Appendix B

Site C Clean Energy Project

PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2021 Annual Report

Prepared for:

BC Hydro
900-1111 West Georgia St.
Vancouver, BC V6E 4M3

March 10, 2022

Prepared by:

Ecofish Research Ltd. and Aski Reclamation LP

Published by Ecofish Research Ltd., Suite 906 - 595 Howe Street, Vancouver, BC V6C 2T5 and Aski Reclamation LP, 1717 Boucher Lake Rd., Moberly Lake, BC V0C 1X0

For inquiries contact: Technical lead documentcontrol@ecofishresearch.com 250-334-3042

Citation:

Ganshorn, K., T. Jensma, and C. Suzanne. 2022. Site C Clean Energy Project PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2021 Annual Report. Consultant's report prepared for BC Hydro by Ecofish Research Ltd. and Aski Reclamation LP., March 10, 2022.

Certification: *Certified - stamped version on file.*

Senior Reviewer:

Kevin Ganshorn, M.Sc., R.P.Bio. No. 2448

Biologist

Technical Leads:

Tetje Jensma, M.Sc.

Environmental Chemist

Christina Suzanne, M.Sc., R.P. Bio, P. Biol.

Aquatic Scientist

Disclaimer:

This report was prepared by Ecofish Research Ltd. and Aski Reclamation LP for the account of BC Hydro. The material in it reflects the best judgement of Ecofish Research Ltd. and Aski Reclamation LP in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Ecofish Research Ltd. and Aski Reclamation LP accept no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions, based on this report. This numbered report is a controlled document. Any reproductions of this report are uncontrolled and may not be the most recent revision.

EXECUTIVE SUMMARY

Ecofish Research Ltd. (Ecofish) and Aski Reclamation LP (Aski) were retained by BC Hydro to conduct surface water quality monitoring for the Site C Clean Energy Project (the "Project"). The scope of monitoring is specific to relocated surplus excavated material (RSEM) sediment ponds containing water that has come into contact with potentially acid generating (PAG) material. We acknowledge this work is being conducted on the traditional territory of Treaty 8 First Nations of Dunne Zaa, Cree and Tse'khene cultural descent.

This report summarizes the monitoring results for the 2021 calendar year[1]. Peace River diversion commenced on September 30, 2020 and full diversion was achieved on October 3, 2020. RSEM R6W, R6E, and L6 ponds remain in place following river diversion, and six new Phase 2 (post diversion) ponds are now operational: R5a-P2 (four ponds) and L5-P2 (two ponds). The Phase 2 RSEM R5a-P2 ponds were commissioned for discharge in 2021 but have not discharged to the Peace River to date. The Phase 2 RSEM L5-P2 ponds did not discharge to the Peace River prior to June 2021, with the RSEM L5E-P2 pond having its first discharge to the Peace River on June 29, 2021 and the RSEM L5W-P2 pond having its first discharge to the Peace River on August 25, 2021. There are safety constraints around working in or next to the Site C headpond in close (~1 km) proximity to the entrance to twin tunnels that divert the entire flow of the Peace River around the Site C dam. Therefore, water quality sampling in the Peace River was not conducted for the RSEM L5-P2 ponds when they discharged in 2021.

In 2021 during Phase 2 of construction, the RSEM R6E and R6W ponds regularly passively discharged water to the Peace River. In 2021, the RSEM L6 sediment control pond was dewatered by pumping through the discharge pipe on April 29-30 and on November 9-10.

In 2021, monitoring included acute toxicity testing of RSEM pond water as well as surface water quality monitoring in the Peace River as it relates to discharge from PAG contact RSEM sediment ponds. RSEM pond toxicity and Peace River surface water quality monitoring are requirements of the Acid Rock Drainage and Metal Leachate (ARD/ML) Management Plan[2] included as Appendix E of the Construction Environmental Management Plan (CEMP, BC Hydro 2022). The monitoring program was designed to evaluate: 1) RSEM pond water acute toxicity and 2) pond discharge for compliance with BC water quality guidelines (WQG) for the protection of aquatic life at the downstream edge of the 100 m long initial dilution zone (IDZ) in the Peace River. A summary of each monitoring component is provided below.

[1] In addition to this annual report, detailed monthly reports were issued that summarized the current RSEM status, monthly and cumulative monitoring results, and upcoming monitoring requirements. Additional reports are prepared for discharge compliance exceedances when required; this was not required in 2021. Annual and monthly reports were also prepared for the 2017, 2018, 2019, and 2020 monitoring periods.

[2] Other requirements of the CEMP, including RSEM in-pond water quality monitoring and mitigation implementation, are the responsibility of the project's Main Civil Works contractor, Peace River Hydro Partners (PRHP); these other requirements are reported on separately by PRHP and/or their Qualified Professional consultants and therefore are not included in this report.

RSEM Pond Acute Toxicity

The toxicity testing program for PAG containing RSEM sediment ponds consists of two components: routine bi-monthly monitoring and targeted monitoring as specified in the CEMP (BC Hydro 2022). In 2021, acute toxicity of RSEM pond water was monitored for each pond, provided sufficient water was available for sampling. Acute toxicity was evaluated using a standard laboratory assay (Rainbow Trout 96 hour LC50 test) performed on water samples collected directly from the pond or from the end-of-pipe pond outflow.

Considering all RSEM ponds, a total of 38 toxicity samples were collected in 2021 and all the tests passed (>100% v/v). Three samples were collected from each of RSEM R5a-P2A, R5a-P2B, and R5a-P2C and four samples were collected from RSEM R5a-P2D. Five samples were collected from the RSEM R6W pond, six from the RSEM R6E pond, five from the RSEM L5W-P2 pond, five from the RSEM L5E-P2 pond, and four from the RSEM L6 pond.

RSEM Discharge/Peace River Surface Water Quality Monitoring

The ARD/ML Management Plan (BC Hydro 2022) stipulates water quality criteria (i.e., BC WQG for the protection of aquatic life) at the IDZ location 100 m downstream of each RSEM discharge location. To evaluate compliance, a full suite of water quality parameters (including physical parameters, nutrients, anions, total metals and dissolved metals) was measured *in-situ* and/or sampled for laboratory analysis. Sampling was conducted on monthly and 5 in 30-day sampling schedules (5 sets of samples over a 30-day period during both turbid and clear flow conditions). Sampling was conducted at IDZ sites 100 m downstream of discharging RSEM ponds, as well as at upstream (upstream of all Site C construction influences), immediate background (just upstream of RSEM discharge points), and far-field downstream locations.

BC WQG were occasionally exceeded in 2021 due to naturally occurring Peace River conditions. There were no exceedances of BC WQG measured at IDZ sites that were attributable to discharge of water from RSEM sediment ponds. The range in water quality parameter concentrations measured in 2021 were similar to those measured in 2017, 2018, 2019, and 2020 and were within historical water quality data ranges observed in the Peace River.

The RSEM ponds have end-of-pipe (EOP) limits for total suspended solids (TSS). Continuous turbidity gauges installed on the left and right bank of the Peace River upstream of the confluence with the Moberly River are used to inform the project's Main Civil Works contractor, Peace River Hydro Partners (PRHP), of the Peace River background TSS twice daily via automated email as per Section 2.1 in BC Hydro (2017). To estimate the background Peace River TSS, Ecofish has developed TSS:turbidity relationships over the course of monitoring which are used to estimate TSS concentrations from the turbidity data logged by the monitoring stations. In total 142 TSS samples collected over 33 dates between March 14, 2018 to December 31, 2021 were used to develop the TSS:turbidity relationship used in 2021. These data encompassed a wide range of turbidity (4 NTU to 2,365 NTU) and TSS (2 mg/L to 1,535 mg/L) observations. The 2021 background TSS data are reported by PRHP and are not included in this report.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

LIST OF APPENDICES

1. INTRODUCTION

Ecofish Research Ltd. (Ecofish) and Aski Reclamation LP (Aski) were retained by BC Hydro to conduct sediment pond discharge surface water quality monitoring and to conduct acute toxicity monitoring for the Site C Clean Energy Project (the "Project") as it relates to sediment ponds in relocated surplus excavated material (RSEM) areas containing potentially acid generating (PAG) material and/or PAG contact water potentially discharging to the Peace River. We acknowledge this work is being conducted on the traditional territory of Treaty 8 First Nations of Dunne Zaa, Cree and Tse'khene cultural descent.

Project construction works include management of excavated PAG shale bedrock. The excavated shale bedrock is placed in up to four PAG contact RSEM areas (RSEM R5a, R6, L5, and L6; Map 1). Surface runoff from these RSEM areas and water from PAG excavation sites is directed into the associated active PAG contact RSEM sediment ponds (henceforth referred to as RSEM ponds), and water in these ponds may be discharged to the Peace River.

An Acid Rock Drainage and Metal Leachate (ARD/ML) Management Plan is included as Appendix E of the Construction Environmental Management Plan (CEMP, BC Hydro 2022) for the Project. Section 7.2 of the ARD/ML Management Plan specifies compliance requirements related to the PAG-contact RSEM ponds. Ecofish and Aski's scope of work is to conduct the monitoring and reporting associated with compliance requirements for acute toxicity (Section 7.2.1 of the ARD/ML Management Plan) and for Peace River water quality downstream of each PAG-contact RSEM (Section 7.2.3 of the ARD/ML Management Plan). Other requirements of the CEMP, including RSEM in-pond water quality monitoring and mitigation implementation, are the responsibility of the project's Main Civil Works contractor, Peace River Hydro Partners (PRHP); these other requirements are reported on separately by PRHP and/or their Qualified Professional consultants.

Peace River diversion commenced on September 30, 2020 and full diversion was achieved on October 3, 2020. RSEM R6W, R6E, and L6 ponds remain in place following river diversion, and six new Phase 2 (post diversion) ponds are now operational: R5a-P2 (four ponds) and L5-P2 (two ponds). The Phase 1 RSEM R5a, L5, and R5b ponds were decommissioned in 2020. Table 1 provides a summary of PAG contact RSEM pond construction and discharge history; the status of each Phase 1 and Phase 2 pond is further described below.

Water management in the RSEM R5a drainage area was transitioned to the Phase 2 RSEM R5a ponds (RSEM R5a-P2A, RSEM R5a P2B, RSEM R5a-P2C, and RSEM R5a-P2D) in September 2020. The Phase 2 RSEM R5a-P2 sediment ponds A and B are separated by a berm, as are ponds C and D. RSEM R5a-P2 ponds A and B are designed to discharge passively through a shared riprap lined outfall. Similarly, ponds R5a-P2C and R5a-P2D share a discharge outfall. The Phase 2 RSEM R5a-P2 ponds have not discharged to the Peace River to date. The Phase 2 RSEM L5-P2 pond is divided by a berm, resulting in two ponds: an east pond (RSEM-L5E-P2) and a west pond (RSEM-L5W-P2). The ponds are used to manage PAG contact water from the RSEM Area L5 catchment, the LBEX area and other

areas as needed. The ponds are commissioned for discharge; the discharge pipes from each pond are directed to a single spillway. The Phase 2 RSEM L5-P2 ponds did not discharge to the Peace River prior to June 2021, with the RSEM L5E-P2 pond having its first discharge to the Peace River on June 29, 2021 and the RSEM L5W-P2 pond having its first discharge to the Peace River on August 25, 2021. There are safety constraints around working in or next to the Site C headpond in close (~1 km, Map 1) proximity to the entrance to twin tunnels that divert the entire flow of the Peace River around the Site C dam. Therefore, water quality sampling in the Peace River was not planned for the RSEM R5a-P2 ponds or RSEM L5-P2 ponds in 2021.

The RSEM R6 pond is divided by a berm, resulting in two ponds: an east pond (RSEM R6E) and a west pond (RSEM R6W). Discharge from these RSEM R6 sediment ponds commenced in April 2017. Since May 9, 2020, RSEM R6W receives treated effluent from the MWTF pond. The two RSEM R6 ponds also receive water from several sources on site as documented in PRHP's Weekly Environmental Monitoring Reports. In 2021 during Phase 2 of construction, the RSEM R6E and R6W ponds passively discharged water to the Peace River. Construction of the RSEM L6 sediment pond was completed in March 2019. The pond is used to manage PAG contact water from the RSEM Area L6 catchment; the catchment is small therefore RSEM L6 pond generally does not discharge, and it is generally managed to prevent passive discharge. In 2021, the RSEM L6 sediment control pond was dewatered by pumping through the discharge pipe on April 29-30 and on November 9-10.

This report fulfils the annual reporting requirement outlined in Section 7.5 of the ARD/ML Management Plan (CEMP, Appendix E, BC Hydro 2022) for the associated monitoring conducted by Ecofish and Aski (RSEM pond toxicity testing and Peace River water quality sampling) on behalf of BC Hydro in 2021.

Table 1. PAG contact RSEM pond construction and discharge history as of the end of 2021.

RSEM Pond	RSEM Pond Construction Completed	Discharge to the Peace River Commenced	Status
R5a-P2[1]	September 2020	No discharge has occurred to date	Four ponds, active in Phase 2 of construction. The R5a-P2 ponds were commissioned for passive discharge in 2021 but have not discharged to the Peace River to date.
R6	March 2017	April 2017	Two ponds; ponds remain the same in Phase 1 and Phase 2 of construction. The RSEM R6 West pond has been receiving treated effluent from the MWTF since May 9, 2020.
L5-P2	September 2020	June 2021 (L5E-P2) and August 2021 (L5W-P2)	Single pond divided by a berm, resulting in two ponds: an east pond (L5E-P2) and a west pond (L5W-P2); active in Phase 2 of construction.
L6[2]	March 2019	No planned discharge	Unchanged between Phase 1 and Phase 2 of construction.

[1] Water from the four RSEM R5a-P2 ponds is managed to avoid discharge to the Peace River by pumping water between the R5a-P2 ponds.

[2] Water stored in RSEM L6 is managed to prevent passive discharge into the Peace River. In 2021, discharge to the Peace River occurred on April 29-30 and on November 9-10 when water was pumped to the Peace River.

628000 629000 630000 631000 632000

6232000 6231000 6230000 6229000

N

PAM-LB1
PAM-LB
PAM-RB
Peace Upstream
RSEM-R5A-P2-D
RSEM-R5A-P2-C
R5aD-P2 SP Toxicity
R5aC-P2 SP Toxicity
RSEM R5a
RSEM-R5A-P2-B
RSEM-R5A-P2-A
R5aB-P2 SP Toxicity
R5aA-P2 SP Toxicity
L5W-P2 SP Toxicity
L5E-P2 SP Toxicity
RSEM L5
Peace River
Moberly River
RSEM R5b

Inset 1
L6 SP Toxicity
L6 Upstream
L6 Back Eddy
L6 Discharge
L6 Discharge
Peace River
L6 IDZ
0 25 50 m

Inset 2
Peace River
R6 Discharge
R6 Upstream
R6 IDZ
R6E EOP Toxicity
R6W EOP Toxicity
R6W SP Toxicity
R6E SP Toxicity
0 50 100 m

Inset 3
Peace River
PAM-RB1
0 50 100 m

Inset 4
PAM-LB2
Peace River
0 100 200 m
PAM-RB2

Inset 1
RSEM L6
L6 SP Toxicity
L6 Upstream
L6 Back Eddy
L6 Discharge
L6 Discharge
L6 IDZ
MECCS site (far-field downstream, left bank)
Peace River
MECCS site (far-field downstream, right bank)
R6 Discharge
R6 Upstream
R6W SP Toxicity
R6 IDZ
R6W EOP Toxicity
R6E EOP Toxicity
R6E SP Toxicity
Inset 2
RSEM R6

SITE C CLEAN ENERGY PROJECT

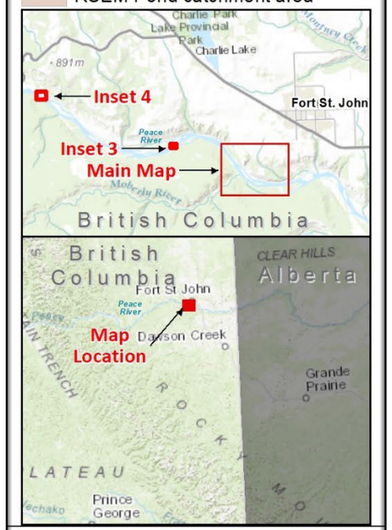
PAG Contact RSEM Sediment Ponds and Water Quality Monitoring Locations

Legend

- Pond toxicity sampling collected in the sediment pond (SP) or from the end of pipe (EOP)
- Peace River Water Quality Monitoring
- RSEM Sediment Pond Discharge Point
- Continuous Turbidity Gauge
- Debris Boom
- Area of New Cofferdam
- Restricted Watercraft Operating Areas (No-Go Zones)

Sediment Ponds

- RSEM Pond constructed and discharge has commenced
- RSEM Pond constructed but discharge is not anticipated
- Phase 2 RSEM Pond constructed but not yet discharging
- Decommissioned RSEM Pond
- RSEM Pond catchment area



MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

0 75 150 300 450 600 750 Meters

Scale: 1:17,000

NO.	DATE	REVISION	BY
1	2022-02-25	1200_RSEM_WQ_Annual_4836_20220224	
2			
3			
4			
5			

Date Saved: 2022-02-25
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 1

Path: M:\Projects-Active\1200_SiteC\MXD\WaterQuality\1200_RSEM_WQ_Annual_4836_20220224.mxd

2. BACKGROUND

2.1. RSEM Pond Acute Toxicity

The acute toxicity (Rainbow Trout 96 hour LC50) monitoring program is designed to confirm that water discharged from the PAG contact RSEM ponds is not acutely toxic to aquatic life at the point of discharge into the Peace River (as per Section 7.1 of ARD/ML Management Plan, BC Hydro 2022). Therefore, prior to discharge into the Peace River, and for the duration of discharge into the Peace River, acute toxicity testing is required for each RSEM pond.

The acute toxicity monitoring program is described in Section 7.3.1 of the ARD/ML Management Plan, BC Hydro 2022), and reflects the toxicity monitoring program (Shelley *et al.* 2018) that was accepted by regulators in February 2019. On February 27, 2019 a bi-monthly acute toxicity sampling approach was adopted, and the sampling schedule specified in the CEMP (BC Hydro 2022) switched to a bi-monthly schedule for all RSEM ponds.

The current toxicity monitoring approach specifies that samples be collected from each PAG contact RSEM sediment pond every two months if there is sufficient water to collect a sample (Shelley *et al.* 2018). This will demonstrate regulatory compliance over a range of operating conditions and provide data to confirm or revise the testing program. In the event of an acute toxicity test failure under this monitoring program, an additional sample(s) will be collected to confirm pond water quality returns to non-toxic conditions (Shelley *et al.* 2018). An initial sample will be collected 96 hours after the failed sample; if that sample also fails, additional samples will be collected every 96 hours until a sample passes. After a test passes, routine acute toxicity testing will resume at a bi-monthly frequency from the sample date of the passed test (Shelley *et al.* 2018). Additional targeted acute toxicity testing is also conducted if pond pH drops below 6.5 for more than one hour, which is more conservative than the lower end-of-pipe (EOP) discharge limit of 6.0 (Shelley *et al.* 2018).

A toxicity test "passes" (i.e., the pond water is not acutely toxic) if the result of the test is ≥ 50% survival in undiluted pond water. Detailed monthly reports were issued for each month of 2021 which provide results for RSEM pond acute toxicity testing. If a toxicity test fails, results are communicated directly to BC Hydro and PRHP as soon as results are available. A high-level summary of the methods and results of the RSEM pond acute toxicity monitoring conducted in 2021 are provided herein and data summary tables are provided in Appendix A.

2.2. Peace River Water Quality

The compliance requirements for the monitoring program for Peace River water quality downstream of each RSEM pond are described in Section 7.2.3 of the ARD/ML Management Plan (BC Hydro 2022). A compliance requirement includes defining and approving water quality monitoring sites in the Peace River. Compliance requirements also include confirming that the Peace River samples are in fact sampling within the RSEM pond discharge plume and confirming discharge plume dynamics under a range of river flows and discharge rates to confirm plume modeling

predictions (Ganshorn *et al.* 2017a, 2017b). During Phase 2 of construction discharge plume characterization will be confirmed for RSEM R6 and L6.

It is also a compliance requirement that during discharge from RSEM ponds, water quality at the initial dilution zone (IDZ) monitoring locations 100 m downstream of the RSEM discharge points shall meet the Peace River IDZ Limits (i.e., BC Water Quality Guidelines (BC WQG)) as specified in Table 2 of the ARD/ML Management Plan (BC Hydro 2022). Compliance with this requirement is assessed using a sampling program which is described in Section 7.3.4 of the ARD/ML Management Plan. The program requires sampling only during periods of RSEM discharge and includes monthly and 5 in 30-day sampling (five evenly spaced sampling events over 30 days performed twice per year, once during clear flow and once during turbid flow).

Water quality monitoring within the RSEM ponds is monitored daily by PRHP. Pond data for the dates corresponding to monthly and 5 in 30-day sampling in the Peace River as described above are included for reference in this report in the time series graphs of each water quality parameter for RSEM R6 (Appendix B) and RSEM L6 (Appendix C).

It is a compliance requirement (for PRHP), to meet EOP discharge limits for total suspended solids (TSS) in water that discharges to the Peace River from the RSEM ponds. PRHP reports on compliance with respect to EOP limits, and Ecofish provides PRHP with background Peace River TSS data to inform the TSS EOP limit twice a day via automated email. The background TSS data are derived from continuous turbidity data collected at two background real time monitoring stations in the Peace River, and Ecofish is responsible for developing and maintaining the TSS:turbidity relationships for these stations.

Detailed monthly reports were issued for each month of 2021[3] which provide water quality data summary tables, figures, and sampling details to meet the monthly reporting requirement outlined in Section 7.5.3 of the ARD/ML Management Plan (BC Hydro 2022). In accordance with Section 7.3.4 of the ARD/ML Management Plan, exceedance reports are issued immediately (i.e., within 24 hours of receipt of *in-situ* or laboratory analytical results) if exceedances of the Peace River IDZ limits are identified in any IDZ sample, provided the cause of the exceedance was attributable to discharge from a RSEM pond. There were no exceedance reports issued in 2021. A high-level summary of the methods and results of the Peace River and RSEM IDZ surface water quality sampling conducted in 2021 are provided herein.

[3] Annual and monthly reports were also prepared for 2017, 2018, 2019 and 2020.

3. METHODS

3.1. RSEM Pond Acute Toxicity

Four sterile 10 L plastic carboys (or two 20 L carboys) are provided by ALS for each acute toxicity test. Carboys are filled with pond water either obtained directly from the outflow pipe when a RSEM pond is discharging or collected from the pond close to the outflow pipe location if there is no discharge from the RSEM pond. Sampling procedures, chain of custody, and QA/QC follow the guidelines of the British Columbia Field Sampling Manual (Gov BC 2013).

The acute toxicity testing is performed by Nautilus Environmental in Burnaby or Calgary (under subcontract to ALS Environmental). Sample carboys are delivered to ALS in Fort St. John shortly after sampling (on the same day) and the samples are shipped to Nautilus Environmental following standard chain of custody and within acceptable hold times.

Toxicity samples were not collected if the water level was too low or the pond was frozen to the bottom, in this case, sampling was postponed until sufficient water was available.

3.1.1. RSEM R5a-P2

Acute toxicity sampling of the RSEM R5a-P2 ponds (R5a-P2A, R5a-P2B, R5a-P2C, R5a-P2D) commenced on April 22, 2021. Prior to this the ponds were frozen or contained an insufficient depth of water for sample collection. In 2021, toxicity samples were collected from each pond on a bi-monthly basis from April until October. During October sampling, RSEMR5aP2A and C ponds were dry and could not be sampled; RSEMR5aP2B pond had just enough water to collect an *in-situ* sample but no toxicity sample could be collected. Sampling of RSEMR5aP2A, B and C ponds was attempted on November 24, 2021 and sampling of all ponds was attempted on December 13, 2021; however, due to frozen conditions the ponds could not be sampled.

3.1.2. RSEM R6

In 2021, RSEM R6 toxicity samples were collected on a bi-monthly sampling schedule as site conditions allowed starting in January for RSEM R6E and in March for RSEM R6W.

3.1.3. RSEM L5-P2

In 2021, toxicity samples were collected from the two RSEM L5-P2 ponds on a bi-monthly basis from March (the ponds were frozen/empty in January and February) through November.

3.1.4. RSEM L6

In 2021, toxicity sampling of the RSEM L6 pond was done on a bi-monthly basis beginning in April; sampling was not done prior to this due to frozen conditions/insufficient water for sample collection.

3.1.5. Acute Toxicity Test Failure Notification and Evaluation

In the event that a toxicity sample is determined to be acutely toxic, the LC_{50} (i.e., the concentration at which there is mortality in 50% (v/v) of the fish) is estimated and reported by Nautilus based on the toxicity results at serial dilutions of the pond water sample. Data are provided in tabular format as % Survival of Rainbow Trout for serial dilutions (% v/v) of the RSEM Pond Water. Nautilus provides

the final laboratory report to ALS at which point the final report is automatically emailed to Ecofish and PRHP.

Although it is not a requirement of the CEMP (BC Hydro 2022) to collect water quality samples from the Peace River in conjunction with acute toxicity sampling, sampling schedules can overlap and in some cases acute toxicity sampling is done in conjunction with water quality sampling in the Peace River. If an acute toxicity test failure occurs, and corresponding water quality samples were collected in the Peace River (upstream of the discharge, at the compliance point 100 m downstream of the discharge and the far-field monitoring sites), data will be reviewed to evaluate any effects of the discharge in the Peace River.

If an acute toxicity test failure occurs and water quality sampling was not performed in the Peace River on the date of the toxicity test failure, the potential effects of the discharge on the water quality in the IDZ can be modelled using the site-specific mixing model developed for the RSEM IDZs (Ganshorn *et al.* 2017a). The background water quality (general parameters, metals) in the Peace River required for modelling is estimated based on historical data during similar environmental conditions (seasonal flow and turbidity), and the pond water quality is provided by PRHP, who collect water quality samples daily from the RSEM sediment ponds provided there is sufficient water for sample collection.

3.2. Peace River Water Quality

3.2.1. RSEM Pond Discharge Plume Characterization

Monitoring of RSEM pond discharge plumes within the IDZ is conducted to characterize dilution under a variety of pond discharge and Peace River flows to meet the CEMP requirement to confirm discharge plume dynamics, and modeling predictions. Characterization of discharge relies on measurements of *in-situ* specific conductivity, as conductivity in the RSEM ponds is reliably higher than the Peace River. *In-situ* specific conductivity measurements are recorded in the Peace River at different depths (typically 15 and 30 cm below the surface), distances from shore, and distances upstream and downstream from pond discharge points.

In 2021, IDZ characterization was completed for RSEM R6 (October 25) and RSEM L6 (November 9) to confirm that the pond upstream and IDZ monitoring sites are adequate under Phase 2 hydraulic conditions. Characterization for the new Phase 2 ponds (RSEM R5a-P2 and RSEM L5-P2) is not currently possible due to safety constraints around working in or next to the Site C headpond in close (~1 km, Map 1) proximity to the entrance to twin tunnels that divert the entire flow of the Peace River around the Site C dam. IDZ characterization for the R6 and L6 ponds will be reported on separately in a stand-alone report.

3.2.2. Peace River and RSEM IDZ Surface Water Quality Sampling

The following sections describe the methods used to monitor water quality in the Peace River as it relates to discharge from the PAG contact RSEM sediment ponds.

3.2.2.1. Monthly and 5 in 30-day Surface Water Quality Sampling

Monthly and 5 in 30-day water quality sampling (five evenly spaced sampling events over 30 days performed twice per year, once during clear flow and once during turbid flow) were conducted during periods of RSEM pond discharge in 2021 (Table 2). Sampling consists of collecting measurements in the field with *in-situ* water quality meters, and collection of water quality samples for laboratory analysis. *In-situ* and laboratory sampling procedures, chain of custody procedures, and QA/QC procedures adhered to the guidelines of the British Columbia Field Sampling Manual (Gov BC 2013). In addition, data screening and management followed the QA/QC procedures outlined below in Section 3.2.3. Typically, triplicate readings were collected for *in-situ* data and a duplicate sample for laboratory analysis was collected at one site on each sampling date. Field blanks and travel blanks were also collected on each sampling date.

The full suite of laboratory parameters as specified in Section 7.3.2 of the ARD/ML Management Plan (BC Hydro 2022) (physical parameters, nutrients, anions, total metals and dissolved metals) were sampled monthly when the RSEM ponds were discharging. The same parameters were also sampled for the 5 in 30-day sampling. Monthly sampling was used to also fulfil one or more of the 5 in 30-day sampling requirements. These parameters are consistent with those being measured by PRHP in the RSEM ponds.

The following monthly and 5 in 30-day sampling site locations were sampled in the Peace River to monitor discharge from the RSEM R6 ponds and the RSEM L6 pond (sampled on only one occasion in 2021): a control site upstream of the Site C instream works in the Peace River (Peace Upstream/ PR-2.81), two far-field locations downstream of the construction footprint on the right bank and left bank of the Peace River (MECCS far-field downstream sites), an upstream site located 5 m upstream of the discharge point, and an IDZ monitoring site located at the edge of the IDZ (100 m downstream of the discharge point) (Table 3, Map 1).

In-situ measurements and laboratory samples were collected 10 to 15 cm below the surface of the water to avoid surface contamination from airborne particulate and approximately 1 m from shore, except for at the Peace Upstream site (which replaced Peace 03 following diversion). Samples were collected mid-channel at the Peace Upstream site to provide Peace River background data upstream of the confluence of the Moberly River and the Peace River.

Monthly sampling is conducted during months where discharge occurs from each pond (Table 2). In 2021, monthly sampling during discharge was completed for RSEM R6 (sampling in the Peace River was not conducted due to COVID restrictions in January and February 2021); RSEM L6 was also sampled once on November 9, 2021 to meet the monthly requirement and to complete discharge plume characterization (Table 2, Section 3.2.1). The 5 in 30-day sampling for RSEM R6 was completed

during turbid flows from May 11, 2021, to June 8, 2021 and for RSEM R6 during clear flows from October 12, 2021 to November 9, 2021 (Table 2).

Detailed monthly reports were issued for each month of 2021; these reports provide water quality data summary tables, figures, and sampling details to meet the monthly reporting requirement outlined in Section 7.5.3 of the ARD/ML Management Plan (BC Hydro 2022). A table of summary statistics (average, minimum, maximum, and standard deviation) is provided for each sample site that considers all of the data collected at that site in 2021. Replicate samples and *in-situ* measurements (duplicates and triplicates) were averaged prior to calculating the summary statistics. Parameters with a concentration below the method detection limit (MDL) were assumed to have a concentration equal to the MDL for calculation of the summary statistics.

In the 2021 annual summary statistics tables, the annual average, minimum, and maximum values for each parameter for each Peace River monitoring site were screened against the applicable short-term maximum BC WQG for the protection of aquatic life (MECCS 2021; Appendix A). The annual average values for each parameter at each site were also screened against the applicable long-term BC WQG (MECCS 2021; Appendix A). The 5 in 30-day monitoring results were screened against the applicable long-term BC WQG in the June and November 2021 monthly reports.

Several water quality parameters have BC WQGs that are calculated based on an equation, or the Biotic Ligand Model as is required for dissolved copper, that depends on the value of other stream chemistry parameters (e.g., pH, hardness (as $CaCO_3$), dissolved organic carbon (DOC), chloride). To calculate the short-term BC WQG values using an equation, the site chemistry parameter values as measured at each site/date are used. Exceedances of the short-term BC WQG are shaded in blue in the summary tables and the total number of short-term BC WQG exceedances considering all sites and sampling dates over the 2021 monitoring period is also provided in the summary tables.

To calculate the long-term BC WQGs, when the guideline is an equation the annual average of the required stream chemistry parameter values (e.g., pH, hardness (as $CaCO_3$), DOC, chloride) at a particular site, is used to generate the applicable guideline value. In the summary statistics tables, yellow shading indicates an exceedance of the long-term BC WQG.

Illustrative time series figures depicting monthly and 5 in 30-day data collected at each sampling site for each parameter sampled in 2021 were completed for the RSEM ponds that discharged in 2021 (i.e., RSEM R6 and RSEM L6; Appendix B and Appendix C, respectively). RSEM pond water quality results were also included for each sampling date in the time series figures. Parameters with a concentration below the MDL were assumed to have a concentration equal to the MDL for the purpose of generating the figures. It should be noted that for some of the parameters, the MDL used for the pond water quality analysis was different than the MDL used for the Peace River water quality analysis as two different laboratories are used for these analyses. RSEM pond water quality analyses

are contracted by PRHP to Bureau Veritas[4], whereas Peace River water quality analyses are contracted by Ecofish to ALS Environmental).

Short term and long-term BC WQG are included in the time series figures for illustrative purposes. For those guidelines that are equations which rely on specific stream chemistry parameter values, an average based on previous data collected in the Peace River is used. Details are provided as footnotes to applicable figures.

Table 2. 2021 monthly and 5 in 30-day water quality sampling dates and Peace River background TSS (clear/turbid/very turbid flow).

Month (2021)	Day	Sampling Type	RSEM Area	Background Clear/Turbid Flow at RSEM Pond Upstream Site	Background Clear/Turbid Flow at Peace River Upstream/PR2.88
Mar	25	Monthly	RSEM R6	Clear	Clear
Apr	20	Monthly	RSEM R6	Turbid flow	Turbid flow
May	11	5 in 30 day	RSEM R6	Turbid flow	Clear
	19	Monthly/5 in 30 day	RSEM R6	Very turbid flow	Very turbid flow
	26	5 in 30 day	RSEM R6	Very turbid flow	Very turbid flow
Jun	2	5 in 30 day	RSEM R6	Very turbid flow	Turbid flow
	8	Monthly/5 in 30 day	RSEM R6	Very turbid flow	Very turbid flow
Jul	29	Monthly	RSEM R6	Clear	Clear
Aug	25	Monthly	RSEM R6	Clear	Turbid flow
Sep	8	Monthly	RSEM R6	Clear	Clear
	9	Monthly	RSEM R6	Clear	Clear
Oct	12	5 in 30 day	RSEM R6	Clear	Clear
	19	Monthly/5 in 30 day	RSEM R6	Clear	Clear
	26	5 in 30 day	RSEM R6	Clear	Clear
Nov	2	5 in 30 day	RSEM R6	Clear	Clear
	9	Monthly/5 in 30 day	RSEM R6	Clear	Clear
	9	Monthly	RSEM L6	Clear	Clear
Dec	10	Monthly	RSEM R6	Clear	Clear
	13	Monthly	RSEM R6	Clear	Clear

[1] Clear flow: TSS ≤ 25 mg/L; Turbid flow: TSS > 25 mg/L and ≤ 100 mg/L; Very Turbid Flow TSS > 100 mg/L.

[2] TSS data for RSEM R6 upstream (RBPR-7.05) and RSEM L6 upstream (LBPR-6.82) are obtained from ALS laboratory data for each sampling date.

3.2.2.2. Peace River Background TSS

The RSEM ponds have EOP limits for TSS. Continuous turbidity gauges installed on the left and right bank of the Peace River upstream of the confluence with the Moberly River were used to inform PRHP of the Peace River background TSS twice daily via automated email as per Section 2.1 in BC Hydro (2017).

[4] Due to a cyberattack of the Bureau Veritas computer system in November 2021, PRHP redirected December 2021 water quality samples to ALS Environmental for analytical testing.

Until recently, the turbidity gauges PAM-LB and PAM-RB located on the left and right bank of the Peace River immediately upstream of the confluence with the Moberly River have been used to provide the background TSS data (Map 1). Following construction of the Stage 2 cofferdam and river diversion, these locations have become backwatered at high Peace River flows, such that at high flows the cable lengths of the sensors are insufficient to simultaneously keep the sensors wetted and keep the monitoring equipment on shore from being flooded by the Peace River. Accordingly, the monitoring equipment at PAM-LB and PAM-RB was re-located slightly upstream to locations with steeper bank topography where there is no risk of the onshore equipment becoming flooded by the Peace River. On March 3, 2021 the PAM-LB monitoring equipment was moved 375 m upstream to PAM-LB1 and the PAM-RB monitoring equipment was moved 4.9 km upstream to PAM-RB1 (Map 1).

In addition, BC Hydro has elected to install two additional upstream continuous turbidity stations further upstream in the Peace River beyond the influence of backwatering from the Stage 2 cofferdam. This was done in the event that stations closer to the Moberly River confluence do not collect representative background TSS data as a result of backwatering (e.g., due to the potential for increased settling of TSS under backwatered conditions). These continuous turbidity gauges (PAM-LB2 and PAM-RB2) were installed on August 24, 2020 and they are located ~21 km upstream of the Moberly River confluence (Map 1).

After both left and right bank gauges (i.e., PAM-LB and PAM-RB until March 3, 2021, and PAM-LB1 and PAM-RB1 from March 3, 2021 onwards) have transmitted data logged at 06:00 MST, the average of all of the turbidity data collected over the previous 12 hours from both the left and right bank turbidity gauges is used to estimate the Peace River background TSS, which is automatically emailed to PRHP, BC Hydro, and Ecofish personnel. Similarly, this is done for the previous 12 hours after both gauges have transmitted data logged at 18:00 MST.

In order to estimate the background Peace River TSS that are provided in the automated emails, TSS:turbidity relationships developed over the course of monitoring are used to estimate TSS concentrations from the turbidity data logged by the monitoring stations. Note that background TSS data are reported by PRHP and are not included in this report.

This relationship between TSS and turbidity is dynamic and depends upon a variety of factors, including snowmelt and precipitation driven changes in the relative contributions of various sediment sources (MECCS 2021), as well as hydrology related changes in the sediment carrying capacity of the Peace River. As such, a site-specific TSS:turbidity relationship has been developed for the Peace River over a range of flow and turbidity conditions and this relationship is updated regularly with turbidity data recorded by the gauges paired with additional data from laboratory analysed TSS samples to ensure the relationship reflects current conditions.

In 2021, a total of 33 water samples were collected from April 8 to October 26, 2021 in the Peace River for laboratory analysis of TSS. These samples were collected across eight monitoring sites where continuous turbidity loggers are present. These laboratory-analyzed TSS data were paired with

simultaneously recorded turbidity data from the real stations to determine the TSS:turbidity ratio of each paired sample. The TSS:turbidity ratios of these individual samples were then plotted over time to identify whether shifts in the relationship had occurred. For each period identified, data from within that period are combined and analyzed to determine the appropriate relationship. The analysis of this TSS:turbidity ratio consists of using either a linear model with site specific interactions (if Tukey post hoc tests shows that this ratio differs amongst sites) or if there is no clear evidence of site-specific interactions, then a single common linear relationship is used.

3.2.2.3. BC WQG Exceedance Evaluation and Exceedance Notifications

To determine if an exceedance of the BC WQG (short-term maximum and long-term average) observed at the Peace River IDZ monitoring sites is related to the RSEM pond discharge, or alternately, is naturally occurring, the following steps are taken upon collection of *in-situ* data and upon receipt of laboratory data:

1. The RSEM pond discharge logs (kept by PRHP) are reviewed; if there is no discharge corresponding to the exceedance (including discharge residence time), it is assumed that the exceedance was naturally occurring.
2. The IDZ monitoring result is compared to the Peace River upstream location data (i.e., RSEM R6 upstream, or RSEM L6 upstream).
3. The IDZ monitoring result is compared to the RSEM pond data (pond data are provided by PRHP/Bureau Veritas).
4. If the IDZ monitoring result is higher than the RSEM pond data, then it is assumed that the exceedance was naturally occurring.
5. If the IDZ monitoring result is lower than the RSEM pond data, and the pond data exceeds the Peace River upstream data, then it is assumed that the exceedance was attributed to the RSEM pond and in accordance with the ARD/ML Management Plan requirements (BC Hydro 2022), an Exceedance Notification memorandum is issued to BC Hydro within 24 hours:
    a. Prior to composing the Exceedance Notification memorandum, BC Hydro will be notified immediately following identification of the exceedance.
    b. In the Exceedance Notification memorandum, the data are evaluated in the context of the corresponding water quality monitoring results for the Peace Upstream site, the two far-field downstream sites, as well as historical water quality data for the Peace River (Golder 2012, Ganshorn *et al.* 2018, Ganshorn *et al.* 2019, Ganshorn *et al.* 2020, Ganshorn *et al.* 2021).
    c. The Exceedance Notification memorandum is distributed by BC Hydro to one or more representatives of each of the following parties: the Project's Independent Environmental Monitor (EDI Environmental Dynamics Inc.), BC Government

(Ministry of Environment, Office of the Comptroller of Water Rights, and Emergency Management BC), PRHP, and PRHP's ARD Qualified Professional (Lorax Environmental).

d. Exceedance Notification summary tables including the distribution list, are also provided as required in the applicable monthly report that Ecofish prepares for BC Hydro.

e. The exceedance is also logged internally in BC Hydro's enterprise Incident Management System.

3.2.3. QA/QC

To ensure accurate and reliable results, all data collection and analyses undergo rigorous QA/QC. *In-situ* measurements are recorded in triplicate for each parameter. *In-situ* meters are maintained and calibrated as per manufacturer's guidelines; repair and calibration data are recorded and stored in a detailed log. QA/QC replicates (duplicates/triplicates), travel blanks, and field blanks are included in water quality sampling for laboratory analysis as required based on sampling frequency. Laboratory analysis of samples collected from the Peace River is completed by ALS Environmental, an accredited analytical laboratory with an ISO 9001:2008 and Canadian Association for Laboratory Accreditation certification. All samples are transported under standard chain of custody procedures and comprehensive QC checks are completed by the laboratory with every analysis.

Data are entered into EcoDAT, Ecofish's proprietary data management system, where comprehensive manual and automated QA/QC procedures are implemented. Sample data and QA/QC results are evaluated based on the BC Guidelines for Interpreting Water Quality Data (RISC 1998) and British Columbia Field Sampling Manual (Gov BC 2013).

The following overall QA/QC objectives were established for the program:

- % QA/QC samples (e.g., replicates, field blanks and travel blanks) collected should be at least 10% of the overall sampling program (Gov BC 2013).
- Field and travel blanks detections (value greater than the ALS Environmental MDL) should not exceed 5% of all parameter results, not including pH which is detectable in both samples and blanks.
- Precision between duplicates is expected to meet the Gov BC (2013) guideline, unless variability between replicates is a natural occurrence (e.g., during highly turbid flow, TSS, metals, and turbidity may be highly variable):
    - Relative percent deviation (RPD) between duplicates should be <20%; and
    - This metric is only calculated if at least one of the replicates was >5 x MDL.

- Precision between triplicates is expected to meet the RISC (1998) guideline, unless variability between replicates is a natural occurrence (e.g., during highly turbid flow, TSS, metals, and turbidity may be highly variable):
    - Relative standard deviation (RSD) between triplicates should be <18%; and
    - This metric is only calculated if at least one of the replicates was >5 x MDL.
- The cation - anion balance (%) should be <10% for samples that include the necessary major anions and cations for this calculation. The total anion sum and cation sum are expected to be within 10% of each other (ALS 2021).
- Considering the paired dissolved and total metals parameters, the dissolved metals (D-metals) concentration should be <1.2 * the total metals (T-metals) concentration. This metric was calculated if the D-metal concentration was at least 5 x >MDL.

Additional QA/QC checks and procedures in 2021 included:

- Review of field data sheets, QA/QC of *in-situ* and toxicity data manually entered into EcoDAT;
- Review of electronically uploaded ALS Environmental laboratory data;
- Review of laboratory hold time exceedances and sample qualifiers, the hold time for pH is 15 minutes and therefore exceedance of this hold time is unavoidable for all field samples; and
- Review of *in-situ* measurements and corresponding laboratory results for pH, turbidity, and specific conductivity. These data are evaluated to ensure that they are comparable. It is expected that these values will vary due to differences in analytical methods and precision between *in-situ* meters and laboratory instruments. This comparison is therefore completed by a Qualified Professional, and is largely qualitative, ensuring that values measured in the field and in the lab are within reasonable agreement.

Laboratory hold time exceedances, sample qualifiers, field and travel blank results, and precision between replicates were reviewed by a Qualified Professional for QA/QC issues that may affect interpretation of the data presented in each of the 2021 monthly sampling reports. Duplicate laboratory results were provided individually in the monthly report summary tables for each sampling date; and error bars were included in the illustrative figures where duplicate data were available.

4. RESULTS

4.1. RSEM Pond Acute Toxicity

The sample schedule for RSEM pond toxicity testing as outlined in the CEMP[5] (BC Hydro 2016) was revised as of February 27, 2019 after acceptance by regulators of an alternate testing program proposed by Shelley *et al.* (2018) on that date (CWR 2019). This revised approach was incorporated into revision 7 and onward of the CEMP (BC Hydro 2022). The updated toxicity testing program for PAG containing RSEM sediment ponds consists of two components: routine monitoring and targeted monitoring. In 2021, only routine monitoring was necessary. Test results are summarized for each pond separately in tables in Appendix A.

4.1.1. RSEM R5a-P2

In 2021, all 13 samples collected from the four RSEM R5a-P2 ponds (four from pond D, three from ponds A, B, and C) passed the acute toxicity test.

4.1.2. RSEM R6

In 2021, all 11 samples collected from the two RSEM R6 ponds (five samples from RSEM R6W and six from RSEM R6E) passed the acute toxicity test.

4.1.3. RSEM L5-P2

In 2021, all ten samples collected from the two Phase 2 RSEM L5 ponds (five samples from RSEM L5W-P2 and five from RSEM L5E-P2) passed the acute toxicity test.

4.1.4. RSEM L6

In 2021, all four samples collected from the RSEM L6 pond passed the acute toxicity test.

4.1.5. Acute Toxicity Test Failure Notification and Evaluation

In 2021, there were no acute toxicity test failures (Appendix A).

4.2. Peace River Water Quality

4.2.1. RSEM Pond Discharge Plume Characterization

In 2021, during Phase 2 of construction discharge plume characterization was completed on October 25 at RSEM R6 and on November 9 during pumped discharge from RSEM L6. These data have not yet been reported on and will be written up in a stand-alone report in early 2022. Plume characterization for the new Phase 2 RSEM ponds (RSEM R5a-P2 and RSEM L5-P2) is not currently possible due to safety constraints around working in or next to the Site C headpond in close (~1 km) proximity to the entrance to twin tunnels that divert the entire flow of the Peace River around the Site C dam.

No changes to sampling site locations for RSEM R6 or RSEM L6 are recommended at this time.

[5] The previous sampling schedule consisted of three biweekly samplings after pond construction, periods without discharge in excess of 30 days, and after test failures. Ponds passing this biweekly sampling were then sampled on a monthly schedule for one year, followed by a quarterly schedule.

4.2.2. Peace River and RSEM IDZ Surface Water Quality Sampling

4.2.2.1. Monthly and 5 in 30-day Surface Water Quality Sampling

Annual *in-situ* and laboratory water quality data summary tables based on data collected for monthly and 5 in 30-day sampling in 2021 are provided in Appendix A. Separate tables are provided for each sampling site (Peace Upstream, RSEM R6 upstream, RSEM R6 IDZ, and two far-field downstream sites; Map 1). Annual average, median, minimum, maximum, and standard deviation for each parameter is provided in the tables. Data were screened against the long-term and short-term BC WQG for the protection of aquatic life, and exceedances are highlighted in the summary tables. *In-situ* and laboratory water quality data summary tables are also included for the RSEM L6 monitoring sites which were sampled once in 2021 on November 9 (Appendix A). Since the RSEM R6 sites were only sampled once, data are only screened against the short-term BC WQG for the protection of aquatic life. Exceedances are discussed below in Section 4.2.2.3.

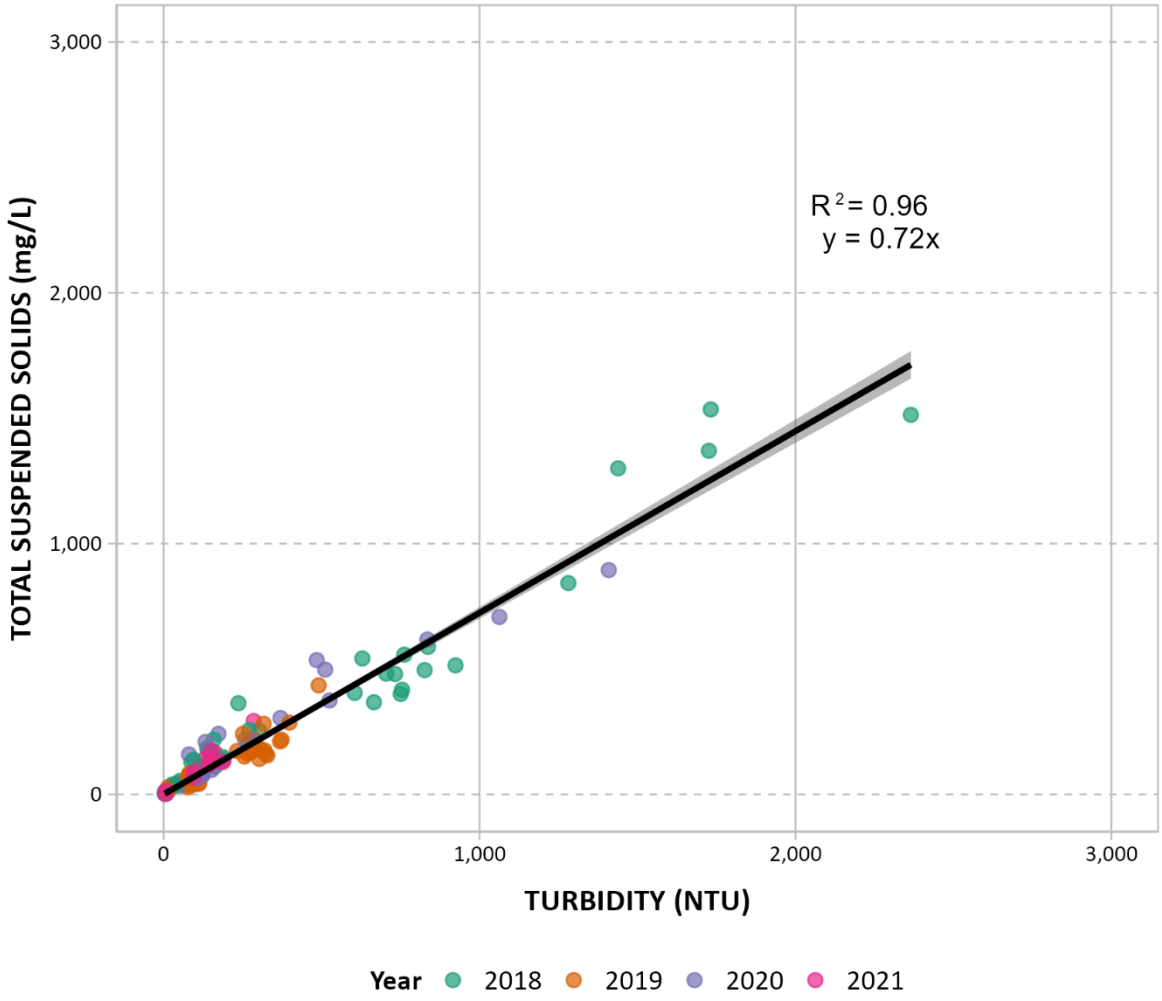
Annual time series bar plots for each water quality parameter based on data collected for monthly and 5 in 30-day sampling in 2021 are provided for RSEM R6 and RSEM L6 in Appendix B and Appendix C, respectively. Applicable BC WQG and Site C EOP limits for each parameter are shown in the figures along with the corresponding RSEM pond water quality data (from PRHP) for each monthly and 5 in 30-day sampling date. These figures illustrate patterns in Peace River and RSEM pond water quality over the course of 2021.

4.2.2.2. Peace River Background TSS

The TSS:turbidity relationship applied to calculate TSS from turbidity data in 2021 was 0.72:1. In total 142 samples collected over 33 dates between March 14, 2018 to December 31, 2021 were used to develop the updated TSS:turbidity relationship. These data encompassed a wide range of turbidity (4 NTU to 2,365 NTU) and TSS (2 mg/L to 1,535 mg/L) observations (Figure 1). In 2021, TSS sampling was completed on 8 sampling dates.

The relationship in use at the end of 2021 is shown in Figure 1. Proceeding with a linear model common to all sites in the Peace River including data from 2021, a combined TSS:turbidity relationship of 0.72:1 was found (i.e., TSS = 0.72*Turbidity). This relationship has good agreement amongst the data (R^2 = 0.96) (Figure 1).

Figure 1. Combined relationship for TSS:turbidity in the Peace River using data collected from 2018 to 2021. Shaded areas are 95% confidence intervals.



4.2.2.3. BC WQG Exceedances

For the monitoring conducted in 2021, there were no observations of exceedances in the Peace River of the BC WQG (short-term or long-term) for the protection of aquatic life that were related to discharge of water from the RSEM ponds. Similar to annual monitoring in 2017 (Ganshorn *et al.* 2018), 2018 (Ganshorn *et al.* 2019), 2019 (Ganshorn *et al.* 2020), 2020 (Ganshorn *et al.* 2021), and baseline monitoring (Golder 2012), there were natural exceedances in the Peace River of the BC WQG for the protection of aquatic life. Natural exceedances occurred predominantly during the freshet period (April to the end of June) and were observed at all sample sites. Exceedances were most often associated with elevated concentrations of suspended solids in the Peace River. The BC WQG exceedances shown on the tables in Appendix A and on the graphs shown in Appendix B are all naturally occurring exceedances as documented in monthly reports submitted for each month of 2021.

4.2.3. QA/QC

Overall QA/QC objectives were met in 2021. All QA/QC issues were reviewed, and no data were excluded due to QA/QC failures in 2021. An anomalous, high, value for dissolved orthophosphate was observed at Peace Upstream (Figure 14) during monthly sampling on June 2, 2021. Considering that dissolved phosphorous was less than the MDL at the same site and date and considering that the dissolved orthophosphate result was much higher than the typical range for this parameter, the data point has been flagged as anomalous.

The results of the QA/QC checks and procedures completed in 2021 are provided in summary tables in Appendix D. The number of QA/QC laboratory samples (15 replicates, 13 field blanks, and 14 travel blanks) comprised 33.9% (42 of 124 samples) of the overall sampling program based on the total number of monthly and 5 in 30-day samples collected in 2021. The number of QA/QC *in-situ* measurements is 66% (2/3) based on the triplicate measurement for each parameter. Overall, sampling in 2021 has surpassed the QA/QC objective of at least 10% QA/QC effort.

On occasion, hold times were exceeded for sample analysis for DOC (one sample date), TDS (two sample dates), turbidity (two sample dates), orthophosphate (one sample date), nitrate (one sample date), nitrite (one sample date), and alkalinity (one sample date) in 2021 due to field sampling logistics, shipping delays, and sample re-analysis because the variable was omitted from the initial lab analysis report. Where hold times were exceeded, results were reviewed to ensure parameter values were consistent with previous sampling results, and no data were flagged in 2021 due to hold time exceedances. The number of samples affected by hold time exceedances which occurred in 2021 are summarized in Table 26 in Appendix D, with the exception of pH which has a hold time of only 15 minutes (laboratory analysis within this time frame is not practical).

The 2021 field blank and travel blank results were non-detectable (below the MDL) for 98.2% of the field blank data (995/1,013) and 96.1% of the travel blank data (715/742) set thereby meeting the QA/QC objective of >95% non-detectable results for field and travel blanks (Table 27 in Appendix D).

Elevated variability between duplicate laboratory samples (RPD>20%) and triplicate *in-situ* measurements (RSD>18%) was observed on a number of occasions for TSS, turbidity, total phosphorus, total and dissolved organic carbon, ammonia, nitrate, nitrite, chloride, and select total and dissolved metals, during turbid and clear flow conditions (Table 28 and Table 29 in Appendix D). Variability in excess of the QA/QC objective thresholds occurred on 68 of 1,472 occasions (4.6%) for duplicate samples and 1 of 776 occasions (0.13%) for *in-situ* triplicate sample measurements. These results are thought to reflect real heterogeneity in the Peace River. No substantial effect on data quality is expected.

The cation-anion balance was less than 10% in all samples. The majority of dissolved/total metal parameter pairs met the QA/QC objective where the concentration of D-metals was <1.2 * the concentration of T-metals for 99.6% or 3,670 out of a total of 3,685 parameter pairs (Table 30 in Appendix D).

REFERENCES

ALS (ALS Environmental). 2021. Ion Balance Calculations. Available online at: https://www.alsenvironmental.co.uk/media-uk/pdf/datasheets/waste-water/als_ww_ionic_balance_v3.pdf. Accessed on January 19, 2022.

BC Hydro. 2016. Acid Rock Drainage and Metal Leachate Management Plan; Appendix E of the Construction Environmental Management Plan. Site C Clean Energy Project. Revision 4: July 26, 2016. Original prepared by Klohn Crippen Berger Ltd. and SNC-Lavalin Inc.

BC Hydro. 2017. Adaptive Management Approach for TSS End-of-pipe Limits for Discharge of Water from PAG-Contact RSEM Sediment Ponds to the Peace River. Letter from Greg Scarborough, Manager, Environmental Mitigation, Monitoring and Compliance, Site C Clean Energy Project to Bruce O'Neill, Deputy Comptroller of Water Rights. March 31, 2017.

BC Hydro. 2022. Acid Rock Drainage and Metal Leachate Management Plan (Revision 6.0: January 17, 2022); Appendix E of the Construction Environmental Management Plan (Revision 10: March 9, 2022). Site C Clean Energy Project. Original prepared by Klohn Crippen Berger Ltd. and SNC-Lavalin Inc. Available online at: https://www.sitecproject.com/sites/default/files/construction-environmental-management-plan-CEMP-rev-10.pdf. Accessed on March 9, 2022.

CWR (Comptroller of Water Rights). 2019. Water Sustainability Act Order, Section 93, Site C Clean Energy Project, File Number: 7001837. RSEM R5b Pond Operations Order. Signed by Ted White, Comptroller of Water Rights, February 27, 2019.

Ganshorn, K., J. Kurtz, A. Baki, J. Romano, and T. Jensma. 2017a. Site C RSEM Initial Dilution Zone Field Mixing Study. Consultant's report prepared for BC Hydro by Ecofish Research Ltd., May 5, 2017.

Ganshorn, K., T. Jensma, J. Ellenor, and J. Kurtz. 2017b. Site C PAG Contact Sediment Pond Discharge Plume Characterization in the Peace River. Consultant's report prepared for BC Hydro by Ecofish Research Ltd., November 10, 2017.

Ganshorn, K., T. Jensma, J. Ellenor, and J. Kurtz. 2018. Site C Clean Energy Project PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2017 Annual Report. Consultant's report prepared for BC Hydro by Ecofish Research Ltd., March 5, 2018.

Ganshorn, K., D. Durston, T. Jensma, and J. Kurtz. 2019. Site C Clean Energy Project PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2018 Annual Report. Consultant's report prepared for BC Hydro by Ecofish Research Ltd., March 15, 2019.

Ganshorn, K., T. Jensma, D. Durston, and J. Kurtz. 2020. Site C Clean Energy Project PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2019 Annual Report. Consultant's report prepared for BC Hydro by Ecofish Research Ltd., March 2, 2020.

Ganshorn, K., T. Jensma, D. Durston, and J. Kurtz. 2021. Site C Clean Energy Project PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2020 Annual Report. Consultant's report prepared for BC Hydro by Ecofish Research Ltd. and Aski Reclamation LP. February 17, 2021.

Golder Associates Ltd. 2012. Site C Clean Energy Project. EIS Technical Appendix: Water Quality Baseline Conditions in the Peace River, Volume 2, Appendix E. Available online at: http://www.ceaa-acee.gc.ca/050/documents_staticpost/63919/85328/Vol2_Appendix_E.pdf. Accessed on January 19, 2022.

Gov BC (Government of British Columbia). 2013. Ambient Freshwater and Effluent Sampling, Field Sampling Manual. Part E, Water and Wastewater Sampling. Available online at: https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/bc_field_sampling_manual_part_e.pdf. Accessed on January 19, 2022.

MECCS (British Columbia Ministry of Environment and Climate Change Strategy). 2021. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary. Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C. Available online at: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/wqg_summary_aquaticlife_wildlife_agri.pdf. Accessed on January 19, 2022.

RISC (Resource Inventory Standards Committee). 1998. Guidelines for Interpreting Water Quality Data. Prepared by the BC Ministry of Environment, Lands and Parks for the Resource Inventory Commission.

Shelley L., K. Ganshorn, D. Durston, and J. Kurtz. 2018. Evaluation and Recommendations for Site C Toxicity Testing and Peace River Initial Dilution Zone Sampling in Response to the November 2, 2018 *Water Sustainability Act* Order Requirements. Memorandum from Ecofish Research Ltd. to Molly Brewis, BC Hydro Senior Environmental Coordinator, Site C. November 16, 2018.

APPENDICES

Appendix A. Site C PAG Contact RSEM Surface Water Quality Monitoring Data Tables

Table 3. Peace River water quality monitoring site descriptions and coordinates, 2021.

Site Name[1]	Site Common Name	Description	UTM Coordinates (Zone 10V)	
			Easting (m)	Northing (m)
PR-2.81	Peace Upstream	In the Peace River upstream of the confluence with the Moberly River and upstream of the debris boom installed in September 2020. Phase 2 Peace Upstream site.	627,372	6,232,207
RBPR-7.05	R6 Upstream	In the Peace River, 5 m upstream of the R6 discharge channel.	630,283	6,229,254
RBPR-7.15	R6 IDZ	In the Peace River, 100 m downstream of the R6 discharge channel.	630,383	6,229,259
LBPR-6.82	L6 Upstream	In the Peace River, ~250 m upstream of the L6 discharge channel. Site is located more than 5 m upstream of the point of discharge due to the presence of a large back eddy.	630,149	6,229,663
LBPR-6.97	L6 Back eddy	In the Peace River, ~50 m upstream of the L6 discharge channel in the back eddy.	630,311	6,229,648
LBPR-7.21	L6 IDZ	In the Peace River 100 m downstream of the location where the back eddy flow joins the main Peace River flow.	630,495	6,229,560
LBPR-9.34	MECCS far-field downstream left bank	In the Peace River, downstream of the project.	632,498	6,229,678
RBPR-9.34	MECCS far-field downstream right bank	In the Peace River, downstream of the project.	632,614	6,229,369

[1] Site names follow a river chainage convention. The numbers in the site name indicate the distance (in km) downstream of the W.A.C. Bennett Dam less 100 km. River chainages at each site are measured perpendicular to the Peace River center line, obtained from the BC government GIS data set.

Table 4. RSEM R5a Phase 2 pond toxicity sampling results, 2021.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2021	22-Apr	RSEMR5aP2A-SPTOX	Bi-monthly	>100
		RSEMR5aP2B-SPTOX	Bi-monthly	>100
		RSEMR5aP2C-SPTOX	Bi-monthly	>100
		RSEMR5aP2D-SPTOX	Bi-monthly	>100
	23-Jun	RSEMR5aP2A-SPTOX	Bi-monthly	>100
		RSEMR5aP2B-SPTOX	Bi-monthly	>100
		RSEMR5aP2C-SPTOX	Bi-monthly	>100
		RSEMR5aP2D-SPTOX	Bi-monthly	>100
	16-Aug	RSEMR5aP2A-SPTOX	Bi-monthly	>100
		RSEMR5aP2B-SPTOX	Bi-monthly	>100
		RSEMR5aP2C-SPTOX	Bi-monthly	>100
		RSEMR5aP2D-SPTOX	Bi-monthly	>100
	13-Oct[2]	RSEMR5aP2D-SPTOX	Bi-monthly	>100

Note >100% (v/v) indicates toxicity test passed.

[1] The acute toxicity sample is collected from the RSEM pond (indicated by SP in the site name), or collected from the outflow of the discharge pipe (indicated by EOP (end of pipe) in the site name).

[2] On October 13, 2021, RSEMR5aP2A and C ponds were dry and could not be sampled; RSEMR5aP2B pond had just enough water to collect an *in-situ* sample but no toxicity sample could be collected. Sampling of RSEMR5aP2A, B and C ponds was attempted on November 24, 2021 and sampling of all ponds was attempted on December 13, 2021; however, all ponds were empty and could not be sampled.

Phase 1 R5a ponds were decommissioned in August and September 2020. Phase 2 RSEM R5a-P2 ponds are sampled when sufficient water is available to allow collection of toxicity samples.

Table 5. RSEM R6 pond toxicity sampling results, 2021.

Year	Date	Site[1]	Sampling Schedule	96 hr. LC50 % (v/v)
2021	27-Jan	RSEMR6E-EOPTOX	Bi-monthly	>100
	25-Mar	RSEMR6W-EOPTOX	Bi-monthly	>100
	27-Apr	RSEMR6E-SPTOX	Bi-monthly	>100
	17-May	RSEMR6W-EOPTOX	Bi-monthly	>100
	14-Jun	RSEMR6E-SPTOX	Bi-monthly	>100
	19-Jul	RSEMR6W-EOPTOX	Bi-monthly	>100
	26-Aug	RSEMR6E-EOPTOX	Bi-monthly	>100
	20-Sep	RSEMR6W-EOPTOX	Bi-monthly	>100
	13-Oct	RSEMR6E-EOPTOX	Bi-monthly	>100
	24-Nov	RSEMR6W-EOPTOX	Bi-monthly	>100
	13-Dec	RSEMR6E-SPTOX	Bi-monthly	>100

Note >100% (v/v) indicates toxicity test passed.

Scheduled collection dates assume toxicity test results will continue to be >100% (v/v).

[1] The acute toxicity sample is collected from the RSEM pond (indicated by SP in the site name), or collected from the outflow of the discharge pipe (indicated by EOP (end of pipe) in the site name).

Table 6. RSEM L5-P2 Phase 2 pond toxicity sampling results, 2021.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2021	30-Mar/ 1-Apr	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	17-May	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	19-Jul	RSEM L5E-P2-EOPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	20-Sep	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	24-Nov	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100

Note >100% (v/v) indicates toxicity test passed.

[1] The acute toxicity sample is collected from the RSEM pond (indicated by SP in the site name), or collected from the outflow of the discharge pipe (indicated by EOP (end of pipe) in the site name).

Phase 1 RSEM L5 ponds were decommissioned by September 2020. Phase 2 L5-P2 pond is sampled bi-monthly if sufficient water is available.

The Phase 2 RSEM L5-P2 pond is separated by a berm creating an east (L5E-P2) and west (L5W-P2) pond.

On March 30, 2021 half of the required volume (20 L) of water was collected at each pond, therefore the field crew returned to collect an additional 20 L volume on April 1, 2021. These samples were combined at Nautilus and toxicity testing was completed.

Table 7. RSEM L6 pond toxicity sampling results, 2021.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2021	27-Apr	RSEML6-SPTOX	Bi-monthly	>100
	14-Jun	RSEML6-SPTOX	Bi-monthly	>100
	26-Aug	RSEML6-SPTOX	Bi-monthly	>100
	13-Oct	RSEML6-SPTOX	Bi-monthly	>100

Note >100% (v/v) indicates toxicity test passed.

[1] The acute toxicity sample is collected from the RSEM pond (indicated by SP in the site name), or collected from the outflow of the discharge pipe (indicated by EOP (end of pipe) in the site name).

Table 8. 2021 annual data summary statistics for lab and *in-situ* sampling (organic carbon, physical tests, anions and nutrients) collected at the PR-2.81 site.

Parameters (mg/L) Date: 2021	MDL	PR-2.81							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Physical Tests											
Hardness (as $CaCO_3$)	0.5	19	0	100	96.7	86.8	137	13.3			
Sp. Conductivity (*in-situ*, µS/cm)		42	0	198	192	173	253	25.8			
Sp. Conductivity (lab, µS/cm)	2	19	0	192	186	163	237	20			
Total Dissolved Solids	20	19	0	124	126	93	164	21			
Total Suspended Solids	1	19	0	54.4	6.5	1.4	320	87.5			
Turbidity (*in-situ*, NTU)		42	0	26	8.27	1.71	113	34.64			
Turbidity (lab, NTU)	0.1	19	0	35.1	4.89	1.82	195	54.79			
pH (*in-situ*, pH units)		42	0	8.13	8.16	7.79	8.49	0.19		6.5 to 9.0	0
pH (lab, pH units)	0.1	19	0	7.98	7.95	7.59	8.21	0.14		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1	19	0	92.1	87.4	81.8	123	11.7			
Ammonia, Total (as N)	0.005	19	4	0.0154	0.0074	0.005	0.067	0.0182	0.102	0.68	0
Bromide (Br)	0.05	19	19	0.05	0.05	0.05	0.05	0			
Chloride (Cl)	0.5	19	17	0.629	0.5	0.5	2.75	0.52	150	600	0
Fluoride (F)	0.02	19	0	0.0392	0.037	0.02	0.058	0.011		EQ	0
Nitrate (as N)	0.005	19	0	0.0763	0.0742	0.0596	0.0987	0.0091	3	32.8	0
Nitrite (as N)	0.001	19	19	0.00574	0.01	0.001	0.01	0.0046	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.001	19	10	0.00233	0.001	0.001	0.0179	0.0039			
Sulfate (SO_4)	0.3	19	0	16.2	15.8	12.7	23.3	2.8	EQ		0
Total Phosphorus (P)	0.002	19	0	0.0424	0.0161	0.0035	0.323	0.0778			
Organic Carbon											
Dissolved Organic Carbon	0.5	19	0	3.45	3.22	2.32	5.17	0.71			
Total Organic Carbon	0.5	19	0	3.8	3.46	2.35	6.71	1.16			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 9. 2021 annual data summary statistics for total metals collected at the PR-2.81 site.

Parameters (mg/L)	MDL	PR-2.81							BC Long-Term	BC Short-Term Maximum	
Date: 2021		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al)-Total	0.003	19	0	0.473	0.126	0.0077	2.71	0.6719			
Antimony (Sb)-Total	0.0001	19	14	0.000124	0.0001	0.0001	0.00033	0.00006			
Arsenic (As)-Total	0.0001	19	0	0.000558	0.00031	0.00021	0.00217	0.0005		0.005	0
Barium (Ba)-Total	0.0001	19	0	0.0541	0.0351	0.0301	0.15	0.0333	1		0
Beryllium (Be)-Total	0.00002	19	10	0.0000527	0.000031	0.00002	0.000203	0.000048	0.00013		0
Bismuth (Bi)-Total	0.00005	19	19	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Total	0.01	19	18	0.0101	0.01	0.01	0.011	0		1.2	0
Cadmium (Cd)-Total	0.000005	19	0	0.0000842	0.0000249	0.0000096	0.000416	0.0001093			
Calcium (Ca)-Total	0.05	19	0	30.8	28.2	24.3	47.3	6.4			
Chromium (Cr)-Total	0.0001	19	2	0.000967	0.0005	0.00016	0.00541	0.00126			
Cobalt (Co)-Total	0.0001	19	10	0.000406	0.0001	0.0001	0.0019	0.00049	0.004	0.11	0
Copper (Cu)-Total	0.0005	19	0	0.00179	0.00121	0.0007	0.00599	0.00148			
Iron (Fe)-Total	0.01	19	0	0.806	0.176	0.054	4.65	1.165		1	4
Lead (Pb)-Total	0.00005	19	5	0.000486	0.000082	0.00005	0.00253	0.000677	EQ	EQ	0
Lithium (Li)-Total	0.001	19	0	0.00206	0.0016	0.0011	0.0057	0.0012			
Magnesium (Mg)-Total	0.005	19	0	7.4	6.83	5.85	11.5	1.71			
Manganese (Mn)-Total	0.0001	19	0	0.0173	0.00371	0.00053	0.0718	0.02171	EQ	EQ	0
Mercury (Hg)-Total	0.000005	19	17	0.00000518	0.000005	0.000005	0.0000071	0.0000006	0.00002		0
Molybdenum (Mo)-Total	0.00005	19	0	0.000978	0.000866	0.000743	0.00204	0.000319	7.6	46	0
Nickel (Ni)-Total	0.0005	19	0	0.00223	0.00158	0.0008	0.00816	0.00189	EQ		0
Phosphorus (P)-Total	0.05	19	13	0.0787	0.05	0.05	0.267	0.06			
Potassium (K)-Total	0.05	19	0	0.622	0.478	0.39	1.42	0.27			
Selenium (Se)-Total	0.00005	19	0	0.000378	0.000305	0.000228	0.000901	0.00019	0.002		0
Silicon (Si)-Total	0.05	19	0	2.88	2.44	1.96	6.48	1.1			
Silver (Ag)-Total	0.00001	19	13	0.000015	0.00001	0.00001	0.000066	0.000013	EQ	EQ	0
Sodium (Na)-Total	0.05	19	0	1.41	1.35	1.09	1.88	0.25			
Strontium (Sr)-Total	0.0002	19	0	0.12	0.114	0.0994	0.182	0.0228			
Sulfur (S)-Total	0.5	19	0	5.78	5.64	4.83	8.13	0.86			
Thallium (Tl)-Total	0.00001	19	10	0.0000235	0.00001	0.00001	0.000114	0.000026			
Tin (Sn)-Total	0.0001	19	17	0.000112	0.0001	0.0001	0.00031	0.00005			
Titanium (Ti)-Total	0.0003	19	1	0.00757	0.00292	0.0003	0.0406	0.01022			
Uranium (U)-Total	0.00001	19	0	0.000525	0.000481	0.000373	0.000828	0.00012	0.0085		0
Vanadium (V)-Total	0.0005	19	0	0.00267	0.00143	0.00052	0.0131	0.0031			
Zinc (Zn)-Total	0.003	19	9	0.00853	0.0039	0.003	0.0419	0.0103	EQ	EQ	1
Zirconium (Zr)-Total	0.0002	19	18	0.000316	0.0003	0.0002	0.0011	0.0002			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG.

EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 10. 2021 annual data summary statistics for dissolved metals collected at the PR-2.81 site.

Parameters (mg/L)	MDL	PR-2.81							BC Long-Term	BC Short-Term Maximum	
Date: 2021		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al)-Dissolved	0.001	19	0	0.00752	0.0068	0.005	0.013	0.0022	EQ	EQ	0
Antimony (Sb)-Dissolved	0.0001	19	17	0.000102	0.0001	0.0001	0.00013	0.00001			
Arsenic (As)-Dissolved	0.0001	19	0	0.000201	0.0002	0.00018	0.00024	0.00002			
Barium (Ba)-Dissolved	0.0001	19	0	0.0354	0.0332	0.0303	0.0507	0.0056			
Beryllium (Be)-Dissolved	0.00002	19	19	0.0000284	0.00002	0.00002	0.0001	0.000025			
Bismuth (Bi)-Dissolved	0.00005	19	19	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Dissolved	0.01	19	19	0.01	0.01	0.01	0.01	0			
Cadmium (Cd)-Dissolved	0.000005	19	0	0.0000108	0.00001	0.0000077	0.0000158	0.0000025	EQ	EQ	0
Calcium (Ca)-Dissolved	0.05	19	0	28.8	28.3	25.1	39	3.5			
Chromium (Cr)-Dissolved	0.0001	19	15	0.000143	0.0001	0.0001	0.0005	0.00013			
Cobalt (Co)-Dissolved	0.0001	19	19	0.0001	0.0001	0.0001	0.0001	0			
Copper (Cu)-Dissolved	0.0002	19	0	0.000733	0.00074	0.00061	0.00104	0.00011	EQ	EQ	0
Iron (Fe)-Dissolved	0.01	19	7	0.017	0.012	0.01	0.06	0.012		0.35	0
Lead (Pb)-Dissolved	0.00005	19	19	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li)-Dissolved	0.001	19	0	0.00157	0.0015	0.001	0.003	0.0005			
Magnesium (Mg)-Dissolved	0.005	19	0	6.94	6.64	5.88	10.1	1.17			
Manganese (Mn)-Dissolved	0.0001	19	0	0.00145	0.00098	0.00031	0.00353	0.00112			
Mercury (Hg)-Dissolved	0.000005	19	19	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo)-Dissolved	0.00005	19	0	0.000947	0.000882	0.000725	0.00173	0.000281			
Nickel (Ni)-Dissolved	0.0005	19	0	0.000864	0.00082	0.00065	0.00136	0.00021			
Phosphorus (P)-Dissolved	0.05	19	19	0.05	0.05	0.05	0.05	0			
Potassium (K)-Dissolved	0.05	19	0	0.454	0.455	0.38	0.56	0.052			
Selenium (Se)-Dissolved	0.00005	19	0	0.000374	0.000314	0.000264	0.000842	0.000155			
Silicon (Si)-Dissolved	0.05	19	0	2.11	2.07	1.91	2.31	0.12			
Silver (Ag)-Dissolved	0.00001	19	19	0.00001	0.00001	0.00001	0.00001	0			
Sodium (Na)-Dissolved	0.05	19	0	1.38	1.31	1.11	1.9	0.24			
Strontium (Sr)-Dissolved	0.0002	19	0	0.115	0.111	0.096	0.156	0.0158			
Sulfur (S)-Dissolved	0.5	19	0	5.72	5.23	4.9	8.04	1.07			
Thallium (Tl)-Dissolved	0.00001	19	19	0.00001	0.00001	0.00001	0.00001	0			
Tin (Sn)-Dissolved	0.0001	19	19	0.0001	0.0001	0.0001	0.0001	0			
Titanium (Ti)-Dissolved	0.0003	19	12	0.000331	0.0003	0.0003	0.00049	0.00005			
Uranium (U)-Dissolved	0.00001	19	0	0.00046	0.000441	0.000367	0.000578	0.000067			
Vanadium (V)-Dissolved	0.0005	19	18	0.0005	0.0005	0.0005	0.0005	0			
Zinc (Zn)-Dissolved	0.001	19	14	0.00122	0.001	0.001	0.003	0.0005			
Zirconium (Zr)-Dissolved	0.0002	19	19	0.000274	0.0003	0.0002	0.0003	0.00005			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG.

EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 11. 2021 annual data summary statistics for lab and *in-situ* sampling (organic carbon, physical tests, anions, and nutrients) collected at the RSEM R6 upstream site (RBPR-7.05).

Parameters (mg/L)	MDL	RBPR-7.05							BC Long-Term	BC Short-Term Maximum	
Date: 2021		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Physical Tests											
Hardness (as $CaCO_3$)	0.5	20	0	101	98.4	87.6	131	11.9			
Sp. Conductivity (*in-situ*, µS/cm)		45	0	200	193	175	249	21.7			
Sp. Conductivity (lab, µS/cm)	2	20	0	193	188	168	235	17			
Total Dissolved Solids	20	20	0	131	129	97	180	24			
Total Suspended Solids	1	20	0	42.3	7.4	1.9	210	61.7			
Turbidity (*in-situ*, NTU)		43	0	29.6	3.71	2.18	93.3	34.13			
Turbidity (lab, NTU)	0.1	20	0	31.1	4.54	1.81	135	43.64			
pH (*in-situ*, pH units)		45	0	8.09	8.14	7.81	8.33	0.17		6.5 to 9.0	0
pH (lab, pH units)	0.1	20	0	7.97	8	7.54	8.1	0.13		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1	20	0	92.1	88.1	83.2	119	10			
Ammonia, Total (as N)	0.005	20	4	0.0264	0.0108	0.005	0.137	0.0375	0.102	0.68	0
Bromide (Br)	0.05	20	20	0.05	0.05	0.05	0.05	0			
Chloride (Cl)	0.5	20	19	0.556	0.5	0.5	1.61	0.25	150	600	0
Fluoride (F)	0.02	20	0	0.0378	0.0345	0.022	0.062	0.01		EQ	0
Nitrate (as N)	0.005	20	0	0.0732	0.0745	0.0544	0.0891	0.0099	3	32.8	0
Nitrite (as N)	0.001	20	20	0.00595	0.01	0.001	0.01	0.0046	0.02	0.06	0
Orthophosphate-Dissolved (as P)	0.001	20	13	0.00135	0.001	0.001	0.0038	0.0007			
Sulfate (SO_4)	0.3	20	0	15.6	15.1	12.3	20.8	2.3	EQ		0
Total Phosphorus (P)	0.002	20	1	0.0335	0.006	0.002	0.148	0.0452			
Organic Carbon											
Dissolved Organic Carbon	0.5	20	0	3.69	3.57	2.63	5.43	0.88			
Total Organic Carbon	0.5	20	0	4.14	3.63	2.53	8.7	1.8			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 12. 2021 annual data summary statistics for total metals collected at the RSEM R6 upstream site (RBPR-7.05).

Parameters (mg/L)	MDL	RBPR-7.05							BC Long-Term	BC Short-Term Maximum	
Date: 2021		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al)-Total	0.003	20	0	0.566	0.0771	0.0462	2.38	0.7808			
Antimony (Sb)-Total	0.0001	20	13	0.000139	0.0001	0.0001	0.00035	0.00007			
Arsenic (As)-Total	0.0001	20	0	0.000593	0.00027	0.00023	0.00191	0.00053		0.005	0
Barium (Ba)-Total	0.0001	20	0	0.0572	0.0373	0.0319	0.134	0.0341	1		0
Beryllium (Be)-Total	0.00002	20	12	0.0000597	0.00002	0.00002	0.00022	0.000061	0.00013		0
Bismuth (Bi)-Total	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Total	0.01	20	19	0.01	0.01	0.01	0.01	0		1.2	0
Cadmium (Cd)-Total	0.000005	20	0	0.0000789	0.0000255	0.0000128	0.000282	0.0000915			
Calcium (Ca)-Total	0.05	20	0	30.7	29.4	25.1	43	5.4			
Chromium (Cr)-Total	0.0001	20	2	0.0011	0.000385	0.00015	0.00427	0.00136			
Cobalt (Co)-Total	0.0001	20	12	0.000447	0.0001	0.0001	0.00193	0.00055	0.004	0.11	0
Copper (Cu)-Total	0.0005	20	0	0.00189	0.00093	0.00072	0.00615	0.00162			
Iron (Fe)-Total	0.01	20	0	0.941	0.123	0.071	4.36	1.33		1	7
Lead (Pb)-Total	0.00005	20	2	0.000525	0.00007	0.00005	0.00245	0.000729	EQ	EQ	0
Lithium (Li)-Total	0.001	20	0	0.00226	0.0014	0.0011	0.0058	0.0014			
Magnesium (Mg)-Total	0.005	20	0	7.45	7.01	6.05	11.1	1.5			
Manganese (Mn)-Total	0.0001	20	0	0.0174	0.00352	0.00249	0.0743	0.0216	EQ	EQ	0
Mercury (Hg)-Total	0.000005	20	18	0.0000053	0.000005	0.000005	0.000008	0.0000009	0.00002		0
Molybdenum (Mo)-Total	0.00005	20	0	0.000996	0.00091	0.000765	0.00177	0.000257	7.6	46	0
Nickel (Ni)-Total	0.0005	20	0	0.00235	0.00114	0.00084	0.00744	0.00202	EQ		0
Phosphorus (P)-Total	0.05	20	13	0.0754	0.05	0.05	0.196	0.047			
Potassium (K)-Total	0.05	20	0	0.668	0.47	0.41	1.31	0.313			
Selenium (Se)-Total	0.00005	20	0	0.000378	0.0003	0.000232	0.000781	0.000167	0.002		0
Silicon (Si)-Total	0.05	20	0	3.02	2.4	2.01	6.18	1.24			
Silver (Ag)-Total	0.00001	20	13	0.000017	0.00001	0.00001	0.000055	0.000013	EQ	EQ	0
Sodium (Na)-Total	0.05	20	0	1.6	1.42	1.11	4.34	0.69			
Strontium (Sr)-Total	0.0002	20	0	0.12	0.116	0.101	0.169	0.018			
Sulfur (S)-Total	0.5	20	0	5.77	5.43	4.85	8.02	0.85			
Thallium (Tl)-Total	0.00001	20	12	0.0000315	0.00001	0.00001	0.000163	0.00004			
Tin (Sn)-Total	0.0001	20	18	0.000123	0.0001	0.0001	0.00048	0.00009			
Titanium (Ti)-Total	0.0003	20	0	0.0091	0.00175	0.00085	0.0456	0.01258			
Uranium (U)-Total	0.00001	20	0	0.00052	0.000482	0.000384	0.000745	0.000115	0.0085		0
Vanadium (V)-Total	0.0005	20	0	0.00285	0.00091	0.00063	0.0102	0.0032			
Zinc (Zn)-Total	0.003	20	11	0.00676	0.003	0.003	0.0226	0.0064	EQ	EQ	0
Zirconium (Zr)-Total	0.0002	20	18	0.000321	0.0003	0.0002	0.001	0.00017			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 13. 2021 annual data summary statistics for dissolved metals collected at the RSEM R6 upstream site (RBPR-7.05).

Parameters (mg/L)	MDL	RBPR-7.05							BC Long-Term	BC Short-Term Maximum	
Date: 2021		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al)-Dissolved	0.001	20	0	0.00706	0.0066	0.0052	0.0135	0.0018	EQ	EQ	0
Antimony (Sb)-Dissolved	0.0001	20	18	0.000103	0.0001	0.0001	0.00015	0.00001			
Arsenic (As)-Dissolved	0.0001	20	0	0.000201	0.000205	0.00016	0.00024	0.00002			
Barium (Ba)-Dissolved	0.0001	20	0	0.0391	0.0349	0.0318	0.0596	0.0087			
Beryllium (Be)-Dissolved	0.00002	20	20	0.000024	0.00002	0.00002	0.0001	0.000018			
Bismuth (Bi)-Dissolved	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Dissolved	0.01	20	20	0.01	0.01	0.01	0.01	0			
Cadmium (Cd)-Dissolved	0.000005	20	0	0.0000103	0.00000965	0.0000069	0.000017	0.0000025	EQ	EQ	0
Calcium (Ca)-Dissolved	0.05	20	0	28.9	28.4	25.3	37.4	3.1			
Chromium (Cr)-Dissolved	0.0001	20	18	0.000141	0.0001	0.0001	0.0005	0.00012			
Cobalt (Co)-Dissolved	0.0001	20	20	0.0001	0.0001	0.0001	0.0001	0			
Copper (Cu)-Dissolved	0.0002	20	0	0.000722	0.000685	0.00055	0.00098	0.00012	EQ	EQ	0
Iron (Fe)-Dissolved	0.01	20	11	0.014	0.01	0.01	0.027	0.006		0.35	0
Lead (Pb)-Dissolved	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li)-Dissolved	0.001	20	0	0.00164	0.00145	0.001	0.003	0.0006			
Magnesium (Mg)-Dissolved	0.005	20	0	7	6.71	5.94	9.95	1.05			
Manganese (Mn)-Dissolved	0.0001	20	0	0.00134	0.000715	0.00044	0.00374	0.00118			
Mercury (Hg)-Dissolved	0.000005	20	20	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo)-Dissolve	0.00005	20	0	0.000918	0.000839	0.000758	0.00149	0.0002			
Nickel (Ni)-Dissolved	0.0005	20	0	0.000846	0.000775	0.00066	0.0013	0.00019			
Phosphorus (P)-Dissolved	0.05	20	20	0.05	0.05	0.05	0.05	0			
Potassium (K)-Dissolved	0.05	20	0	0.47	0.437	0.39	0.64	0.074			
Selenium (Se)-Dissolved	0.00005	20	0	0.00038	0.000324	0.00028	0.000813	0.000137			
Silicon (Si)-Dissolved	0.05	20	0	2.09	2.06	1.83	2.31	0.14			
Silver (Ag)-Dissolved	0.00001	20	20	0.00001	0.00001	0.00001	0.00001	0			
Sodium (Na)-Dissolved	0.05	20	0	1.55	1.38	1.1	4.2	0.66			
Strontium (Sr)-Dissolved	0.0002	20	0	0.115	0.114	0.0984	0.146	0.012			
Sulfur (S)-Dissolved	0.5	20	0	5.75	5.49	4.73	7.65	0.92			
Thallium (Tl)-Dissolved	0.00001	20	20	0.00001	0.00001	0.00001	0.00001	0			
Tin (Sn)-Dissolved	0.0001	20	20	0.0001	0.0001	0.0001	0.0001	0			
Titanium (Ti)-Dissolved	0.0003	20	16	0.000324	0.0003	0.0003	0.00049	0.00006			
Uranium (U)-Dissolved	0.00001	20	0	0.000454	0.000457	0.000365	0.000556	0.000065			
Vanadium (V)-Dissolved	0.0005	20	20	0.0005	0.0005	0.0005	0.0005	0			
Zinc (Zn)-Dissolved	0.001	20	17	0.0011	0.001	0.001	0.002	0.0003			
Zirconium (Zr)-Dissolved	0.0002	20	20	0.00028	0.0003	0.0002	0.0003	0.00004			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 14. 2021 annual data summary statistics for lab and *in-situ* sampling (organic carbon, physical tests, anions, and nutrients) collected at the RSEM R6 IDZ site (RBPR-7.15).

Parameters (mg/L) Date: 2021	MDL	RBPR-7.15							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Physical Tests											
Hardness (as $CaCO_3$)	0.5	17	0	102	97.7	88.3	136	13.6			
Sp. Conductivity (*in-situ*, µS/cm)		42	0	206	195	179	290	31.1			
Sp. Conductivity (lab, µS/cm)	2	17	0	199	189	171	242	22			
Total Dissolved Solids	20	17	0	129	132	97	163	20			
Total Suspended Solids	1	17	0	46.6	6.7	3.1	214	70.7			
Turbidity (*in-situ*, NTU)		42	0	26.1	3.43	2.09	123	35.97			
Turbidity (lab, NTU)	0.1	17	0	39.1	4.37	1.71	161	58.28			
pH (*in-situ*, pH units)		42	0	8.23	8.22	7.91	8.63	0.19		6.5 to 9.0	0
pH (lab, pH units)	0.1	17	0	7.98	7.99	7.57	8.18	0.14		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1	17	0	94	88.8	83.2	125	12.2			
Ammonia, Total (as N)	0.005	17	2	0.0184	0.0119	0.005	0.065	0.0165	0.102	0.68	0
Bromide (Br)	0.05	17	17	0.05	0.05	0.05	0.05	0			
Chloride (Cl)	0.5	17	11	0.666	0.5	0.5	1.51	0.34	150	600	0
Fluoride (F)	0.02	17	0	0.0381	0.034	0.021	0.06	0.012		EQ	0
Nitrate (as N)	0.005	17	0	0.0738	0.076	0.057	0.087	0.0091	3	32.8	0
Nitrite (as N)	0.001	17	16	0.0063	0.01	0.001	0.01	0.0046	0.02	0.06	0
Orthophosphate-Dissolved (as P)	0.001	17	6	0.0015	0.0014	0.001	0.003	0.0006			
Sulfate (SO_4)	0.3	17	0	16.7	16.5	13.2	21.3	2.9	EQ		0
Total Phosphorus (P)	0.002	17	0	0.0452	0.0067	0.003	0.191	0.0638			
Organic Carbon											
Dissolved Organic Carbon	0.5	17	0	3.77	3.6	2.42	5.31	0.94			
Total Organic Carbon	0.5	17	0	4.06	3.35	2.62	8.2	1.56			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 15. 2021 annual data summary statistics for total metals collected at the RSEM R6 IDZ site (RBPR-7.15).

Parameters (mg/L) Date: 2021	MDL	RBPR-7.15							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Total Metals											
Aluminum (Al)-Total	0.003	17	0	0.682	0.0775	0.0458	2.56	0.9425			
Antimony (Sb)-Total	0.0001	17	9	0.000146	0.0001	0.0001	0.00029	0.00007			
Arsenic (As)-Total	0.0001	17	0	0.000682	0.00029	0.00023	0.00208	0.00066		0.005	0
Barium (Ba)-Total	0.0001	17	0	0.0605	0.0365	0.0324	0.131	0.0375	1		0
Beryllium (Be)-Total	0.00002	17	10	0.0000574	0.00002	0.00002	0.000166	0.000054	0.00013		0
Bismuth (Bi)-Total	0.00005	17	17	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Total	0.01	17	14	0.0101	0.01	0.01	0.011	0		1.2	0
Cadmium (Cd)-Total	0.000005	17	0	0.0000823	0.0000235	0.0000144	0.000319	0.0001008			
Calcium (Ca)-Total	0.05	17	0	31.1	29.1	25.3	42.8	5.7			
Chromium (Cr)-Total	0.0001	17	1	0.00131	0.00025	0.00019	0.0045	0.00165			
Cobalt (Co)-Total	0.0001	17	10	0.000522	0.0001	0.0001	0.00199	0.00067	0.004	0.11	0
Copper (Cu)-Total	0.0005	17	0	0.00211	0.00083	0.00075	0.00638	0.00199			
Iron (Fe)-Total	0.01	17	0	1.14	0.14	0.068	4.53	1.618		1	5
Lead (Pb)-Total	0.00005	17	3	0.000636	0.000087	0.00005	0.00262	0.000893	EQ	EQ	0
Lithium (Li)-Total	0.001	17	0	0.00272	0.0017	0.0013	0.0065	0.0018			
Magnesium (Mg)-Total	0.005	17	0	7.58	7.03	6.08	10.6	1.64			
Manganese (Mn)-Total	0.0001	17	0	0.0199	0.00396	0.00259	0.0776	0.0257	EQ	EQ	0
Mercury (Hg)-Total	0.000005	17	17	0.000005	0.000005	0.000005	0.000005	0	0.00002		0
Molybdenum (Mo)-Total	0.00005	17	0	0.00109	0.000902	0.000807	0.0019	0.000335	7.6	46	0
Nickel (Ni)-Total	0.0005	17	0	0.00264	0.00111	0.00083	0.00794	0.00255	EQ		0
Phosphorus (P)-Total	0.05	17	11	0.0796	0.05	0.05	0.213	0.054			
Potassium (K)-Total	0.05	17	0	0.725	0.467	0.43	1.45	0.387			
Selenium (Se)-Total	0.00005	17	0	0.000409	0.000308	0.000239	0.000824	0.000192	0.002		0
Silicon (Si)-Total	0.05	17	0	3.16	2.3	1.99	6.75	1.49			
Silver (Ag)-Total	0.00001	17	11	0.0000191	0.00001	0.00001	0.00006	0.000017	EQ	EQ	0
Sodium (Na)-Total	0.05	17	0	2.12	1.76	1.36	3.82	0.77			
Strontium (Sr)-Total	0.0002	17	0	0.122	0.116	0.102	0.168	0.021			
Sulfur (S)-Total	0.5	17	0	6.21	5.94	5.02	8.07	0.91			
Thallium (Tl)-Total	0.00001	17	10	0.0000306	0.00001	0.00001	0.000107	0.000035			
Tin (Sn)-Total	0.0001	17	16	0.000104	0.0001	0.0001	0.00016	0.00001			
Titanium (Ti)-Total	0.0003	17	0	0.0108	0.00164	0.00088	0.0533	0.01552			
Uranium (U)-Total	0.00001	17	0	0.000541	0.000524	0.000402	0.000795	0.000131	0.0085		0
Vanadium (V)-Total	0.0005	17	0	0.00337	0.00096	0.00054	0.0108	0.00388			
Zinc (Zn)-Total	0.003	17	10	0.00815	0.003	0.003	0.024	0.0082	EQ	EQ	0
Zirconium (Zr)-Total	0.0002	17	14	0.000345	0.0003	0.0002	0.00125	0.00024			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 16. 2021 annual data summary statistics for dissolved metals collected at the RSEM R6 IDZ site (RBPR-7.15).

Parameters (mg/L) Date: 2021	MDL	RBPR-7.15							BC Long-Term WQG[1]	BC Short-Term Maximum WQG[2]	BC Short-Term Maximum # Exc
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.			
Dissolved Metals											
Aluminum (Al)-Dissolved	0.001	17	0	0.00762	0.007	0.0053	0.0143	0.0024	EQ	EQ	0
Antimony (Sb)-Dissolved	0.0001	17	13	0.000104	0.0001	0.0001	0.00013	0.00001			
Arsenic (As)-Dissolved	0.0001	17	0	0.000213	0.0002	0.00017	0.00028	0.00003			
Barium (Ba)-Dissolved	0.0001	17	0	0.0401	0.0347	0.0313	0.0605	0.0099			
Beryllium (Be)-Dissolved	0.00002	17	17	0.0000247	0.00002	0.00002	0.0001	0.000019			
Bismuth (Bi)-Dissolved	0.00005	17	17	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Dissolved	0.01	17	17	0.01	0.01	0.01	0.01	0			
Cadmium (Cd)-Dissolved	0.000005	17	0	0.0000104	0.00001	0.0000071	0.0000167	0.0000024	EQ	EQ	0
Calcium (Ca)-Dissolved	0.05	17	0	29.1	28.4	25.4	38.7	3.6			
Chromium (Cr)-Dissolved	0.0001	17	9	0.00013	0.0001	0.0001	0.0005	0.0001			
Cobalt (Co)-Dissolved	0.0001	17	17	0.0001	0.0001	0.0001	0.0001	0			
Copper (Cu)-Dissolved	0.0002	17	0	0.000736	0.00066	0.00059	0.00095	0.00013	EQ	EQ	0
Iron (Fe)-Dissolved	0.01	17	9	0.0148	0.01	0.01	0.027	0.007		0.35	0
Lead (Pb)-Dissolved	0.00005	17	17	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li)-Dissolved	0.001	17	0	0.00186	0.0016	0.0012	0.0031	0.0006			
Magnesium (Mg)-Dissolved	0.005	17	0	7.18	6.78	6.06	10	1.17			
Manganese (Mn)-Dissolved	0.0001	17	0	0.00156	0.00087	0.00046	0.00365	0.0013			
Mercury (Hg)-Dissolved	0.000005	17	17	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo)-Dissolved	0.00005	17	0	0.00101	0.000864	0.00078	0.00156	0.00026			
Nickel (Ni)-Dissolved	0.0005	17	0	0.000876	0.00078	0.00068	0.00136	0.00021			
Phosphorus (P)-Dissolved	0.05	17	17	0.05	0.05	0.05	0.05	0			
Potassium (K)-Dissolved	0.05	17	0	0.487	0.456	0.4	0.6	0.073			
Selenium (Se)-Dissolved	0.00005	17	0	0.000427	0.000321	0.000277	0.000878	0.000193			
Silicon (Si)-Dissolved	0.05	17	0	2.09	2.1	1.86	2.28	0.12			
Silver (Ag)-Dissolved	0.00001	17	17	0.00001	0.00001	0.00001	0.00001	0			
Sodium (Na)-Dissolved	0.05	17	0	2.08	1.76	1.42	3.64	0.74			
Strontium (Sr)-Dissolved	0.0002	17	0	0.117	0.112	0.0972	0.149	0.0157			
Sulfur (S)-Dissolved	0.5	17	0	6.25	5.63	4.9	8.76	1.23			
Thallium (Tl)-Dissolved	0.00001	17	17	0.00001	0.00001	0.00001	0.00001	0			
Tin (Sn)-Dissolved	0.0001	17	16	0.000101	0.0001	0.0001	0.00012	0			
Titanium (Ti)-Dissolved	0.0003	17	11	0.000342	0.0003	0.0003	0.00062	0.00009			
Uranium (U)-Dissolved	0.00001	17	0	0.000465	0.000458	0.000394	0.000572	0.000066			
Vanadium (V)-Dissolved	0.0005	17	16	0.0005	0.0005	0.0005	0.0005	0			
Zinc (Zn)-Dissolved	0.001	17	9	0.00134	0.001	0.001	0.0037	0.0007			
Zirconium (Zr)-Dissolved	0.0002	17	17	0.000282	0.0003	0.0002	0.0003	0.00004			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 17. 2021 annual data summary statistics for lab and *in-situ* sampling (organic carbon, physical tests, anions, and nutrients) collected at the MECCS far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	RBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Physical Tests											
Hardness (as $CaCO_3$)	0.5	18	0	100	97.3	87.5	132	12.8			
Sp. Conductivity (*in-situ*, µS/cm)		39	0	195	191	175	241	18.3			
Sp. Conductivity (lab, µS/cm)	2	18	0	193	189	173	247	19			
Total Dissolved Solids	20	18	0	128	126	97	186	22			
Total Suspended Solids	1	18	0	49.2	13	3.5	213	67			
Turbidity (*in-situ*, NTU)		39	0	23.7	5.12	2.52	84.2	29.08			
Turbidity (lab, NTU)	0.1	18	0	31.7	4.54	2.04	128	43.76			
pH (*in-situ*, pH units)		39	0	8.03	8.1	7.5	8.27	0.23		6.5 to 9.0	0
pH (lab, pH units)	0.1	18	0	8.01	8.06	7.54	8.2	0.14		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1	18	0	92.4	88.5	81.9	119	10.5			
Ammonia, Total (as N)	0.005	18	3	0.013	0.0083	0.005	0.034	0.0093	0.102	0.68	0
Bromide (Br)	0.05	18	18	0.05	0.05	0.05	0.05	0			
Chloride (Cl)	0.5	18	18	0.5	0.5	0.5	0.5	0	150	600	0
Fluoride (F)	0.02	18	0	0.035	0.032	0.021	0.056	0.01		EQ	0
Nitrate (as N)	0.005	18	0	0.07	0.071	0.052	0.089	0.0095	3	32.8	0
Nitrite (as N)	0.001	18	17	0.006	0.01	0.001	0.01	0.0046	0.02	0.06	0
Orthophosphate-Dissolved (as P)	0.001	18	12	0.001	0.001	0.001	0.003	0.0007			
Sulfate (SO_4)	0.3	18	0	15.1	14.4	10.6	20	2.5	EQ		0
Total Phosphorus (P)	0.002	18	0	0.034	0.00975	0.003	0.123	0.0387			
Organic Carbon											
Dissolved Organic Carbon	0.5	18	0	3.69	3.28	2.41	6.69	1.13			
Total Organic Carbon	0.5	18	0	3.9	3.29	2.15	7.5	1.57			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 18. 2021 annual data summary statistics for total metals collected at the MECCS far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	RBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Total Metals											
Aluminum (Al)-Total	0.003	18	0	0.591	0.12	0.0536	2.83	0.7876			
Antimony (Sb)-Total	0.0001	18	11	0.000128	0.0001	0.0001	0.00027	0.00005			
Arsenic (As)-Total	0.0001	18	0	0.000596	0.00035	0.00022	0.00165	0.00047		0.005	0
Barium (Ba)-Total	0.0001	18	0	0.056	0.0372	0.0326	0.131	0.0322	1		0
Beryllium (Be)-Total	0.00002	18	11	0.0000499	0.00002	0.00002	0.00016	0.000043	0.00013		0
Bismuth (Bi)-Total	0.00005	18	18	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Total	0.01	18	17	0.0101	0.01	0.01	0.011	0		1.2	0
Cadmium (Cd)-Total	0.000005	18	0	0.0000689	0.0000288	0.0000145	0.000236	0.0000703			
Calcium (Ca)-Total	0.05	18	0	30.3	29	25.3	41.4	4.9			
Chromium (Cr)-Total	0.0001	18	1	0.00113	0.000385	0.00018	0.00504	0.00137			
Cobalt (Co)-Total	0.0001	18	9	0.000436	0.000115	0.0001	0.00142	0.00048	0.004	0.11	0
Copper (Cu)-Total	0.0005	18	0	0.00185	0.000945	0.00073	0.00482	0.00146			
Iron (Fe)-Total	0.01	18	0	0.94	0.205	0.085	3.4	1.168		1	7
Lead (Pb)-Total	0.00005	18	1	0.00052	0.000113	0.00005	0.00186	0.00064	EQ	EQ	0
Lithium (Li)-Total	0.001	18	0	0.00218	0.0015	0.0011	0.0054	0.0013			
Magnesium (Mg)-Total	0.005	18	0	7.35	7.03	6.03	10.6	1.51			
Manganese (Mn)-Total	0.0001	18	0	0.0175	0.00569	0.00263	0.0539	0.01903	EQ	EQ	0
Mercury (Hg)-Total	0.000005	18	17	5.64E-06	0.000005	0.000005	0.0000165	0.0000027	0.00002		0
Molybdenum (Mo)-Total	0.00005	18	0	0.000972	0.000875	0.000733	0.00179	0.000276	7.6	46	0
Nickel (Ni)-Total	0.0005	18	0	0.00229	0.00128	0.00088	0.00635	0.00185	EQ		0
Phosphorus (P)-Total	0.05	18	12	0.0707	0.05	0.05	0.171	0.038			
Potassium (K)-Total	0.05	18	0	0.665	0.465	0.41	1.43	0.315			
Selenium (Se)-Total	0.00005	18	0	0.000361	0.000299	0.000245	0.000826	0.000164	0.002		0
Silicon (Si)-Total	0.05	18	0	3.01	2.35	1.99	7.21	1.32			
Silver (Ag)-Total	0.00001	18	11	0.0000164	0.00001	0.00001	0.000046	0.000012	EQ	EQ	0
Sodium (Na)-Total	0.05	18	0	1.41	1.31	1.11	1.92	0.25			
Strontium (Sr)-Total	0.0002	18	0	0.119	0.113	0.0974	0.167	0.018			
Sulfur (S)-Total	0.5	18	0	5.72	5.48	4.88	7.18	0.67			
Thallium (Tl)-Total	0.00001	18	11	0.0000244	0.00001	0.00001	0.000088	0.000024			
Tin (Sn)-Total	0.0001	18	14	0.000111	0.0001	0.0001	0.00026	0.00004			
Titanium (Ti)-Total	0.0003	18	0	0.00985	0.00268	0.00092	0.0548	0.0137			
Uranium (U)-Total	0.00001	18	0	0.000525	0.000514	0.000401	0.000718	0.000102	0.0085		0
Vanadium (V)-Total	0.0005	18	0	0.003	0.0015	0.00066	0.0117	0.00309			
Zinc (Zn)-Total	0.003	18	9	0.00793	0.0035	0.003	0.0266	0.0074	EQ	EQ	0
Zirconium (Zr)-Total	0.0002	18	16	0.000371	0.0003	0.0002	0.00178	0.00035			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 19. 2021 annual data summary statistics for dissolved metals collected at the MECCS far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	RBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al)-Dissolved	0.001	18	0	0.00723	0.0065	0.0055	0.0152	0.0024	EQ	EQ	0
Antimony (Sb)-Dissolved	0.0001	18	16	0.000102	0.0001	0.0001	0.00013	0.00001			
Arsenic (As)-Dissolved	0.0001	18	0	0.0002	0.0002	0.00015	0.00026	0.00003			
Barium (Ba)-Dissolved	0.0001	18	0	0.037	0.0327	0.0311	0.0599	0.0089			
Beryllium (Be)-Dissolved	0.00002	18	18	0.0000244	0.00002	0.00002	0.0001	0.000019			
Bismuth (Bi)-Dissolved	0.00005	18	18	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Dissolved	0.01	18	18	0.01	0.01	0.01	0.01	0			
Cadmium (Cd)-Dissolved	0.000005	18	0	0.0000106	0.0000109	0.0000071	0.0000144	0.0000025	EQ	EQ	0
Calcium (Ca)-Dissolved	0.05	18	0	28.6	28.2	25.1	37.2	3.3			
Chromium (Cr)-Dissolved	0.0001	18	14	0.000126	0.0001	0.0001	0.0005	0.00009			
Cobalt (Co)-Dissolved	0.0001	18	18	0.0001	0.0001	0.0001	0.0001	0			
Copper (Cu)-Dissolved	0.0002	18	0	0.000717	0.000655	0.00057	0.00109	0.00014	EQ	EQ	0
Iron (Fe)-Dissolved	0.01	18	9	0.0215	0.01	0.01	0.131	0.028		0.35	0
Lead (Pb)-Dissolved	0.00005	18	18	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li)-Dissolved	0.001	18	0	0.00152	0.0013	0.0011	0.0028	0.0005			
Magnesium (Mg)-Dissolved	0.005	18	0	6.95	6.67	5.93	9.99	1.15			
Manganese (Mn)-Dissolved	0.0001	18	0	0.00164	0.00075	0.00041	0.00446	0.00145			
Mercury (Hg)-Dissolved	0.000005	18	18	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo)-Dissolved	0.00005	18	0	0.000909	0.000827	0.000746	0.00152	0.000224			
Nickel (Ni)-Dissolved	0.0005	18	0	0.000839	0.000735	0.00062	0.00135	0.00022			
Phosphorus (P)-Dissolved	0.05	18	18	0.05	0.05	0.05	0.05	0			
Potassium (K)-Dissolved	0.05	18	0	0.461	0.422	0.39	0.58	0.071			
Selenium (Se)-Dissolved	0.00005	18	0	0.000376	0.00031	0.000274	0.000841	0.000153			
Silicon (Si)-Dissolved	0.05	18	0	2.07	2.04	1.82	2.29	0.15			
Silver (Ag)-Dissolved	0.00001	18	17	0.0000102	0.00001	0.00001	0.000014	0.000001			
Sodium (Na)-Dissolved	0.05	18	0	1.4	1.31	1.11	2.01	0.26			
Strontium (Sr)-Dissolved	0.0002	18	0	0.114	0.111	0.0947	0.149	0.0138			
Sulfur (S)-Dissolved	0.5	18	0	5.68	5.36	4.78	7.53	0.84			
Thallium (Tl)-Dissolved	0.00001	18	18	0.00001	0.00001	0.00001	0.00001	0			
Tin (Sn)-Dissolved	0.0001	18	18	0.0001	0.0001	0.0001	0.0001	0			
Titanium (Ti)-Dissolved	0.0003	18	11	0.000382	0.0003	0.0003	0.00066	0.00012			
Uranium (U)-Dissolved	0.00001	18	0	0.000452	0.000431	0.000381	0.000544	0.000068			
Vanadium (V)-Dissolved	0.0005	18	17	0.000501	0.0005	0.0005	0.00051	0			
Zinc (Zn)-Dissolved	0.001	18	12	0.00128	0.001	0.001	0.0024	0.0005			
Zirconium (Zr)-Dissolved	0.0002	18	18	0.000283	0.0003	0.0002	0.0003	0.00004			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 20. 2021 annual data summary statistics for lab and *in-situ* sampling (organic carbon, physical tests, anions and nutrients) collected at the MECCS far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	LBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Physical Tests											
Hardness (as $CaCO_3$)	0.5	20	0	106	99.3	88.5	138	16.4			
Sp. Conductivity (*in-situ*, µS/cm)		45	0	200	193	176	247	20.4			
Sp. Conductivity (lab, µS/cm)	2	20	0	200	190	173	252	23			
Total Dissolved Solids	20	20	0	131	132	101	184	26			
Total Suspended Solids	1	20	0	55	16.4	3.4	214	69.3			
Turbidity (*in-situ*, NTU)		45	0	26.6	4	2.51	84.6	29.76			
Turbidity (lab, NTU)	0.1	20	0	35.9	5.04	1.99	125	43.75			
pH (*in-situ*, pH units)		45	0	7.99	8.1	7.58	8.26	0.23		6.5 to 9.0	0
pH (lab, pH units)	0.1	20	0	7.95	7.96	7.6	8.17	0.14		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1	20	0	96.4	88.9	83.2	133	15.1			
Ammonia, Total (as N)	0.005	20	4	0.0193	0.01	0.005	0.0695	0.0216	0.102	0.68	0
Bromide (Br)	0.05	20	20	0.05	0.05	0.05	0.05	0			
Chloride (Cl)	0.5	20	19	0.641	0.5	0.5	3.32	0.63	150	600	0
Fluoride (F)	0.02	20	0	0.0406	0.035	0.021	0.061	0.012		EQ	0
Nitrate (as N)	0.005	20	0	0.0722	0.0696	0.052	0.143	0.0191	3	32.8	0
Nitrite (as N)	0.001	20	19	0.0066	0.01	0.001	0.0145	0.0048	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.001	20	10	0.0015	0.001	0.001	0.0038	0.0008			
Sulfate (SO_4)	0.3	20	0	16.6	16.2	11.5	21.6	3.1	EQ		0
Total Phosphorus (P)	0.002	20	0	0.0375	0.0166	0.0024	0.16	0.0425			
Organic Carbon											
Dissolved Organic Carbon	0.5	20	0	3.94	3.77	2.39	6.83	1.11			
Total Organic Carbon	0.5	20	0	4.29	4.01	2.7	8	1.47			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 21. 2021 annual data summary statistics for total metals collected at the MECCS far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	LBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[2]	# Exc
Total Metals											
Aluminum (Al)-Total	0.003	20	0	0.592	0.111	0.0518	2.24	0.7233			
Antimony (Sb)-Total	0.0001	20	11	0.000138	0.0001	0.0001	0.00028	0.00006			
Arsenic (As)-Total	0.0001	20	0	0.000622	0.000345	0.00021	0.00163	0.00048		0.005	0
Barium (Ba)-Total	0.0001	20	0	0.0587	0.0401	0.0319	0.121	0.0312	1		0
Beryllium (Be)-Total	0.00002	20	12	0.0000536	0.00002	0.00002	0.000166	0.000046	0.00013		0
Bismuth (Bi)-Total	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Total	0.01	20	20	0.01	0.01	0.01	0.01	0		1.2	0
Cadmium (Cd)-Total	0.000005	20	0	0.0000858	0.0000256	0.0000124	0.000276	0.0000888			
Calcium (Ca)-Total	0.05	20	0	31.9	29.2	24.9	45.3	6.6			
Chromium (Cr)-Total	0.0001	20	1	0.00117	0.00039	0.00018	0.00413	0.00129			
Cobalt (Co)-Total	0.0001	20	11	0.000459	0.0001	0.0001	0.00154	0.00048	0.004	0.11	0
Copper (Cu)-Total	0.0005	20	0	0.00191	0.000895	0.00072	0.00498	0.00142			
Iron (Fe)-Total	0.01	20	0	0.948	0.177	0.084	3.39	1.121		1	8
Lead (Pb)-Total	0.00005	20	0	0.000553	0.0000975	0.000052	0.00194	0.00065	EQ	EQ	0
Lithium (Li)-Total	0.001	20	0	0.00237	0.0016	0.0011	0.005	0.0013			
Magnesium (Mg)-Total	0.005	20	0	7.85	7.12	5.99	11.1	1.89			
Manganese (Mn)-Total	0.0001	20	0	0.0187	0.0046	0.0026	0.0618	0.01955	EQ	EQ	0
Mercury (Hg)-Total	0.000005	20	19	5.19E-06	0.000005	0.000005	0.0000087	0.0000008	0.00002		0
Molybdenum (Mo)-Total	0.00005	20	0	0.0011	0.000913	0.000782	0.00196	0.00037	7.6	46	0
Nickel (Ni)-Total	0.0005	20	0	0.00241	0.00131	0.00081	0.00605	0.00184	EQ		0
Phosphorus (P)-Total	0.05	20	12	0.0795	0.05	0.05	0.177	0.046			
Potassium (K)-Total	0.05	20	0	0.673	0.478	0.41	1.23	0.293			
Selenium (Se)-Total	0.00005	20	0	0.00041	0.000299	0.000228	0.000884	0.000219	0.002		0
Silicon (Si)-Total	0.05	20	0	3.05	2.45	1.99	6.19	1.19			
Silver (Ag)-Total	0.00001	20	12	0.0000163	0.00001	0.00001	0.000044	0.00001	EQ	EQ	0
Sodium (Na)-Total	0.05	20	0	1.51	1.38	1.1	1.98	0.28			
Strontium (Sr)-Total	0.0002	20	0	0.128	0.118	0.1	0.185	0.026			
Sulfur (S)-Total	0.5	20	0	6.11	5.89	5.07	8.07	0.97			
Thallium (Tl)-Total	0.00001	20	11	0.000027	0.00001	0.00001	0.000089	0.000026			
Tin (Sn)-Total	0.0001	20	18	0.000111	0.0001	0.0001	0.0003	0.00004			
Titanium (Ti)-Total	0.0003	20	0	0.0102	0.00242	0.00094	0.0515	0.01416			
Uranium (U)-Total	0.00001	20	0	0.000554	0.000518	0.000402	0.000785	0.000117	0.0085		0
Vanadium (V)-Total	0.0005	20	0	0.00312	0.00149	0.00066	0.00987	0.00308			
Zinc (Zn)-Total	0.003	20	11	0.00703	0.003	0.003	0.0192	0.0059	EQ	EQ	0
Zirconium (Zr)-Total	0.0002	20	17	0.000362	0.0003	0.0002	0.0013	0.00027			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 22. 2021 annual data summary statistics for dissolved metals collected at the MECCS far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L) Date: 2021	MDL	LBPR-9.34							BC Long-Term WQG[1]	BC Short-Term Maximum WQG[2]	BC Short-Term Maximum # Exc
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.			
Dissolved Metals											
Aluminum (Al)-Dissolved	0.001	20	0	0.00761	0.00655	0.0057	0.0124	0.0024	EQ	EQ	0
Antimony (Sb)-Dissolved	0.0001	20	17	0.000103	0.0001	0.0001	0.00013	0.00001			
Arsenic (As)-Dissolved	0.0001	20	0	0.000206	0.0002	0.00017	0.00025	0.00002			
Barium (Ba)-Dissolved	0.0001	20	0	0.0379	0.0344	0.031	0.053	0.0077			
Beryllium (Be)-Dissolved	0.00002	20	20	0.000024	0.00002	0.00002	0.0001	0.000018			
Bismuth (Bi)-Dissolved	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Boron (B)-Dissolved	0.01	20	20	0.01	0.01	0.01	0.01	0			
Cadmium (Cd)-Dissolved	0.000005	20	0	0.0000111	0.0000106	0.0000062	0.0000182	0.0000032	EQ	EQ	0
Calcium (Ca)-Dissolved	0.05	20	0	30	28	25.6	39.1	4.3			
Chromium (Cr)-Dissolved	0.0001	20	13	0.000125	0.0001	0.0001	0.0005	0.00009			
Cobalt (Co)-Dissolved	0.0001	20	20	0.0001	0.0001	0.0001	0.0001	0			
Copper (Cu)-Dissolved	0.0002	20	0	0.000743	0.00069	0.00055	0.00097	0.00014	EQ	EQ	0
Iron (Fe)-Dissolved	0.01	20	11	0.0157	0.01	0.01	0.033	0.008		0.35	0
Lead (Pb)-Dissolved	0.00005	20	20	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li)-Dissolved	0.001	20	0	0.00171	0.0014	0.0011	0.0029	0.0006			
Magnesium (Mg)-Dissolved	0.005	20	0	7.41	6.79	5.98	10.2	1.42			
Manganese (Mn)-Dissolved	0.0001	20	0	0.00166	0.00077	0.00041	0.00398	0.00138			
Mercury (Hg)-Dissolved	0.000005	20	20	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo)-Dissolved	0.00005	20	0	0.00103	0.000866	0.000738	0.00169	0.00033			
Nickel (Ni)-Dissolved	0.0005	20	0	0.000908	0.000805	0.00066	0.00131	0.00024			
Phosphorus (P)-Dissolved	0.05	20	20	0.05	0.05	0.05	0.05	0			
Potassium (K)-Dissolved	0.05	20	0	0.469	0.447	0.38	0.57	0.067			
Selenium (Se)-Dissolved	0.00005	20	0	0.000435	0.000338	0.000256	0.000913	0.000205			
Silicon (Si)-Dissolved	0.05	20	0	2.08	2.05	1.84	2.3	0.13			
Silver (Ag)-Dissolved	0.00001	20	20	0.00001	0.00001	0.00001	0.00001	0			
Sodium (Na)-Dissolved	0.05	20	0	1.47	1.31	1.11	2.04	0.3			
Strontium (Sr)-Dissolved	0.0002	20	0	0.122	0.116	0.0968	0.157	0.0188			
Sulfur (S)-Dissolved	0.5	20	0	6.02	5.62	4.8	7.88	1.1			
Thallium (Tl)-Dissolved	0.00001	20	20	0.00001	0.00001	0.00001	0.00001	0			
Tin (Sn)-Dissolved	0.0001	20	20	0.0001	0.0001	0.0001	0.0001	0			
Titanium (Ti)-Dissolved	0.0003	20	15	0.000374	0.0003	0.0003	0.00094	0.00017			
Uranium (U)-Dissolved	0.00001	20	0	0.000475	0.000482	0.00039	0.000592	0.000073			
Vanadium (V)-Dissolved	0.0005	20	20	0.0005	0.0005	0.0005	0.0005	0			
Zinc (Zn)-Dissolved	0.001	20	15	0.0011	0.001	0.001	0.0023	0.0003			
Zirconium (Zr)-Dissolved	0.0002	20	20	0.00028	0.0003	0.0002	0.0003	0.00004			

[1] Only average parameter values are compared to the long-term BC WQG. See the methods section of the report for details on how the comparisons are made.

[2] The average, minimum, and maximum values are compared to the short-term max BC WQG. See the methods section of the report for details on how the comparisons are made. A count of the total number of exceedances considering all sampling dates is provided in the "# Exc" column.

Yellow shading indicates an exceedance of the long-term 30 day mean BC WQG, and blue shading indicates an exceedance of the short-term max BC WQG. EQ indicates that the guideline values vary per sample based on applicable equations defined by MECCS (2021).

Parameters with a concentration below the detection limit are assumed to have a concentration equal to the detection limit for calculation of the summary statistics.

BC WQG exceedances were not related to RSEM Pond discharge unless otherwise indicated.

Table 23. 2021 lab and *in-situ* sampling (organic carbon, physical tests, anions, and nutrients) data collected on November 9, 2021 at the RSEM L6 monitoring sites.

Site	RSEM L6										BC Max WQG
	Upstream/ LBPR-6.82			Plume/LBPR-6.97			L6-SP	IDZ/LBPR-7.21			
Date: November 9, 2021	A	B	C	A	B	C	A	A	B	C	
Physical Tests (mg/L)											
Hardness (as $CaCO_3$)	91.8			94.8			455	91.4			
Sp. Conductivity (*in-situ*, µS/cm)	179.1	179.1	179.1	193.1	192.2	200.8		178.9	178.9	178.9	
Sp. Conductivity (lab, µS/cm)	179			198			1270	177			
Total Dissolved Solids	104			110			900	100			
Total Suspended Solids	8.0			8.7			2.9	4.9			EQ
Turbidity (*in-situ*, NTU)				4.34	3.87	3.75		2.52	2.56	2.51	
Turbidity (lab, NTU)	2.72			4.30			6.3	2.45			
pH (*in-situ*, pH units)	8.21	8.21	8.21	8.25	8.26	8.25		8.25	8.25	8.25	6.5-9.0
pH (lab, pH units)	8.08			8.08			7.85	8.08			6.5-9.0
Anions and Nutrients (mg/L)											
Alkalinity, Total (as $CaCO_3$)	88.7			86.6			54.5	86.3			
Ammonia, Total (as N)	0.0052			<0.0050			0.022	<0.0050			0.68
Anion Sum (meq/L)	2.04			2.18				2.01			
Bromide (Br)	<0.050			<0.050			1.16	<0.050			
Cation - Anion Balance	-3.7			-4.6			5.6	-3.1			
Cation Sum (meq/L)	1.90			1.98				1.89			
Chloride (Cl)	<0.50			1.30			81.8	<0.50			600
Orthophosphate (as P)	0.0016			0.0014			<0.0030	0.0015			
Fluoride (F)	0.036			0.040			0.32	0.037			EQ
Nitrate (as N)	0.067			0.081			0.012	0.072			32.8
Nitrite (as N)	<0.010			<0.010			<0.010	<0.010			EQ
Sulfate (SO_4)	12.5			19.3			485	13.4			
Total Phosphorus (P)	0.0054			0.0069				0.0041			
Organic Carbon (mg/L)											
Dissolved Organic Carbon	3.04			3.42			5.25	3.41			
Total Organic Carbon	3.16			3.06			4.82	2.96			

Blue shading indicates an exceedance of short term (maximum) BC WQG (MECCS 2021).
EQ indicates that the applicable guideline is an equation as per MECCS (2021).

Table 24. 2021 lab sampling (dissolved metals) data collected on November 9, 2021 at the RSEM L6 monitoring sites.

Site	RSEM L6				BC Max WQG
	Upstream/ LBPR-6.82	Plume/LBPR-6.97	L6-SP	IDZ/LBPR-7.21	
Date: November 9, 2021	A	A	A	A	
Dissolved Metals (mg/L)					
Aluminum (Al)-Dissolved	0.0061	0.0062	0.0061	0.0054	EQ
Antimony (Sb)-Dissolved	<0.00010	<0.00010	0.0005	<0.00010	
Arsenic (As)-Dissolved	0.00018	0.00021	0.00038	0.00020	
Barium (Ba)-Dissolved	0.0321	0.0325	0.0567	0.0319	
Beryllium (Be)-Dissolved	<0.00010	<0.00010	0.0001	<0.00010	
Bismuth (Bi)-Dissolved	<0.000050	<0.000050	0.001	<0.000050	
Boron (B)-Dissolved	<0.010	<0.010	0.115	<0.010	
Cadmium (Cd)-Dissolved	0.0000086	0.0000099	0.000016	0.0000100	EQ
Calcium (Ca)-Dissolved	26.5	27.3	122	26.3	
Chromium (Cr)-Dissolved	<0.00010	<0.00010	0.001	<0.00010	
Cobalt (Co)-Dissolved	<0.00010	<0.00010	0.0002	<0.00010	
Copper (Cu)-Dissolved	0.00063	0.00063	0.00128	0.00062	EQ
Iron (Fe)-Dissolved	<0.010	<0.010	0.01	<0.010	0.35
Lead (Pb)-Dissolved	<0.000050	<0.000050	0.0002	<0.000050	
Lithium (Li)-Dissolved	0.0012	0.0013	0.0264	0.0011	
Magnesium (Mg)-Dissolved	6.21	6.48	36.8	6.24	
Manganese (Mn)-Dissolved	0.00051	0.00059	0.0045	0.00060	
Mercury (Hg)-Dissolved	<0.0000050	<0.0000050	0.0000019	<0.0000050	
Molybdenum (Mo)-Dissolved	0.000830	0.000864	0.0082	0.000828	
Nickel (Ni)-Dissolved	0.00073	0.00074	0.0017	0.00072	
Phosphorus (P)-Dissolved	<0.050	<0.050		<0.050	
Potassium (K)-Dissolved	0.417	0.453	5.12	0.418	
Selenium (Se)-Dissolved	0.000283	0.000293	0.00218	0.000303	
Silicon (Si)-Dissolved	2.06	2.06	0.1	2.08	
Silver (Ag)-Dissolved	<0.000010	<0.000010	0.00002	<0.000010	
Sodium (Na)-Dissolved	1.17	1.80	65.4	1.19	
Strontium (Sr)-Dissolved	0.108	0.112	0.709	0.106	
Sulfur (S)-Dissolved	4.18	5.72	107	4.38	
Thallium (Tl)-Dissolved	<0.000010	<0.000010	0.00001	<0.000010	
Tin (Sn)-Dissolved	<0.00010	<0.00010	0.005	<0.00010	
Titanium (Ti)-Dissolved	<0.00030	<0.00030	0.005	<0.00030	
Uranium (U)-Dissolved	0.000405	0.000418	0.00237	0.000404	
Vanadium (V)-Dissolved	<0.00050	<0.00050	0.005	<0.00050	
Zinc (Zn)-Dissolved	<0.0010	<0.0010	0.005	<0.0010	
Zirconium (Zr)-Dissolved	<0.00020	<0.00020	0.0001	<0.00020	

Blue shading indicates an exceedance of short term (maximum) BC WQG (MECCS 2021).
EQ indicates that the applicable guideline is an equation as per MECCS (2021).

Table 25. 2021 lab sampling (total metals) data collected on November 9, 2021 at the RSEM L6 monitoring sites.

Site	RSEM L6				BC Max WQG	EOP Limit
	Upstream/ LBPR-6.82	Plume/LBPR-6.97	L6-SP	IDZ/LBPR-7.21		
Date: November 9, 2021	A	A	A	A		
Total Metals (mg/L)						
Aluminum (Al)-Total	0.0602	0.0932	0.0691	0.0518		
Antimony (Sb)-Total	<0.00010	<0.00010	0.0005	<0.00010		
Arsenic (As)-Total	0.00024	0.00028	0.0005	0.00021	0.005	
Barium (Ba)-Total	0.0338	0.0356	0.0629	0.0345		
Beryllium (Be)-Total	<0.00010	<0.00010	0.0001	<0.00010		
Bismuth (Bi)-Total	<0.000050	<0.000050	0.001	<0.000050		
Boron (B)-Total	<0.010	<0.010	0.111	<0.010	1.2	
Cadmium (Cd)-Total	0.0000207	0.0000221	0.00002	0.0000215		0.00029
Calcium (Ca)-Total	25.1	26.4	134	25.5		
Chromium (Cr)-Total	0.00020	0.00027	0.001	0.00019		
Cobalt (Co)-Total	<0.00010	<0.00010	0.0002	<0.00010	0.11	0.55
Copper (Cu)-Total	0.00075	0.00085	0.00158	0.00077		0.011
Iron (Fe)-Total	0.093	0.161	0.18	0.084	1	
Lead (Pb)-Total	0.000059	0.000099	0.0002	0.000057	0.003	
Lithium (Li)-Total	0.0013	0.0015	0.0275	0.0012		
Magnesium (Mg)-Total	6.18	6.68	39.9	6.18		
Manganese (Mn)-Total	0.00283	0.00395	0.0087	0.00294	EQ	
Mercury (Hg)-Total	<0.0000050	<0.0000050	0.0000019	<0.0000050		
Molybdenum (Mo)-Total	0.000905	0.000963	0.0092	0.000861	46	
Nickel (Ni)-Total	0.00090	0.00099	0.0022	0.00088		
Phosphorus (P)-Total	<0.050	<0.050		<0.050		
Potassium (K)-Total	0.431	0.513	5.35	0.429		
Selenium (Se)-Total	0.000292	0.000278	0.00197	0.000247		
Silicon (Si)-Total	2.18	2.17	0.175	2.18		
Silver (Ag)-Total	<0.000010	<0.000010	0.00002	<0.000010	0.0001	
Sodium (Na)-Total	1.21	2.09	72.5	1.21		
Strontium (Sr)-Total	0.112	0.119	0.762	0.111		
Sulfur (S)-Total	4.58	6.33	138	4.51		
Thallium (Tl)-Total	<0.000010	<0.000010	0.00001	<0.000010		
Tin (Sn)-Total	<0.00010	<0.00010	0.005	<0.00010		
Titanium (Ti)-Total	0.00113	0.00113	0.005	0.00093		
Uranium (U)-Total	0.000471	0.000503	0.00252	0.000477		
Vanadium (V)-Total	0.00066	0.00076	0.005	0.00057		
Zinc (Zn)-Total	<0.0030	<0.0030	0.005	<0.0030	EQ	0.033
Zirconium (Zr)-Total	<0.00020	<0.00020	0.0001	<0.00020		

Blue shading indicates an exceedance of short term (maximum) BC WQG (MECCS 2021).
EQ indicates that the applicable guideline is an equation as per MECCS (2021).

Appendix B. Site C PAG Contact RSEM Surface Water Quality Monitoring Time Series Plots – R6 Monthly and 5 in 30-day Sampling Data

The following time series plots depict data collected in 2021 at PAG-contact RSEM ponds R6W and R6E and the corresponding Peace River monitoring sites. Unless otherwise specified, all data are laboratory analytical results. Peace River samples were collected by Ecofish and included a field blank, travel blank, and duplicate sample for QA/QC purposes. RSEM pond data were provided by PRHP. Error bars are included when duplicate samples are collected. The location of duplicate sampling is varied with each sampling date. Similarly pond sampling duplicates are collected periodically, and error bars are included when duplicate sampling in the pond has occurred. Sampling in the Peace River was not conducted in in January and February 2021 due to COVID restrictions.

Figure 2. 2021 Peace River (*in-situ*) and RSEM R6 pond (lab) specific conductivity.

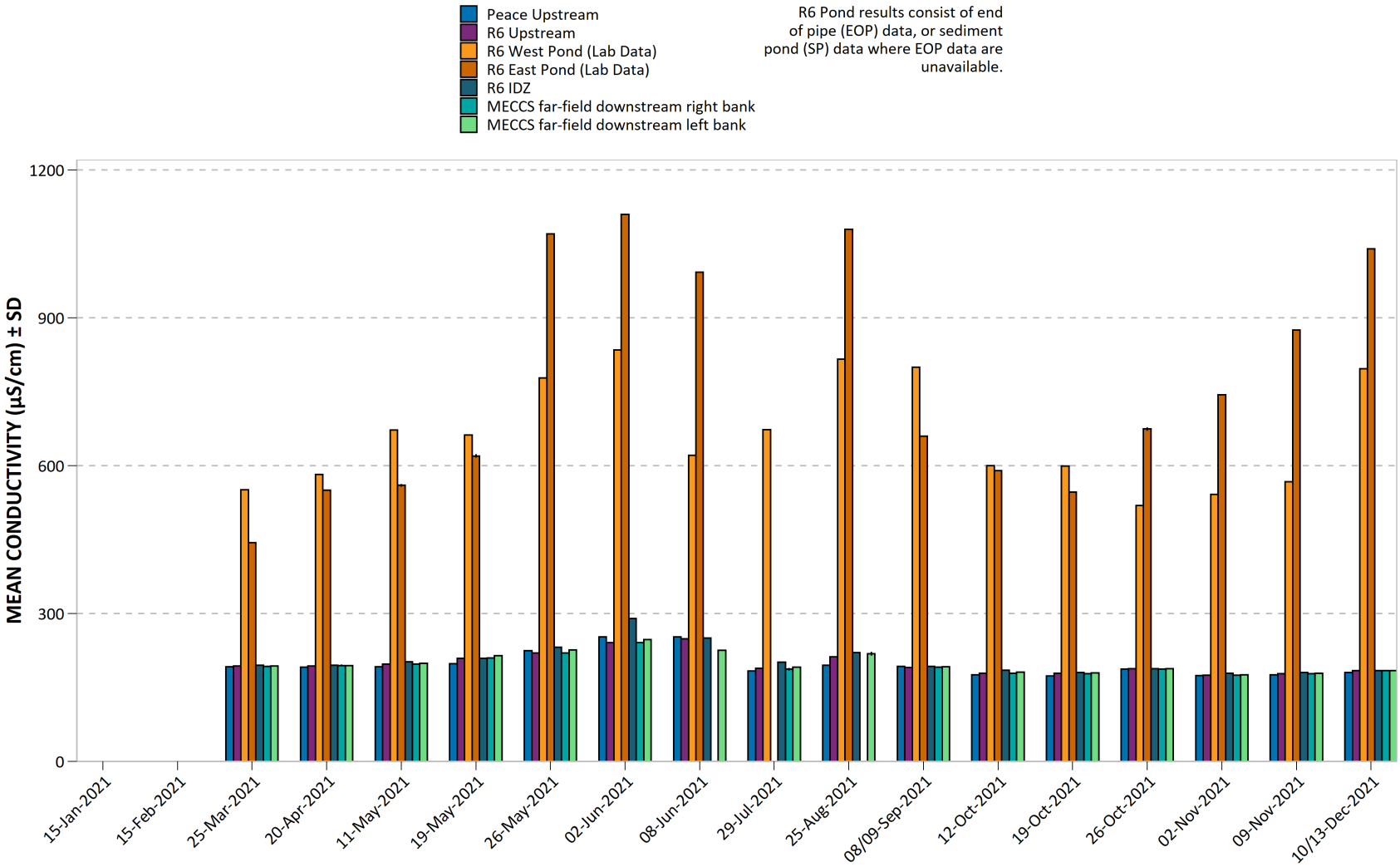


Figure 3. 2021 Peace River and RSEM R6 pond lab specific conductivity.

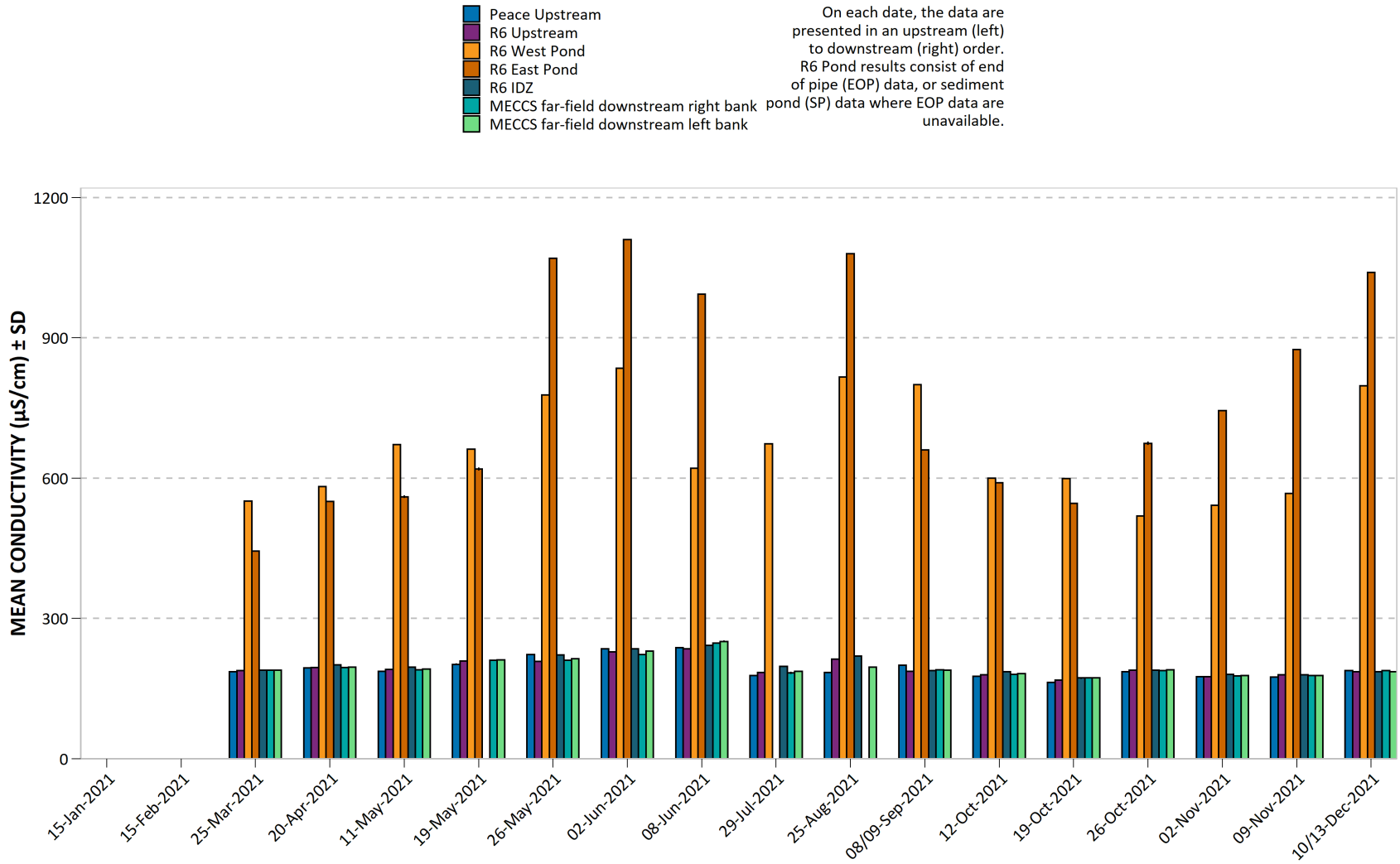


Figure 4. 2021 Peace River and RSEM R6 pond hardness (as $CaCO_3$).

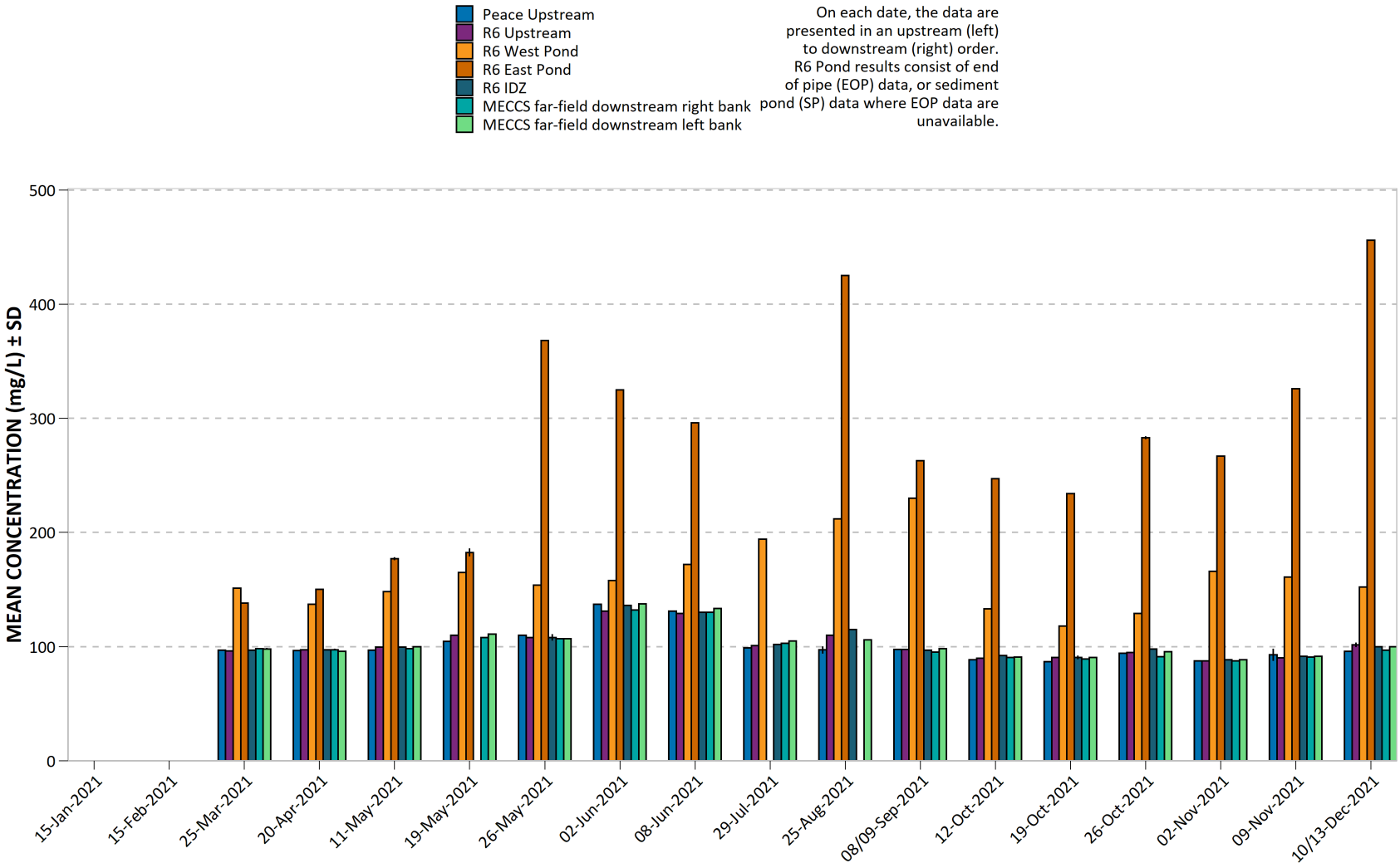


Figure 5. 2021 Peace River and RSEM R6 pond total dissolved solids (TDS).

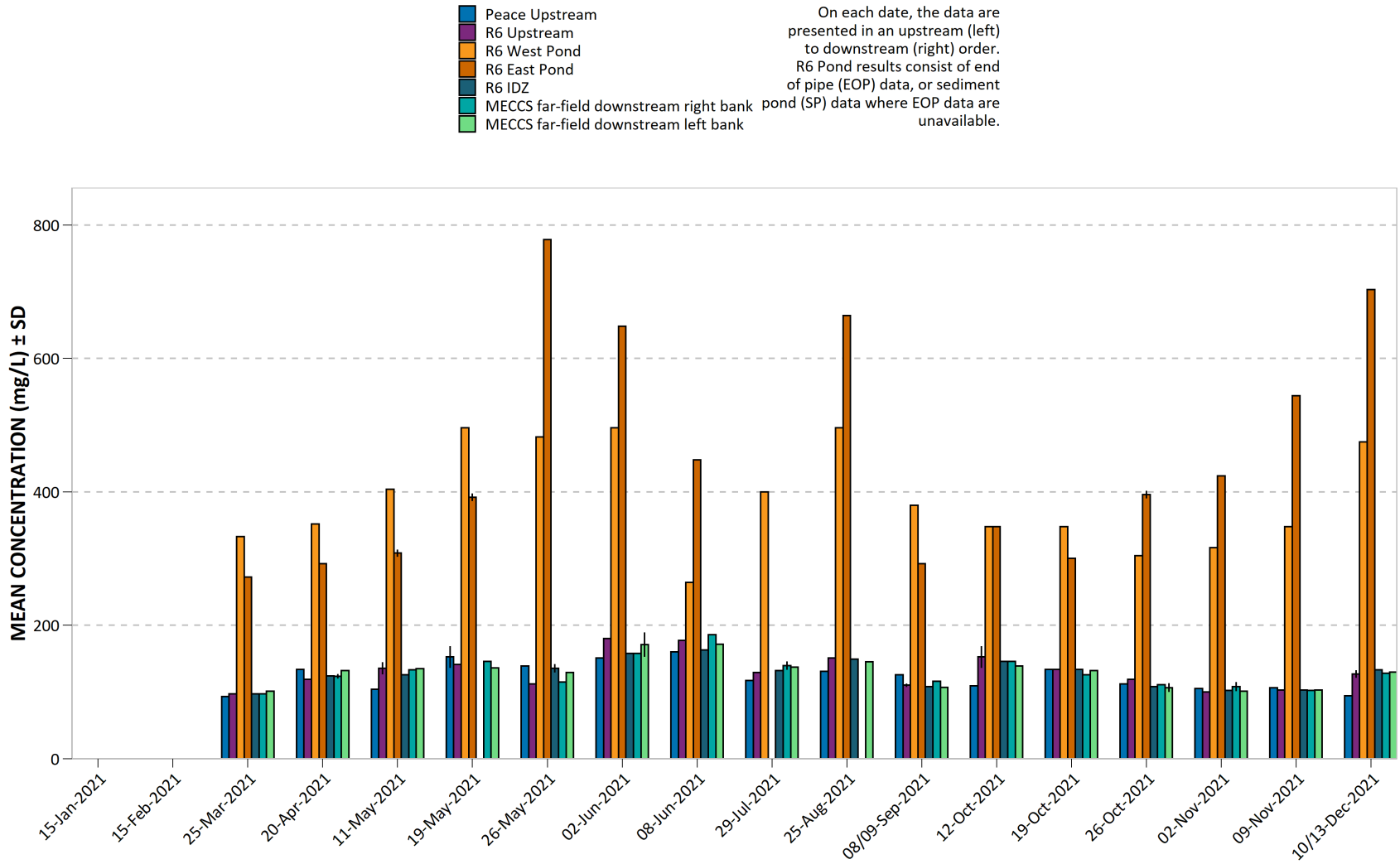


Figure 6. 2021 Peace River and RSEM R6 pond total suspended solids (TSS).

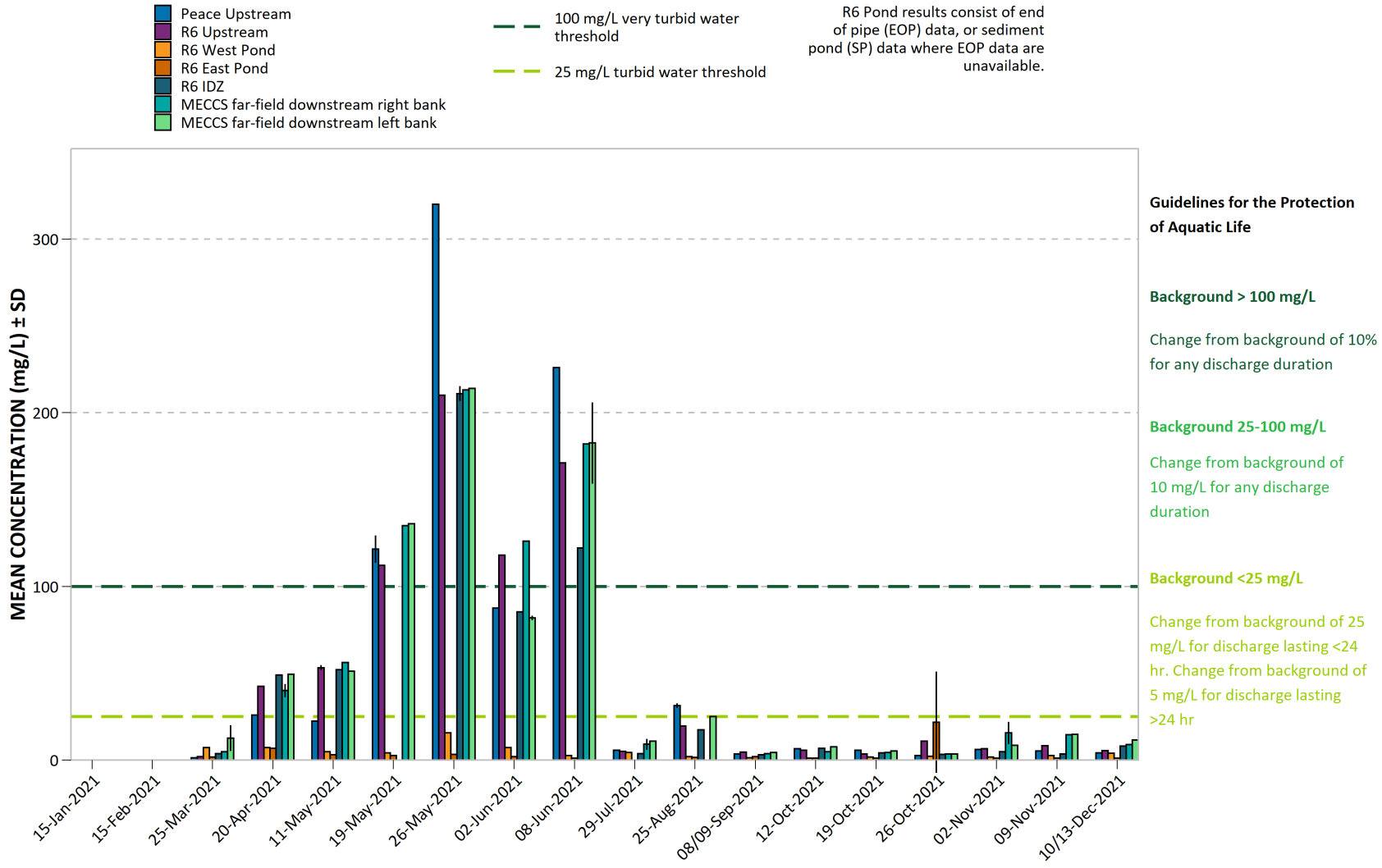


Figure 7. 2021 Peace River (*in-situ*) and RSEM R6 pond (lab) turbidity.

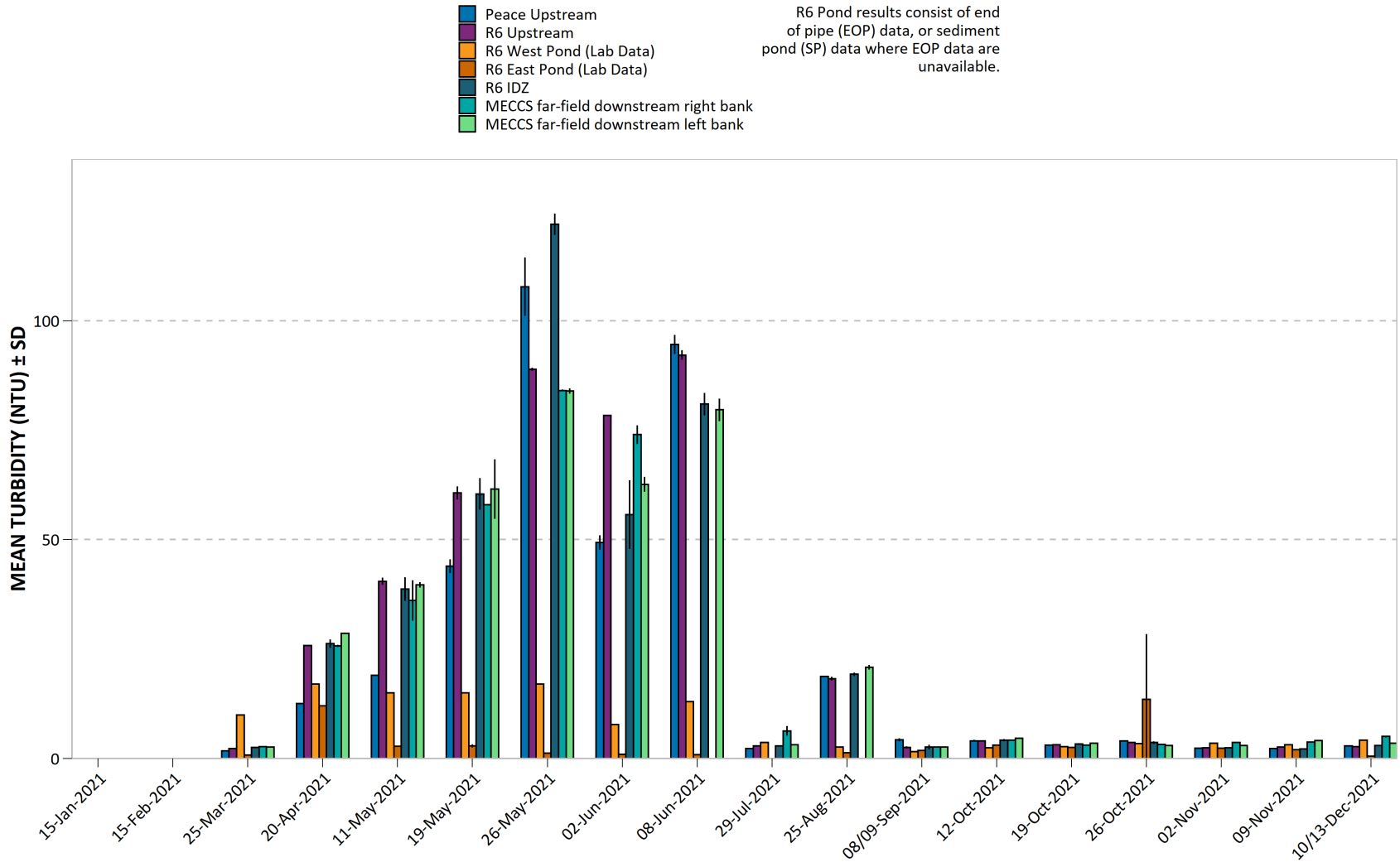


Figure 8. 2021 Peace River (*in-situ*) and RSEM R6 pond (lab) pH.

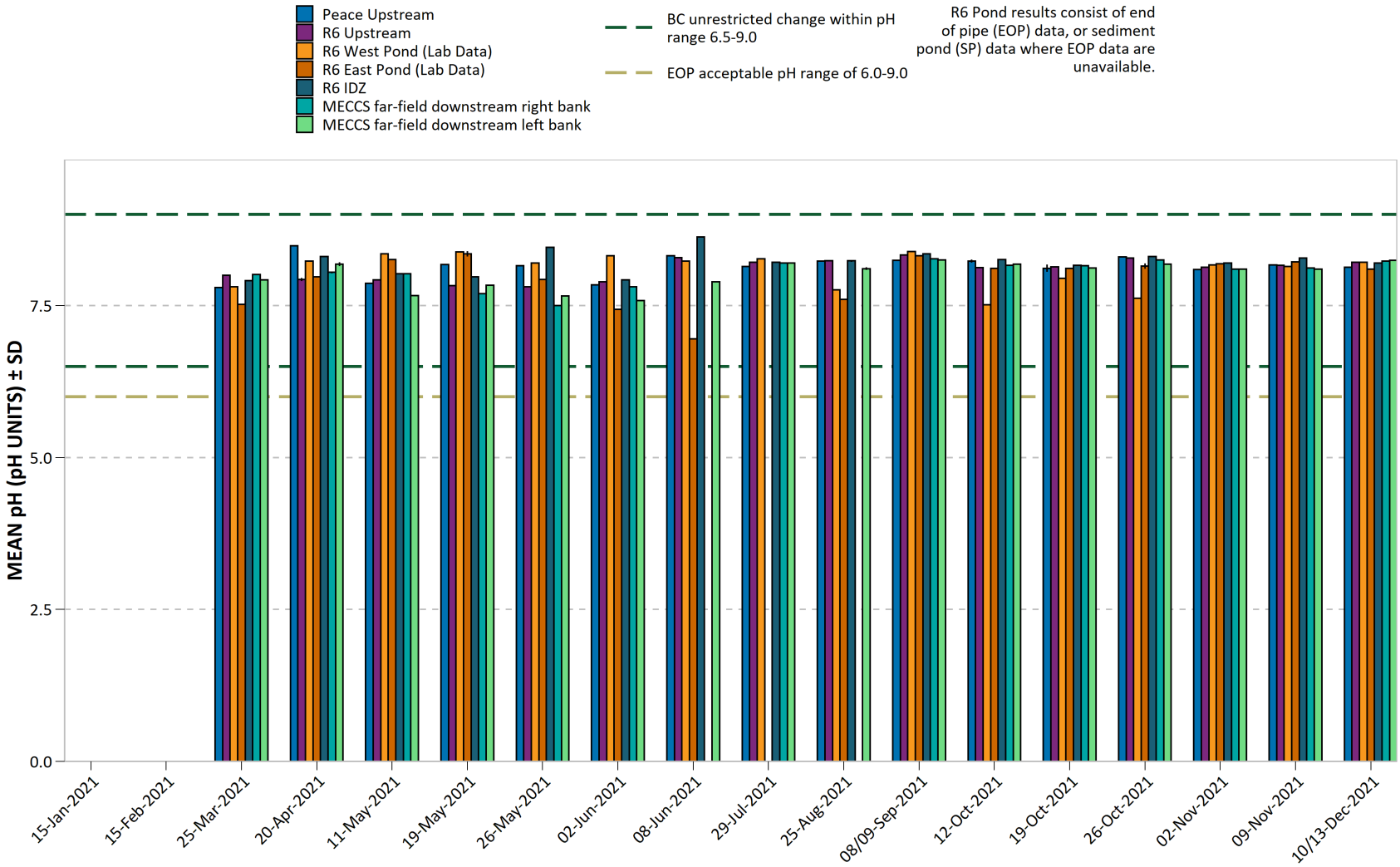


Figure 9. 2021 Peace River and RSEM R6 pond lab pH.

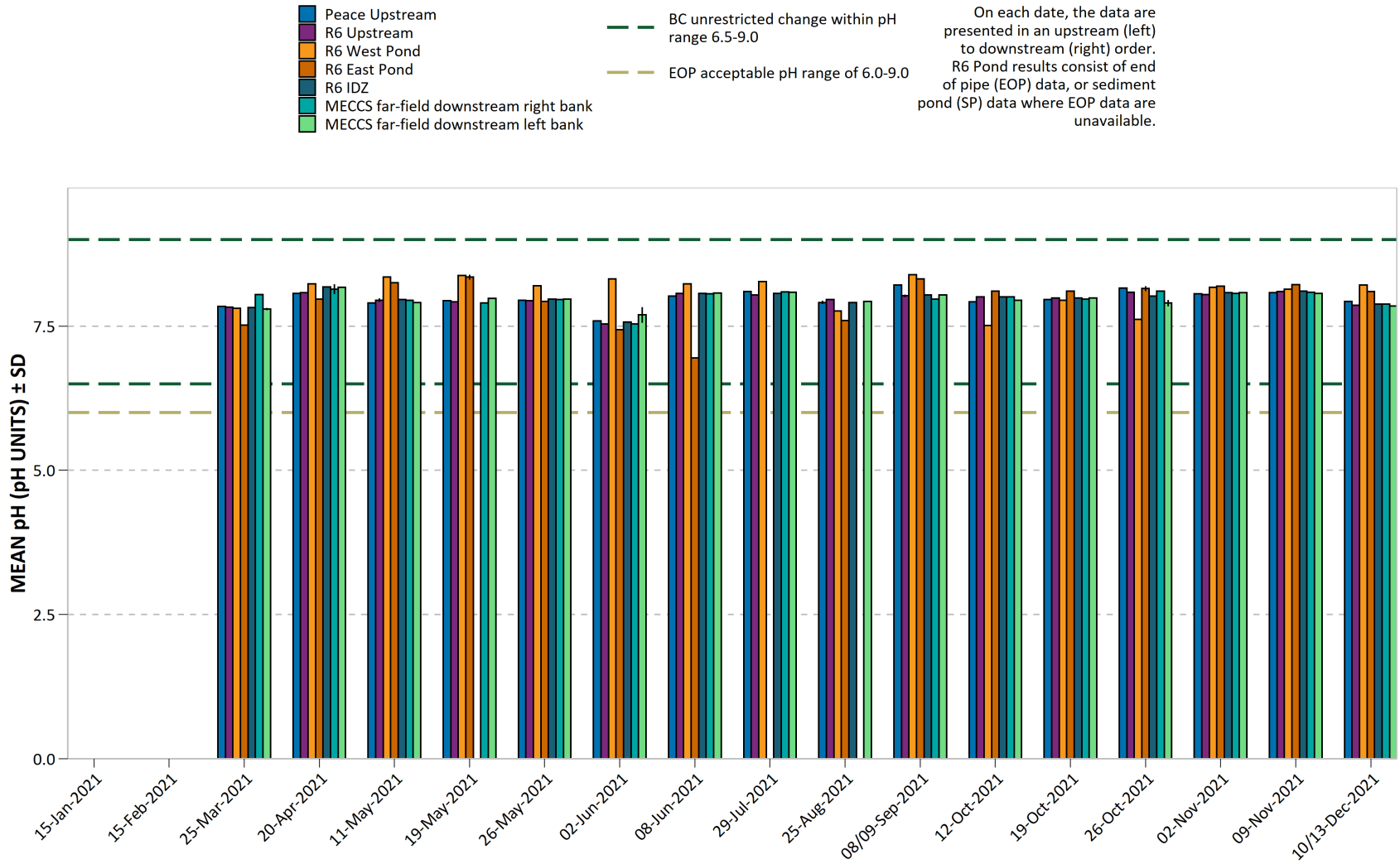


Figure 10. 2021 Peace River and RSEM R6 pond total alkalinity (as $CaCO_3$).

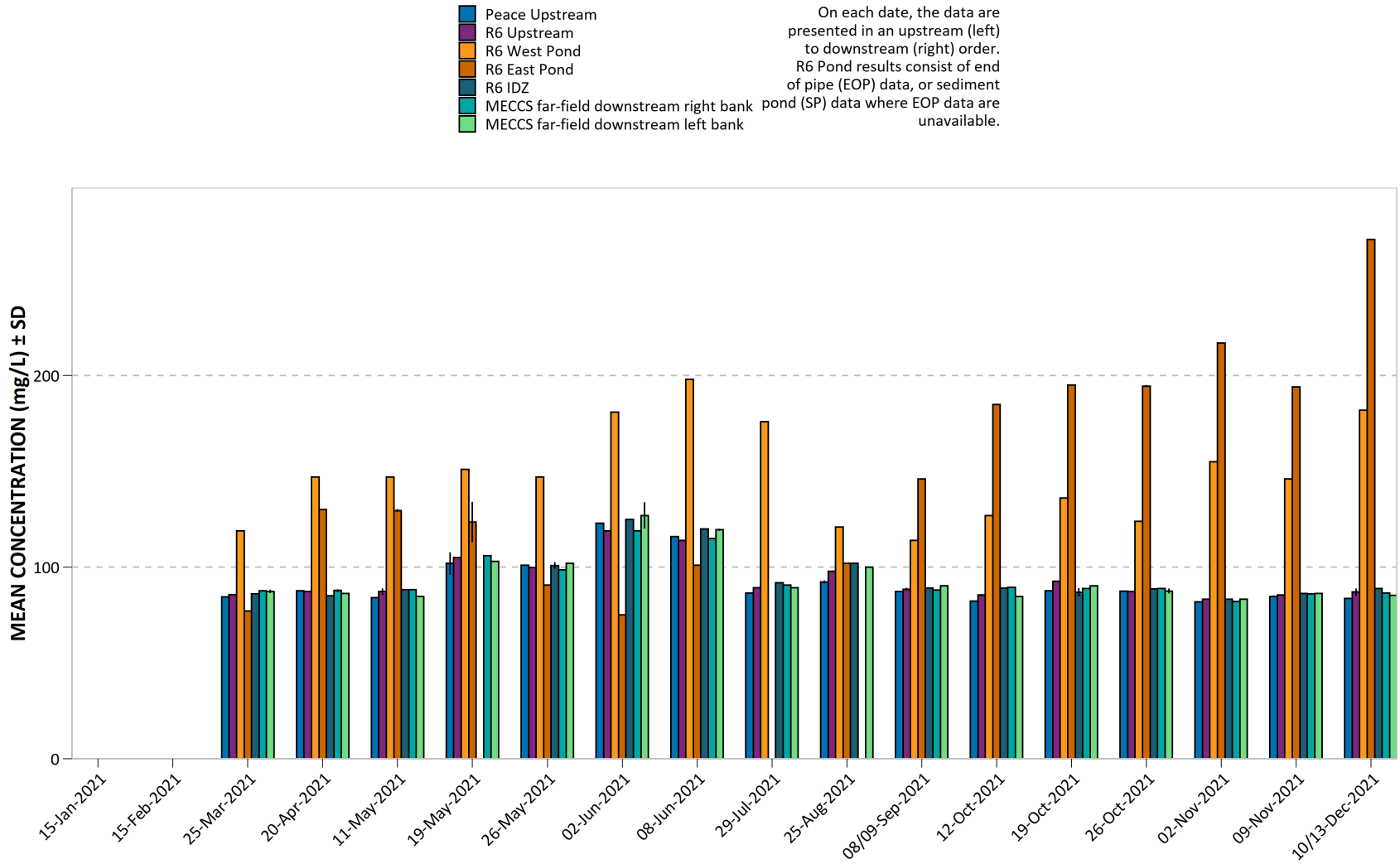


Figure 11. 2021 Peace River and RSEM R6 pond total ammonia (as N).

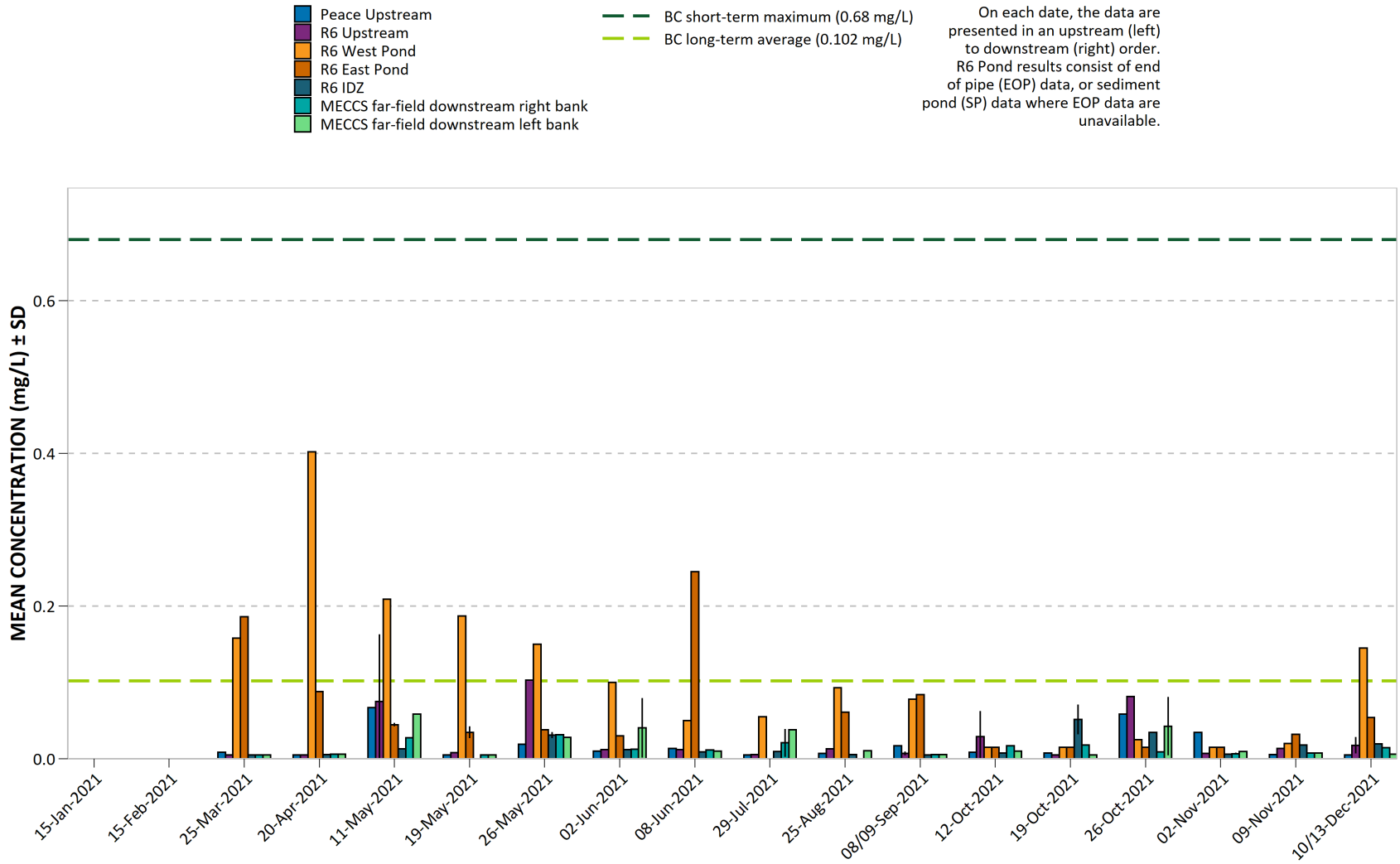


Figure 12. 2021 Peace River and RSEM R6 pond bromide (Br).

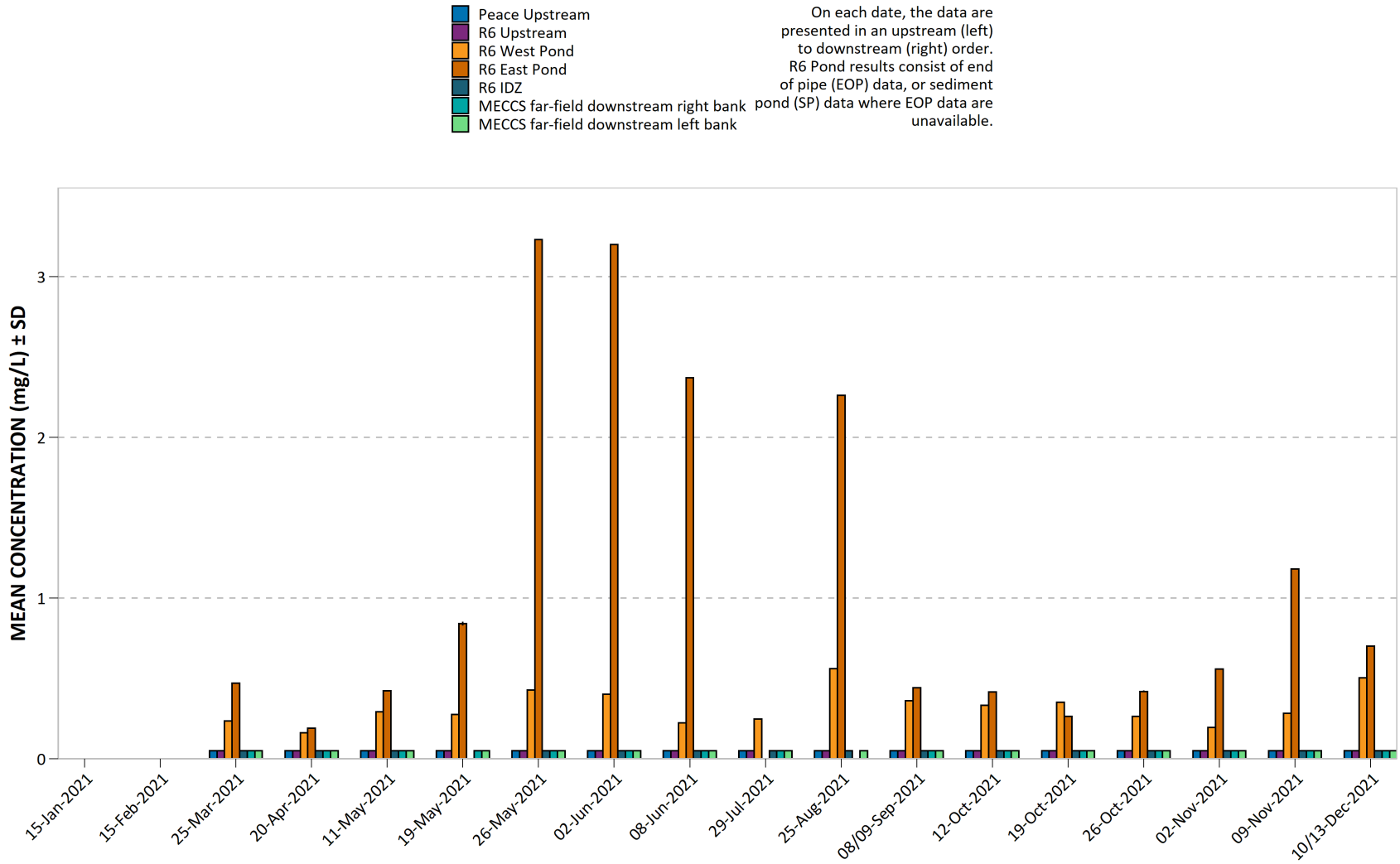


Figure 13. 2021 Peace River and RSEM R6 pond chloride (Cl).

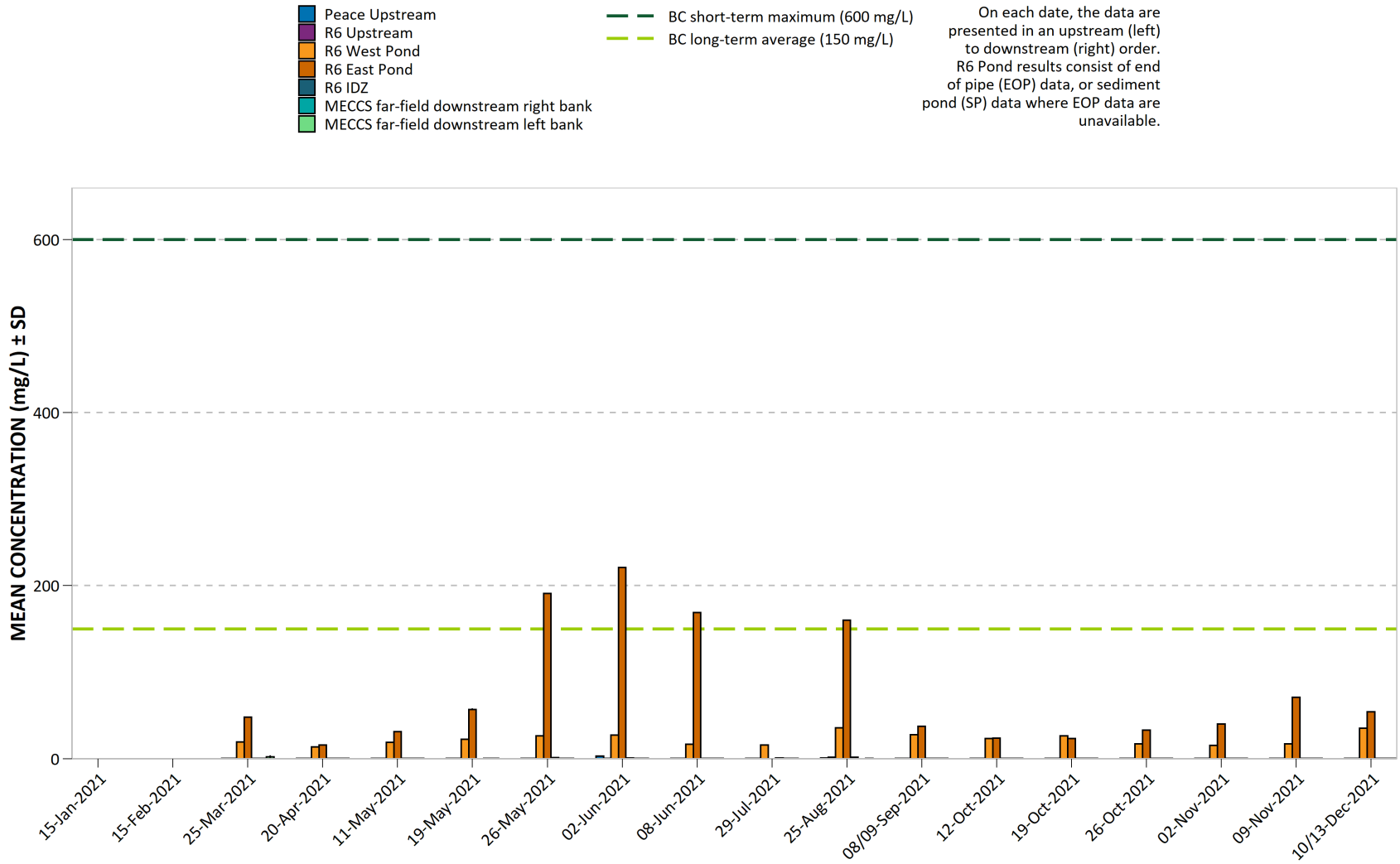


Figure 14. 2021 Peace River and RSEM R6 pond dissolved orthophosphate.

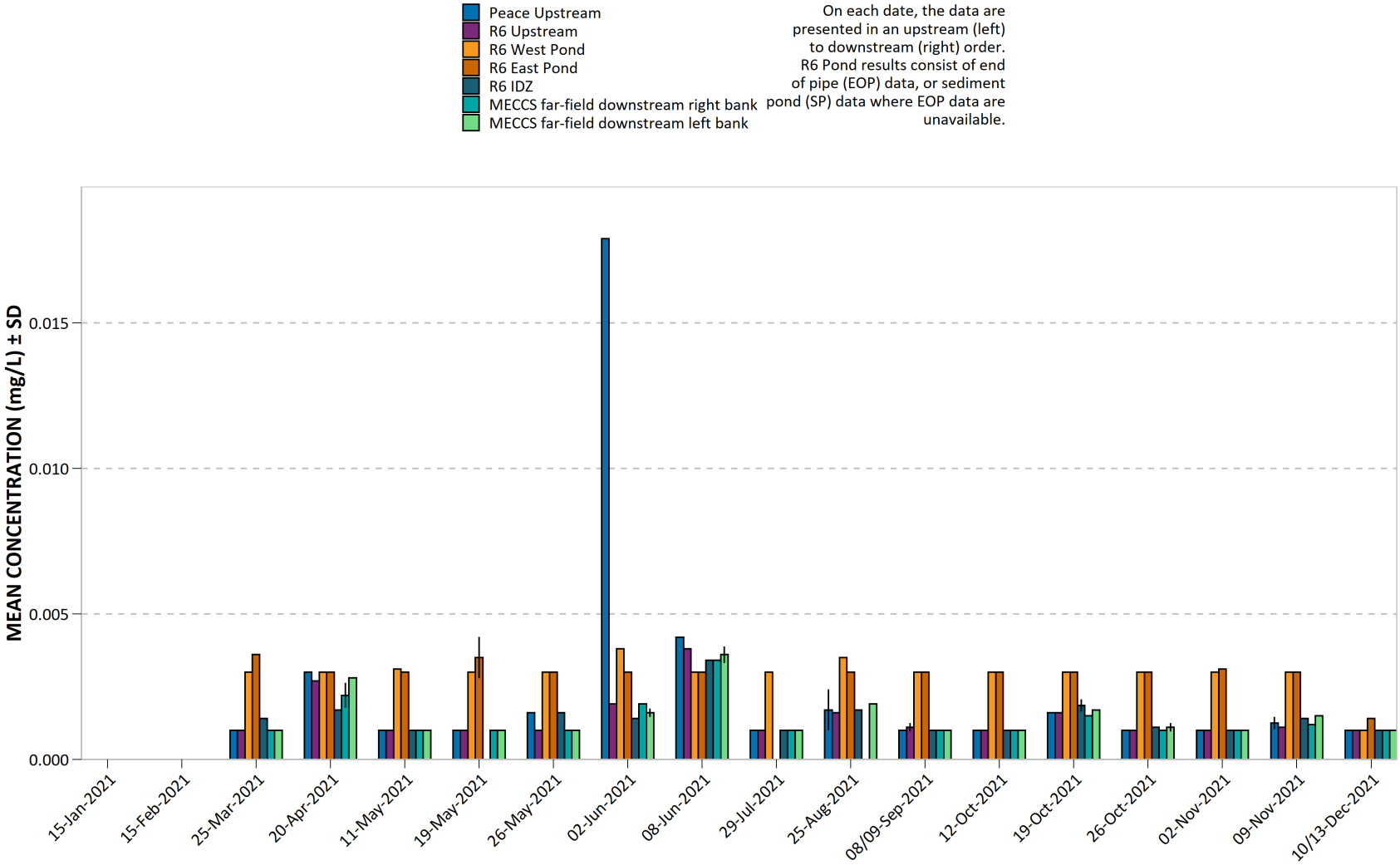


Figure 15. 2021 Peace River and RSEM R6 pond fluoride (F).

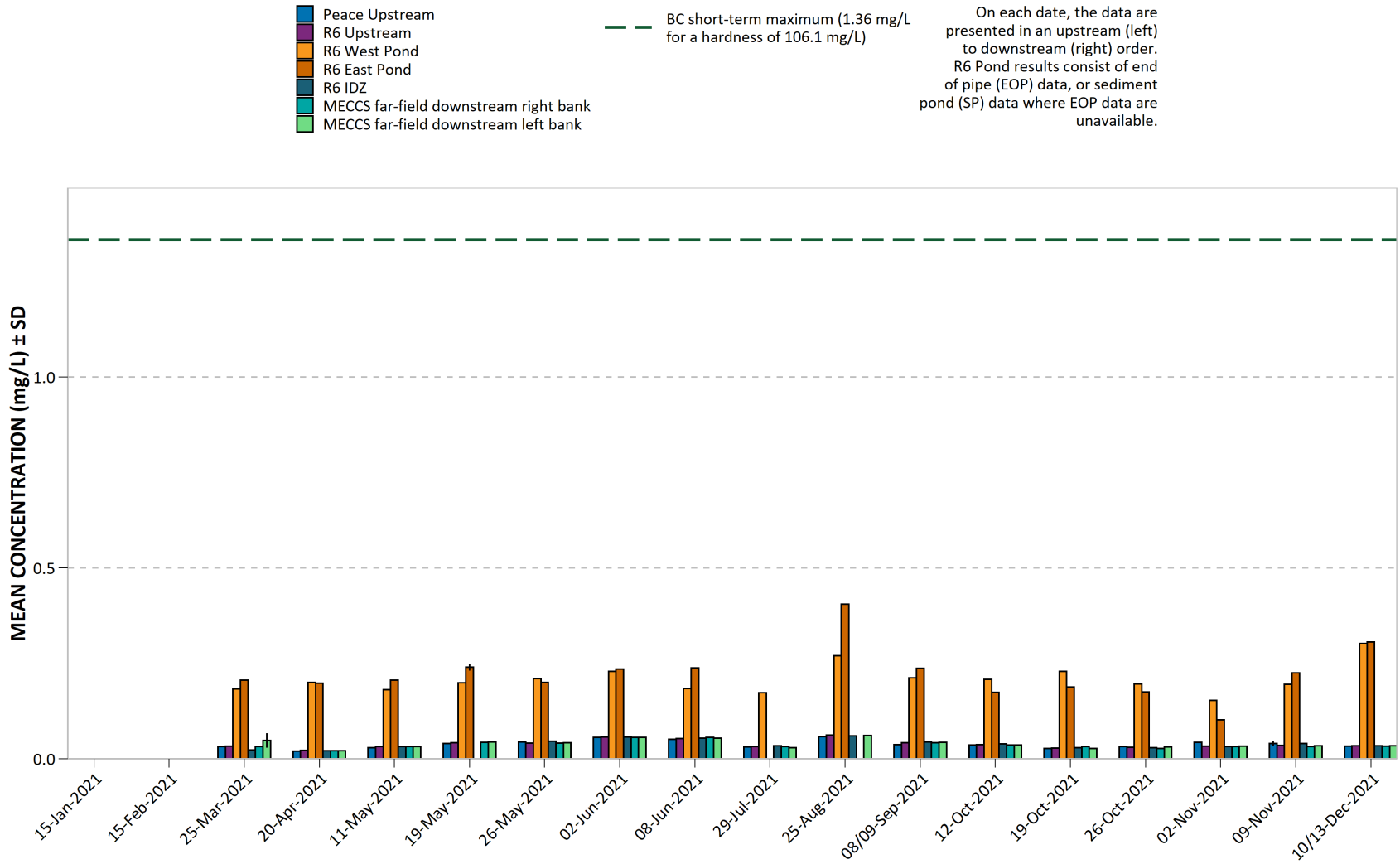


Figure 16. 2021 Peace River and RSEM R6 pond nitrate (as N).

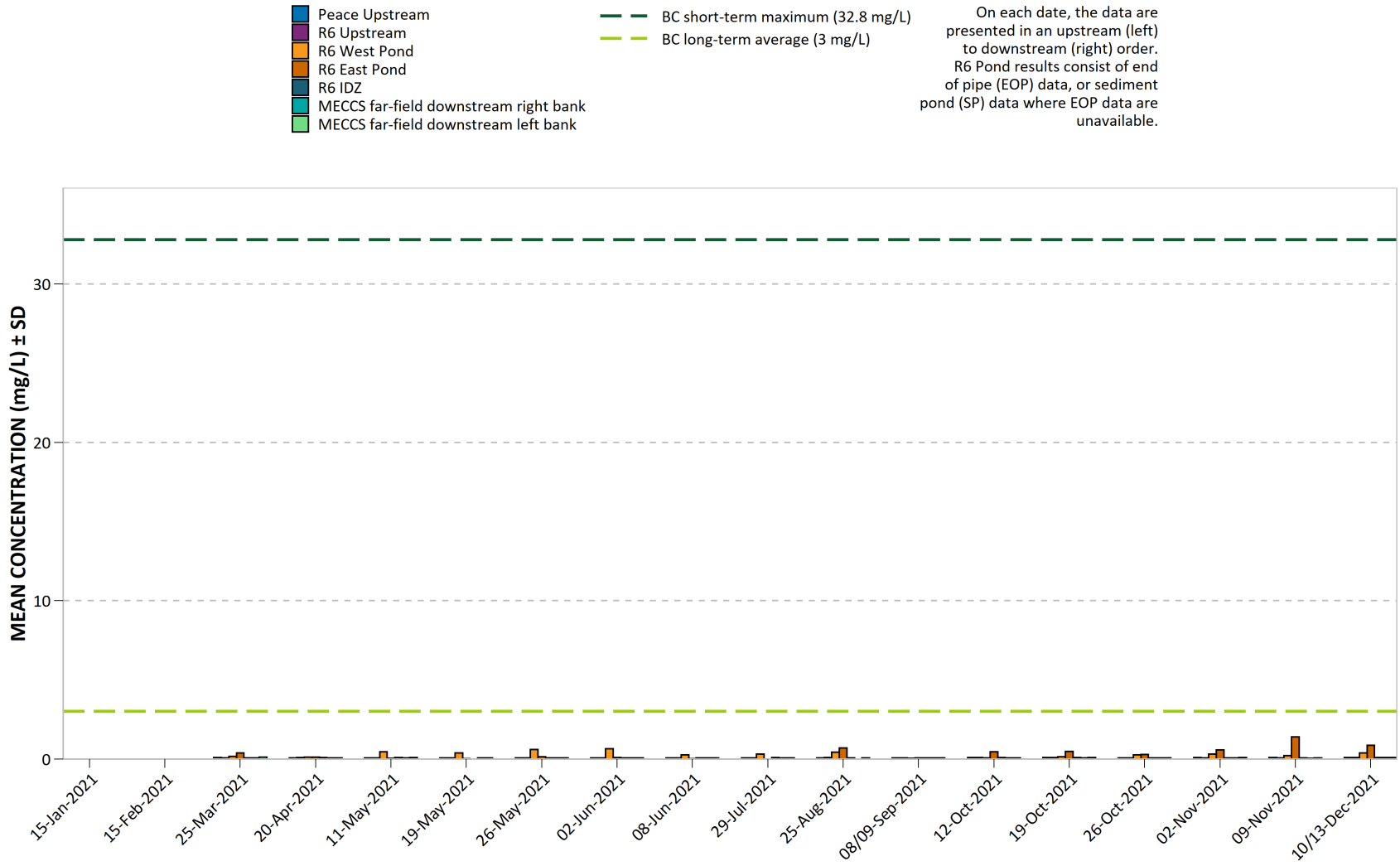
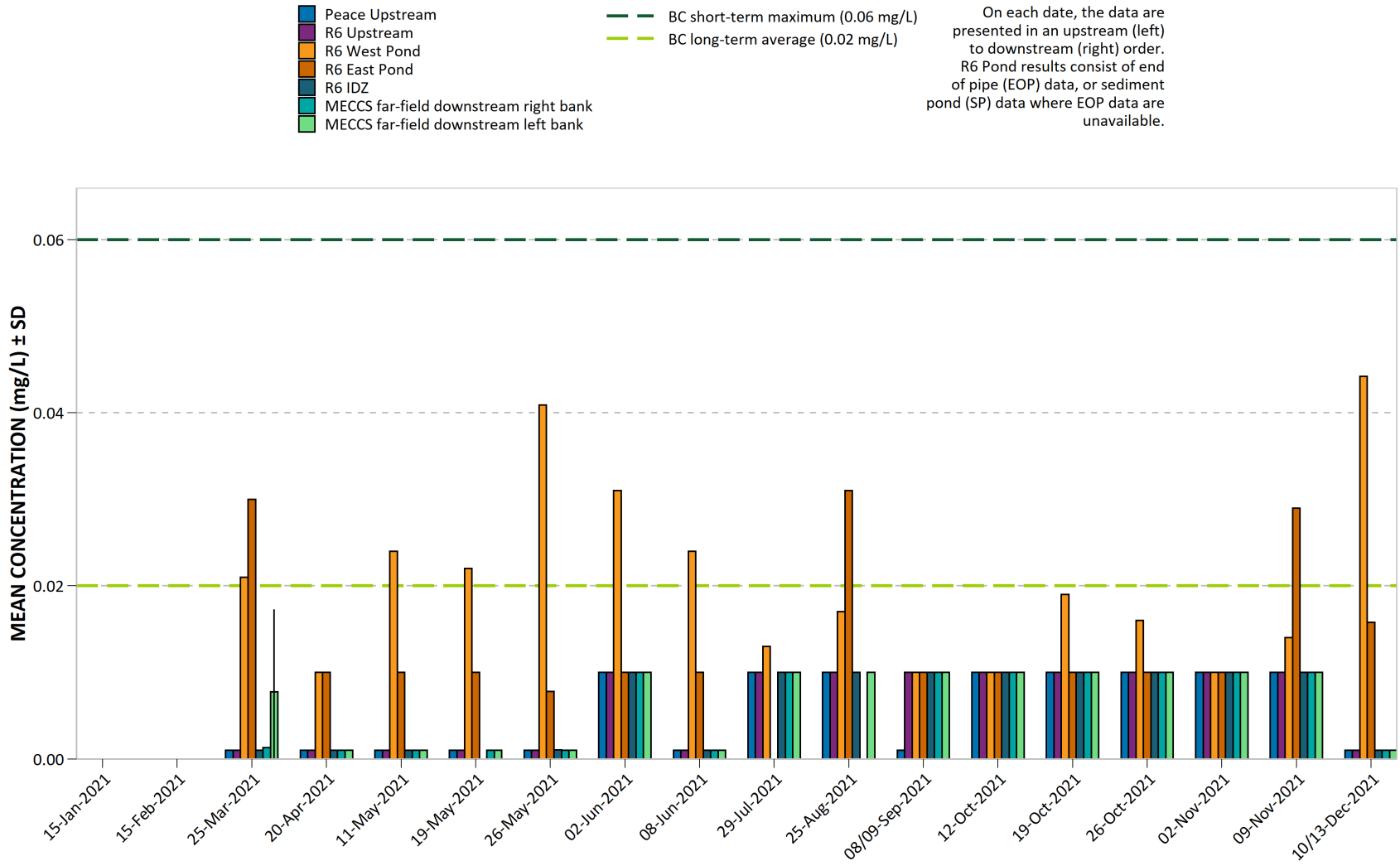


Figure 17. 2021 Peace River and RSEM R6 pond nitrite (as N).



Note: BC WQG for nitrite are chloride dependent, and therefore guidelines depicted in the plot are applicable for Peace River sites only. Based on the range of chloride values observed in the Peace River, the applicable BC Maximum and 30-day guidelines are 0.06 mg/L and 0.02 mg/L, respectively.

Figure 18. 2021 Peace River and RSEM R6 pond sulfate (SO_4).

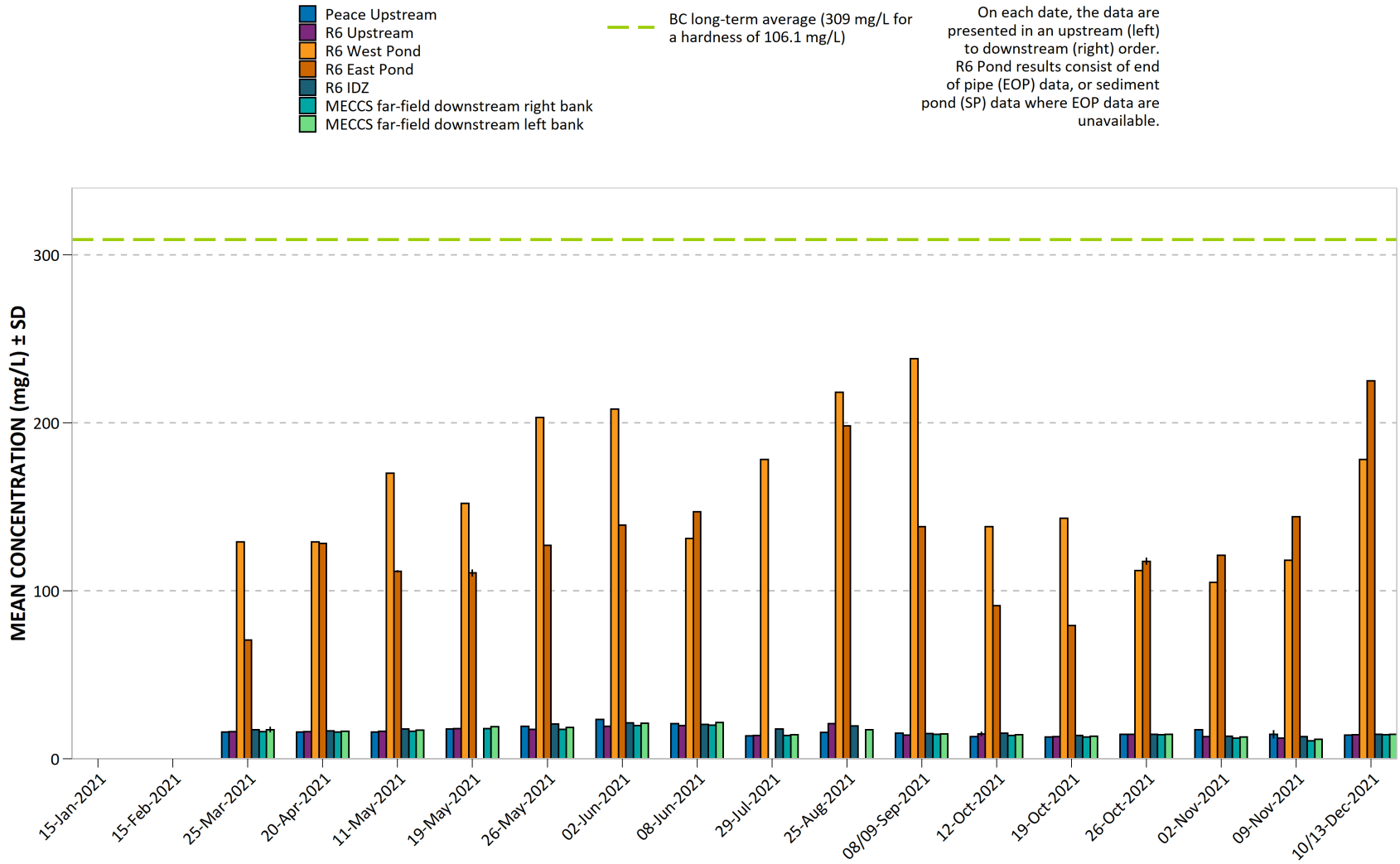


Figure 19. 2021 Peace River and RSEM R6 pond dissolved organic carbon (DOC).

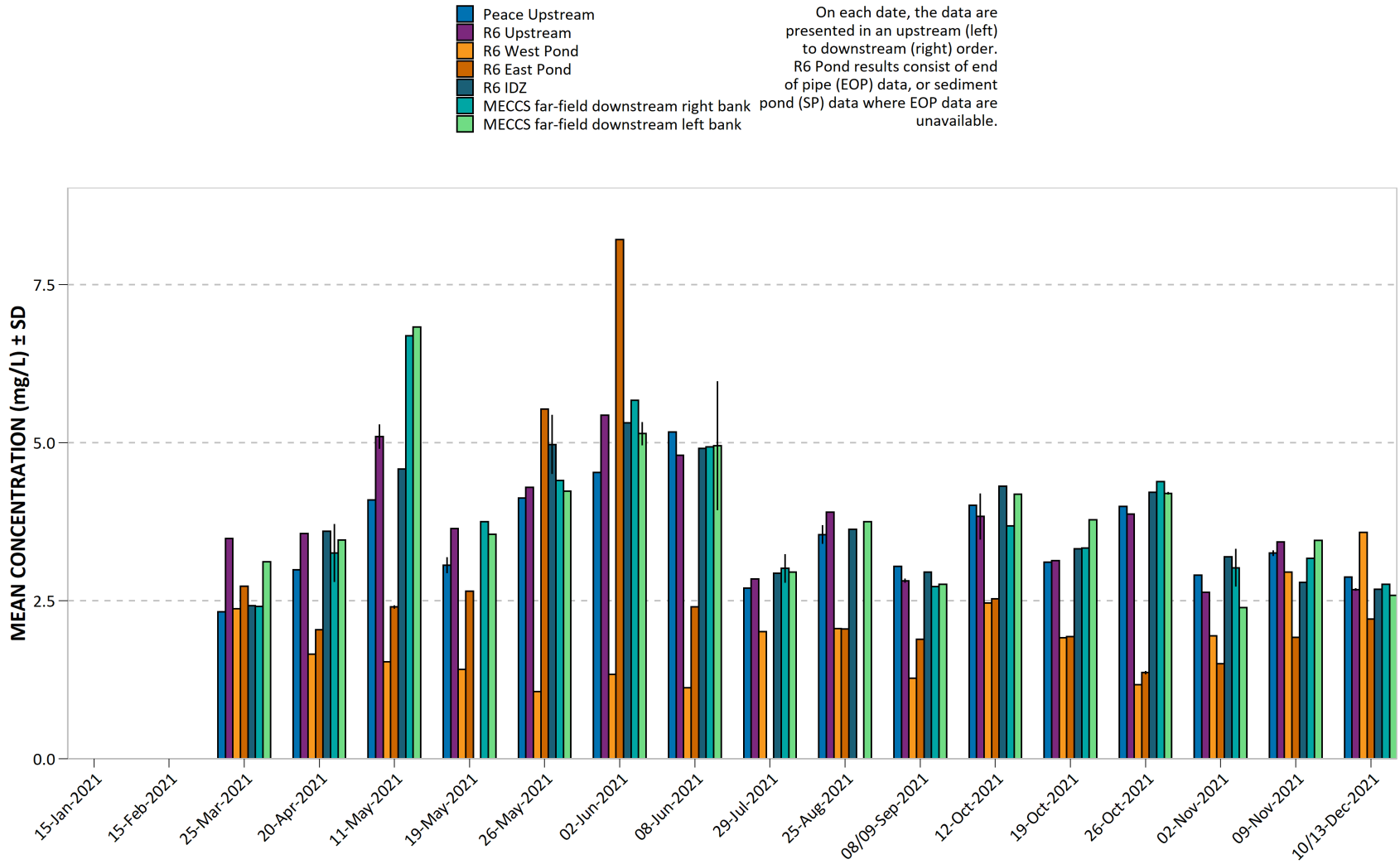


Figure 20. 2021 Peace River and RSEM R6 pond total organic carbon (TOC).

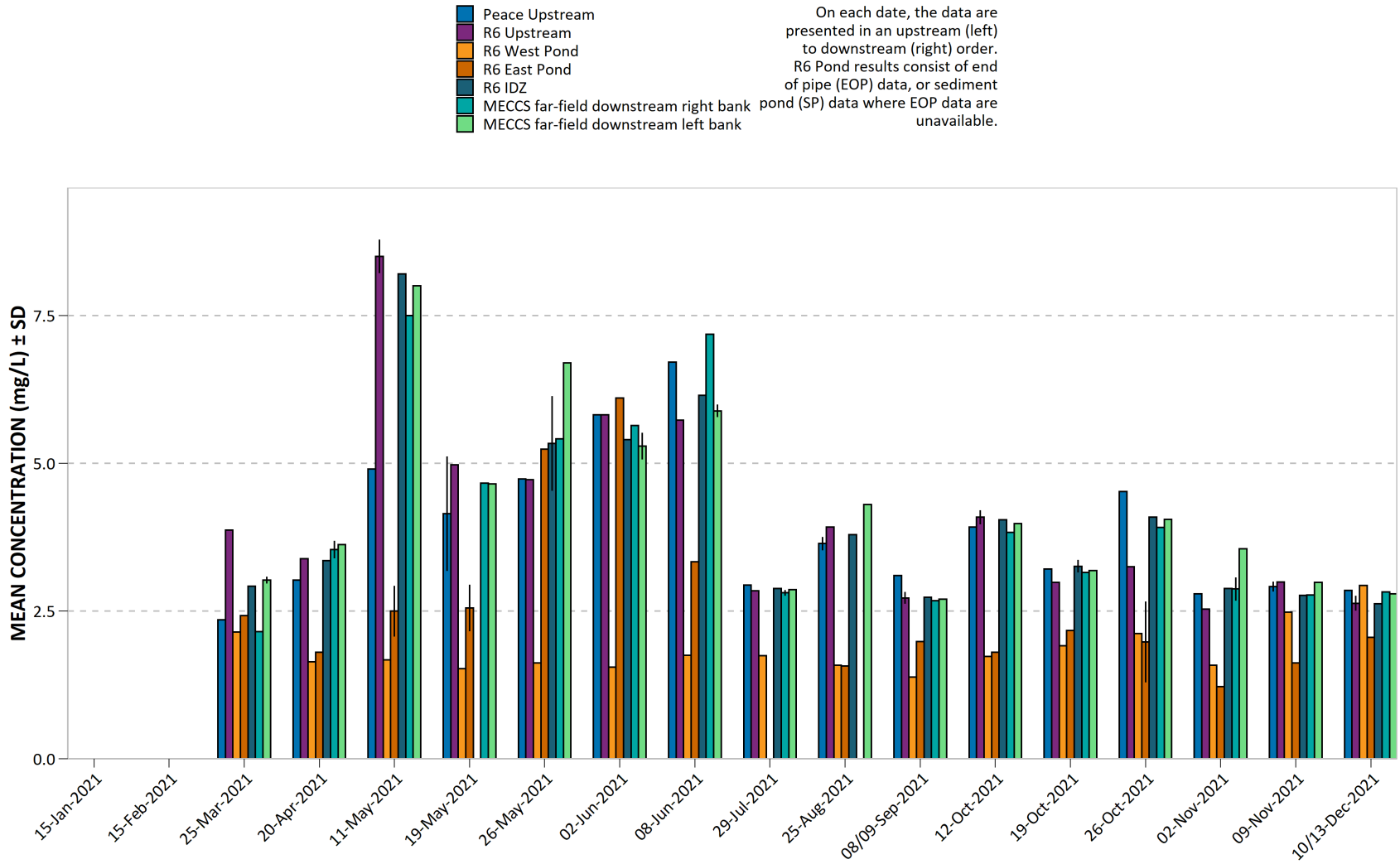


Figure 21. 2021 Peace River and RSEM R6 pond total aluminum (Al).

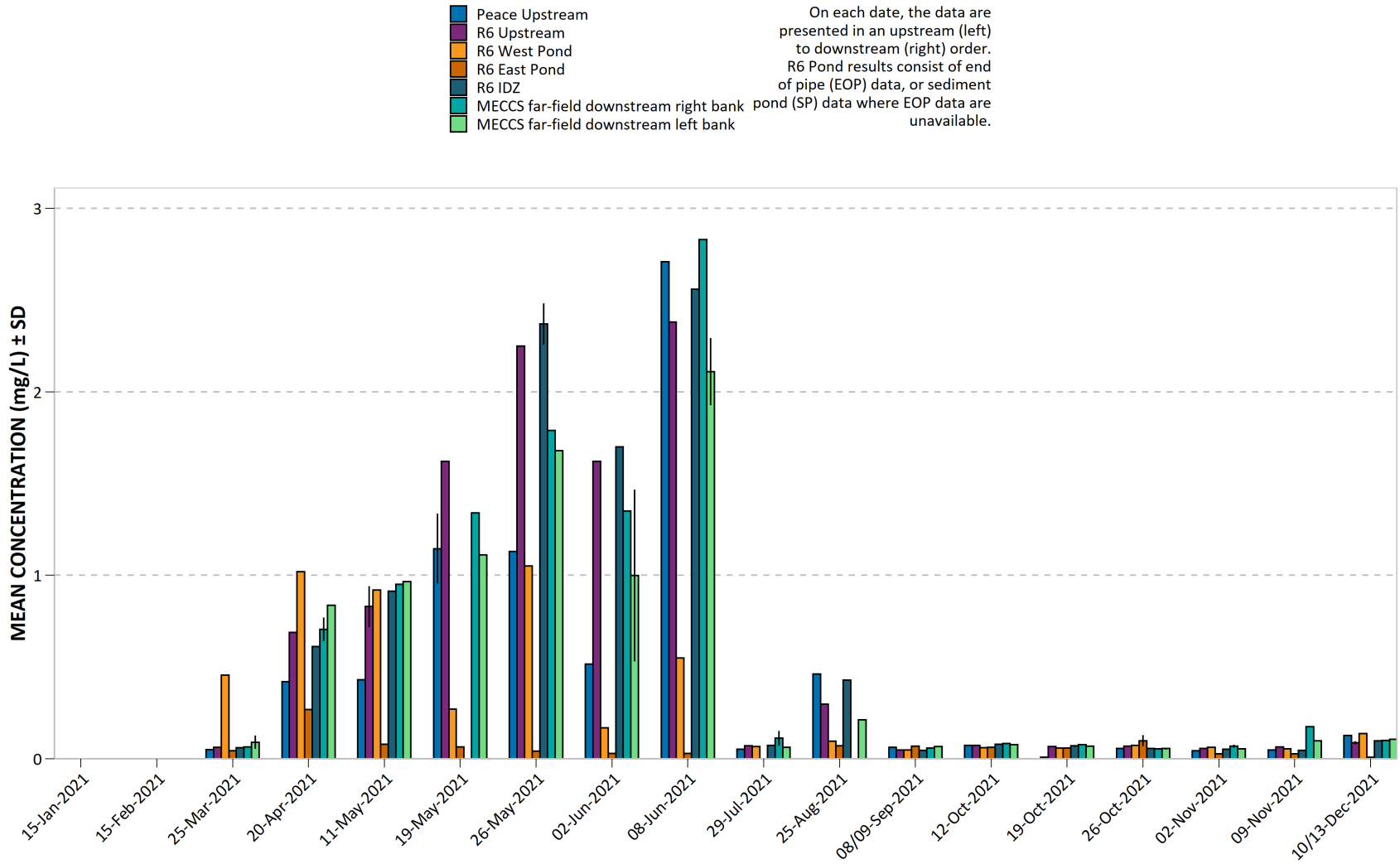


Figure 22. 2021 Peace River and RSEM R6 pond total antimony (Sb).

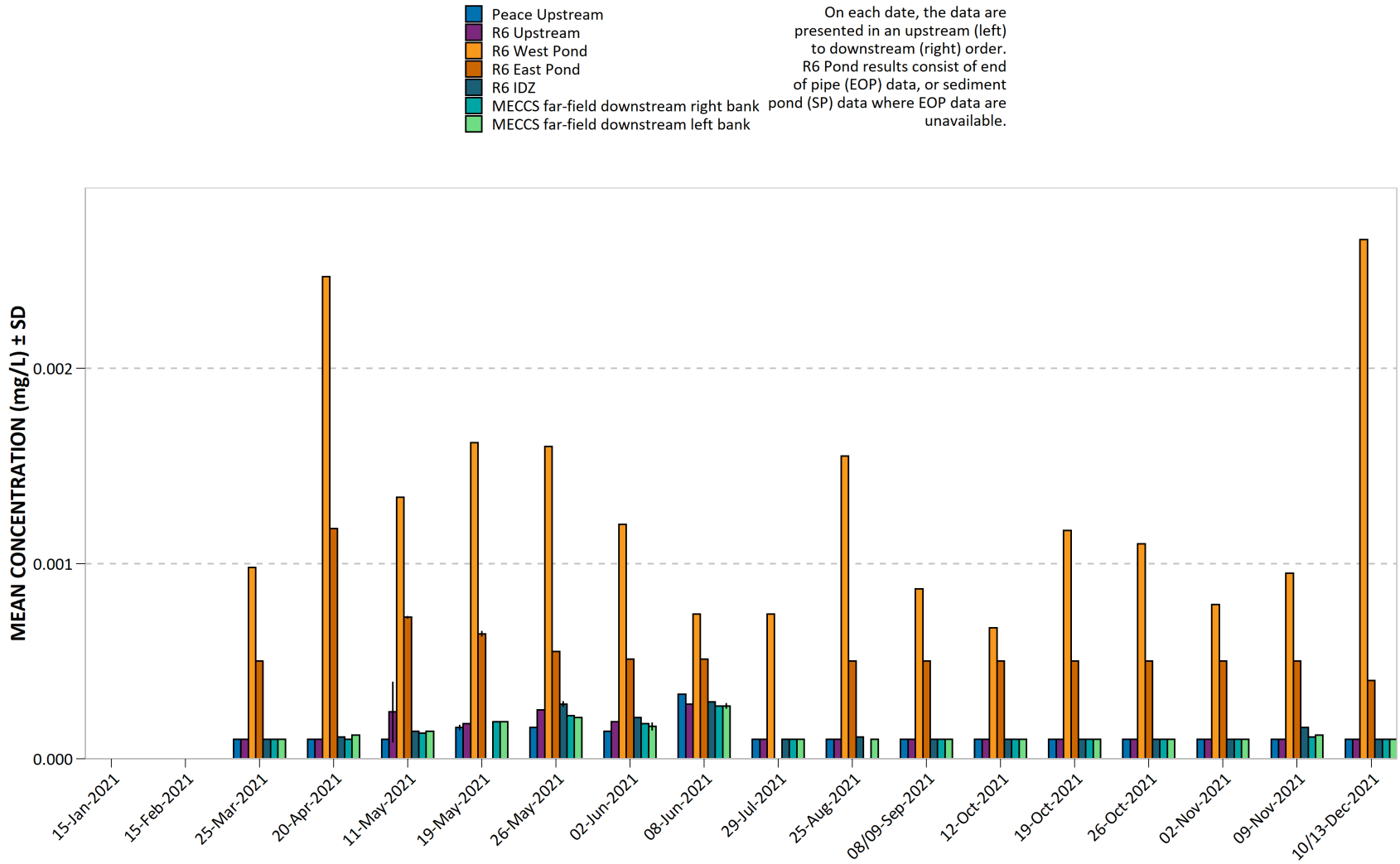


Figure 23. 2021 Peace River and RSEM R6 pond total arsenic (As).

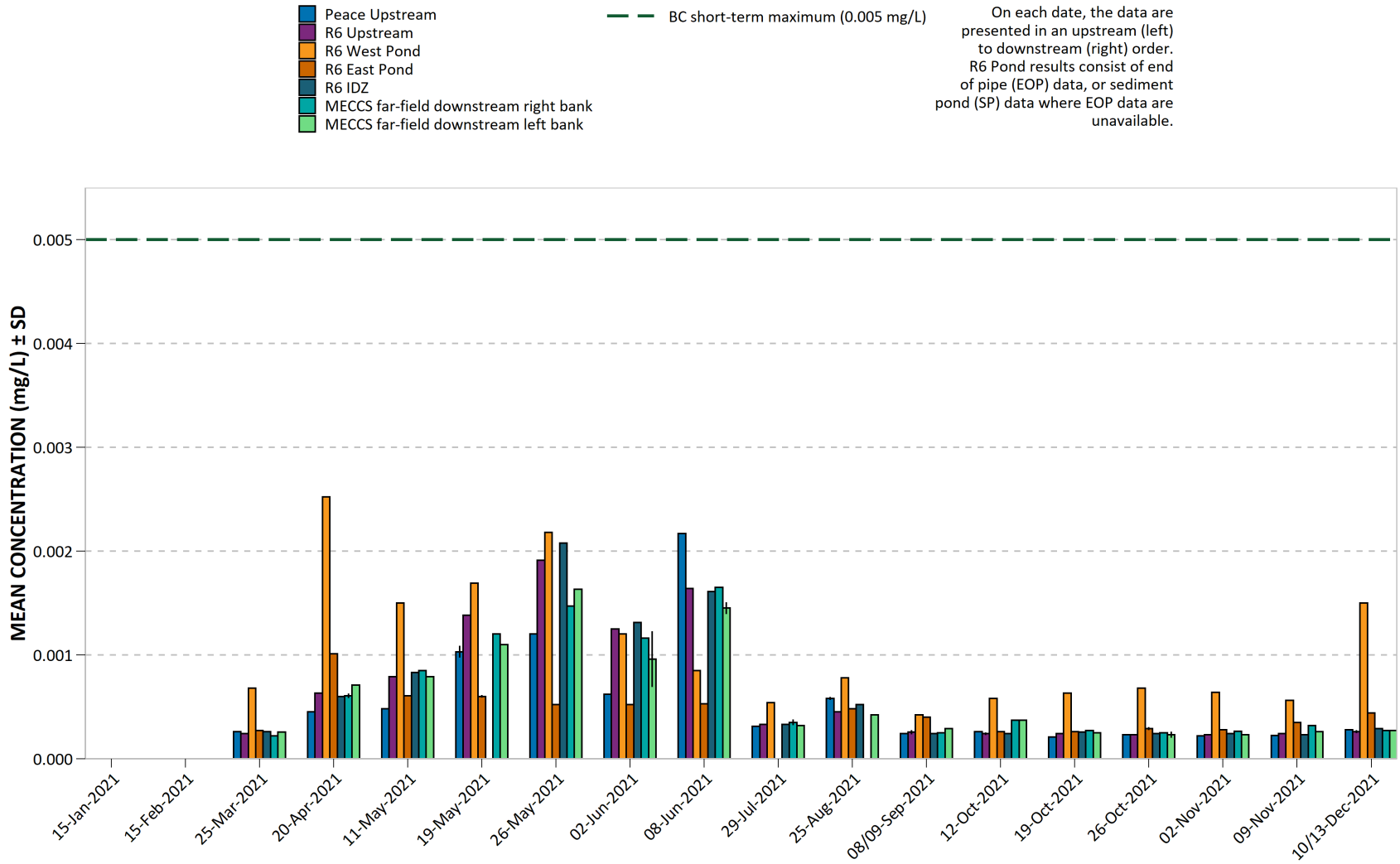


Figure 24. 2021 Peace River and RSEM R6 pond total barium (Ba).

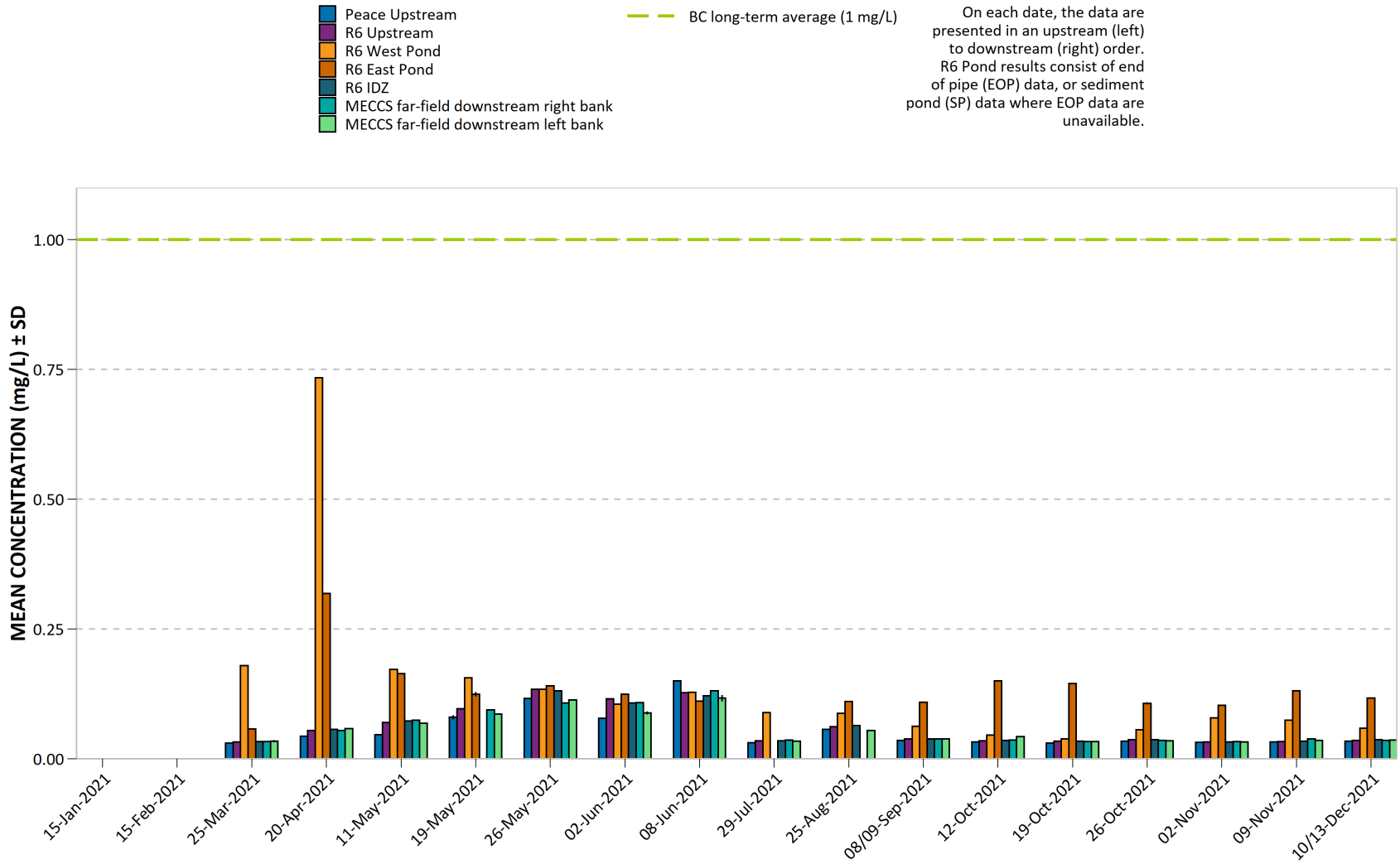


Figure 25. 2021 Peace River and RSEM R6 pond total beryllium (Be).

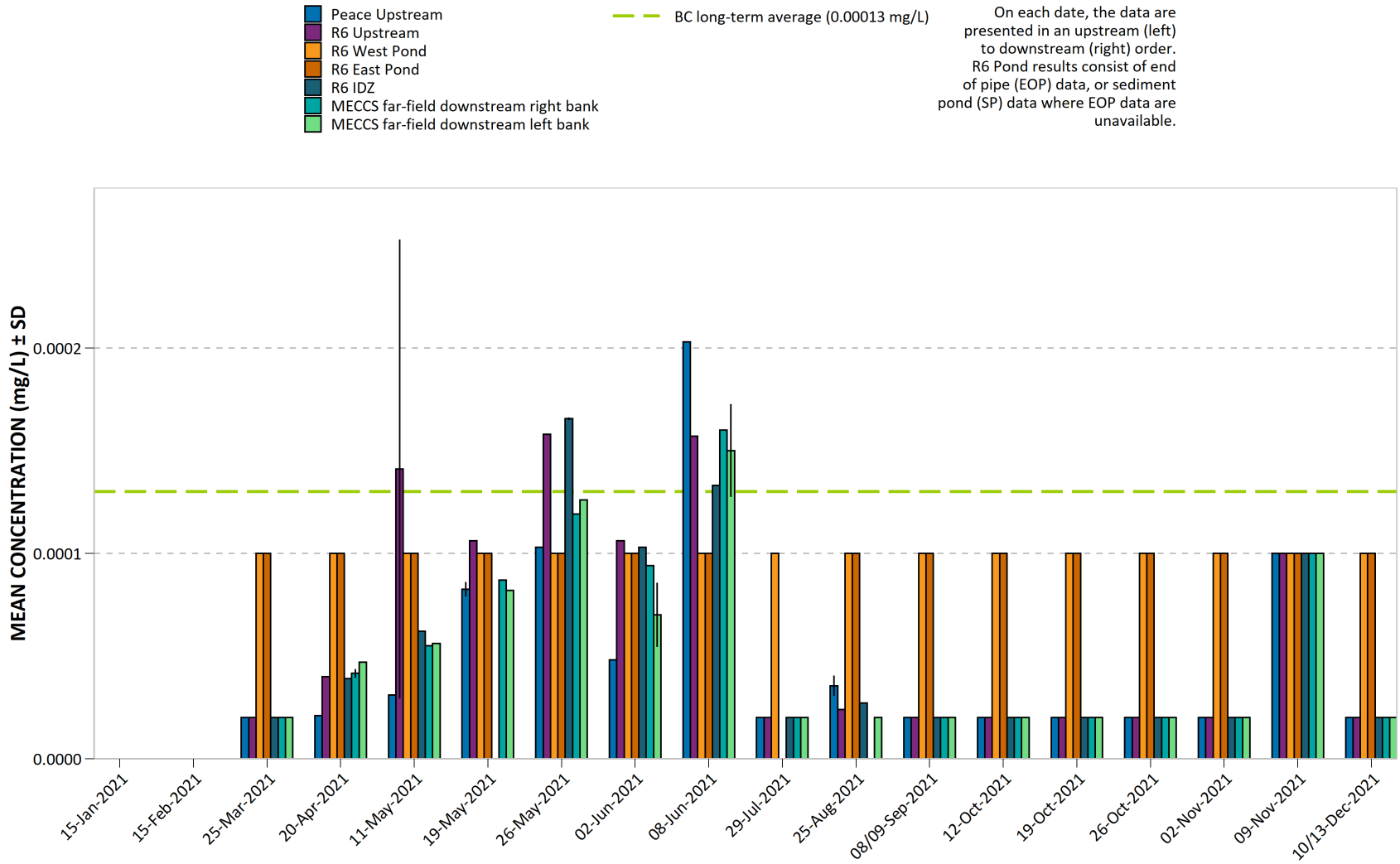


Figure 26. 2021 Peace River and RSEM R6 pond total bismuth (Bi).

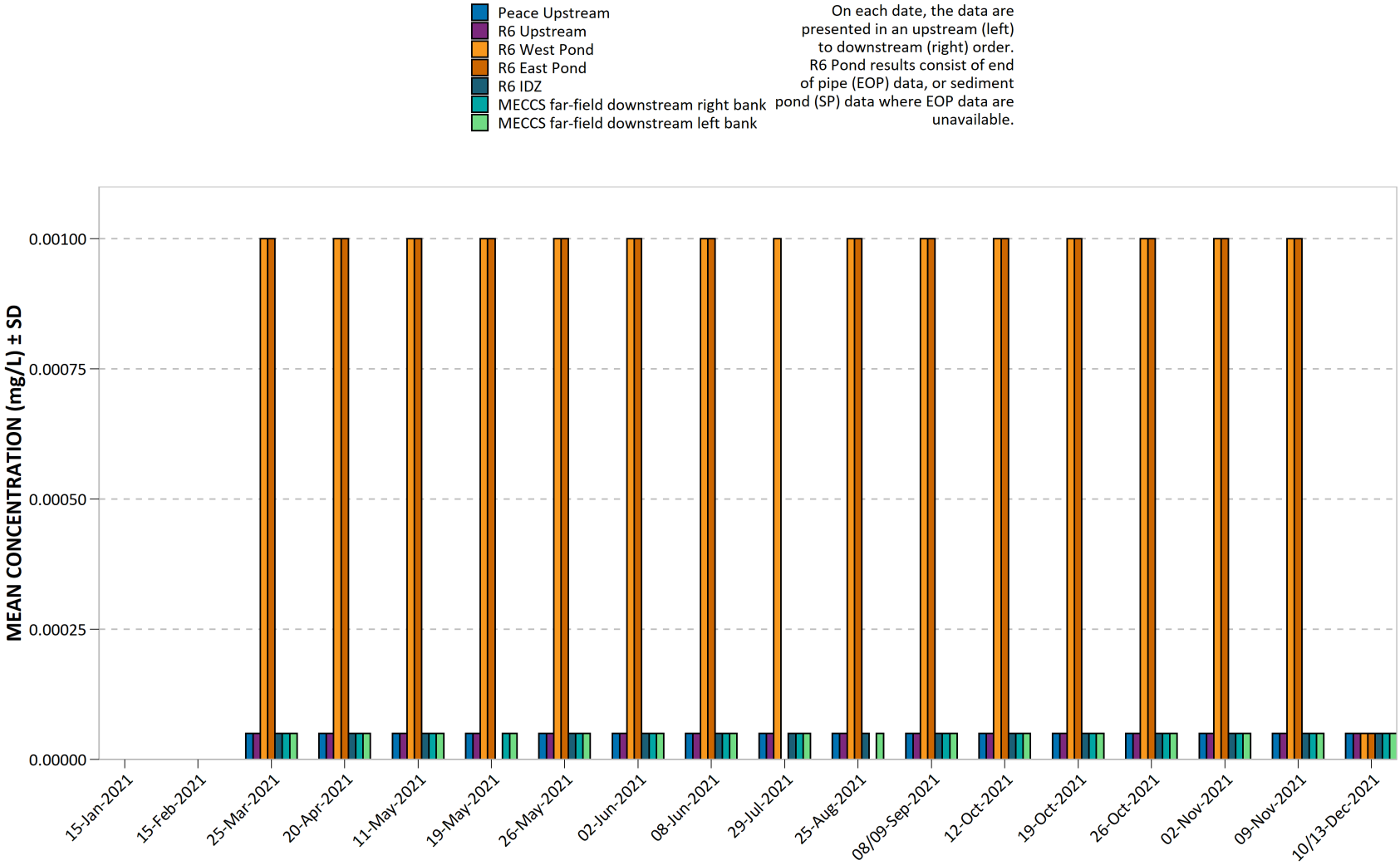


Figure 27. 2021 Peace River and RSEM R6 pond total boron (B).

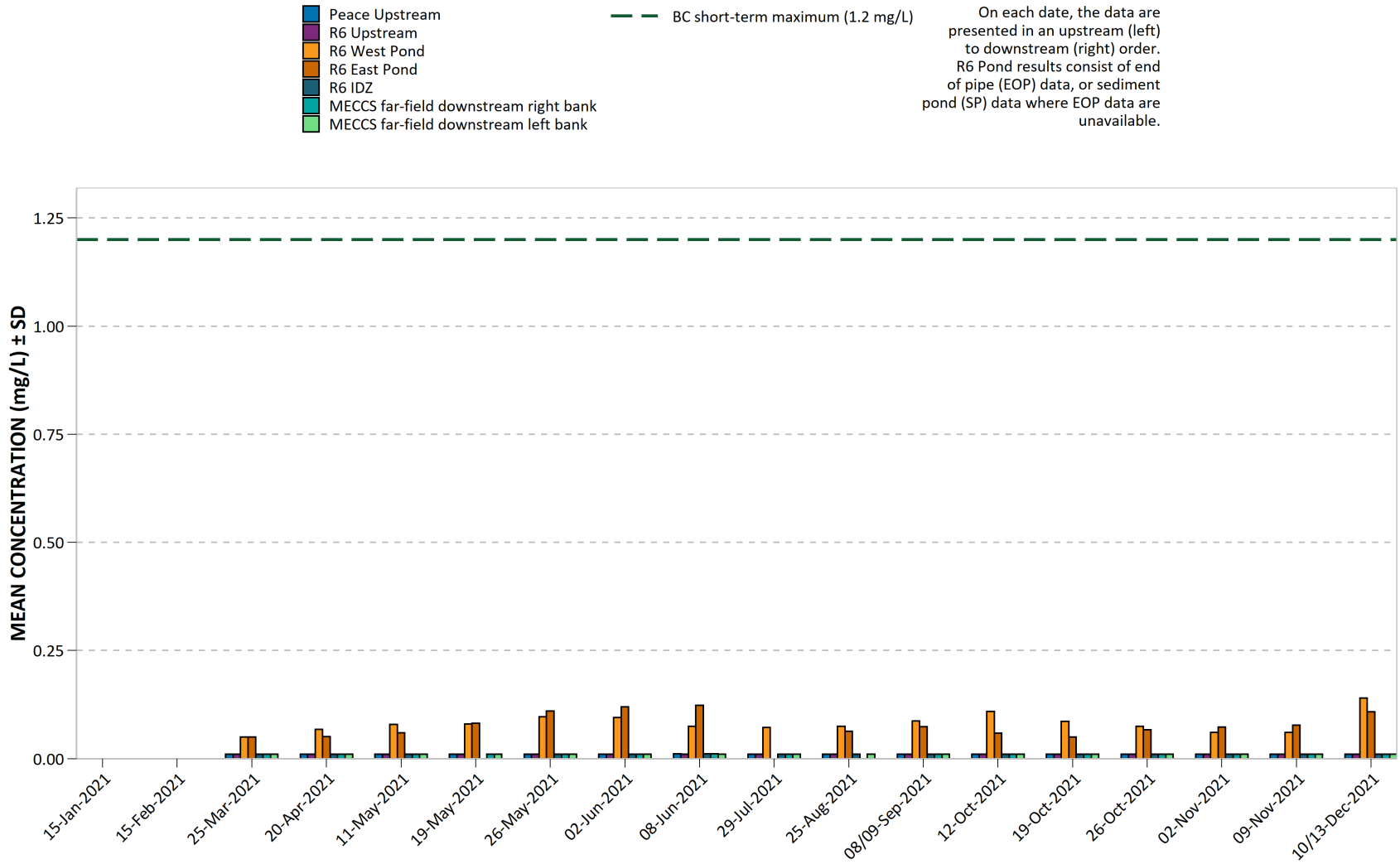


Figure 28. 2021 Peace River and RSEM R6 pond total cadmium (Cd).

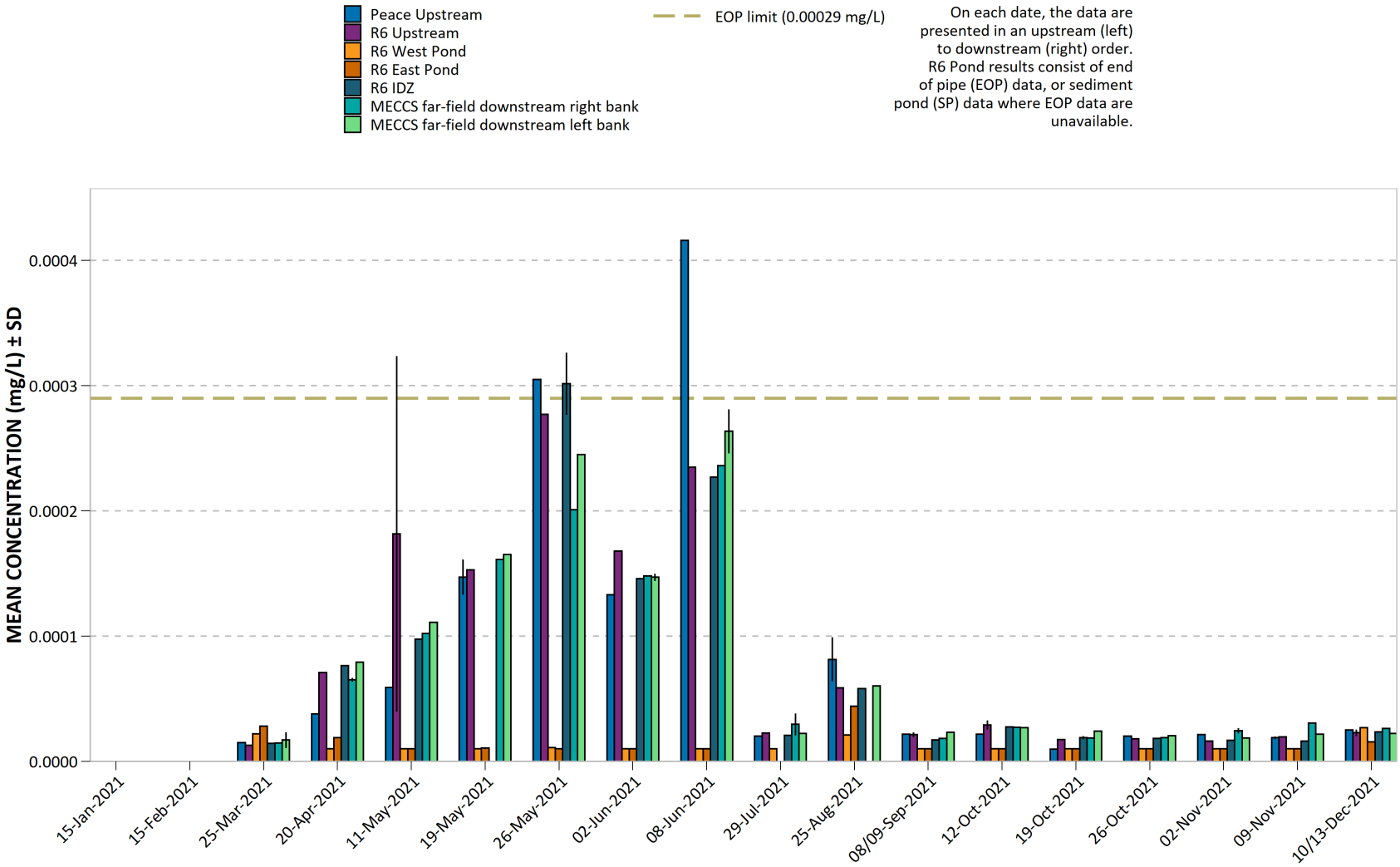


Figure 29. 2021 Peace River and RSEM R6 pond total calcium (Ca).

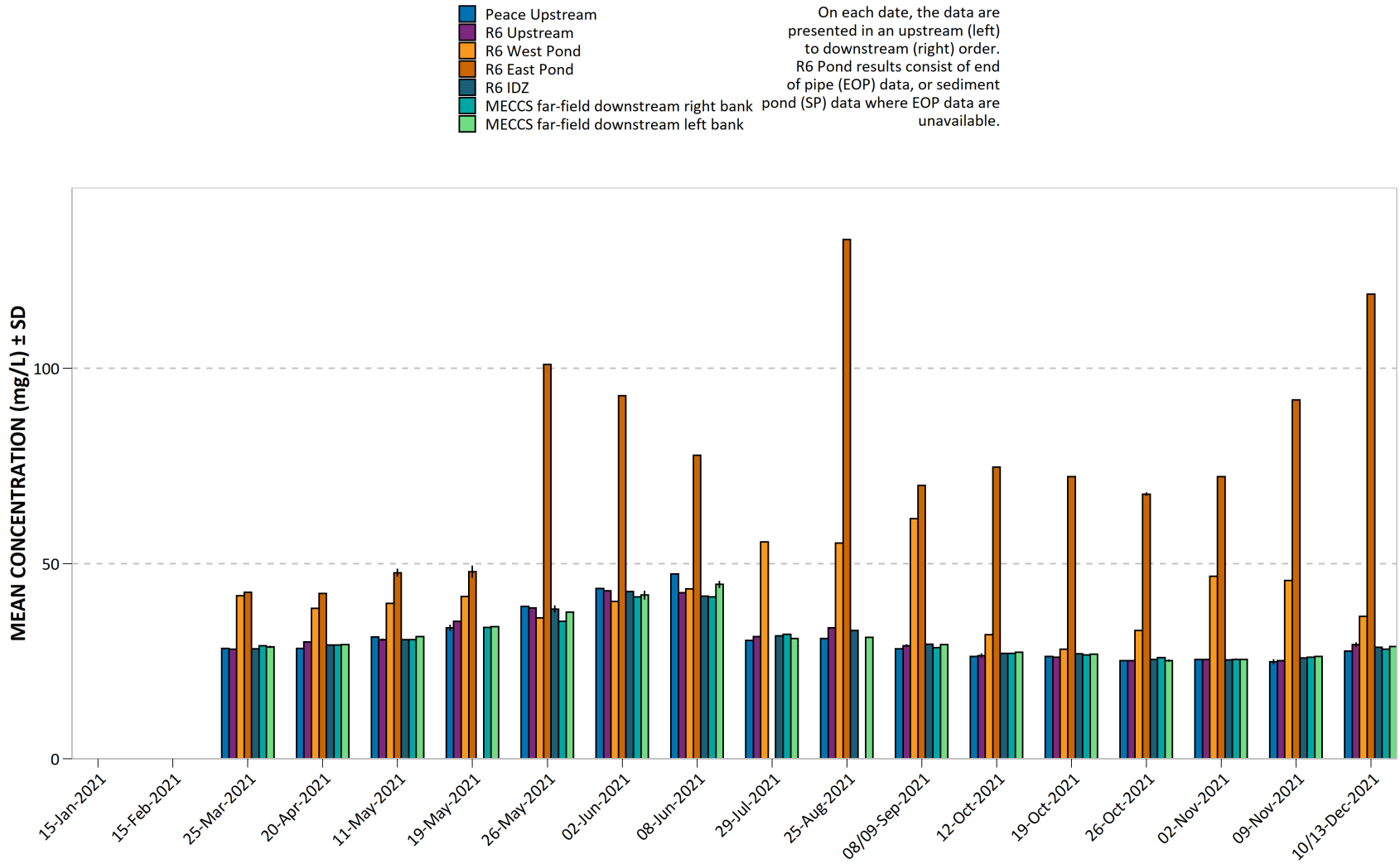


Figure 30. 2021 Peace River and RSEM R6 pond total chromium (Cr).

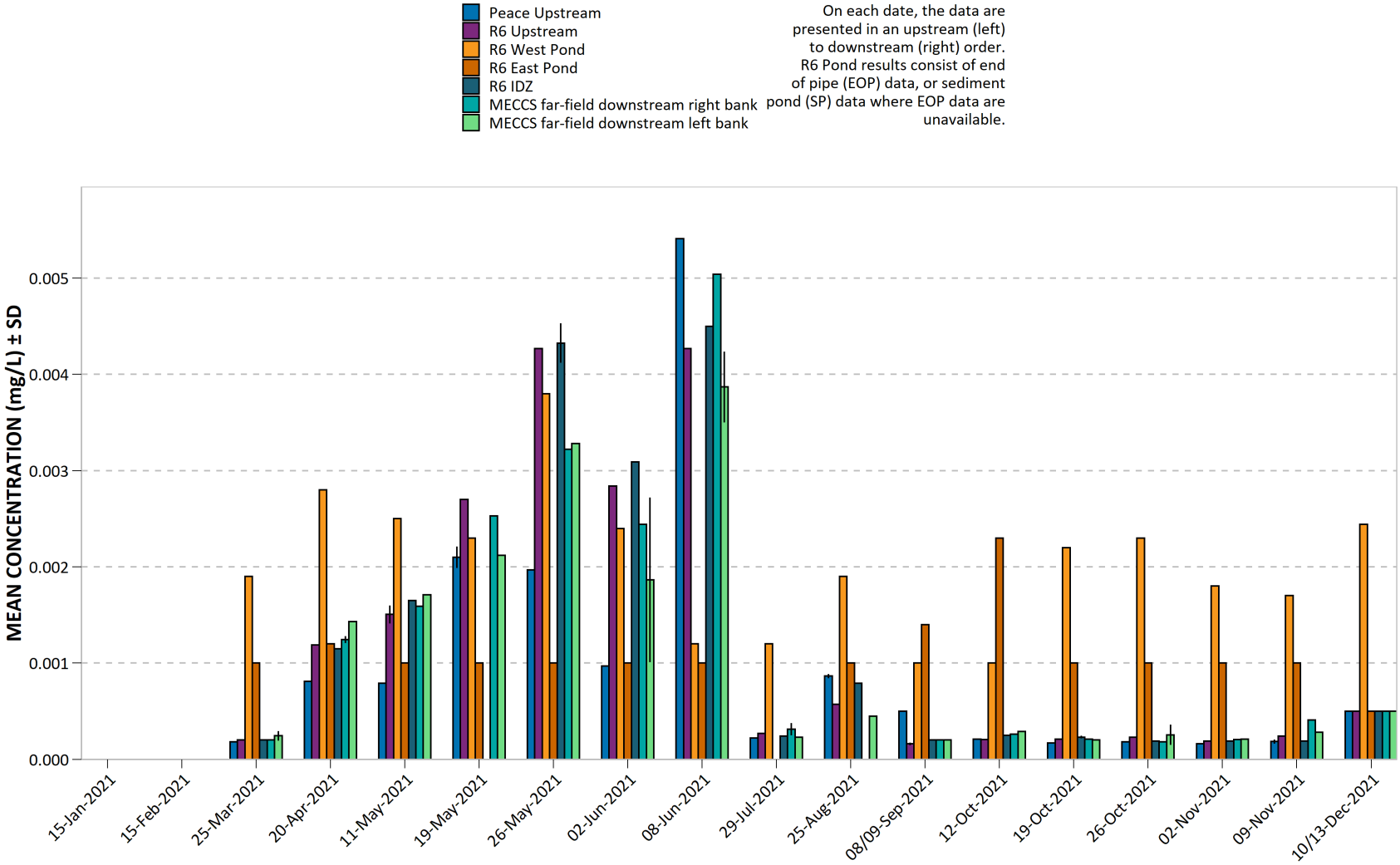


Figure 31. 2021 Peace River and RSEM R6 pond total cobalt (Co).

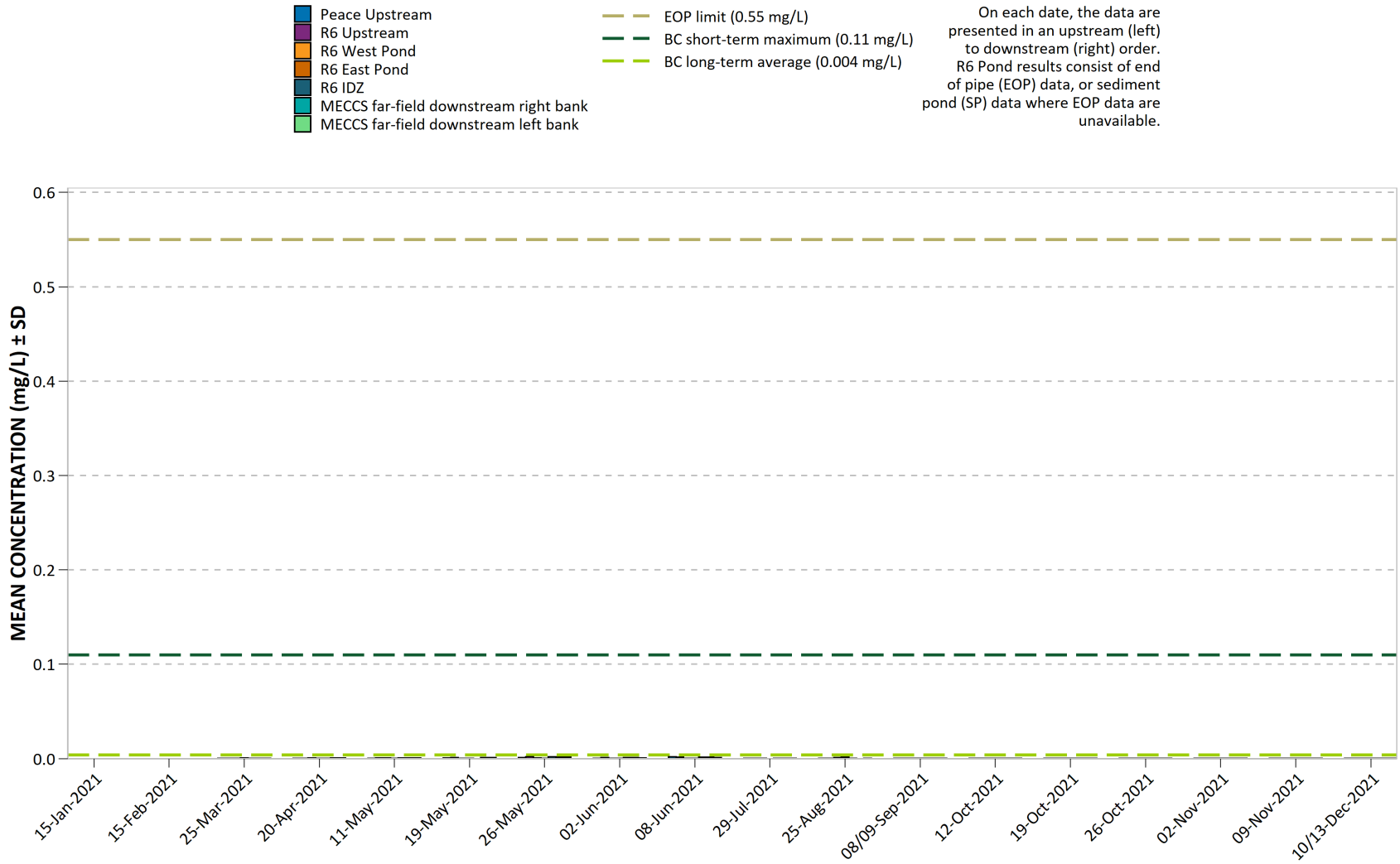


Figure 32. 2021 Peace River and RSEM R6 pond total copper (Cu).

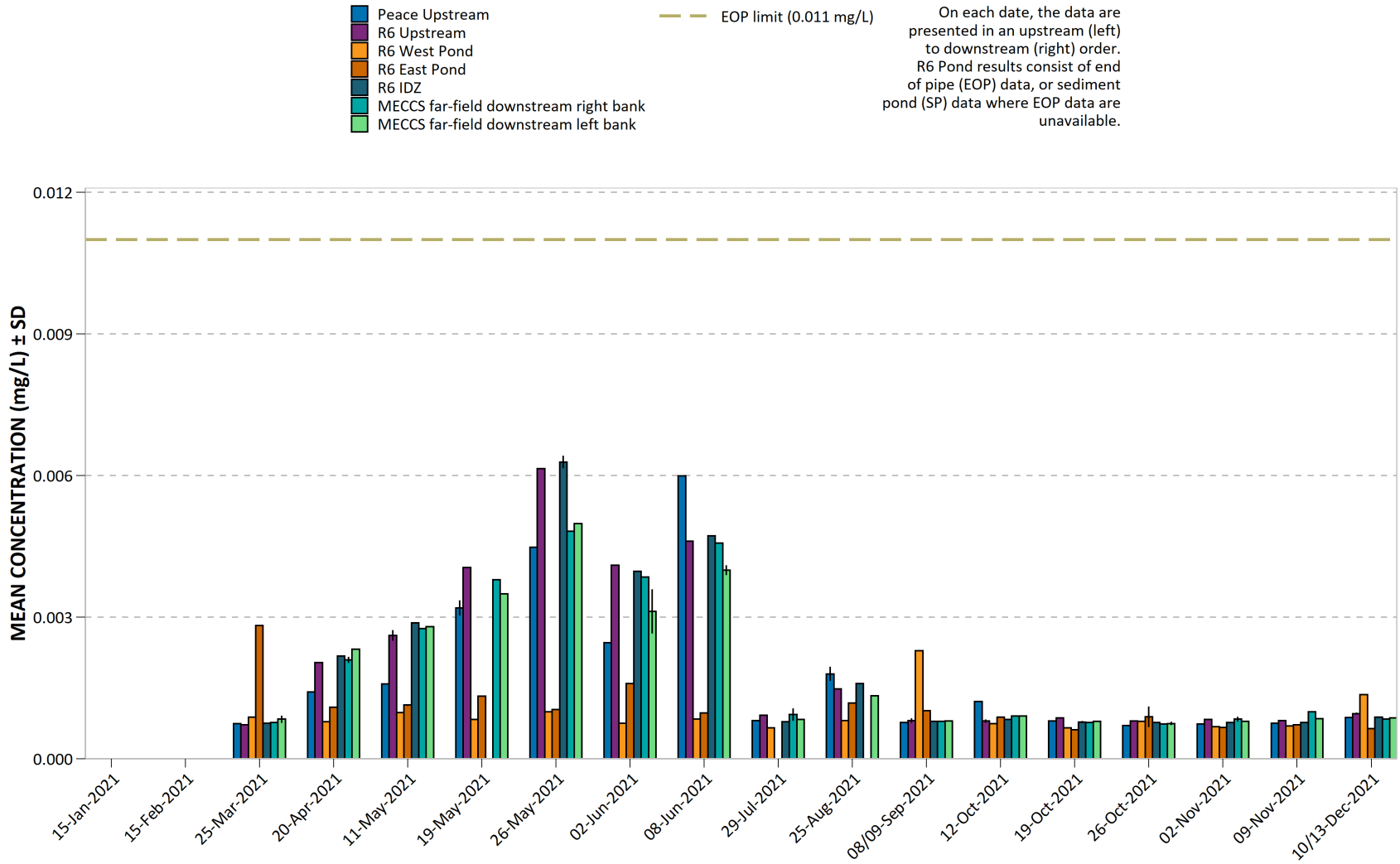


Figure 33. 2021 Peace River and RSEM R6 pond total iron (Fe).

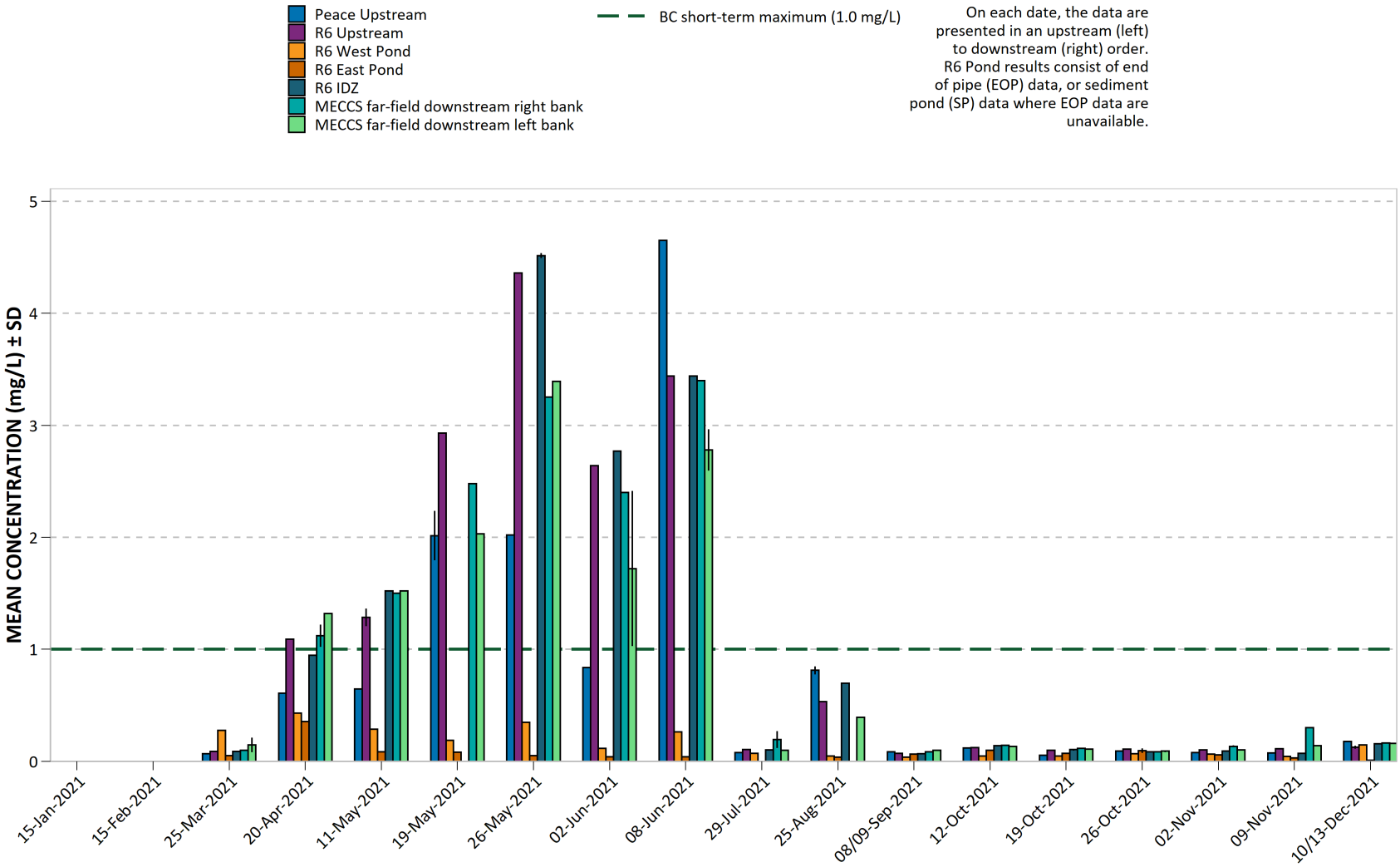


Figure 34. 2021 Peace River and RSEM R6 pond total lead (Pb).

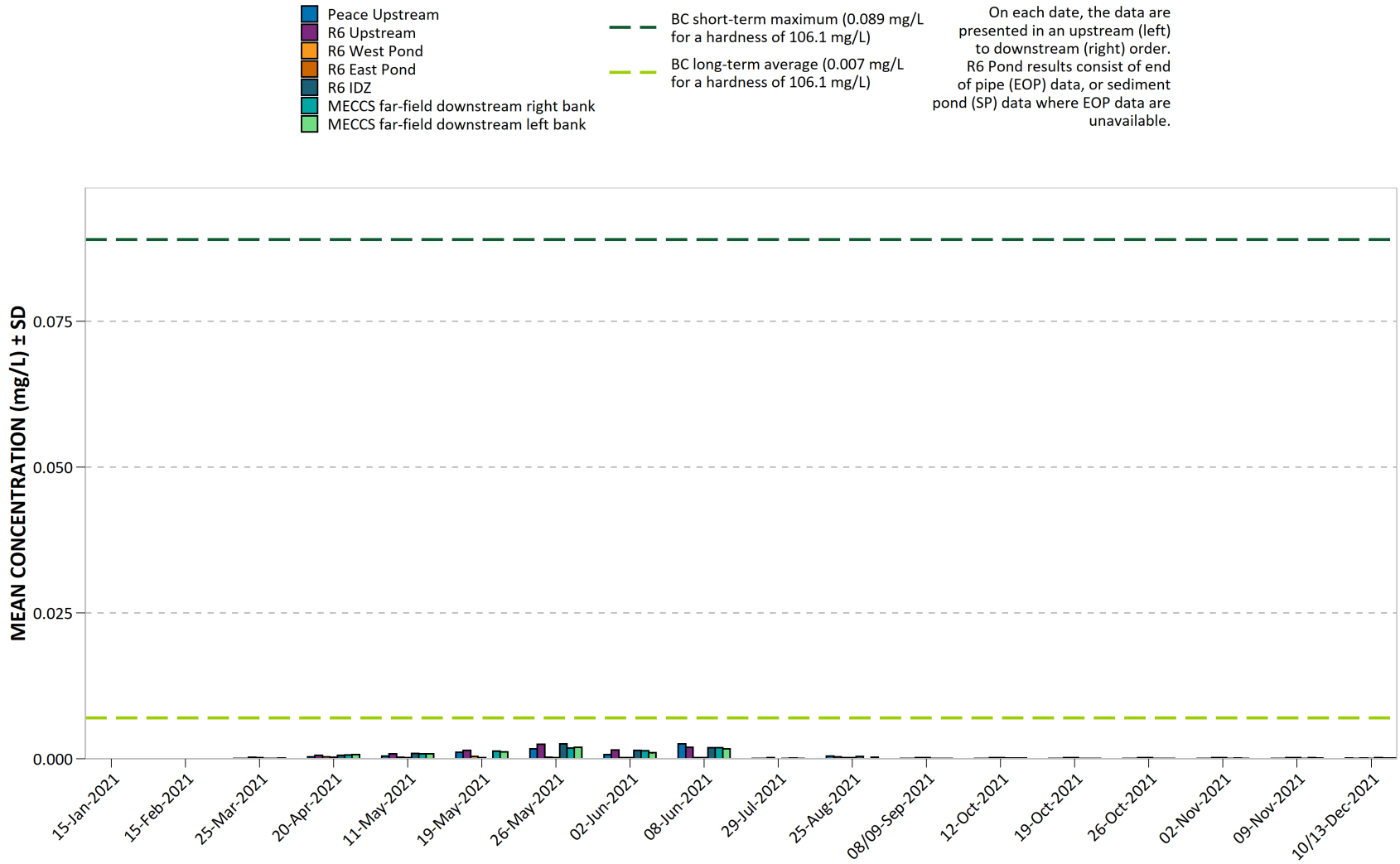


Figure 35. 2021 Peace River and RSEM R6 pond total lithium (Li).

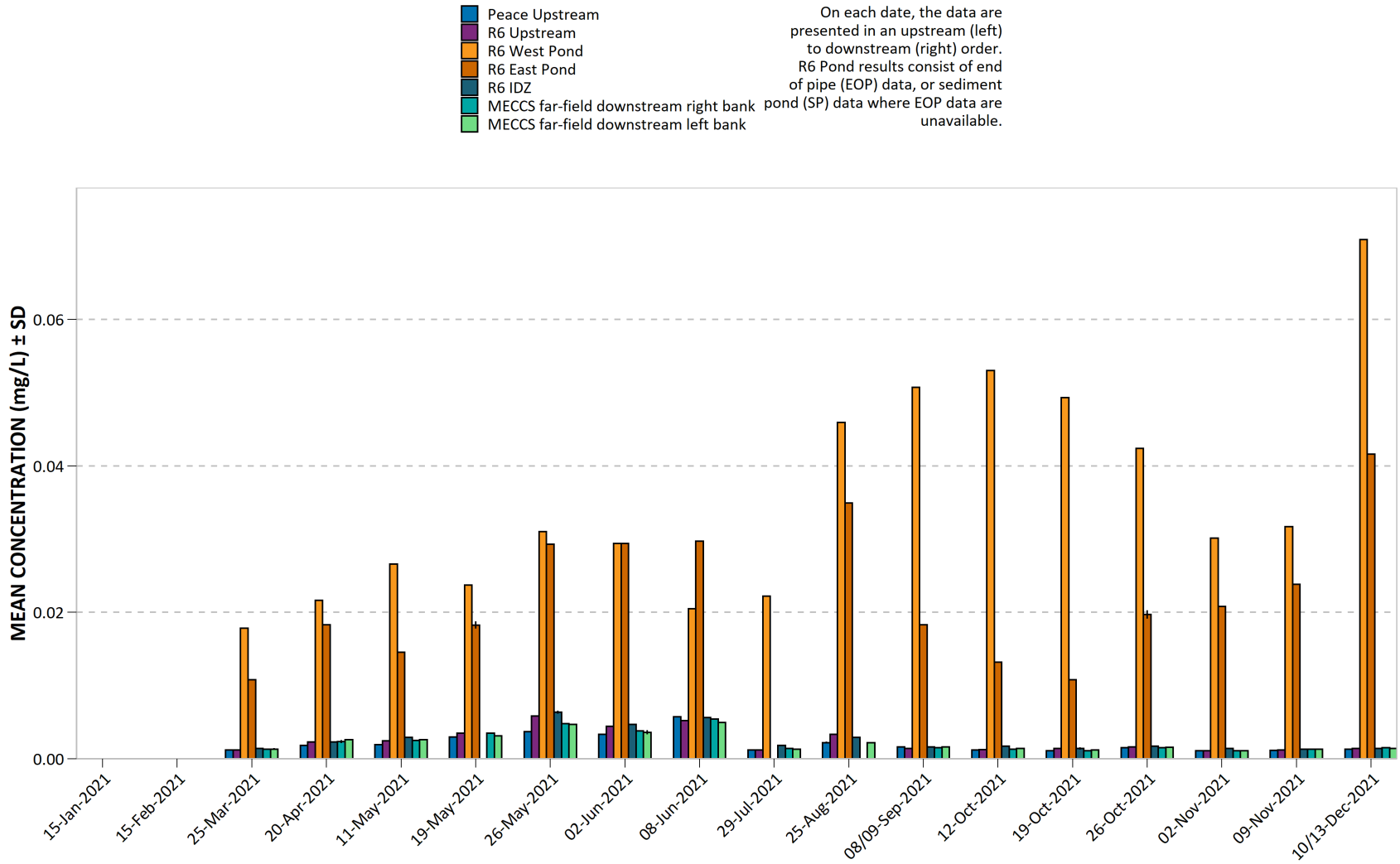


Figure 36. 2021 Peace River and RSEM R6 pond total magnesium (Mg).

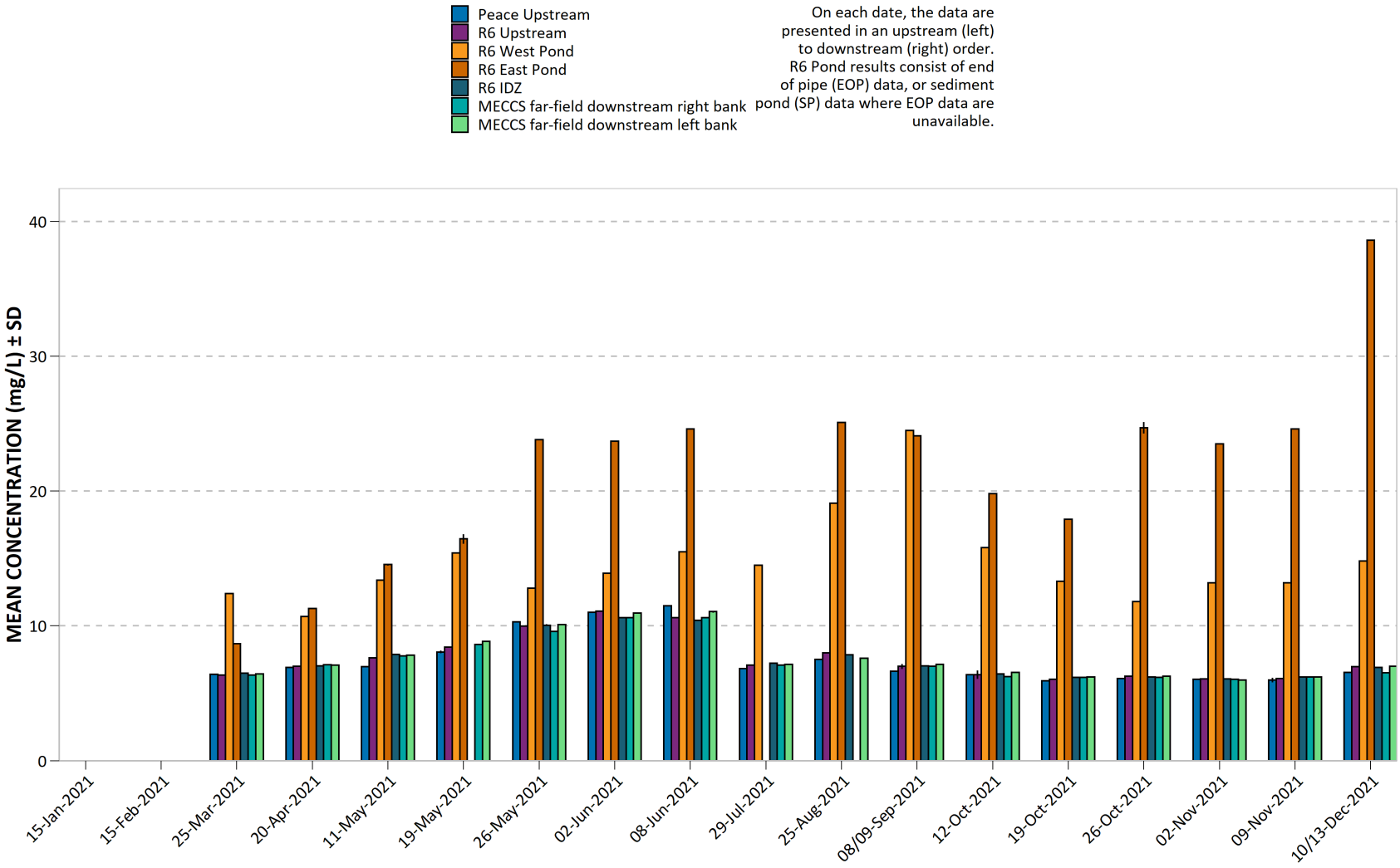


Figure 37. 2021 Peace River and RSEM R6 pond total manganese (Mn).

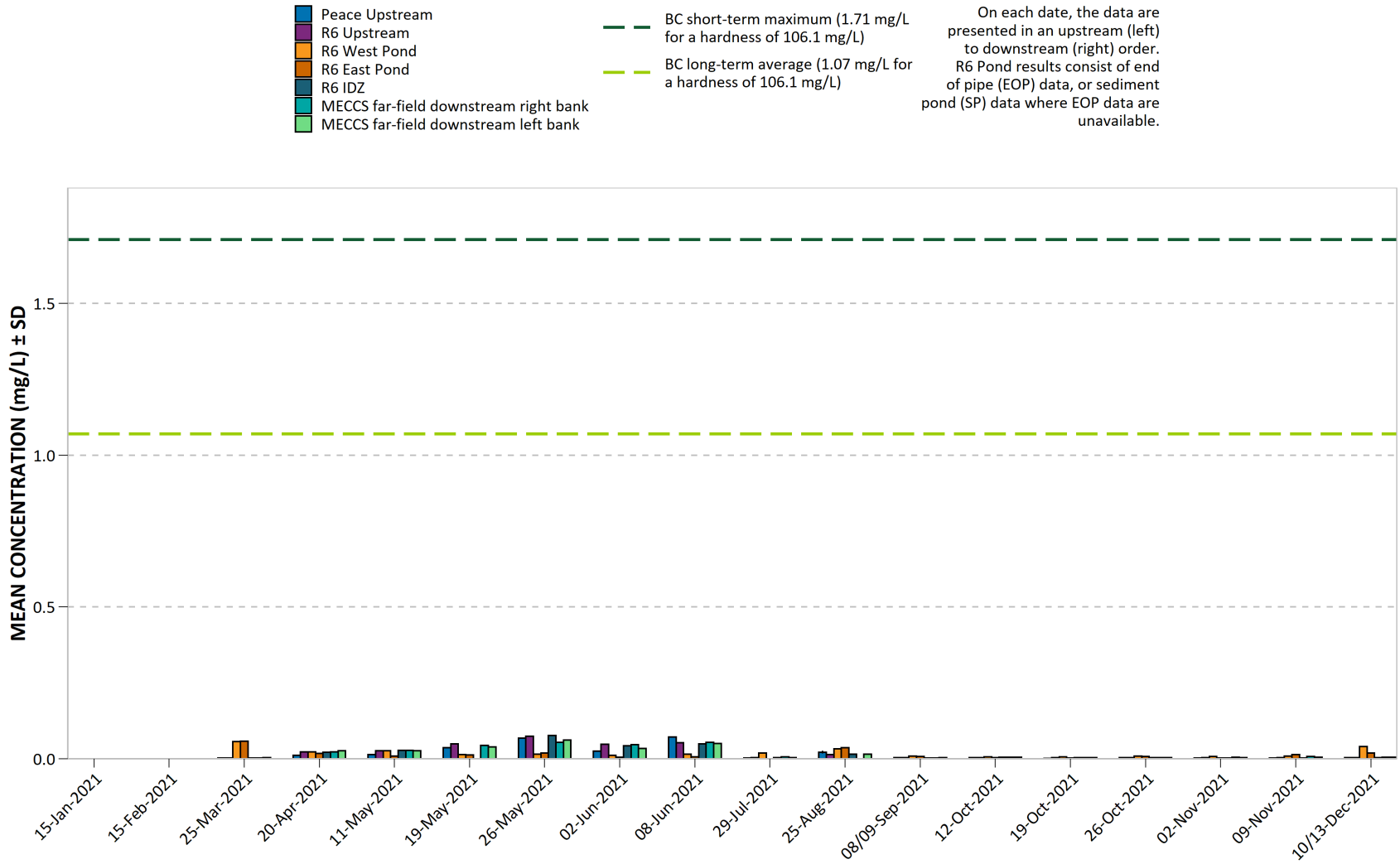


Figure 38. 2021 Peace River and RSEM R6 pond total mercury (Hg).

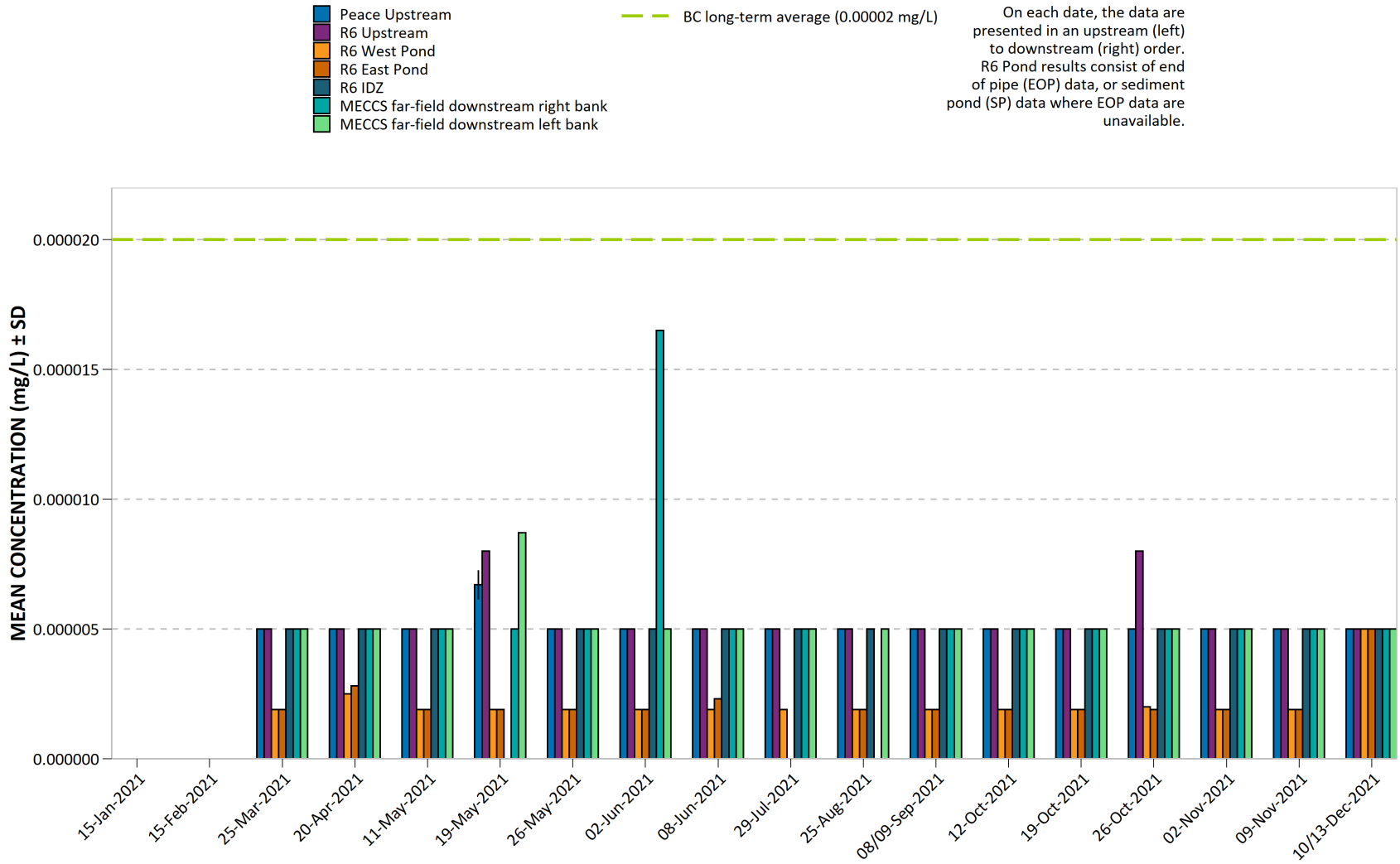


Figure 39. 2021 Peace River and RSEM R6 pond total molybdenum (Mo).

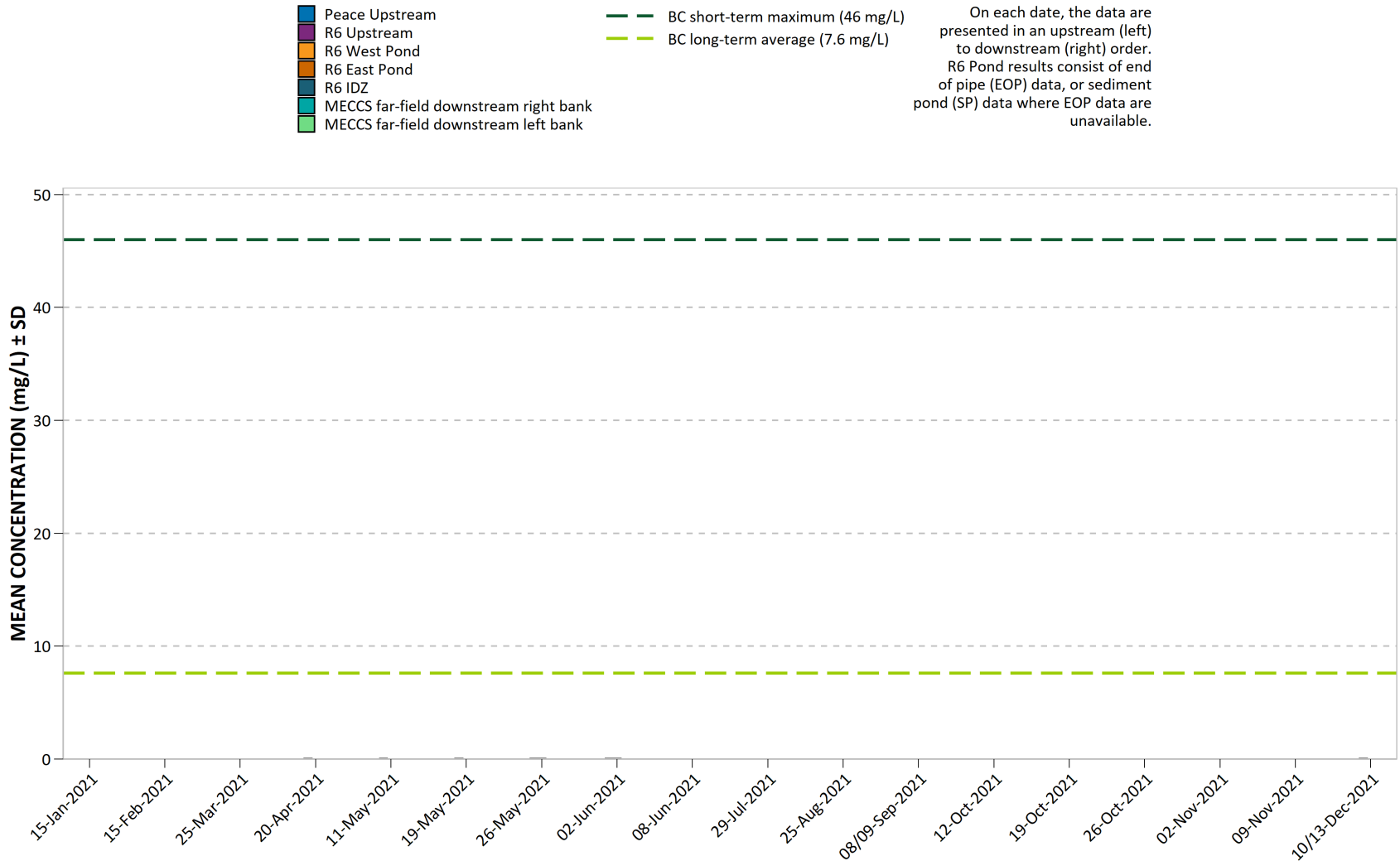


Figure 40. 2021 Peace River and RSEM R6 pond total nickel (Ni).

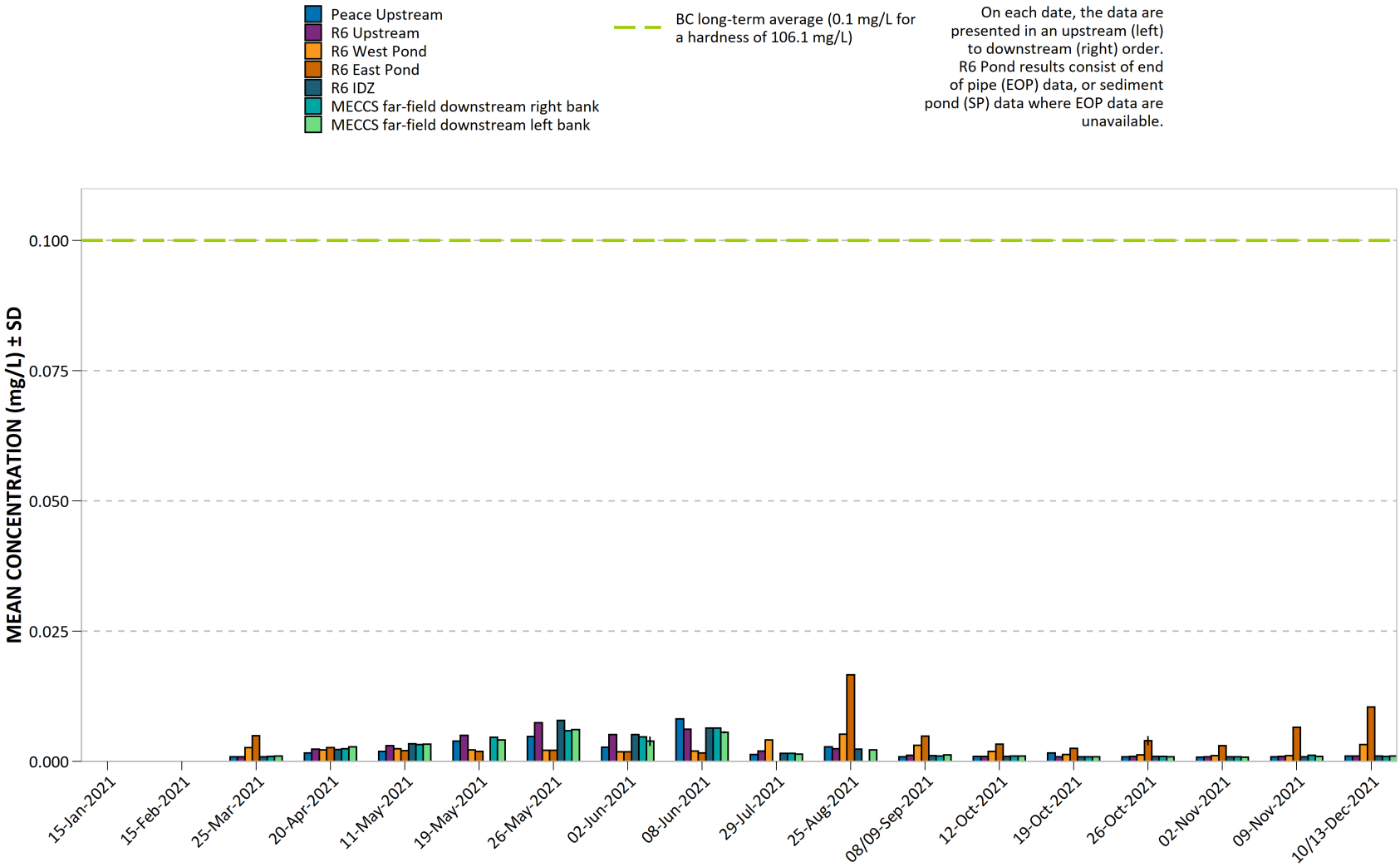


Figure 41. 2021 Peace River and RSEM R6 pond total potassium (K).

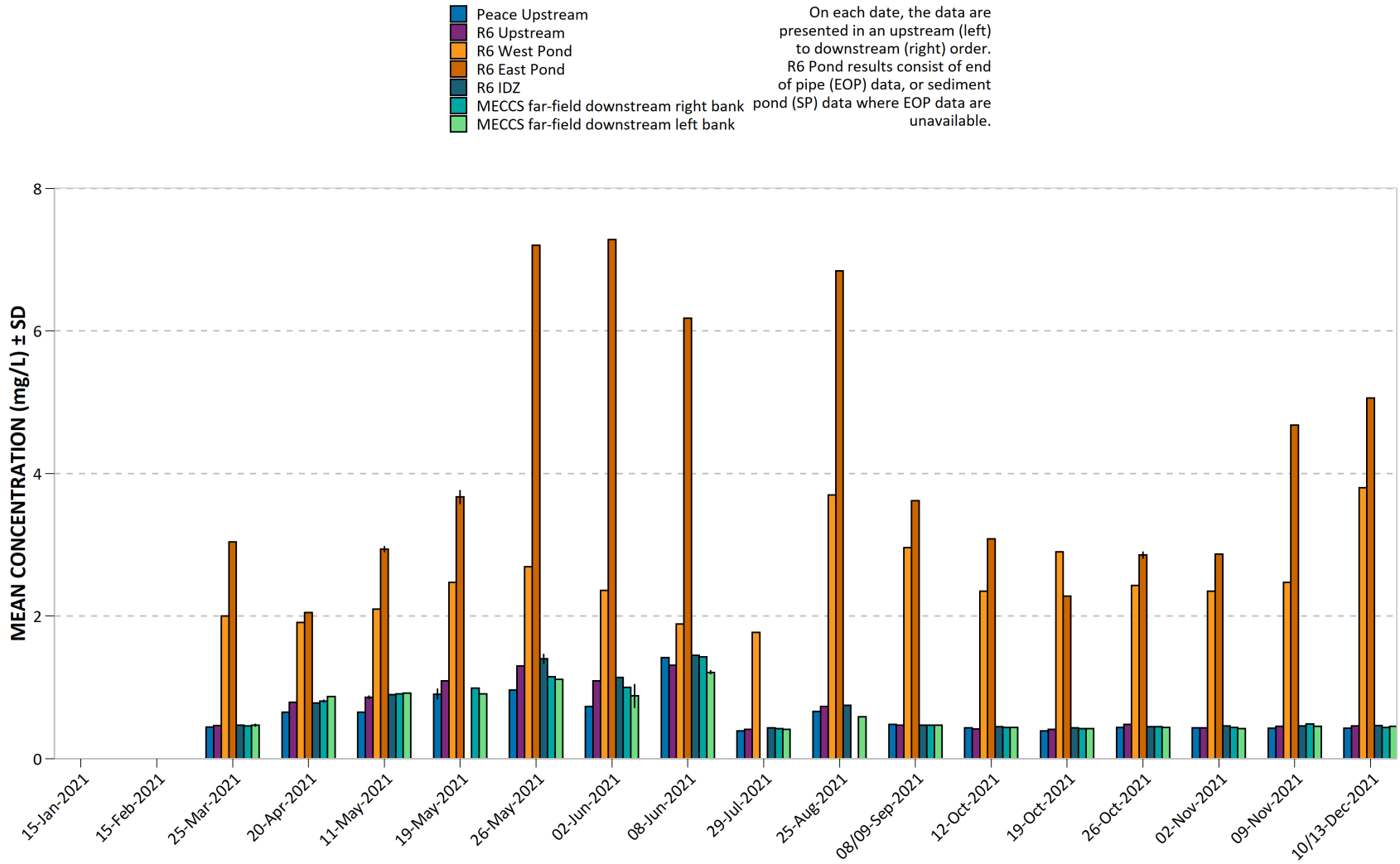


Figure 42. 2021 Peace River and RSEM R6 pond total selenium (Se).

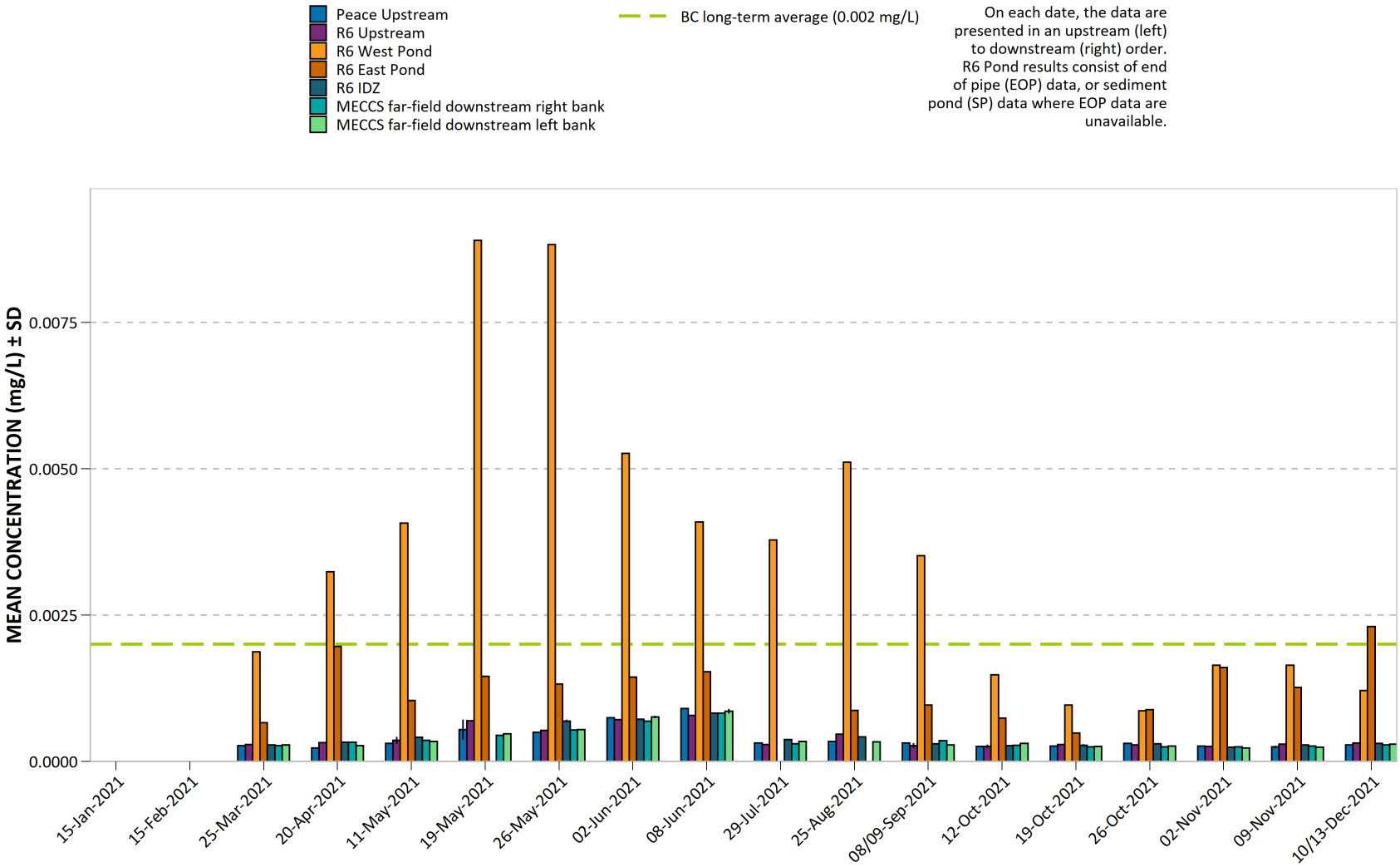


Figure 43. 2021 Peace River and RSEM R6 pond total silicon (Si).

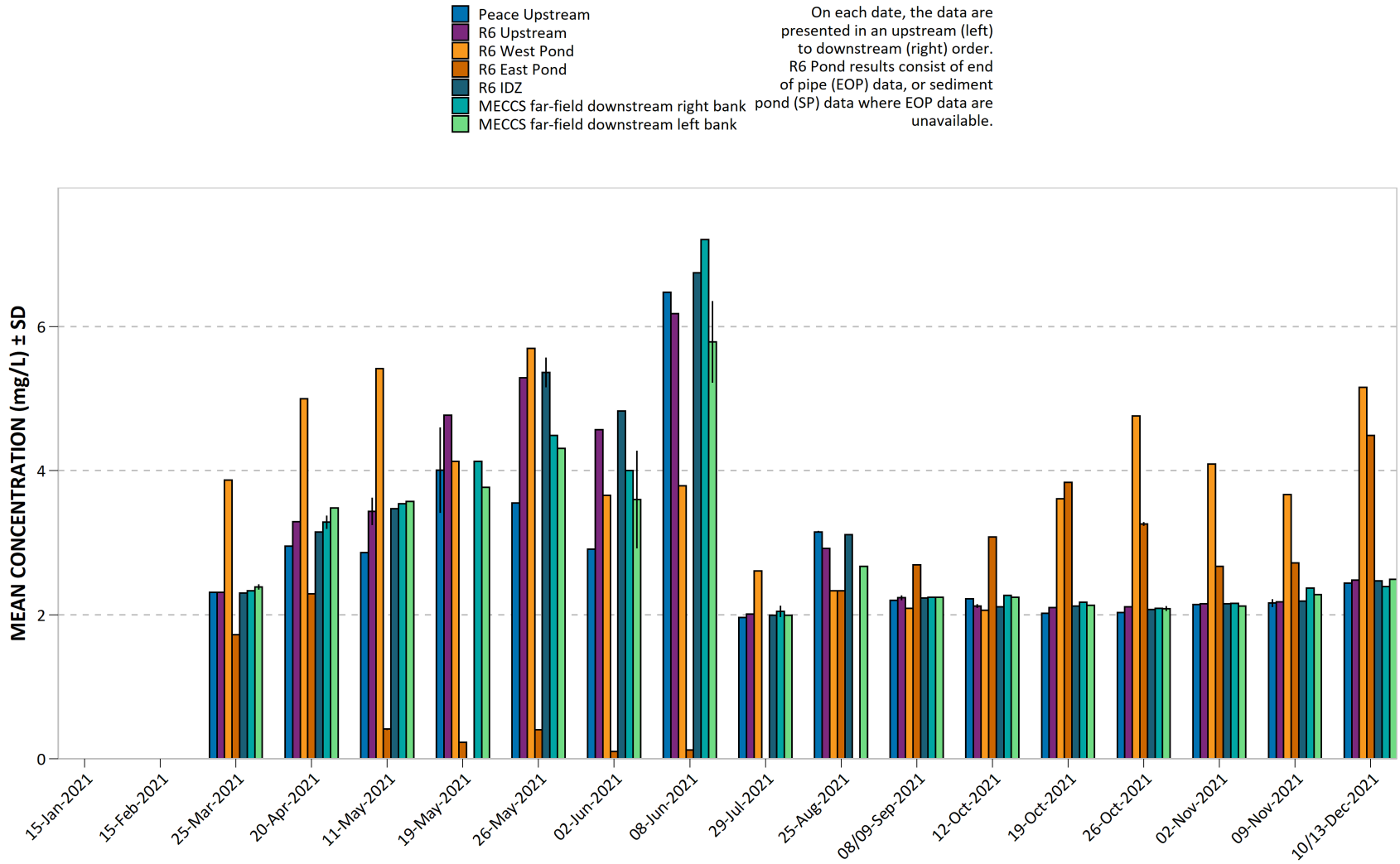


Figure 44. 2021 Peace River and RSEM R6 pond total silver (Ag).

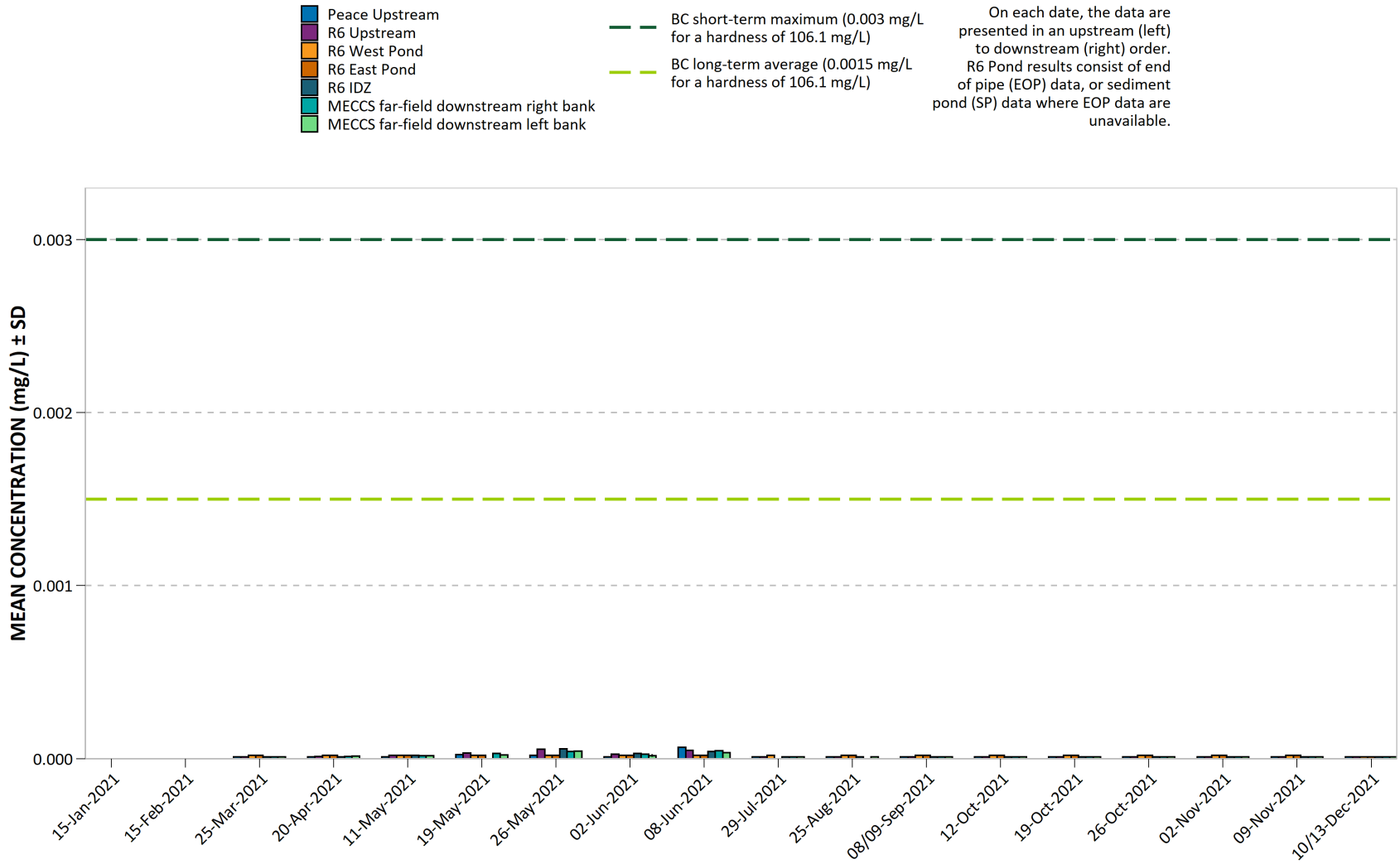


Figure 45. 2021 Peace River and RSEM R6 pond total sodium (Na).

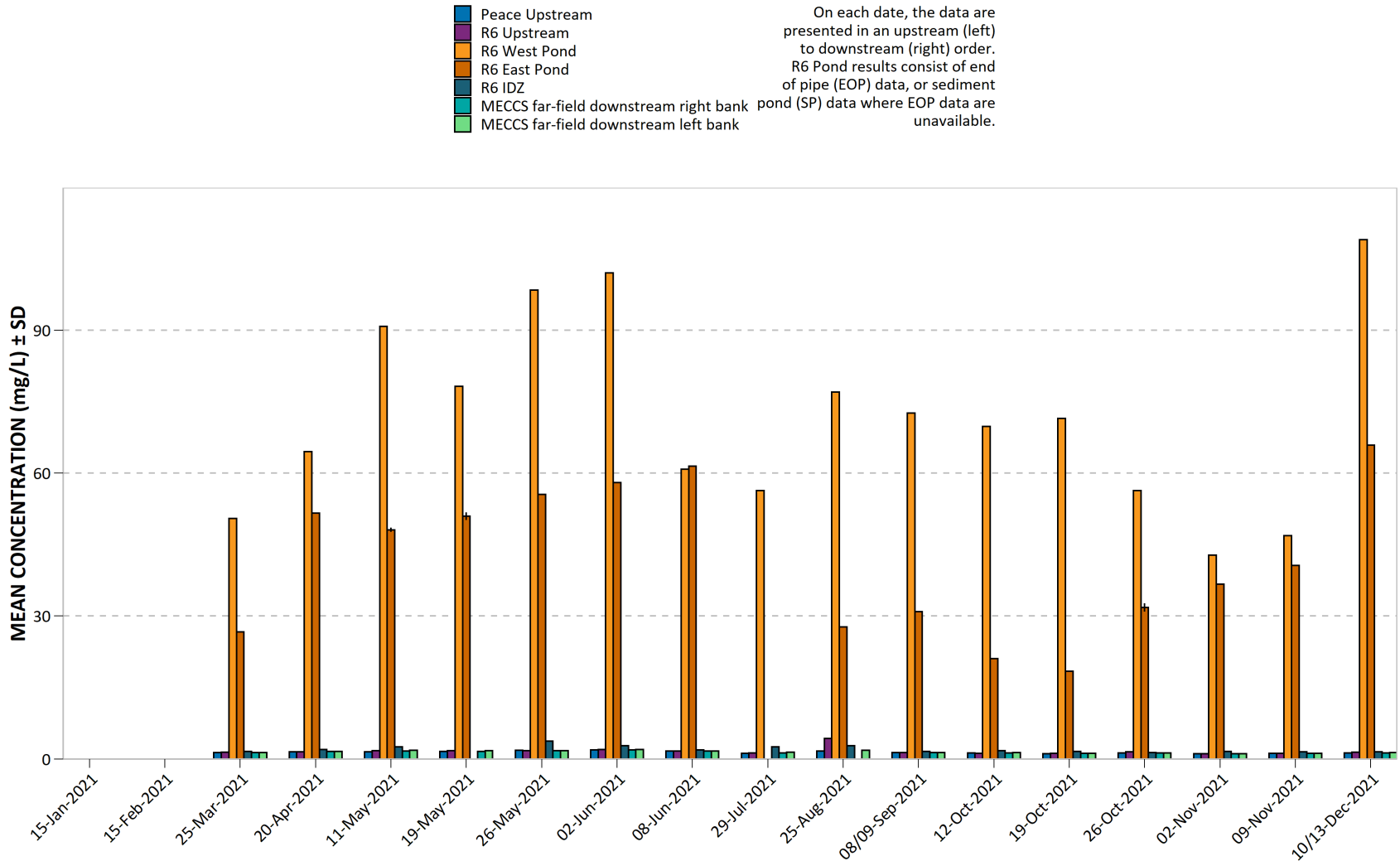


Figure 46. 2021 Peace River and RSEM R6 pond total strontium (Sr).

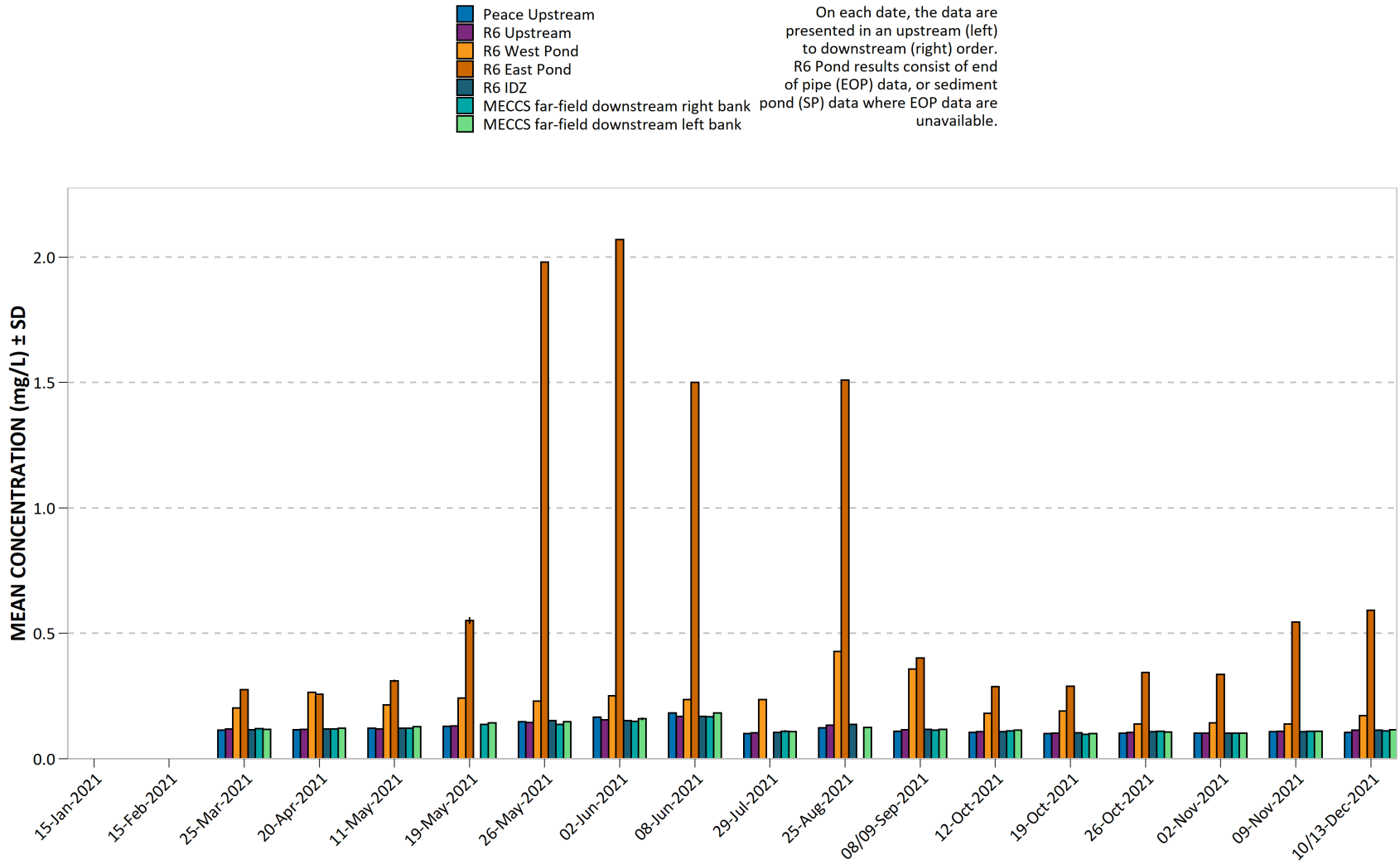


Figure 47. 2021 Peace River and RSEM R6 pond total sulfur (S).

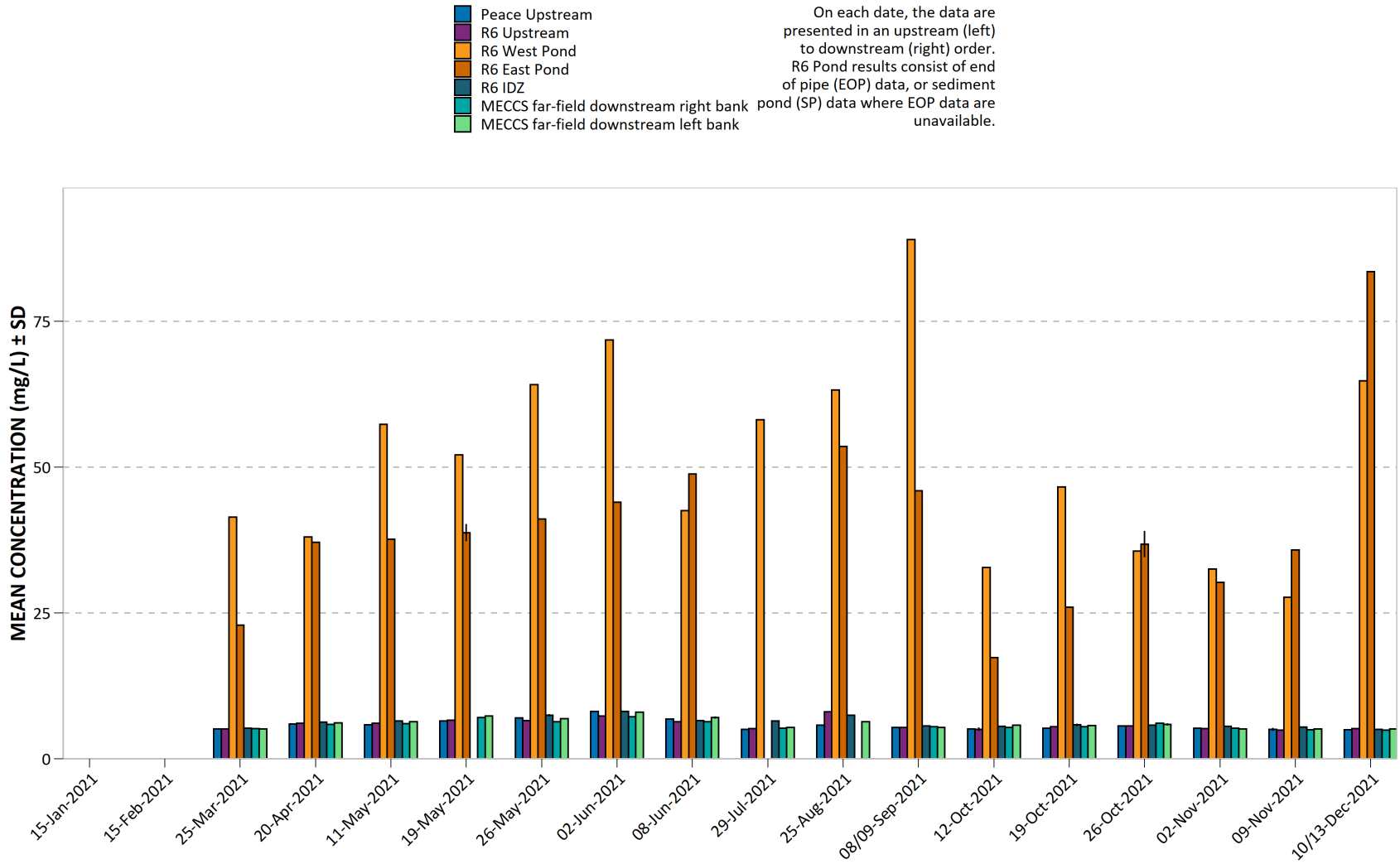


Figure 48. 2021 Peace River and RSEM R6 pond total thallium (Tl).

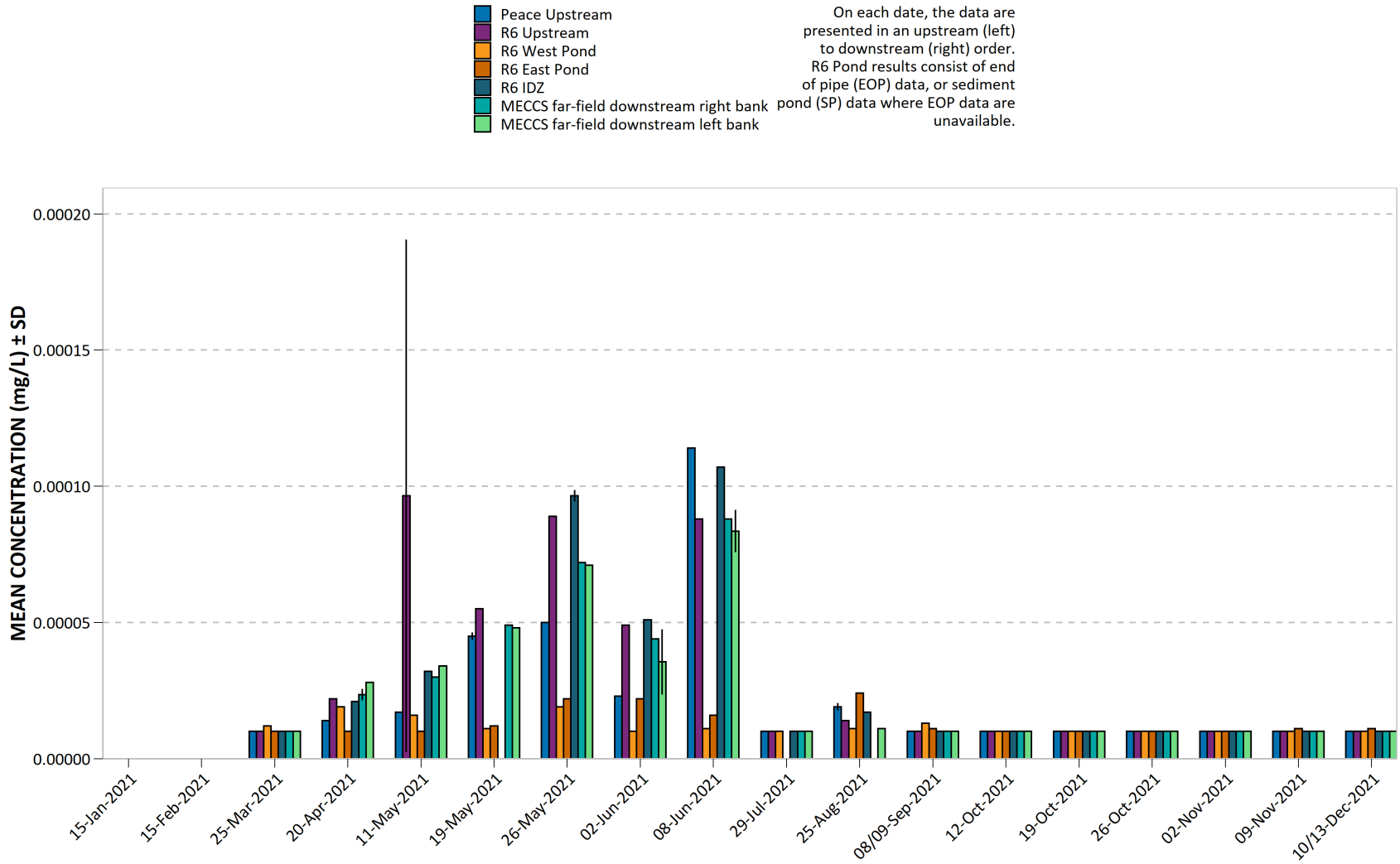


Figure 49. 2021 Peace River and RSEM R6 pond total tin (Sn).

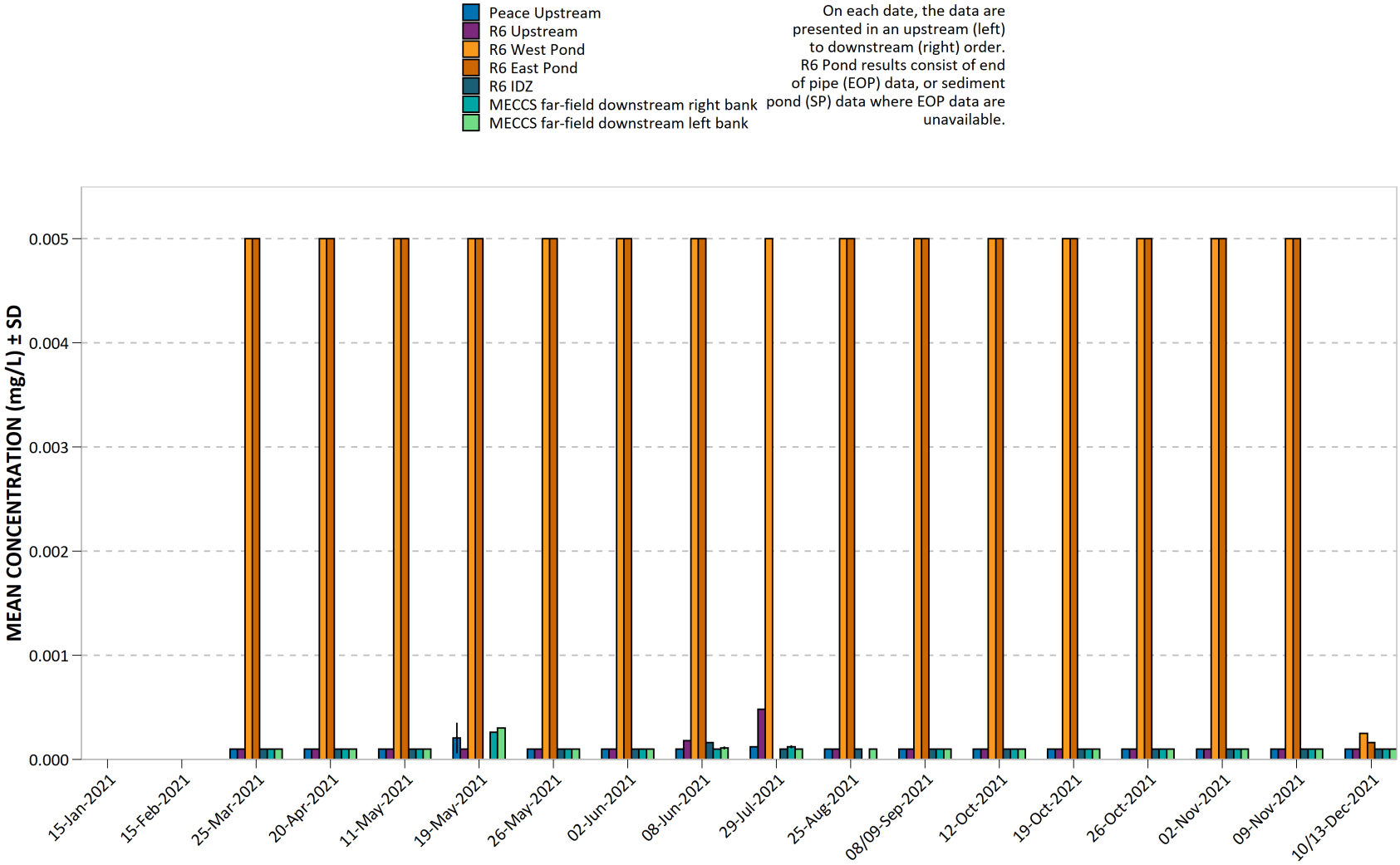


Figure 50. 2021 Peace River and RSEM R6 pond total titanium (Ti).

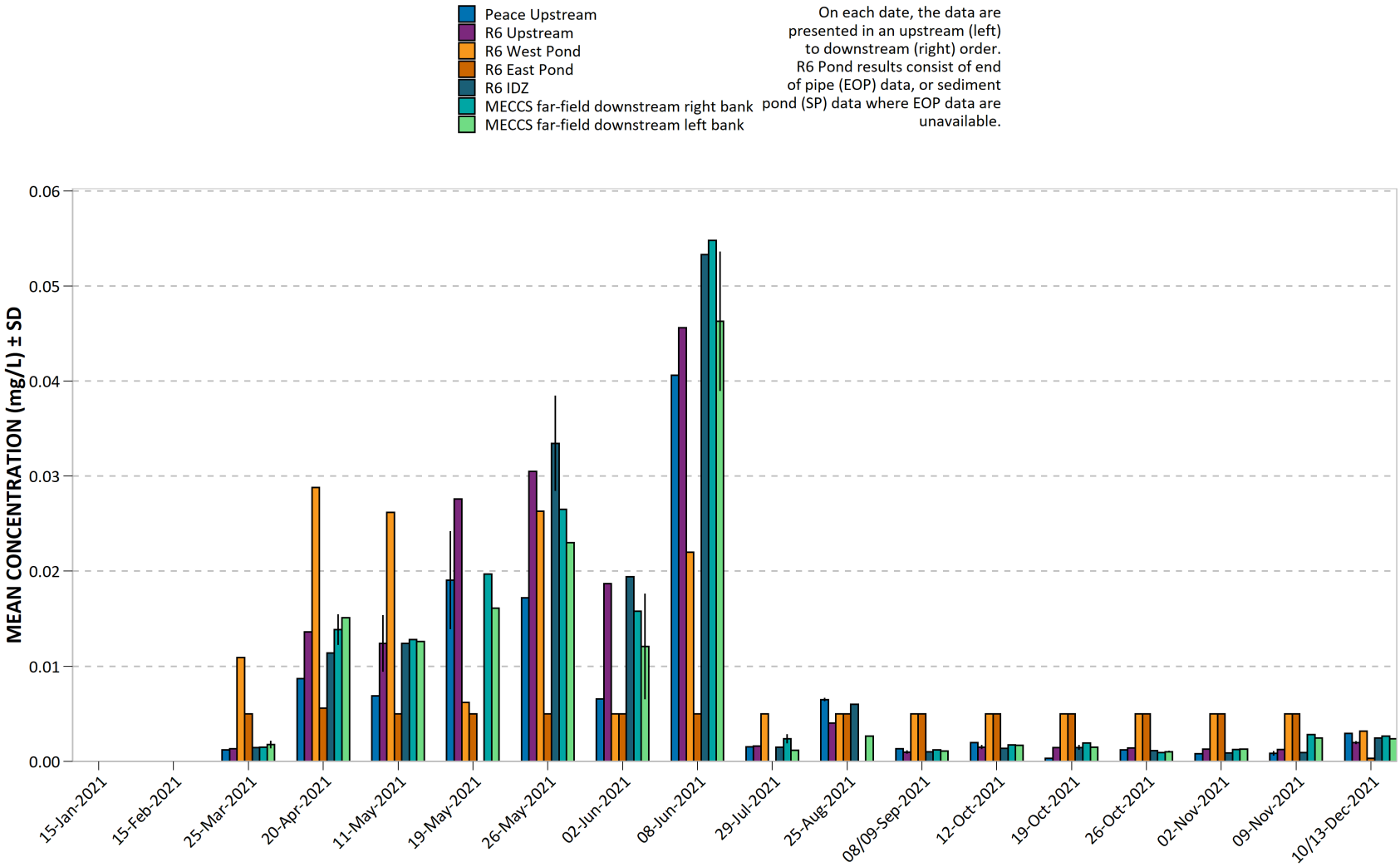


Figure 51. 2021 Peace River and RSEM R6 pond total uranium (U).

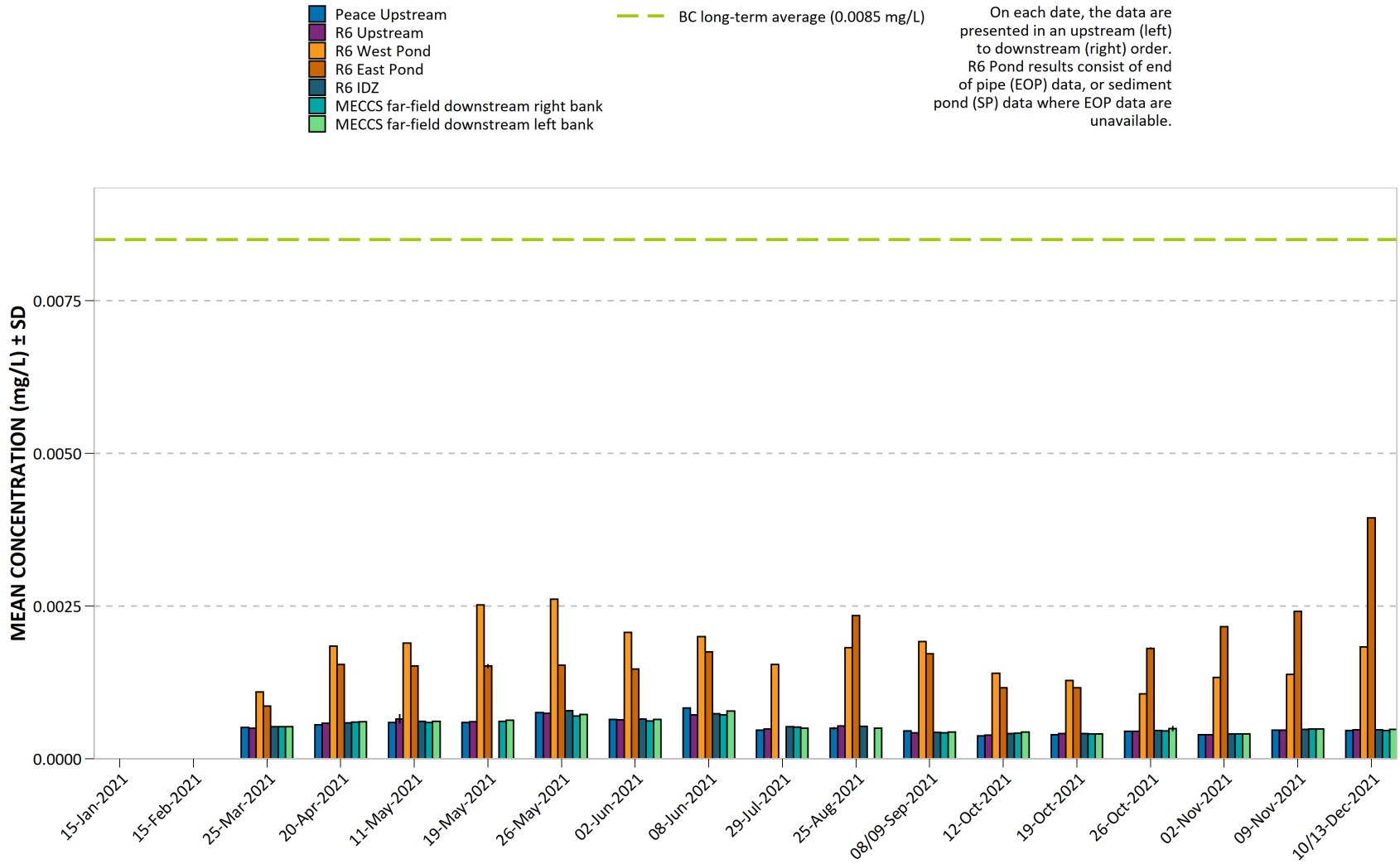


Figure 52. 2021 Peace River and RSEM R6 pond total vanadium (V).

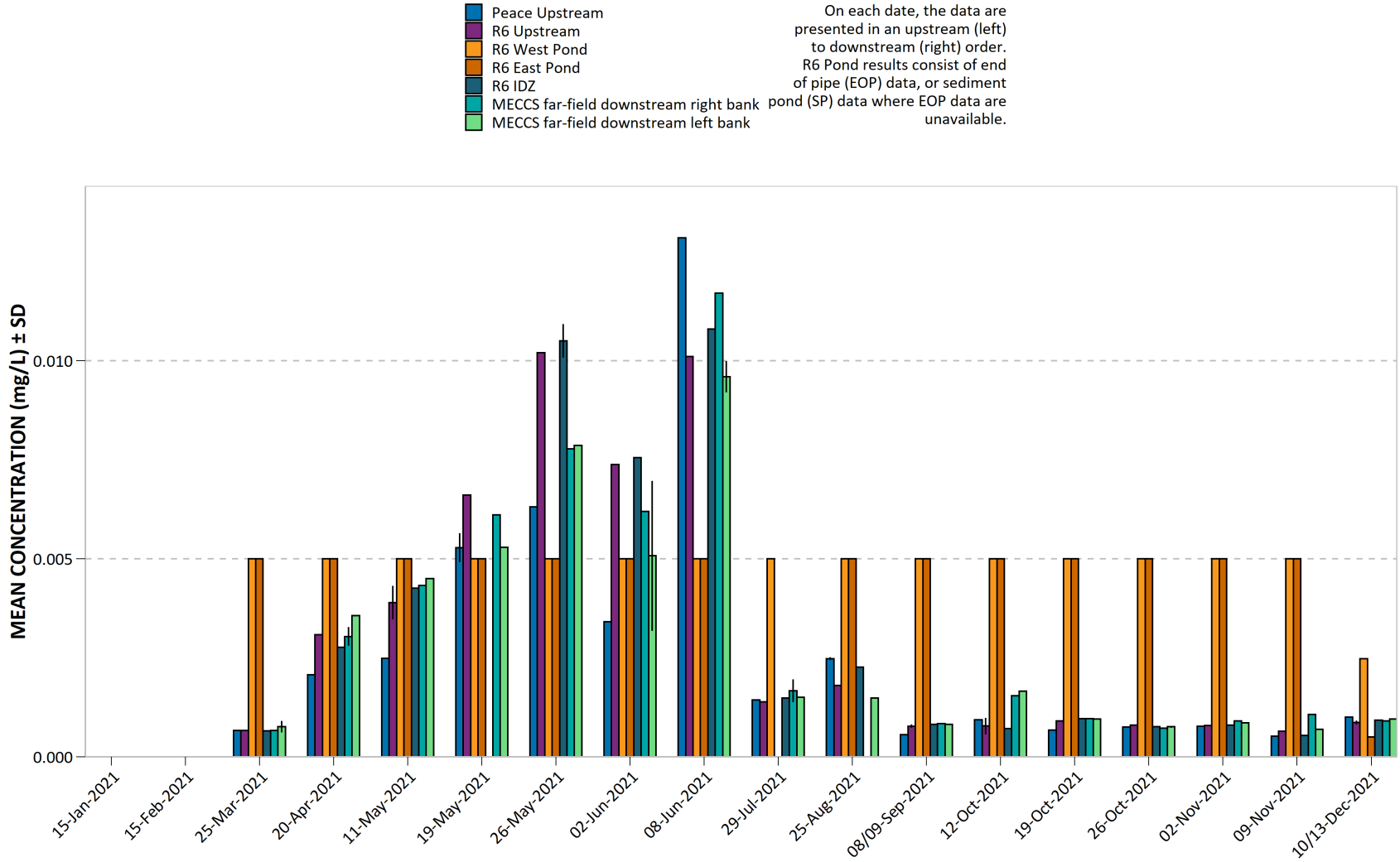
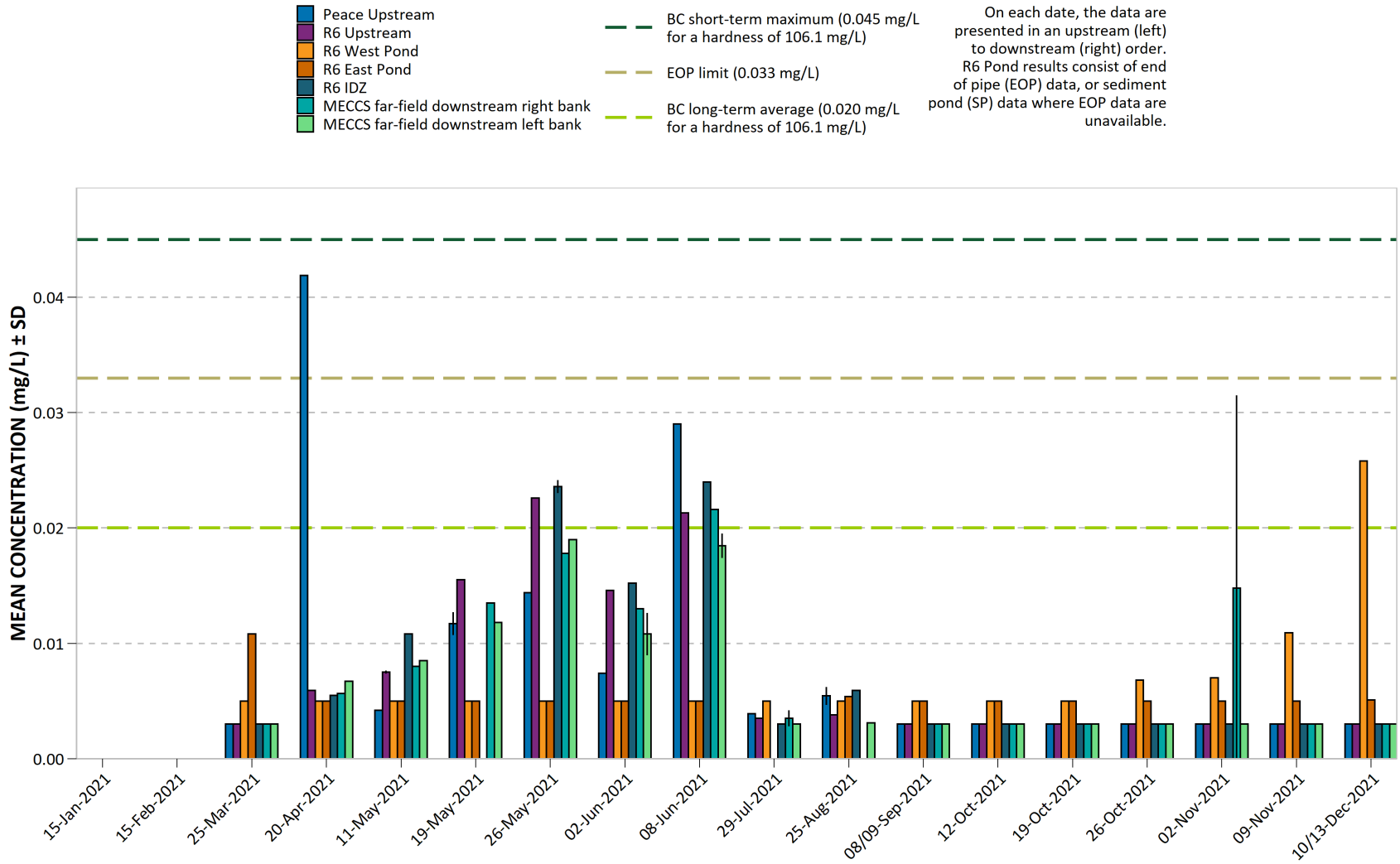


Figure 53. 2021 Peace River and RSEM R6 pond total zinc (Zn).



Note: BC WQG for total zinc are hardness dependent. An average Peace River hardness of 106.1 mg/L (based on 26 samples collected between April 2007 – Jan. 2017, BC Hydro 2017) was used in the plot to depict the maximum and 30-day guidelines for ease of interpretation. Sample specific hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 54. 2021 Peace River and RSEM R6 pond total zirconium (Zr).

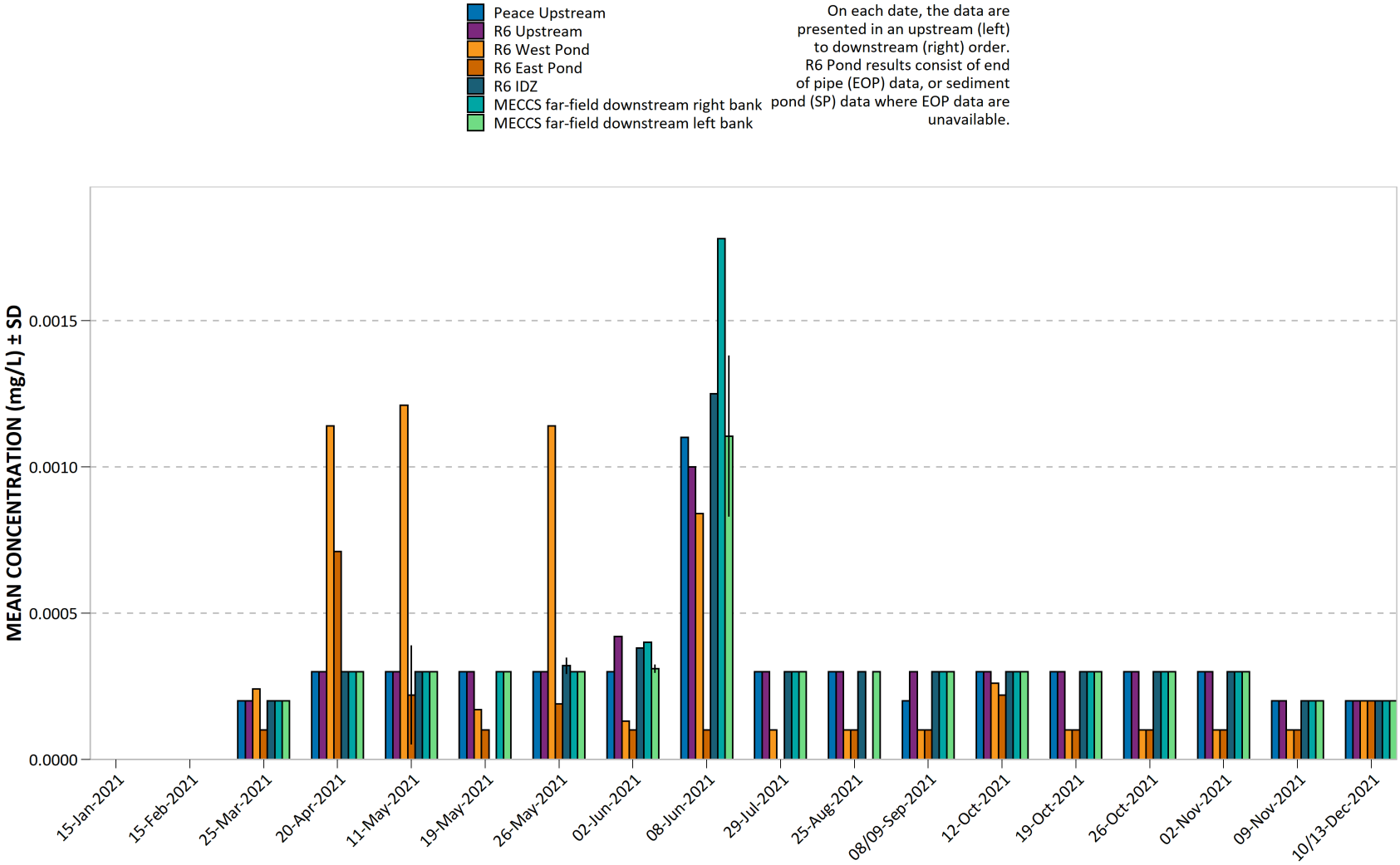


Figure 55. 2021 Peace River and RSEM R6 pond dissolved aluminum (Al).

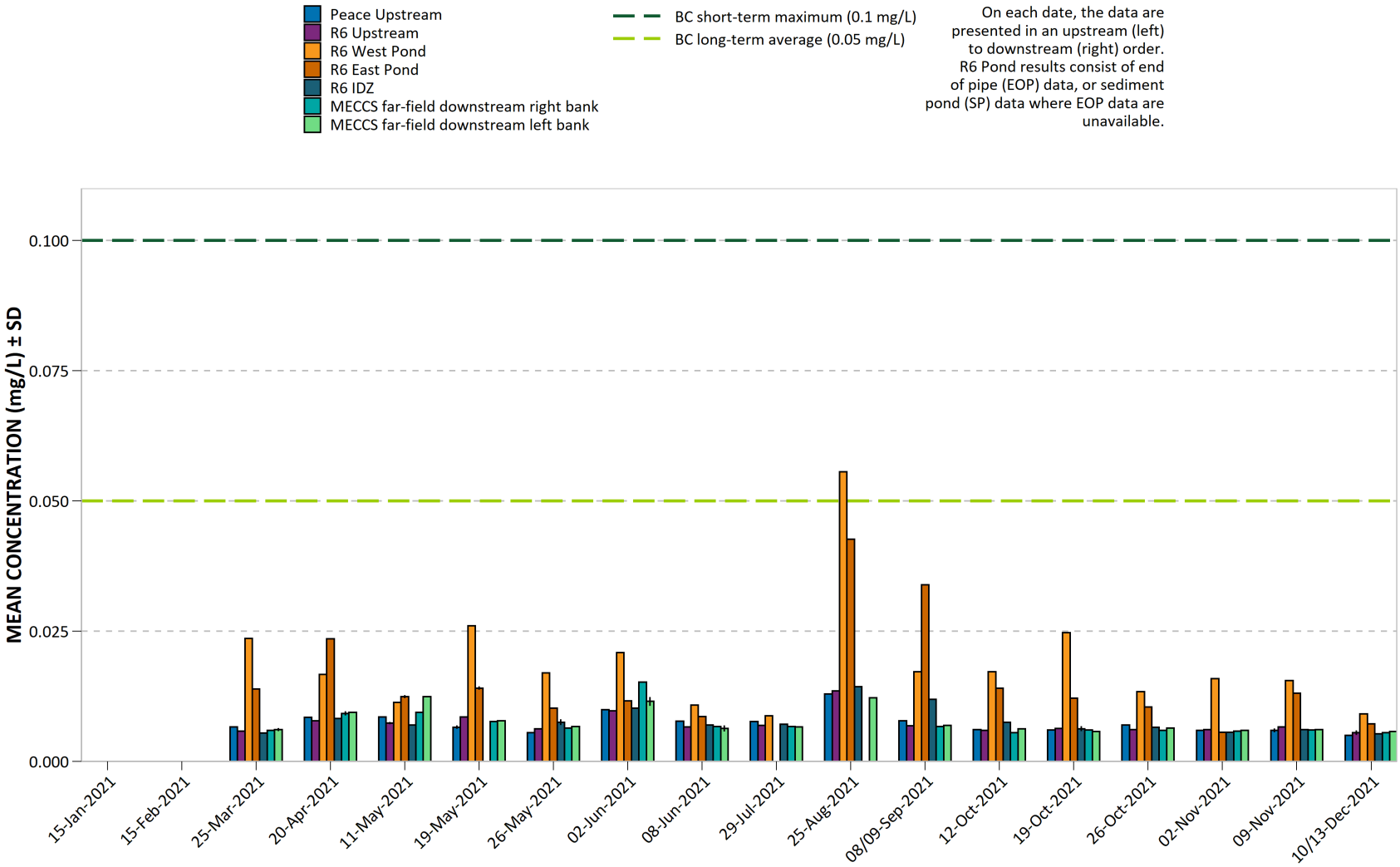


Figure 56. 2021 Peace River and RSEM R6 pond dissolved antimony (Sb).

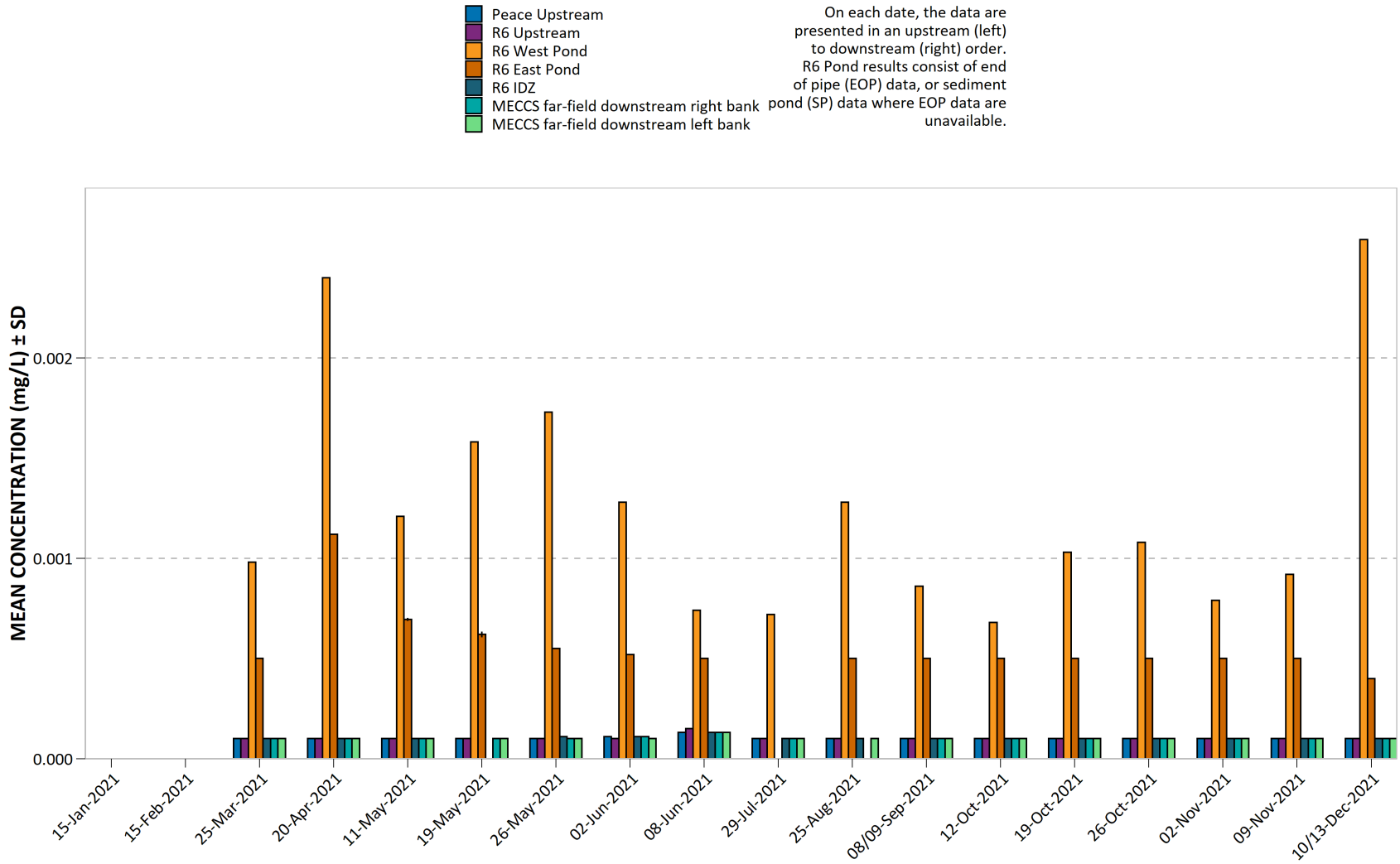


Figure 57. 2021 Peace River and RSEM R6 pond dissolved arsenic (As).

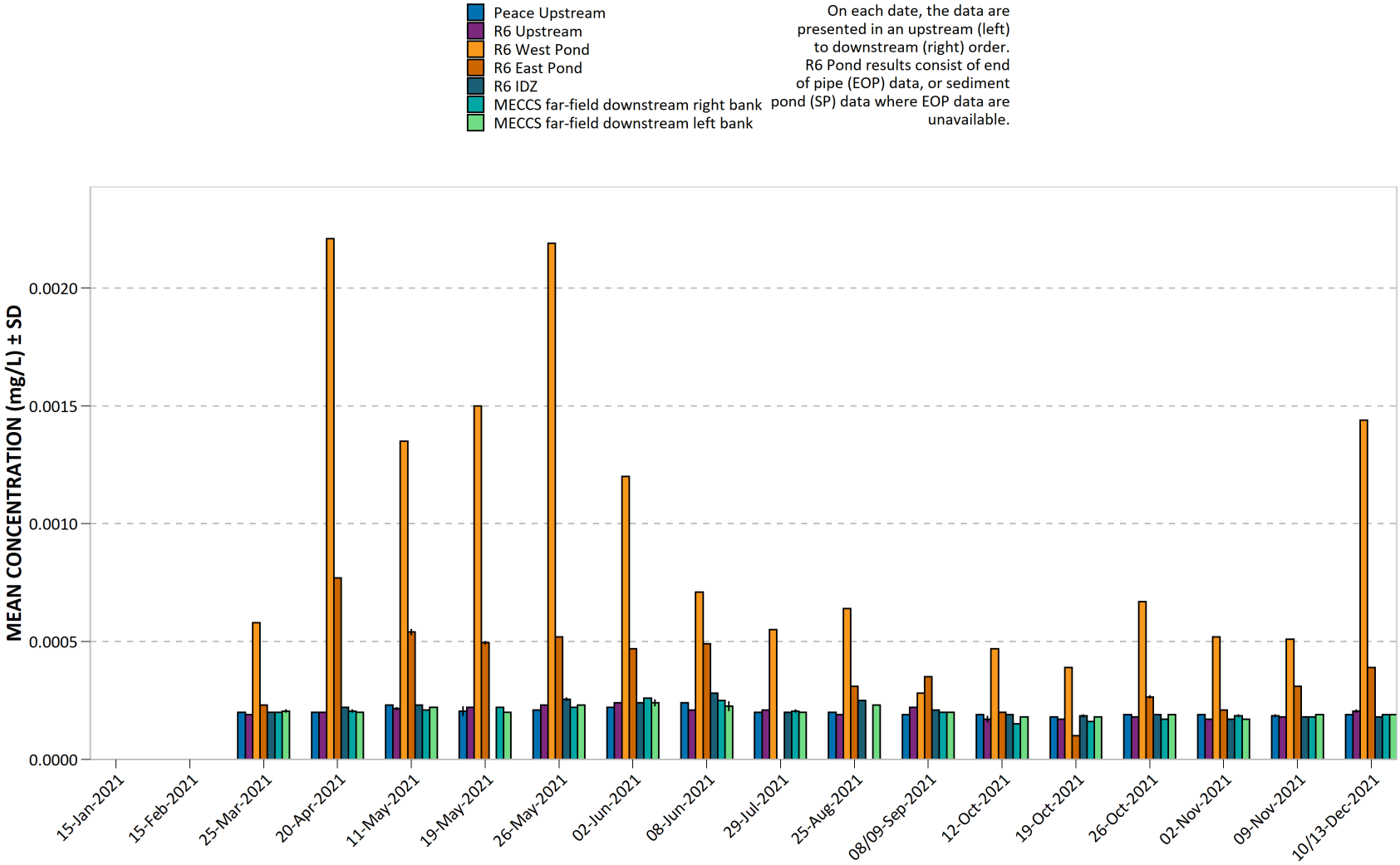


Figure 58. 2021 Peace River and RSEM R6 pond dissolved barium (Ba).

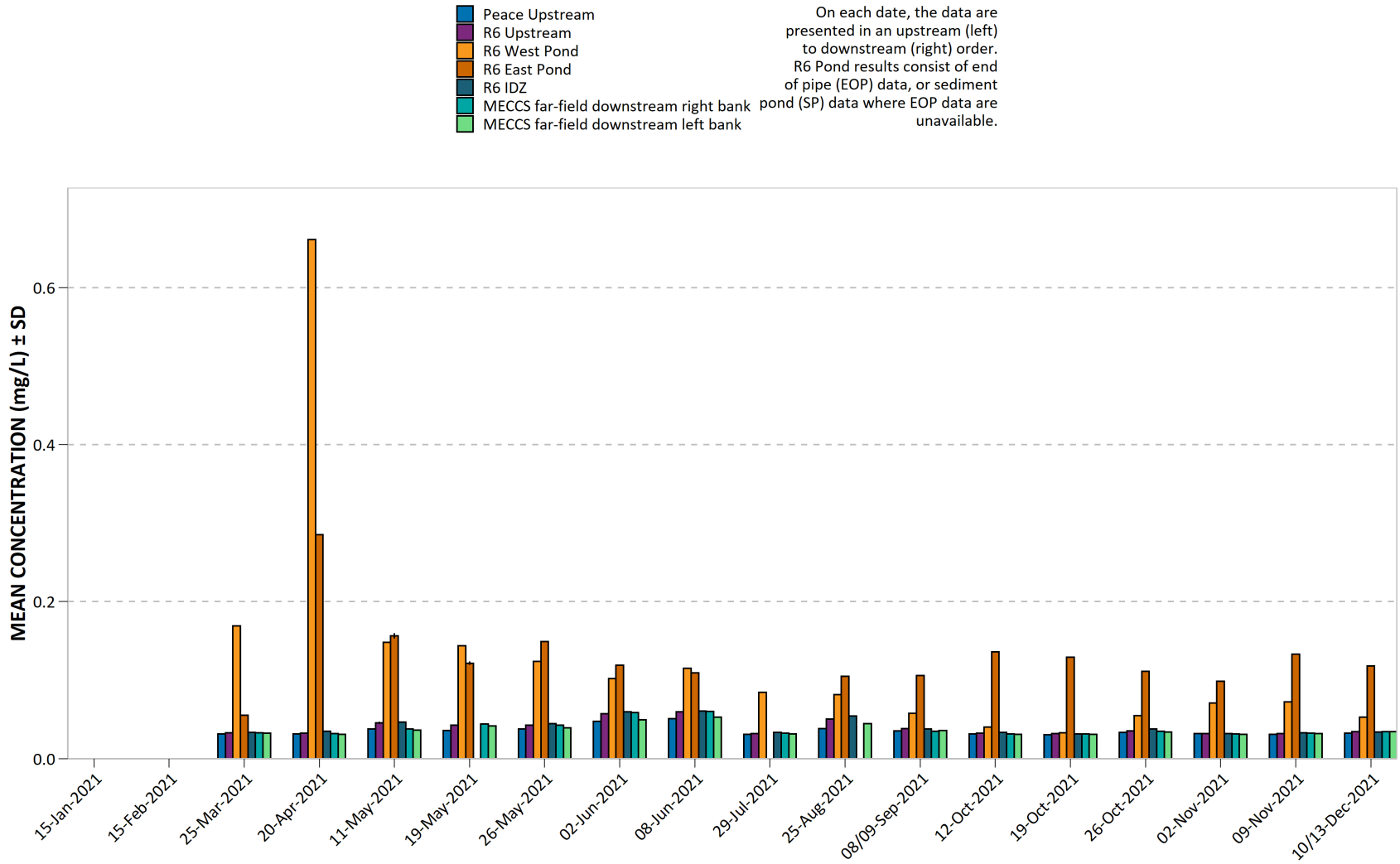


Figure 59. 2021 Peace River and RSEM R6 pond dissolved beryllium (Be).

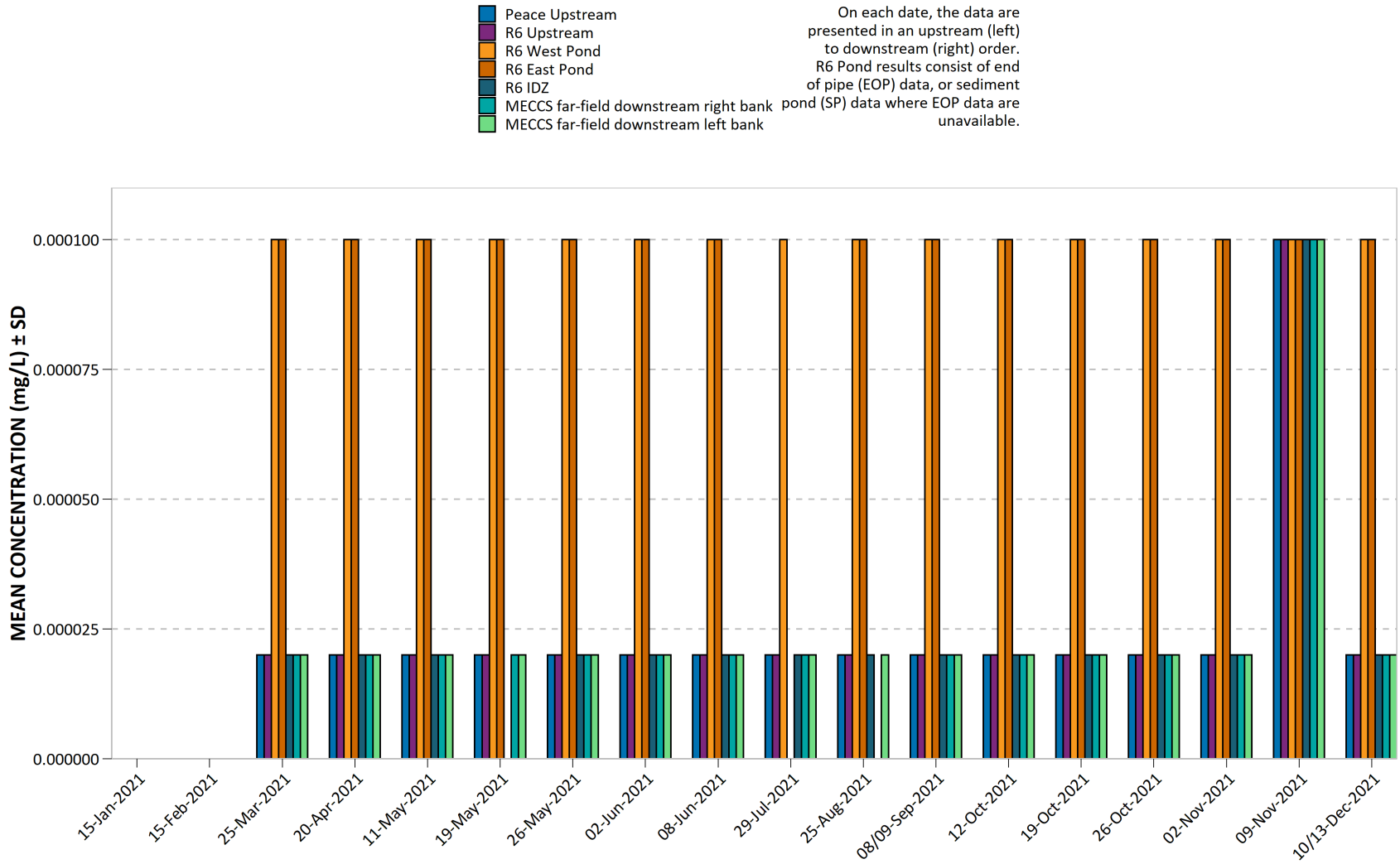


Figure 60. 2021 Peace River and RSEM R6 pond dissolved bismuth (Bi).

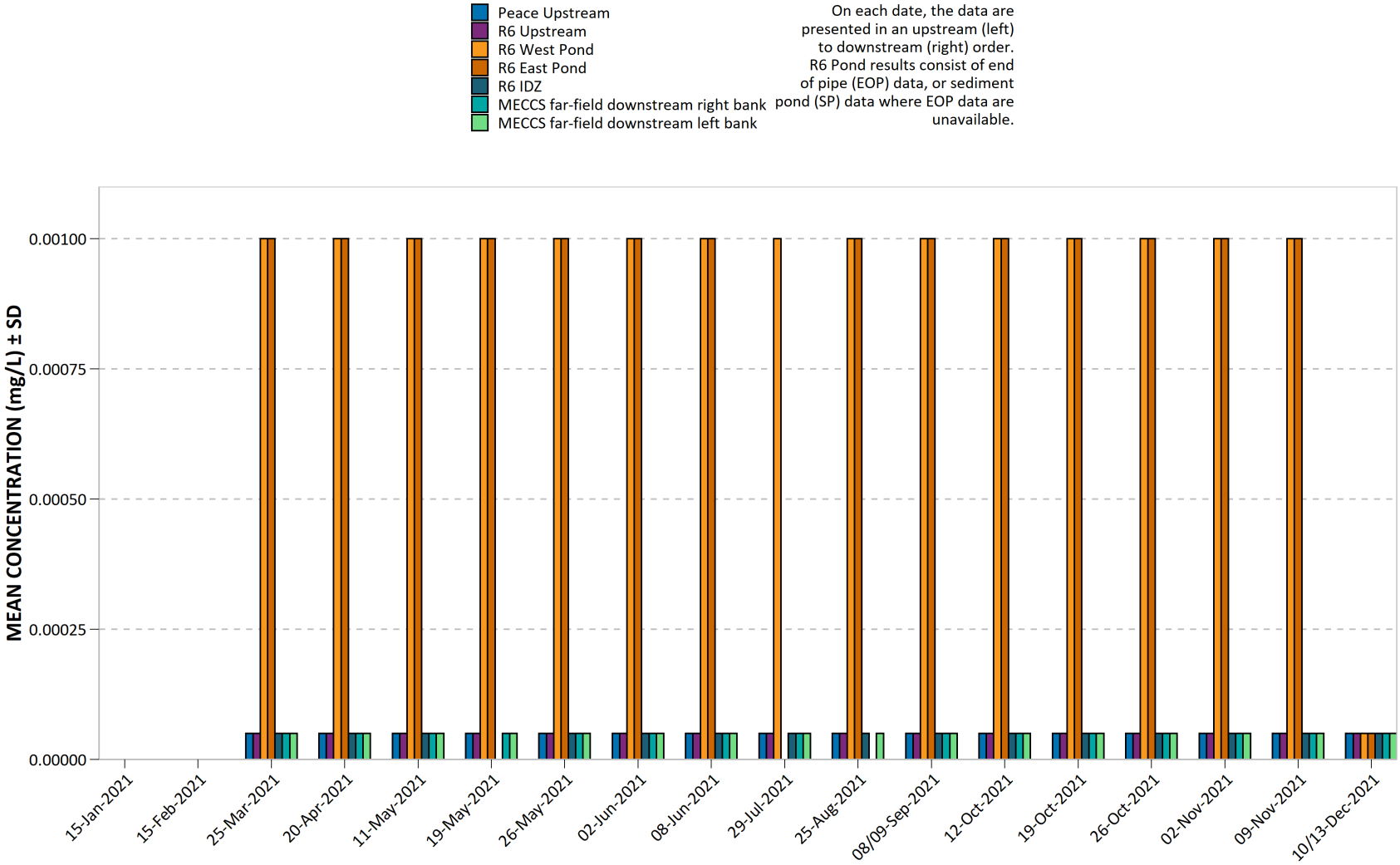


Figure 61. 2021 Peace River and RSEM R6 pond dissolved boron (B).

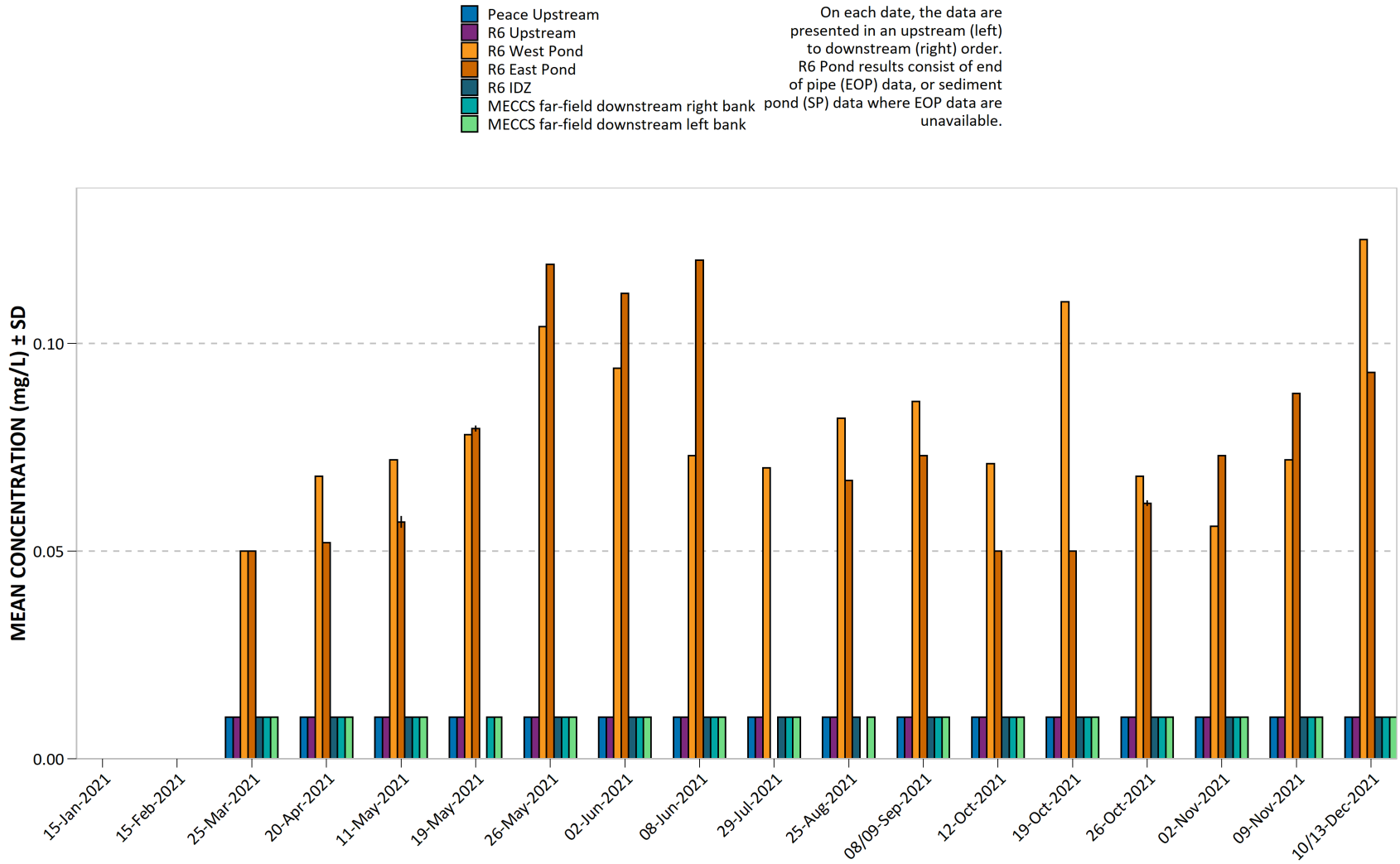


Figure 62. 2021 Peace River and RSEM R6 pond dissolved cadmium (Cd).

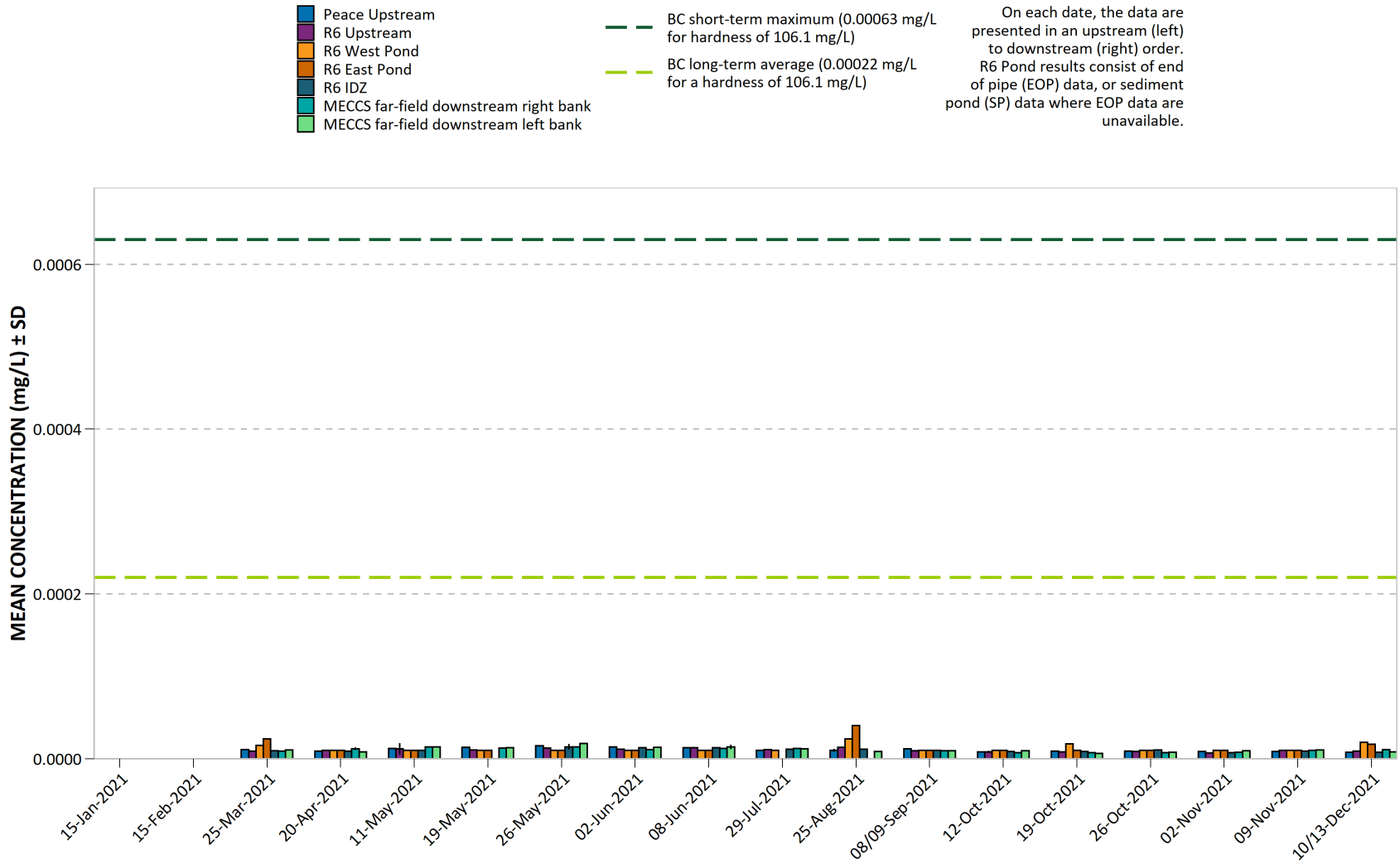


Figure 63. 2021 Peace River and RSEM R6 pond dissolved calcium (Ca).

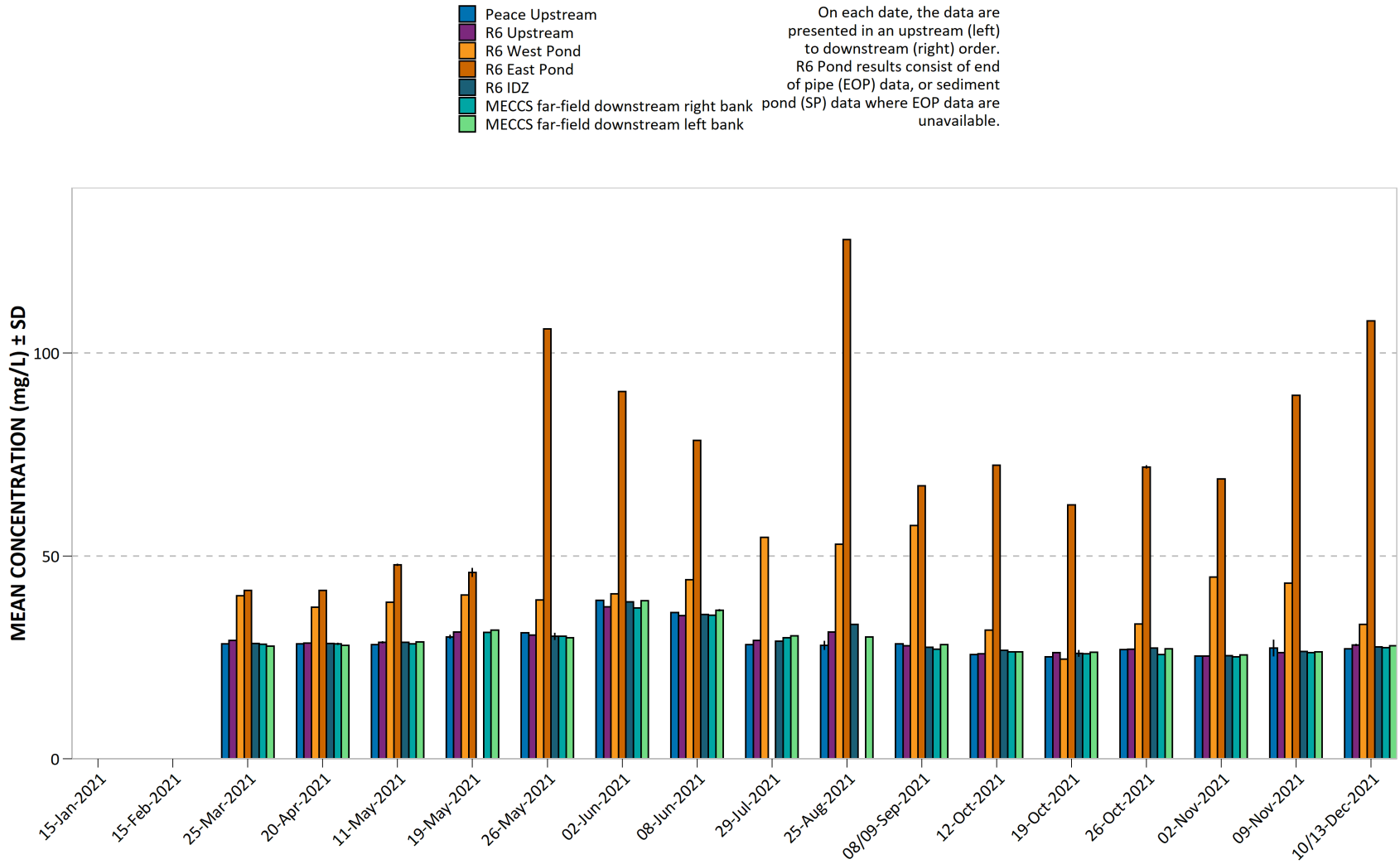


Figure 64. 2021 Peace River and RSEM R6 pond dissolved chromium (Cr).

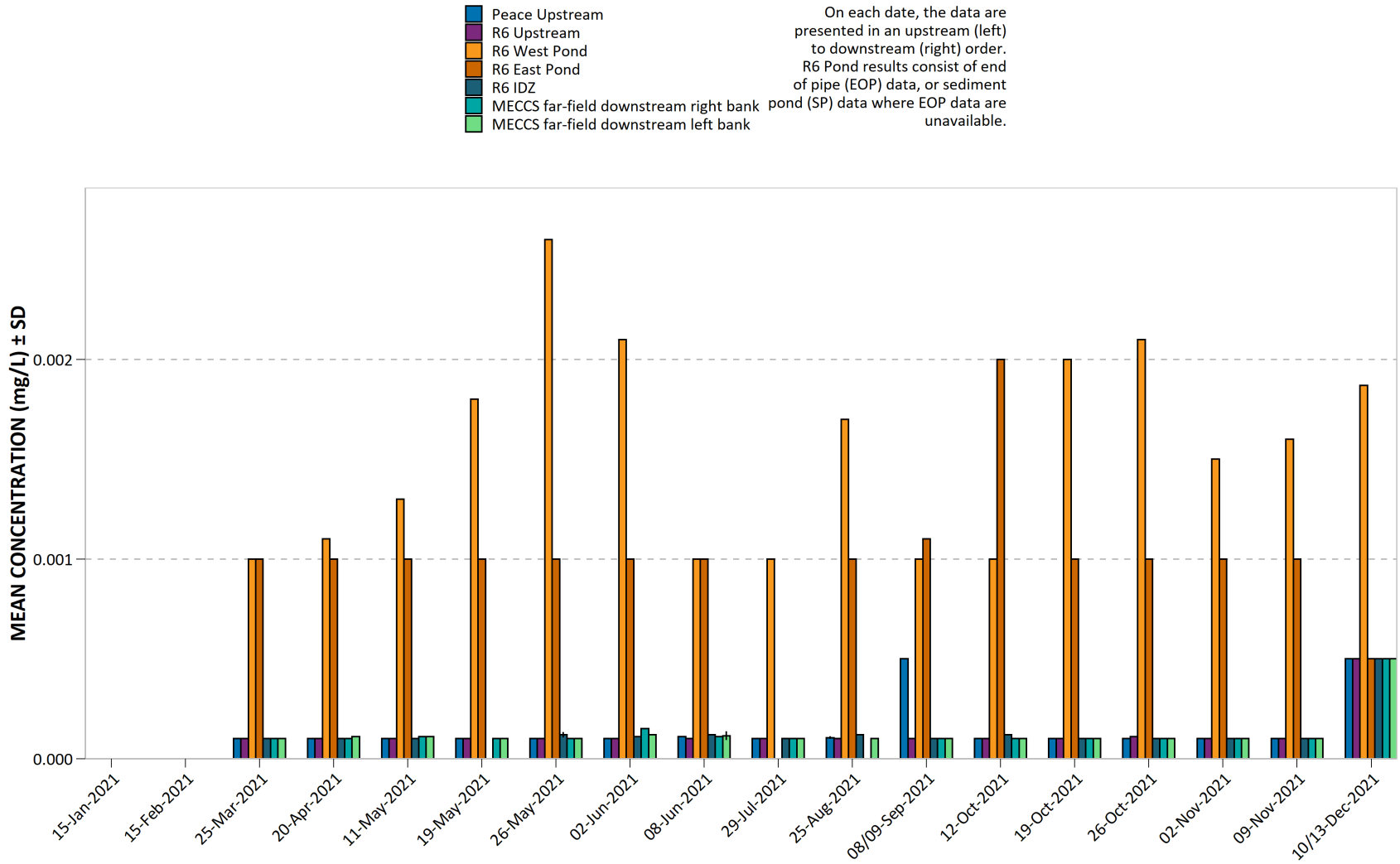


Figure 65. 2021 Peace River and RSEM R6 pond dissolved cobalt (Co).

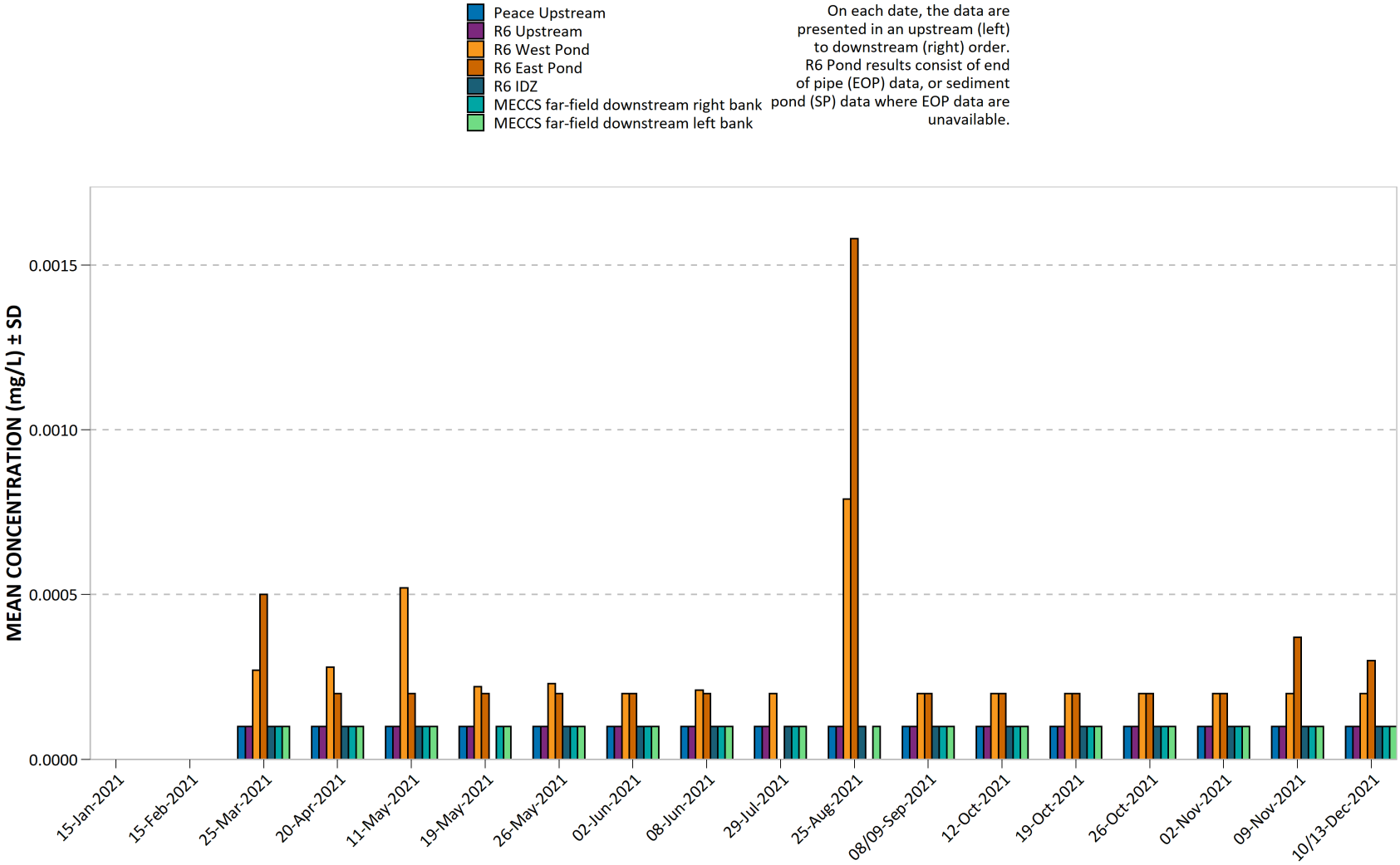


Figure 66. 2021 Peace River and RSEM R6 pond dissolved copper (Cu).

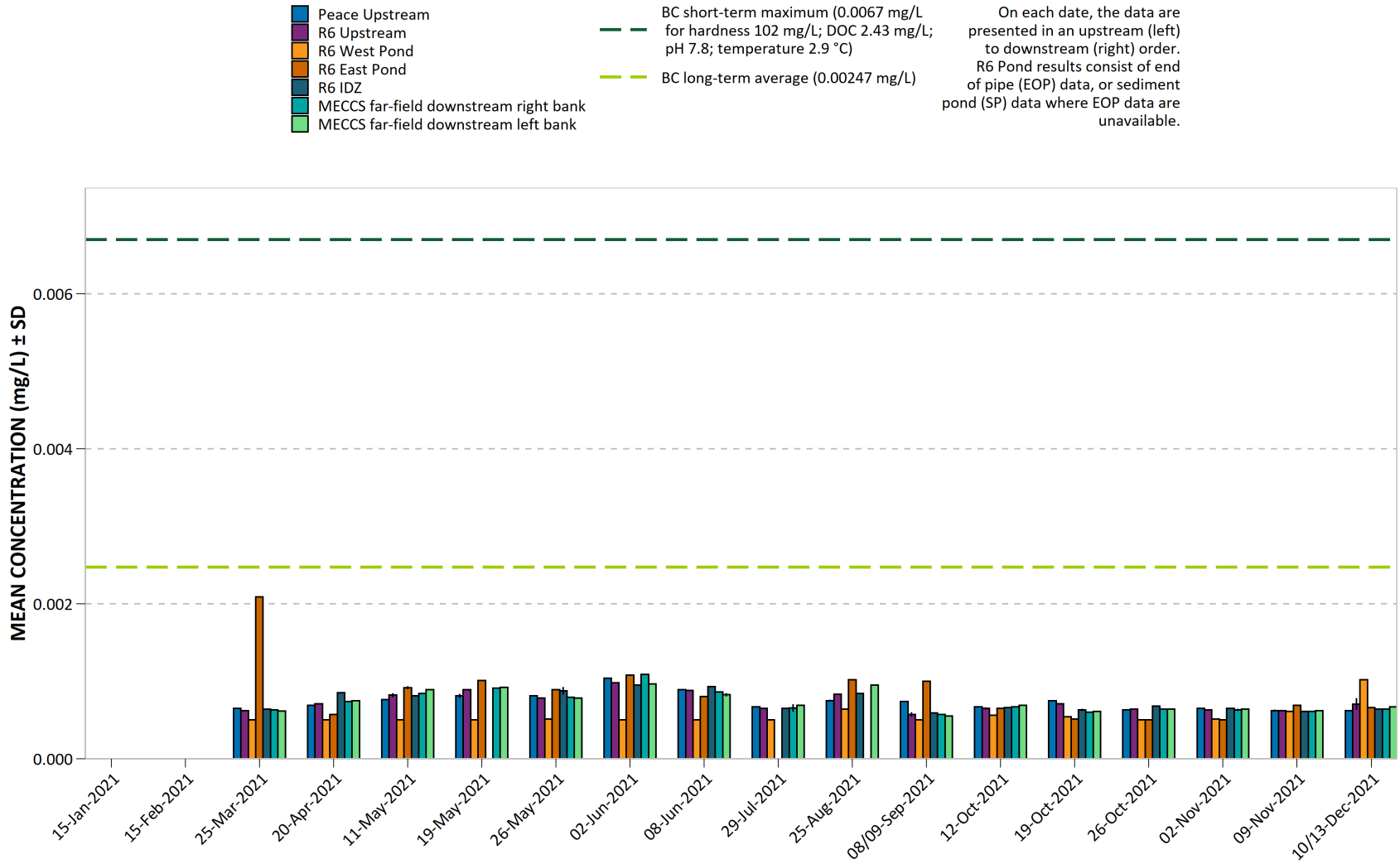


Figure 67. 2021 Peace River and RSEM R6 pond dissolved iron (Fe).

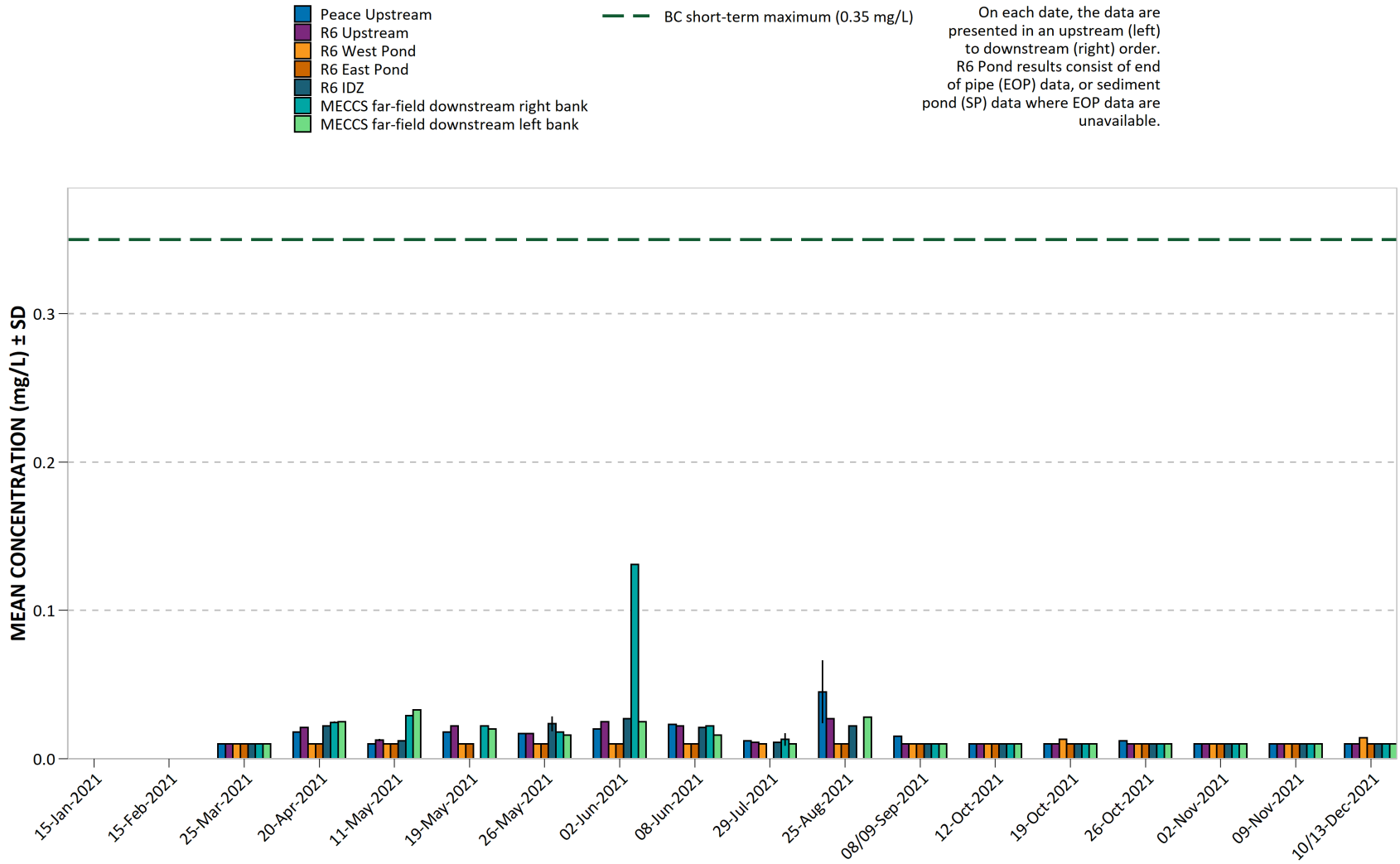


Figure 68. 2021 Peace River and RSEM R6 pond dissolved lead (Pb).

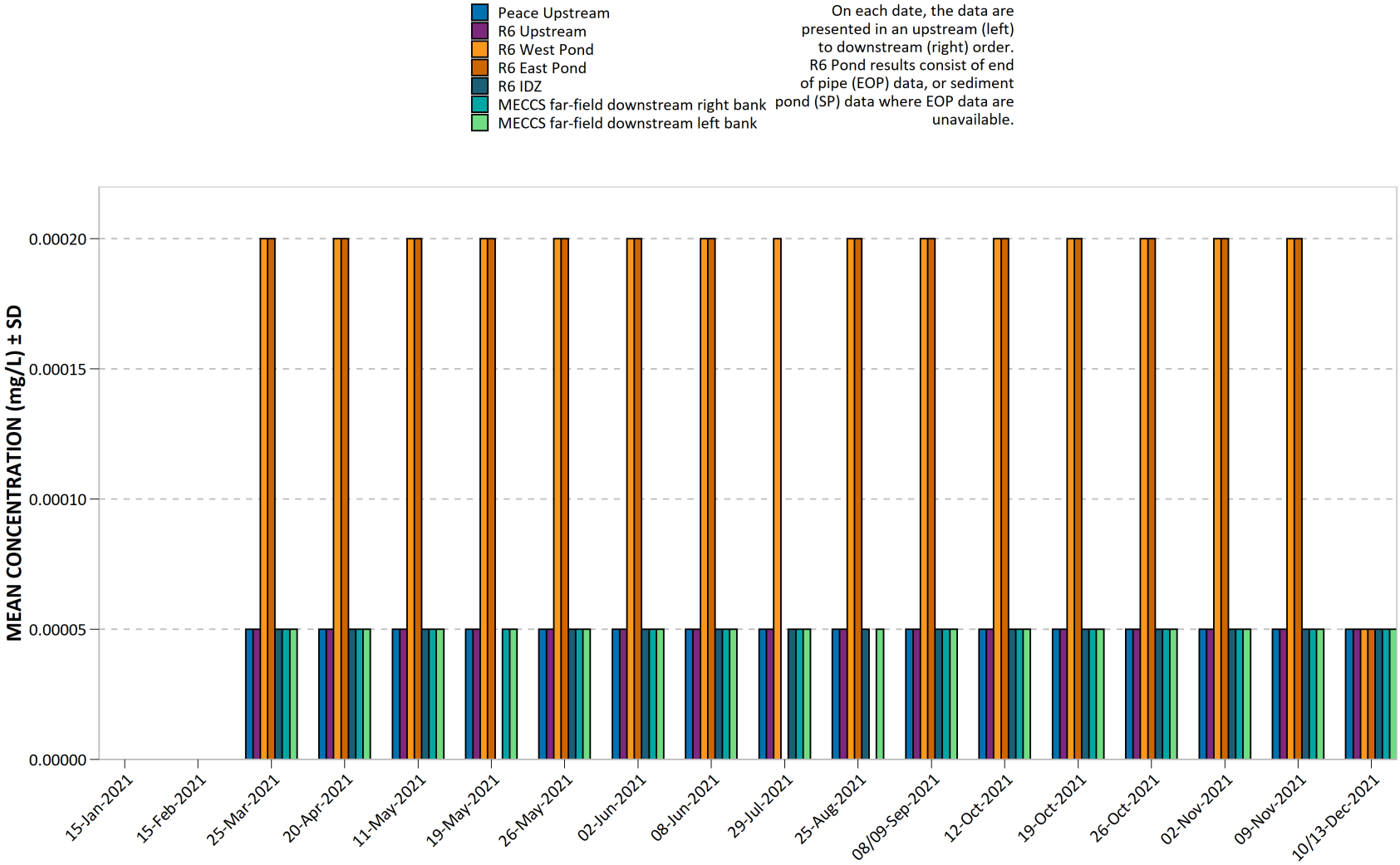


Figure 69. 2021 Peace River and RSEM R6 pond dissolved lithium (Li).

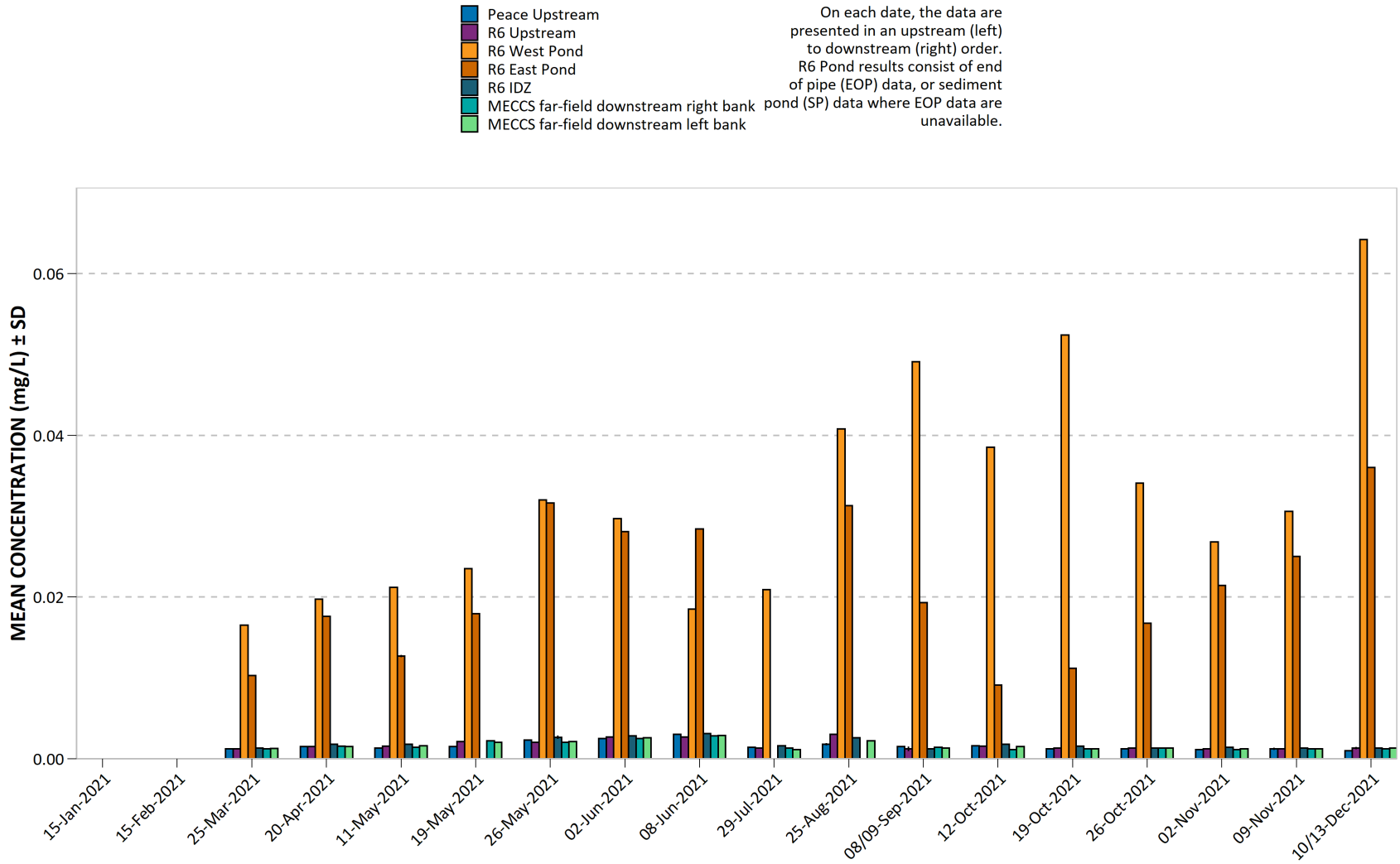


Figure 70. 2021 Peace River and RSEM R6 pond dissolved magnesium (Mg).

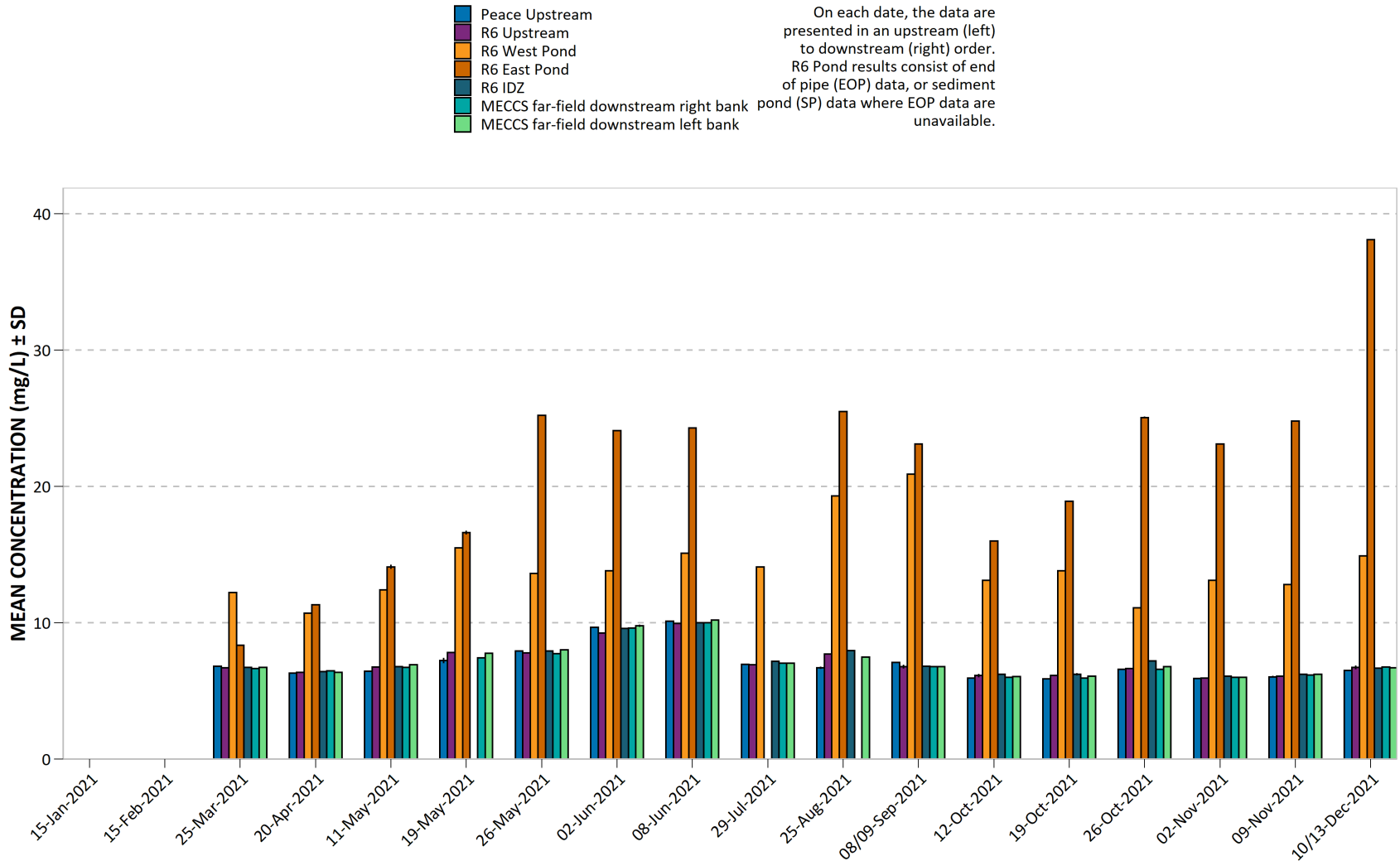


Figure 71. 2021 Peace River and RSEM R6 pond dissolved manganese (Mn).

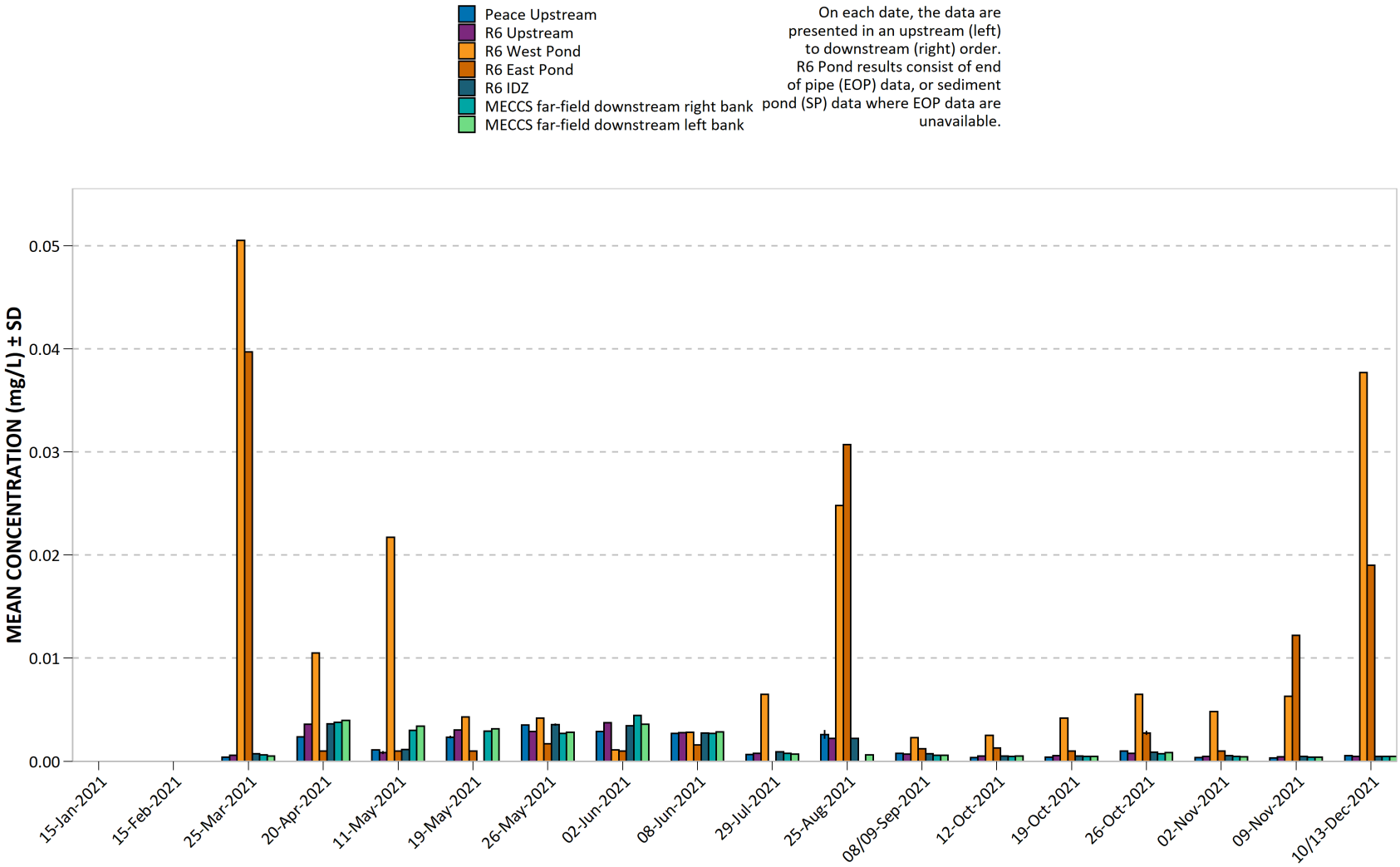


Figure 72. 2021 Peace River and RSEM R6 pond dissolved mercury (Hg).

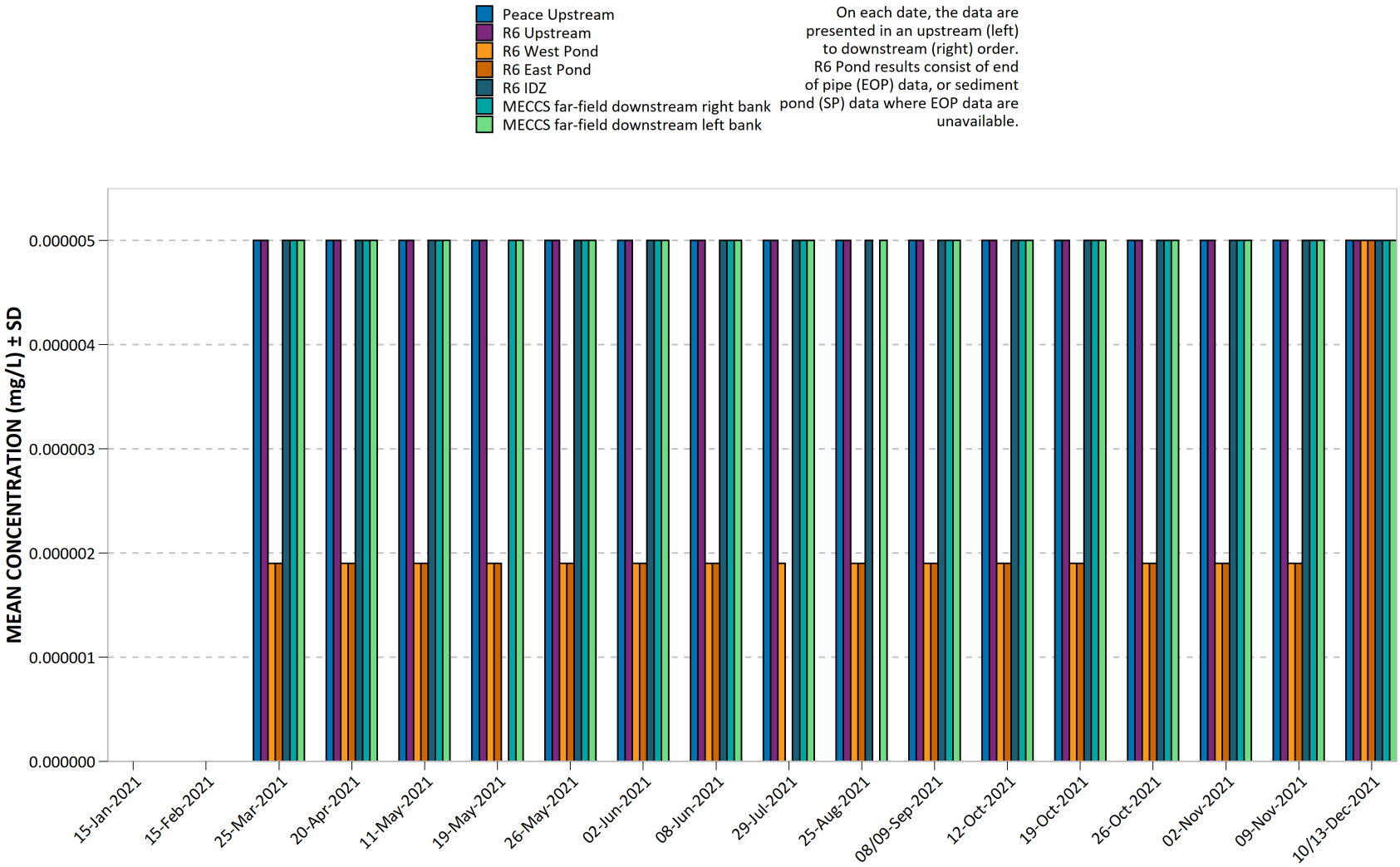


Figure 73. 2021 Peace River and RSEM R6 pond dissolved molybdenum (Mo).

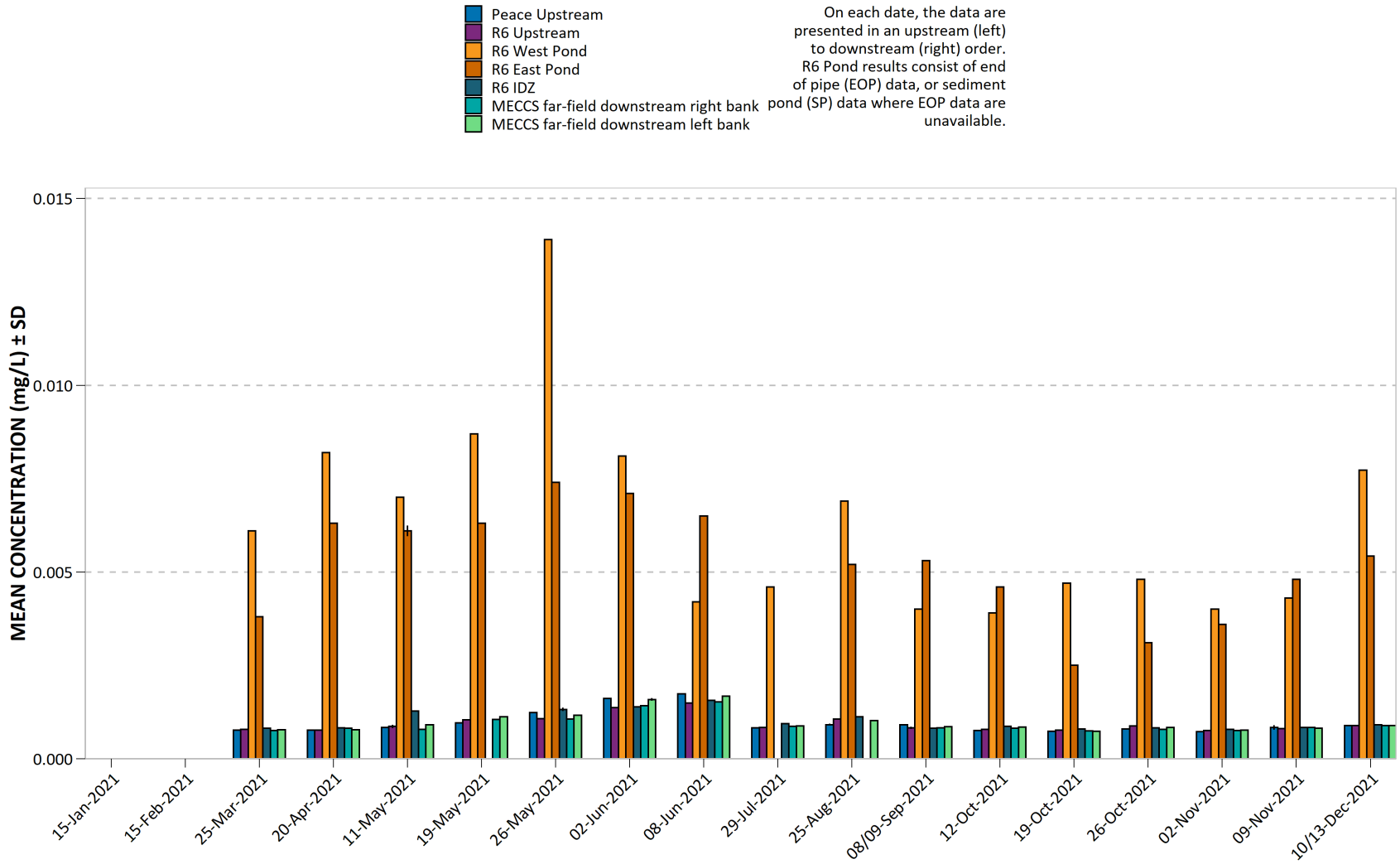


Figure 74. 2021 Peace River and RSEM R6 pond dissolved nickel (Ni).

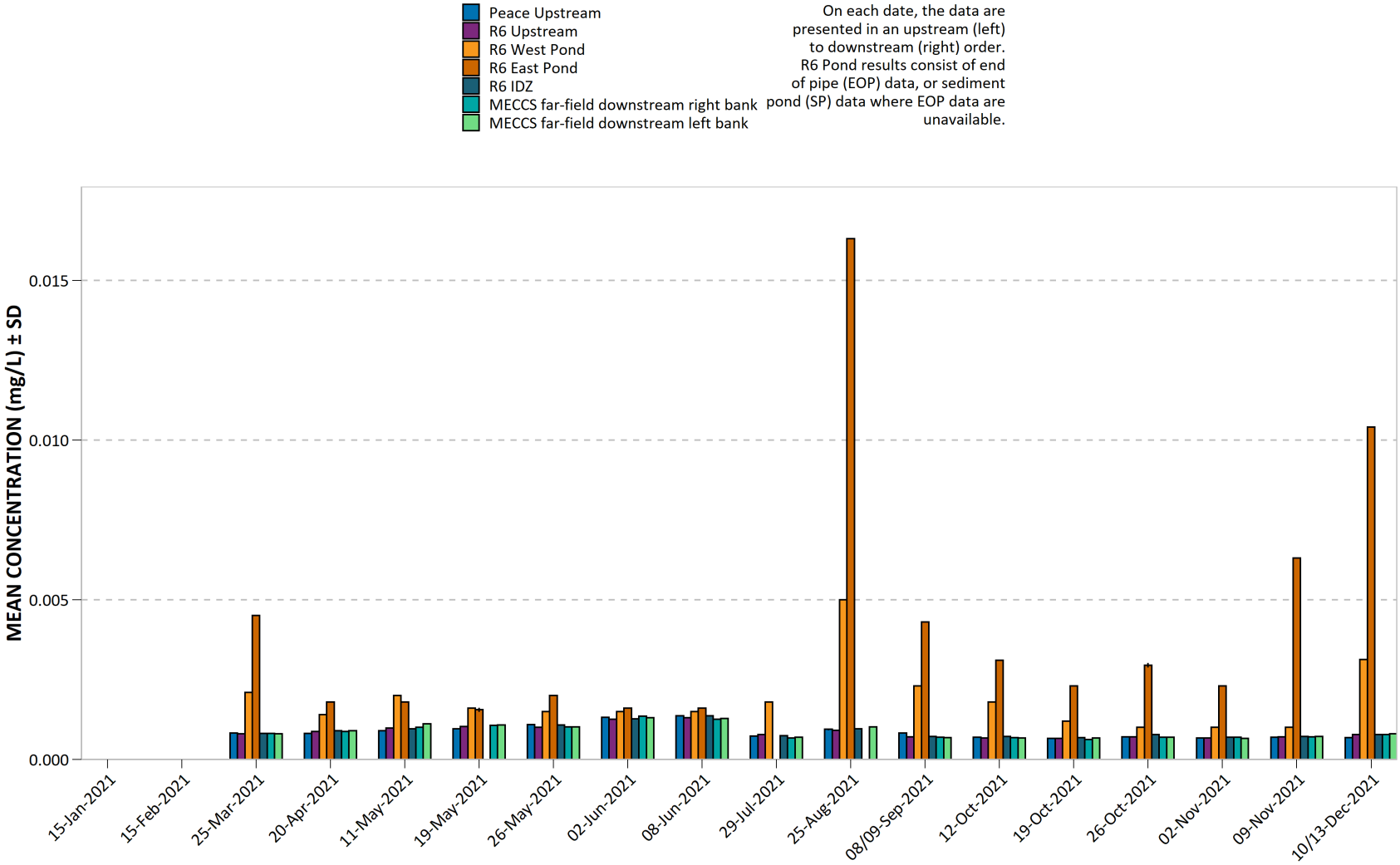


Figure 75. 2021 Peace River and RSEM R6 pond dissolved potassium (K).

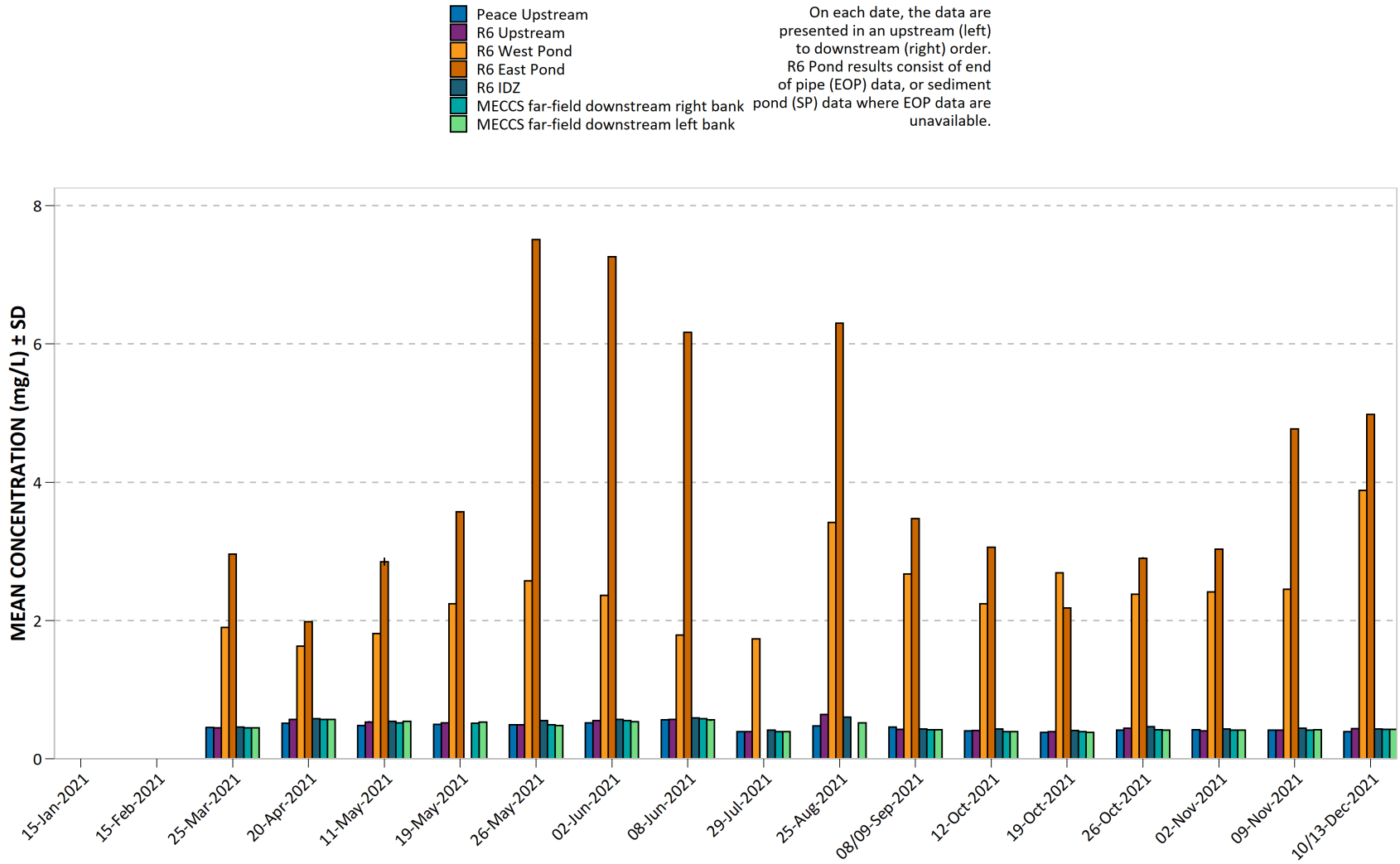


Figure 76. 2021 Peace River and RSEM R6 pond dissolved selenium (Se).

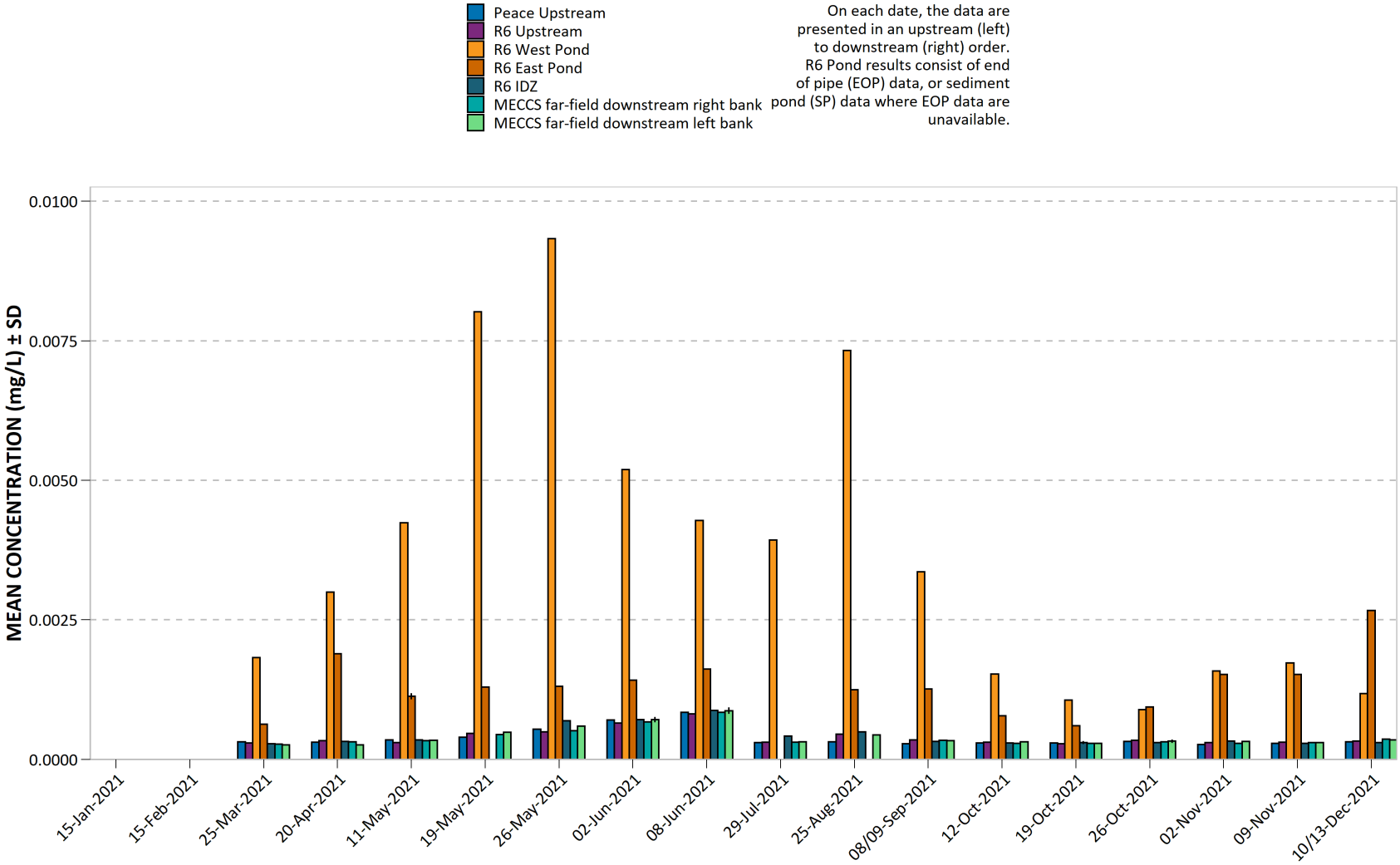


Figure 77. 2021 Peace River and RSEM R6 pond dissolved silicon (Si).

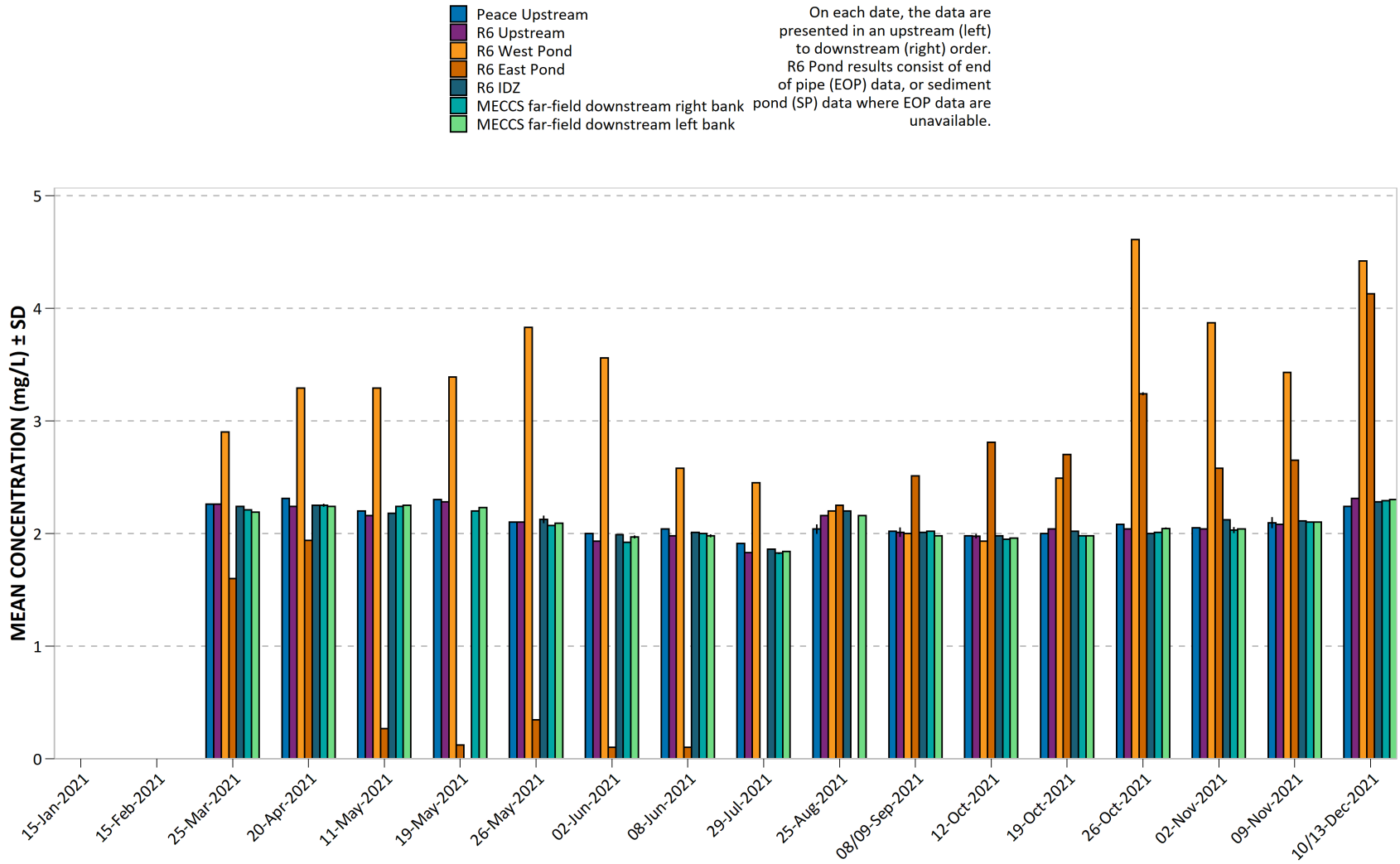


Figure 78. 2021 Peace River and RSEM R6 pond dissolved silver (Ag).

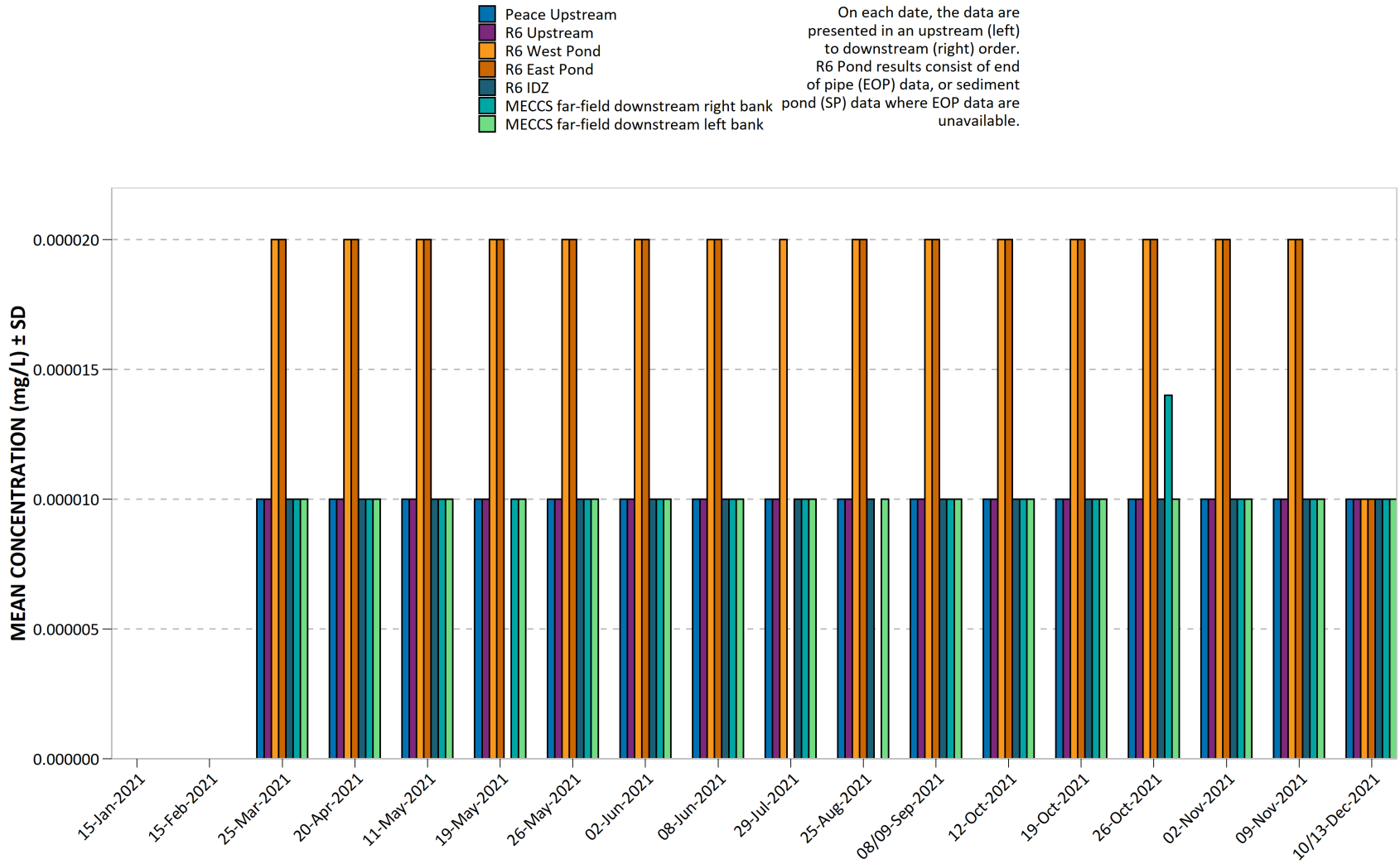


Figure 79. 2021 Peace River and RSEM R6 pond dissolved sodium (Na).

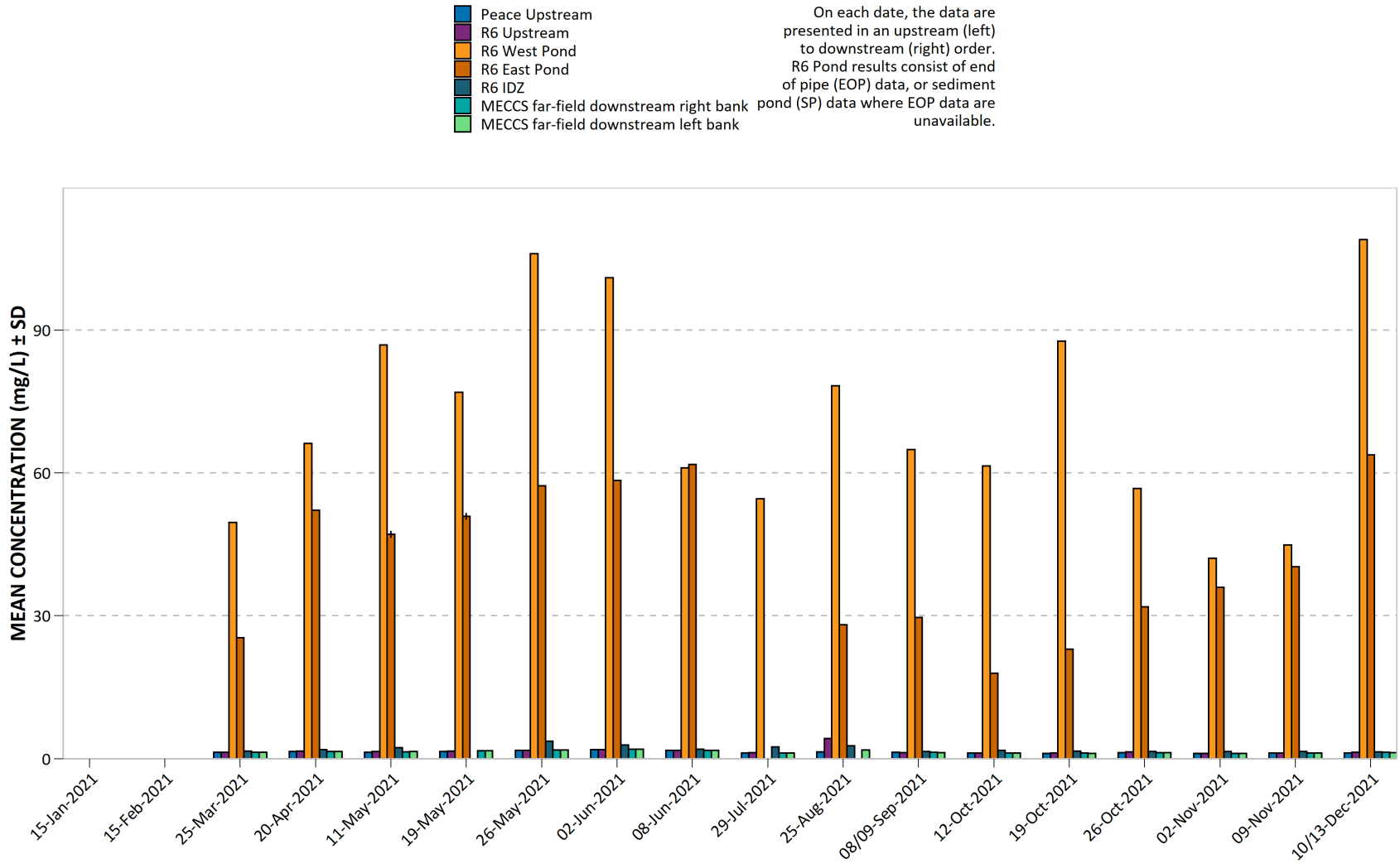


Figure 80. 2021 Peace River and RSEM R6 pond dissolved strontium (Sr).

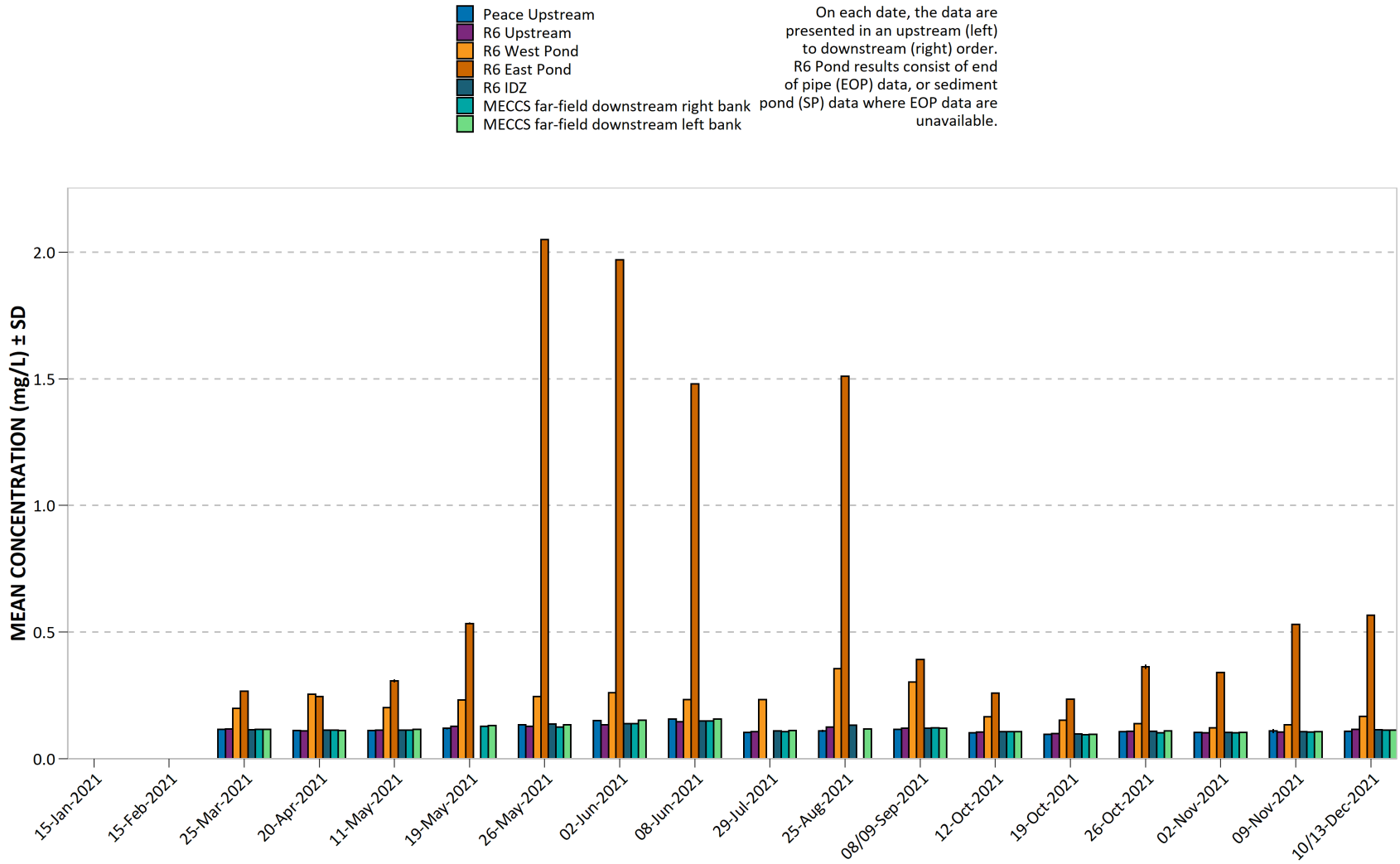


Figure 81. 2021 Peace River and RSEM R6 pond dissolved sulfur (S).

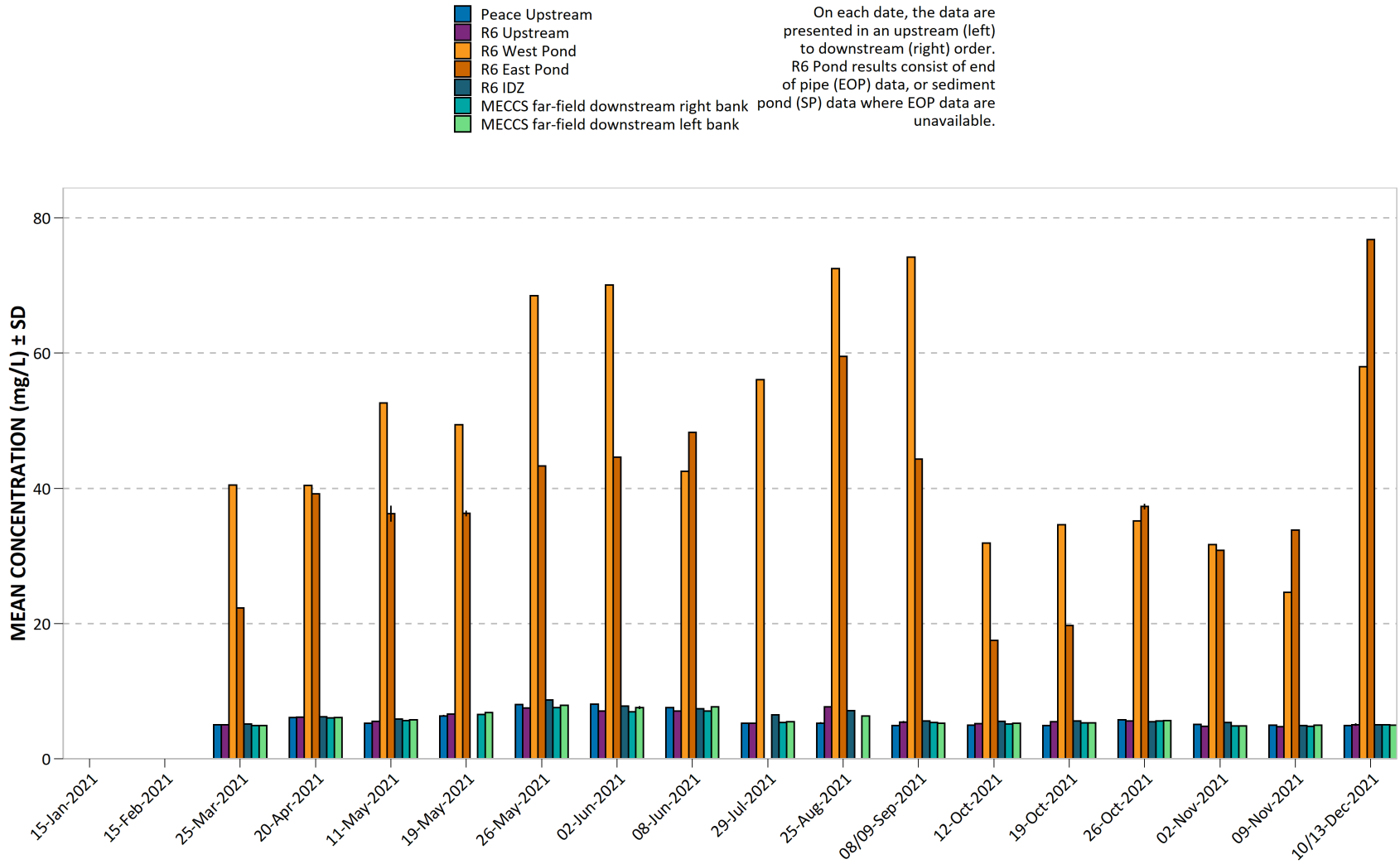


Figure 82. 2021 Peace River and RSEM R6 pond dissolved thallium (Tl).

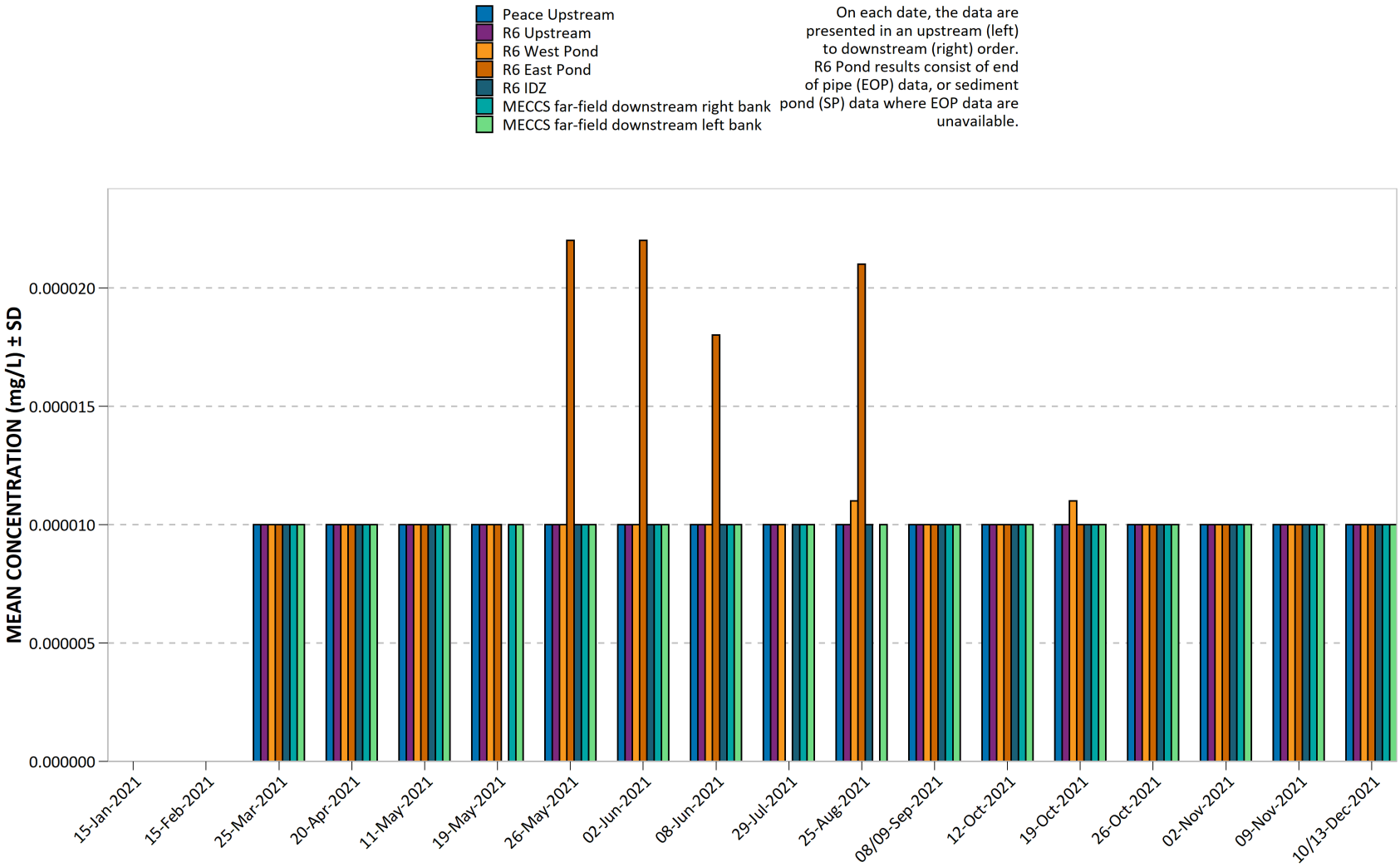


Figure 83. 2021 Peace River and RSEM R6 pond dissolved tin (Sn).

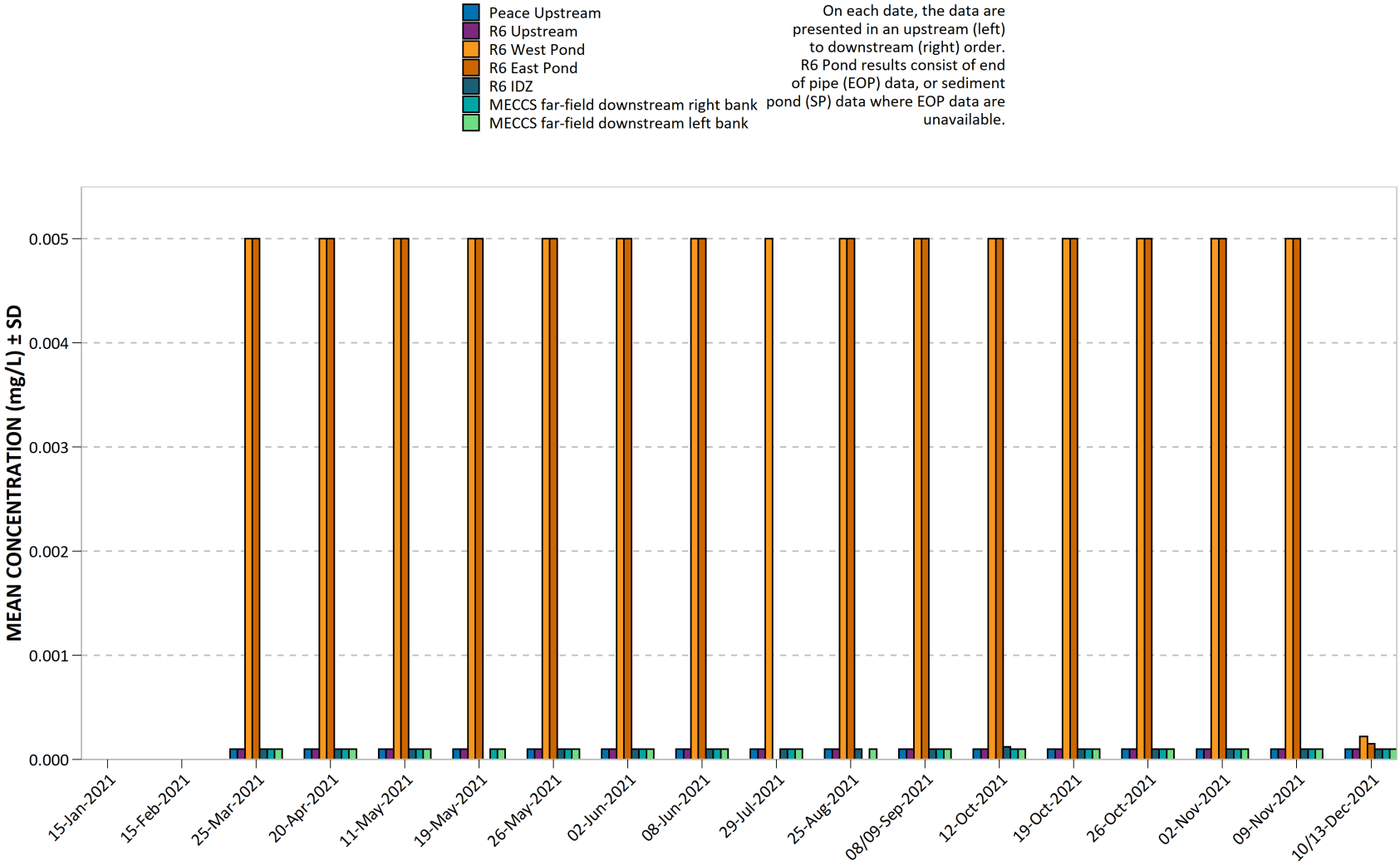


Figure 84. 2021 Peace River and RSEM R6 pond dissolved titanium (Ti).

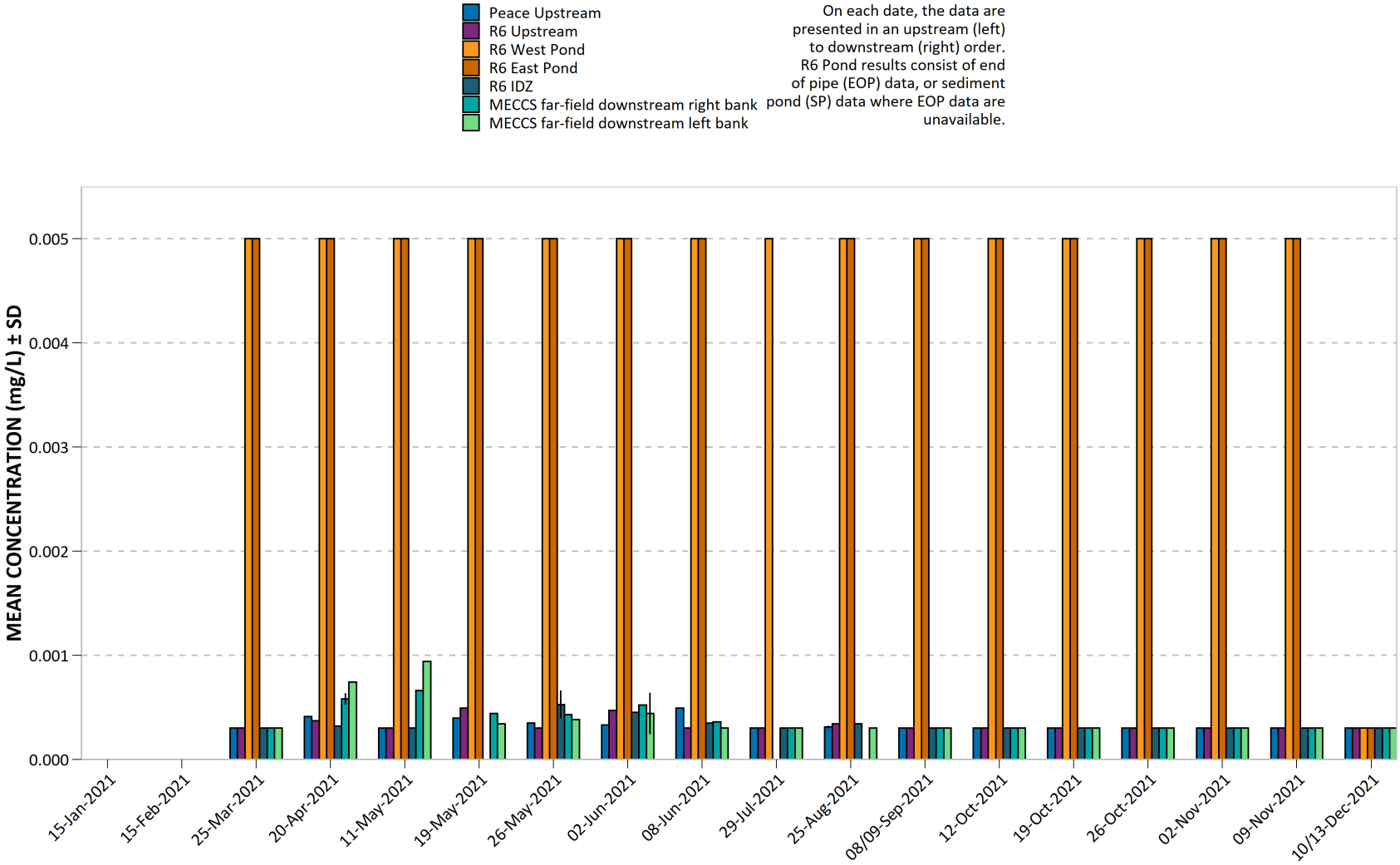


Figure 85. 2021 Peace River and RSEM R6 pond dissolved uranium (U).

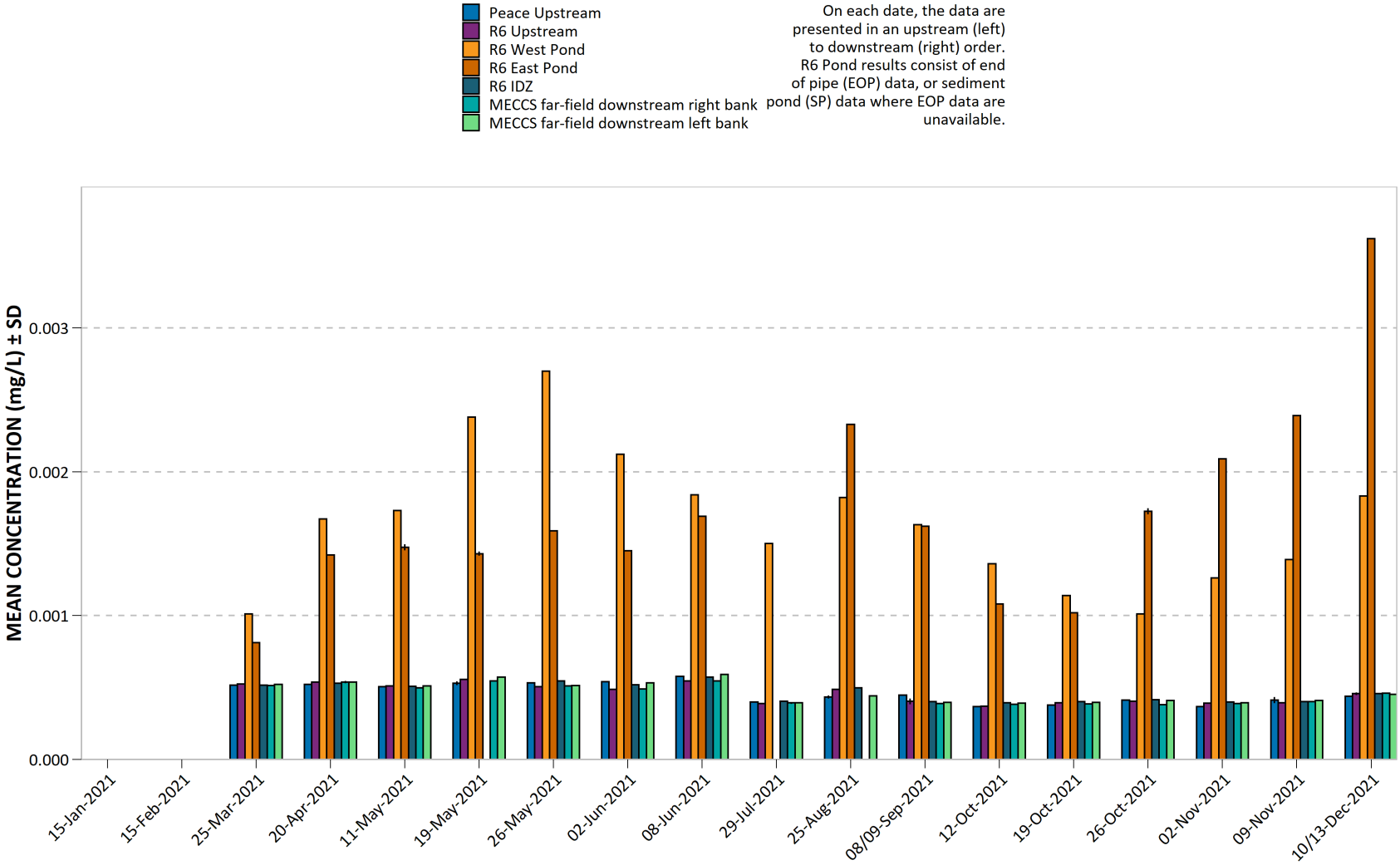


Figure 86. 2021 Peace River and RSEM R6 pond dissolved vanadium (V).

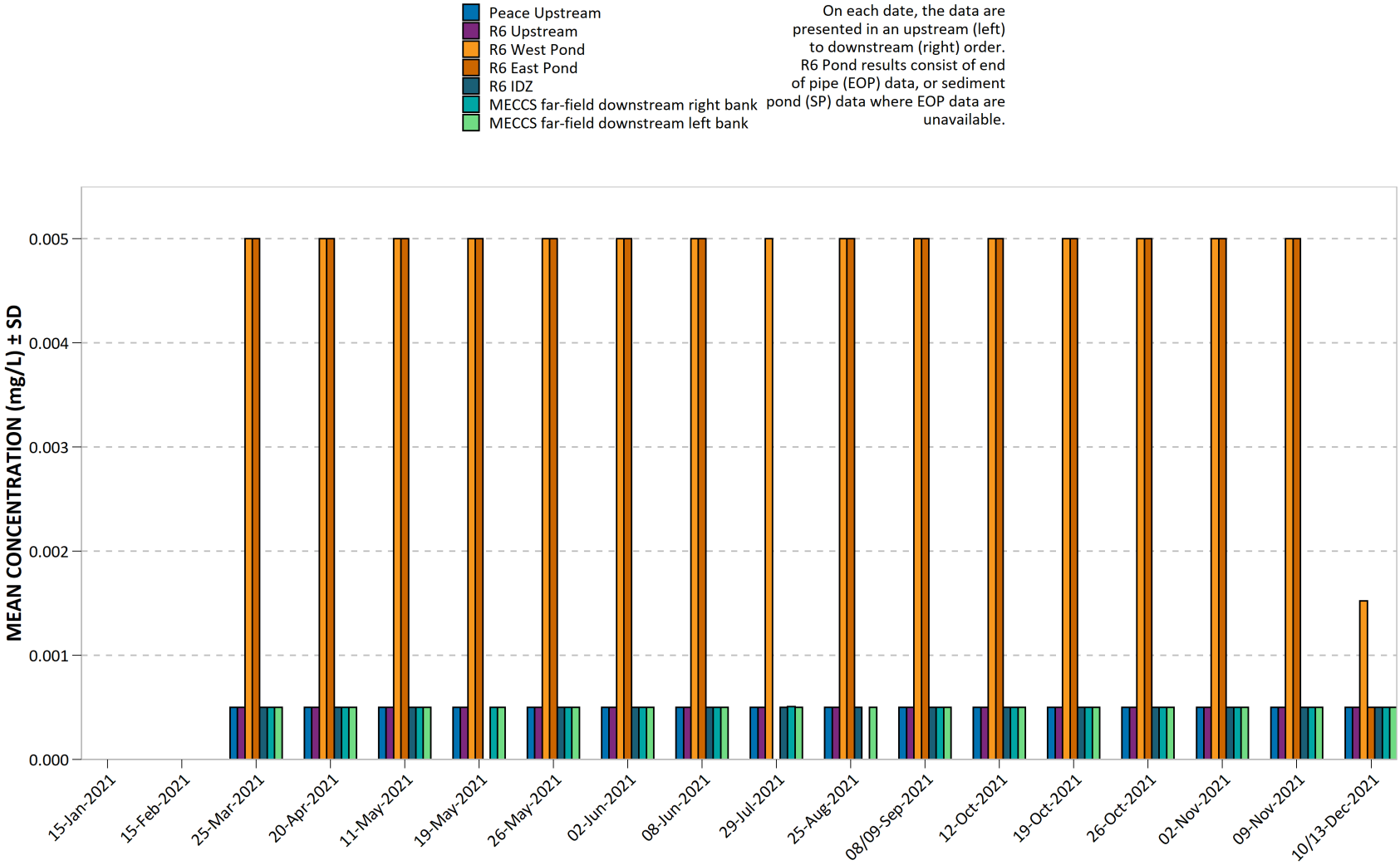


Figure 87. 2021 Peace River and RSEM R6 pond dissolved zinc (Zn).

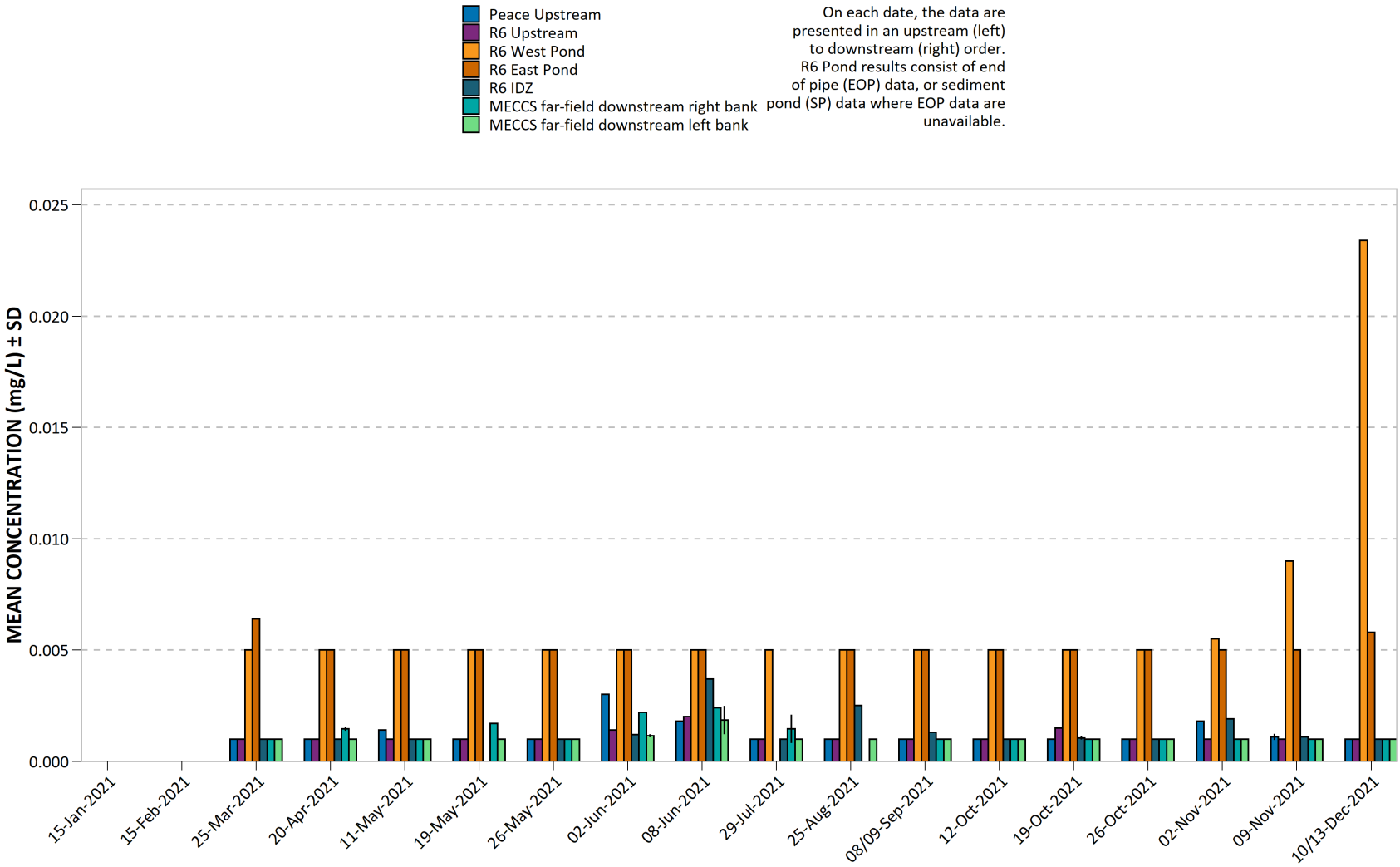
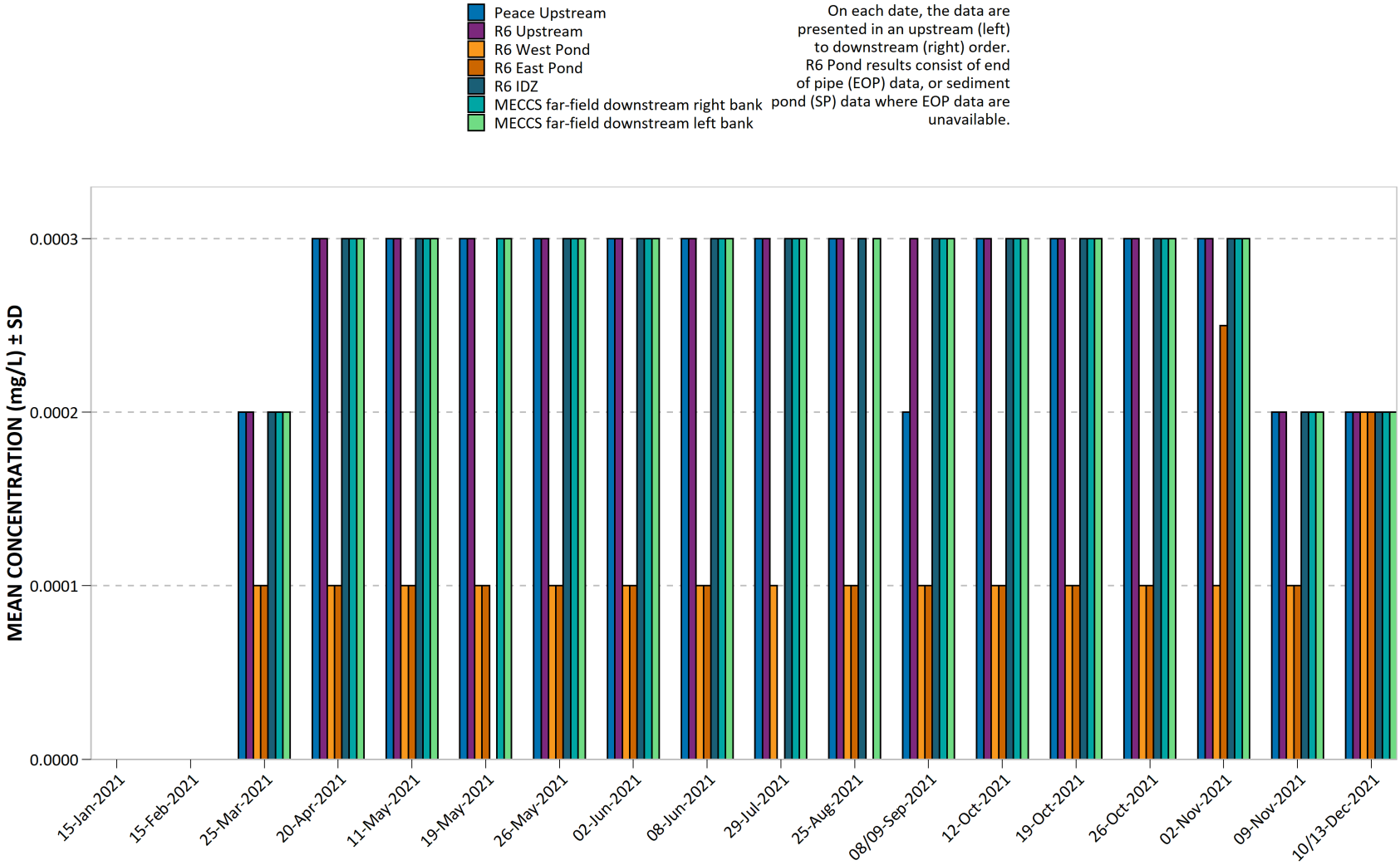


Figure 88. 2021 Peace River and RSEM R6 pond dissolved zirconium (Zr).



Appendix C. Site C PAG Contact RSEM Surface Water Quality Monitoring Time Series Plots – L6 Monthly Data

L6 does not normally discharge to the Peace River; on November 9 – 10, 2021 it was dewatered by pumping the water in the pond to the Peace River. The following time series plots depict data collected on November 9, 2021 for each parameter at the PAG-contact RSEM pond L6 and the corresponding Peace River monitoring sites. Unless otherwise specified, all data are laboratory analytical results. Peace River samples were collected by Ecofish and included a field blank, travel blank and duplicate sample for QA/QC purposes. RSEM pond data were provided by PRHP. Error bars are included when duplicate samples are collected. The location of duplicate sampling is varied with each sampling date. Similarly pond sampling duplicates are collected periodically, and error bars are included when duplicate sampling in the pond has occurred.

Figure 89. 2021 Peace River (*in-situ*) and RSEM L6 pond (lab) specific conductivity.

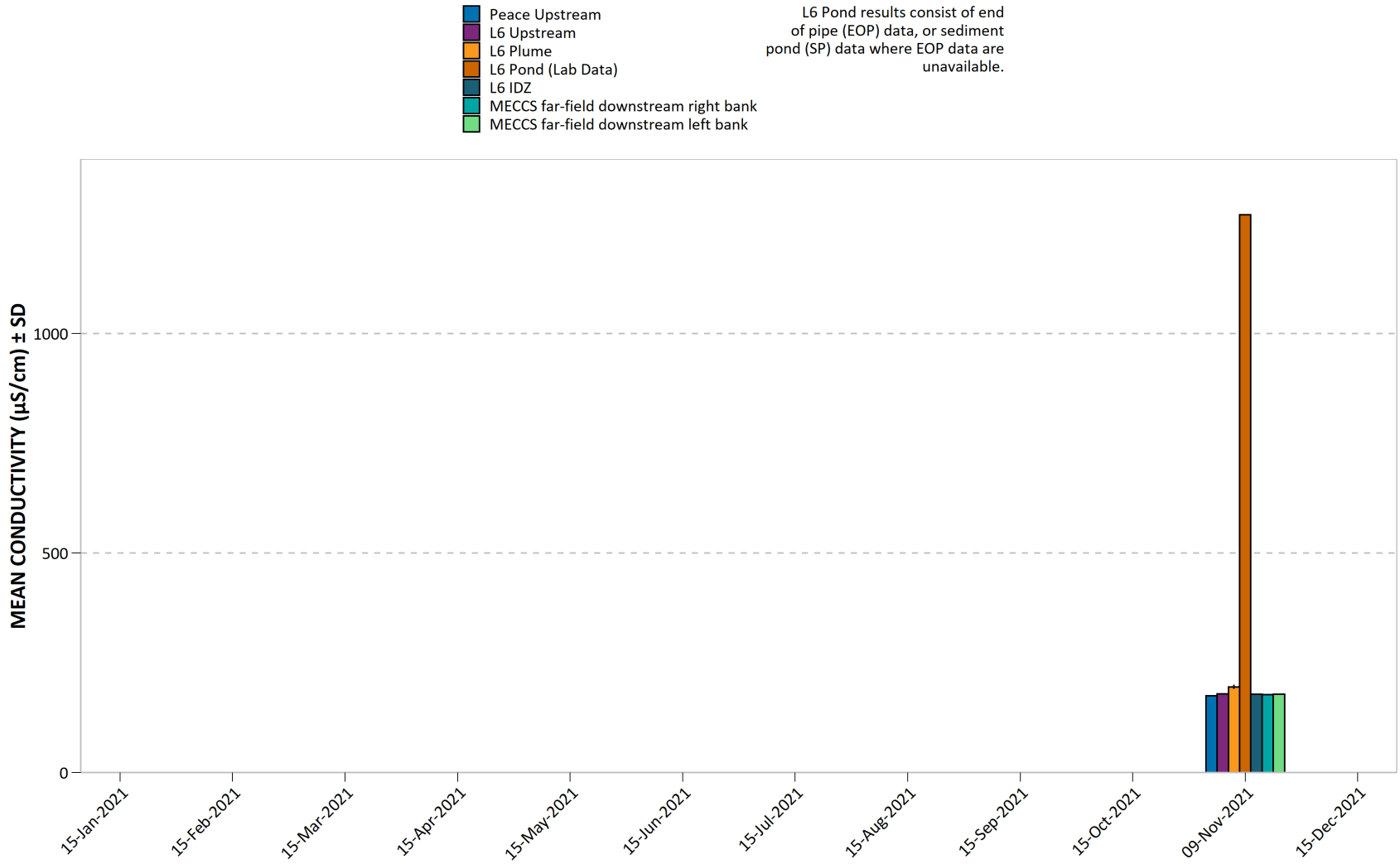


Figure 90. 2021 Peace River and RSEM L6 pond lab specific conductivity.

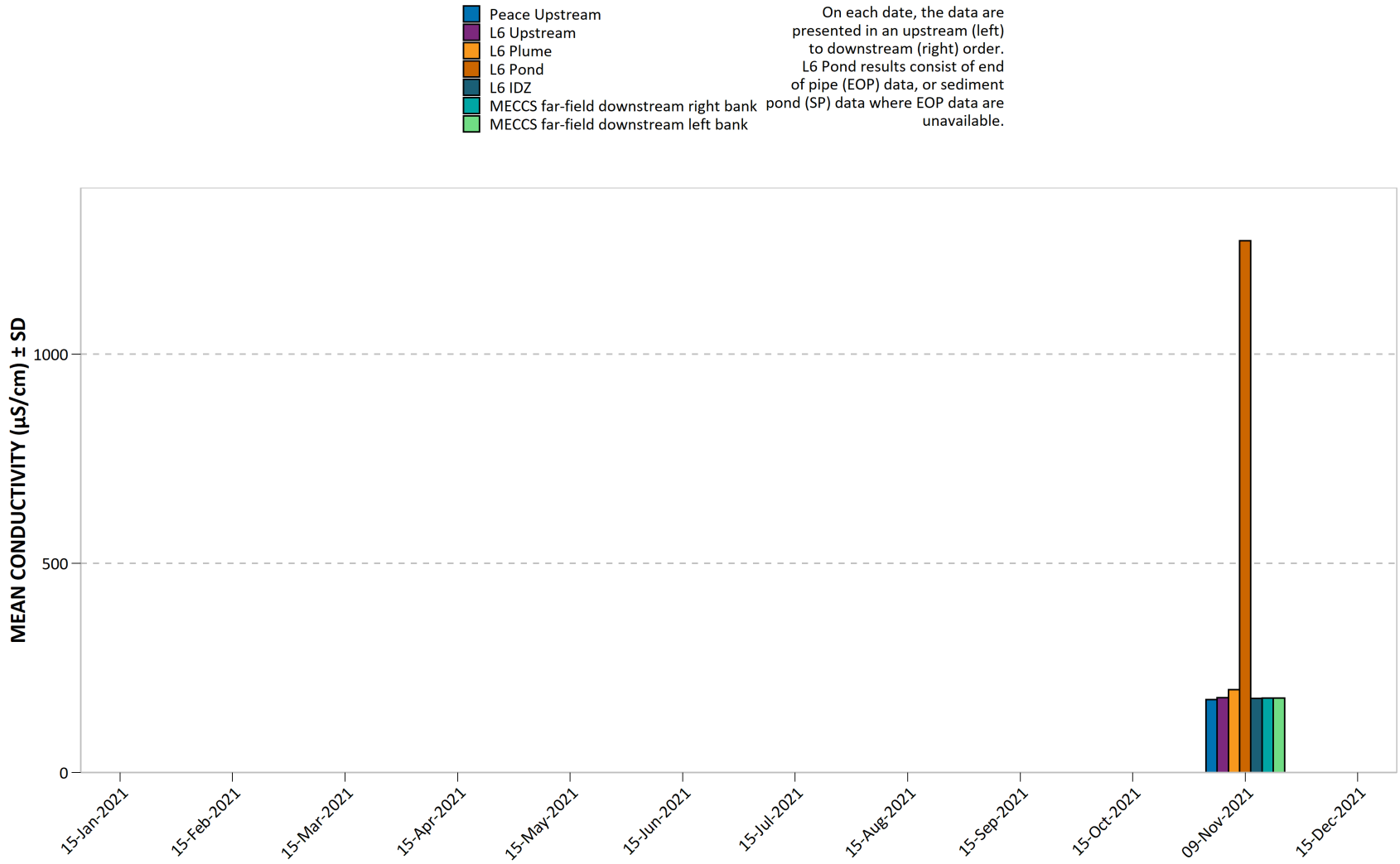


Figure 91. 2021 Peace River and RSEM L6 pond hardness (as $CaCO_3$).

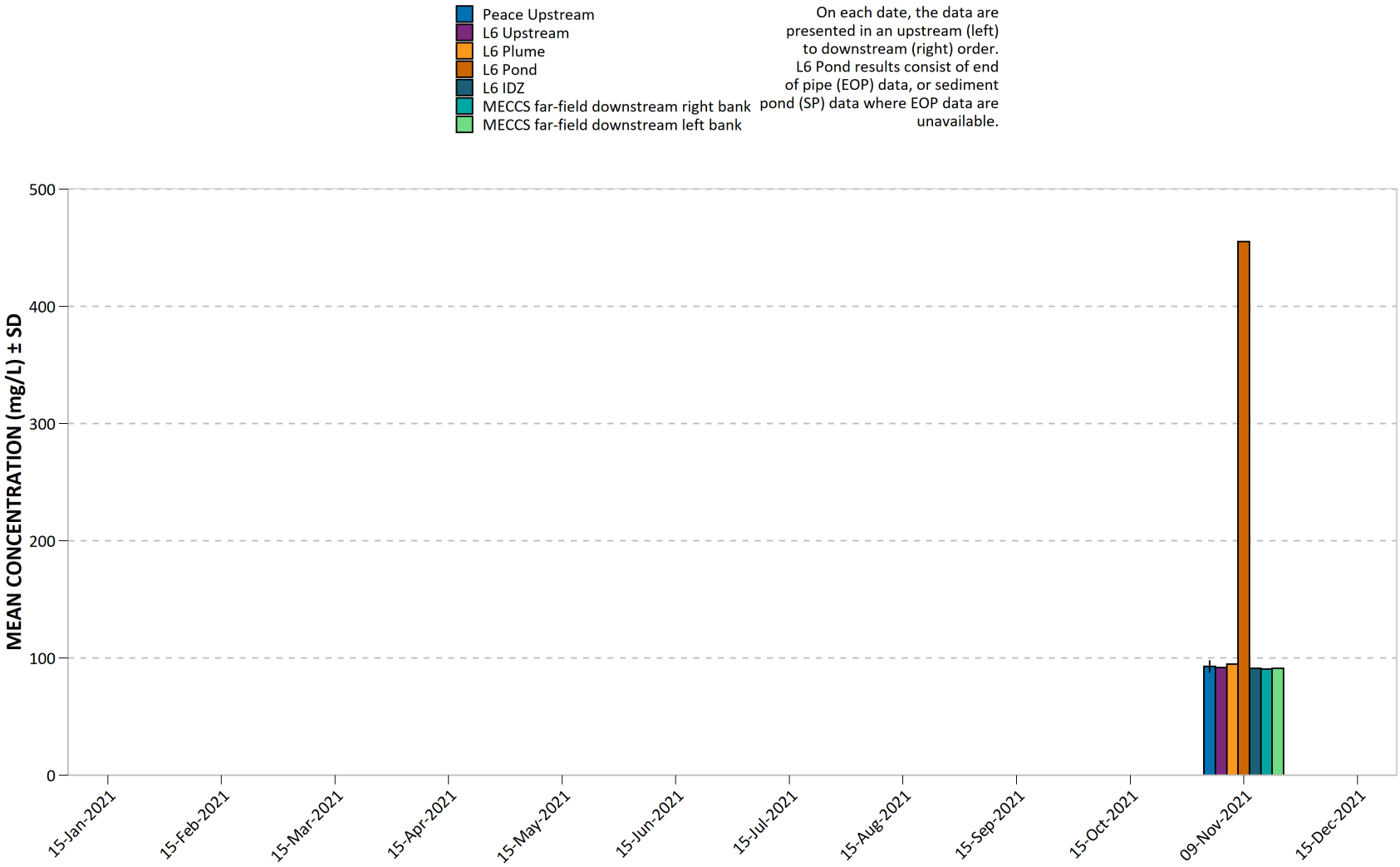


Figure 92. 2021 Peace River and RSEM L6 pond total dissolved solids (TDS).

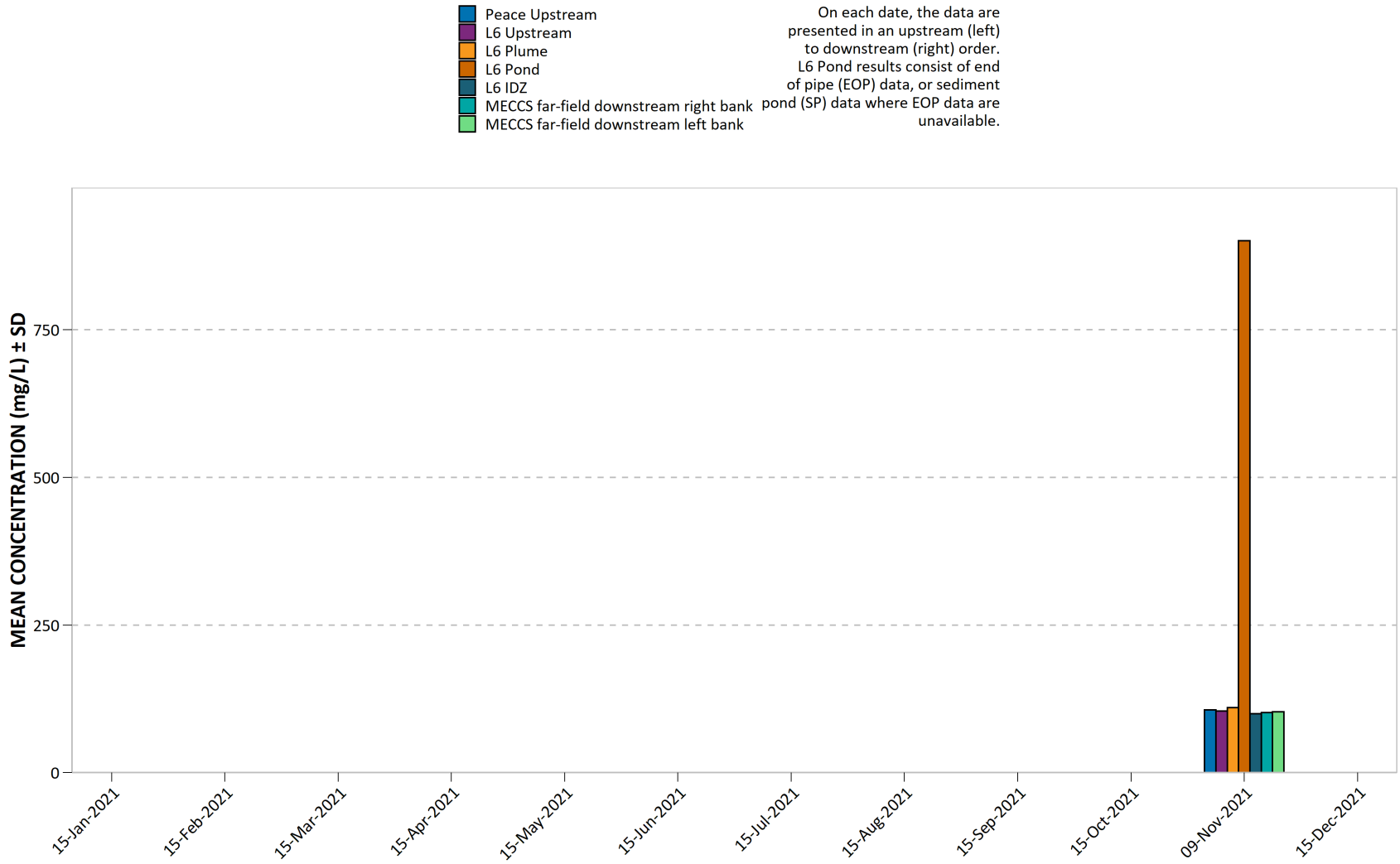


Figure 93. 2021 Peace River and RSEM L6 pond total suspended solids (TSS).

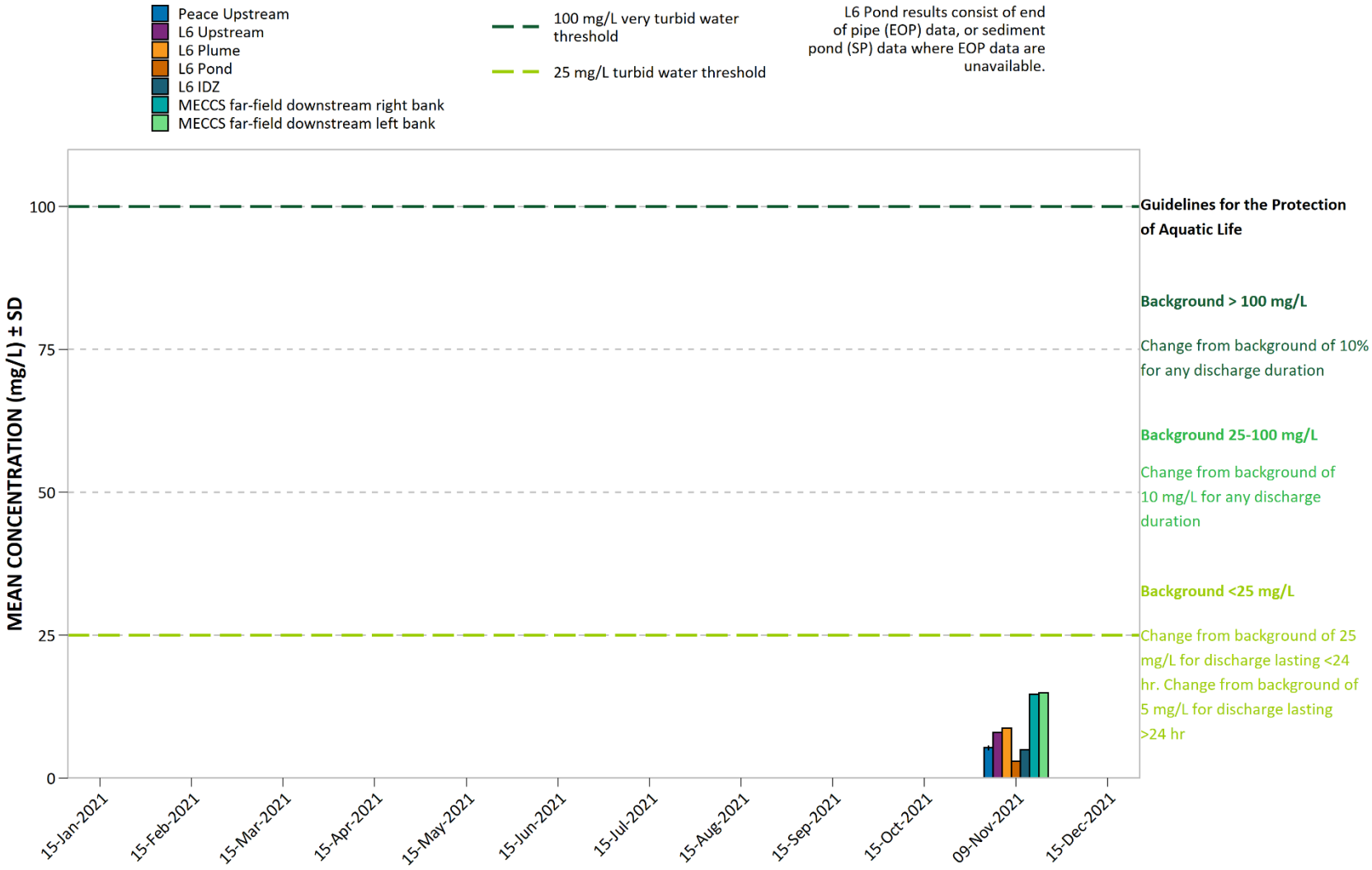


Figure 94. 2021 Peace River (*in-situ*) and RSEM L6 pond (lab) turbidity.

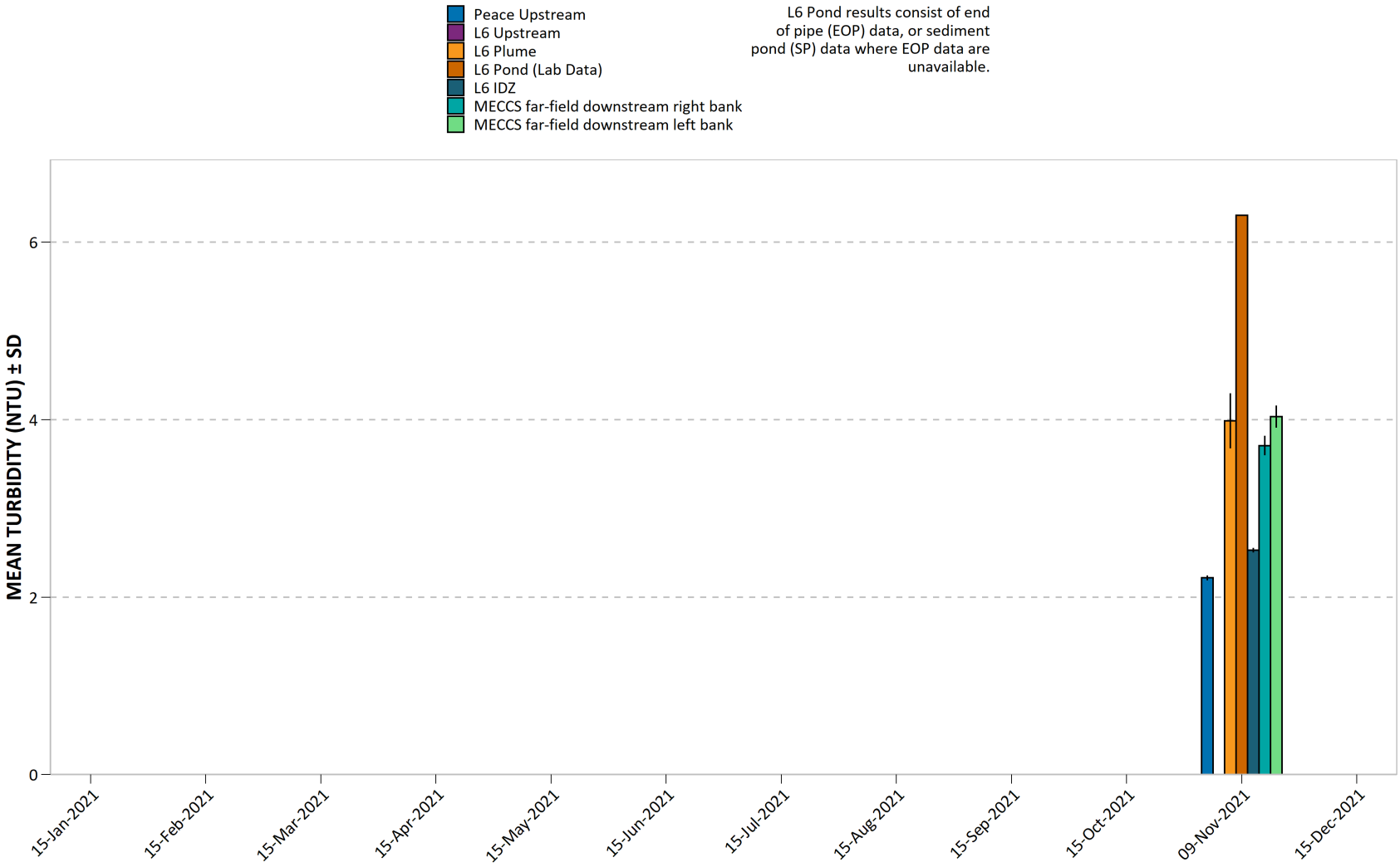


Figure 95. 2021 Peace River (*in-situ*) and RSEM L6 pond (lab) pH.

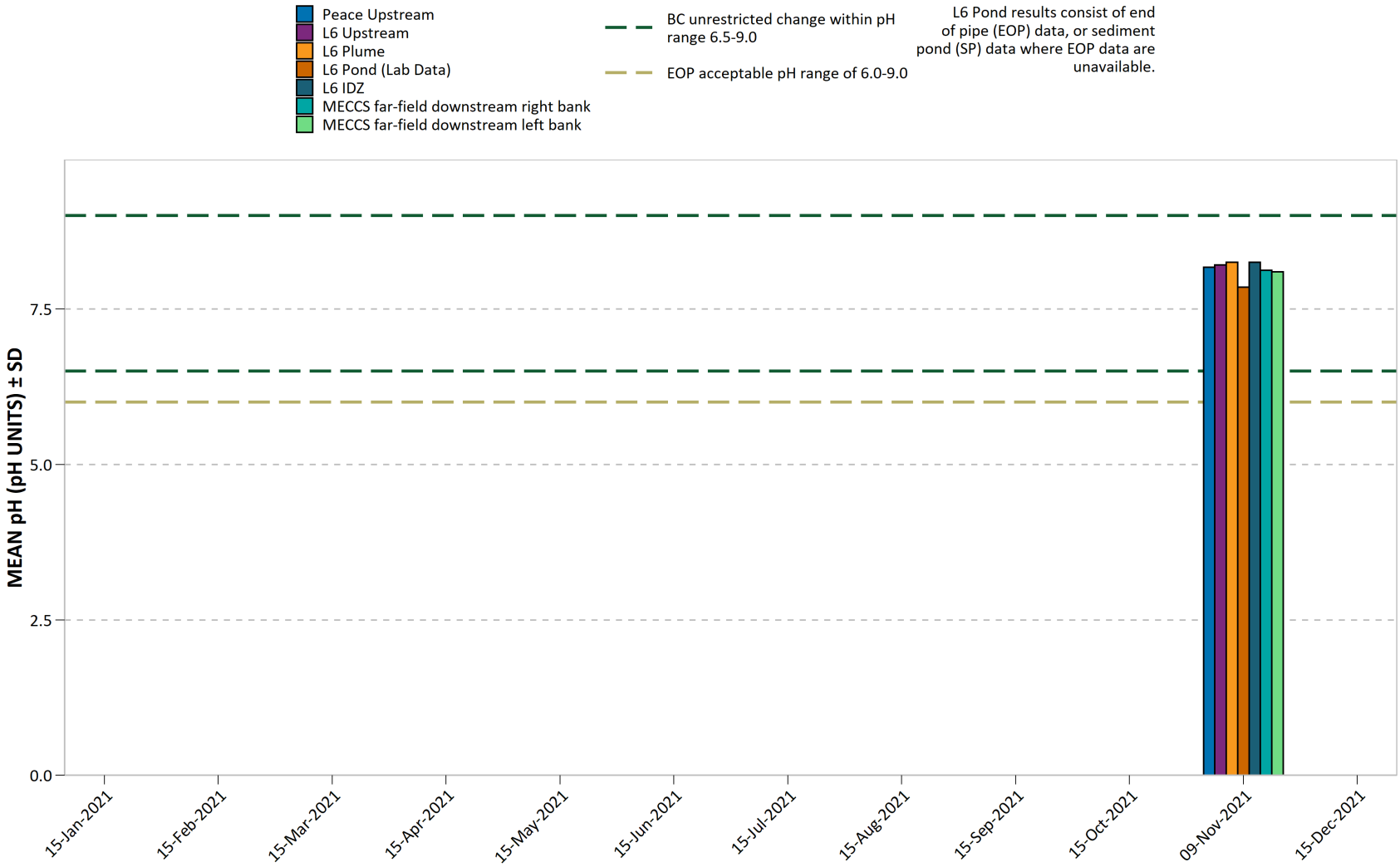


Figure 96. 2021 Peace River and RSEM L6 pond lab pH.

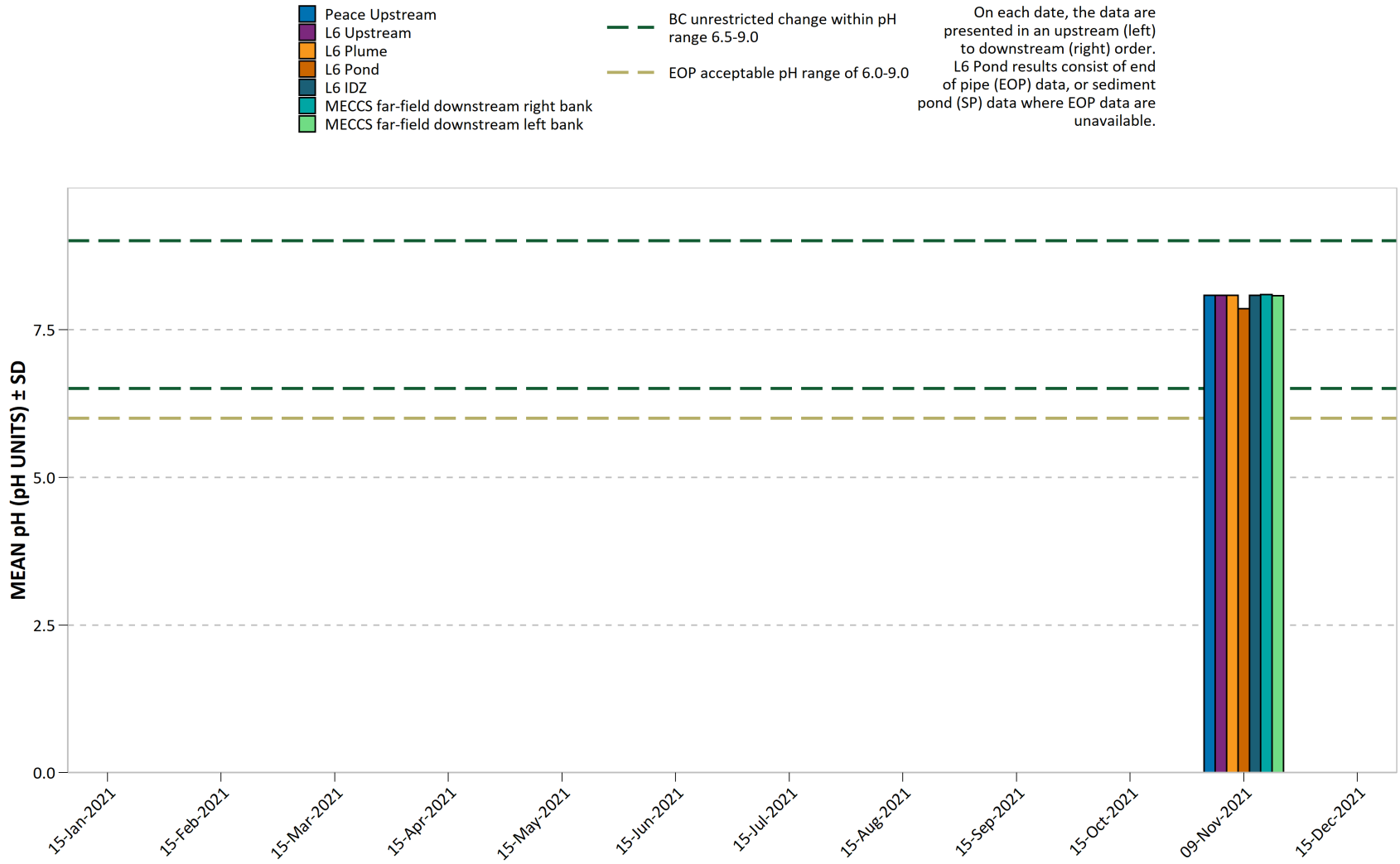


Figure 97. 2021 Peace River and RSEM L6 pond total alkalinity (as $CaCO_3$).

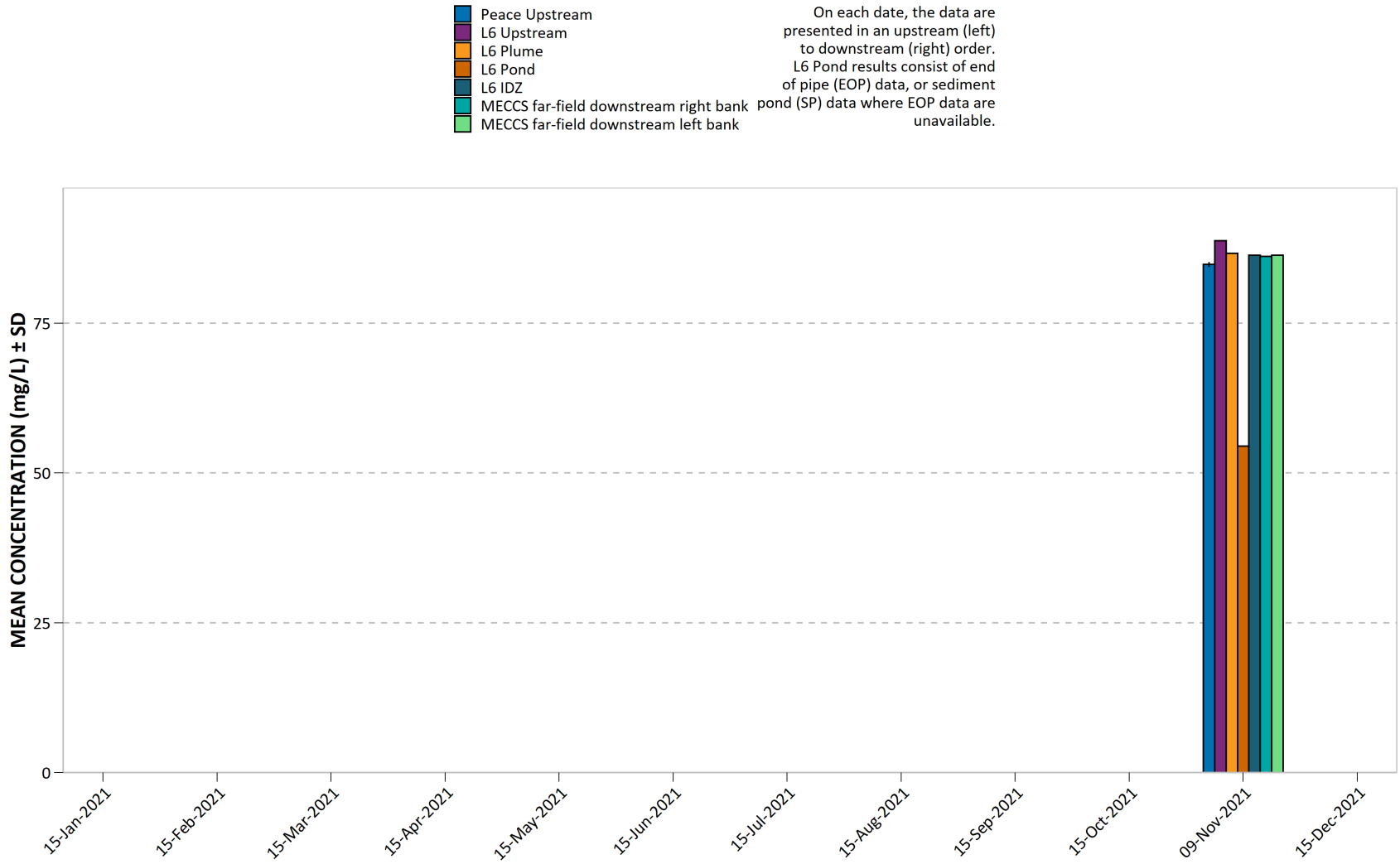


Figure 98. 2021 Peace River and RSEM L6 pond total ammonia (as N).

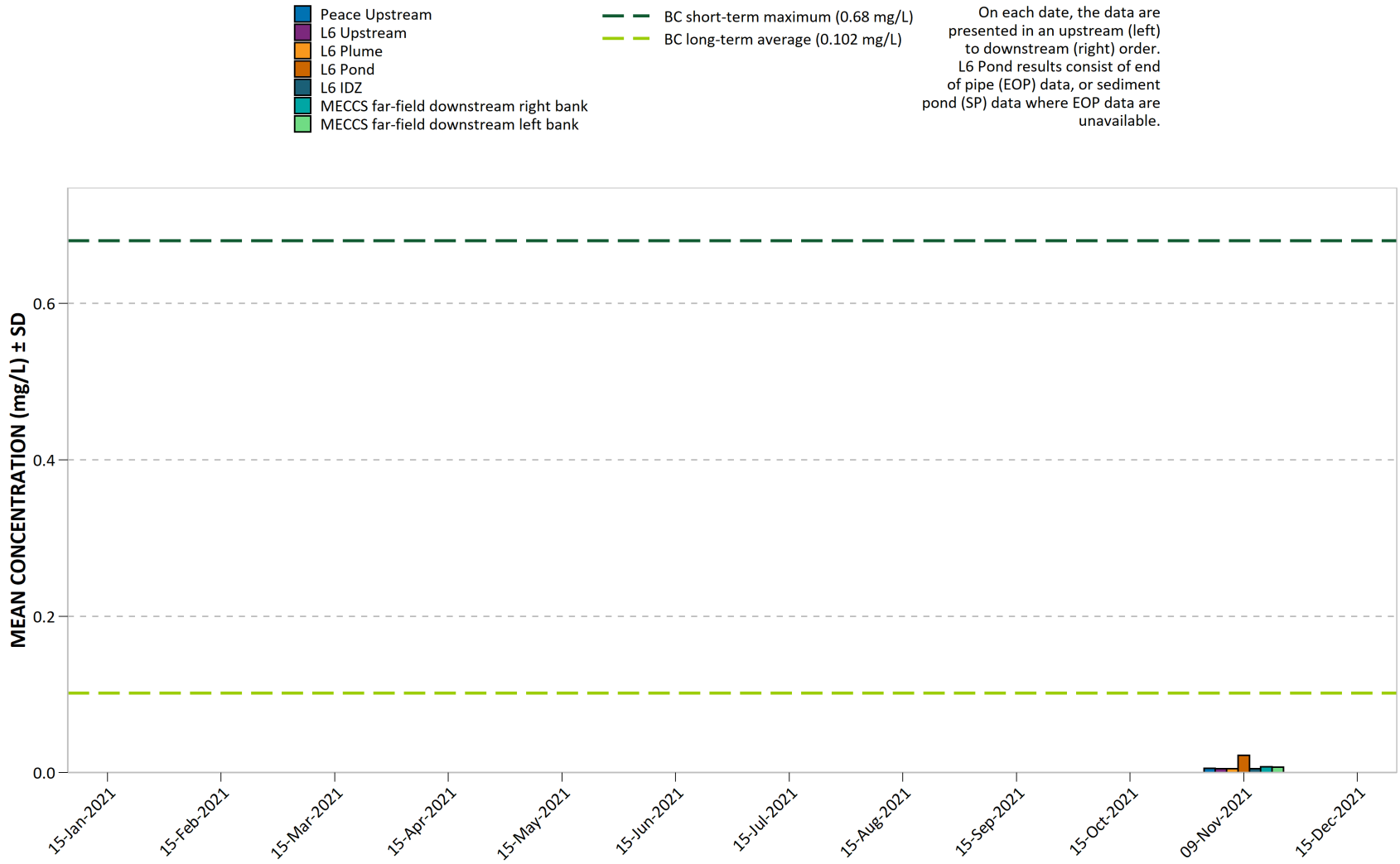


Figure 99. 2021 Peace River and RSEM L6 pond bromide (Br).

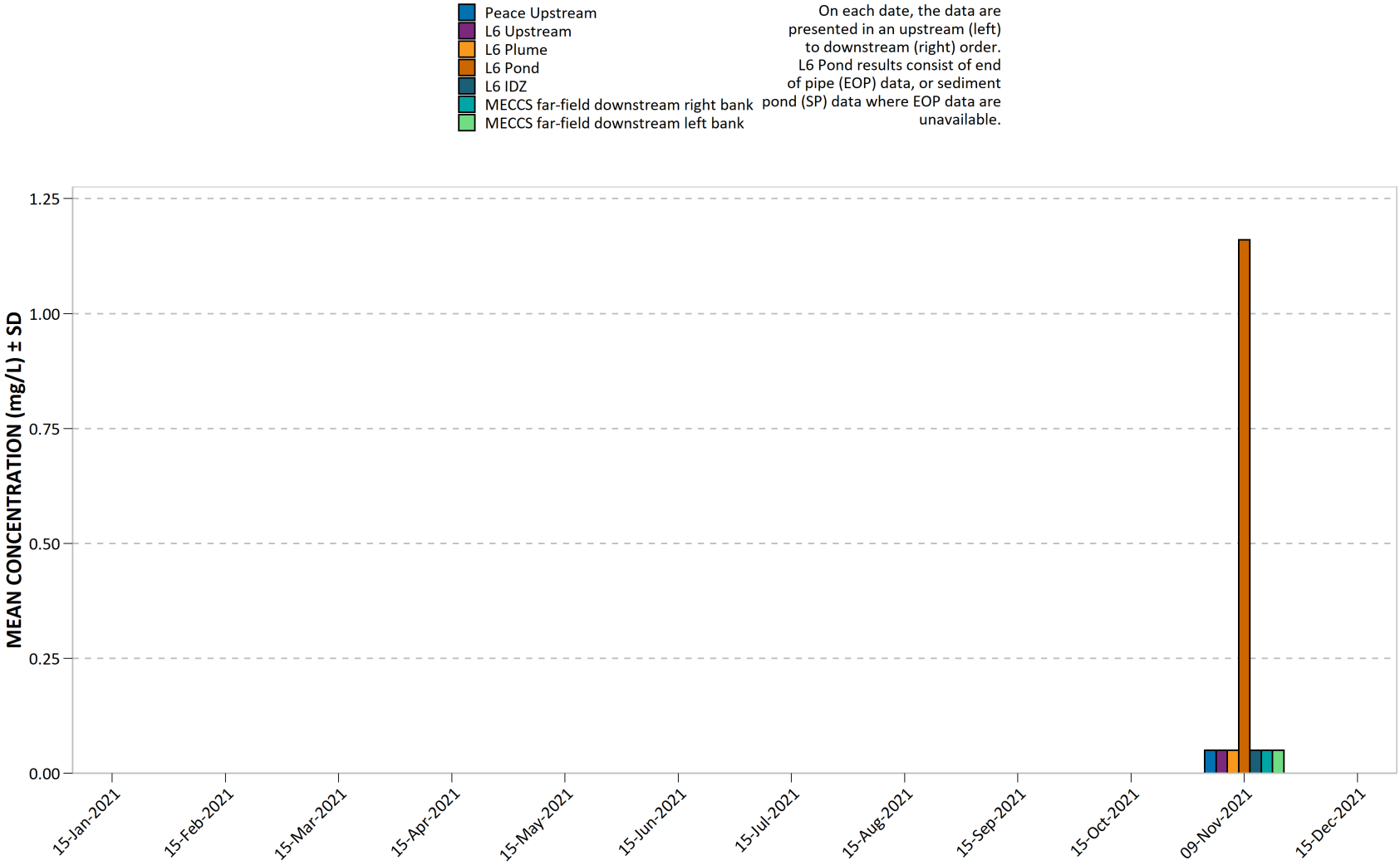


Figure 100. 2021 Peace River and RSEM L6 pond chloride (Cl).

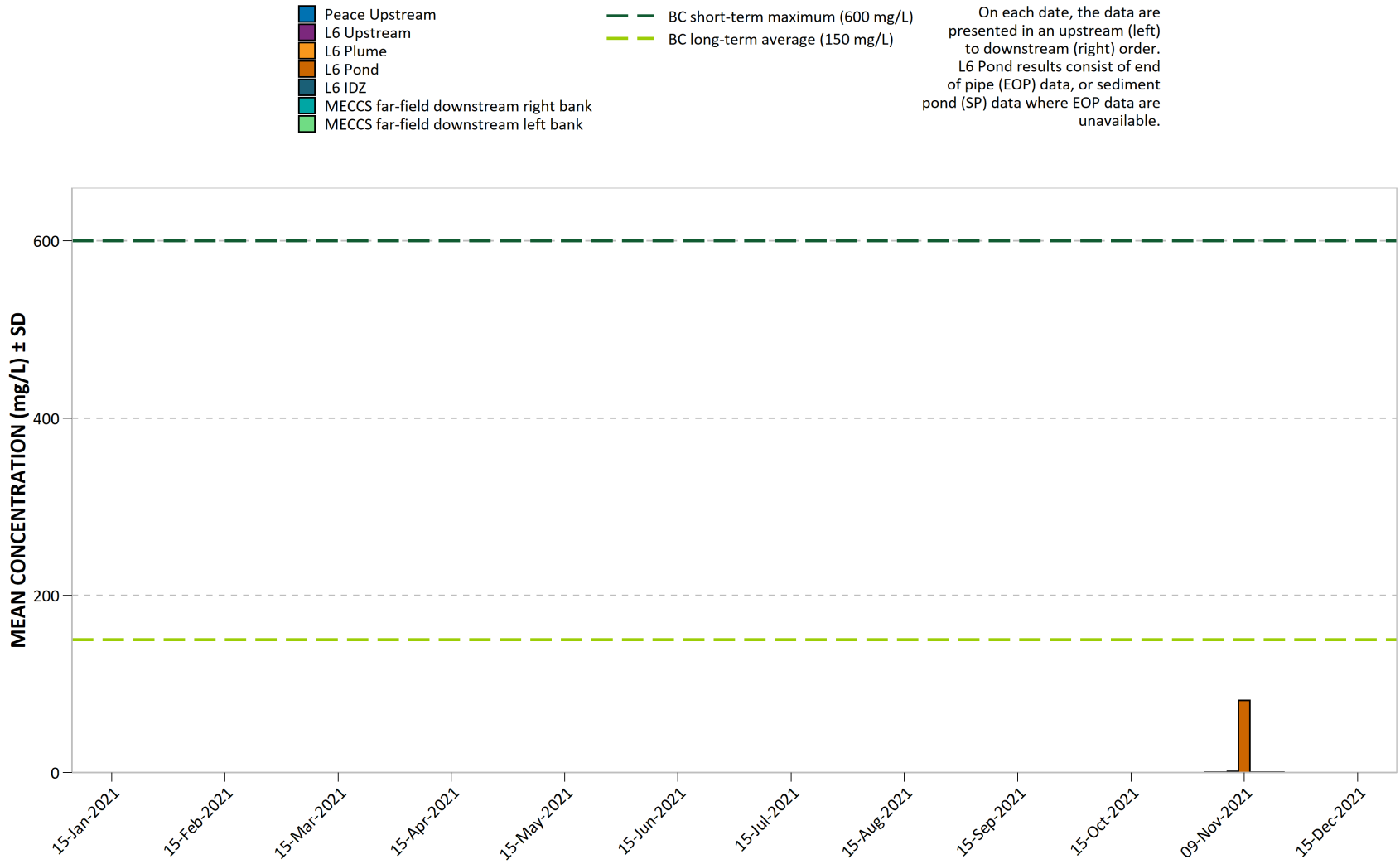


Figure 101. 2021 Peace River and RSEM L6 pond dissolved orthophosphate.

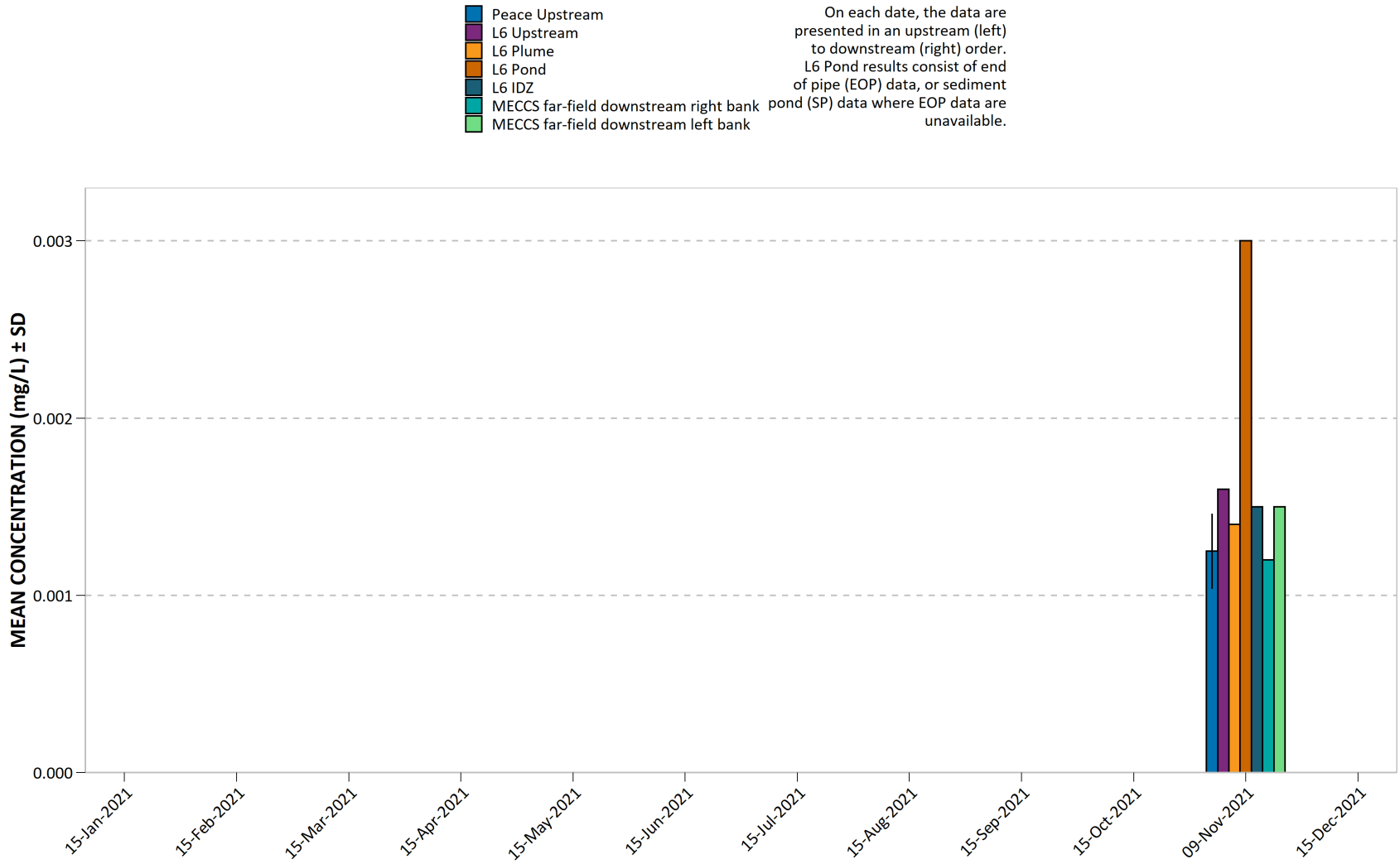


Figure 102. 2021 Peace River and RSEM L6 pond fluoride (F).

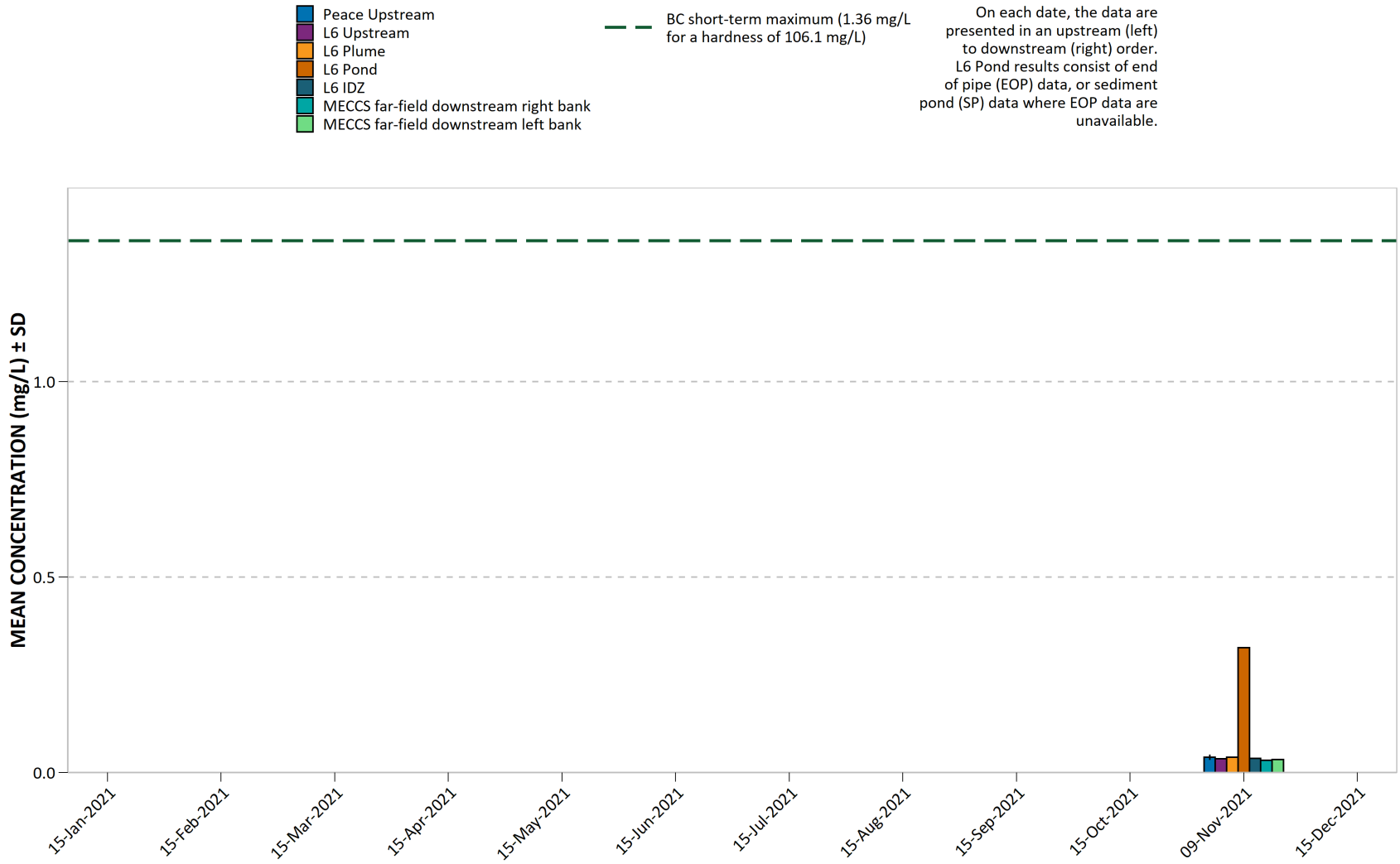


Figure 103. 2021 Peace River and RSEM L6 pond nitrate (as N).

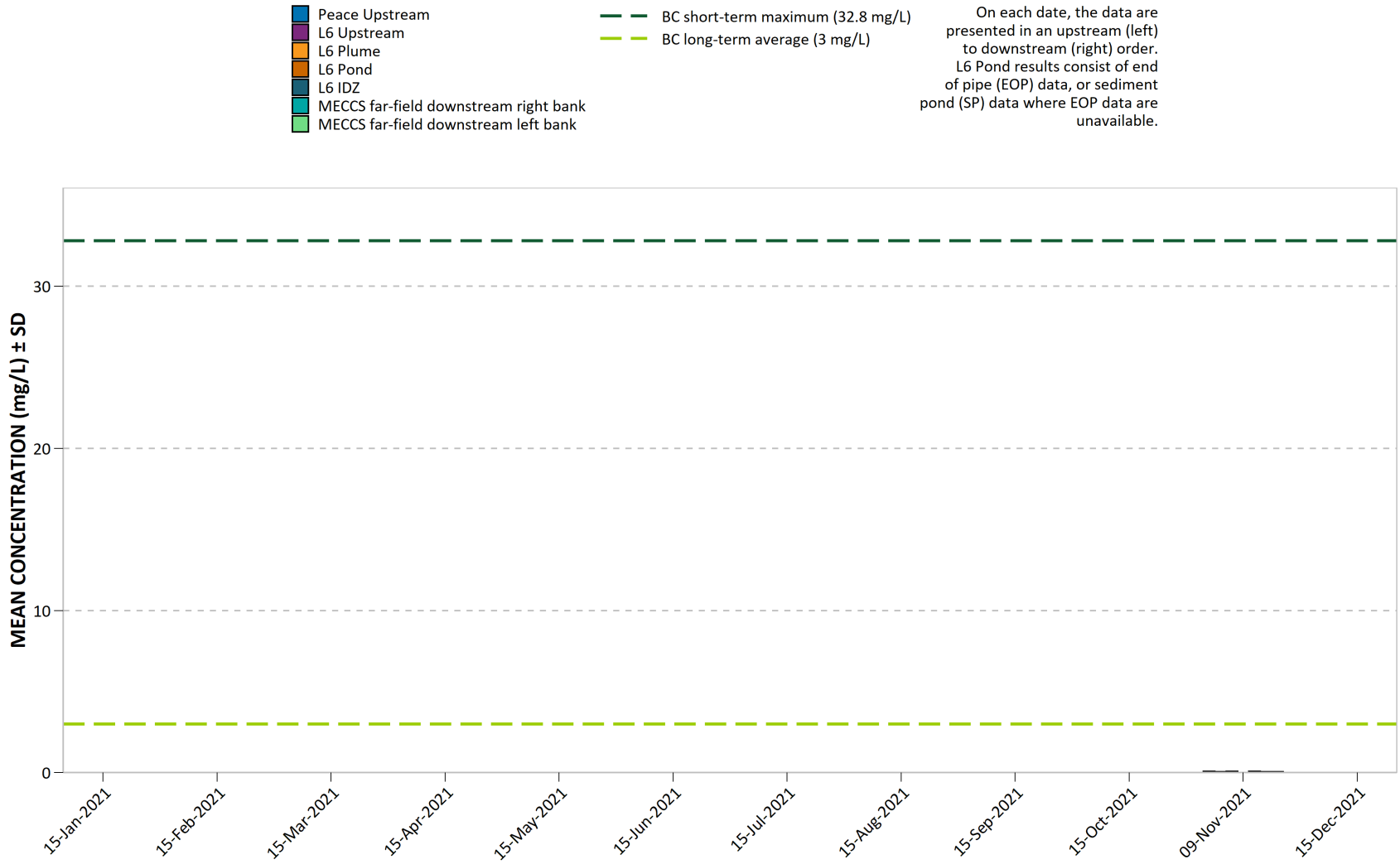
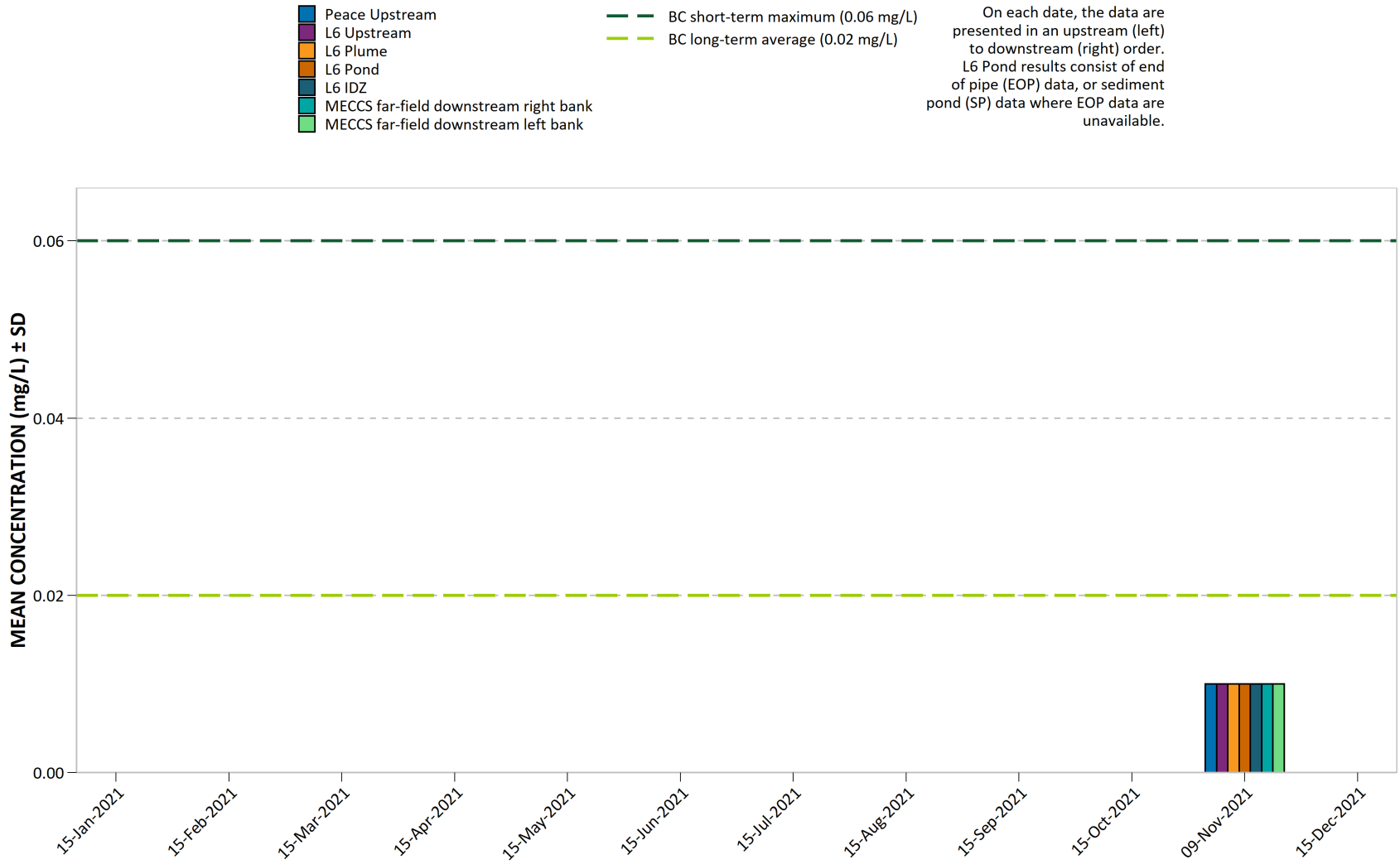


Figure 104. 2021 Peace River and RSEM L6 pond nitrite (as N).



Note: BC WQG for nitrite are chloride dependent, and therefore guidelines depicted in the plot are applicable for Peace River sites only. Based on the range of chloride values observed in the Peace River, the applicable BC Maximum and 30-day guidelines are 0.06 mg/L and 0.02 mg/L, respectively.

Figure 105. 2021 Peace River and RSEM L6 pond sulfate (SO_4).

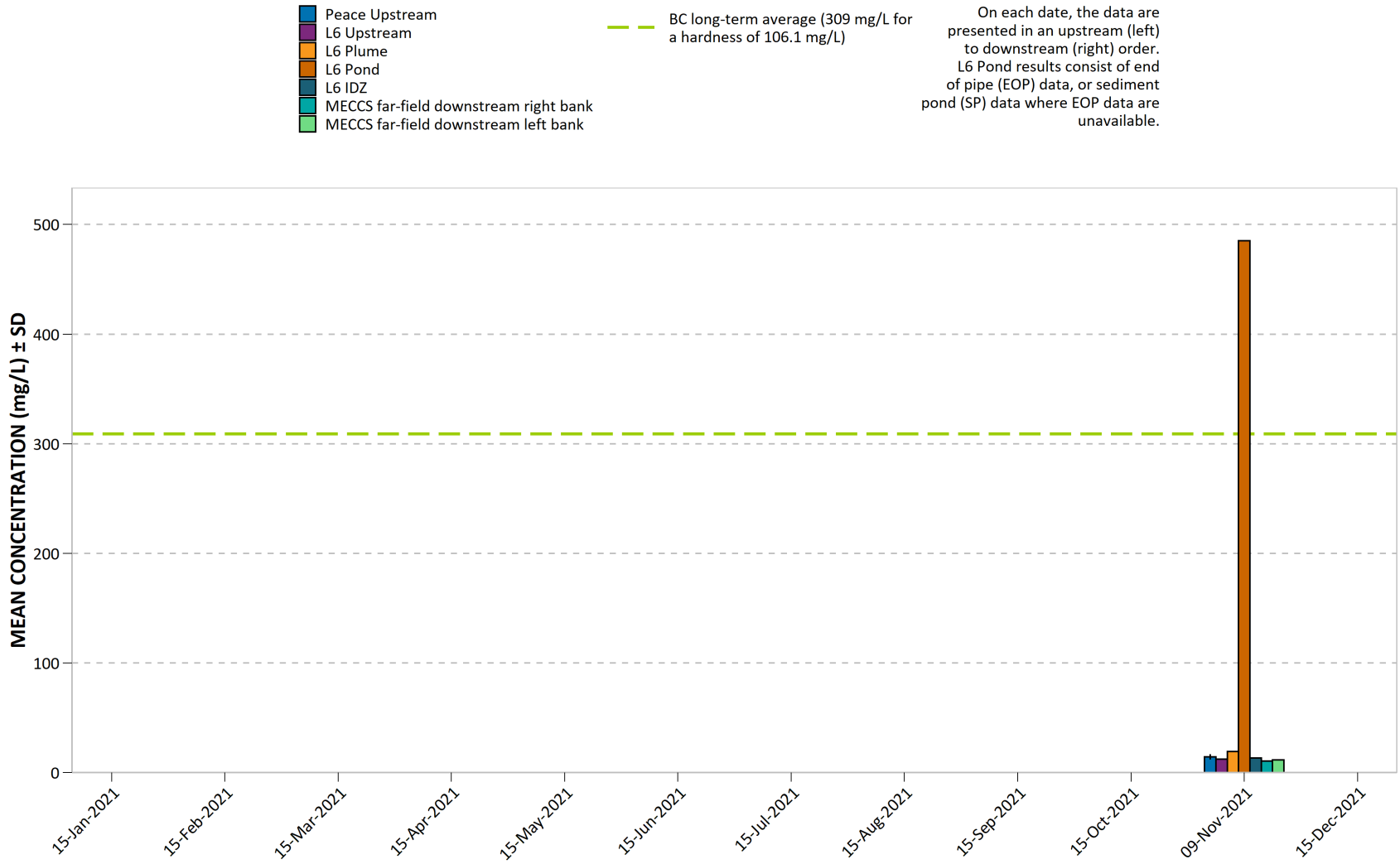


Figure 106. 2021 Peace River and RSEM L6 pond dissolved organic carbon (DOC).

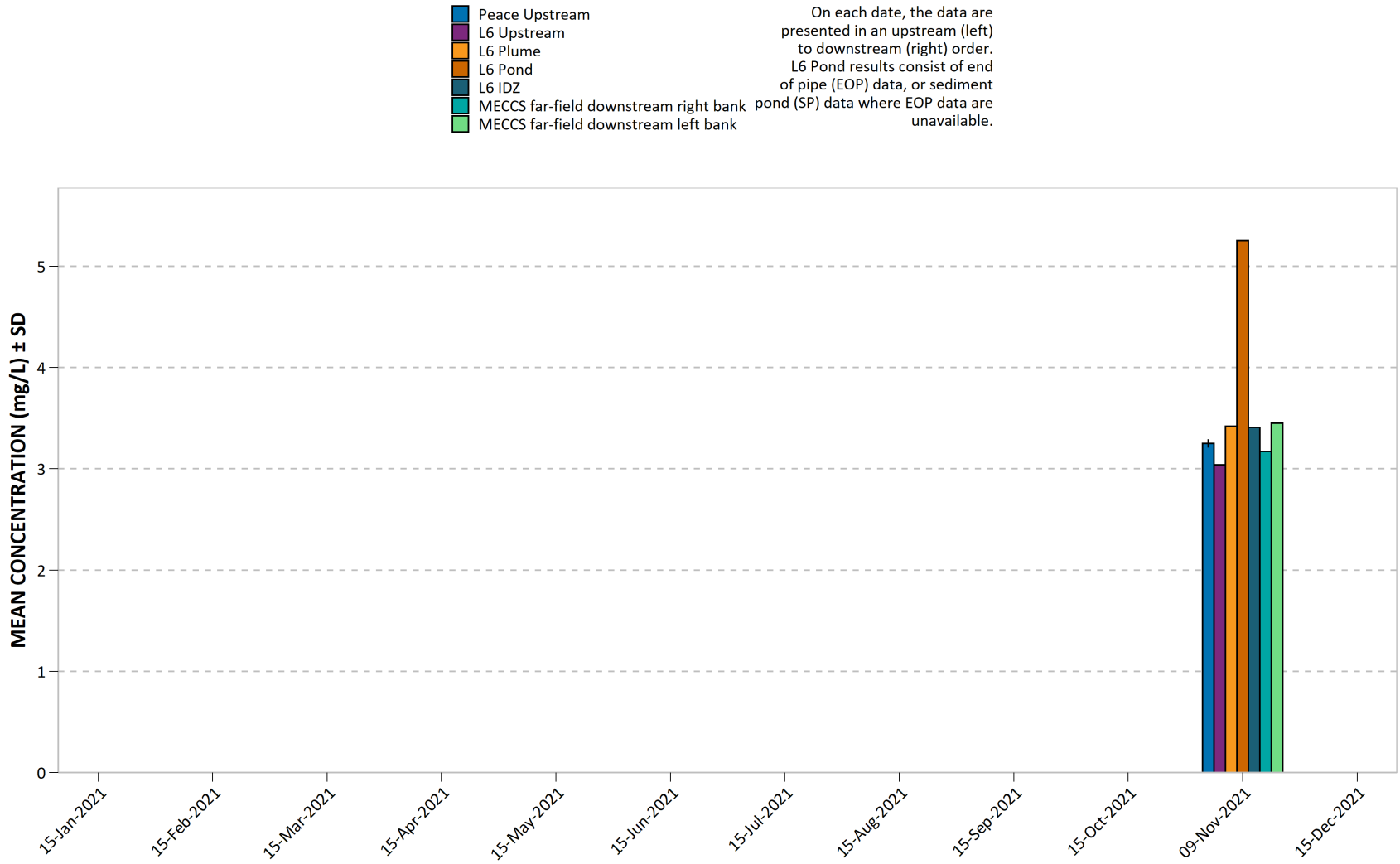


Figure 107. 2021 Peace River and RSEM L6 pond total organic carbon (TOC).

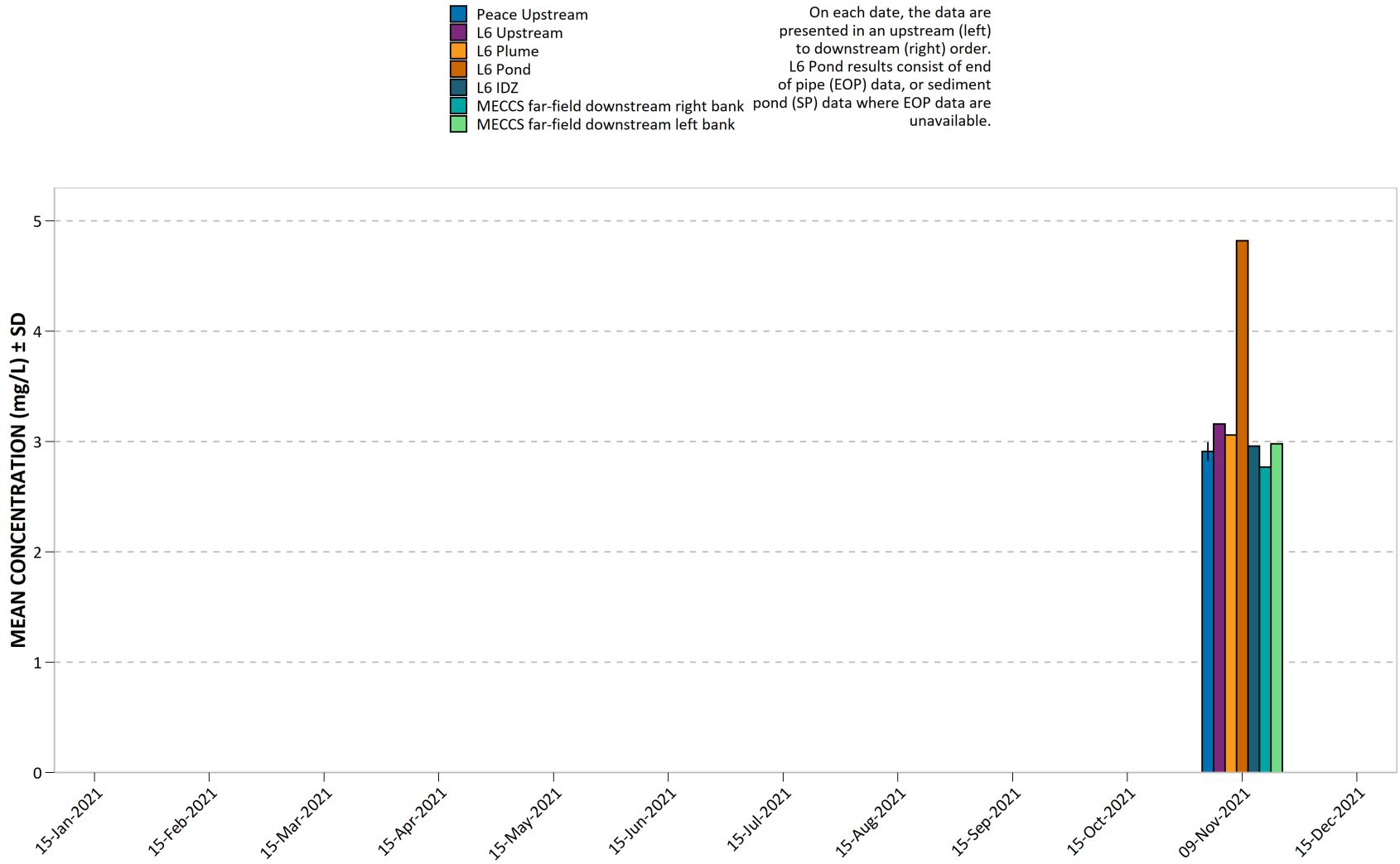


Figure 108. 2021 Peace River and RSEM L6 pond total aluminum (Al).

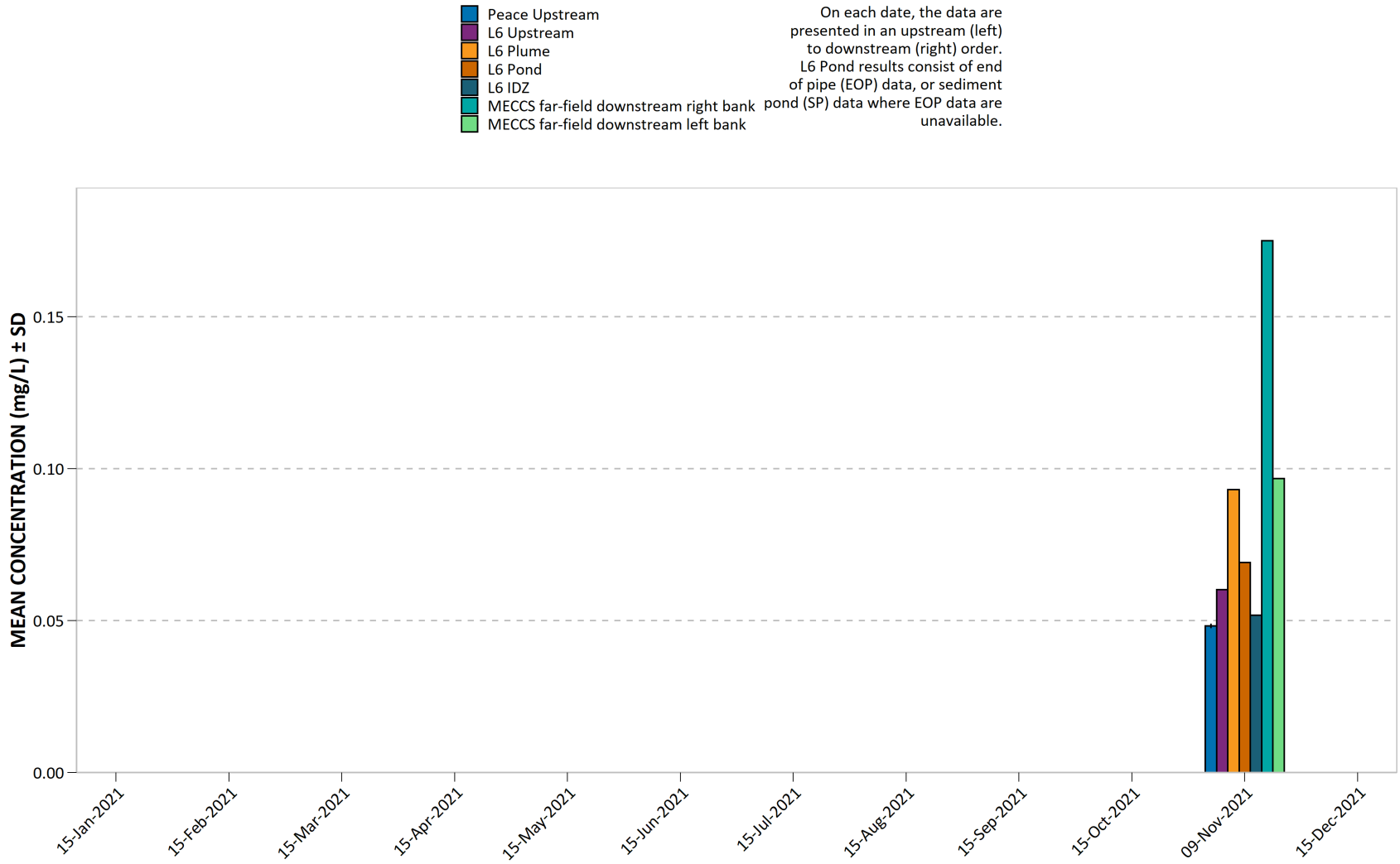


Figure 109. 2021 Peace River and RSEM L6 pond total antimony (Sb).

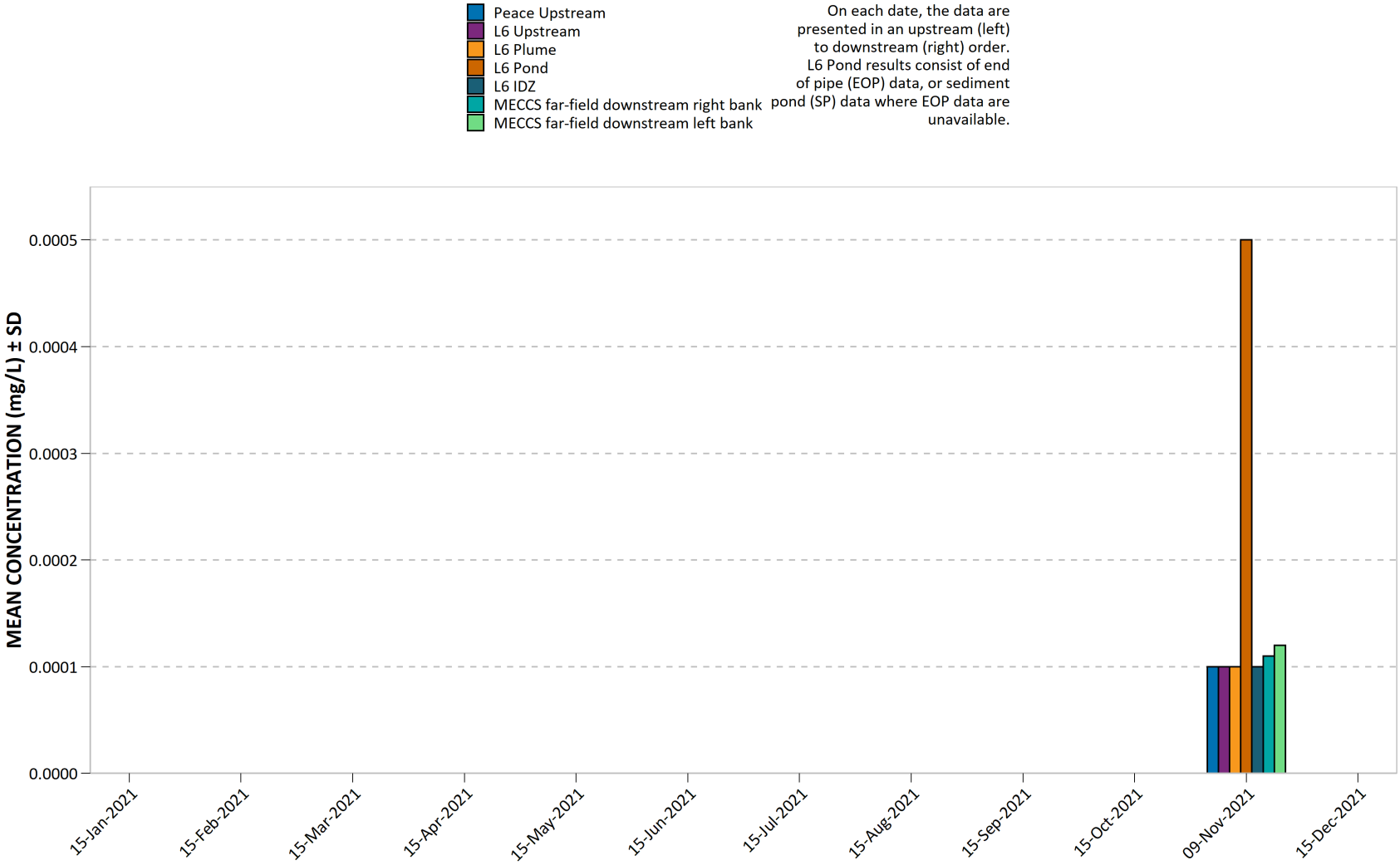


Figure 110. 2021 Peace River and RSEM L6 pond total arsenic (As).

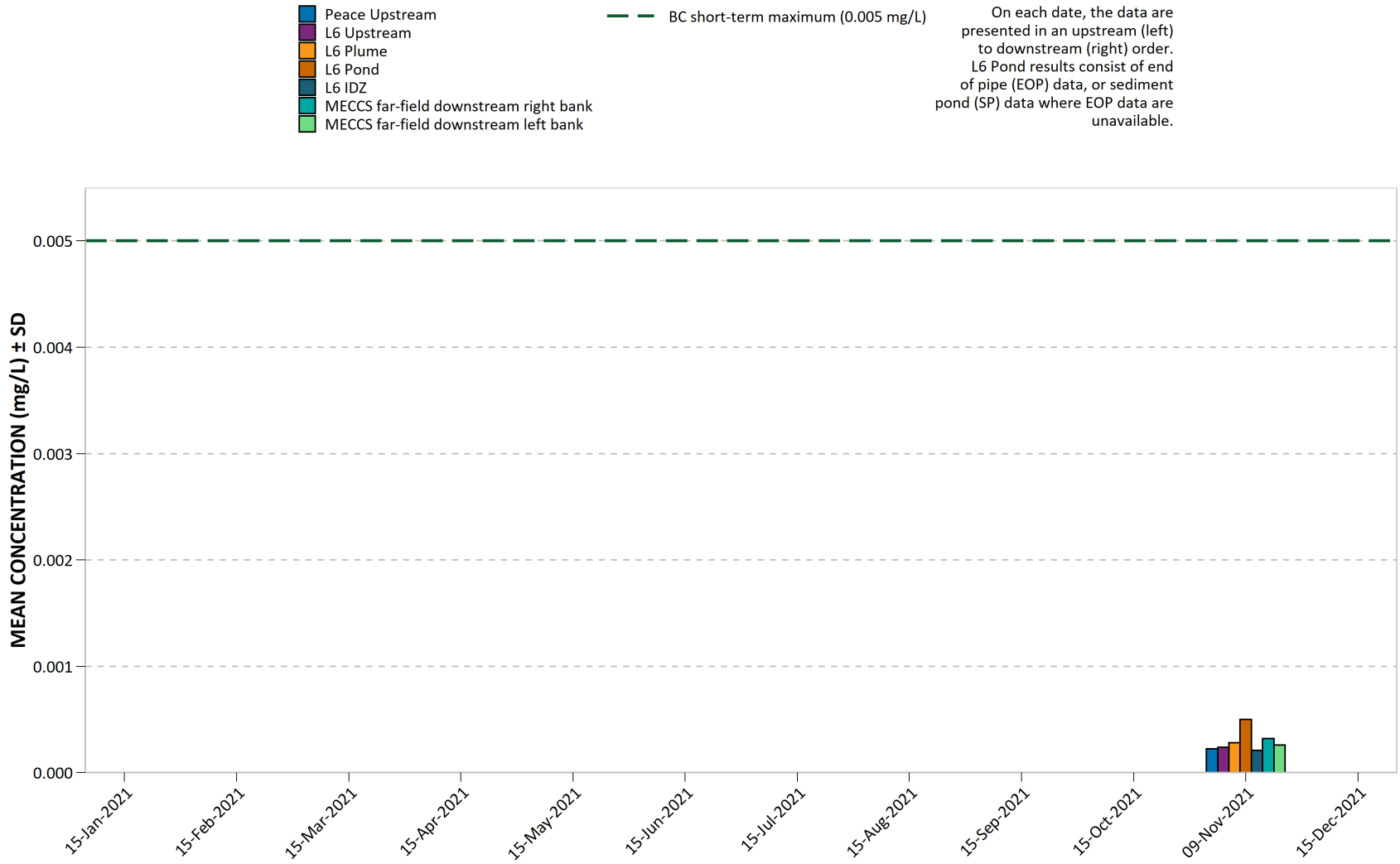


Figure 111. 2021 Peace River and RSEM L6 pond total barium (Ba).

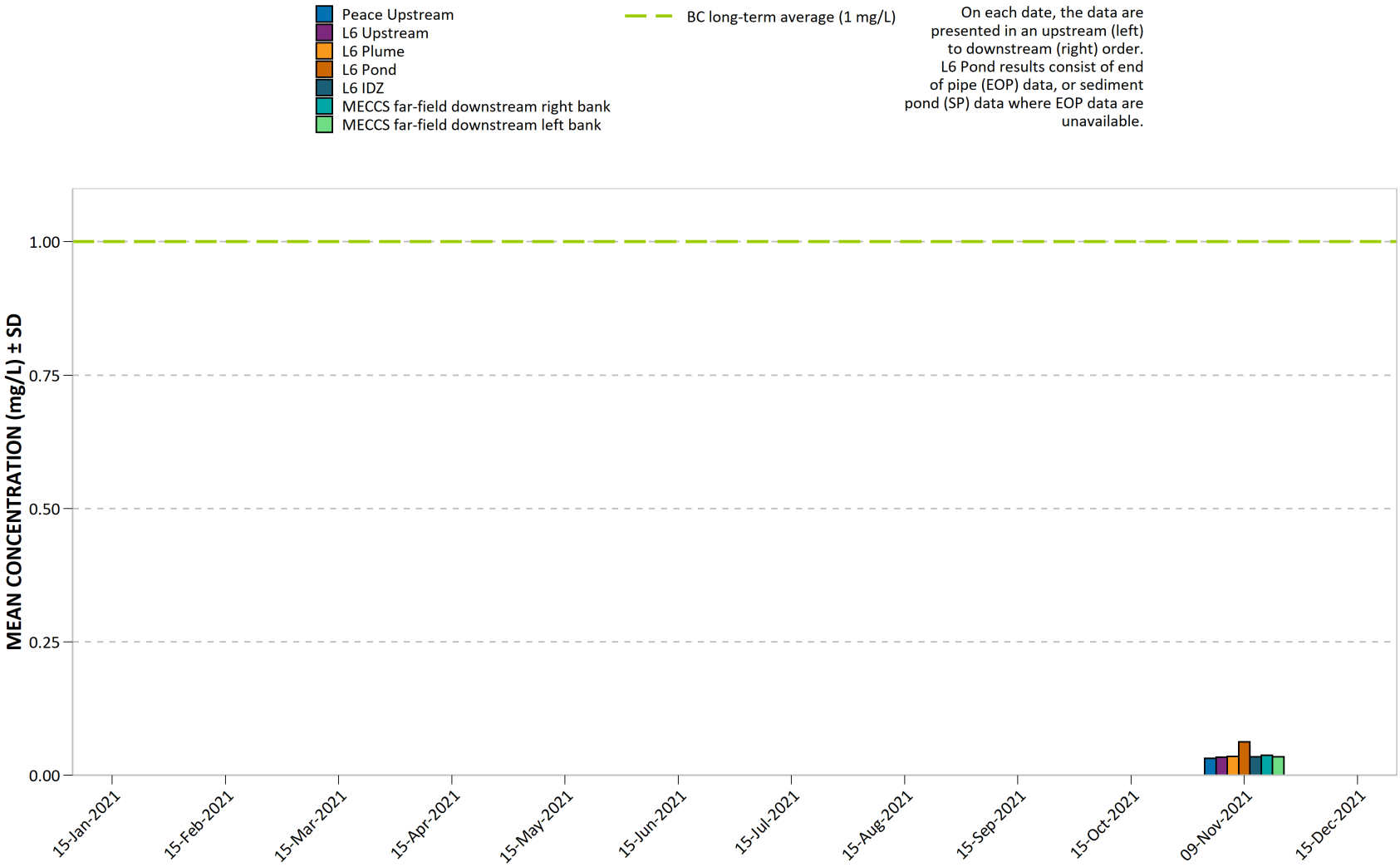


Figure 112. 2021 Peace River and RSEM L6 pond total beryllium (Be).

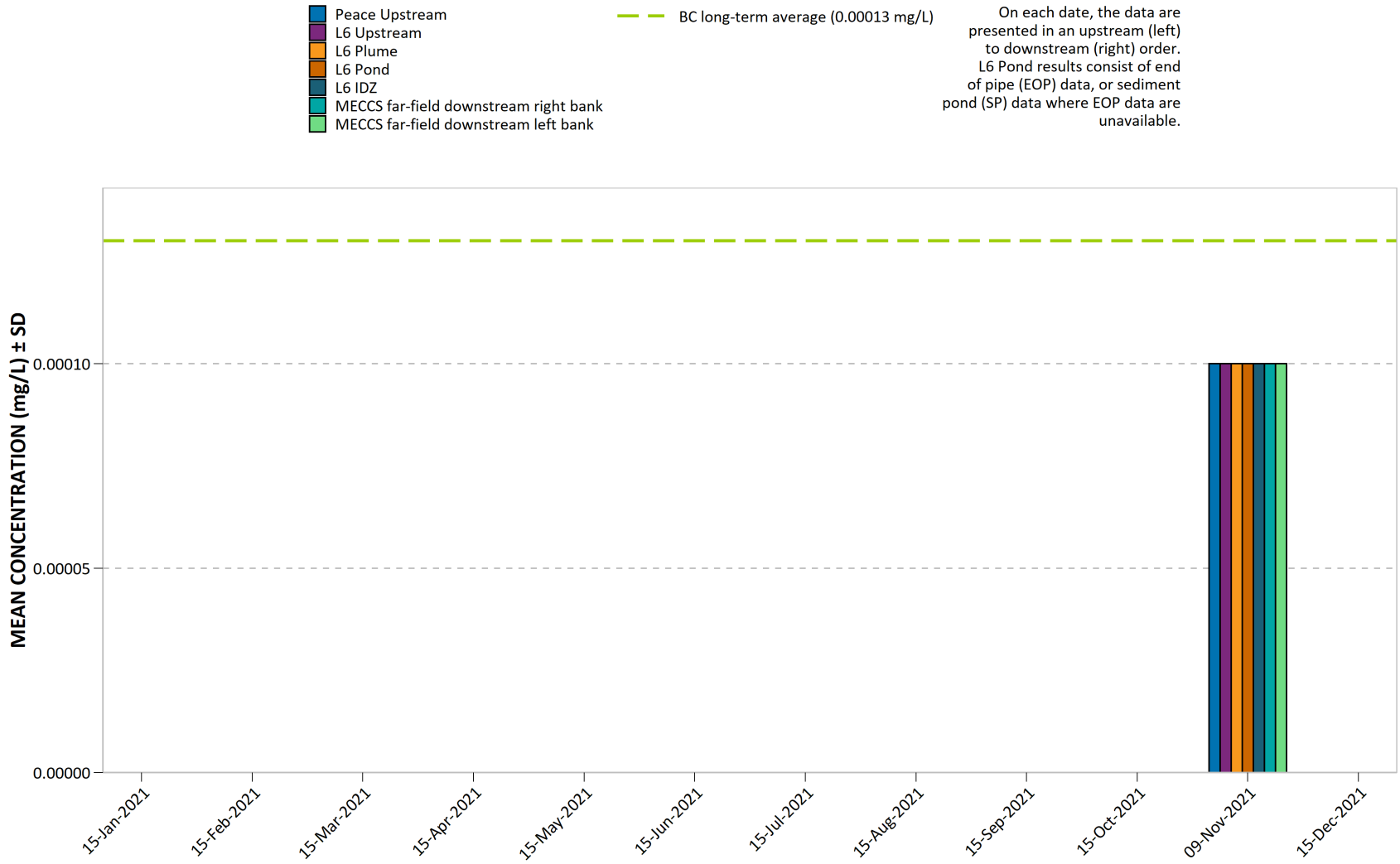


Figure 113. 2021 Peace River and RSEM L6 pond total bismuth (Bi).

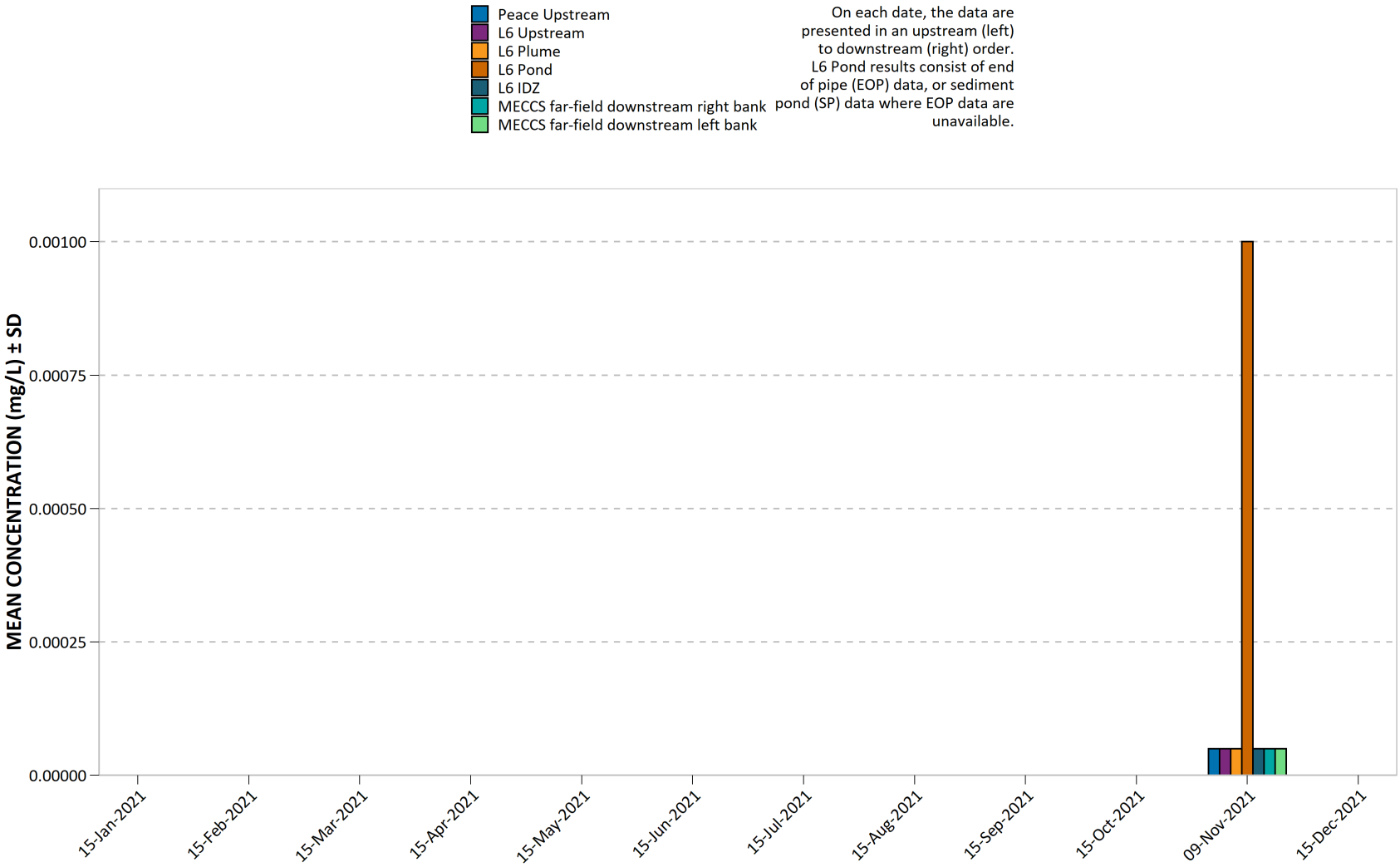


Figure 114. 2021 Peace River and RSEM L6 pond total boron (B).

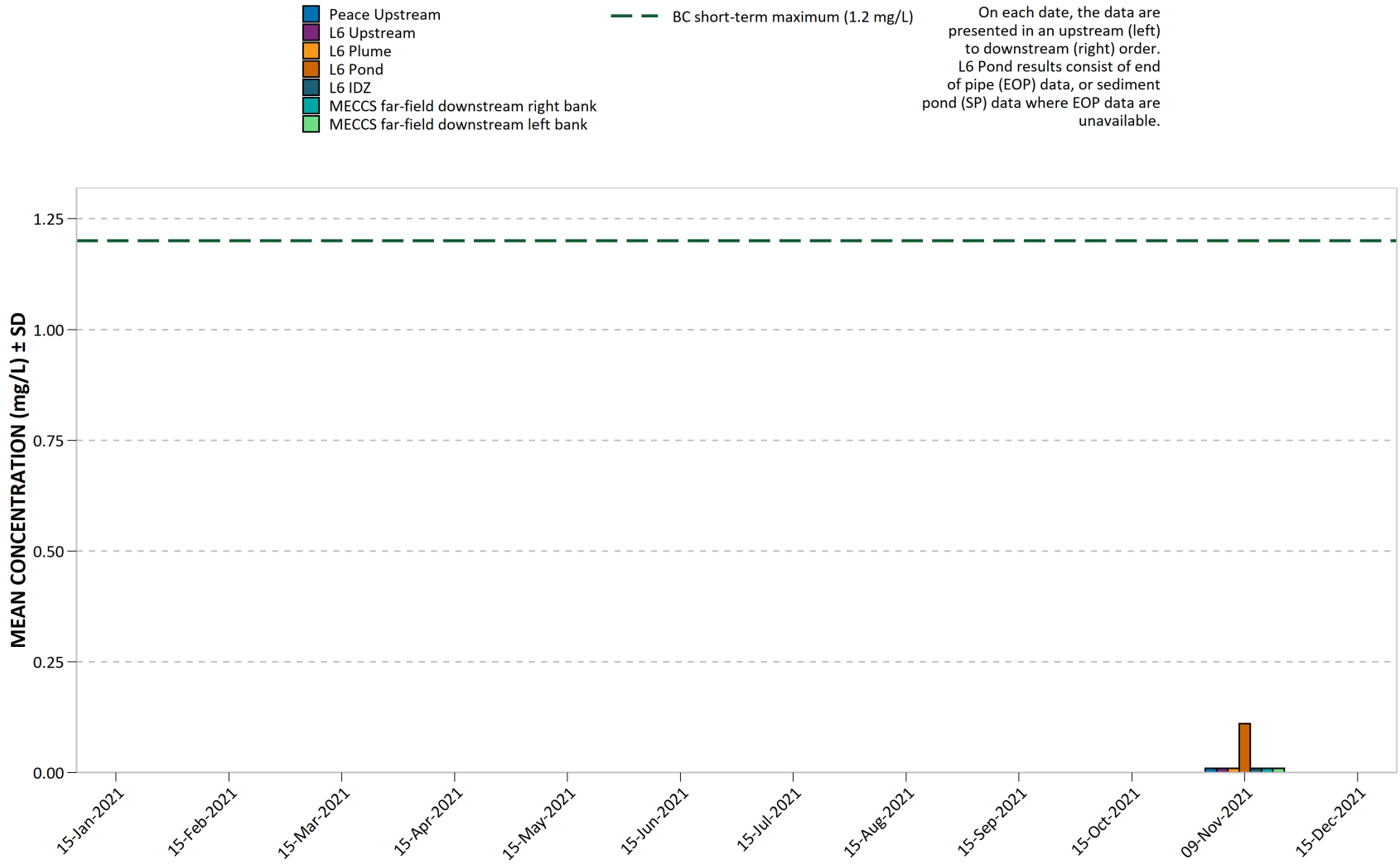


Figure 115. 2021 Peace River and RSEM L6 pond total cadmium (Cd).

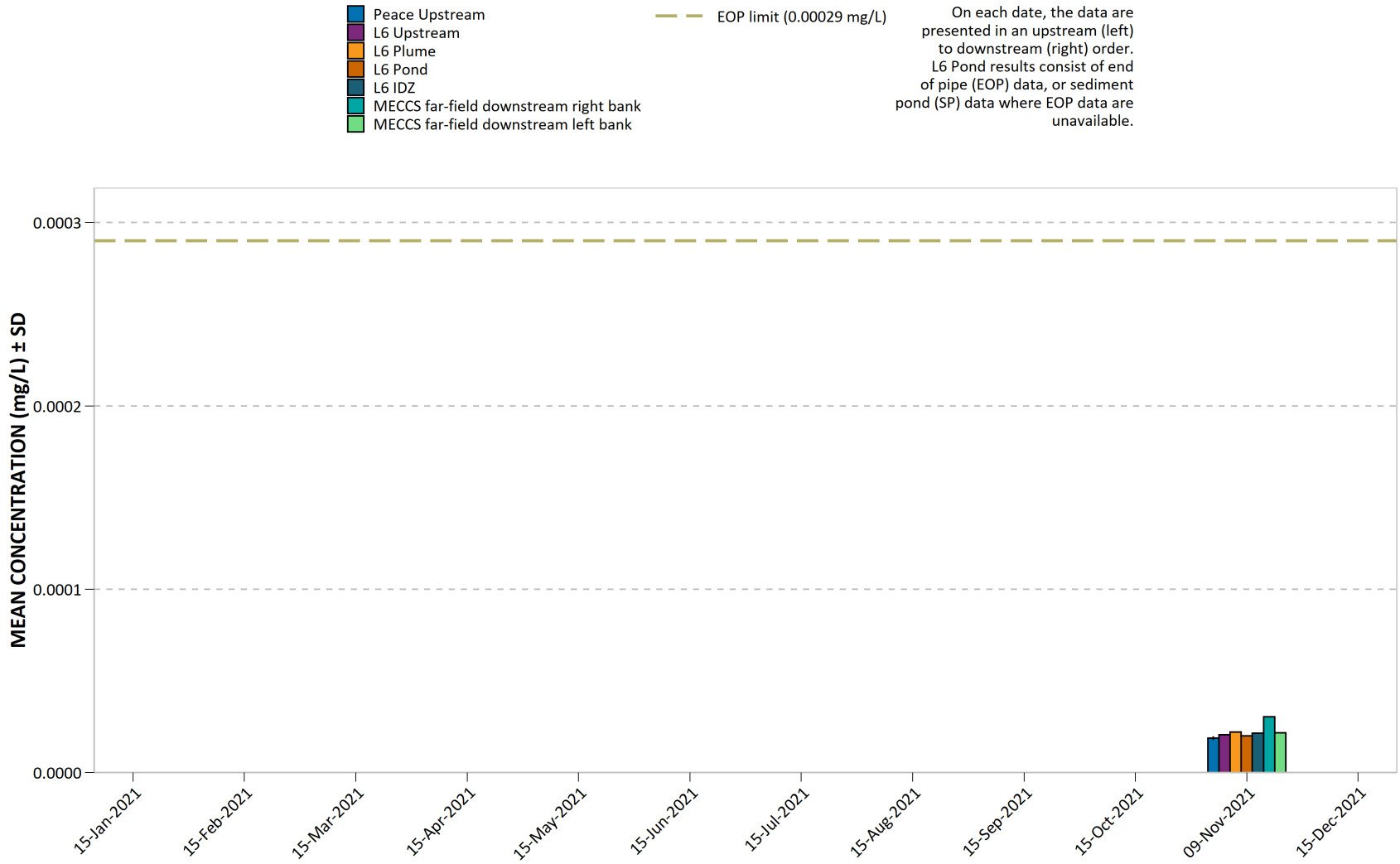


Figure 116. 2021 Peace River and RSEM L6 pond total calcium (Ca).

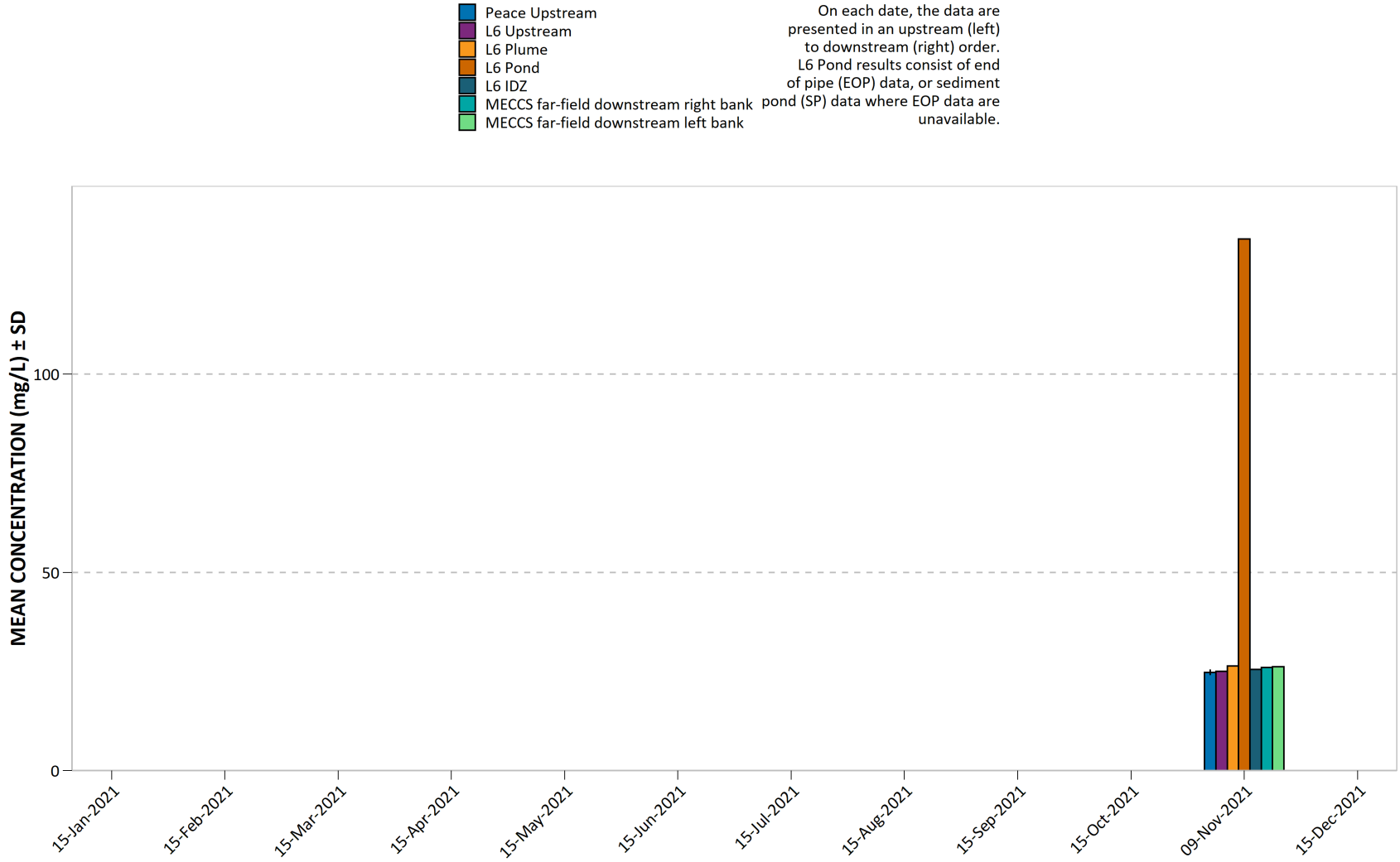


Figure 117. 2021 Peace River and RSEM L6 pond total chromium (Cr).

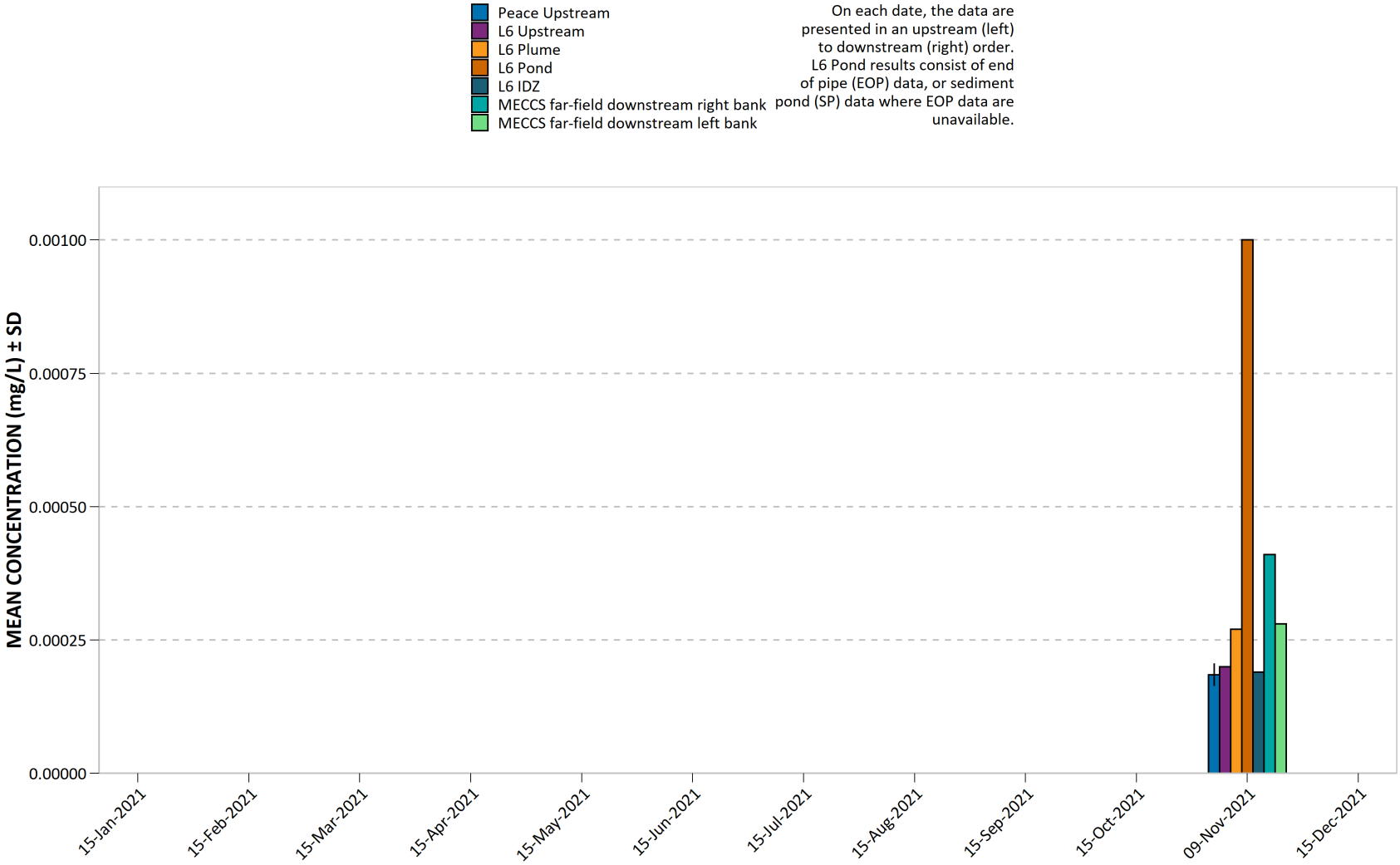


Figure 118. 2021 Peace River and RSEM L6 pond total cobalt (Co).

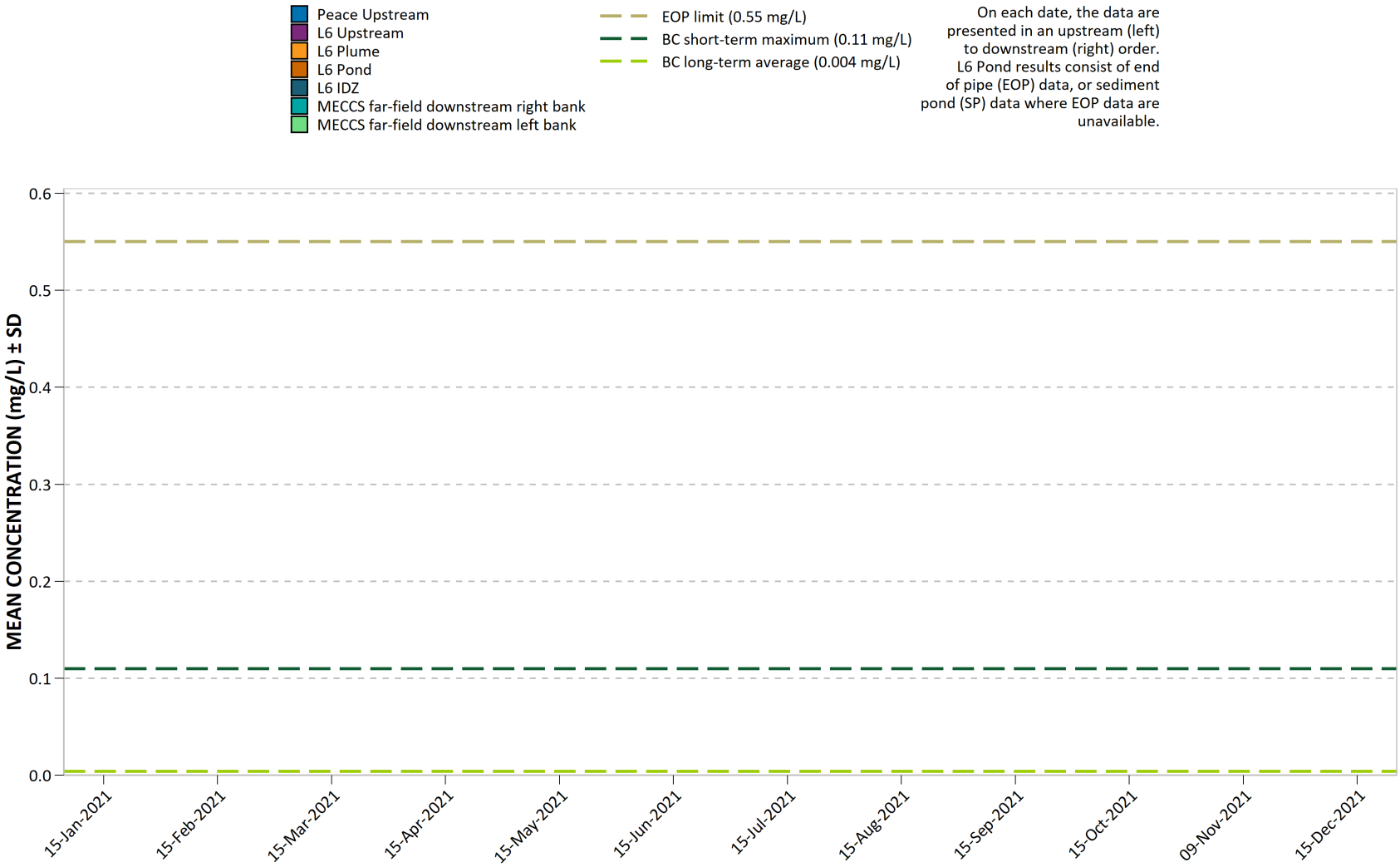


Figure 119. 2021 Peace River and RSEM L6 pond total copper (Cu).

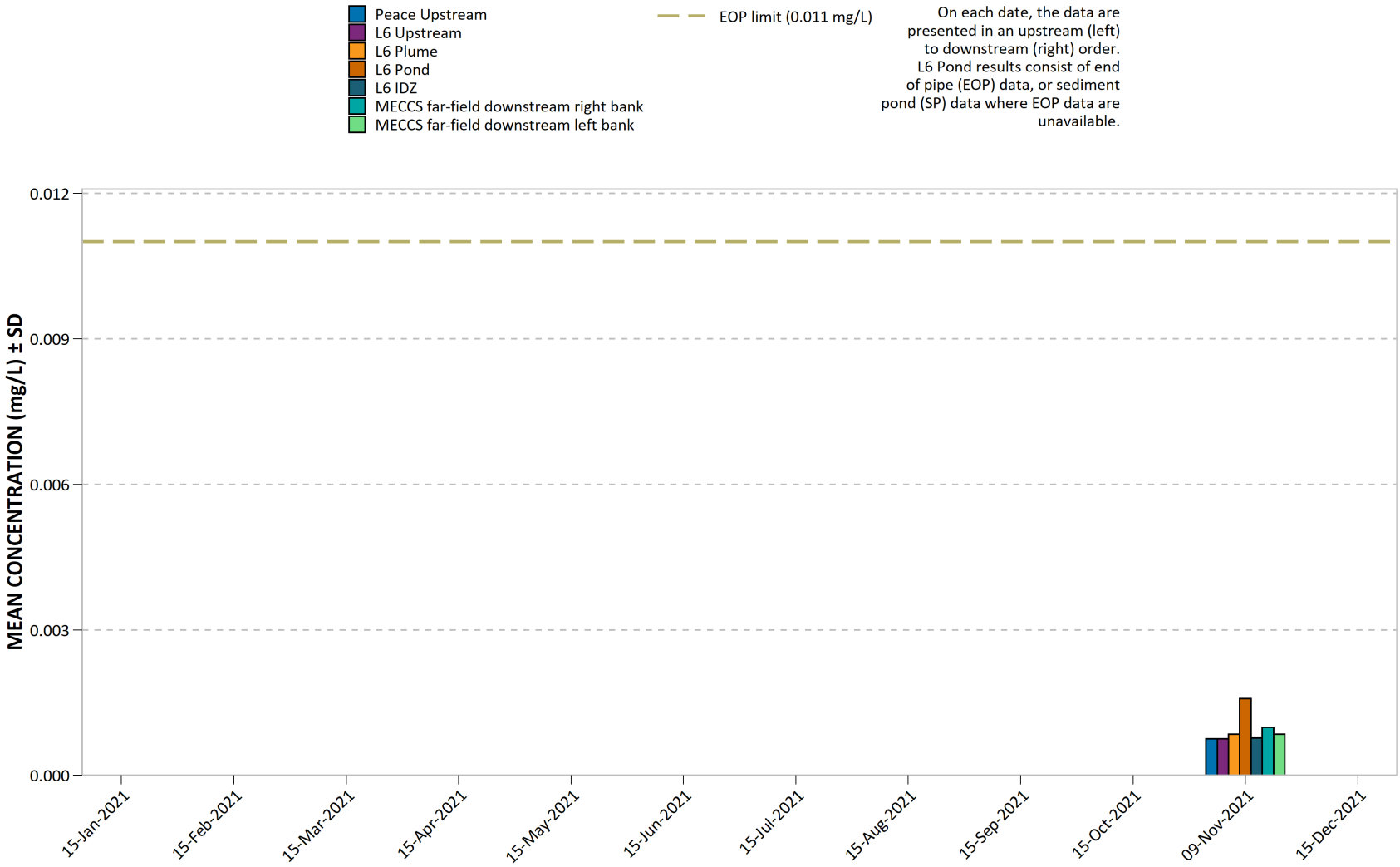


Figure 120. 2021 Peace River and RSEM L6 pond total iron (Fe).

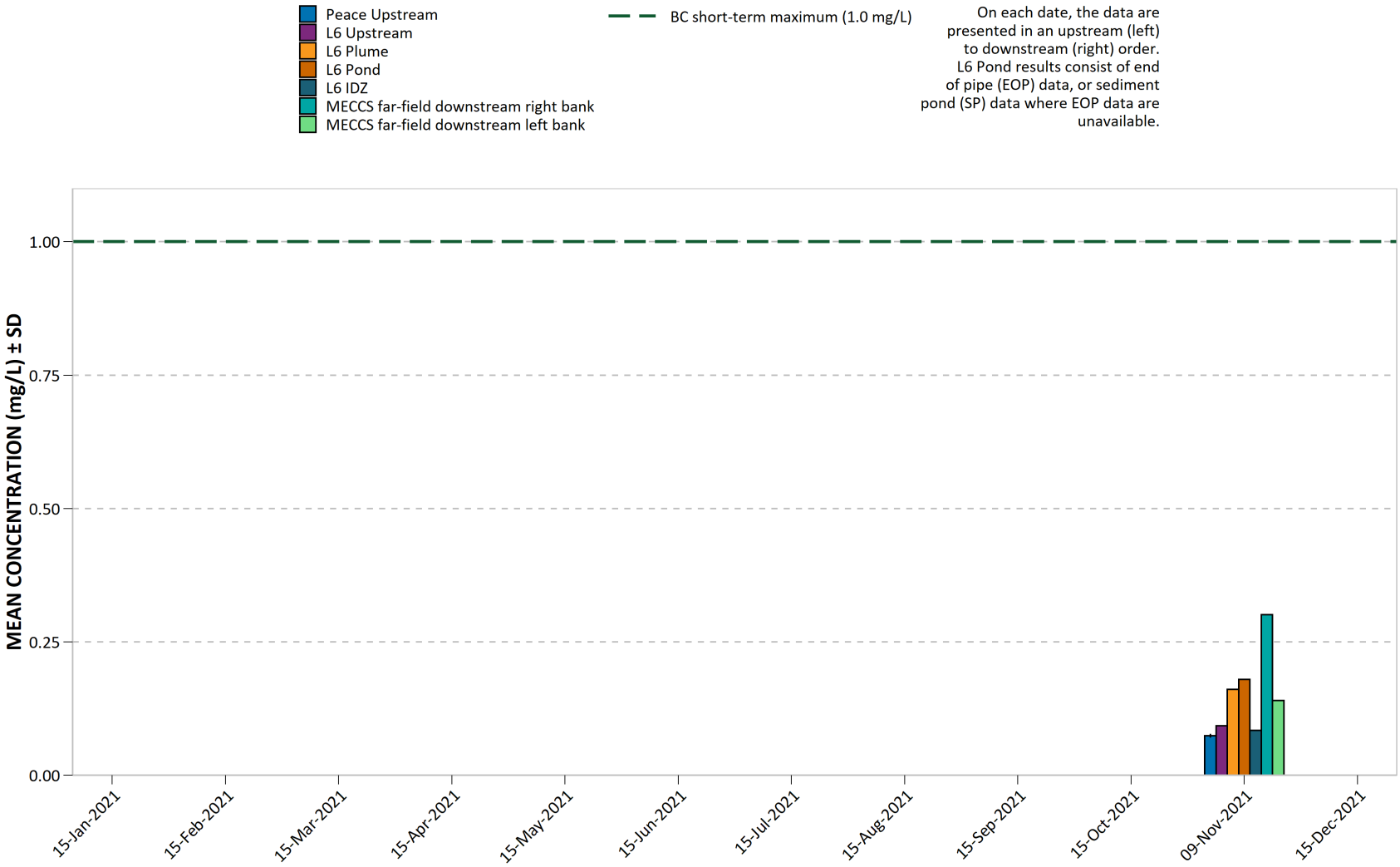


Figure 121. 2021 Peace River and RSEM L6 pond total lead (Pb).

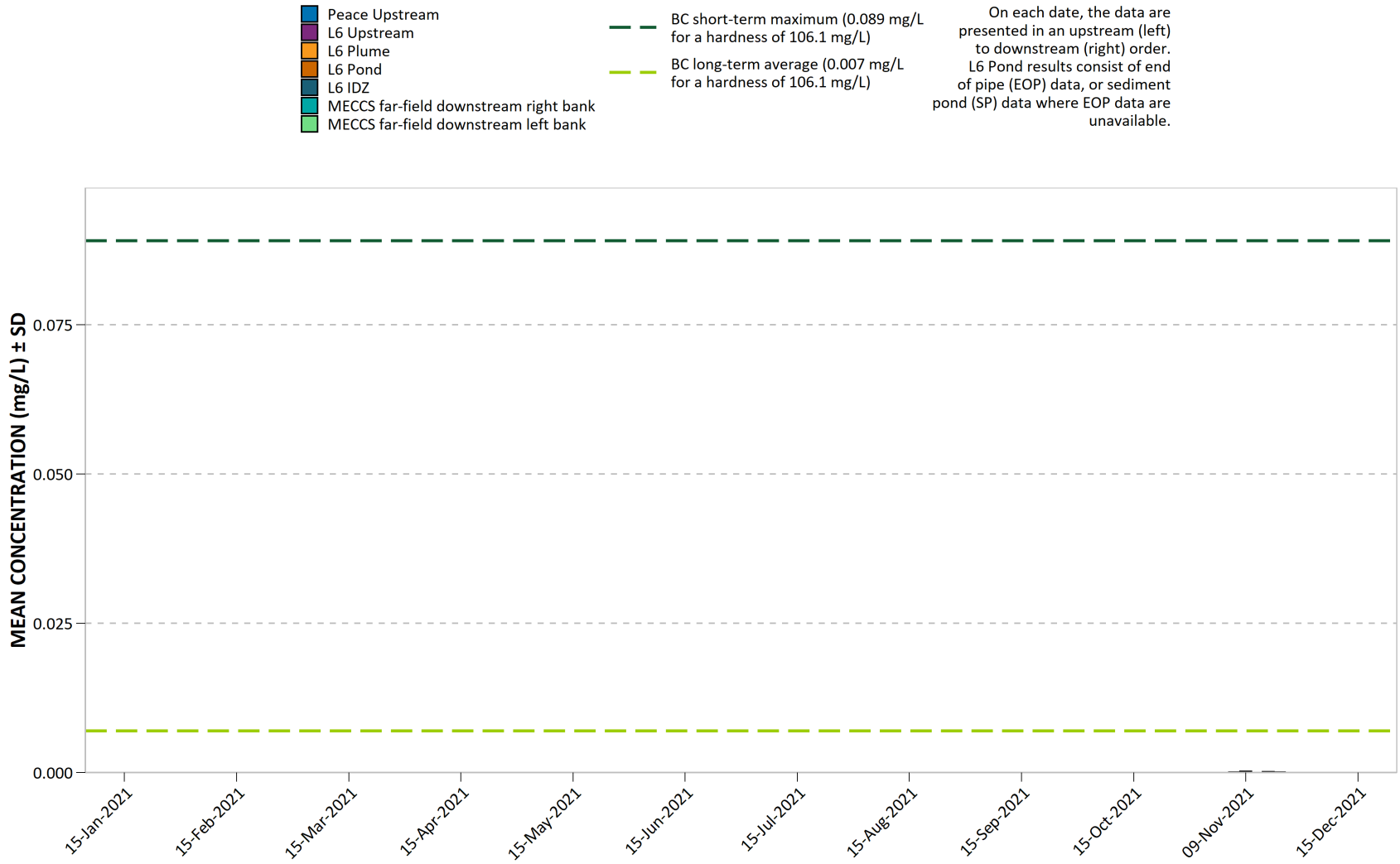


Figure 122. 2021 Peace River and RSEM L6 pond total lithium (Li).

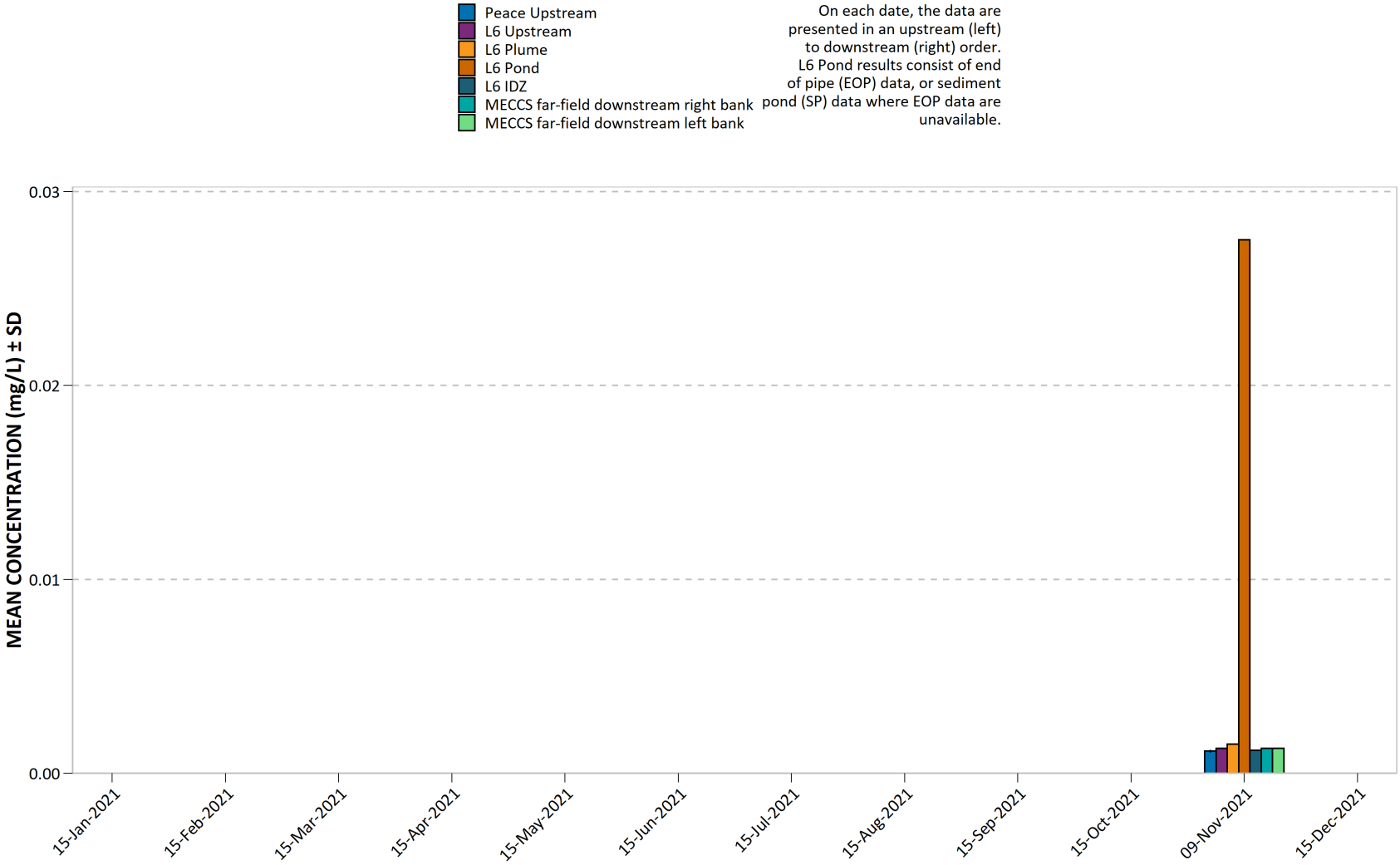


Figure 123. 2021 Peace River and RSEM L6 pond total magnesium (Mg).

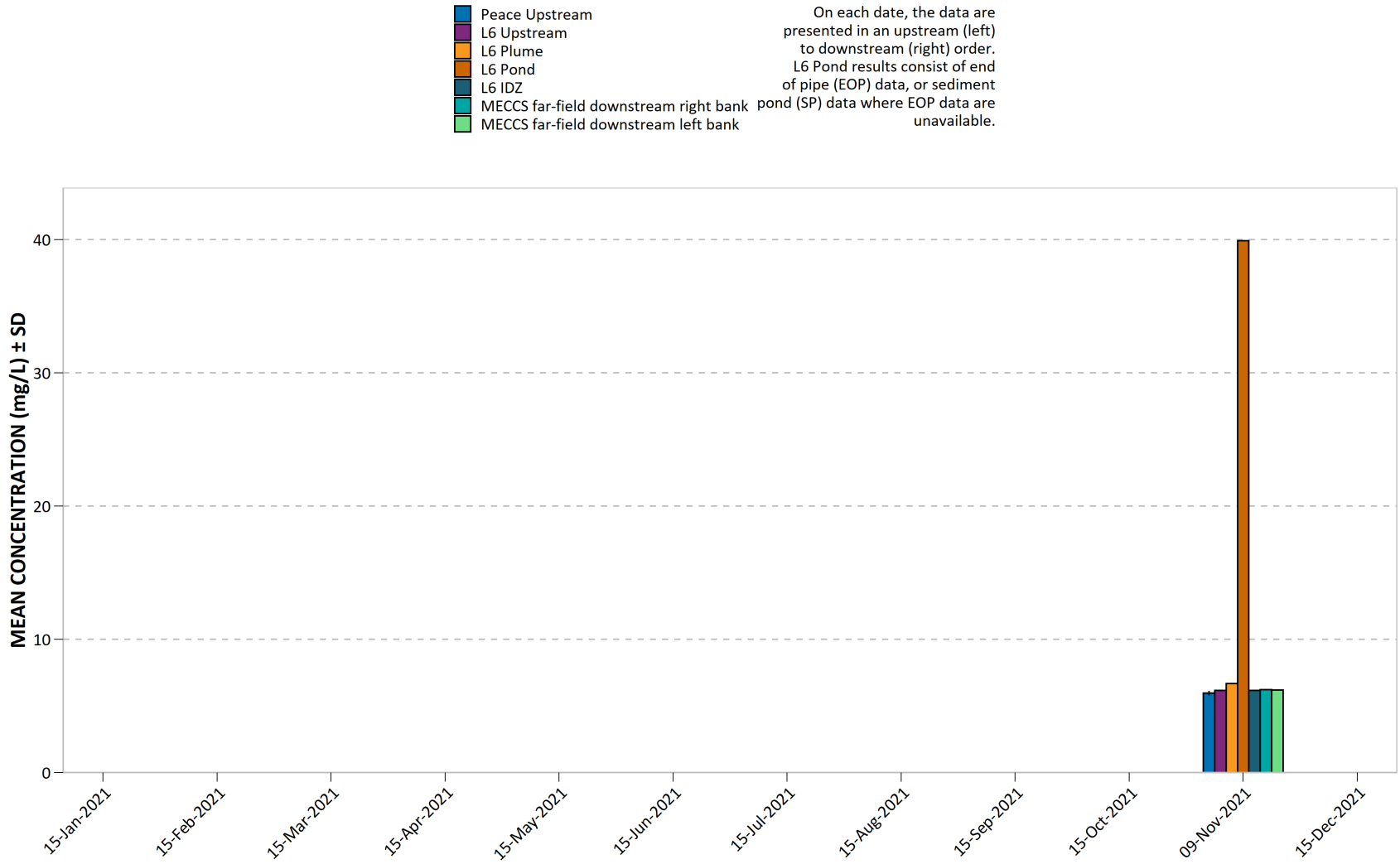


Figure 124. 2021 Peace River and RSEM L6 pond total manganese (Mn).

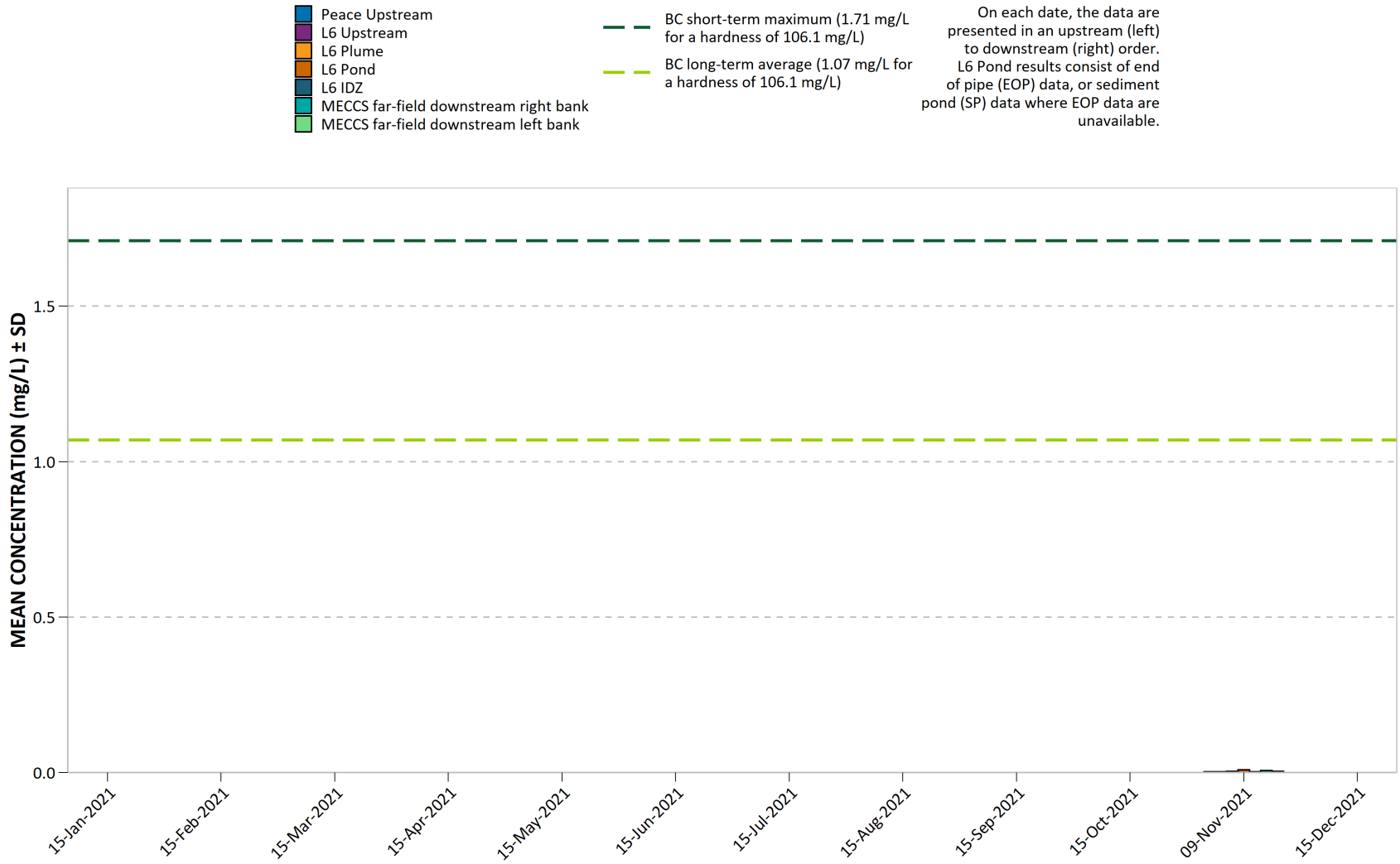


Figure 125. 2021 Peace River and RSEM L6 pond total mercury (Hg).

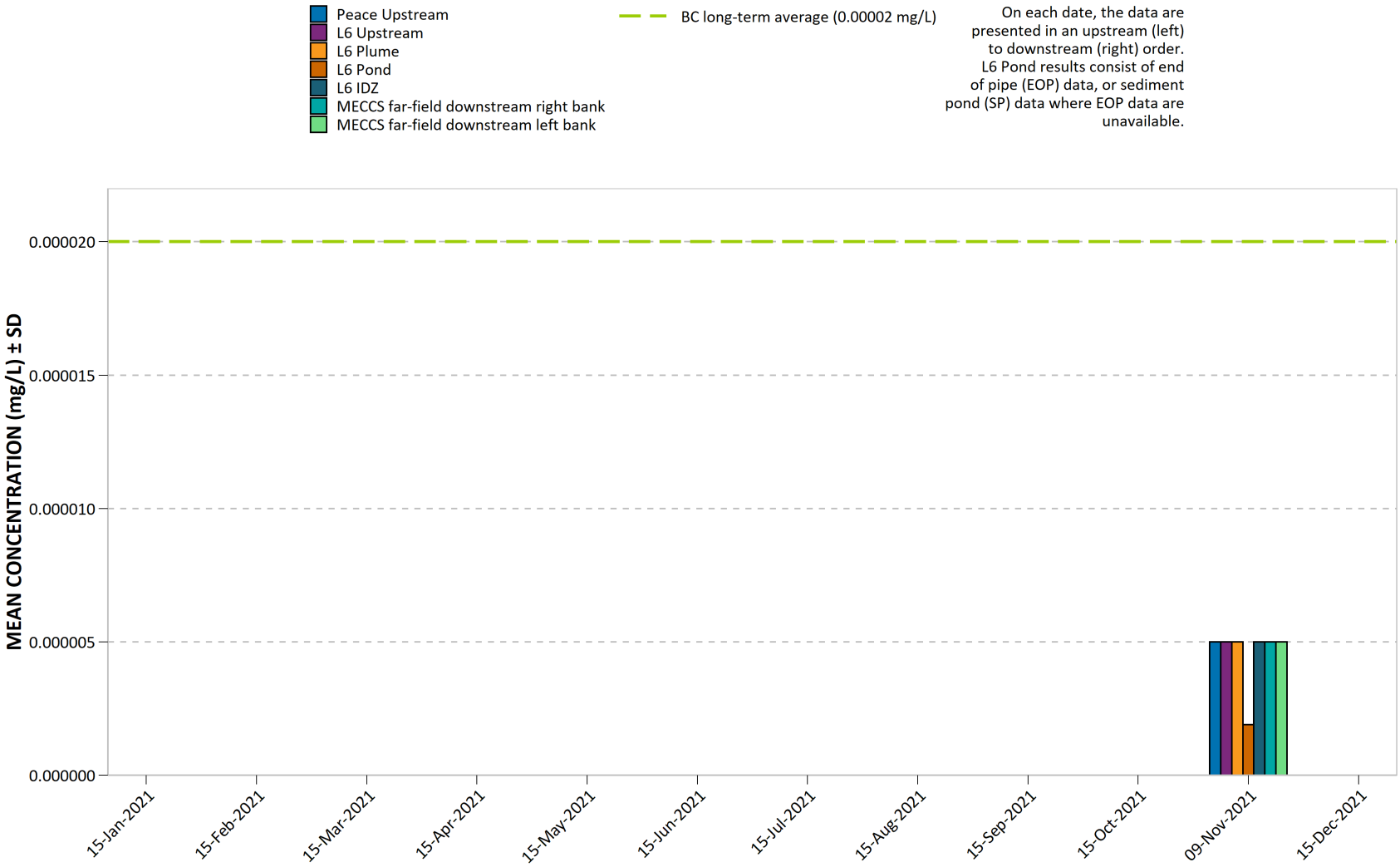


Figure 126. 2021 Peace River and RSEM L6 pond total molybdenum (Mo).

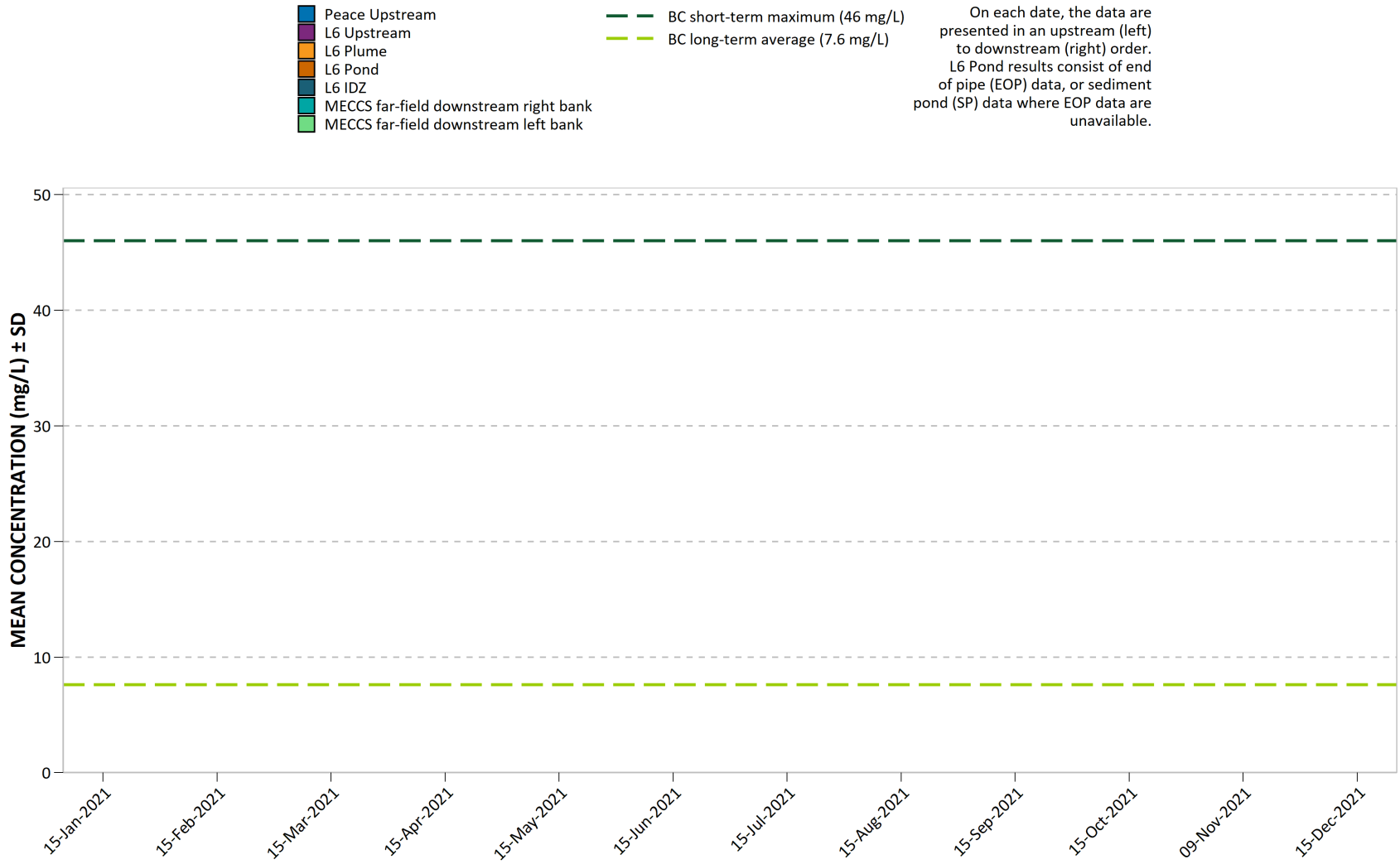


Figure 127. 2021 Peace River and RSEM L6 pond total nickel (Ni).

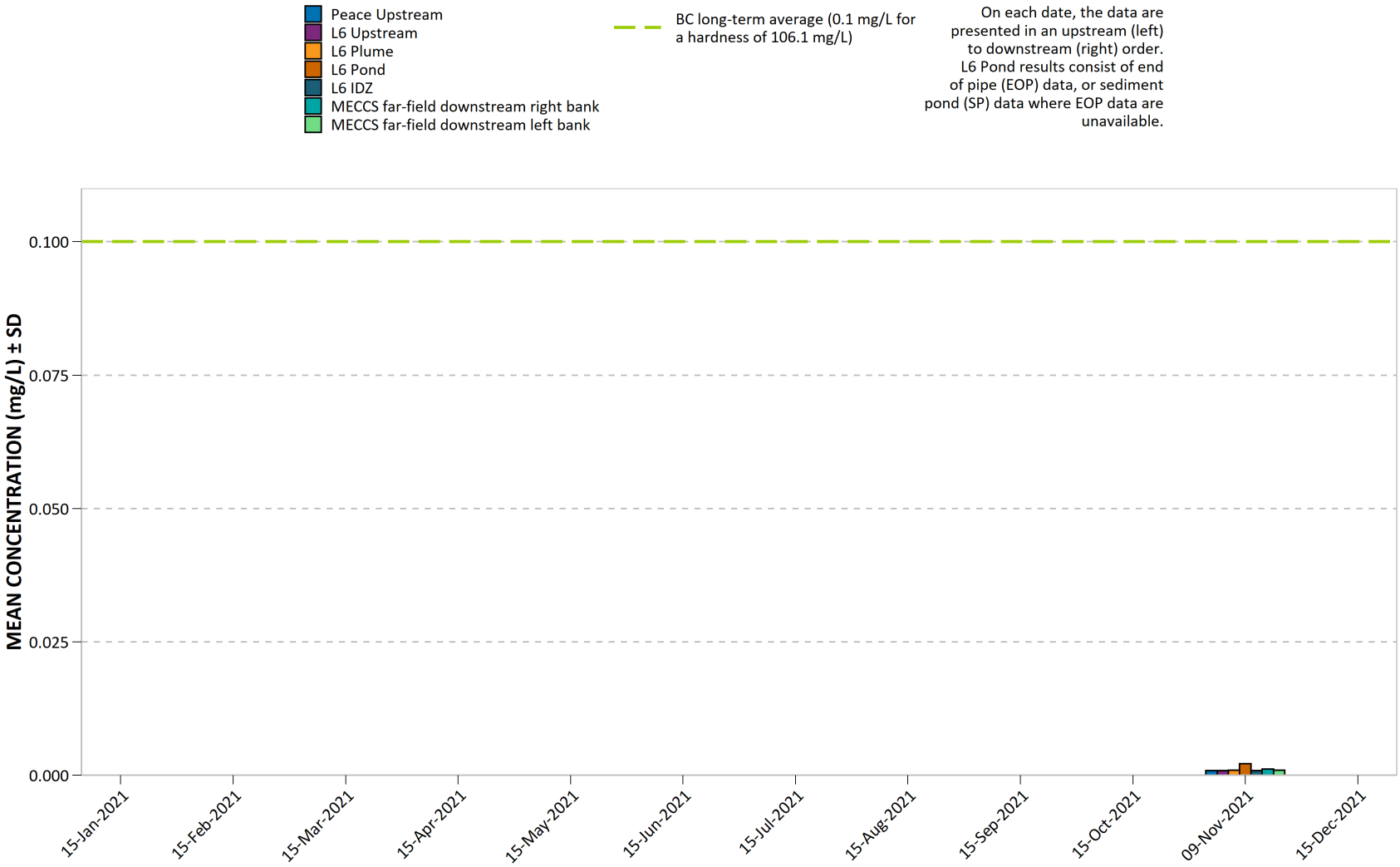


Figure 128. 2021 Peace River and RSEM L6 pond total potassium (K).

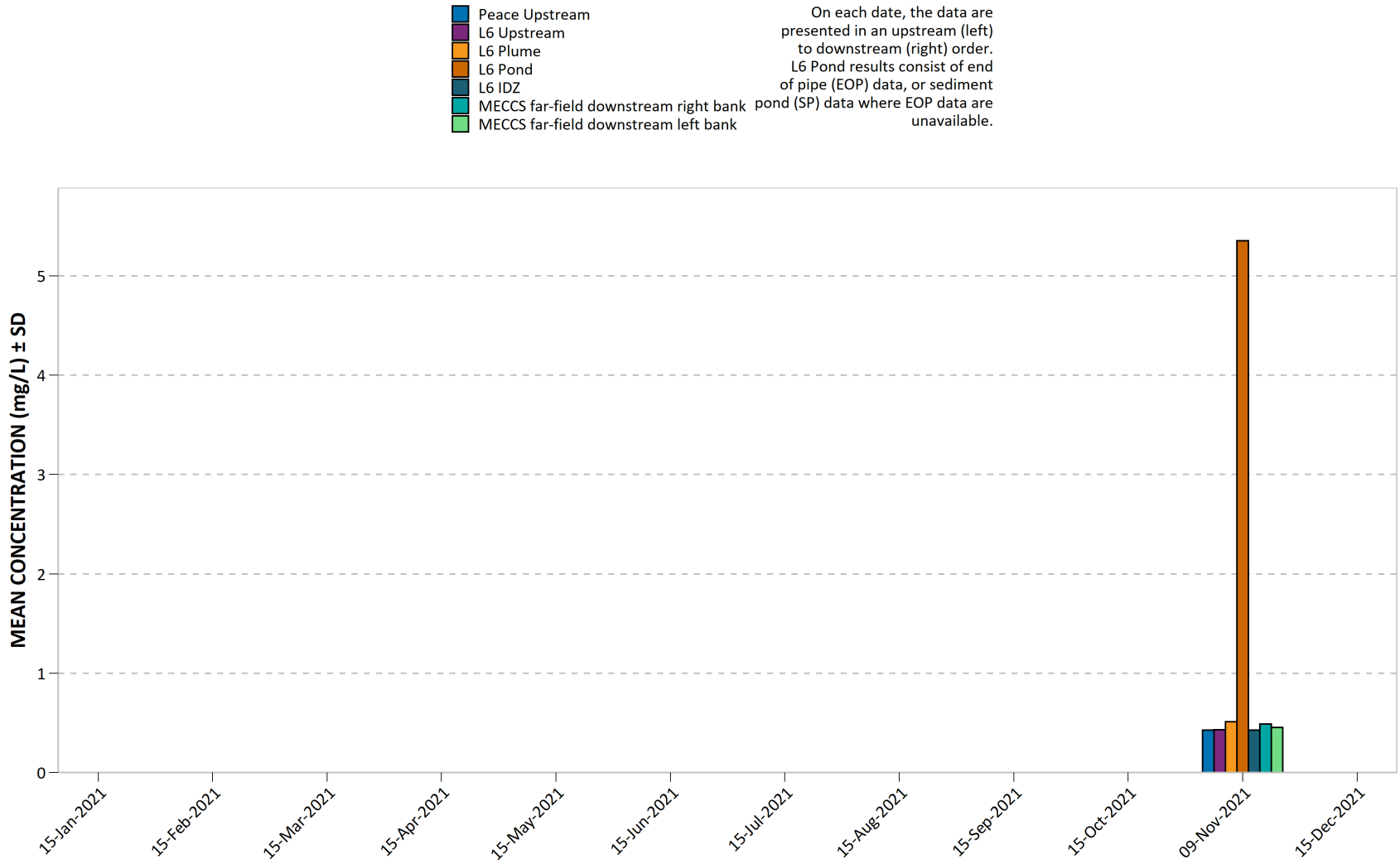


Figure 129. 2021 Peace River and RSEM L6 pond total selenium (Se).

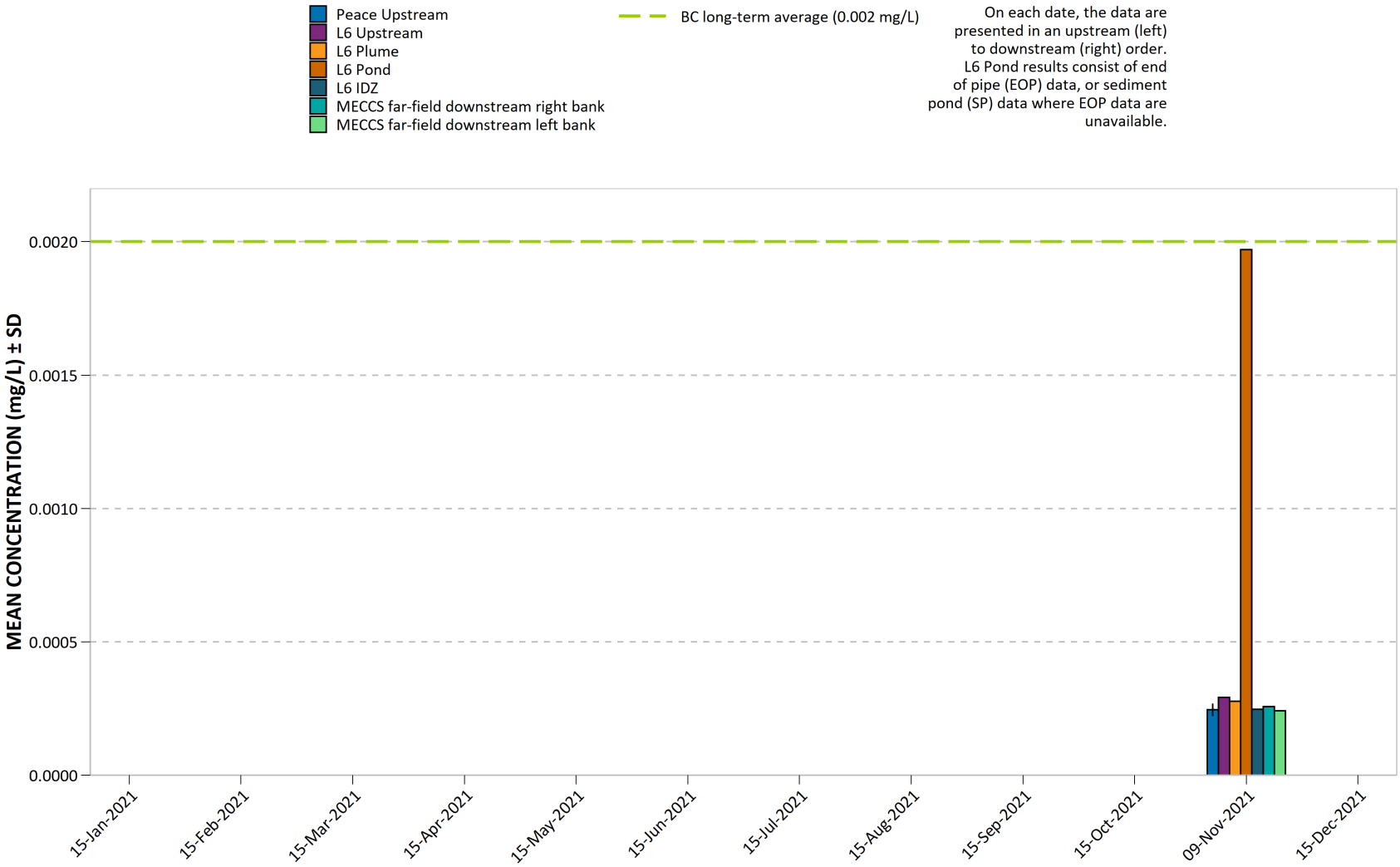


Figure 130. 2021 Peace River and RSEM L6 pond total silicon (Si).

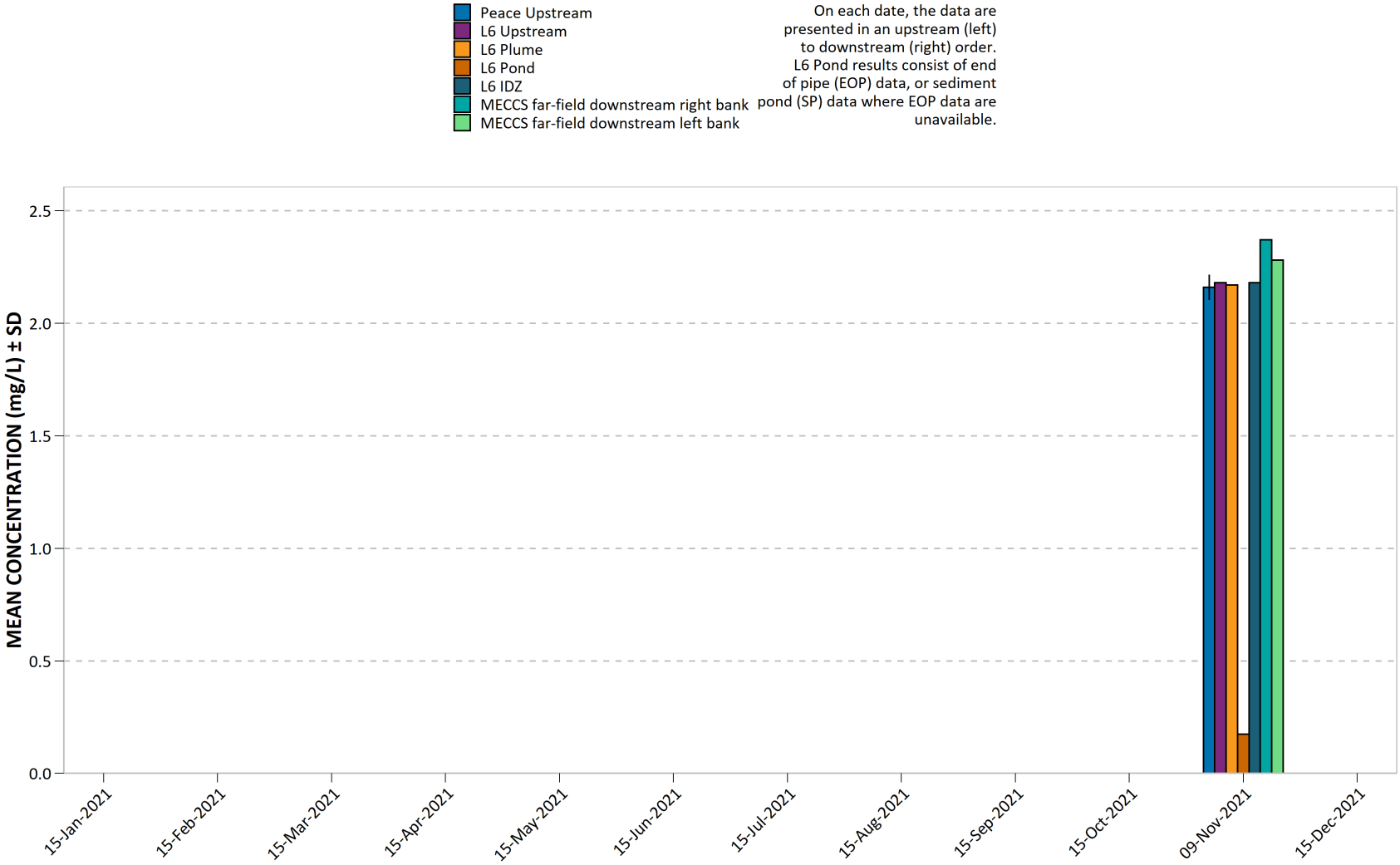


Figure 131. 2021 Peace River and RSEM L6 pond total silver (Ag).

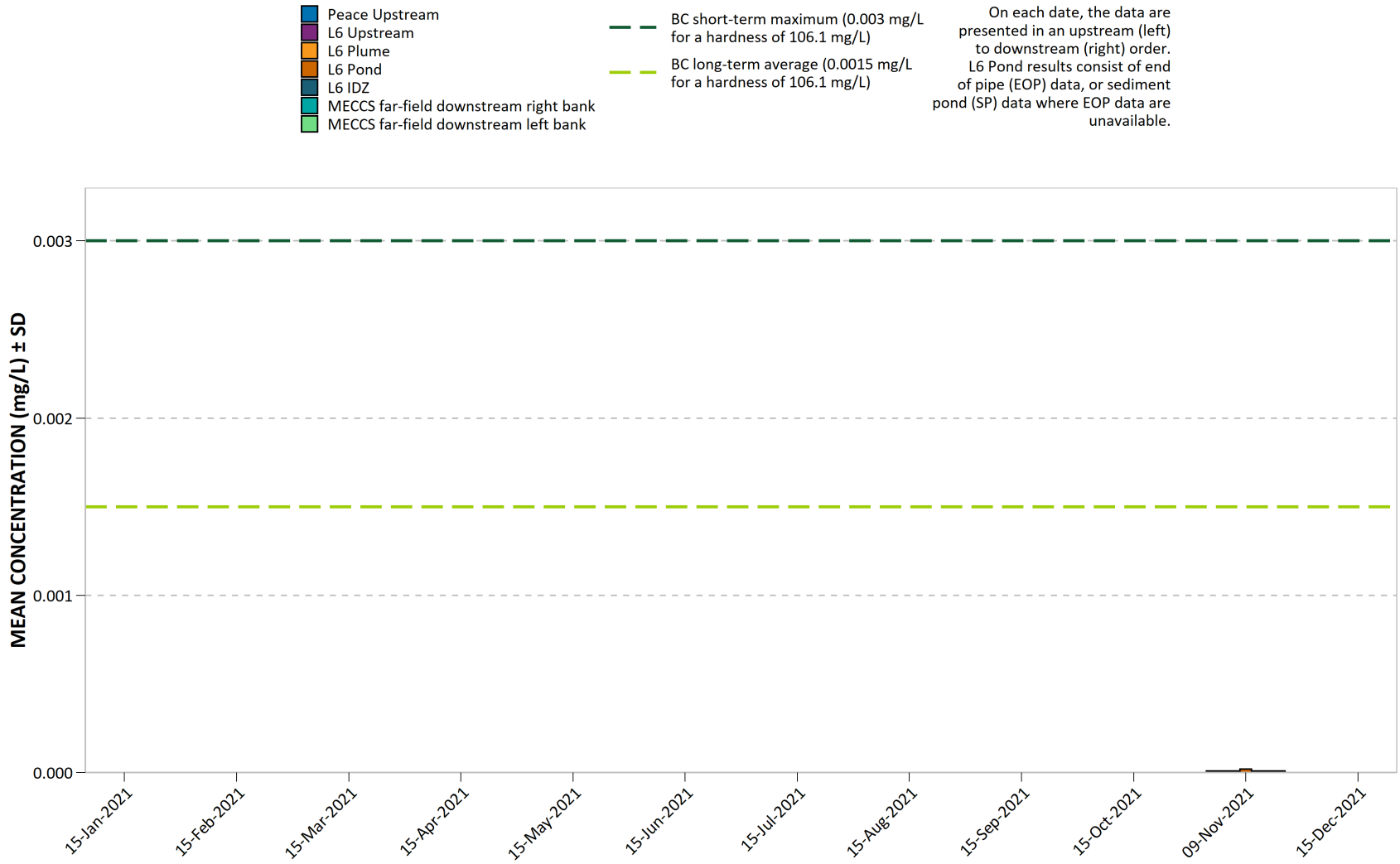


Figure 132. 2021 Peace River and RSEM L6 pond total sodium (Na).

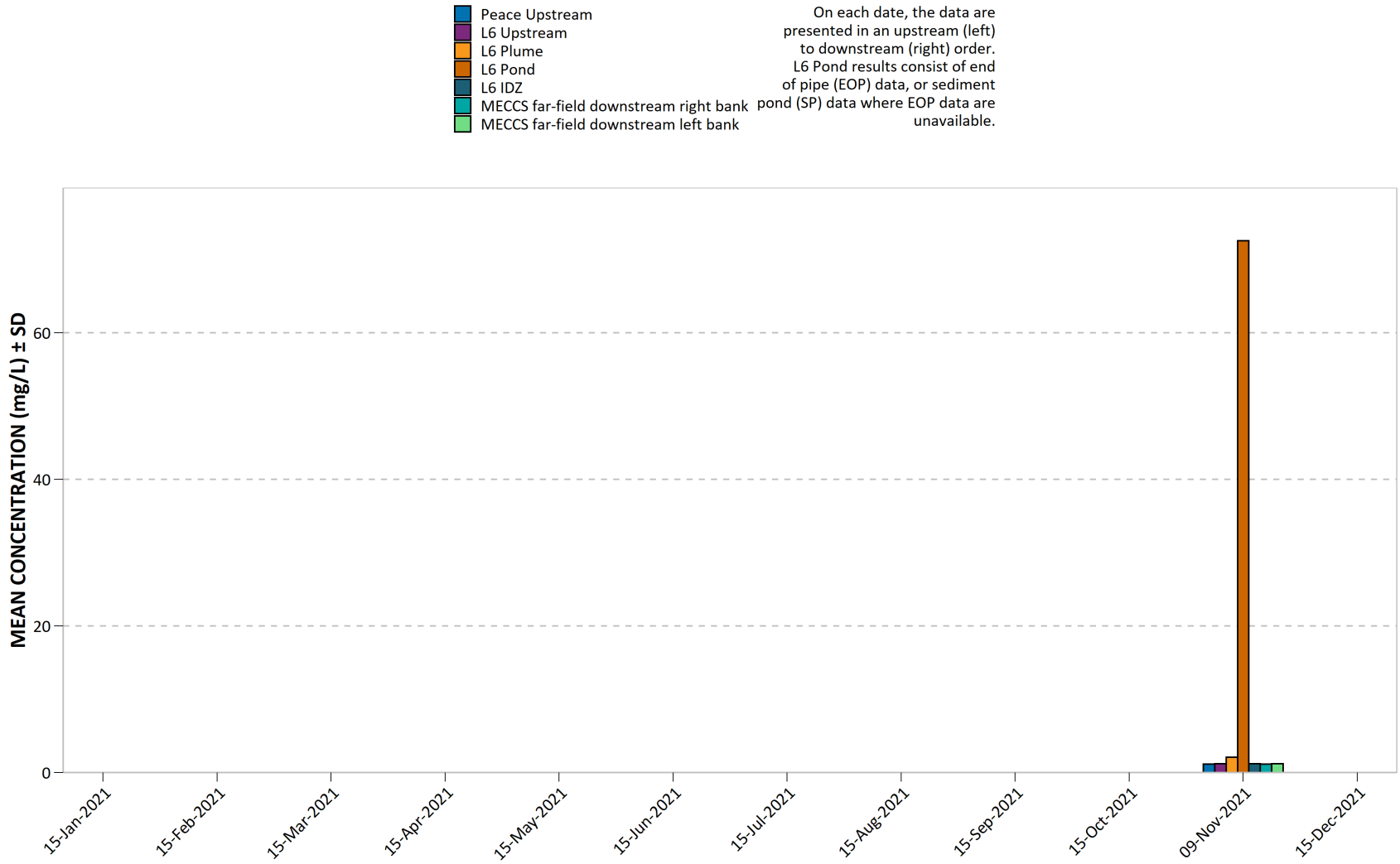


Figure 133. 2021 Peace River and RSEM L6 pond total strontium (Sr).

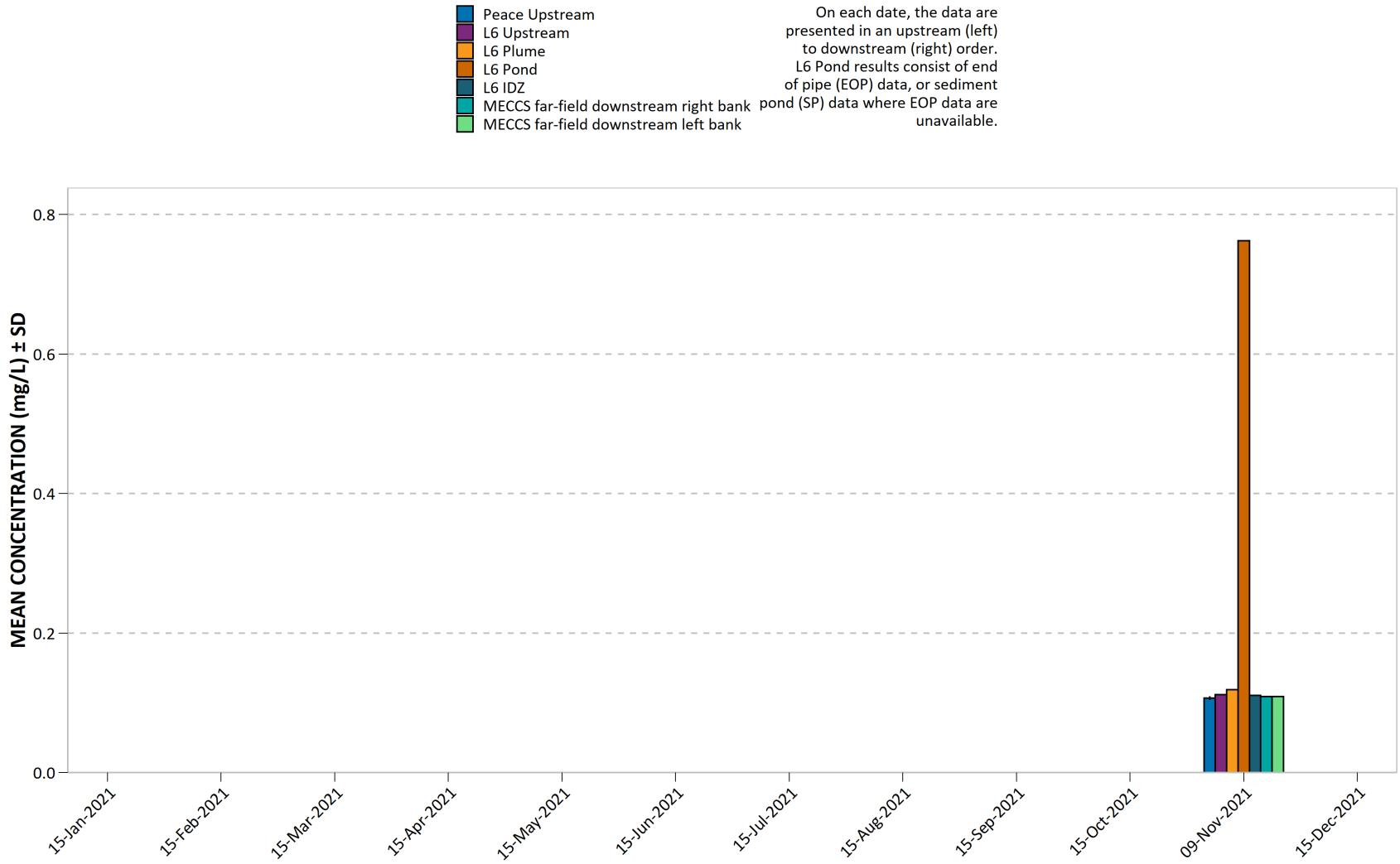


Figure 134. 2021 Peace River and RSEM L6 pond total sulfur (S).

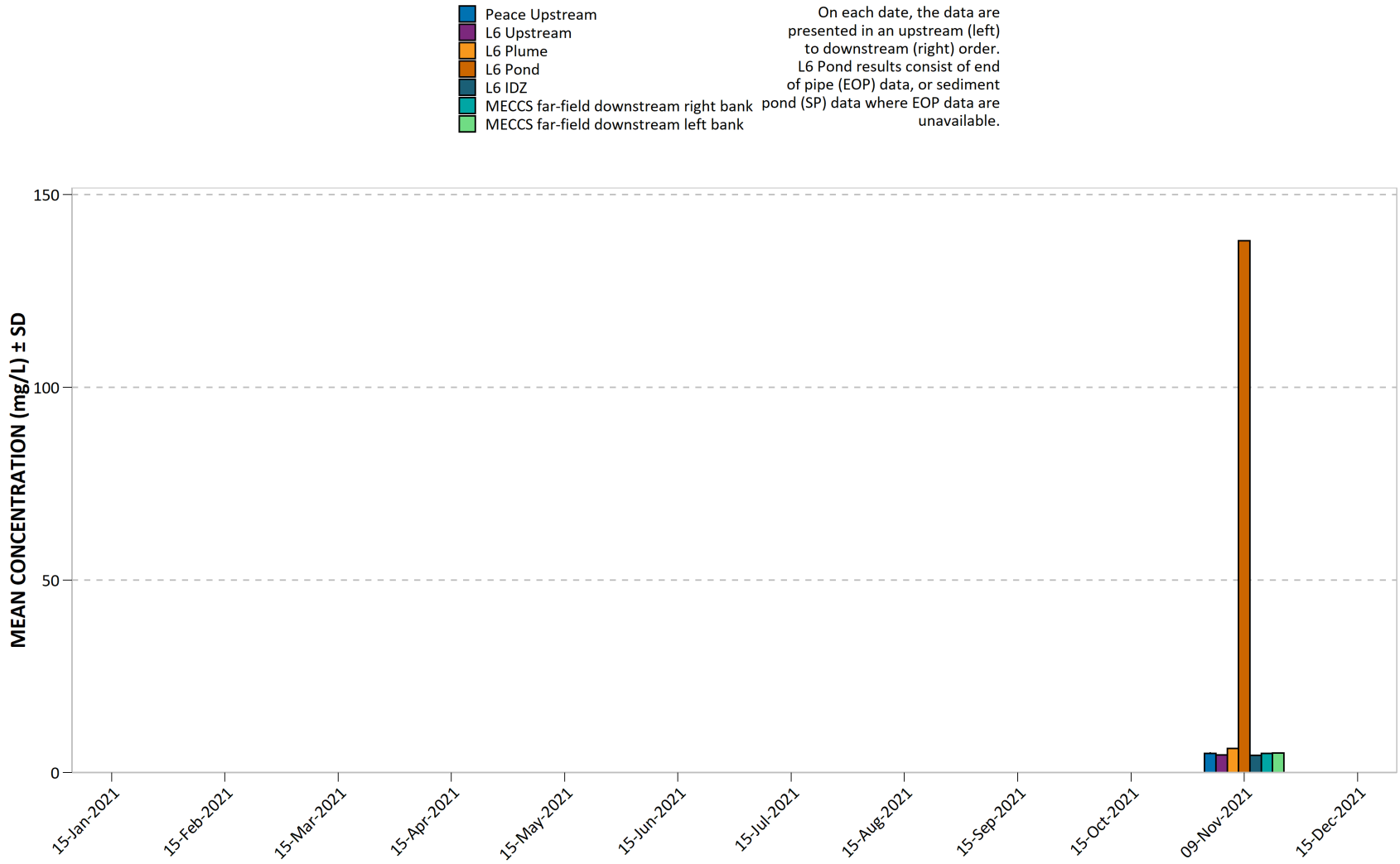


Figure 135. 2021 Peace River and RSEM L6 pond total thallium (Tl).

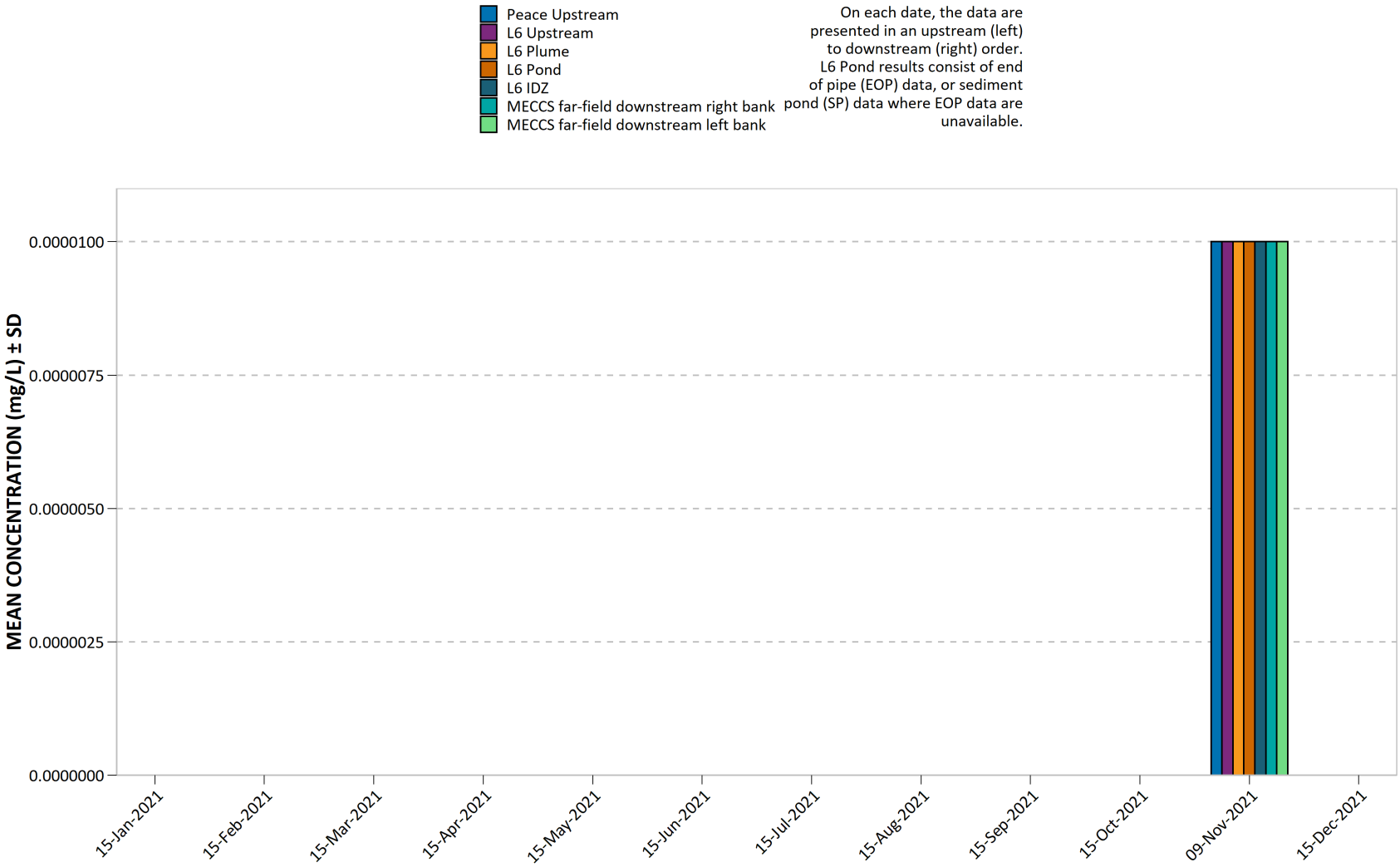


Figure 136. 2021 Peace River and RSEM L6 pond total tin (Sn).

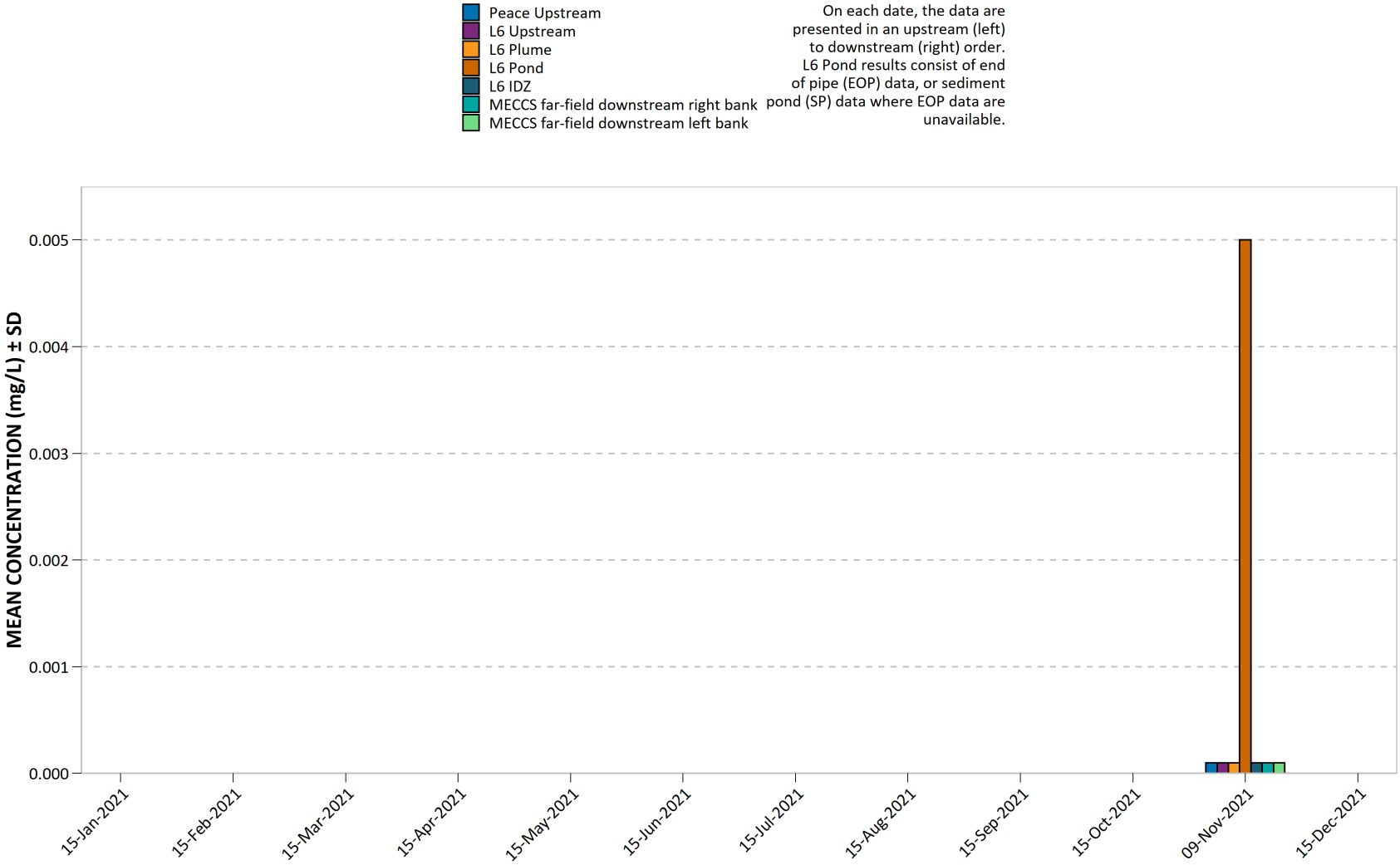


Figure 137. 2021 Peace River and RSEM L6 pond total titanium (Ti).

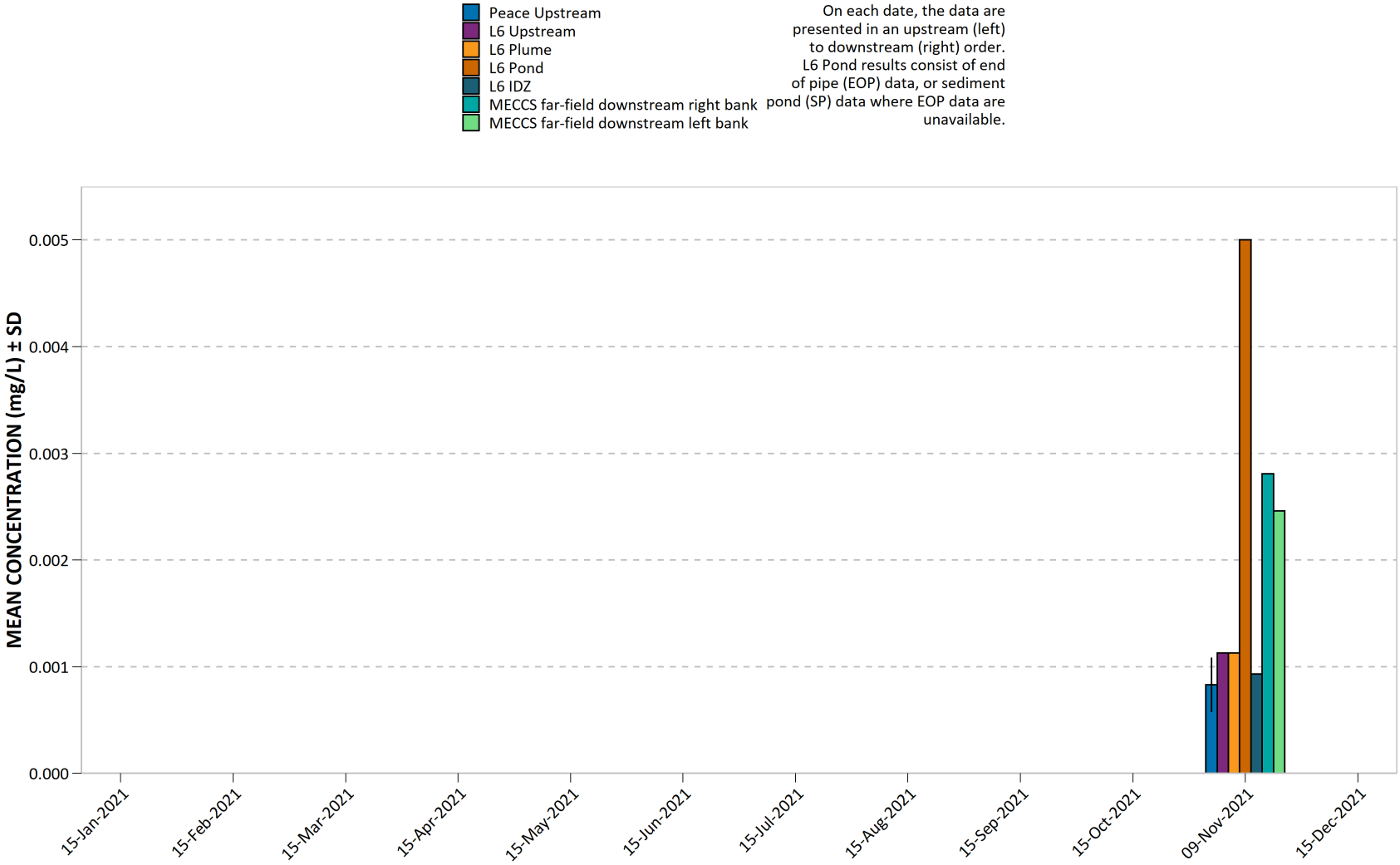


Figure 138. 2021 Peace River and RSEM L6 pond total uranium (U).

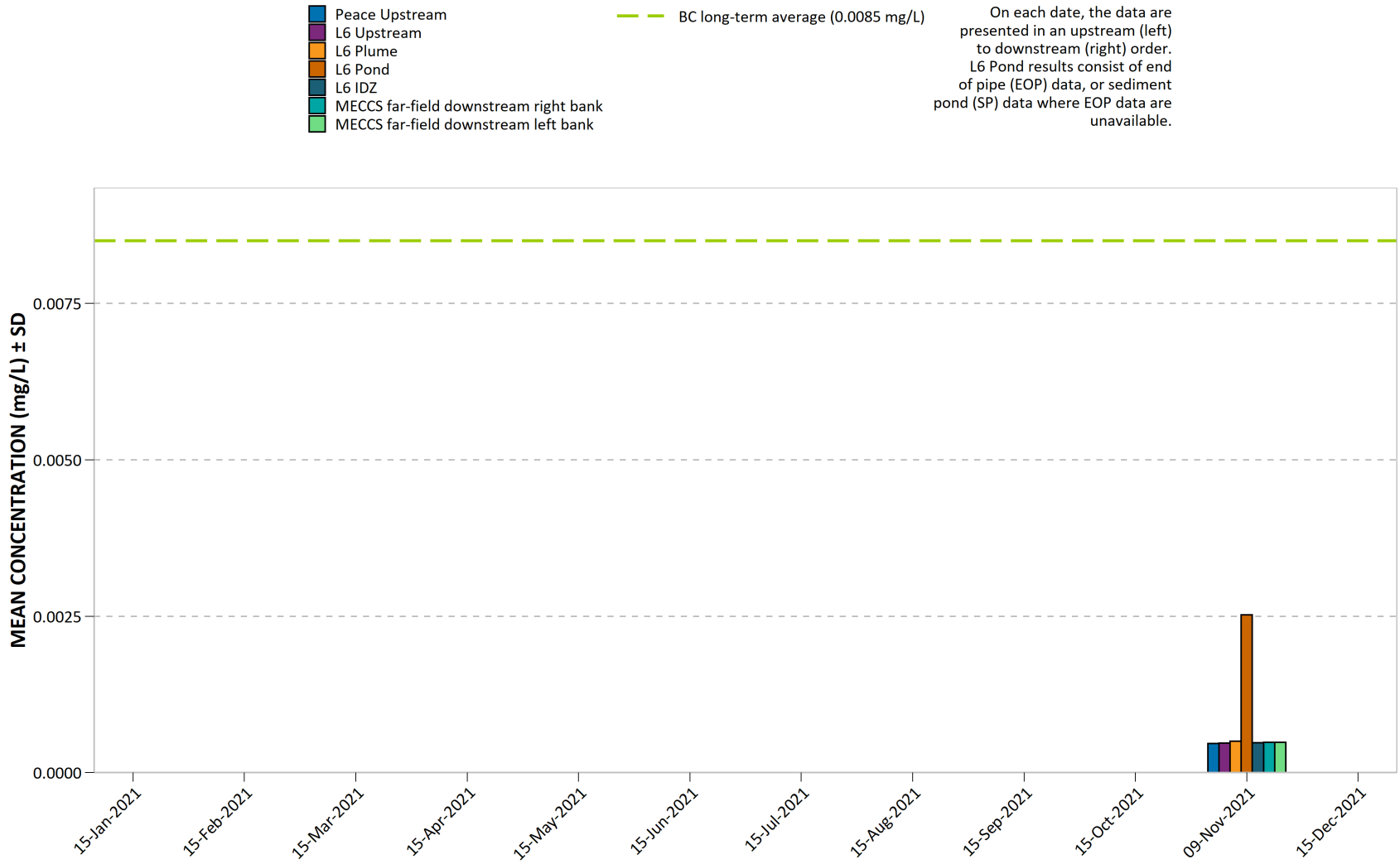


Figure 139. 2021 Peace River and RSEM L6 pond total vanadium (V).

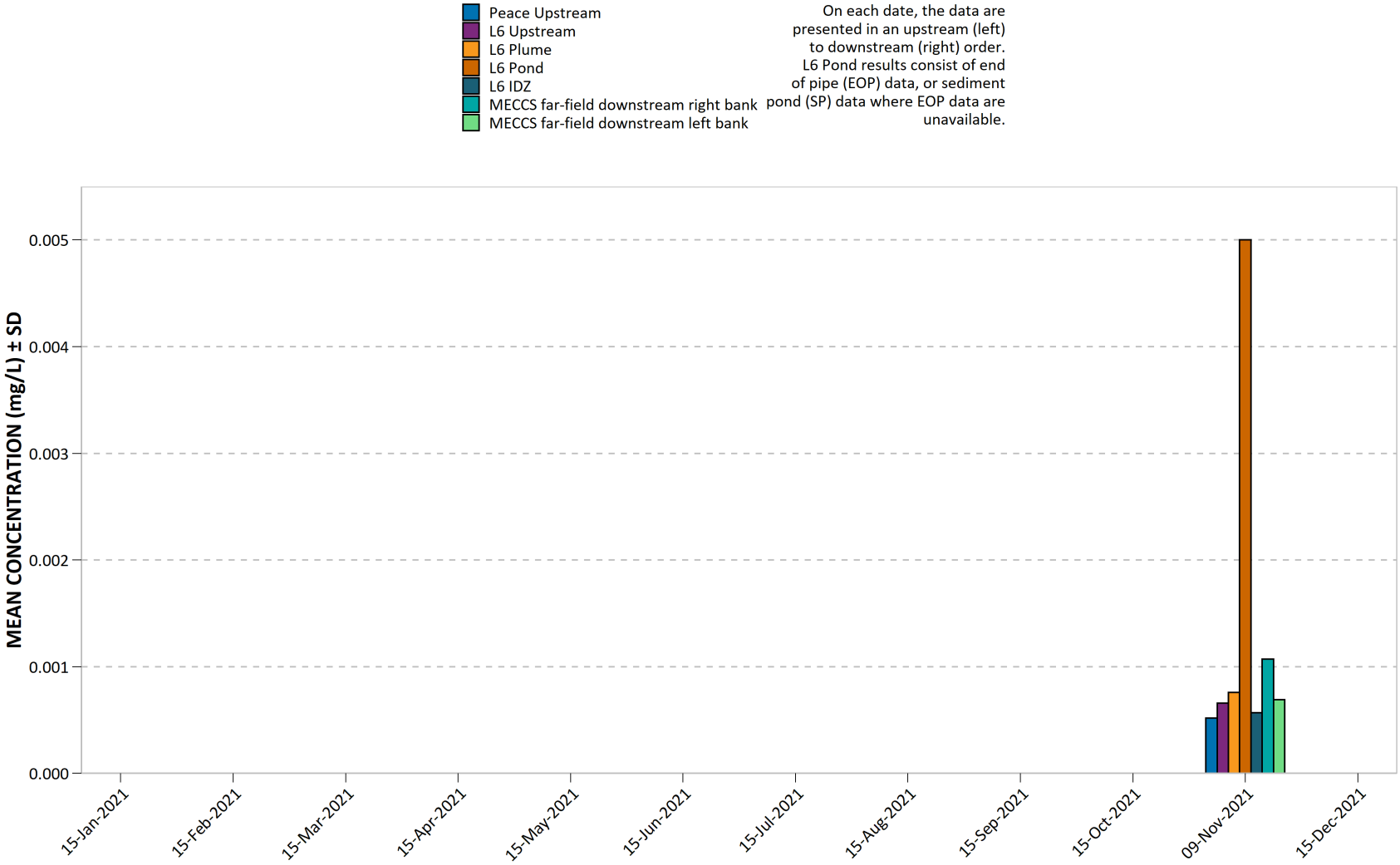
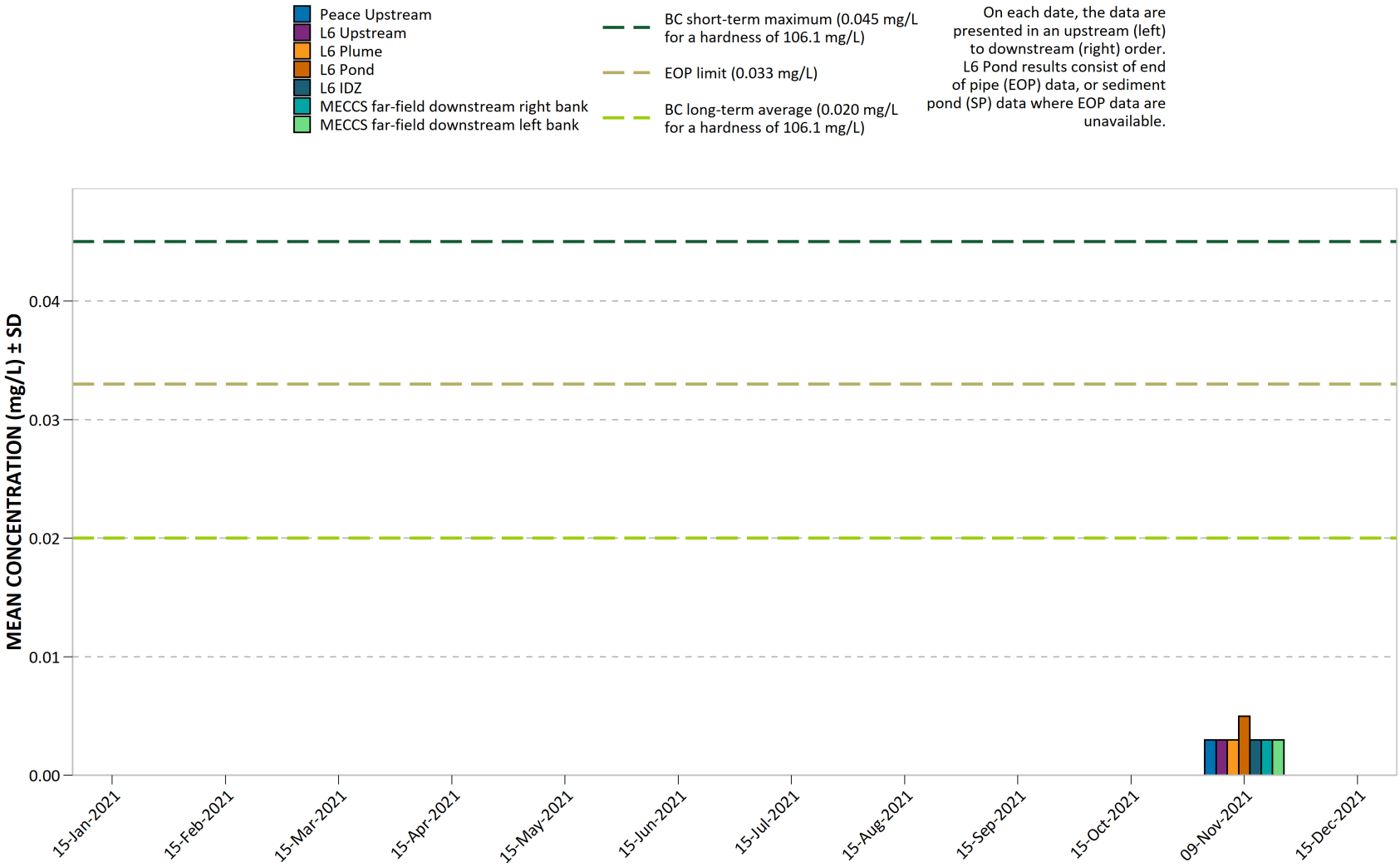


Figure 140. 2021 Peace River and RSEM L6 pond total zinc (Zn).



Note: BC WQG for total zinc is hardness dependent. An average Peace River hardness of 106.1 mg/L (based on 26 samples collected between April 2007 – Jan. 2017, BC Hydro 2017) was used in the plot to depict the maximum and 30-day guidelines for ease of interpretation. Sample specific hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 141. 2021 Peace River and RSEM L6 pond total zirconium (Zr).

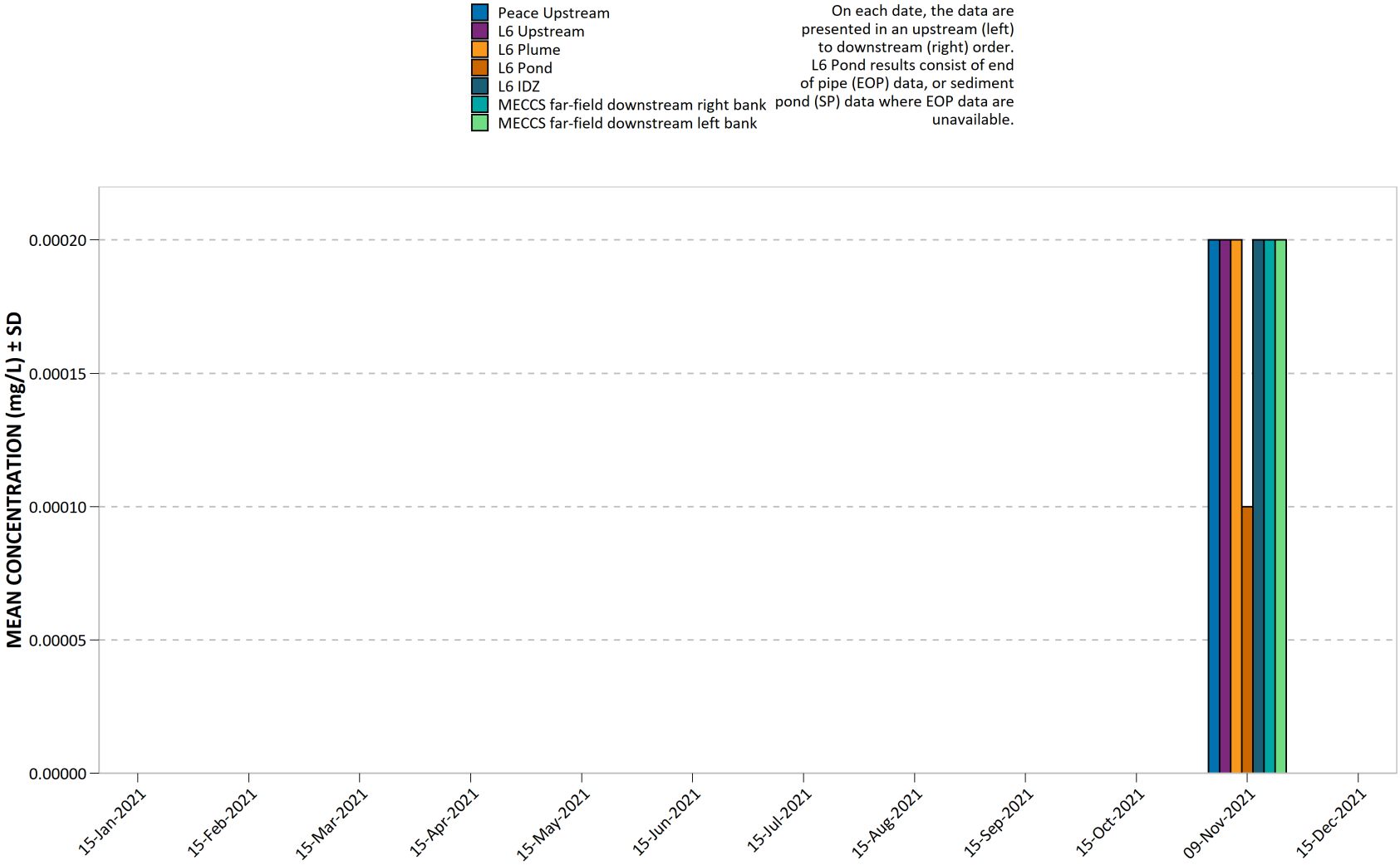


Figure 142. 2021 Peace River and RSEM L6 pond dissolved aluminum (Al).

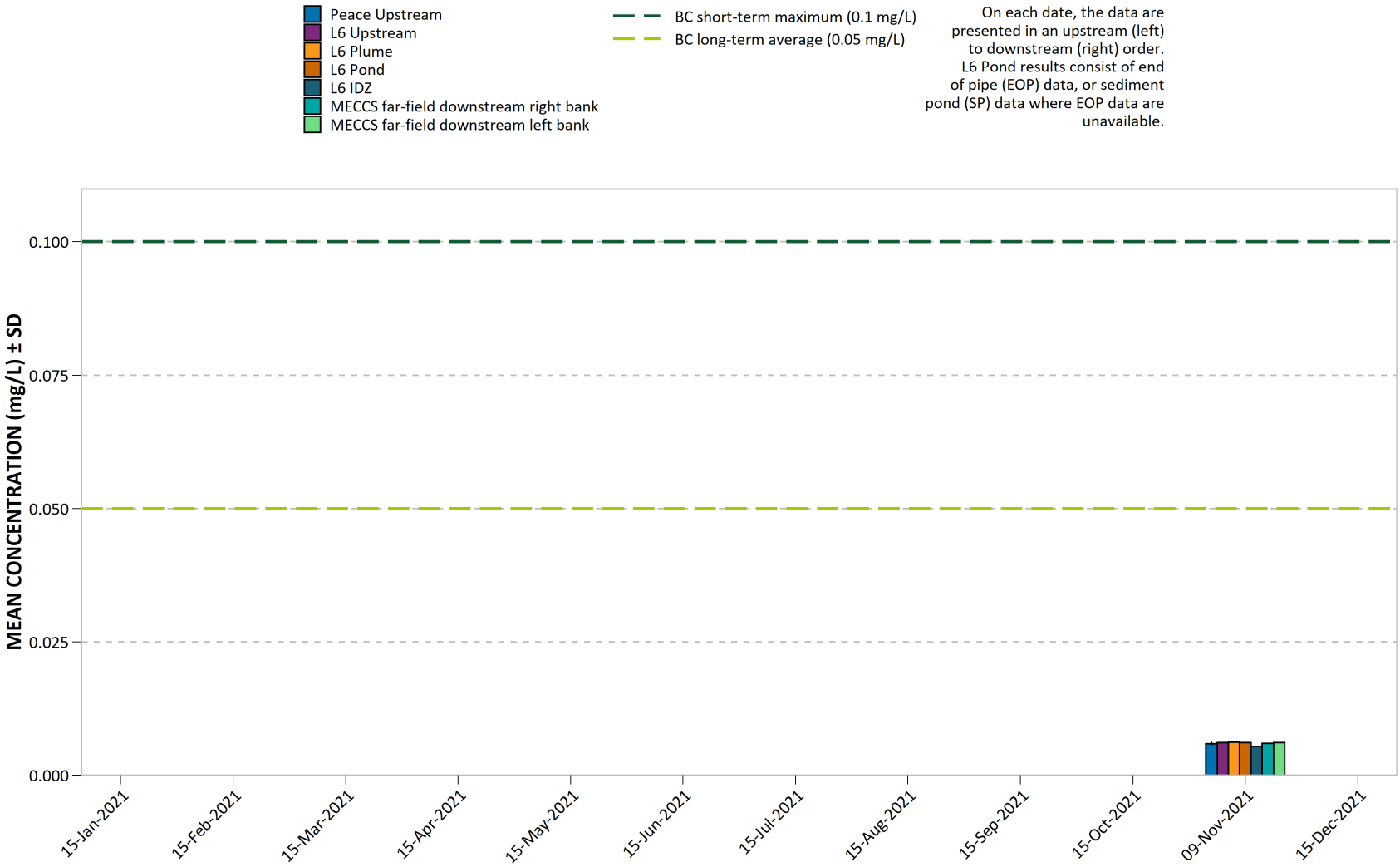


Figure 143. 2021 Peace River and RSEM L6 pond dissolved antimony (Sb).

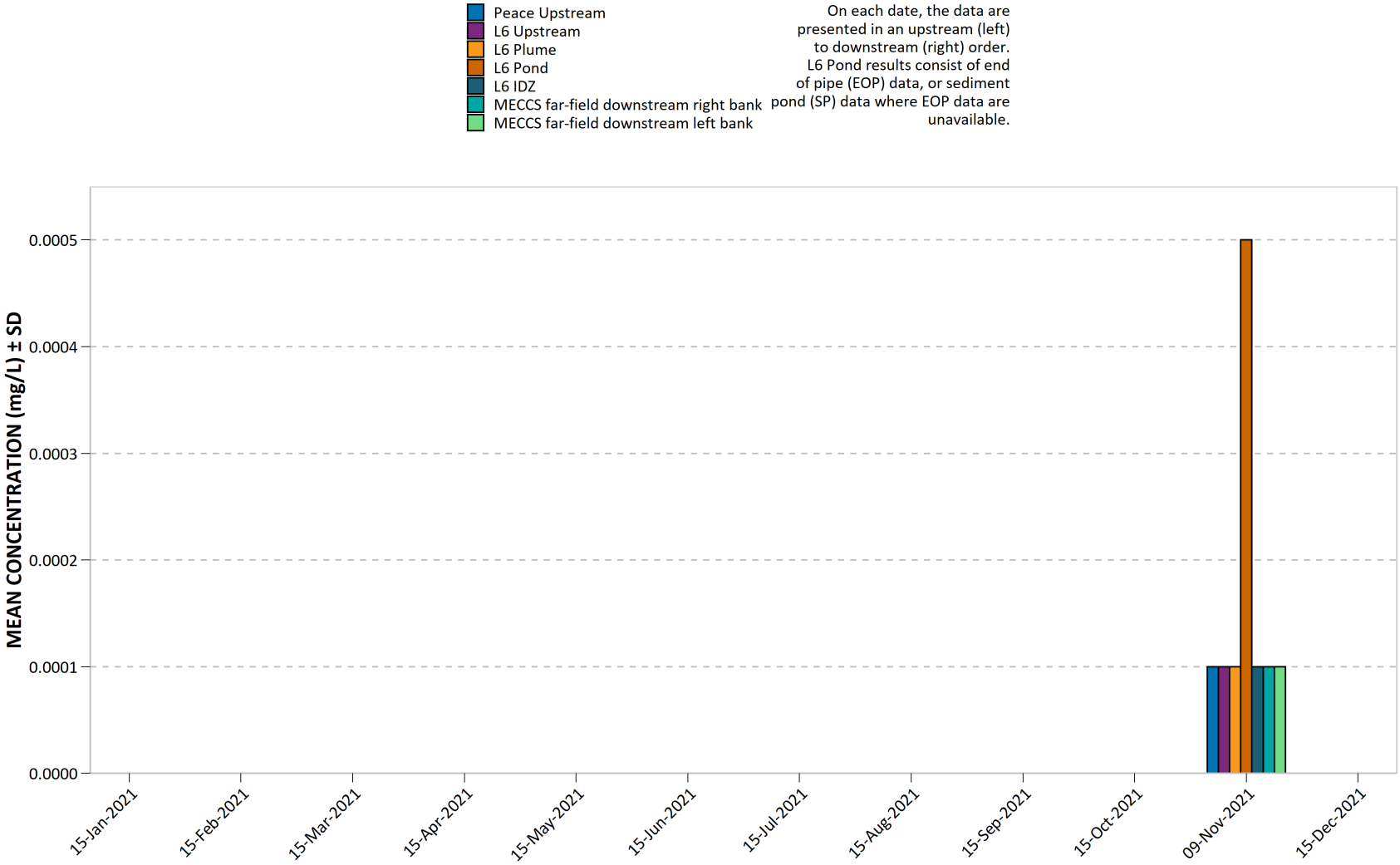


Figure 144. 2021 Peace River and RSEM L6 pond dissolved arsenic (As).

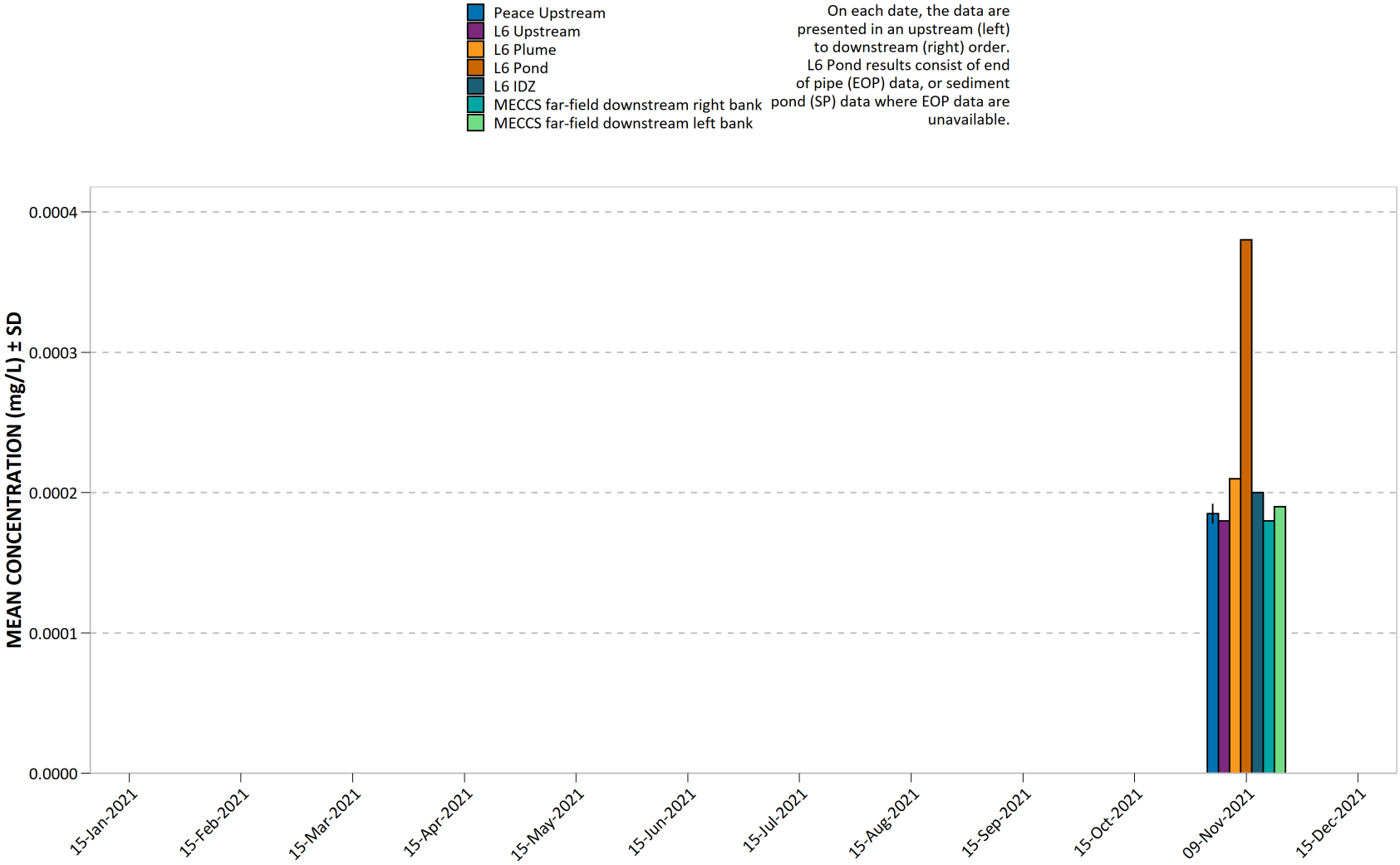


Figure 145. 2021 Peace River and RSEM L6 pond dissolved barium (Ba).

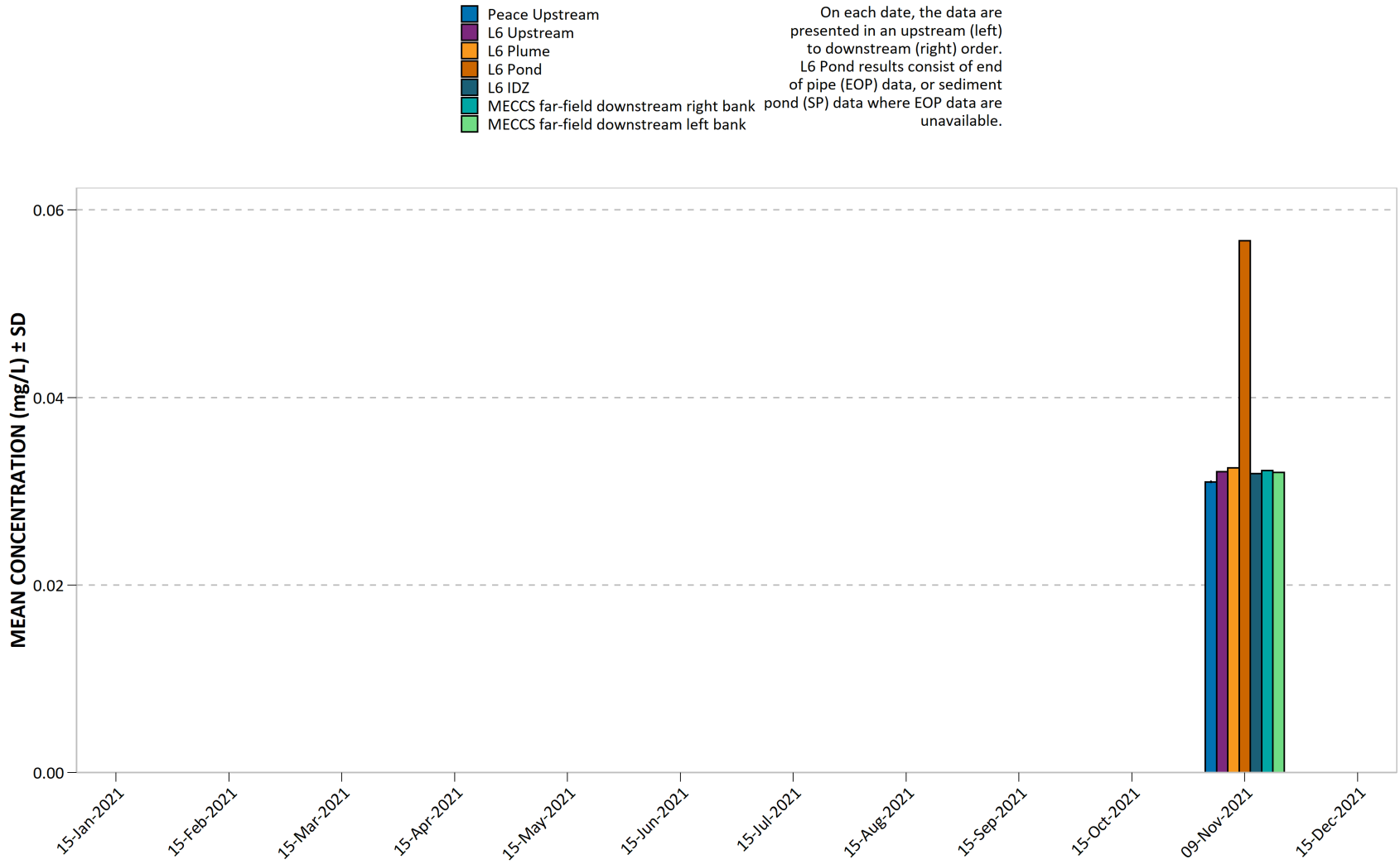


Figure 146. 2021 Peace River and RSEM L6 pond dissolved beryllium (Be).

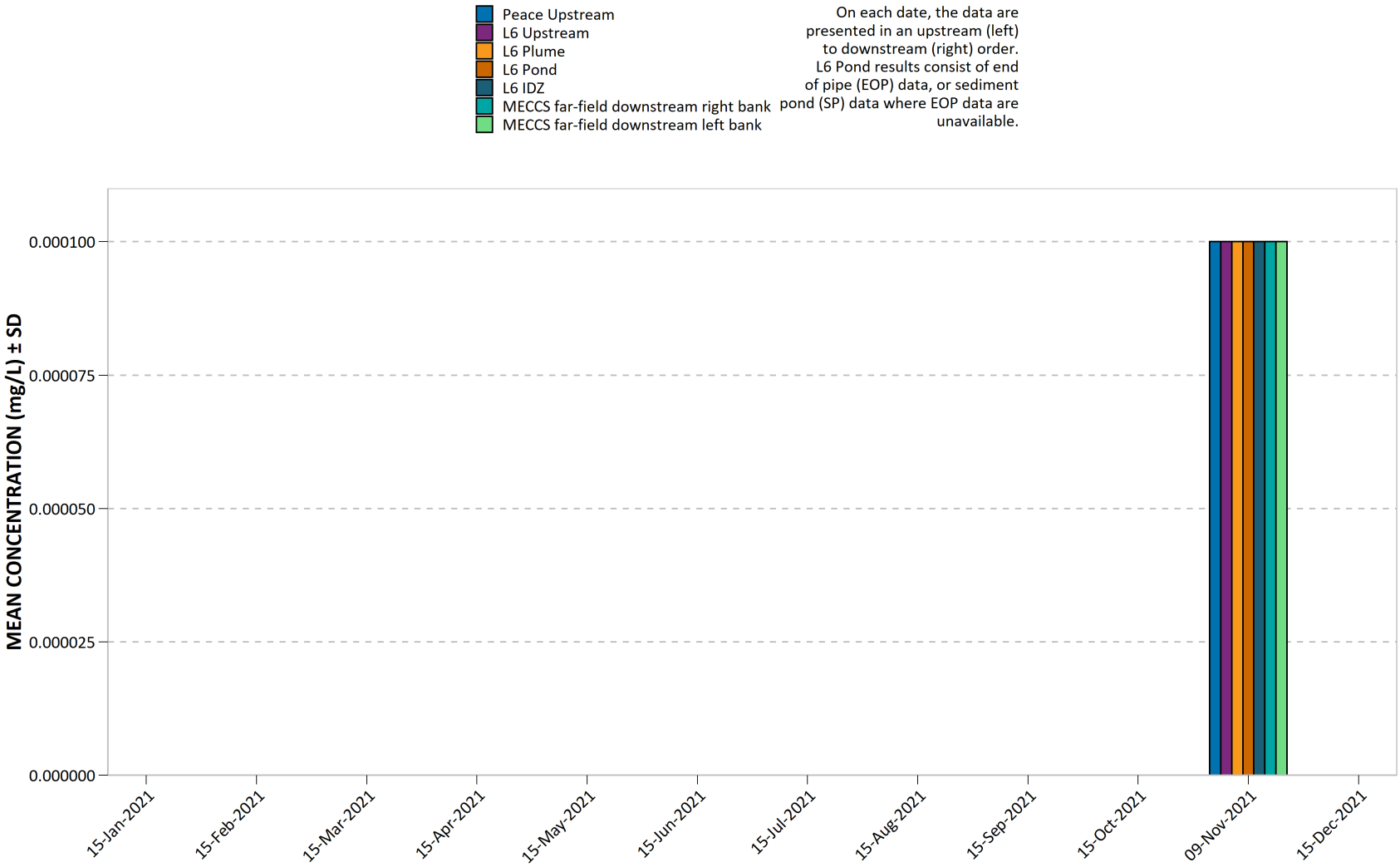


Figure 147. 2021 Peace River and RSEM L6 pond dissolved bismuth (Bi).

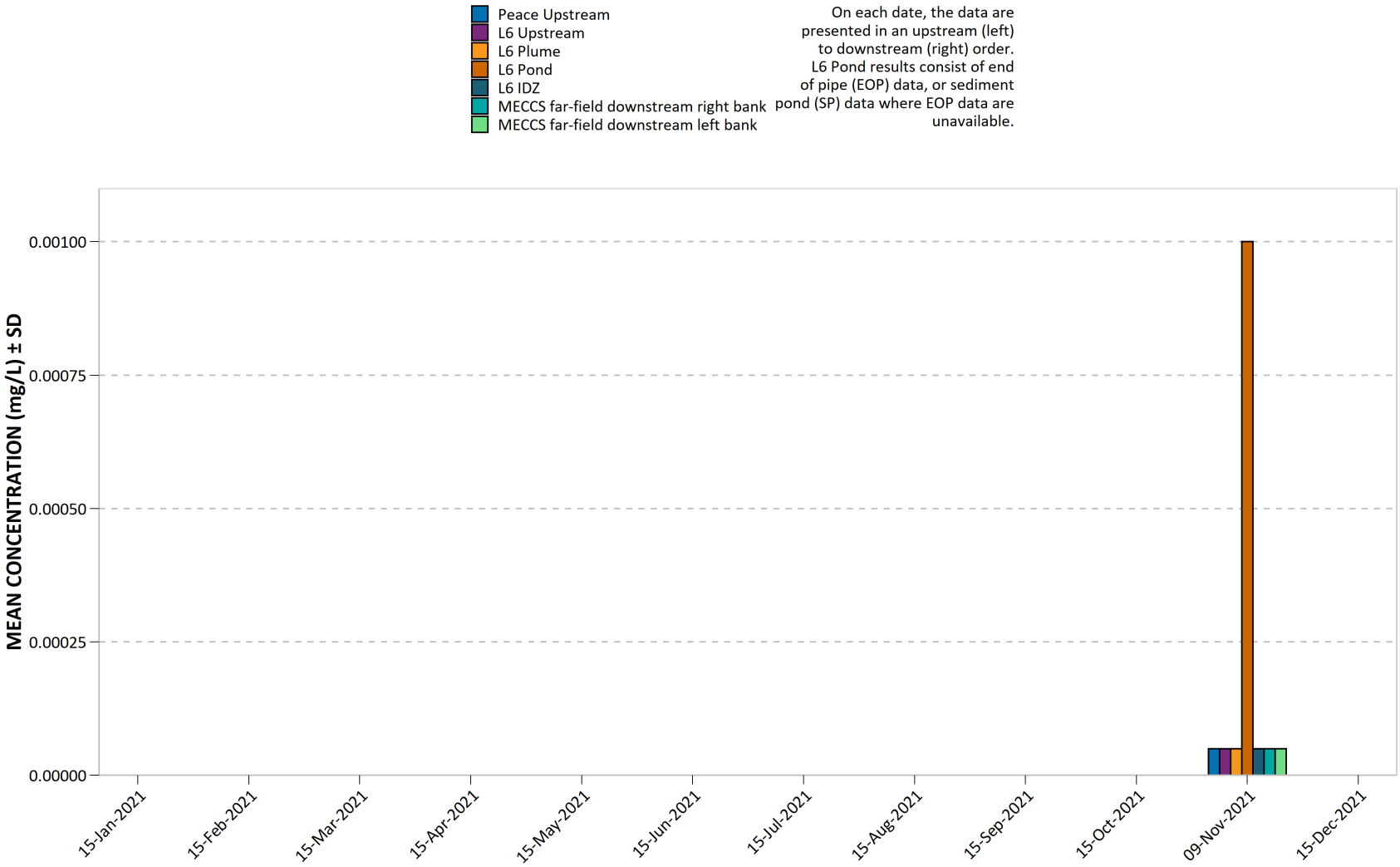


Figure 148. 2021 Peace River and RSEM L6 pond dissolved boron (B).

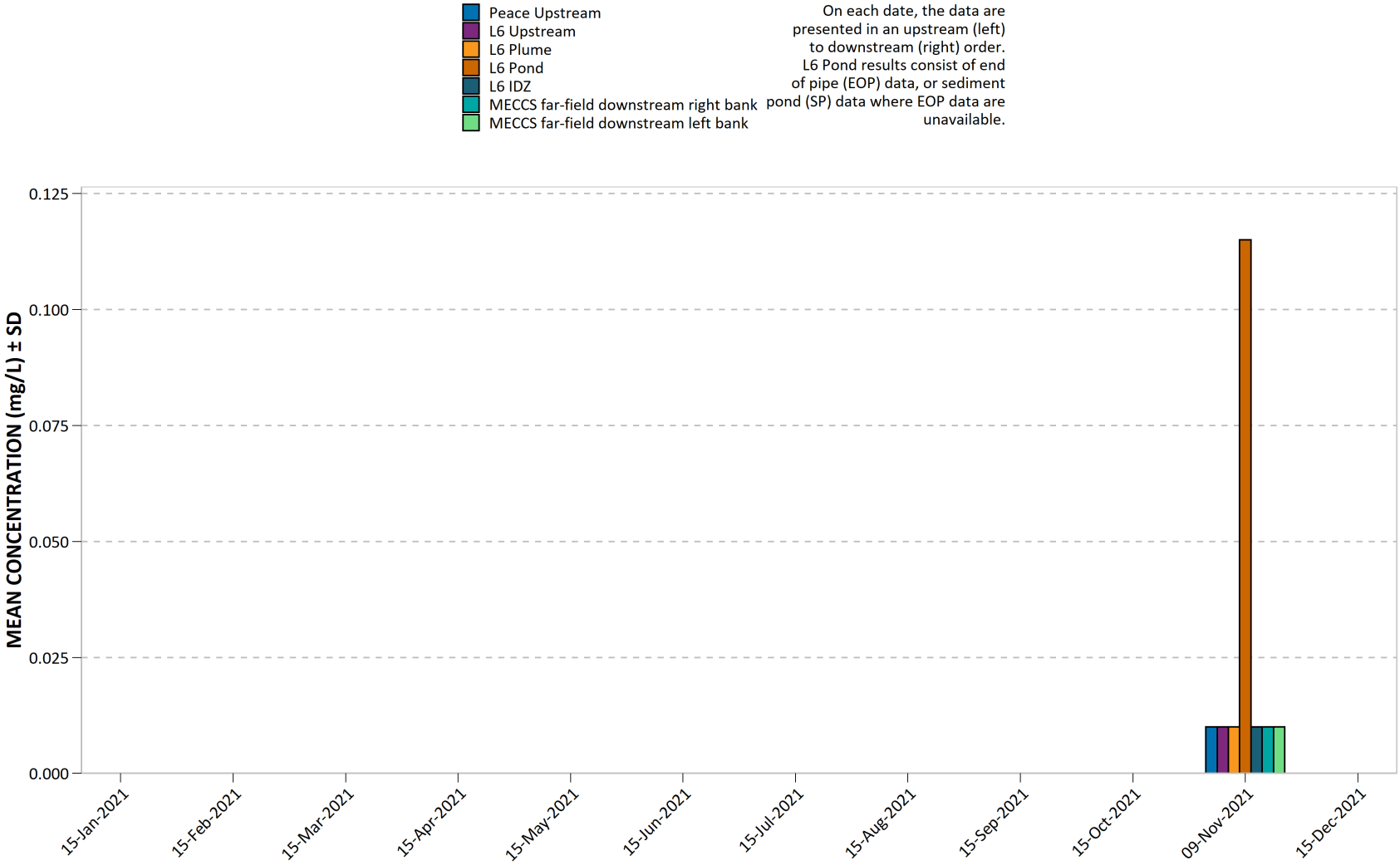


Figure 149. 2021 Peace River and RSEM L6 pond dissolved cadmium (Cd).

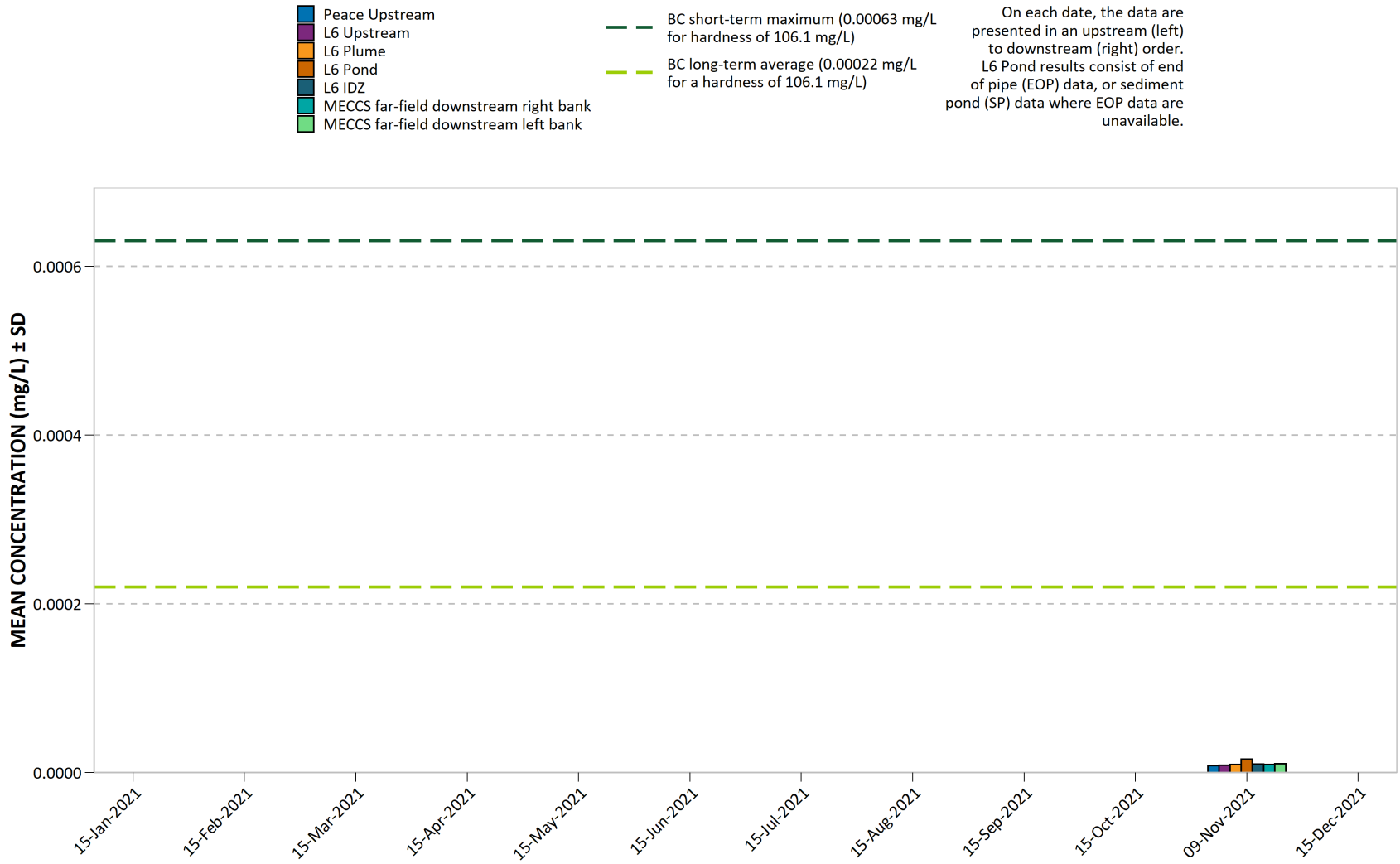


Figure 150. 2021 Peace River and RSEM L6 pond dissolved calcium (Ca).

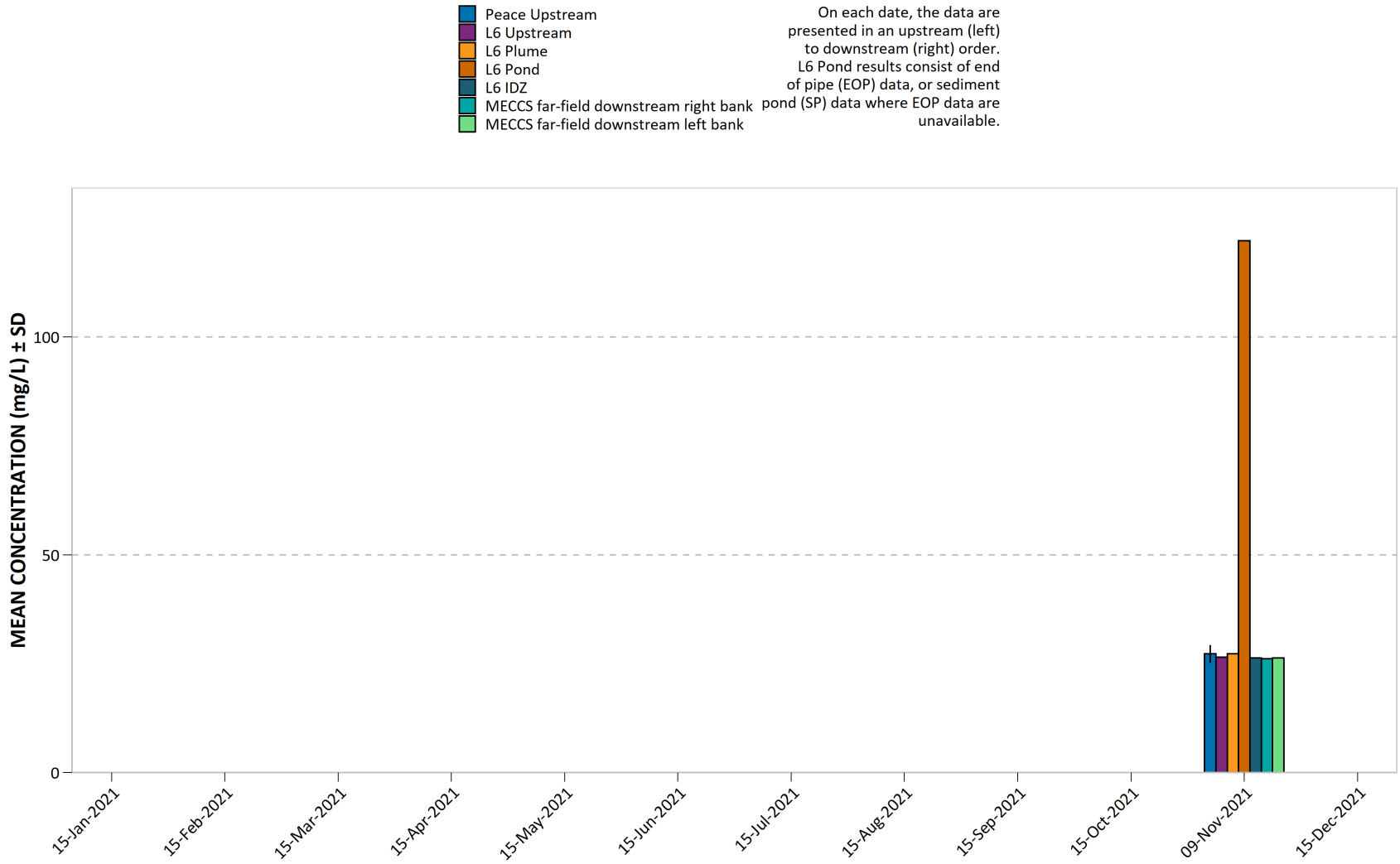


Figure 151. 2021 Peace River and RSEM L6 pond dissolved chromium (Cr).

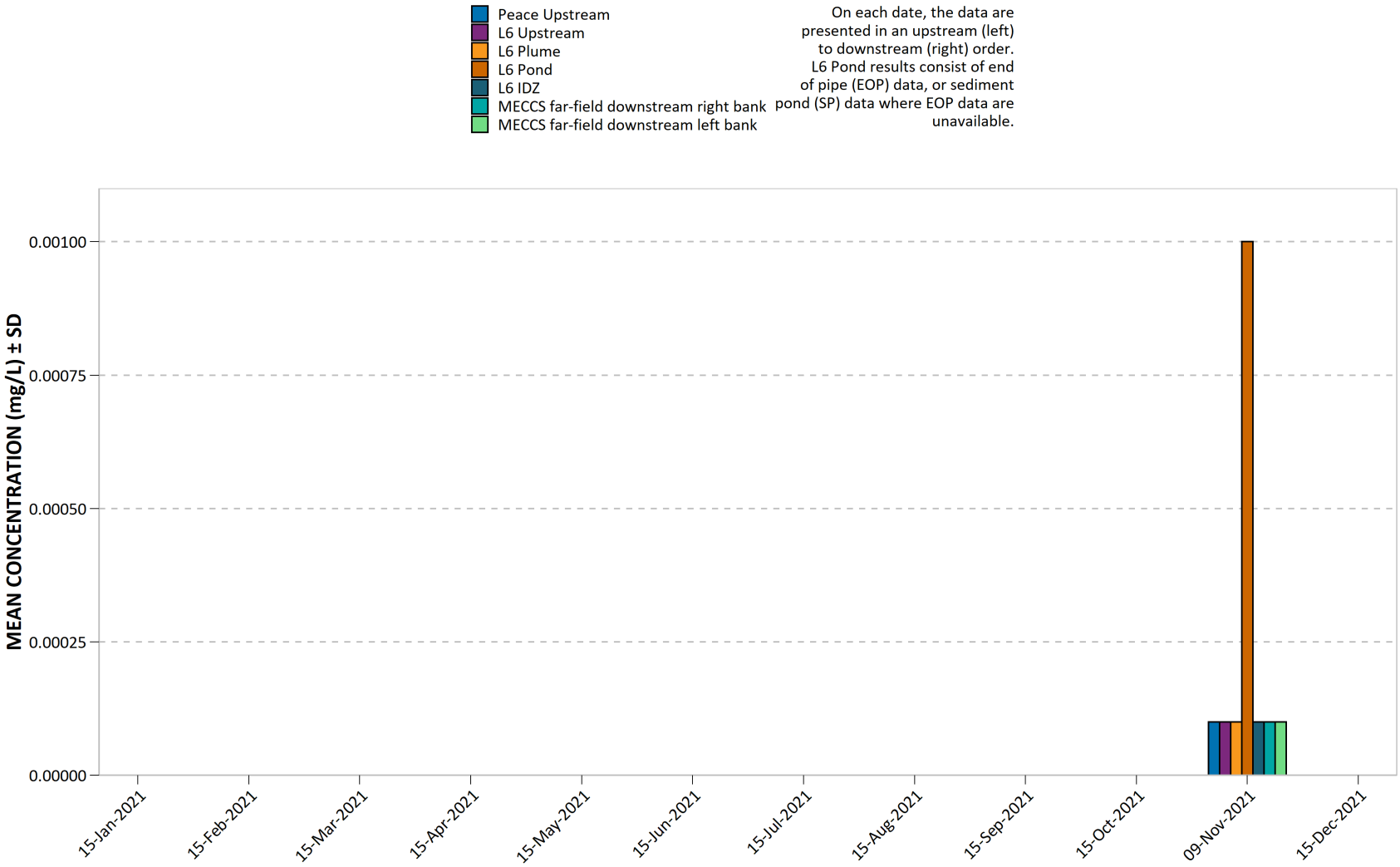


Figure 152. 2021 Peace River and RSEM L6 pond dissolved cobalt (Co).

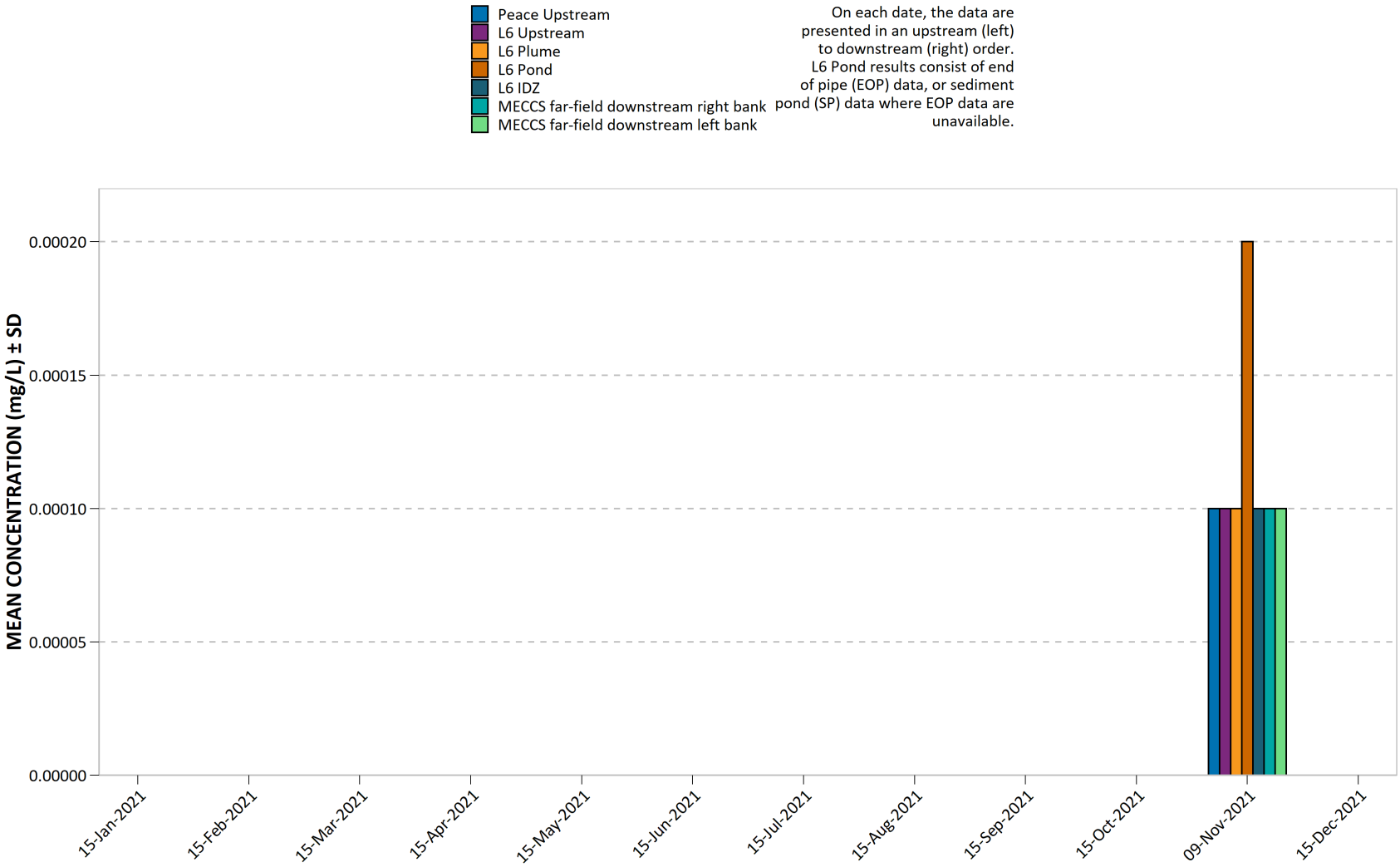


Figure 153. 2021 Peace River and RSEM L6 pond dissolved copper (Cu).

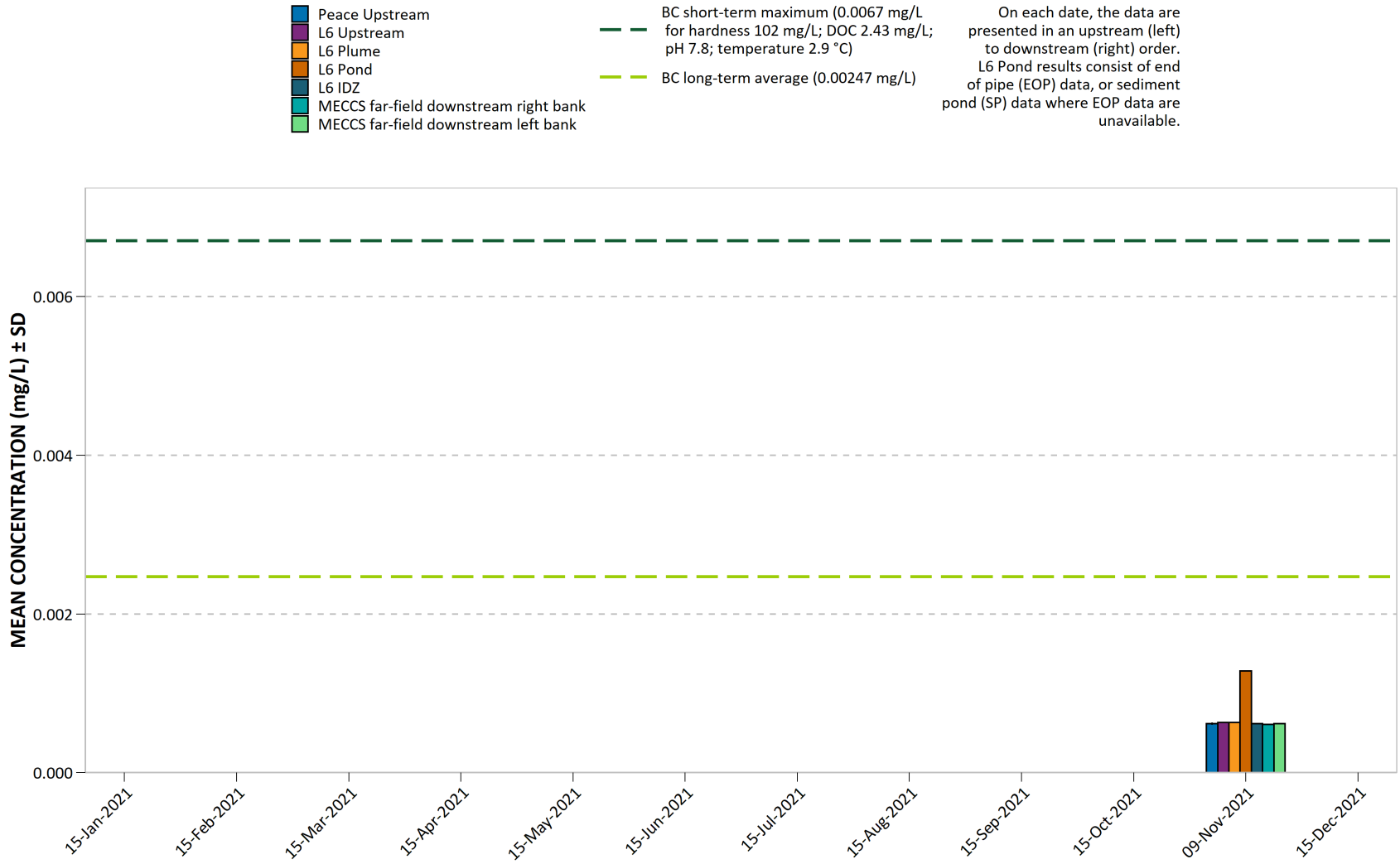


Figure 154. 2021 Peace River and RSEM L6 pond dissolved iron (Fe).

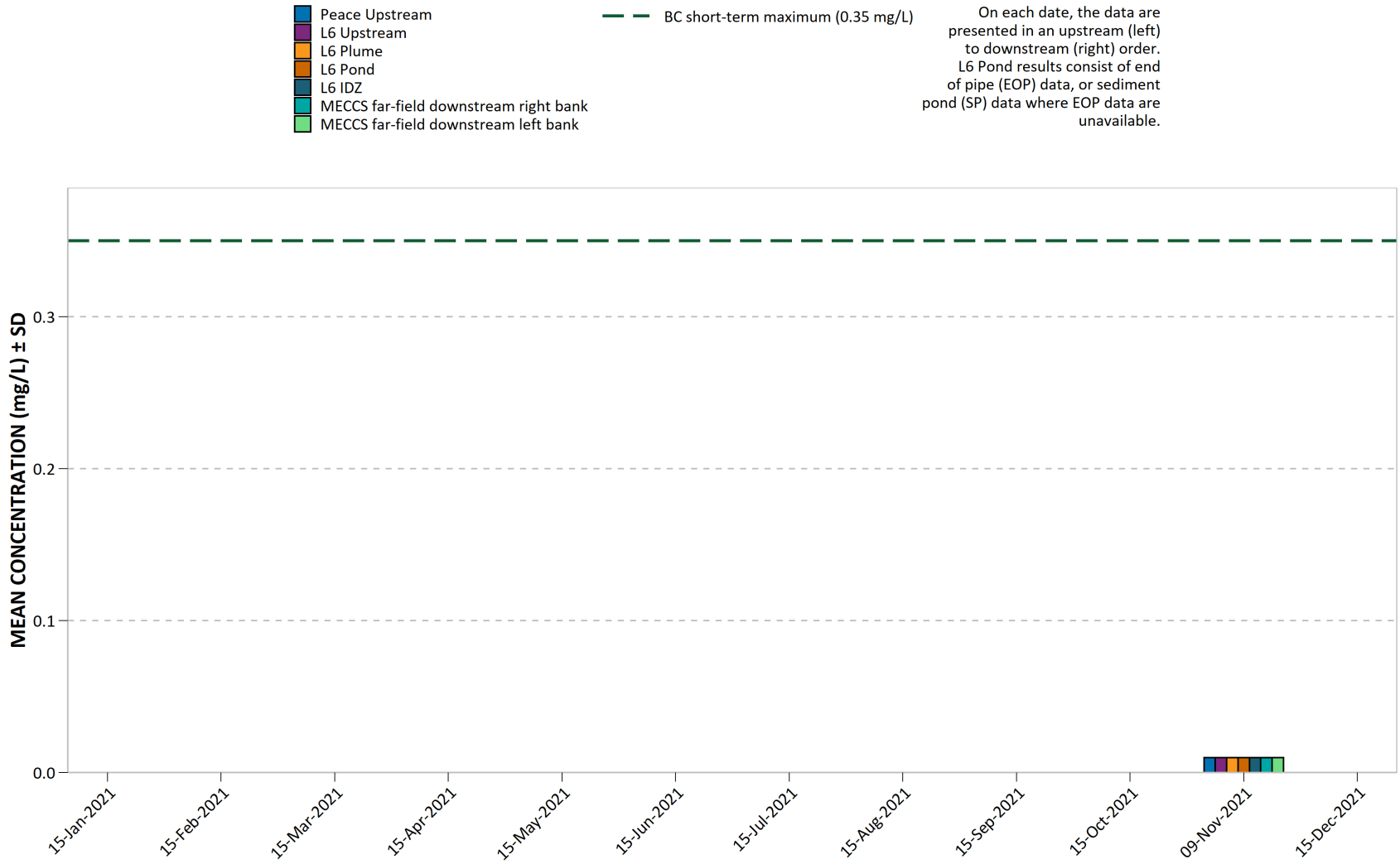


Figure 155. 2021 Peace River and RSEM L6 pond dissolved lead (Pb).

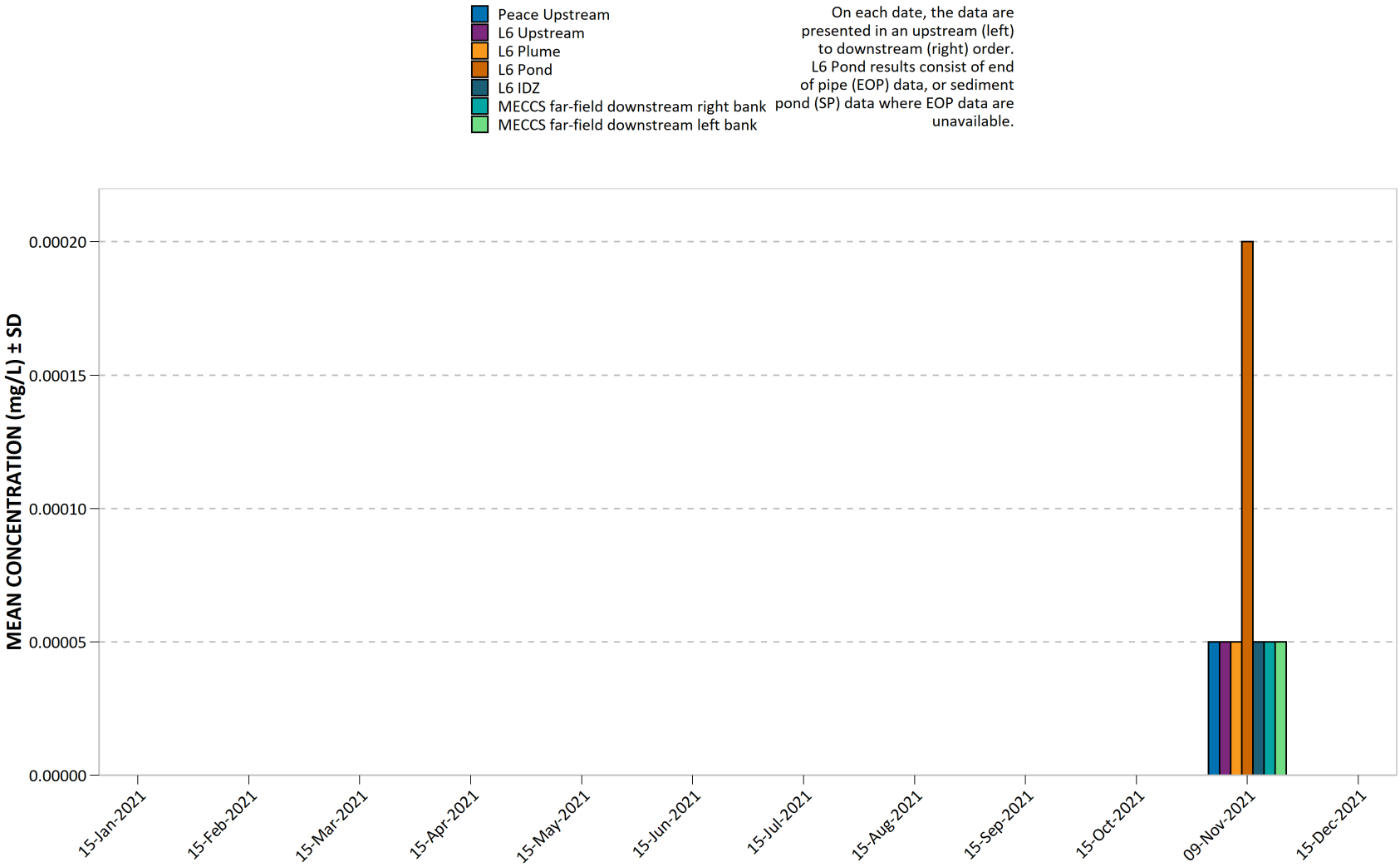


Figure 156. 2021 Peace River and RSEM L6 pond dissolved lithium (Li).

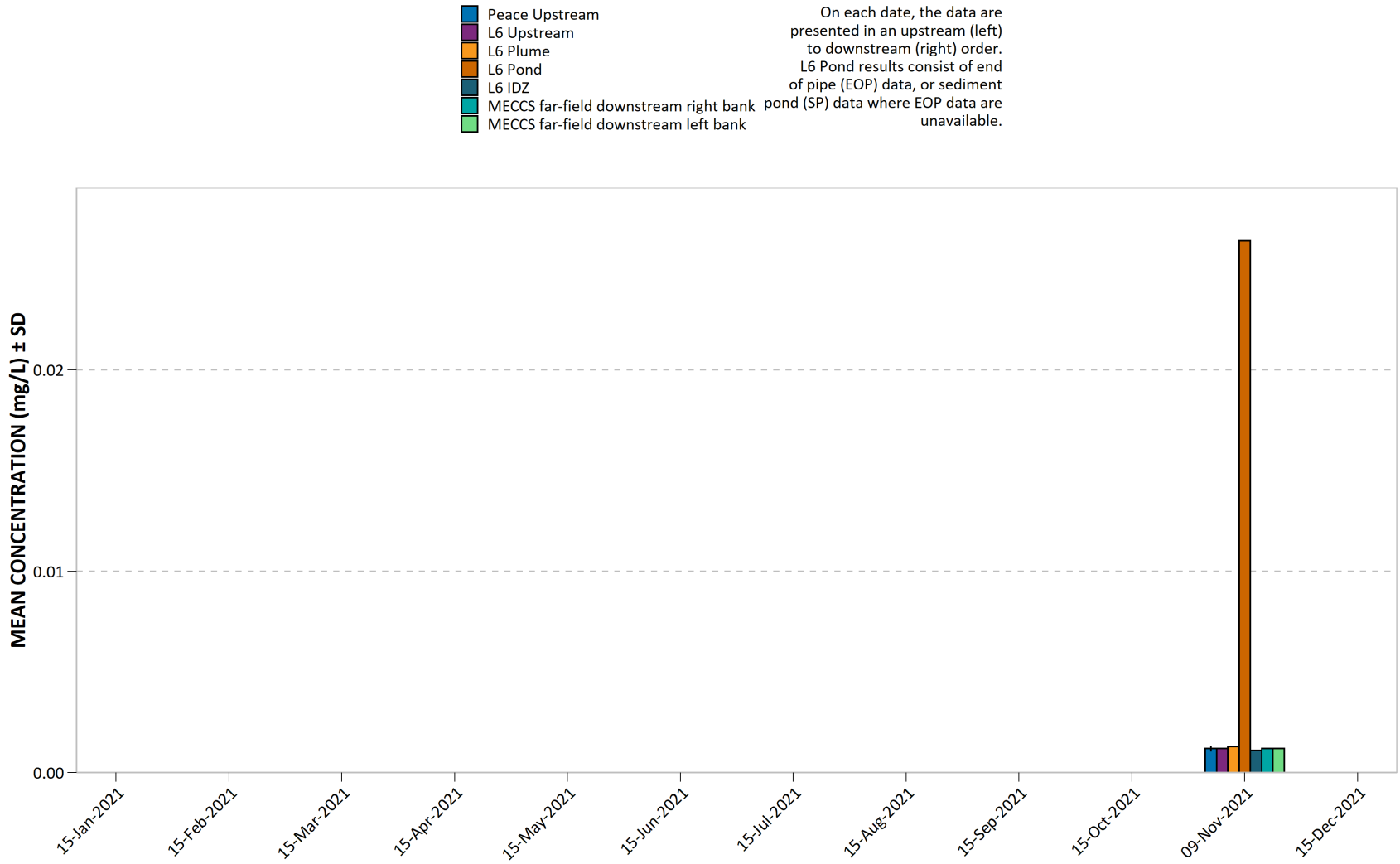


Figure 157. 2021 Peace River and RSEM L6 pond dissolved magnesium (Mg).

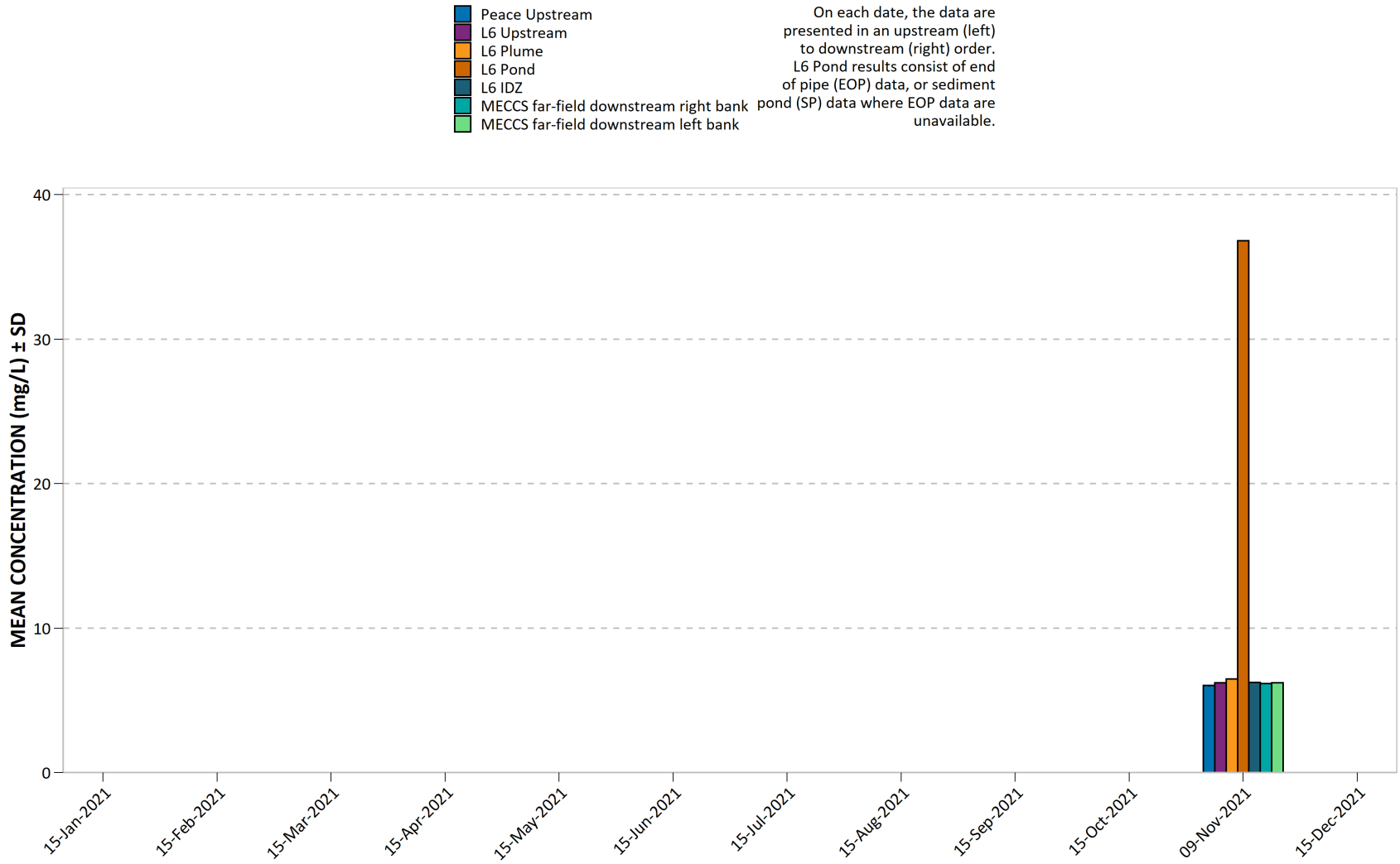


Figure 158. 2021 Peace River and RSEM L6 pond dissolved manganese (Mn).

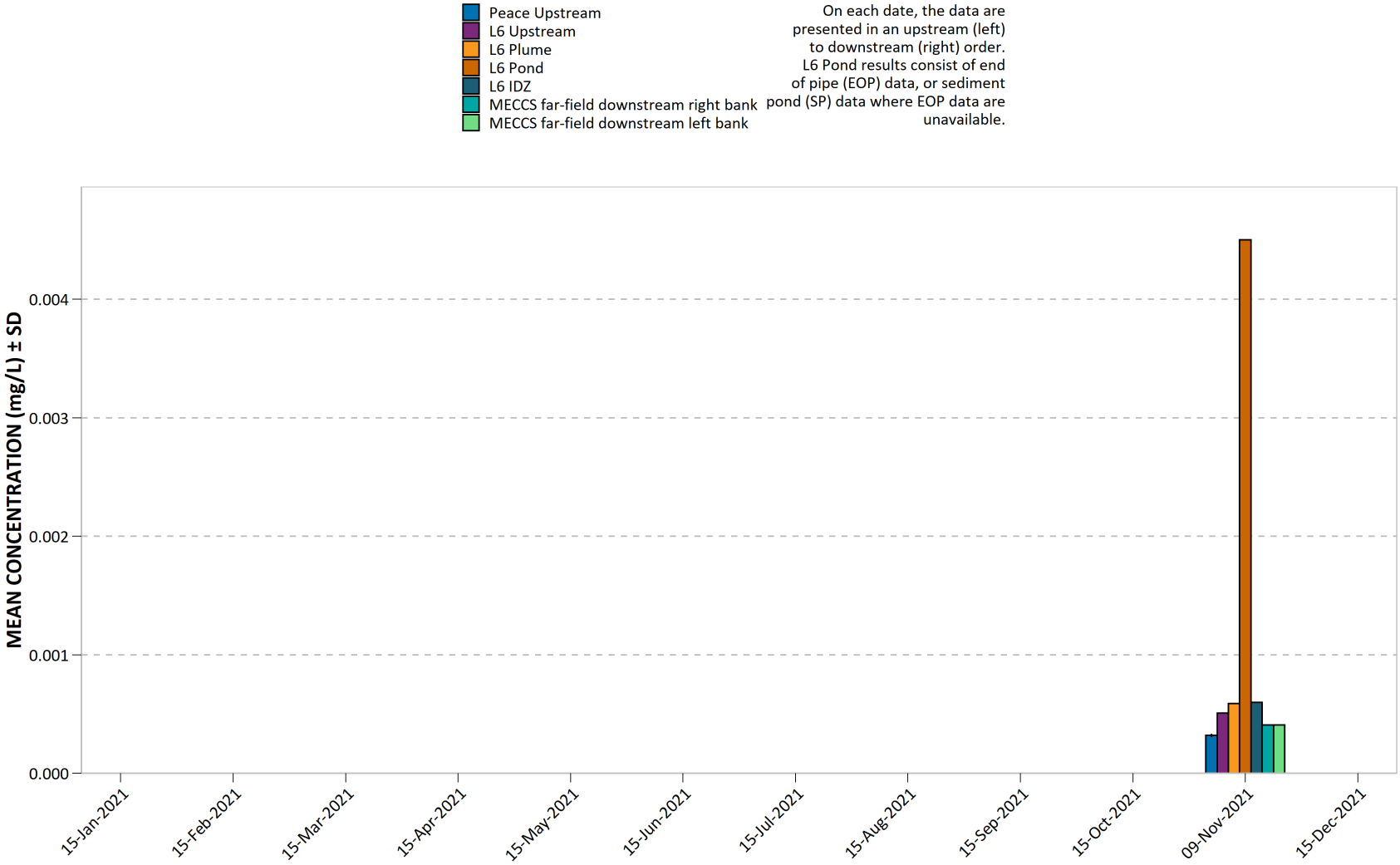


Figure 159. 2021 Peace River and RSEM L6 pond dissolved mercury (Hg).

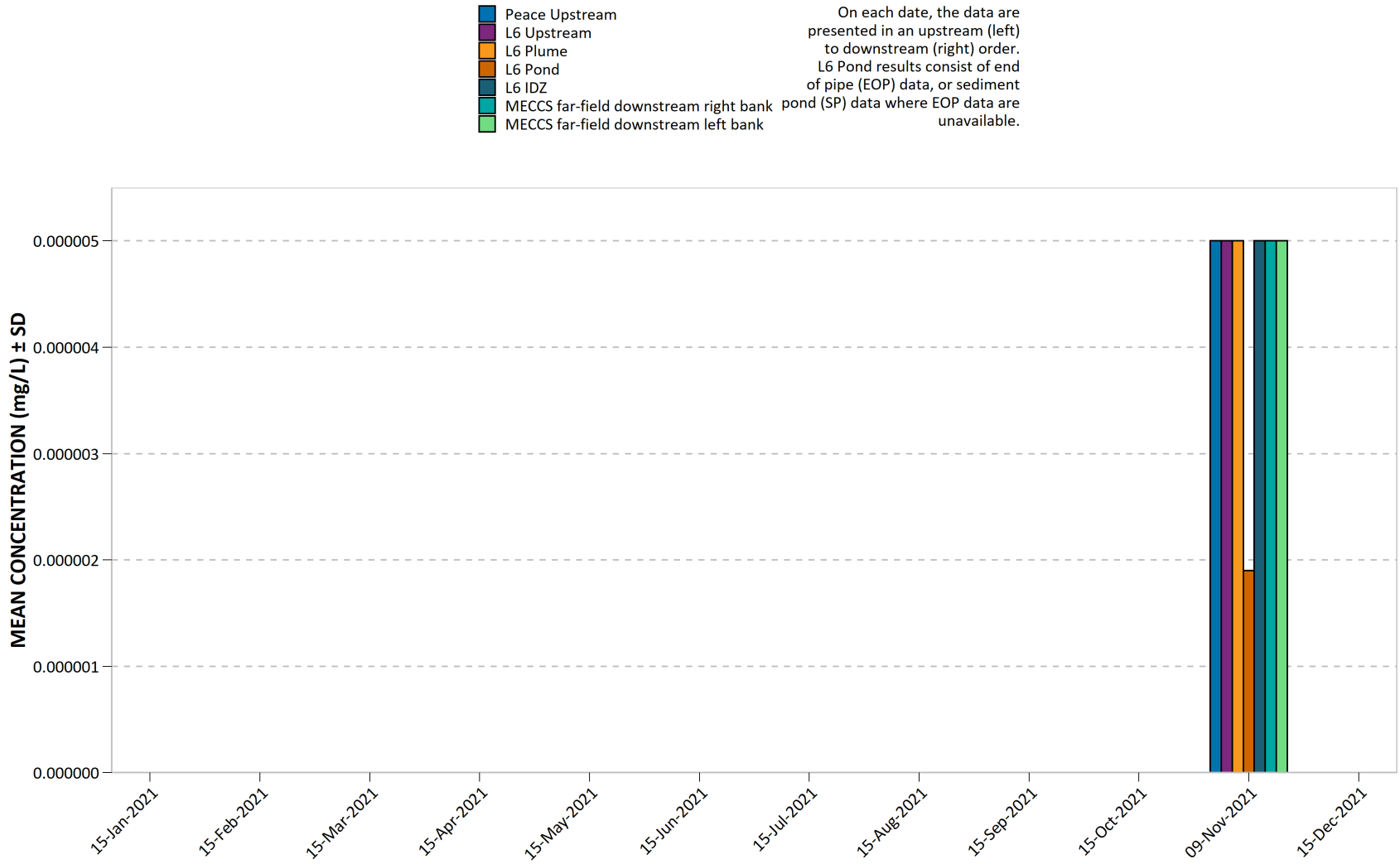


Figure 160. 2021 Peace River and RSEM L6 pond dissolved molybdenum (Mo).

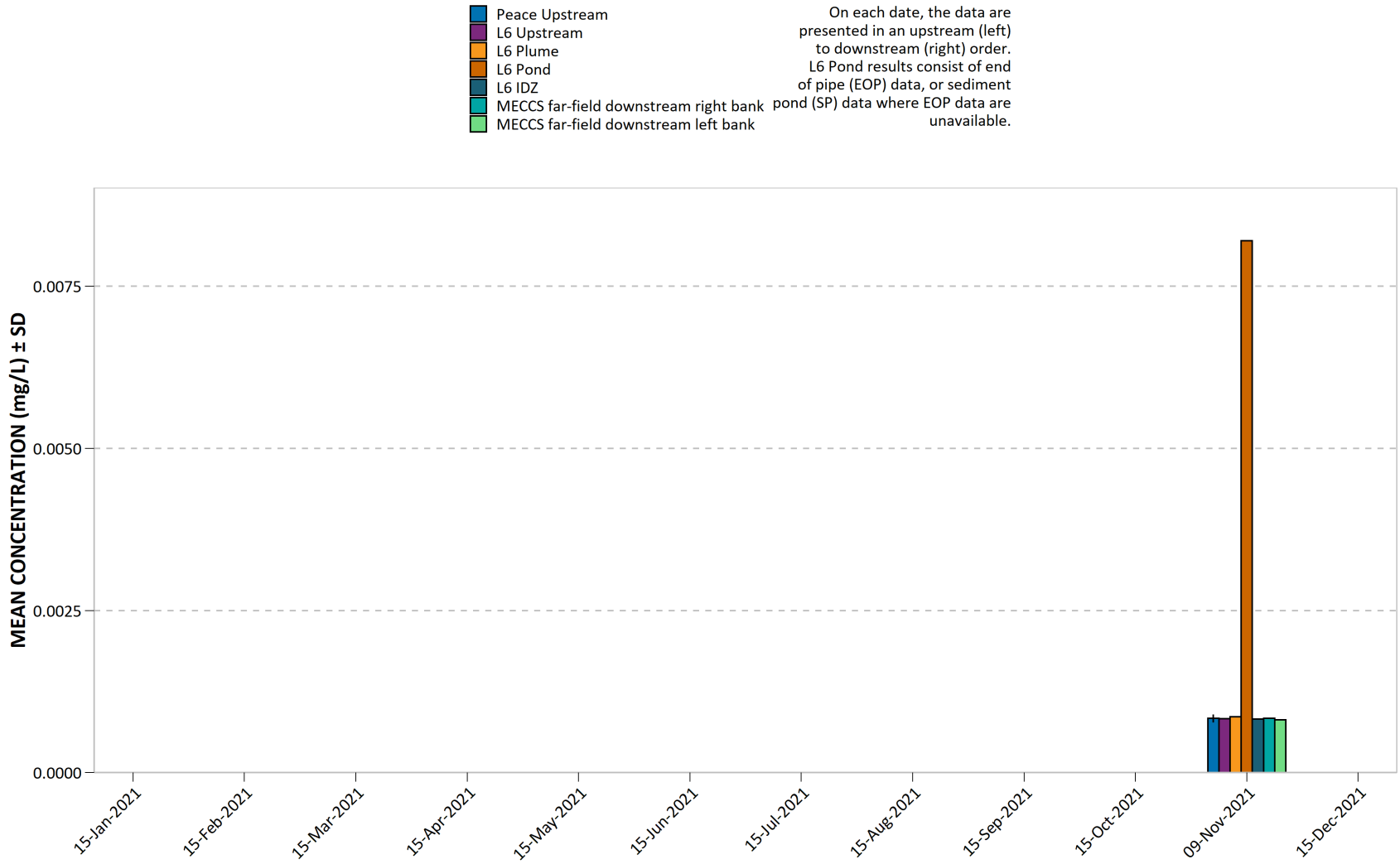


Figure 161. 2021 Peace River and RSEM L6 pond dissolved nickel (Ni).

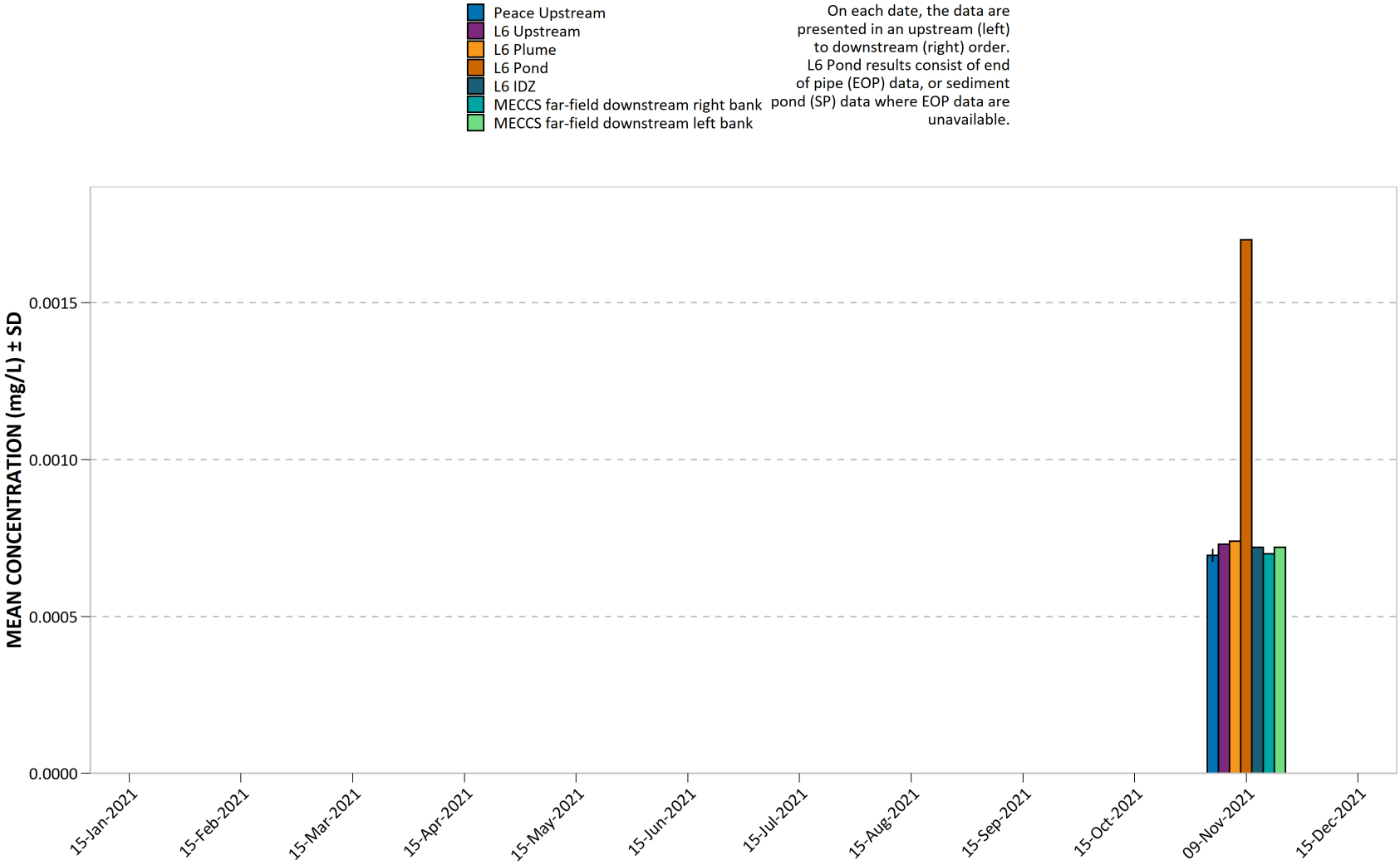


Figure 162. 2021 Peace River and RSEM L6 pond dissolved potassium (K).

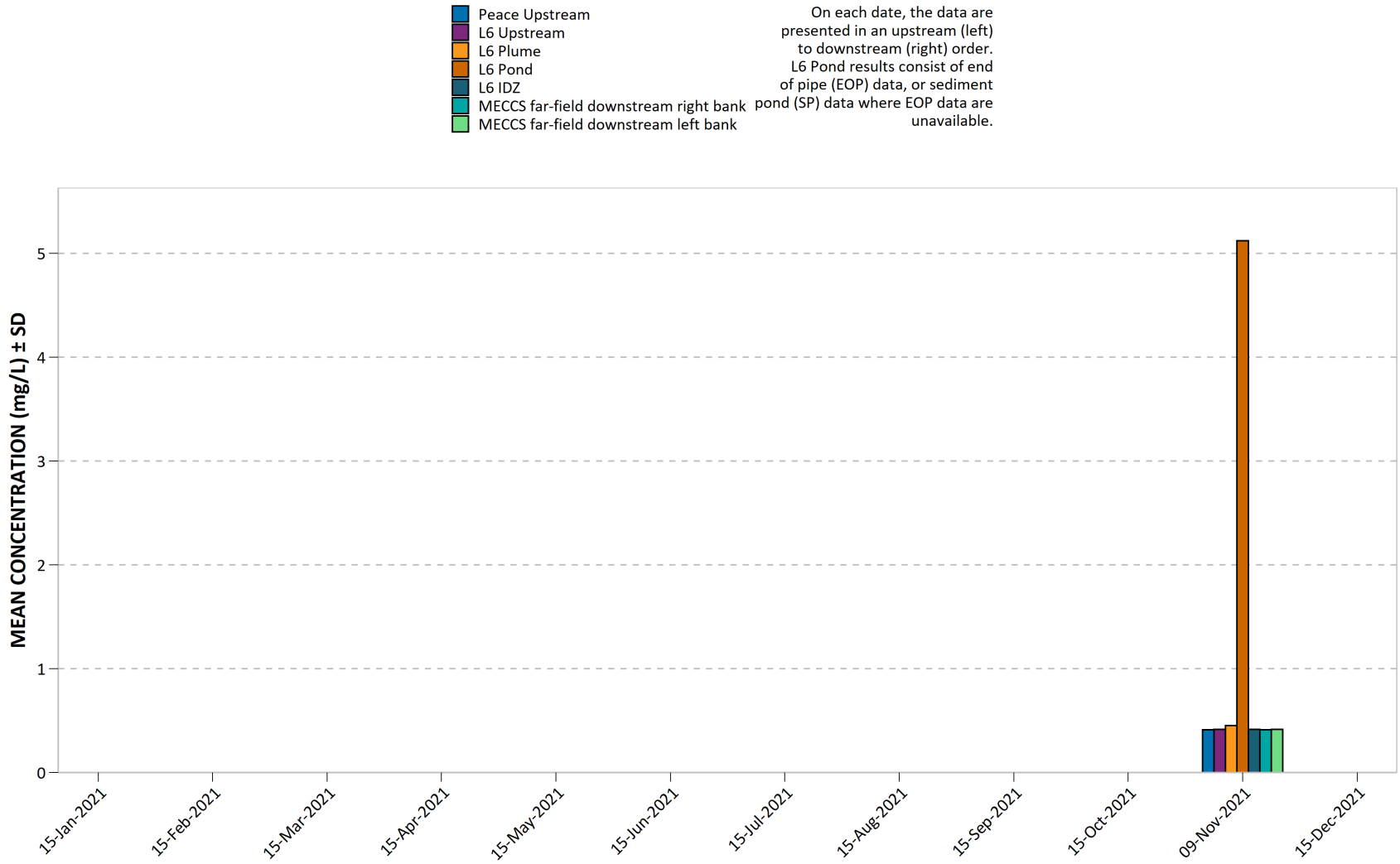


Figure 163. 2021 Peace River and RSEM L6 pond dissolved selenium (Se).

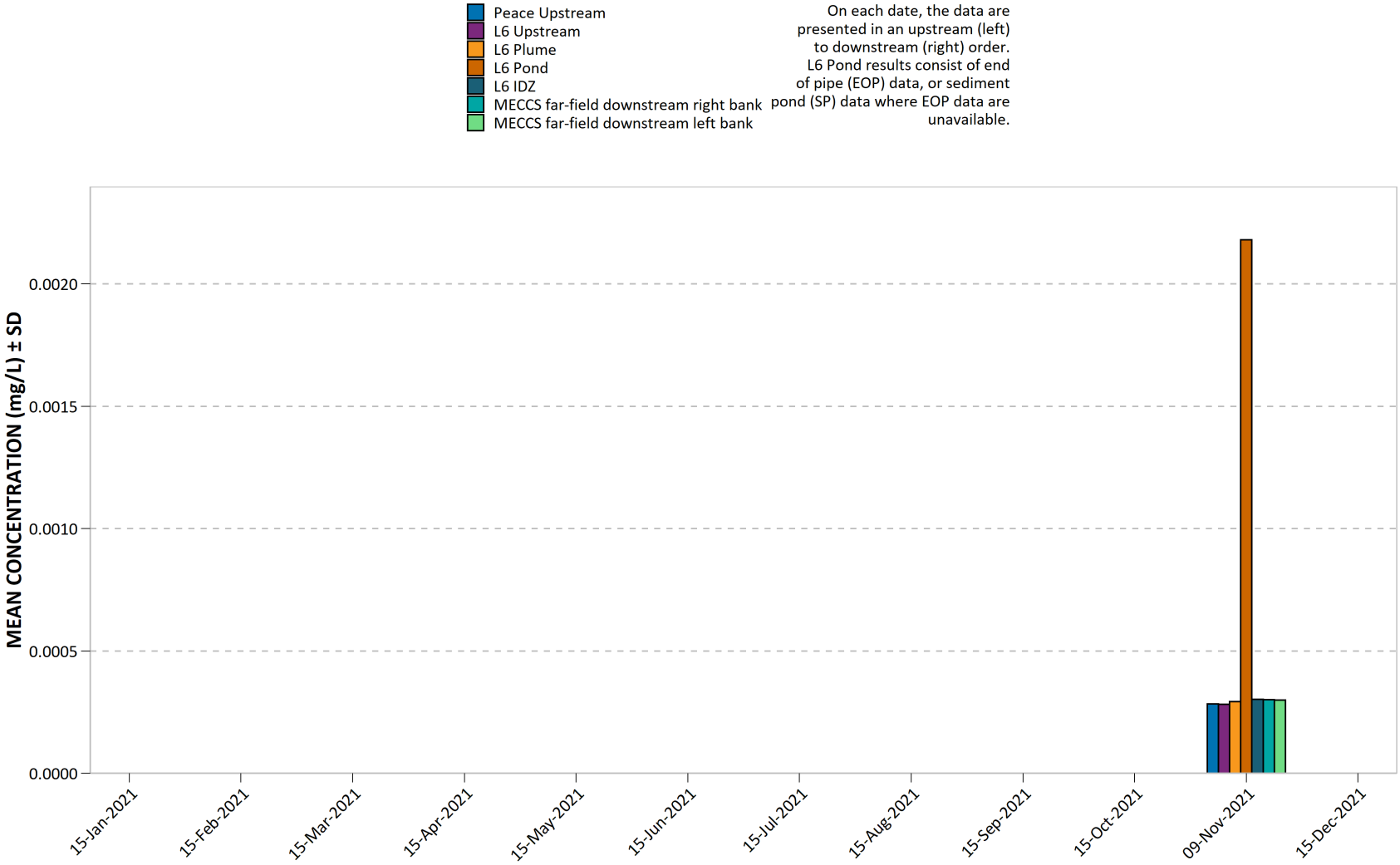


Figure 164. 2021 Peace River and RSEM L6 pond dissolved silicon (Si).

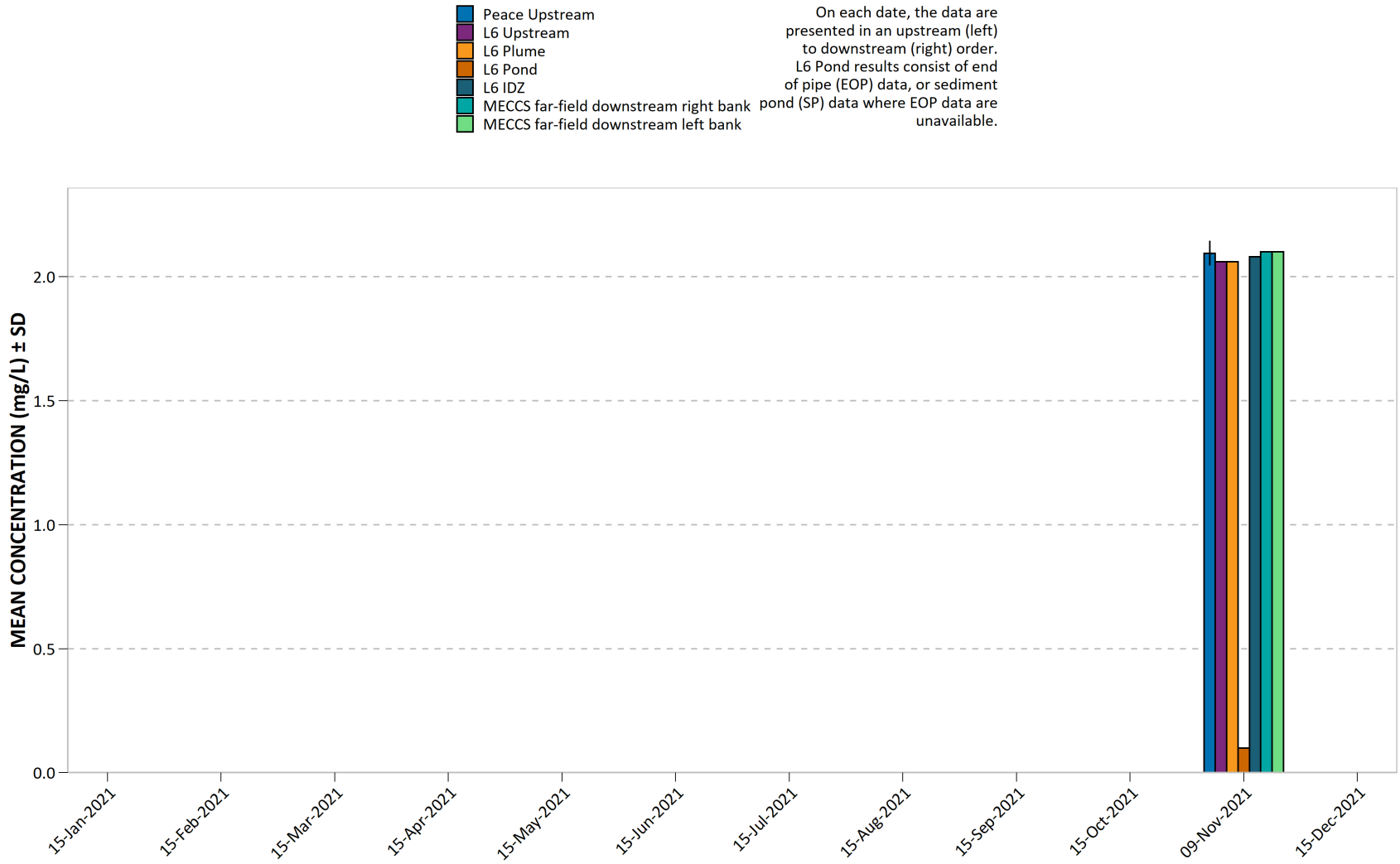


Figure 165. 2021 Peace River and RSEM L6 pond dissolved silver (Ag).

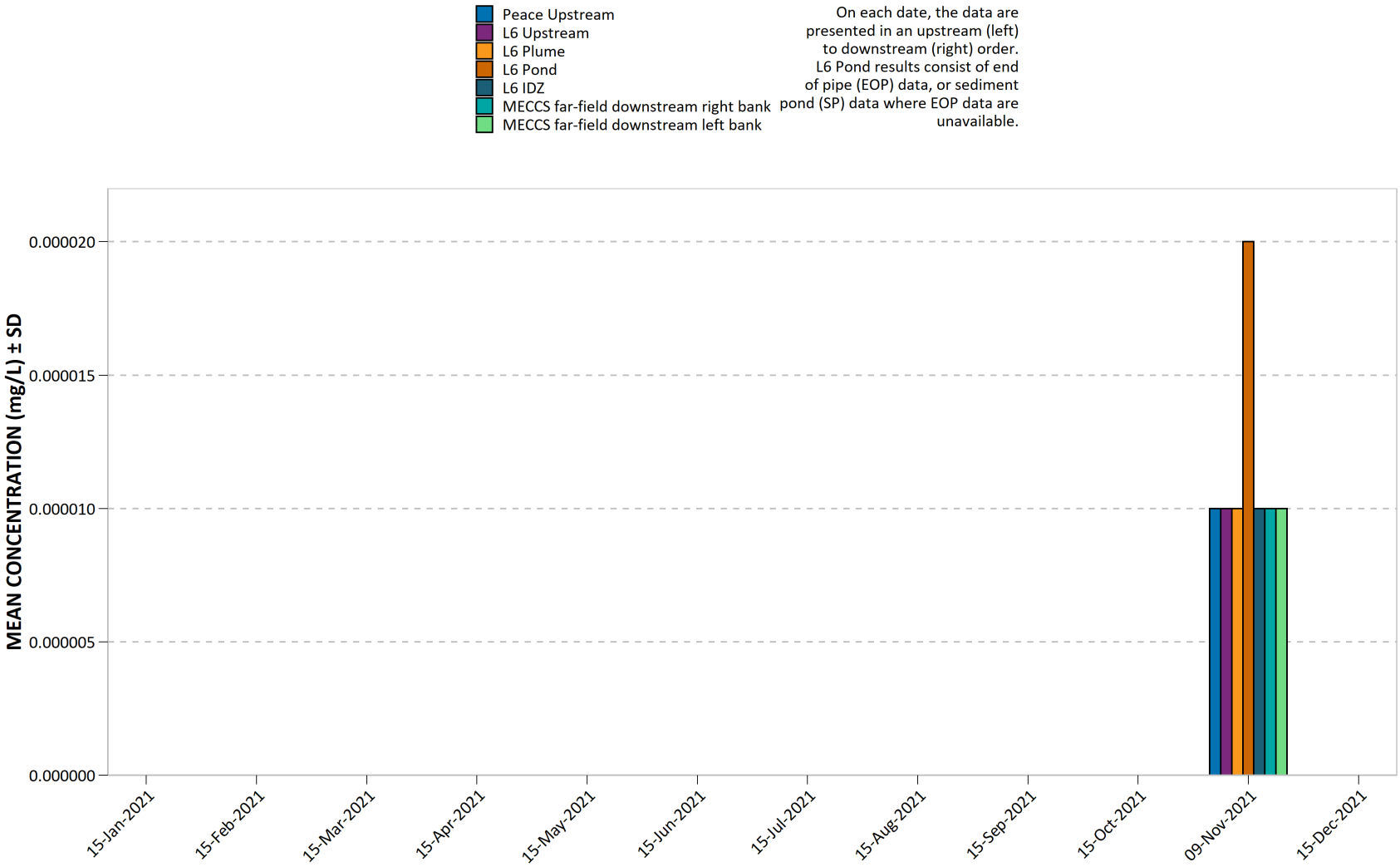


Figure 166. 2021 Peace River and RSEM L6 pond dissolved sodium (Na).

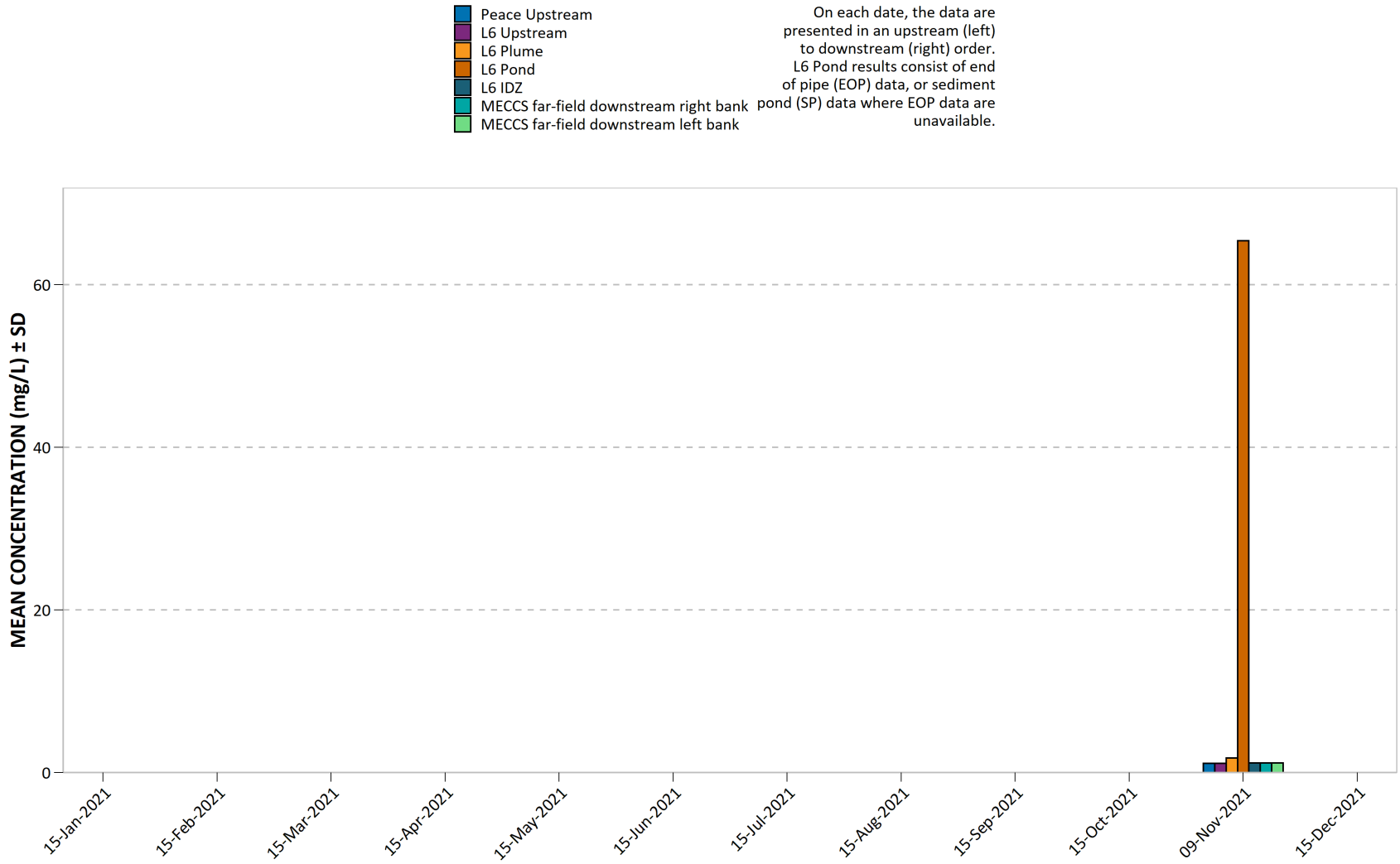


Figure 167. 2021 Peace River and RSEM L6 pond dissolved strontium (Sr).

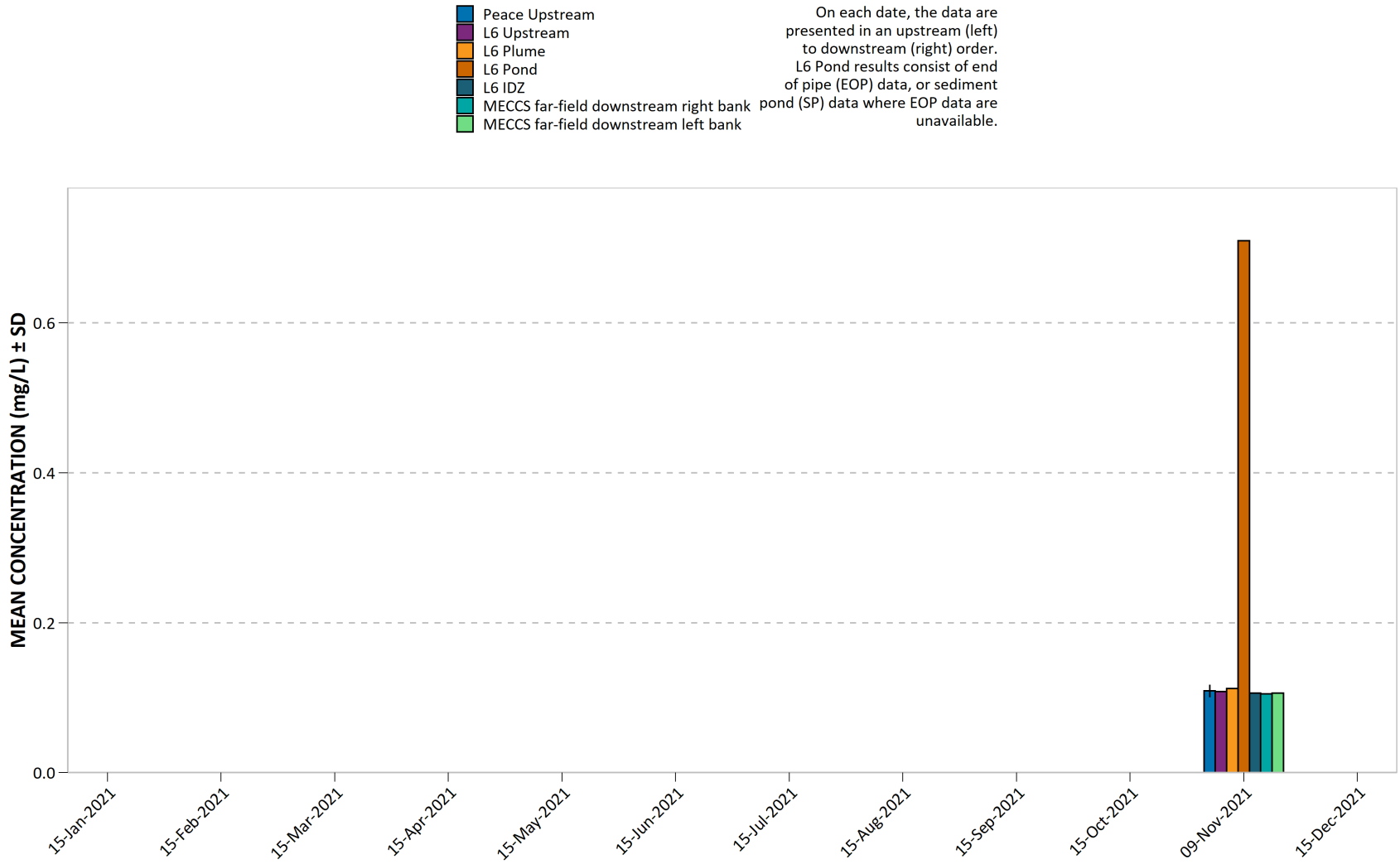


Figure 168. 2021 Peace River and RSEM L6 pond dissolved sulfur (S).

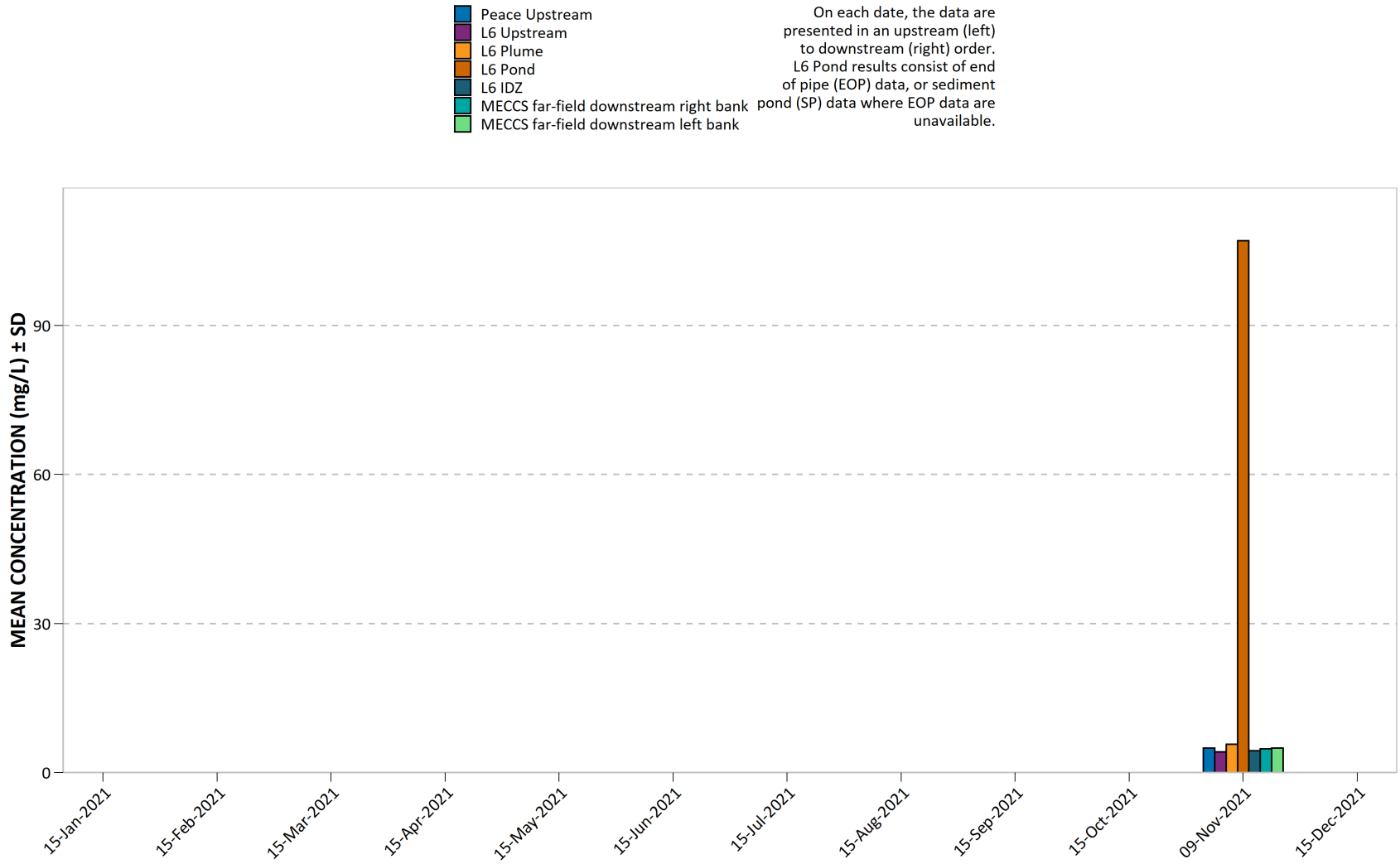


Figure 169. 2021 Peace River and RSEM L6 pond dissolved thallium (Tl).

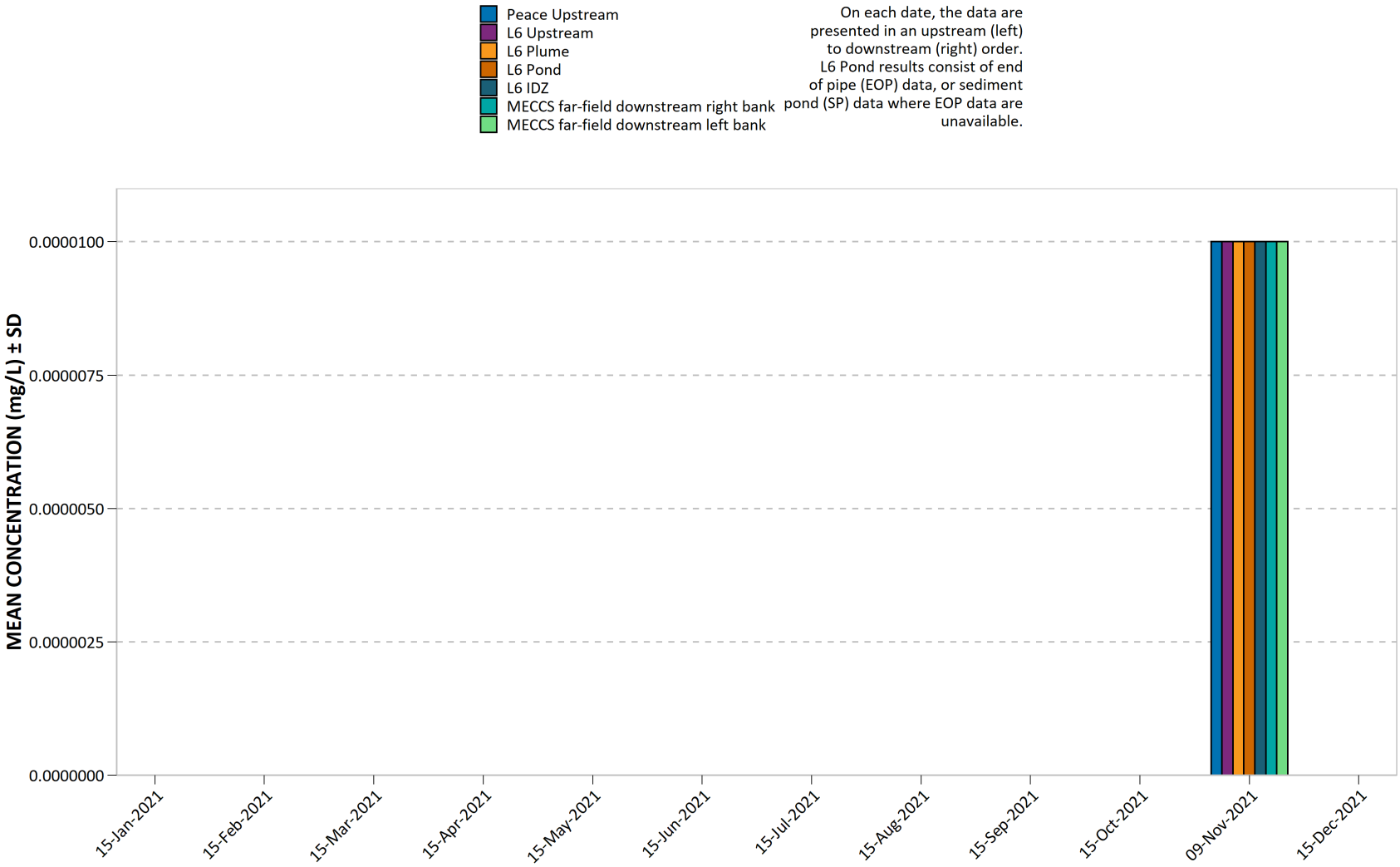


Figure 170. 2021 Peace River and RSEM L6 pond dissolved tin (Sn).

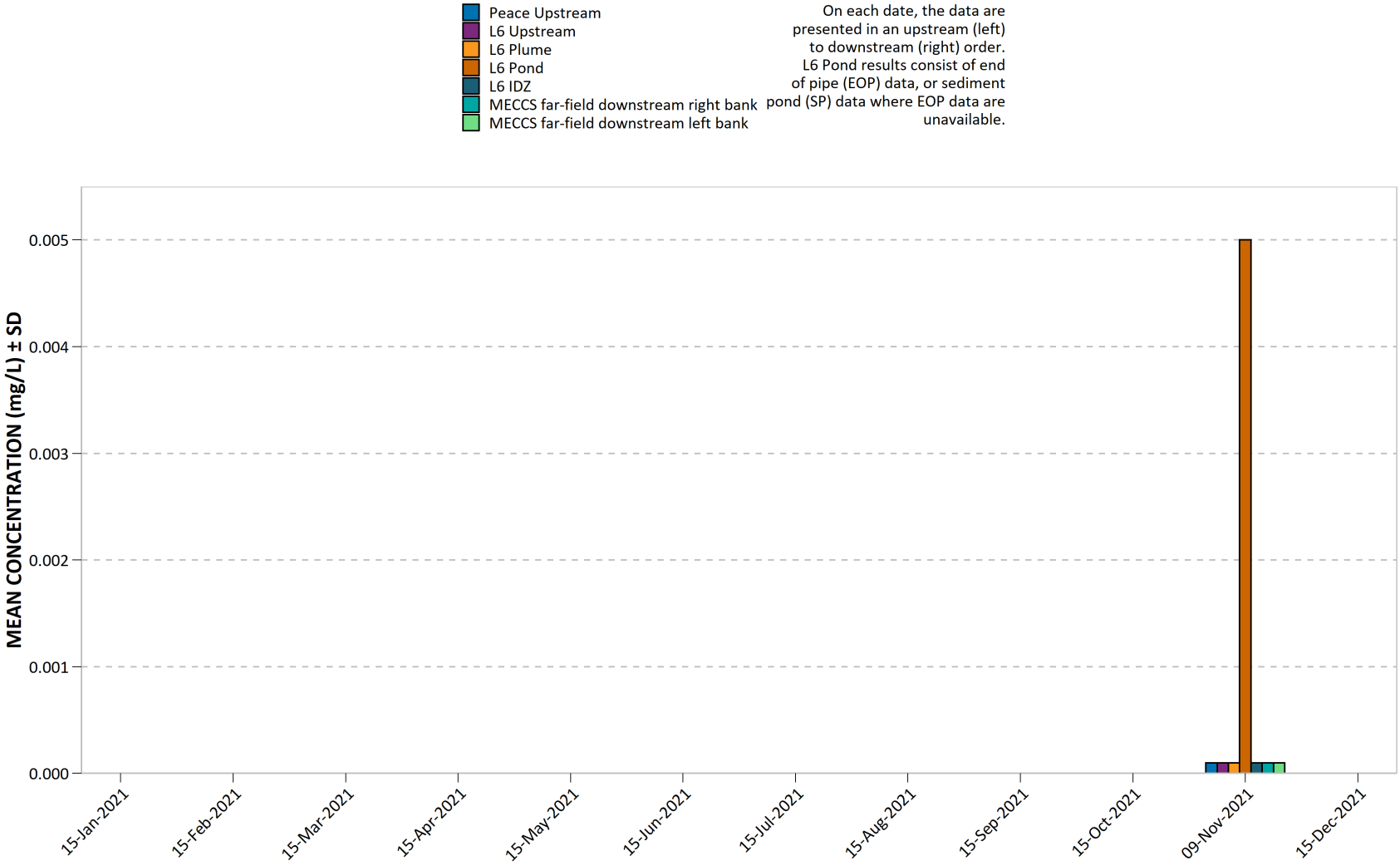


Figure 171. 2021 Peace River and RSEM L6 pond dissolved titanium (Ti).

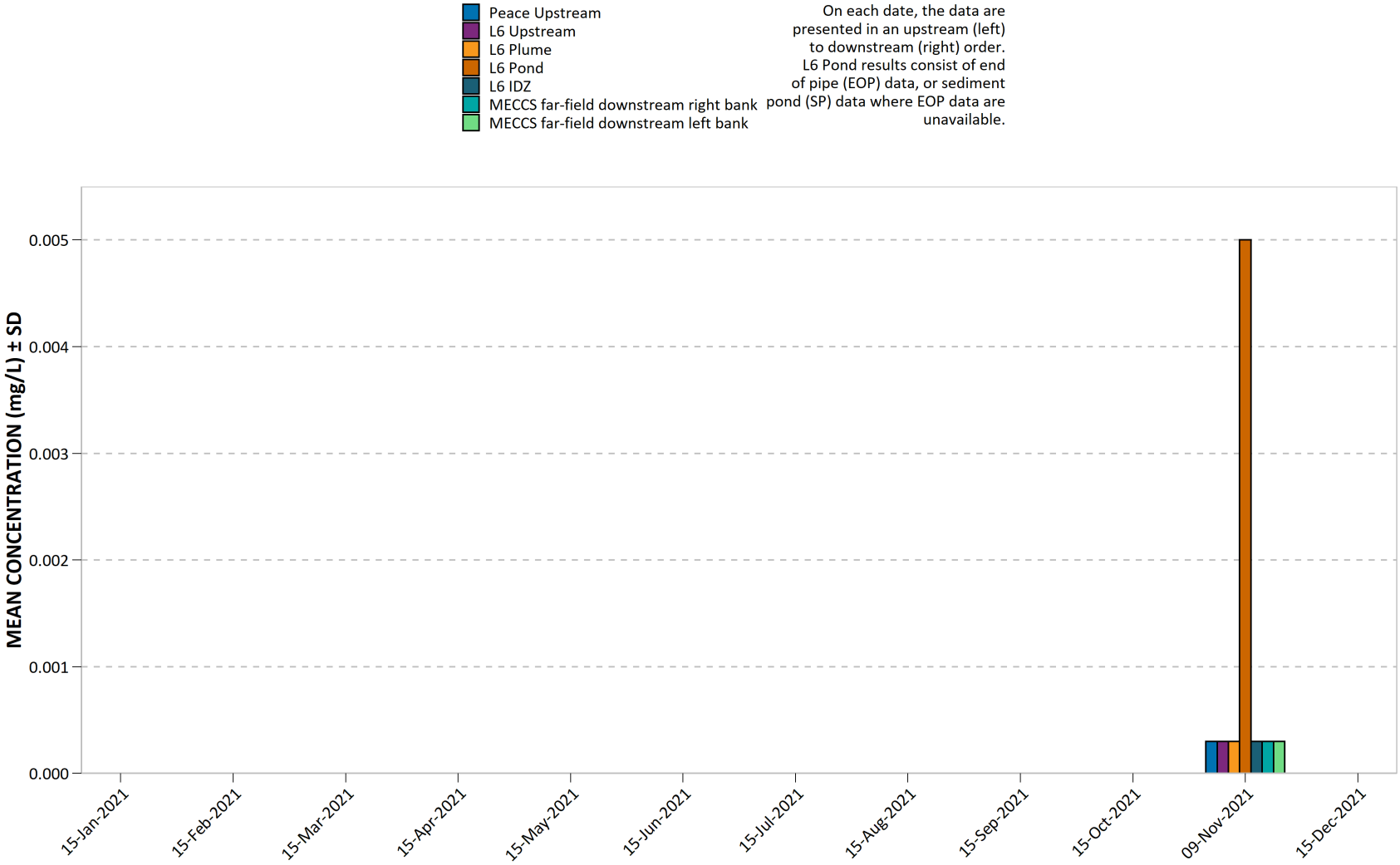


Figure 172. 2021 Peace River and RSEM L6 pond dissolved uranium (U).

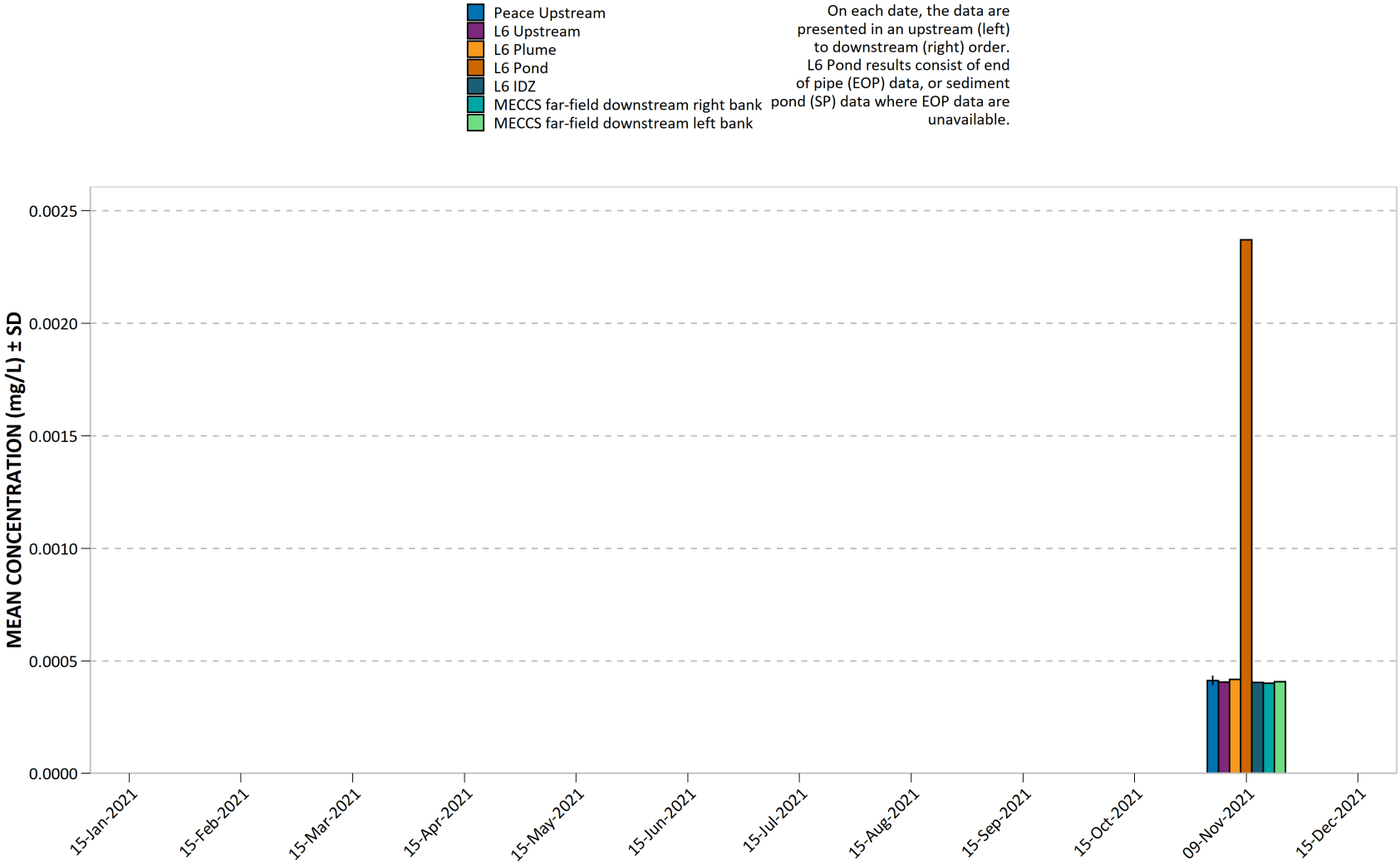


Figure 173. 2021 Peace River and RSEM L6 pond dissolved vanadium (V).

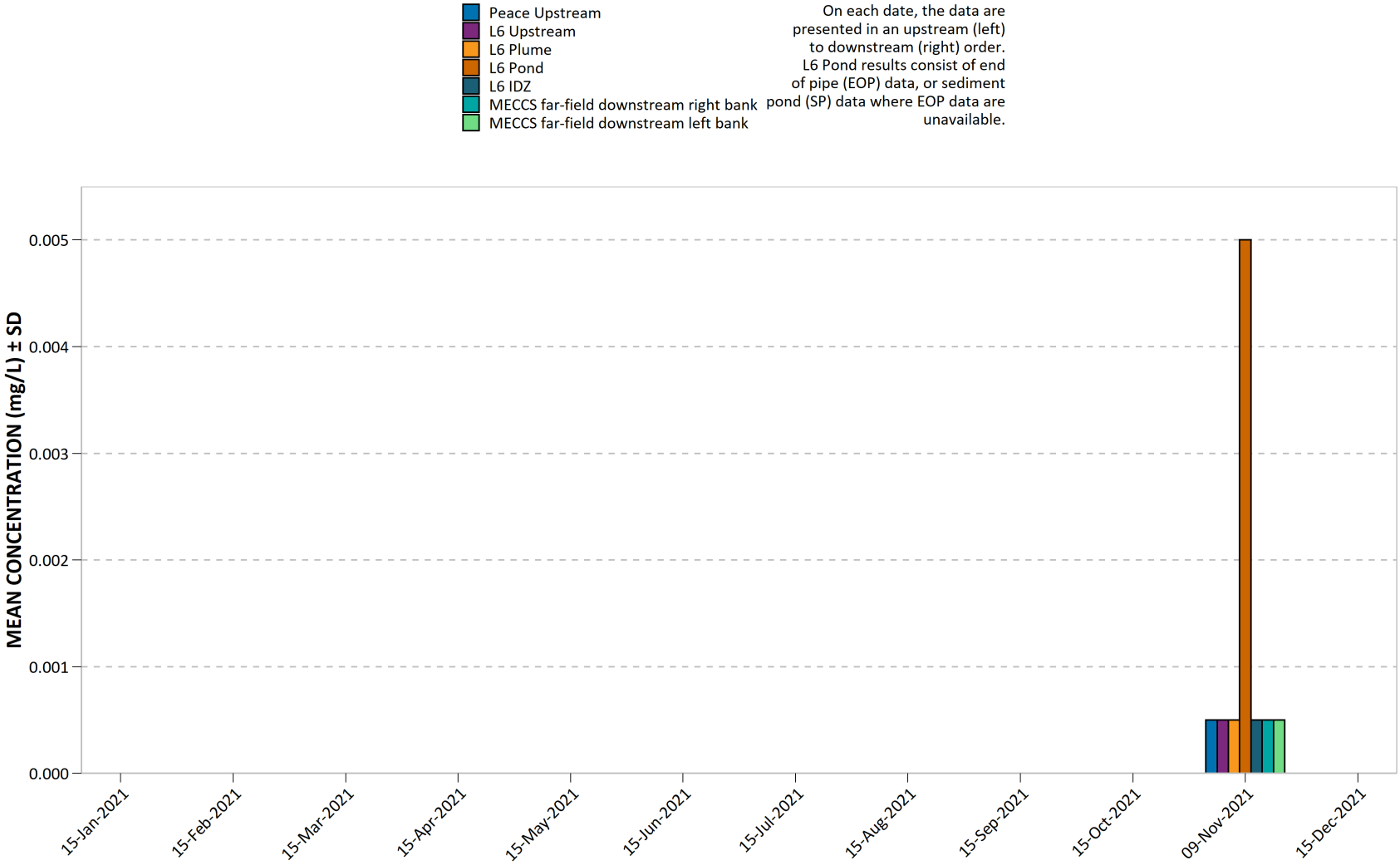


Figure 174. 2021 Peace River and RSEM L6 pond dissolved zinc (Zn).

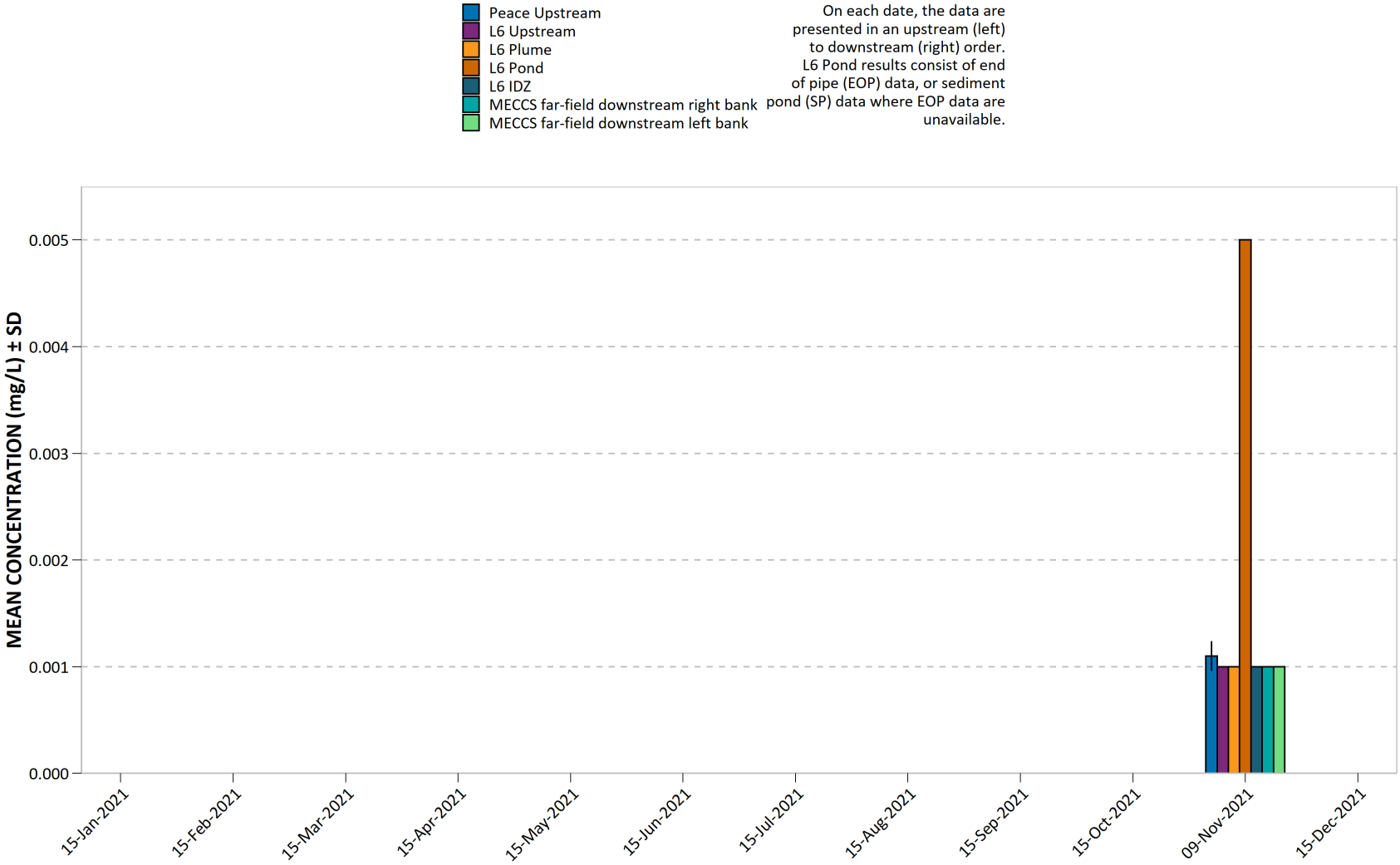
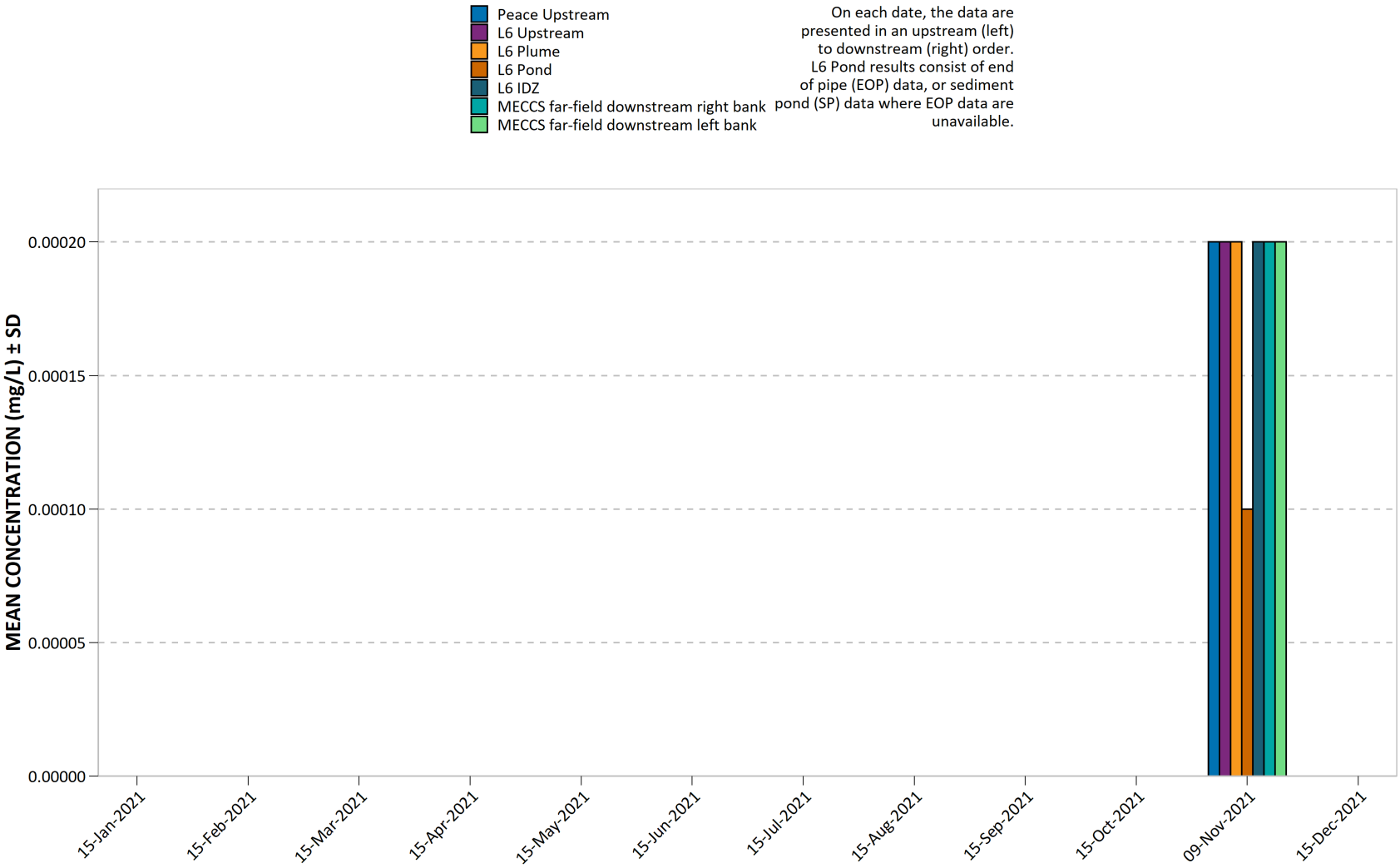


Figure 175. 2021 Peace River and RSEM L6 pond dissolved zirconium (Zr).



Appendix D. 2021 Quality Assurance and Quality Control Summary

Table 26. ALS Environmental hold time exceedance summary for 2021.

Sampling Date	Description	Site	Recommended Holdtime	Actual Holdtime	Units	Qualifier
11-May-21	Dissolved Organic Carbon	RBPR-7.05-A	3	10	days	EHT
	Dissolved Organic Carbon	RBPR-7.05-B	3	10	days	EHT
	Dissolved Organic Carbon	RBPR-7.15	3	7	days	EHT
9-Nov-21	Total Dissolved Solids	PR-2.81-A	7	8	days	EHT
	Total Dissolved Solids	PR-2.81-B	7	8	days	EHT
	Turbidity	PR-2.81-A	3	38	days	EHT
	Turbidity	PR-2.81-B	3	38	days	EHT
	Turbidity	LBPR-9.34	3	38	days	EHT
	Turbidity	RBPR-9.34	3	38	days	EHT
	Turbidity	RBPR-7.05	3	38	days	EHT
	Turbidity	RBPR-7.15	3	38	days	EHT
10-Dec-21	Dissolved Orthophosphate by Colourimetry	RBPR-7.15	3	4	days	EHT
	Dissolved Orthophosphate by Colourimetry	RBPR-7.05-A	3	4	days	EHT
	Dissolved Orthophosphate by Colourimetry	RBPR-7.05-B	3	4	days	EHT
	Dissolved Orthophosphate by Colourimetry	LBPR-9.34	3	4	days	EHT
	Dissolved Orthophosphate by Colourimetry	RBPR-9.34	3	4	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.15	3	4	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.05-A	3	4	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.05-B	3	4	days	EHT
	Nitrate in Water by IC (Low Level)	LBPR-9.34	3	4	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-9.34	3	4	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.15	3	4	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.05-A	3	4	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.05-B	3	4	days	EHT
	Nitrite in Water by IC (Low Level)	LBPR-9.34	3	4	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-9.34	3	4	days	EHT
	Turbidity by Nephelometry	RBPR-7.15	3	4	days	EHT
	Turbidity by Nephelometry	RBPR-7.05-A	3	4	days	EHT
	Turbidity by Nephelometry	RBPR-7.05-B	3	4	days	EHT
	Turbidity by Nephelometry	LBPR-9.34	3	4	days	EHT
	Turbidity by Nephelometry	RBPR-9.34	3	4	days	EHT
13-Dec-21	Alkalinity Species by Titration	PR-2.81	14	38	days	EHT
	Total Dissolved Solids	PR-2.81	7	38	days	EHT

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.

EHT: Exceeded ALS recommended hold time prior to analysis.

Table 27. Field blank and travel blank detections in 2021.

Sample Type	No. of Sampling Dates (2021)	Field Blank QA/QC Objective (≤5.0% Detectable)			
		No. of Parameter Results (n) [1]	No. of Detectable Results (>MDL)	% Detectable Results	QA/QC Objective Met
Field Blanks	13	1,013	18	1.8%	Yes
Travel Blanks	14	742	29	3.9%	Yes

[1] n refers to the total number of parameters analyzed in the field and travel blanks (non-detectable and detectable).

pH is not included in the calculation of detectable results.

The field blank QA/QC objective of ≤5% detectable is applied to the entire data set for the monitoring period.

Table 28. Summary of cases with relative percent difference >20% for duplicate samples in 2021.

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Detection Limit (mg/L)	RPD (%)
25-Mar-2021	LBPR-9.34	Aluminum (Al)-Total	0.115	0.0636	0.003	57.6
	LBPR-9.34	Chloride (Cl)	3.32	0.5	0.5	148
	LBPR-9.34	Iron (Fe)-Total	0.193	0.099	0.01	64.4
	LBPR-9.34	Manganese (Mn)-Total	0.00431	0.0026	0.0001	49.5
	LBPR-9.34	Nitrate (as N)	0.143	0.0696	0.005	69
	LBPR-9.34	Nitrite (as N)	0.0145	0.001	0.001	174
	LBPR-9.34	Titanium (Ti)-Total	0.00206	0.00149	0.0003	32.1
	LBPR-9.34	Total Suspended Solids	17.9	7.4	1	83
20-Apr-2021	RBPR-9.34	Dissolved Organic Carbon	2.93	3.58	0.5	20
	RBPR-9.34	Nitrate (as N)	0.0893	0.0645	0.005	32.2
11-May-2021	RBPR-7.05	Ammonia, Total (as N)	0.137	0.013	0.005	165
	RBPR-7.05	Beryllium (Be)-Total	0.00022	0.000062	0.00002	112
	RBPR-7.05	Cadmium (Cd)-Total	0.000282	0.0000813	0.000005	110
	RBPR-7.05	Manganese (Mn)-Dissolved	0.00073	0.00095	0.0001	26.2
	RBPR-7.05	Molybdenum (Mo)-Total	0.00117	0.000909	0.00005	25.1
	RBPR-7.05	Selenium (Se)-Total	0.000401	0.000319	0.00005	22.8
	RBPR-7.05	Thallium (Tl)-Total	0.000163	0.00003	0.00001	138
	RBPR-7.05	Titanium (Ti)-Total	0.0103	0.0145	0.0003	33.9
19-May-2021	PR-2.81	Aluminum (Al)-Total	1.28	1.01	0.003	23.6
	PR-2.81	Selenium (Se)-Total	0.000662	0.000421	0.00005	44.5
	PR-2.81	Silicon (Si)-Total	4.43	3.59	0.05	20.9
	PR-2.81	Titanium (Ti)-Total	0.0227	0.0154	0.0003	38.3
	PR-2.81	Total Organic Carbon	4.83	3.46	0.5	33.1
26-May-2021	RBPR-7.15	Titanium (Ti)-Total	0.037	0.0299	0.0003	21.2
	RBPR-7.15	Total Organic Carbon	4.77	5.9	0.5	21.2
2-Jun-2021	LBPR-9.34	Aluminum (Al)-Total	0.668	1.33	0.003	66.3
	LBPR-9.34	Ammonia, Total (as N)	0.068	0.0129	0.005	136
	LBPR-9.34	Arsenic (As)-Total	0.00077	0.00115	0.0001	39.6
	LBPR-9.34	Chromium (Cr)-Total	0.00126	0.00247	0.0001	64.9
	LBPR-9.34	Cobalt (Co)-Total	0.00066	0.00094	0.0001	35
	LBPR-9.34	Copper (Cu)-Total	0.00279	0.00345	0.0005	21.2
	LBPR-9.34	Iron (Fe)-Total	1.23	2.21	0.01	57
	LBPR-9.34	Lead (Pb)-Total	0.000877	0.00112	0.00005	24.3
	LBPR-9.34	Nickel (Ni)-Total	0.00322	0.00449	0.0005	32.9
	LBPR-9.34	Potassium (K)-Total	0.76	1	0.1	27.3
	LBPR-9.34	Silicon (Si)-Total	3.12	4.08	0.05	26.7
	LBPR-9.34	Titanium (Ti)-Total	0.00814	0.016	0.0003	65.1
	LBPR-9.34	Vanadium (V)-Total	0.00373	0.00641	0.0005	52.9

Table 28. Continued (2 of 2).

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Detection Limit (mg/L)	RPD (%)
8-Jun-2021	LBPR-9.34	Beryllium (Be)-Total	0.000134	0.000166	0.00002	21.3
	LBPR-9.34	Dissolved Organic Carbon	5.67	4.23	0.5	29.1
	LBPR-9.34	Titanium (Ti)-Total	0.0411	0.0515	0.0003	22.5
	LBPR-9.34	Total Phosphorus (P)	0.16	0.0994	0.002	46.7
29-Jul-2021	RBPR-9.34	Aluminum (Al)-Total	0.14	0.0818	0.003	52.5
	RBPR-9.34	Ammonia, Total (as N)	0.0079	0.0336	0.005	124
	RBPR-9.34	Cadmium (Cd)-Total	0.0000357	0.0000233	0.000005	42
	RBPR-9.34	Iron (Fe)-Total	0.247	0.14	0.01	55.3
	RBPR-9.34	Manganese (Mn)-Total	0.00687	0.00401	0.0001	52.6
	RBPR-9.34	Titanium (Ti)-Total	0.00272	0.00201	0.0003	30
	RBPR-9.34	Total Suspended Solids	11.3	6.9	1	48.4
	RBPR-9.34	Turbidity (lab, NTU)	3.63	2.56	0.1	34.6
25-Aug-2021	PR-2.81	Cadmium (Cd)-Total	0.0000689	0.0000938	0.000005	30.6
	PR-2.81	Iron (Fe)-Dissolved	0.06	0.03	0.01	66.7
	PR-2.81	Manganese (Mn)-Dissolved	0.0029	0.0023	0.0001	23.1
	PR-2.81	Manganese (Mn)-Total	0.0188	0.0243	0.0001	25.5
9-Sep-2021	RBPR-7.05	Selenium (Se)-Total	0.000299	0.000239	0.00005	22.3
12-Oct-2021	RBPR-7.05	Ammonia, Total (as N)	0.005	0.0524	0.005	165
	RBPR-7.05	Titanium (Ti)-Total	0.00133	0.00165	0.0003	21.5
19-Oct-2021	RBPR-7.15	Ammonia, Total (as N)	0.0376	0.0652	0.005	53.7
	RBPR-7.15	Titanium (Ti)-Total	0.00127	0.00164	0.0003	25.4
26-Oct-2021	LBPR-9.34	Ammonia, Total (as N)	0.0695	0.0156	0.005	127
	LBPR-9.34	Turbidity (lab, NTU)	3.76	3.02	0.1	21.8
2-Nov-2021	RBPR-9.34	Total Phosphorus (P)	0.0417	0.0053	0.002	155
	RBPR-9.34	Total Suspended Solids	20.1	11.1	1	57.7
	RBPR-9.34	Turbidity (lab, NTU)	4.68	3.72	0.1	22.9
	RBPR-9.34	Zinc (Zn)-Total	0.003	0.0266	0.003	159
9-Nov-2021	PR-2.81	Sulfate (SO4)	16.2	12.7	0.3	24.2
10-Dec-2021	RBPR-7.05	Ammonia, Total (as N)	0.0253	0.0099	0.005	87.5
	RBPR-7.05	Turbidity (lab, NTU)	3.48	2.67	0.1	26.3

Table 29. Summary of cases with a relative standard deviation >18% for triplicate samples in 2021.

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Replicate C (mg/L)	Relative Standard Deviation
9-Sep-2021	RBPR-7.15	Turbidity (*in-situ*, NTU)	2.49	3.13	2.15	19.2

Table 30. Summary of cases where the dissolved metals to total metals ratio was >1.2 in 2021.

Date	Parameter	Site	Total Concentration (mg/L)	Dissolved Concentration (mg/L)	Dissolved Metal/ Total Metal Ratio
20-Apr-21	Selenium (Se)	PR-2.81	0.000228	0.000307	1.35
26-May-21	Molybdemun (Mo)	PR-2.81	0.00102	0.00123	1.21
25-Aug-21	Selenium (Se)	LBPR-9.34	0.000332	0.00044	1.33
9-Sep-21	Selenium (Se)	RBPR-7.05	0.000239	0.000336	1.41
12-Oct-21	Selenium (Se)	RBPR-7.05	0.000232	0.000315	1.36
19-Oct-21	Selenium (Se)	RBPR-7.15	0.000257	0.00032	1.25
26-Oct-21	Selenium (Se)	LBPR-9.34	0.000252	0.000347	1.38
	Selenium (Se)	RBPR-7.05	0.00028	0.000341	1.22
	Selenium (Se)	RBPR-9.34	0.000245	0.000315	1.29
2-Nov-21	Selenium (Se)	LBPR-9.34	0.000228	0.000321	1.41
	Selenium (Se)	RBPR-7.15	0.000239	0.00033	1.38
9-Nov-21	Selenium (Se)	LBPR-9.34	0.000242	0.0003	1.24
	Selenium (Se)	PR-2.81	0.000229	0.000284	1.24
	Selenium (Se)	LBPR-7.21	0.000247	0.000303	1.23
10-Dec-21	Selenium (Se)	RBPR-9.34	0.000277	0.00036	1.30