99	102.3	302.6	13.77	307.1	
							4.0	16.49	8.51	9.97	102.2	302.6	13.57	306.6	
							5.0	16.48	8.51	9.97	102.2	302.6	14.12	306.1	
							6.0	16.49	8.51	9.97	102.1	302.6	14.14	305.6	
							7.0	16.49	8.51	9.95	101.9	302.6	14.60	305.1	
							8.0	16.49	8.51	9.94	101.9	302.6	15.35	304.4	
							9.0	16.49	8.50	9.93	101.8	302.7	14.03	304.0	
							10.0	16.49	8.51	9.93	101.8	302.7	13.79	303.4	
							11.0	16.49	8.51	9.91	101.6	302.7	13.69	302.7	
							12.0	16.49	8.51	9.91	101.6	302.7	13.98	302.5	
							13.0	16.49	8.51	9.90	101.4	302.8	13.93	302.3	
							14.0	16.49	8.50	9.89	101.4	302.7	14.20	302.2	
							15.0	16.49	8.50	9.89	101.3	302.7	14.59	302.1	
							16.0	16.50	8.50	9.87	101.2	302.8	14.61	301.9	
							17.0	16.50	8.50	9.87	101.1	302.7	13.89	301.7	
							18.0	16.50	8.50	9.86	101.0	302.8	13.79	301.6	
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	7:15	5.8	n/a	n/a	0.3	16.35	8.50	9.96	101.8	303.0	12.81	278.3	0.48
							1.0	16.35	8.50	9.96	101.7	302.8	13.74	278.3	
							2.0	16.37	8.50	9.94	101.5	302.1	13.73	278.2	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	7:15	5.8	n/a	n/a	3.0	16.35	8.50	9.94	101.6	302.1	13.48	278.0	
							4.0	16.37	8.49	9.92	101.4	302.1	14.50	277.9	
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	9:10	18.5	n/a	n/a	0.3	16.51	8.52	10.06	103.1	302.4	13.78	280.1	0.45
							1.0	16.50	8.51	10.04	102.9	302.4	13.64	280.2	
							2.0	16.50	8.51	10.02	102.6	302.4	12.73	208.5	
							3.0	16.50	8.51	9.99	102.4	302.3	13.64	280.6	
							4.0	16.48	8.50	9.96	102.1	302.3	15.73	281.9	
							5.0	16.48	8.50	9.95	101.9	302.2	13.12	283.1	
							6.0	16.47	8.50	9.94	101.8	302.2	13.65	283.4	
							7.0	16.47	8.50	9.92	101.6	302.2	13.96	283.4	
							8.0	16.44	8.50	9.90	101.4	301.9	15.24	283.5	
							9.0	16.45	8.50	9.90	101.3	302.0	15.11	283.8	
							10.0	16.42	8.49	9.88	101.1	301.8	14.02	284.0	
							11.0	16.41	8.50	9.87	101.0	301.7	13.53	284.1	
							12.0	16.41	8.49	9.86	100.8	301.7	13.14	284.4	
							13.0	16.40	8.49	9.84	100.7	301.5	13.13	284.6	
							14.0	16.39	8.49	9.83	100.5	301.4	13.73	284.8	
							15.0	16.39	8.49	9.81	100.3	301.3	12.89	285.0	
							16.0	16.40	8.49	9.81	100.3	301.4	14.40	285.2	
							17.0	16.39	8.49	9.80	100.2	301.4	13.69	284.4	
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	15:51	22.3	n/a	n/a	0.3	16.05	8.44	9.77	99.2	300.6	11.80	286	0.65
							1.0	16.05	8.44	9.76	99.0	300.6	11.72	282	
							2.0	16.06	8.43	9.74	98.9	300.5	12.3	280	
							3.0	16.05	8.42	9.71	98.6	300.5	11.81	278	
							4.0	16.08	8.41	9.65	98.0	300.4	11.14	278	
							5.0	16.07	8.41	9.66	98.1	300.4	11.53	277	
							6.0	16.07	8.41	9.66	98.0	300.4	11.53	278	
							7.0	16.07	8.41	9.63	97.8	300.3	11.97	276	
							8.0	16.09	8.40	9.60	97.6	300.3	11.99	279	
							9.0	16.08	8.40	9.61	97.6	300.3	11.95	277	
							10.0	16.08	8.40	9.59	97.4	300.3	11.43	277	
							11.0	16.08	8.40	9.58	97.3	300.3	12.37	277	
							12.0	16.08	8.39	9.58	97.4	300.3	11.92	277.6	
							13.0	16.09	8.39	9.54	97.0	300.3	12.20	277.4	
							14.0	16.09	8.39	9.52	96.7	300.3	12.20	277.8	
							15.0	16.09	8.40	9.52	96.8	300.2	12.01	277.4	
							16.0	16.09	8.39	9.52	96.7	300.3	12.50	278.0	
							17.0	16.09	8.39	9.50	96.6	300.3	12.20	278.3	
							18.0	16.08	8.38	9.48	96.3	300.3	12.08	278.7	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	15:51	22.3	n/a	n/a	19.0	16.06	8.39	9.48	96.2	300.5	12.87	278.8	
							20.0	15.97	8.39	9.49	96.1	301.1	11.80	279.3	
							21.0	15.95	8.39	9.49	96.1	301.0	11.81	279.3	
							22.0	15.93	8.39	9.49	95.9	301.2	-	279.9	
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	16:49	16.6	n/a	n/a	0.3	16.33	8.47	9.79	99.9	299.2	13.56	284.0	0.55
							1.0	16.33	8.47	9.75	99.6	299.3	12.59	287.0	
							2.0	16.32	8.46	9.73	99.3	299.3	13.79	286.7	
							3.0	16.33	8.46	9.69	99.0	299.3	13.64	285.2	
							4.0	16.33	8.45	9.64	98.4	299.3	14.27	280.4	
							5.0	16.34	8.45	9.63	98.3	299.4	13.47	278.6	
							6.0	16.34	8.44	9.61	98.1	299.4	14.38	277.7	
							7.0	16.34	8.44	9.60	98.0	299.3	13.80	277.5	
							8.0	16.33	8.44	9.59	97.9	299.3	13.77	277.7	
							9.0	16.33	8.43	9.56	97.6	299.3	13.07	278.0	
							10.0	16.33	8.43	9.55	97.5	299.3	13.78	278.2	
							11.0	16.33	8.42	9.54	97.4	299.3	13.92	278.6	
							12.0	16.33	8.42	9.53	97.3	299.3	13.85	279.0	
							13.0	16.33	8.43	9.51	97.1	299.3	13.85	279.9	
							14.0	16.32	8.42	9.49	96.9	299.3	13.47	280.5	
							15.0	16.31	8.42	9.47	96.9	299.3	14.66	281.0	
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	17:40	28.1	n/a	n/a	0.3	16.36	8.48	9.76	99.7	300.8	13.9	289.8	0.50
							1.0	16.36	8.49	9.75	99.6	300.6	12.8	286.1	
							3.0	16.36	8.48	9.72	99.3	300.8	12.57	284.2	
							5.0	16.36	8.48	9.71	99.2	300.7	13.01	283.0	
							7.0	16.36	8.48	9.70	99.1	300.7	11.51	282.1	
							9.0	16.36	8.47	9.65	98.6	301.0	13.41	282.0	
							11.0	16.36	8.47	9.64	98.5	301.0	12.27	282.1	
							13.0	16.36	8.47	9.61	98.2	301.0	13.21	282	
							15.0	16.36	8.47	9.58	97.9	301.0	13.21	283	
							17.0	16.37	8.47	9.56	97.7	301.1	14.19	283	
							19.0	16.37	8.47	9.55	97.6	301.1	13.46	283	
							21.0	16.37	8.46	9.54	97.4	301.2	13.30	284	
							23.0	16.37	8.47	9.52	97.3	301.1	13.00	284	
							25.0	16.37	8.46	9.51	97.2	301.1	13.45	284.6	
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	17:15	15.1	n/a	n/a	0.3	16.35	8.48	9.77	99.8	299.6	14.45	284.8	0.50
							1.0	16.35	8.48	9.77	99.8	299.6	13.98	282.2	
							2.0	16.35	8.48	9.76	99.6	299.6	13.59	280.0	
							3.0	16.34	8.48	9.75	99.6	299.6	13.47	279.2	
							4.0	16.34	8.48	9.75	99.4	299.6	13.70	278.4	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	17:15	15.1	n/a	n/a	5.0	16.34	8.47	9.72	99.3	299.6	13.24	278.2	
							6.0	16.34	8.47	9.70	99.2	299.7	11.80	278.3	
							7.0	16.34	8.47	9.68	99.0	299.8	13.80	278.3	
							8.0	16.34	8.47	9.66	98.6	300.0	13.77	278.3	
							9.0	16.33	8.46	9.61	98.2	300.4	14.31	279.0	
							10.0	16.32	8.45	9.58	97.8	300.6	14.44	279.5	
							11.0	16.31	8.45	9.54	97.4	300.8	14.46	279.9	
							12.0	16.29	8.44	9.51	97.1	301.0	14.86	280.3	
							13.0	16.29	8.44	9.50	96.9	301.1	13.42	280.5	
							14.0	16.29	8.44	9.47	96.7	301.2	-	281.0	
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	16:30	11.6	n/a	n/a	0.3	16.23	8.47	9.73	99.2	299.7	12.78	275.6	0.60
							1.0	16.22	8.46	9.72	99.1	299.7	12.87	272.6	
							2.0	16.23	8.46	9.71	98.9	299.7	12.44	270.3	
							3.0	16.23	8.46	9.69	98.7	299.7	12.91	268.9	
							4.0	16.23	8.45	9.65	98.4	299.7	12.80	269.4	
							5.0	16.23	8.45	9.66	98.4	299.7	12.39	269.5	
							6.0	16.23	8.44	9.64	98.2	299.8	13.21	269.4	
							7.0	16.22	8.44	9.61	97.9	299.8	14.06	269.7	
							8.0	16.22	8.44	9.59	97.7	299.8	13.65	270.1	
							9.0	16.22	8.44	9.57	97.5	299.7	13.91	270.5	
							10.0	16.22	8.43	9.56	97.4	299.7	13.96	270.8	
Nelson River Upstream # 1	US-1	23-Sep-15	15:27	13.7	n/a	n/a	0.3	12.04	8.34	10.53	97.9	309.4	14.76	255.1	0.45
Nelson River Upstream # 2	US-2	23-Sep-15	15:53	7.7	n/a	n/a	0.3	12.18	8.40	10.70	99.4	317.0	14.66	283.7	0.50
Nelson River Upstream # 3	US-3	23-Sep-15	16:29	10.3	n/a	n/a	0.3	12.16	8.42	10.83	100.0	309.7	15.06	295.1	0.55
Nelson River Upstream # 4	US-4	23-Sep-15	17:08	11.0	n/a	n/a	0.3	12.07	8.42	11.94	110.1	308.9	14.69	296.6	0.45
Nelson River Upstream # 5	US-5	23-Sep-15	16:11	9.0	n/a	n/a	0.3	12.18	8.40	10.62	98.9	316.6	14.45	291.8	0.60
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	11:17	20.2	n/a	n/a	0.3	11.93	8.40	11.14	103.0	316.7	14.70	-	0.55
							1.0	11.95	8.40	10.98	101.8	316.7	14.83	-	
							2.0	11.96	8.40	10.95	101.6	316.7	14.84	-	
							3.0	11.95	8.40	10.94	101.5	316.7	15.24	-	
							4.0	11.96	8.40	10.92	101.3	316.7	15.30	-	
							5.0	11.96	8.40	10.91	101.2	316.8	14.98	-	
							6.0	11.95	8.40	10.90	101.1	316.8	15.76	-	
							7.0	11.95	8.40	10.90	101.1	316.8	14.68	-	
							8.0	11.94	8.40	10.89	101.0	316.7	14.66	-	
							9.0	11.94	8.40	10.88	100.9	316.7	14.83	-	
							10.0	11.95	8.39	10.87	100.8	316.8	15.24	-	
							11.0	11.96	8.39	10.85	100.7	316.8	15.07	-	
							12.0	11.96	8.39	10.84	100.6	316.8	14.88	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	11:17	20.2	n/a	n/a	13.0	11.96	8.39	10.83	100.5	316.8	14.98	-	
							14.0	11.96	8.39	10.82	100.4	316.8	12.82	-	
							15.0	11.96	8.39	10.81	100.3	316.9	15.16	-	
							16.0	11.96	8.39	10.80	100.2	316.9	15.82	-	
							17.0	11.96	8.39	10.79	100.2	316.9	15.51	-	
							18.0	11.96	8.39	10.79	100.1	316.8	15.78	-	
							19.0	11.96	8.38	10.78	100.0	316.8	15.34	-	
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	12:06	12.1	n/a	n/a	0.3	11.88	8.42	11.16	103.1	315.8	14.19	-	0.50
							1.0	11.90	8.41	10.97	101.6	316.2	14.59	-	
							2.0	11.91	8.41	10.93	101.3	316.3	15.26	-	
							3.0	11.91	8.40	10.90	101.0	316.1	14.26	-	
							4.0	11.91	8.40	10.88	100.8	316.0	14.87	-	
							5.0	11.91	8.40	10.86	100.6	316.3	14.41	-	
							6.0	11.91	8.40	10.85	100.5	315.8	15.00	-	
							7.0	11.90	8.40	10.84	100.5	316.0	14.35	-	
							8.0	11.90	8.40	10.84	100.4	316.0	14.56	-	
							9.0	11.90	8.40	10.83	100.3	315.8	14.56	-	
							10.0	11.91	8.40	10.81	100.2	315.5	14.59	-	
							11.0	11.91	8.40	10.81	100.1	315.9	14.35	-	
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	11:40	19.9	n/a	n/a	0.3	11.93	8.40	11.11	102.8	315.7	14.82	-	0.50
							1.0	11.93	8.40	11.00	102.0	315.8	14.56	-	
							2.0	11.93	8.40	10.96	101.6	315.7	14.95	-	
							3.0	11.93	8.39	10.95	101.5	315.7	14.81	-	
							4.0	11.93	8.39	10.93	101.3	315.7	15.09	-	
							5.0	11.93	8.39	10.92	101.2	315.7	14.87	-	
							6.0	11.94	8.39	10.90	101.1	315.7	15.24	-	
							7.0	11.94	8.39	10.88	100.9	315.9	14.84	-	
							8.0	11.94	8.39	10.87	100.8	315.8	15.13	-	
							9.0	11.94	8.39	10.86	100.7	315.8	15.26	-	
							10.0	11.93	8.39	10.86	100.7	315.5	15.05	-	
							11.0	11.93	8.39	10.86	100.6	315.6	15.04	-	
							12.0	11.94	8.39	10.84	100.5	315.7	14.97	-	
							13.0	11.94	8.39	10.82	100.4	315.8	14.90	-	
							14.0	11.94	8.39	10.82	100.3	315.9	15.14	-	
							15.0	11.94	8.39	10.81	100.2	316.1	14.62	-	
							16.0	11.94	8.39	10.78	100.0	316.1	15.05	-	
							17.0	11.94	8.39	10.77	100.0	316.1	15.04	-	
							18.0	11.94	8.39	10.77	100.0	316.2	15.09	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	12:30	6.6	n/a	n/a	0.3	11.83	8.42	11.20	103.3	314.8	14.02	-	0.50
							1.0	11.88	8.41	11.02	101.9	315.4	13.82	-	
							2.0	11.88	8.41	10.95	101.4	315.5	15.62	-	
							3.0	11.88	8.41	10.91	101.0	315.4	14.94	-	
							4.0	11.88	8.40	10.89	100.9	315.5	14.50	-	
							5.0	11.87	8.40	10.87	100.7	315.3	14.48	-	
							6.0	11.86	8.40	10.86	100.4	315.0	14.06	-	
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	10:53	19.5	n/a	n/a	0.3	11.92	8.42	12.09	109.7	316.8	14.29	-	0.55
							1.0	11.92	8.41	11.34	104.7	317.0	14.71	-	
							2.0	11.93	8.41	11.13	103.0	316.7	14.46	-	
							3.0	11.91	8.41	11.04	102.1	315.7	14.90	-	
							4.0	11.92	8.40	10.98	101.8	316.2	14.81	-	
							5.0	11.94	8.40	10.96	101.5	316.8	15.63	-	
							6.0	11.92	8.40	10.93	101.4	316.5	14.93	-	
							7.0	11.93	8.40	10.92	101.2	316.9	14.60	-	
							8.0	11.93	8.40	10.90	101.1	316.6	15.43	-	
							9.0	11.92	8.40	10.88	100.9	316.1	16.27	-	
							10.0	11.92	8.39	10.87	100.7	316.1	14.85	-	
							11.0	11.91	8.39	10.85	100.6	316.0	14.65	-	
							12.0	11.91	8.39	10.84	100.4	316.0	14.67	-	
							13.0	11.91	8.39	10.83	100.3	315.6	14.75	-	
							14.0	11.91	8.39	10.82	100.2	315.6	14.51	-	
							15.0	11.90	8.39	10.80	100.0	315.1	14.99	-	
							16.0	11.90	8.39	10.79	99.9	315.4	14.54	-	
							17.0	11.90	8.39	10.78	99.8	315.4	14.43	-	
							18.0	11.90	8.39	10.77	99.8	315.3	14.79	-	
							19.0	11.90	8.39	10.76	99.7	315.2	14.91	-	
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8:53	23.7	n/a	n/a	0.3	11.50	8.40	10.85	99.4	308.9	13.65	-	0.55
							1.0	11.51	8.39	10.73	98.5	309.1	13.46	-	
							2.0	11.51	8.39	10.68	98.0	309.1	13.65	-	
							3.0	11.50	8.39	10.66	97.8	309.1	13.61	-	
							4.0	11.50	8.39	10.63	97.6	309.2	14.01	-	
							5.0	11.49	8.38	10.61	97.4	309.2	13.76	-	
							6.0	11.49	8.38	10.60	97.3	309.2	13.58	-	
							7.0	11.49	8.39	10.59	97.2	309.2	13.52	-	
							8.0	11.50	8.39	10.57	97.0	309.2	13.50	-	
							9.0	11.48	8.38	10.56	96.9	309.3	13.46	-	
							10.0	11.48	8.38	10.56	96.9	309.3	13.84	-	
							11.0	11.48	8.38	10.55	96.8	309.3	13.83	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8:53	23.7	n/a	n/a	12.0	11.47	8.38	10.54	96.7	309.3	13.71	-	
							13.0	11.44	8.39	10.53	96.6	309.5	13.44	-	
							14.0	11.43	8.38	10.53	96.5	309.5	13.86	-	
							15.0	11.43	8.38	10.52	96.4	309.5	13.70	-	
							16.0	11.40	8.38	10.51	96.2	309.6	14.08	-	
							17.0	11.35	8.38	10.52	96.3	309.6	13.79	-	
							18.0	11.34	8.38	10.52	96.2	309.7	15.66	-	
							19.0	11.33	8.38	10.51	96.1	309.7	14.16	-	
							20.0	11.32	8.38	10.50	96.0	309.7	14.54	-	
							22.0	11.32	8.38	10.49	95.9	309.8	15.02	-	0.55
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	9:23	15.8	n/a	n/a	0.3	11.65	8.40	10.78	99.2	309.8	13.73	-	
							1.0	11.64	8.39	10.70	98.5	309.8	13.75	-	
							2.0	11.66	8.39	10.65	98.1	309.9	14.07	-	
							3.0	11.67	8.39	10.60	97.7	310.0	13.73	-	
							4.0	11.67	8.39	10.58	97.5	310.0	13.98	-	
							5.0	11.67	8.39	10.57	97.4	310.0	13.72	-	
							6.0	11.67	8.39	10.55	97.2	310.0	13.80	-	
							7.0	11.67	8.39	10.54	97.1	310.0	13.85	-	
							8.0	11.67	8.39	10.52	97.0	310.0	13.45	-	
							9.0	11.67	8.38	10.50	96.8	310.0	13.99	-	
							10.0	11.67	8.38	10.50	96.7	310.0	14.21	-	
							11.0	11.67	8.38	10.48	96.6	310.0	14.17	-	
							12.0	11.67	8.38	10.47	96.5	310.1	14.04	-	
							13.0	11.67	8.38	10.47	96.5	310.1	14.26	-	
							14.0	11.67	8.38	10.45	96.4	310.1	13.62	-	
							15.0	11.67	8.38	10.44	96.2	310.1	14.43	-	0.55
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	10:05	26.9	n/a	n/a	0.3	11.86	8.40	10.89	100.6	309.7	13.64	-	
							1.0	11.88	8.40	10.75	99.5	310.3	13.78	-	
							2.0	11.89	8.40	10.69	99.0	310.3	13.91	-	
							3.0	11.90	8.40	10.65	98.6	310.4	14.06	-	
							4.0	11.89	8.40	10.62	98.4	310.4	14.35	-	
							5.0	11.88	8.40	10.60	98.2	310.4	13.72	-	
							6.0	11.88	8.40	10.59	98.0	310.4	13.60	-	
							7.0	11.88	8.40	10.58	97.9	310.4	13.65	-	
							8.0	11.89	8.39	10.56	97.8	310.4	13.70	-	
							9.0	11.89	8.39	10.54	97.6	310.4	13.98	-	
							10.0	11.88	8.40	10.53	97.6	310.6	14.07	-	
							11.0	11.88	8.39	10.52	97.4	310.5	13.57	-	
							12.0	11.87	8.39	10.52	97.4	310.6	13.81	-	

Table A1-1: *In situ* parameters measured in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth	Snow Thickness	Ice Thickness	Sample Depth	Temperature	pH	Dissolved Oxygen		Specific Conductance	Turbidity	ORP	Secchi Depth
				(m)	(m)	(m)	(m)	(°C)	(pH units)	(mg/L)	(% Saturation)	(µS/cm)	(NTU)	(mV)	(m)
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	10:05	26.9	n/a	n/a	13.0	11.87	8.40	10.51	97.3	310.6	13.80	-	
							14.0	11.87	8.39	10.50	97.2	310.6	13.68	-	
							15.0	11.87	8.39	10.50	97.1	310.6	13.54	-	
							16.0	11.87	8.39	10.48	97.0	310.6	14.03	-	
							17.0	11.87	8.39	10.47	96.9	310.6	14.24	-	
							18.0	11.87	8.39	10.46	96.8	310.6	13.82	-	
							19.0	11.87	8.39	10.45	96.8	310.7	14.04	-	
							20.0	11.87	8.39	10.44	96.7	310.6	14.40	-	
							22.0	11.85	8.39	10.43	96.4	310.6	14.36	-	
							24.0	11.76	8.39	10.41	96.1	310.6	14.00	-	
							26.0	11.67	8.39	10.42	96.1	310.5	14.14	-	
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	9:44	14.4	n/a	n/a	0.3	11.77	8.41	10.85	100.0	309.8	14.19	-	0.55
							1.0	11.77	8.40	10.70	98.8	310.0	14.25	-	
							2.0	11.78	8.40	10.64	98.3	310.1	14.08	-	
							3.0	11.78	8.40	10.61	98.0	310.1	14.43	-	
							4.0	11.78	8.40	10.59	97.8	310.1	14.41	-	
							5.0	11.78	8.39	10.57	97.6	310.1	14.26	-	
							6.0	11.78	8.39	10.55	97.4	310.2	14.24	-	
							7.0	11.77	8.39	10.53	97.3	310.2	14.42	-	
							8.0	11.77	8.39	10.52	97.2	310.1	14.50	-	
							9.0	11.77	8.39	10.51	97.1	310.2	14.22	-	
							10.0	11.76	8.39	10.50	97.0	310.2	15.40	-	
							11.0	11.76	8.39	10.49	96.9	310.2	14.52	-	
							12.0	11.76	8.39	10.47	96.7	310.1	14.66	-	
							13.0	11.74	8.38	10.47	96.6	310.1	14.85	-	
							14.0	11.73	8.38	10.46	96.5	310.1	15.01	-	
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	8:29	11.9	n/a	n/a	0.3	11.56	8.37	10.65	97.9	309.1	13.67	-	0.55
							1.0	11.56	8.37	10.63	97.8	309.3	13.94	-	
							2.0	11.57	8.38	10.62	97.6	309.7	14.52	-	
							3.0	11.57	8.38	10.61	97.5	309.8	13.85	-	
							4.0	11.57	8.38	10.60	97.4	309.7	13.95	-	
							5.0	11.57	8.38	10.59	97.4	309.7	13.82	-	
							6.0	11.56	8.38	10.58	97.2	309.8	13.93	-	
							7.0	11.55	8.38	10.57	97.2	309.9	13.96	-	
							8.0	11.54	8.38	10.56	97.8	309.8	14.24	-	
							9.0	11.53	8.38	10.56	97.0	309.9	13.50	-	
							10.0	11.50	8.38	10.55	96.9	310.0	13.70	-	
							11.0	11.48	8.39	10.53	96.6	310.3	14.56	-	

Table A1-2: *In situ* parameters measured in the Keeyask regional study area (RSA), June 2015.

Sample Location	Site ID	Sample Date	Sample Time	Total Water Depth (m)	Sample Depth (m)	Temperature (°C)	pH (pH units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductance (µS/cm)	Turbidity (NTU)	ORP (mV)	Secchi Depth (m)
Stephens Lake-North Arm	STL-N	16-Jun-15	14:00	7.5	0.3	9.12	8.30	11.36	101.1	281.0	31.8	171	0.50
					1.0	9.06	8.30	11.45	101.8	281.2	29.6	171	
					2.0	9.05	8.30	11.48	101.9	281.3	27.5	171	
					3.0	8.77	8.31	11.48	101.4	279.6	27.4	177	
					4.0	8.70	8.31	11.51	101.4	279.5	30.5	178	
					5.0	8.71	8.31	11.51	101.4	279.7	31.1	179	
					6.0	8.70	8.31	11.49	101.3	280.4	35.6	180	
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	12:35	33.0	0.3	12.62	8.36	10.45	100.6	299.2	31.4	148	0.55
					1.0	12.59	8.36	10.45	100.6	299.3	29.5	148	
					3.0	12.50	8.36	10.46	100.5	299.0	28.5	148	
					5.0	12.45	8.36	10.47	100.5	298.8	28.2	148	
					7.0	12.37	8.35	10.48	100.3	298.2	27.8	149	
					9.0	12.35	8.35	10.48	100.2	298.2	26.1	149	
					11.0	12.28	8.35	10.46	100.0	297.9	28.0	149	
					13.0	12.29	8.35	10.44	100.0	297.9	27.2	149	
					15.0	12.26	8.35	10.44	99.8	297.7	27.4	150	
					16.5	12.25	8.36	10.45	99.8	297.6	27.6	150	
Long Spruce Forebay	LNR-3	16-Jun-15	12:05	15.0	0.3	11.90	8.29	10.48	98.9	280.0	30.5	147	0.55
					1.0	11.91	8.31	10.48	98.9	280.0	28.8	147	
					2.0	11.90	8.31	10.48	98.9	280.0	28.5	147	
					3.0	11.91	8.31	10.47	98.8	280.3	30.5	147	
					4.0	11.92	8.31	10.47	98.8	280.5	30.2	147	
					5.0	11.93	8.31	10.47	98.8	280.5	28.2	147	
					6.0	11.90	8.31	10.48	98.9	280.5	28.3	147	
					7.0	11.92	8.31	10.48	98.9	280.1	28.8	148	
					8.0	11.89	8.31	10.48	98.8	280.6	30.5	148	
					9.0	11.88	8.31	10.47	98.7	280.7	30.5	148	
					10.0	11.88	8.31	10.46	98.5	280.7	29.4	148	
					11.0	11.81	8.31	10.47	98.5	281.1	31.6	148	
					12.0	11.77	8.31	10.46	98.3	281.4	31.7	149	
					13.0	11.74	8.31	10.45	98.1	281.5	28.7	149	
					14.0	11.75	8.31	10.42	98.0	281.4	30.5	149	
Limestone Forebay	LNR-4	16-Jun-15	11:30	26.0	0.3	11.67	8.29	10.44	97.9	286.5	25.3	179	0.50
					1.0	11.68	8.31	10.53	98.5	286.7	24.8	178	
					3.0	11.65	8.31	10.56	98.6	286.0	25.1	178	
					5.0	11.66	8.31	10.56	98.6	286.5	24.9	177	
					7.0	11.63	8.31	10.56	98.6	285.9	24.0	177	
					9.0	11.62	8.32	10.56	98.7	285.9	24.9	177	
Nelson River upstream of proposed Conawapa Generating Station	LNR-5	16-Jun-15	11:00	1.2	0.3	11.11	8.22	10.65	97.7	245.5	43.6	163	-
Nelson River downstream of the proposed Conawapa Generating Station	LNR-6	16-Jun-15	10:40	1.1	0.3	11.38	8.26	10.60	97.8	280.4	47.8	160	-
Nelson River downstream of Deer Island	LNR-7	16-Jun-15	10:05	2.5	0.3	11.15	8.29	10.70	97.9	269.8	36.0	171	-
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	9:40	3.1	0.3	11.02	8.29	10.79	98.4	261	50.2	178	-

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect.

				Alkalinity				Nitrogen							
Sample Location	Site ID	Sample Date	Sample Time	Total ($CaCO_3$) (mg/L)	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (OH) (mg/L)	Ammonia (mg/L N)	Nitrate/ Nitrite (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Dissolved Inorganic N[1] (mg/L)	Total Organic N[2] (mg/L)	Total N[3] (mg/L)
Detection Limit				1.0/20	1.2/24	0.60/12	0.34/6.8	0.010	0.0051	0.0050	0.0010	0.20			
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	9:24	117	137	<12	<6.8	0.026	0.0583	0.0583	<0.0010	0.51	0.084	0.48	0.57
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	117	136	<12	<6.8	0.019	0.0548	0.0548	<0.0010	0.53	0.074	0.51	0.58
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	13:10	116	136	<12	<6.8	0.012	0.0559	0.0559	<0.0010	0.45	0.068	0.44	0.51
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	115	133	<12	<6.8	0.017	0.0561	0.0561	<0.0010	0.40	0.073	0.38	0.46
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	10:31	117	136	<12	<6.8	0.017	0.0560	0.0560	<0.0010	0.42	0.073	0.40	0.48
Nelson River Upstream # 1	US-6	2-Apr-15	9:40	118	137	<12	<6.8	<0.010	0.0544	0.0544	<0.0010	0.59	0.012	0.59	0.60
Nelson River Upstream # 2	US-7	2-Apr-15	11:21	116	135	<12	<6.8	<0.010	0.0553	0.0553	<0.0010	0.47	0.060	0.47	0.53
Nelson River Upstream # 3	US-8	2-Apr-15	11:00	118	137	<12	<6.8	<0.010	0.0532	0.0532	<0.0010	0.44	0.058	0.44	0.49
Nelson River Upstream # 4	US-9	2-Apr-15	12:40	118	137	<12	<6.8	<0.010	0.0516	0.0516	<0.0010	0.44	0.057	0.44	0.49
Nelson River Upstream # 5	US-10	2-Apr-15	11:51	118	137	<12	<6.8	0.013	0.0551	0.0551	<0.0010	0.46	0.068	0.45	0.52
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	14:41	117	137	<12	<6.8	<0.010	0.0510	0.0510	<0.0010	0.45	0.056	0.45	0.50
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	16:50	117	136	<12	<6.8	0.015	0.0530	0.0530	<0.0010	0.45	0.068	0.44	0.50
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	14:15	110	128	<12	<6.8	0.039	0.0526	0.0526	<0.0010	0.53	0.092	0.49	0.58
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	16:18	117	136	<12	<6.8	<0.010	0.0516	0.0516	<0.0010	0.45	0.057	0.45	0.50
Nelson River Upstream # 1	US-1	23-Jun-15	10:20	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Nelson River Upstream # 2	US-2	23-Jun-15	10:44	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.31	<0.010	0.31	0.31
Nelson River Upstream # 3	US-3	23-Jun-15	12:00	107	130	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.28	<0.010	0.28	0.28
Nelson River Upstream # 4	US-4	23-Jun-15	11:33	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.31	<0.010	0.31	0.32
Nelson River Upstream # 5	US-5	23-Jun-15	11:03	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.31	<0.010	0.31	0.31
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	11:27	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.40	<0.010	0.40	0.40
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	13:01	109	133	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.40	<0.010	0.40	0.40
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	12:05	110	134	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.41	<0.010	0.41	0.41
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	12:35	110	134	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.38	<0.010	0.38	0.38
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	11:10	109	133	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.37	<0.010	0.37	0.37
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	106	129	<0.60	<0.34	0.015	<0.0051	<0.0050	<0.0010	0.36	0.018	0.35	0.36
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	9:07	107	130	<0.60	<0.34	0.022	<0.0051	<0.0050	<0.0010	0.38	0.025	0.36	0.38
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.41	<0.010	0.41	0.41
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	9:28	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.42	<0.010	0.42	0.42
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	107	131	<0.60	<0.34	0.011	<0.0051	<0.0050	<0.0010	0.38	0.014	0.37	0.38
Nelson River Upstream # 1	US-1	27-Jul-15	12:51	112	132	2.16	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Nelson River Upstream # 2	US-2	27-Jul-15	13:22	113	133	2.64	<0.34	<0.010	0.0056	0.0056	<0.0010	0.36	0.011	0.36	0.37
Nelson River Upstream # 3	US-3	27-Jul-15	14:42	113	133	2.28	<0.34	0.013	<0.0051	<0.0050	<0.0010	0.32	0.016	0.31	0.32
Nelson River Upstream # 4	US-4	27-Jul-15	14:23	115	134	2.88	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.35	<0.010	0.35	0.35
Nelson River Upstream # 5	US-5	27-Jul-15	13:43	113	133	2.16	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.32	<0.010	0.31	0.32
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	11:09	109	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.42	<0.010	0.42	0.42
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	11:29	109	133	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.39	<0.010	0.39	0.39
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	11:56	107	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.38	<0.010	0.38	0.38
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	10:01	111	135	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.38	<0.010	0.38	0.38
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	110	134	<0.60	<0.34	0.040	<0.0051	<0.0050	<0.0010	0.39	0.043	0.35	0.39
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	9:17	110	135	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.36	<0.010	0.36	0.36
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8:29	106	130	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.32	<0.010	0.32	0.32

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

				Alkalinity				Nitrogen							
Sample Location	Site ID	Sample Date	Sample Time	Total ($CaCO_3$) (mg/L)	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (OH) (mg/L)	Ammonia (mg/L N)	Nitrate/ Nitrite (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Dissolved Inorganic N[1] (mg/L)	Total Organic N[2] (mg/L)	Total N[3] (mg/L)
Detection Limit				1.0/20	1.2/24	0.60/12	0.34/6.8	0.010	0.0051	0.0050	0.0010	0.20			
Nelson River Upstream # 1	US-1	23-Aug-15	11:30	107	130	<0.60	<0.34	<0.010	0.0076	0.0076	<0.0010	0.50	0.013	0.50	0.51
Nelson River Upstream # 2	US-2	23-Aug-15	12:08	107	130	<0.60	<0.34	<0.010	0.0102	0.0102	<0.0010	0.40	0.015	0.40	0.41
Nelson River Upstream # 3	US-3	23-Aug-15	12:35	106	129	<0.60	<0.34	0.012	0.0094	0.0094	<0.0010	0.48	0.021	0.47	0.49
Nelson River Upstream # 4	US-4	23-Aug-15	13:05	106	130	<0.60	<0.34	<0.010	0.0084	0.0084	<0.0010	0.47	0.013	0.47	0.48
Nelson River Upstream # 5	US-5	23-Aug-15	13:30	107	130	<0.60	<0.34	0.014	0.0115	0.0115	<0.0010	0.50	0.026	0.49	0.51
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8:45	106	125	1.80	<0.34	<0.010	0.0104	0.0104	<0.0010	0.58	0.015	0.58	0.59
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	7:35	105	126	1.08	<0.34	<0.010	0.0110	0.0110	<0.0010	0.59	0.016	0.59	0.60
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	8:10	106	128	0.68	<0.34	<0.010	0.0113	0.0106	<0.0010	0.59	0.016	0.59	0.60
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	7:15	105	128	<0.60	<0.34	<0.010	0.0184	0.0184	<0.0010	0.66	0.023	0.66	0.68
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	9:10	107	127	1.56	<0.34	<0.010	0.0109	0.0098	0.0011	0.64	0.016	0.64	0.65
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	15:51	107	130	<0.60	<0.34	<0.010	0.0063	0.0063	<0.0010	0.52	0.011	0.52	0.53
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	16:49	105	128	<0.60	<0.34	<0.010	0.0092	0.0092	<0.0010	0.59	0.014	0.59	0.60
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	17:40	104	127	<0.60	<0.34	<0.010	0.0082	0.0082	<0.0010	0.60	0.013	0.60	0.61
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	17:15	106	129	<0.60	<0.34	<0.010	0.0066	0.0066	<0.0010	0.53	0.012	0.53	0.54
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	16:30	105	128	<0.60	<0.34	<0.010	0.0057	0.0057	<0.0010	0.63	0.011	0.63	0.64
Nelson River Upstream # 1	US-1	23-Sep-15	15:27	131	160	<0.60	<0.34	0.014	0.0435	0.0423	0.0012	0.41	0.058	0.40	0.45
Nelson River Upstream # 2	US-2	23-Sep-15	15:53	112	137	<0.60	<0.34	0.013	0.0463	0.0451	0.0012	0.46	0.059	0.45	0.51
Nelson River Upstream # 3	US-3	23-Sep-15	16:29	112	137	<0.60	<0.34	0.014	0.0440	0.0428	0.0012	0.38	0.052	0.37	0.42
Nelson River Upstream # 4	US-4	23-Sep-15	17:08	111	136	<0.60	<0.34	0.014	0.0442	0.0430	0.0012	0.39	0.058	0.38	0.43
Nelson River Upstream # 5	US-5	23-Sep-15	16:11	111	136	<0.60	<0.34	0.015	0.0453	0.0439	0.0014	0.45	0.060	0.44	0.50
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	11:17	106	129	<0.60	<0.34	0.015	0.0469	0.0456	0.0014	0.29	0.062	0.28	0.34
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	12:06	107	130	<0.60	<0.34	0.012	0.0477	0.0463	0.0014	0.24	0.060	0.23	0.29
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	11:40	107	130	<0.60	<0.34	0.015	0.0475	0.0462	0.0013	0.28	0.063	0.27	0.33
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	12:30	106	129	<0.60	<0.34	0.012	0.0469	0.0456	0.0014	0.33	0.059	0.32	0.38
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	10:53	106	129	<0.60	<0.34	0.016	0.0480	0.0463	0.0017	0.29	0.064	0.27	0.34
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8:53	109	133	<0.60	<0.34	0.012	0.0464	0.0450	0.0014	0.31	0.058	0.30	0.36
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	9:23	108	132	<0.60	<0.34	0.014	0.0483	0.0467	0.0016	0.26	0.062	0.25	0.31
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	10:05	110	134	<0.60	<0.34	0.012	0.0480	0.0465	0.0015	<0.20	0.060	<0.20	<0.20
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	9:44	109	133	<0.60	<0.34	0.012	0.0478	0.0462	0.0016	<0.20	0.060	<0.20	<0.20
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	8:29	110	134	<0.60	<0.34	0.011	0.0502	0.0485	0.0017	<0.20	0.061	<0.20	<0.20

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

			Phosphorus				N:P Molar Ratios			Carbon		C:N Molar Ratios		Water Clarity		
Sample Location	Site ID	Sample Date	Dissolved P (mg/L)	Total Particulate P (mg/L)	Total P (mg/L)	Dissolved Fraction (%)	TN:TP (mg/L)	DIN:DP (mg/L)	DIN:TP (mg/L)	Total Organic C (mg/L)	Dissolved Organic C (mg/L)	TOC:ON	TOC:TN	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)
Detection Limit			0.0010	0.0028/0.010	0.0010/0.010					1.0	1.0			2.0	0.10	5.0
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	0.0152	-	0.033	46	38	12	6	6.5	6.3	16	13	8.2	14.9	8.8
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	0.0161	-	0.033	49	39	10	5	6.6	6.4	15	13	6.8	14.5	10.2
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	0.0158	-	0.031	51	36	10	5	6.5	6.4	17	15	10.2	15.7	10.4
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	0.0174	-	0.031	56	33	9	5	6.4	6.4	19	16	7.8	15.1	11.2
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	0.0207	-	0.032	65	33	8	5	6.4	6.3	19	16	7.4	14.1	10.5
Nelson River Upstream # 1	US-6	2-Apr-15	0.0144	-	0.029	50	46	2	1	7.0	6.9	14	14	3.7	9.55	12.7
Nelson River Upstream # 2	US-7	2-Apr-15	0.0152	-	0.029	52	40	9	5	7.1	7.1	18	16	4.6	9.13	11.3
Nelson River Upstream # 3	US-8	2-Apr-15	0.0156	-	0.030	52	36	8	4	6.8	6.9	18	16	4.2	9.57	10.4
Nelson River Upstream # 4	US-9	2-Apr-15	0.0144	-	0.028	51	39	9	4	6.8	6.6	18	16	4.6	9.43	20.0
Nelson River Upstream # 5	US-10	2-Apr-15	0.0144	-	0.029	50	39	10	5	6.6	6.8	17	15	3.8	9.36	13.9
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	0.0146	-	0.038	38	29	8	3	6.9	6.8	18	16	19.6	15.8	17.5
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	0.0145	-	0.029	50	38	10	5	6.8	6.8	18	16	9.4	9.87	11.0
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	0.0148	-	0.033	45	39	14	6	6.8	6.9	16	14	8.6	10.1	15.1
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	0.0151	-	0.029	52	38	8	4	6.9	6.9	18	16	9.0	11.5	12.2
Nelson River Upstream # 1	US-1	23-Jun-15	0.0117	-	0.041	29	20	1	0	5.3	5.3	17	17	13.2	26.0	13.8
Nelson River Upstream # 2	US-2	23-Jun-15	0.0102	-	0.039	26	18	2	0	5.3	5.4	20	20	12.8	26.0	12.2
Nelson River Upstream # 3	US-3	23-Jun-15	0.0105	-	0.043	24	15	2	0	5.7	5.4	24	24	14.8	27.0	14.4
Nelson River Upstream # 4	US-4	23-Jun-15	0.0115	-	0.040	29	17	1	0	5.4	5.5	20	20	13.7	27.0	14.2
Nelson River Upstream # 5	US-5	23-Jun-15	0.0114	-	0.042	27	16	1	0	5.6	5.4	21	21	13.8	27.0	15.6
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	0.0091	-	0.037	25	24	2	0	5.6	5.7	17	16	9.6	22.0	15.3
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	0.0154	-	0.038	41	23	1	0	5.5	5.7	16	16	8.6	22.0	14.8
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	0.0085	-	0.037	23	25	2	0	5.8	5.7	17	16	9.6	21.0	15.5
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	0.0090	-	0.037	24	23	2	0	5.4	5.7	17	16	9.0	22.0	16.4
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	0.0109	-	0.036	30	23	2	0	4.9	5.3	16	15	9.4	22.0	17.0
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	0.0088	-	0.035	25	23	4	1	5.5	5.4	19	18	6.6	22.0	29.6
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	0.0085	-	0.035	24	24	6	2	5.4	5.6	18	16	8.8	21.0	15.9
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	0.0085	-	0.034	25	27	2	0	5.5	5.7	16	16	8.2	20.0	14.6
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	0.0090	-	0.035	26	27	2	0	5.7	5.8	16	16	8.6	21.0	14.5
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	0.0111	-	0.035	32	24	3	1	5.7	5.6	18	17	8.0	22.0	14.4
Nelson River Upstream # 1	US-1	27-Jul-15	0.0144	-	0.039	37	21	1	0	8.2	8.6	27	26	5.8	20.0	15.8
Nelson River Upstream # 2	US-2	27-Jul-15	0.0149	-	0.039	38	21	2	1	8.5	8.4	28	27	7.6	19.0	14.6
Nelson River Upstream # 3	US-3	27-Jul-15	0.0143	-	0.040	36	18	2	1	8.5	8.4	32	31	2.2	21.0	15.1
Nelson River Upstream # 4	US-4	27-Jul-15	0.0138	-	0.039	35	20	1	0	8.6	8.2	29	28	8.2	21.0	15.5
Nelson River Upstream # 5	US-5	27-Jul-15	0.0148	-	0.038	39	18	1	0	8.9	8.7	33	33	9.4	20.0	16.0
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	0.0131	-	0.034	39	27	1	0	9.1	9.8	26	25	5.6	17.4	7.1
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	0.0126	-	0.032	39	25	1	1	8.0	8.5	26	26	6.2	16.4	8.3
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	0.0123	-	0.030	41	29	1	1	8.2	8.3	25	24	10.2	17.1	7.8
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	0.0132	-	0.026	51	33	1	1	8.1	8.3	25	25	5.2	15.0	7.2
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	0.0134	-	0.027	50	30	1	1	8.1	8.3	27	26	6.2	17.1	7.4
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	0.0119	-	0.026	46	33	1	1	8.1	8.4	25	25	4.4	14.3	8.9
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	0.0126	-	0.028	45	31	7	3	8.1	8.2	27	24	5.0	13.7	9.9
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	0.0127	-	0.028	45	29	1	1	8.1	8.6	27	26	4.4	14.1	8.4
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	0.0117	-	0.028	42	29	1	1	8.1	8.3	27	26	4.2	13.8	9.6
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	0.0123	-	0.027	46	26	1	1	8.0	8.3	30	29	3.2	13.9	8.6

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

			Phosphorus				N:P Molar Ratios			Carbon		C:N Molar Ratios		Water Clarity		
Sample Location	Site ID	Sample Date	Dissolved P (mg/L)	Total Particulate P (mg/L)	Total P (mg/L)	Dissolved Fraction (%)	TN:TP (mg/L)	DIN:DP (mg/L)	DIN:TP (mg/L)	Total Organic C (mg/L)	Dissolved Organic C (mg/L)	TOC:ON	TOC:TN	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)
Detection Limit			0.0010	0.0028/0.010	0.0010/0.010					1.0	1.0			2.0	0.10	5.0
Nelson River Upstream # 1	US-1	23-Aug-15	0.0090	-	0.040	23	28	3	1	9.8	10.5	23	23	14.4	23.0	19.7
Nelson River Upstream # 2	US-2	23-Aug-15	0.0105	-	0.038	28	24	3	1	9.7	10.2	29	28	12.4	22.0	19.3
Nelson River Upstream # 3	US-3	23-Aug-15	0.012	-	0.039	31	28	4	1	9.7	9.6	24	23	11.6	22.0	19.0
Nelson River Upstream # 4	US-4	23-Aug-15	0.0100	-	0.038	26	28	3	1	9.7	9.8	24	24	10.6	22.0	19.0
Nelson River Upstream # 5	US-5	23-Aug-15	0.0104	-	0.039	27	29	5	1	9.6	9.7	23	22	14.2	23.0	17.6
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	0.0095	-	0.038	25	34	4	1	9.5	9.9	19	19	13.8	19.5	18.4
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	0.0105	-	0.038	28	35	3	1	9.4	9.6	19	18	10.0	20.0	18.9
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	0.0101	-	0.038	27	35	4	1	9.3	9.6	19	18	11.9	19.8	19.1
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	0.0109	-	0.040	27	38	5	1	9.5	9.5	17	16	9.6	19.8	18.8
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	0.0106	-	0.038	28	38	3	1	9.4	9.7	17	17	10.8	19.5	*154*
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	0.0112	-	0.036	31	32	2	1	10.4	9.4	24	23	6.6	17.1	18.9
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	0.0111	-	0.039	28	34	3	1	9.4	9.7	19	18	11.0	19.2	20.0
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	0.0103	-	0.036	29	37	3	1	9.5	9.7	19	18	9.6	18.2	22.0
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	0.0106	-	0.036	29	33	2	1	9.5	9.7	21	21	10.4	17.2	18.1
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	0.0105	-	0.037	28	38	2	1	9.7	9.7	18	18	7.8	18.4	18.0
Nelson River Upstream # 1	US-1	23-Sep-15	0.0180	-	0.036	50	28	7	4	33.3	13.2	98	86	16.0	22.0	19.8
Nelson River Upstream # 2	US-2	23-Sep-15	0.0168	-	0.039	43	29	8	3	34.1	16.3	89	79	15.0	21.0	20.5
Nelson River Upstream # 3	US-3	23-Sep-15	0.0192	-	0.036	53	26	6	3	34.0	12.7	106	93	10.7	21.7	18.8
Nelson River Upstream # 4	US-4	23-Sep-15	0.0175	-	0.036	49	27	7	4	33.9	12.6	105	91	12.6	22.0	18.2
Nelson River Upstream # 5	US-5	23-Sep-15	0.0179	-	0.035	51	31	7	4	34.3	13.5	92	81	12.8	22.0	18.4
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	0.0168	0.019	0.036	47	21	8	4	33.6	13.0	142	116	9.8	22.0	18.4
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	0.0188	0.013	0.032	59	20	7	4	33.9	13.0	173	137	8.2	19.7	17.8
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	0.0142	0.021	0.036	39	20	10	4	33.8	12.7	149	120	9.6	22.0	19.0
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	0.0203	0.012	0.033	62	25	6	4	34.0	12.7	125	105	8.0	21.0	18.0
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	0.0187	0.013	0.032	58	23	8	4	33.8	12.5	144	117	9.2	21.0	18.2
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	*0.0358*	<0.010	0.031	115	25	4	4	33.4	12.6	131	109	5.8	19.1	16.7
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	0.0197	0.011	0.031	64	22	7	4	13.5	11.8	64	51	7.4	19.5	17.3
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	0.0187	0.014	0.033	57	10	7	4	33.1	13.5	439	261	7.6	19.8	17.6
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	0.0186	0.013	0.031	60	11	7	4	33.3	11.4	441	263	7.6	19.8	17.8
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	0.0184	0.013	0.031	59	11	7	4	33.4	12.1	438	259	7.6	19.3	17.6

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Lab pH	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Productivity: Chlorophyll *a* (µg/L)	Productivity: Phaeophytin *a* (µg/L)
Detection Limit			0.10	1.0/20	3.0/5.0/6.0	0.10/0.20	0.10
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	8.41	350	191	2.44	0.96
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	8.42	352	196	1.23	0.84
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	8.40	353	193	1.27	0.83
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	8.39	359	194	1.25	0.86
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	8.41	359	198	1.22	0.85
Nelson River Upstream # 1	US-6	2-Apr-15	8.44	363	206	1.59	0.87
Nelson River Upstream # 2	US-7	2-Apr-15	8.43	359	201	1.50	0.91
Nelson River Upstream # 3	US-8	2-Apr-15	8.47	364	197	1.58	0.87
Nelson River Upstream # 4	US-9	2-Apr-15	8.48	369	199	1.67	0.89
Nelson River Upstream # 5	US-10	2-Apr-15	8.46	366	204	1.56	0.86
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	8.40	358	194	1.50	0.96
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	8.42	361	201	1.44	0.92
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	8.42	341	208	1.39	0.87
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	8.46	359	194	1.38	0.96
Nelson River Upstream # 1	US-1	23-Jun-15	8.14	299	198	5.16	1.28
Nelson River Upstream # 2	US-2	23-Jun-15	8.14	311	200	5.66	1.84
Nelson River Upstream # 3	US-3	23-Jun-15	8.16	299	186	6.36	1.95
Nelson River Upstream # 4	US-4	23-Jun-15	8.17	302	191	5.40	1.79
Nelson River Upstream # 5	US-5	23-Jun-15	8.17	306	195	5.60	1.77
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	8.22	310	192	6.13	1.80
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	8.21	309	204	5.70	1.71
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	8.22	308	189	6.45	1.86
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	8.24	308	196	6.06	1.74
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	8.19	309	192	6.20	1.84
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8.16	300	201	4.91	1.41
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	8.20	304	201	5.21	1.52
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	8.20	304	193	5.86	1.74
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	8.21	305	187	5.28	1.62
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8.21	303	199	4.97	1.50
Nelson River Upstream # 1	US-1	27-Jul-15	8.35	318	187	5.25	2.33
Nelson River Upstream # 2	US-2	27-Jul-15	8.38	323	187	5.08	2.39
Nelson River Upstream # 3	US-3	27-Jul-15	8.32	320	179	5.31	2.38
Nelson River Upstream # 4	US-4	27-Jul-15	8.37	317	184	4.90	2.08
Nelson River Upstream # 5	US-5	27-Jul-15	8.36	320	188	4.38	1.93
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	8.22	311	173	8.15	3.44
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	8.25	310	182	6.51	2.51
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	8.24	307	178	7.89	3.31
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	8.25	312	197	6.29	2.53
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	8.23	314	190	5.87	2.11
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	8.24	312	170	5.08	2.78
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8.20	314	164	9.35	2.43
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	8.23	315	184	5.45	3.12
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	8.25	315	175	5.19	2.62
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8.24	311	164	6.37	2.13

Table A1-3: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Lab pH	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Productivity: Chlorophyll *a* (µg/L)	Productivity: Phaeophytin *a* (µg/L)
Detection Limit			0.10	1.0/20	3.0/5.0/6.0	0.10/0.20	0.10
Nelson River Upstream # 1	US-1	23-Aug-15	8.27	296	194	14.60	2.99
Nelson River Upstream # 2	US-2	23-Aug-15	8.24	297	188	13.70	3.35
Nelson River Upstream # 3	US-3	23-Aug-15	8.28	297	191	14.30	3.51
Nelson River Upstream # 4	US-4	23-Aug-15	8.29	298	190	13.50	3.16
Nelson River Upstream # 5	US-5	23-Aug-15	8.26	297	188	11.90	3.04
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8.34	304	189	14.60	2.26
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	8.30	305	183	15.90	1.80
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	8.28	297	189	13.63	2.23
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	8.24	306	173	15.70	1.94
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	8.31	306	179	14.80	1.94
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	8.22	291	184	13.00	2.01
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	8.24	296	189	12.30	2.07
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	8.29	295	192	13.80	2.38
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	8.25	265	181	12.20	2.48
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	8.28	301	179	12.50	2.36
Nelson River Upstream # 1	US-1	23-Sep-15	8.21	302	172	4.07	2.42
Nelson River Upstream # 2	US-2	23-Sep-15	8.18	310	177	4.28	2.73
Nelson River Upstream # 3	US-3	23-Sep-15	8.19	305	181	4.35	2.63
Nelson River Upstream # 4	US-4	23-Sep-15	8.19	305	194	4.33	2.59
Nelson River Upstream # 5	US-5	23-Sep-15	8.20	309	189	4.32	2.56
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	8.20	310	195	4.33	3.18
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	8.16	305	198	4.40	3.16
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	8.15	306	197	4.40	3.04
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	8.15	305	222	4.34	3.11
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	8.15	309	226	4.39	3.31
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8.14	301	223	4.22	3.02
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	8.17	303	212	3.63	2.94
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	8.17	303	219	4.14	2.94
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	8.11	303	221	3.98	1.04
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	8.14	306	224	4.10	2.21

[1] Dissolved inorganic nitrogen calculated as ammonia + nitrate/nitrite

[2] Total organic nitrogen calculated as total Kjeldahl nitrogen –ammonia

[3] Total nitrogen calculated as total Kjeldahl nitrogen + nitrate/nitrite

Table A1-4: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015.

				Alkalinity				Nitrogen							
Sample Location	Site ID	Sample Date	Sample Time	Total ($CaCO_3$) (mg/L)	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (OH) (mg/L)	Ammonia (mg/L N)	Nitrate/Nitrite (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Dissolved Inorganic N[1] (mg/L)	Total Organic N[2] (mg/L)	Total N[3] (mg/L)
Detection Limit				1.0	1.2	0.60	0.34	0.010	0.0051	0.0050	0.0010	0.20			
Stephens Lake-North Arm	STL-N	16-Jun-15	14:00	118	144	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.37	<0.010	0.37	0.37
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	12:35	105	128	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.38	<0.010	0.38	0.38
Long Spruce Forebay	LNR-3	16-Jun-15	12:05	97.3	119	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.45	<0.010	0.45	0.45
Limestone Forebay	LNR-4	16-Jun-15	11:30	104	127	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.39	<0.010	0.39	0.39
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	11:00	95.2	116	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.48	<0.010	0.48	0.48
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	10:40	97	118	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.43	<0.010	0.43	0.43
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	10:05	97.7	119	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.43	<0.010	0.43	0.43
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	9:40	93.6	114	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.48	<0.010	0.48	0.48

Table A1-4: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015 (continued).

			Phosphorus				N:P Molar Ratios			Carbon		C:N Molar Ratios		Water Clarity		
Sample Location	Site ID	Sample Date	Dissolved P (mg/L)	Particulate P (mg/L)	Total P (mg/L)	Fraction (%)	TN:TP (mg/L)	DIN:DP (mg/L)	DIN:TP (mg/L)	Total Organic C (mg/L)	Dissolved Organic C (mg/L)	TOC:ON	TOC:TN	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)
Detection Limit			0.0010	0.0028	0.0010/0.010					1.0	1.0			2.0	0.10	5.0
Stephens Lake-North Arm	STL-N	16-Jun-15	0.0026	0.0144	0.0171	15	48	6	1	5.4	5.5	17	17	8.2	19.4	17.5
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	0.0071	-	0.030	24	28	2	1	5.5	5.3	17	17	6.6	20.0	13.0
Long Spruce Forebay	LNR-3	16-Jun-15	0.0077	-	0.026	30	38	2	1	6.6	6.3	17	17	8.8	21.0	19.1
Limestone Forebay	LNR-4	16-Jun-15	0.0072	-	0.030	24	29	2	1	6.2	5.9	19	18	6.8	18.0	15.1
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	0.0062	-	0.038	16	28	3	0	7.6	7.7	19	18	35.0	32.0	30.6
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	0.0070	0.0309	0.0378	19	25	2	0	6.0	6.1	16	16	26.6	26.0	18.2
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	0.0071	-	0.033	22	29	2	1	6.2	6.1	17	17	19.0	28.0	19.1
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	0.0067	-	0.043	16	25	2	0	6.7	6.5	16	16	39.6	36.0	26.2

Table A1-4: Routine water chemistry parameters measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015 (continued).

			Productivity	
Sample Location	Site ID	Sample Date	Chlorophyll *a* (µg/L)	Phaeophytin *a* (µg/L)
Detection Limit			0.10	0.10
Stephens Lake-North Arm	STL-N	16-Jun-15	<0.60	<0.60
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	4.35	1.22
Long Spruce Forebay	LNR-3	16-Jun-15	2.98	1.04
Limestone Forebay	LNR-4	16-Jun-15	3.27	1.13
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	3.18	1.27
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	3.47	1.34
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	3.82	1.28
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	2.70	1.05

[1] Dissolved inorganic nitrogen calculated as ammonia + nitrate/nitrite
[2] Total organic nitrogen calculated as total Kjeldahl nitrogen –ammonia
[3] Total nitrogen calculated as total Kjeldahl nitrogen + nitrate/nitrite

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect.

Sample Location	Site ID	Sample Date	Sample Time	Hardness (as $CaCO_3$) (mg/L)	Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Cesium (mg/L)	Chloride (mg/L)	Chromium (mg/L)
Detection Limit				0.30	0.0050	0.00020	0.00020	0.00020	0.00020	0.00020	0.010	0.000010	0.10	0.00010	0.20	0.0010
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	9:24	131	0.563	0.00040	0.00112	0.0400	<0.00020	<0.00020	0.029	<0.000010	31.2	<0.00010	18.4	<0.0010
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	131	0.674	<0.00020	0.00010	0.0431	<0.00020	<0.00020	0.029	<0.000010	30.4	<0.00010	18.0	0.0011
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	13:10	148	0.704	<0.00020	0.00118	0.0431	<0.00020	<0.00020	0.025	<0.000010	34.6	<0.00010	18.2	0.0012
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	137	0.643	0.00046	0.00119	0.0420	<0.00020	<0.00020	0.028	<0.000010	32.1	<0.00010	18.2	0.0010
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	10:31	140	0.580	0.00031	0.00116	0.0415	<0.00020	<0.00020	0.029	<0.000010	32.8	<0.00010	18.0	0.0013
Nelson River Upstream # 1	US-6	2-Apr-15	9:40	138	0.451	<0.00020	0.00114	0.0408	<0.00020	<0.00020	0.028	<0.000010	32.6	<0.00010	18.4	<0.0010
Nelson River Upstream # 2	US-7	2-Apr-15	11:21	143	0.369	<0.00020	0.00114	0.0412	<0.00020	<0.00020	0.028	<0.000010	34.2	<0.00010	18.5	<0.0010
Nelson River Upstream # 3	US-8	2-Apr-15	11:00	140	0.333	<0.00020	0.00113	0.0389	<0.00020	<0.00020	0.027	<0.000010	33.1	<0.00010	18.3	<0.0010
Nelson River Upstream # 4	US-9	2-Apr-15	12:40	139	0.392	<0.00020	0.00113	0.0392	<0.00020	<0.00020	0.028	<0.000010	33.0	<0.00010	18.5	<0.0010
Nelson River Upstream # 5	US-10	2-Apr-15	11:51	137	0.443	<0.00020	0.00110	0.0403	<0.00020	<0.00020	0.027	<0.000010	32.1	<0.00010	18.4	<0.0010
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	14:41	143	0.795	<0.00020	0.00112	0.0416	<0.00020	<0.00020	0.026	<0.000010	33.9	<0.00010	17.3	0.0013
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	16:50	135	0.616	<0.00020	0.00109	0.0404	<0.00020	<0.00020	0.026	<0.000010	31.1	<0.00010	17.6	<0.0010
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	14:15	133	0.518	<0.00020	0.00103	0.0387	<0.00020	<0.00020	0.025	<0.000010	31.3	<0.00010	17.3	<0.0010
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	16:18	132	0.561	<0.00020	0.00104	0.0382	<0.00020	<0.00020	0.026	<0.000010	30.0	<0.00010	17.1	<0.0010
Nelson River Upstream # 1	US-1	23-Jun-15	10:20	144	1.15	0.00024	0.00112	0.0392	<0.00020	<0.00020	0.031	<0.000010	35.6	0.00012	15.9	0.0018
Nelson River Upstream # 2	US-2	23-Jun-15	10:44	147	1.16	<0.00020	0.00110	0.0403	<0.00020	<0.00020	0.029	<0.000010	35.9	0.00013	16.3	0.0018
Nelson River Upstream # 3	US-3	23-Jun-15	12:00	145	1.12	0.00029	0.00108	0.0398	<0.00020	<0.00020	0.030	<0.000010	36.0	0.00012	15.9	0.0017
Nelson River Upstream # 4	US-4	23-Jun-15	11:33	145	1.19	<0.00020	0.00107	0.0402	<0.00020	<0.00020	0.030	<0.000010	35.8	0.00012	15.9	0.0018
Nelson River Upstream # 5	US-5	23-Jun-15	11:03	138	1.11	<0.00020	0.00104	0.0432	<0.00020	<0.00020	0.027	<0.000010	33.8	0.00011	16.4	0.0017
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	11:27	129	0.873	<0.00020	0.00102	0.0379	<0.00020	<0.00020	0.029	0.000011	31.1	<0.00010	16.3	0.0015
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	13:01	125	0.798	<0.00020	0.00104	0.0378	<0.00020	<0.00020	0.029	0.000011	30.0	<0.00010	16.3	0.0014
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	12:05	126	0.813	<0.00020	0.00100	0.0379	<0.00020	<0.00020	0.030	0.000013	29.9	<0.00010	16.3	0.0014
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	12:35	124	0.818	0.00027	0.00104	0.0374	<0.00020	<0.00020	0.028	0.000022	29.5	<0.00010	16.3	0.0014
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	11:10	128	0.856	<0.00020	0.00106	0.0384	<0.00020	<0.00020	0.029	0.000021	31.1	<0.00010	16.2	0.0013
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	125	0.803	<0.00020	0.00103	0.0359	<0.00020	<0.00020	0.040	<0.000010	29.5	<0.00010	15.8	0.0013
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	9:07	122	0.801	<0.00020	0.00099	0.0380	<0.00020	<0.00020	0.030	0.000010	28.9	<0.00010	16.1	0.0014
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	124	0.803	<0.00020	0.00103	0.0380	<0.00020	<0.00020	0.029	<0.000010	29.4	<0.00010	16.1	0.0013
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	9:28	125	0.857	<0.00020	0.00102	0.0379	<0.00020	<0.00020	0.030	0.000040	29.8	<0.00010	16.1	0.0014
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	121	0.839	<0.00020	0.00100	0.0381	<0.00020	<0.00020	0.028	0.000012	28.4	<0.00010	16.0	0.0014
Nelson River Upstream # 1	US-1	27-Jul-15	12:51	132	0.817	<0.00020	0.00122	0.0369	<0.00020	<0.00020	0.028	0.000020	30.8	<0.00010	16.9	0.0013
Nelson River Upstream # 2	US-2	27-Jul-15	13:22	131	0.779	0.00021	0.00129	0.0376	<0.00020	<0.00020	0.029	<0.000010	31.0	<0.00010	17.1	0.0012
Nelson River Upstream # 3	US-3	27-Jul-15	14:42	134	0.749	0.00029	0.00122	0.0357	<0.00020	<0.00020	0.029	<0.000010	32.1	<0.00010	16.9	0.0013
Nelson River Upstream # 4	US-4	27-Jul-15	14:23	132	0.811	0.00023	0.00122	0.0360	<0.00020	<0.00020	0.029	<0.000010	31.1	<0.00010	16.9	0.0013
Nelson River Upstream # 5	US-5	27-Jul-15	13:43	129	0.800	0.00020	0.00124	0.0375	<0.00020	<0.00020	0.025	<0.000010	30.5	<0.00010	17.1	0.0012
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	11:09	128	0.616	<0.00020	0.00120	0.0349	<0.00020	<0.00020	0.024	<0.000010	29.8	<0.00010	17.5	0.0010
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	125	0.644	<0.00020	0.00116	0.0358	<0.00020	<0.00020	0.022	<0.000010	29.5	<0.00010	17.6	0.0010
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	11:29	123	0.666	<0.00020	0.00120	0.0351	<0.00020	<0.00020	0.023	<0.000010	28.8	<0.00010	17.4	0.0011
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	11:56	128	0.575	<0.00020	0.00119	0.0347	<0.00020	<0.00020	0.028	<0.000010	30.9	<0.00010	17.5	<0.0010
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	127	0.829	<0.00020	0.00121	0.0366	<0.00020	<0.00020	0.025	<0.000010	29.8	<0.00010	17.5	0.0012
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	10:01	119	0.641	<0.00020	0.00122	0.0351	<0.00020	<0.00020	0.023	<0.000010	28.4	<0.00010	17.3	<0.0010
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	122	0.574	<0.00020	0.00117	0.0339	<0.00020	<0.00020	0.023	<0.000010	28.9	<0.00010	17.4	<0.0010
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	9:17	127	0.587	<0.00020	0.00117	0.0359	<0.00020	<0.00020	0.024	<0.000010	29.8	<0.00010	17.5	<0.0010
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	124	0.530	<0.00020	0.00120	0.0342	<0.00020	<0.00020	0.023	<0.000010	29.2	<0.00010	17.5	<0.0010
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8:29	125	0.567	<0.00020	0.00111	0.0347	<0.00020	<0.00020	0.024	<0.000010	30.1	<0.00010	17.4	<0.0010

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Hardness (as $CaCO_3$) (mg/L)	Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Cesium (mg/L)	Chloride (mg/L)	Chromium (mg/L)
Detection Limit				0.30	0.0050	0.00020	0.00020	0.00020	0.00020	0.00020	0.010	0.000010	0.10	0.00010	0.20	0.0010
Nelson River Upstream # 1	US-1	23-Aug-15	11:30	124	0.975	<0.00020	0.00142	0.0360	<0.00020	<0.00020	0.026	<0.000010	28.4	<0.00010	15.6	0.0015
Nelson River Upstream # 2	US-2	23-Aug-15	12:08	127	0.867	0.00061	0.00147	0.0345	<0.00020	<0.00020	0.025	<0.000010	29.8	<0.00010	15.6	0.0013
Nelson River Upstream # 3	US-3	23-Aug-15	12:35	127	0.866	0.00029	0.00143	0.0358	<0.00020	<0.00020	0.024	<0.000010	30.7	<0.00010	15.7	0.0012
Nelson River Upstream # 4	US-4	23-Aug-15	13:05	129	0.926	<0.00020	0.00140	0.0353	<0.00020	<0.00020	0.024	<0.000010	31.9	0.00010	15.6	0.0014
Nelson River Upstream # 5	US-5	23-Aug-15	13:30	129	0.946	<0.00020	0.00143	0.0375	<0.00020	<0.00020	0.025	<0.000010	30.8	0.00011	15.6	0.0014
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8:45	126	0.824	<0.00020	0.00135	0.0332	<0.00020	<0.00020	0.025	<0.000010	30.1	<0.00010	15.9	0.0012
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	7:35	132	0.698	<0.00020	0.00130	0.0309	<0.00020	<0.00020	0.028	<0.000010	33.7	<0.00010	15.9	0.0011
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	8:10	129	0.766	0.00025	0.00139	0.0349	<0.00020	<0.00020	0.025	<0.000010	31.0	<0.00010	16.0	0.0012
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	7:15	129	0.735	<0.00020	0.00140	0.0351	<0.00020	<0.00020	0.026	<0.000010	30.0	<0.00010	15.9	0.0012
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	9:10	127	0.401	<0.00020	0.00140	0.0307	<0.00020	<0.00020	0.026	<0.000010	30.5	<0.00010	15.9	<0.0010
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	15:51	131	0.683	<0.00020	0.00130	0.0333	<0.00020	<0.00020	0.027	<0.000010	31.1	<0.00010	15.5	<0.0010
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	16:49	123	0.743	<0.00020	0.00136	0.0334	<0.00020	<0.00020	0.025	<0.000010	29.1	<0.00010	15.6	0.0011
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	17:40	125	0.718	<0.00020	0.00124	0.0332	<0.00020	<0.00020	0.026	<0.000010	30.1	<0.00010	15.7	<0.0010
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	17:15	127	0.808	<0.00020	0.00140	0.0335	<0.00020	<0.00020	0.025	<0.000010	30.3	<0.00010	15.6	0.0012
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	16:30	130	0.740	<0.00020	0.00134	0.0331	<0.00020	<0.00020	0.026	<0.000010	31.5	<0.00010	15.5	0.0011
Nelson River Upstream # 1	US-1	23-Sep-15	15:27	125	0.852	0.00028	0.00133	0.0362	<0.00020	<0.00020	0.028	<0.000010	30.2	0.00010	16.0	0.0013
Nelson River Upstream # 2	US-2	23-Sep-15	15:53	127	0.805	0.00023	0.00131	0.0377	<0.00020	<0.00020	0.028	<0.000010	30.3	<0.00010	16.9	0.0013
Nelson River Upstream # 3	US-3	23-Sep-15	16:29	134	0.845	<0.00020	0.00130	0.0360	<0.00020	<0.00020	0.030	<0.000010	33.4	<0.00010	16.2	0.0013
Nelson River Upstream # 4	US-4	23-Sep-15	17:08	134	0.879	0.00029	0.00135	0.0373	<0.00020	<0.00020	0.029	<0.000010	32.2	0.00010	16.2	0.0014
Nelson River Upstream # 5	US-5	23-Sep-15	16:11	126	0.818	0.00027	0.00136	0.0370	<0.00020	<0.00020	0.027	<0.000010	30.0	<0.00010	16.7	0.0013
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	11:17	129	0.773	<0.00020	0.00137	0.0371	<0.00020	<0.00020	0.029	<0.000010	30.8	<0.00010	16.9	0.0012
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	12:06	129	0.789	<0.00020	0.00140	0.0367	<0.00020	<0.00020	0.029	<0.000010	30.7	<0.00010	17.0	0.0013
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	11:40	132	0.829	<0.00020	0.00133	0.0386	<0.00020	<0.00020	0.030	<0.000010	31.6	<0.00010	16.9	0.0014
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	12:30	130	0.723	<0.00020	0.00132	0.0365	<0.00020	<0.00020	0.030	<0.000010	32.0	<0.00010	16.9	0.0012
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	10:53	129	0.749	0.00021	0.00131	0.0375	<0.00020	<0.00020	0.027	<0.000010	31.7	<0.00010	17.1	0.0012
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8:53	125	0.709	0.00021	0.00131	0.0358	<0.00020	<0.00020	0.027	<0.000010	29.4	<0.00010	16.3	0.0012
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	9:23	124	0.727	<0.00020	0.00125	0.0371	<0.00020	<0.00020	0.027	<0.000010	30.4	<0.00010	16.4	0.0011
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	10:05	128	0.757	0.00021	0.00132	0.0360	<0.00020	<0.00020	0.030	<0.000010	30.8	<0.00010	16.4	0.0011
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	9:44	130	0.724	0.00027	0.00138	0.0371	<0.00020	<0.00020	0.027	<0.000010	31.2	<0.00010	16.4	0.0012
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	8:29	126	0.731	0.00024	0.00129	0.0350	<0.00020	<0.00020	0.027	<0.000010	30.6	<0.00010	16.3	0.0011

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Rubidium (mg/L)
Detection Limit 2015				0.00020	0.00020	0.010/0.10	0.000090	0.0020	0.010	0.00030	0.0000010	0.00020	0.0020	0.10	0.020	0.00020
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	9:24	0.00026	0.00181	0.53	0.000233	0.0100	13.0	0.0144	0.0000012	0.00072	<0.0020	<0.10	2.80	0.00257
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	0.00027	0.00180	0.59	0.000245	0.0099	13.4	0.0159	<0.0000010	0.00073	<0.0020	<0.10	2.95	0.00268
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	13:10	0.00032	0.00201	0.67	0.000279	0.0110	15.0	0.0172	<0.0000010	0.00078	<0.0020	<0.10	3.30	0.00292
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	0.00028	0.00177	0.58	0.000278	0.0116	13.9	0.0162	<0.0000010	0.00071	<0.0020	<0.10	2.95	0.00267
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	10:31	0.00028	*0.0148*	0.55	0.000266	0.0116	14.1	0.0153	0.0000010	0.00071	*0.0103*	<0.10	3.06	0.00263
Nelson River Upstream # 1	US-6	2-Apr-15	9:40	<0.00020	0.00157	0.41	0.000198	0.0117	13.8	0.0120	<0.0000010	0.00071	<0.0020	<0.10	2.96	0.00228
Nelson River Upstream # 2	US-7	2-Apr-15	11:21	<0.00020	0.00210	0.35	0.000185	0.0116	13.9	0.0114	<0.0000010	0.00070	<0.0020	<0.10	3.00	0.00209
Nelson River Upstream # 3	US-8	2-Apr-15	11:00	<0.00020	0.00147	0.31	0.000177	0.0114	13.8	0.0112	<0.0000010	0.00067	<0.0020	<0.10	3.00	0.00208
Nelson River Upstream # 4	US-9	2-Apr-15	12:40	<0.00020	0.00162	0.36	0.000183	0.0113	13.8	0.0114	0.0000013	0.00069	<0.0020	<0.10	3.01	0.00214
Nelson River Upstream # 5	US-10	2-Apr-15	11:51	0.00020	0.00181	0.41	0.000191	0.0114	13.7	0.0116	0.0000048	0.00069	<0.0020	<0.10	2.90	0.00239
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	14:41	0.00035	0.00188	0.75	0.000340	0.0109	14.1	0.0223	0.0000014	0.00068	<0.0020	<0.10	3.09	0.00295
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	16:50	0.00024	0.00156	0.53	0.000237	0.0104	14.0	0.0144	0.0000010	0.00069	<0.0020	<0.10	3.06	0.00234
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	14:15	0.00022	0.00145	0.47	0.000209	0.0104	13.3	0.0132	<0.0000010	0.00065	<0.0020	<0.10	3.07	0.00229
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	16:18	0.00021	0.00149	0.46	0.000194	0.0103	13.7	0.0136	<0.0000010	0.00067	<0.0020	<0.10	2.95	0.00243
Nelson River Upstream # 1	US-1	23-Jun-15	10:20	0.00044	0.00193	0.87	0.000564	0.0111	13.5	0.0216	0.0000024	0.00062	0.0020	<0.10	3.02	0.00341
Nelson River Upstream # 2	US-2	23-Jun-15	10:44	0.00048	0.00192	0.94	0.000466	0.0117	13.8	0.0235	0.0000013	0.00061	0.0028	<0.10	3.12	0.00362
Nelson River Upstream # 3	US-3	23-Jun-15	12:00	0.00044	0.00187	0.85	0.000398	0.0122	13.4	0.0211	0.0000013	0.00061	0.0021	<0.10	3.04	0.00335
Nelson River Upstream # 4	US-4	23-Jun-15	11:33	0.00045	0.00189	0.89	0.000458	0.0126	13.5	0.0221	0.0000022	0.00062	0.0022	<0.10	3.04	0.00349
Nelson River Upstream # 5	US-5	23-Jun-15	11:03	0.00044	0.00189	0.92	0.000468	0.0095	12.9	0.0222	0.0000015	0.00066	0.0021	<0.10	2.98	0.00344
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	11:27	0.00039	0.00193	0.81	0.000376	0.0107	12.4	0.0169	0.0000016	0.00069	<0.0020	<0.10	2.65	0.00310
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	13:01	0.00037	0.00206	0.79	0.000883	0.0105	12.2	0.0164	0.0000010	0.00065	<0.0020	<0.10	2.71	0.00293
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	12:05	0.00038	0.00198	0.79	0.000485	0.0104	12.4	0.0172	0.0000015	0.00063	<0.0020	<0.10	2.69	0.00293
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	12:35	0.00036	0.00203	0.75	0.000346	0.0111	12.2	0.0158	-	0.00069	<0.0020	<0.10	2.74	0.00301
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	11:10	0.00038	0.00191	0.79	0.000484	0.0107	12.3	0.0168	0.0000014	0.00070	<0.0020	<0.10	2.71	0.00294
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	0.00036	0.00195	0.75	0.000345	0.0105	12.5	0.0148	0.0000015	0.00063	<0.0020	<0.10	2.64	0.00285
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	9:07	0.00036	0.00186	0.76	0.000343	0.0101	12.2	0.0157	0.0000017	0.00063	<0.0020	<0.10	2.66	0.00294
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	0.00035	0.00180	0.73	0.000380	0.0102	12.4	0.0143	0.0000016	0.00064	<0.0020	<0.10	2.66	0.00272
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	9:28	0.00037	0.00207	0.77	0.000461	0.0106	12.3	0.0154	0.0000014	0.00066	<0.0020	<0.10	2.69	0.00311
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	0.00037	0.00192	0.79	0.000372	0.0100	12.1	0.0154	0.0000022	0.00062	<0.0020	<0.10	2.67	0.00293
Nelson River Upstream # 1	US-1	27-Jul-15	12:51	0.00033	0.00184	0.68	0.000390	0.0113	13.3	0.0175	<0.0000010	0.00064	<0.0020	<0.10	2.88	0.00311
Nelson River Upstream # 2	US-2	27-Jul-15	13:22	0.00032	0.00190	0.68	0.000303	0.0116	13.0	0.0169	<0.0000010	0.00066	<0.0020	<0.10	2.92	0.00291
Nelson River Upstream # 3	US-3	27-Jul-15	14:42	0.00032	0.00194	0.67	0.000294	0.0118	12.9	0.0171	<0.0000010	0.00069	<0.0020	<0.10	2.87	0.00299
Nelson River Upstream # 4	US-4	27-Jul-15	14:23	0.00032	0.00186	0.67	0.000413	0.0119	13.3	0.0168	0.0000013	0.00069	<0.0020	<0.10	2.90	0.00307
Nelson River Upstream # 5	US-5	27-Jul-15	13:43	0.00032	0.00188	0.68	0.000410	0.0104	12.8	0.0164	<0.0000010	0.00068	<0.0020	<0.10	2.86	0.00309
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	11:09	0.00028	0.00185	0.54	0.000256	0.0089	13.1	0.0125	<0.0000010	0.00071	<0.0020	<0.10	2.74	0.00249
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	0.00026	0.00187	0.54	0.000241	0.0087	12.4	0.0119	<0.0000010	0.00070	<0.0020	<0.10	2.73	0.00263
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	11:29	0.00029	0.00183	0.59	0.000276	0.0088	12.5	0.0129	<0.0000010	0.00070	<0.0020	<0.10	2.77	0.00281
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	11:56	0.00025	0.00180	0.49	0.000238	0.0098	12.4	0.0110	<0.0000010	0.00073	<0.0020	<0.10	2.76	0.00272
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	0.00030	0.00178	0.61	0.000286	0.0098	12.7	0.0130	<0.0000010	0.00072	<0.0020	<0.10	2.82	0.00302
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	10:01	0.00022	0.00174	0.44	0.000228	0.0092	11.8	0.00968	<0.0000010	0.00068	<0.0020	<0.10	2.79	0.00253
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	0.00021	0.00174	0.41	0.000203	0.0092	12.1	0.00924	<0.0000010	0.00068	<0.0020	<0.10	2.75	0.00266
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	9:17	0.00023	0.00186	0.46	0.000209	0.0094	12.8	0.00969	<0.0000010	0.00070	<0.0020	<0.10	2.78	0.00258
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	0.00020	0.00175	0.41	0.000195	0.0092	12.3	0.00938	<0.0000010	0.00068	<0.0020	<0.10	2.72	0.00236
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8:29	0.00020	0.00170	0.42	0.000203	0.0095	12.1	0.00924	<0.0000010	0.00068	<0.0020	<0.10	2.72	0.00257

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Rubidium (mg/L)
Detection Limit			0.00020	0.00020	0.010/0.10	0.000090	0.0020	0.010	0.00030	0.0000010	0.00020	0.0020	0.10	0.020	0.00020
Nelson River Upstream # 1	US-1	23-Aug-15	0.00039	0.00190	0.74	0.000348	0.0112	12.9	0.0218	<0.0000010	0.00061	<0.0020	<0.10	2.71	0.00323
Nelson River Upstream # 2	US-2	23-Aug-15	0.00036	0.00183	0.74	0.000350	0.0104	12.7	0.0214	<0.0000010	0.00066	<0.0020	<0.10	2.78	0.00300
Nelson River Upstream # 3	US-3	23-Aug-15	0.00036	0.00190	0.74	0.000344	0.0103	12.3	0.0208	0.0000016	0.00064	<0.0020	<0.10	2.79	0.00320
Nelson River Upstream # 4	US-4	23-Aug-15	0.00035	0.00185	0.75	0.000341	0.0104	12.1	0.0213	<0.0000010	0.00063	<0.0020	<0.10	2.80	0.00319
Nelson River Upstream # 5	US-5	23-Aug-15	0.00036	0.00192	0.76	0.000370	0.0105	12.7	0.0217	<0.0000010	0.00065	<0.0020	<0.10	2.85	0.00321
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	0.00033	0.00175	0.68	0.000307	0.0102	12.4	0.0186	<0.0000010	0.00061	<0.0020	<0.10	2.67	0.00315
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	0.00031	0.00179	0.65	0.000335	0.0115	11.5	0.0164	<0.0000010	0.00070	<0.0020	<0.10	2.46	0.00270
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	0.00033	0.00178	0.65	0.000301	0.0100	12.6	0.0188	0.0000011	0.00066	<0.0020	<0.10	2.76	0.00300
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	0.00033	0.00180	0.65	0.000299	0.0105	13.1	0.0178	<0.0000010	0.00066	<0.0020	<0.10	2.71	0.00293
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	0.00021	0.00150	0.36	0.000252	0.0100	12.3	0.0155	<0.0000010	0.00061	<0.0020	<0.10	2.54	0.00201
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	0.00027	0.00175	0.55	0.000250	0.0105	12.9	0.0147	<0.0000010	0.00063	<0.0020	<0.10	2.69	0.00262
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	0.00030	0.00174	0.62	0.000287	0.0102	12.2	0.0167	<0.0000010	0.00061	<0.0020	<0.10	2.60	0.00274
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	0.00029	0.00171	0.59	0.000276	0.0104	12.2	0.0151	<0.0000010	0.00063	<0.0020	<0.10	2.55	0.00266
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	0.00030	0.00178	0.65	0.000291	0.0102	12.5	0.0181	<0.0000010	0.00062	<0.0020	<0.10	2.72	0.00284
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	0.00028	0.00173	0.57	0.000275	0.0104	12.3	0.0154	<0.0000010	0.00062	<0.0020	<0.10	2.68	0.00262
Nelson River Upstream # 1	US-1	23-Sep-15	0.00034	0.00174	0.72	0.000359	0.0108	12.2	0.0199	0.0000015	0.00063	<0.0020	<0.10	2.66	0.00296
Nelson River Upstream # 2	US-2	23-Sep-15	0.00035	0.00164	0.67	0.000336	0.0111	12.5	0.0200	0.0000017	0.00065	<0.0020	<0.10	2.64	0.00273
Nelson River Upstream # 3	US-3	23-Sep-15	0.00036	0.00184	0.74	0.000393	0.0122	12.4	0.0207	0.0000016	0.00083	<0.0020	<0.10	2.65	0.00288
Nelson River Upstream # 4	US-4	23-Sep-15	0.00036	0.00177	0.75	0.000364	0.0115	13.0	0.0206	0.0000020	0.00065	<0.0020	<0.10	2.77	0.00327
Nelson River Upstream # 5	US-5	23-Sep-15	0.00036	0.00172	0.70	0.000363	0.0111	12.4	0.0204	0.0000010	0.00064	<0.0020	<0.10	2.67	0.00288
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	0.00036	0.00179	0.70	0.000355	0.0114	12.8	0.0198	0.0000012	0.00065	<0.0020	<0.10	2.76	0.00289
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	0.00032	0.00176	0.67	0.000336	0.0118	12.8	0.0181	0.0000018	0.00084	<0.0020	<0.10	2.69	0.00284
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	0.00035	0.00185	0.69	0.000389	0.0117	12.9	0.0196	0.0000014	0.00067	<0.0020	<0.10	2.83	0.00307
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	0.00031	0.00169	0.65	0.000317	0.0120	12.3	0.0178	0.0000012	0.00067	<0.0020	<0.10	2.64	0.00288
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	0.00033	0.00166	0.68	0.000342	0.0114	12.2	0.0186	0.0000013	0.00064	<0.0020	<0.10	2.61	0.00276
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	0.00031	0.00171	0.61	0.000294	0.0113	12.6	0.0163	0.0000012	0.00061	<0.0020	<0.10	2.64	0.00253
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	0.00031	0.00167	0.64	0.000337	0.0113	11.7	0.0166	0.0000012	0.00061	0.0026	<0.10	2.57	0.00278
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	0.00030	0.00167	0.63	0.000297	0.0104	12.3	0.0163	0.0000010	0.00066	<0.0020	<0.10	2.71	0.00274
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	0.00032	0.00170	0.61	0.000325	0.0105	12.6	0.0172	0.0000015	0.00066	<0.0020	<0.10	2.76	0.00270
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	0.00029	0.00159	0.60	0.000298	0.0104	12.2	0.0161	0.0000013	0.00064	<0.0020	<0.10	2.63	0.00269

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Sodium (mg/L)	Strontium (mg/L)	Sulfate (mg/L)	Tellurium (mg/L)	Thallium (mg/L)	Thorium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Tungsten (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Zirconium (mg/L)
Detection Limit			0.0010	0.10	0.00010	0.030	0.00010	0.30/0.50	0.00020	0.00010	0.00010	0.00020	0.00050	0.00010	0.00010	0.00020	0.0020	0.00040
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	<0.0010	2.53	<0.00010	17.7	0.127	36.6	<0.00020	<0.00010	0.00023	<0.00020	0.0232	<0.00010	0.00067	0.00146	0.0034	0.00058
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	<0.0010	2.88	<0.00010	18.4	0.123	35.9	<0.00020	<0.00010	0.00024	<0.00020	0.0265	<0.00010	0.00071	0.00167	0.0027	0.00063
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	<0.0010	2.72	<0.00010	20.2	0.136	36.3	<0.00020	<0.00010	0.00024	<0.00020	0.0302	<0.00010	0.00076	0.00170	0.0094	0.00066
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	<0.0010	2.70	<0.00010	18.3	0.131	36.3	<0.00020	<0.00010	0.00029	<0.00020	0.0267	<0.00010	0.00079	0.00160	0.0028	0.00068
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	<0.0010	2.51	<0.00010	20.2	0.138	35.7	0.00035	<0.00010	0.00020	<0.00020	0.0236	<0.00010	0.00077	0.00146	0.0033	0.00060
Nelson River Upstream # 1	US-6	2-Apr-15	<0.0010	2.25	<0.00010	19.4	0.132	36.8	<0.00020	<0.00010	0.00016	<0.00020	0.0177	<0.00010	0.00083	0.00120	0.0025	0.00049
Nelson River Upstream # 2	US-7	2-Apr-15	<0.0010	2.13	<0.00010	19.0	0.137	37.2	<0.00020	<0.00010	0.00014	<0.00020	0.0140	<0.00010	0.00081	0.00110	<0.0020	0.00049
Nelson River Upstream # 3	US-8	2-Apr-15	<0.0010	1.95	<0.00010	19.2	0.136	36.5	<0.00020	<0.00010	0.00012	<0.00020	0.0133	<0.00010	0.00080	0.00104	<0.0020	0.00043
Nelson River Upstream # 4	US-9	2-Apr-15	<0.0010	2.12	<0.00010	19.8	0.138	36.8	<0.00020	<0.00010	0.00014	<0.00020	0.0149	<0.00010	0.00079	0.00115	0.0021	0.00045
Nelson River Upstream # 5	US-10	2-Apr-15	<0.0010	2.23	<0.00010	19.0	0.130	36.7	<0.00020	<0.00010	0.00016	<0.00020	0.0179	<0.00010	0.00079	0.00118	0.0023	0.00046
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	<0.0010	2.90	<0.00010	18.5	0.130	34.4	<0.00020	<0.00010	0.00029	<0.00020	0.0342	<0.00010	0.00071	0.00187	0.0092	0.00067
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	<0.0010	2.65	<0.00010	19.4	0.129	35.0	<0.00020	<0.00010	0.00019	<0.00020	0.0238	<0.00010	0.00072	0.00148	<0.0020	0.00058
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	<0.0010	2.34	<0.00010	18.6	0.122	34.7	<0.00020	<0.00010	0.00017	<0.00020	0.0211	<0.00010	0.00070	0.00129	0.0020	0.00052
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	<0.0010	2.36	<0.00010	18.3	0.126	34.0	<0.00020	<0.00010	0.00019	<0.00020	0.0219	<0.00010	0.00069	0.00136	<0.0020	0.00051
Nelson River Upstream # 1	US-1	23-Jun-15	<0.0010	3.52	<0.00010	17.5	0.131	31.1	<0.00020	<0.00010	0.00038	<0.00020	0.0424	<0.00010	0.00068	0.00234	0.0095	0.00077
Nelson River Upstream # 2	US-2	23-Jun-15	<0.0010	3.55	<0.00010	17.8	0.119	31.9	<0.00020	<0.00010	0.00040	<0.00020	0.0447	<0.00010	0.00071	0.00237	0.0071	0.00076
Nelson River Upstream # 3	US-3	23-Jun-15	<0.0010	3.43	<0.00010	17.6	0.116	31.3	<0.00020	<0.00010	0.00037	<0.00020	0.0426	<0.00010	0.00068	0.00232	0.0101	0.00073
Nelson River Upstream # 4	US-4	23-Jun-15	<0.0010	3.58	<0.00010	17.8	0.115	31.2	<0.00020	<0.00010	0.00039	<0.00020	0.0440	<0.00010	0.00070	0.00240	0.0102	0.00077
Nelson River Upstream # 5	US-5	23-Jun-15	<0.0010	3.59	<0.00010	17.4	0.123	32.0	<0.00020	<0.00010	0.00037	<0.00020	0.0429	<0.00010	0.00070	0.00233	0.0095	0.00085
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	<0.0010	2.93	<0.00010	16.4	0.127	31.8	<0.00020	<0.00010	0.00034	<0.00020	0.0349	<0.00010	0.00069	0.00203	0.0118	0.00080
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	<0.0010	2.73	<0.00010	16.8	0.122	32.0	<0.00020	<0.00010	0.00032	<0.00020	0.0330	<0.00010	0.00066	0.00197	0.0114	0.00076
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	<0.0010	2.73	<0.00010	16.8	0.120	31.9	<0.00020	<0.00010	0.00032	<0.00020	0.0334	<0.00010	0.00067	0.00204	0.0097	0.00074
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	<0.0010	2.68	<0.00010	16.3	0.121	32.1	<0.00020	<0.00010	0.00032	<0.00020	0.0327	<0.00010	0.00068	0.00201	0.0093	0.00075
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	<0.0010	2.84	<0.00010	17.0	0.127	31.8	<0.00020	<0.00010	0.00032	<0.00020	0.0343	<0.00010	0.00067	0.00205	0.0100	0.00079
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	<0.0010	2.64	<0.00010	15.9	0.120	30.9	<0.00020	<0.00010	0.00031	<0.00020	0.0320	<0.00010	0.00067	0.00191	0.0105	0.00075
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	<0.0010	2.66	<0.00010	16.1	0.121	31.6	<0.00020	<0.00010	0.00030	<0.00020	0.0331	<0.00010	0.00066	0.00199	0.0115	0.00070
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	<0.0010	2.71	<0.00010	16.3	0.120	31.6	<0.00020	<0.00010	0.00030	<0.00020	0.0303	<0.00010	0.00066	0.00192	0.0354	0.00071
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	<0.0010	2.78	<0.00010	16.7	0.122	31.6	<0.00020	<0.00010	0.00031	<0.00020	0.0331	<0.00010	0.00066	0.00199	0.0106	0.00079
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	<0.0010	2.73	<0.00010	16.3	0.116	31.3	<0.00020	<0.00010	0.00032	<0.00020	0.0333	<0.00010	0.00067	0.00200	0.0098	0.00073
Nelson River Upstream # 1	US-1	27-Jul-15	<0.0010	3.54	<0.00010	18.7	0.117	32.2	<0.00020	<0.00010	0.00028	<0.00020	0.0299	<0.00010	0.00068	0.00210	0.0064	0.00064
Nelson River Upstream # 2	US-2	27-Jul-15	<0.0010	3.37	<0.00010	19.4	0.123	32.7	<0.00020	<0.00010	0.00028	<0.00020	0.0290	<0.00010	0.00069	0.00207	0.0083	0.00063
Nelson River Upstream # 3	US-3	27-Jul-15	<0.0010	3.27	<0.00010	18.8	0.120	32.2	<0.00020	<0.00010	0.00028	<0.00020	0.0288	<0.00010	0.00069	0.00199	0.0075	0.00062
Nelson River Upstream # 4	US-4	27-Jul-15	<0.0010	3.48	<0.00010	18.7	0.121	32.2	<0.00020	<0.00010	0.00028	<0.00020	0.0285	<0.00010	0.00068	0.00208	0.0085	0.00062
Nelson River Upstream # 5	US-5	27-Jul-15	<0.0010	3.29	<0.00010	17.8	0.123	32.6	<0.00020	<0.00010	0.00028	<0.00020	0.0298	<0.00010	0.00070	0.00210	0.0077	0.00067
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	<0.0010	2.58	<0.00010	18.1	0.127	33.2	<0.00020	<0.00010	0.00022	<0.00020	0.0230	<0.00010	0.00072	0.00187	0.0099	0.00059
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	<0.0010	2.56	<0.00010	18.2	0.122	33.4	<0.00020	<0.00010	0.00023	<0.00020	0.0225	<0.00010	0.00071	0.00184	0.0059	0.00057
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	<0.0010	2.73	<0.00010	17.6	0.122	33.1	<0.00020	<0.00010	0.00024	<0.00020	0.0242	<0.00010	0.00070	0.00191	0.0068	0.00061
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	<0.0010	2.60	<0.00010	18.1	0.135	33.4	<0.00020	<0.00010	0.00025	<0.00020	0.0210	<0.00010	0.00071	0.00174	0.0079	0.00059
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	<0.0010	3.29	<0.00010	17.9	0.128	33.2	<0.00020	<0.00010	0.00027	<0.00020	0.0312	<0.00010	0.00072	0.00201	<0.0020	0.00085
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	<0.0010	2.90	<0.00010	17.5	0.121	32.9	<0.00020	<0.00010	0.00021	<0.00020	0.0215	<0.00010	0.00070	0.00174	<0.0020	0.00062
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	<0.0010	2.60	<0.00010	17.2	0.119	33.1	<0.00020	<0.00010	0.00019	<0.00020	0.0182	<0.00010	0.00070	0.00162	0.0092	0.00050
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	<0.0010	2.64	<0.00010	17.5	0.127	33.4	<0.00020	<0.00010	0.00020	<0.00020	0.0197	<0.00010	0.00069	0.00168	0.0077	0.00051
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	<0.0010	2.53	<0.00010	17.7	0.120	33.2	<0.00020	<0.00010	0.00018	<0.00020	0.0177	<0.00010	0.00069	0.00158	0.0066	0.00048
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	<0.0010	2.58	<0.00010	17.6	0.124	33.1	<0.00020	<0.00010	0.00019	<0.00020	0.0187	<0.00010	0.00071	0.00165	0.0077	0.00052

Table A1-5: Metals and major ions measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Sodium (mg/L)	Strontium (mg/L)	Sulfate (mg/L)	Tellurium (mg/L)	Thallium (mg/L)	Thorium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Tungsten (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Zirconium (mg/L)
Detection Limit			0.0010	0.10	0.00010	0.030	0.00010	0.30/0.50	0.00020	0.00010	0.00010	0.00020	0.00050	0.00010	0.00010	0.00020	0.0020	0.00040
Nelson River Upstream # 1	US-1	23-Aug-15	<0.0010	3.44	<0.00010	16.8	0.107	29.5	<0.00020	<0.00010	0.00032	<0.00020	0.0356	<0.00010	0.00065	0.00239	0.0023	0.00076
Nelson River Upstream # 2	US-2	23-Aug-15	<0.0010	3.38	<0.00010	16.1	0.109	29.5	<0.00020	<0.00010	0.00037	<0.00020	0.0329	<0.00010	0.00063	0.00228	0.0021	0.00076
Nelson River Upstream # 3	US-3	23-Aug-15	<0.0010	3.35	<0.00010	16.4	0.108	29.6	<0.00020	<0.00010	0.00032	<0.00020	0.0324	<0.00010	0.00064	0.00227	0.0023	0.00073
Nelson River Upstream # 4	US-4	23-Aug-15	<0.0010	3.50	<0.00010	15.8	0.109	29.5	<0.00020	<0.00010	0.00033	<0.00020	0.0349	<0.00010	0.00064	0.00240	<0.0020	0.00074
Nelson River Upstream # 5	US-5	23-Aug-15	<0.0010	3.56	<0.00010	16.4	0.110	29.4	<0.00020	<0.00010	0.00035	<0.00020	0.0350	<0.00010	0.00066	0.00240	0.0027	0.00077
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	<0.0010	3.30	<0.00010	15.9	0.107	30.1	<0.00020	<0.00010	0.00031	<0.00020	0.0300	<0.00010	0.00064	0.00212	<0.0020	0.00068
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	<0.0010	3.18	<0.00010	14.7	0.120	30.0	<0.00020	<0.00010	0.00032	<0.00020	0.0272	<0.00010	0.00071	0.00190	<0.0020	0.00076
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	<0.0010	3.19	<0.00010	16.1	0.109	30.1	<0.00020	<0.00010	0.00032	<0.00020	0.0290	<0.00010	0.00065	0.00218	<0.0020	0.00069
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	<0.0010	3.12	<0.00010	16.2	0.109	30.0	<0.00020	<0.00010	0.00028	<0.00020	0.0278	<0.00010	0.00065	0.00206	<0.0020	0.00068
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	<0.0010	2.26	<0.00010	15.7	0.109	30.0	<0.00020	<0.00010	0.00016	<0.00020	0.0150	<0.00010	0.00061	0.00158	<0.0020	0.00053
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	<0.0010	3.09	<0.00010	15.6	0.106	29.4	<0.00020	<0.00010	0.00024	<0.00020	0.0238	<0.00010	0.00061	0.00194	<0.0020	0.00059
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	<0.0010	3.21	<0.00010	15.3	0.105	29.4	<0.00020	<0.00010	0.00027	<0.00020	0.0267	<0.00010	0.00061	0.00191	<0.0020	0.00065
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	<0.0010	3.08	<0.00010	15.4	0.108	29.8	<0.00020	<0.00010	0.00025	<0.00020	0.0251	<0.00010	0.00062	0.00195	<0.0020	0.00068
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	<0.0010	3.37	<0.00010	15.5	0.108	29.5	<0.00020	<0.00010	0.00027	<0.00020	0.0285	<0.00010	0.00060	0.00207	0.0022	0.00069
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	<0.0010	3.12	<0.00010	14.9	0.109	29.3	<0.00020	<0.00010	0.00027	<0.00020	0.0258	<0.00010	0.00064	0.00189	<0.0020	0.00066
Nelson River Upstream # 1	US-1	23-Sep-15	<0.0010	3.43	<0.00010	17.2	0.116	29.8	<0.00020	<0.00010	0.00033	<0.00020	0.0320	<0.00010	0.00069	0.00210	0.0022	0.00073
Nelson River Upstream # 2	US-2	23-Sep-15	<0.0010	3.28	<0.00010	16.3	0.122	31.5	<0.00020	<0.00010	0.00031	<0.00020	0.0301	<0.00010	0.00069	0.00212	0.0022	0.00069
Nelson River Upstream # 3	US-3	23-Sep-15	<0.0010	3.50	<0.00010	16.4	0.127	30.2	<0.00020	<0.00010	0.00037	<0.00020	0.0320	<0.00010	0.00075	0.00217	0.0022	0.00081
Nelson River Upstream # 4	US-4	23-Sep-15	<0.0010	3.65	<0.00010	16.7	0.117	30.2	<0.00020	<0.00010	0.00035	<0.00020	0.0324	<0.00010	0.00072	0.00215	0.0022	0.00088
Nelson River Upstream # 5	US-5	23-Sep-15	<0.0010	3.46	<0.00010	16.5	0.119	31.0	<0.00020	<0.00010	0.00033	<0.00020	0.0315	<0.00010	0.00070	0.00215	0.0021	0.00076
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	<0.0010	3.27	<0.00010	17.4	0.120	31.6	<0.00020	<0.00010	0.00031	<0.00020	0.0299	<0.00010	0.00073	0.00212	0.0022	0.00069
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	<0.0010	3.37	<0.00010	17.5	0.117	31.7	<0.00020	<0.00010	0.00030	<0.00020	0.0286	<0.00010	0.00070	0.00209	0.0023	0.00068
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	<0.0010	3.44	<0.00010	17.4	0.120	31.5	<0.00020	<0.00010	0.00034	<0.00020	0.0312	<0.00010	0.00071	0.00221	0.0025	0.00073
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	<0.0010	3.21	<0.00010	16.8	0.126	31.5	<0.00020	<0.00010	0.00029	<0.00020	0.0271	<0.00010	0.00069	0.00204	0.0021	0.00070
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	<0.0010	3.28	<0.00010	16.4	0.116	31.8	<0.00020	<0.00010	0.00031	<0.00020	0.0275	<0.00010	0.00071	0.00203	<0.0020	0.00067
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	<0.0010	3.21	<0.00010	16.4	0.113	30.4	<0.00020	<0.00010	0.00027	<0.00020	0.0259	<0.00010	0.00067	0.00192	<0.0020	0.00063
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	<0.0010	3.32	<0.00010	15.5	0.112	30.7	<0.00020	<0.00010	0.00030	<0.00020	0.0271	<0.00010	0.00070	0.00201	0.0023	0.00076
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	<0.0010	3.32	<0.00010	15.6	0.121	30.7	<0.00020	<0.00010	0.00031	<0.00020	0.0277	<0.00010	0.00066	0.00201	0.0023	0.00068
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	<0.0010	3.41	<0.00010	16.1	0.119	30.6	<0.00020	<0.00010	0.00029	<0.00020	0.0267	<0.00010	0.00067	0.00203	<0.0020	0.00065
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	<0.0010	3.39	<0.00010	15.7	0.120	30.5	<0.00020	<0.00010	0.00028	<0.00020	0.0265	<0.00010	0.00066	0.00197	<0.0020	0.00071

Table A1-6: Metals and major ions measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015.

Sample Location	Site ID	Sample Date	Sample Time	Hardness (as $CaCO_3$) (mg/L)	Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Cesium (mg/L)	Chloride (mg/L)	Chromium (mg/L)
Detection Limit				0.30	0.0050	0.00020	0.00020	0.00020	0.00020	0.00020	0.010	0.000010	0.10	0.00010	0.20	0.0010
Stephens Lake-North Arm	STL-N	16-Jun-15	14:00	124	0.562	<0.00020	0.00065	0.0212	<0.00020	<0.00020	0.017	0.000010	33.0	<0.00010	10.8	<0.0010
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	12:35	116	0.711	0.00021	0.00090	0.0355	<0.00020	<0.00020	0.023	<0.000010	27.5	<0.00010	15.5	0.0010
Long Spruce Forebay	LNR-3	16-Jun-15	12:05	108	0.741	0.00024	0.00084	0.0327	<0.00020	<0.00020	0.022	0.000013	25.7	<0.00010	14.0	0.0011
Limestone Forebay	LNR-4	16-Jun-15	11:30	115	0.673	<0.00020	0.00085	0.0329	<0.00020	<0.00020	0.022	<0.000010	27.0	<0.00010	14.6	<0.0010
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	11:00	110	0.986	<0.00020	0.00077	0.0306	<0.00020	<0.00020	0.018	0.000018	27.2	0.00011	10.7	0.0016
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	10:40	120	1.13	<0.00020	0.00097	0.0359	<0.00020	<0.00020	0.022	0.000012	28.0	0.00013	14.1	0.0019
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	10:05	113	0.834	<0.00020	0.00086	0.0319	<0.00020	<0.00020	0.021	<0.000010	26.9	<0.00010	13.5	0.0013
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	9:40	114	1.13	<0.00020	0.00091	0.0345	<0.00020	<0.00020	0.020	0.000013	27.2	0.00013	12.5	0.0018

Table A1-6: Metals and major ions measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015 (continued).

Sample Location	Site ID	Sample Date	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Rubidium (mg/L)
Detection Limit			0.00020	0.00020	0.010/0.10	0.000090	0.0020	0.010	0.00030	0.0000010	0.00020	0.0020	0.10	0.020	0.00020
Stephens Lake-North Arm	STL-N	16-Jun-15	0.00024	0.00153	0.51	0.000492	0.0060	10.2	0.0178	0.0000023	0.00041	<0.0020	<0.10	1.88	0.00167
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	0.00029	0.00155	0.59	0.000310	0.0095	11.5	0.0125	0.0000019	0.00058	<0.0020	<0.10	2.63	0.00255
Long Spruce Forebay	LNR-3	16-Jun-15	0.00029	0.00161	0.63	0.000402	0.0087	10.6	0.0157	0.0000021	0.00051	<0.0020	<0.10	2.45	0.00242
Limestone Forebay	LNR-4	16-Jun-15	0.00026	0.00150	0.56	0.000293	0.0090	11.5	0.0133	0.0000022	0.00056	<0.0020	<0.10	2.52	0.00255
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	0.00043	0.00162	0.94	0.000564	0.0073	10.2	0.0270	0.0000031	0.00043	<0.0020	<0.10	2.07	0.00298
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	0.00047	0.00188	1.07	0.000526	0.0090	12.2	0.0215	0.0000025	0.00053	<0.0020	<0.10	2.63	0.00335
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	0.00034	0.00162	0.75	0.000377	0.0085	11.2	0.0180	0.0000023	0.00051	<0.0020	<0.10	2.44	0.00274
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	0.00046	0.00177	1.04	0.000517	0.0082	11.2	0.0263	0.0000052	0.00050	<0.0020	<0.10	2.35	0.00334

Table A1-6: Metals and major ions measured in the laboratory for sites monitored in the Keeyask regional study area, June 2015 (continued).

Sample Location	Site ID	Sample Date	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Sodium (mg/L)	Strontium (mg/L)	Sulfate (mg/L)	Tellurium (mg/L)	Thallium (mg/L)	Thorium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Tungsten (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Zirconium (mg/L)
Detection Limit			0.0010	0.10	0.00010	0.030	0.00010	0.50	0.00020	0.00010	0.00010	0.00020	0.00050	0.00010	0.00010	0.00020	0.0020	0.00040
Stephens Lake-North Arm	STL-N	16-Jun-15	<0.0010	2.58	<0.00010	10.5	0.0799	17.3	<0.00020	<0.00010	0.00022	<0.00020	0.0224	<0.00010	0.00046	0.00142	0.0073	0.00062
Stephens Lake-upstream of the Kettle GS	STL-KettleGS	16-Jun-15	<0.0010	2.43	<0.00010	15.6	0.107	30.2	<0.00020	<0.00010	0.00026	<0.00020	0.0267	<0.00010	0.00063	0.00161	0.0091	0.00065
Long Spruce Forebay	LNR-3	16-Jun-15	<0.0010	2.52	<0.00010	14.5	0.103	27.4	<0.00020	<0.00010	0.00027	<0.00020	0.0275	<0.00010	0.00059	0.00159	0.0096	0.00065
Limestone Forebay	LNR-4	16-Jun-15	<0.0010	2.40	<0.00010	14.9	0.108	28.6	<0.00020	<0.00010	0.00025	<0.00020	0.0243	<0.00010	0.00061	0.00147	0.0064	0.00064
Nelson River upstream of the proposed Conawapa GS	LNR-5	16-Jun-15	<0.0010	3.14	<0.00010	11.1	0.084	20.6	<0.00020	<0.00010	0.00037	<0.00020	0.0391	<0.00010	0.00047	0.00207	0.0086	0.00082
Nelson River downstream of the proposed Conawapa GS	LNR-6	16-Jun-15	<0.0010	3.41	<0.00010	14.2	0.102	27.6	<0.00020	<0.00010	0.00045	<0.00020	0.0462	<0.00010	0.00061	0.00235	0.0082	0.00097
Nelson River upstream of Deer Island	LNR-7	16-Jun-15	<0.0010	2.65	<0.00010	13.8	0.0989	26.3	<0.00020	<0.00010	0.00035	<0.00020	0.0328	<0.00010	0.00055	0.00178	0.0095	0.00079
Nelson River upstream of Gillam Island	LNR-8	16-Jun-15	<0.0010	3.33	<0.00010	12.9	0.0932	24.3	<0.00020	<0.00010	0.00045	<0.00020	0.0452	<0.00010	0.00056	0.00237	0.0081	0.00094

Table A1-7: Hydrocarbons measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect.

Sample Location	Site ID	Sample Date	Sample Time	Benzene (mg/L)	Ethyl benzene (mg/L)	Toluene (mg/L)	o-Xylene (mg/L)	m+p-Xylenes (mg/L)	Xylenes (Total) (mg/L)	F1 (C6-C10) (mg/L)	F1-BTEX (mg/L)	Total Hydrocarbons (C6-C50) (mg/L)	F2 (C10-C16) (mg/L)	F3 (C16-C34) (mg/L)	F4 (C34-C50) (mg/L)
Detection Limit				0.00050	0.00050	0.0010	0.00050	0.00050	0.0015	0.10	0.10	0.44	0.25	0.25	0.25
Stephens Lake - Farfield # 1	FF-1	31-Mar-15	9:24	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 2	FF-2	31-Mar-15	11:05	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 3	FF-3	31-Mar-15	13:10	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 4	FF-4	31-Mar-15	12:15	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 5	FF-5	31-Mar-15	10:31	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 1	US-6	2-Apr-15	9:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 2	US-7	2-Apr-15	11:21	-	-	-	-	-	-	-	-	-	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-8	2-Apr-15	11:00	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-9	2-Apr-15	12:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-10	2-Apr-15	11:51	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 11	NF-6	2-Apr-15	14:41	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 2	NF-7	2-Apr-15	16:50	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 4	NF-8	2-Apr-15	14:15	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 5	NF-9	2-Apr-15	16:18	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 1	US-1	23-Jun-15	10:20	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	*4.13*	<0.25	*3.29*	*0.84*
Nelson River Upstream # 2	US-2	23-Jun-15	10:44	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3	23-Jun-15	12:00	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4	23-Jun-15	11:33	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5	23-Jun-15	11:03	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 1	NF-1	22-Jun-15	11:27	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 2	NF-2	22-Jun-15	13:01	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3	22-Jun-15	12:05	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 4	NF-4	22-Jun-15	12:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 5	NF-5	22-Jun-15	11:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Farfield # 1	FF-1	22-Jun-15	8:08	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 2	FF-2	22-Jun-15	9:07	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 3	FF-3	22-Jun-15	9:49	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 4	FF-4	22-Jun-15	9:28	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 5	FF-5	22-Jun-15	8:47	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 1	US-1	27-Jul-15	12:51	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 2	US-2	27-Jul-15	13:22	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3	27-Jul-15	14:42	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4	27-Jul-15	14:23	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5	27-Jul-15	13:43	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 1	NF-1	28-Jul-15	11:09	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 2	NF-2	28-Jul-15	12:21	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3	28-Jul-15	11:29	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 4	NF-4	28-Jul-15	11:56	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 5	NF-5	28-Jul-15	10:45	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Farfield # 1	FF-1	28-Jul-15	10:01	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 2	FF-2	28-Jul-15	8:55	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 3	FF-3	28-Jul-15	9:17	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 4	FF-4	28-Jul-15	9:39	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 5	FF-5	28-Jul-15	8:29	-	-	-	-	-	-	-	-	-	-	-	-

Table A1-7: Hydrocarbons measured in the laboratory for sites monitored in the Keeyask local study area during the ice-cover and open-water seasons of 2015. Values in blue italics are considered suspect (continued).

Sample Location	Site ID	Sample Date	Sample Time	Benzene (mg/L)	Ethyl benzene (mg/L)	Toluene (mg/L)	o-Xylene (mg/L)	m+p-Xylenes (mg/L)	Xylenes (Total) (mg/L)	F1 (C6-C10) (mg/L)	F1-BTEX (mg/L)	Total Hydrocarbons (C6-C50) (mg/L)	F2 (C10-C16) (mg/L)	F3 (C16-C34) (mg/L)	F4 (C34-C50) (mg/L)
Detection Limit				0.00050	0.00050	0.0010	0.00050	0.00050	0.0015	0.10	0.10	0.44	0.25	0.25	0.25
Nelson River Upstream # 1	US-1	23-Aug-15	11:30	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 2	US-2	23-Aug-15	12:08	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3	23-Aug-15	12:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4	23-Aug-15	13:05	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5	23-Aug-15	13:30	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 1	NF-1	25-Aug-15	8:45	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 2	NF-2	25-Aug-15	7:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3	25-Aug-15	8:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 4	NF-4	25-Aug-15	7:15	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 5	NF-5	25-Aug-15	9:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Farfield # 1	FF-1	24-Aug-15	15:51	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 2	FF-2	24-Aug-15	16:49	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 3	FF-3	24-Aug-15	17:40	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 4	FF-4	24-Aug-15	17:15	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 5	FF-5	24-Aug-15	16:30	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 1	US-1	23-Sep-15	15:27	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 2	US-2	23-Sep-15	15:53	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3	23-Sep-15	16:29	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4	23-Sep-15	17:08	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5	23-Sep-15	16:11	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 1	NF-1	24-Sep-15	11:17	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 2	NF-2	24-Sep-15	12:06	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3	24-Sep-15	11:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 4	NF-4	24-Sep-15	12:30	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 5	NF-5	24-Sep-15	10:53	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Farfield # 1	FF-1	24-Sep-15	8:53	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 2	FF-2	24-Sep-15	9:23	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 3	FF-3	24-Sep-15	10:05	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 4	FF-4	24-Sep-15	9:44	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Farfield # 5	FF-5	24-Sep-15	8:29	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX 2: RESULTS OF QUALITY ASSURANCE/QUALITY CONTROL SAMPLES, 2015

Table A2-1: Quality assurance/quality control results for routine water chemistry variables measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit.

				Alkalinity				Nitrogen							
Sample Location	Sample ID	Sample Date	Sample Time	Total ($CaCO_3$) (mg/L)	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (OH) (mg/L)	Ammonia (mg/L N)	Nitrate/ Nitrite (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Dissolved Inorganic N[1] (mg/L)	Total Organic N[2] (mg/L)	Total N[3] (mg/L)
Detection Limit				1.0/20	1.2/24	0.60/12	0.34/6.8	0.010	0.0051	0.0050	0.0010	0.20			
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	108	132	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.27	<0.010	0.27	0.27
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	107	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.37	<0.010	0.37	0.37
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.30	<0.010	0.30	0.30
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	108	131	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.31	-	0.31	0.32
			SD	0.6	0.6	-	-	-	-	-	-	0.051			
			PRSD	1	0	-	-	-	-	-	-	-			
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	113	133	2.40	<0.34	<0.010	0.0053	0.0053	<0.0010	0.33	0.010	0.33	0.34
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	112	133	1.92	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.31	<0.010	0.31	0.31
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	113	134	2.16	<0.34	<0.010	<0.0051	0.0051	<0.0010	0.31	<0.010	0.31	0.31
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	113	133	2.16	<0.34	<0.010	<0.0051	<0.0050	<0.0010	0.32	-	0.31	0.32
			SD	0.6	0.6	0.240	-	-	-	-	-	0.012			
			PRSD	1	0	-	-	-	-	-	-	-			
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	106	126	1.44	<0.34	<0.010	0.0101	0.0101	<0.0010	0.64	0.015	0.64	0.65
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	107	130	<0.60	<0.34	<0.010	0.0123	0.0112	0.0011	0.59	0.017	0.59	0.60
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	106	129	<0.60	<0.34	<0.010	0.0114	0.0104	0.0010	0.54	0.016	0.54	0.55
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	106	128	0.68	<0.34	<0.010	0.0113	0.0106	<0.0010	0.59	0.016	0.59	0.60
			SD	0.6	2.1	0.658	-	-	0.00111	0.00057	0.00032	0.050			
			PRSD	1	2	-	-	-	-	-	-	-			
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	112	136	<0.60	<0.34	0.015	0.0445	0.0434	0.0011	0.39	0.060	0.38	0.43
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	112	137	<0.60	<0.34	0.015	0.0437	0.0425	0.0012	0.38	0.059	0.37	0.42
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	112	137	<0.60	<0.34	0.014	0.0438	0.0426	0.0012	0.37	0.058	0.36	0.41
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	112	137	<0.60	<0.34	0.015	0.0440	0.0428	0.0012	0.38	0.059	0.37	0.42
			SD	0.0	0.6	0.658	-	0.0006	0.00044	0.00049	0.00006	0.010			
			PRSD	0	0	-	-	4	1	1	-	-			
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	118	138	<12	<6.8	<0.010	0.0557	0.0557	<0.0010	0.50	0.061	0.50	0.56
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	117	136	<12	<6.8	0.012	0.0527	0.0527	<0.0010	0.64	0.065	0.63	0.69
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	118	137	<12	<6.8	<0.010	0.0547	0.0547	<0.0010	0.63	0.060	0.63	0.68
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	118	137	<12	<6.8	<0.010	0.0544	0.0544	<0.0010	0.59	0.062	0.58	0.64
			SD	0.6	1.0	-	-	-	0.00153	0.00153	-	0.078			
			PRSD	0	1	-	-	-	3	3	-	-			
Field Blanks															
Field Blank	TF-2	31-Mar-15	10:31	1.7	2.0	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Field Blank	TF-2	22-Jun-15	10:05	1.1	1.3	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Field Blank	TF-2	28-Jul-15	12:35	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Field Blank	TF-2	23-Aug-15	13:50	1.3	1.6	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20			
Field Blank	TF-2	24-Sep-15	12:40	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20			
Trip Blanks															
Trip Blank	TF-1	31-Mar-15	10:31	1.5	1.8	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Trip Blank	TF-1	22-Jun-15	10:00	1.2	1.5	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Trip Blank	TF-1	28-Jul-15	12:30	1.1	1.3	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20	-	-	-
Trip Blank	TF-1	23-Aug-15	13:40	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20			
Trip Blank	TF-1	24-Sep-15	12:35	<1.0	<1.2	<0.60	<0.34	<0.010	<0.0051	<0.0050	<0.0010	<0.20			

Table A2-1: Quality assurance/quality control results for routine water chemistry variables measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit (continued).

				Phosphorus			N:P Molar Ratios			Carbon		C:N Molar Ratios		Water Clarity		
Sample Location	Sample ID	Sample Date	Sample Time	Dissolved P (mg/L)	Total Particulate P (mg/L)	Total P (mg/L)	TN:TP (mg/L)	DIN:DP (mg/L)	DIN:TP (mg/L)	Total Organic C (mg/L)	Dissolved Organic C (mg/L)	TOC:ON	TOC:TN	Total Suspended Solids (mg/L)	Turbidity (NTU)	True Colour (CU)
Detection Limit				0.0010	0.0028/0.010	0.0010/0.010				1.0	1.0			2.0	0.10	5.0
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	0.0111	-	0.041	15	2	0	5.4	5.4	24	23	14.2	26.0	14.4
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	0.0106	-	0.039	21	2	0	5.4	5.3	17	17	13.2	27.0	13.9
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	0.0127	-	0.040	17	1	0	5.4	5.7	21	21	13.8	28.0	14.3
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	0.0115	-	0.040	18	1	0	5.4	5.5	21	20	13.7	27.0	14.2
			SD	0.00110	-	0.0010				0.00	0.21			0.50	1.00	0.26
			PRSD	10	-	-				0	4			4	4	-
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	0.0137	-	0.038	20	2	1	8.6	8.4	31	30	8.2	20.0	17.1
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	0.0141	-	0.038	18	1	0	9.6	9.3	37	36	12.4	20.0	15.9
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	0.0165	-	0.039	18	1	0	8.5	8.4	33	32	7.6	20.0	15.0
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	0.0148	-	0.038	18	1	0	8.9	8.7	33	32	9.4	20.0	16.0
			SD	0.00151	-	0.0006				0.61	0.52			2.62	0.00	1.05
			PRSD	10	-	-				7	6			-	0	-
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	0.0092	-	0.040	36	4	1	9.4	9.6	17	17	13.4	20.0	19.3
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	0.0107	-	0.038	35	4	1	9.5	9.5	19	18	12.8	19.8	19.1
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	0.0105	-	0.036	34	3	1	9.0	9.8	20	19	9.4	19.7	18.8
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	0.0101	-	0.038	35	4	1	9.3	9.6	19	18	11.9	19.8	19.1
			SD	0.00081	-	0.0020				0.26	0.15			2.16	0.15	0.25
			PRSD	8	-	-				3	2			-	1	-
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	0.024	-	0.033	29	5	4	33.9	13.8	105	91	13.4	22.0	19.1
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	0.0163	-	0.037	25	8	4	34.0	12.0	109	94	9.2	21.0	19.4
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	0.0172	-	0.038	24	7	3	34.0	12.3	111	96	9.4	22.0	17.8
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	0.0192	-	0.036	26	7	4	34.0	12.7	108	93	10.7	21.7	18.8
			SD	0.00421	-	0.0026				0.06	0.96			2.37	0.58	0.85
			PRSD	-	-	-				0	8			-	3	-
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	0.0150	-	0.029	42	9	5	7.5	6.9	18	16	3.6	9.56	9.5
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	0.0147	-	0.029	53	10	5	6.9	6.9	13	12	3.8	9.63	12.5
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	0.0135	-	0.029	52	10	5	6.7	6.8	13	11	3.8	9.46	16
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	0.0144	-	0.029	49	9	5	7.0	6.9	14	13	3.7	9.55	12.7
			SD	0.00079	-	0.0000				0.42	0.06			0.12	0.085	3.25
			PRSD	6	-	-				6	1			-	1	-
Field Blanks																
Field Blank	TF-2	31-Mar-15	10:31	<0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Field Blank	TF-2	22-Jun-15	10:05	0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Field Blank	TF-2	28-Jul-15	12:35	<0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Field Blank	TF-2	23-Aug-15	13:50	<0.0010	<0.0028	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Field Blank	TF-2	24-Sep-15	12:40	<0.0010	<0.0028	<0.0010	-	-	-	0.87	0.91	-	-	<2.0	0.16	<5.0
Trip Blanks																
Trip Blank	TF-1	31-Mar-15	10:31	<0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Trip Blank	TF-1	22-Jun-15	10:00	<0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Trip Blank	TF-1	28-Jul-15	12:30	<0.0010	-	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Trip Blank	TF-1	23-Aug-15	13:40	<0.0010	<0.0028	<0.0010	-	-	-	<1.0	<1.0	-	-	<2.0	<0.10	<5.0
Trip Blank	TF-1	24-Sep-15	12:35	<0.0010	<0.0028	<0.0010	-	-	-	0.99	1.03	-	-	<2.0	<0.10	<5.0

Table A2-1: Quality assurance/quality control results for routine water chemistry variables measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit (continued).

							Productivity	
Sample Location	Sample ID	Sample Date	Sample Time	Lab pH	Laboratory Conductivity (µmhos/cm)	Total Dissolved Solids (mg/L)	Chlorophyll *a* (µg/L)	Phaeophytin *a* (µg/L)
Detection Limit				0.10	1.0/20	3.0/5.0/6.0	0.10/0.20	0.10
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	8.17	301	194	5.14	1.70
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	8.17	303	192	5.39	1.82
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	8.18	303	188	5.67	1.85
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	8.17	302	191	5.40	1.79
			SD	0.006	1.2	3.1	0.265	0.079
			PRSD	0	0	2	5	4
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	8.37	320	184	4.34	1.97
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	8.36	320	202	4.10	1.87
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	8.35	320	179	4.69	1.94
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	8.36	320	188	4.38	1.93
			SD	0.010	0.0	12.1	0.297	0.051
			PRSD	0	0	6	7	3
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	8.31	304	184	14.20	2.20
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	8.25	308	188	13.80	2.23
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	8.27	278	196	12.90	2.26
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	8.28	297	189	13.63	2.23
			SD	0.031	16.3	6.1	0.666	0.030
			PRSD	0	5	3	5	1
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	8.21	305	174	4.25	2.59
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	8.19	304	188	4.41	2.69
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	8.18	305	180	4.40	2.61
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	8.19	305	181	4.35	2.63
			SD	0.015	0.6	7.0	0.090	0.053
			PRSD	0	0	4	2	2
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	8.41	364	212	1.54	0.86
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	8.44	362	201	1.66	0.87
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	8.47	363	206	1.57	0.89
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	8.44	363	206	1.59	0.87
			SD	0.030	1.0	5.5	0.062	0.015
			PRSD	0	0	3	4	2
Field Blanks								
Field Blank	TF-2	31-Mar-15	10:31	5.96	<1.0	<3.0	<0.10	<0.10
Field Blank	TF-2	22-Jun-15	10:05	5.99	1.4	<3.0	<0.10	<0.10
Field Blank	TF-2	28-Jul-15	12:35	6.13	1.2	<3.0	<0.10	<0.10
Field Blank	TF-2	23-Aug-15	13:50	5.98	1.6	<3.0	<0.10	<0.10
Field Blank	TF-2	24-Sep-15	12:40	6.00	1.2	<3.0	<0.10	<0.10
Trip Blanks								
Trip Blank	TF-1	31-Mar-15	10:31	5.79	<1.0	4.2	<0.10	<0.10
Trip Blank	TF-1	22-Jun-15	10:00	6.10	1.1	<3.0	<0.10	<0.10
Trip Blank	TF-1	28-Jul-15	12:30	6.00	<1.0	<3.0	<0.10	<0.10
Trip Blank	TF-1	23-Aug-15	13:40	5.87	1.1	<3.0	<0.10	<0.10
Trip Blank	TF-1	24-Sep-15	12:35	6.03	<1.0	<3.0	<0.10	<0.10

[1] Dissolved inorganic nitrogen calculated as ammonia + nitrate/nitrite
[2] Total organic nitrogen calculated as total Kjeldahl nitrogen –ammonia
[3] Total nitrogen calculated as total Kjeldahl nitrogen + nitrate/nitrite

Table A2-2: Quality assurance/quality control results for metals and major ions measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit.

Sample Location	Sample ID	Sample Date	Sample Time	Hardness (as $CaCO_3$) (mg/L)	Aluminum (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Cesium (mg/L)	Chloride (mg/L)	Chromium (mg/L)
Detection Limit				0.30	0.0050	0.00020	0.00020	0.00020	0.00020	0.00020	0.010	0.000010	0.10	0.00010	0.20	0.0010
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	146	1.23	<0.00020	0.00110	0.0397	<0.00020	<0.00020	0.030	<0.000010	36.7	0.00013	16.0	0.0018
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	147	1.19	<0.00020	0.00105	0.0400	<0.00020	<0.00020	0.030	<0.000010	36.4	0.00012	15.9	0.0018
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	141	1.16	<0.00020	0.00106	0.0409	<0.00020	<0.00020	0.031	<0.000010	34.2	0.00012	15.9	0.0017
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	145	1.19	<0.00020	0.00107	0.0402	<0.00020	<0.00020	0.030	<0.000010	35.8	0.00012	15.9	0.0018
			SD	3.2	0.035	-	0.000026	0.00062	-	-	0.0006	-	1.37	0.000006	0.06	0.00006
			PRSD	2	3	-	2	2	-	-	-	-	4	-	0	-
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	134	0.819	0.00024	0.00125	0.0378	<0.00020	<0.00020	0.028	<0.000010	31.4	<0.00010	17.1	0.0012
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	127	0.770	0.00025	0.00127	0.0366	<0.00020	<0.00020	0.024	<0.000010	30.1	<0.00010	17.1	0.0012
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	126	0.812	<0.00020	0.00119	0.0381	<0.00020	<0.00020	0.023	<0.000010	30.0	<0.00010	17.1	0.0012
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	129	0.800	0.00020	0.00124	0.0375	<0.00020	<0.00020	0.025	<0.000010	30.5	<0.00010	17.1	0.0012
			SD	4.4	0.0265	0.000084	0.000042	0.00079	-	-	0.0026	-	0.78	-	0.00	0.00000
			PRSD	3	3	-	3	2	-	-	-	-	3	-	0	-
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	129	0.746	<0.00020	0.00136	0.0335	<0.00020	<0.00020	0.025	<0.000010	31.1	<0.00010	16.0	0.0011
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	131	0.782	0.00056	0.00144	0.0356	<0.00020	<0.00020	0.026	0.000010	30.5	<0.00010	16.0	0.0013
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	128	0.770	<0.00020	0.00136	0.0355	<0.00020	<0.00020	0.025	<0.000010	31.4	<0.00010	15.9	0.0011
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	129	0.766	0.00025	0.00139	0.0349	<0.00020	<0.00020	0.025	<0.000010	31.0	<0.00010	16.0	0.0012
			SD	1.5	0.0183	0.000266	0.000046	0.00118	-	-	0.0006	-	0.46	-	0.06	0.00012
			PRSD	1	2	-	3	3	-	-	-	-	1	-	0	-
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	131	0.857	0.00020	0.00127	0.0358	<0.00020	<0.00020	0.029	<0.000010	32.4	<0.00010	16.3	0.0014
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	136	0.833	0.00023	0.00134	0.0359	<0.00020	<0.00020	0.031	<0.000010	33.9	0.00010	16.2	0.0013
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	136	0.845	<0.00020	0.00130	0.0364	<0.00020	<0.00020	0.031	<0.000010	34.0	0.00011	16.2	0.0013
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	134	0.845	<0.00020	0.00130	0.0360	<0.00020	<0.00020	0.030	<0.000010	33.4	<0.00010	16.2	0.0013
			SD	2.9	0.0120	-	0.000035	0.00032	-	-	0.0012	-	0.90	-	0.06	0.00006
			PRSD	2	1	-	3	1	-	-	-	-	3	-	0	-
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	138	0.428	<0.00020	0.00114	0.0412	<0.00020	<0.00020	0.027	<0.000010	33.0	<0.00010	18.7	<0.0010
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	141	0.459	<0.00020	0.00114	0.0403	<0.00020	<0.00020	0.028	<0.000010	33.1	<0.00010	17.8	<0.0010
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	136	0.465	<0.00020	0.00113	0.0410	<0.00020	<0.00020	0.028	<0.000010	31.8	<0.00010	18.6	<0.0010
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	138	0.451	<0.00020	0.00114	0.0408	<0.00020	<0.00020	0.028	<0.000010	32.6	<0.00010	18.4	<0.0010
			SD	2.5	0.0199	-	0.000006	0.00047	-	-	0.0006	-	0.72	-	0.49	-
			PRSD	2	4	-	1	1	-	-	-	-	2	-	3	-
Field Blanks																
Field Blank	TF-2	31-Mar-15	10:31	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Field Blank	TF-2	22-Jun-15	10:05	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Field Blank	TF-2	28-Jul-15	12:35	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	0.11	<0.00010	<0.10	<0.0010
Field Blank	TF-2	23-Aug-15	13:50	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Field Blank	TF-2	24-Sep-15	12:40	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Trip Blanks																
Trip Blank	TF-1	31-Mar-15	10:31	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Trip Blank	TF-1	22-Jun-15	10:00	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Trip Blank	TF-1	28-Jul-15	12:30	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Trip Blank	TF-1	23-Aug-15	13:40	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010
Trip Blank	TF-1	24-Sep-15	12:35	<0.30	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.010	<0.000010	<0.10	<0.00010	<0.10	<0.0010

Table A2-2: Quality assurance/quality control results for metals and major ions measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit (continued).

Sample Location	Sample ID	Sample Date	Sample Time	Cobalt (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Lithium (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Rubidium (mg/L)
Detection Limit				0.00020	0.00020	0.010/0.10	0.000090	0.0020	0.010	0.00030	0.0000010	0.00020	0.0020	0.10	0.020	0.00020
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	0.00047	0.00193	0.93	0.000571	0.0127	13.2	0.0231	0.0000022	0.00064	0.0022	<0.10	3.02	0.00352
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	0.00045	0.00190	0.88	0.000398	0.0125	13.7	0.0221	0.0000016	0.00061	0.0022	<0.10	3.06	0.00355
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	0.00044	0.00185	0.87	0.000404	0.0126	13.5	0.0211	0.0000028	0.00062	0.0021	<0.10	3.05	0.00339
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	0.00045	0.00189	0.89	0.000458	0.0126	13.5	0.0221	0.0000022	0.00062	0.0022	<0.10	3.04	0.00349
			SD	0.000015	0.000040	0.032	0.0000982	0.00010	0.25	0.00100	0.00000060	0.000015	0.00006	-	0.021	0.000085
			PRSD	-	2	4	-	1	2	5	-	-	-	-	1	2
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	0.00031	0.00185	0.68	0.000573	0.0118	13.5	0.0171	<0.0000010	0.00065	<0.0020	<0.10	2.92	0.00306
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	0.00033	0.00191	0.67	0.000302	0.0099	12.5	0.0161	<0.0000010	0.00069	<0.0020	<0.10	2.83	0.00305
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	0.00033	0.00189	0.70	0.000355	0.0096	12.3	0.0160	<0.0000010	0.00069	<0.0020	<0.10	2.82	0.00317
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	0.00032	0.00188	0.68	0.000410	0.0104	12.8	0.0164	<0.0000010	0.00068	<0.0020	<0.10	2.86	0.00309
			SD	0.000012	0.000031	0.015	0.0001436	0.00119	0.64	0.00061	-	0.000023	-	-	0.055	0.000067
			PRSD	-	2	2	-	-	5	4	-	-	-	-	2	2
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	0.00032	0.00174	0.65	0.000284	0.0102	12.4	0.0187	0.0000017	0.00063	<0.0020	<0.10	2.66	0.00303
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	0.00033	0.00183	0.65	0.000311	0.0099	13.4	0.0189	0.0000011	0.00068	<0.0020	<0.10	2.87	0.00300
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	0.00033	0.00176	0.65	0.000308	0.0099	12.1	0.0187	<0.0000010	0.00066	<0.0020	<0.10	2.74	0.00297
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	0.00033	0.00178	0.65	0.000301	0.0100	12.6	0.0188	0.0000011	0.00066	<0.0020	<0.10	2.76	0.00300
			SD	0.000006	0.000047	0.000	0.0000148	0.00017	0.68	0.00012	0.00000060	0.000025	-	-	0.106	0.000030
			PRSD	-	3	0	-	-	5	1	-	-	-	-	4	1
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	0.00037	0.00173	0.75	0.000359	0.0113	12.3	0.0206	0.0000019	0.00110	<0.0020	<0.10	2.65	0.00287
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	0.00036	0.00206	0.74	0.000408	0.0126	12.4	0.0210	0.0000015	0.00070	<0.0020	<0.10	2.67	0.00276
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	0.00035	0.00173	0.72	0.000413	0.0128	12.4	0.0204	0.0000014	0.00070	<0.0020	<0.10	2.63	0.00300
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	0.00036	0.00184	0.74	0.000393	0.0122	12.4	0.0207	0.0000016	0.00083	<0.0020	<0.10	2.65	0.00288
			SD	0.000010	0.000191	0.015	0.0000298	0.00081	0.06	0.00031	0.00000026	0.000231	-	-	0.020	0.000120
			PRSD	-	10	2	-	7	0	1	-	-	-	-	1	4
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	<0.00020	0.00157	0.40	0.000198	0.0120	13.5	0.0118	<0.0000010	0.00070	<0.0020	<0.10	2.87	0.00226
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	<0.00020	0.00160	0.42	0.000207	0.0118	14.0	0.0120	<0.0000010	0.00072	<0.0020	<0.10	2.95	0.00225
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	0.00020	0.00154	0.42	0.000189	0.0113	13.8	0.0122	0.0000013	0.00070	<0.0020	<0.10	3.05	0.00232
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	<0.00020	0.00157	0.41	0.000198	0.0117	13.8	0.0120	<0.0000010	0.00071	<0.0020	<0.10	2.96	0.00228
			SD	-	0.000030	0.012	0.0000090	0.00036	0.25	0.00020	-	0.000012	-	-	0.090	0.000038
			PRSD	-	2	-	-	3	2	2	-	-	-	-	3	2
Field Blanks																
Field Blank	TF-2	31-Mar-15	10:31	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Field Blank	TF-2	22-Jun-15	10:05	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Field Blank	TF-2	28-Jul-15	12:35	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Field Blank	TF-2	23-Aug-15	13:50	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Field Blank	TF-2	24-Sep-15	12:40	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Trip Blanks																
Trip Blank	TF-1	31-Mar-15	10:31	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Trip Blank	TF-1	22-Jun-15	10:00	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Trip Blank	TF-1	28-Jul-15	12:30	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Trip Blank	TF-1	23-Aug-15	13:40	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020
Trip Blank	TF-1	24-Sep-15	12:35	<0.00020	<0.00020	<0.010	<0.000090	<0.0020	<0.010	<0.00030	<0.0000010	<0.00020	<0.0020	<0.10	<0.020	<0.00020

Table A2-2: Quality assurance/quality control results for metals and major ions measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit (continued).

Sample Location	Sample ID	Sample Date	Sample Time	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	Sodium (mg/L)	Strontium (mg/L)	Sulfate (mg/L)	Tellurium (mg/L)	Thallium (mg/L)	Thorium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Tungsten (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Zirconium (mg/L)
Detection Limit				0.0010	0.10	0.00010	0.030	0.00010	0.30/0.50	0.00020	0.00010	0.00010	0.00020	0.00050	0.00010	0.00010	0.00020	0.0020	0.00040
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	<0.0010	3.71	<0.00010	17.7	0.119	31.2	<0.00020	<0.00010	0.00042	<0.00020	0.0458	<0.00010	0.00072	0.00243	0.0080	0.00081
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	<0.0010	3.59	<0.00010	17.7	0.111	31.2	<0.00020	<0.00010	0.00038	<0.00020	0.0437	<0.00010	0.00067	0.00244	0.0145	0.00075
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	<0.0010	3.45	<0.00010	18.1	0.115	31.2	<0.00020	<0.00010	0.00038	<0.00020	0.0425	<0.00010	0.00070	0.00233	0.0082	0.00075
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	<0.0010	3.58	<0.00010	17.8	0.115	31.2	<0.00020	<0.00010	0.00039	<0.00020	0.0440	<0.00010	0.00070	0.00240	0.0102	0.00077
			SD	-	0.130	-	0.23	0.0040	0.00	-	-	0.000023	-	0.00167	-	0.000025	0.000061	0.00370	0.000035
			PRSD	-	4	-	1	3	0	-	-	-	-	4	-	4	3	-	-
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	<0.0010	3.61	<0.00010	18.4	0.119	32.5	<0.00020	<0.00010	0.00029	<0.00020	0.0294	<0.00010	0.00071	0.00208	0.0093	0.00064
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	<0.0010	3.00	<0.00010	18.0	0.126	32.6	<0.00020	<0.00010	0.00026	<0.00020	0.0294	<0.00010	0.00070	0.00212	0.0063	0.00067
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	<0.0010	3.27	<0.00010	16.9	0.123	32.6	<0.00020	<0.00010	0.00028	<0.00020	0.0305	<0.00010	0.00070	0.00211	0.0075	0.00069
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	<0.0010	3.29	<0.00010	17.8	0.123	32.6	<0.00020	<0.00010	0.00028	<0.00020	0.0298	<0.00010	0.00070	0.00210	0.0077	0.00067
			SD	-	0.306	-	0.78	0.0035	0.06	-	-	0.000015	-	0.00064	-	0.000006	0.000021	0.00151	0.000025
			PRSD	-	9	-	4	3	0	-	-	-	-	2	-	1	1	-	-
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	<0.0010	3.04	<0.00010	15.5	0.107	30.1	<0.00020	<0.00010	0.00028	<0.00020	0.0279	<0.00010	0.00063	0.00211	<0.0020	0.00064
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	<0.0010	3.23	<0.00010	16.8	0.110	30.2	<0.00020	<0.00010	0.00037	<0.00020	0.0306	<0.00010	0.00065	0.00224	<0.0020	0.00072
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	<0.0010	3.29	<0.00010	16.1	0.111	30.1	<0.00020	<0.00010	0.00031	<0.00020	0.0285	<0.00010	0.00066	0.00219	0.0020	0.00071
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	<0.0010	3.19	<0.00010	16.1	0.109	30.1	<0.00020	<0.00010	0.00032	<0.00020	0.0290	<0.00010	0.00065	0.00218	<0.0020	0.00069
			SD	-	0.131	-	0.65	0.0021	0.06	-	-	0.000046	-	0.00142	-	0.000015	0.000066	-	0.000044
			PRSD	-	4	-	4	2	0	-	-	-	-	5	-	2	3	-	-
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	<0.0010	3.55	<0.00010	16.2	0.128	30.3	<0.00020	<0.00010	0.00034	<0.00020	0.0327	<0.00010	0.00068	0.00220	0.0023	0.00078
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	<0.0010	3.48	<0.00010	16.7	0.126	30.2	<0.00020	<0.00010	0.00038	<0.00020	0.0312	<0.00010	0.00079	0.00215	0.0024	0.00083
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	<0.0010	3.48	<0.00010	16.2	0.127	30.2	<0.00020	<0.00010	0.00039	<0.00020	0.0321	<0.00010	0.00078	0.00217	0.0020	0.00082
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	<0.0010	3.50	<0.00010	16.4	0.127	30.2	<0.00020	<0.00010	0.00037	<0.00020	0.0320	<0.00010	0.00075	0.00217	0.0022	0.00081
			SD	-	0.040	-	0.29	0.0010	0.06	-	-	0.000026	-	0.00075	-	0.000061	0.000025	0.00021	0.000026
			PRSD	-	1	-	2	1	0	-	-	-	-	2	-	8	1	-	-
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	<0.0010	2.21	<0.00010	19.2	0.137	37.5	<0.00020	<0.00010	0.00017	<0.00020	0.0167	<0.00010	0.00083	0.00116	0.0027	0.00051
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	<0.0010	2.21	<0.00010	19.7	0.131	35.5	<0.00020	<0.00010	0.00016	<0.00020	0.0181	<0.00010	0.00087	0.00119	0.0026	0.00047
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	<0.0010	2.34	<0.00010	19.2	0.128	37.4	<0.00020	<0.00010	0.00016	<0.00020	0.0182	<0.00010	0.00080	0.00126	0.0023	0.00048
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	<0.0010	2.25	<0.00010	19.4	0.132	36.8	<0.00020	<0.00010	0.00016	<0.00020	0.0177	<0.00010	0.00083	0.00120	0.0025	0.00049
			SD	-	0.075	-	0.29	0.0046	1.13	-	-	0.000006	-	0.00084	-	0.000035	0.000051	0.00021	0.000021
			PRSD	-	3	-	1	3	3	-	-	-	-	5	-	4	4	-	-
Field Blanks																			
Field Blank	TF-2	31-Mar-15	10:31	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Field Blank	TF-2	22-Jun-15	10:05	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Field Blank	TF-2	28-Jul-15	12:35	<0.0010	<0.10	<0.00010	0.127	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Field Blank	TF-2	23-Aug-15	13:50	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Field Blank	TF-2	24-Sep-15	12:40	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Trip Blanks																			
Trip Blank	TF-1	31-Mar-15	10:31	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Trip Blank	TF-1	22-Jun-15	10:00	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Trip Blank	TF-1	28-Jul-15	12:30	<0.0010	<0.10	<0.00010	0.149	0.00011	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Trip Blank	TF-1	23-Aug-15	13:40	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040
Trip Blank	TF-1	24-Sep-15	12:35	<0.0010	<0.10	<0.00010	<0.030	<0.00010	<0.30	<0.00020	<0.00010	<0.00010	<0.00020	<0.00050	<0.00010	<0.00010	<0.00020	<0.0020	<0.00040

Table A2-3: Quality assurance/quality control results for hydrocarbons measured in the laboratory during the ice-cover and open-water seasons, 2015. Percent relative standard deviations (PRSD) were calculated for triplicate samples where all results exceeded five times the detection limit.

Sample Location	Sample ID	Sample Date	Sample Time	Benzene (mg/L)	Ethyl benzene (mg/L)	Toluene (mg/L)	o-Xylene (mg/L)	m+p-Xylenes (mg/L)	Xylenes (Total) (mg/L)	F1 (C6-C10) (mg/L)	F1-BTEX (mg/L)	Total Hydrocarbons (C6-C50) (mg/L)	F2 (C10-C16) (mg/L)	F3 (C16-C34) (mg/L)	F4 (C34-C50) (mg/L)
Detection Limit				0.00050	0.00050	0.0010	0.00050	0.00050	0.0015	0.10	0.10	0.44	0.25	0.25	0.25
Nelson River Upstream # 4	US-4A	23-Jun-15	11:33	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4B	23-Jun-15	11:45	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4C	23-Jun-15	11:55	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 4	US-4	23-Jun-15	Mean	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
			SD	-	-	-	-	-	-	-	-	-	-	-	-
			PRSD	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 5	US-5A	27-Jul-15	13:43	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5B	27-Jul-15	13:45	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5C	27-Jul-15	13:45	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 5	US-5	27-Jul-15	Mean	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
			SD	-	-	-	-	-	-	-	-	-	-	-	-
			PRSD	-	-	-	-	-	-	-	-	-	-	-	-
Stephens Lake - Nearfield # 3	NF-3A	25-Aug-15	8:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3B	25-Aug-15	8:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3C	25-Aug-15	8:10	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Stephens Lake - Nearfield # 3	NF-3	25-Aug-14	Mean	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
			SD	-	-	-	-	-	-	-	-	-	-	-	-
			PRSD	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 3	US-3A	23-Sep-15	16:29	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3B	23-Sep-15	16:32	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3C	23-Sep-15	16:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 3	US-3	23-Sep-15	Mean	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
			SD	-	-	-	-	-	-	-	-	-	-	-	-
			PRSD	-	-	-	-	-	-	-	-	-	-	-	-
Nelson River Upstream # 1	US-6A	2-Apr-15	9:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 1	US-6B	2-Apr-15	9:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 1	US-6C	2-Apr-15	9:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Nelson River Upstream # 1	US-6	2-Apr-15	Mean	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
			SD	-	-	-	-	-	-	-	-	-	-	-	-
			PRSD	-	-	-	-	-	-	-	-	-	-	-	-
Field Blanks															
Field Blank	TF-2	31-Mar-15	10:31	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	0.11	0.11	<0.44	<0.25	<0.25	<0.25
Field Blank	TF-2	22-Jun-15	10:05	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Field Blank	TF-2	28-Jul-15	12:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Field Blank	TF-2	23-Aug-15	13:50	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Field Blank	TF-2	24-Sep-15	12:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Trip Blanks															
Trip Blank	TF-1	31-Mar-15	10:31	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Trip Blank	TF-1	22-Jun-15	10:00	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Trip Blank	TF-1	28-Jul-15	12:30	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Trip Blank	TF-1	23-Aug-15	13:40	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25
Trip Blank	TF-1	24-Sep-15	12:35	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.0015	<0.10	<0.10	<0.44	<0.25	<0.25	<0.25

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