DOMINION DIAMOND

APPENDIX 8F

HYDRODYNAMIC AND WATER QUALITY MODELS OF LAC DU SAUVAGE AND LAC DE GRAS

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Abbreviations

Abbreviation	Definition
2-D	two-dimensional
3-D	three-dimensional
AEMP	Aquatic Effects Monitoring Program
BHP Billiton	BHP Billiton Canada Inc.
Diavik Mine	Diavik Diamond Mine
DO	dissolved oxygen
Dominion Diamond	Dominion Diamond Ekati Corporation
e.g.,	for example
Ekati Mine	Ekati Diamond Mine
ERM Rescan	ERM Rescan Environmental Services Ltd.
et al.	and more than one additional author
FF	far-field
GEMSS	Generalized Environmental Modelling System for Surfacewaters
GIS	Geographic Information System
Golder	Golder Associates Ltd.
i.e.,	that is
Jay Pit Model	hydrodynamic model of Jay Pit
Lac de Gras Model	hydrodynamic and water quality model of Lac de Gras
Lac du Sauvage Model	hydrodynamic and water quality model of Lac du Sauvage
LDG	Lac de Gras
LDS	Lac du Sauvage
MF	mid-field
Misery Pit Model	hydrodynamic model of Misery Pit
N	north
NWT	Northwest Territories
Project	Jay Project
SNP	Surveillance Network Program
SOD	sediment oxygen demand
TDS	total dissolved solids
WASP	Water Quality Analysis Simulation Program
WRSA	waste rock storage area

Units of Measure

Unit	Definition
<	less than
-	not applicable
°C	degrees Celsius
/d	per day
cal/m^2/s	calories per square metre per second
DO/m^2/d	dissolved oxygen per square metre per day
g	gram
g-C/m^3	grams as carbon per cubic metre
g-N/g-C	grams as nitrogen per grams as carbon
g-N/m^2/d	grams as nitrogen per square metre per day
g-N/m^3	grams as nitrogen per cubic metre
g-O_2/m^3	grams as oxygen per cubic metre
g-P/m^3	grams as phosphorus per cubic metre
g-P/g-C	grams as phosphorus per gram of carbon
g-P/m^2/d	grams as phosphorus per square metre per day
m	metre
m/d	metres per day
m/s	metres per second
m^2	square metre
m^3	cubic metre
m^3/s	cubic metres per second
mg/L	milligrams per litre
mg-N/L	milligrams as nitrogen per litre
mg-P/L	milligrams as phosphorus per litre
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre

8F1 INTRODUCTION

Dominion Diamond Ekati Corporation (Dominion Diamond) is proposing the construction and operation of the Jay Project (Project). The Project is an open-pit diamond mine located at Lac du Sauvage, Northwest Territories (NWT) that will extend the life of the Ekati Diamond Mine (Ekati Mine) for an additional 10 or more years. The Project is located approximately 300 kilometres (km) northeast of Yellowknife, NWT.

This appendix describes the hydrodynamic and water quality models developed to predict concentrations of total dissolved solids (TDS), major ions, nutrients, and metals in Lac du Sauvage and in Lac de Gras, which is immediately downstream of Lac du Sauvage. The models predict concentrations for operational, closure, and post-closure conditions of the Project. The Lac du Sauvage Model includes discharge from the Misery site at the Ekati Mine, and the Lac de Gras Model includes discharges from the Diavik Diamond Mine (Diavik Mine) and the Ekati Mine (i.e., Koala watershed), as well as Misery Pit discharge (i.e., overflow) during post-closure.

Setup, calibration, and simulations for the Lac du Sauvage and Lac de Gras models are described in Section 8F2. Operational, closure, and post-closure water quality predictions for Lac du Sauvage and Lac de Gras are presented in Section 8F3. Finally, model uncertainty and limitations are discussed in Section 8F4, and conclusions are provided in Section 8F5.

8F2 METHODS

8F2.1 Model Linkages

Several interlinked models were concurrently developed for the purpose of predicting the water quality in Lac du Sauvage and Lac de Gras, including:

- hydrogeological models (Appendices 8A, 8B, and 8C);
- a regional water balance model (Appendix 8D);
- a near-field model of the discharge to Lac du Sauvage (Attachment 8F1);
- a site discharge water quality model (Appendix 8E);
- two-dimensional (2-D) open pit hydrodynamic models of the Misery (Misery Pit Model) and Jay (Jay Pit Model) pits (Appendix 8G);
- a Misery site model for the King-Cujo watershed (Robb 2014; Attachment 8F2);
- a Koala watershed model (ERM Rescan 2014; Attachment 8F3); and,
- three-dimensional (3-D) hydrodynamic and water quality models of Lac du Sauvage (Lac du Sauvage Model) and Lac de Gras (Lac de Gras Model).

The focus of this appendix is the Lac du Sauvage and Lac de Gras models. Other models are described in their respective appendices and attachments. A brief description of the direct model linkages to the Lac du Sauvage and Lac de Gras models is provided below.

The regional water balance model was developed to account for all natural watershed inflows, precipitation, mine-related inflows, evaporation, and outflows from Lac du Sauvage and Lac de Gras. The resulting diffuser design from the near-field model of the discharge to Lac du Sauvage was an input to the Lac du Sauvage Model (Attachment 8F1). The site discharge water quality model was developed to predict discharge water quality from the Misery Pit to Lac du Sauvage, runoff water quality from runoff from the Jay waste rock storage area (WRSA) to Lac du Sauvage, monimolimnion water quality of the Jay Pit within Lac du Sauvage, mixolimnion water quality of the Misery Pit overflow to Lac de Gras, and seepage water quality from the Misery Pit monimolimnion to Lac de Gras. Water temperature of the Misery Pit discharge to Lac du Sauvage was predicted by the Misery Pit Model. A Misery site model for the King-Cujo watershed was developed by ERM Rescan Environmental Services Ltd. (ERM Rescan) (Robb 2014; Attachment 8F2) to predict water quality in the discharge from Christine Lake to Lac du Sauvage. A Koala watershed model was updated by ERM Rescan (2014; Attachment 8F3) to account for discharging fine processed kimberlite produced during mining of the Jay pipe into the mined-out Panda and Koala open pits and underground workings and to predict water quality in the discharge from Slipper Lake to Lac de Gras. The predicted discharge water quality from the Lac du Sauvage Model was an input to the Lac de Gras Model.

8F2.2 Three-dimensional Model Platform

The Lac du Sauvage and Lac de Gras models were developed in the Generalized Environmental Modeling System for Surfacewaters (GEMSS). GEMSS is an integrated system of three-dimensional (3-D) hydrodynamic and transport modules embedded in a geographic information and environmental data system. GEMSS is in the public domain and has been used for similar studies in the NWT (e.g., Snap Lake and Gahcho Kué diamond mines), as well as throughout North America and worldwide. GEMSS was developed in the mid-1980s as a hydrodynamic platform for transport and fate modelling. The hydrodynamic platform ("kernel") provides 3-D flow fields from which the distribution of various constituents can be computed. The constituent transport and fate computations are grouped into modules. The modules used for Lac du Sauvage and Lac de Gras simulations were the hydrodynamic and transport module, the water quality module, and the user-defined constituent module.

The theoretical basis of the hydrodynamic kernel of the GEMSS is the 3-D generalized, longitudinal-lateral-vertical hydrodynamic and transport model (Edinger and Buchak 1980, 1985). This computation has been peer reviewed and published (Edinger and Buchak 1995; Edinger and Kolluru 1999; Edinger et al. 1994, 1997). The "kernel" is an extension of the longitudinal-vertical transport model written by Buchak and Edinger (1984) that forms the hydrodynamic and transport basis of the water quality model CE-QUAL-W2 (US Army Engineer Waterways Experiment Station 1986). Improvements to the transport scheme, construction of the constituent modules, incorporation of supporting software tools, Geographic Information System (GIS) interoperability, visualization tools, graphical user interface, and post-processors have been developed by Kolluru et al. (1998, 1999, 2003) and Kolluru and Fichera (2003).

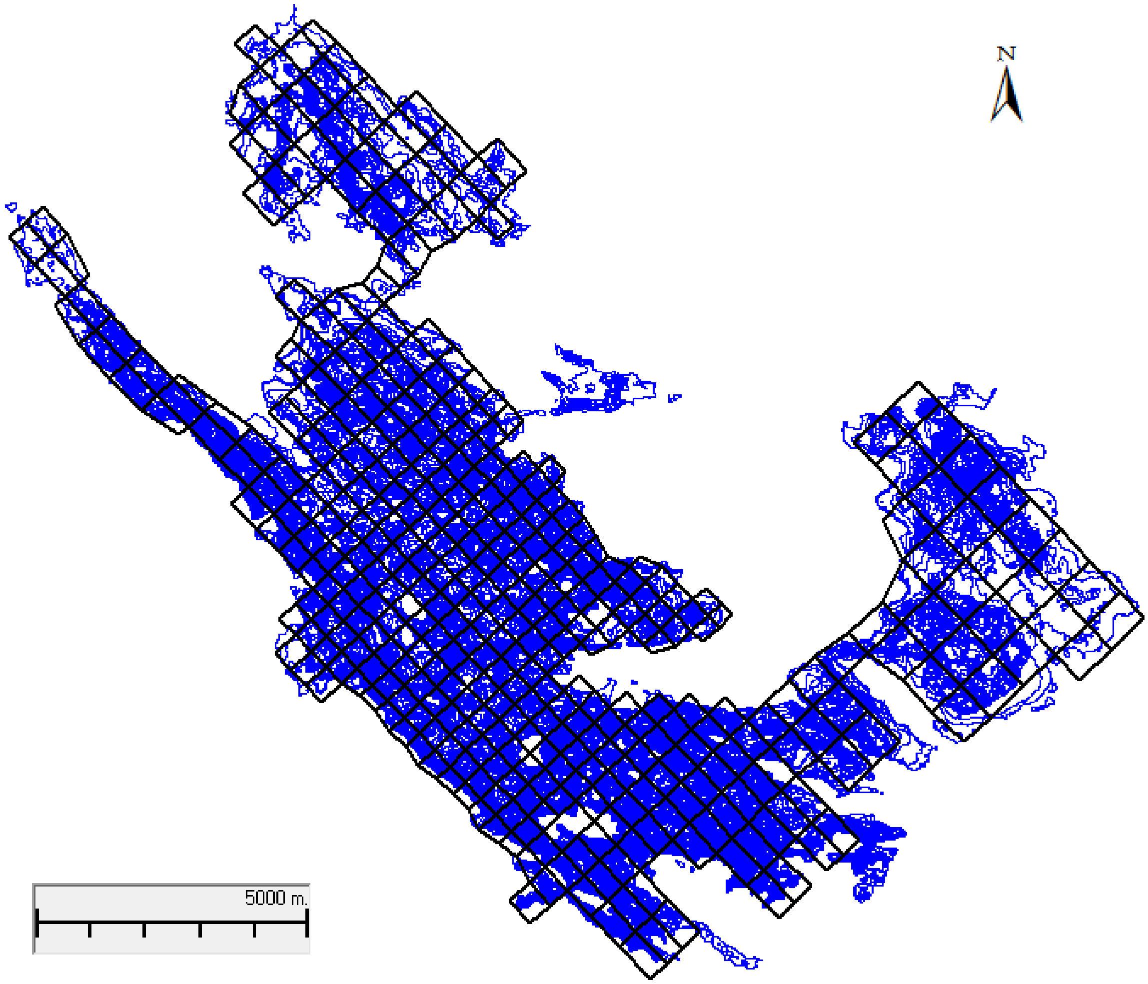
The "Modified WASP5" module was used for simulating water quality in Lac du Sauvage and Lac de Gras. The Modified WASP5 module is composed mainly of formulae from the United States Environmental Protection Agency's Water Quality Analysis Simulation Program (WASP) model (Ambrose et al. 1993), adapted to fit within the GEMSS framework. This module was used to simulate nutrients and oxygen-related constituents. The user-defined constituent module was derived from the CE-QUAL-W2 model (Cole and Wells 2008), and was used to simulate constituents that behaved conservatively.

8F2.2.1 Model Segmentation

8F2.2.1.1 Lac du Sauvage

The geometry of Lac du Sauvage will be modified by dikes and a pit during operations, closure, and post-closure. Consequently, separate model grids were developed for calibration and pre-operations, operations and closure, and post-closure. For the calibration and pre-operational time periods, 2009 to 2013 and 2014 to 2018, a 3-D grid (Figure 8F2.2-1) was developed to cover all of Lac du Sauvage, with the exception of some small bays that are not anticipated to affect the overall circulation of water and constituents in the lake. The grid spacing varied between approximately 400 metres (m) and 800 m horizontally, and vertical resolution was approximately 2 m. The grid comprised a total of 10 active vertical layers and 1,552 active cells. The comparison of hypsographic curves (i.e., depth and area in Figure 8F2.2-2a and depth and volume in Figure 8F2.2-2b) created by the model and from the bathymetric map of Lac du Sauvage shows a reasonably good match.

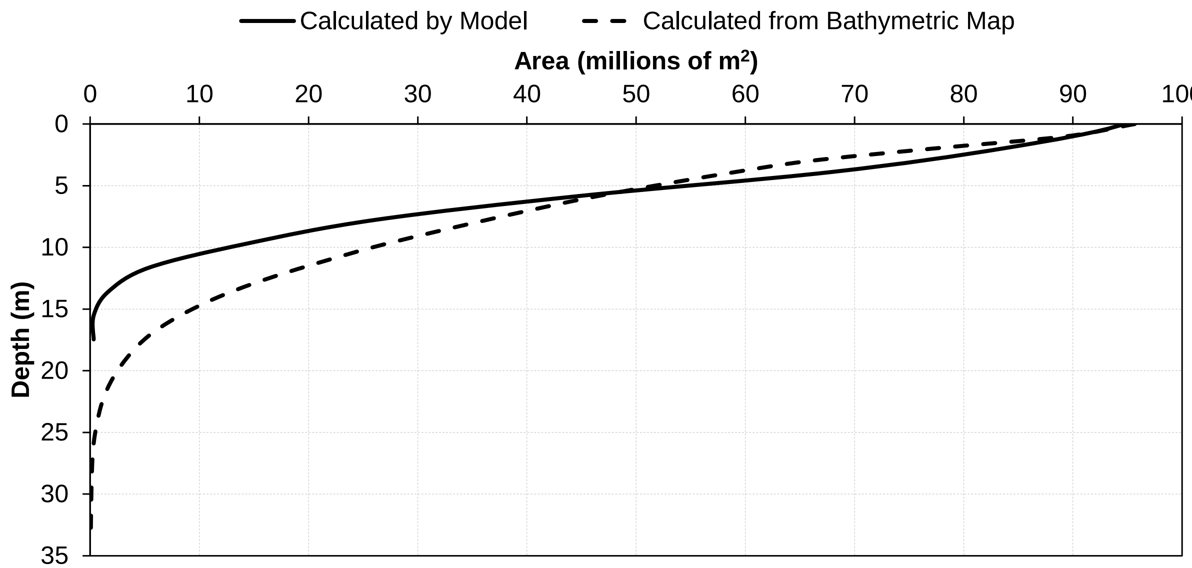
Figure 8F2.2-1 Lac du Sauvage Calibration Model Grid in Plan View



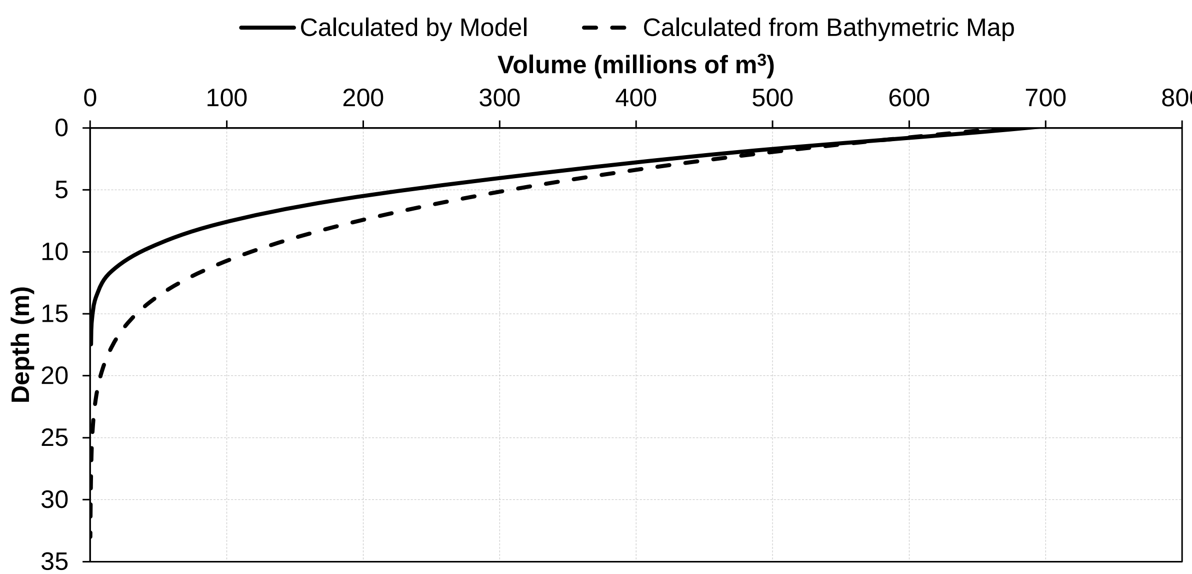
m = metre; N = north.

Figure 8F2.2-2 Hypsographic Curves for Lac du Sauvage

(a) Depth and Area Curve



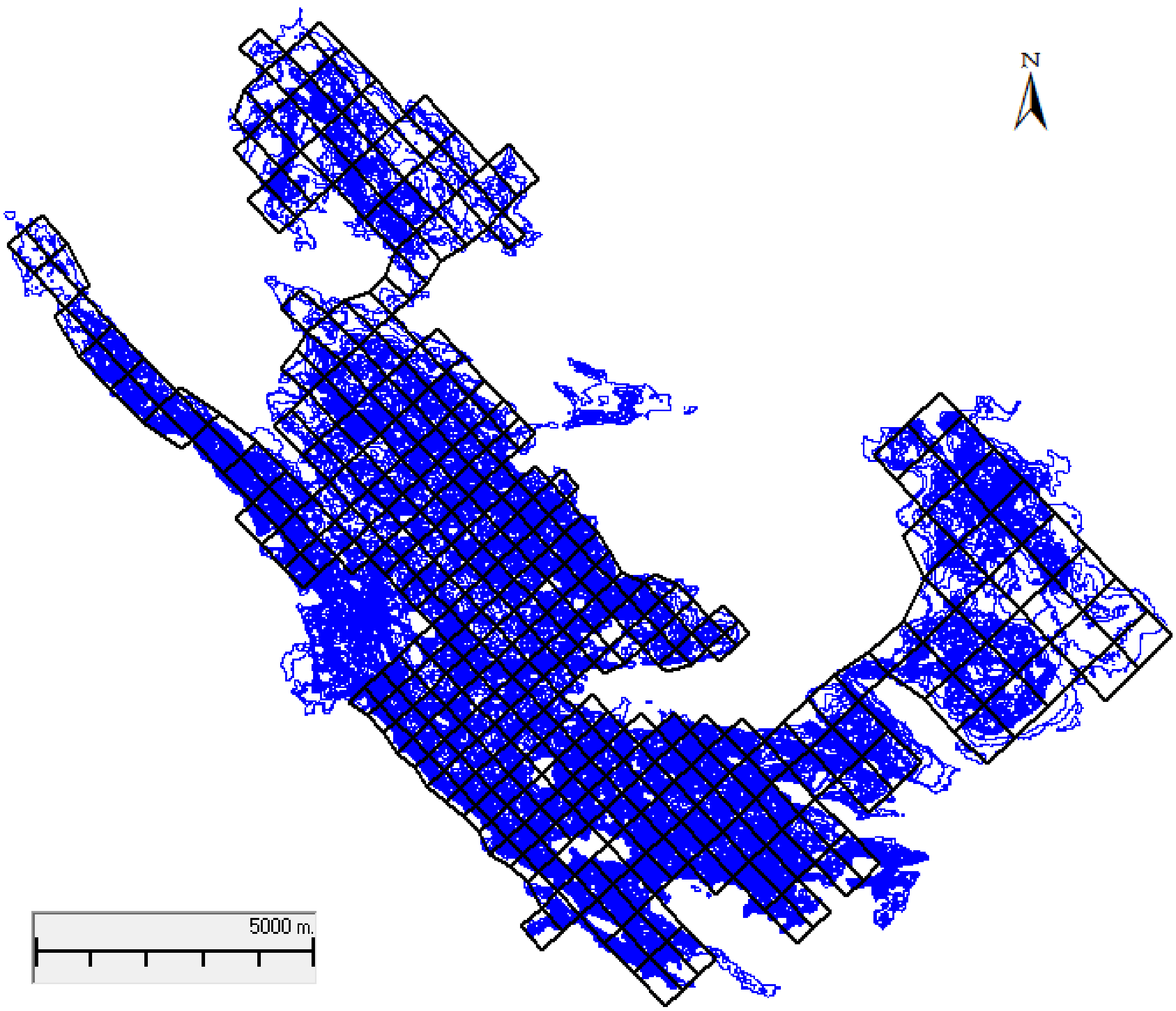
(b) Depth and Volume Curve



m = metre; m^2 = square metre; m^3 = cubic metre.

For the operational time period, 2019 to 2029, and the closure time period, 2030 to 2033, a 3-D grid (Figure 8F2.2-3) was developed to cover all of Lac du Sauvage, with the exception of the diked area. The horizontal and vertical resolution of the grid was the same as the calibration model grid. The grid comprised a total of 10 active vertical layers and 1,450 active cells.

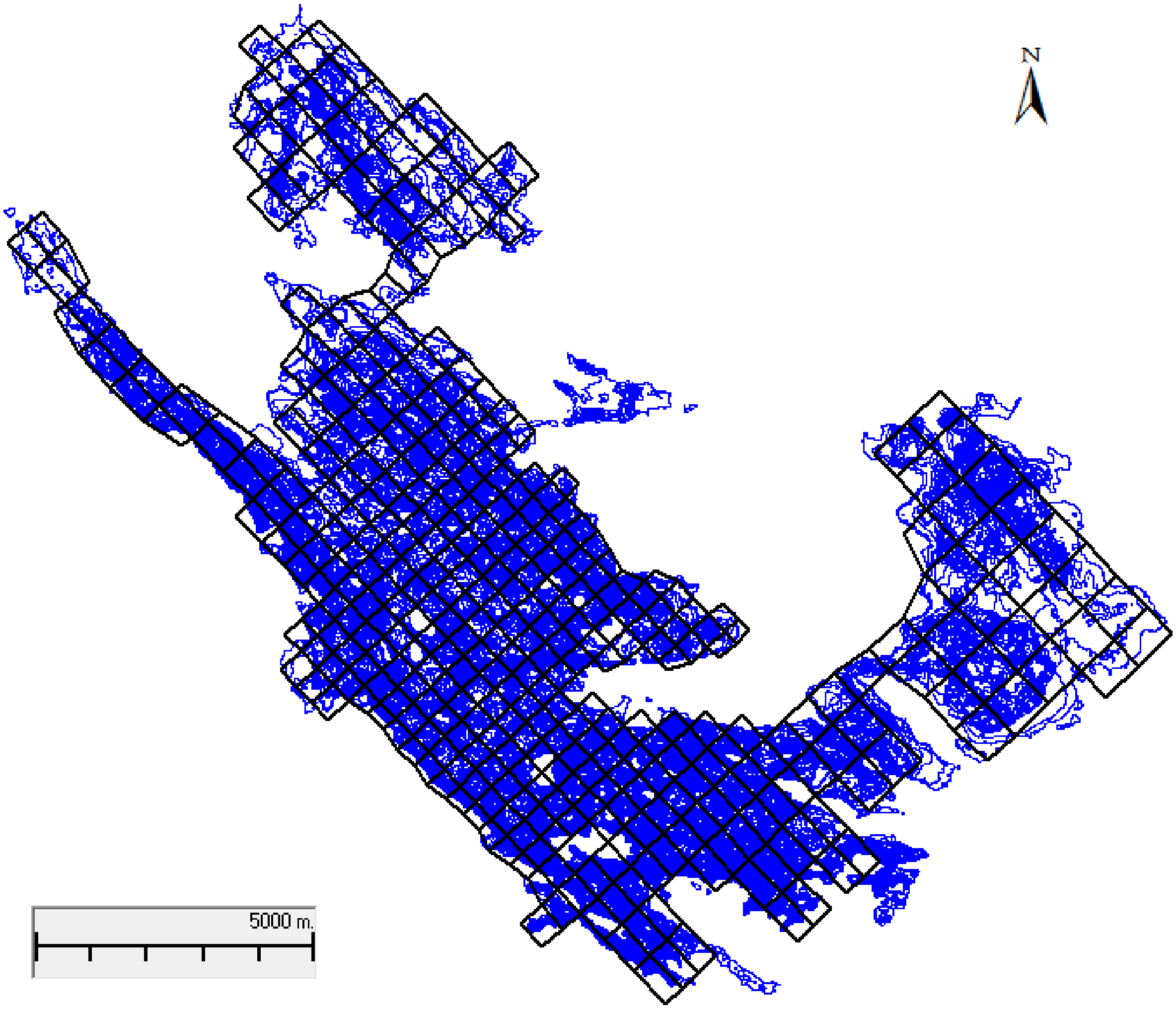
Figure 8F2.2-3 Lac du Sauvage Operations and Closure Model Grid in Plan View



m = metre; N = north.

For the post-closure period (2034 to 2060), a 3-D grid (Figure 8F2.2-4) was developed to cover all of Lac du Sauvage. The horizontal and vertical resolution of the grid was the same as the calibration model grid. The Jay Pit was modelled to a depth of 60 m (356 m elevation). The grid comprised a total of 18 active vertical layers and 1,930 active cells.

Figure 8F2.2-4 Lac du Sauvage Post-closure Model Grid in Plan View

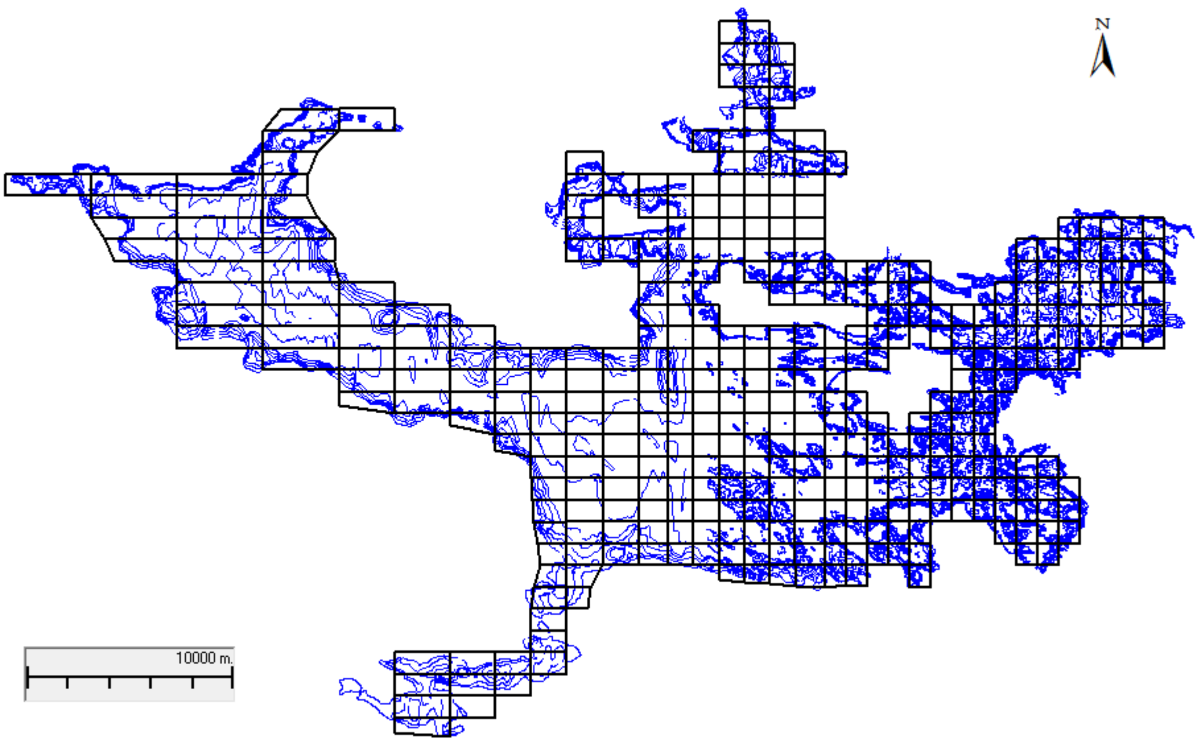


m = metre; N = north.

8F2.2.1.2 Lac de Gras

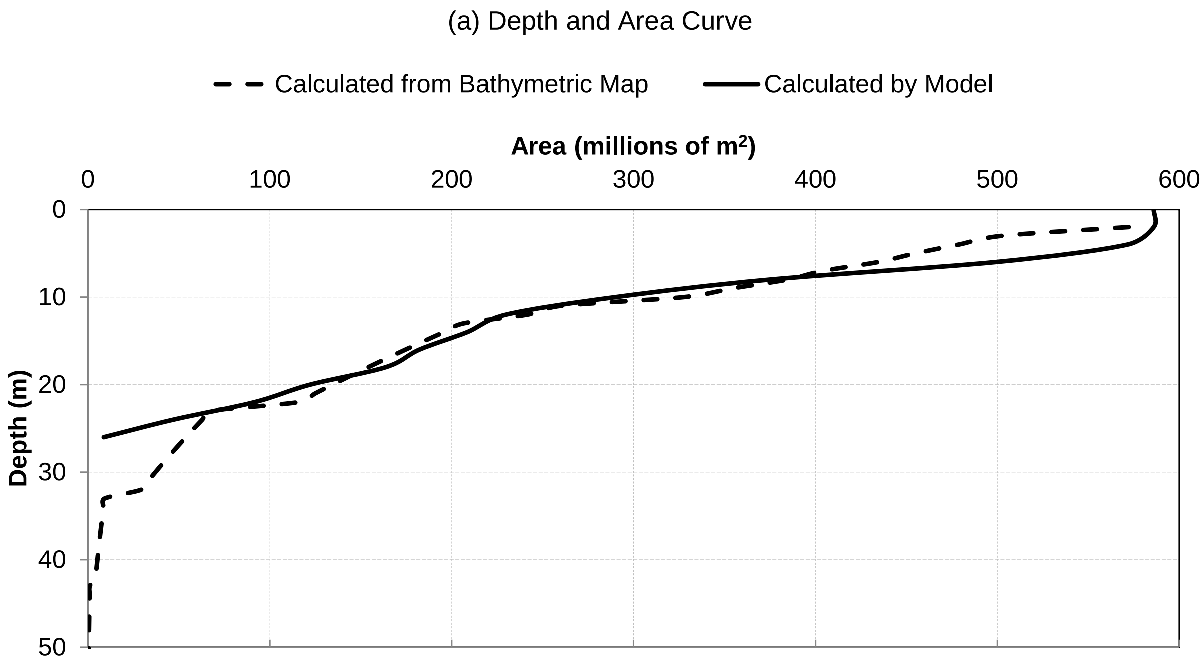
A 3-D grid (Figure 8F2.2-5) was developed to cover all of Lac de Gras, with the exception of some small bays that are not anticipated to affect the overall circulation of water and constituents in the lake. The grid spacing varied from approximately 1,000 m horizontally in the eastern part of the lake where the discharge from Lac du Sauvage and the Diavik Mine enter Lac de Gras to 4,000 m horizontally near the outlet of the lake, and vertical resolution was 2 m. The grid comprised a total of 13 active vertical layers and 2,298 active cells. The comparison of hypsographic curves (i.e., depth and area in Figure 8F2.2-6a and depth and volume in Figure 8F2.2-6b) created by the model and from the bathymetric map of Lac de Gras shows a reasonably good match.

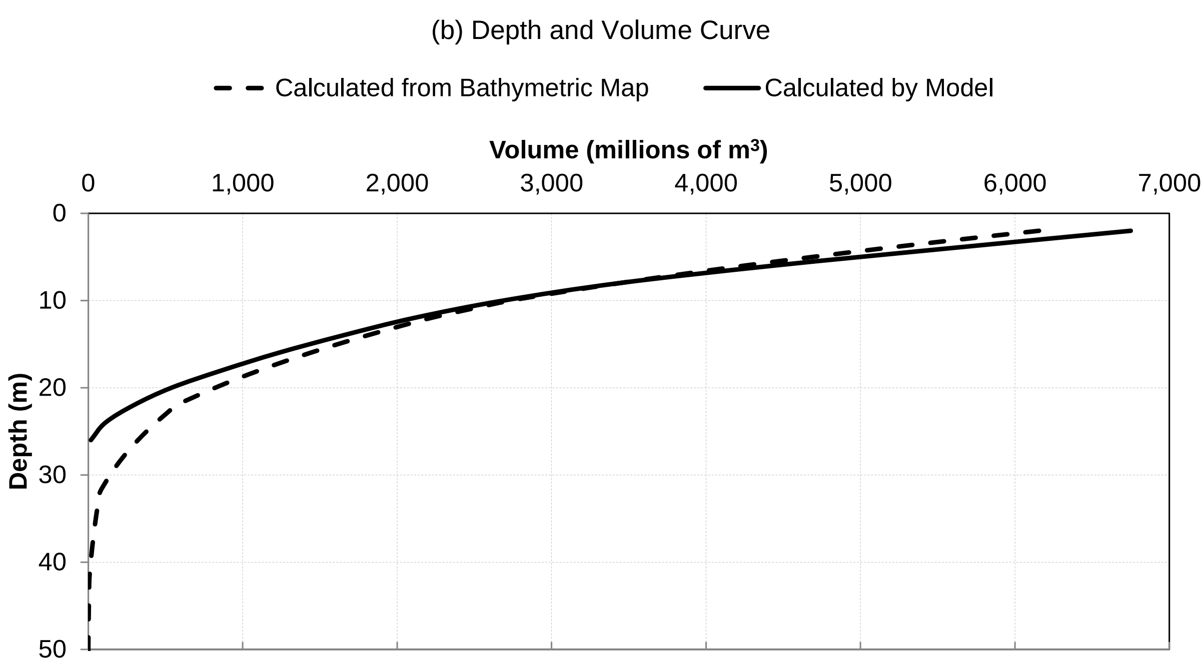
Figure 8F2.2-5 Lac de Gras Model Grid in Plan View



m = metre; N = north.

Figure 8F2.2-6 Hypsographic Curves for Lac de Gras





m = metre; m^2 = square metre; m^3 = cubic metre.

8F2.2.2 Model Inputs

8F2.2.2.1 Meteorological Inputs

Meteorological inputs are drivers of lake circulation and thermal dynamics. The following meteorological input data were required for the Lac du Sauvage and Lac de Gras models:

- air temperature;
- dew point temperature;
- wet bulb temperature;
- atmospheric pressure;
- wind direction;
- wind speed; and,
- solar radiation.

An hourly time series was constructed for each of these inputs during the calibration time period based on measured data from an on-site meteorological station at the Diavik Mine, with the exception of atmospheric pressure. An hourly time series of atmospheric pressure was constructed from the Environment Canada meteorological station at the Yellowknife Airport. Hourly time series of dew point and wet bulb temperatures were calculated based on recorded air temperature, relative humidity, and atmospheric pressure. Where gaps existed in the data from the Diavik Mine, data from an on-site meteorological station at the Ekati Mine were used. For prediction of future conditions, the time series used to calibrate the model was repeated. The same meteorological inputs were used for the Lac du Sauvage and Lac de Gras models.

8F2.2.2.2 Hydrologic Inputs

8F2.2.2.2.1 Lac du Sauvage

For the calibration, pre-operational, operational, and closure time periods, the water balance was consistent with the regional water balance model (Appendix 8D). For the calibration time period, 2009 to 2013, the hydrologic inputs to Lac du Sauvage were tributary and non-point source inflows from the Lac du Sauvage basin and direct precipitation on the lake. The outflows from the lake were the outlet channel between Lac du Sauvage and Lac de Gras and evaporation.

For the pre-operational time period, 2014 to 2018, and operational time period, 2019 to 2029, the hydrologic inputs to Lac du Sauvage were the same as those described for the calibration time period, with the addition of water pumped from the diked area and minewater pumped from the Misery Pit. The outflows from Lac du Sauvage were the same as those described for the calibration time period with the addition of seepage to the diked area.

For the closure time period, 2030 to 2033, the hydrologic inputs to Lac du Sauvage were the same as those described for the calibration time period. The outflows from Lac du Sauvage were the same as those described for the calibration time period with the addition of water pumped from Lac du Sauvage to the diked area and water pumped to the Misery Pit.

During post-closure (2034 to 2060), the hydrologic inputs to and outputs from Lac du Sauvage were the same as those described for the calibration time period with the addition of runoff from the WRSA and vertical movement of water from the monimolimnion of the Jay Pit into Lac du Sauvage. These inputs are shown schematically in Map 8F2.2-1, along with projected monthly flow rates.

Ice formation and thawing volumes were derived from the annual average of maximum ice thickness measurements collected as part of the Ekati Mine Aquatic Effects Monitoring Program (AEMP) in 2010, 2011, and 2012 (BHP Billiton 2011, 2012, 2013). The annual average of maximum ice thickness measurements were calculated by first identifying the maximum ice thickness measurement at each AEMP station from each year and then averaging the maximum ice thickness measurements from all AEMP stations (Table 8F2.2-1).

Modelling the processes of ice formation and thawing involved the following assumptions:

- Ice formation occurred over a ninety-day period from mid-October to January each year.
- Ice thawing occurred over a seventy-five-day period from mid-April to late-June each year.
- An ice thickness of 1.5 m was used each year.
- As ice forms on the lake, constituents (mass) were rejected from the ice and remain in the lake.
  - As a result, predicted constituent concentrations in the lake increase during the ice-covered season. The magnitude of the cycle varies and depends on ice thickness and the depth of the lake at the monitoring station of interest.

Table 8F2.2-1 Annual Average of Maximum Ice Thickness

Year	Average of Maximum Ice Thickness (m)[a]
2009-2010	1.3
2010-2011	1.5
2011-2012	1.5
2012-2013	1.5

a) Values obtained from BHP Billiton (2011, 2012, 2013).
m = metre.

Map 8F2.2-1 Inflows, Outflows, Calibration Stations and Prediction Locations in Lac du Sauvage

DAR_WQ_006_GIS

8F2.2.2.2.2 Lac de Gras

For the calibration, pre-operational, operational, closure, and post-closure snapshots, the water balance was consistent with the regional water balance model (Appendix 8D). For the calibration time period at Lac de Gras, 2009 to 2012, the hydrologic inputs to Lac de Gras were tributary and non-point source inflows from the Lac de Gras basin, monitored inflows (effluent discharge) from the Diavik Mine, discharge from Slipper Lake to Lac de Gras, and direct precipitation on the lake. The outflows from Lac de Gras were the outlet channel to the Coppermine River and evaporation.

For the pre-operational time period, 2013 to 2018, the hydrologic inputs to Lac de Gras were the same as those described for the calibration time period with the exception of effluent discharge from the Diavik Mine and discharge from Slipper Lake to Lac de Gras. Predictions of effluent discharge from the Diavik Mine were obtained from Golder Associates Ltd. (Golder 2012). Predictions of inflows from Slipper Lake to Lac de Gras were received from ERM Rescan (2014; Attachment 8F3) and incorporated into the regional water balance model. The outflows from Lac de Gras were the same as those described for the calibration time period.

For the operational time period, 2019 to 2029, the hydrologic inputs to Lac de Gras were the same as those described for the calibration time period with the exception of the Diavik Mine discharge, which was assumed to cease by the end of 2023 and predictions of discharge from Slipper Lake to Lac de Gras, which were sourced from ERM Rescan (2014). The outflows from Lac de Gras were the same as those described for the calibration time period.

For the closure time period, 2030 to 2033, the hydrologic inputs to Lac de Gras were the same as those described for the operational time period with the addition of seepage from the Misery Pit and overflow from the Misery Pit to Lac de Gras. The Misery Pit seepage and overflow were obtained from the regional water balance model. The outflows from Lac de Gras were the same as those described for the calibration time period. During the post-closure period (2034 to 2060), the hydrologic inputs to and outputs from Lac de Gras were the same as those described for the closure time period. These inputs are shown schematically in Map 8F2.2-2 along with projected monthly flow rates.

The same processes of ice formation and thawing and assumptions that were used in the Lac du Sauvage Model were applied to the Lac de Gras Model with one exception. In the Lac de Gras Model, ice thawing occurred over an eighty-day period from mid-April to early July each year to allow for improved temperature profile calibration (Section 8F2.3.1).

8F2.2.2.3 Chemical Inputs

8F2.2.2.3.1 Lac du Sauvage

Water quality data for tributary and non-point source inflows were represented by median constituent concentrations from water quality monitoring results for Lac du Sauvage collected between 2004 and 2013 for the open-water season (Table 8F2.2-2), with the exception of inflow water quality from Christine Lake to Lac du Sauvage. Water quality from Christine Lake to Lac du Sauvage has been influenced by the Misery site, which discharges minewater via the King Pond Settling Facility into Cujo Lake and then through Christine Lake.

Map 8F2.2-2 Inflows, Outflows, Calibration Stations and Prediction Locations in Lac de Gras

DAR_WQ_007_GIS

From 2009 to 2013, water quality data for inflows from Christine Lake to Lac du Sauvage were obtained from data presented in the 2010, 2011, and 2012 Ekati Mine AEMPs for the Christine Lake discharge stream and for sampling stations in Lac du Sauvage (BHP Billiton 2011, 2012, 2013), and from data presented for Christine Lake in the Water and Sediment Quality Baseline Report (Annex XI). From 2014 to 2018, predicted water quality concentrations from Christine Lake to Lac du Sauvage were provided by the King-Cujo watershed model developed by ERM Rescan (Robb 2014; Attachment 8F2) for ammonia, nitrate, phosphorus, chloride, potassium, and sulphate. Water quality in Christine Lake was assumed to remain affected by discharge from the King Pond Settling Facility and Cujo Lake for a period of time after mining of the Misery pipe was completed. Therefore, the final water quality predictions for December 2018 from the King-Cujo watershed model for ammonia, nitrate, phosphorus, chloride, potassium, and sulphate were input into the Lac du Sauvage Model as constant concentrations from 2019 to 2029. For constituent predictions not provided by ERM Rescan (Robb 2014; Attachment 8F2), the final water quality concentrations used during the calibration period were assigned to future inflows as constant concentrations from 2013 to 2029. From 2030 to 2060, water quality data for inflows from Christine Lake to Lac du Sauvage were set to median baseline concentrations (Table 8F2.2-2).

Table 8F2.2-2 Median Baseline Concentrations in Lac du Sauvage, 2004 to 2013

Constituent	Open-Water Concentration[(a)]
Temperature (°C)	15.8
Total dissolved solids (mg/L)	11
Total ammonia (mg-N/L)	0.0070
Nitrate (mg-N/L)	0.0025
Total organic nitrogen (mg-N/L)	0.162
Orthophosphate (mg-P/L)	0.0005
Total organic phosphorus (mg-P/L)	0.006
Chlorophyll *a* (µg/L)	4
Calcium (mg/L)	0.83
Chloride (mg/L)	0.25
Fluoride (mg/L)	0.01
Magnesium (mg/L)	0.58
Potassium (mg/L)	0.53
Silica (mg/L)	0.14
Sodium (mg/L)	0.56
Sulphate (mg/L)	1.20

a) Concentrations obtained from Annex XI.

°C = degrees Celsius; mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre.

The maximum of mean water quality concentrations and the maximum of 99th percentile water quality concentrations from 200 model realizations were obtained from the site discharge water quality model for the minewater pumped from the Misery Pit to Lac du Sauvage, for runoff from the WRSA, and for the monimolimnion of the Jay Pit (Appendix 8E). Both the maximum of mean water quality concentrations and the maximum of 99th percentile water quality concentrations were input into the Lac du Sauvage Model to predict changes in water quality in the lake. As discussed in Section 8F3.1.1, water quality concentrations in Lac du Sauvage were not predicted to be sensitive to the maximum of 99th percentile water quality concentrations from the minewater pumped from the Misery Pit to Lac du Sauvage, for runoff from the WRSA, or for the monimolimnion of the Jay Pit. Therefore, the maximum of mean water quality concentrations were carried forward in the Lac du Sauvage and Lac de Gras models. Site discharge water quality model predictions for dissolved phosphorus were input to the Lac du Sauvage Model as orthophosphate. Water temperature of the Misery Pit discharge to Lac du Sauvage was obtained from the Misery Pit Model (Appendix 8G).

Water quality data for the Lac du Sauvage Model calibration were obtained from the Ekati Mine AEMPs in 2010, 2011, and 2012 (BHP Billiton 2011, 2012, 2013) and from Annex XI. Water quality monitoring stations used for the Lac du Sauvage Model are shown in Map 8F2.2-1.

8F2.2.2.3.2 Lac de Gras

Water quality data for tributary and non-point source inflows were represented by median constituent concentrations from water quality monitoring results for Lac du Sauvage collected between 2004 and 2013 for the open-water season (Table 8F2.2-2), with the exception of inflow water quality from Lac du Sauvage to Lac de Gras and from Slipper Lake to Lac de Gras. From 2009 to 2060, water quality in the discharge from Lac du Sauvage to Lac de Gras was obtained from the Lac du Sauvage Model. Water quality in the discharge from Slipper Lake to Lac de Gras has been affected by Ekati Mine operations in the Koala watershed, which discharge via the Long Lake Containment Facility into Leslie Lake, and then through Moose, Nero, Nema, Martine, and Slipper lakes (BHP Billiton 2013). Water quality data for inflows from Slipper Lake to Lac de Gras were obtained from data presented in the 2010, 2011, and 2012 Ekati Mine AEMPs for Slipper Lake, the Slipper Lake discharge stream, and sampling stations in Lac de Gras (BHP Billiton 2011, 2012, 2013). From 2009 to 2012, Slipper Lake discharge water quality was represented by median concentrations. For future simulations, predicted water quality concentrations from Slipper Lake to Lac de Gras were provided by the Koala watershed model (ERM Rescan 2014; Attachment 8F3).

Water quality data for the Diavik Mine treated effluent discharge were obtained from monitored data at Surveillance Network Program (SNP) stations 1645-18 and 1645-18b for 2009, 2010, 2011, and 2012 (WLWB 2014). From 2013 to 2023, the Diavik Mine effluent discharge was assigned a water chemistry profile equal to the 95th percentile concentrations of monitored data. The maximum of mean water quality concentrations from 200 model realizations were obtained from the site discharge water quality model for Misery Pit seepage and Misery Pit overflow to Lac de Gras (Appendix 8E).

Water quality data for the Lac de Gras Model calibration were obtained from the Diavik Mine AEMPs in 2009, 2010, 2011, and 2012 (DDMI 2010, 2011, 2012, 2013). Water quality monitoring stations used for the Lac de Gras Model are shown in Map 8F2.2-2.

8F2.2.3 Modelled Constituents

The modelled constituents were those most relevant to water quality and aquatic health in Lac du Sauvage and Lac de Gras (Table 8F2.2-3). The calibration of hydrodynamic constituents, oxygen-related constituents, nutrients, and major ions is described in Section 8F2.3.

Table 8F2.2-3 Modelled Water Quality Constituents

Group	Constituent
Hydrodynamic	Temperature
	Total dissolved solids
Oxygen-related	Dissolved oxygen
Nutrient-related	Total ammonia
	Nitrate
	Total nitrogen
	Orthophosphate
	Total phosphorus
	Phytoplankton (as chlorophyll *a*)
Major ions	Calcium
	Chloride
	Fluoride
	Magnesium
	Silica
	Sodium
	Sulphate
	Hardness[(a)]
Total and dissolved metals	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Cadmium
	Chromium
	Cobalt
	Copper
	Iron
	Lead
	Manganese
	Mercury
	Molybdenum
	Nickel

Table 8F2.2-3 Modelled Water Quality Constituents

Group	Constituent
Total and dissolved metals (continued)	Selenium
	Silver
	Strontium
	Uranium
	Vanadium
	Zinc

a) Predicted hardness concentrations were calculated from modelled calcium and magnesium concentrations.

8F2.2.3.1 Total and Dissolved Metals

Total and dissolved metals concentrations in Lac du Sauvage and Lac de Gras were predicted using conservative generic constituents. Conservative generic constituents were added to the inflow from the following mine discharges at a constant concentration of 100 milligrams per litre (mg/L):

- the discharge from the Misery Pit to Lac du Sauvage;
- the WRSA runoff to Lac du Sauvage;
- the mass flux from the monimolimnion of the Jay Pit within Lac du Sauvage;
- the Diavik Mine discharge to Lac de Gras;
- the Slipper Lake discharge to Lac de Gras;
- the seepage from the Misery Pit to Lac de Gras; and,
- the overflow from the Misery Pit to Lac de Gras.

Initial generic constituent concentrations in the lakes were set to zero. Generic constituents were assumed to behave conservatively in the water column, which means that they would not undergo chemical reactions (i.e., precipitation) or physical processes (i.e., settling) other than advective transport.

To calculate total and dissolved metals concentrations from the generic constituent concentrations in the lakes, a conservative approach was used whereby total and dissolved metals concentrations in the mine discharges were assumed to be at maximum concentrations over the entire period of time that the discharges were active. The maximum total and dissolved metals concentrations that were used in the mine discharges were:

- maximum measured metals concentrations:
  - for the Diavik Mine discharge to Lac de Gras (WLWB 2014); and,
  - the Slipper Lake discharge to Lac de Gras (BHP Billiton 2011, 2012, 2013).

- maximum of predicted metals concentrations:
  - for the discharge from the Misery Pit to Lac du Sauvage;
  - for the WRSA runoff to Lac du Sauvage;
  - for the mass flux from the monimolimnion of the Jay Pit within Lac du Sauvage;
  - for the seepage from the Misery Pit to Lac de Gras; and,
  - for the overflow from the Misery Pit to Lac de Gras from the site discharge water quality model (Appendix 8E).

Predictions of total and dissolved metals concentrations were calculated using the same equation. For example, total aluminum concentrations in Lac du Sauvage at any time were predicted using Equation 8F2.2-1 and total aluminum concentrations in Lac de Gras at any time were predicted using Equation 8F2.2-2.

Equation 8F2.2-1

$$\text{Total Al}_{\text{LDS,t}} = \sum_{i=1}^{3}\left[\frac{\text{Generic Constituent in LDS}_{\text{i,t}}}{100} \times (\text{Maximum Predicted Al}_{\text{i}} - \text{Baseline Al}_{\text{LDS}})\right] + \text{Baseline Al}_{\text{LDS}}$$

Where:

$\text{Total Al}_{\text{LDS,t}}$	= total aluminum concentration in Lac du Sauvage at any time (mg/L)
t	= time (d)
$\frac{\text{Generic Constituent in LDS}_{\text{i,t}}}{100}$	= concentration of the generic constituent in Lac du Sauvage from a mine discharge at any time (mg/L)
i	= the discharge from 1) the Misery Pit to Lac du Sauvage, 2) the WRSA runoff to Lac du Sauvage, and 3) the mass flux from the monimolimnion of the Jay Pit within Lac du Sauvage
$\text{Maximum Predicted Al}_{\text{i}}$	= maximum predicted total aluminum concentration from a mine discharge to Lac du Sauvage (mg/L)
$\text{Baseline Al}_{\text{LDS}}$	= baseline total aluminum concentration in Lac du Sauvage (mg/L)

Equation 8F2.2-2

$$\text{Total Al}_{\text{LDG,t}} = \sum_{i=1}^{7}\left[\frac{\text{Generic Constituent in LDG}_{\text{i,t}}}{100} \times (\text{Maximum Predicted Al}_{\text{i}} - \text{Baseline Al}_{\text{LDG}})\right] + \text{Baseline Al}_{\text{LDG}}$$

Where:

$\text{Total Al}_{\text{LDG,t}}$	= total aluminum concentration in Lac de Gras at any time (mg/L)
t	= time (d)
$\frac{\text{Generic Constituent in LDG}_{\text{i,t}}}{100}$	= concentration of the generic constituent in Lac de Gras from a mine discharge at any time (mg/L)
i	= the discharge from 1) the Misery Pit to Lac du Sauvage, 2) the WRSA runoff to Lac du Sauvage, 3) the mass flux from the monimolimnion of the Jay Pit within Lac du Sauvage, 4) the Diavik Mine discharge to Lac de Gras, 5) the Slipper Lake discharge to Lac de Gras, 6) the seepage from the Misery Pit to Lac de Gras, and 7) the overflow from the Misery Pit to Lac de Gras
$\text{Maximum Predicted Al}_{\text{i}}$	= maximum predicted total aluminum concentration from a mine discharge to Lac du Sauvage or Lac de Gras (mg/L)
$\text{Baseline Al}_{\text{LDG}}$	= 2009 measured total aluminum concentration in Lac de Gras (mg/L)

8F2.2.3.2 Total Nitrogen and Total Phosphorus

Predicted total nitrogen concentrations were calculated: 1) by summing the predicted ammonia and nitrate concentrations and the median baseline total organic nitrogen concentration in Lac du Sauvage, and 2) by summing the predicted ammonia and nitrate concentrations and the 2009 median total organic nitrogen concentration in Lac de Gras. Predicted total phosphorus concentrations were calculated: 1) by summing the predicted orthophosphate concentrations and the median baseline total organic phosphorus concentration in Lac du Sauvage, and 2) by summing the predicted orthophosphate concentrations and the 2009 median total organic phosphorus concentration in Lac de Gras.

8F2.3 Model Calibration

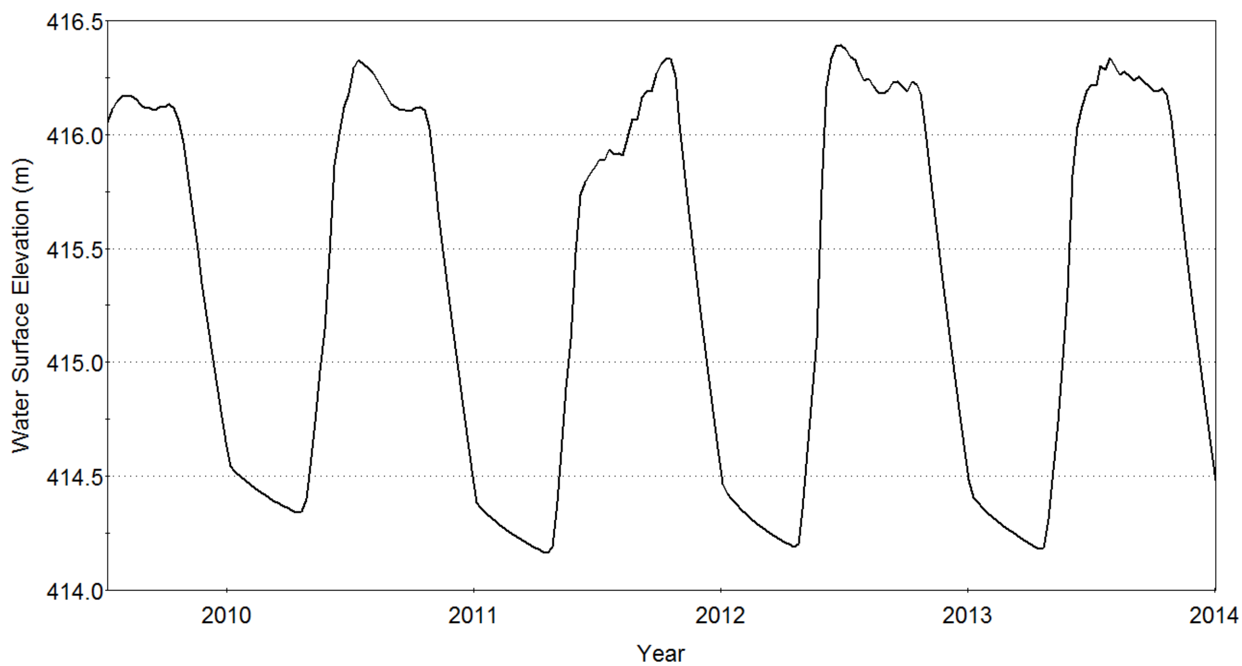
The Lac du Sauvage Model was calibrated to measured data from 2009 to 2014 and the Lac de Gras Model was calibrated to measured data from 2009 to 2012. Time series and profile figures were created to compare model results to measured data at several locations in both lakes.

8F2.3.1 Hydrodynamic Calibration

The first step in the calibration process was to achieve a water balance within the models. This was accomplished by using inflows and outflows to Lac du Sauvage and Lac de Gras that were consistent with those presented in the regional water balance model (Appendix 8D).

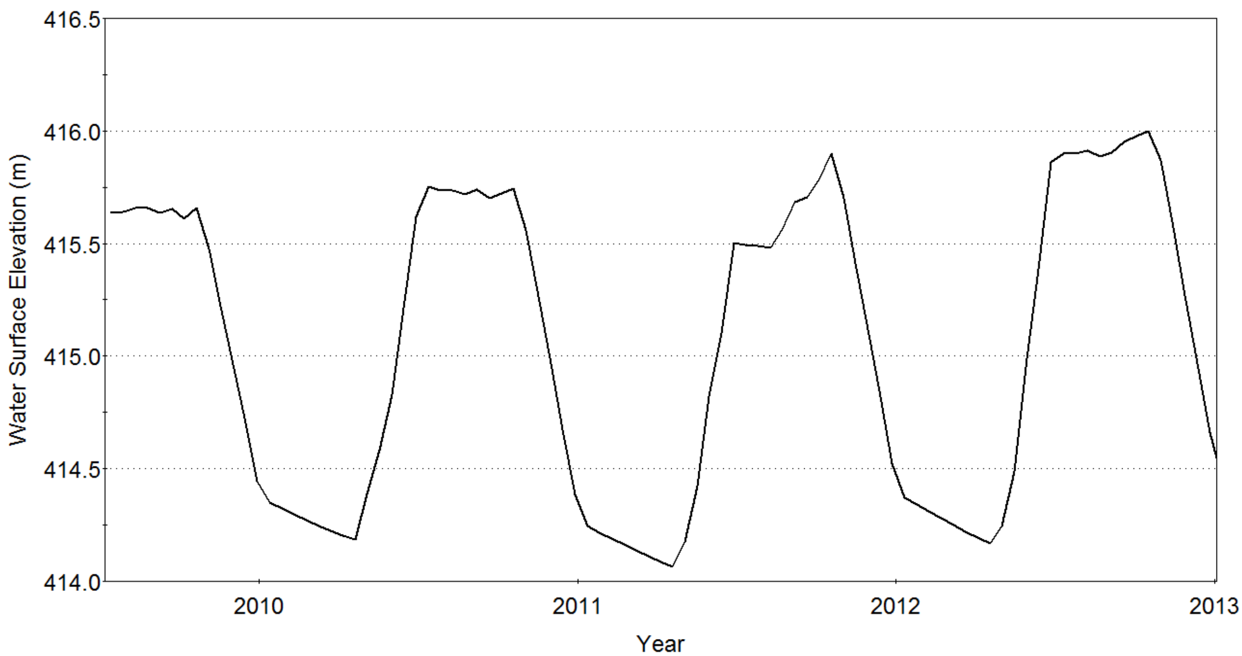
Surface water elevations in Lac du Sauvage (Figure 8F2.3-1) and Lac de Gras (Figure 8F2.3-2) indicate that the lake volumes are balanced over their calibration periods. Model predictions do not exhibit increasing or decreasing trends in water level over the years, and reproduce the expected seasonal cycle. The change in water level predicted during the ice-covered season is due to abstraction of water by ice formation.

Figure 8F2.3-1 Lac du Sauvage Water Surface Elevation Time Series Calibration Plot



m = metre.

Figure 8F2.3-2 Lac de Gras Water Surface Elevation Time Series Calibration Plot



m = metre.

The hydrodynamic component of the models was calibrated to match measured and modelled thermal and transport behaviour in Lac du Sauvage and Lac de Gras. As the goal of calibration is to apply the formulae and constants that most closely approximate the behaviour of the system under study, an adjustment of parameters is standard practice during calibration (Cole and Wells 2008).
Default model parameters were used for the thermal variables, with the following exception:

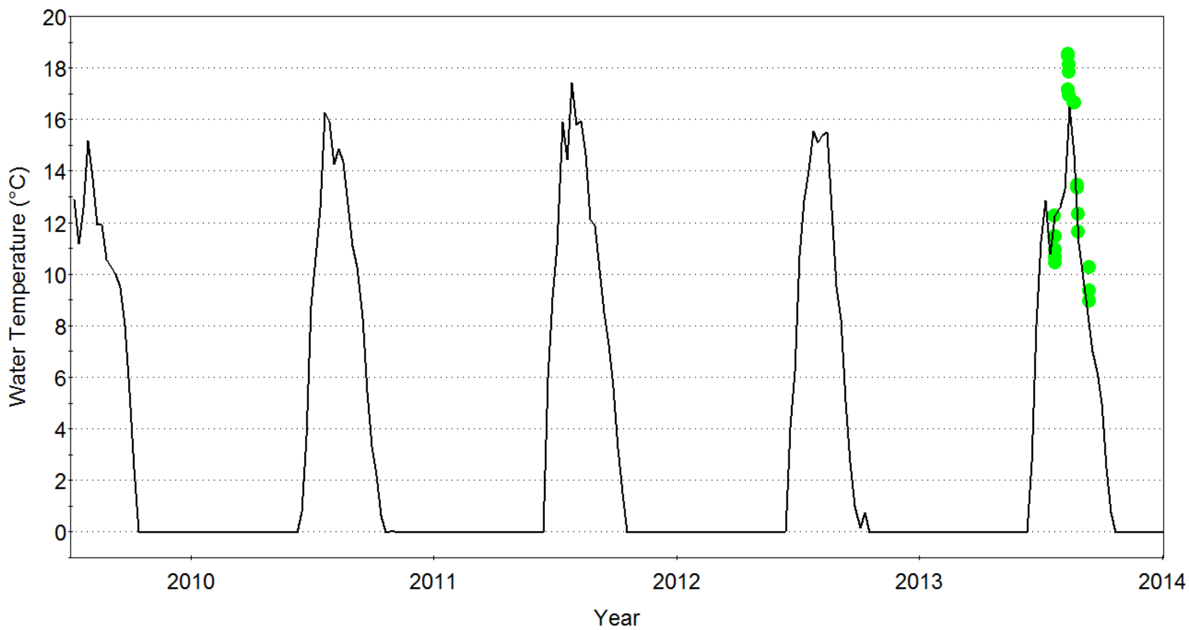
- To improve thermal profiles during the ice-covered seasons, sediment heat exchange was added to the Lac du Sauvage and Lac de Gras models. Based on the Lac du Sauvage and Lac de Gras calibrations, the sediment temperature was set at a constant value of 1 degree Celsius (°C) and 2°C, respectively. Additionally, a sediment-water heat exchange coefficient of $3x10^{-7}$ metres per second (m/s) was added to each model and a negative heat load of 5°C cubic metres per second (m^3/s) was added to the surface of each lake to simulate an ice-water heat exchange.

Time series plots of surface water temperatures at stations throughout Lac du Sauvage (Figure 8F2.3-3). and Lac de Gras (Figure 8F2.3-4) show that the models matched the surface water temperatures reasonably well. During the open-water season for Lac du Sauvage and the ice-covered and open-water seasons for Lac de Gras, the modelled thermal profiles fit the measured profiles well (Figure 8F2.3-5 and 8F2.3-6).

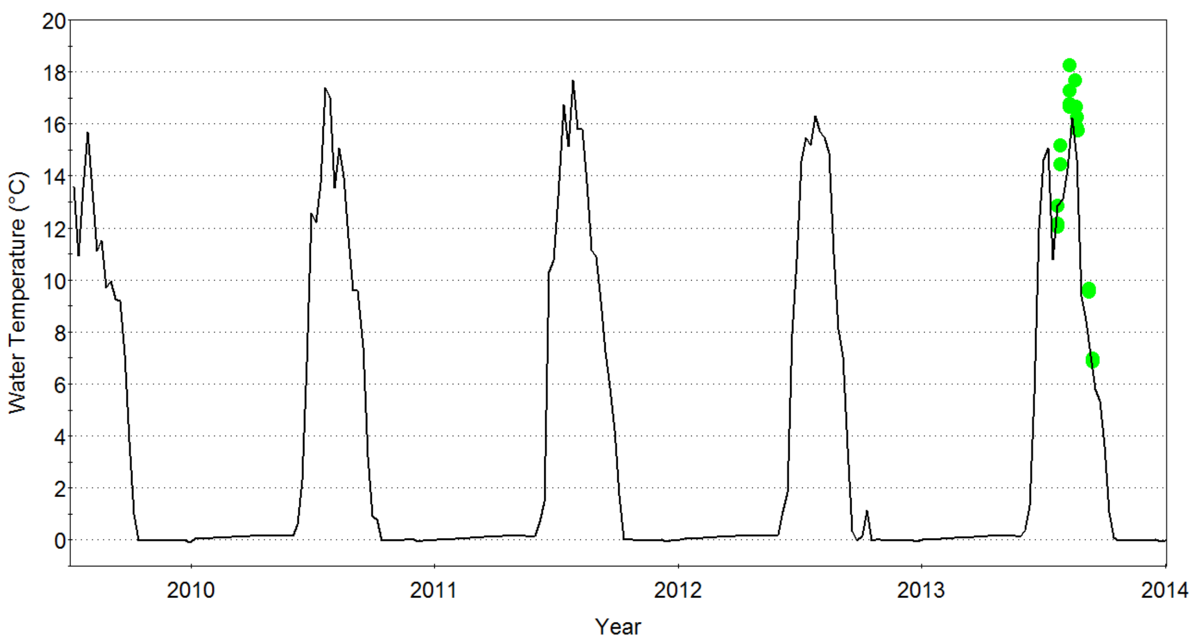
The maximum surface temperature was not achieved in the Lac du Sauvage profile calibration plots; however, the surface temperature time series matched measured data well. The modelled temperature profiles were colder than measured data in August (Figure 8F2.3-5) because the 2 m vertical grid spacing used in the Lac du Sauvage Model reduced the vertical resolution of the model. In Lac de Gras, modelled temperature profiles were colder in the near-field and mid-field areas of the lake than measured data in early July (Figure 8F2.3-6), which may be the result of the duration of the ice-covered season. In the Lac de Gras Model, the ice-covered season extended into early July.

Figure 8F2.3-3 Lac du Sauvage Water Temperature Time Series Calibration Plots

(a) AC

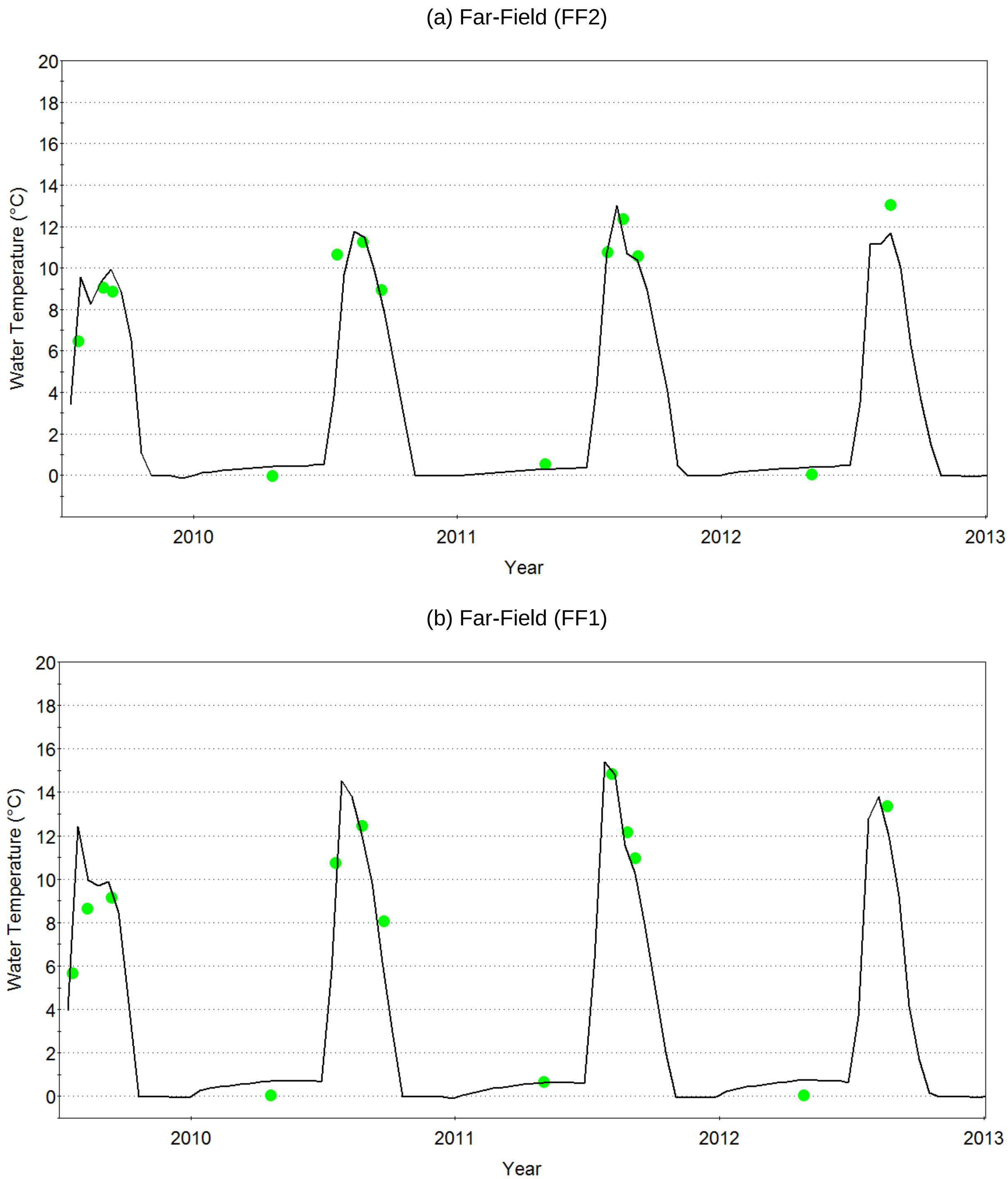


(b) AF



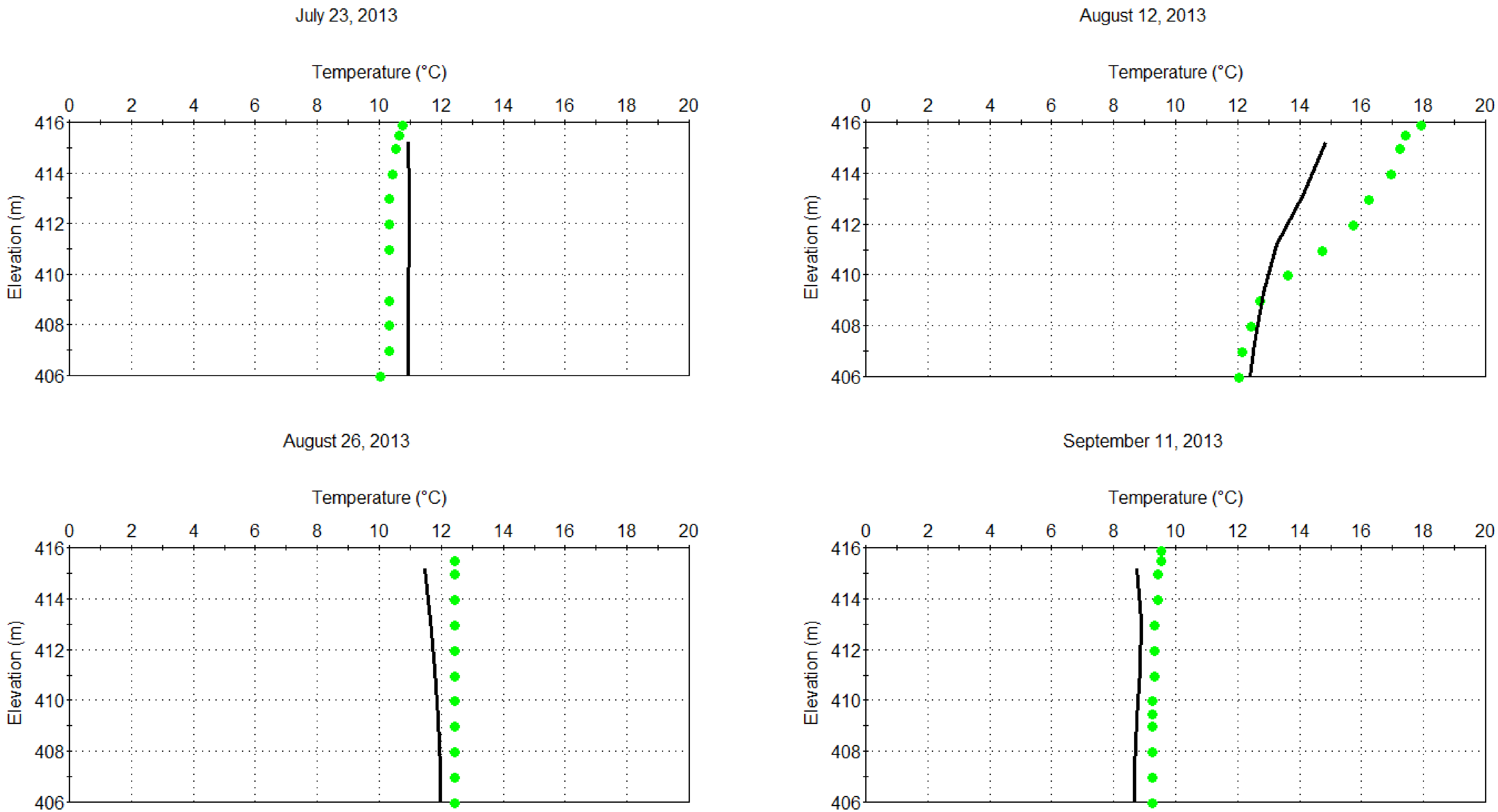
°C = degree Celsius; dots represent measured data; solid line represents model results; AC and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-4 Lac de Gras Water Temperature Time Series Calibration Plots



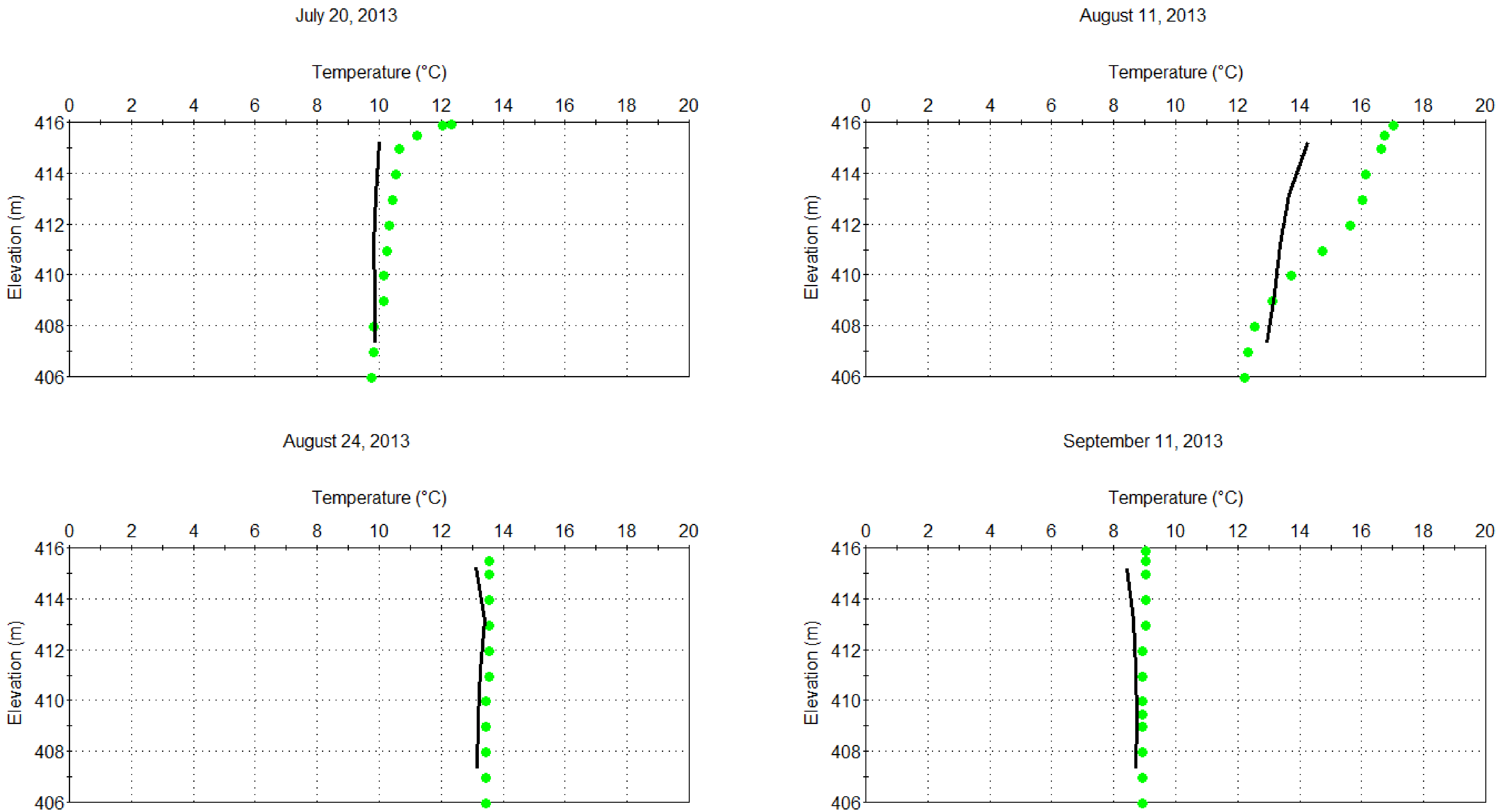
°C = degree Celsius; dots represent measured data; solid line represents model results; FF2 and FF1 are calibration locations in Lac de Gras.

Figure 8F2.3-5a Lac du Sauvage Water Temperature Profile Calibration Plots, AB



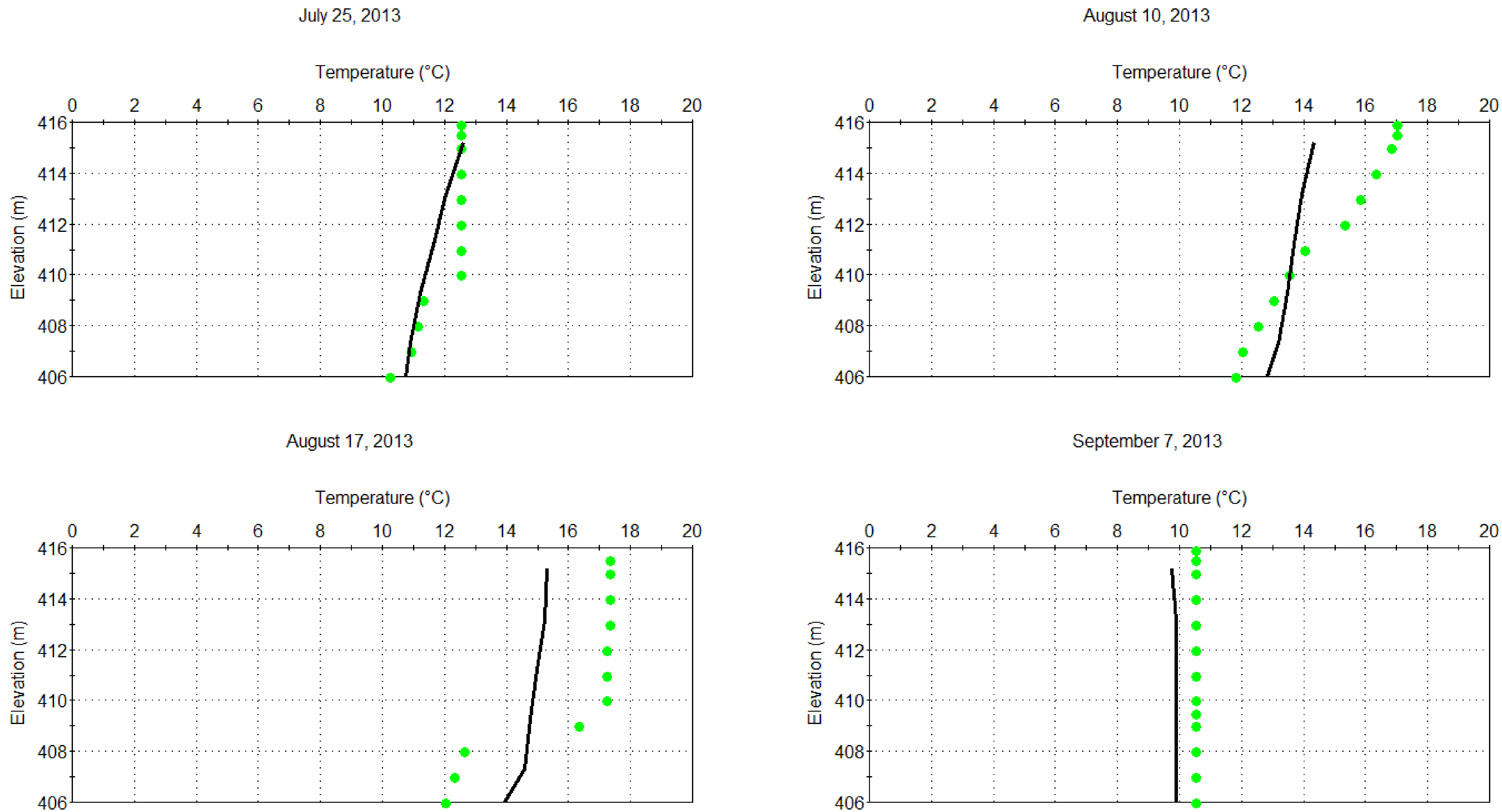
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; AB is a calibration location in Lac du Sauvage.

Figure 8F2.3-5b Lac du Sauvage Water Temperature Profile Calibration Plots, AC



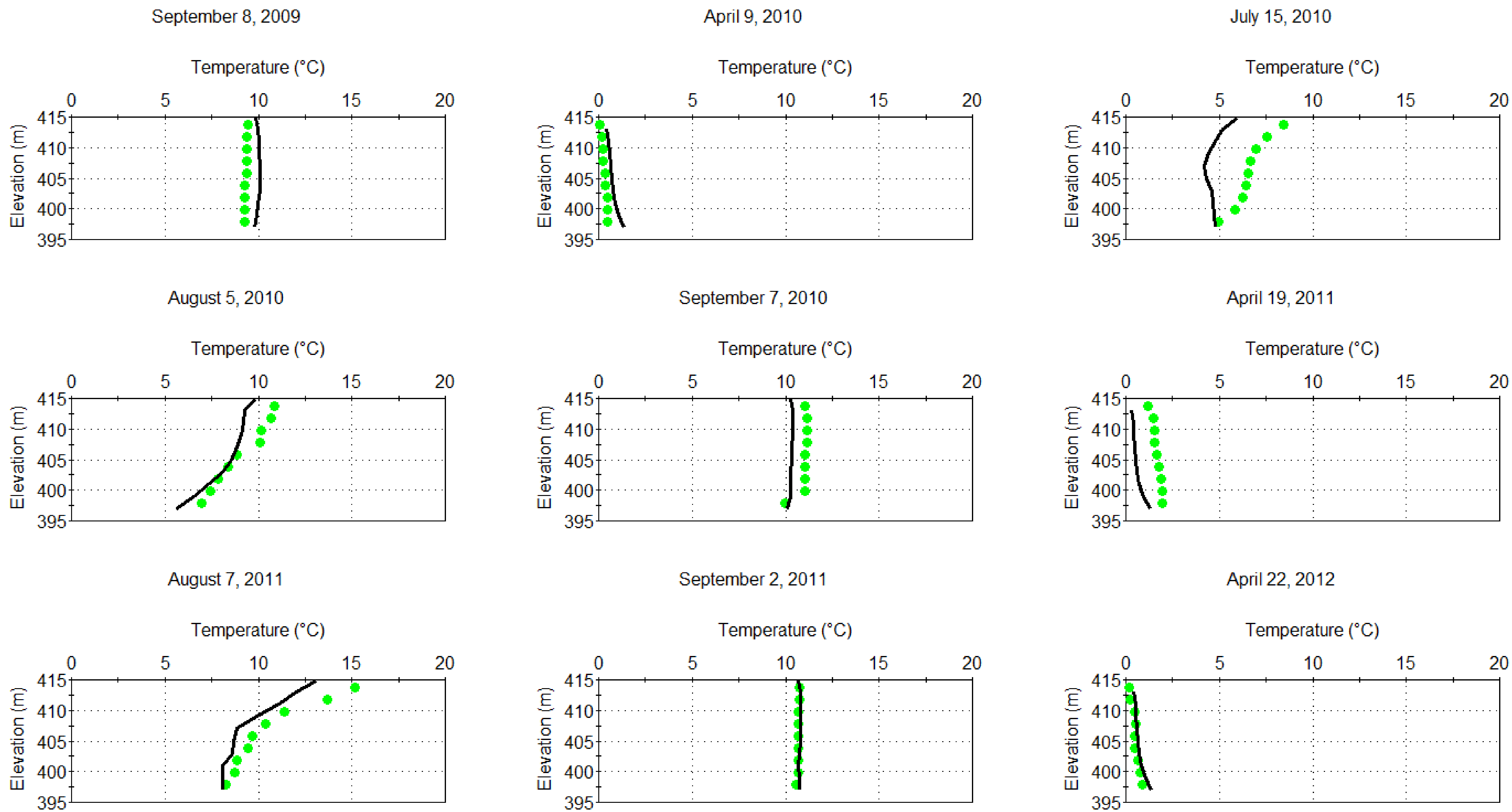
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; AC is a calibration location in Lac du Sauvage.

Figure 8F2.3-5c Lac du Sauvage Water Temperature Profile Calibration Plots, AD



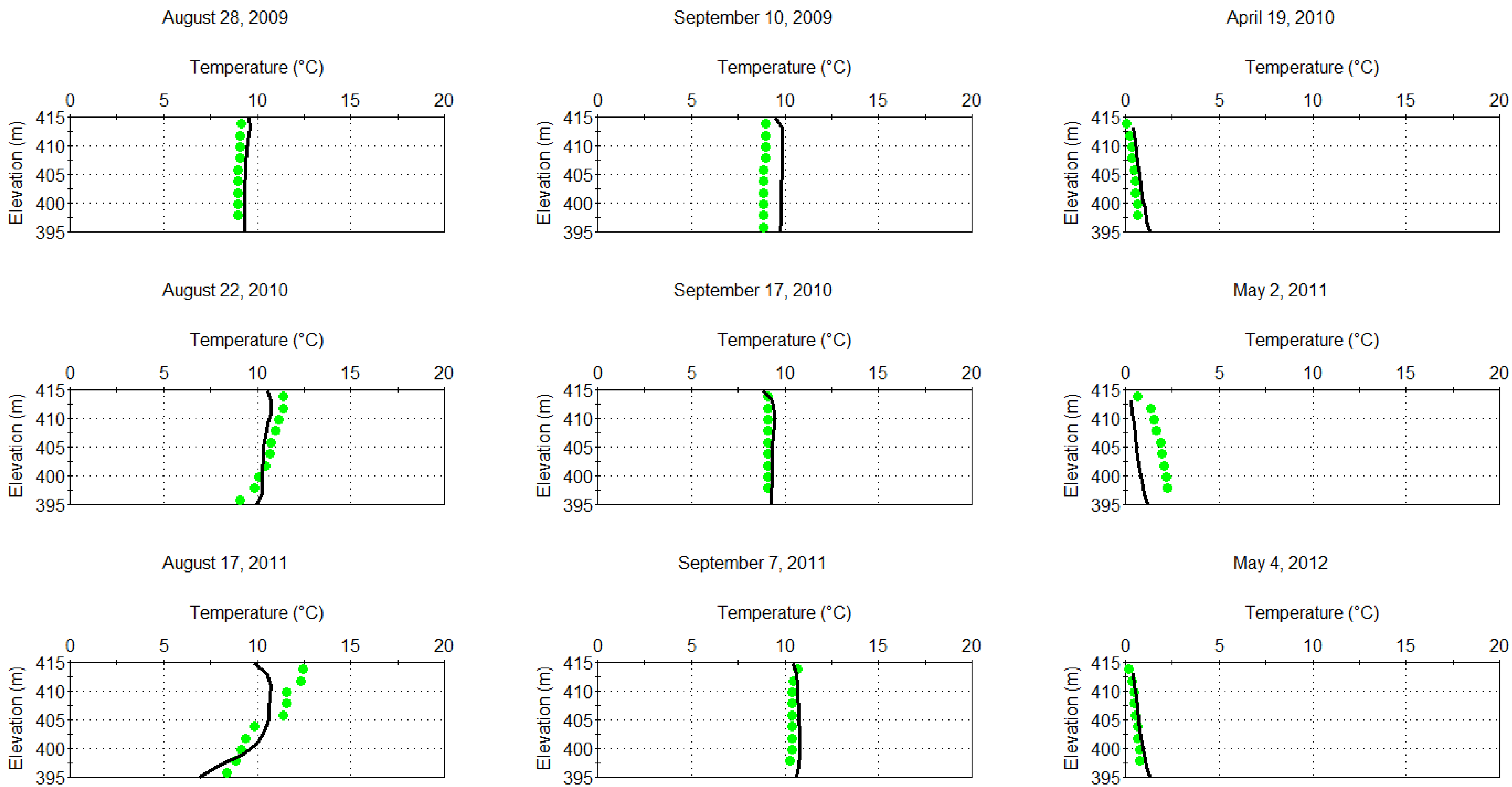
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; AD is a calibration location in Lac du Sauvage.

Figure 8F2.3-6a Lac de Gras Water Temperature Profile Calibration Plots, Near-Field (NF3)



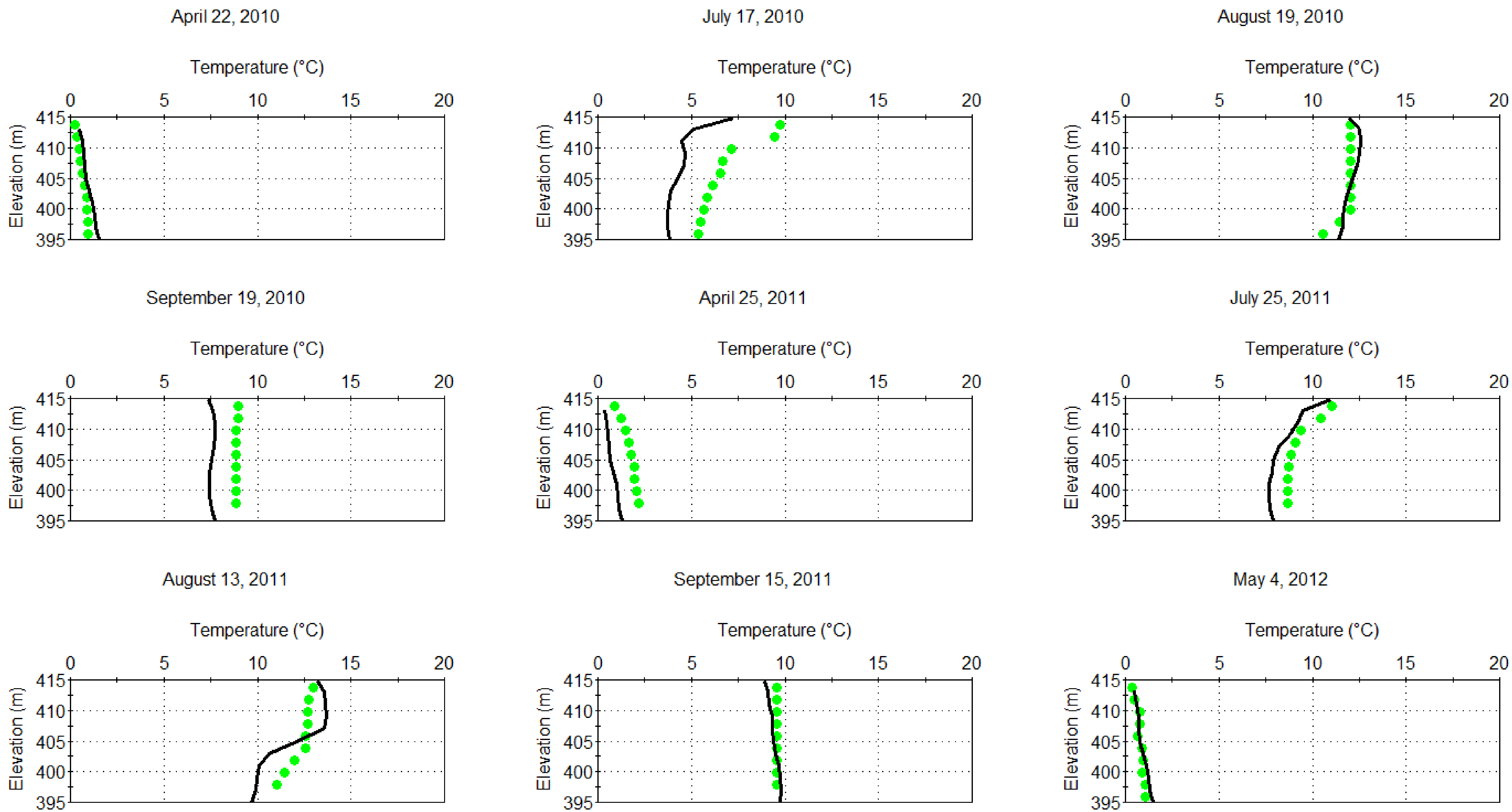
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; NF3 is a calibration location in Lac de Gras.

Figure 8F2.3-6b Lac de Gras Water Temperature Profile Calibration Plots, Far-Field (FF2-2)



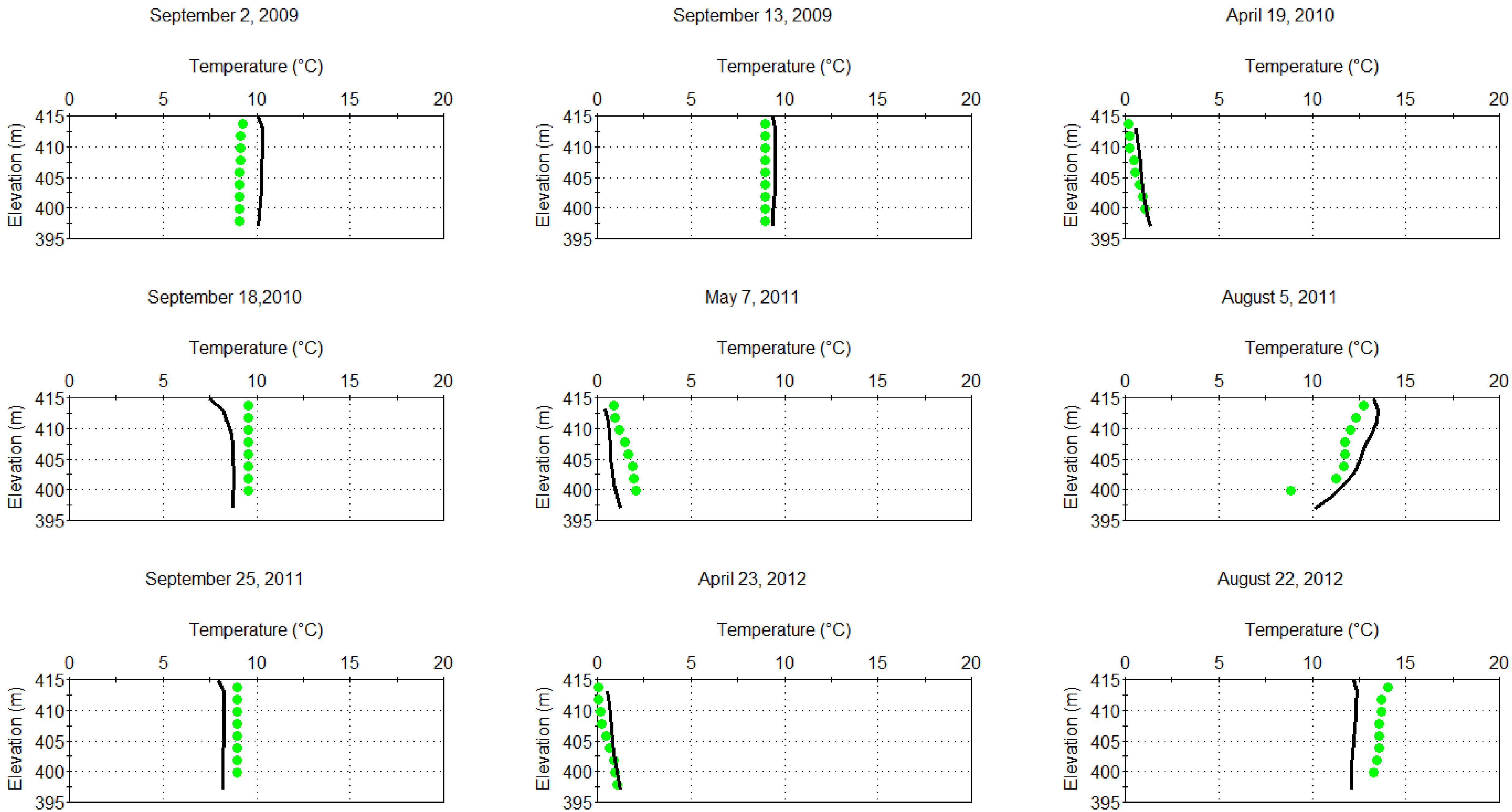
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; FF2-2 is a calibration location in Lac de Gras.

Figure 8F2.3-6c Lac de Gras Water Temperature Profile Calibration Plots, Mid-Field (MF3-4)



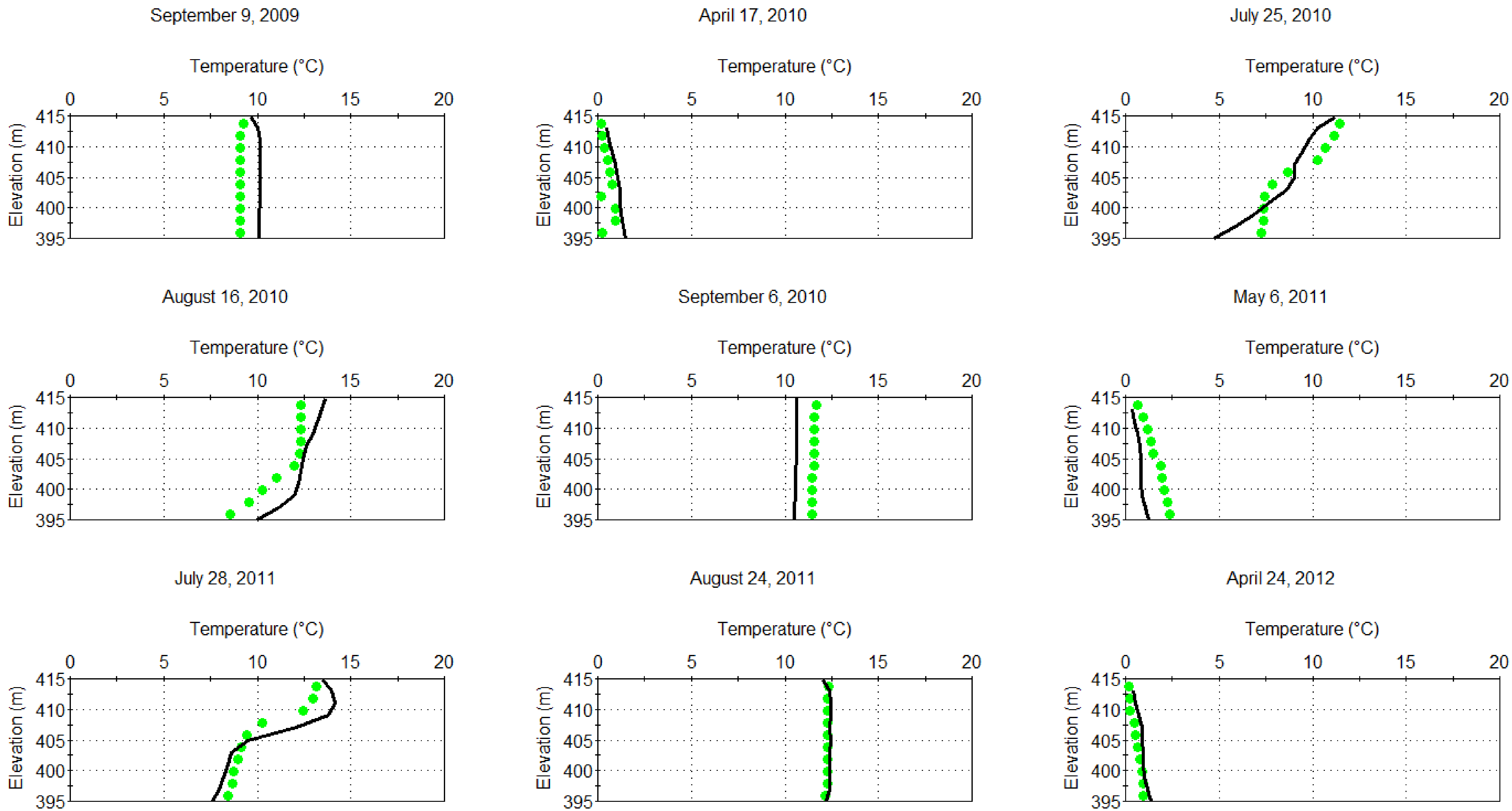
m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; MF3-4 is a calibration location in Lac de Gras.

Figure 8F2.3-6d Lac de Gras Water Temperature Profile Calibration Plots, Far-Field (FFB-2)



m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; FFB-2 is a calibration location in Lac de Gras.

Figure 8F2.3-6e Lac de Gras Water Temperature Profile Calibration Plots, Far-Field (FFA-3)

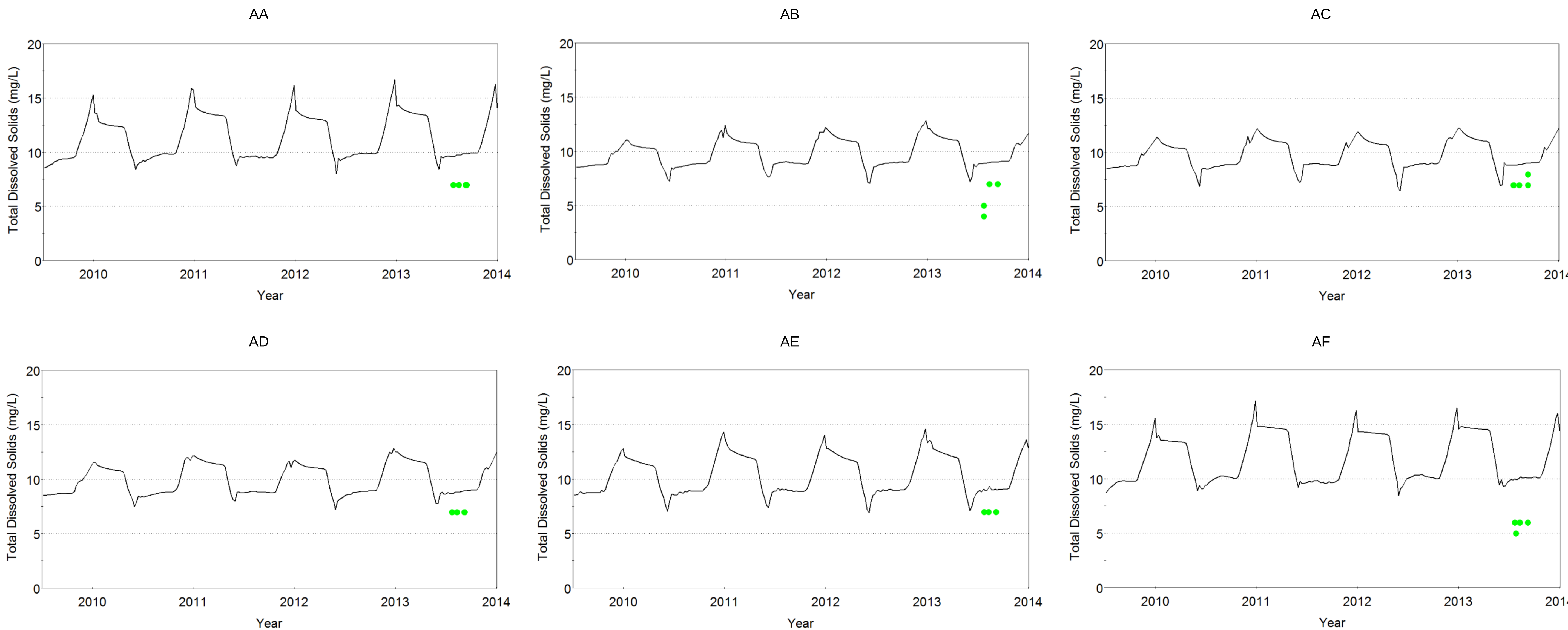


m = metre; °C = degrees Celsius; dots represent measured data; solid line represents model results; FFA-3 is a calibration location in Lac de Gras.

The transport calibration considered the horizontal and vertical distribution of TDS in Lac du Sauvage and Lac de Gras. For the horizontal transport calibration, the Lac du Sauvage Model matched measured TDS concentrations well at locations throughout the lake (Figure 8F2.3-7). In Lac de Gras, the model typically underpredicted TDS concentrations in the near-field area of the lake, and either matched measured concentrations reasonably well or slightly overpredicted measured concentrations in the mid-field and far-field areas of the lake (Figure 8F2.3-8). As inferred in Section 8F2.2.2.2, cyclical annual patterns evident in the time series figures are due to salt rejection during ice formation and dilution during ice thawing. The magnitude of these cycles varies and depends on ice thickness and the depth of the lake at the location of interest.

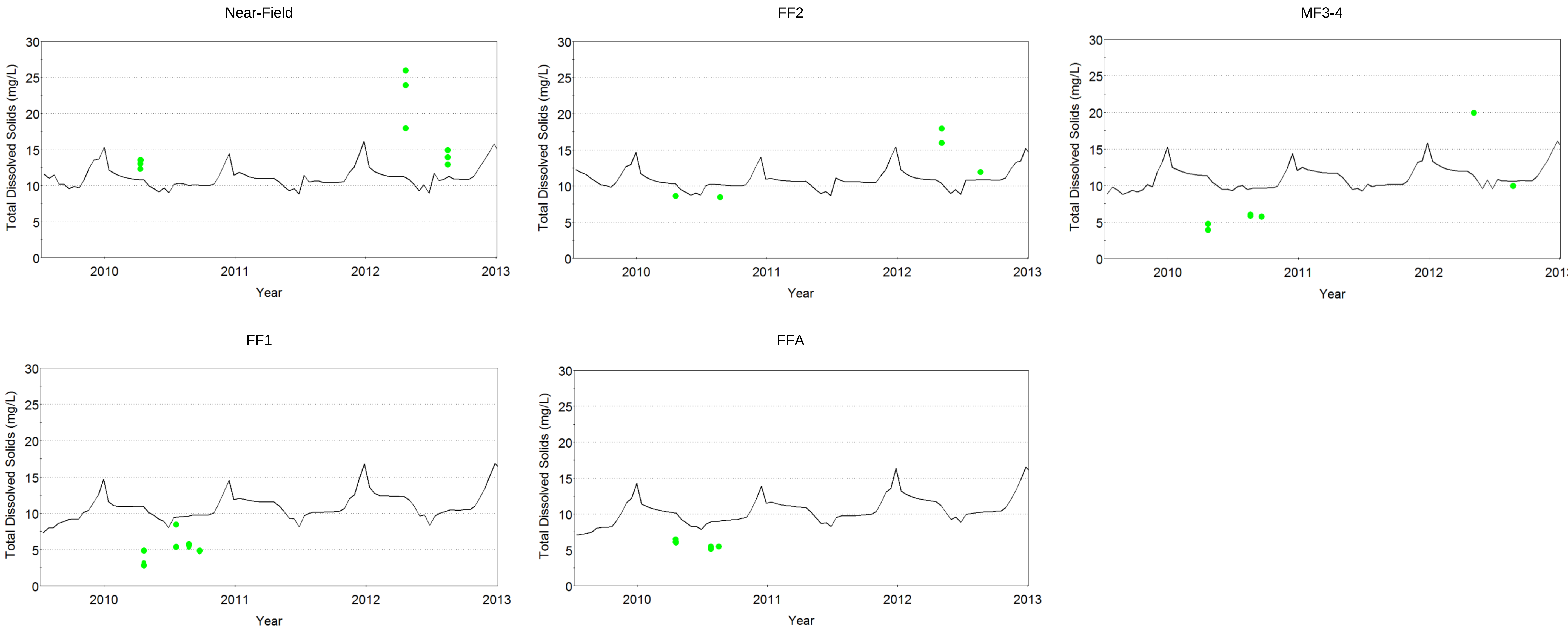
For the vertical transport calibration, default model parameter values were used for hydrodynamic parameters. For the vertical component of the transport calibration, measured specific conductivity profile data were compared to predicted TDS profiles. The calibration was considered adequate if the observed specific conductivity profiles and the predicted TDS profiles followed the same vertical pattern, while recognizing that the absolute values would not be expected to match. Modelled TDS profiles throughout Lac du Sauvage (Figure 8F2.3-9) and Lac de Gras (Figure 8F2.3-10) generally matched the observed conductivity profiles reasonably well with one exception. In Lac de Gras, measured near-field specific conductivity profiles showed stratification during the late ice-covered season (i.e., April) that the model was not able to reproduce. Overall, the transport calibration indicates that the models are tracking the movement of water and dissolved constituents well throughout the vertical and lateral extents of the lake.

**Figure 8F2.3-7	Lac du Sauvage Total Dissolved Solids Time Series Calibration Plots**



mg/L = milligrams per litre; dots represent measured data; open circles represent measured data that were reported as below the detection limit; solid line represents model results; AA, AB, AC, AD, AE, and AF are calibration locations in Lac du Sauvage.

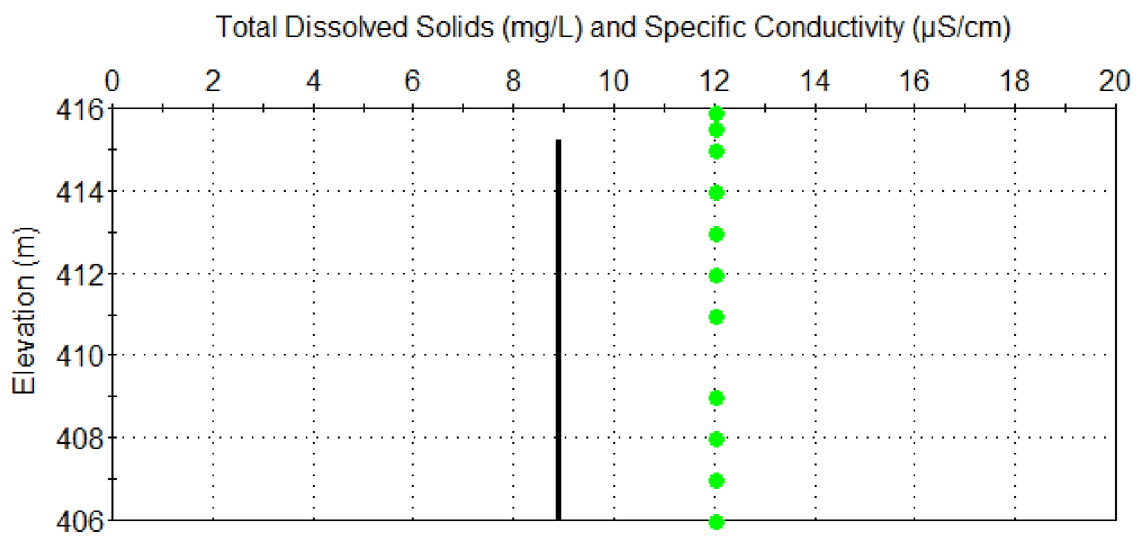
Figure 8F2.3-8 Lac de Gras Total Dissolved Solids Time Series Calibration Plots



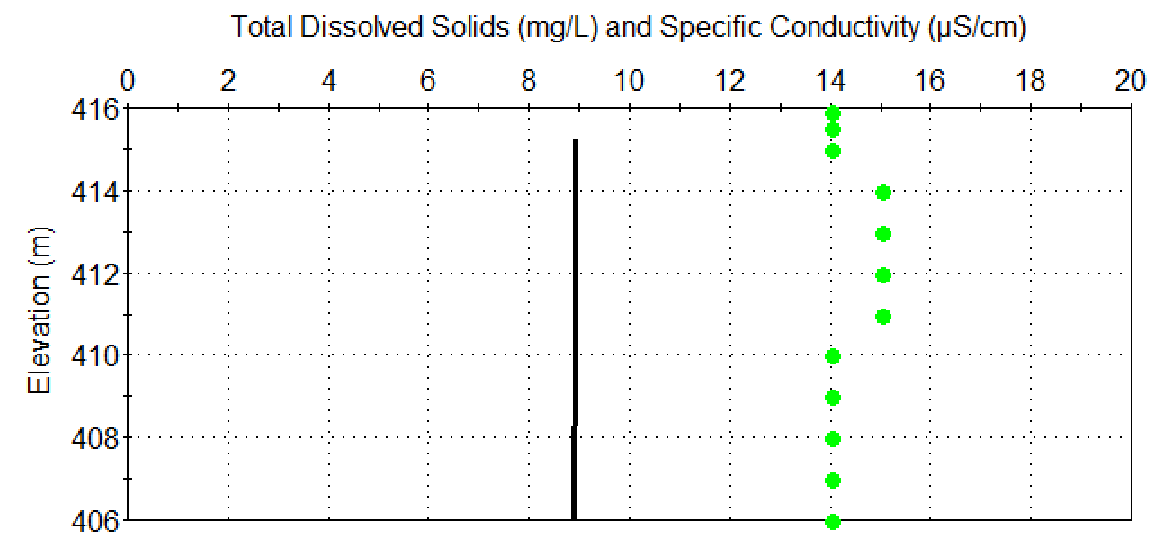
mg/L = milligrams per litre; dots represent measured data; open circles represent measured data that were reported as below the detection limit; solid line represents model results; Near-Field, FF2, MF3-4, FF1, and FFA are calibration locations in Lac de Gras.

Figure 8F2.3-9a Lac du Sauvage Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, AB

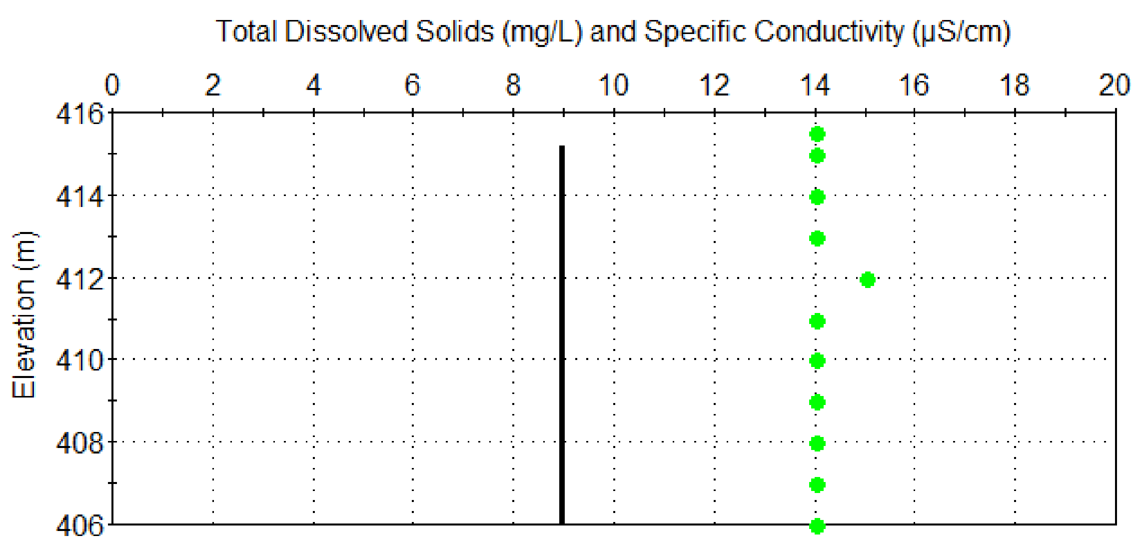
July 23, 2013



August 12, 2013

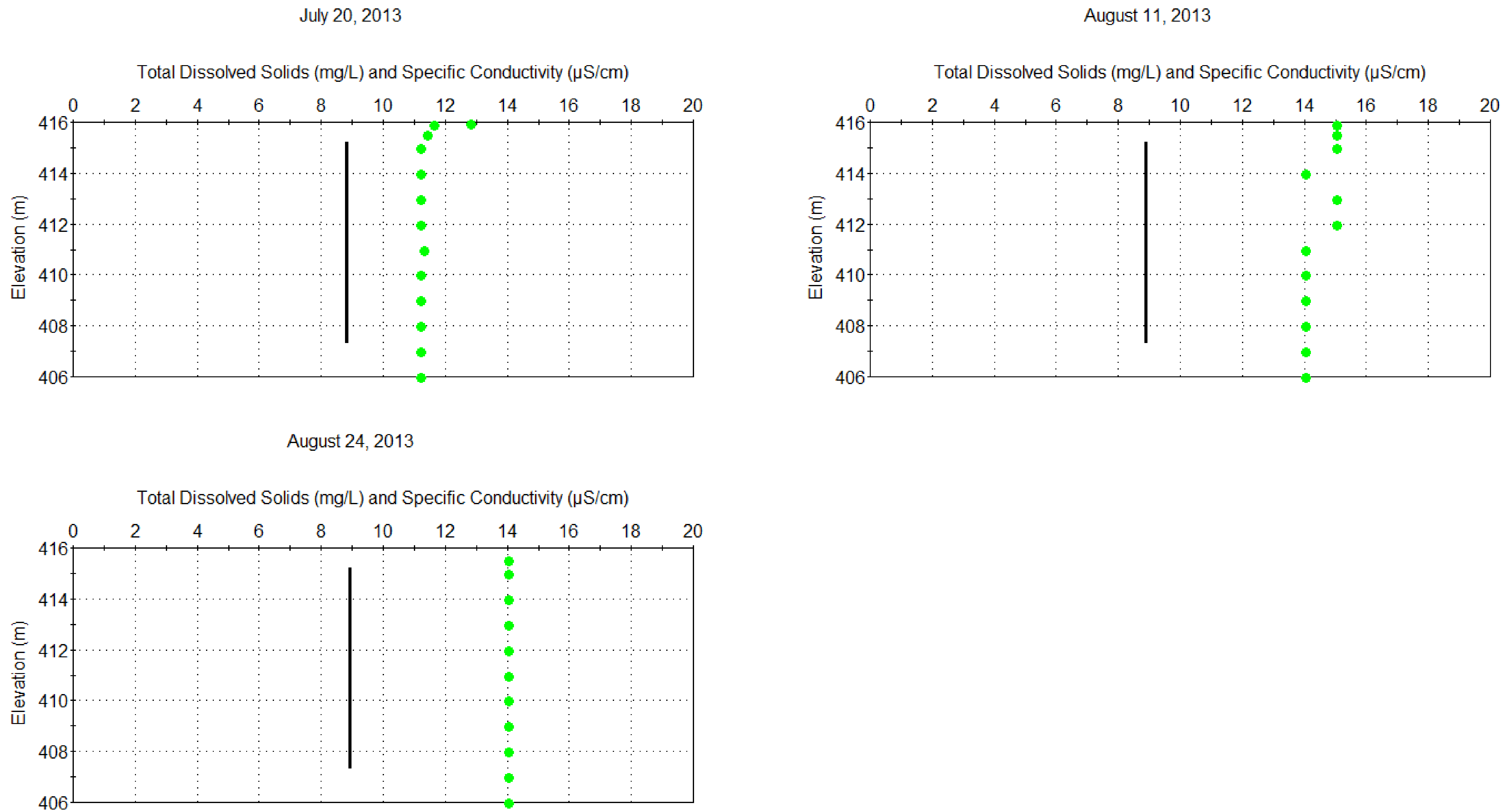


August 26, 2013



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; AB is a calibration location in Lac du Sauvage.

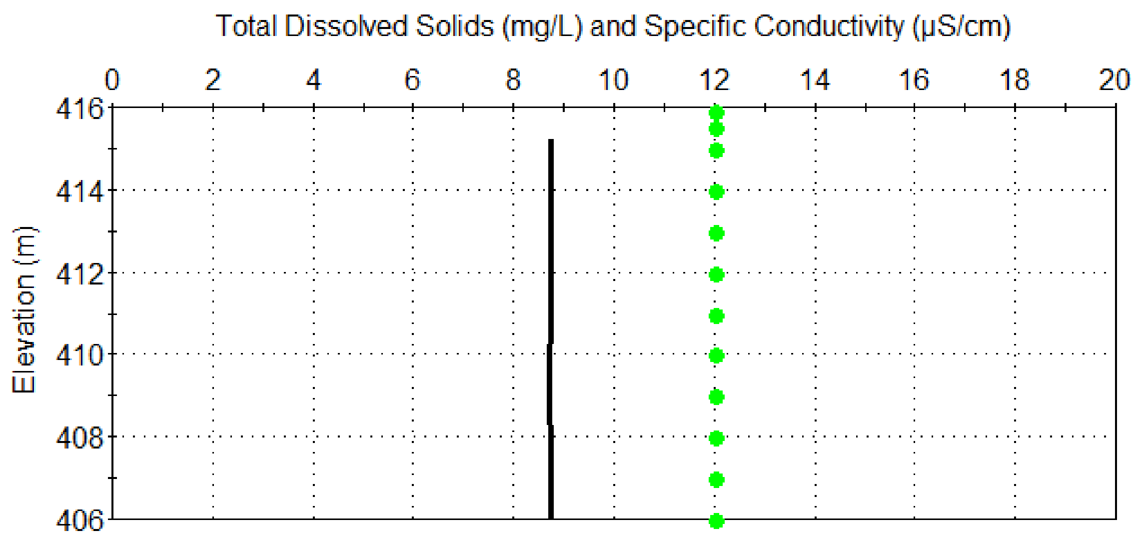
Figure 8F2.3-9b Lac du Sauvage Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, AC



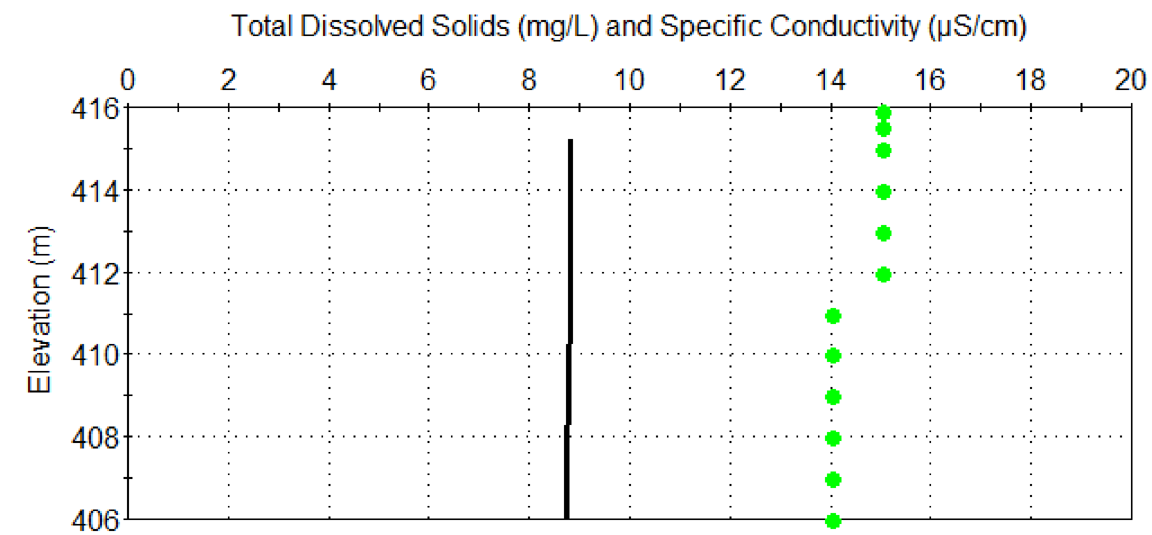
m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; AC is a calibration location in Lac du Sauvage.

Figure 8F2.3-9c Lac du Sauvage Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, AD

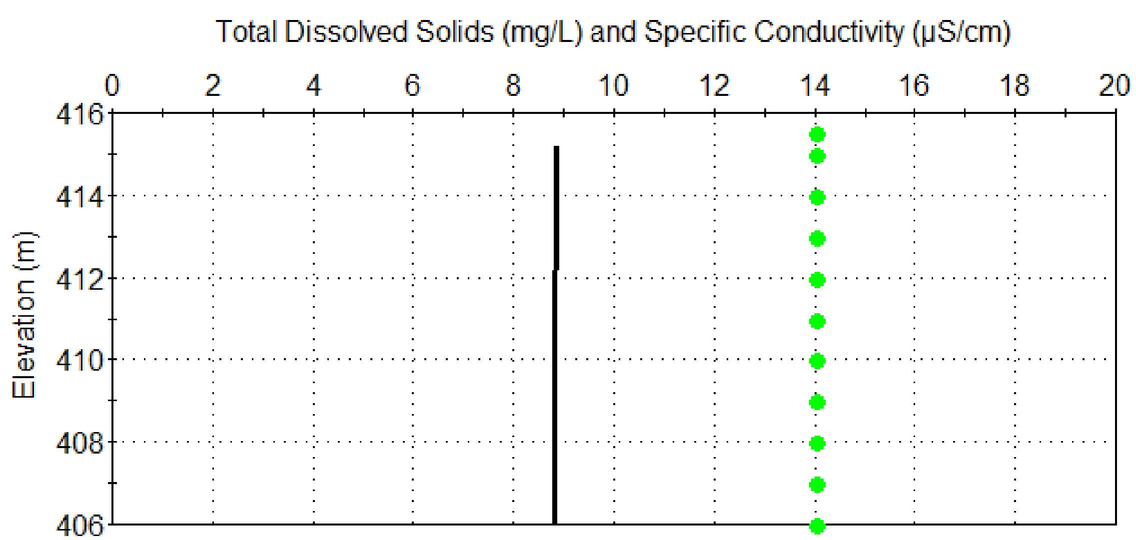
July 25, 2013



August 10, 2013

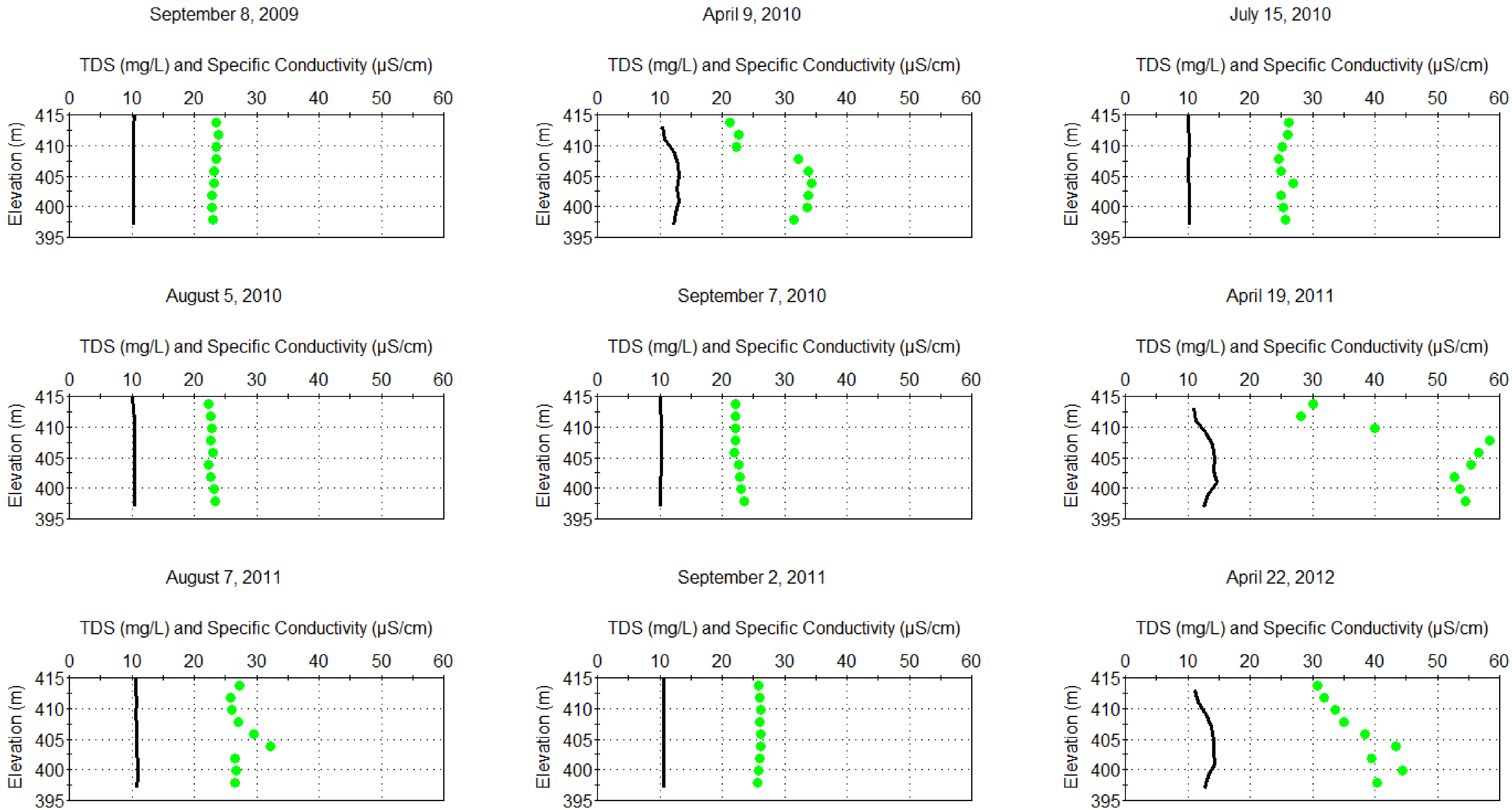


August 17, 2013



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; AD is a calibration in Lac du Sauvage.

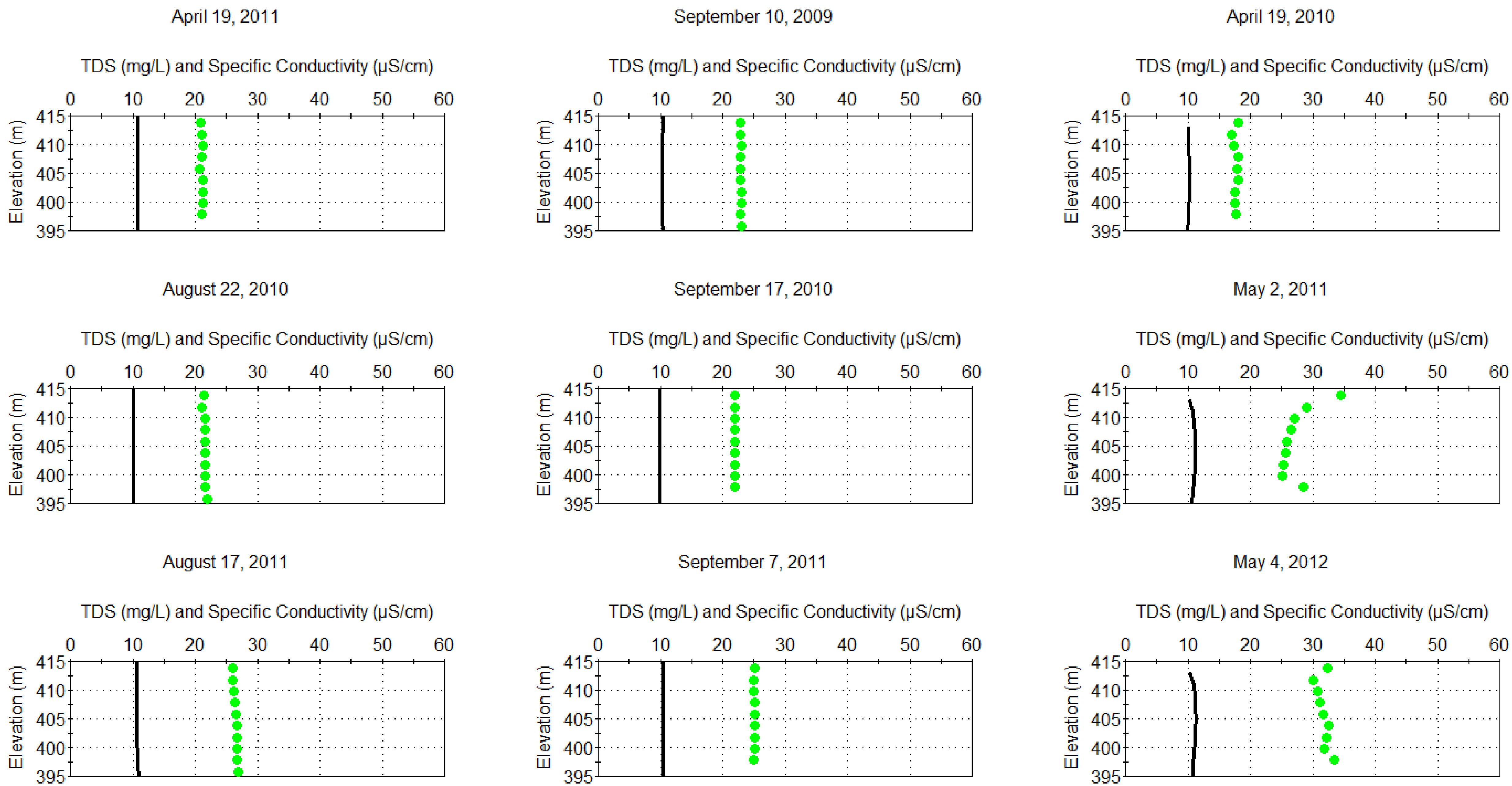
Figure 8F2.3-10a Lac de Gras Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, Near-Field (NF3)



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; TDS = total dissolved solids; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; NF3 is a calibration location in Lac de Gras.

DOMINION DIAMOND

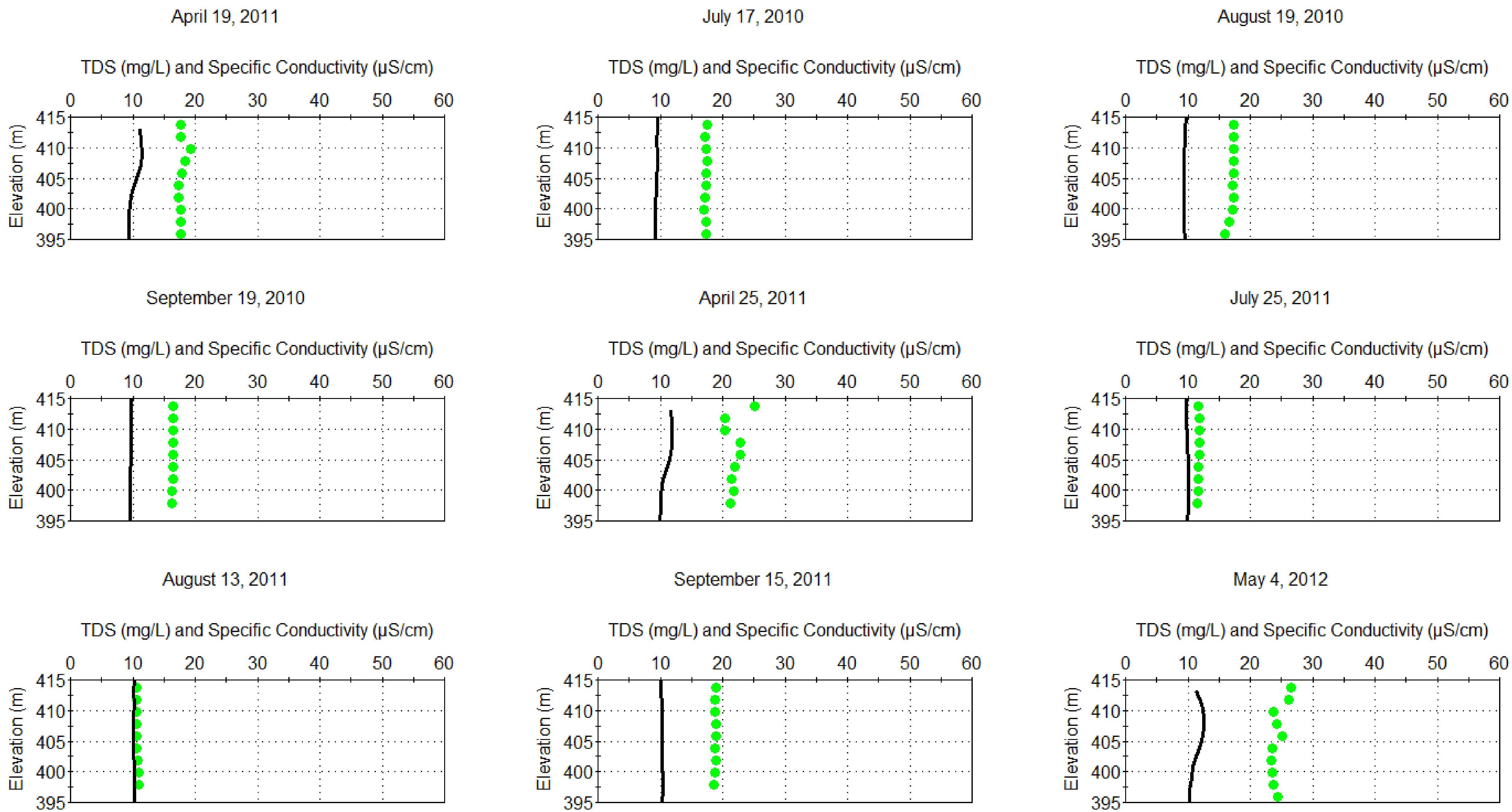
Figure 8F2.3-10b Lac de Gras Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, Far-Field (FF2-2)



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; TDS = total dissolved solids; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; FF2-2 is a calibration location in Lac de Gras.

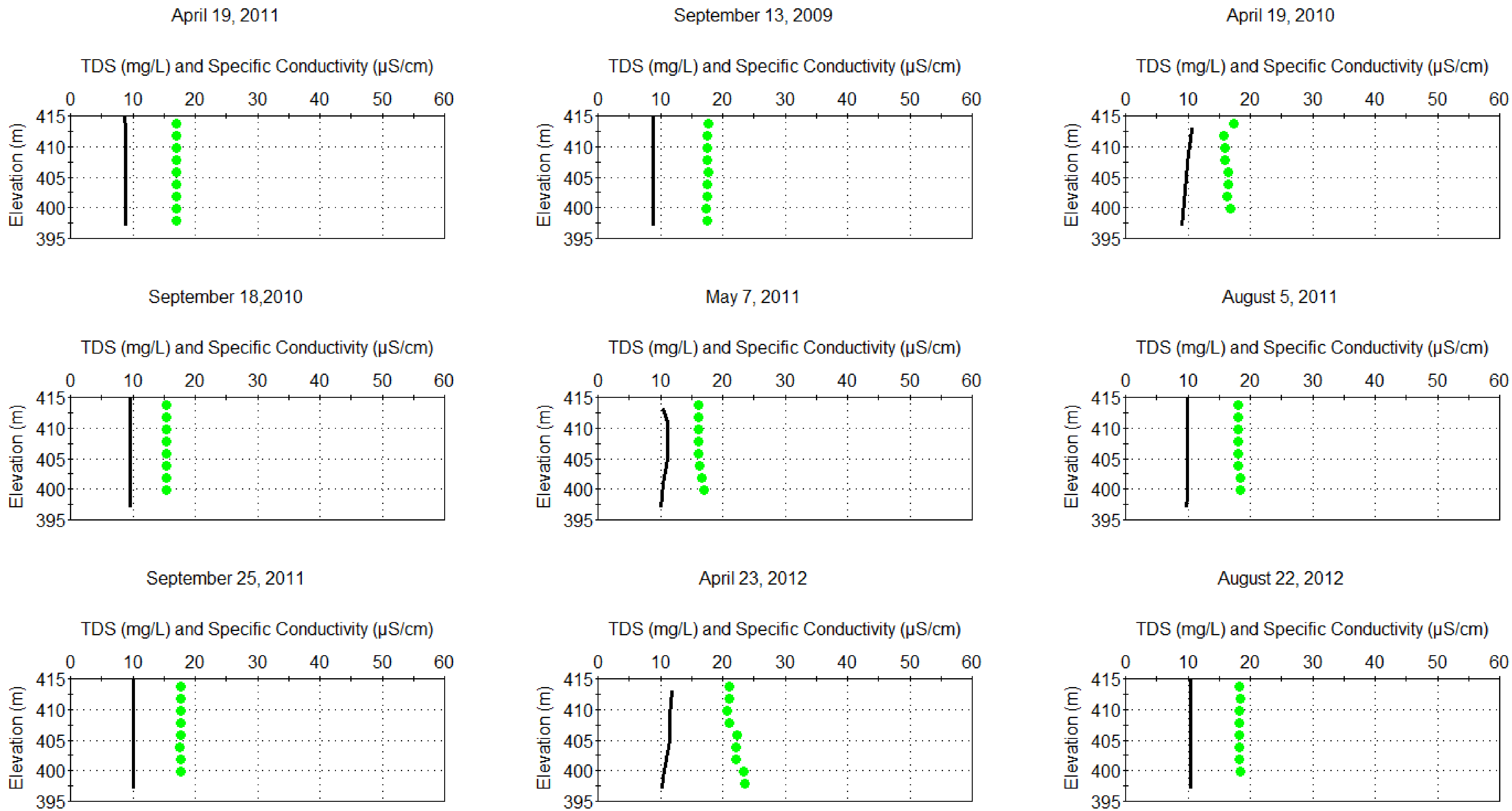
DOMINION DIAMOND

Figure 8F2.3-10c Lac de Gras Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, Mid-Field (MF3-4)



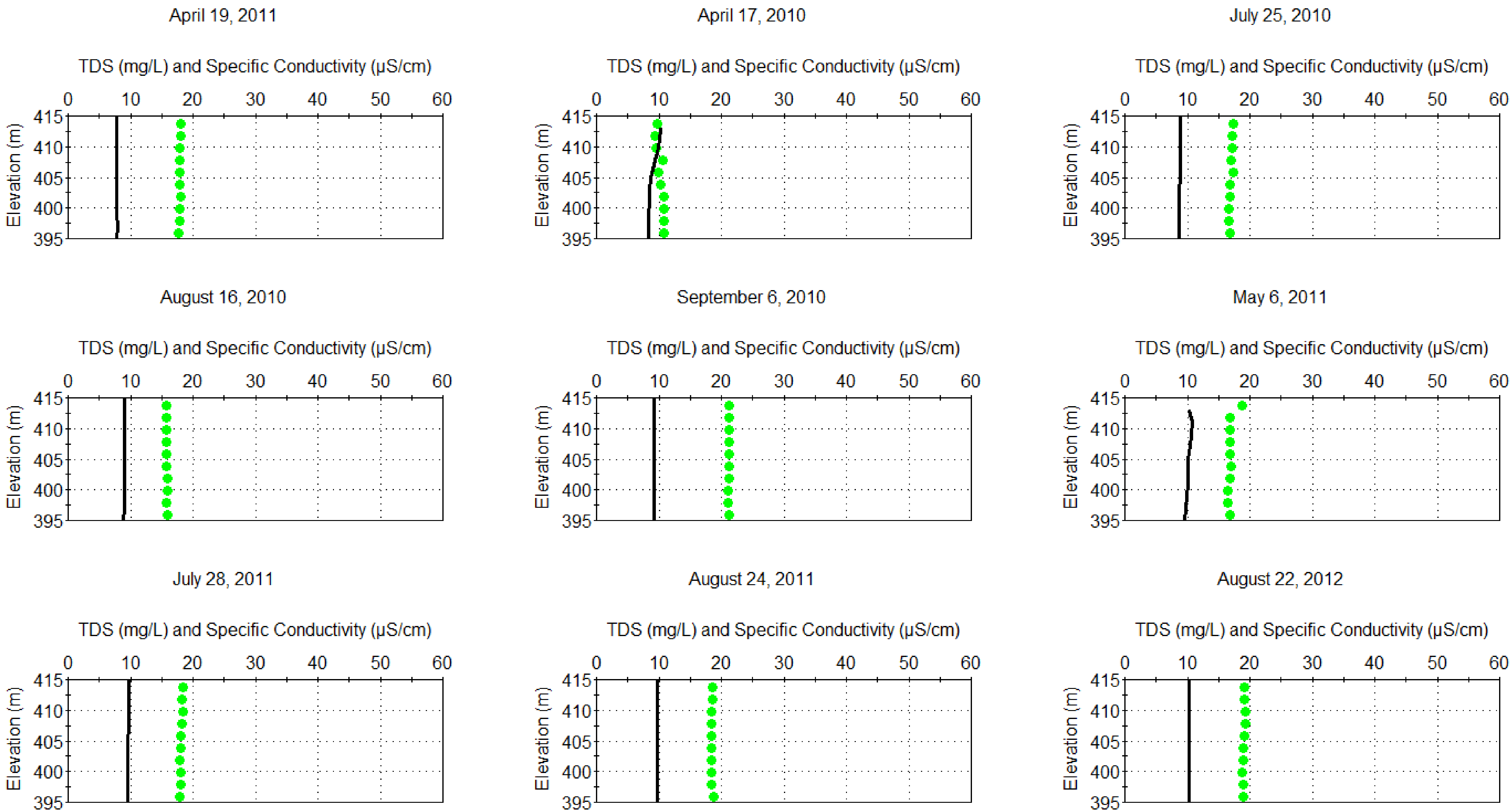
m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; TDS = total dissolved solids; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; MF3-4 is a calibration location in Lac de Gras.

Figure 8F2.3-10d Lac de Gras Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, Far-Field (FFB-2)



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; TDS = total dissolved solids; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; FFB-2 is a calibration location in Lac de Gras.

Figure 8F2.3-10e Lac de Gras Total Dissolved Solids and Specific Conductivity Profile Calibration Plots, Far-Field (FFA-3)



m = metre; mg/L = milligrams per litre; µS/cm = microSiemens per centimetre; TDS = total dissolved solids; dots represent measured specific conductivity data; solid line represents total dissolved solids model results; FFA-3 is a calibration location in Lac de Gras.

8F2.3.2 Dissolved Oxygen Calibration

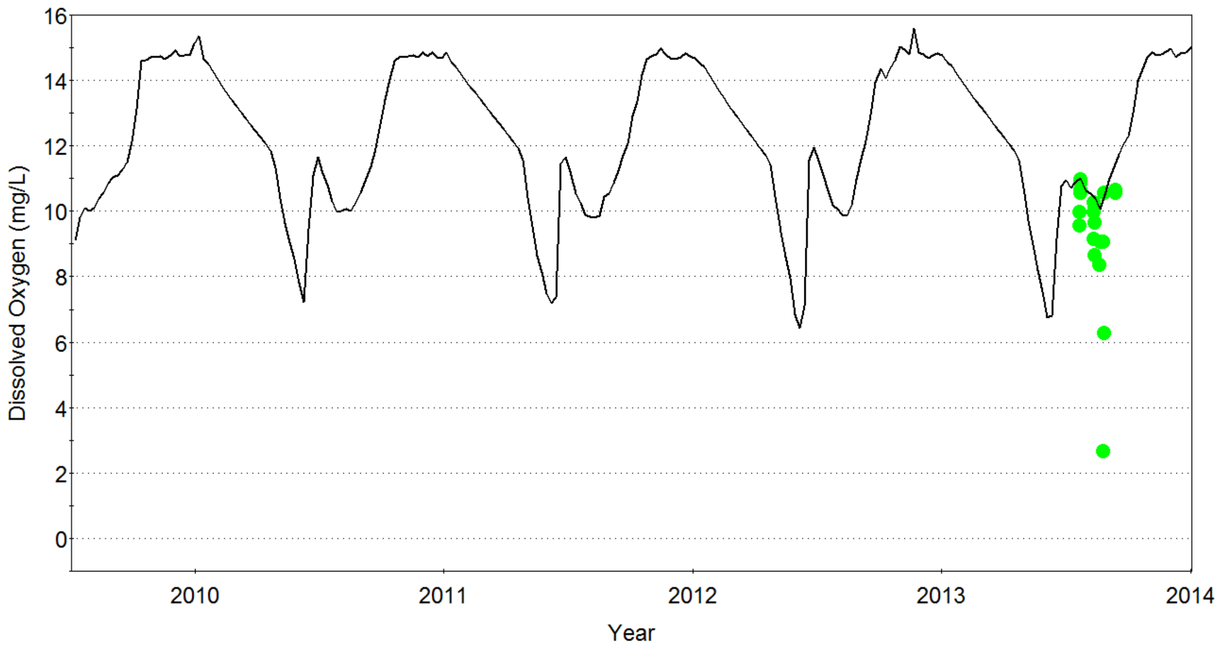
Dissolved oxygen (DO) was included in the models because of its role in nutrient cycles, and in phytoplankton growth and respiration. The DO calibration considered the horizontal and vertical distribution of DO in Lac du Sauvage and Lac de Gras. For the horizontal calibration, the model matched measured DO concentrations well at all locations throughout Lac du Sauvage (Figure 8F2.3-11) and Lac de Gras (Figure 8F2.3-12). Cyclical annual patterns evident in the time series figures are due to changing water temperatures and to ice formation and melting.

For vertical calibration of DO, all model parameters were left at default values; however, a sediment oxygen demand (SOD) was added to the models. The SOD is the movement of oxygen from the water column into the bottom sediment, and consists of microbial and macrobenthic respiration and oxidation of reduced solids. A constant demand of -0.15 grams (g) dissolved oxygen per square metre per day ($DO/m^2/d$) was applied over the entire lake bed throughout the calibration, pre-operations, operations, closure, and post-closure time periods for Lac du Sauvage (Figure 8F2.3-13) and Lac de Gras (Figure 8F2.3-14). This value was based on similar calibration work for dissolved oxygen profiles in lakes in the NWT.

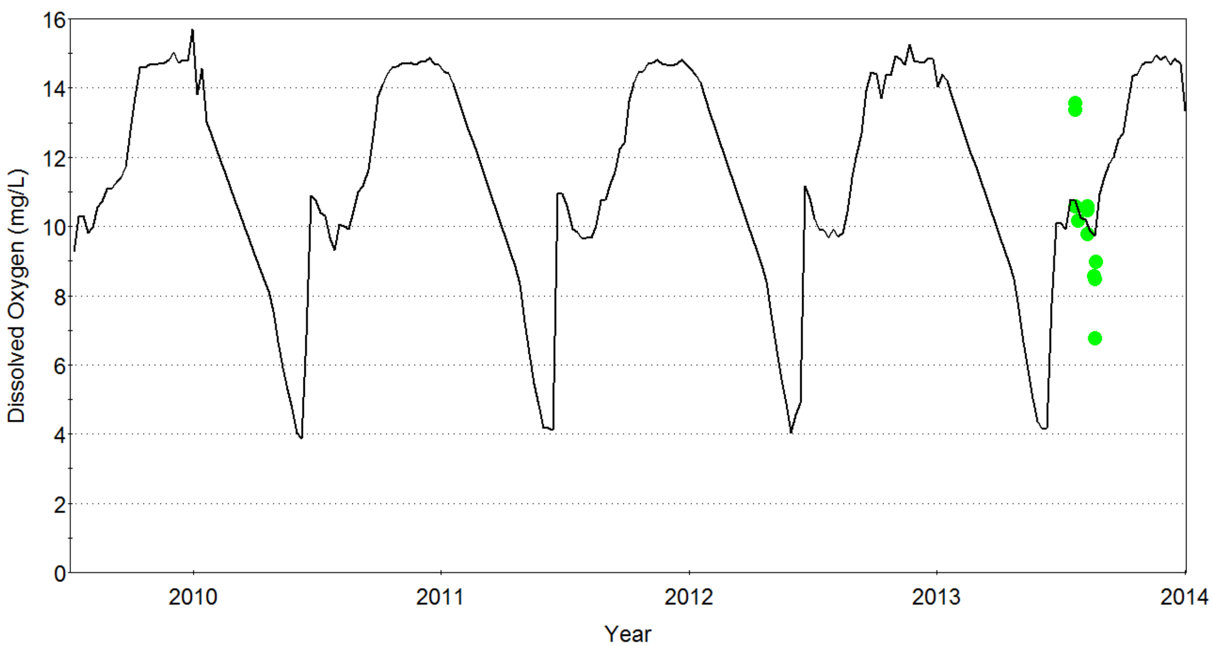
Biological oxygen demand was modelled, but in-lake concentrations of biological oxygen demand were not calibrated because they are typically below detection limits. Biological oxygen demand was included in the model because of its role in nutrient cycles, and in phytoplankton excretion and death.

Figure 8F2.3-11 Lac du Sauvage Dissolved Oxygen Time Series Calibration Plots

(a) AC

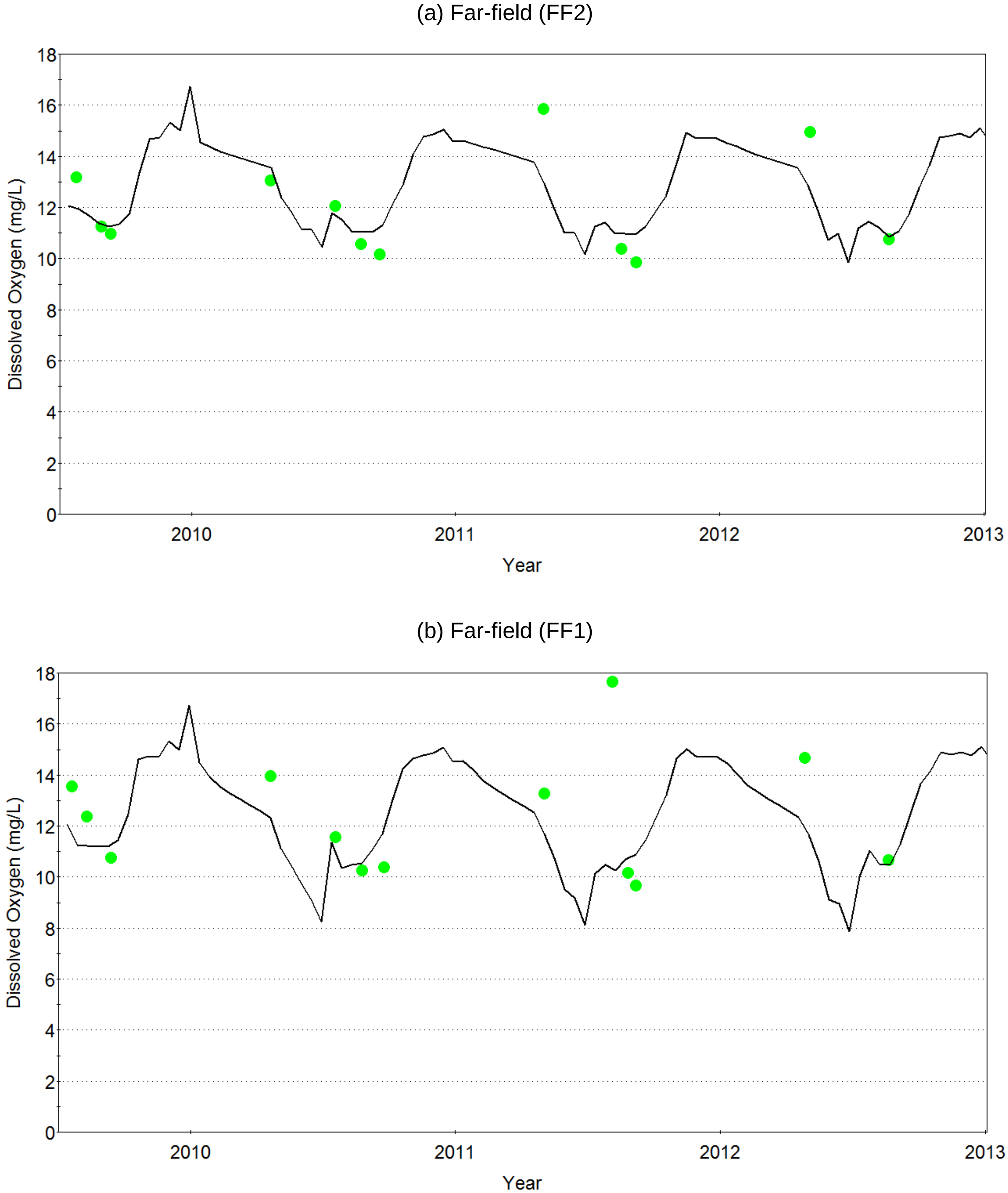


(b) AF



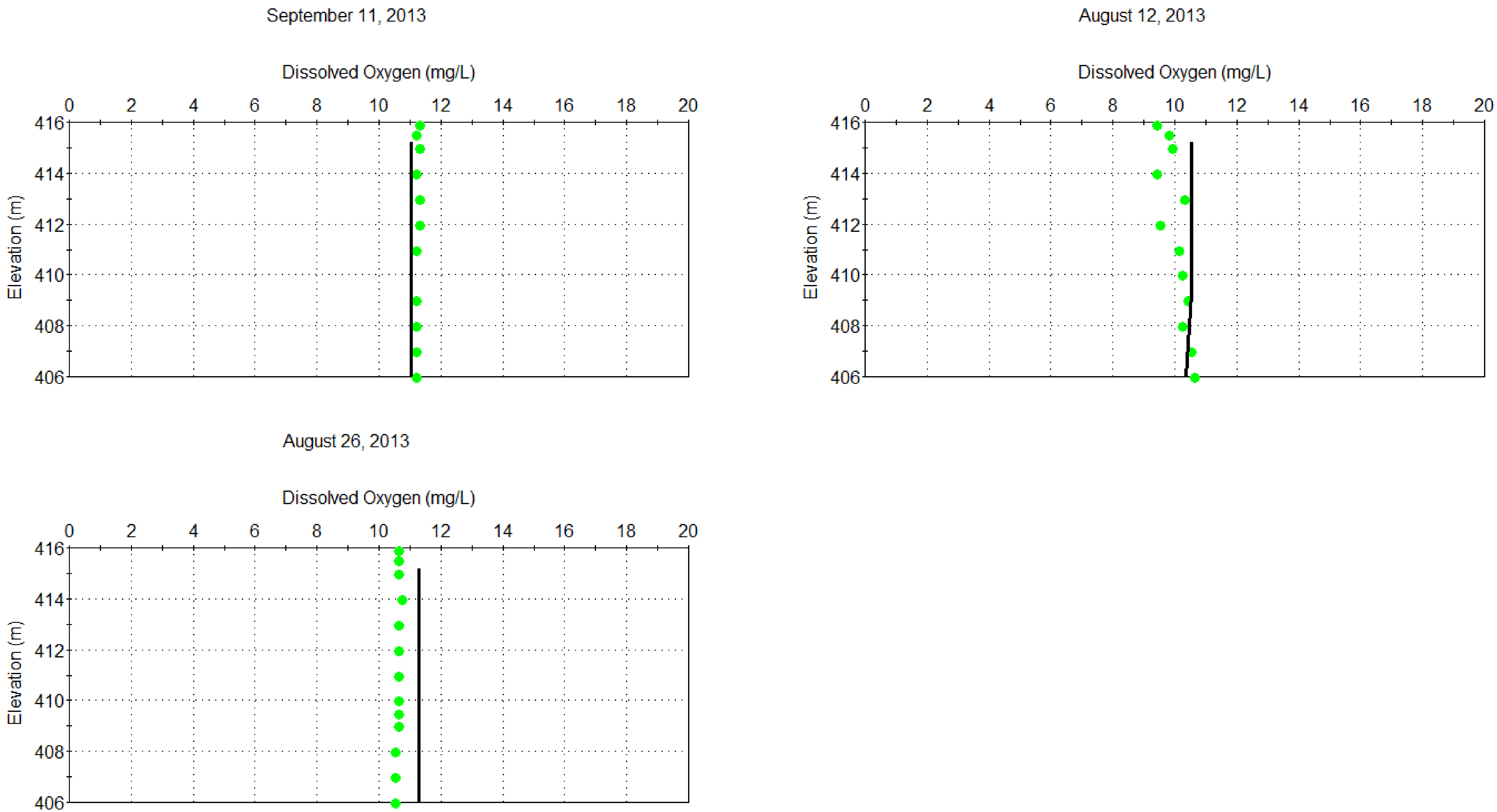
mg/L = milligrams per litre; dots represent measured data; solid line represents model results; AC and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-12 Lac de Gras Dissolved Oxygen Profile Calibration Plots



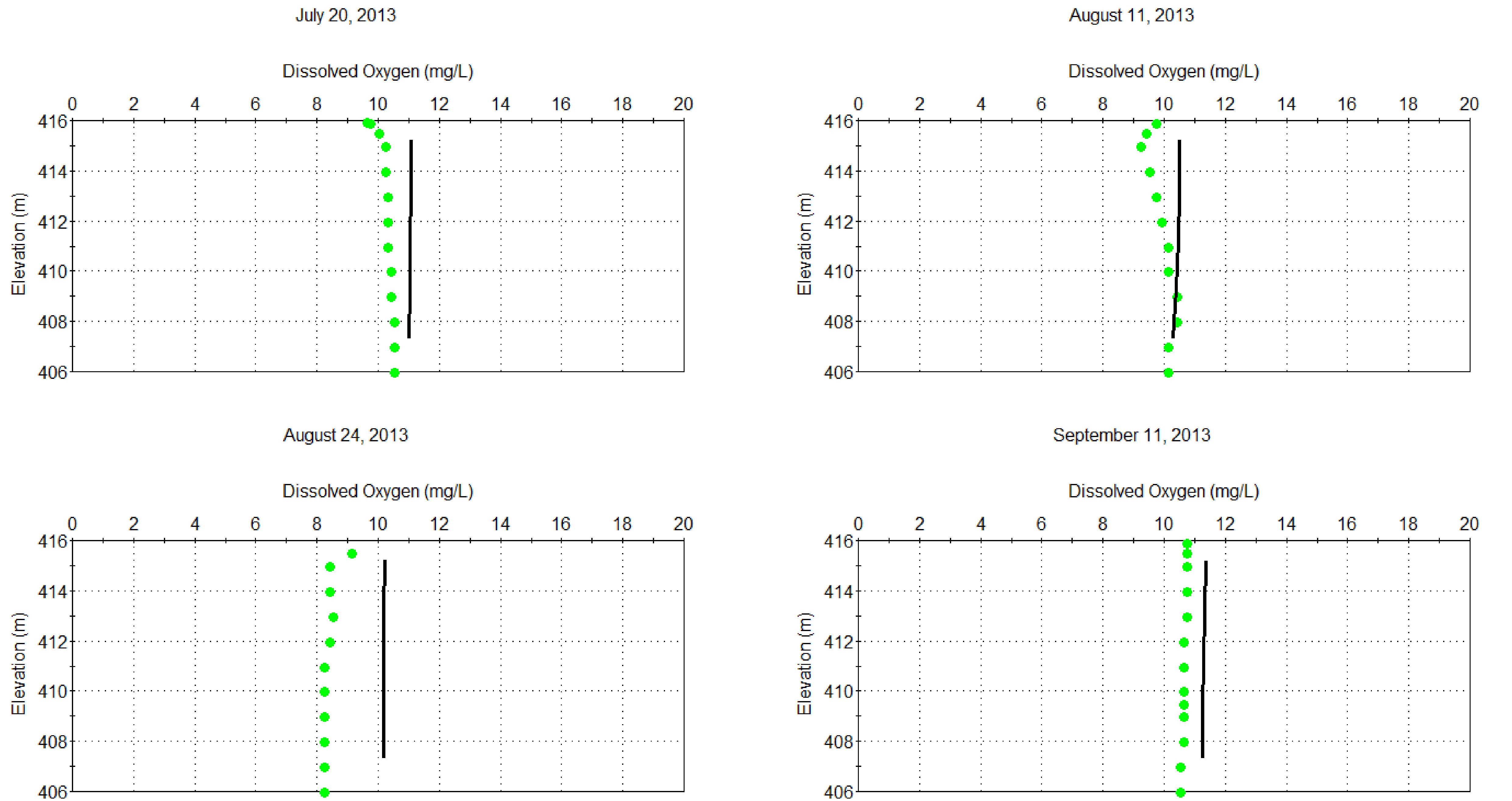
mg/L = milligrams per litre; dots represent measured data; solid line represents model results; FF2 and FF1 are calibration locations in Lac de Gras.

Figure 8F2.3-13a Lac du Sauvage Dissolved Oxygen Profile Calibration Plots, AB



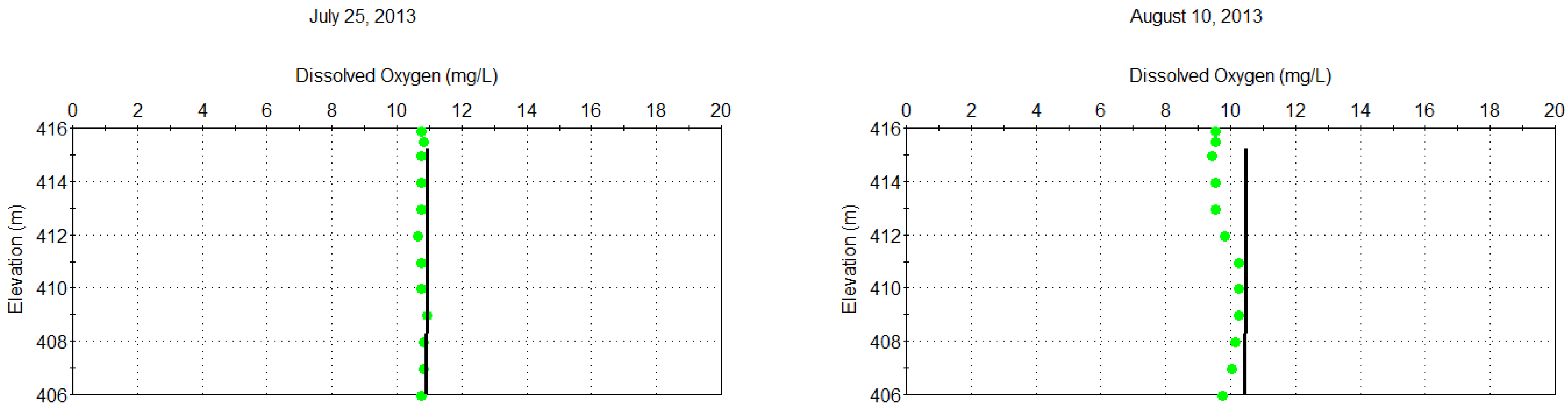
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; AB is a calibration location in Lac du Sauvage.

Figure 8F2.3-13b Lac du Sauvage Dissolved Oxygen Profile Calibration Plots, AC



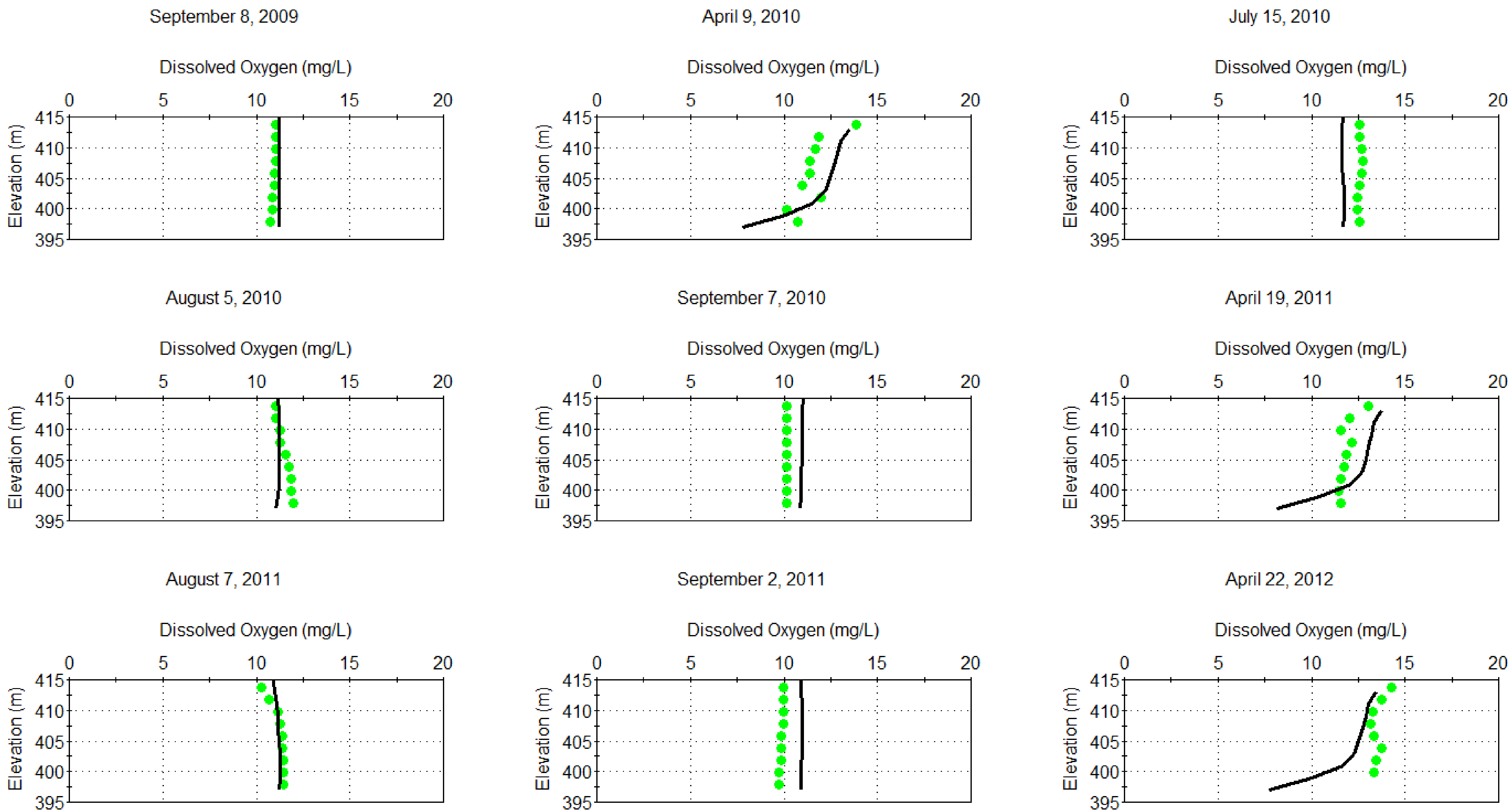
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; AC is a calibration location in Lac du Sauvage.

Figure 8F2.3-13c Lac du Sauvage Dissolved Oxygen Profile Calibration Plots, AD



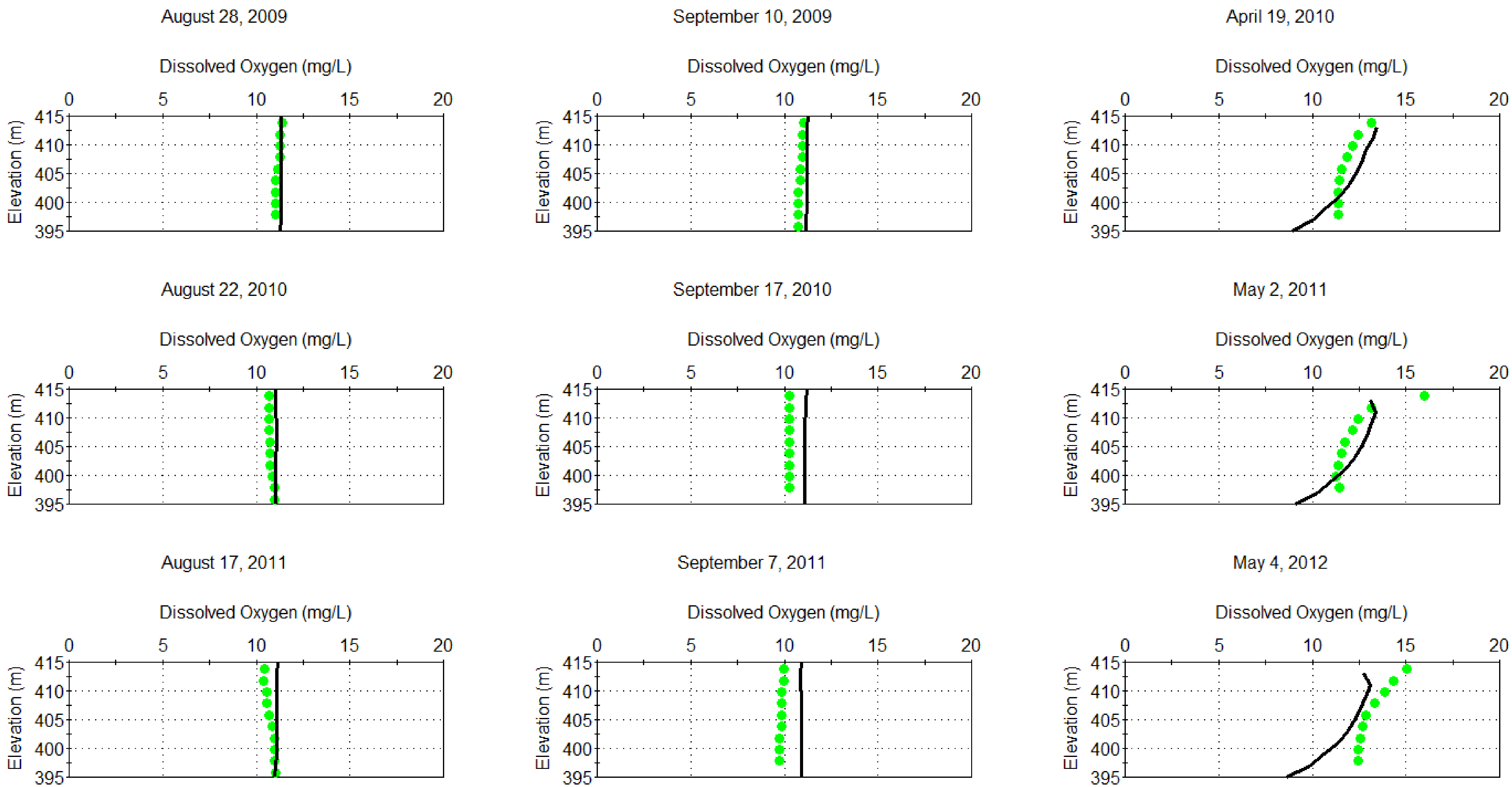
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; AD is a calibration location in Lac du Sauvage.

Figure 8F2.3-14a Lac de Gras Dissolved Oxygen Profile Calibration Plots, Near-Field (NF3)



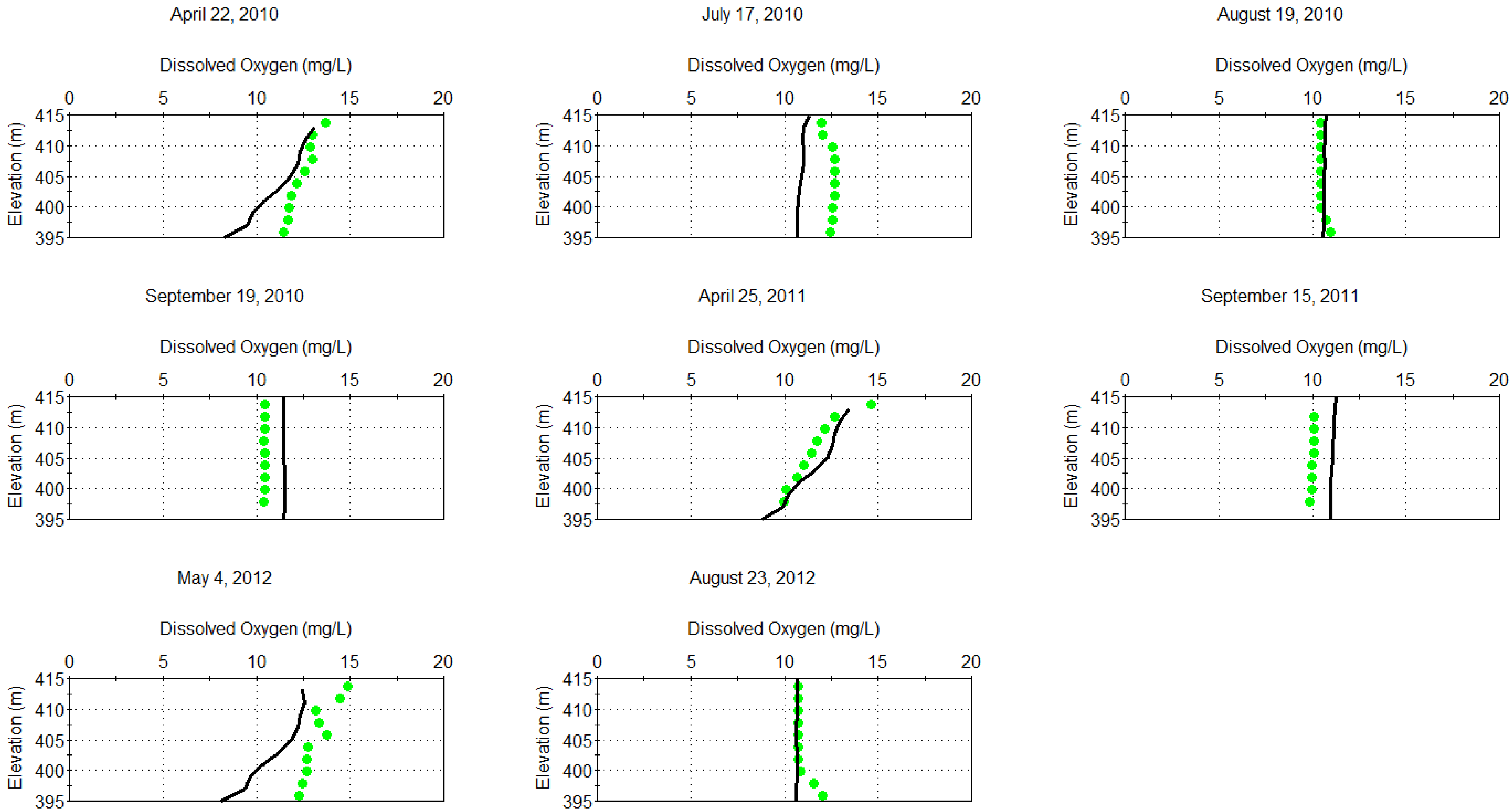
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; NF3 is a calibration location in Lac de Gras.

Figure 8F2.3-14b Lac de Gras Dissolved Oxygen Profile Calibration Plots, Far-Field (FF2-2)



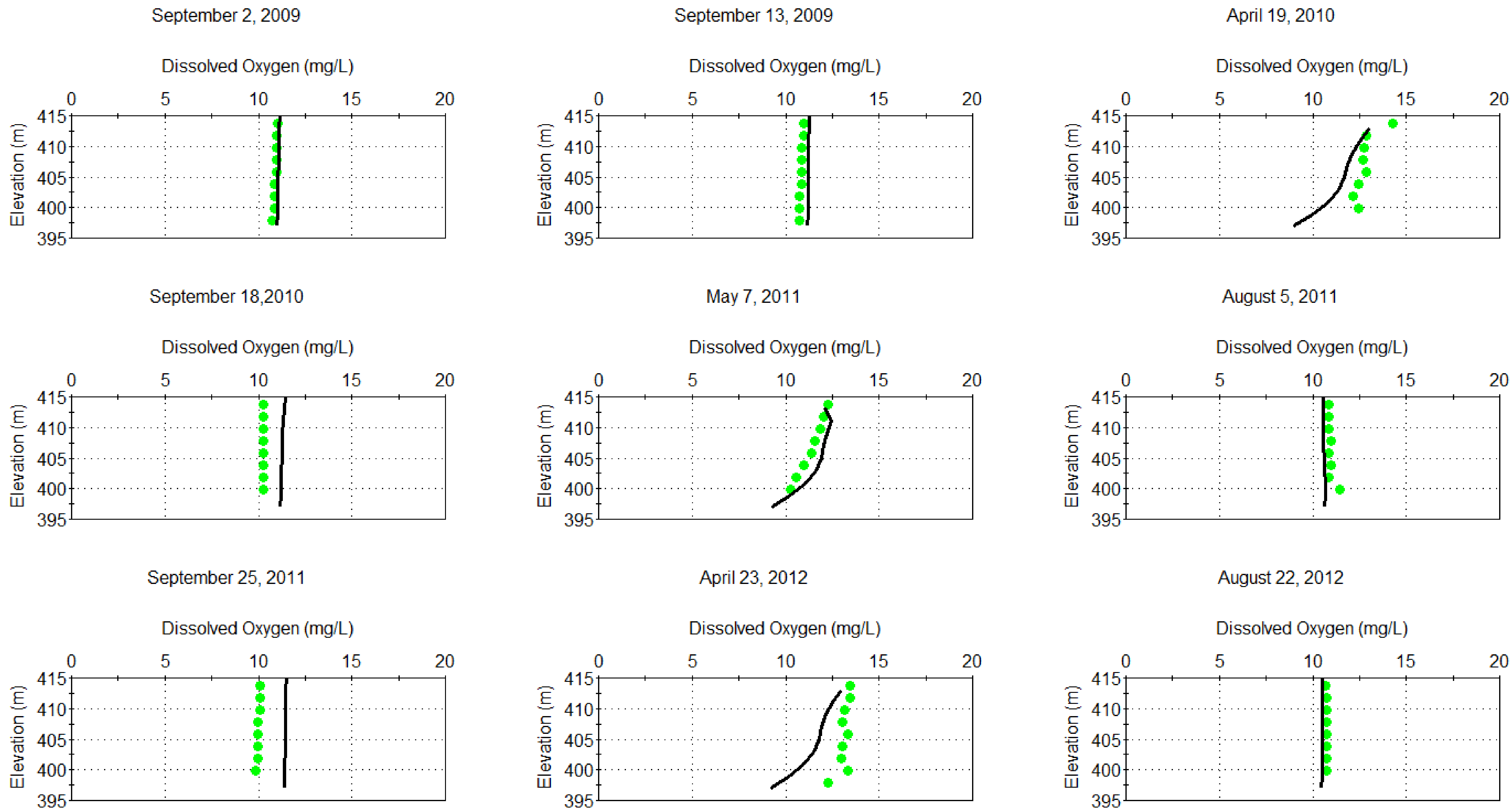
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; FF2-2 is a calibration location in Lac de Gras.

Figure 8F2.3-14c Lac de Gras Dissolved Oxygen Profile Calibration Plots, Mid-Field (MF3-4)



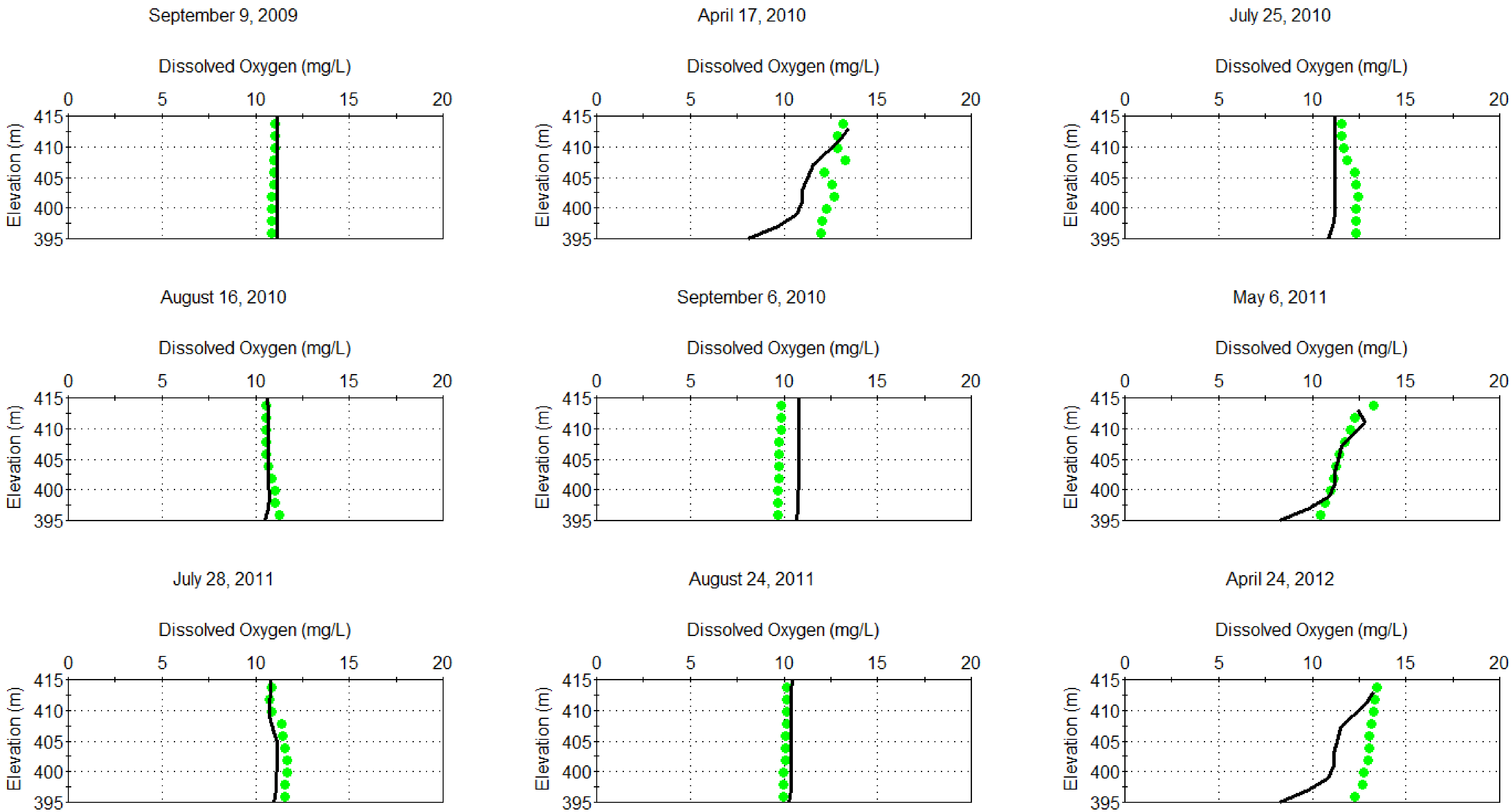
m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; MF3-4 is a calibration location in Lac de Gras.

Figure 8F2.3-14d Lac de Gras Dissolved Oxygen Profile Calibration Plots, Far-Field (FFB-2)



m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; FFB-2 is a calibration location in Lac de Gras.

Figure 8F2.3-14e Lac de Gras Dissolved Oxygen Profile Calibration Plots, Far-Field (FFA-3)



m = metre; mg/L = milligrams per litre; dots represent measured data; solid line represents model results; FFA-3 is a calibration location in Lac de Gras.

8F2.3.3 Nutrients and Chlorophyll *a* Calibration

Nutrients included in the model were ammonia, nitrate, and orthophosphate. Phytoplankton (chlorophyll *a*) was also modelled. Rates and coefficients applied to the nutrient module are listed in Table 8F2.3-1. Calibration began with default model parameter values; however, the following rates and coefficients were changed from default values to improve calibration for the Lac du Sauvage and Lac de Gras models:

- The organic nitrogen mineralization rate was increased from 0.0075 per day (/d) to 0.1/d to improve ammonia calibration.
- The nitrification rate was decreased from 0.02/d to 0.0075/d to improve ammonia calibration.
- The denitrification rate was increased from 0.09/d to 0.16/d in the Lac du Sauvage Model and from 0.09/d to 0.15/d in the Lac de Gras Model to improve nitrate calibration.
- The Michaelis constant for denitrification was adjusted from 0.1 to 0.2 grams as oxygen per cubic metre (g O_2/m^3) in the Lac de Gras Model to increase the rate of denitrification at higher in-lake DO concentrations and improve the nitrate calibration.
- The phosphorus to carbon ratio was decreased from 0.025 grams as phosphorus per gram of carbon (g P/g C) to 0.015 g P/g C to improve orthophosphate calibration.
- The dissolved organic phosphorus mineralization rate at 20°C was increased from 0.1/d to 0.3/d to improve orthophosphate and phytoplankton calibration (dissolved organic phosphorus mineralizes to orthophosphate, which is a source of phosphorus for phytoplankton growth).
- The half saturation constant for phosphorus mineralization was decreased from 5 grams as carbon per cubic metre (g C/m^3) to 2 g C/m^3 to increase the rate of particulate organic phosphorus mineralization over a wider range of in-lake phytoplankton concentrations and to improve phytoplankton calibration (particulate organic phosphorus mineralizes to orthophosphate, which is a source of phosphorus for phytoplankton growth).
- The ratio of carbon to chlorophyll *a* was decreased from 70 to 20 to improve phytoplankton calibration (a carbon to chlorophyll *a* ratio of 20 lies within the range of literature values for total phytoplankton in Bowie et al. 1985).
- The half saturation constant for nitrogen uptake was increased from 0.001 grams as nitrogen per cubic metre (g N/m^3) to 0.025 g N/m^3 to decrease the nitrogen uptake rate of phytoplankton over a wider range of in-lake ammonia concentrations and to improve ammonia and phytoplankton calibration.
- Grazing rates for microzooplankton and macrozooplankton were decreased from default rates to 0.0001/d to limit grazing from zooplankton and improve phytoplankton calibration.
- The maximum growth rate for phytoplankton was decreased from 2.0/d to 1.5/d to improve phytoplankton calibration.

- The half saturation constant for phosphorus uptake was increased from 0.001 grams as phosphorus per cubic metre (g P/m^3) to 0.002 g P/m^3 to decrease the phosphorus uptake rate of phytoplankton over a wider range of in-lake orthophosphate concentrations and improve orthophosphate and phytoplankton calibration.
- The settling velocity for phytoplankton was decreased from 0.05 metres per day (m/d) to 0.02 m/d to improve phytoplankton calibration.

Table 8F2.3-1 Rates and Coefficients Applied to the Nutrient Calibration

Parameter Description	Value Applied to the LDS Model[(a)]	Value Applied to the LDG Model[(a)]	Units
Ammonia			
Nitrogen to carbon ratio	0.25	0.25	g-N/g-C
Organic nitrogen mineralization rate	**0.1**	**0.1**	1/d
Temperature coefficient	1.08	1.08	-
Nitrification rate	**0.0075**	**0.0075**	1/d
Half saturation constant for oxygen limitation of nitrification	2.0	2.0	g-O_2/m^3
Sediment release type for ammonia	0	0	-
Sediment flux of ammonia	0	0	g-N/m^2/d
Fraction of SOD (sediment oxygen demand)	0.45	0.45	-
Half saturation constant for nitrogen mineralization	1.0	1.0	g-C/m^3
Nitrate			
Denitrification rate at 20°C	**0.16**	**0.15**	1/d
Temperature coefficient	1.08	1.08	-
Michaelis constant for denitrification	0.1	**0.2**	g-O_2/m^3
Sediment flux of nitrate	0	0	g-N/m^2/d
Inorganic Phosphate			
Phosphorus to carbon ratio	**0.015**	**0.015**	g-P/g-C
Dissolved organic phosphorus mineralization at 20°C	**0.3**	**0.3**	1/d
Temperature coefficient	1.08	1.08	-
Half saturation constant for phosphorus mineralization	**2**	**2**	g-C/m^3
Sediment release of phosphorus	1.5	1.5	g-P/m^2/d
Phytoplankton			
Ratio of carbon to chlorophyll *a*	**20**	**20**	-
Saturating light intensity	200	200	cal/m^2/s
Half saturation constant for nitrogen uptake	**0.025**	**0.025**	g-N/m^3
Zooplankton grazing mode	Linear Grazing	Linear Grazing	-
Grazing rate due to microzooplankton	**0.0001**	**0.0001**	1/d
Temperature coefficient	1.045	1.045	-
Death rate	**0.005**	**0.005**	1/d
Maximum growth rate	**1.5**	**1.5**	1/d

Table 8F2.3-1 Rates and Coefficients Applied to the Nutrient Calibration

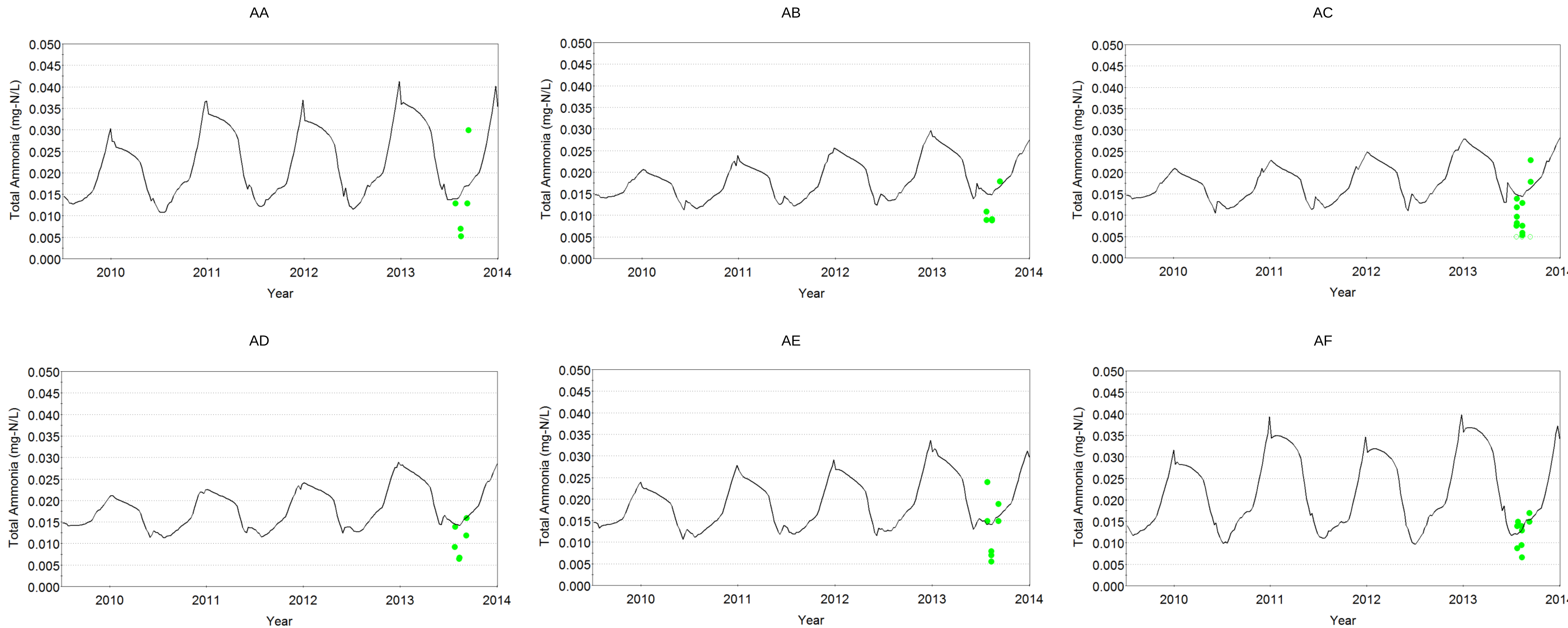
Parameter Description	Value Applied to the LDS Model[(a)]	Value Applied to the LDG Model[(a)]	Units
Phytoplankton (continued)			
Temperature coefficient	1.068	1.068	-
Half saturation constant for phosphorus uptake	**0.002**	**0.002**	g-P/m^3
Fraction dissolved inorganic phosphorus	0.70	0.70	-
Endogenous respiration at 20°C	0.015	0.015	1/d
Settling velocity	**0.02**	**0.02**	m/d
Excretion fraction of phytoplankton	0.1	0.1	-
Assimilation efficiency of zooplankton grazing	0.5	0.5	-
Light attenuation coefficient due to pure water	0.32	0.32	-
Light attenuation coefficient due to chlorophyll *a*	0.016	0.016	-
Light attenuation coefficient due to suspended solids	0.094	0.094	-
Dissolved and Particulate Organic Nitrogen			
Organic nitrogen from dead algae	0.5	0.5	-
Organic matter settling velocity	0.08	0.08	m/d
Particulate organic nitrogen to carbon ratio	0.25	0.25	-
Dissolved and Particulate Organic Phosphorus			
Organic phosphorus from dead algae; fraction to dissolved component	0.5	0.5	-
Organic matter settling velocity	0.08	0.08	m/d
Particulate organic phosphorus to carbon ratio	0.75	0.75	-

a) Non-default values marked in **bold**.

LDS = Lac du Sauvage; LDG = Lac de Gras; g N/g-C = grams as nitrogen per grams as carbon; 1/d = one per day; g O_2/m^3 = grams as oxygen per cubic metre; g N/m^2/d = grams as nitrogen per square metre per day; g C/m^3 = grams as carbon per cubic metre; g P/g C = grams as phosphorus per gram of carbon; g P/m^2/d = grams as phosphorus per square metre per day; cal/m^2/s = calories per square metre per second; g N/m^3 = grams as nitrogen per cubic metre; g P/m^3 = grams as phosphorus per cubic metre; m/d = metres per day; °C = degrees Celsius; - = not applicable.

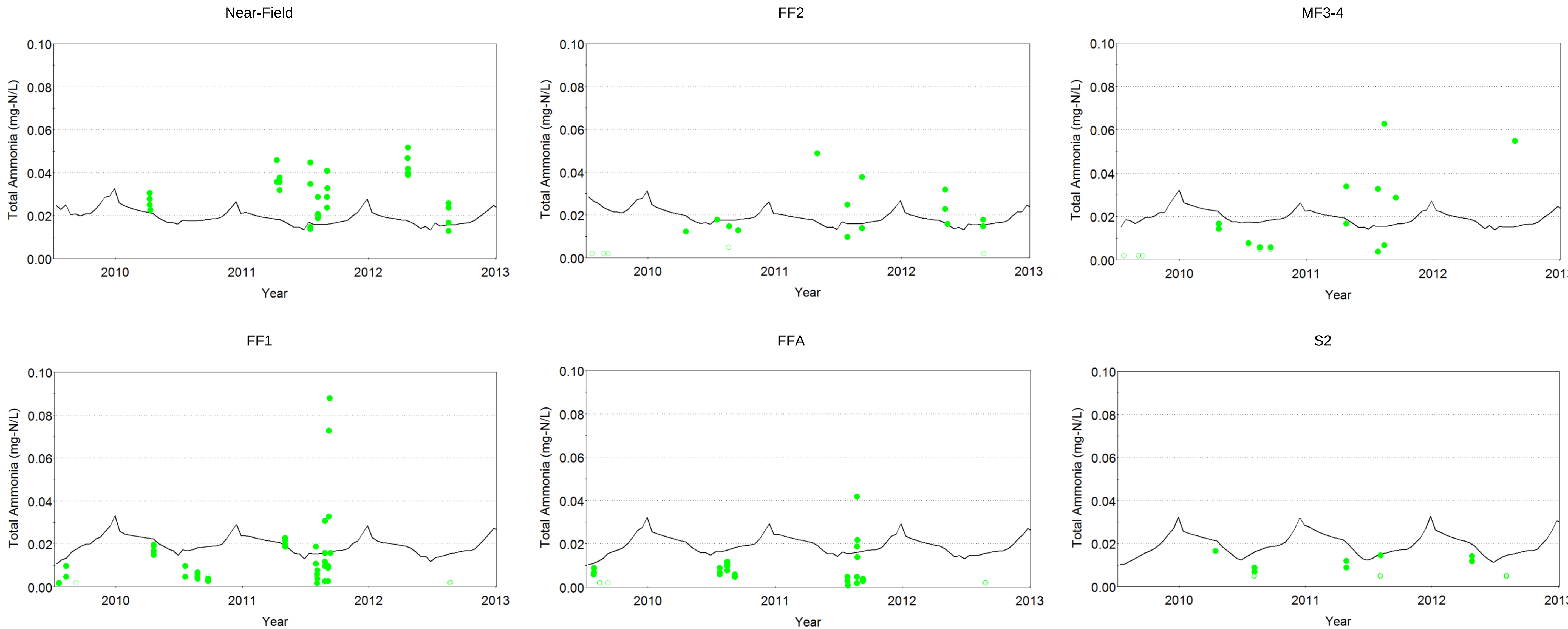
Calibration time series figures for Lac du Sauvage and Lac de Gras for ammonia, nitrate, orthophosphate, and phytoplankton are presented in Figures 8F2.3-15 to 8F2.3-22.

Figure 8F2.3-15 Lac du Sauvage Total Ammonia Time Series Calibration Plots



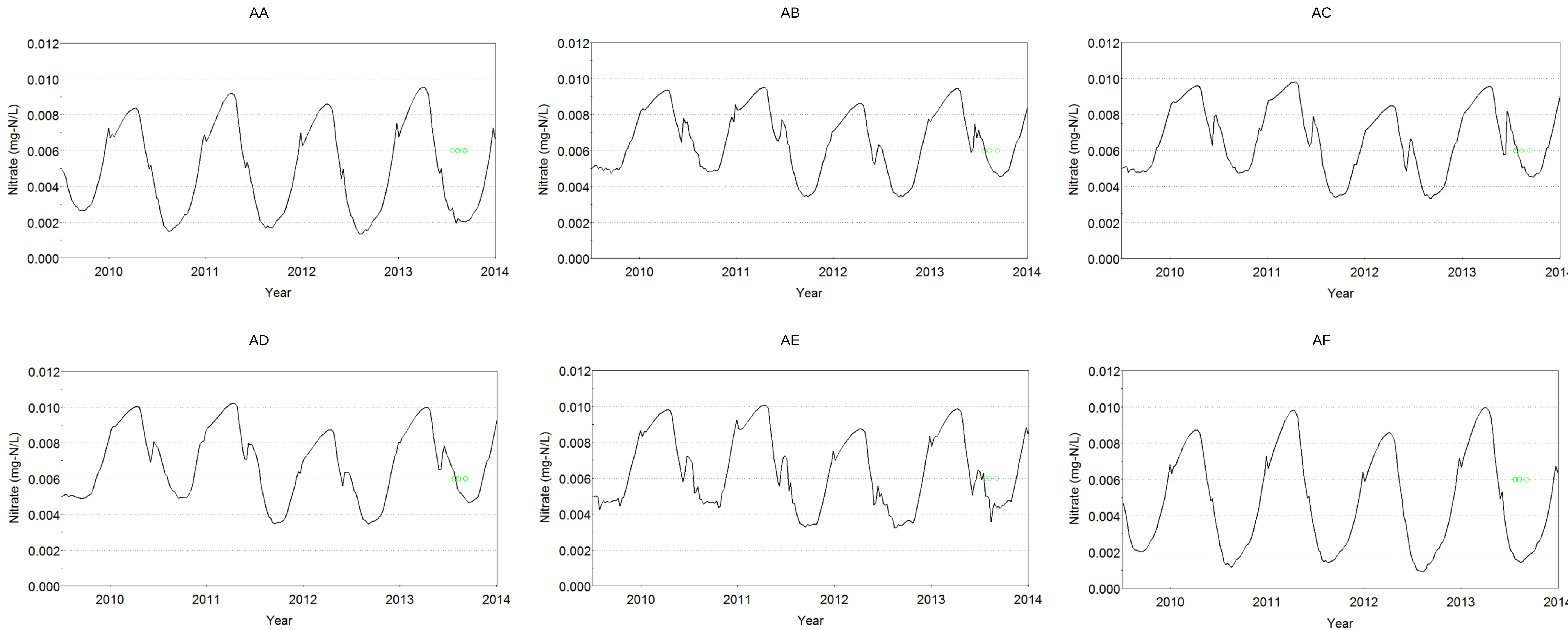
mg-N/L = milligrams as nitrogen per litre; dots represent measured data; open circles represent measured data that were reported as below detection limits; solid line represents model results; AA, AB, AC, AD, AE, and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-16 Lac de Gras Total Ammonia Time Series Calibration Plots



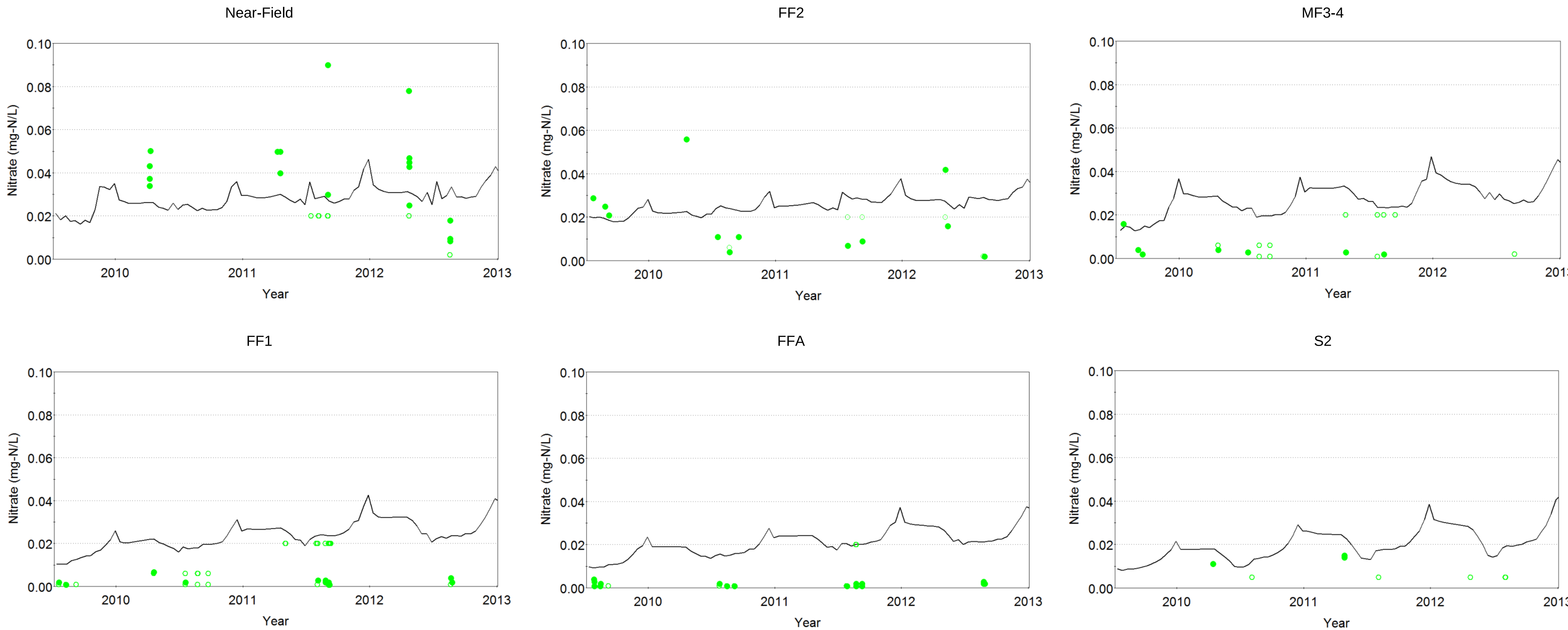
mg-N/L = milligrams as nitrogen per litre; dots represent measured data; open circles represent measured data that were reported as below detection limits; solid line represents model results; Near-Field, FF2, MF3-4, FF1, FFA, and S2 are calibration locations in Lac de Gras.

Figure 8F2.3-17 Lac du Sauvage Nitrate Time Series Calibration Plots



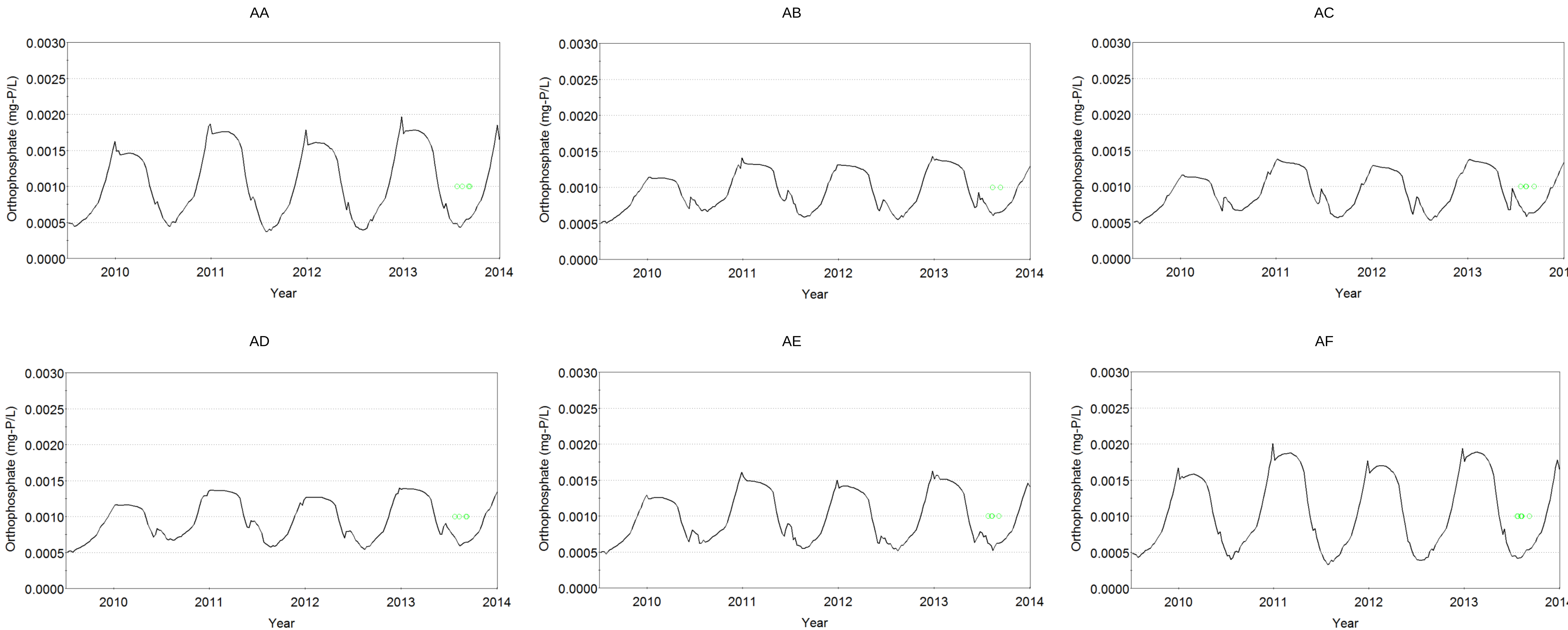
mg-N/L = milligrams as nitrogen per litre; dots represent measured data; open circles represent measured data that were reported as below detection limits; solid line represents model results; AA, AB, AC, AD, AE, and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-18 Lac de Gras Nitrate Time Series Calibration Plots



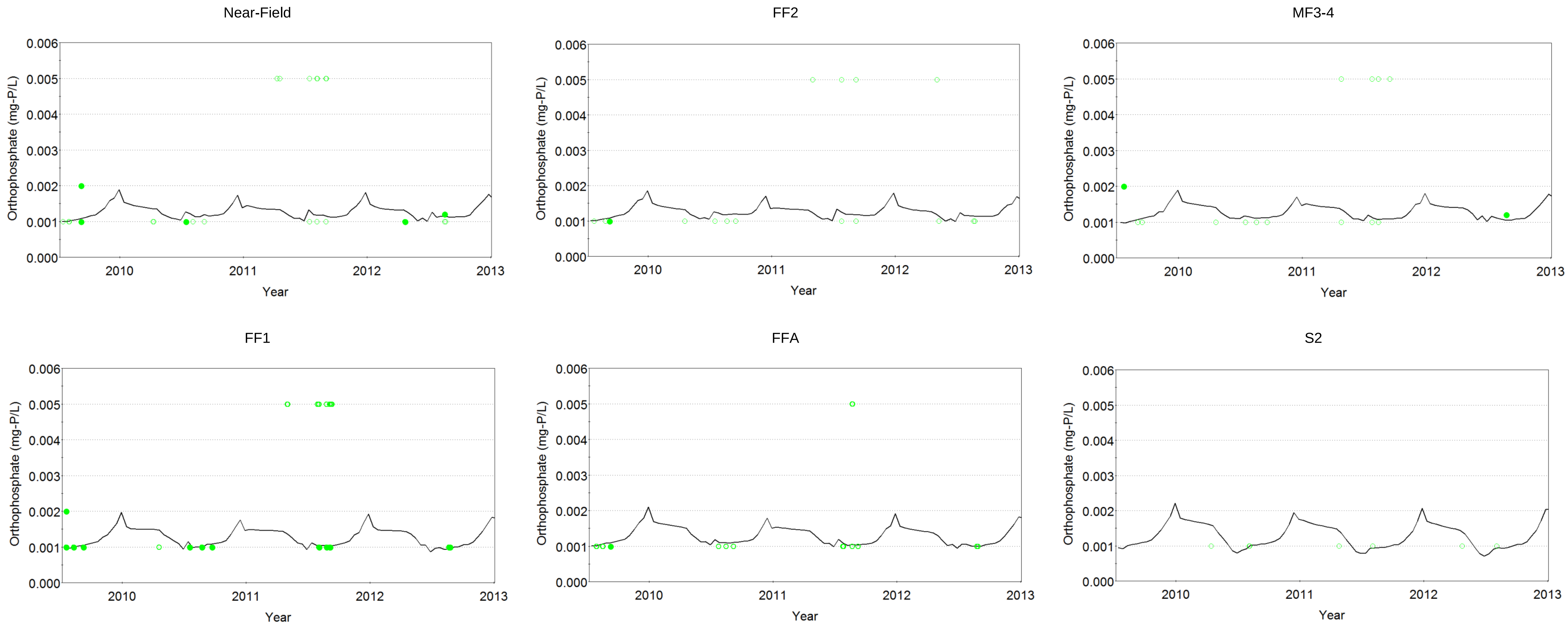
mg-N/L = milligrams as nitrogen per litre; dots represent measured data; open circles represent data that were reported as below detection limits; solid line represents model results; Near-Field, FF2, MF3-4, FF1, FFA, and S2 are calibration locations in Lac de Gras.

Figure 8F2.3-19 Lac du Sauvage Orthophosphate Time Series Calibration Plots



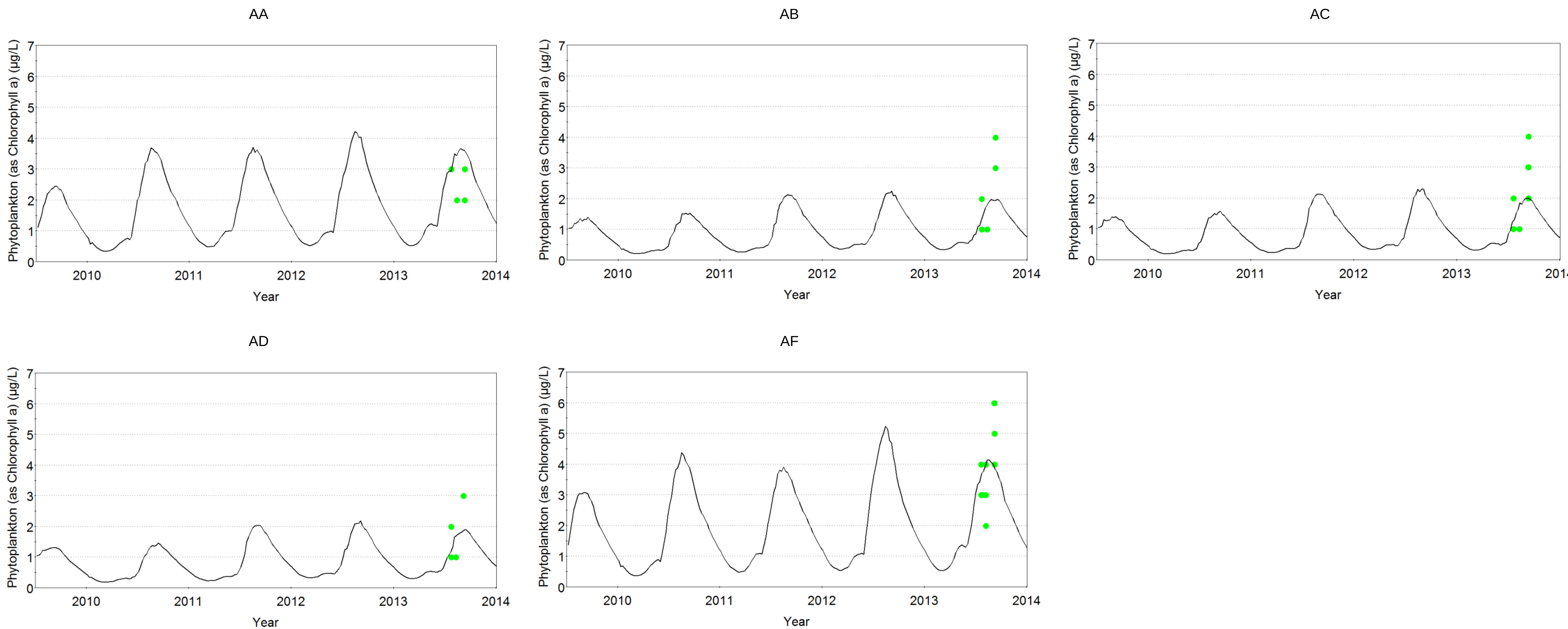
mg-P/L = milligrams as phosphorus per litre; dots represent measured data; open circles represent measured data that were reported as below detection limits; solid line represents model results; AA, AB, AC, AD, AE, and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-20 Lac de Gras Orthophosphate Time Series Calibration Plots



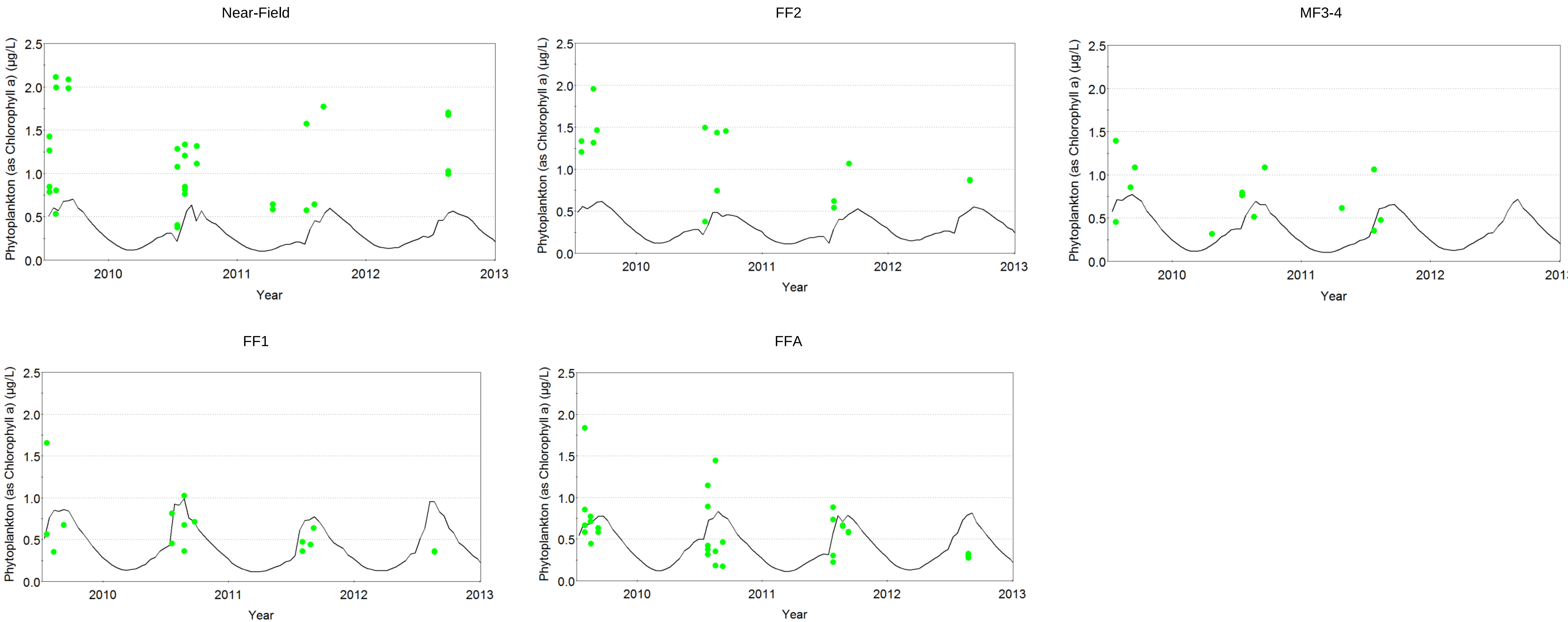
mg-P/L = milligrams as phosphorus per litre; dots represent measured data; open circles represent measured data that were reported as below detection limits; solid line represents model results ; Near-Field, FF2, MF3-4, FF1, FFA, and S2 are calibration locations in Lac de Gras.

Figure 8F2.3-21 Lac du Sauvage Phytoplankton (as Chlorophyll *a*) Time Series Calibration Plots



µg/L = micrograms per litre; dots represent measured chlorophyll *a* data; solid line represents model results; AA, AB, AC, AD, and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-22 Lac de Gras Phytoplankton (as Chlorophyll *a*) Time Series Calibration Plots



µg/L = micrograms per litre; dots represent measured chlorophyll *a* data; solid line represents model results; Near-Field, FF2, MF3-4, FF1, and FFA are calibration locations in Lac de Gras.

Predicted ammonia concentrations in Lac du Sauvage (Figure 8F2.3-15) matched the magnitude of measured concentrations throughout the lake. In general, where discrepancies existed between the model results and measured ammonia concentrations, the model tended to overpredict concentrations. A weak positive trend was seen in predicted ammonia concentrations at some model locations because of the existing discharge from the Misery site through the King Pond Settling Facility, Cujo Lake, Christine Lake, and into Lac du Sauvage. Because field data were limited to 2013, this trend was not observed in field data. The Lac de Gras Model underpredicted measured ammonia concentrations in the near-field area of the lake, matched measured ammonia concentrations reasonably well in the mid-field and far-field areas of the lake, and overpredicted ammonia concentrations in the Slipper Bay area of Lac de Gras where discharge from the Ekati Mine operations enters Lac de Gras (Figure 8F2.3-16). In both models, peak ammonia concentrations were predicted to occur during the ice-covered season due to salt rejection from the ice into the surface layer of the lakes.

In general, measured nitrate concentrations in Lac du Sauvage were below detection. Nitrate model results varied within 0.005 milligrams as nitrogen per litre (mg-N/L) of this detection limit (Figure 8F2.3-17). As seen in predicted ammonia concentrations, a weak positive trend was seen in predicted nitrate concentrations at some model locations because of the existing discharge from the Misery site through the King Pond Settling Facility, Cujo Lake, Christine Lake, and into Lac du Sauvage. The Lac de Gras Model matched measured nitrate concentrations reasonably well in the near-field and mid-field areas of the lake, and typically overpredicted measured nitrate concentrations in the far-field areas of the lake and in Slipper Bay (Figure 8F2.3-18). In both models, peak nitrate concentrations were predicted to occur during the ice-covered season due to salt rejection from the ice into the surface layer of the lakes.

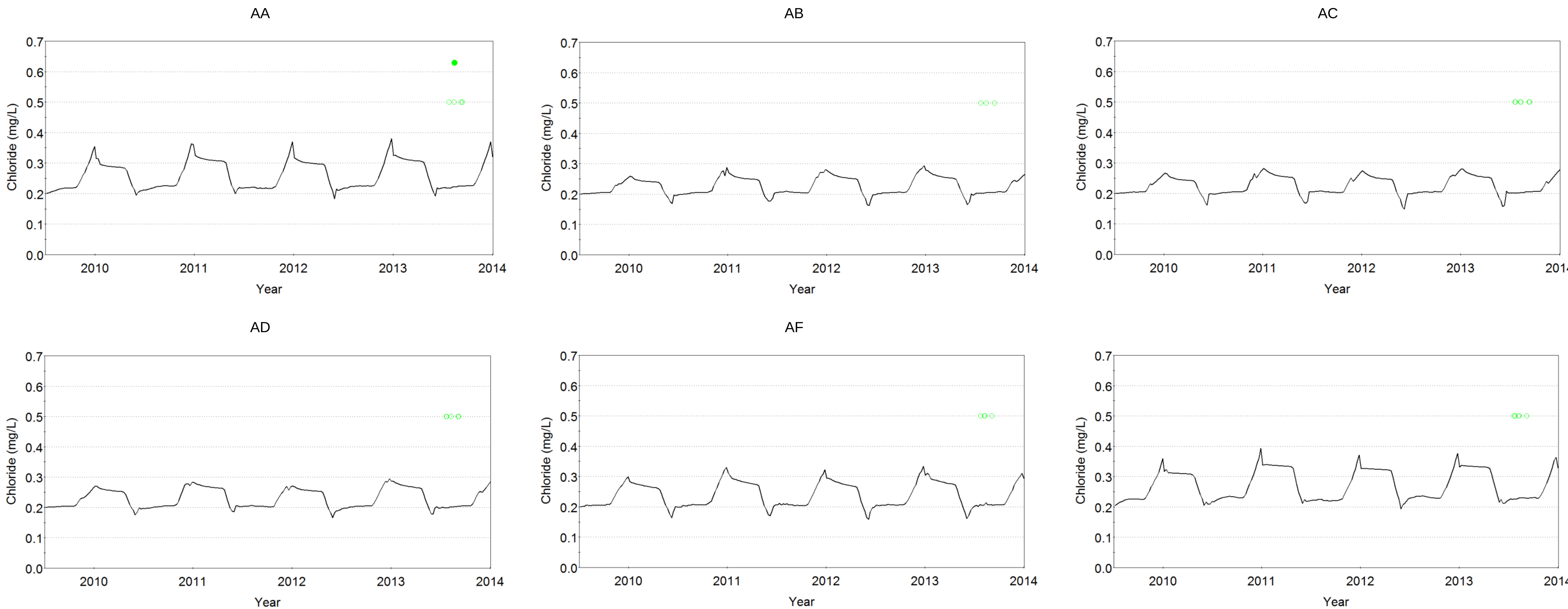
Orthophosphate concentrations were generally below detection limits in Lac du Sauvage, with the exception of samples collected during the ice-covered season of 2014 (Figure 8F2.3-19), and below detection limits in Lac de Gras, with the exception of samples collected during the open-water season of 2012 (Figure 8F2.3-20). In both models, predicted orthophosphate concentrations varied within 0.001 milligrams as phosphorus per litre (mg-P/L) and peaked during the ice-covered season. Because much of the data were near or below detection, the predicted orthophosphate concentrations are believed to be a "best guess" approximation of concentrations in Lac du Sauvage and Lac de Gras.

Predicted phytoplankton (chlorophyll *a*) concentrations were generally within the same magnitude and trend as measured chlorophyll *a* data in Lac du Sauvage (Figure 8F2.3-21). The Lac de Gras Model generally underpredicted phytoplankton concentrations in the near-field and mid-field areas of the lake and matched measured concentrations reasonably well in the far-field areas of the lake (Figure 8F2.3-22). Peak predicted concentrations of phytoplankton occurred during the open-water season, when solar radiation and water temperatures were at maximum values, allowing for higher rates of phytoplankton growth. As expected, predicted phytoplankton concentrations decreased during the ice-covered season.

8F2.3.4 Major Ions Calibration

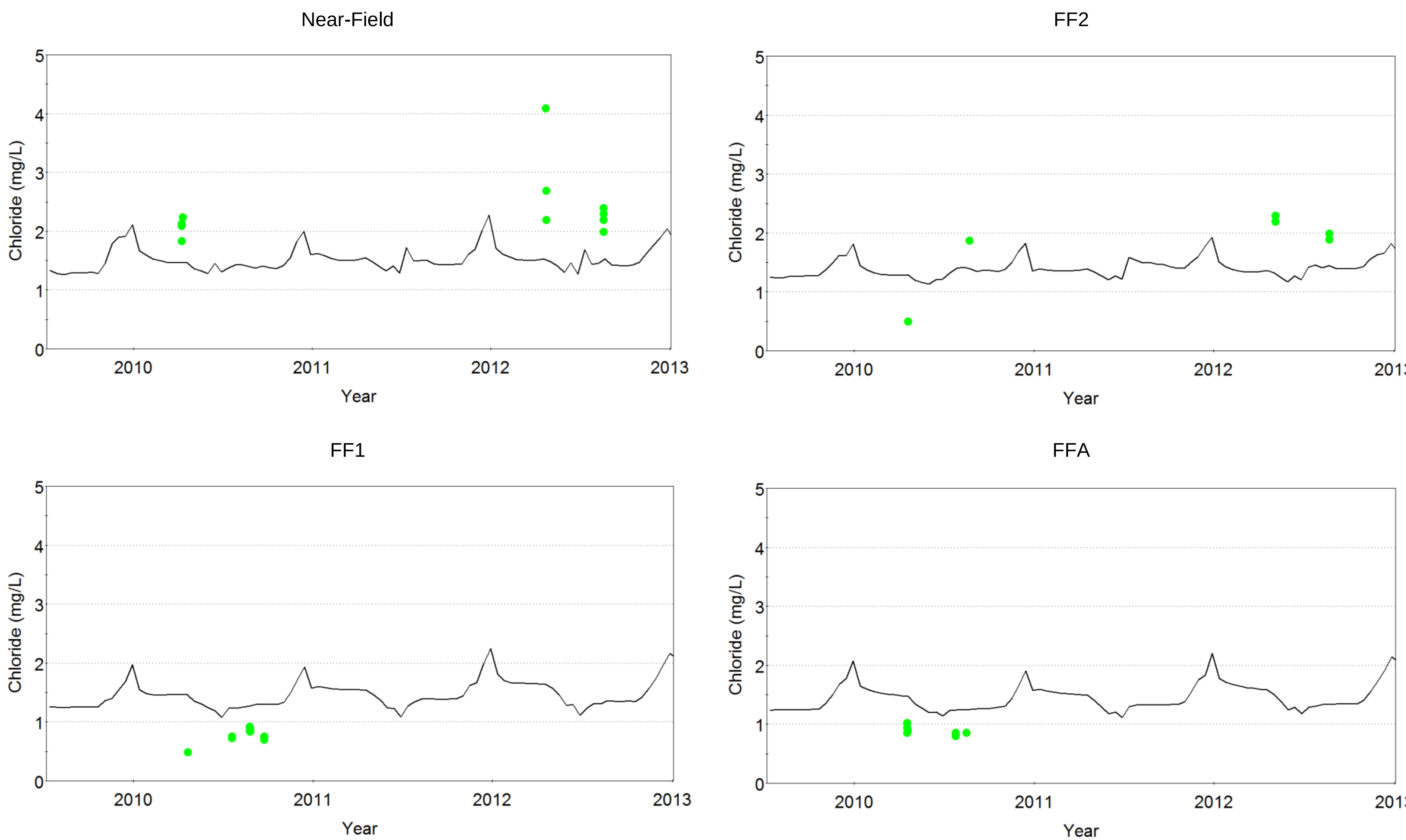
Several major ions were modelled as conservative constituents in the Lac du Sauvage and Lac de Gras models, including calcium, chloride, fluoride, magnesium, potassium, sodium, silica, and sulphate. Conservative constituents were not assumed to undergo chemical reactions or physical processes other than advective transport. In the Lac du Sauvage Model, where field data were below detection limits, the predicted concentrations were also below detection. Measured chloride concentrations in Lac du Sauvage were below detection limits and the modelled chloride concentrations were also below detection limits (Figure 8F2.3-23). In Lac de Gras, the model typically underpredicted major ions concentrations in the near-field area of the lake, and either matched measured concentrations reasonably well or slightly overpredicted measured concentrations in the mid-field and far-field areas of the lake (Figures 8F2.3-24).

Figure 8F2.3-23 Lac du Sauvage Chloride Time Series Calibration Plots



mg/L = milligrams per litre; dots represent measured; open circles represent data that were reported as below detection limits; solid line represents model results; AA, AB, AC, AD, and AF are calibration locations in Lac du Sauvage.

Figure 8F2.3-24 Lac de Gras Chloride Time Series Calibration Plots



mg/L = milligrams per litre; dots represent measured; open circles represent data that were reported as below detection limits; solid line represents model results; Near-Field, FF2, MF3-4, FF1, and FFA are calibration locations in Lac de Gras.

8F2.4 Model Simulations

After calibration of the Lac du Sauvage and Lac de Gras models was completed, model simulations were run for a period of time that covered the following snapshots:

- pre-operations: from 2014 to 2018 – represents conditions before operations of the Project at Lac du Sauvage;
- early operations: from 2019 to 2024 – represents the period before active discharge of minewater from the Project to Lac du Sauvage;
- late operations: from 2024 to 2029 – represents the period of active discharge of minewater from the Project to Lac du Sauvage;
- closure: from 2030 to 2033 – represents the period following active discharge of minewater to Lac du Sauvage, but before dike breaching and complete back-flooding of the Jay Pit and diked area; and,
- post-closure: from 2034 to 2060 – represents the final configuration of Lac du Sauvage following mining, dike breaching, and complete back-flooding of the Misery and Jay pits.

8F3 MODEL RESULTS

8F3.1 Lac du Sauvage

Lac du Sauvage Model predictions are presented in table format (Table 8F3.1-1 to Table 8F3.1-6) as maximum concentrations, maximum depth-averaged concentrations, and maximum surface concentrations for the ice-covered and open-water seasons. Model predictions are also presented in time series figure format (Attachment 8F4).

Model predictions are presented for the following locations:

- AA, AB, AC, AD, AE, and AF: calibration locations in the Lac du Sauvage Model (Map 8F2.2-1);
- LDS-P1: location of the diffuser for the discharge from the Misery Pit to Lac du Sauvage;
- LDS-P2: location approximately half-way between the diffuser and the outlet of Lac du Sauvage; and,
- LDS-P3: Lac du Sauvage outlet.

In the tables and figures, peak concentrations are predicted to occur at the end of operations. Concentrations in Lac du Sauvage are predicted to decrease rapidly in the closure time period. Long-term post-closure concentrations for many constituents are slightly elevated relative to baseline concentrations because of continued loading from the WRSA runoff to the lake. Cyclical annual patterns evident in the time series figures are due to salt rejection during ice formation and dilution during ice thawing.

Table 8F3.1-1 Predicted Maximum Concentrations in Lac du Sauvage, AA to AF
Part A

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.35	18	0.3	17	0.26	17	0.7	18	1.7	17	1.0	17	0.62	16	1.7	17	1.1	17	0.75	17	0.77	16	1.2	17
Dissolved oxygen[(a)]	mg/L	4.3	4.4	4.2	4.6	4.1	4.0	4.0	2.9	7.3	7.7	7.1	8.0	7.3	7.5	4.5	5.9	6.0	6.0	5.9	7.6	6.6	6.3	5.6	5.0
Conventional Constituents																									
Hardness (calculated)	mg/L	6.8	4.3	18	12	18	13	11	6.3	5.4	4.0	43	32	46	30	11	8.1	5.3	4.5	46	38	47	33	11	8.5
Total dissolved solids	mg/L	17	11	36	25	36	26	23	14	14	10	80	62	86	58	22	17	13	12	87	73	90	63	23	18
Total suspended solids[(b)]	mg/L	2.3	1.4	2.3	1.4	2.2	1.7	2.5	1.4	1.8	1.4	1.8	1.3	1.7	1.4	2.1	1.3	1.8	1.5	1.8	1.3	1.7	1.5	2.0	1.4
Major Ions																									
Calcium	mg/L	1.3	0.79	5.3	3.7	5.4	3.9	2.8	1.6	1.0	0.75	15	11	16	10	3.0	2.3	0.98	0.83	16	13	16	11	3.1	2.3
Chloride	mg/L	0.39	0.24	12	8.7	13	9.4	5.0	2.8	0.34	0.24	39	29	43	28	6.2	4.7	0.33	0.28	43	36	44	30	6.6	4.9
Fluoride	mg/L	0.015	0.0096	0.016	0.0098	0.015	0.012	0.017	0.0092	0.012	0.0091	0.015	0.012	0.014	0.011	0.014	0.0093	0.012	0.01	0.015	0.012	0.015	0.012	0.014	0.01
Magnesium	mg/L	0.88	0.55	1.0	0.72	1.0	0.74	1.0	0.56	0.71	0.52	1.5	1.2	1.5	1.1	0.85	0.6	0.69	0.58	1.5	1.3	1.6	1.2	0.86	0.65
Potassium	mg/L	0.83	0.52	0.86	0.54	0.8	0.63	0.91	0.49	0.73	0.53	0.86	0.69	0.82	0.63	0.77	0.51	0.72	0.61	0.87	0.67	0.85	0.68	0.77	0.54
Sodium	mg/L	0.85	0.54	3.5	2.4	3.5	2.6	1.8	1.1	0.68	0.51	9.4	7.0	10	6.7	1.9	1.5	0.66	0.56	10	8.6	11	7.3	2.0	1.5
Sulphate	mg/L	2.0	1.3	2.1	1.3	1.9	1.5	2.1	1.1	2.2	1.5	2.3	1.8	2.2	1.7	1.8	1.2	2.2	1.8	2.5	1.9	2.3	1.8	1.8	1.3
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.23	0.2	0.42	0.33	0.42	0.32	0.27	0.22	0.25	0.22	0.95	0.72	0.91	0.6	0.33	0.29	0.26	0.23	0.96	0.81	0.93	0.63	0.37	0.33
Total ammonia	mg-N/L	0.048	0.025	0.085	0.049	0.088	0.045	0.068	0.033	0.043	0.027	0.16	0.088	0.16	0.066	0.071	0.048	0.041	0.029	0.17	0.1	0.17	0.069	0.067	0.054
Nitrate	mg-N/L	0.017	0.011	0.17	0.12	0.17	0.11	0.04	0.027	0.045	0.033	0.63	0.47	0.59	0.37	0.1	0.077	0.053	0.043	0.63	0.55	0.61	0.4	0.14	0.11
Total phosphorus (calculated)	mg-P/L	0.0078	0.0069	0.0085	0.0069	0.0088	0.0073	0.0083	0.0072	0.0074	0.007	0.012	0.0084	0.012	0.0074	0.0082	0.0074	0.0074	0.0072	0.012	0.0087	0.012	0.0075	0.0083	0.0075
Dissolved orthophosphate	mg-P/L	0.0018	0.00091	0.0026	0.00091	0.0029	0.0013	0.0023	0.0013	0.0014	0.0011	0.0063	0.0024	0.0059	0.0014	0.0022	0.0015	0.0014	0.0012	0.0062	0.0027	0.0057	0.0015	0.0023	0.0016
Phytoplankton (as chlorophyll a)	µg/L	2.8	4.0	5.3	7.6	5.0	6.4	3.1	4.3	1.9	2.3	11	14	12	11	2.7	3.5	1.9	2.4	12	15	12	11	2.7	3.7
Silica, reactive	mg/L	0.21	0.13	0.22	0.15	0.21	0.17	0.24	0.13	0.17	0.13	0.25	0.21	0.25	0.18	0.2	0.13	0.16	0.14	0.25	0.21	0.26	0.2	0.2	0.14
Total Metals																									
Aluminum	µg/L	4.4	8.8	23	23	24	22	11	12	4.4	8.8	61	53	57	44	13	15	4.4	8.8	61	59	58	48	13	16
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.41	0.34	0.41	0.34	0.36	0.31	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	2.4	1.9	2.4	1.8	1.7	1.4	1.3	1.2	4.5	3.3	4.2	2.9	1.8	1.5	1.3	1.2	4.5	3.6	4.3	3.1	1.8	1.6
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.0072	0.0063	0.0073	0.0062	0.0057	0.0053	0.005	0.005	0.012	0.009	0.011	0.0082	0.0059	0.0056	0.005	0.005	0.012	0.0095	0.011	0.0085	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.027	0.026	0.028	0.026	0.026	0.025	0.025	0.025	0.032	0.03	0.032	0.029	0.026	0.026	0.025	0.025	0.032	0.03	0.032	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.2	0.12	0.2	0.12	0.18	0.11	0.17	0.1	0.26	0.17	0.25	0.16	0.18	0.11	0.17	0.1	0.26	0.18	0.25	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.12	0.092	0.12	0.089	0.072	0.063	0.05	0.05	0.25	0.18	0.23	0.16	0.094	0.081	0.05	0.05	0.25	0.2	0.24	0.17	0.1	0.093
Copper	µg/L	0.68	0.6	0.73	0.63	0.73	0.63	0.7	0.61	0.68	0.6	0.84	0.71	0.83	0.69	0.7	0.62	0.68	0.6	0.84	0.72	0.83	0.7	0.7	0.62
Iron	µg/L	5.0	16	16	23	16	23	8.6	18	5.0	16	37	39	35	34	9.7	20	5.0	16	37	42	35	36	10	20
Lead	µg/L	0.025	0.058	0.035	0.064	0.035	0.064	0.028	0.06	0.025	0.058	0.053	0.077	0.051	0.073	0.029	0.061	0.025	0.058	0.053	0.08	0.052	0.075	0.03	0.062
Manganese	µg/L	1.7	4.7	4.3	6.3	4.3	6.2	2.6	5.2	1.7	4.7	9.4	9.7	8.8	8.7	3.5	6.0	1.7	4.7	9.4	10	9.0	9.1	3.8	6.4

Table 8F3.1-1 Predicted Maximum Concentrations in Lac du Sauvage, AA to AF
Part A

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.001	0.001	0.0026	0.0022	0.0026	0.0021	0.0015	0.0013	0.001	0.001	0.0058	0.0046	0.0054	0.0039	0.0017	0.0015	0.001	0.001	0.0058	0.0051	0.0056	0.0042	0.0017	0.0016
Molybdenum	µg/L	0.025	0.025	0.22	0.13	0.23	0.13	0.091	0.053	0.025	0.025	0.62	0.37	0.57	0.3	0.11	0.073	0.025	0.025	0.62	0.41	0.59	0.33	0.12	0.077
Nickel	µg/L	0.3	0.32	0.43	0.4	0.43	0.39	0.34	0.34	0.3	0.32	0.68	0.57	0.65	0.52	0.36	0.36	0.3	0.32	0.68	0.6	0.66	0.54	0.37	0.38
Selenium	µg/L	0.05	0.05	0.054	0.053	0.055	0.053	0.051	0.051	0.05	0.05	0.063	0.059	0.062	0.057	0.053	0.052	0.05	0.05	0.063	0.06	0.063	0.058	0.054	0.053
Silver	µg/L	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	179	94	182	88	64	28	7.2	5.3	519	285	478	231	80	44	7.2	5.3	520	322	493	253	85	45
Uranium	µg/L	0.022	0.022	0.22	0.15	0.22	0.14	0.087	0.064	0.022	0.022	0.61	0.41	0.56	0.34	0.17	0.13	0.022	0.022	0.61	0.47	0.58	0.37	0.19	0.17
Vanadium	µg/L	0.025	0.025	0.043	0.038	0.043	0.037	0.031	0.028	0.025	0.025	0.079	0.065	0.075	0.057	0.033	0.031	0.025	0.025	0.079	0.071	0.076	0.061	0.033	0.031
Zinc	µg/L	0.5	0.5	0.65	0.59	0.65	0.59	0.55	0.53	0.5	0.5	0.94	0.79	0.9	0.74	0.59	0.56	0.5	0.5	0.94	0.83	0.92	0.76	0.6	0.59
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	5.8	4.2	5.9	4.1	4.9	3.6	4.4	3.3	8.7	6.2	8.3	5.6	5.5	4.1	4.4	3.3	8.7	6.5	8.5	5.8	5.7	4.4
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.41	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.41	0.34	0.41	0.33	0.36	0.31
Barium[(c)]	µg/L	1.3	1.1	2.2	1.7	2.2	1.6	1.6	1.2	1.3	1.1	4.1	2.9	3.8	2.6	1.7	1.4	1.3	1.1	4.1	3.1	3.9	2.7	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0059	0.0055	0.0059	0.0055	0.0053	0.0051	0.005	0.005	0.0076	0.0066	0.0074	0.0063	0.0054	0.0052	0.005	0.005	0.0076	0.0068	0.0075	0.0064	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.007	0.0061	0.007	0.006	0.0057	0.0053	0.005	0.005	0.011	0.0085	0.01	0.0078	0.0058	0.0055	0.005	0.005	0.011	0.0089	0.011	0.0081	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.0049	0.0039	0.005	0.0038	0.0033	0.0029	0.0025	0.0025	0.0097	0.0071	0.0092	0.0062	0.0035	0.0032	0.0025	0.0025	0.0097	0.0077	0.0094	0.0066	0.0036	0.0033
Chromium	µg/L	0.065	0.003	0.07	0.0064	0.07	0.0062	0.067	0.0039	0.065	0.003	0.079	0.014	0.077	0.012	0.068	0.0052	0.065	0.003	0.079	0.015	0.078	0.013	0.068	0.0061
Cobalt	µg/L	0.011	0.005	0.074	0.045	0.075	0.042	0.032	0.018	0.011	0.005	0.2	0.13	0.18	0.11	0.055	0.036	0.011	0.005	0.2	0.15	0.19	0.12	0.062	0.048
Copper	µg/L	0.68	0.57	0.73	0.6	0.73	0.6	0.7	0.58	0.68	0.57	0.82	0.66	0.81	0.65	0.7	0.58	0.68	0.57	0.82	0.68	0.81	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	7.2	7.0	7.3	6.8	3.7	4.8	1.9	3.7	18	14	16	12	5.9	6.5	1.9	3.7	18	16	17	13	6.6	7.6
Lead	µg/L	0.005	0.005	0.011	0.0085	0.011	0.0083	0.0069	0.006	0.005	0.005	0.022	0.016	0.021	0.014	0.0084	0.0074	0.005	0.005	0.022	0.018	0.021	0.015	0.0089	0.0083
Manganese	µg/L	1.6	0.8	4.1	2.4	4.2	2.3	2.4	1.3	1.6	0.8	9.1	5.8	8.5	4.8	3.4	2.1	1.6	0.8	9.1	6.5	8.7	5.2	3.7	2.5
Mercury	µg/L	0.00025	0.00025	0.00061	0.00048	0.00062	0.00046	0.00037	0.00031	0.00025	0.00025	0.0013	0.00096	0.0012	0.00082	0.0004	0.00035	0.00025	0.00025	0.0013	0.0011	0.0013	0.00088	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.22	0.13	0.23	0.13	0.091	0.052	0.025	0.025	0.62	0.37	0.57	0.3	0.11	0.073	0.025	0.025	0.62	0.41	0.59	0.33	0.12	0.076
Nickel	µg/L	0.3	0.28	0.42	0.35	0.42	0.35	0.34	0.3	0.3	0.28	0.65	0.51	0.62	0.46	0.36	0.32	0.3	0.28	0.65	0.54	0.63	0.48	0.37	0.34
Selenium	µg/L	0.02	0.02	0.024	0.023	0.025	0.023	0.021	0.021	0.02	0.02	0.033	0.029	0.032	0.027	0.023	0.022	0.02	0.02	0.033	0.03	0.033	0.028	0.024	0.023
Silver	µg/L	0.0025	0.0025	0.003	0.0028	0.003	0.0028	0.0027	0.0026	0.0025	0.0025	0.004	0.0035	0.0039	0.0033	0.0028	0.0027	0.0025	0.0025	0.004	0.0036	0.0039	0.0034	0.0029	0.0028
Strontium	µg/L	7.2	5.3	179	94	182	87	64	28	7.2	5.3	519	285	478	231	80	44	7.2	5.3	519	322	492	253	85	45
Uranium	µg/L	0.02	0.021	0.21	0.14	0.22	0.13	0.084	0.063	0.02	0.021	0.6	0.4	0.55	0.33	0.17	0.13	0.02	0.021	0.6	0.46	0.57	0.36	0.19	0.16
Vanadium[(c)]	µg/L	0.025	0.025	0.03	0.028	0.03	0.028	0.027	0.026	0.025	0.025	0.04	0.035	0.039	0.033	0.027	0.027	0.025	0.025	0.04	0.036	0.039	0.034	0.027	0.027
Zinc[(c)]	µg/L	0.5	0.4	0.63	0.48	0.63	0.48	0.54	0.42	0.5	0.4	0.89	0.66	0.86	0.61	0.59	0.46	0.5	0.4	0.89	0.7	0.87	0.63	0.6	0.48

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

DOMINION DIAMOND

Table 8F3.1-1 Predicted Maximum Concentrations in Lac du Sauvage, AA to AF
Part B

Constituent	Units	AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	1.3	17	0.85	17	0.52	17	1.4	17	0.64	18	0.73	17	0.56	17	1.0	18	0.71	18	0.54	18	0.26	17	1.1	18
Dissolved oxygen[(a)]	mg/L	4.4	6.2	4.6	7.0	4.6	4.7	3.7	5.3	4.9	5.1	4.8	6.3	5.0	4.1	5.1	5.3	3.0	3.3	2.9	3.7	2.7	2.8	3.1	3.5
Conventional Constituents																									
Hardness (calculated)	mg/L	5.8	4.1	32	27	34	27	12	8.4	6.1	4.5	35	29	39	29	11	8.8	6.8	4.2	19	11	21	12	11	5.9
Total dissolved solids	mg/L	15	11	63	53	66	52	24	17	15	12	67	56	75	55	23	19	17	10	39	23	43	24	23	13
Total suspended solids[(b)]	mg/L	1.9	1.4	1.8	1.3	1.7	1.4	2.1	1.4	2.1	1.5	2.1	1.4	2.0	1.5	2.2	1.4	2.3	1.4	2.4	1.4	2.1	1.5	2.5	1.4
Major Ions																									
Calcium	mg/L	1.1	0.76	11	9.1	11	9.0	3.3	2.3	1.1	0.84	12	9.8	13	9.8	3.1	2.5	1.3	0.77	6.0	3.3	6.7	3.6	2.6	1.4
Chloride	mg/L	0.36	0.27	29	24	30	24	6.9	4.9	0.37	0.28	31	26	36	26	6.3	5.2	0.39	0.24	14	7.5	16	8.5	4.4	2.4
Fluoride	mg/L	0.013	0.0093	0.014	0.011	0.014	0.011	0.015	0.0097	0.014	0.01	0.016	0.011	0.015	0.011	0.015	0.0096	0.015	0.0094	0.016	0.01	0.015	0.01	0.017	0.0095
Magnesium	mg/L	0.75	0.53	1.2	1.0	1.3	1.0	0.89	0.64	0.8	0.59	1.3	1.1	1.4	1.1	0.9	0.63	0.88	0.54	1.1	0.71	1.1	0.68	1.0	0.57
Potassium	mg/L	0.78	0.6	0.89	0.71	0.84	0.65	0.8	0.53	0.82	0.61	0.91	0.66	0.85	0.63	0.82	0.52	0.83	0.51	0.89	0.55	0.82	0.54	0.91	0.51
Sodium	mg/L	0.73	0.51	7.1	5.9	7.4	5.8	2.1	1.5	0.77	0.57	7.6	6.4	8.6	6.4	2.0	1.6	0.85	0.52	3.9	2.2	4.4	2.3	1.7	0.95
Sulphate	mg/L	2.5	2.3	3.0	2.5	2.5	1.9	1.9	1.3	2.4	1.8	2.6	1.9	2.3	1.7	1.9	1.2	2.1	1.3	2.2	1.4	2.1	1.3	2.1	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.28	0.28	0.72	0.63	0.75	0.56	0.37	0.4	0.26	0.23	0.82	0.65	0.81	0.57	0.34	0.29	0.23	0.2	0.45	0.31	0.49	0.31	0.27	0.22
Total ammonia	mg-N/L	0.042	0.027	0.11	0.079	0.12	0.062	0.077	0.083	0.047	0.028	0.13	0.084	0.14	0.061	0.075	0.048	0.047	0.024	0.088	0.045	0.095	0.04	0.069	0.032
Nitrate	mg-N/L	0.08	0.092	0.44	0.39	0.46	0.34	0.13	0.16	0.052	0.042	0.52	0.4	0.51	0.35	0.11	0.084	0.023	0.012	0.2	0.10	0.23	0.11	0.044	0.026
Total phosphorus (calculated)	mg-P/L	0.0074	0.0071	0.0098	0.0077	0.011	0.0077	0.0083	0.0075	0.0075	0.0072	0.011	0.0082	0.011	0.0075	0.0082	0.0073	0.0079	0.0067	0.0088	0.0069	0.0092	0.0069	0.0083	0.0071
Dissolved orthophosphate	mg-P/L	0.0015	0.0011	0.0039	0.0017	0.0046	0.0018	0.0023	0.0015	0.0016	0.0012	0.0051	0.0023	0.0052	0.0015	0.0022	0.0013	0.0019	0.00077	0.0029	0.00091	0.0032	0.00093	0.0023	0.0012
Phytoplankton (as chlorophyll a)	µg/L	1.8	2.3	10	13	9.9	10	2.7	3.6	2.0	2.9	11	14	11	10	2.8	3.9	3.0	4.5	5.6	7.1	6.0	6.4	3.3	4.9
Silica, reactive	mg/L	0.18	0.13	0.22	0.18	0.23	0.18	0.2	0.14	0.19	0.14	0.25	0.19	0.24	0.18	0.21	0.14	0.21	0.13	0.22	0.15	0.22	0.14	0.24	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	47	44	49	43	13	18	4.4	8.8	54	48	52	43	13	15	4.4	8.8	26	20	28	21	9.9	12
Arsenic	µg/L	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.41	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.38	0.31	0.36	0.3
Barium	µg/L	1.3	1.2	3.7	2.9	3.8	2.8	1.8	1.7	1.3	1.2	4.1	3.1	3.9	2.9	1.8	1.5	1.3	1.2	2.5	1.7	2.6	1.8	1.6	1.3
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.010	0.0082	0.01	0.0081	0.006	0.0057	0.005	0.005	0.011	0.0085	0.011	0.0081	0.0059	0.0056	0.005	0.005	0.0075	0.006	0.0078	0.0061	0.0056	0.0053
Cadmium	µg/L	0.025	0.025	0.031	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.031	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.028	0.026	0.028	0.026	0.026	0.025
Chromium	µg/L	0.17	0.1	0.24	0.16	0.24	0.15	0.18	0.11	0.17	0.1	0.25	0.16	0.24	0.16	0.18	0.11	0.17	0.1	0.2	0.12	0.21	0.12	0.18	0.1
Cobalt	µg/L	0.05	0.05	0.2	0.16	0.2	0.15	0.10	0.11	0.05	0.05	0.22	0.17	0.21	0.15	0.094	0.083	0.05	0.05	0.12	0.084	0.13	0.087	0.07	0.061
Copper	µg/L	0.68	0.6	0.8	0.69	0.81	0.68	0.71	0.63	0.68	0.6	0.82	0.69	0.81	0.68	0.7	0.62	0.68	0.6	0.74	0.63	0.75	0.63	0.7	0.61
Iron	µg/L	5.0	16	29	35	30	34	10	23	5.0	16	33	36	32	34	9.8	20	5.0	16	17	22	18	22	8.1	18
Lead	µg/L	0.025	0.058	0.046	0.073	0.047	0.073	0.03	0.064	0.025	0.058	0.05	0.075	0.049	0.073	0.029	0.061	0.025	0.058	0.036	0.063	0.037	0.063	0.028	0.059
Manganese	µg/L	1.7	4.7	7.5	8.8	7.7	8.6	3.7	7.3	1.7	4.7	8.4	9.1	8.1	8.7	3.5	6.0	1.7	4.7	4.6	6.0	4.9	6.1	2.5	5.2

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Table 8F3.1-1 Predicted Maximum Concentrations in Lac du Sauvage, AA to AF
Part B

Constituent	Units	AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.001	0.001	0.0046	0.004	0.0048	0.0038	0.0018	0.0017	0.001	0.001	0.0052	0.0042	0.005	0.0039	0.0017	0.0015	0.001	0.001	0.0028	0.0019	0.003	0.002	0.0015	0.0012
Molybdenum	µg/L	0.025	0.025	0.47	0.3	0.49	0.29	0.12	0.083	0.025	0.025	0.55	0.33	0.52	0.29	0.11	0.076	0.025	0.025	0.25	0.11	0.27	0.12	0.082	0.048
Nickel	µg/L	0.3	0.32	0.58	0.52	0.6	0.51	0.37	0.41	0.3	0.32	0.63	0.54	0.61	0.52	0.36	0.37	0.3	0.32	0.44	0.38	0.46	0.39	0.34	0.34
Selenium	µg/L	0.05	0.05	0.06	0.057	0.06	0.057	0.054	0.055	0.05	0.05	0.062	0.058	0.061	0.057	0.053	0.052	0.05	0.05	0.055	0.052	0.056	0.052	0.051	0.051
Silver	µg/L	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05
Strontium	µg/L	7.2	5.3	393	232	409	221	89	46	7.2	5.3	455	252	434	226	81	47	7.2	5.3	200	77	222	83	57	24
Uranium	µg/L	0.022	0.022	0.47	0.34	0.48	0.32	0.19	0.24	0.022	0.022	0.54	0.37	0.51	0.33	0.17	0.13	0.022	0.022	0.24	0.12	0.27	0.13	0.087	0.059
Vanadium	µg/L	0.025	0.025	0.066	0.058	0.067	0.056	0.034	0.032	0.025	0.025	0.072	0.061	0.07	0.057	0.033	0.031	0.025	0.025	0.045	0.035	0.048	0.036	0.03	0.028
Zinc	µg/L	0.5	0.5	0.83	0.74	0.85	0.73	0.6	0.63	0.5	0.5	0.88	0.76	0.87	0.73	0.59	0.57	0.5	0.5	0.67	0.58	0.68	0.58	0.54	0.52
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	7.6	5.6	7.8	5.5	5.6	4.9	4.4	3.3	8.1	5.8	8.0	5.6	5.5	4.1	4.4	3.3	6.0	4.0	6.2	4.1	4.9	3.6
Arsenic	µg/L	0.35	0.3	0.39	0.33	0.4	0.33	0.36	0.31	0.35	0.3	0.4	0.33	0.4	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3
Barium[(c)]	µg/L	1.3	1.1	3.4	2.6	3.5	2.5	1.7	1.6	1.3	1.1	3.7	2.7	3.6	2.5	1.7	1.4	1.3	1.1	2.3	1.6	2.5	1.6	1.6	1.2
Beryllium	µg/L	0.005	0.005	0.007	0.0063	0.0071	0.0062	0.0054	0.0053	0.005	0.005	0.0073	0.0064	0.0072	0.0062	0.0054	0.0052	0.005	0.005	0.006	0.0054	0.0061	0.0054	0.0053	0.0051
Bismuth	µg/L	0.005	0.005	0.0095	0.0078	0.0097	0.0077	0.0059	0.0056	0.005	0.005	0.01	0.008	0.0099	0.0077	0.0058	0.0055	0.005	0.005	0.0072	0.0059	0.0075	0.006	0.0056	0.0052
Cadmium	µg/L	0.0025	0.0025	0.008	0.0062	0.0082	0.006	0.0036	0.0036	0.0025	0.0025	0.0088	0.0065	0.0085	0.0061	0.0035	0.0032	0.0025	0.0025	0.0052	0.0037	0.0055	0.0038	0.0032	0.0028
Chromium	µg/L	0.065	0.003	0.075	0.012	0.076	0.011	0.068	0.0076	0.065	0.003	0.077	0.013	0.076	0.012	0.068	0.0054	0.065	0.003	0.07	0.0058	0.071	0.006	0.066	0.0038
Cobalt	µg/L	0.011	0.005	0.15	0.11	0.16	0.1	0.06	0.069	0.011	0.005	0.18	0.12	0.17	0.1	0.055	0.038	0.011	0.005	0.082	0.037	0.09	0.04	0.031	0.016
Copper	µg/L	0.68	0.57	0.79	0.65	0.79	0.64	0.7	0.6	0.68	0.57	0.8	0.65	0.8	0.64	0.7	0.58	0.68	0.57	0.73	0.59	0.74	0.6	0.69	0.58
Iron	µg/L	1.9	3.7	14	12	14	12	6.4	9.5	1.9	3.7	16	13	15	12	5.9	6.7	1.9	3.7	7.9	6.4	8.5	6.6	3.7	4.7
Lead	µg/L	0.005	0.005	0.018	0.014	0.018	0.014	0.0089	0.0099	0.005	0.005	0.02	0.015	0.019	0.014	0.0084	0.0076	0.005	0.005	0.011	0.0078	0.012	0.0081	0.0066	0.0059
Manganese	µg/L	1.6	0.8	7.2	4.9	7.5	4.7	3.6	3.4	1.6	0.8	8.2	5.2	7.9	4.7	3.4	2.1	1.6	0.8	4.4	2.1	4.7	2.2	2.4	1.3
Mercury	µg/L	0.00025	0.00025	0.0011	0.00083	0.0011	0.0008	0.00042	0.0004	0.00025	0.00025	0.0012	0.00088	0.0011	0.00081	0.0004	0.00036	0.00025	0.00025	0.00065	0.00043	0.0007	0.00045	0.00035	0.0003
Molybdenum	µg/L	0.025	0.025	0.47	0.3	0.49	0.29	0.12	0.083	0.025	0.025	0.55	0.33	0.52	0.29	0.11	0.076	0.025	0.025	0.25	0.11	0.27	0.12	0.082	0.048
Nickel	µg/L	0.3	0.28	0.56	0.47	0.57	0.46	0.37	0.37	0.3	0.28	0.6	0.48	0.59	0.46	0.36	0.33	0.3	0.28	0.43	0.34	0.45	0.34	0.33	0.3
Selenium	µg/L	0.02	0.02	0.03	0.027	0.03	0.027	0.024	0.025	0.02	0.02	0.032	0.028	0.031	0.027	0.023	0.022	0.02	0.02	0.025	0.022	0.026	0.022	0.021	0.021
Silver	µg/L	0.0025	0.0025	0.0036	0.0033	0.0037	0.0033	0.0028	0.0029	0.0025	0.0025	0.0038	0.0034	0.0038	0.0033	0.0028	0.0027	0.0025	0.0025	0.0031	0.0028	0.0031	0.0028	0.0026	0.0026
Strontium	µg/L	7.2	5.3	393	232	409	221	88	46	7.2	5.3	455	252	434	226	80	47	7.2	5.3	199	77	222	83	57	24
Uranium	µg/L	0.02	0.021	0.46	0.33	0.47	0.32	0.18	0.23	0.02	0.021	0.52	0.36	0.5	0.32	0.17	0.13	0.02	0.021	0.24	0.12	0.26	0.13	0.085	0.058
Vanadium[(c)]	µg/L	0.025	0.025	0.036	0.033	0.037	0.033	0.028	0.028	0.025	0.025	0.038	0.034	0.038	0.033	0.027	0.027	0.025	0.025	0.031	0.028	0.031	0.028	0.026	0.026
Zinc[(c)]	µg/L	0.5	0.4	0.8	0.61	0.81	0.6	0.6	0.53	0.5	0.4	0.84	0.63	0.83	0.61	0.59	0.47	0.5	0.4	0.65	0.47	0.67	0.47	0.54	0.42

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

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Table 8F3.1-2 Predicted Maximum Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

		LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
Constituent	Units	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	1.0	17	1.2	17	0.91	17	1.4	17	1.3	17	1.2	17	0.82	17	1.4	17	1.3	17	1.1	17	0.31	17	1.5	17
Dissolved oxygen[(a)]	mg/L	5.0	5.0	4.9	7.4	5.7	5.5	4.6	4.7	5.6	5.5	5.5	7.7	6.1	5.9	4.9	5.6	7.2	7.5	7.3	9.0	7.4	7.9	7.1	7.5
Conventional Constituents																									
Hardness (calculated)	mg/L	5.3	4.4	57	46	59	39	11	9.8	5.2	4.3	52	38	54	33	11	9.8	5.2	3.8	37	33	40	32	11	8.1
Total dissolved solids	mg/L	14	11	107	86	110	74	23	21	13	11	99	71	102	64	22	21	13	9.6	72	63	76	60	22	17
Total suspended solids[(b)]	mg/L	1.8	1.5	1.8	1.3	1.7	1.5	2.0	1.4	1.8	1.4	1.7	1.3	1.7	1.5	2.0	1.4	1.8	1.3	1.8	1.3	1.7	1.3	2.0	1.3
Major Ions																									
Calcium	mg/L	0.98	0.82	20	16	20	13	3.1	2.8	0.97	0.8	18	13	19	11	3.0	2.8	0.97	0.7	13	11	14	11	3.0	2.3
Chloride	mg/L	0.33	0.27	54	44	56	36	6.6	5.9	0.33	0.26	50	35	51	31	6.4	5.9	0.32	0.23	34	30	36	29	6.4	4.8
Fluoride	mg/L	0.012	0.010	0.016	0.012	0.016	0.013	0.014	0.01	0.012	0.0098	0.015	0.012	0.016	0.012	0.014	0.01	0.012	0.0085	0.014	0.012	0.014	0.011	0.014	0.0088
Magnesium	mg/L	0.68	0.57	1.8	1.4	1.8	1.3	0.88	0.69	0.68	0.56	1.7	1.3	1.7	1.2	0.88	0.69	0.68	0.49	1.4	1.2	1.4	1.1	0.88	0.58
Potassium	mg/L	0.72	0.59	0.92	0.69	0.92	0.75	0.78	0.56	0.71	0.58	0.9	0.67	0.89	0.67	0.78	0.56	0.7	0.51	0.81	0.66	0.82	0.64	0.79	0.49
Sodium	mg/L	0.66	0.55	13	10	13	8.6	2.0	1.8	0.66	0.54	12	8.4	12	7.4	2.0	1.8	0.65	0.47	8.2	7.3	8.8	7.0	2.0	1.5
Sulphate	mg/L	2.2	1.8	2.6	1.9	2.4	2.0	1.9	1.3	2.1	1.7	2.5	1.9	2.3	1.8	1.9	1.3	2.1	1.5	2.3	1.8	2.2	1.7	1.9	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.26	0.23	1.1	0.96	1.1	0.73	0.39	0.36	0.25	0.23	1.1	0.83	1.0	0.64	0.42	0.35	0.25	0.22	0.82	0.73	0.82	0.61	0.38	0.34
Total ammonia	mg-N/L	0.041	0.028	0.2	0.15	0.2	0.092	0.072	0.066	0.04	0.028	0.19	0.13	0.19	0.071	0.081	0.063	0.041	0.027	0.13	0.094	0.14	0.064	0.07	0.061
Nitrate	mg-N/L	0.053	0.043	0.73	0.65	0.74	0.48	0.16	0.13	0.05	0.04	0.71	0.54	0.69	0.41	0.18	0.13	0.046	0.033	0.52	0.47	0.51	0.38	0.15	0.12
Total phosphorus (calculated)	mg-P/L	0.0074	0.0072	0.013	0.01	0.013	0.0087	0.0083	0.0076	0.0074	0.0072	0.013	0.0099	0.012	0.008	0.0084	0.0076	0.0074	0.0069	0.011	0.0077	0.011	0.0072	0.0083	0.0075
Dissolved orthophosphate	mg-P/L	0.0014	0.0013	0.0073	0.0042	0.0069	0.0027	0.0024	0.0016	0.0014	0.0013	0.007	0.0039	0.0065	0.0021	0.0024	0.0016	0.0014	0.00095	0.0049	0.0017	0.0052	0.0012	0.0024	0.0015
Phytoplankton (as chlorophyll *a*)	µg/L	1.9	2.4	11	15	12	11	2.7	3.6	1.8	2.4	12	15	12	11	2.7	3.6	1.8	2.3	13	15	12	11	2.7	3.5
Silica, reactive	mg/L	0.16	0.14	0.28	0.22	0.28	0.22	0.2	0.15	0.16	0.13	0.27	0.2	0.27	0.2	0.2	0.15	0.16	0.12	0.23	0.2	0.24	0.19	0.2	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	68	66	68	54	13	16	4.4	8.8	66	60	64	48	13	16	4.4	8.8	54	53	52	46	13	15
Arsenic	µg/L	0.35	0.3	0.42	0.36	0.42	0.34	0.36	0.31	0.35	0.3	0.42	0.35	0.42	0.34	0.36	0.31	0.35	0.3	0.41	0.34	0.4	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	4.8	4.0	4.8	3.3	1.8	1.6	1.3	1.2	4.7	3.6	4.6	3.1	1.8	1.6	1.3	1.2	4.0	3.3	3.9	3.0	1.8	1.6
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.012	0.01	0.012	0.0091	0.006	0.0057	0.005	0.005	0.012	0.0096	0.012	0.0086	0.006	0.0057	0.005	0.005	0.011	0.009	0.011	0.0084	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.033	0.031	0.033	0.03	0.026	0.026	0.025	0.025	0.033	0.03	0.033	0.029	0.026	0.026	0.025	0.025	0.031	0.03	0.031	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.27	0.19	0.27	0.17	0.18	0.11	0.17	0.1	0.27	0.18	0.26	0.16	0.18	0.11	0.17	0.1	0.25	0.17	0.24	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.27	0.22	0.27	0.18	0.11	0.1	0.05	0.05	0.26	0.2	0.26	0.17	0.12	0.1	0.05	0.05	0.22	0.18	0.22	0.16	0.11	0.096
Copper	µg/L	0.68	0.6	0.86	0.74	0.86	0.71	0.7	0.62	0.68	0.6	0.85	0.72	0.85	0.7	0.71	0.62	0.68	0.6	0.82	0.71	0.81	0.69	0.7	0.62
Iron	µg/L	5.0	16	41	46	41	39	11	21	5.0	16	40	42	39	37	12	21	5.0	16	33	39	32	35	11	21
Lead	µg/L	0.025	0.058	0.057	0.083	0.057	0.077	0.03	0.063	0.025	0.058	0.056	0.08	0.055	0.075	0.031	0.062	0.025	0.058	0.05	0.077	0.049	0.074	0.03	0.062
Manganese	µg/L	1.7	4.7	10	11	10	9.8	4.1	6.8	1.7	4.7	10	10	9.8	9.2	4.4	6.7	1.7	4.7	8.4	9.7	8.1	8.9	3.9	6.5
Mercury	µg/L	0.001	0.001	0.0064	0.0058	0.0064	0.0047	0.0017	0.0016	0.001	0.001	0.0062	0.0052	0.0061	0.0043	0.0017	0.0016	0.001	0.001	0.0052	0.0046	0.005	0.0041	0.0017	0.0015

Table 8F3.1-2 Predicted Maximum Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

		LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
Constituent	Units	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Molybdenum	µg/L	0.025	0.025	0.69	0.47	0.69	0.37	0.12	0.084	0.025	0.025	0.67	0.42	0.65	0.33	0.11	0.084	0.025	0.025	0.54	0.37	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.32	0.72	0.65	0.72	0.58	0.38	0.39	0.3	0.32	0.71	0.61	0.7	0.54	0.39	0.39	0.3	0.32	0.63	0.57	0.62	0.53	0.38	0.38
Selenium	µg/L	0.05	0.05	0.065	0.062	0.065	0.059	0.054	0.054	0.05	0.05	0.064	0.06	0.064	0.058	0.055	0.054	0.05	0.05	0.062	0.059	0.061	0.057	0.054	0.053
Silver	µg/L	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	579	372	576	291	85	54	7.2	5.3	563	329	545	256	82	54	7.2	5.3	453	284	437	242	82	45
Uranium	µg/L	0.022	0.022	0.68	0.54	0.68	0.42	0.22	0.2	0.022	0.022	0.66	0.48	0.64	0.37	0.25	0.19	0.022	0.022	0.53	0.41	0.52	0.35	0.21	0.18
Vanadium	µg/L	0.025	0.025	0.085	0.078	0.085	0.066	0.033	0.032	0.025	0.025	0.083	0.072	0.082	0.061	0.033	0.032	0.025	0.025	0.072	0.065	0.07	0.059	0.033	0.031
Zinc	µg/L	0.5	0.5	0.99	0.89	0.99	0.8	0.62	0.61	0.5	0.5	0.98	0.84	0.96	0.76	0.64	0.6	0.5	0.5	0.88	0.79	0.87	0.75	0.61	0.59
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	9.2	7.0	9.1	6.2	5.8	4.6	4.4	3.3	9.0	6.6	8.9	5.9	6.1	4.5	4.4	3.3	8.1	6.1	8.0	5.7	5.8	4.4
Arsenic	µg/L	0.35	0.3	0.42	0.35	0.42	0.34	0.36	0.31	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31
Barium[(c)]	µg/L	1.3	1.1	4.4	3.5	4.4	2.9	1.7	1.5	1.3	1.1	4.3	3.2	4.2	2.7	1.8	1.5	1.3	1.1	3.7	2.9	3.6	2.6	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0079	0.0071	0.0079	0.0066	0.0054	0.0053	0.005	0.005	0.0078	0.0068	0.0078	0.0064	0.0054	0.0053	0.005	0.005	0.0073	0.0066	0.0072	0.0063	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.012	0.0095	0.012	0.0085	0.0059	0.0056	0.005	0.005	0.011	0.009	0.011	0.0081	0.0059	0.0056	0.005	0.005	0.01	0.0084	0.010	0.0079	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.011	0.0085	0.011	0.0072	0.0036	0.0033	0.0025	0.0025	0.01	0.0078	0.01	0.0066	0.0036	0.0033	0.0025	0.0025	0.0088	0.0071	0.0086	0.0064	0.0036	0.0032
Chromium	µg/L	0.065	0.003	0.08	0.017	0.08	0.014	0.069	0.0067	0.065	0.003	0.08	0.016	0.079	0.013	0.07	0.0066	0.065	0.003	0.077	0.014	0.076	0.012	0.069	0.0063
Cobalt	µg/L	0.011	0.005	0.22	0.17	0.22	0.13	0.069	0.058	0.011	0.005	0.22	0.15	0.21	0.12	0.079	0.055	0.011	0.005	0.17	0.13	0.17	0.11	0.067	0.051
Copper	µg/L	0.68	0.57	0.84	0.69	0.84	0.66	0.7	0.59	0.68	0.57	0.83	0.68	0.83	0.65	0.71	0.59	0.68	0.57	0.8	0.66	0.8	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	20	17	20	14	7.2	8.5	1.9	3.7	19	16	19	13	8.1	8.3	1.9	3.7	16	14	15	13	7.0	7.9
Lead	µg/L	0.005	0.005	0.024	0.02	0.024	0.016	0.0095	0.009	0.005	0.005	0.023	0.018	0.023	0.015	0.01	0.0088	0.005	0.005	0.02	0.016	0.019	0.014	0.0093	0.0085
Manganese	µg/L	1.6	0.8	10.0	7.4	9.9	5.9	3.9	2.9	1.6	0.8	9.7	6.6	9.5	5.3	4.3	2.8	1.6	0.8	8.1	5.8	7.9	5.0	3.8	2.6
Mercury	µg/L	0.00025	0.00025	0.0014	0.0012	0.0014	0.00098	0.00041	0.00037	0.00025	0.00025	0.0014	0.0011	0.0014	0.00089	0.00041	0.00037	0.00025	0.00025	0.0012	0.00096	0.0012	0.00085	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.69	0.47	0.69	0.37	0.12	0.084	0.025	0.025	0.67	0.42	0.65	0.33	0.11	0.084	0.025	0.025	0.54	0.37	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.28	0.69	0.58	0.69	0.51	0.38	0.35	0.3	0.28	0.68	0.55	0.66	0.49	0.39	0.35	0.3	0.28	0.6	0.51	0.59	0.47	0.38	0.34
Selenium	µg/L	0.02	0.02	0.035	0.031	0.035	0.029	0.024	0.024	0.02	0.02	0.034	0.03	0.034	0.028	0.025	0.024	0.02	0.02	0.031	0.029	0.031	0.027	0.024	0.023
Silver	µg/L	0.0025	0.0025	0.0042	0.0038	0.0042	0.0035	0.0029	0.0029	0.0025	0.0025	0.0041	0.0036	0.0041	0.0034	0.003	0.0028	0.0025	0.0025	0.0038	0.0035	0.0038	0.0033	0.0029	0.0028
Strontium	µg/L	7.2	5.3	579	372	576	290	85	54	7.2	5.3	562	329	544	256	82	54	7.2	5.3	453	284	436	241	82	45
Uranium	µg/L	0.02	0.021	0.66	0.52	0.66	0.41	0.21	0.2	0.02	0.021	0.65	0.46	0.63	0.36	0.25	0.19	0.02	0.021	0.52	0.4	0.5	0.34	0.21	0.17
Vanadium[(c)]	µg/L	0.025	0.025	0.042	0.038	0.042	0.035	0.028	0.027	0.025	0.025	0.041	0.037	0.041	0.034	0.028	0.027	0.025	0.025	0.038	0.035	0.038	0.033	0.028	0.027
Zinc[(c)]	µg/L	0.5	0.4	0.94	0.74	0.94	0.67	0.61	0.5	0.5	0.4	0.93	0.7	0.91	0.63	0.63	0.5	0.5	0.4	0.84	0.66	0.83	0.62	0.61	0.49

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.1-3 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, AA to AF
Part A

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.26	17	0.22	17	0.18	17	0.54	17	1.4	16	0.97	16	0.46	16	1.5	16	0.93	16	0.73	16	0.6	16	1.1	17
Dissolved oxygen[(a)]	mg/L	4.4	4.4	4.4	4.9	4.5	4.1	4.3	4.2	8.1	8.1	7.8	8.1	8.2	8.0	7.9	7.4	6.8	6.8	6.7	7.9	7.3	7.0	7.1	6.9
Conventional Constituents																									
Hardness (calculated)	mg/L	5.5	4.1	16	12	17	13	9.2	6.3	4.5	3.8	40	31	42	30	9.8	8.0	4.6	3.9	44	36	45	32	11	8.2
Total dissolved solids	mg/L	14	10	33	25	35	26	20	14	11	9.6	76	61	81	58	21	17	12	9.9	83	69	86	61	22	17
Total suspended solids[(b)]	mg/L	1.8	1.4	1.8	1.4	1.8	1.5	1.8	1.4	1.5	1.3	1.6	1.3	1.5	1.3	1.5	1.3	1.5	1.3	1.7	1.3	1.6	1.4	1.6	1.3
Major Ions																									
Calcium	mg/L	1.0	0.76	4.9	3.7	5.2	3.9	2.4	1.6	0.83	0.7	14	11	15	10	2.8	2.2	0.85	0.72	15	12	15	11	3.0	2.3
Chloride	mg/L	0.31	0.24	12	8.5	12	9.4	4.4	2.8	0.27	0.23	37	28	39	28	5.8	4.7	0.28	0.24	41	33	42	29	6.4	4.9
Fluoride	mg/L	0.012	0.0092	0.013	0.0098	0.013	0.01	0.012	0.0092	0.01	0.0085	0.014	0.012	0.014	0.011	0.01	0.0089	0.01	0.0088	0.015	0.012	0.015	0.011	0.011	0.0092
Magnesium	mg/L	0.71	0.53	0.92	0.72	0.98	0.7	0.78	0.56	0.58	0.49	1.4	1.2	1.4	1.1	0.69	0.58	0.6	0.5	1.5	1.2	1.5	1.1	0.74	0.59
Potassium	mg/L	0.67	0.5	0.71	0.54	0.73	0.56	0.66	0.49	0.59	0.51	0.82	0.69	0.79	0.62	0.56	0.49	0.62	0.52	0.85	0.67	0.85	0.66	0.6	0.51
Sodium	mg/L	0.69	0.52	3.2	2.4	3.4	2.6	1.6	1.1	0.56	0.47	8.9	6.9	9.5	6.7	1.8	1.5	0.58	0.49	9.7	8.1	10	7.1	2.0	1.5
Sulphate	mg/L	1.6	1.2	1.8	1.3	1.8	1.3	1.5	1.1	1.7	1.5	2.2	1.8	2.1	1.7	1.3	1.1	1.9	1.6	2.4	1.9	2.3	1.8	1.4	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.22	0.2	0.4	0.33	0.42	0.32	0.25	0.22	0.23	0.22	0.88	0.72	0.86	0.6	0.3	0.28	0.24	0.23	0.9	0.76	0.9	0.62	0.34	0.31
Total ammonia	mg-N/L	0.039	0.025	0.078	0.048	0.083	0.044	0.05	0.033	0.033	0.027	0.15	0.088	0.15	0.065	0.055	0.047	0.034	0.027	0.15	0.091	0.16	0.067	0.059	0.052
Nitrate	mg-N/L	0.016	0.01	0.16	0.12	0.17	0.11	0.036	0.025	0.039	0.032	0.57	0.47	0.55	0.37	0.083	0.073	0.048	0.037	0.58	0.51	0.58	0.39	0.12	0.096
Total phosphorus (calculated)	mg-P/L	0.0077	0.0068	0.0084	0.0069	0.0088	0.007	0.0078	0.0072	0.0073	0.0069	0.012	0.0083	0.011	0.0072	0.0076	0.0073	0.0073	0.0069	0.012	0.0079	0.011	0.0072	0.0077	0.0075
Dissolved orthophosphate	mg-P/L	0.0017	0.00085	0.0025	0.00091	0.0028	0.0011	0.0019	0.0012	0.0013	0.00097	0.0057	0.0024	0.0055	0.0013	0.0016	0.0014	0.0013	0.00099	0.0057	0.002	0.0053	0.0012	0.0018	0.0015
Phytoplankton (as chlorophyll *a*)	µg/L	2.8	3.9	5.2	7.5	4.5	6.4	3.1	4.3	1.9	2.3	11	14	8.1	10	2.7	3.5	1.9	2.4	11	15	9.9	11	2.7	3.7
Silica, reactive	mg/L	0.17	0.13	0.19	0.15	0.2	0.15	0.18	0.13	0.14	0.12	0.24	0.21	0.24	0.18	0.15	0.13	0.14	0.12	0.25	0.2	0.25	0.19	0.16	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	22	23	23	22	9.9	12	4.4	8.8	57	52	54	44	12	15	4.4	8.8	58	57	57	47	13	16
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.41	0.34	0.41	0.34	0.36	0.31	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	2.3	1.9	2.3	1.8	1.6	1.4	1.3	1.2	4.2	3.3	4.0	2.9	1.7	1.5	1.3	1.2	4.3	3.5	4.2	3.0	1.8	1.6
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.007	0.0062	0.0072	0.0062	0.0056	0.0053	0.005	0.005	0.011	0.0089	0.011	0.0082	0.0059	0.0056	0.005	0.005	0.011	0.0094	0.011	0.0084	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.027	0.026	0.027	0.026	0.026	0.025	0.025	0.025	0.032	0.03	0.031	0.029	0.026	0.026	0.025	0.025	0.032	0.03	0.032	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.2	0.12	0.2	0.12	0.18	0.11	0.17	0.1	0.25	0.17	0.25	0.16	0.18	0.11	0.17	0.1	0.25	0.18	0.25	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.11	0.091	0.11	0.089	0.069	0.062	0.05	0.05	0.23	0.18	0.22	0.16	0.083	0.081	0.05	0.05	0.24	0.19	0.23	0.16	0.095	0.089
Copper	µg/L	0.68	0.6	0.73	0.63	0.73	0.63	0.7	0.61	0.68	0.6	0.83	0.71	0.82	0.69	0.7	0.62	0.68	0.6	0.83	0.72	0.83	0.69	0.7	0.62
Iron	µg/L	5.0	16	15	23	16	23	8.1	18	5.0	16	35	39	33	34	9.3	19	5.0	16	35	41	35	36	9.7	20
Lead	µg/L	0.025	0.058	0.034	0.064	0.034	0.064	0.028	0.06	0.025	0.058	0.051	0.077	0.05	0.073	0.029	0.061	0.025	0.058	0.052	0.079	0.051	0.074	0.029	0.061
Manganese	µg/L	1.7	4.7	4.1	6.3	4.2	6.2	2.4	5.2	1.7	4.7	8.8	9.7	8.4	8.7	3.0	5.9	1.7	4.7	8.9	10	8.8	9.0	3.5	6.3

Table 8F3.1-3 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, AA to AF Part A

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.001	0.001	0.0025	0.0021	0.0026	0.0021	0.0015	0.0013	0.001	0.001	0.0055	0.0046	0.0052	0.0039	0.0016	0.0015	0.001	0.001	0.0055	0.005	0.0054	0.0042	0.0017	0.0016
Molybdenum	µg/L	0.025	0.025	0.21	0.13	0.22	0.13	0.083	0.052	0.025	0.025	0.58	0.36	0.54	0.3	0.1	0.072	0.025	0.025	0.59	0.4	0.57	0.32	0.11	0.076
Nickel	µg/L	0.3	0.32	0.42	0.4	0.42	0.39	0.34	0.34	0.3	0.32	0.65	0.57	0.63	0.52	0.35	0.36	0.3	0.32	0.65	0.59	0.65	0.54	0.36	0.37
Selenium	µg/L	0.05	0.05	0.054	0.053	0.054	0.053	0.051	0.051	0.05	0.05	0.062	0.059	0.062	0.057	0.052	0.052	0.05	0.05	0.063	0.06	0.062	0.058	0.053	0.053
Silver	µg/L	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05	0.05	0.05	0.052	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	166	93	176	87	57	28	7.2	5.3	481	282	453	231	75	43	7.2	5.3	489	312	479	247	82	45
Uranium	µg/L	0.022	0.022	0.2	0.14	0.22	0.14	0.079	0.061	0.022	0.022	0.57	0.41	0.53	0.34	0.13	0.13	0.022	0.022	0.58	0.45	0.56	0.36	0.17	0.15
Vanadium	µg/L	0.025	0.025	0.042	0.038	0.043	0.037	0.03	0.028	0.025	0.025	0.075	0.065	0.072	0.057	0.032	0.031	0.025	0.025	0.076	0.069	0.075	0.06	0.033	0.031
Zinc	µg/L	0.5	0.5	0.64	0.59	0.64	0.59	0.54	0.52	0.5	0.5	0.91	0.79	0.88	0.74	0.57	0.56	0.5	0.5	0.91	0.82	0.9	0.75	0.59	0.58
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	5.7	4.2	5.8	4.1	4.8	3.6	4.4	3.3	8.4	6.1	8.1	5.6	5.2	4.1	4.4	3.3	8.4	6.4	8.3	5.8	5.5	4.3
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.41	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.41	0.34	0.4	0.33	0.36	0.31
Barium(c)	µg/L	1.3	1.1	2.2	1.7	2.2	1.6	1.6	1.2	1.3	1.1	3.9	2.9	3.7	2.6	1.7	1.4	1.3	1.1	3.9	3.1	3.8	2.7	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0058	0.0055	0.0059	0.0055	0.0053	0.0051	0.005	0.005	0.0074	0.0065	0.0073	0.0063	0.0053	0.0052	0.005	0.005	0.0075	0.0067	0.0074	0.0064	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.0068	0.0061	0.0069	0.006	0.0056	0.0053	0.005	0.005	0.01	0.0084	0.01	0.0078	0.0058	0.0055	0.005	0.005	0.011	0.0088	0.01	0.008	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.0047	0.0039	0.0049	0.0038	0.0032	0.0029	0.0025	0.0025	0.0092	0.007	0.0088	0.0062	0.0035	0.0032	0.0025	0.0025	0.0093	0.0075	0.0092	0.0064	0.0036	0.0033
Chromium	µg/L	0.065	0.003	0.069	0.0064	0.069	0.0062	0.066	0.0039	0.065	0.003	0.078	0.014	0.077	0.012	0.067	0.0052	0.065	0.003	0.078	0.015	0.077	0.012	0.068	0.0058
Cobalt	µg/L	0.011	0.005	0.069	0.044	0.073	0.042	0.029	0.017	0.011	0.005	0.19	0.13	0.18	0.11	0.044	0.036	0.011	0.005	0.19	0.14	0.18	0.11	0.056	0.044
Copper	µg/L	0.68	0.57	0.72	0.6	0.73	0.6	0.69	0.58	0.68	0.57	0.81	0.66	0.8	0.64	0.7	0.58	0.68	0.57	0.81	0.67	0.81	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	6.8	7.0	7.1	6.8	3.4	4.8	1.9	3.7	17	14	16	12	4.9	6.5	1.9	3.7	17	15	16	13	6.0	7.2
Lead	µg/L	0.005	0.005	0.01	0.0085	0.011	0.0083	0.0066	0.0059	0.005	0.005	0.021	0.016	0.02	0.014	0.0075	0.0074	0.005	0.005	0.021	0.017	0.021	0.015	0.0084	0.008
Manganese	µg/L	1.6	0.8	3.9	2.4	4.1	2.3	2.3	1.3	1.6	0.8	8.5	5.7	8.1	4.8	2.9	2.0	1.6	0.8	8.6	6.3	8.5	5.1	3.4	2.4
Mercury	µg/L	0.00025	0.00025	0.00058	0.00047	0.0006	0.00046	0.00035	0.00031	0.00025	0.00025	0.0012	0.00096	0.0012	0.00082	0.00039	0.00035	0.00025	0.00025	0.0013	0.001	0.0012	0.00087	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.21	0.13	0.22	0.12	0.083	0.052	0.025	0.025	0.58	0.36	0.54	0.3	0.1	0.072	0.025	0.025	0.58	0.4	0.57	0.32	0.11	0.076
Nickel	µg/L	0.3	0.28	0.41	0.35	0.41	0.35	0.33	0.3	0.3	0.28	0.62	0.51	0.6	0.46	0.35	0.32	0.3	0.28	0.63	0.53	0.62	0.48	0.36	0.33
Selenium	µg/L	0.02	0.02	0.024	0.023	0.024	0.023	0.021	0.021	0.02	0.02	0.032	0.029	0.031	0.027	0.022	0.022	0.02	0.02	0.032	0.029	0.032	0.027	0.023	0.023
Silver	µg/L	0.0025	0.0025	0.003	0.0028	0.003	0.0028	0.0026	0.0026	0.0025	0.0025	0.0039	0.0035	0.0038	0.0033	0.0027	0.0027	0.0025	0.0025	0.0039	0.0036	0.0039	0.0034	0.0028	0.0028
Strontium	µg/L	7.2	5.3	166	93	176	87	57	28	7.2	5.3	481	282	453	230	75	43	7.2	5.3	488	311	479	247	82	45
Uranium	µg/L	0.02	0.021	0.2	0.14	0.21	0.13	0.076	0.06	0.02	0.021	0.55	0.4	0.52	0.33	0.13	0.12	0.02	0.021	0.56	0.44	0.55	0.35	0.17	0.15
Vanadium(c)	µg/L	0.025	0.025	0.03	0.028	0.03	0.028	0.026	0.026	0.025	0.025	0.039	0.035	0.038	0.033	0.027	0.027	0.025	0.025	0.039	0.036	0.039	0.034	0.027	0.027
Zinc(c)	µg/L	0.5	0.4	0.62	0.48	0.63	0.48	0.54	0.42	0.5	0.4	0.86	0.66	0.84	0.61	0.56	0.46	0.5	0.4	0.87	0.69	0.86	0.63	0.59	0.48

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

DOMINION DIAMOND

Table 8F3.1-3 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, AA to AF Part B

		AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
Constituent	Units	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	1.1	16	0.83	16	0.36	16	1.3	16	0.43	17	0.7	16	0.46	17	0.98	17	0.64	18	0.48	17	0.22	17	0.96	18
Dissolved oxygen[a]	mg/L	6.8	6.9	6.8	7.2	7.1	6.7	6.9	6.8	6.6	5.8	7.2	6.6	7.6	6.9	6.0	5.5	3.4	3.4	3.5	4.0	3.5	2.9	3.2	3.6
Conventional Constituents																									
Hardness (calculated)	mg/L	4.2	3.8	31	27	34	27	9.8	8.2	5.0	3.8	34	29	37	28	10	7.9	6.0	4.2	18	11	21	12	9.4	5.9
Total dissolved solids	mg/L	11	10	60	52	65	52	21	17	13	9.7	65	55	72	55	22	17	15	10	37	23	43	24	21	13
Total suspended solids[b]	mg/L	1.4	1.3	1.5	1.3	1.5	1.3	1.4	1.3	1.7	1.3	1.7	1.3	1.6	1.3	1.6	1.3	2.0	1.4	2.0	1.4	2.0	1.4	2.0	1.4
Major Ions																									
Calcium	mg/L	0.79	0.71	10	9.0	11	8.9	2.8	2.3	0.94	0.7	12	9.7	13	9.6	2.9	2.2	1.1	0.77	5.8	3.2	6.6	3.6	2.4	1.4
Chloride	mg/L	0.28	0.26	27	24	30	24	6.0	4.8	0.31	0.24	31	26	34	26	6.0	4.5	0.35	0.24	14	7.1	16	8.5	4.1	2.4
Fluoride	mg/L	0.0097	0.0088	0.012	0.011	0.014	0.011	0.01	0.0092	0.011	0.0086	0.014	0.011	0.014	0.011	0.011	0.0089	0.014	0.0093	0.014	0.01	0.015	0.0098	0.014	0.0095
Magnesium	mg/L	0.55	0.5	1.2	1.0	1.3	1.0	0.68	0.6	0.65	0.49	1.3	1.1	1.4	1.1	0.76	0.58	0.78	0.54	0.98	0.7	1.1	0.67	0.83	0.57
Potassium	mg/L	0.62	0.6	0.76	0.71	0.83	0.65	0.55	0.5	0.67	0.52	0.81	0.65	0.82	0.63	0.62	0.48	0.75	0.51	0.78	0.55	0.81	0.53	0.74	0.5
Sodium	mg/L	0.53	0.48	6.7	5.9	7.4	5.8	1.8	1.5	0.63	0.48	7.5	6.3	8.2	6.2	1.9	1.4	0.76	0.52	3.8	2.1	4.3	2.3	1.6	0.95
Sulphate	mg/L	2.1	2.3	2.4	2.5	2.5	1.9	1.3	1.2	2.0	1.6	2.2	1.8	2.2	1.7	1.5	1.1	1.9	1.3	2.0	1.4	2.1	1.3	1.7	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.26	0.28	0.69	0.63	0.74	0.56	0.31	0.38	0.25	0.23	0.76	0.65	0.78	0.57	0.31	0.29	0.23	0.2	0.44	0.3	0.48	0.31	0.26	0.22
Total ammonia	mg-N/L	0.032	0.027	0.11	0.078	0.12	0.062	0.056	0.076	0.036	0.027	0.13	0.083	0.13	0.061	0.06	0.047	0.042	0.024	0.082	0.045	0.093	0.04	0.056	0.032
Nitrate	mg-N/L	0.071	0.091	0.42	0.39	0.46	0.34	0.096	0.14	0.047	0.037	0.47	0.4	0.48	0.34	0.089	0.084	0.022	0.011	0.2	0.095	0.23	0.11	0.043	0.025
Total phosphorus (calculated)	mg-P/L	0.0072	0.007	0.0096	0.0074	0.01	0.0074	0.0076	0.0073	0.0074	0.0068	0.011	0.0074	0.011	0.0071	0.0077	0.0072	0.0078	0.0067	0.0087	0.0069	0.0092	0.0068	0.008	0.0071
Dissolved orthophosphate	mg-P/L	0.0013	0.0011	0.0036	0.0015	0.0043	0.0014	0.0017	0.0014	0.0015	0.00088	0.0047	0.0015	0.0049	0.0012	0.0018	0.0013	0.0019	0.00077	0.0028	0.0009	0.0032	0.00085	0.0021	0.0012
Phytoplankton (as chlorophyll a)	µg/L	1.8	2.3	10	13	7.3	10	2.7	3.6	2.0	2.7	10	14	9.2	10	2.8	3.8	3.0	4.5	5.6	7.1	5.3	6.4	3.3	4.9
Silica, reactive	mg/L	0.13	0.12	0.21	0.18	0.22	0.18	0.15	0.13	0.16	0.12	0.23	0.19	0.24	0.18	0.17	0.13	0.19	0.13	0.21	0.15	0.22	0.14	0.19	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	45	44	49	43	12	18	4.4	8.8	50	47	50	43	12	15	4.4	8.8	25	20	28	21	9.5	12
Arsenic	µg/L	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.38	0.31	0.36	0.3
Barium	µg/L	1.3	1.2	3.6	2.9	3.8	2.8	1.7	1.7	1.3	1.2	3.9	3.1	3.8	2.8	1.7	1.5	1.3	1.2	2.4	1.7	2.6	1.8	1.6	1.3
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.0097	0.0082	0.01	0.0081	0.0059	0.0057	0.005	0.005	0.01	0.0085	0.01	0.0081	0.0059	0.0056	0.005	0.005	0.0074	0.006	0.0077	0.0061	0.0056	0.0053
Cadmium	µg/L	0.025	0.025	0.03	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.031	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.028	0.026	0.028	0.026	0.026	0.025
Chromium	µg/L	0.17	0.1	0.23	0.16	0.24	0.15	0.18	0.11	0.17	0.1	0.24	0.16	0.24	0.15	0.18	0.11	0.17	0.1	0.2	0.12	0.21	0.12	0.18	0.1
Cobalt	µg/L	0.05	0.05	0.19	0.16	0.2	0.15	0.087	0.11	0.05	0.05	0.21	0.17	0.21	0.15	0.085	0.083	0.05	0.05	0.12	0.082	0.13	0.086	0.068	0.061
Copper	µg/L	0.68	0.6	0.79	0.69	0.8	0.68	0.7	0.63	0.68	0.6	0.81	0.69	0.81	0.68	0.7	0.62	0.68	0.6	0.74	0.63	0.75	0.63	0.69	0.61
Iron	µg/L	5.0	16	28	35	30	34	9.4	22	5.0	16	31	36	31	34	9.4	20	5.0	16	17	22	18	22	7.9	18
Lead	µg/L	0.025	0.058	0.045	0.073	0.047	0.073	0.029	0.063	0.025	0.058	0.048	0.075	0.048	0.073	0.029	0.061	0.025	0.058	0.035	0.063	0.037	0.063	0.028	0.059
Manganese	µg/L	1.7	4.7	7.2	8.8	7.7	8.6	3.2	7.1	1.7	4.7	7.9	9.1	7.8	8.6	3.1	6.0	1.7	4.7	4.5	5.9	4.9	6.1	2.4	5.1

Table 8F3.1-3 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, AA to AF
Part B

Constituent	Units	AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (Continued)																									
Mercury	µg/L	0.001	0.001	0.0044	0.004	0.0047	0.0038	0.0017	0.0017	0.001	0.001	0.0049	0.0042	0.0049	0.0038	0.0017	0.0015	0.001	0.001	0.0028	0.0019	0.003	0.002	0.0014	0.0012
Molybdenum	µg/L	0.025	0.025	0.45	0.3	0.49	0.29	0.11	0.082	0.025	0.025	0.51	0.33	0.5	0.29	0.11	0.072	0.025	0.025	0.24	0.11	0.27	0.12	0.078	0.048
Nickel	µg/L	0.3	0.32	0.57	0.52	0.59	0.51	0.35	0.4	0.3	0.32	0.6	0.54	0.6	0.51	0.35	0.37	0.3	0.32	0.44	0.38	0.46	0.39	0.33	0.34
Selenium	µg/L	0.05	0.05	0.06	0.057	0.06	0.057	0.053	0.054	0.05	0.05	0.061	0.058	0.061	0.057	0.053	0.052	0.05	0.05	0.055	0.052	0.056	0.052	0.051	0.051
Silver	µg/L	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05
Strontium	µg/L	7.2	5.3	373	232	405	221	77	45	7.2	5.3	421	251	416	222	78	42	7.2	5.3	193	74	220	83	53	24
Uranium	µg/L	0.022	0.022	0.44	0.34	0.48	0.32	0.15	0.22	0.022	0.022	0.5	0.37	0.49	0.33	0.14	0.13	0.022	0.022	0.24	0.12	0.27	0.13	0.079	0.058
Vanadium	µg/L	0.025	0.025	0.063	0.058	0.067	0.056	0.032	0.032	0.025	0.025	0.069	0.06	0.068	0.056	0.032	0.031	0.025	0.025	0.045	0.035	0.047	0.036	0.03	0.028
Zinc	µg/L	0.5	0.5	0.81	0.74	0.84	0.73	0.57	0.62	0.5	0.5	0.86	0.76	0.85	0.73	0.57	0.57	0.5	0.5	0.66	0.57	0.68	0.58	0.54	0.52
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	7.4	5.6	7.7	5.5	5.3	4.8	4.4	3.3	7.9	5.8	7.8	5.5	5.3	4.1	4.4	3.3	6.0	4.0	6.2	4.1	4.8	3.6
Arsenic	µg/L	0.35	0.3	0.39	0.33	0.4	0.33	0.36	0.31	0.35	0.3	0.4	0.33	0.4	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3
Barium[c]	µg/L	1.3	1.1	3.3	2.6	3.5	2.5	1.7	1.6	1.3	1.1	3.5	2.7	3.5	2.5	1.7	1.4	1.3	1.1	2.3	1.5	2.4	1.6	1.5	1.2
Beryllium	µg/L	0.005	0.005	0.0069	0.0063	0.007	0.0062	0.0054	0.0053	0.005	0.005	0.0071	0.0064	0.0071	0.0062	0.0054	0.0052	0.005	0.005	0.006	0.0054	0.0061	0.0054	0.0052	0.0051
Bismuth	µg/L	0.005	0.005	0.0092	0.0078	0.0096	0.0077	0.0058	0.0056	0.005	0.005	0.0098	0.008	0.0097	0.0077	0.0058	0.0055	0.005	0.005	0.0072	0.0058	0.0075	0.006	0.0055	0.0052
Cadmium	µg/L	0.0025	0.0025	0.0077	0.0062	0.0081	0.006	0.0035	0.0035	0.0025	0.0025	0.0083	0.0065	0.0083	0.006	0.0035	0.0032	0.0025	0.0025	0.0051	0.0036	0.0055	0.0038	0.0031	0.0028
Chromium	µg/L	0.065	0.003	0.075	0.012	0.076	0.011	0.067	0.0072	0.065	0.003	0.076	0.013	0.076	0.011	0.067	0.0054	0.065	0.003	0.07	0.0056	0.071	0.006	0.066	0.0038
Cobalt	µg/L	0.011	0.005	0.15	0.11	0.16	0.1	0.048	0.064	0.011	0.005	0.16	0.12	0.16	0.1	0.046	0.038	0.011	0.005	0.079	0.036	0.089	0.04	0.028	0.016
Copper	µg/L	0.68	0.57	0.78	0.65	0.79	0.64	0.7	0.59	0.68	0.57	0.79	0.65	0.79	0.64	0.7	0.58	0.68	0.57	0.73	0.59	0.74	0.6	0.69	0.58
Iron	µg/L	1.9	3.7	13	12	14	12	5.3	9.1	1.9	3.7	15	13	15	12	5.1	6.7	1.9	3.7	7.7	6.3	8.5	6.6	3.5	4.7
Lead	µg/L	0.005	0.005	0.017	0.014	0.018	0.014	0.0079	0.0095	0.005	0.005	0.019	0.015	0.018	0.014	0.0077	0.0075	0.005	0.005	0.011	0.0077	0.012	0.0081	0.0065	0.0058
Manganese	µg/L	1.6	0.8	6.9	4.8	7.4	4.7	3.1	3.2	1.6	0.8	7.7	5.2	7.6	4.7	3.0	2.1	1.6	0.8	4.3	2.0	4.7	2.2	2.3	1.2
Mercury	µg/L	0.00025	0.00025	0.001	0.00083	0.0011	0.0008	0.0004	0.00039	0.00025	0.00025	0.0011	0.00088	0.0011	0.0008	0.0004	0.00035	0.00025	0.00025	0.00064	0.00042	0.0007	0.00045	0.00035	0.0003
Molybdenum	µg/L	0.025	0.025	0.45	0.3	0.49	0.29	0.11	0.082	0.025	0.025	0.51	0.33	0.5	0.29	0.11	0.072	0.025	0.025	0.24	0.11	0.27	0.12	0.078	0.048
Nickel	µg/L	0.3	0.28	0.55	0.47	0.57	0.46	0.35	0.36	0.3	0.28	0.58	0.48	0.58	0.46	0.35	0.33	0.3	0.28	0.43	0.34	0.44	0.34	0.33	0.3
Selenium	µg/L	0.02	0.02	0.029	0.027	0.03	0.027	0.023	0.024	0.02	0.02	0.031	0.028	0.031	0.027	0.023	0.022	0.02	0.02	0.025	0.022	0.025	0.022	0.021	0.021
Silver	µg/L	0.0025	0.0025	0.0036	0.0033	0.0037	0.0033	0.0028	0.0029	0.0025	0.0025	0.0037	0.0034	0.0037	0.0033	0.0027	0.0027	0.0025	0.0025	0.003	0.0027	0.0031	0.0028	0.0026	0.0026
Strontium	µg/L	7.2	5.3	372	232	405	221	77	45	7.2	5.3	421	251	416	222	78	42	7.2	5.3	193	74	220	83	53	24
Uranium	µg/L	0.02	0.021	0.43	0.33	0.47	0.32	0.14	0.22	0.02	0.021	0.49	0.36	0.48	0.32	0.14	0.13	0.02	0.021	0.23	0.11	0.26	0.13	0.077	0.057
Vanadium[c]	µg/L	0.025	0.025	0.036	0.033	0.037	0.033	0.027	0.028	0.025	0.025	0.037	0.034	0.037	0.033	0.027	0.027	0.025	0.025	0.031	0.027	0.031	0.028	0.026	0.026
Zinc[c]	µg/L	0.5	0.4	0.78	0.61	0.81	0.6	0.57	0.52	0.5	0.4	0.82	0.63	0.81	0.6	0.57	0.47	0.5	0.4	0.64	0.46	0.66	0.47	0.54	0.42

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.1-4 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

Constituent	Units	LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.89	16	1.1	16	0.76	16	1.4	16	1.0	16	1.2	16	0.65	16	1.3	16	1.1	17	1.1	17	0.16	17	1.4	17
Dissolved oxygen[a]	mg/L	6.6	6.7	6.6	7.7	7.2	7.0	7.1	6.7	7.2	7.2	7.2	8.3	7.7	7.5	7.6	7.2	7.9	7.9	8.0	9.1	8.0	8.1	7.3	7.6
Conventional Constituents																									
Hardness (calculated)	mg/L	4.5	3.9	51	42	51	38	10	9.2	4.3	3.9	47	37	49	32	10	8.4	4.8	3.7	37	33	40	32	11	8.1
Total dissolved solids	mg/L	11	10	97	79	97	72	22	20	11	10	90	70	92	62	21	18	12	9.6	72	63	76	60	22	17
Total suspended solids[b]	mg/L	1.5	1.3	1.7	1.3	1.7	1.4	1.5	1.4	1.5	1.3	1.7	1.3	1.6	1.4	1.5	1.3	1.6	1.3	1.6	1.3	1.7	1.3	1.7	1.3
Major Ions																									
Calcium	mg/L	0.83	0.73	18	15	18	13	2.9	2.6	0.81	0.73	16	13	17	11	2.9	2.4	0.89	0.69	13	11	14	11	3.0	2.3
Chloride	mg/L	0.28	0.24	48	40	48	35	6.3	5.6	0.27	0.24	44	34	46	30	6.1	5.0	0.3	0.23	34	30	36	29	6.4	4.8
Fluoride	mg/L	0.01	0.0089	0.015	0.012	0.016	0.013	0.011	0.0097	0.0099	0.0089	0.015	0.012	0.015	0.011	0.011	0.0092	0.011	0.0085	0.014	0.012	0.014	0.011	0.012	0.0088
Magnesium	mg/L	0.58	0.51	1.7	1.3	1.7	1.3	0.72	0.65	0.57	0.51	1.6	1.2	1.6	1.1	0.71	0.6	0.63	0.49	1.4	1.2	1.4	1.1	0.77	0.58
Potassium	mg/L	0.6	0.53	0.9	0.68	0.89	0.74	0.58	0.52	0.59	0.53	0.86	0.66	0.86	0.65	0.57	0.5	0.65	0.51	0.8	0.66	0.81	0.64	0.66	0.49
Sodium	mg/L	0.56	0.5	12	9.5	12	8.4	1.9	1.7	0.55	0.49	11	8.2	11	7.2	1.9	1.6	0.6	0.47	8.2	7.2	8.8	7.0	2.0	1.5
Sulphate	mg/L	1.8	1.6	2.5	1.9	2.4	2.0	1.4	1.2	1.8	1.5	2.4	1.8	2.3	1.8	1.4	1.2	1.9	1.5	2.2	1.8	2.2	1.7	1.6	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.24	0.23	1.0	0.89	1.0	0.72	0.35	0.33	0.24	0.23	0.95	0.79	0.95	0.63	0.36	0.34	0.24	0.22	0.8	0.73	0.81	0.61	0.35	0.32
Total ammonia	mg-N/L	0.033	0.027	0.18	0.13	0.18	0.088	0.06	0.055	0.033	0.027	0.17	0.11	0.17	0.068	0.061	0.058	0.037	0.027	0.13	0.093	0.14	0.063	0.066	0.055
Nitrate	mg-N/L	0.045	0.037	0.66	0.6	0.66	0.47	0.13	0.11	0.043	0.036	0.63	0.52	0.62	0.4	0.13	0.12	0.043	0.033	0.51	0.47	0.51	0.38	0.12	0.11
Total phosphorus (calculated)	mg-P/L	0.0072	0.007	0.012	0.0091	0.012	0.0084	0.0077	0.0075	0.0072	0.007	0.012	0.0083	0.012	0.0075	0.0077	0.0075	0.0073	0.0069	0.011	0.0077	0.011	0.0072	0.0079	0.0075
Dissolved orthophosphate	mg-P/L	0.0013	0.001	0.0065	0.0032	0.0059	0.0025	0.0018	0.0016	0.0013	0.0011	0.0062	0.0023	0.0057	0.0016	0.0018	0.0015	0.0013	0.00095	0.0048	0.0017	0.0051	0.0012	0.002	0.0015
Phytoplankton (as chlorophyll *a*)	µg/L	1.9	2.4	11	15	8.6	11	2.7	3.6	1.8	2.3	11	15	8.9	11	2.7	3.6	1.8	2.3	12	15	11	11	2.7	3.5
Silica, reactive	mg/L	0.14	0.12	0.27	0.21	0.27	0.22	0.16	0.14	0.14	0.12	0.25	0.2	0.26	0.19	0.15	0.13	0.15	0.12	0.23	0.2	0.24	0.19	0.17	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	63	62	62	53	13	16	4.4	8.8	61	56	60	47	12	16	4.4	8.8	53	53	52	46	13	15
Arsenic	µg/L	0.35	0.3	0.42	0.35	0.42	0.34	0.36	0.31	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31	0.35	0.3	0.41	0.34	0.4	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	4.5	3.8	4.5	3.3	1.8	1.6	1.3	1.2	4.4	3.5	4.4	3.0	1.7	1.6	1.3	1.2	4.0	3.3	3.9	3.0	1.8	1.5
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.012	0.0098	0.012	0.009	0.0059	0.0056	0.005	0.005	0.012	0.0093	0.011	0.0085	0.0059	0.0056	0.005	0.005	0.011	0.009	0.011	0.0083	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.033	0.031	0.033	0.03	0.026	0.026	0.025	0.025	0.032	0.03	0.032	0.029	0.026	0.026	0.025	0.025	0.031	0.03	0.031	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.26	0.19	0.26	0.17	0.18	0.11	0.17	0.1	0.26	0.18	0.26	0.16	0.18	0.11	0.17	0.1	0.25	0.17	0.24	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.25	0.21	0.25	0.18	0.1	0.094	0.05	0.05	0.25	0.19	0.24	0.16	0.1	0.096	0.05	0.05	0.22	0.18	0.21	0.16	0.096	0.091
Copper	µg/L	0.68	0.6	0.84	0.73	0.84	0.71	0.7	0.62	0.68	0.6	0.84	0.72	0.83	0.69	0.7	0.62	0.68	0.6	0.82	0.71	0.81	0.69	0.7	0.62
Iron	µg/L	5.0	16	38	44	38	39	10	20	5.0	16	37	41	36	36	10	21	5.0	16	32	39	32	35	9.9	20
Lead	µg/L	0.025	0.058	0.054	0.081	0.054	0.077	0.03	0.062	0.025	0.058	0.053	0.079	0.052	0.075	0.03	0.062	0.025	0.058	0.049	0.077	0.049	0.074	0.029	0.062
Manganese	µg/L	1.7	4.7	9.6	11	9.5	9.7	3.7	6.4	1.7	4.7	9.3	10	9.1	9.1	3.8	6.5	1.7	4.7	8.3	9.7	8.1	8.9	3.6	6.4
Mercury	µg/L	0.001	0.001	0.006	0.0054	0.0059	0.0047	0.0017	0.0016	0.001	0.001	0.0058	0.0049	0.0057	0.0042	0.0017	0.0016	0.001	0.001	0.0051	0.0046	0.005	0.0041	0.0017	0.0015

Table 8F3.1-4 Predicted Maximum of Depth-Averaged Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

Constituent	Units	LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (Continued)																									
Molybdenum	µg/L	0.025	0.025	0.64	0.44	0.63	0.37	0.11	0.081	0.025	0.025	0.62	0.39	0.6	0.32	0.11	0.076	0.025	0.025	0.53	0.37	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.32	0.69	0.62	0.68	0.57	0.37	0.38	0.3	0.32	0.67	0.59	0.66	0.54	0.37	0.38	0.3	0.32	0.62	0.57	0.62	0.53	0.36	0.38
Selenium	µg/L	0.05	0.05	0.064	0.061	0.064	0.059	0.054	0.053	0.05	0.05	0.063	0.06	0.063	0.058	0.054	0.053	0.05	0.05	0.061	0.059	0.061	0.057	0.053	0.053
Silver	µg/L	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05	0.05	0.05	0.052	0.051	0.052	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	534	345	529	286	80	51	7.2	5.3	516	308	503	248	79	46	7.2	5.3	445	284	436	241	82	45
Uranium	µg/L	0.022	0.022	0.63	0.5	0.62	0.41	0.19	0.17	0.022	0.022	0.61	0.45	0.59	0.36	0.19	0.18	0.022	0.022	0.52	0.41	0.51	0.35	0.18	0.16
Vanadium	µg/L	0.025	0.025	0.08	0.074	0.08	0.065	0.033	0.032	0.025	0.025	0.079	0.069	0.077	0.06	0.033	0.031	0.025	0.025	0.071	0.065	0.07	0.059	0.033	0.031
Zinc	µg/L	0.5	0.5	0.95	0.86	0.95	0.8	0.6	0.59	0.5	0.5	0.94	0.82	0.93	0.76	0.6	0.59	0.5	0.5	0.88	0.79	0.87	0.75	0.59	0.58
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	8.8	6.8	8.8	6.2	5.6	4.4	4.4	3.3	8.6	6.4	8.5	5.8	5.7	4.4	4.4	3.3	8.1	6.1	8.0	5.7	5.5	4.3
Arsenic	µg/L	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31	0.35	0.3	0.41	0.34	0.41	0.33	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31
Barium[c]	µg/L	1.3	1.1	4.2	3.3	4.1	2.9	1.7	1.4	1.3	1.1	4.0	3.1	4.0	2.7	1.7	1.4	1.3	1.1	3.7	2.9	3.6	2.6	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0077	0.0069	0.0077	0.0066	0.0054	0.0053	0.005	0.005	0.0076	0.0067	0.0075	0.0064	0.0054	0.0052	0.005	0.005	0.0072	0.0066	0.0072	0.0063	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.011	0.0092	0.011	0.0085	0.0058	0.0056	0.005	0.005	0.011	0.0087	0.011	0.008	0.0058	0.0055	0.005	0.005	0.01	0.0084	0.010	0.0079	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.010	0.008	0.0099	0.0071	0.0035	0.0033	0.0025	0.0025	0.0097	0.0074	0.0095	0.0065	0.0035	0.0032	0.0025	0.0025	0.0087	0.0071	0.0086	0.0063	0.0036	0.0032
Chromium	µg/L	0.065	0.003	0.079	0.016	0.079	0.014	0.068	0.0061	0.065	0.003	0.078	0.015	0.078	0.012	0.068	0.0063	0.065	0.003	0.077	0.014	0.076	0.012	0.068	0.0059
Cobalt	µg/L	0.011	0.005	0.2	0.16	0.2	0.13	0.061	0.049	0.011	0.005	0.2	0.14	0.19	0.11	0.062	0.051	0.011	0.005	0.17	0.13	0.17	0.11	0.057	0.046
Copper	µg/L	0.68	0.57	0.82	0.68	0.82	0.66	0.7	0.59	0.68	0.57	0.82	0.67	0.82	0.65	0.7	0.59	0.68	0.57	0.8	0.66	0.8	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	18	16	18	14	6.4	7.7	1.9	3.7	18	15	17	13	6.6	7.9	1.9	3.7	15	14	15	13	6.1	7.5
Lead	µg/L	0.005	0.005	0.022	0.019	0.022	0.016	0.0088	0.0083	0.005	0.005	0.022	0.017	0.021	0.015	0.0089	0.0085	0.005	0.005	0.019	0.016	0.019	0.014	0.0085	0.0082
Manganese	µg/L	1.6	0.8	9.3	6.9	9.2	5.8	3.6	2.6	1.6	0.8	9.0	6.2	8.9	5.1	3.7	2.6	1.6	0.8	8.0	5.8	7.9	5.0	3.5	2.5
Mercury	µg/L	0.00025	0.00025	0.0014	0.0011	0.0013	0.00096	0.0004	0.00037	0.00025	0.00025	0.0013	0.001	0.0013	0.00087	0.0004	0.00036	0.00025	0.00025	0.0012	0.00096	0.0011	0.00085	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.64	0.44	0.63	0.37	0.11	0.081	0.025	0.025	0.62	0.39	0.6	0.32	0.11	0.076	0.025	0.025	0.53	0.36	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.28	0.66	0.56	0.65	0.51	0.37	0.34	0.3	0.28	0.64	0.53	0.64	0.48	0.37	0.34	0.3	0.28	0.6	0.51	0.59	0.47	0.36	0.34
Selenium	µg/L	0.02	0.02	0.034	0.03	0.033	0.029	0.024	0.023	0.02	0.02	0.033	0.029	0.033	0.028	0.024	0.023	0.02	0.02	0.031	0.029	0.031	0.027	0.023	0.023
Silver	µg/L	0.0025	0.0025	0.004	0.0037	0.004	0.0035	0.0028	0.0028	0.0025	0.0025	0.004	0.0036	0.004	0.0034	0.0029	0.0028	0.0025	0.0025	0.0038	0.0035	0.0038	0.0033	0.0028	0.0028
Strontium	µg/L	7.2	5.3	534	344	529	286	80	51	7.2	5.3	515	308	503	248	79	46	7.2	5.3	445	284	436	241	82	45
Uranium	µg/L	0.02	0.021	0.61	0.49	0.61	0.41	0.19	0.17	0.02	0.021	0.59	0.44	0.58	0.35	0.19	0.17	0.02	0.021	0.51	0.4	0.5	0.34	0.17	0.16
Vanadium[c]	µg/L	0.025	0.025	0.041	0.037	0.04	0.035	0.027	0.027	0.025	0.025	0.04	0.036	0.04	0.034	0.027	0.027	0.025	0.025	0.038	0.035	0.038	0.033	0.027	0.027
Zinc[c]	µg/L	0.5	0.4	0.91	0.72	0.9	0.66	0.6	0.49	0.5	0.4	0.89	0.68	0.88	0.63	0.6	0.49	0.5	0.4	0.84	0.66	0.83	0.62	0.59	0.48

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.1-5 Predicted Maximum of Surface Concentrations in Lac du Sauvage, AA to AF
Part A

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.15	17	0.14	17	0.13	17	0.39	18	0.77	17	0.96	17	0.07	16	1.2	17	0.42	17	0.66	17	0.055	16	0.9	17
Dissolved oxygen[(a)]	mg/L	4.3	4.4	4.2	5.5	4.1	4.0	4.0	4.4	7.4	7.7	7.3	8.2	7.4	7.6	7.3	7.5	6.6	6.7	6.6	8.4	6.9	6.8	6.6	6.7
Conventional Constituents																									
Hardness (calculated)	mg/L	6.8	4.0	18	12	18	13	11	6.3	5.4	3.7	36	32	38	30	11	8.0	5.3	3.8	40	35	41	33	11	8.2
Total dissolved solids	mg/L	17	10	36	25	36	26	23	14	14	9.6	70	62	73	58	22	17	13	9.6	77	66	78	63	23	17
Total suspended solids[(b)]	mg/L	2.3	1.4	2.3	1.4	2.2	1.4	2.5	1.4	1.8	1.3	1.8	1.3	1.7	1.3	2.1	1.2	1.8	1.3	1.8	1.3	1.7	1.3	2.0	1.3
Major Ions																									
Calcium	mg/L	1.3	0.75	5.3	3.7	5.4	3.9	2.8	1.6	1.0	0.7	12	11	13	10	3.0	2.3	0.98	0.7	14	12	14	11	3.1	2.3
Chloride	mg/L	0.39	0.23	12	8.7	13	9.3	5.0	2.8	0.34	0.23	33	29	35	28	6.2	4.7	0.33	0.23	36	33	37	30	6.6	4.8
Fluoride	mg/L	0.015	0.0091	0.016	0.0098	0.015	0.0096	0.017	0.0092	0.012	0.0085	0.015	0.012	0.014	0.011	0.014	0.0088	0.012	0.0085	0.015	0.011	0.015	0.012	0.014	0.0088
Magnesium	mg/L	0.88	0.53	1.0	0.72	1.0	0.7	1.0	0.56	0.71	0.49	1.3	1.2	1.4	1.1	0.85	0.58	0.69	0.49	1.4	1.2	1.5	1.2	0.86	0.59
Potassium	mg/L	0.83	0.5	0.86	0.54	0.8	0.52	0.91	0.49	0.73	0.51	0.86	0.69	0.78	0.61	0.77	0.48	0.72	0.52	0.85	0.66	0.85	0.68	0.77	0.48
Sodium	mg/L	0.85	0.51	3.5	2.4	3.5	2.6	1.8	1.1	0.68	0.47	8.0	7.0	8.4	6.7	1.9	1.5	0.66	0.47	8.8	7.8	9.0	7.3	2.0	1.5
Sulphate	mg/L	2.0	1.2	2.1	1.3	1.9	1.3	2.1	1.1	2.2	1.5	2.3	1.8	2.1	1.6	1.8	1.1	2.2	1.6	2.5	1.9	2.3	1.8	1.8	1.1
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.23	0.2	0.42	0.33	0.42	0.32	0.27	0.22	0.25	0.22	0.76	0.72	0.78	0.59	0.33	0.29	0.26	0.23	0.82	0.74	0.83	0.63	0.37	0.3
Total ammonia	mg-N/L	0.048	0.025	0.085	0.049	0.088	0.044	0.068	0.033	0.043	0.027	0.13	0.087	0.13	0.065	0.071	0.048	0.041	0.027	0.14	0.087	0.14	0.069	0.067	0.049
Nitrate	mg-N/L	0.017	0.011	0.17	0.12	0.17	0.11	0.04	0.024	0.045	0.032	0.47	0.47	0.49	0.37	0.1	0.077	0.053	0.038	0.52	0.5	0.53	0.4	0.14	0.092
Total phosphorus (calculated)	mg-P/L	0.0078	0.0068	0.0085	0.0069	0.0088	0.0068	0.0083	0.0072	0.0074	0.0069	0.01	0.0082	0.011	0.0072	0.0082	0.0074	0.0074	0.0069	0.011	0.0077	0.011	0.0073	0.0083	0.0074
Dissolved orthophosphate	mg-P/L	0.0018	0.00083	0.0026	0.00091	0.0029	0.00087	0.0023	0.0012	0.0014	0.00096	0.0045	0.0022	0.0049	0.0012	0.0022	0.0014	0.0014	0.00094	0.0047	0.0017	0.0048	0.0013	0.0023	0.0014
Phytoplankton (as chlorophyll *a*)	µg/L	2.7	3.9	5.2	7.6	4.3	6.4	3.1	4.3	1.8	2.3	11	14	9.9	11	2.7	3.5	1.9	2.4	10	15	9.9	11	2.7	3.7
Silica, reactive	mg/L	0.21	0.13	0.22	0.15	0.21	0.14	0.24	0.13	0.17	0.12	0.24	0.21	0.23	0.18	0.2	0.13	0.16	0.12	0.24	0.19	0.25	0.2	0.2	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	23	23	24	22	11	12	4.4	8.8	50	53	50	44	13	15	4.4	8.8	54	54	54	48	13	16
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.4	0.34	0.4	0.34	0.36	0.31	0.35	0.3	0.41	0.34	0.41	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	2.4	1.9	2.4	1.8	1.7	1.4	1.3	1.2	3.8	3.3	3.8	2.9	1.8	1.5	1.3	1.2	4.0	3.4	4.1	3.1	1.8	1.6
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.0072	0.0063	0.0073	0.0062	0.0057	0.0053	0.005	0.005	0.01	0.009	0.01	0.0082	0.0059	0.0055	0.005	0.005	0.011	0.0091	0.011	0.0085	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.027	0.026	0.028	0.026	0.026	0.025	0.025	0.025	0.031	0.03	0.031	0.029	0.026	0.026	0.025	0.025	0.031	0.03	0.032	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.2	0.12	0.2	0.12	0.18	0.11	0.17	0.1	0.24	0.17	0.24	0.16	0.18	0.11	0.17	0.1	0.25	0.17	0.25	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.12	0.092	0.12	0.088	0.072	0.062	0.05	0.05	0.21	0.18	0.21	0.16	0.094	0.081	0.05	0.05	0.22	0.19	0.22	0.17	0.1	0.087
Copper	µg/L	0.68	0.6	0.73	0.63	0.73	0.63	0.7	0.61	0.68	0.6	0.81	0.71	0.81	0.69	0.7	0.62	0.68	0.6	0.82	0.71	0.82	0.7	0.7	0.62
Iron	µg/L	5.0	16	16	23	16	23	8.6	18	5.0	16	31	39	31	34	9.7	20	5.0	16	33	40	33	36	10	20
Lead	µg/L	0.025	0.058	0.035	0.064	0.035	0.064	0.028	0.06	0.025	0.058	0.048	0.077	0.048	0.073	0.029	0.061	0.025	0.058	0.05	0.078	0.05	0.075	0.03	0.061
Manganese	µg/L	1.7	4.7	4.3	6.3	4.3	6.2	2.6	5.2	1.7	4.7	7.9	9.7	7.9	8.7	3.5	6.0	1.7	4.7	8.3	9.9	8.4	9.1	3.8	6.2

**Table 8F3.1-5 Predicted Maximum of Surface Concentrations in Lac du Sauvage, AA to AF
Part A**

Constituent	Units	AA								AB								AC							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.001	0.001	0.0026	0.0022	0.0026	0.0021	0.0015	0.0013	0.001	0.001	0.0049	0.0046	0.0049	0.0039	0.0017	0.0015	0.001	0.001	0.0052	0.0047	0.0052	0.0042	0.0017	0.0016
Molybdenum	µg/L	0.025	0.025	0.22	0.13	0.23	0.12	0.091	0.052	0.025	0.025	0.51	0.37	0.51	0.3	0.11	0.072	0.025	0.025	0.54	0.38	0.55	0.33	0.12	0.076
Nickel	µg/L	0.3	0.32	0.43	0.4	0.43	0.39	0.34	0.34	0.3	0.32	0.6	0.57	0.6	0.52	0.36	0.36	0.3	0.32	0.63	0.58	0.63	0.54	0.37	0.37
Selenium	µg/L	0.05	0.05	0.054	0.053	0.055	0.053	0.051	0.051	0.05	0.05	0.061	0.059	0.061	0.057	0.053	0.052	0.05	0.05	0.062	0.059	0.062	0.058	0.054	0.053
Silver	µg/L	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	179	94	182	87	64	28	7.2	5.3	420	285	420	230	80	44	7.2	5.3	450	293	457	253	85	45
Uranium	µg/L	0.022	0.022	0.22	0.15	0.22	0.14	0.087	0.063	0.022	0.022	0.5	0.41	0.5	0.34	0.17	0.13	0.022	0.022	0.53	0.42	0.54	0.37	0.19	0.15
Vanadium	µg/L	0.025	0.025	0.043	0.038	0.043	0.037	0.031	0.028	0.025	0.025	0.068	0.065	0.068	0.057	0.033	0.031	0.025	0.025	0.072	0.066	0.072	0.061	0.033	0.031
Zinc	µg/L	0.5	0.5	0.65	0.59	0.65	0.59	0.55	0.53	0.5	0.5	0.85	0.79	0.85	0.74	0.59	0.56	0.5	0.5	0.88	0.8	0.89	0.76	0.6	0.57
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	5.8	4.2	5.9	4.1	4.9	3.6	4.4	3.3	7.8	6.2	7.8	5.6	5.5	4.1	4.4	3.3	8.1	6.2	8.2	5.8	5.7	4.2
Arsenic	µg/L	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31
Barium[c]	µg/L	1.3	1.1	2.2	1.7	2.2	1.6	1.6	1.2	1.3	1.1	3.5	2.9	3.5	2.6	1.7	1.4	1.3	1.1	3.7	3.0	3.7	2.7	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0059	0.0055	0.0059	0.0055	0.0053	0.0051	0.005	0.005	0.0071	0.0066	0.0071	0.0063	0.0054	0.0052	0.005	0.005	0.0073	0.0066	0.0073	0.0064	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.007	0.0061	0.007	0.006	0.0057	0.0053	0.005	0.005	0.0098	0.0085	0.0098	0.0078	0.0058	0.0055	0.005	0.005	0.01	0.0085	0.01	0.0081	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.0049	0.0039	0.005	0.0038	0.0033	0.0029	0.0025	0.0025	0.0083	0.0071	0.0083	0.0062	0.0035	0.0032	0.0025	0.0025	0.0088	0.0072	0.0089	0.0066	0.0036	0.0033
Chromium	µg/L	0.065	0.003	0.07	0.0064	0.07	0.0062	0.067	0.0039	0.065	0.003	0.076	0.014	0.076	0.012	0.068	0.0052	0.065	0.003	0.077	0.014	0.077	0.013	0.068	0.0057
Cobalt	µg/L	0.011	0.005	0.074	0.045	0.075	0.042	0.032	0.017	0.011	0.005	0.16	0.13	0.16	0.11	0.055	0.036	0.011	0.005	0.17	0.13	0.18	0.12	0.062	0.042
Copper	µg/L	0.68	0.57	0.73	0.6	0.73	0.6	0.7	0.58	0.68	0.57	0.79	0.66	0.79	0.64	0.7	0.58	0.68	0.57	0.8	0.67	0.8	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	7.2	7.0	7.3	6.8	3.7	4.8	1.9	3.7	15	14	15	12	5.9	6.5	1.9	3.7	16	14	16	13	6.6	7.1
Lead	µg/L	0.005	0.005	0.011	0.0085	0.011	0.0083	0.0069	0.006	0.005	0.005	0.019	0.016	0.019	0.014	0.0084	0.0074	0.005	0.005	0.02	0.016	0.02	0.015	0.0089	0.0078
Manganese	µg/L	1.6	0.8	4.1	2.4	4.2	2.3	2.4	1.3	1.6	0.8	7.6	5.8	7.6	4.8	3.4	2.1	1.6	0.8	8.1	5.9	8.2	5.2	3.7	2.3
Mercury	µg/L	0.00025	0.00025	0.00061	0.00048	0.00062	0.00046	0.00037	0.00031	0.00025	0.00025	0.0011	0.00096	0.0011	0.00082	0.0004	0.00035	0.00025	0.00025	0.0012	0.00098	0.0012	0.00088	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.22	0.13	0.23	0.12	0.091	0.052	0.025	0.025	0.5	0.37	0.5	0.3	0.11	0.072	0.025	0.025	0.54	0.38	0.55	0.33	0.12	0.076
Nickel	µg/L	0.3	0.28	0.42	0.35	0.42	0.35	0.34	0.3	0.3	0.28	0.58	0.51	0.58	0.46	0.36	0.32	0.3	0.28	0.6	0.52	0.6	0.48	0.37	0.33
Selenium	µg/L	0.02	0.02	0.024	0.023	0.025	0.023	0.021	0.021	0.02	0.02	0.031	0.029	0.031	0.027	0.023	0.022	0.02	0.02	0.031	0.029	0.032	0.028	0.024	0.023
Silver	µg/L	0.0025	0.0025	0.003	0.0028	0.003	0.0028	0.0027	0.0026	0.0025	0.0025	0.0037	0.0035	0.0037	0.0033	0.0028	0.0027	0.0025	0.0025	0.0038	0.0035	0.0038	0.0034	0.0029	0.0028
Strontium	µg/L	7.2	5.3	179	94	182	87	64	28	7.2	5.3	420	285	420	230	80	44	7.2	5.3	449	293	457	253	85	45
Uranium	µg/L	0.02	0.021	0.21	0.14	0.22	0.13	0.084	0.062	0.02	0.021	0.49	0.4	0.49	0.33	0.17	0.13	0.02	0.021	0.52	0.41	0.53	0.36	0.19	0.14
Vanadium[c]	µg/L	0.025	0.025	0.03	0.028	0.03	0.028	0.027	0.026	0.025	0.025	0.037	0.035	0.037	0.033	0.027	0.027	0.025	0.025	0.038	0.035	0.038	0.034	0.027	0.027
Zinc[c]	µg/L	0.5	0.4	0.63	0.48	0.63	0.48	0.54	0.42	0.5	0.4	0.82	0.66	0.82	0.61	0.59	0.46	0.5	0.4	0.84	0.67	0.85	0.63	0.6	0.47

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.1-5 Predicted Maximum of Surface Concentrations in Lac du Sauvage, AA to AF Part B

Constituent	Units	AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.44	17	0.73	16	0.12	16	1.1	17	0.043	18	0.68	17	0.14	17	0.91	18	0.56	18	0.41	18	0.2	17	0.75	18
Dissolved oxygen[(a)]	mg/L	6.9	7.9	6.9	7.8	6.8	7.8	6.7	7.2	5.1	5.6	4.8	6.5	5.0	4.1	5.3	6.0	3.0	3.3	2.9	4.6	2.7	2.8	3.1	3.5
Conventional Constituents																									
Hardness (calculated)	mg/L	5.8	3.9	32	27	34	27	12	8.2	6.1	3.8	33	29	34	28	11	7.8	6.8	4.2	19	11	21	12	11	5.9
Total dissolved solids	mg/L	15	10	63	53	66	52	24	17	15	9.7	64	56	66	54	23	17	17	10	39	22	43	24	23	13
Total suspended solids[(b)]	mg/L	1.9	1.3	1.8	1.3	1.7	1.3	2.1	1.3	2.1	1.3	2.1	1.3	2.0	1.3	2.2	1.3	2.3	1.4	2.4	1.4	2.1	1.4	2.5	1.4
Major Ions																									
Calcium	mg/L	1.1	0.72	11	9.0	11	9.0	3.3	2.3	1.1	0.71	11	9.8	11	9.5	3.1	2.2	1.3	0.77	6.0	3.1	6.6	3.5	2.6	1.4
Chloride	mg/L	0.36	0.26	29	24	30	24	6.9	4.9	0.37	0.24	29	26	30	25	6.3	4.5	0.39	0.24	14	6.9	16	8.4	4.4	2.4
Fluoride	mg/L	0.013	0.0088	0.014	0.011	0.014	0.011	0.015	0.009	0.014	0.0086	0.016	0.011	0.015	0.011	0.015	0.0089	0.015	0.0094	0.016	0.010	0.015	0.0098	0.017	0.0095
Magnesium	mg/L	0.75	0.5	1.2	1.0	1.3	1.0	0.89	0.59	0.8	0.5	1.3	1.1	1.3	1.0	0.9	0.58	0.88	0.54	1.1	0.69	1.1	0.67	1.0	0.57
Potassium	mg/L	0.78	0.6	0.89	0.71	0.83	0.65	0.8	0.49	0.82	0.52	0.91	0.65	0.85	0.63	0.82	0.48	0.83	0.51	0.89	0.55	0.82	0.53	0.91	0.51
Sodium	mg/L	0.73	0.48	7.1	5.9	7.4	5.8	2.1	1.5	0.77	0.48	7.1	6.4	7.4	6.1	2.0	1.4	0.85	0.52	3.9	2.1	4.3	2.3	1.7	0.95
Sulphate	mg/L	2.5	2.3	3.0	2.5	2.5	1.9	1.9	1.2	2.4	1.6	2.6	1.8	2.3	1.7	1.9	1.1	2.1	1.3	2.2	1.4	2.1	1.3	2.1	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.28	0.28	0.72	0.63	0.74	0.56	0.37	0.37	0.26	0.23	0.7	0.65	0.72	0.56	0.34	0.29	0.23	0.2	0.45	0.3	0.48	0.31	0.27	0.22
Total ammonia	mg-N/L	0.042	0.027	0.11	0.078	0.12	0.062	0.077	0.071	0.047	0.027	0.12	0.084	0.13	0.061	0.075	0.047	0.047	0.024	0.088	0.044	0.095	0.04	0.069	0.032
Nitrate	mg-N/L	0.08	0.091	0.44	0.39	0.46	0.34	0.13	0.14	0.052	0.037	0.41	0.4	0.43	0.34	0.11	0.084	0.023	0.011	0.2	0.092	0.23	0.11	0.044	0.024
Total phosphorus (calculated)	mg-P/L	0.0074	0.007	0.0096	0.0075	0.01	0.0072	0.0083	0.0073	0.0075	0.0069	0.0099	0.0075	0.01	0.0071	0.0082	0.0072	0.0079	0.0067	0.0088	0.0069	0.0091	0.0068	0.0083	0.0071
Dissolved orthophosphate	mg-P/L	0.0015	0.001	0.0036	0.0016	0.0043	0.0013	0.0023	0.0014	0.0016	0.00091	0.004	0.0015	0.0044	0.0012	0.0022	0.0013	0.0019	0.00077	0.0029	0.0009	0.0032	0.00084	0.0023	0.0011
Phytoplankton (as chlorophyll a)	µg/L	1.8	2.3	10	13	8.6	10	2.7	3.6	2.0	2.9	10	14	8.5	10	2.8	3.9	3.0	4.5	5.6	7.0	4.6	6.4	3.3	4.9
Silica, reactive	mg/L	0.18	0.12	0.22	0.18	0.23	0.18	0.2	0.13	0.19	0.12	0.25	0.19	0.24	0.18	0.21	0.13	0.21	0.13	0.22	0.15	0.22	0.14	0.24	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	47	44	49	42	13	17	4.4	8.8	45	48	47	42	13	15	4.4	8.8	26	19	28	21	9.9	12
Arsenic	µg/L	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.38	0.31	0.36	0.3
Barium	µg/L	1.3	1.2	3.7	2.9	3.8	2.8	1.8	1.7	1.3	1.2	3.6	3.1	3.6	2.8	1.8	1.5	1.3	1.2	2.5	1.7	2.6	1.8	1.6	1.3
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.010	0.0082	0.01	0.0081	0.006	0.0057	0.005	0.005	0.0097	0.0085	0.0099	0.008	0.0059	0.0056	0.005	0.005	0.0075	0.006	0.0077	0.0061	0.0056	0.0053
Cadmium	µg/L	0.025	0.025	0.031	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.03	0.029	0.031	0.029	0.026	0.026	0.025	0.025	0.028	0.026	0.028	0.026	0.026	0.025
Chromium	µg/L	0.17	0.1	0.24	0.16	0.24	0.15	0.18	0.11	0.17	0.1	0.23	0.16	0.24	0.15	0.18	0.11	0.17	0.1	0.2	0.12	0.21	0.12	0.18	0.1
Cobalt	µg/L	0.05	0.05	0.2	0.16	0.2	0.15	0.10	0.11	0.05	0.05	0.19	0.17	0.2	0.15	0.094	0.083	0.05	0.05	0.12	0.082	0.13	0.086	0.07	0.061
Copper	µg/L	0.68	0.6	0.8	0.69	0.8	0.68	0.71	0.62	0.68	0.6	0.79	0.69	0.8	0.68	0.7	0.62	0.68	0.6	0.74	0.63	0.75	0.63	0.7	0.61
Iron	µg/L	5.0	16	29	35	30	34	10	22	5.0	16	28	36	29	34	9.8	20	5.0	16	17	22	18	22	8.1	18
Lead	µg/L	0.025	0.058	0.046	0.073	0.047	0.073	0.03	0.063	0.025	0.058	0.045	0.075	0.046	0.073	0.029	0.061	0.025	0.058	0.036	0.063	0.037	0.063	0.028	0.059
Manganese	µg/L	1.7	4.7	7.5	8.8	7.7	8.5	3.7	6.9	1.7	4.7	7.2	9.1	7.4	8.5	3.5	6.0	1.7	4.7	4.6	5.9	4.9	6.1	2.5	5.1

Table 8F3.1-5 Predicted Maximum of Surface Concentrations in Lac du Sauvage, AA to AF
Part B

Constituent	Units	AD								AE								AF							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.001	0.001	0.0046	0.004	0.0048	0.0038	0.0018	0.0017	0.001	0.001	0.0044	0.0042	0.0046	0.0038	0.0017	0.0015	0.001	0.001	0.0028	0.0019	0.003	0.002	0.0015	0.0012
Molybdenum	µg/L	0.025	0.025	0.47	0.3	0.49	0.29	0.12	0.081	0.025	0.025	0.45	0.33	0.47	0.29	0.11	0.072	0.025	0.025	0.25	0.11	0.27	0.12	0.082	0.047
Nickel	µg/L	0.3	0.32	0.58	0.52	0.59	0.51	0.37	0.4	0.3	0.32	0.57	0.54	0.58	0.51	0.36	0.37	0.3	0.32	0.44	0.38	0.46	0.39	0.34	0.34
Selenium	µg/L	0.05	0.05	0.06	0.057	0.06	0.057	0.054	0.054	0.05	0.05	0.06	0.058	0.06	0.057	0.053	0.052	0.05	0.05	0.055	0.052	0.056	0.052	0.051	0.051
Silver	µg/L	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.05	0.051	0.05	0.05	0.05
Strontium	µg/L	7.2	5.3	393	232	406	220	89	46	7.2	5.3	373	252	388	219	81	42	7.2	5.3	200	73	220	82	57	24
Uranium	µg/L	0.022	0.022	0.47	0.34	0.48	0.32	0.19	0.21	0.022	0.022	0.44	0.37	0.46	0.32	0.17	0.13	0.022	0.022	0.24	0.12	0.27	0.13	0.087	0.058
Vanadium	µg/L	0.025	0.025	0.066	0.058	0.067	0.056	0.034	0.032	0.025	0.025	0.064	0.061	0.065	0.056	0.033	0.031	0.025	0.025	0.045	0.035	0.047	0.036	0.03	0.028
Zinc	µg/L	0.5	0.5	0.83	0.74	0.84	0.73	0.6	0.61	0.5	0.5	0.81	0.76	0.83	0.73	0.59	0.57	0.5	0.5	0.67	0.57	0.68	0.58	0.54	0.52
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	7.6	5.6	7.7	5.5	5.6	4.7	4.4	3.3	7.5	5.8	7.6	5.5	5.5	4.1	4.4	3.3	6.0	4.0	6.2	4.1	4.9	3.6
Arsenic	µg/L	0.35	0.3	0.39	0.33	0.4	0.33	0.36	0.31	0.35	0.3	0.39	0.33	0.39	0.33	0.36	0.31	0.35	0.3	0.37	0.31	0.37	0.31	0.36	0.3
Barium[(c)]	µg/L	1.3	1.1	3.4	2.6	3.5	2.5	1.7	1.5	1.3	1.1	3.3	2.7	3.4	2.5	1.7	1.4	1.3	1.1	2.3	1.5	2.5	1.6	1.6	1.2
Beryllium	µg/L	0.005	0.005	0.007	0.0063	0.007	0.0062	0.0054	0.0052	0.005	0.005	0.0069	0.0064	0.0069	0.0062	0.0054	0.0052	0.005	0.005	0.006	0.0054	0.0061	0.0054	0.0053	0.0051
Bismuth	µg/L	0.005	0.005	0.0095	0.0078	0.0096	0.0076	0.0059	0.0056	0.005	0.005	0.0092	0.008	0.0094	0.0076	0.0058	0.0055	0.005	0.005	0.0072	0.0058	0.0075	0.0059	0.0056	0.0052
Cadmium	µg/L	0.0025	0.0025	0.008	0.0062	0.0081	0.006	0.0036	0.0035	0.0025	0.0025	0.0077	0.0065	0.0079	0.006	0.0035	0.0032	0.0025	0.0025	0.0052	0.0036	0.0055	0.0038	0.0032	0.0028
Chromium	µg/L	0.065	0.003	0.075	0.012	0.076	0.011	0.068	0.007	0.065	0.003	0.075	0.013	0.075	0.011	0.068	0.0054	0.065	0.003	0.07	0.0056	0.071	0.006	0.066	0.0038
Cobalt	µg/L	0.011	0.005	0.15	0.11	0.16	0.1	0.06	0.061	0.011	0.005	0.15	0.12	0.15	0.1	0.055	0.038	0.011	0.005	0.082	0.035	0.089	0.039	0.031	0.016
Copper	µg/L	0.68	0.57	0.79	0.65	0.79	0.64	0.7	0.59	0.68	0.57	0.78	0.65	0.78	0.64	0.7	0.58	0.68	0.57	0.73	0.59	0.74	0.6	0.69	0.58
Iron	µg/L	1.9	3.7	14	12	14	12	6.4	8.8	1.9	3.7	13	13	14	12	5.9	6.7	1.9	3.7	7.9	6.2	8.5	6.6	3.7	4.7
Lead	µg/L	0.005	0.005	0.018	0.014	0.018	0.014	0.0089	0.0093	0.005	0.005	0.017	0.015	0.018	0.014	0.0084	0.0075	0.005	0.005	0.011	0.0077	0.012	0.0081	0.0066	0.0058
Manganese	µg/L	1.6	0.8	7.2	4.8	7.4	4.6	3.6	3.0	1.6	0.8	7.0	5.2	7.2	4.6	3.4	2.1	1.6	0.8	4.4	2.0	4.7	2.2	2.4	1.2
Mercury	µg/L	0.00025	0.00025	0.0011	0.00083	0.0011	0.0008	0.00042	0.00039	0.00025	0.00025	0.001	0.00088	0.001	0.00079	0.0004	0.00035	0.00025	0.00025	0.00065	0.00042	0.0007	0.00045	0.00035	0.0003
Molybdenum	µg/L	0.025	0.025	0.47	0.3	0.49	0.29	0.12	0.081	0.025	0.025	0.45	0.33	0.47	0.29	0.11	0.072	0.025	0.025	0.25	0.11	0.27	0.12	0.082	0.047
Nickel	µg/L	0.3	0.28	0.56	0.47	0.57	0.46	0.37	0.36	0.3	0.28	0.55	0.48	0.56	0.46	0.36	0.33	0.3	0.28	0.43	0.34	0.44	0.34	0.33	0.3
Selenium	µg/L	0.02	0.02	0.03	0.027	0.03	0.027	0.024	0.024	0.02	0.02	0.029	0.028	0.03	0.027	0.023	0.022	0.02	0.02	0.025	0.022	0.025	0.022	0.021	0.021
Silver	µg/L	0.0025	0.0025	0.0036	0.0033	0.0037	0.0033	0.0028	0.0029	0.0025	0.0025	0.0036	0.0034	0.0036	0.0033	0.0028	0.0027	0.0025	0.0025	0.0031	0.0027	0.0031	0.0028	0.0026	0.0026
Strontium	µg/L	7.2	5.3	393	232	406	220	88	46	7.2	5.3	373	252	388	219	80	42	7.2	5.3	199	73	220	82	57	24
Uranium	µg/L	0.02	0.021	0.46	0.33	0.47	0.32	0.18	0.21	0.02	0.021	0.43	0.36	0.45	0.31	0.17	0.13	0.02	0.021	0.24	0.11	0.26	0.13	0.085	0.057
Vanadium[(c)]	µg/L	0.025	0.025	0.036	0.033	0.037	0.033	0.028	0.028	0.025	0.025	0.036	0.034	0.036	0.033	0.027	0.027	0.025	0.025	0.031	0.027	0.031	0.028	0.026	0.026
Zinc[(c)]	µg/L	0.5	0.4	0.8	0.61	0.81	0.6	0.6	0.51	0.5	0.4	0.78	0.63	0.79	0.6	0.59	0.47	0.5	0.4	0.65	0.46	0.66	0.47	0.54	0.42

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.1-6 Predicted Maximum of Surface Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

		LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
Constituent	Units	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	0.39	17	1.1	17	0.21	17	1.3	17	0.54	17	1.1	17	0.17	17	1.4	17	0.68	17	0.99	17	0.0	16	1.3	17
Dissolved oxygen[a]	mg/L	6.9	7.0	6.9	8.1	7.2	7.2	6.9	7.0	7.2	7.3	7.2	8.8	7.5	7.5	7.1	7.3	7.2	7.5	7.3	9.3	7.4	7.9	7.1	7.5
Conventional Constituents																									
Hardness (calculated)	mg/L	5.3	3.9	40	37	41	37	11	8.4	5.2	3.7	38	37	40	33	11	8.3	5.2	3.7	37	33	39	31	11	8.1
Total dissolved solids	mg/L	14	9.9	76	70	78	70	23	18	13	9.6	73	70	76	64	22	18	13	9.6	72	63	75	60	22	17
Total suspended solids[b]	mg/L	1.8	1.3	1.8	1.3	1.7	1.4	2.0	1.3	1.8	1.3	1.7	1.3	1.7	1.3	2.0	1.3	1.8	1.3	1.8	1.3	1.7	1.3	2.0	1.3
Major Ions																									
Calcium	mg/L	0.98	0.72	13	13	14	13	3.1	2.4	0.97	0.7	13	13	13	11	3.0	2.4	0.97	0.69	13	11	13	11	3.0	2.3
Chloride	mg/L	0.33	0.24	36	35	37	34	6.6	5.0	0.33	0.23	35	34	36	31	6.4	4.9	0.32	0.23	34	30	36	29	6.4	4.8
Fluoride	mg/L	0.012	0.0088	0.015	0.012	0.015	0.013	0.014	0.0089	0.012	0.0085	0.014	0.012	0.014	0.012	0.014	0.0088	0.012	0.0085	0.014	0.012	0.014	0.011	0.014	0.0088
Magnesium	mg/L	0.68	0.5	1.4	1.2	1.5	1.3	0.88	0.6	0.68	0.49	1.4	1.2	1.4	1.2	0.88	0.59	0.68	0.49	1.4	1.2	1.4	1.1	0.88	0.58
Potassium	mg/L	0.72	0.52	0.86	0.66	0.86	0.72	0.78	0.48	0.71	0.51	0.82	0.66	0.83	0.67	0.78	0.49	0.7	0.51	0.81	0.66	0.82	0.63	0.79	0.49
Sodium	mg/L	0.66	0.49	8.7	8.3	9.0	8.2	2.0	1.6	0.66	0.47	8.4	8.3	8.8	7.4	2.0	1.5	0.65	0.47	8.2	7.2	8.7	6.9	2.0	1.5
Sulphate	mg/L	2.2	1.6	2.5	1.8	2.3	1.9	1.9	1.2	2.1	1.5	2.3	1.9	2.2	1.8	1.9	1.2	2.1	1.5	2.3	1.8	2.2	1.7	1.9	1.2
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.26	0.22	0.81	0.8	0.83	0.7	0.39	0.32	0.25	0.22	0.8	0.79	0.81	0.64	0.42	0.32	0.25	0.22	0.79	0.73	0.81	0.6	0.38	0.34
Total ammonia	mg-N/L	0.041	0.027	0.14	0.11	0.15	0.082	0.072	0.055	0.04	0.027	0.14	0.11	0.14	0.071	0.081	0.055	0.041	0.027	0.13	0.092	0.14	0.063	0.07	0.061
Nitrate	mg-N/L	0.053	0.036	0.51	0.53	0.52	0.46	0.16	0.1	0.05	0.033	0.5	0.52	0.51	0.41	0.18	0.11	0.046	0.033	0.49	0.47	0.51	0.38	0.15	0.12
Total phosphorus (calculated)	mg-P/L	0.0074	0.0069	0.011	0.0081	0.011	0.008	0.0083	0.0074	0.0074	0.0069	0.011	0.0084	0.011	0.0074	0.0084	0.0075	0.0074	0.0069	0.011	0.0077	0.011	0.0072	0.0083	0.0075
Dissolved orthophosphate	mg-P/L	0.0014	0.00099	0.0046	0.0021	0.0048	0.0021	0.0024	0.0015	0.0014	0.00097	0.0047	0.0025	0.005	0.0014	0.0024	0.0015	0.0014	0.00095	0.0046	0.0017	0.005	0.0012	0.0024	0.0015
Phytoplankton (as chlorophyll a)	µg/L	1.8	2.3	11	15	9.9	11	2.7	3.6	1.8	2.3	11	15	10	11	2.7	3.6	1.8	2.3	11	15	10	11	2.7	3.5
Silica, reactive	mg/L	0.16	0.12	0.25	0.2	0.25	0.21	0.2	0.13	0.16	0.12	0.24	0.2	0.24	0.2	0.2	0.13	0.16	0.12	0.23	0.2	0.24	0.19	0.2	0.13
Total Metals																									
Aluminum	µg/L	4.4	8.8	53	57	54	52	13	16	4.4	8.8	52	56	53	48	13	16	4.4	8.8	52	53	52	45	13	15
Arsenic	µg/L	0.35	0.3	0.41	0.35	0.41	0.34	0.36	0.31	0.35	0.3	0.4	0.35	0.4	0.34	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.34	0.36	0.31
Barium	µg/L	1.3	1.2	4.0	3.5	4.1	3.3	1.8	1.6	1.3	1.2	3.9	3.5	4.0	3.1	1.8	1.5	1.3	1.2	3.9	3.3	3.9	3.0	1.8	1.6
Beryllium	µg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bismuth	µg/L	0.005	0.005	0.011	0.0093	0.011	0.0089	0.006	0.0056	0.005	0.005	0.011	0.0092	0.011	0.0086	0.006	0.0056	0.005	0.005	0.011	0.009	0.011	0.0083	0.006	0.0056
Cadmium	µg/L	0.025	0.025	0.031	0.03	0.031	0.03	0.026	0.026	0.025	0.025	0.031	0.03	0.031	0.029	0.026	0.026	0.025	0.025	0.031	0.03	0.031	0.029	0.026	0.026
Chromium	µg/L	0.17	0.1	0.25	0.18	0.25	0.17	0.18	0.11	0.17	0.1	0.24	0.18	0.25	0.16	0.18	0.11	0.17	0.1	0.24	0.17	0.24	0.16	0.18	0.11
Cobalt	µg/L	0.05	0.05	0.22	0.19	0.22	0.18	0.11	0.091	0.05	0.05	0.21	0.19	0.22	0.17	0.12	0.092	0.05	0.05	0.22	0.18	0.22	0.16	0.11	0.096
Copper	µg/L	0.68	0.6	0.82	0.72	0.82	0.7	0.7	0.62	0.68	0.6	0.81	0.71	0.81	0.7	0.71	0.62	0.68	0.6	0.81	0.71	0.81	0.69	0.7	0.62
Iron	µg/L	5.0	16	32	41	33	38	11	20	5.0	16	32	40	32	37	12	20	5.0	16	32	39	32	35	11	21
Lead	µg/L	0.025	0.058	0.049	0.079	0.05	0.077	0.03	0.062	0.025	0.058	0.049	0.078	0.049	0.075	0.031	0.062	0.025	0.058	0.049	0.077	0.049	0.074	0.03	0.062
Manganese	µg/L	1.7	4.7	8.3	10	8.4	9.6	4.1	6.4	1.7	4.7	8.1	10	8.2	9.2	4.4	6.4	1.7	4.7	8.1	9.7	8.1	8.9	3.9	6.5
Mercury	µg/L	0.001	0.001	0.0051	0.005	0.0052	0.0046	0.0017	0.0016	0.001	0.001	0.005	0.0049	0.0051	0.0043	0.0017	0.0016	0.001	0.001	0.005	0.0046	0.005	0.004	0.0017	0.0015

Table 8F3.1-6 Predicted Maximum of Surface Concentrations in Lac du Sauvage, LDS-P1 to LDS-P3

		LDS-P1								LDS-P2								LDS-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
Constituent	Units	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Molybdenum	µg/L	0.025	0.025	0.53	0.4	0.54	0.36	0.12	0.077	0.025	0.025	0.52	0.39	0.53	0.33	0.11	0.076	0.025	0.025	0.52	0.37	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.32	0.62	0.59	0.63	0.57	0.38	0.38	0.3	0.32	0.62	0.59	0.62	0.54	0.39	0.38	0.3	0.32	0.62	0.57	0.62	0.53	0.38	0.38
Selenium	µg/L	0.05	0.05	0.061	0.06	0.062	0.059	0.054	0.053	0.05	0.05	0.061	0.059	0.061	0.058	0.055	0.053	0.05	0.05	0.061	0.059	0.061	0.057	0.054	0.053
Silver	µg/L	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05	0.05	0.05	0.051	0.051	0.051	0.051	0.05	0.05
Strontium	µg/L	7.2	5.3	445	310	454	279	85	46	7.2	5.3	436	304	440	256	82	46	7.2	5.3	437	284	437	239	82	45
Uranium	µg/L	0.022	0.022	0.52	0.45	0.54	0.41	0.22	0.16	0.022	0.022	0.51	0.44	0.52	0.37	0.25	0.16	0.022	0.022	0.52	0.41	0.52	0.35	0.21	0.18
Vanadium	µg/L	0.025	0.025	0.071	0.069	0.072	0.064	0.033	0.031	0.025	0.025	0.07	0.068	0.071	0.061	0.033	0.031	0.025	0.025	0.07	0.065	0.07	0.059	0.033	0.031
Zinc	µg/L	0.5	0.5	0.88	0.82	0.88	0.79	0.62	0.58	0.5	0.5	0.87	0.81	0.87	0.76	0.64	0.58	0.5	0.5	0.87	0.79	0.87	0.75	0.61	0.59
Dissolved Metals																									
Aluminum	µg/L	4.4	3.3	8.1	6.4	8.1	6.1	5.8	4.3	4.4	3.3	8.0	6.3	8.0	5.9	6.1	4.3	4.4	3.3	8.0	6.1	8.0	5.7	5.8	4.4
Arsenic	µg/L	0.35	0.3	0.4	0.34	0.4	0.34	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.34	0.36	0.31	0.35	0.3	0.4	0.34	0.4	0.33	0.36	0.31
Barium[(c)]	µg/L	1.3	1.1	3.7	3.1	3.7	2.9	1.7	1.4	1.3	1.1	3.6	3.0	3.6	2.7	1.8	1.4	1.3	1.1	3.6	2.9	3.6	2.6	1.7	1.4
Beryllium	µg/L	0.005	0.005	0.0072	0.0067	0.0073	0.0065	0.0054	0.0052	0.005	0.005	0.0072	0.0067	0.0072	0.0064	0.0054	0.0052	0.005	0.005	0.0072	0.0066	0.0072	0.0063	0.0054	0.0052
Bismuth	µg/L	0.005	0.005	0.01	0.0088	0.01	0.0084	0.0059	0.0055	0.005	0.005	0.010	0.0087	0.01	0.0081	0.0059	0.0055	0.005	0.005	0.010	0.0084	0.010	0.0079	0.0059	0.0055
Cadmium	µg/L	0.0025	0.0025	0.0087	0.0075	0.0088	0.007	0.0036	0.0033	0.0025	0.0025	0.0086	0.0074	0.0086	0.0066	0.0036	0.0032	0.0025	0.0025	0.0086	0.0071	0.0086	0.0063	0.0036	0.0032
Chromium	µg/L	0.065	0.003	0.077	0.015	0.077	0.014	0.069	0.0059	0.065	0.003	0.076	0.015	0.076	0.013	0.07	0.006	0.065	0.003	0.076	0.014	0.076	0.012	0.069	0.0063
Cobalt	µg/L	0.011	0.005	0.17	0.14	0.18	0.13	0.069	0.046	0.011	0.005	0.17	0.14	0.17	0.12	0.079	0.047	0.011	0.005	0.17	0.13	0.17	0.11	0.067	0.051
Copper	µg/L	0.68	0.57	0.8	0.67	0.8	0.66	0.7	0.59	0.68	0.57	0.8	0.67	0.8	0.65	0.71	0.59	0.68	0.57	0.8	0.66	0.8	0.65	0.7	0.59
Iron	µg/L	1.9	3.7	15	15	16	14	7.2	7.4	1.9	3.7	15	15	15	13	8.1	7.5	1.9	3.7	15	14	15	12	7.0	7.9
Lead	µg/L	0.005	0.005	0.019	0.017	0.02	0.016	0.0095	0.0081	0.005	0.005	0.019	0.017	0.019	0.015	0.01	0.0082	0.005	0.005	0.019	0.016	0.019	0.014	0.0093	0.0085
Manganese	µg/L	1.6	0.8	8.0	6.2	8.1	5.7	3.9	2.5	1.6	0.8	7.9	6.1	7.9	5.3	4.3	2.5	1.6	0.8	7.9	5.8	7.9	5.0	3.8	2.6
Mercury	µg/L	0.00025	0.00025	0.0012	0.001	0.0012	0.00095	0.00041	0.00036	0.00025	0.00025	0.0011	0.001	0.0012	0.00089	0.00041	0.00036	0.00025	0.00025	0.0012	0.00096	0.0012	0.00084	0.00041	0.00036
Molybdenum	µg/L	0.025	0.025	0.53	0.4	0.54	0.36	0.12	0.077	0.025	0.025	0.52	0.39	0.53	0.33	0.11	0.076	0.025	0.025	0.52	0.36	0.52	0.31	0.11	0.074
Nickel	µg/L	0.3	0.28	0.6	0.53	0.6	0.5	0.38	0.34	0.3	0.28	0.59	0.52	0.59	0.49	0.39	0.34	0.3	0.28	0.59	0.51	0.59	0.47	0.38	0.34
Selenium	µg/L	0.02	0.02	0.031	0.029	0.032	0.028	0.024	0.023	0.02	0.02	0.031	0.029	0.031	0.028	0.025	0.023	0.02	0.02	0.031	0.029	0.031	0.027	0.024	0.023
Silver	µg/L	0.0025	0.0025	0.0038	0.0036	0.0038	0.0035	0.0029	0.0028	0.0025	0.0025	0.0038	0.0036	0.0038	0.0034	0.003	0.0028	0.0025	0.0025	0.0038	0.0035	0.0038	0.0033	0.0029	0.0028
Strontium	µg/L	7.2	5.3	445	310	454	279	85	46	7.2	5.3	436	304	440	256	82	46	7.2	5.3	436	284	436	239	82	45
Uranium	µg/L	0.02	0.021	0.51	0.44	0.52	0.4	0.21	0.16	0.02	0.021	0.5	0.43	0.51	0.36	0.25	0.16	0.02	0.021	0.5	0.4	0.5	0.34	0.21	0.17
Vanadium[(c)]	µg/L	0.025	0.025	0.038	0.036	0.038	0.035	0.028	0.027	0.025	0.025	0.038	0.036	0.038	0.034	0.028	0.027	0.025	0.025	0.038	0.035	0.038	0.033	0.028	0.027
Zinc[(c)]	µg/L	0.5	0.4	0.84	0.69	0.84	0.66	0.61	0.48	0.5	0.4	0.83	0.68	0.83	0.63	0.63	0.48	0.5	0.4	0.83	0.66	0.83	0.62	0.61	0.49

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
c) Total baseline concentrations used in calculations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius; <= less than.

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8F3.1.1 Lac du Sauvage Model Sensitivity Analysis

The maximum of mean water quality concentrations and the maximum of 99th percentile water quality concentrations from 200 model realizations were obtained from the site discharge water quality model for minewater pumped from the Misery Pit to Lac du Sauvage, for runoff from the WRSA, and for the monimolimnion of the Jay Pit (Appendix 8E). The Lac du Sauvage Model used the maximum of mean concentrations and the maximum of the 99th percentile for each of these inflows.

In operations and closure, water quality predictions in Lac du Sauvage using the maximum of the mean and the maximum of the 99th percentile concentrations for the discharge from the Misery Pit to Lac du Sauvage were compared. Maximum TDS concentration were predicted to vary by less than 5 mg/L between the two scenarios (Figure 8F3.1-1), while maximum chloride concentrations were predicted to vary by less than 2 mg/L (Figure 8F3.1-2). Concentrations at the end of closure (i.e., 2033) were predicted to be nearly identical when using the maximum of the mean or the maximum of the 99th percentile concentrations for the discharge from the Misery Pit to Lac du Sauvage.

In post-closure, water quality predictions in Lac du Sauvage using the maximum of mean and the maximum of 99th percentile concentrations for the WRSA runoff and the monimolimnion of the Jay Pit were compared. Long-term post-closure concentrations of TDS were predicted to increase by less than 5 mg/L when using the maximum of the 99th percentile WRSA runoff concentrations but reach a steady state similar to the mean model scenario (Figure 8F3.1-3). Long-term post-closure concentrations of chloride were predicted to increase by less than 2 mg/L when using the maximum of the 99th percentile WRSA runoff concentrations compared to the mean scenario (Figure 8F3.1-4). Post-closure concentrations of TDS and chloride were predicted to be nearly identical when using the maximum of the mean or the maximum of the 99th percentile monimolimnion water quality concentrations (Figures 8F3.1-3 and 8F3.1-4).

In general, the Lac du Sauvage Model was not sensitive to changes in the input water quality for the discharge from the Misery Pit to Lac du Sauvage, the WRSA runoff, and the monimolimnion of the Jay Pit.

8F3.2 Lac de Gras

Lac de Gras Model predictions are presented in table format (Table 8F3.2-1 to Table 8F3.2-3) as maximum concentrations, maximum depth-averaged concentrations, and maximum surface concentrations for the ice-covered and open-water seasons. Model predictions are also presented in time series format (Attachment 8F5).

Model predictions are presented for the following locations (Map 8F2.2-2):

- LDG-P1: FF2-2 Diavik Mine AEMP station located between the Diavik Mine discharge and the inflow from Lac du Sauvage (a calibration location in the Lac de Gras Model);
- LDG-P2: location of the FF1 Diavik Mine AEMP stations where the discharge from Paul Lake enters Lac de Gras (a calibration location in the Lac de Gras Model);
- LDG-P3: location of the FFB Diavik Mine AEMP stations (a calibration location in the Lac de Gras Model);

- LDG-P4: location of the FFA Diavik Mine AEMP stations (a calibration location in the Lac de Gras Model);
- LDG-P5: a location south of the S2 and S3 Ekati Mine AEMP stations; and,
- LDG-P6: Lac de Gras outlet.

Predicted concentrations for constituents rise steadily in Lac de Gras until the assumed end of operations at the Diavik Mine in 2023. From 2024 to 2028, predicted concentrations for most constituents begin to decrease. Between 2029 and 2033, predicted concentrations for constituents including TDS, calcium, chloride, ammonia, nitrate, and strontium increase steadily in Lac de Gras again as a result of Project-affected inflows from Lac du Sauvage. Concentrations in Lac de Gras are predicted to decrease rapidly in the post-closure period (2034 to 2060). Predicted concentrations at LDG-P5 and LDG-P6 are influenced by discharge from Slipper Lake to Lac de Gras. Concentrations at LDG-P6 during the ice-covered season are predicted to peak at higher concentrations than at other locations in the lake because of the shallow depth of the lake at LDG-P6. As stated in Section 8F3.1.1, water quality concentrations in Lac du Sauvage were not predicted to be sensitive to the maximum of 99th percentile water quality concentrations from the minewater pumped from the Misery Pit to Lac du Sauvage, for runoff from the WRSA, or for the monimolimnion of the Jay Pit. Because only minor changes in water quality were predicted in Lac du Sauvage, the maximum of 99th percentile water quality concentrations was not input to the Lac de Gras Model.

Table 8F3.2-1 Predicted Maximum Concentrations in Lac de Gras
Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	4.7	14	2.9	17	4.0	13	5.0	16	3.5	16	1.9	17	2.6	15	3.6	16	2.8	15	1.6	14	3.0	15	3.1	15
Dissolved oxygen[(a)]	mg/L	12	11	12	11	13	11	12	11	11	10	11	9.9	11	10	11	9.4	12	10	12	10	12	11	11	10
Conventional Constituents																									
Hardness (calculated)	mg/L	13	11	15	13	14	14	12	9.7	15	10	14	10	15	11	13	10	14	11	14	10	15	11	13	10
Total dissolved solids	mg/L	29	26	31	26	32	29	27	22	34	24	32	24	34	24	30	23	31	24	31	23	33	24	30	23
Total suspended solids[(b)]	mg/L	2.4	1.9	2.3	1.8	2.2	1.6	2.1	1.5	2.7	1.9	2.6	1.9	2.4	1.7	2.3	1.6	2.5	1.9	2.4	1.8	2.3	1.7	2.1	1.6
Major Ions																									
Calcium	mg/L	2.6	2.3	3.7	3.4	3.7	4.0	3.1	2.4	3.0	2.1	2.9	2.1	3.8	2.7	3.3	2.5	2.8	2.1	2.8	2.1	3.6	2.7	3.2	2.5
Chloride	mg/L	5.1	4.9	8.3	8.0	8.2	9.8	6.5	5.3	6.1	4.2	6.0	4.3	8.2	5.9	6.9	5.4	5.6	4.3	5.8	4.3	7.9	5.8	7.0	5.4
Fluoride	mg/L	0.019	0.015	0.017	0.014	0.016	0.012	0.015	0.011	0.022	0.015	0.02	0.015	0.018	0.013	0.016	0.012	0.021	0.015	0.019	0.014	0.017	0.013	0.016	0.012
Magnesium	mg/L	1.6	1.4	1.4	1.2	1.3	0.99	1.1	0.88	1.8	1.3	1.7	1.3	1.4	1.0	1.2	0.93	1.7	1.3	1.6	1.2	1.4	1.0	1.2	0.93
Potassium	mg/L	1.6	1.4	1.5	1.2	1.2	0.95	1.1	0.85	1.8	1.3	1.8	1.3	1.4	1.0	1.2	0.9	1.7	1.3	1.7	1.3	1.3	1.0	1.2	0.91
Sodium	mg/L	3.1	2.9	3.2	2.8	3.2	3.1	2.7	2.2	3.6	2.5	3.4	2.6	3.4	2.4	2.9	2.3	3.4	2.6	3.3	2.5	3.4	2.4	3.0	2.3
Sulphate	mg/L	6.2	6.0	5.7	4.9	4.0	3.4	3.4	2.8	7.3	5.1	6.8	5.1	4.6	3.6	3.8	3.0	6.6	5.1	6.4	5.0	4.5	3.7	3.9	3.0
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.39	0.37	0.34	0.36	0.34	0.35	0.28	0.26	0.36	0.31	0.32	0.3	0.29	0.28	0.27	0.25	0.35	0.3	0.31	0.28	0.29	0.27	0.27	0.26
Total ammonia	mg-N/L	0.062	0.043	0.059	0.043	0.046	0.036	0.028	0.019	0.07	0.04	0.064	0.044	0.04	0.029	0.027	0.02	0.064	0.037	0.061	0.039	0.039	0.029	0.027	0.019
Nitrate	mg-N/L	0.12	0.12	0.078	0.11	0.084	0.11	0.048	0.034	0.087	0.058	0.047	0.044	0.045	0.04	0.039	0.027	0.079	0.06	0.045	0.036	0.041	0.039	0.039	0.028
Total phosphorus (calculated)	mg-P/L	0.0047	0.0046	0.0045	0.0045	0.0038	0.0037	0.0033	0.003	0.0051	0.0044	0.0047	0.0045	0.0038	0.0034	0.0034	0.003	0.0047	0.0038	0.0046	0.0037	0.0037	0.0033	0.0034	0.003
Dissolved orthophosphate	mg/L	0.0033	0.0032	0.0031	0.0031	0.0024	0.0023	0.0019	0.0016	0.0037	0.003	0.0033	0.0031	0.0024	0.002	0.002	0.0016	0.0033	0.0024	0.0032	0.0023	0.0023	0.0019	0.002	0.0016
Phytoplankton (as chlorophyll *a*)	µg/L	3.9	4.7	4.0	4.3	2.6	2.5	0.82	0.91	4.3	6.1	5.1	5.7	1.8	3.0	0.92	1.5	4.5	6.0	5.0	5.7	1.9	2.7	0.93	1.2
Silica, reactive	mg/L	0.18	0.13	0.19	0.14	0.2	0.14	0.2	0.14	0.21	0.14	0.19	0.14	0.22	0.15	0.22	0.15	0.2	0.14	0.18	0.14	0.21	0.15	0.2	0.14
Total Metals																									
Aluminum	µg/L	42	42	35	33	31	32	24	21	45	31	41	31	32	24	26	20	41	31	39	31	31	24	26	20
Arsenic	µg/L	0.49	0.48	0.45	0.41	0.37	0.34	0.34	0.31	0.48	0.35	0.46	0.35	0.34	0.27	0.31	0.24	0.45	0.35	0.44	0.35	0.35	0.28	0.32	0.24
Barium	µg/L	10	9.0	9.2	7.6	7.8	6.2	7.0	5.3	9.2	6.3	8.6	6.3	6.4	4.6	5.6	3.9	8.5	6.3	8.3	6.2	6.5	4.7	5.8	4.0
Beryllium	µg/L	0.14	0.14	0.13	0.13	0.12	0.11	0.11	0.11	0.14	0.13	0.14	0.13	0.12	0.11	0.11	0.11	0.13	0.13	0.13	0.13	0.12	0.12	0.11	0.11
Bismuth	µg/L	0.12	0.12	0.11	0.11	0.11	0.11	0.1	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.1
Cadmium	µg/L	0.042	0.041	0.039	0.037	0.035	0.033	0.033	0.031	0.044	0.037	0.043	0.037	0.037	0.033	0.034	0.031	0.042	0.037	0.042	0.037	0.037	0.033	0.035	0.031
Chromium	µg/L	0.24	0.15	0.2	0.12	0.15	0.1	0.12	0.078	0.27	0.13	0.25	0.13	0.16	0.095	0.13	0.081	0.24	0.13	0.23	0.12	0.16	0.097	0.13	0.082
Cobalt	µg/L	0.089	0.089	0.1	0.10	0.1	0.1	0.086	0.077	0.093	0.08	0.093	0.08	0.099	0.083	0.089	0.078	0.088	0.08	0.091	0.08	0.097	0.083	0.089	0.078
Copper	µg/L	0.47	0.42	0.45	0.4	0.44	0.39	0.42	0.37	0.5	0.39	0.49	0.4	0.46	0.38	0.43	0.37	0.48	0.4	0.48	0.4	0.46	0.38	0.44	0.37
Iron	µg/L	56	59	45	44	31	32	22	22	61	44	56	44	33	27	26	21	55	43	52	42	32	28	26	21
Lead	µg/L	0.046	0.043	0.042	0.038	0.04	0.038	0.036	0.033	0.048	0.039	0.046	0.039	0.04	0.036	0.037	0.034	0.046	0.039	0.045	0.039	0.04	0.036	0.037	0.034
Manganese	µg/L	5.3	7.3	4.8	6.4	4.4	6.3	3.6	5.1	6.1	3.6	5.7	3.6	4.9	2.8	4.2	2.4	5.6	3.6	5.5	3.5	4.8	2.9	4.2	2.4

Table 8F3.2-1 Predicted Maximum Concentrations in Lac de Gras
Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Mercury	µg/L	0.014	0.014	0.013	0.013	0.012	0.012	0.012	0.011	0.014	0.013	0.014	0.013	0.012	0.012	0.012	0.011	0.013	0.013	0.013	0.013	0.012	0.012	0.012	0.011
Total Metals																									
Molybdenum	µg/L	4.9	4.4	4.4	3.5	3.5	2.4	3.1	2.0	5.6	3.4	5.3	3.4	3.9	2.3	3.3	1.9	5.2	3.4	5.2	3.4	4.1	2.4	3.6	2.0
Nickel	µg/L	1.4	1.3	1.3	1.2	1.2	1.0	1.1	0.94	1.7	1.2	1.6	1.2	1.4	1.0	1.3	0.95	1.6	1.2	1.6	1.2	1.4	1.0	1.3	0.95
Selenium	µg/L	0.2	0.2	0.17	0.16	0.12	0.11	0.1	0.092	0.22	0.17	0.2	0.17	0.13	0.12	0.11	0.096	0.2	0.17	0.2	0.16	0.13	0.12	0.11	0.096
Silver	µg/L	0.068	0.064	0.064	0.06	0.058	0.055	0.055	0.054	0.07	0.061	0.068	0.061	0.059	0.056	0.056	0.054	0.067	0.061	0.066	0.06	0.058	0.056	0.056	0.054
Strontium	µg/L	55	46	136	104	132	108	107	66	56	35	101	54	128	68	108	63	53	36	98	55	125	68	110	63
Uranium	µg/L	0.65	0.66	0.53	0.5	0.43	0.4	0.32	0.28	0.64	0.46	0.58	0.46	0.37	0.3	0.29	0.23	0.57	0.46	0.54	0.45	0.36	0.31	0.29	0.23
Vanadium	µg/L	0.94	0.13	0.75	0.11	0.45	0.095	0.33	0.082	1.0	0.11	0.95	0.11	0.5	0.094	0.39	0.086	0.93	0.12	0.89	0.11	0.49	0.098	0.4	0.088
Zinc	µg/L	4.1	0.69	4.1	0.62	4.1	0.61	4.1	0.54	1.6	0.63	1.5	0.63	1.5	0.58	1.4	0.55	1.5	0.63	1.5	0.63	1.5	0.58	1.5	0.55
Dissolved Metals																									
Aluminum	µg/L	6.6	5.8	6.1	4.6	5.5	3.9	4.8	3.0	7.9	4.8	7.5	4.8	6.4	3.7	5.4	3.2	7.4	4.9	7.4	4.8	6.6	3.9	5.8	3.3
Arsenic	µg/L	0.14	0.13	0.12	0.099	0.1	0.075	0.085	0.056	0.16	0.1	0.15	0.1	0.12	0.073	0.098	0.06	0.15	0.1	0.15	0.1	0.12	0.076	0.1	0.061
Barium	µg/L	4.5	4.2	4.0	3.3	3.2	2.5	2.7	1.8	5.3	3.4	5.0	3.4	3.7	2.4	3.1	1.9	4.9	3.4	4.8	3.4	3.8	2.4	3.2	2.0
Beryllium	µg/L	0.02	0.02	0.015	0.015	0.0088	0.0078	0.0058	0.0051	0.022	0.015	0.02	0.015	0.0096	0.0083	0.0069	0.0056	0.019	0.015	0.018	0.015	0.0095	0.0085	0.0069	0.0056
Bismuth	µg/L	0.003	0.003	0.0025	0.0022	0.0023	0.0021	0.0016	0.0012	0.0033	0.0023	0.0029	0.0023	0.0023	0.0016	0.0018	0.0013	0.0029	0.0023	0.0027	0.0022	0.0022	0.0017	0.0018	0.0013
Cadmium	µg/L	0.018	0.017	0.015	0.013	0.011	0.0089	0.0094	0.0065	0.021	0.014	0.019	0.014	0.013	0.0089	0.011	0.007	0.019	0.014	0.019	0.013	0.013	0.0092	0.011	0.0071
Chromium	µg/L	0.12	0.11	0.097	0.084	0.064	0.051	0.053	0.038	0.13	0.088	0.12	0.088	0.076	0.054	0.061	0.041	0.12	0.088	0.12	0.086	0.077	0.056	0.065	0.042
Cobalt	µg/L	0.017	0.017	0.041	0.039	0.04	0.041	0.028	0.02	0.018	0.013	0.03	0.019	0.038	0.024	0.031	0.021	0.016	0.013	0.029	0.019	0.036	0.024	0.03	0.021
Copper	µg/L	0.097	0.07	0.12	0.08	0.12	0.08	0.11	0.062	0.12	0.062	0.12	0.064	0.13	0.068	0.12	0.065	0.11	0.065	0.12	0.068	0.14	0.071	0.13	0.067
Iron	µg/L	1.5	0.91	4.2	3.5	4.2	3.7	3.5	2.2	1.8	0.86	3.4	1.8	4.5	2.4	3.8	2.3	1.7	0.92	3.4	1.9	4.5	2.5	4.0	2.3
Lead	µg/L	0.0058	0.0054	0.0072	0.0064	0.007	0.0064	0.0059	0.0044	0.0069	0.0046	0.0068	0.0047	0.0078	0.005	0.0066	0.0047	0.0064	0.0048	0.0067	0.0049	0.0079	0.0052	0.0069	0.0048
Manganese	µg/L	3.5	3.4	3.3	2.8	3.1	2.8	2.3	1.7	4.0	2.7	3.7	2.7	3.2	2.2	2.6	1.8	3.6	2.7	3.5	2.6	3.2	2.2	2.7	1.8
Mercury	µg/L	0.004	0.004	0.0031	0.0029	0.0019	0.0017	0.0012	0.0011	0.0043	0.0031	0.0039	0.0031	0.002	0.0017	0.0014	0.0012	0.0039	0.003	0.0036	0.003	0.0019	0.0017	0.0015	0.0012
Molybdenum	µg/L	4.4	3.8	3.9	3.0	3.1	2.0	2.8	1.7	5.2	3.1	4.9	3.2	3.7	2.2	3.2	1.8	4.8	3.2	4.8	3.1	3.9	2.3	3.4	1.8
Nickel	µg/L	0.45	0.45	0.4	0.36	0.33	0.29	0.27	0.22	0.54	0.37	0.5	0.37	0.38	0.28	0.31	0.24	0.49	0.38	0.48	0.37	0.39	0.29	0.33	0.24
Selenium	µg/L	0.088	0.085	0.072	0.064	0.047	0.038	0.037	0.028	0.10	0.067	0.091	0.067	0.054	0.04	0.043	0.03	0.09	0.067	0.087	0.065	0.054	0.041	0.045	0.03
Silver	µg/L	0.008	0.008	0.0062	0.0058	0.0036	0.0032	0.0024	0.0021	0.0087	0.0062	0.0078	0.0061	0.0039	0.0034	0.0028	0.0023	0.0077	0.0061	0.0073	0.0059	0.0038	0.0034	0.0028	0.0023
Strontium	µg/L	40	33	121	91	118	96	92	53	48	28	93	48	120	61	100	56	45	29	90	48	117	61	102	56
Uranium	µg/L	0.54	0.54	0.42	0.39	0.33	0.3	0.22	0.18	0.59	0.42	0.53	0.41	0.33	0.26	0.25	0.2	0.52	0.41	0.49	0.4	0.32	0.27	0.25	0.2
Vanadium	µg/L	0.093	0.072	0.086	0.063	0.082	0.051	0.077	0.046	0.11	0.063	0.11	0.065	0.098	0.053	0.091	0.049	0.11	0.066	0.11	0.065	0.1	0.056	0.094	0.051
Zinc	µg/L	0.24	0.21	0.25	0.19	0.23	0.19	0.2	0.13	0.29	0.17	0.27	0.18	0.27	0.15	0.22	0.14	0.27	0.18	0.27	0.17	0.27	0.16	0.24	0.14

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.2-1 Predicted Maximum Concentrations in Lac de Gras
Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	3.7	15	1.9	14	2.7	14	3.9	15	3.2	15	1.8	16	3.0	15	3.4	16	2.7	17	2.0	16	2.8	16	2.9	16
Dissolved oxygen[(a)]	mg/L	11	10	12	10	12	10	11	10	11	10	11	10	12	10	11	10.0	11	10	11	10	11	10	11	10
Conventional Constituents																									
Hardness (calculated)	mg/L	15	9.4	14	9.4	15	9.6	14	9.0	16	10	15	10	15	10	14	9.3	16	9.6	14	9.9	15	9.9	14	9.3
Total dissolved solids	mg/L	35	21	33	21	34	21	31	20	36	23	34	23	35	23	32	21	37	22	33	22	34	22	33	21
Total suspended solids[(b)]	mg/L	2.7	1.6	2.5	1.6	2.3	1.5	2.3	1.4	2.7	1.7	2.6	1.7	2.4	1.6	2.3	1.5	2.8	1.7	2.5	1.7	2.4	1.5	2.4	1.5
Major Ions																									
Calcium	mg/L	3.1	1.9	2.9	1.9	3.7	2.3	3.4	2.2	3.2	2.1	3.0	2.1	3.8	2.4	3.4	2.3	3.3	2.0	2.9	2.0	3.7	2.4	3.5	2.3
Chloride	mg/L	6.5	4.1	6.1	4.2	8.0	5.1	7.3	4.9	6.8	4.8	6.3	4.7	8.3	5.4	7.4	5.2	6.9	4.3	6.1	4.3	8.2	5.3	7.5	5.1
Fluoride	mg/L	0.021	0.013	0.02	0.013	0.017	0.011	0.016	0.011	0.022	0.014	0.02	0.013	0.018	0.012	0.017	0.011	0.023	0.013	0.02	0.013	0.018	0.012	0.017	0.011
Magnesium	mg/L	1.8	1.1	1.7	1.1	1.4	0.92	1.3	0.83	1.9	1.2	1.8	1.2	1.4	0.96	1.3	0.87	1.9	1.1	1.7	1.2	1.4	0.94	1.3	0.86
Potassium	mg/L	1.9	1.2	1.8	1.2	1.4	0.93	1.3	0.84	1.9	1.2	1.8	1.2	1.4	0.98	1.3	0.92	2.0	1.2	1.8	1.2	1.4	0.95	1.3	0.87
Sodium	mg/L	3.8	2.4	3.5	2.4	3.5	2.2	3.2	2.1	4.0	2.7	3.7	2.6	3.6	2.4	3.3	2.3	4.0	2.5	3.5	2.5	3.6	2.3	3.4	2.2
Sulphate	mg/L	7.3	4.5	6.8	4.5	4.6	3.3	4.1	2.7	7.6	4.7	7.1	4.8	4.8	3.5	4.2	3.0	7.7	4.5	6.8	4.7	4.6	3.4	4.3	2.9
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.36	0.3	0.32	0.29	0.29	0.26	0.28	0.26	0.37	0.32	0.32	0.29	0.29	0.27	0.28	0.28	0.37	0.3	0.32	0.27	0.29	0.26	0.28	0.26
Total ammonia	mg-N/L	0.072	0.038	0.065	0.043	0.04	0.025	0.028	0.018	0.074	0.039	0.068	0.043	0.042	0.026	0.028	0.019	0.075	0.036	0.065	0.036	0.041	0.025	0.029	0.018
Nitrate	mg-N/L	0.082	0.054	0.044	0.039	0.041	0.031	0.046	0.036	0.085	0.071	0.045	0.041	0.043	0.04	0.045	0.054	0.088	0.056	0.047	0.028	0.043	0.032	0.048	0.039
Total phosphorus (calculated)	mg-P/L	0.005	0.0041	0.0048	0.0044	0.0038	0.0033	0.0035	0.003	0.0051	0.0042	0.0049	0.0044	0.0039	0.0033	0.0036	0.003	0.0052	0.003	0.0047	0.003	0.0038	0.0029	0.0036	0.0027
Dissolved orthophosphate	mg/L	0.0036	0.0027	0.0034	0.003	0.0024	0.0019	0.0021	0.0016	0.0037	0.0028	0.0035	0.003	0.0025	0.0019	0.0022	0.0016	0.0038	0.0016	0.0033	0.0016	0.0024	0.0015	0.0022	0.0013
Phytoplankton (as chlorophyll *a*)	µg/L	4.5	5.9	5.2	5.8	1.9	2.7	1.0	1.4	4.6	6.0	5.5	5.7	2.0	2.8	1.0	1.4	4.6	6.2	5.5	6.1	2.0	2.9	1.0	1.5
Silica, reactive	mg/L	0.21	0.13	0.19	0.13	0.21	0.13	0.22	0.13	0.21	0.13	0.19	0.13	0.22	0.14	0.22	0.14	0.22	0.13	0.2	0.13	0.22	0.14	0.22	0.13
Total Metals																									
Aluminum	µg/L	45	27	41	27	32	21	27	18	46	28	43	29	33	22	27	19	47	27	41	28	31	22	28	19
Arsenic	µg/L	0.48	0.33	0.46	0.33	0.36	0.27	0.33	0.24	0.49	0.34	0.47	0.34	0.36	0.27	0.33	0.25	0.5	0.32	0.46	0.34	0.36	0.27	0.33	0.24
Barium	µg/L	9.4	5.7	8.8	5.7	6.8	4.4	6.1	3.8	9.6	6.0	9.1	6.2	7.0	4.8	6.2	4.2	9.8	5.7	8.9	5.9	6.8	4.5	6.3	4.0
Beryllium	µg/L	0.14	0.12	0.13	0.12	0.12	0.11	0.11	0.11	0.14	0.12	0.14	0.12	0.12	0.11	0.11	0.11	0.14	0.12	0.13	0.12	0.12	0.11	0.11	0.11
Bismuth	µg/L	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1
Cadmium	µg/L	0.044	0.036	0.043	0.036	0.038	0.032	0.036	0.031	0.045	0.036	0.044	0.037	0.038	0.033	0.036	0.031	0.046	0.036	0.043	0.036	0.038	0.032	0.036	0.031
Chromium	µg/L	0.27	0.11	0.25	0.11	0.16	0.09	0.14	0.078	0.27	0.12	0.26	0.12	0.17	0.096	0.14	0.085	0.28	0.11	0.25	0.12	0.17	0.092	0.14	0.081
Cobalt	µg/L	0.091	0.075	0.09	0.075	0.097	0.078	0.089	0.075	0.092	0.075	0.091	0.076	0.098	0.079	0.089	0.075	0.093	0.075	0.088	0.076	0.096	0.079	0.089	0.075
Copper	µg/L	0.51	0.39	0.5	0.39	0.48	0.38	0.46	0.37	0.52	0.4	0.51	0.41	0.49	0.39	0.46	0.38	0.53	0.39	0.5	0.39	0.48	0.38	0.47	0.37
Iron	µg/L	60	37	55	37	32	25	26	19	61	37	56	39	34	26	26	19	62	37	54	39	34	25	26	19
Lead	µg/L	0.048	0.037	0.046	0.037	0.041	0.034	0.038	0.033	0.049	0.038	0.047	0.038	0.041	0.035	0.038	0.034	0.049	0.037	0.046	0.038	0.04	0.035	0.038	0.033
Manganese	µg/L	6.1	3.1	5.7	3.1	4.9	2.5	4.4	2.2	6.2	3.3	5.9	3.4	5.1	2.7	4.4	2.3	6.3	3.1	5.7	3.3	4.9	2.6	4.4	2.3

Table 8F3.2-1 Predicted Maximum Concentrations in Lac de Gras Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Mercury	µg/L	0.014	0.012	0.013	0.012	0.012	0.012	0.012	0.011	0.014	0.012	0.014	0.012	0.012	0.012	0.012	0.011	0.014	0.012	0.013	0.012	0.012	0.012	0.012	0.011
Total Metals (continued)																									
Molybdenum	µg/L	6.0	3.1	5.7	3.2	4.5	2.3	4.0	2.0	6.3	3.6	6.0	3.6	4.7	2.7	4.2	2.4	6.4	3.2	5.8	3.3	4.6	2.4	4.3	2.1
Nickel	µg/L	1.7	1.1	1.6	1.1	1.4	0.99	1.4	0.94	1.7	1.1	1.6	1.2	1.4	1.0	1.4	0.99	1.7	1.1	1.6	1.1	1.4	1.0	1.4	0.95
Selenium	µg/L	0.22	0.15	0.2	0.15	0.14	0.11	0.12	0.093	0.22	0.15	0.21	0.16	0.14	0.11	0.12	0.096	0.23	0.15	0.2	0.15	0.14	0.11	0.12	0.094
Silver	µg/L	0.069	0.059	0.067	0.059	0.059	0.055	0.056	0.054	0.069	0.059	0.068	0.059	0.059	0.055	0.056	0.054	0.07	0.059	0.067	0.059	0.059	0.055	0.056	0.054
Strontium	µg/L	61	35	99	50	129	61	115	58	64	40	101	52	133	67	118	65	66	36	95	50	130	64	120	60
Uranium	µg/L	0.62	0.39	0.56	0.39	0.36	0.27	0.29	0.21	0.64	0.39	0.58	0.4	0.37	0.28	0.29	0.21	0.65	0.38	0.56	0.41	0.37	0.27	0.29	0.21
Vanadium	µg/L	1.0	0.11	0.94	0.11	0.52	0.097	0.41	0.092	1.1	0.13	0.97	0.13	0.53	0.11	0.41	0.11	1.1	0.12	0.94	0.11	0.56	0.10	0.42	0.094
Zinc	µg/L	1.6	0.61	1.6	0.61	1.5	0.57	1.5	0.54	1.6	0.63	1.6	0.63	1.5	0.58	1.5	0.57	1.6	0.61	1.6	0.62	1.5	0.57	1.5	0.55
Dissolved Metals																									
Aluminum	µg/L	8.6	4.6	8.2	4.7	7.3	3.8	6.6	3.4	9.1	5.3	8.7	5.4	7.7	4.4	6.9	4.1	9.3	4.7	8.3	4.7	7.5	3.9	7.0	3.5
Arsenic	µg/L	0.17	0.094	0.16	0.095	0.13	0.071	0.12	0.061	0.18	0.11	0.17	0.11	0.14	0.082	0.12	0.072	0.19	0.094	0.17	0.099	0.13	0.073	0.12	0.063
Barium	µg/L	5.6	3.0	5.2	3.1	4.1	2.2	3.6	1.9	5.8	3.4	5.5	3.5	4.3	2.6	3.7	2.2	5.9	3.0	5.3	3.2	4.1	2.3	3.8	2.0
Beryllium	µg/L	0.021	0.013	0.019	0.013	0.0098	0.0075	0.0071	0.005	0.022	0.013	0.02	0.013	0.0099	0.0078	0.007	0.0051	0.022	0.013	0.019	0.013	0.01	0.0076	0.007	0.0052
Bismuth	µg/L	0.0031	0.0019	0.0029	0.0019	0.0022	0.0014	0.0018	0.0011	0.0032	0.0019	0.0029	0.002	0.0023	0.0015	0.0018	0.0012	0.0033	0.0019	0.0028	0.002	0.0022	0.0014	0.0018	0.0012
Cadmium	µg/L	0.022	0.012	0.02	0.012	0.014	0.0084	0.012	0.0069	0.023	0.013	0.021	0.014	0.015	0.0095	0.013	0.008	0.023	0.012	0.02	0.013	0.015	0.0088	0.013	0.0071
Chromium	µg/L	0.14	0.077	0.13	0.077	0.082	0.051	0.07	0.04	0.14	0.083	0.13	0.086	0.086	0.057	0.072	0.046	0.14	0.076	0.13	0.081	0.084	0.053	0.074	0.042
Cobalt	µg/L	0.018	0.011	0.027	0.016	0.036	0.021	0.03	0.018	0.018	0.011	0.028	0.016	0.037	0.021	0.03	0.019	0.018	0.011	0.026	0.015	0.035	0.021	0.031	0.019
Copper	µg/L	0.13	0.068	0.14	0.072	0.15	0.073	0.14	0.072	0.14	0.084	0.14	0.084	0.16	0.088	0.15	0.087	0.15	0.073	0.14	0.073	0.16	0.076	0.15	0.075
Iron	µg/L	2.2	1.0	3.6	1.8	4.7	2.3	4.3	2.2	2.3	1.4	3.7	2.0	5.0	2.6	4.5	2.6	2.4	1.1	3.5	1.8	4.9	2.4	4.6	2.3
Lead	µg/L	0.0075	0.0047	0.0073	0.0049	0.0084	0.0051	0.0076	0.0049	0.008	0.0056	0.0076	0.0057	0.0089	0.0059	0.0079	0.0058	0.0081	0.0049	0.0075	0.0049	0.0087	0.0052	0.008	0.005
Manganese	µg/L	4.0	2.3	3.7	2.3	3.3	1.9	2.8	1.6	4.2	2.5	3.9	2.5	3.4	2.0	2.8	1.8	4.2	2.3	3.7	2.4	3.3	2.0	2.9	1.7
Mercury	µg/L	0.0042	0.0025	0.0038	0.0026	0.002	0.0015	0.0015	0.001	0.0043	0.0026	0.0039	0.0027	0.002	0.0016	0.0015	0.0011	0.0044	0.0025	0.0038	0.0027	0.0021	0.0016	0.0015	0.0011
Molybdenum	µg/L	5.6	2.9	5.4	3.0	4.3	2.2	3.9	1.9	5.9	3.4	5.7	3.4	4.5	2.6	4.0	2.3	6.0	3.0	5.4	3.1	4.4	2.3	4.1	2.0
Nickel	µg/L	0.56	0.35	0.52	0.35	0.41	0.28	0.36	0.25	0.58	0.4	0.55	0.4	0.44	0.32	0.38	0.29	0.59	0.35	0.53	0.36	0.42	0.29	0.38	0.25
Selenium	µg/L	0.1	0.058	0.093	0.058	0.058	0.038	0.048	0.028	0.1	0.062	0.097	0.064	0.06	0.041	0.049	0.033	0.11	0.057	0.093	0.061	0.06	0.039	0.05	0.03
Silver	µg/L	0.0084	0.0051	0.0076	0.0051	0.004	0.003	0.0029	0.0021	0.0086	0.0051	0.0079	0.0053	0.004	0.0032	0.0029	0.0021	0.0088	0.005	0.0075	0.0054	0.0042	0.0031	0.0028	0.0021
Strontium	µg/L	53	28	91	43	121	55	107	51	56	33	93	45	126	60	110	58	57	29	87	43	123	57	112	54
Uranium	µg/L	0.57	0.34	0.51	0.35	0.32	0.23	0.26	0.17	0.58	0.35	0.53	0.36	0.33	0.24	0.26	0.18	0.59	0.34	0.51	0.36	0.33	0.24	0.26	0.18
Vanadium	µg/L	0.13	0.067	0.12	0.069	0.12	0.059	0.11	0.057	0.13	0.082	0.13	0.082	0.12	0.073	0.11	0.07	0.14	0.071	0.13	0.069	0.12	0.062	0.12	0.06
Zinc	µg/L	0.31	0.17	0.29	0.17	0.29	0.15	0.26	0.14	0.33	0.19	0.31	0.19	0.31	0.17	0.27	0.16	0.33	0.17	0.3	0.17	0.3	0.15	0.28	0.14

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.2-2 Predicted Maximum of Depth-Averaged Concentrations in Lac de Gras
Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	4.6	11	2.9	11	3.8	11	4.8	11	2.9	11	1.2	11	1.6	11	3.1	11	2.1	13	1.4	14	2.6	14	2.9	14
Dissolved oxygen[(a)]	mg/L	10	9.8	10.0	9.7	10	9.8	9.9	9.7	10.0	9.2	9.9	8.6	10.0	9.3	9.7	8.5	10	10	10	10	10	10	10	9.8
Conventional Constituents																									
Hardness (calculated)	mg/L	10.66	10.8	11.73	11.24	11.18	11.74	9.28	9.04	10.53	9.83	10.71	9.91	10.91	10.38	10.23	9.5	10.45	9.56	10.35	9.47	10.44	9.9	9.9	9.0
Total dissolved solids	mg/L	24	24	24	23	24	25	21	20	24	22	24	22	24	23	23	21	24	21	23	21	23	22	22	20
Total suspended solids[(b)]	mg/L	1.8	1.8	1.7	1.7	1.5	1.5	1.5	1.4	1.9	1.8	1.9	1.7	1.7	1.6	1.6	1.5	1.8	1.7	1.8	1.7	1.6	1.6	1.6	1.4
Major Ions																									
Calcium	mg/L	2.1	2.1	2.8	2.6	2.9	3.1	2.3	2.3	2.1	2.0	2.2	2.0	2.7	2.5	2.5	2.4	2.1	1.9	2.1	1.9	2.5	2.4	2.5	2.2
Chloride	mg/L	4.5	4.5	6.3	5.9	6.6	7.3	5.0	4.9	4.2	3.9	4.6	4.2	5.8	5.5	5.5	5.1	4.3	3.9	4.4	4.0	5.5	5.2	5.3	4.8
Fluoride	mg/L	0.015	0.015	0.013	0.013	0.012	0.012	0.011	0.011	0.015	0.014	0.015	0.014	0.013	0.012	0.012	0.011	0.015	0.014	0.014	0.013	0.012	0.012	0.012	0.011
Magnesium	mg/L	1.3	1.3	1.2	1.1	0.96	0.95	0.84	0.81	1.3	1.2	1.3	1.2	1.0	0.98	0.94	0.87	1.3	1.2	1.2	1.1	1.0	0.94	0.91	0.83
Potassium	mg/L	1.3	1.3	1.2	1.2	0.91	0.9	0.81	0.79	1.3	1.2	1.3	1.2	1.0	0.97	0.91	0.85	1.3	1.2	1.3	1.1	0.99	0.93	0.89	0.82
Sodium	mg/L	2.6	2.7	2.5	2.4	2.5	2.6	2.1	2.0	2.5	2.4	2.5	2.4	2.4	2.3	2.3	2.1	2.6	2.3	2.5	2.2	2.3	2.2	2.2	2.0
Sulphate	mg/L	5.5	5.6	4.7	4.6	3.2	3.2	2.6	2.5	5.1	4.8	5.1	4.8	3.6	3.4	3.0	2.8	5.1	4.5	5.0	4.5	3.5	3.3	2.9	2.7
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.36	0.35	0.31	0.31	0.31	0.31	0.26	0.26	0.32	0.3	0.3	0.28	0.28	0.27	0.26	0.25	0.31	0.29	0.3	0.27	0.27	0.27	0.26	0.25
Total ammonia	mg-N/L	0.047	0.04	0.046	0.039	0.038	0.032	0.022	0.018	0.049	0.036	0.05	0.038	0.033	0.027	0.023	0.018	0.048	0.036	0.048	0.035	0.03	0.026	0.021	0.017
Nitrate	mg-N/L	0.1	0.1	0.059	0.068	0.066	0.074	0.03	0.03	0.06	0.053	0.044	0.036	0.04	0.037	0.026	0.025	0.06	0.05	0.042	0.027	0.037	0.032	0.028	0.025
Total phosphorus (calculated)	mg-P/L	0.0044	0.0043	0.0043	0.004	0.0036	0.0035	0.003	0.0029	0.0043	0.0037	0.0044	0.0036	0.0034	0.0032	0.0031	0.0029	0.0043	0.0033	0.0043	0.003	0.0034	0.003	0.003	0.0027
Dissolved orthophosphate	mg-P/L	0.003	0.0029	0.0029	0.0026	0.0022	0.0021	0.0016	0.0015	0.0029	0.0023	0.003	0.0022	0.002	0.0018	0.0017	0.0015	0.0029	0.0019	0.0029	0.0016	0.002	0.0016	0.0016	0.0013
Phytoplankton (as chlorophyll *a*)	µg/L	3.9	4.5	3.3	4.0	1.7	2.2	0.82	0.9	4.3	5.3	3.6	5.3	1.8	2.5	0.91	1.2	4.4	6.0	3.8	5.7	1.9	2.6	0.92	1.2
Silica, reactive	mg/L	0.13	0.13	0.14	0.13	0.14	0.14	0.14	0.13	0.14	0.13	0.14	0.13	0.15	0.14	0.15	0.14	0.14	0.13	0.14	0.13	0.14	0.14	0.14	0.13
Total Metals																									
Aluminum	µg/L	38	39	31	30	26	27	20	20	33	30	33	29	26	23	22	19	32	28	32	27	25	22	21	18
Arsenic	µg/L	0.47	0.46	0.42	0.4	0.35	0.33	0.32	0.3	0.39	0.34	0.39	0.34	0.32	0.27	0.29	0.24	0.39	0.33	0.39	0.33	0.31	0.26	0.28	0.23
Barium	µg/L	9.6	8.5	8.5	7.2	7.1	5.8	6.4	5.1	7.1	6.0	7.0	6.0	5.5	4.5	4.9	3.8	7.0	5.7	6.9	5.7	5.5	4.4	4.9	3.7
Beryllium	µg/L	0.13	0.13	0.13	0.12	0.11	0.11	0.11	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.11	0.11	0.13	0.12	0.13	0.12	0.11	0.11	0.11	0.11
Bismuth	µg/L	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1
Cadmium	µg/L	0.04	0.039	0.037	0.036	0.033	0.032	0.032	0.03	0.038	0.036	0.038	0.036	0.034	0.032	0.033	0.031	0.038	0.036	0.038	0.036	0.034	0.032	0.033	0.03
Chromium	µg/L	0.22	0.14	0.18	0.11	0.13	0.09	0.1	0.074	0.2	0.12	0.2	0.12	0.14	0.092	0.11	0.078	0.19	0.11	0.19	0.11	0.14	0.089	0.11	0.076
Cobalt	µg/L	0.085	0.086	0.09	0.087	0.091	0.089	0.079	0.075	0.08	0.078	0.083	0.078	0.087	0.082	0.082	0.076	0.079	0.076	0.081	0.077	0.085	0.079	0.081	0.075
Copper	µg/L	0.45	0.41	0.43	0.38	0.41	0.38	0.39	0.36	0.44	0.39	0.44	0.39	0.42	0.38	0.41	0.37	0.44	0.39	0.44	0.38	0.42	0.37	0.41	0.36
Iron	µg/L	51	54	40	41	26	28	19	21	45	41	44	41	28	26	21	19	43	38	42	38	28	25	21	18
Lead	µg/L	0.044	0.041	0.04	0.037	0.037	0.035	0.034	0.032	0.041	0.038	0.041	0.038	0.037	0.035	0.035	0.033	0.041	0.037	0.041	0.037	0.037	0.034	0.035	0.033

Table 8F3.2-2 Predicted Maximum of Depth-Averaged Concentrations in Lac de Gras Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Manganese	µg/L	4.9	7.0	4.1	6.0	3.8	5.7	3.1	4.9	4.7	3.4	4.7	3.4	4.1	2.7	3.7	2.2	4.7	3.2	4.6	3.1	4.0	2.6	3.6	2.1
Total Metals (continued)																									
Mercury	µg/L	0.013	0.013	0.013	0.012	0.012	0.012	0.011	0.011	0.013	0.013	0.013	0.013	0.012	0.012	0.011	0.011	0.013	0.012	0.013	0.012	0.012	0.012	0.011	0.011
Molybdenum	µg/L	4.4	4.1	3.9	3.3	2.8	2.2	2.5	1.8	3.9	3.2	3.9	3.2	3.0	2.2	2.6	1.8	4.0	3.0	3.9	3.0	3.0	2.1	2.7	1.7
Nickel	µg/L	1.4	1.2	1.3	1.1	1.1	0.99	1.1	0.92	1.5	1.1	1.5	1.1	1.3	1.0	1.3	0.93	1.5	1.1	1.5	1.1	1.3	0.98	1.3	0.92
Selenium	µg/L	0.19	0.19	0.16	0.15	0.11	0.11	0.094	0.088	0.17	0.16	0.17	0.16	0.12	0.11	0.1	0.093	0.17	0.15	0.17	0.15	0.12	0.11	0.1	0.091
Silver	µg/L	0.066	0.063	0.063	0.059	0.056	0.055	0.054	0.053	0.064	0.06	0.064	0.06	0.057	0.056	0.055	0.054	0.063	0.059	0.063	0.059	0.057	0.055	0.055	0.053
Strontium	µg/L	49	44	107	79	110	85	87	62	41	34	79	54	92	65	87	59	42	33	77	53	89	62	86	56
Uranium	µg/L	0.6	0.61	0.48	0.47	0.36	0.35	0.28	0.26	0.46	0.43	0.46	0.43	0.31	0.29	0.24	0.22	0.45	0.4	0.44	0.39	0.3	0.27	0.24	0.2
Vanadium	µg/L	0.85	0.12	0.68	0.1	0.38	0.087	0.28	0.076	0.75	0.11	0.73	0.11	0.44	0.091	0.32	0.082	0.73	0.11	0.72	0.1	0.43	0.09	0.32	0.081
Zinc	µg/L	4.1	0.67	4.1	0.61	4.1	0.57	4.0	0.53	1.5	0.62	1.5	0.62	1.4	0.57	1.4	0.54	1.5	0.61	1.5	0.6	1.4	0.56	1.4	0.53
Dissolved Metals																									
Aluminum	µg/L	5.8	5.3	5.1	4.3	4.2	3.4	3.8	2.7	5.5	4.5	5.5	4.5	4.7	3.5	4.3	3.0	5.6	4.3	5.6	4.2	4.7	3.4	4.3	2.9
Arsenic	µg/L	0.13	0.12	0.11	0.091	0.079	0.065	0.068	0.05	0.12	0.096	0.12	0.096	0.089	0.069	0.078	0.056	0.12	0.092	0.11	0.09	0.089	0.067	0.078	0.054
Barium	µg/L	4.1	3.9	3.4	3.0	2.6	2.1	2.1	1.6	3.7	3.2	3.7	3.2	2.8	2.3	2.4	1.8	3.7	3.0	3.7	2.9	2.8	2.2	2.5	1.7
Beryllium	µg/L	0.018	0.018	0.014	0.013	0.0073	0.0071	0.005	0.0047	0.016	0.014	0.015	0.014	0.0084	0.0079	0.0057	0.0053	0.015	0.013	0.015	0.013	0.0082	0.0075	0.0056	0.0049
Bismuth	µg/L	0.0027	0.0028	0.0021	0.002	0.0019	0.0017	0.0013	0.0011	0.0023	0.0022	0.0023	0.0021	0.0018	0.0016	0.0015	0.0012	0.0022	0.002	0.0022	0.002	0.0017	0.0015	0.0014	0.0011
Cadmium	µg/L	0.016	0.016	0.014	0.012	0.0092	0.0078	0.0076	0.0059	0.015	0.013	0.015	0.013	0.01	0.0085	0.0087	0.0065	0.015	0.012	0.015	0.012	0.01	0.0081	0.0087	0.0063
Chromium	µg/L	0.1	0.1	0.086	0.077	0.053	0.046	0.043	0.034	0.094	0.082	0.093	0.082	0.062	0.051	0.049	0.038	0.093	0.077	0.092	0.076	0.061	0.049	0.049	0.037
Cobalt	µg/L	0.015	0.015	0.031	0.028	0.032	0.03	0.023	0.019	0.013	0.012	0.023	0.019	0.028	0.023	0.025	0.02	0.013	0.011	0.022	0.018	0.026	0.021	0.024	0.019
Copper	µg/L	0.08	0.065	0.087	0.063	0.087	0.065	0.081	0.055	0.08	0.058	0.087	0.061	0.091	0.064	0.091	0.061	0.083	0.058	0.089	0.06	0.094	0.063	0.093	0.059
Iron	µg/L	1.2	0.85	3.2	2.5	3.3	2.8	2.7	2.0	1.2	0.8	2.6	1.8	3.1	2.3	3.0	2.1	1.3	0.84	2.6	1.8	3.0	2.2	3.0	2.0
Lead	µg/L	0.0051	0.005	0.0055	0.0049	0.0056	0.0051	0.0046	0.004	0.0048	0.0043	0.0051	0.0045	0.0055	0.0048	0.0052	0.0044	0.0049	0.0043	0.0051	0.0044	0.0055	0.0046	0.0052	0.0042
Manganese	µg/L	3.2	3.2	2.6	2.4	2.5	2.2	1.9	1.5	2.8	2.5	2.8	2.5	2.4	2.1	2.1	1.7	2.8	2.4	2.7	2.3	2.4	1.9	2.1	1.6
Mercury	µg/L	0.0036	0.0037	0.0028	0.0027	0.0015	0.0015	0.001	0.00098	0.0031	0.0029	0.003	0.0028	0.0017	0.0016	0.0012	0.0011	0.003	0.0027	0.0029	0.0026	0.0017	0.0015	0.0012	0.001
Molybdenum	µg/L	3.9	3.5	3.4	2.8	2.4	1.9	2.2	1.5	3.6	2.9	3.6	2.9	2.8	2.1	2.5	1.7	3.7	2.8	3.7	2.8	2.8	2.0	2.5	1.6
Nickel	µg/L	0.41	0.42	0.35	0.33	0.27	0.25	0.22	0.2	0.38	0.35	0.37	0.35	0.29	0.27	0.25	0.22	0.37	0.33	0.37	0.33	0.29	0.26	0.25	0.21
Selenium	µg/L	0.079	0.078	0.064	0.059	0.038	0.035	0.03	0.025	0.071	0.063	0.07	0.062	0.045	0.038	0.035	0.028	0.069	0.059	0.068	0.057	0.044	0.037	0.035	0.027
Silver	µg/L	0.0072	0.0074	0.0056	0.0054	0.003	0.0029	0.002	0.0019	0.0062	0.0058	0.0061	0.0057	0.0034	0.0032	0.0023	0.0021	0.006	0.0053	0.0059	0.0052	0.0033	0.003	0.0023	0.002
Strontium	µg/L	34	31	92	66	95	72	72	49	33	26	71	47	84	58	79	52	34	26	68	46	81	55	78	49
Uranium	µg/L	0.49	0.5	0.38	0.36	0.27	0.25	0.18	0.17	0.42	0.39	0.41	0.38	0.27	0.25	0.21	0.18	0.4	0.36	0.4	0.35	0.27	0.24	0.2	0.17
Vanadium	µg/L	0.078	0.067	0.072	0.057	0.061	0.047	0.059	0.041	0.076	0.059	0.077	0.06	0.069	0.051	0.066	0.046	0.079	0.059	0.079	0.058	0.071	0.05	0.068	0.045
Zinc	µg/L	0.21	0.2	0.19	0.16	0.19	0.15	0.16	0.12	0.2	0.16	0.2	0.16	0.19	0.15	0.18	0.13	0.2	0.16	0.2	0.15	0.19	0.14	0.18	0.12

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.2-2 Predicted Maximum of Depth-Averaged Concentrations in Lac de Gras Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	3.3	13	1.8	12	2.5	12	3.6	13	2.6	12	1.8	13	2.8	13	3.0	13	2.0	14	1.6	14	2.3	13	2.5	14
Dissolved oxygen[(a)]	mg/L	9.4	9.0	9.3	9.0	9.4	8.9	9.2	8.8	9.2	8.6	9.1	8.3	9.4	8.6	9.1	8.5	10	9.9	11	9.9	11	9.7	10	9.6
Conventional Constituents																									
Hardness (calculated)	mg/L	10.0	9.36	9.79	9.26	9.91	9.19	9.41	8.74	10.18	9.51	9.85	9.43	9.96	9.48	9.38	8.92	11.78	9.48	11.65	9.42	11.46	9.26	11.03	9.04
Total dissolved solids	mg/L	23	21	22	21	22	21	21	20	23	21	22	21	22	21	21	20	27	22	26	21	26	21	25	21
Total suspended solids[(b)]	mg/L	1.7	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.8	1.6	1.7	1.6	1.5	1.5	1.5	1.4	2.0	1.6	2.0	1.6	1.8	1.5	1.7	1.4
Major Ions																									
Calcium	mg/L	2.0	1.9	2.0	1.9	2.4	2.2	2.3	2.2	2.1	2.0	2.0	1.9	2.4	2.3	2.3	2.2	2.4	2.0	2.4	1.9	2.8	2.2	2.7	2.2
Chloride	mg/L	4.3	4.1	4.2	4.1	5.3	4.9	5.1	4.8	4.4	4.3	4.2	4.2	5.3	5.0	5.1	4.9	5.1	4.3	5.0	4.2	6.1	4.9	6.0	4.9
Fluoride	mg/L	0.014	0.013	0.013	0.012	0.012	0.011	0.011	0.01	0.014	0.013	0.013	0.013	0.012	0.011	0.011	0.01	0.016	0.013	0.016	0.013	0.014	0.011	0.013	0.011
Magnesium	mg/L	1.2	1.1	1.2	1.1	0.94	0.88	0.87	0.81	1.2	1.1	1.2	1.1	0.94	0.91	0.87	0.83	1.4	1.1	1.4	1.1	1.1	0.89	1.0	0.84
Potassium	mg/L	1.2	1.2	1.2	1.1	0.95	0.89	0.87	0.84	1.3	1.2	1.2	1.2	0.95	0.92	0.88	0.85	1.5	1.2	1.4	1.2	1.1	0.91	1.0	0.85
Sodium	mg/L	2.5	2.4	2.4	2.3	2.3	2.1	2.2	2.1	2.5	2.4	2.5	2.4	2.3	2.2	2.2	2.1	2.9	2.4	2.9	2.4	2.6	2.2	2.6	2.2
Sulphate	mg/L	4.8	4.5	4.7	4.4	3.4	3.1	2.9	2.7	4.9	4.5	4.7	4.5	3.4	3.3	2.9	2.8	5.7	4.5	5.6	4.5	3.9	3.2	3.4	2.8
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.31	0.3	0.29	0.28	0.27	0.26	0.26	0.26	0.31	0.3	0.3	0.28	0.27	0.26	0.26	0.26	0.33	0.3	0.31	0.27	0.28	0.26	0.27	0.26
Total ammonia	mg-N/L	0.048	0.037	0.048	0.036	0.029	0.025	0.022	0.017	0.049	0.037	0.048	0.037	0.029	0.025	0.022	0.017	0.056	0.036	0.056	0.036	0.033	0.024	0.026	0.017
Nitrate	mg-N/L	0.054	0.053	0.039	0.033	0.032	0.029	0.029	0.033	0.054	0.058	0.039	0.037	0.032	0.032	0.03	0.04	0.064	0.054	0.044	0.027	0.035	0.031	0.035	0.038
Total phosphorus (calculated)	mg-P/L	0.0041	0.0031	0.0042	0.003	0.0033	0.0029	0.003	0.0027	0.0041	0.0036	0.0042	0.0036	0.0033	0.0031	0.003	0.0028	0.0042	0.0029	0.0044	0.0028	0.0035	0.0027	0.0032	0.0027
Dissolved orthophosphate	mg-P/L	0.0027	0.0017	0.0028	0.0016	0.0019	0.0015	0.0016	0.0013	0.0027	0.0022	0.0028	0.0022	0.0019	0.0017	0.0016	0.0014	0.0028	0.0015	0.003	0.0014	0.0021	0.0013	0.0018	0.0013
Phytoplankton (as chlorophyll *a*)	µg/L	4.5	5.8	3.9	5.6	1.9	2.6	1.0	1.3	4.6	5.6	4.0	5.4	1.9	2.7	1.0	1.3	4.6	6.2	5.3	6.0	1.9	2.8	1.0	1.5
Silica, reactive	mg/L	0.13	0.12	0.13	0.12	0.14	0.13	0.14	0.13	0.13	0.13	0.13	0.12	0.14	0.13	0.14	0.13	0.16	0.12	0.15	0.12	0.16	0.13	0.16	0.13
Total Metals																									
Aluminum	µg/L	30	27	30	26	24	20	21	17	31	27	30	27	23	21	21	18	35	27	35	27	27	21	24	18
Arsenic	µg/L	0.38	0.32	0.37	0.32	0.31	0.26	0.28	0.24	0.38	0.32	0.38	0.33	0.31	0.27	0.29	0.24	0.41	0.32	0.41	0.33	0.33	0.26	0.31	0.24
Barium	µg/L	6.8	5.7	6.7	5.6	5.4	4.3	4.9	3.8	6.9	5.7	6.8	5.7	5.5	4.5	5.0	3.9	7.7	5.7	7.6	5.7	6.1	4.4	5.5	3.9
Beryllium	µg/L	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.13	0.12	0.13	0.12	0.12	0.11	0.11	0.11
Bismuth	µg/L	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1
Cadmium	µg/L	0.038	0.036	0.038	0.035	0.034	0.032	0.033	0.031	0.038	0.036	0.038	0.036	0.034	0.032	0.033	0.031	0.04	0.035	0.04	0.036	0.036	0.032	0.034	0.031
Chromium	µg/L	0.18	0.11	0.18	0.11	0.13	0.088	0.11	0.078	0.19	0.11	0.18	0.11	0.13	0.09	0.11	0.079	0.21	0.11	0.21	0.11	0.15	0.089	0.13	0.08
Cobalt	µg/L	0.077	0.075	0.079	0.074	0.081	0.077	0.079	0.073	0.077	0.075	0.078	0.075	0.081	0.077	0.078	0.074	0.081	0.074	0.081	0.075	0.086	0.077	0.083	0.074
Copper	µg/L	0.44	0.39	0.44	0.39	0.42	0.38	0.41	0.37	0.44	0.39	0.44	0.39	0.42	0.38	0.41	0.37	0.47	0.39	0.47	0.39	0.44	0.38	0.43	0.37
Iron	µg/L	40	37	39	36	26	23	20	18	40	36	39	37	26	25	20	18	46	36	46	37	30	24	23	19
Lead	µg/L	0.04	0.037	0.04	0.037	0.036	0.034	0.034	0.033	0.04	0.037	0.04	0.037	0.036	0.034	0.034	0.033	0.043	0.037	0.042	0.037	0.038	0.034	0.036	0.033
Manganese	µg/L	4.5	3.1	4.4	3.0	3.9	2.4	3.6	2.1	4.5	3.1	4.4	3.1	3.8	2.5	3.6	2.2	5.0	3.1	5.0	3.1	4.2	2.5	3.9	2.2

Table 8F3.2-2 Predicted Maximum of Depth-Averaged Concentrations in Lac de Gras Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Total Metals (continued)																									
Mercury	µg/L	0.012	0.012	0.012	0.012	0.012	0.012	0.011	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.011	0.011	0.013	0.012	0.013	0.012	0.012	0.012	0.012	0.011
Molybdenum	µg/L	4.0	3.1	3.9	3.1	3.1	2.3	2.8	2.0	4.1	3.1	4.0	3.2	3.2	2.4	2.9	2.0	4.7	3.2	4.7	3.2	3.7	2.4	3.4	2.0
Nickel	µg/L	1.4	1.1	1.4	1.1	1.3	0.99	1.3	0.94	1.5	1.1	1.4	1.1	1.3	1.0	1.3	0.95	1.5	1.1	1.5	1.1	1.4	0.99	1.3	0.95
Selenium	µg/L	0.16	0.15	0.16	0.14	0.12	0.11	0.10	0.091	0.16	0.15	0.16	0.15	0.12	0.11	0.10	0.093	0.18	0.15	0.18	0.15	0.13	0.11	0.11	0.093
Silver	µg/L	0.062	0.059	0.062	0.059	0.057	0.055	0.055	0.053	0.062	0.059	0.062	0.059	0.057	0.055	0.055	0.053	0.064	0.059	0.064	0.059	0.058	0.055	0.056	0.053
Strontium	µg/L	43	35	73	50	87	60	84	57	44	35	73	50	89	61	84	59	50	36	80	50	100	60	98	59
Uranium	µg/L	0.42	0.38	0.41	0.37	0.28	0.25	0.22	0.2	0.42	0.38	0.41	0.38	0.28	0.26	0.22	0.2	0.48	0.38	0.47	0.38	0.32	0.26	0.26	0.21
Vanadium	µg/L	0.68	0.11	0.67	0.11	0.42	0.096	0.31	0.091	0.69	0.11	0.67	0.11	0.42	0.099	0.31	0.092	0.79	0.11	0.78	0.11	0.48	0.099	0.36	0.093
Zinc	µg/L	1.5	0.6	1.5	0.6	1.4	0.56	1.4	0.54	1.5	0.6	1.5	0.61	1.4	0.57	1.4	0.55	1.5	0.6	1.5	0.61	1.5	0.56	1.4	0.55
Dissolved Metals																									
Aluminum	µg/L	5.7	4.5	5.6	4.5	4.8	3.7	4.5	3.4	5.8	4.6	5.8	4.7	4.9	3.8	4.7	3.4	6.8	4.7	6.7	4.6	5.8	3.8	5.5	3.5
Arsenic	µg/L	0.11	0.093	0.11	0.093	0.09	0.069	0.081	0.06	0.12	0.093	0.11	0.094	0.091	0.072	0.083	0.061	0.14	0.094	0.13	0.094	0.11	0.071	0.098	0.062
Barium	µg/L	3.7	3.0	3.6	3.0	2.8	2.2	2.5	1.9	3.8	3.0	3.6	3.1	2.9	2.3	2.6	1.9	4.3	3.0	4.3	3.1	3.4	2.3	3.0	1.9
Beryllium	µg/L	0.014	0.013	0.014	0.012	0.0078	0.007	0.0053	0.0047	0.014	0.013	0.013	0.013	0.0077	0.0074	0.0053	0.0049	0.016	0.012	0.016	0.013	0.009	0.0072	0.0062	0.005
Bismuth	µg/L	0.0021	0.0019	0.002	0.0018	0.0016	0.0013	0.0013	0.0011	0.0021	0.0019	0.002	0.0019	0.0016	0.0014	0.0013	0.0011	0.0024	0.0019	0.0024	0.0019	0.0018	0.0014	0.0016	0.0011
Cadmium	µg/L	0.014	0.012	0.014	0.012	0.01	0.0082	0.0089	0.0068	0.015	0.012	0.014	0.012	0.01	0.0085	0.009	0.0069	0.017	0.012	0.017	0.012	0.012	0.0085	0.011	0.007
Chromium	µg/L	0.09	0.076	0.088	0.075	0.061	0.049	0.05	0.039	0.091	0.076	0.088	0.077	0.062	0.052	0.051	0.04	0.11	0.076	0.1	0.077	0.072	0.051	0.06	0.041
Cobalt	µg/L	0.012	0.011	0.019	0.016	0.024	0.019	0.022	0.017	0.012	0.011	0.019	0.016	0.024	0.02	0.022	0.018	0.013	0.01	0.021	0.015	0.027	0.02	0.026	0.018
Copper	µg/L	0.089	0.066	0.096	0.071	0.1	0.072	0.098	0.071	0.093	0.07	0.098	0.071	0.1	0.075	0.1	0.073	0.11	0.072	0.11	0.072	0.12	0.076	0.12	0.074
Iron	µg/L	1.4	1.0	2.6	1.8	3.1	2.2	3.0	2.2	1.5	1.1	2.6	1.8	3.2	2.3	3.0	2.2	1.7	1.1	2.9	1.8	3.7	2.3	3.6	2.2
Lead	µg/L	0.005	0.0046	0.0052	0.0048	0.0055	0.0049	0.0053	0.0048	0.0051	0.0048	0.0053	0.0049	0.0057	0.0051	0.0054	0.0049	0.0059	0.0049	0.0059	0.0048	0.0065	0.0052	0.0063	0.0049
Manganese	µg/L	2.6	2.3	2.6	2.2	2.2	1.8	2.0	1.6	2.7	2.3	2.6	2.3	2.2	1.9	2.0	1.6	3.1	2.3	3.1	2.3	2.6	1.8	2.4	1.7
Mercury	µg/L	0.0028	0.0025	0.0027	0.0024	0.0016	0.0014	0.0011	0.00099	0.0028	0.0025	0.0027	0.0025	0.0016	0.0015	0.0011	0.001	0.0032	0.0025	0.0032	0.0025	0.0018	0.0015	0.0013	0.001
Molybdenum	µg/L	3.7	2.9	3.6	2.9	2.9	2.2	2.7	1.9	3.8	2.9	3.7	3.0	3.0	2.2	2.7	1.9	4.4	3.0	4.4	3.0	3.5	2.2	3.2	1.9
Nickel	µg/L	0.37	0.34	0.36	0.34	0.29	0.27	0.26	0.24	0.38	0.35	0.36	0.35	0.29	0.28	0.26	0.25	0.43	0.35	0.43	0.35	0.34	0.28	0.31	0.25
Selenium	µg/L	0.066	0.057	0.065	0.056	0.044	0.036	0.035	0.028	0.067	0.057	0.065	0.058	0.044	0.038	0.035	0.029	0.078	0.057	0.077	0.058	0.051	0.037	0.042	0.029
Silver	µg/L	0.0055	0.0051	0.0054	0.0049	0.0031	0.0028	0.0022	0.0019	0.0055	0.005	0.0054	0.0051	0.0031	0.003	0.0022	0.002	0.0064	0.005	0.0063	0.0051	0.0036	0.0029	0.0025	0.002
Strontium	µg/L	35	27	65	43	79	53	76	51	36	28	65	43	81	54	76	52	42	29	72	43	92	53	90	52
Uranium	µg/L	0.37	0.34	0.36	0.33	0.25	0.22	0.19	0.16	0.37	0.34	0.36	0.34	0.24	0.23	0.19	0.17	0.43	0.34	0.43	0.34	0.28	0.22	0.22	0.17
Vanadium	µg/L	0.083	0.065	0.083	0.067	0.076	0.058	0.074	0.056	0.087	0.069	0.087	0.07	0.079	0.061	0.076	0.058	0.1	0.071	0.10	0.069	0.092	0.062	0.09	0.059
Zinc	µg/L	0.2	0.16	0.2	0.16	0.19	0.15	0.18	0.14	0.21	0.16	0.21	0.17	0.2	0.15	0.19	0.14	0.24	0.17	0.24	0.17	0.23	0.15	0.22	0.14

a) Dissolved oxygen predictions are minimum concentrations.

b) Total suspended solids were modelled using baseline concentrations.

mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

DOMINION DIAMOND

Table 8F3.2-3 Predicted Maximum of Surface Concentrations in Lac de Gras
Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	4.2	14	2.7	17	3.4	13	4.4	16	2.4	16	0.75	17	1.2	15	2.0	16	1.9	15	1.0	14	2.0	15	2.3	15
Dissolved oxygen[a]	mg/L	11	10	11	10	11	9.9	11	9.7	9.2	7.8	9.2	7.9	9.5	7.6	8.7	7.4	10	9.2	10	9.3	10	9.0	9.7	8.8
Conventional Constituents																									
Hardness (calculated)	mg/L	13	11	15	11	14	11	12	8.9	15	9.3	14	9.4	15	9.5	13	8.6	14	9.4	14	9.4	15	9.3	13	8.9
Total dissolved solids	mg/L	29	24	31	22	32	24	27	20	34	21	32	20	34	21	30	19	31	21	31	21	33	21	30	20
Total suspended solids[b]	mg/L	2.4	1.8	2.3	1.7	2.2	1.5	2.1	1.4	2.7	1.6	2.6	1.6	2.4	1.4	2.3	1.4	2.5	1.7	2.4	1.6	2.3	1.4	2.1	1.5
Major Ions																									
Calcium	mg/L	2.6	2.1	3.7	2.5	3.7	3.0	3.1	2.2	3.0	1.9	2.9	2.0	3.8	2.3	3.3	2.1	2.8	1.9	2.8	1.9	3.6	2.3	3.2	2.2
Chloride	mg/L	5.1	4.4	8.3	5.4	8.2	6.8	6.5	4.8	6.1	3.8	6.0	4.2	8.2	5.1	6.9	4.6	5.6	3.8	5.8	4.0	7.9	4.9	7.0	4.7
Fluoride	mg/L	0.019	0.014	0.017	0.013	0.016	0.011	0.015	0.011	0.022	0.013	0.02	0.012	0.018	0.011	0.016	0.01	0.021	0.013	0.019	0.013	0.017	0.011	0.016	0.011
Magnesium	mg/L	1.6	1.3	1.4	1.1	1.3	0.93	1.1	0.81	1.8	1.1	1.7	1.1	1.4	0.88	1.2	0.79	1.7	1.1	1.6	1.1	1.4	0.88	1.2	0.82
Potassium	mg/L	1.6	1.3	1.5	1.1	1.2	0.88	1.1	0.79	1.8	1.1	1.8	1.1	1.4	0.85	1.2	0.77	1.7	1.2	1.7	1.1	1.3	0.87	1.2	0.81
Sodium	mg/L	3.1	2.6	3.2	2.2	3.2	2.5	2.7	2.0	3.6	2.3	3.4	2.1	3.4	2.1	2.9	1.9	3.4	2.3	3.3	2.2	3.4	2.1	3.0	2.0
Sulphate	mg/L	6.2	5.4	5.7	4.4	4.0	3.1	3.4	2.5	7.3	4.6	6.8	4.3	4.6	3.0	3.8	2.5	6.6	4.5	6.4	4.4	4.5	3.1	3.9	2.6
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.36	0.34	0.34	0.29	0.34	0.3	0.28	0.26	0.36	0.29	0.32	0.27	0.29	0.26	0.27	0.25	0.35	0.29	0.31	0.27	0.29	0.26	0.27	0.25
Total ammonia	mg-N/L	0.062	0.038	0.059	0.036	0.046	0.029	0.028	0.018	0.07	0.036	0.064	0.034	0.04	0.026	0.027	0.017	0.064	0.036	0.061	0.035	0.039	0.026	0.027	0.017
Nitrate	mg-N/L	0.087	0.095	0.078	0.05	0.084	0.064	0.048	0.03	0.087	0.05	0.047	0.026	0.045	0.03	0.039	0.022	0.079	0.048	0.042	0.024	0.041	0.028	0.039	0.024
Total phosphorus (calculated)	mg-P/L	0.0047	0.0041	0.0045	0.0037	0.0038	0.0032	0.0033	0.0029	0.0051	0.003	0.0047	0.0028	0.0038	0.0027	0.0034	0.0027	0.0047	0.003	0.0046	0.0029	0.0037	0.0027	0.0034	0.0027
Dissolved orthophosphate	mg/L	0.0033	0.0027	0.0031	0.0023	0.0024	0.0018	0.0019	0.0015	0.0037	0.0016	0.0033	0.0014	0.0024	0.0013	0.002	0.0013	0.0033	0.0016	0.0032	0.0015	0.0023	0.0013	0.002	0.0013
Phytoplankton (as chlorophyll *a*)	µg/L	3.9	4.7	4.0	4.3	2.6	2.5	0.82	0.91	4.3	6.1	4.8	5.7	1.8	3.0	0.9	1.5	4.4	6.0	5.0	5.7	1.9	2.6	0.93	1.2
Silica, reactive	mg/L	0.18	0.13	0.19	0.13	0.2	0.14	0.2	0.13	0.21	0.12	0.19	0.13	0.22	0.13	0.22	0.13	0.2	0.12	0.18	0.12	0.21	0.13	0.2	0.13
Total Metals																									
Aluminum	µg/L	38	37	35	29	31	26	24	20	45	29	41	26	32	21	26	17	41	28	39	27	31	21	26	17
Arsenic	µg/L	0.48	0.44	0.45	0.39	0.37	0.33	0.34	0.3	0.48	0.33	0.46	0.32	0.34	0.25	0.31	0.23	0.45	0.33	0.44	0.32	0.35	0.26	0.32	0.23
Barium	µg/L	9.8	8.2	9.2	7.0	7.8	5.7	7.0	5.1	9.2	5.8	8.6	5.4	6.4	4.1	5.6	3.5	8.5	5.8	8.3	5.6	6.5	4.2	5.8	3.7
Beryllium	µg/L	0.13	0.13	0.13	0.12	0.12	0.11	0.11	0.11	0.14	0.13	0.14	0.12	0.12	0.11	0.11	0.11	0.13	0.12	0.13	0.12	0.12	0.11	0.11	0.11
Bismuth	µg/L	0.11	0.11	0.11	0.11	0.11	0.11	0.1	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.11	0.11	0.11	0.11	0.11	0.1
Cadmium	µg/L	0.041	0.038	0.039	0.035	0.035	0.032	0.033	0.03	0.044	0.036	0.043	0.035	0.037	0.031	0.034	0.03	0.042	0.036	0.042	0.035	0.037	0.032	0.035	0.03
Chromium	µg/L	0.23	0.14	0.2	0.11	0.15	0.089	0.12	0.073	0.27	0.12	0.25	0.11	0.16	0.085	0.13	0.073	0.24	0.11	0.23	0.11	0.16	0.086	0.13	0.075
Cobalt	µg/L	0.085	0.084	0.1	0.083	0.1	0.087	0.086	0.074	0.093	0.077	0.093	0.078	0.099	0.079	0.089	0.074	0.088	0.076	0.091	0.077	0.097	0.078	0.089	0.074
Copper	µg/L	0.47	0.4	0.45	0.38	0.44	0.37	0.42	0.36	0.5	0.39	0.49	0.38	0.46	0.37	0.43	0.36	0.48	0.39	0.48	0.38	0.46	0.37	0.44	0.36
Iron	µg/L	51	51	45	40	31	27	22	20	61	40	56	36	33	23	26	17	55	39	52	37	32	23	26	18
Lead	µg/L	0.044	0.04	0.042	0.037	0.04	0.035	0.036	0.032	0.048	0.038	0.046	0.036	0.04	0.034	0.037	0.032	0.046	0.037	0.045	0.037	0.04	0.034	0.037	0.032
Manganese	µg/L	5.0	6.7	4.8	5.9	4.4	5.6	3.6	4.9	6.1	3.3	5.7	3.0	4.9	2.5	4.2	2.0	5.6	3.2	5.5	3.1	4.8	2.5	4.2	2.1

Table 8F3.2-3 Predicted Maximum of Surface Concentrations in Lac de Gras
Part A

Constituent	Units	LDG-P1								LDG-P2								LDG-P3							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Mercury	µg/L	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.014	0.013	0.014	0.012	0.012	0.012	0.012	0.011	0.013	0.012	0.013	0.012	0.012	0.012	0.012	0.011
Total Metals (continued)																									
Molybdenum	µg/L	4.9	3.9	4.4	3.1	3.5	2.2	3.1	1.9	5.6	3.0	5.3	2.8	3.9	1.9	3.3	1.6	5.2	3.0	5.2	2.9	4.1	2.1	3.6	1.7
Nickel	µg/L	1.4	1.2	1.3	1.1	1.2	0.98	1.1	0.92	1.7	1.1	1.6	1.1	1.4	0.96	1.3	0.9	1.6	1.1	1.6	1.1	1.4	0.97	1.3	0.92
Selenium	µg/L	0.19	0.18	0.17	0.15	0.12	0.1	0.1	0.088	0.22	0.16	0.2	0.14	0.13	0.1	0.11	0.088	0.2	0.15	0.2	0.15	0.13	0.11	0.11	0.09
Silver	µg/L	0.066	0.062	0.064	0.059	0.058	0.055	0.055	0.053	0.07	0.06	0.068	0.059	0.059	0.055	0.056	0.053	0.067	0.059	0.066	0.059	0.058	0.055	0.056	0.053
Strontium	µg/L	55	43	136	72	132	81	107	61	56	33	101	54	128	61	108	54	53	33	98	53	125	59	110	55
Uranium	µg/L	0.59	0.58	0.53	0.45	0.43	0.34	0.32	0.26	0.64	0.42	0.58	0.38	0.37	0.26	0.29	0.2	0.57	0.4	0.54	0.39	0.36	0.26	0.29	0.2
Vanadium	µg/L	0.86	0.12	0.75	0.1	0.45	0.085	0.33	0.076	1.0	0.1	0.95	0.099	0.5	0.083	0.39	0.076	0.93	0.11	0.89	0.1	0.49	0.088	0.4	0.08
Zinc	µg/L	4.1	0.65	4.1	0.6	4.1	0.57	4.1	0.53	1.6	0.61	1.5	0.59	1.5	0.55	1.4	0.53	1.5	0.61	1.5	0.6	1.5	0.56	1.5	0.53
Dissolved Metals																									
Aluminum	µg/L	6.6	5.1	6.1	4.1	5.5	3.3	4.8	2.7	7.9	4.3	7.5	4.0	6.4	3.1	5.4	2.7	7.4	4.3	7.4	4.2	6.6	3.3	5.8	2.9
Arsenic	µg/L	0.14	0.11	0.12	0.087	0.1	0.063	0.085	0.05	0.16	0.093	0.15	0.085	0.12	0.061	0.098	0.05	0.15	0.092	0.15	0.089	0.12	0.064	0.1	0.053
Barium	µg/L	4.4	3.7	4.0	2.9	3.2	2.1	2.7	1.6	5.3	3.1	5.0	2.8	3.7	2.0	3.1	1.6	4.9	3.0	4.8	2.9	3.8	2.1	3.2	1.7
Beryllium	µg/L	0.018	0.017	0.015	0.013	0.0088	0.0069	0.0058	0.0046	0.022	0.014	0.02	0.012	0.0096	0.0069	0.0069	0.0046	0.019	0.013	0.018	0.013	0.0095	0.0069	0.0069	0.0048
Bismuth	µg/L	0.0027	0.0026	0.0025	0.0019	0.0023	0.0016	0.0016	0.0011	0.0033	0.0021	0.0029	0.0019	0.0023	0.0014	0.0018	0.0011	0.0029	0.002	0.0027	0.0019	0.0022	0.0014	0.0018	0.0011
Cadmium	µg/L	0.017	0.015	0.015	0.011	0.011	0.0076	0.0094	0.0058	0.021	0.012	0.019	0.011	0.013	0.0074	0.011	0.0058	0.019	0.012	0.019	0.012	0.013	0.0077	0.011	0.0061
Chromium	µg/L	0.11	0.096	0.097	0.074	0.064	0.045	0.053	0.034	0.13	0.079	0.12	0.072	0.076	0.045	0.061	0.034	0.12	0.078	0.12	0.075	0.077	0.047	0.065	0.036
Cobalt	µg/L	0.015	0.015	0.041	0.025	0.04	0.029	0.028	0.019	0.018	0.012	0.03	0.019	0.038	0.021	0.031	0.018	0.016	0.011	0.029	0.018	0.036	0.02	0.03	0.018
Copper	µg/L	0.097	0.064	0.12	0.062	0.12	0.063	0.11	0.055	0.12	0.056	0.12	0.057	0.13	0.059	0.12	0.054	0.11	0.058	0.12	0.06	0.14	0.064	0.13	0.059
Iron	µg/L	1.5	0.86	4.2	2.3	4.2	2.7	3.5	2.0	1.8	0.78	3.4	1.8	4.5	2.1	3.8	1.9	1.7	0.84	3.4	1.8	4.5	2.1	4.0	2.0
Lead	µg/L	0.0058	0.0049	0.0072	0.0047	0.007	0.0049	0.0059	0.004	0.0069	0.0042	0.0068	0.0042	0.0078	0.0044	0.0066	0.0039	0.0064	0.0043	0.0067	0.0044	0.0079	0.0046	0.0069	0.0042
Manganese	µg/L	3.3	3.0	3.3	2.3	3.1	2.2	2.3	1.5	4.0	2.4	3.7	2.2	3.2	1.9	2.6	1.5	3.6	2.4	3.5	2.3	3.2	1.9	2.7	1.5
Mercury	µg/L	0.0036	0.0035	0.0031	0.0026	0.0019	0.0014	0.0012	0.00097	0.0043	0.0028	0.0039	0.0025	0.002	0.0014	0.0014	0.00097	0.0039	0.0027	0.0036	0.0026	0.0019	0.0014	0.0015	0.001
Molybdenum	µg/L	4.4	3.4	3.9	2.7	3.1	1.8	2.8	1.5	5.2	2.8	4.9	2.6	3.7	1.8	3.2	1.5	4.8	2.8	4.8	2.7	3.9	1.9	3.4	1.6
Nickel	µg/L	0.44	0.4	0.4	0.31	0.33	0.25	0.27	0.2	0.54	0.33	0.5	0.31	0.38	0.23	0.31	0.2	0.49	0.33	0.48	0.32	0.39	0.25	0.33	0.21
Selenium	µg/L	0.083	0.073	0.072	0.056	0.047	0.034	0.037	0.025	0.10	0.06	0.091	0.055	0.054	0.033	0.043	0.025	0.09	0.059	0.087	0.057	0.054	0.035	0.045	0.026
Silver	µg/L	0.0072	0.0069	0.0062	0.0051	0.0036	0.0028	0.0024	0.0019	0.0087	0.0056	0.0078	0.005	0.0039	0.0028	0.0028	0.0019	0.0077	0.0053	0.0073	0.0052	0.0038	0.0028	0.0028	0.002
Strontium	µg/L	40	30	121	59	118	69	92	49	48	25	93	47	120	54	100	47	45	26	90	46	117	53	102	48
Uranium	µg/L	0.48	0.47	0.42	0.34	0.33	0.24	0.22	0.17	0.59	0.38	0.53	0.34	0.33	0.22	0.25	0.16	0.52	0.36	0.49	0.35	0.32	0.22	0.25	0.17
Vanadium	µg/L	0.093	0.066	0.086	0.056	0.082	0.045	0.077	0.042	0.11	0.057	0.11	0.054	0.098	0.044	0.091	0.041	0.11	0.059	0.11	0.058	0.1	0.05	0.094	0.045
Zinc	µg/L	0.24	0.19	0.25	0.15	0.23	0.15	0.2	0.12	0.29	0.16	0.27	0.14	0.27	0.13	0.22	0.11	0.27	0.16	0.27	0.15	0.27	0.14	0.24	0.12

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

Table 8F3.2-3 Predicted Maximum of Surface Concentrations in Lac de Gras Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Field Measured																									
Water temperature	°C	2.0	15	1.5	14	2.0	14	2.3	15	2.0	15	1.4	16	2.3	15	2.8	16	0.8	17	0.73	16	1.5	16	1.6	16
Dissolved oxygen[(a)]	mg/L	10	9.8	10	9.7	10	9.6	10	9.3	10	9.1	10	9.2	10	8.9	9.7	8.6	9.9	9.0	9.9	8.9	10	8.8	9.5	8.4
Conventional Constituents																									
Hardness (calculated)	mg/L	15	9.4	14	9.3	15	9.2	14	8.7	16	9.6	15	9.4	15	9.2	14	8.8	16	9.5	14	9.4	15	9.2	14	9.0
Total dissolved solids	mg/L	35	21	33	21	34	21	31	20	36	21	34	21	35	21	32	20	37	22	33	21	34	21	33	21
Total suspended solids[(b)]	mg/L	2.7	1.6	2.5	1.6	2.3	1.4	2.3	1.4	2.7	1.6	2.6	1.6	2.4	1.5	2.3	1.4	2.8	1.6	2.5	1.6	2.4	1.5	2.4	1.4
Major Ions																									
Calcium	mg/L	3.1	1.9	2.9	1.9	3.7	2.2	3.4	2.2	3.2	2.0	3.0	1.9	3.8	2.2	3.4	2.2	3.3	2.0	2.9	1.9	3.7	2.2	3.5	2.2
Chloride	mg/L	6.5	4.1	6.1	4.1	8.0	4.9	7.3	4.8	6.8	4.4	6.3	4.2	8.3	4.9	7.4	4.8	6.9	4.3	6.1	4.2	8.2	4.9	7.5	4.9
Fluoride	mg/L	0.021	0.013	0.02	0.012	0.017	0.011	0.016	0.01	0.022	0.013	0.02	0.013	0.018	0.011	0.017	0.01	0.023	0.013	0.02	0.013	0.018	0.011	0.017	0.011
Magnesium	mg/L	1.8	1.1	1.7	1.1	1.4	0.88	1.3	0.81	1.9	1.1	1.8	1.1	1.4	0.88	1.3	0.82	1.9	1.1	1.7	1.1	1.4	0.89	1.3	0.84
Potassium	mg/L	1.9	1.2	1.8	1.1	1.4	0.9	1.3	0.84	1.9	1.2	1.8	1.2	1.4	0.9	1.3	0.85	2.0	1.2	1.8	1.2	1.4	0.91	1.3	0.85
Sodium	mg/L	3.8	2.4	3.5	2.4	3.5	2.2	3.2	2.1	4.0	2.5	3.7	2.4	3.6	2.2	3.3	2.2	4.0	2.5	3.5	2.4	3.6	2.2	3.4	2.2
Sulphate	mg/L	7.3	4.5	6.8	4.4	4.6	3.1	4.1	2.7	7.6	4.5	7.1	4.5	4.8	3.1	4.2	2.7	7.7	4.5	6.8	4.5	4.6	3.2	4.3	2.8
Nutrients																									
Total nitrogen (calculated)	mg-N/L	0.36	0.3	0.32	0.27	0.29	0.26	0.28	0.26	0.37	0.31	0.32	0.28	0.29	0.27	0.28	0.27	0.37	0.3	0.32	0.27	0.29	0.26	0.28	0.26
Total ammonia	mg-N/L	0.072	0.037	0.065	0.036	0.04	0.025	0.028	0.017	0.074	0.037	0.068	0.036	0.042	0.025	0.028	0.017	0.075	0.036	0.065	0.036	0.041	0.025	0.029	0.017
Nitrate	mg-N/L	0.082	0.054	0.044	0.03	0.041	0.03	0.046	0.036	0.085	0.069	0.045	0.034	0.043	0.038	0.045	0.048	0.088	0.056	0.047	0.027	0.043	0.032	0.048	0.039
Total phosphorus (calculated)	mg-P/L	0.005	0.003	0.0048	0.0029	0.0038	0.0027	0.0035	0.0026	0.0051	0.0031	0.0049	0.0031	0.0039	0.0027	0.0036	0.0028	0.0052	0.0029	0.0047	0.0028	0.0038	0.0027	0.0036	0.0027
Dissolved orthophosphate	mg/L	0.0036	0.0016	0.0034	0.0015	0.0024	0.0013	0.0021	0.0012	0.0037	0.0017	0.0035	0.0017	0.0025	0.0013	0.0022	0.0014	0.0038	0.0015	0.0033	0.0014	0.0024	0.0013	0.0022	0.0013
Phytoplankton (as chlorophyll *a*)	µg/L	4.5	5.9	5.0	5.8	1.9	2.7	1.0	1.4	4.6	6.0	4.9	5.7	2.0	2.8	1.0	1.4	4.6	6.2	4.9	6.1	1.9	2.9	1.0	1.5
Silica, reactive	mg/L	0.21	0.12	0.19	0.12	0.21	0.13	0.22	0.13	0.21	0.12	0.19	0.12	0.22	0.13	0.22	0.13	0.22	0.12	0.2	0.12	0.22	0.13	0.22	0.13
Total Metals																									
Aluminum	µg/L	45	27	41	26	32	20	27	17	46	27	43	26	33	20	27	18	47	27	41	27	31	20	28	18
Arsenic	µg/L	0.48	0.32	0.46	0.32	0.36	0.26	0.33	0.24	0.49	0.32	0.47	0.32	0.36	0.26	0.33	0.24	0.5	0.32	0.46	0.32	0.36	0.26	0.33	0.24
Barium	µg/L	9.4	5.7	8.8	5.6	6.8	4.4	6.1	3.8	9.6	5.7	9.1	5.7	7.0	4.4	6.2	3.8	9.8	5.7	8.9	5.7	6.8	4.4	6.3	3.9
Beryllium	µg/L	0.14	0.12	0.13	0.12	0.12	0.11	0.11	0.11	0.14	0.12	0.14	0.12	0.12	0.11	0.11	0.11	0.14	0.12	0.13	0.12	0.12	0.11	0.11	0.11
Bismuth	µg/L	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1	0.12	0.11	0.12	0.11	0.11	0.11	0.11	0.1
Cadmium	µg/L	0.044	0.036	0.043	0.035	0.038	0.032	0.036	0.031	0.045	0.036	0.044	0.036	0.038	0.032	0.036	0.031	0.046	0.035	0.043	0.036	0.038	0.032	0.036	0.031
Chromium	µg/L	0.27	0.11	0.25	0.11	0.16	0.088	0.14	0.078	0.27	0.11	0.26	0.11	0.17	0.088	0.14	0.078	0.28	0.11	0.25	0.11	0.17	0.089	0.14	0.079
Cobalt	µg/L	0.091	0.075	0.09	0.074	0.097	0.077	0.089	0.073	0.092	0.075	0.091	0.074	0.098	0.077	0.089	0.073	0.093	0.074	0.088	0.075	0.096	0.077	0.089	0.074
Copper	µg/L	0.51	0.39	0.5	0.39	0.48	0.38	0.46	0.37	0.52	0.39	0.51	0.39	0.49	0.38	0.46	0.37	0.53	0.39	0.5	0.39	0.48	0.38	0.47	0.37
Iron	µg/L	60	37	55	36	32	23	26	18	61	37	56	36	34	23	26	18	62	36	54	37	34	23	26	19
Lead	µg/L	0.048	0.037	0.046	0.037	0.041	0.034	0.038	0.033	0.049	0.037	0.047	0.037	0.041	0.034	0.038	0.033	0.049	0.037	0.046	0.037	0.04	0.034	0.038	0.033
Manganese	µg/L	6.1	3.1	5.7	3.0	4.9	2.4	4.4	2.1	6.2	3.1	5.9	3.1	5.1	2.4	4.4	2.1	6.3	3.1	5.7	3.1	4.9	2.4	4.4	2.2

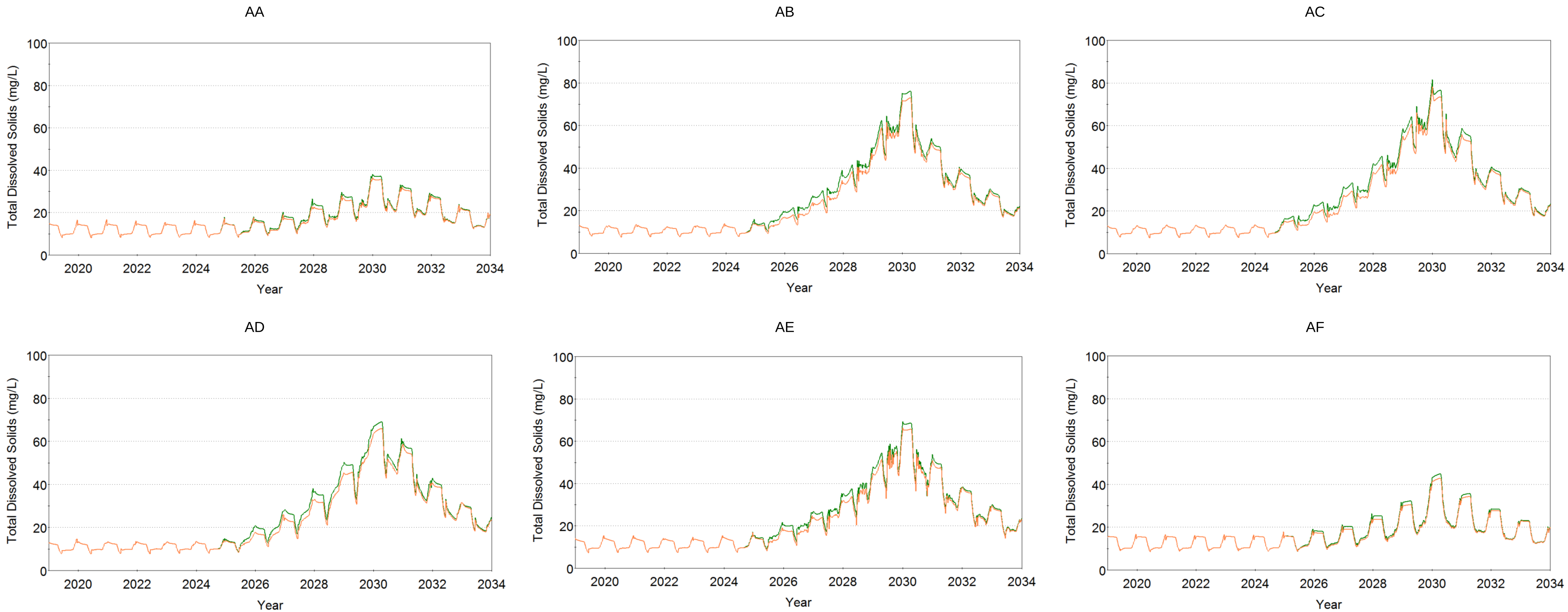
Table 8F3.2-3 Predicted Maximum of Surface Concentrations in Lac de Gras
Part B

Constituent	Units	LDG-P4								LDG-P5								LDG-P6							
		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)		Early Operations (2019 – 2024)		Late Operations (2024 – 2029)		Closure - Pit Back-Flooding Period (2030 – 2033)		Post-closure (2034 – 2060)	
		Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water	Under Ice	Open Water
Mercury	µg/L	0.014	0.012	0.013	0.012	0.012	0.011	0.012	0.011	0.014	0.012	0.014	0.012	0.012	0.012	0.012	0.011	0.014	0.012	0.013	0.012	0.012	0.011	0.012	0.011
Total Metals (continued)																									
Molybdenum	µg/L	6.0	3.1	5.7	3.2	4.5	2.3	4.0	2.0	6.3	3.1	6.0	3.2	4.7	2.5	4.2	2.0	6.4	3.2	5.8	3.2	4.6	2.4	4.3	2.0
Nickel	µg/L	1.7	1.1	1.6	1.1	1.4	0.99	1.4	0.94	1.7	1.1	1.6	1.1	1.4	1.0	1.4	0.94	1.7	1.1	1.6	1.1	1.4	0.99	1.4	0.95
Selenium	µg/L	0.22	0.15	0.2	0.14	0.14	0.11	0.12	0.091	0.22	0.15	0.21	0.15	0.14	0.11	0.12	0.091	0.23	0.15	0.2	0.15	0.14	0.11	0.12	0.093
Silver	µg/L	0.069	0.059	0.067	0.059	0.059	0.055	0.056	0.053	0.069	0.059	0.068	0.059	0.059	0.055	0.056	0.053	0.07	0.059	0.067	0.059	0.059	0.055	0.056	0.053
Strontium	µg/L	61	35	99	50	129	60	115	57	64	36	101	50	133	60	118	58	66	36	95	50	130	60	120	59
Uranium	µg/L	0.62	0.39	0.56	0.37	0.36	0.25	0.29	0.2	0.64	0.38	0.58	0.37	0.37	0.25	0.29	0.2	0.65	0.38	0.56	0.38	0.37	0.25	0.29	0.21
Vanadium	µg/L	1.0	0.11	0.94	0.11	0.52	0.097	0.41	0.091	1.1	0.11	0.97	0.11	0.53	0.11	0.41	0.097	1.1	0.11	0.94	0.11	0.56	0.099	0.42	0.094
Zinc	µg/L	1.6	0.6	1.6	0.6	1.5	0.56	1.5	0.54	1.6	0.61	1.6	0.61	1.5	0.57	1.5	0.54	1.6	0.6	1.6	0.61	1.5	0.56	1.5	0.55
Dissolved Metals																									
Aluminum	µg/L	8.6	4.5	8.2	4.6	7.3	3.7	6.6	3.4	9.1	4.6	8.7	4.6	7.7	4.1	6.9	3.5	9.3	4.7	8.3	4.6	7.5	3.8	7.0	3.5
Arsenic	µg/L	0.17	0.093	0.16	0.094	0.13	0.07	0.12	0.06	0.18	0.094	0.17	0.094	0.14	0.074	0.12	0.061	0.19	0.094	0.17	0.094	0.13	0.071	0.12	0.062
Barium	µg/L	5.6	3.0	5.2	3.0	4.1	2.2	3.6	1.9	5.8	3.0	5.5	3.1	4.3	2.3	3.7	1.9	5.9	3.0	5.3	3.1	4.1	2.3	3.8	1.9
Beryllium	µg/L	0.021	0.013	0.019	0.012	0.0098	0.0069	0.0071	0.0047	0.022	0.013	0.02	0.012	0.0099	0.007	0.007	0.0048	0.022	0.012	0.019	0.013	0.01	0.007	0.007	0.005
Bismuth	µg/L	0.0031	0.0019	0.0029	0.0018	0.0022	0.0013	0.0018	0.0011	0.0032	0.0019	0.0029	0.0018	0.0023	0.0013	0.0018	0.0011	0.0033	0.0019	0.0028	0.0019	0.0022	0.0013	0.0018	0.0011
Cadmium	µg/L	0.022	0.012	0.02	0.012	0.014	0.0083	0.012	0.0068	0.023	0.012	0.021	0.012	0.015	0.0084	0.013	0.0068	0.023	0.012	0.02	0.012	0.015	0.0084	0.013	0.007
Chromium	µg/L	0.14	0.076	0.13	0.076	0.082	0.05	0.07	0.039	0.14	0.076	0.13	0.076	0.086	0.05	0.072	0.04	0.14	0.076	0.13	0.077	0.084	0.051	0.074	0.041
Cobalt	µg/L	0.018	0.011	0.027	0.016	0.036	0.019	0.03	0.017	0.018	0.011	0.028	0.016	0.037	0.019	0.03	0.018	0.018	0.01	0.026	0.015	0.035	0.019	0.031	0.018
Copper	µg/L	0.13	0.067	0.14	0.071	0.15	0.073	0.14	0.07	0.14	0.075	0.14	0.075	0.16	0.083	0.15	0.08	0.15	0.073	0.14	0.073	0.16	0.076	0.15	0.075
Iron	µg/L	2.2	1.0	3.6	1.8	4.7	2.2	4.3	2.2	2.3	1.2	3.7	1.8	5.0	2.3	4.5	2.2	2.4	1.1	3.5	1.8	4.9	2.3	4.6	2.2
Lead	µg/L	0.0075	0.0047	0.0073	0.0048	0.0084	0.005	0.0076	0.0048	0.008	0.0049	0.0076	0.005	0.0089	0.0055	0.0079	0.0049	0.0081	0.0049	0.0075	0.0048	0.0087	0.0052	0.008	0.0049
Manganese	µg/L	4.0	2.3	3.7	2.2	3.3	1.8	2.8	1.6	4.2	2.3	3.9	2.3	3.4	1.8	2.8	1.6	4.2	2.3	3.7	2.3	3.3	1.8	2.9	1.7
Mercury	µg/L	0.0042	0.0025	0.0038	0.0024	0.002	0.0014	0.0015	0.00098	0.0043	0.0025	0.0039	0.0025	0.002	0.0014	0.0015	0.00099	0.0044	0.0025	0.0038	0.0025	0.0021	0.0014	0.0015	0.001
Molybdenum	µg/L	5.6	2.9	5.4	3.0	4.3	2.2	3.9	1.9	5.9	3.0	5.7	3.0	4.5	2.4	4.0	1.9	6.0	3.0	5.4	3.0	4.4	2.2	4.1	1.9
Nickel	µg/L	0.56	0.34	0.52	0.35	0.41	0.27	0.36	0.24	0.58	0.35	0.55	0.35	0.44	0.3	0.38	0.25	0.59	0.35	0.53	0.35	0.42	0.28	0.38	0.25
Selenium	µg/L	0.1	0.057	0.093	0.056	0.058	0.036	0.048	0.028	0.1	0.057	0.097	0.057	0.06	0.037	0.049	0.028	0.11	0.057	0.093	0.058	0.06	0.037	0.05	0.029
Silver	µg/L	0.0084	0.0051	0.0076	0.0049	0.004	0.0028	0.0029	0.0019	0.0086	0.005	0.0079	0.0049	0.004	0.0028	0.0029	0.0019	0.0088	0.005	0.0075	0.005	0.0042	0.0028	0.0028	0.002
Strontium	µg/L	53	28	91	43	121	53	107	51	56	29	93	43	126	53	110	51	57	29	87	43	123	54	112	52
Uranium	µg/L	0.57	0.34	0.51	0.33	0.32	0.21	0.26	0.16	0.58	0.34	0.53	0.33	0.33	0.22	0.26	0.17	0.59	0.34	0.51	0.34	0.33	0.22	0.26	0.17
Vanadium	µg/L	0.13	0.066	0.12	0.069	0.12	0.059	0.11	0.056	0.13	0.072	0.13	0.072	0.12	0.069	0.11	0.069	0.14	0.071	0.13	0.069	0.12	0.062	0.12	0.06
Zinc	µg/L	0.31	0.16	0.29	0.17	0.29	0.15	0.26	0.14	0.33	0.17	0.31	0.17	0.31	0.16	0.27	0.14	0.33	0.17	0.3	0.17	0.3	0.15	0.28	0.14

a) Dissolved oxygen predictions are minimum concentrations.
b) Total suspended solids were modelled using baseline concentrations.
mg/L = milligrams per litre; mg-N/L = milligrams as nitrogen per litre; mg-P/L = milligrams as phosphorus per litre; µg/L = micrograms per litre; °C = degrees Celsius.

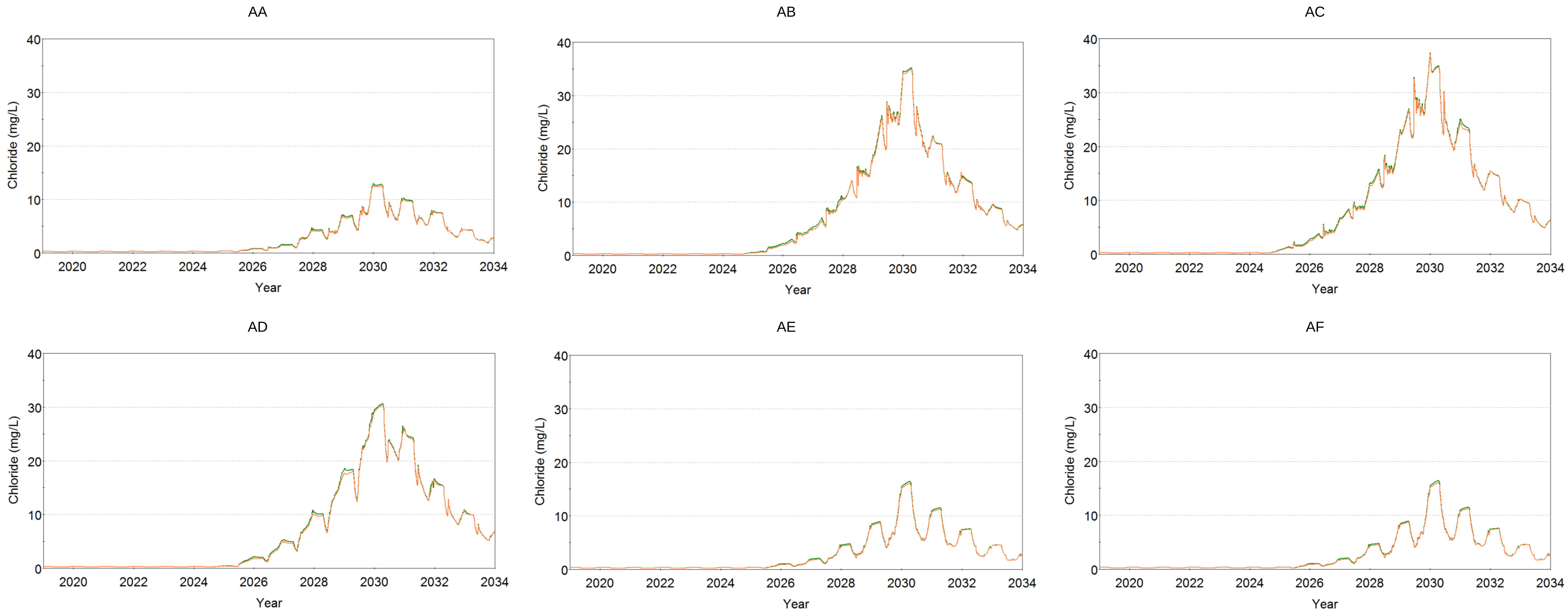
DOMINION DIAMOND

Figure 8F3.1-1 Lac du Sauvage Operations and Closure Total Dissolved Solids Sensitivity Analysis



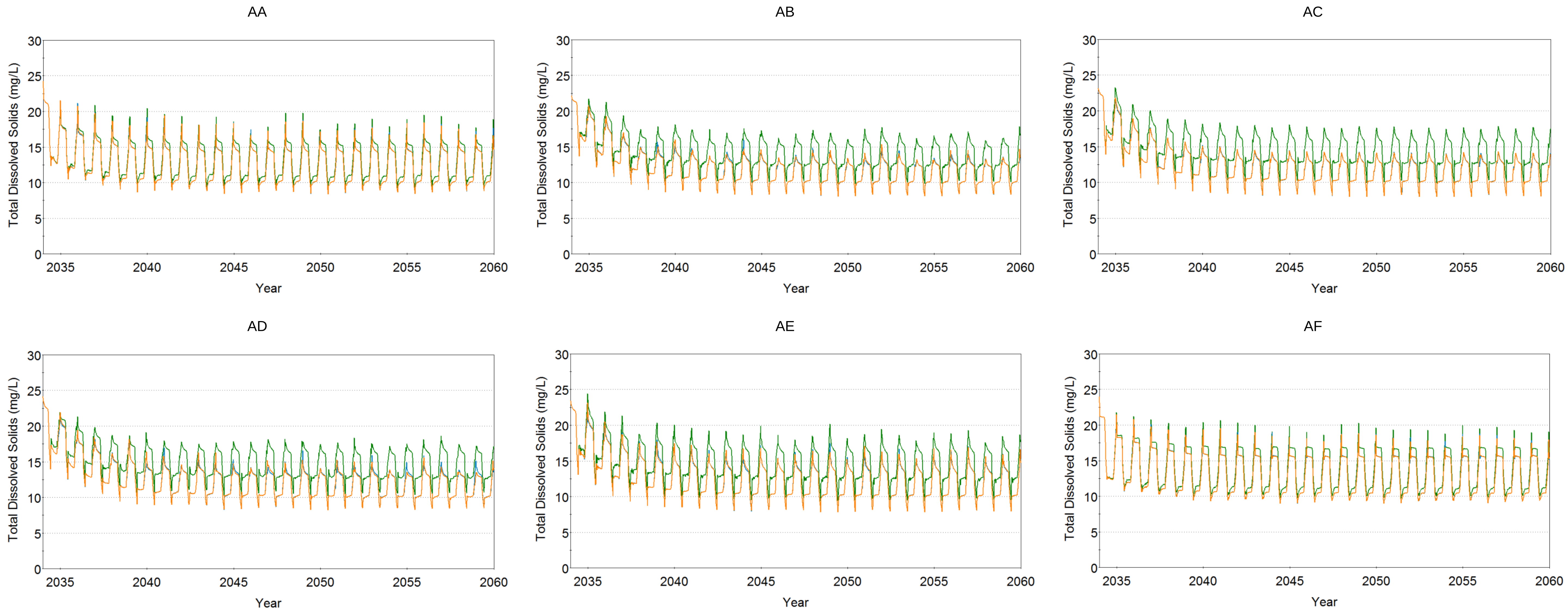
mg/L = milligrams per litre; solid orange line represents model results for the mean scenario; green line represents 99th percentile sensitivity results.

Figure 8F3.1-2 Lac du Sauvage Operations and Closure Chloride Sensitivity Analysis



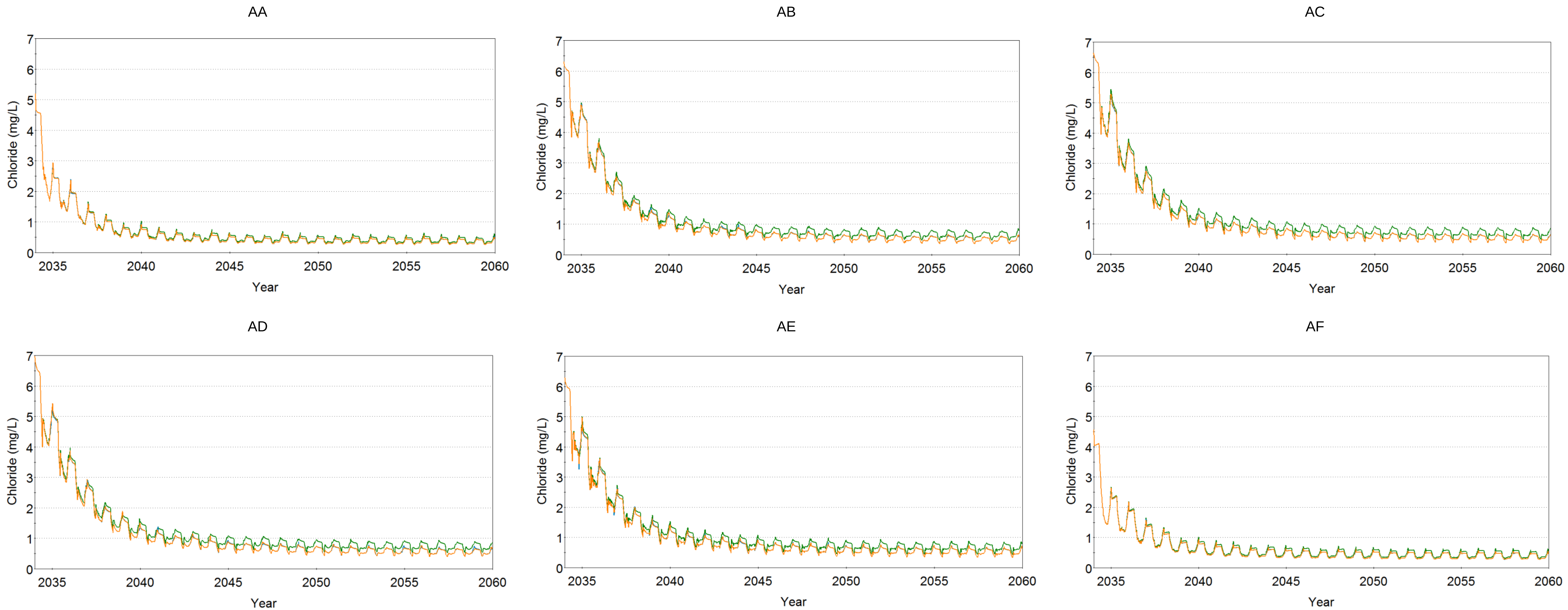
mg/L = milligrams per litre; solid orange line represents model results for the mean scenario; green line represents 99th percentile sensitivity results.

Figure 8F3.1-3 Lac du Sauvage Post-closure Total Dissolved Solids Sensitivity Analysis



mg/L = milligrams per litre; solid orange line represents model results for the mean scenario; green line represents 99th percentile WRSA sensitivity results; blue line represents 99th percentile monimolimnion water quality sensitivity results.

Figure 8F3.1-4 Lac du Sauvage Post-closure Chloride Sensitivity Analysis



mg/L = milligrams per litre; solid orange line represents model results for the mean scenario; green line represents 99th percentile WRSA sensitivity results; blue line represents 99th percentile monimolimnion water quality sensitivity results.

8F4 MODEL UNCERTAINTY AND LIMITATIONS

Modelling requires the use of many assumptions related to determining the physical and chemical characteristics of a system. Predictions are based on several inputs, all of which have inherent uncertainty. Given the inherent uncertainties, the results of a model should be used as a tool in project planning, and to outline potential risks, rather than to indicate absolute concentrations.

Important sources of model uncertainty are discussed below:

- Water chemistry profiles used as inputs to the Lac du Sauvage and Lac de Gras models were representative of their respective sources. This is an inherent assumption in all modelling, that data obtained as part of baseline, AEMP, and SNP sampling programs adequately represent the input sources and will continue to do so in the future.
- The Lac du Sauvage hydrodynamic model was built using a minimum horizontal grid cell size of 400 m by 400 m, which extended up to 800 m by 800 m in Duchess Lake and the AA area of Lac du Sauvage. Given this grid size, the narrow passages between the main basin of Lac du Sauvage and the adjoining Duchess Lake and AA area were larger in the model than in reality. This may have increased the amount of flow between the main basin and these adjoining basins, likely leading to estimates of concentrations in Duchess Lake and the AA area of Lac du Sauvage that are higher than they should be in reality.
- A vertical grid resolution of approximately 2 m was used in the Lac du Sauvage Model. This grid setup differed from measured profile data at all locations (i.e., collected at 1 m intervals), and in all seasons. (Section 8F2.3). However, a finer vertical grid resolution would have made the model run time prohibitively long. Despite the coarse vertical grid resolution used, the Lac du Sauvage Model provided a reasonable representation of the lake.
- The Lac de Gras hydrodynamic model was built using a minimum horizontal grid resolution of 1,000 m by 1,000 m, which extended up to 4,000 m by 1,000 m near the outlet of the lake. Given the larger horizontal grid size, predicted transport and mixing of constituents between near-field and far-field areas of the lake may have occurred more quickly in the model than in reality.
- To calibrate DO concentrations in Lac du Sauvage and Lac de Gras, a constant SOD of -0.15 g DO/m^2/d was applied over the entirety of each lake bed throughout the calibration, pre-operations, operations, closure, and post-closure time periods. The SOD is the movement of oxygen from the water column into the bottom sediment and consists of microbial and macrobenthic respiration and oxidation of reduced solids. In the future, both Lac du Sauvage and Lac de Gras were predicted to become more productive due to mine related inputs. Therefore, SOD in these lakes may be higher than the SOD applied during the calibration time period.
- The Lac du Sauvage and Lac de Gras models assume that ice forms on the lake at the same rate and at the same thickness each year from 2013 to 2060. As discussed in Section 8F2.2.2.2, as ice forms on the lake, constituents (mass) are rejected from the ice and remain in the lake. As a result, predicted constituent concentrations in the lake increase during the ice-covered season. The magnitude of the cycle varies and depends on the ice thickness and the depth of the lake at the monitoring station of interest. Changes in ice thickness or the depth of the lake from modelled values could affect peak predicted concentrations presented in this appendix.

- The Lac de Gras Model relied on predicted water quality concentrations from the Slipper Lake discharge that were provided by the Koala watershed model (ERM Rescan 2014). The Koala watershed model overpredicted concentrations in Slipper Lake for a number of constituents including nitrate, phosphorus, aluminum, antimony, arsenic, molybdenum, selenium, strontium, vanadium, and zinc. As a result, predicted concentrations entering Lac de Gras from the Slipper Lake discharge are potentially greater than they would be in reality.
- The Lac du Sauvage and Lac de Gras models were capable of reproducing constituent concentrations reasonably well during the calibration time period. Predicted concentrations in Lac du Sauvage and Lac de Gras only apply to the discharge water qualities noted in this appendix. Changes to discharge water quantity and quality may result in changes to constituent concentrations in the lakes beyond the range of concentrations predicted in this appendix.

8F5 CONCLUSIONS

Hydrodynamic and water quality models of Lac du Sauvage and Lac de Gras were developed using GEMSS to predict water quality concentrations within the lakes throughout pre-operations, operations, closure, and post-closure of the Project.

The models were calibrated using existing field data. Overall, the hydrodynamic calibration indicates that the models are tracking the movement of water and dissolved constituents well vertically and horizontally throughout each lake, with the following exceptions:

- In Lac du Sauvage, modelled temperature profiles were colder than measured data in August because of the 2 m vertical grid spacing used in the model.
- In Lac de Gras, modelled temperature profiles were colder in the near-field and mid-field areas of Lac de Gras in early July because of the duration of the ice-covered season, which extended into early July.
- In Lac de Gras, measured near-field specific conductivity profiles showed stratification during the late ice-covered season (i.e., April) that the model was not able to reproduce.

The Lac du Sauvage and Lac de Gras models are considered reasonable representations of the systems.

Peak concentrations in Lac du Sauvage were predicted to occur at the end of operations and to decrease rapidly during closure. Long-term post-closure concentrations for many constituents were predicted to remain slightly elevated above exisiting concentrations because of continued loading from the WRSA runoff to the lake.

Sensitivity analyses were developed using the maximum of mean concentrations and the maximum of 99th percentile concentrations obtained from site discharge water quality model for minewater pumped from the Misery Pit to Lac du Sauvage, for runoff from the WRSA, and for the monimolimnion of the Jay Pit (Appendix 8E). In general, the Lac du Sauvage Model was not sensitive to changes in the site water quality inputs. Therefore, the maximum of mean water quality concentrations were carried forward in the Lac du Sauvage and Lac de Gras models.

In Lac de Gras, predicted concentrations for constituents rise steadily until the assumed end of operations at the Diavik Mine in 2023. From 2024 to 2028, predicted concentrations for most constituents begin to decrease. Between 2029 and 2033, predicted concentrations for constituents including TDS, calcium, chloride, ammonia, nitrate, and strontium increase steadily in Lac de Gras again as a result of Project-affected inflows from Lac du Sauvage. Concentrations in Lac de Gras are predicted to decrease rapidly in post-closure (2034 to 2060).

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8F7 GLOSSARY

Term	Definition
Advective transport	In physics, engineering, and earth sciences, advection is a transport mechanism of a substance or conserved property by a fluid due to the fluid's bulk motion. An example of advection is the transport of pollutants or silt in a river by bulk water flow downstream.
Bathymetry	Measurement of the depth of an ocean or large waterbody.
Conductivity	A measure of the ability of water to carry an electrical current. This measurement is directly related to the amount of positively (cations) and negatively (anions) charged ions in the water and can be correlated with the concentration of total dissolved solids.
Constituent	An individual chemical, property, or measurement in water and fish tissue (e.g., aluminum, chloride, total dissolved solids)
Denitrification	A microbially facilitated process of nitrate reduction (performed by a large group of heterotrophic facultative anaerobic bacteria) that may ultimately produce molecular nitrogen (N2) through a series of intermediate gaseous nitrogen oxide products.
Dike	A natural or artificial slope or wall to regulate water levels.
Discharge	The volumetric rate of flow of water in a watercourse at a specified point, expressed in units of cubic metres per second or equivalent.
Holomictic lake	A waterbody, such as a lake, where at least once per year, physical mixing occurs between the surface and the deep waters
Hypsographic curve	Cumulative height (or depth) frequency curve for the Earth's surface or some part thereof. A hypsographic curve (also called hypsometric curve) is essentially a graph that shows the proportion of land area that exists at various elevations by plotting relative area against relative height or depth.
Inflow	Water flowing into a lake.
Meromictic conditions	Permanent segregation of waters with different densities
Minewater	Water collected in a mine and which is brought to the surface by water management methods in order to enable the mine to continue working.
Mixolimnion	The uppermost portion of a meromictic waterbody that behaves as holomictic lake
Monimolimnion	The lower portion of a meromictic waterbody that does not circulate much and is generally anoxic and more saline than the rest of the waterbody
Nutrients	Elements or chemicals essential to growth or repair of organic bodies, including carbon, oxygen, nitrogen, phosphorus, and silica.
Outflow	Water flowing out of a lake.
Parameter	A particular physical, chemical, or biological property that is being measured in a groundwater system; whatever it is you measure in a groundwater system.
Percentile (e.g., 98%)	The 98th percentile is the specific value (e.g., air quality ground-level concentration) below which 98% of the observed or modelled values occur (and only 2% of the values exceed the 98th percentile).
Runoff	The portion of water from rain and snow that flows over land to streams, ponds or other surface waterbodies. It is the portion of water from precipitation that does not infiltrate into the ground, or evaporate.
Salinity	The concentration of soluble salts in water measured as total dissolved solids.
Sediment	Solid material that is transported by, suspended in, or deposited from water. It originates mostly from disintegrated rocks; it also includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope soil characteristics, land usage and quantity and intensity of precipitation.

Term	Definition
Seepage	Slow water movement in subsurface. Flow of water from man-made retaining structures. A spot or zone, where water oozes from the ground, often forming the source of a small spring.
Total Dissolved Solids	The dissolved matter found in water comprised of mineral salts and small amounts of other inorganic and organic substances.
Waste Rock	Rock moved and discarded in order to access resources.
Waste Rock Storage Areas	Engineered landforms in which waste rock from mining activities is stored.
Water quality	A measure of concentrations of contaminants, or naturally occurring minerals, in water. Lower the concentrations of a particular contaminant lead to better water quality.
Watershed	The area drained by a river or stream; see also drainage basin.