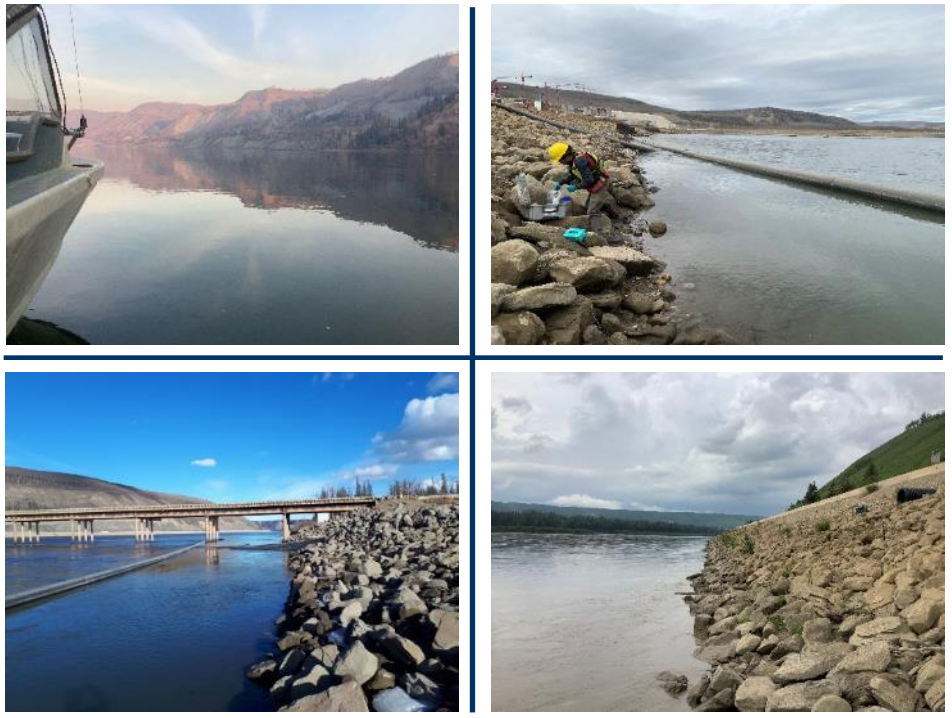
Appendix B

Site C Clean Energy Project

PAG Contact RSEM Pond Monitoring: Peace River Surface Water Quality and Pond Toxicity 2022 Annual Report



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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 2022 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 Phase 2 (post diversion) ponds are operational: R5A-P2 (four ponds) and L5-P2 (two ponds). 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 Stage 2 cofferdam. Therefore, water quality sampling in the Peace River was not planned for the RSEM R5A-P2 ponds or RSEM L5-P2 ponds in 2022.

In 2022 during Phase 2 of construction, the RSEM R6E and R6W ponds regularly passively discharged water to the Peace River. In 2022, the RSEM L6 sediment control pond was dewatered by pumping through the discharge pipe from April 23 – 25, May 17 – 19, June 4 – 5, and October 22 – 23.

In 2022, 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 2022a). 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.

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 2022a).

[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 2022. Annual and monthly reports were also prepared for the 2017, 2018, 2019, 2020, and 2021 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.

In 2022, 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 LC_{50} test) performed on water samples collected directly from the pond or from the end of pipe pond outflow. In 2022, three toxicity samples were collected from each of RSEM R5A-P2A, R5A-P2C, and R5A-P2D and four samples were collected from RSEM R5A-P2B. Six samples were collected from both the RSEM R6W and RSEM R6E ponds, five from the RSEM L5W-P2 pond, five from the RSEM L5E-P2 pond, and five from the RSEM L6 pond.

Considering all RSEM ponds, a total of 40 routine toxicity samples were collected in 2022; all but one of the tests passed. On March 28, 2022, a sample collected from RSEM R5A-P2D did not pass the acute toxicity test: no fish survived in the undiluted pond water while all fish survived in the 50% dilution of the pond water. The LC_{50} (i.e., the concentration at which there is mortality for 50% of the fish) was estimated to be 70.7% v/v.

This water that was sampled from R5A-P2D on March 28, 2022 for the acute toxicity was never directly discharged to the Peace River. From March 21 – 22, 2022, the R5A pond waters were serially pumped from ponds D to C to B to A where water was then discharged to the Peace River. Pumping from pond D to C was stopped on March 22 due to increased conductivity in pond D which was a potential indication of ARD influence. For the rest of the year Pond D was managed as ARD influenced water and would have been dewatered to the Pre-Treatment Pond for the treatment of ARD parameters if there was a risk of discharge. Further dewatering of Pond D was not required after March 22. In consideration of these factors, an additional toxicity sample was not collected 96 hours after the failed sample, as prescribed in Shelley *et al.* (2018) and BC Hydro (2022a).

The water that was pumped from the R5A-P2D pond through ponds C, B, then A on March 21 and 22 would have been substantially (>50%) diluted by water in these three ponds before mixed water from all four ponds was discharged to the Peace River via the R5A-P2A pond. As discussed in Section 4.1.1, there were no Rainbow Trout mortalities in the 50% dilution of R5A-P2D water in the 96-hour toxicity test, and there were no mortalities in the March 28 toxicity tests for R5A-P2A, R5A-P2B, and R5A-P2C.

RSEM Discharge/Peace River Surface Water Quality Monitoring

The ARD/ML Management Plan (BC Hydro 2022a) 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 2022 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 2022 were similar to those measured in 2017, 2018, 2019, 2020, 2021 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. A total of 207 TSS samples collected over 43 dates between December 15, 2017 to October 27, 2022 were used to develop the TSS:turbidity relationship used in 2022. These data encompassed a wide range of turbidity (4 NTU to 2,617 NTU) and TSS (2 mg/L to 1,710 mg/L) observations. The 2022 background TSS data are reported by PRHP and are not included in this report.

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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 2022a) 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 R5A-P2A and R5A-P2B are separated by a berm, as are ponds R5A-P2C and R5A-P2D. RSEM R5A-P2A and R5A-P2B are designed to discharge passively through a shared riprap lined outfall. Similarly, ponds R5A-P2C and R5A-P2D share a discharge outfall. To date, R5A-P2D is the only RSEM R5A-P2 pond that has not discharged to the Peace River; both ponds R5A-P2A and R5A-P2B have discharged to the Peace River directly, and R5A-P2C has discharged to the Peace River indirectly via having its water pumped to Pond A.

The two Phase 2 RSEM L5-P2 ponds are divided by a berm; there is 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 RSEM L5-P2 ponds are commissioned for discharge, and both have discharged to the Peace River; the discharge pipes from each pond are directed to a single shared spillway. 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 Stage 2 cofferdam. Therefore, water quality sampling in the Peace River was not planned for the RSEM R5A-P2 ponds or RSEM L5-P2 ponds in 2022.

The two RSEM R6 ponds are divided by a berm; there is 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 Water Treatment Plant (WTP) sludge pond. The two RSEM R6 ponds also receive water from several sources on-site as documented in the PRHP Weekly Environmental Monitoring Reports. In 2022 during Phase 2 of construction, the RSEM R6E and R6W ponds regularly 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 2022, the RSEM L6 sediment control pond was dewatered by pumping through the discharge pipe from April 23 – 25, May 17 – 19, June 4 – 5, and October 22 – 23.

This report fulfils the annual reporting requirement outlined in Section 7.5 of the ARD/ ML Management Plan (CEMP, Appendix E, BC Hydro 2022a) 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 2022.

Table 1. PAG contact RSEM pond construction and discharge history as of the end of 2022.

RSEM Pond	RSEM Pond Construction Completed	Discharge to the Peace River Commenced	Status
R5A-P2[1]	September 2020	March 2022 (R5A-P2A, R5A-P2B) and May 2022 (R5A-P2C; indirectly). No discharge has occurred to date for R5A-P2D.	Four ponds, active in Phase 2 of construction. The R5A-P2 ponds were commissioned for passive discharge in 2021. To date, Pond D has not discharged to the Peace River; both ponds A and B have discharged to the Peace River directly, and Pond C has discharged to the Peace River indirectly via having its water pumped to Pond A.
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 WTP sludge pond 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 2022, discharge to the Peace River occurred from April 23 – 25, May 17 – 19, June 4 – 5, and October 22 – 23 when water was pumped to the Peace River.

628000 629000 630000 631000 632000

6232000 6231000 6230000 6229000

PAM-LB1

PR-2.81
(Peace Upstream)

R5A-P2D Toxicity
R5A-P2C Toxicity
R5A-P2C/D Discharge

RSEM R5a

PR-4.00
(Peace Upstream alternative)

R5A-P2A/B Discharge
R5A-P2B Toxicity
R5A-P2A Toxicity

L5W-P2 SP Toxicity
L5E-P2 SP Toxicity
L5-P2 Discharge

RSEM L5

Peace River

Moberly River

RSEM R5b

Inset 1

L6 SP Toxicity
L6 Upstream
L6 Back Eddy
L6 Discharge
L6 Discharge
L6 IDZ
Peace River
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

BC ENV site (far-field downstream, left bank)

Peace River

BC ENV 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

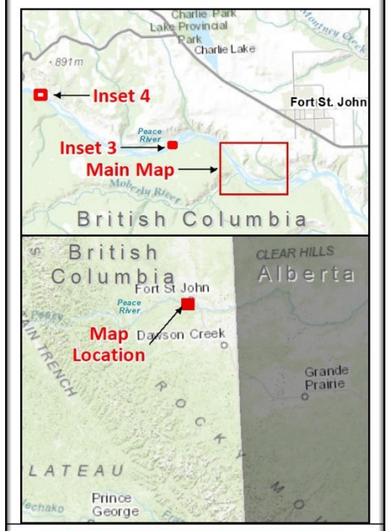
PAG Contact RSEM Sediment Ponds and Water Quality Monitoring Locations

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
- Decommissioned RSEM Pond
- RSEM Pond catchment area



MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

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Scale: 1:17,000

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2			
3			
4			
5			

Date Saved: 2023-03-02
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 1

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2. BACKGROUND

2.1. RSEM Pond Acute Toxicity

The acute toxicity (Rainbow Trout 96 hour LC_{50}) 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 2022a). 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 2022a), 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 2022a) 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 test 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 for more than one hour (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 2022 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 2022 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 2022a). 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 2022a). 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 when the ponds are discharging, and less frequently for RSEM PAG contact water storage ponds that are managed to not discharge but may contain PAG contact water (e.g., RSEM R5A and L6 sediment ponds). PAG contact RSEM pond water quality data for the dates corresponding to monthly and 5 in 30-day sampling in the Peace River 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 and Aski are responsible for developing and maintaining the TSS:turbidity relationships for these stations.

Detailed monthly reports were issued for each month of 2022[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 2022a). 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 PAG contact RSEM pond. There were no exceedance reports issued in 2022. A high-level summary of the methods and results of the Peace River and RSEM IDZ surface water quality sampling conducted in 2022 are provided herein.

[3] Annual and monthly reports were also prepared for 2017, 2018, 2019, 2020, and 2021.

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 (Nautilus) in Burnaby or Calgary (under subcontract to ALS Environmental (ALS)), and in rare cases by Bureau Veritas Laboratories in Burnaby when Nautilus is having issues with their supply of Rainbow Trout. Sample carboys are delivered to ALS in Fort St. John shortly after sampling (on the same day) and the samples are shipped to Nautilus 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. 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.

3.1.1. RSEM R5A-P2

In 2022, toxicity samples were collected, or attempted to be collected, from each pond on a bi-monthly basis from March until October; the ponds could not be sampled in 2022 prior to March or after October due to low water levels or frozen conditions. During May sampling, the RSEM R5A-P2A pond could not be sampled due to low water levels and was therefore sampled on June 16, 2022 instead. RSEM R5A-P2B, C, and D were sampled in July. Sampling of the RSEM R5A-P2A pond was attempted on August 17, 2022 and sampling of all ponds was attempted on September 19, 2022; however, due to low water levels, the ponds could not be sampled. During October sampling, RSEM R5A-P2A and B were sampled, while RSEM R5A-P2C and D ponds were dry and could not be sampled. Sampling of RSEM R5A-P2C and D ponds was attempted on November 16, 2022 and sampling of all ponds was attempted on December 12, 2022; however, due to low water levels and frozen conditions, the ponds could not be sampled.

3.1.2. RSEM R6

In 2022, RSEM R6 toxicity samples were collected on a bi-monthly sampling schedule starting in January for RSEM R6W and in February for RSEM R6E.

3.1.3. RSEM L5-P2

In 2022, toxicity samples were collected from the two RSEM L5-P2 ponds on a bi-monthly basis from January through September; the ponds were frozen/empty in November and December.

3.1.4. RSEM L6

In 2022, toxicity sampling of the RSEM L6 pond was done on a bi-monthly basis from January through September; the pond was frozen/empty in November and December.

3.1.5. Acute Toxicity Test Failure 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 2022a) 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 for a discharging PAG contact RSEM pond, 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 for a discharging PAG contact RSEM pond 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. IDZ characterization 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.

This work is considered to be complete for the R5b, R6, and Phase 1 L5 RSEM sediment ponds (Ganshorn *et al.* 2017b, 2019a) under Phase 1 of Project construction.

Additional IDZ characterization is required for L6 and for R6 under Phase 2 conditions (it is possible that Peace River diversion may have changed dilution hydraulics compared to previous characterization) to meet the CEMP requirement to confirm discharge plume dynamics and modeling predictions. IDZ characterization for the new Phase 2 ponds (RSEM R5A-P2 and RSEM L5-P2) is

not possible at this time due to safety constraints associated with 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 Stage 2 cofferdam. Additional IDZ characterization for R6 was done on October 25, 2021. IDZ characterization was done for L6 on November 9, 2021 when the pond water was being pumped to the Peace River prior to the onset of freezing conditions. IDZ characterization for the R6 and L6 ponds under Phase 2 conditions will be reported on separately in a stand-alone report which is currently in progress.

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 2022 (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 2022a) (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 two occasions in 2022): a control site upstream of all Site C instream works in the Peace River (Peace 03 was used during Phase 1 of construction, and was replaced by Peace Upstream (aka PR-2.81 (boat access) or PR-4.00 (shore access in winter) following diversion on October 3, 2020), two far-field locations downstream of the construction footprint on the right bank and left bank of the Peace River (British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) 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. 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 2022, monthly sampling during discharge was completed for RSEM R6; RSEM L6 was also sampled on May 19, 2022 (L6 pond water quality samples were collected on May 18, 2022) and June 4, 2022 to meet the monthly requirement when L6 was dewatered to the Peace River[4] (Table 2). The 5 in 30-day sampling for RSEM R6 was completed during turbid flows from May 11, 2022, to June 8, 2022 and for RSEM R6 during clear flows from October 5, 2022 to November 1, 2022 (Table 2).

Detailed monthly reports were issued for each month of 2022; 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 2022a). 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 2022. 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 2022 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 (BC ENV 2021; Appendix A). The annual average values for each parameter at each site were also screened against the applicable long-term BC WQG (BC ENV 2021; Appendix A). The 5 in 30-day monitoring results were screened against the applicable long-term BC WQG in the June and November 2022 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, dissolved 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 2022 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, dissolved hardness (as $CaCO_3$), DOC, chloride)

[4] The RSEM L6 sediment control pond was also dewatered to the Peace River from April 23 – 25, 2022 and October 22 – 23, 2022; however, monthly water quality sampling in the Peace River was not conducted for the L6 pond in April and October 2022 as BC Hydro/Ecofish/Aski were not notified that L6 was going to be dewatered.

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 2022 were completed for the RSEM ponds that discharged in 2022 (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, whereas Peace River water quality analyses are contracted by Ecofish to ALS.

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. 2022 monthly and 5 in 30-day water quality sampling dates and Peace River background TSS (clear/turbid/very turbid flow).

Month (2022)	Day	Sampling Type	RSEM Area	Background Clear/Turbid Flow at RSEM Pond Upstream Site[1,2]	Background Clear/Turbid Flow at Peace River Upstream/PR-2.81[1,3]
Jan	27	Monthly	RSEM R6	Clear	Clear
Feb	17	Monthly	RSEM R6	Clear	Clear
Mar	16	Monthly	RSEM R6	-	Clear
	17	Monthly	RSEM R6	Clear	-
Apr	7	Monthly	RSEM R6	Clear	Clear
May	11	Monthly/5 in 30 day	RSEM R6	Very turbid flow	Turbid flow
	19	5 in 30 day	RSEM R6	Turbid flow	Turbid flow
	19	Monthly	RSEM L6	Turbid flow	Turbid flow
	25	5 in 30 day	RSEM R6	Very turbid flow	Clear
	31	5 in 30 day	RSEM R6	Very turbid flow	Very turbid flow
Jun	4	Monthly	RSEM L6	Very turbid flow	-
	8	Monthly/5 in 30 day	RSEM R6	Very turbid flow	Very turbid flow
Jul	18	Monthly	RSEM R6	Very turbid flow	Clear
Aug	22	Monthly	RSEM R6	Clear	Clear
Sep	15	Monthly	RSEM R6	Clear	Clear
Oct	5	5 in 30 day	RSEM R6	Clear	Clear
	12	Monthly/5 in 30 day	RSEM R6	Clear	Clear
	18	5 in 30 day	RSEM R6	Clear	Clear
	26	5 in 30 day	RSEM R6	Clear	Clear
Nov	1	Monthly/5 in 30 day	RSEM R6	Clear	Clear
Dec	5	Monthly	RSEM R6	Clear	-
	8	Monthly	RSEM R6	-	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-6.97) are obtained from ALS laboratory data for each sampling date.

[3] Water quality sampling on January 27, 2022 and February 17, 2022 occurred by foot access from shore (right bank) adjacent to Phase 1 Peace River Upstream site (PR-4.00) because boat launch site for the Phase 2 Peace River Upstream site (PR-2.81) was inaccessible.

"-" indicates a water quality sample was not collected at this site during the sampling period.

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).

The turbidity gauges PAM-LB1 and PAM-RB1 are located on the left and right bank of the Peace River, respectively 2.8 km and 7.5 km upstream from the confluence with the Moberly River (Map 1). They have been used to provide the background TSS data since March 3, 2021. Two additional turbidity gauges, PAM-LB2 and PAM-RB2, located ~21 km upstream of the Moberly River confluence were also used to monitor background TSS. These were installed beyond the influence of

backwatering from the construction of the Stage 2 cofferdam and river diversion. These ensure backup data are available if stations closer to the Moberly River confluence do not collect representative background TSS data because of backwatering (e.g., due to the potential for increased settling of TSS under backwatered conditions).

Turbidity data collected over periods of 12 hours, starting at 06:00 MST and at 18:00 MST, are averaged to estimate the Peace River background TSS. These results are automatically emailed to PRHP, BC Hydro, and Ecofish personnel. These results include averaged data from both the left and right bank gauges. 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 (BC ENV 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 2022, a total of 50 water samples were collected from April 9 to October 27, 2022 in the Peace River for laboratory analysis of TSS. These samples were collected across ten 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 along with data from 2017 – 2021 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 2022a), 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, 2019b, 2020, 2021, 2022a).
    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, 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 should not exceed the detection limit for any parameter, 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 (% difference) 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)[5].
- 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 2022 included:

- Review of field data sheets, QA/QC of *in situ* and toxicity data manually entered into EcoDAT;
- Review of electronically uploaded ALS laboratory data;

[5] Due to an ALS database update in October 2022, ion balance values are now reported as +/-.

- 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 laboratory 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 2022 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[6] (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 is incorporated into the latest revision (Rev 11.0) of the CEMP (BC Hydro 2022a). The updated toxicity testing program for PAG containing RSEM sediment ponds consists of two components: routine monitoring and targeted monitoring. In 2022, only routine monitoring was conducted. Test results are summarized for each pond separately in tables in Appendix A.

4.1.1. RSEM R5A-P2

In 2022, 12 of 13 samples collected from the four RSEM R5A-P2 ponds (two from pond D, three from ponds A and C, and four from pond B) passed the acute toxicity test. On March 28, 2022, a sample collected from RSEM R5A-P2D did not pass the acute toxicity test: no fish survived in the undiluted pond water. All fish survived in the 50% volume/volume (v/v) test, while there was 100% mortality in the 100% v/v test (i.e., undiluted pond water test). The LC_{50} (i.e., the concentration at which there is mortality in 50% of the fish) was estimated to be 70.7% v/v.

4.1.2. RSEM R6

In 2022, all 12 samples collected from the two RSEM R6 ponds (six samples from RSEM R6W and six from RSEM R6E) passed the acute toxicity test.

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

4.1.3. RSEM L5-P2

In 2022, 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 2022, all five samples collected from the RSEM L6 pond passed the acute toxicity test.

4.1.5. Acute Toxicity Test Failure Evaluation

In 2022, a single acute toxicity test failure occurred for a sample collected on March 28, 2022 from the RSEM R5A-P2D pond as described in Section 4.1.1. This water was never directly discharged to the Peace River. From March 21 – 22, 2022, the R5A pond waters were serially pumped from ponds D to C to B to A where water was then discharged to the Peace River. This was done to prevent ponds C and D from discharging during a period of high inflows due to local snow melt. Pumping from pond D to C was stopped on March 22 due to increased conductivity in pond D which was a potential indication of ARD influence. For the rest of the year Pond D was managed as ARD influenced water. Had there been risk of overtopping from March 22 onwards, PRHP intended for Pond D to have been dewatered to the Pre-Treatment Pond for the treatment of ARD parameters. Further dewatering of Pond D was not required after March 22. During 2022, PRHP field staff observed a generally low water level in Pond D compared to other R5A ponds and attributed this to a relatively higher exfiltration rate at Pond D. In consideration of these factors, an additional toxicity sample was not collected 96 hours after the failed sample, as prescribed in Shelley *et al.* (2018) and BC Hydro (2022a).

The water that was pumped from the R5A-P2D pond through ponds C, B, then A would have been substantially (>50%) diluted by water in these three ponds before mixed water from all four ponds was discharged to the Peace River via the R5A-P2A pond. As discussed in Section 4.1.1, there were no Rainbow Trout mortalities in the 50% dilution of R5A-P2D water in the 96-hour toxicity test, and there were no mortalities in the March 28 toxicity tests for R5A-P2A, R5A-P2B, and R5A-P2C.

4.2. Peace River Water Quality

4.2.1. RSEM Pond Discharge Plume Characterization

Discharge plume characterization was not conducted in 2022. As discussed in Section 3.2.1, discharge plume characterization was completed under Phase 2 conditions on October 25, 2021 at RSEM R6 and on November 9, 2021 during pumped discharge from RSEM L6. These data have not yet been reported on and are currently being written up in a stand-alone report.

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

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 during monthly and 5 in 30-day sampling in 2022 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 twice in 2022 on May 19 and June 4 (Appendix A). Since the RSEM L6 sites were only sampled twice, 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 during monthly and 5 in 30-day sampling in 2022 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 2022.

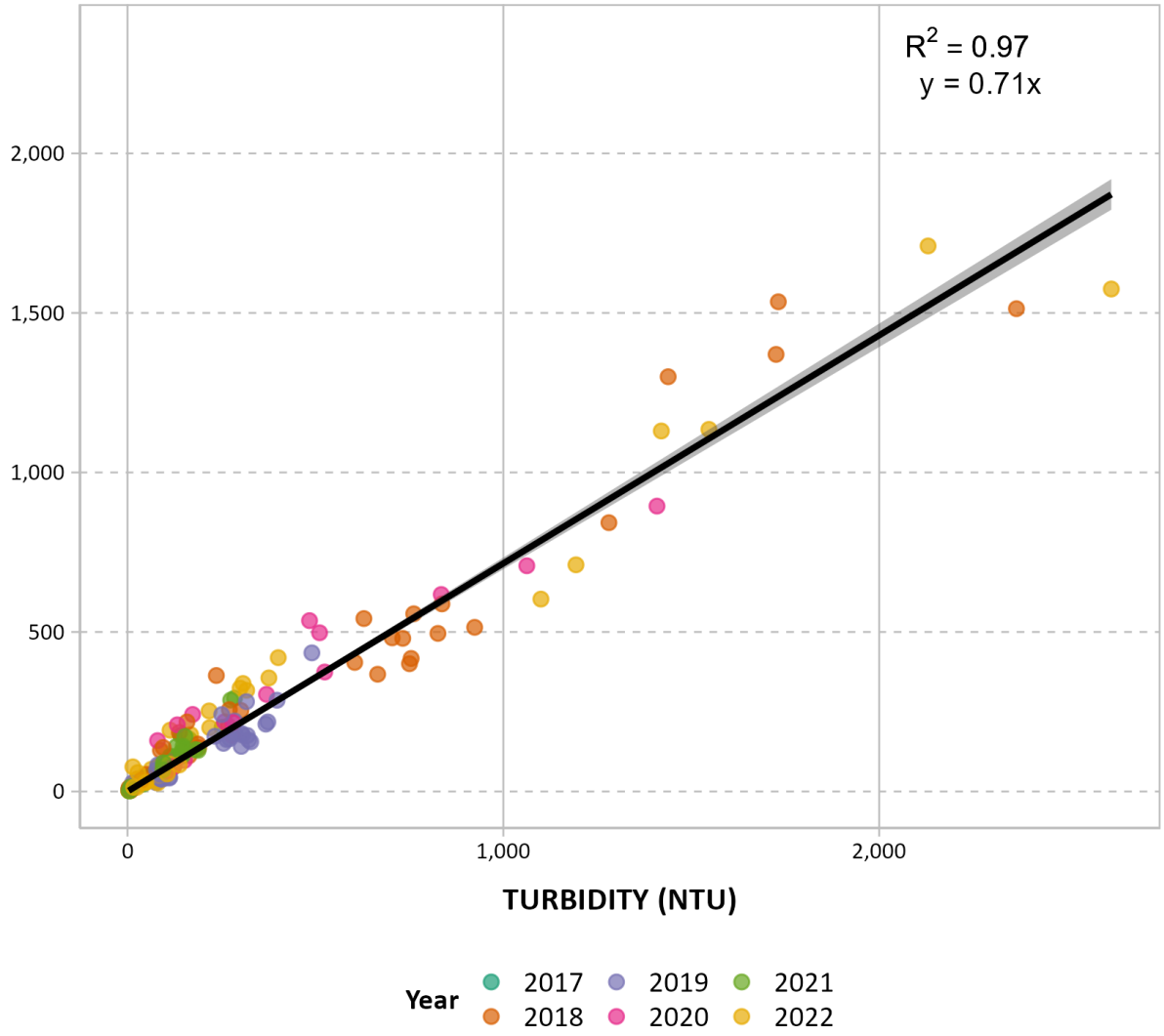
New Site C EOP limits came into effect on January 17, 2022 in revision 10 of the CEMP (BC Hydro 2022b), thus data collected from RSEM ponds in 2022 were screened against the new EOP limits beginning in February 2022 for the monthly reports and for all data in the 2022 annual report. PRHP did not begin screening data against the new EOP limits until April 6, 2022.

4.2.2.2. Peace River Background TSS

The TSS:turbidity relationship applied to calculate TSS from turbidity data in 2022 was 0.71:1. In total 207 samples collected over 43 dates between December 15, 2017 to October 27, 2022 were used to develop the updated TSS:turbidity relationship. These data encompassed a wide range of turbidity (4 NTU to 2,617 NTU) and TSS (2 mg/L to 1,710 mg/L) observations (Figure 1). In 2022, TSS sampling was completed on 9 sampling dates.

The relationship in use at the end of 2022 is shown in Figure 1. Proceeding with a linear model common to all sites in the Peace River including data from 2022, a combined TSS:turbidity relationship of 0.71:1 was found (i.e., TSS = 0.71*Turbidity). This relationship has good agreement amongst the data (R^2 = 0.97) (Figure 1).

Figure 1. **Combined relationship for TSS:turbidity in the Peace River using data collected from December 2017 to October 2022. Shaded areas are 95% confidence intervals.**



4.2.2.3. BC WQG Exceedances

For the monitoring conducted in 2022, 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 attributed to discharge of water from the RSEM ponds. Similar to annual monitoring in 2017 (Ganshorn *et al.* 2018), 2018 (Ganshorn *et al.* 2019b), 2019 (Ganshorn *et al.* 2020), 2020 (Ganshorn *et al.* 2021), 2021 (Ganshorn *et al.* 2022a) and baseline monitoring (Golder 2012), BC WQG exceedances in 2022 were observed for arsenic, iron, and zinc, and occurred predominantly during the freshet period (April to the end of June). 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 (RSEM R6) and Appendix C (RSEM L6). Note that for exceedances of the BC WQG for total zinc, BC ENV (2022) recommends "that the zinc guideline may be interpreted in terms of the dissolved metal fraction when the total zinc concentration in the environment exceeds the guideline due to particulate matter". Comparison of dissolved zinc data to the BC WQG did not indicate any exceedances in 2022.

The maximum total zinc concentration at all sites in 2022 was observed on May 31. This caused an exceedance of the short-term zinc BC WQG guideline on this date at all sites except the R6 IDZ site located 100 m downstream of the RSEM R6 discharge point. Furthermore, the 5 in 30-day average of total zinc also exceeded the long-term BC WQG in May/June at all sites except the R6 IDZ site. The exceedances of the short-term and long-term guidelines were not reported in the May and June 2022 monthly reports (Ganshorn *et al.* 2022b, 2022c) due to an error in the calculation of the hardness dependent guidelines. All hardness dependent guidelines were calculated using the total hardness instead of the dissolved hardness throughout 2022 and for samples taken on November 11, 2020, May 25, 2021, September 8, 2021, and December 10 and 13, 2021. The guidelines were recalculated using dissolved hardness and updated during the preparation of this report. No other unreported exceedances were found.

4.2.1.QA/QC

The results of the QA/QC checks and procedures completed in 2022 are provided in summary tables in Appendix D. QA/QC issues were reviewed. Elevated DOC and total organic carbon (TOC) values at PR-2.81, RBPR-7.05, RBPR-7.15, RBPR-9.34, and LBPR-9.34 in February and March 2022 were excluded due to contamination at the laboratory. All *in situ* turbidity values were excluded from all sites on April 7, 2022 due to suspect readings. One anomalously high *in situ* turbidity value was excluded from LBPR-9.34 on May 19, 2022 and one from RBPR-7.05 on September 15, 2022. Furthermore, all *in situ* pH values measured on October 26, 2022 and November 1, 2022 were excluded due to a malfunction of the YSI meter.

The number of QA/QC laboratory samples (17 replicates, 18 field blanks, and 18 travel blanks) comprised 36.1% (53 of 147 samples) of the overall sampling program based on the total number of monthly and 5 in 30-day samples collected in 2022. The number of QA/QC *in situ* measurements is 66% (2/3) based on the triplicate measurement for each parameter. Overall, sampling in 2022 has surpassed the QA/QC objective of at least 10% QA/QC effort.

Hold times were exceeded for sample analysis for alkalinity (one sample date), conductivity (one sample date), orthophosphate (three sample dates), nitrate (two sample dates), nitrite (three sample dates), TDS (one sample date), total phosphorus (two sample dates), TSS (one sample date), and turbidity (four sample dates) in 2022 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 2022 due to hold time exceedances. The number of samples affected by hold time exceedances which occurred in 2022 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 2022 field blank and travel blank results were non-detectable (below the MDL) for 98.0% of the field blank data (1,603/1,636) and 98.8% of the travel blank data (938/949) (Table 27 in Appendix D). Detected concentrations were generally low and less than 5 times the detection limit. As such, no substantial effect on data quality is expected. On March 16, 2022, field blank detections of DOC and TOC were >5x MDL due to contamination at the laboratory.

Elevated variability between duplicate laboratory samples (RPD>20%) and triplicate *in situ* measurements (RSD>18%) was observed on a number of occasions for TSS, TDS, turbidity, total phosphorus, DOC, ammonia, alkalinity, nitrate, specific conductivity, 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 99 of 1,600 occasions (6.2%) for duplicate samples and 5 of 270 occasions (1.9%) 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 most samples, except for two: the ion balance was 10.6% at RBPR-9.34 and 13.8% at RBPR-7.05 on July 19, 2022. Exceedance of the ±10% objective may be attributable to the presence of less common species or organic salts within a sample (ALS 2021). However, given the ion balance is only slightly greater than the 10% objective, no substantial effect on data quality is expected. 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 99.1% or 4,516 out of a total of 4,557 parameter pairs (Table 30 in Appendix D).

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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, 2022.

Site Name[1]	Description	UTM Coordinates (Zone 10V)	
		Easting (m)	Northing (m)
PR-2.81	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
PR-4.00[2]	In the Peace River upstream of the confluence with the Moberly River. Alternate Peace Upstream site when boat access to PR-2.81 is not possible.	628,027	6,231,374
RBPR-7.05	In the Peace River, 5 m upstream of the R6 discharge channel.	630,283	6,229,254
RBPR-7.15	In the Peace River, 100 m downstream of the R6 discharge channel.	630,383	6,229,259
LBPR-6.82	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	In the Peace River, ~50 m upstream of the L6 discharge channel.	630,311	6,229,648
LBPR-7.21	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	In the Peace River, downstream of the project.	632,498	6,229,678
RBPR-9.34	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.

[2] Water quality sampling on January 27, 2022 and February 17, 2022 occurred by foot access from shore (right bank) just downstream of the Phase 1 Peace River Upstream site (PR-3.88) because the boat launch site for the Phase 2 Peace River Upstream site (PR-2.81) was inaccessible.

Table 4. RSEM R5A Phase 2 pond toxicity sampling results, 2022.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2022	28-Mar	RSEM R5A-P2A-SPTOX	Bi-monthly	>100
		RSEM R5A-P2B-SPTOX	Bi-monthly	>100
		RSEM R5A-P2C-SPTOX	Bi-monthly	>100
		RSEM R5A-P2D-SPTOX	Bi-monthly	70.7 (95% CL: 50.0 – 100.0)*
	24-May[2]	RSEM R5A-P2B-SPTOX	Bi-monthly	>100
		RSEM R5A-P2C-SPTOX	Bi-monthly	>100
		RSEM R5A-P2D-SPTOX	Bi-monthly	>100
	16-Jun	RSEM R5A-P2A-EOPTOX	Bi-monthly	>100
	26-Jul	RSEM R5A-P2B-SPTOX	Bi-monthly	>100
		RSEM R5A-P2C-SPTOX	Bi-monthly	>100
		RSEM R5A-P2D-SPTOX	Bi-monthly	>100
	20-Oct[3]	RSEM R5A-P2A-SPTOX	Bi-monthly	>100
		RSEM R5A-P2B-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 May 24, 2022, the RSEMR5aP2A pond could not be sampled due to low water levels and high sediment content.

[3] On October 20, 2022, RSEMR5aP2C and D ponds were dry and could not be sampled.

* A sample is considered to have failed if at 100% concentration, more than 50% of the test fish die after 96 hours of exposure. In this case, all 10 fish died in the undiluted pond water and no fish died in the 50% dilution of pond water after 96 hours; the concentration lethal to 50% of fish is estimated to occur at 70.7% pond water.

Table 5. RSEM R6 pond toxicity sampling results, 2022.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2022	19-Jan	RSEM R6W-SPTOX	Bi-monthly	>100
	23-Feb	RSEM R6E-SPTOX	Bi-monthly	>100
	21-Mar	RSEM R6W-EOPTOX	Bi-monthly	>100
	11-Apr	RSEM R6E-EOPTOX	Bi-monthly	>100
	16-May	RSEM R6W-EOPTOX	Bi-monthly	>100
	13-Jun	RSEM R6E-EOPTOX	Bi-monthly	>100
	26-Jul	RSEM R6W-EOPTOX	Bi-monthly	>100
	17-Aug	RSEM R6E-EOPTOX	Bi-monthly	>100
	19-Sep	RSEM R6W-EOPTOX	Bi-monthly	>100
	20-Oct	RSEM R6E-EOPTOX	Bi-monthly	>100
	16-Nov	RSEM R6W-EOPTOX	Bi-monthly	>100
	12-Dec	RSEM R6E-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 6. RSEM L5-P2 Phase 2 pond toxicity sampling results, 2022.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2022	27-Jan	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	21-Mar	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	16-May	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	27-Jul	RSEM L5E-P2-SPTOX	Bi-monthly	>100
		RSEM L5W-P2-SPTOX	Bi-monthly	>100
	19-Sep	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.

Table 7. RSEM L6 pond toxicity sampling results, 2022.

Year	Date	Site[1]	Sampling Schedule	96 hr LC50 % (v/v)
2022	27-Jan	RSEM L6-SPTOX	Bi-monthly	>100
	21-Mar	RSEM L6-SPTOX	Bi-monthly	>100
	16-May	RSEM L6-SPTOX	Bi-monthly	>100
	27-Jul	RSEM L6-SPTOX	Bi-monthly	>100
	19-Sep	RSEM L6-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. 2022 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: 2022	Min. MDL	PR-2.81[1]							BC Long-Term WQG[2]	BC Short-Term Maximum	
		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.		WQG[3]	# Exc
Physical Tests											
Dissolved Hardness (as $CaCO_3$)	0.60	22	0	97	94.6	83.8	115	9			
Specific Conductivity (In Situ, µS/cm)		54	0	192.7	191.5	173.5	234.0	17.0			
Specific Conductivity (lab, µS/cm)	2.0	22	0	187	186	167	227	18			
Total Dissolved Solids	13	22	0	135	130	68	248	37			
Total Suspended Solids	1.0	22	0	71	7.3	2.2	502	158		EQ	0
Turbidity (In Situ, NTU)		51	0	31.3	2.4	0.2	284.4	71.9			
Turbidity (lab, NTU)	0.10	22	0	34	2.45	1.00	315	77			
pH (In Situ, pH units)		48	0	7.92	7.91	7.52	8.25	0.18		6.5 to 9.0	0
pH (lab, pH units)	0.10	22	0	8.06	8.08	7.86	8.24	0.09		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1.0	22	0	90	86.2	79.0	117	11			
Ammonia, Total (as N)	0.0050	22	15	0.0104	0.0050	0.0050	0.0670	0.0140	0.102[4]	0.68[4]	0
Anion Sum	0.10	22	0	2.12	2.06	1.85	2.72	0.27			
Bromide (Br)	0.050	22	22	0.050	0.050	0.050	0.050	0.000			
Cation - Anion Balance (% difference)	0.010	22	2	2.18	2.91	-5.98	6.48	2.93			
Cation Sum	0.10	22	0	2.01	1.96	1.73	2.39	0.20			
Chloride (Cl)	0.50	22	22	0.50	0.50	0.50	0.50	0	150	600	0
Fluoride (F)	0.020	22	0	0.037	0.036	0.022	0.059	0.008		EQ	0
Nitrate (as N)	0.0050	22	0	0.0690	0.0704	0.0317	0.0903	0.0126	3	32.8	0
Nitrite (as N)	0.0010	22	16	0.0013	0.0010	0.0010	0.0031	0.0006	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.0010	22	18	0.0012	0.0010	0.0010	0.0029	0.0005			
Total Phosphorus (P)	0.0020	22	0	0.063	0.0086	0.0034	0.502	0.138			
Sulfate (SO_4)	0.30	22	0	15.2	14.5	12.4	23.6	2.9	EQ		0
Organic Carbon											
Dissolved Organic Carbon	0.50	20	0	3.6	3.10	2.52	10.8	1.8			
Total Organic Carbon	0.50	20	0	3.8	2.81	2.51	11.1	2.2			

[1] Water quality sampling on January 27, 2022 and February 17, 2022 occurred by foot access from shore (right bank) adjacent to the Phase 1 Peace River Upstream site (PR-4.00) because the boat launch site for the Phase 2 Peace River Upstream site (PR-2.81) was inaccessible.

[2] 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.

[3] 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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[4] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

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.

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.

Table 9. 2022 annual data summary statistics for dissolved metals collected at the PR-2.81 site.

Parameters (mg/L)	Min. MDL	PR-2.81[1]							BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[2]	WQG[3]	# Exc
Dissolved Metals											
Aluminum (Al) - Dissolved	0.0010	22	0	0.0074	0.0064	0.0044	0.0180	0.0033	EQ	EQ	0
Antimony (Sb) - Dissolved	0.00010	22	19	0.00010	0.00010	0.00010	0.00012	0.00001			
Arsenic (As) - Dissolved	0.00010	22	0	0.00021	0.00019	0.00016	0.00033	0.00004			
Barium (Ba) - Dissolved	0.00010	22	0	0.0347	0.0332	0.0292	0.0476	0.0054			
Beryllium (Be) - Dissolved	0.000020	22	22	0.000035	0.000020	0.000020	0.000100	0.000032			
Bismuth (Bi) - Dissolved	0.000050	22	22	0.000050	0.000050	0.000050	0.000050	0			
Boron (B) - Dissolved	0.010	22	22	0.010	0.010	0.010	0.010	0			
Cadmium (Cd) - Dissolved	0.0000050	22	0	0.0000108	0.0000100	0.0000058	0.0000202	0.0000034	EQ	EQ	0
Calcium (Ca) - Dissolved	0.050	22	0	27.7	27.1	23.7	32.2	2.4			
Chromium (Cr) - Dissolved	0.00050	22	22	0.00050	0.00050	0.00050	0.00050	0			
Cobalt (Co) - Dissolved	0.00010	22	21	0.00010	0.00010	0.00010	0.00018	0.00002			
Copper (Cu) - Dissolved	0.00020	22	0	0.00072	0.00066	0.00057	0.00150	0.00021	EQ	EQ	0
Iron (Fe) - Dissolved	0.010	22	14	0.016	0.010	0.010	0.071	0.014		0.35	0
Lead (Pb) - Dissolved	0.000050	22	21	0.000050	0.000050	0.000050	0.000060	0.000002			
Lithium (Li) - Dissolved	0.0010	22	2	0.0015	0.0012	0.0010	0.0031	0.0006			
Magnesium (Mg) - Dissolved	0.0050	22	0	6.75	6.41	5.80	8.75	0.94			
Manganese (Mn) - Dissolved	0.00010	22	0	0.0020	0.00092	0.00034	0.0121	0.0026			
Mercury (Hg) - Dissolved	0.0000050	22	22	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo) - Dissolved	0.000050	22	0	0.00089	0.000808	0.000700	0.00138	0.00020			
Nickel (Ni) - Dissolved	0.00050	22	0	0.00089	0.00075	0.00063	0.00206	0.00035			
Phosphorus (P) - Dissolved	0.050	22	22	0.050	0.050	0.050	0.050	0			
Potassium (K) - Dissolved	0.050	22	0	0.476	0.446	0.382	0.803	0.094			
Selenium (Se) - Dissolved	0.000050	22	0	0.000358	0.000322	0.000234	0.000644	0.000115			
Silicon (Si) - Dissolved	0.050	22	0	2.09	2.11	1.84	2.30	0.13			
Silver (Ag) - Dissolved	0.000010	22	22	0.000010	0.000010	0.000010	0.000010	0			
Sodium (Na) - Dissolved	0.050	22	0	1.28	1.17	0.927	2.09	0.28			
Strontium (Sr) - Dissolved	0.00020	22	0	0.112	0.112	0.0900	0.146	0.012			
Sulfur (S) - Dissolved	0.50	22	0	5.35	5.08	3.93	7.49	1.04			
Thallium (Tl) - Dissolved	0.000010	22	22	0.000010	0.000010	0.000010	0.000010	0			
Tin (Sn) - Dissolved	0.00010	22	21	0.00010	0.00010	0.00010	0.00012	0			
Titanium (Ti) - Dissolved	0.00030	22	17	0.00039	0.00030	0.00030	0.00119	0.00021			
Uranium (U) - Dissolved	0.000010	22	0	0.000452	0.000450	0.000374	0.000556	0.000048			
Vanadium (V) - Dissolved	0.00050	22	22	0.00050	0.00050	0.00050	0.00050	0			
Zinc (Zn) - Dissolved	0.0010	22	15	0.0012	0.0010	0.0010	0.0028	0.0004	EQ[4]	EQ[4]	0
Zirconium (Zr) - Dissolved	0.00020	22	21	0.00020	0.00020	0.00020	0.00020	0			

[1] Water quality sampling on January 27, 2022 and February 17, 2022 occurred by foot access from shore (right bank) adjacent to the Phase 1 Peace River Upstream site (PR-4.00) because the boat launch site for the Phase 2 Peace River Upstream site (PR-2.81) was inaccessible.

[2] 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.

[3] 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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[4] Total zinc short-term and long-term BC WQG were applied to dissolved zinc values.

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.

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.

Table 10. 2022 annual data summary statistics for total metals collected at the PR-2.81 site.

Parameters (mg/L)	Min. MDL	PR-2.81[1]							BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[2]	WQG[3]	# Exc
Total Metals											
Aluminum (Al) - Total	0.0030	22	0	0.56	0.0760	0.0232	4.93	1.21			
Antimony (Sb) - Total	0.00010	22	19	0.00016	0.00010	0.00010	0.00050	0.00013			
Arsenic (As) - Total	0.00010	22	0	0.00062	0.00026	0.00018	0.00380	0.00091		0.005	0
Barium (Ba) - Total	0.00010	22	0	0.058	0.0362	0.0316	0.226	0.053	1		0
Beryllium (Be) - Total	0.000020	22	18	0.000069	0.000020	0.000020	0.000335	0.000082	0.00013		0
Bismuth (Bi) - Total	0.000050	22	22	0.000073	0.000050	0.000050	0.000250	0.000059			
Boron (B) - Total	0.010	22	22	0.015	0.010	0.010	0.050	0.012		1.2	0
Cadmium (Cd) - Total	0.0000050	22	0	0.000086	0.0000258	0.0000107	0.000545	0.000150			
Calcium (Ca) - Total	0.050	22	0	29.8	28.0	23.9	44.4	5.8			
Chromium (Cr) - Total	0.00050	22	17	0.00133	0.00050	0.00050	0.00891	0.00209			
Cobalt (Co) - Total	0.00010	22	12	0.00055	0.00010	0.00010	0.00447	0.00109	0.004	0.11	0
Copper (Cu) - Total	0.00050	22	0	0.0022	0.00091	0.00064	0.0144	0.0033			
Iron (Fe) - Total	0.010	22	0	1.12	0.111	0.025	9.99	2.47		1	4
Lead (Pb) - Total	0.000050	22	8	0.00066	0.000078	0.000050	0.00552	0.00139	EQ	EQ	0
Lithium (Li) - Total	0.0010	22	3	0.0024	0.0014	0.0010	0.0083	0.0021			
Magnesium (Mg) - Total	0.0050	22	0	7.2	6.71	5.64	11.7	1.8			
Manganese (Mn) - Total	0.00010	22	0	0.022	0.00506	0.00161	0.161	0.041	EQ	EQ	0
Mercury (Hg) - Total	0.0000050	22	22	0.0000050	0.0000050	0.0000050	0.0000050	0	0.00002		0
Molybdenum (Mo) - Total	0.000050	22	0	0.00088	0.000774	0.000687	0.00148	0.00025	7.6	46	0
Nickel (Ni) - Total	0.00050	22	1	0.0026	0.0010	0.00066	0.0173	0.0041	EQ		0
Phosphorus (P) - Total	0.050	22	18	0.097	0.050	0.050	0.406	0.104			
Potassium (K) - Total	0.050	22	0	0.66	0.478	0.416	2.22	0.46			
Selenium (Se) - Total	0.000050	22	0	0.000376	0.000301	0.000233	0.000836	0.000189	0.002		0
Silicon (Si) - Total	0.10	22	0	2.94	2.33	1.83	8.94	1.71			
Silver (Ag) - Total	0.000010	22	18	0.000022	0.000010	0.000010	0.000117	0.000027	EQ	EQ	0
Sodium (Na) - Total	0.050	22	0	1.34	1.24	0.983	2.30	0.33			
Strontium (Sr) - Total	0.00020	22	0	0.119	0.114	0.0986	0.177	0.023			
Sulfur (S) - Total	0.50	22	0	5.40	5.11	3.95	7.70	1.00			
Thallium (Tl) - Total	0.000010	22	18	0.000028	0.000010	0.000010	0.000156	0.000041			
Tin (Sn) - Total	0.00010	22	22	0.00015	0.00010	0.00010	0.00050	0.00012			
Titanium (Ti) - Total	0.00030	22	2	0.0070	0.00158	0.00030	0.0514	0.0127			
Uranium (U) - Total	0.000010	22	0	0.000528	0.000483	0.000385	0.000963	0.000156	0.0085		0
Vanadium (V) - Total	0.00050	22	5	0.00278	0.00075	0.0005	0.0195	0.00497			
Zinc (Zn) - Total	0.0030	22	16	0.0087	0.0030	0.0030	0.0531	0.0131	EQ	EQ	1
Zirconium (Zr) - Total	0.00020	22	21	0.00029	0.00020	0.00020	0.00100	0.00024			

[1] Water quality sampling on January 27, 2022 and February 17, 2022 occurred by foot access from shore (right bank) adjacent to the Phase 1 Peace River Upstream site (PR-4.00) because the boat launch site for the Phase 2 Peace River Upstream site (PR-2.81) was inaccessible.

[2] 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.

[3] 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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

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.

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.

Table 11. 2022 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)	Min. MDL	RBPR-7.05						BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Physical Tests											
Dissolved Hardness (as $CaCO_3$)	0.60	21	0	98	94.5	85.5	124	11			
Specific Conductivity (In Situ, µS/cm)		54	0	195.8	193.2	176.3	254.2	19.5			
Specific Conductivity (lab, µS/cm)	2.0	21	0	191	186	169	239	22			
Total Dissolved Solids	13	21	0	138	122	60	289	47			
Total Suspended Solids	1.0	21	0	108	14.6	1.0	920	215		EQ	0
Turbidity (In Situ, NTU)		50	0	55.0	6.2	0.1	519.2	121.3			
Turbidity (lab, NTU)	0.10	21	0	65	6.09	0.99	693	153			
pH (In Situ, pH units)		47	0	7.93	7.89	7.54	8.23	0.14		6.5 to 9.0	0
pH (lab, pH units)	0.10	21	0	8.06	8.09	7.84	8.23	0.08		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1.0	21	0	94	88.3	77.8	148	18			
Ammonia, Total (as N)	0.0050	21	10	0.0120	0.0052	0.0050	0.0788	0.0167	0.102[3]	0.68[3]	0
Anion Sum	0.10	21	0	2.21	2.10	1.85	3.47	0.42			
Bromide (Br)	0.050	21	21	0.050	0.050	0.050	0.050	0			
Cation - Anion Balance (% difference)	0.010	21	2	3.54	3.35	-5.26	13.8	3.75			
Cation Sum	0.10	21	0	2.04	1.95	1.76	2.63	0.25			
Chloride (Cl)	0.50	21	19	0.55	0.50	0.50	1.05	0.16	150	600	0
Fluoride (F)	0.020	21	0	0.038	0.036	0.023	0.068	0.01		EQ	0
Nitrate (as N)	0.0050	21	0	0.0664	0.0689	0.0225	0.0978	0.0173	3	32.8	0
Nitrite (as N)	0.0010	21	13	0.0013	0.001	0.001	0.0031	0.0006	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.0010	21	16	0.0013	0.001	0.001	0.0044	0.0009			
Total Phosphorus (P)	0.0020	21	1	0.084	0.0150	0.0020	0.626	0.159			
Sulfate (SO_4)	0.30	21	0	15.8	14.9	12.8	23.3	3.3	EQ		0
Organic Carbon											
Dissolved Organic Carbon	0.50	19	0	3.87	3.21	2.62	11.50	2.04			
Total Organic Carbon	0.50	19	0	4.25	3.03	2.15	18.70	3.63			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

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.

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.

Table 12. 2022 annual data summary statistics for dissolved metals collected at the RSEM R6 upstream site (RBPR-7.05).

Parameters (mg/L)	Min. MDL	RBPR-7.05							BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al) - Dissolved	0.0010	21	0	0.0074	0.0059	0.0045	0.0164	0.0031	EQ	EQ	0
Antimony (Sb) - Dissolved	0.00010	21	17	0.00010	0.00010	0.00010	0.00013	0.00001			
Arsenic (As) - Dissolved	0.00010	21	0	0.00021	0.00020	0.00015	0.00034	0.00005			
Barium (Ba) - Dissolved	0.00010	21	0	0.0388	0.0349	0.0297	0.0665	0.0109			
Beryllium (Be) - Dissolved	0.000020	21	21	0.000024	0.000020	0.000020	0.000100	0.000017			
Bismuth (Bi) - Dissolved	0.000050	21	21	0.000050	0.000050	0.000050	0.000050	0			
Boron (B) - Dissolved	0.010	21	21	0.010	0.010	0.010	0.010	0			
Cadmium (Cd) - Dissolved	0.0000050	21	0	0.0000116	0.0000112	0.0000055	0.0000217	0.0000038	EQ	EQ	0
Calcium (Ca) - Dissolved	0.050	21	0	27.8	27.1	24.0	35.3	3.1			
Chromium (Cr) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Cobalt (Co) - Dissolved	0.00010	21	20	0.00010	0.00010	0.00010	0.00016	0.00001			
Copper (Cu) - Dissolved	0.00020	21	0	0.00075	0.00064	0.00057	0.00169	0.00025	EQ	EQ	0
Iron (Fe) - Dissolved	0.010	21	13	0.019	0.010	0.010	0.090	0.019		0.35	0
Lead (Pb) - Dissolved	0.000050	21	19	0.000052	0.000050	0.000050	0.000085	0.000008			
Lithium (Li) - Dissolved	0.0010	21	1	0.0016	0.0013	0.0010	0.0031	0.0007			
Magnesium (Mg) - Dissolved	0.0050	21	0	6.87	6.44	5.86	8.75	0.94			
Manganese (Mn) - Dissolved	0.00010	21	0	0.0057	0.00149	0.00034	0.0377	0.0100			
Mercury (Hg) - Dissolved	0.0000050	21	21	0.0000050	0.0000050	0.0000050	0.0000050	0			
Molybdenum (Mo) - Dissolved	0.000050	21	0	0.00113	0.000805	0.000688	0.00575	0.00108			
Nickel (Ni) - Dissolved	0.00050	21	0	0.00093	0.00080	0.00063	0.00223	0.00039			
Phosphorus (P) - Dissolved	0.050	21	21	0.050	0.050	0.050	0.050	0			
Potassium (K) - Dissolved	0.050	21	0	0.52	0.439	0.393	1.00	0.15			
Selenium (Se) - Dissolved	0.000050	21	0	0.000364	0.000339	0.000261	0.000591	0.000095			
Silicon (Si) - Dissolved	0.050	21	0	2.09	2.16	1.83	2.35	0.16			
Silver (Ag) - Dissolved	0.000010	21	21	0.000010	0.000010	0.000010	0.000010	0			
Sodium (Na) - Dissolved	0.050	21	0	1.47	1.26	0.946	2.92	0.57			
Strontium (Sr) - Dissolved	0.00020	21	0	0.113	0.112	0.0917	0.155	0.016			
Sulfur (S) - Dissolved	0.50	21	0	5.47	5.28	4.09	8.08	1.14			
Thallium (Tl) - Dissolved	0.000010	21	21	0.000010	0.000010	0.000010	0.000010	0			
Tin (Sn) - Dissolved	0.00010	21	21	0.00010	0.00010	0.00010	0.00010	0			
Titanium (Ti) - Dissolved	0.00030	21	16	0.00043	0.00030	0.00030	0.00200	0.00038			
Uranium (U) - Dissolved	0.000010	21	0	0.000459	0.000449	0.000383	0.000609	0.000065			
Vanadium (V) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Zinc (Zn) - Dissolved	0.0010	21	14	0.0013	0.0010	0.0010	0.0044	0.0008	EQ[3]	EQ[3]	0
Zirconium (Zr) - Dissolved	0.00020	21	20	0.00020	0.00020	0.00020	0.00030	0.00002			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] Total zinc short-term and long-term BC WQG were applied to dissolved zinc values.

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 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.

Table 13. 2022 annual data summary statistics for total metals collected at the RSEM R6 upstream site (RBPR-7.05).

Parameters (mg/L)	Min. MDL	RBPR-7.05							BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al) - Total	0.0030	21	0	0.9	0.101	0.0066	10.3	2.3			
Antimony (Sb) - Total	0.00010	21	16	0.00018	0.00010	0.00010	0.00066	0.00017			
Arsenic (As) - Total	0.00010	21	0	0.00090	0.00026	0.00021	0.00774	0.00168		0.005	1
Barium (Ba) - Total	0.00010	21	0	0.083	0.0374	0.0316	0.545	0.114	1		0
Beryllium (Be) - Total	0.000020	21	15	0.000081	0.000020	0.000020	0.000741	0.000160	0.00013		0
Bismuth (Bi) - Total	0.000050	21	21	0.000081	0.000050	0.000050	0.000250	0.000072			
Boron (B) - Total	0.010	21	21	0.016	0.010	0.010	0.050	0.014		1.2	0
Cadmium (Cd) - Total	0.0000050	21	0	0.00012	0.0000233	0.0000093	0.00126	0.00028			
Calcium (Ca) - Total	0.050	21	0	31.2	27.6	24.6	65.6	9.3			
Chromium (Cr) - Total	0.00050	21	14	0.00188	0.00050	0.00050	0.0186	0.00403			
Cobalt (Co) - Total	0.00010	21	11	0.0010	0.00010	0.00010	0.0114	0.0025	0.004	0.11	0
Copper (Cu) - Total	0.00050	21	0	0.00346	0.00097	0.00065	0.0334	0.00718			
Iron (Fe) - Total	0.010	21	1	1.9	0.152	0.010	23.4	5.1		1	5
Lead (Pb) - Total	0.000050	21	6	0.0012	0.000093	0.000050	0.0141	0.0031	EQ	EQ	0
Lithium (Li) - Total	0.0010	21	3	0.0031	0.0014	0.0010	0.0187	0.0039			
Magnesium (Mg) - Total	0.0050	21	0	7.72	6.76	5.84	18.4	2.83			
Manganese (Mn) - Total	0.00010	21	0	0.044	0.00938	0.00162	0.458	0.100	EQ	EQ	0
Mercury (Hg) - Total	0.0000050	21	21	0.0000050	0.0000050	0.0000050	0.0000050	0	0.00002		0
Molybdenum (Mo) - Total	0.000050	21	0	0.00112	0.000830	0.000662	0.00535	0.00099	7.6	46	0
Nickel (Ni) - Total	0.00050	21	0	0.0039	0.00094	0.00073	0.0395	0.0085	EQ		0
Phosphorus (P) - Total	0.050	21	16	0.132	0.050	0.050	0.970	0.208			
Potassium (K) - Total	0.050	21	0	0.77	0.472	0.417	3.35	0.67			
Selenium (Se) - Total	0.000050	21	0	0.000371	0.000302	0.000235	0.000978	0.000199	0.002		0
Silicon (Si) - Total	0.10	21	0	3.4	2.38	1.90	16.4	3.2			
Silver (Ag) - Total	0.000010	21	17	0.000031	0.000010	0.000010	0.000297	0.000063	EQ	EQ	0
Sodium (Na) - Total	0.050	21	0	1.54	1.32	1.02	2.92	0.59			
Strontium (Sr) - Total	0.00020	21	0	0.123	0.114	0.099	0.208	0.028			
Sulfur (S) - Total	0.50	21	0	5.62	5.18	3.94	8.26	1.11			
Thallium (Tl) - Total	0.000010	21	15	0.000034	0.000010	0.000010	0.000296	0.000065			
Tin (Sn) - Total	0.00010	21	20	0.00016	0.00010	0.00010	0.00050	0.00014			
Titanium (Ti) - Total	0.00030	21	1	0.0095	0.0023	0.00030	0.0811	0.0185			
Uranium (U) - Total	0.000010	21	0	0.00057	0.000483	0.000400	0.00170	0.00029	0.0085		0
Vanadium (V) - Total	0.00050	21	3	0.0039	0.00094	0.00050	0.0374	0.0083			
Zinc (Zn) - Total	0.0030	21	13	0.012	0.0030	0.0030	0.116	0.025	EQ	EQ	1
Zirconium (Zr) - Total	0.00020	21	19	0.00033	0.00020	0.00020	0.00100	0.00029			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

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.

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.

Table 14. 2022 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)	Min. MDL	RBPR-7.15						BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Physical Tests											
Dissolved Hardness (as $CaCO_3$)	0.60	21	0	100	96.9	83.8	131	12			
Specific Conductivity (In Situ, µS/cm)		54	0	201.8	196.1	178.5	261.7	23.0			
Specific Conductivity (lab, µS/cm)	2.0	21	0	199	188	174	323	35			
Total Dissolved Solids	13	21	0	137	130	73	259	45			
Total Suspended Solids	1.0	21	0	59	15.9	1.3	545	127		EQ	0
Turbidity (In Situ, NTU)		51	0	43.6	5.6	0.8	422.3	99.0			
Turbidity (lab, NTU)	0.10	21	0	44	6.47	1.37	450	103			
pH (In Situ, pH units)		48	0	8.00	8.00	7.77	8.30	0.12		6.5 to 9.0	0
pH (lab, pH units)	0.10	21	0	8.06	8.07	7.86	8.22	0.09		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1.0	21	0	93.2	89.7	78.2	130	14.1			
Ammonia, Total (as N)	0.0050	21	10	0.0132	0.0051	0.0050	0.0606	0.0156	0.102[3]	0.68[3]	0
Anion Sum	0.10	21	0	2.26	2.11	1.86	3.85	0.48			
Bromide (Br)	0.050	21	20	0.052	0.050	0.050	0.083	0.007			
Cation - Anion Balance (% difference)	0.010	21	2	3.03	2.82	-6.33	9.53	3.63			
Cation Sum	0.10	21	0	2.10	2.02	1.74	3.18	0.33			
Chloride (Cl)	0.50	21	17	1.03	0.50	0.50	7.29	1.61	150	600	0
Fluoride (F)	0.020	21	1	0.039	0.037	0.020	0.084	0.013		EQ	0
Nitrate (as N)	0.0050	21	0	0.0808	0.0786	0.0593	0.1610	0.0219	3	32.8	0
Nitrite (as N)	0.0010	21	13	0.0013	0.0010	0.0010	0.0032	0.0006	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.0010	21	16	0.0013	0.0010	0.0010	0.0035	0.0007			
Total Phosphorus (P)	0.0020	21	0	0.053	0.0151	0.0026	0.421	0.102			
Sulfate (SO_4)	0.30	21	0	18.0	15.6	13.4	58.2	9.5	EQ		0
Organic Carbon											
Dissolved Organic Carbon	0.50	19	0	3.8	3.30	2.55	10.5	1.8			
Total Organic Carbon	0.50	20	0	3.9	3.06	2.57	12.9	2.3			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

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.

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.

Table 15. 2022 annual data summary statistics for dissolved metals collected at the RSEM R6 IDZ site (RBPR-7.15).

Parameters (mg/L)	Min. MDL	RBPR-7.15							BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al) - Dissolved	0.0010	21	0	0.0080	0.0061	0.0043	0.0210	0.0042	EQ	EQ	0
Antimony (Sb) - Dissolved	0.00010	21	18	0.00010	0.00010	0.00010	0.00016	0.00001			
Arsenic (As) - Dissolved	0.00010	21	0	0.00021	0.00020	0.00018	0.00032	0.00004			
Barium (Ba) - Dissolved	0.00010	21	0	0.0385	0.0344	0.0312	0.0612	0.0088			
Beryllium (Be) - Dissolved	0.000020	21	21	0.000024	0.000020	0.000020	0.00010	0.000017			
Bismuth (Bi) - Dissolved	0.000050	21	21	0.000050	0.000050	0.000050	0.000050	0			
Boron (B) - Dissolved	0.010	21	20	0.010	0.010	0.010	0.017	0.002			
Cadmium (Cd) - Dissolved	0.0000050	21	1	0.0000105	0.0000102	0.0000050	0.0000173	0.0000027	EQ	EQ	0
Calcium (Ca) - Dissolved	0.050	21	0	28.4	27.8	23.8	37.3	3.2			
Chromium (Cr) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Cobalt (Co) - Dissolved	0.00010	21	20	0.00010	0.00010	0.00010	0.00014	0.00001			
Copper (Cu) - Dissolved	0.00020	21	0	0.00072	0.00064	0.00059	0.00137	0.00019	EQ	EQ	0
Iron (Fe) - Dissolved	0.010	21	14	0.018	0.010	0.010	0.060	0.014		0.35	0
Lead (Pb) - Dissolved	0.000050	21	21	0.00005	0.00005	0.00005	0.00005	0			
Lithium (Li) - Dissolved	0.0010	21	2	0.0017	0.0013	0.0010	0.0055	0.0010			
Magnesium (Mg) - Dissolved	0.0050	21	0	7.0	6.75	5.93	10.1	1.1			
Manganese (Mn) - Dissolved	0.00010	21	0	0.00236	0.00131	0.00038	0.00961	0.00234			
Mercury (Hg) - Dissolved	0.0000050	21	21	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo) - Dissolved	0.000050	21	0	0.000937	0.000864	0.000716	0.00215	0.000303			
Nickel (Ni) - Dissolved	0.00050	21	0	0.00089	0.00072	0.00062	0.00176	0.00031			
Phosphorus (P) - Dissolved	0.050	21	21	0.050	0.050	0.050	0.050	0			
Potassium (K) - Dissolved	0.050	21	0	0.54	0.478	0.394	1.12	0.18			
Selenium (Se) - Dissolved	0.000050	21	0	0.000386	0.000340	0.000265	0.000791	0.000137			
Silicon (Si) - Dissolved	0.050	21	0	2.10	2.13	1.84	2.30	0.14			
Silver (Ag) - Dissolved	0.000010	21	21	0.000010	0.000010	0.000010	0.000010	0			
Sodium (Na) - Dissolved	0.050	21	0	2.1	1.44	1.08	11.9	2.3			
Strontium (Sr) - Dissolved	0.00020	21	0	0.115	0.114	0.093	0.160	0.013			
Sulfur (S) - Dissolved	0.50	21	0	6.0	5.12	4.47	15.6	2.3			
Thallium (Tl) - Dissolved	0.000010	21	21	0.000010	0.000010	0.000010	0.000010	0			
Tin (Sn) - Dissolved	0.00010	21	21	0.00010	0.00010	0.00010	0.00010	0			
Titanium (Ti) - Dissolved	0.00030	21	15	0.00040	0.00030	0.00030	0.00110	0.00022			
Uranium (U) - Dissolved	0.000010	21	0	0.000467	0.000455	0.000397	0.000677	0.00007			
Vanadium (V) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Zinc (Zn) - Dissolved	0.0010	21	12	0.0012	0.0010	0.0010	0.0023	0.0003	EQ[3]	EQ[3]	0
Zirconium (Zr) - Dissolved	0.00020	21	21	0.00020	0.00020	0.00020	0.00020	0			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] Total zinc short-term and long-term BC WQG were applied to dissolved zinc values.

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

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.

Table 16. 2022 annual data summary statistics for total metals collected at the RSEM R6 IDZ site (RBPR-7.15).

Parameters (mg/L)	Min. MDL	RBPR-7.15						BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al) - Total	0.0030	21	0	0.54	0.128	0.0360	4.87	1.12			
Antimony (Sb) - Total	0.00010	21	17	0.00015	0.00010	0.00010	0.00050	0.00012			
Arsenic (As) - Total	0.00010	21	0	0.00063	0.00030	0.00019	0.00383	0.00086		0.005	0
Barium (Ba) - Total	0.00010	21	0	0.063	0.0460	0.0328	0.254	0.055	1		0
Beryllium (Be) - Total	0.000020	21	17	0.000055	0.000020	0.000020	0.000353	0.000082	0.00013		0
Bismuth (Bi) - Total	0.000050	21	21	0.000071	0.000050	0.000050	0.000250	0.000060			
Boron (B) - Total	0.010	21	20	0.015	0.010	0.010	0.050	0.012		1.2	0
Cadmium (Cd) - Total	0.0000050	21	0	0.000079	0.0000336	0.0000109	0.000532	0.000132			
Calcium (Ca) - Total	0.050	21	0	30.0	28.2	25.1	49.3	5.9			
Chromium (Cr) - Total	0.00050	21	14	0.00123	0.00050	0.00050	0.00861	0.00191			
Cobalt (Co) - Total	0.00010	21	10	0.00055	0.00013	0.00010	0.00464	0.00109	0.004	0.11	0
Copper (Cu) - Total	0.00050	21	0	0.0022	0.00104	0.00067	0.0147	0.0033			
Iron (Fe) - Total	0.010	21	0	1.1	0.253	0.055	10.1	2.4		1	4
Lead (Pb) - Total	0.000050	21	5	0.00066	0.000143	0.000050	0.00599	0.00142	EQ	EQ	0
Lithium (Li) - Total	0.0010	21	1	0.0025	0.0016	0.0011	0.0089	0.0021			
Magnesium (Mg) - Total	0.0050	21	0	7.4	6.86	6.07	12.4	1.7			
Manganese (Mn) - Total	0.00010	21	0	0.024	0.00952	0.00192	0.179	0.042	EQ	EQ	0
Mercury (Hg) - Total	0.0000050	21	19	0.0000051	0.0000050	0.0000050	0.0000069	0.0000004	0.00002		0
Molybdenum (Mo) - Total	0.000050	21	0	0.00095	0.000874	0.000748	0.00205	0.00028	7.6	46	0
Nickel (Ni) - Total	0.00050	21	0	0.0026	0.00116	0.00082	0.0174	0.0039	EQ		0
Phosphorus (P) - Total	0.050	21	16	0.088	0.050	0.050	0.377	0.093			
Potassium (K) - Total	0.050	21	0	0.71	0.508	0.432	2.32	0.46			
Selenium (Se) - Total	0.000050	21	0	0.000382	0.000322	0.000242	0.000946	0.000185	0.002		0
Silicon (Si) - Total	0.10	21	0	2.96	2.42	1.98	9.29	1.65			
Silver (Ag) - Total	0.000010	21	18	0.000019	0.000010	0.000010	0.000107	0.000024	EQ	EQ	0
Sodium (Na) - Total	0.050	21	0	2.1	1.43	1.09	12.0	2.3			
Strontium (Sr) - Total	0.00020	21	0	0.121	0.115	0.103	0.170	0.020			
Sulfur (S) - Total	0.50	21	0	6.1	5.46	4.63	15.2	2.2			
Thallium (Tl) - Total	0.000010	21	13	0.000024	0.000010	0.000010	0.000140	0.000033			
Tin (Sn) - Total	0.00010	21	20	0.00014	0.00010	0.00010	0.00050	0.00012			
Titanium (Ti) - Total	0.00030	21	0	0.0073	0.00267	0.00033	0.0548	0.0125			
Uranium (U) - Total	0.000010	21	0	0.00054	0.000503	0.000418	0.00108	0.00016	0.0085		0
Vanadium (V) - Total	0.00050	21	2	0.0026	0.00111	0.00050	0.0190	0.0043			
Zinc (Zn) - Total	0.0030	21	14	0.0076	0.0030	0.0030	0.0514	0.0118	EQ	EQ	0
Zirconium (Zr) - Total	0.00020	21	20	0.00029	0.00020	0.00020	0.00100	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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

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.

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.

Table 17. 2022 annual data summary statistics for lab and *in situ* sampling (organic carbon, physical tests, anions, and nutrients) collected at the BC ENV far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L)	Min. MDL	RBPR-9.34							BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Physical Tests											
Dissolved Hardness (as $CaCO_3$)	0.60	21	0	98	95.5	86.4	119	10			
Specific Conductivity (In Situ, µS/cm)		54	0	194.5	192.9	176.2	232.1	16.1			
Specific Conductivity (lab, µS/cm)	2.0	21	0	190	188	168	227	18			
Total Dissolved Solids	13	21	0	140	119	60	271	52			
Total Suspended Solids	1.0	21	2	152	14.7	1.0	1210	328		EQ	0
Turbidity (In Situ, NTU)		51	0	52.4	4.4	1.2	500.7	122.5			
Turbidity (lab, NTU)	0.10	21	0	103	4.07	0.96	840	245			
pH (In Situ, pH units)		48	0	7.91	7.89	7.55	8.16	0.15		6.5 to 9.0	0
pH (lab, pH units)	0.10	21	0	8.07	8.07	7.81	8.23	0.09		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1.0	21	0	91.4	88.6	77.7	128	12.5			
Ammonia, Total (as N)	0.0050	21	12	0.018	0.0050	0.0050	0.098	0.025	0.102[3]	0.68[3]	0
Anion Sum	0.10	21	0	2.16	2.08	1.85	2.97	0.30			
Bromide (Br)	0.050	21	21	0.050	0.050	0.050	0.050	0			
Cation - Anion Balance (% difference)	0.010	21	3	2.75	3.22	-7.77	10.60	3.71			
Cation Sum	0.10	21	0	2.04	1.97	1.78	2.48	0.22			
Chloride (Cl)	0.50	21	20	0.51	0.50	0.50	0.61	0.02	150	600	0
Fluoride (F)	0.020	21	0	0.038	0.035	0.022	0.068	0.012		EQ	0
Nitrate (as N)	0.0050	21	0	0.0691	0.0694	0.0275	0.0963	0.0156	3	32.8	0
Nitrite (as N)	0.0010	21	16	0.0012	0.0010	0.0010	0.0030	0.0005	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.0010	21	14	0.0013	0.0010	0.0010	0.0030	0.0006			
Total Phosphorus (P)	0.0020	21	0	0.075	0.0140	0.0031	0.712	0.166			
Sulfate (SO_4)	0.30	21	0	15.5	14.4	12.8	22.4	2.8	EQ		0
Organic Carbon											
Dissolved Organic Carbon	0.50	18	0	4.5	3.35	2.42	13.0	3.1			
Total Organic Carbon	0.50	18	0	5.1	3.13	2.49	18.6	4.8			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

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.

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.

Table 18. 2022 annual data summary statistics for dissolved metals collected at the BC ENV far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L)	Min. MDL	RBPR-9.34							BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al) - Dissolved	0.0010	21	0	0.0077	0.0061	0.0044	0.0210	0.0042	EQ	EQ	0
Antimony (Sb) - Dissolved	0.00010	21	18	0.00010	0.00010	0.00010	0.00014	0.00001			
Arsenic (As) - Dissolved	0.00010	21	0	0.00022	0.00021	0.00018	0.00039	0.00006			
Barium (Ba) - Dissolved	0.00010	21	0	0.0373	0.0342	0.0306	0.0538	0.0076			
Beryllium (Be) - Dissolved	0.000020	21	21	0.000024	0.000020	0.000020	0.000100	0.000017			
Bismuth (Bi) - Dissolved	0.000050	21	21	0.000050	0.000050	0.000050	0.000050	0			
Boron (B) - Dissolved	0.010	21	21	0.010	0.010	0.010	0.010	0			
Cadmium (Cd) - Dissolved	0.0000050	21	0	0.0000119	0.0000099	0.0000056	0.0000448	0.0000083	EQ	EQ	0
Calcium (Ca) - Dissolved	0.050	21	0	27.8	27.2	25.0	33.2	2.4			
Chromium (Cr) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Cobalt (Co) - Dissolved	0.00010	21	19	0.00011	0.00010	0.00010	0.00018	0.00002			
Copper (Cu) - Dissolved	0.00020	21	0	0.00079	0.00067	0.00056	0.00174	0.00032	EQ	EQ	0
Iron (Fe) - Dissolved	0.010	21	14	0.022	0.010	0.010	0.101	0.025		0.35	0
Lead (Pb) - Dissolved	0.000050	21	19	0.000052	0.000050	0.000050	0.000082	0.000007			
Lithium (Li) - Dissolved	0.0010	21	1	0.0016	0.0012	0.0010	0.0032	0.0007			
Magnesium (Mg) - Dissolved	0.0050	21	0	6.84	6.54	5.81	8.87	0.89			
Manganese (Mn) - Dissolved	0.00010	21	0	0.0027	0.00111	0.00030	0.0127	0.0037			
Mercury (Hg) - Dissolved	0.0000050	21	21	0.0000050	0.0000050	0.0000050	0.0000050	0			
Molybdenum (Mo) - Dissolved	0.000050	21	0	0.000895	0.000802	0.000717	0.00143	0.000206			
Nickel (Ni) - Dissolved	0.00050	21	0	0.00096	0.00077	0.00065	0.00228	0.00048			
Phosphorus (P) - Dissolved	0.050	21	21	0.05	0.05	0.05	0.05	0			
Potassium (K) - Dissolved	0.050	21	0	0.52	0.435	0.390	1.01	0.18			
Selenium (Se) - Dissolved	0.000050	21	0	0.000372	0.00033	0.000274	0.000717	0.000113			
Silicon (Si) - Dissolved	0.050	21	0	2.10	2.08	1.85	2.34	0.13			
Silver (Ag) - Dissolved	0.000010	21	20	0.000010	0.000010	0.000010	0.000012	0.000000			
Sodium (Na) - Dissolved	0.050	21	0	1.36	1.22	1.06	2.19	0.35			
Strontium (Sr) - Dissolved	0.00020	21	0	0.111	0.111	0.0944	0.146	0.010			
Sulfur (S) - Dissolved	0.50	21	0	5.46	5.36	4.12	7.14	0.96			
Thallium (Tl) - Dissolved	0.000010	21	21	0.000010	0.000010	0.000010	0.000010	0			
Tin (Sn) - Dissolved	0.00010	21	19	0.00010	0.00010	0.00010	0.00012	0.00001			
Titanium (Ti) - Dissolved	0.00030	21	15	0.00051	0.00030	0.00030	0.00248	0.00054			
Uranium (U) - Dissolved	0.000010	21	0	0.000457	0.000448	0.000392	0.000574	0.00005			
Vanadium (V) - Dissolved	0.00050	21	21	0.00050	0.00050	0.00050	0.00050	0			
Zinc (Zn) - Dissolved	0.0010	21	11	0.0013	0.0010	0.0010	0.0023	0.0004	EQ[3]	EQ[3]	0
Zirconium (Zr) - Dissolved	0.00020	21	19	0.00021	0.00020	0.00020	0.00031	0.00002			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] Total zinc short-term and long-term BC WQG were applied to dissolved zinc values.

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.

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.

Table 19. 2022 annual data summary statistics for total metals collected at the BC ENV far-field downstream right bank site (RBPR-9.34).

Parameters (mg/L)	Min. MDL	RBPR-9.34							BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al) - Total	0.0030	21	0	1.09	0.106	0.0327	8.59	2.45			
Antimony (Sb) - Total	0.00010	21	18	0.00017	0.00010	0.00010	0.00050	0.00014			
Arsenic (As) - Total	0.00010	21	0	0.00100	0.00026	0.00021	0.00639	0.00176		0.005	2
Barium (Ba) - Total	0.00010	21	0	0.086	0.0382	0.0319	0.393	0.108	1		0
Beryllium (Be) - Total	0.000020	21	15	0.000098	0.000020	0.000020	0.000618	0.000178	0.00013		0
Bismuth (Bi) - Total	0.000050	21	21	0.000081	0.000050	0.000050	0.000250	0.000072			
Boron (B) - Total	0.010	21	21	0.016	0.010	0.010	0.050	0.014		1.2	0
Cadmium (Cd) - Total	0.0000050	21	0	0.000145	0.0000261	0.0000115	0.000952	0.000282			
Calcium (Ca) - Total	0.050	21	0	30.9	27.5	24.2	55.1	9.0			
Chromium (Cr) - Total	0.00050	21	13	0.0022	0.00050	0.00050	0.0150	0.0042			
Cobalt (Co) - Total	0.00010	21	11	0.00114	0.00010	0.00010	0.00867	0.00246	0.004	0.11	0
Copper (Cu) - Total	0.00050	21	0	0.0039	0.00091	0.00065	0.0258	0.0073			
Iron (Fe) - Total	0.010	21	0	2.274	0.154	0.029	18.300	5.226		1	6
Lead (Pb) - Total	0.000050	21	6	0.0014	0.000090	0.000050	0.0110	0.0032	EQ	EQ	0
Lithium (Li) - Total	0.0010	21	2	0.0032	0.0014	0.0010	0.0150	0.0040			
Magnesium (Mg) - Total	0.0050	21	0	7.7	6.65	5.66	14.6	2.6			
Manganese (Mn) - Total	0.00010	21	0	0.046	0.0078	0.00159	0.323	0.094	EQ	EQ	0
Mercury (Hg) - Total	0.0000050	21	21	0.0000050	0.0000050	0.0000050	0.0000050	0	0.00002		0
Molybdenum (Mo) - Total	0.000050	21	0	0.00081	0.000773	0.000575	0.00106	0.00012	7.6	46	0
Nickel (Ni) - Total	0.00050	21	0	0.0044	0.00102	0.00073	0.0303	0.0085	EQ		0
Phosphorus (P) - Total	0.050	21	14	0.136	0.050	0.050	0.681	0.192			
Potassium (K) - Total	0.050	21	0	0.81	0.482	0.420	3.04	0.76			
Selenium (Se) - Total	0.000050	21	0	0.000367	0.000295	0.000237	0.000845	0.000177	0.002		0
Silicon (Si) - Total	0.10	21	0	3.6	2.41	1.92	13.7	3.3			
Silver (Ag) - Total	0.000010	21	15	0.000032	0.000010	0.000010	0.000217	0.000059	EQ	EQ	0
Sodium (Na) - Total	0.050	21	0	1.41	1.27	1.04	2.36	0.39			
Strontium (Sr) - Total	0.00020	21	0	0.122	0.115	0.0982	0.186	0.025			
Sulfur (S) - Total	0.50	21	0	5.42	5.29	4.13	6.84	0.76			
Thallium (Tl) - Total	0.000010	21	14	0.000039	0.000010	0.000010	0.000253	0.000068			
Tin (Sn) - Total	0.00010	21	20	0.00016	0.00010	0.00010	0.00050	0.00014			
Titanium (Ti) - Total	0.00030	21	0	0.0098	0.00211	0.00075	0.0577	0.0168			
Uranium (U) - Total	0.000010	21	0	0.00059	0.000479	0.000398	0.00151	0.00031	0.0085		0
Vanadium (V) - Total	0.00050	21	4	0.0044	0.00089	0.00050	0.0298	0.0085			
Zinc (Zn) - Total	0.0030	21	13	0.0138	0.0030	0.0030	0.0941	0.0262	EQ	EQ	2
Zirconium (Zr) - Total	0.00020	21	21	0.00032	0.00020	0.00020	0.0010	0.00029			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

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.

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.

Table 20. 2022 annual data summary statistics for lab and *in situ* sampling (organic carbon, physical tests, anions, and nutrients) collected at the BC ENV far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L)	Min. MDL	LBPR-9.34							BC Long-Term	BC Short-Term Maximum	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Physical Tests											
Dissolved Hardness (as $CaCO_3$)	0.60	23	0	97	95.5	87.0	117	9			
Specific Conductivity (In Situ, µS/cm)		54	0	193.7	192.5	123.1	233.8	19.5			
Specific Conductivity (lab, µS/cm)	2.0	23	0	189	188	169	234	18			
Total Dissolved Solids	13	23	0	133	122	101	252	34			
Total Suspended Solids	1.0	23	0	65	7.3	1.6	744	178		EQ	0
Turbidity (In Situ, NTU)		50	0	43.6	2.8	0.9	406.1	102.7			
Turbidity (lab, NTU)	0.10	23	0	30.15	2.45	0.78	326	76.95			
pH (In Situ, pH units)		48	0	7.93	7.90	7.55	8.24	0.15		6.5 to 9.0	0
pH (lab, pH units)	0.10	23	0	8.09	8.11	7.91	8.24	0.08		6.5 to 9.0	0
Anions and Nutrients											
Alkalinity, Total (as $CaCO_3$)	1.0	23	0	90	87.5	78.0	119	10			
Ammonia, Total (as N)	0.0050	23	12	0.012	0.005	0.005	0.082	0.017	0.102[3]	0.68[3]	0
Anion Sum	0.10	23	0	2.12	2.05	1.86	2.78	0.24			
Bromide (Br)	0.050	23	23	0.05	0.05	0.05	0.05	0			
Cation - Anion Balance (% difference)	0.010	23	3	2.18	3.02	-5.26	6.92	3.28			
Cation Sum	0.10	23	0	2.01	1.97	1.79	2.42	0.20			
Chloride (Cl)	0.50	23	22	0.50	0.50	0.50	0.56	0.01	150	600	0
Fluoride (F)	0.020	23	1	0.036	0.036	0.020	0.065	0.009		EQ	0
Nitrate (as N)	0.0050	23	0	0.0732	0.0685	0.0295	0.166	0.0245	3	32.8	0
Nitrite (as N)	0.0010	23	15	0.001	0.001	0.001	0.004	0.001	EQ	EQ	0
Orthophosphate-Dissolved (as P)	0.0010	23	20	0.0012	0.0010	0.0010	0.0027	0.0005			
Total Phosphorus (P)	0.0020	23	0	0.054	0.0080	0.0029	0.659	0.145			
Sulfate (SO_4)	0.30	23	0	15.3	14.6	13.0	23.6	2.8	EQ		0
Organic Carbon											
Dissolved Organic Carbon	0.50	21	0	3.55	2.85	2.39	12.20	2.11			
Total Organic Carbon	0.50	22	0	3.67	2.87	2.13	16.10	2.96			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

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.

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.

Table 21. 2022 annual data summary statistics for dissolved metals collected at the BC ENV far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L)	Min. MDL	LBPR-9.34							BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Dissolved Metals											
Aluminum (Al) - Dissolved	0.0010	23	0	0.0068	0.0059	0.0044	0.0174	0.0030	EQ	EQ	0
Antimony (Sb) - Dissolved	0.00010	23	21	0.00010	0.00010	0.00010	0.00013	0.00001			
Arsenic (As) - Dissolved	0.00010	23	0	0.00020	0.00020	0.00017	0.00032	0.00003			
Barium (Ba) - Dissolved	0.00010	23	0	0.0358	0.0333	0.0293	0.0499	0.0055			
Beryllium (Be) - Dissolved	0.000020	23	23	0.00002	0.000020	0.000020	0.00010	0.00002			
Bismuth (Bi) - Dissolved	0.000050	23	23	0.000050	0.000050	0.000050	0.000050	0			
Boron (B) - Dissolved	0.010	23	23	0.010	0.010	0.010	0.010	0			
Cadmium (Cd) - Dissolved	0.0000050	23	0	0.0000112	0.0000101	0.0000058	0.0000188	0.0000033	EQ	EQ	0
Calcium (Ca) - Dissolved	0.050	23	0	27.6	27.1	24.5	32.8	2.4			
Chromium (Cr) - Dissolved	0.00050	23	23	0.00050	0.00050	0.00050	0.00050	0			
Cobalt (Co) - Dissolved	0.00010	23	22	0.00010	0.00010	0.00010	0.00018	0.00002			
Copper (Cu) - Dissolved	0.00020	23	0	0.00070	0.00064	0.00055	0.00163	0.00023	EQ	EQ	0
Iron (Fe) - Dissolved	0.010	23	16	0.016	0.010	0.010	0.072	0.014		0.35	0
Lead (Pb) - Dissolved	0.000050	23	23	0.000050	0.000050	0.000050	0.000050	0			
Lithium (Li) - Dissolved	0.0010	23	1	0.0015	0.0013	0.0010	0.0031	0.0006			
Magnesium (Mg) - Dissolved	0.0050	23	0	6.74	6.50	5.84	8.73	0.78			
Manganese (Mn) - Dissolved	0.00010	23	0	0.0019	0.00092	0.00029	0.0134	0.0027			
Mercury (Hg) - Dissolved	0.0000050	23	23	0.000005	0.000005	0.000005	0.000005	0			
Molybdenum (Mo) - Dissolved	0.000050	23	0	0.000883	0.000833	0.000716	0.00145	0.000182			
Nickel (Ni) - Dissolved	0.00050	23	0	0.00083	0.00072	0.00061	0.00224	0.00036			
Phosphorus (P) - Dissolved	0.050	23	23	0.050	0.050	0.050	0.050	0			
Potassium (K) - Dissolved	0.050	23	0	0.478	0.429	0.397	0.928	0.113			
Selenium (Se) - Dissolved	0.000050	23	0	0.00036	0.000324	0.000262	0.000626	0.000103			
Silicon (Si) - Dissolved	0.050	23	0	2.08	2.08	1.83	2.33	0.15			
Silver (Ag) - Dissolved	0.000010	23	23	0.000010	0.000010	0.000010	0.000010	0			
Sodium (Na) - Dissolved	0.050	23	0	1.29	1.21	0.948	2.28	0.30			
Strontium (Sr) - Dissolved	0.00020	23	0	0.113	0.114	0.0946	0.150	0.011			
Sulfur (S) - Dissolved	0.50	23	0	5.36	5.14	4.36	7.39	0.90			
Thallium (Tl) - Dissolved	0.000010	23	23	0.000010	0.000010	0.000010	0.000010	0			
Tin (Sn) - Dissolved	0.00010	23	23	0.00010	0.00010	0.00010	0.00010	0			
Titanium (Ti) - Dissolved	0.00030	23	19	0.00036	0.00030	0.00030	0.00124	0.00020			
Uranium (U) - Dissolved	0.000010	23	0	0.000448	0.000436	0.000388	0.000587	0.000047			
Vanadium (V) - Dissolved	0.00050	23	23	0.00050	0.00050	0.00050	0.00050	0			
Zinc (Zn) - Dissolved	0.0010	23	14	0.0011	0.0010	0.0010	0.0021	0.0003	EQ[3]	EQ[3]	0
Zirconium (Zr) - Dissolved	0.00020	23	22	0.00020	0.00020	0.00020	0.00023	0.00001			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

[3] Total zinc short-term and long-term BC WQG were applied to dissolved zinc values.

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.

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.

Table 22. 2022 annual data summary statistics for total metals collected at the BC ENV far-field downstream left bank site (LBPR-9.34).

Parameters (mg/L)	Min. MDL	LBPR-9.34						BC Long-Term	BC Short-Term	
Date: 2022		n.	n<MDL	Avg.	Median	Min.	Max.	S.D.	WQG[1]	WQG[2]	# Exc
Total Metals											
Aluminum (Al) - Total	0.0030	23	0	0.51	0.0754	0.0276	6.80	1.43			
Antimony (Sb) - Total	0.00010	23	20	0.00016	0.00010	0.00010	0.00050	0.00014			
Arsenic (As) - Total	0.00010	23	1	0.00060	0.00026	0.00020	0.00514	0.00106		0.005	1
Barium (Ba) - Total	0.00010	23	0	0.058	0.0368	0.0325	0.277	0.059	1		0
Beryllium (Be) - Total	0.000020	23	19	0.00006	0.000020	0.000020	0.00042	0.00009	0.00013		0
Bismuth (Bi) - Total	0.000050	23	23	0.00008	0.000050	0.000050	0.00025	0.00007			
Boron (B) - Total	0.010	23	23	0.016	0.010	0.010	0.050	0.014		1.2	0
Cadmium (Cd) - Total	0.0000050	23	1	0.000075	0.0000218	0.0000138	0.000659	0.000157			
Calcium (Ca) - Total	0.050	23	0	29.2	27.4	24.7	45.1	5.3			
Chromium (Cr) - Total	0.00050	23	18	0.00124	0.00050	0.00050	0.0124	0.00252			
Cobalt (Co) - Total	0.00010	23	14	0.00054	0.00010	0.00010	0.00615	0.00132	0.004	0.11	0
Copper (Cu) - Total	0.00050	23	2	0.00216	0.00081	0.00067	0.0193	0.00401			
Iron (Fe) - Total	0.010	23	0	1.0	0.088	0.033	14.2	3.0		1	4
Lead (Pb) - Total	0.000050	23	9	0.00061	0.000065	0.000050	0.00760	0.00165	EQ	EQ	0
Lithium (Li) - Total	0.0010	23	2	0.0024	0.0014	0.0010	0.0109	0.0023			
Magnesium (Mg) - Total	0.0050	23	0	7.11	6.56	5.82	12.40	1.64			
Manganese (Mn) - Total	0.00010	23	0	0.020	0.0036	0.00188	0.215	0.048	EQ	EQ	0
Mercury (Hg) - Total	0.0000050	23	23	0.000005	0.000005	0.000005	0.000005	0	0.00002		0
Molybdenum (Mo) - Total	0.000050	23	0	0.000865	0.000793	0.00072	0.00135	0.000153	7.6	46	0
Nickel (Ni) - Total	0.00050	23	2	0.0025	0.00090	0.00071	0.0229	0.0048	EQ		0
Phosphorus (P) - Total	0.050	23	20	0.096	0.050	0.050	0.444	0.107			
Potassium (K) - Total	0.050	23	0	0.637	0.467	0.424	2.73	0.495			
Selenium (Se) - Total	0.000050	23	0	0.000351	0.000297	0.000227	0.000794	0.000147	0.002		0
Silicon (Si) - Total	0.10	23	0	2.9	2.32	1.92	11.8	2.0			
Silver (Ag) - Total	0.000010	23	20	0.000022	0.000010	0.000010	0.000160	0.000033	EQ	EQ	0
Sodium (Na) - Total	0.050	23	0	1.35	1.25	1.05	2.55	0.35			
Strontium (Sr) - Total	0.00020	23	0	0.118	0.1130	0.0995	0.174	0.019			
Sulfur (S) - Total	0.50	23	0	5.45	5.12	4.27	7.06	0.81			
Thallium (Tl) - Total	0.000010	23	19	0.000025	0.000010	0.000010	0.000192	0.000041			
Tin (Sn) - Total	0.00010	23	23	0.00016	0.00010	0.00010	0.00050	0.00014			
Titanium (Ti) - Total	0.00030	23	0	0.0060	0.00140	0.00033	0.0606	0.0128			
Uranium (U) - Total	0.000010	23	0	0.00052	0.000479	0.000403	0.00114	0.00017	0.0085		0
Vanadium (V) - Total	0.00050	23	5	0.0025	0.00064	0.0005	0.0252	0.00531			
Zinc (Zn) - Total	0.0030	23	16	0.0088	0.0030	0.0030	0.0701	0.0148	EQ	EQ	1
Zirconium (Zr) - Total	0.00020	23	23	0.00031	0.00020	0.00020	0.0010	0.00028			

[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. EQ indicates that the guidelines values varies per sample based on applicable equations defined by BC ENV (2021).

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.

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.

Table 23. 2022 lab and *in situ* sampling (organic carbon, physical tests, anions, and nutrients) data collected on May 19 and June 4, 2022 at the RSEM L6 monitoring sites.

Site	RSEM L6									RSEM L6									BC Max WQG	EOP Limit
	Upstream/LBPR-6.97			L6-EOP[1]			IDZ/LBPR-7.21			Upstream/LBPR-6.97			L6-SP[2,3]			IDZ/LBPR-7.21				
Date	May 19, 2022									June 4, 2022										
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		
Physical Tests (mg/L)																				
Dissolved Hardness (as $CaCO_3$)	96.9			261			96.5			127			215			124				
Specific Conductivity (In Situ, µS/cm)	201	201	201	1,150	1,170	1,140	202	202	202	231	231	231	570	570	570	232	232	232		
Specific Conductivity (lab, µS/cm)	196			718			198			241			588			241				
Total Dissolved Solids	148			428			166			237			332			213				
Total Suspended Solids	47.0			<1.0			43.7			204			5.3			193			EQ	EQ
Turbidity (In Situ, NTU)	37.0	36.8	36.6	119	109	101	38.6	37.4	37.0	159	159	153	0	0	0	185	150	138		
Turbidity (lab, NTU)	51.5			3.20			52.3			157			2.60			170				
pH (In Situ, pH units)	7.88	7.88	7.88	7.97	7.97	7.97	7.87	7.87	7.88	8.00	8.00	7.99	8.36	8.36	8.35	7.92	7.92	7.92	6.5-9.0	6.0-9.0
pH (lab, pH units)	8.06			7.84			8.11			8.21			7.53			8.20			6.5-9.0	6.0-9.0
Anions and Nutrients (mg/L)																				
Alkalinity, Total (as $CaCO_3$)	87.9			68.0			91.8			110			61.9			109				
Ammonia, Total (as N)	0.0110			0.0390			0.0128			0.0158			<0.015			0.0093			0.68[4]	
Anion Sum (meq/L)	2.10						2.18			2.64						2.62				
Bromide (Br)	<0.050			0.400			<0.050			<0.050			0.608			<0.050				
Cation - Anion Balance (% difference)	1.45			3.50			3.56			0.19			5.70			0.77				
Cation Sum (meq/L)	2.04						2.03			2.65						2.58				
Chloride (Cl)	<0.50			47.0			<0.50			<0.50			48.5			<0.50			600	
Orthophosphate (as P)	<0.0010			<0.0030			<0.0010			0.0043			<0.0030			0.0050				
Fluoride (F)	0.035			0.171			0.036			0.062			0.189			0.063			EQ	
Nitrate (as N)	0.0701			0.230			0.0683			0.0568			0.200			0.0557			32.8	
Nitrite (as N)	<0.0010			<0.010			<0.0010			0.0015			<0.010			0.0013			EQ	
Sulfate (SO^4)	16.3			212			16.3			21.0			154			21.1				
Total Phosphorus (P)	0.0598						0.0557			0.265						0.196				
Organic Carbon (mg/L)																				
Dissolved Organic Carbon	4.62			2.17			4.79			5.79			2.28			6.20				
Total Organic Carbon	4.74			2.33			5.16			11.3			1.91			9.90				

Blue shading indicates an exceedance of short term (maximum) BC WQG in the Peace River sampling sites or exceedance of the Site C End of Pipe (EOP) Limits in the RSEM pond data (EOP limits are provided in Table 2, Appendix E (Rev 6) of the CEMP).
EQ indicates that the applicable guideline is an equation as per BC ENV (2021). The EOP limit for TSS is calculated by PRHP based on upstream TSS data collected at turbidity gauges PAM-LB1 and PAM-RB1. The TSS data are emailed twice daily to PRHP.

[1] L6-EOP water quality samples for laboratory analysis were collected on May 18, 2022.

[2] *In-situ* parameters were collected in a location where water was trickling through riprap and into the Peace River back eddy.

[3] *In-situ* turbidity measurements were recorded as negative values and were therefore rounded up to 0 NTU.

[4] BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

Table 24. 2022 lab sampling (dissolved metals) data collected on May 19 and June 4, 2022 at the RSEM L6 monitoring sites.

Site	RSEM L6			RSEM L6			BC Max WQG	EOP Limit
	Upstream/LBPR-	L6-EOP[1]	IDZ/LBPR-7.21	Upstream/LBPR-	L6-SP	IDZ/LBPR-7.21		
Date	May 19, 2022			June 4, 2022				
	A	A	A	A	A	A		
Dissolved Metals (mg/L)								
Aluminum (Al) - Dissolved	0.0137	0.0130	0.0127	0.0120	0.0202	0.0113	EQ	0.46
Antimony (Sb) - Dissolved	<0.00010	<0.00050	<0.00010	0.00012	<0.00050	0.00011		
Arsenic (As) - Dissolved	0.00022	0.00029	0.00020	0.00023	0.00029	0.00025		
Barium (Ba) - Dissolved	0.0394	0.0782	0.0389	0.0535	0.0916	0.0543		
Beryllium (Be) - Dissolved	<0.000020	<0.00010	<0.000020	<0.000020	<0.00010	<0.000020		
Bismuth (Bi) - Dissolved	<0.000050	<0.0010	<0.000050	<0.000050	<0.0010	<0.000050		
Boron (B) - Dissolved	<0.010	<0.0500	<0.010	<0.010	<0.0500	<0.010		
Cadmium (Cd) - Dissolved	0.0000146	0.0000110	0.0000135	0.0000111	0.0000280	0.0000154	EQ	0.00186
Calcium (Ca) - Dissolved	26.8	68.5	26.7	35.1	62.7	33.7		
Chromium (Cr) - Dissolved	<0.00050	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050		
Cobalt (Co) - Dissolved	<0.00010	<0.00020	<0.00010	0.00012	<0.00020	0.00012		
Copper (Cu) - Dissolved	0.00331	0.00087	0.00092	0.00129	0.00104	0.00127	EQ	
Iron (Fe) - Dissolved	0.039	<0.0100	0.037	0.029	<0.0100	0.030	0.35	
Lead (Pb) - Dissolved	0.000256	<0.00020	<0.000050	<0.000050	<0.00020	<0.000050		
Lithium (Li) - Dissolved	0.0019	0.0117	0.0019	0.0029	0.0101	0.0029		
Magnesium (Mg) - Dissolved	7.28	21.8	7.24	9.57	14.2	9.60		
Manganese (Mn) - Dissolved	0.00364	0.00490	0.00370	0.00665	0.00120	0.00703		
Mercury (Hg) - Dissolved	<0.0000050	<0.0000019	<0.0000050	<0.0000050	<0.0000019	<0.0000050		
Molybdenum (Mo) - Dissolved	0.000908	0.00450	0.000897	0.00131	0.00430	0.00134		
Nickel (Ni) - Dissolved	0.00126	0.00110	0.00113	0.00153	0.00220	0.00152		
Phosphorus (P) - Dissolved	<0.050	<0.0100	<0.050	<0.050	<0.0100	<0.050		
Potassium (K) - Dissolved	0.610	3.16	0.600	0.719	2.75	0.726		
Selenium (Se) - Dissolved	0.000370	0.00142	0.000355	0.000502	0.00169	0.000512		
Silicon (Si) - Dissolved	2.28	0.419	2.29	2.12	1.05	2.08		
Silver (Ag) - Dissolved	<0.000010	<0.000020	<0.000010	<0.000010	<0.000020	<0.000010		
Sodium (Na) - Dissolved	1.86	31.1	1.82	2.04	19.2	2.07		
Strontium (Sr) - Dissolved	0.125	0.272	0.125	0.143	0.367	0.140		
Sulfur (S) - Dissolved	6.26	67.4	6.21	6.79	38.3	7.21		
Thallium (Tl) - Dissolved	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010		
Tin (Sn) - Dissolved	0.00016	<0.0050	<0.00010	<0.00010	<0.0050	<0.00010		
Titanium (Ti) - Dissolved	0.00062	<0.0050	0.00057	0.00031	<0.0050	0.00043		
Uranium (U) - Dissolved	0.000494	0.00264	0.000484	0.000540	0.00149	0.000553		
Vanadium (V) - Dissolved	<0.00050	<0.0050	<0.00050	<0.00050	<0.0050	<0.00050		
Zinc (Zn) - Dissolved	0.0032	<0.0050	0.0011	0.0015	<0.0050	0.0018	EQ[2]	
Zirconium (Zr) - Dissolved	<0.00020	<0.00010	<0.00020	<0.00020	<0.00010	<0.00020		

Blue shading indicates an exceedance of short term (maximum) BC WQG in the Peace River sampling sites or exceedance of the Site C End of Pipe (EOP) Limits in the RSEM pond data (EOP limits are provided in Table 2, Appendix E (Rev 6) of the CEMP).
EQ indicates that the applicable guideline is an equation as per BC ENV (2021).

[1] L6-EOP water quality samples for laboratory analysis were collected on May 18, 2022.

[2] Total zinc short-term (maximum) BC WQG was applied to dissolved zinc values.

Table 25. 2022 lab sampling (total metals) data collected on May 19 and June 4, 2022 at the RSEM L6 monitoring sites.

Site	RSEM L6			RSEM L6			BC Max WQG	EOP Limit
	Upstream/LBPR-6.97	L6-EOP[1]	IDZ/LBPR-7.21	Upstream/LBPR-6.97	L6-SP	IDZ/LBPR-7.21		
Date	May 19, 2022			June 4, 2022				
	A	A	A	A	A	A		
Total Metals (mg/L)								
Aluminum (Al) - Total	0.743	0.0366	0.650	1.61	0.0363	1.40		
Antimony (Sb) - Total	0.00014	<0.00050	0.00013	0.00026	0.00052	0.00019		
Arsenic (As) - Total	0.00075	0.00022	0.00067	0.00152	0.00034	0.00135	0.005	0.05
Barium (Ba) - Total	0.0610	0.0768	0.0581	0.150	0.0919	0.141		
Beryllium (Be) - Total	0.000052	<0.00010	0.000046	0.000118	<0.00010	0.000119		
Bismuth (Bi) - Total	<0.000050	<0.0010	<0.000050	<0.000050	<0.0010	<0.000050		
Boron (B) - Total	<0.010	<0.0500	<0.010	<0.010	0.051	<0.010	1.2	
Cadmium (Cd) - Total	0.0000870	0.0000250	0.0000839	0.000304	0.0000420	0.000275		
Calcium (Ca) - Total	28.4	71.1	27.6	38.3	68.1	38.6		
Chromium (Cr) - Total	0.00137	<0.0010	0.00126	0.00298	<0.0010	0.00256		
Cobalt (Co) - Total	0.00062	<0.00020	0.00056	0.00177	0.00052	0.00160	0.11	0.55
Copper (Cu) - Total	0.00282	0.00112	0.00237	0.00594	0.00133	0.00534		0.0163
Iron (Fe) - Total	1.31	0.078	1.15	3.29	0.051	2.89	1	20.9
Lead (Pb) - Total	0.000712	<0.00020	0.000641	0.00227	<0.00020	0.00204	EQ	
Lithium (Li) - Total	0.0024	0.0107	0.0023	0.0045	0.0108	0.0045		
Magnesium (Mg) - Total	7.38	21.3	7.17	9.75	13.5	9.83		
Manganese (Mn) - Total	0.0237	0.0110	0.0218	0.0789	0.0189	0.0722	EQ	8.29
Mercury (Hg) - Total	<0.0000050	<0.0000019	<0.0000050	0.0000144	0.0000026	0.0000159		
Molybdenum (Mo) - Total	0.000878	0.00460	0.000833	0.000955	0.00460	0.000983	46	
Nickel (Ni) - Total	0.00298	0.00130	0.00274	0.00716	0.00250	0.00653		
Phosphorus (P) - Total	0.066	0.012	0.050	0.170	0.010	0.146		
Potassium (K) - Total	0.852	2.87	0.815	1.17	2.59	1.11		
Selenium (Se) - Total	0.000387	0.00246	0.000360	0.000594	0.00155	0.000566		
Silicon (Si) - Total	3.28	0.44	3.12	4.49	1.19	4.21		
Silver (Ag) - Total	0.000015	<0.000020	0.000013	0.000034	<0.000020	0.000028	0.0001	
Sodium (Na) - Total	1.77	32.0	1.76	1.90	18.9	2.05		
Strontium (Sr) - Total	0.123	0.313	0.122	0.163	0.396	0.163		
Sulfur (S) - Total	6.18	58.9	6.20	7.45	38.3	7.46		
Thallium (Tl) - Total	0.000026	<0.000010	0.000023	0.000055	<0.000010	0.000046		
Tin (Sn) - Total	<0.00010	<0.0050	<0.00010	<0.00010	<0.0050	<0.00010		
Titanium (Ti) - Total	0.0123	<0.0050	0.0105	0.0182	<0.0050	0.0153		
Uranium (U) - Total	0.000548	0.00242	0.000548	0.000770	0.00151	0.000748		
Vanadium (V) - Total	0.00330	<0.0050	0.00301	0.00766	<0.0050	0.00665		
Zinc (Zn) - Total	0.0079	<0.0050	0.0072	0.0214	0.0073	0.0188	EQ	0.251
Zirconium (Zr) - Total	0.00022	<0.00010	<0.00020	<0.00020	<0.00010	0.00021		

Blue shading indicates an exceedance of short term (maximum) BC WQG in the Peace River sampling sites or exceedance of the Site C End of Pipe (EOP) Limits in the RSEM pond data (EOP limits are provided in Table 2, Appendix E (Rev 6) of the CEMP).
EQ indicates that the applicable guideline is an equation as per BC ENV (2021).

[1] L6-EOP water quality samples for laboratory analysis were collected on May 18, 2022.

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 2022 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 for laboratory data, and are also included for all *in situ* data where triplicate readings are recorded (error bars for *in situ* data are generally too small to be visible on the plots). 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 2. 2022 Peace River (*in situ*) and RSEM R6 pond (lab) specific conductivity.

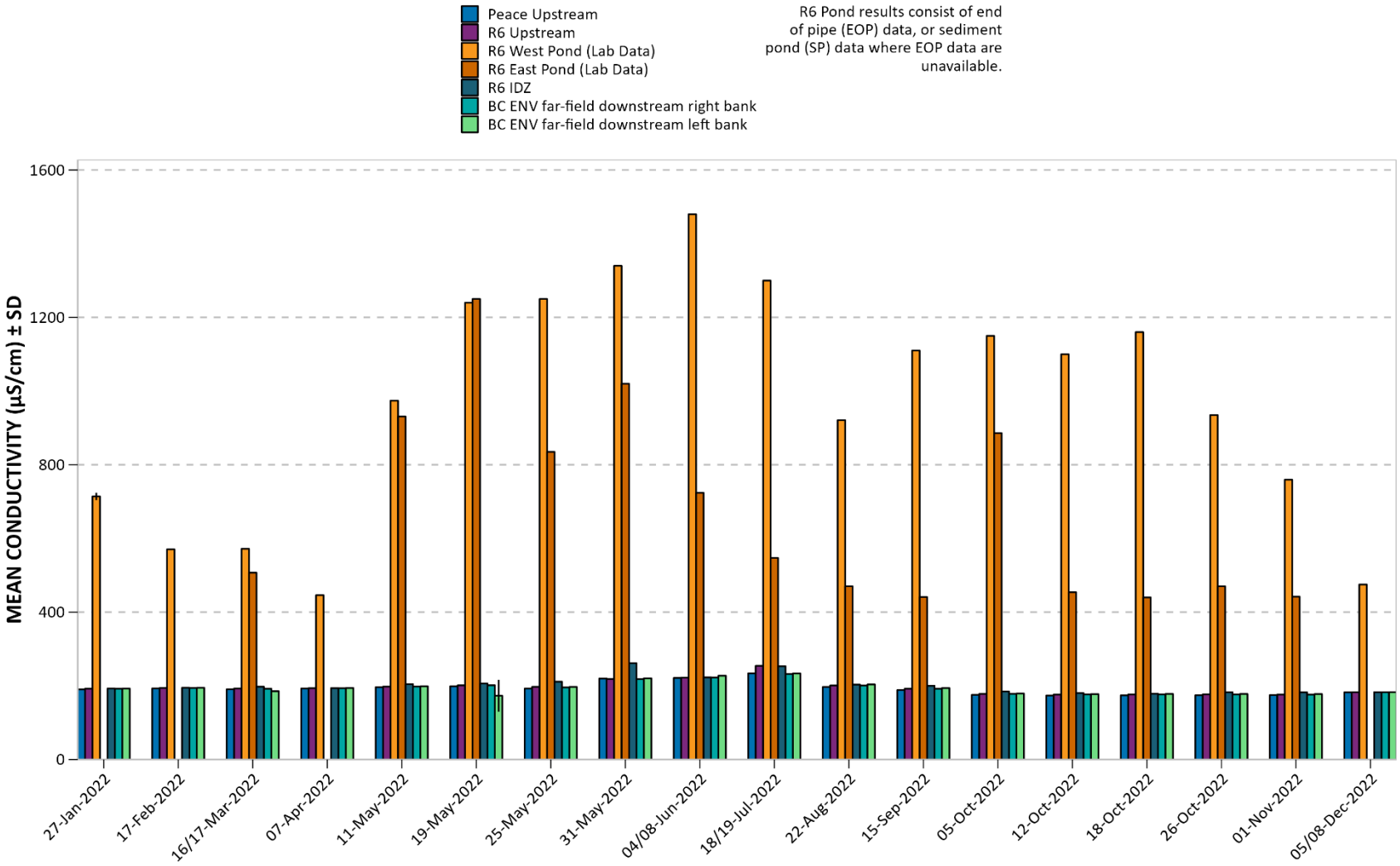


Figure 3. 2022 Peace River and RSEM R6 pond lab specific conductivity.

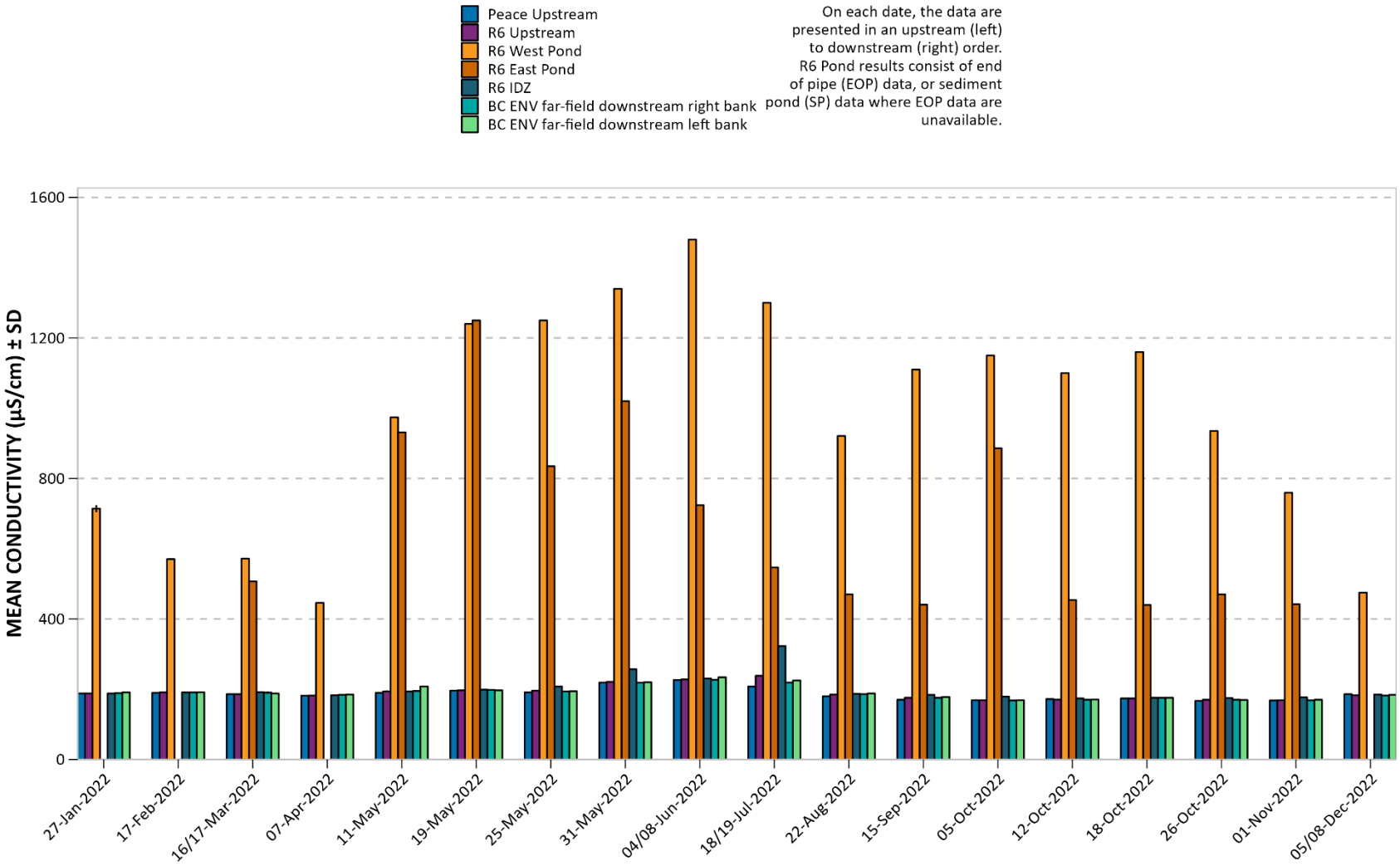


Figure 4. 2022 Peace River and RSEM R6 pond dissolved hardness (as $CaCO_3$).

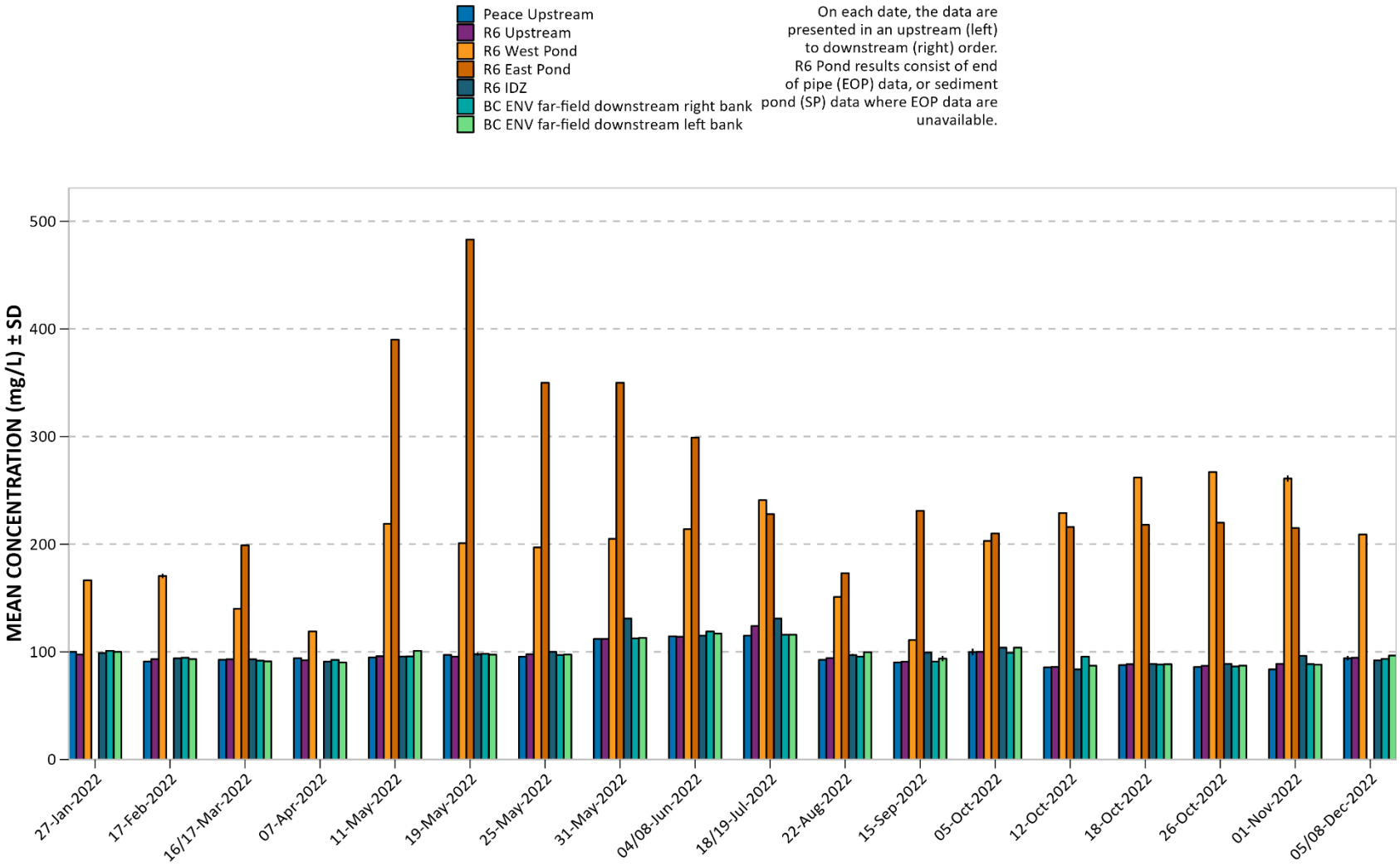


Figure 5. 2022 Peace River and RSEM R6 pond total dissolved solids (TDS).

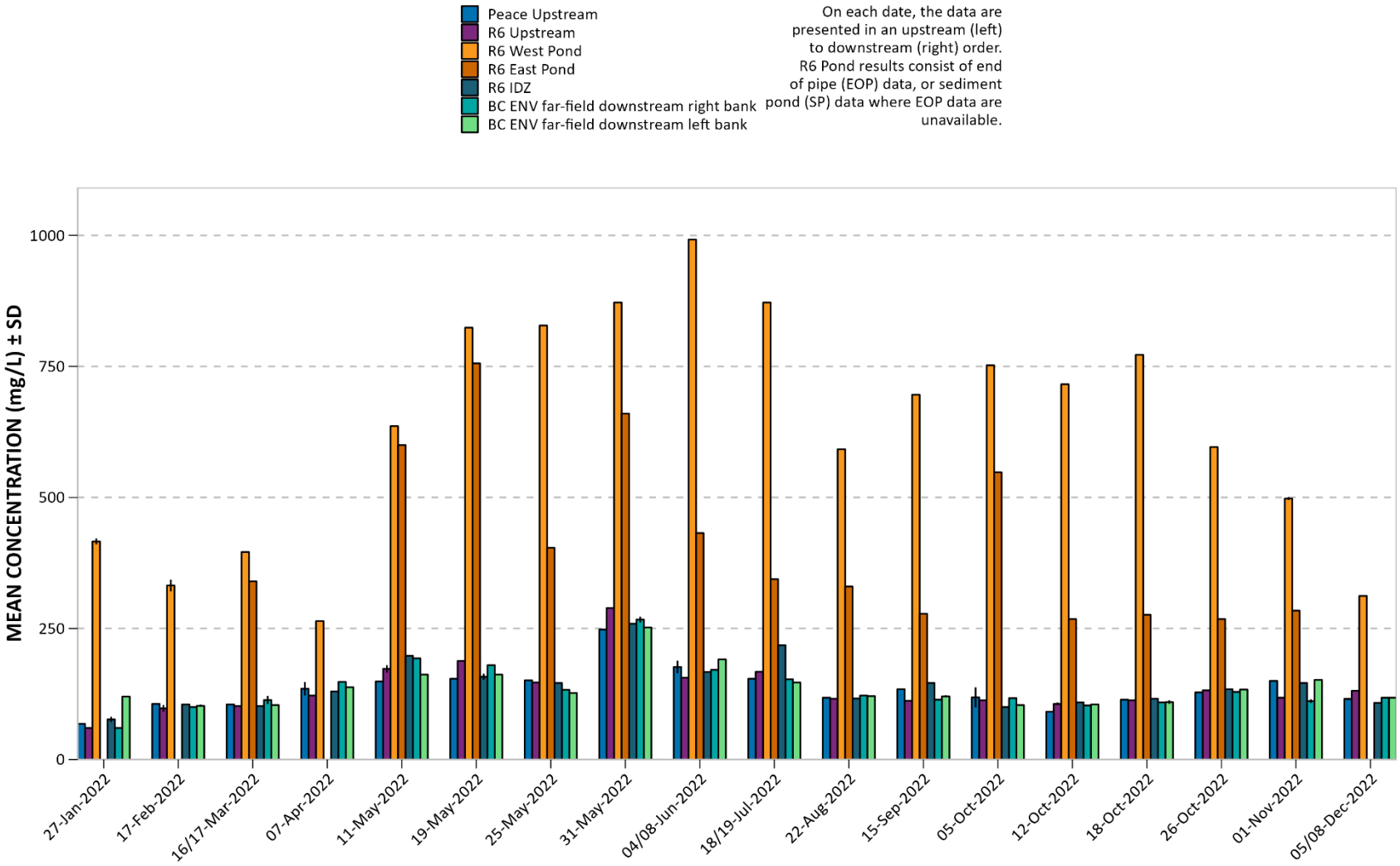


Figure 6. 2022 Peace River and RSEM R6 pond total suspended solids (TSS).

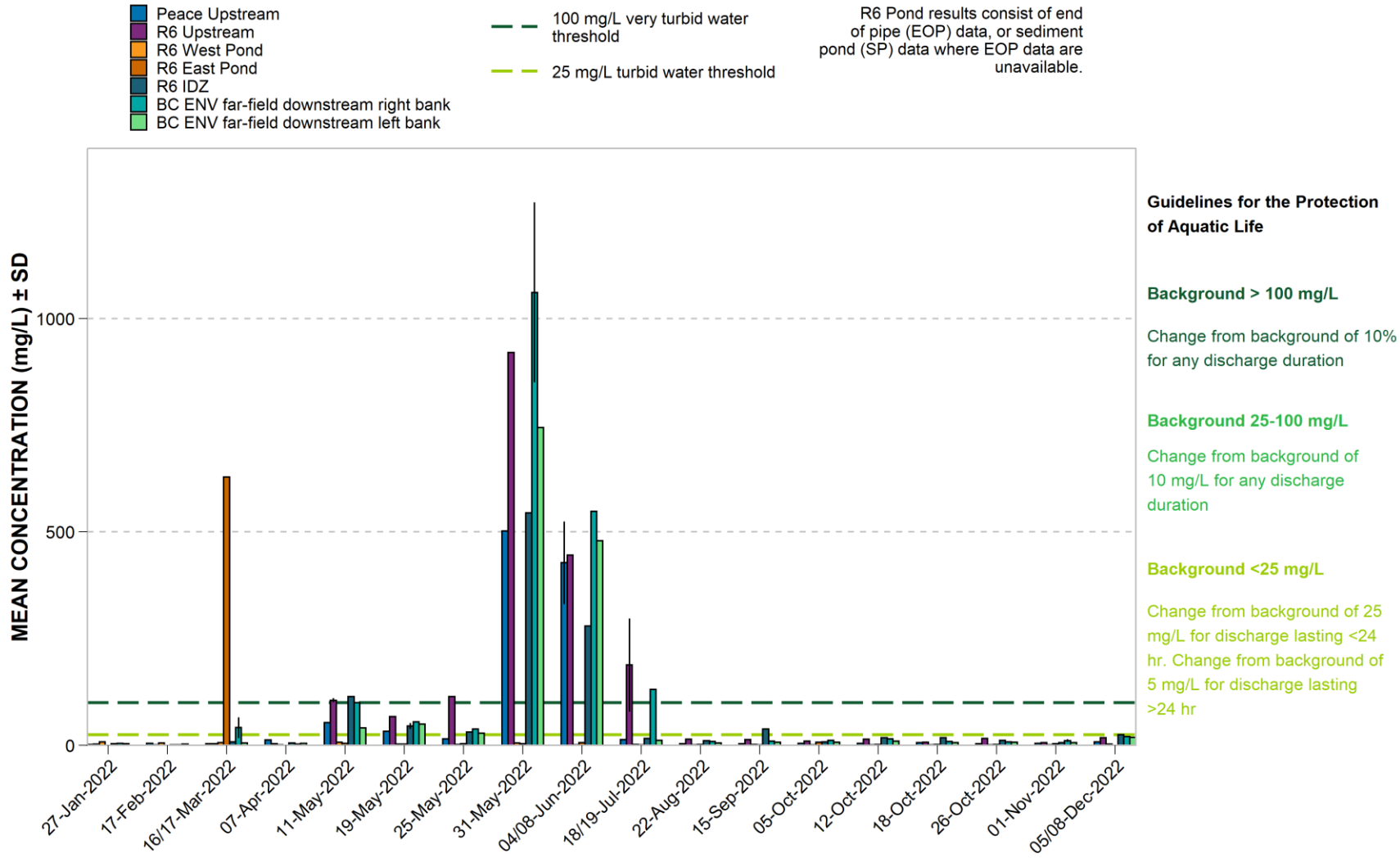


Figure 7. 2022 Peace River (*in situ*) and RSEM R6 pond (lab) turbidity.

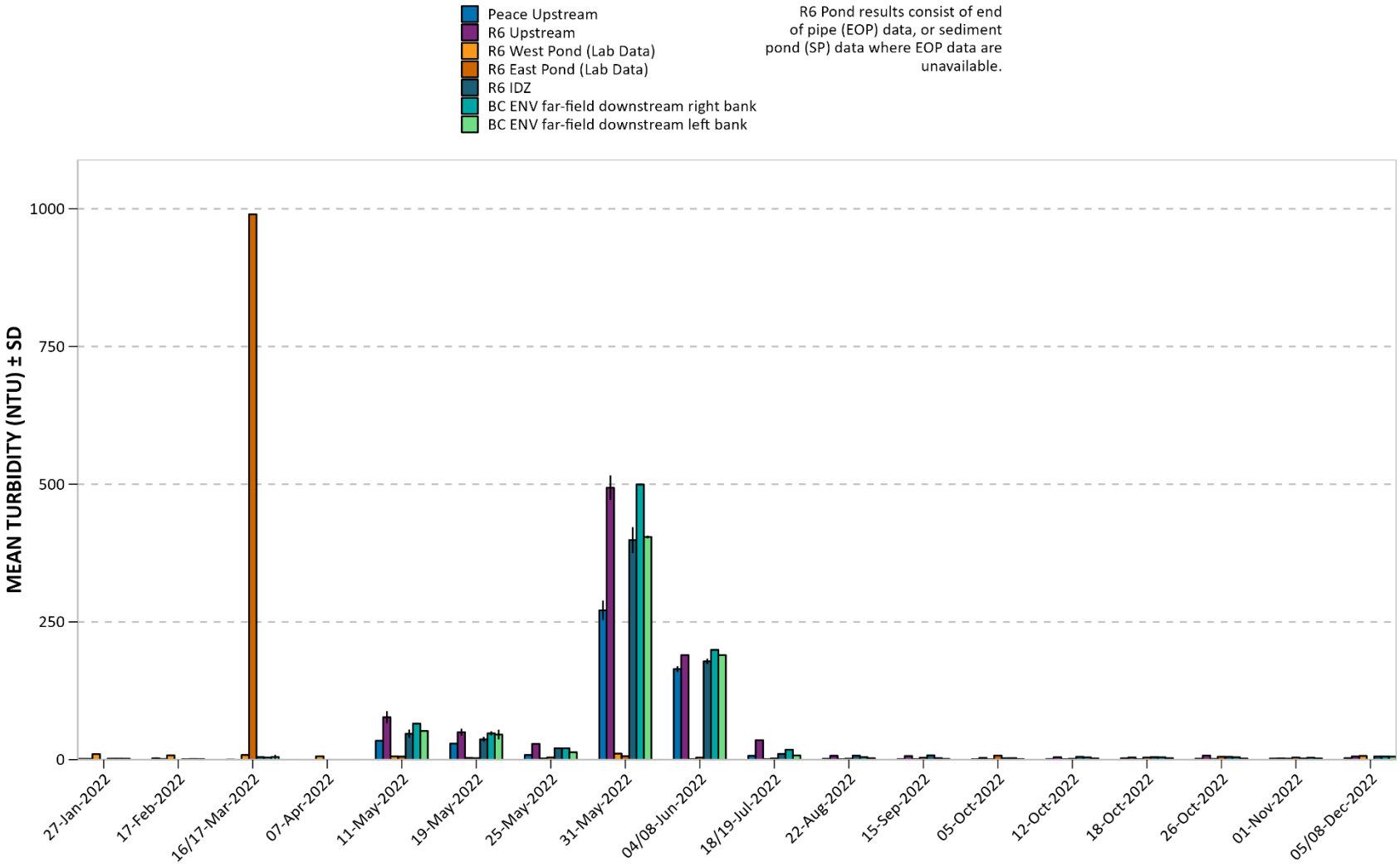


Figure 8. 2022 Peace River (*in situ*) and RSEM R6 pond (lab) pH.

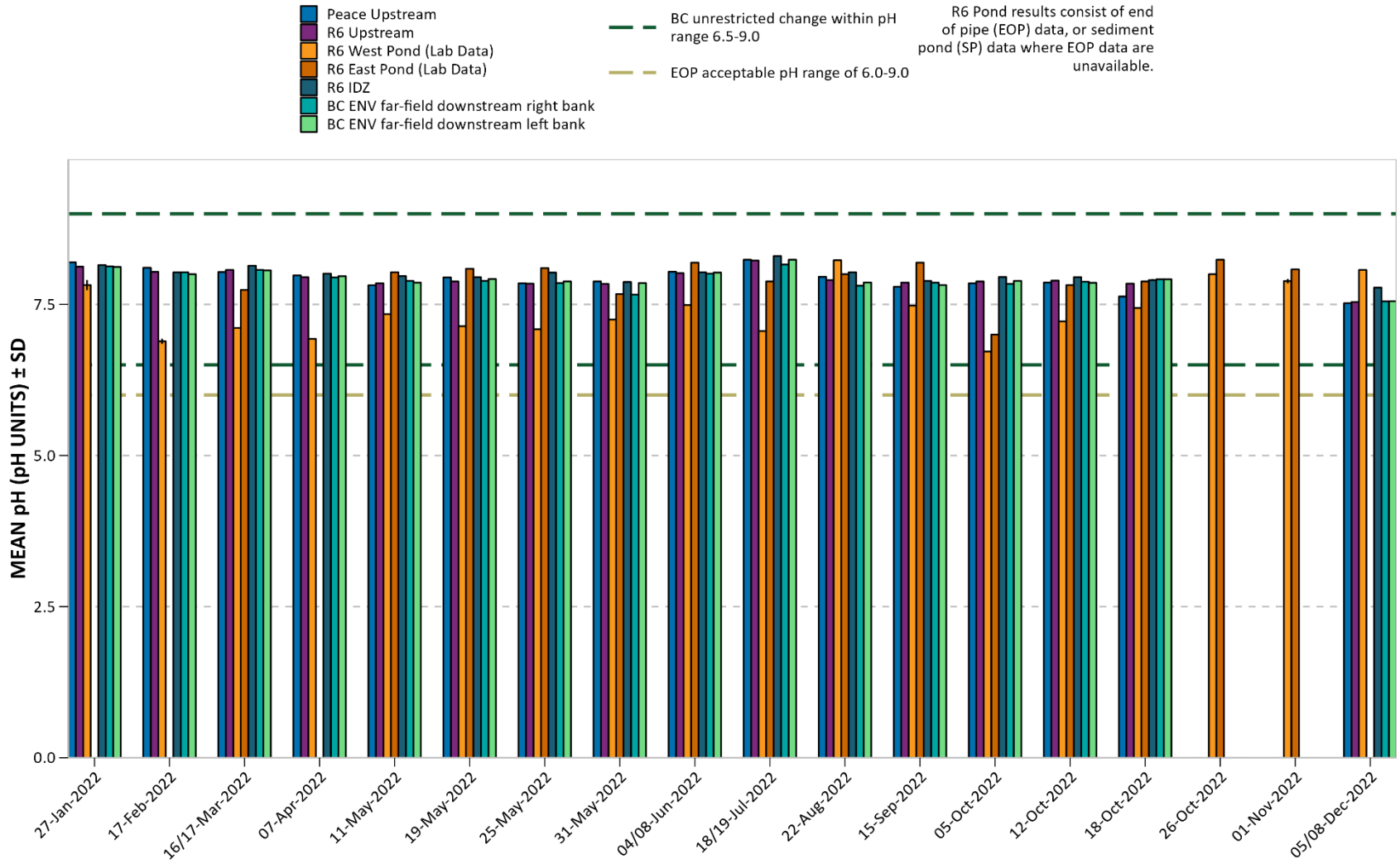


Figure 9. 2022 Peace River and RSEM R6 pond lab pH.

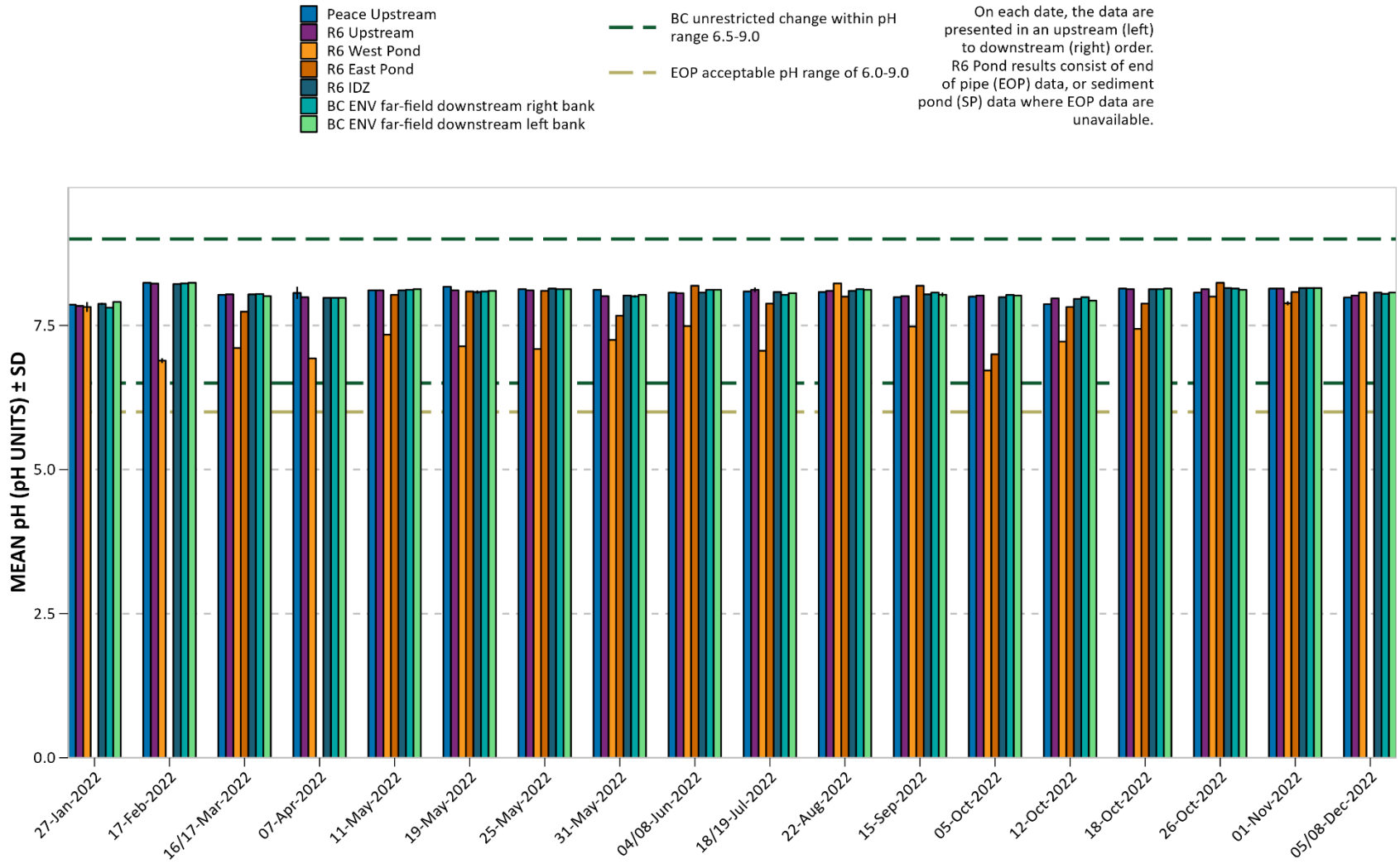


Figure 10. 2022 Peace River and RSEM R6 pond total alkalinity (as $CaCO_3$).

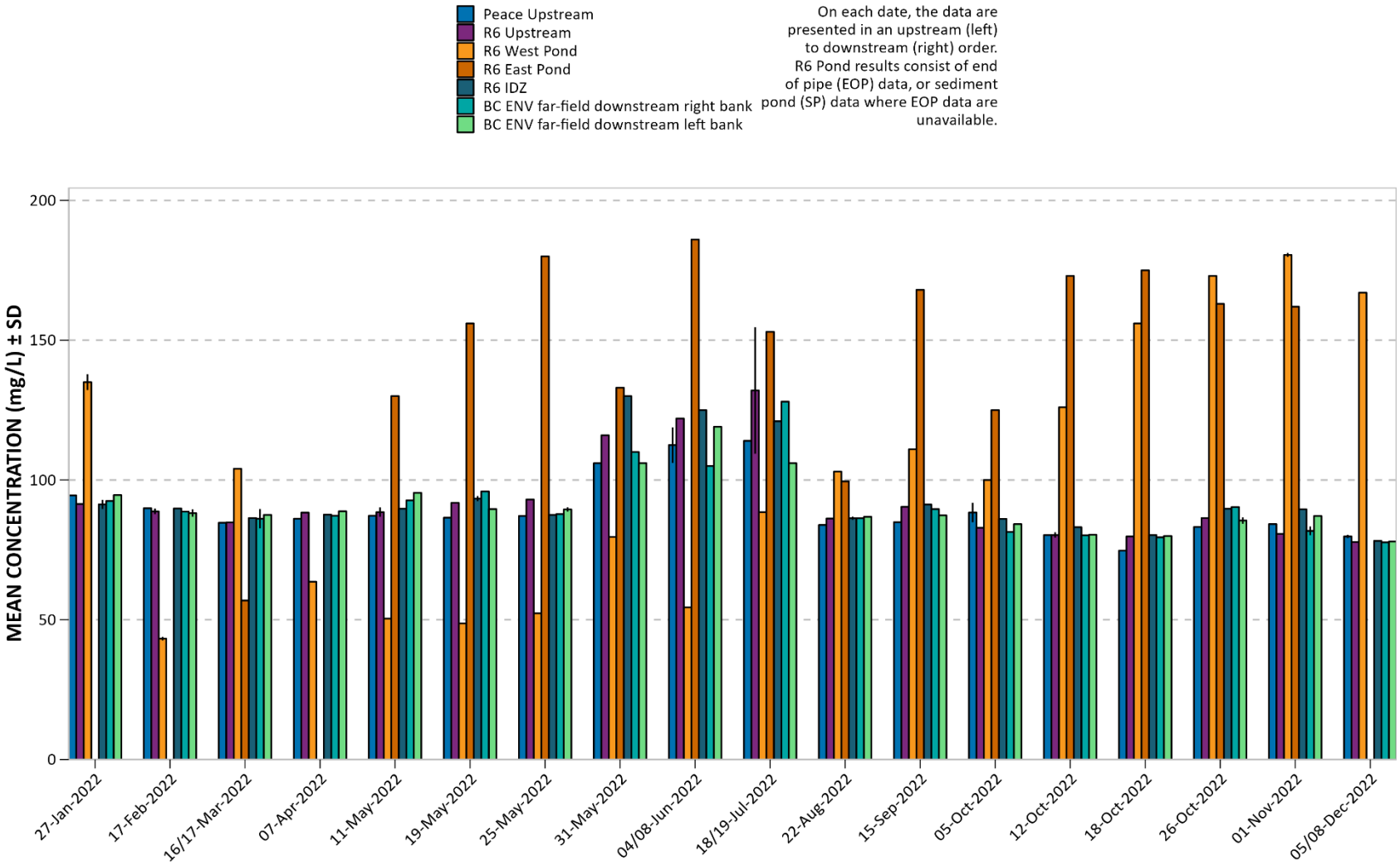
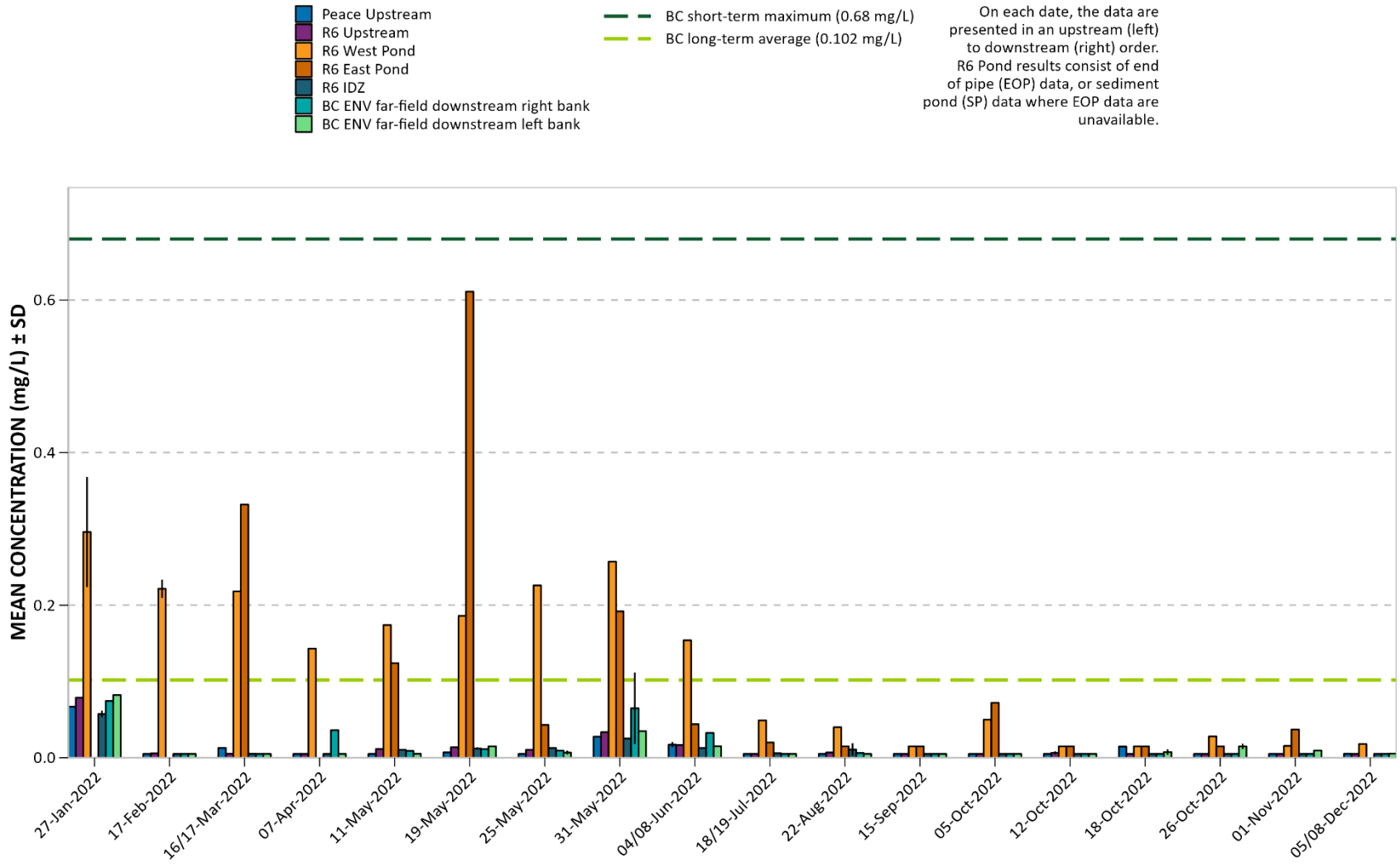


Figure 11. 2022 Peace River and RSEM R6 pond total ammonia (as N).



Note: BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

Figure 12. 2022 Peace River and RSEM R6 pond bromide (Br).

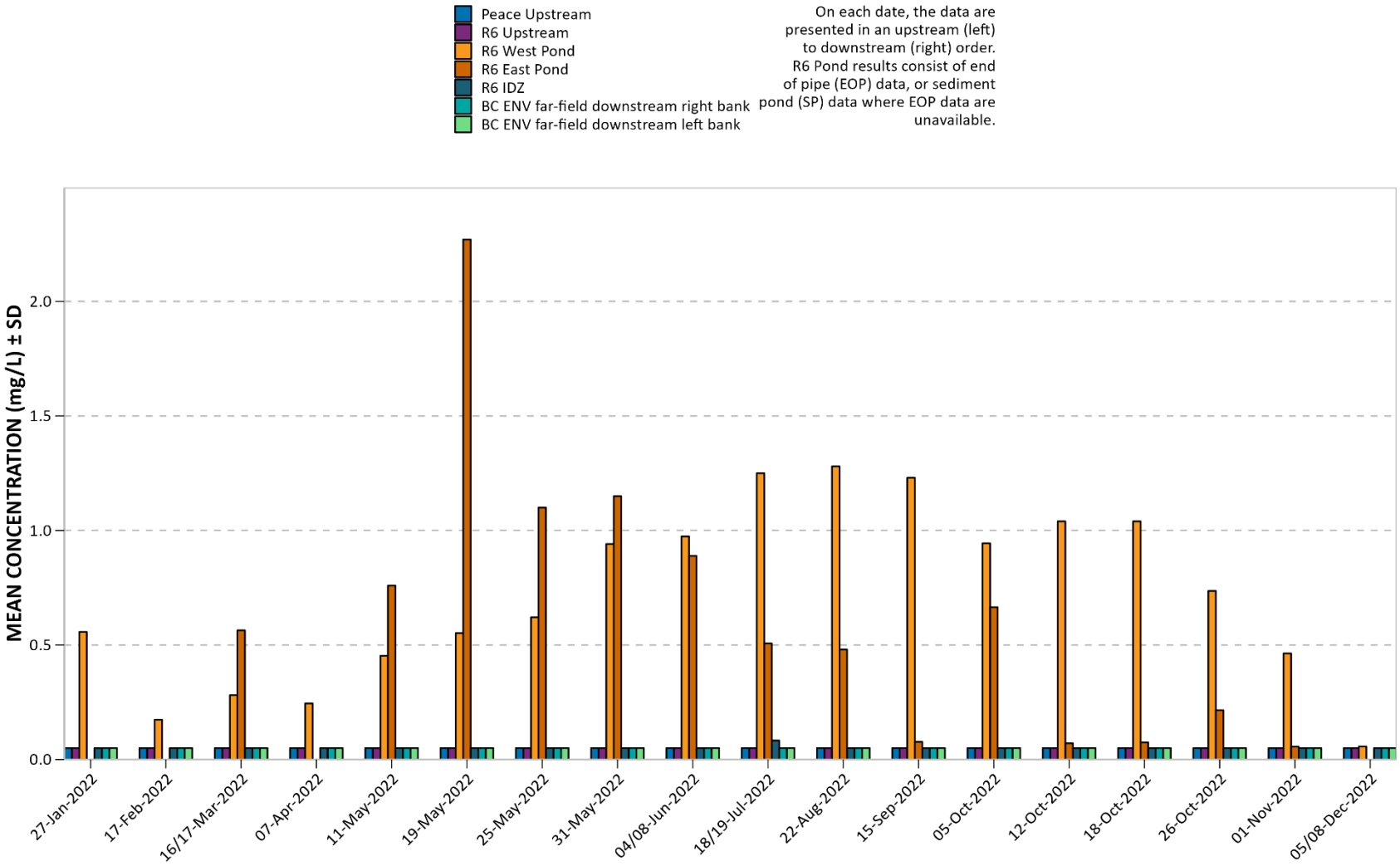


Figure 13. 2022 Peace River and RSEM R6 pond chloride (Cl).

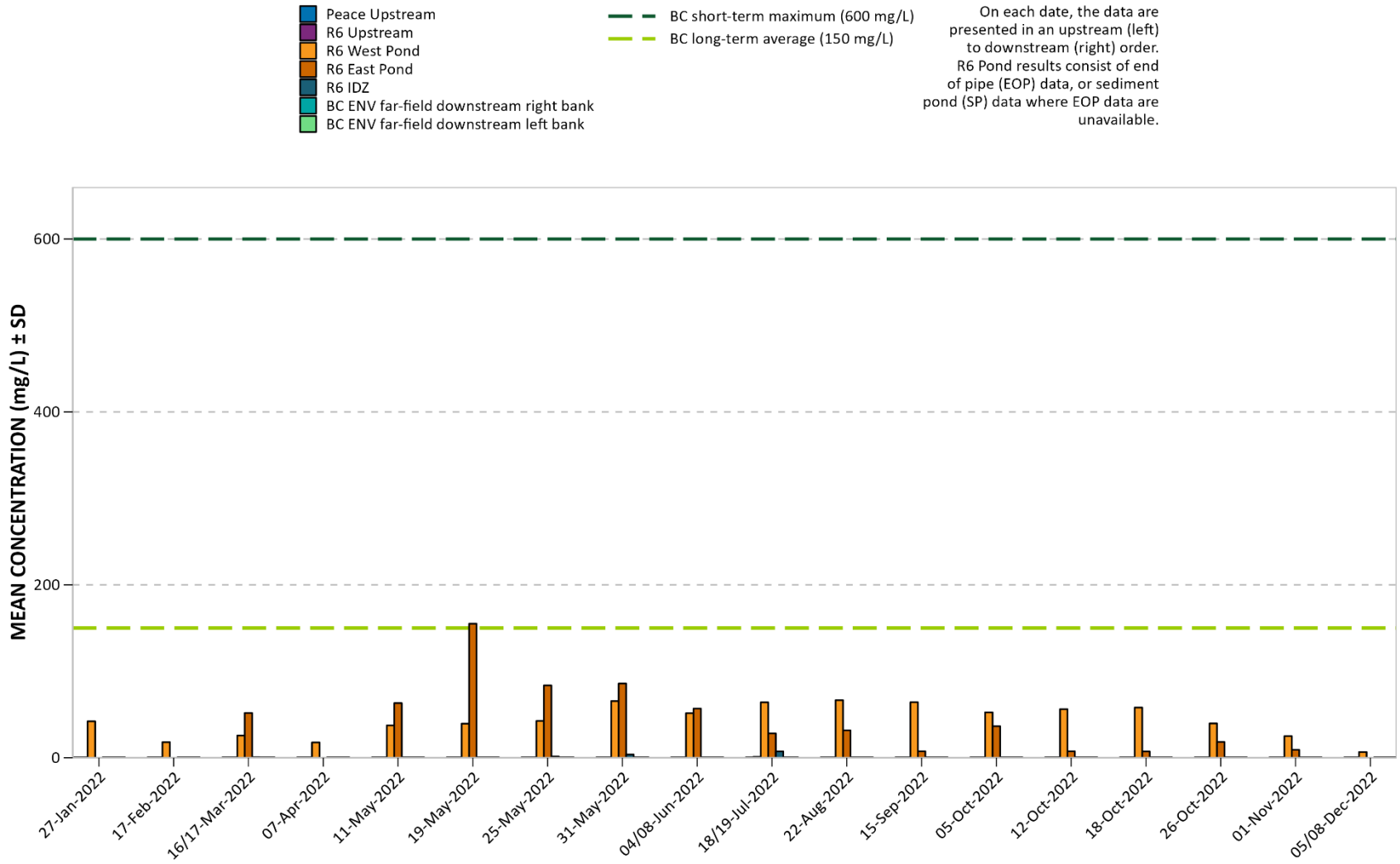


Figure 14. 2022 Peace River and RSEM R6 pond dissolved orthophosphate.

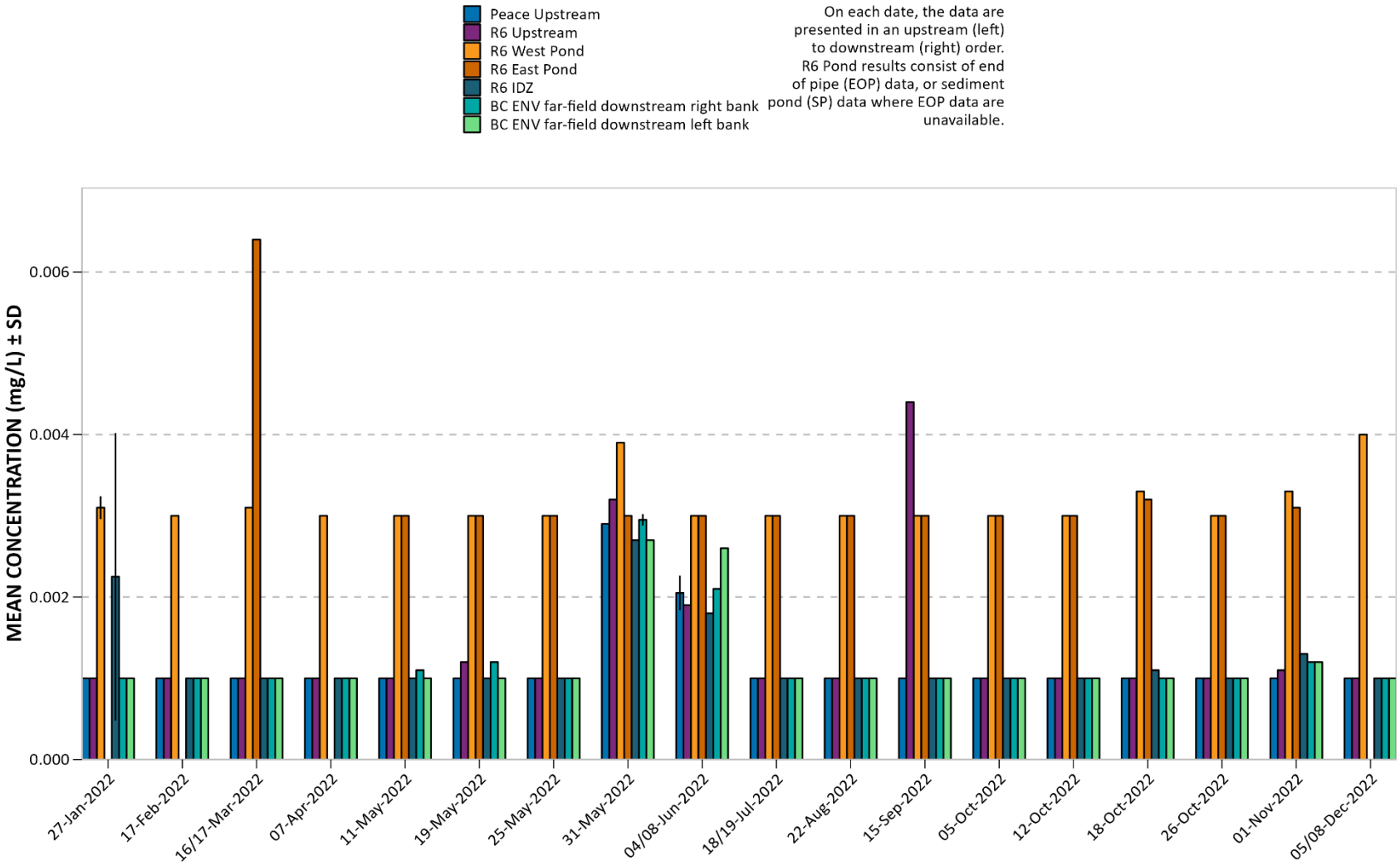


Figure 15. 2022 Peace River and RSEM R6 pond fluoride (F).

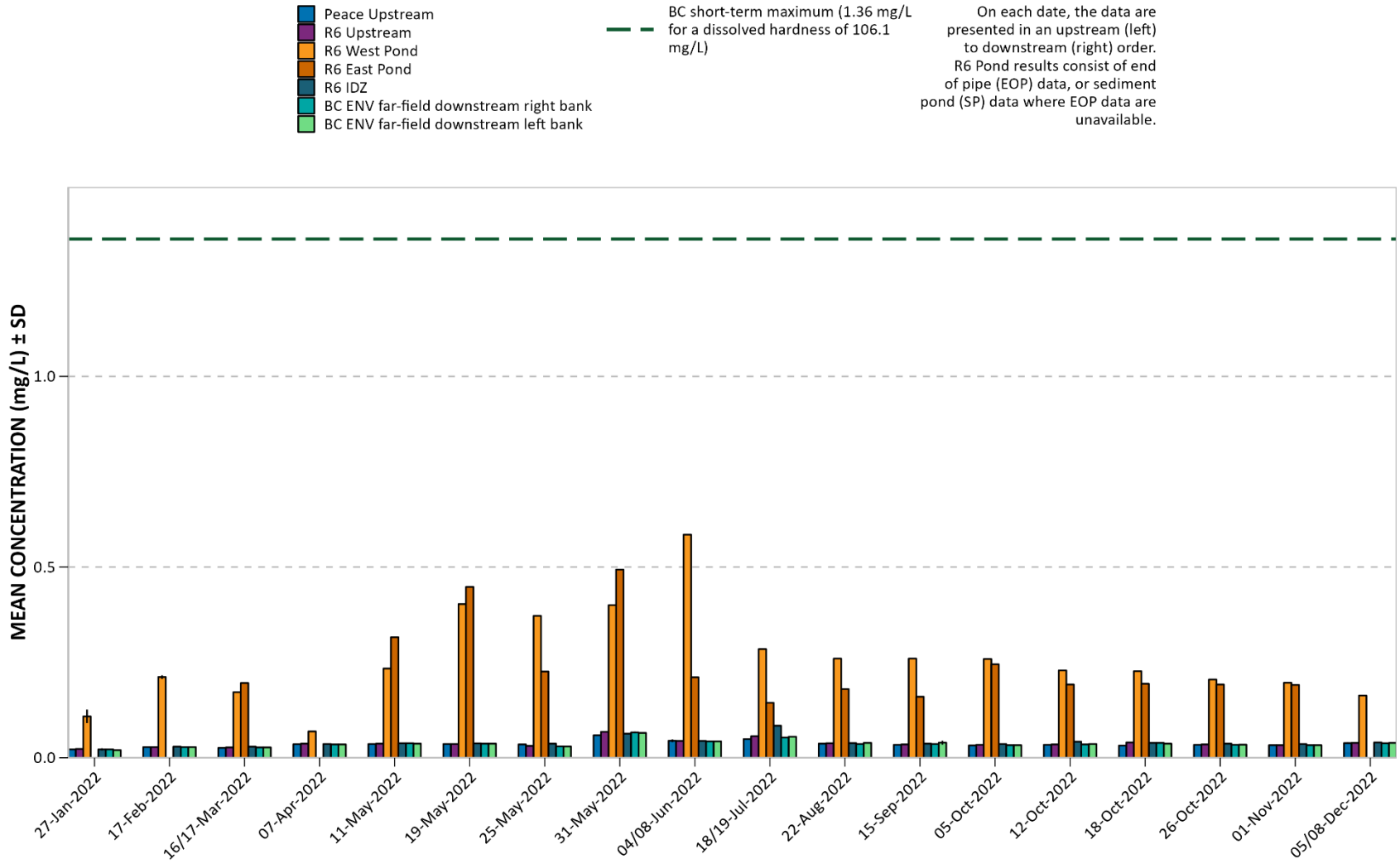


Figure 16. 2022 Peace River and RSEM R6 pond nitrate (as N).

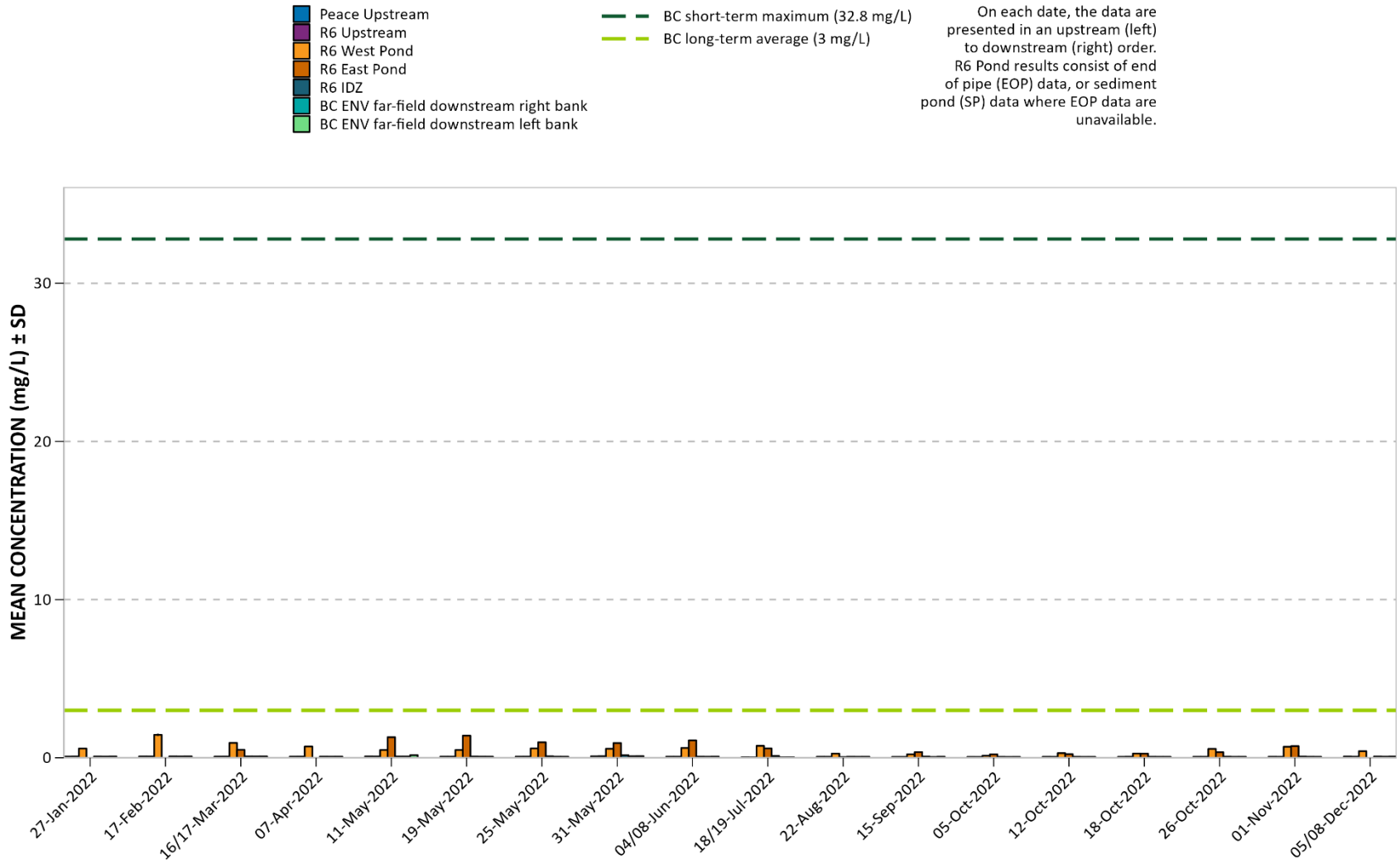
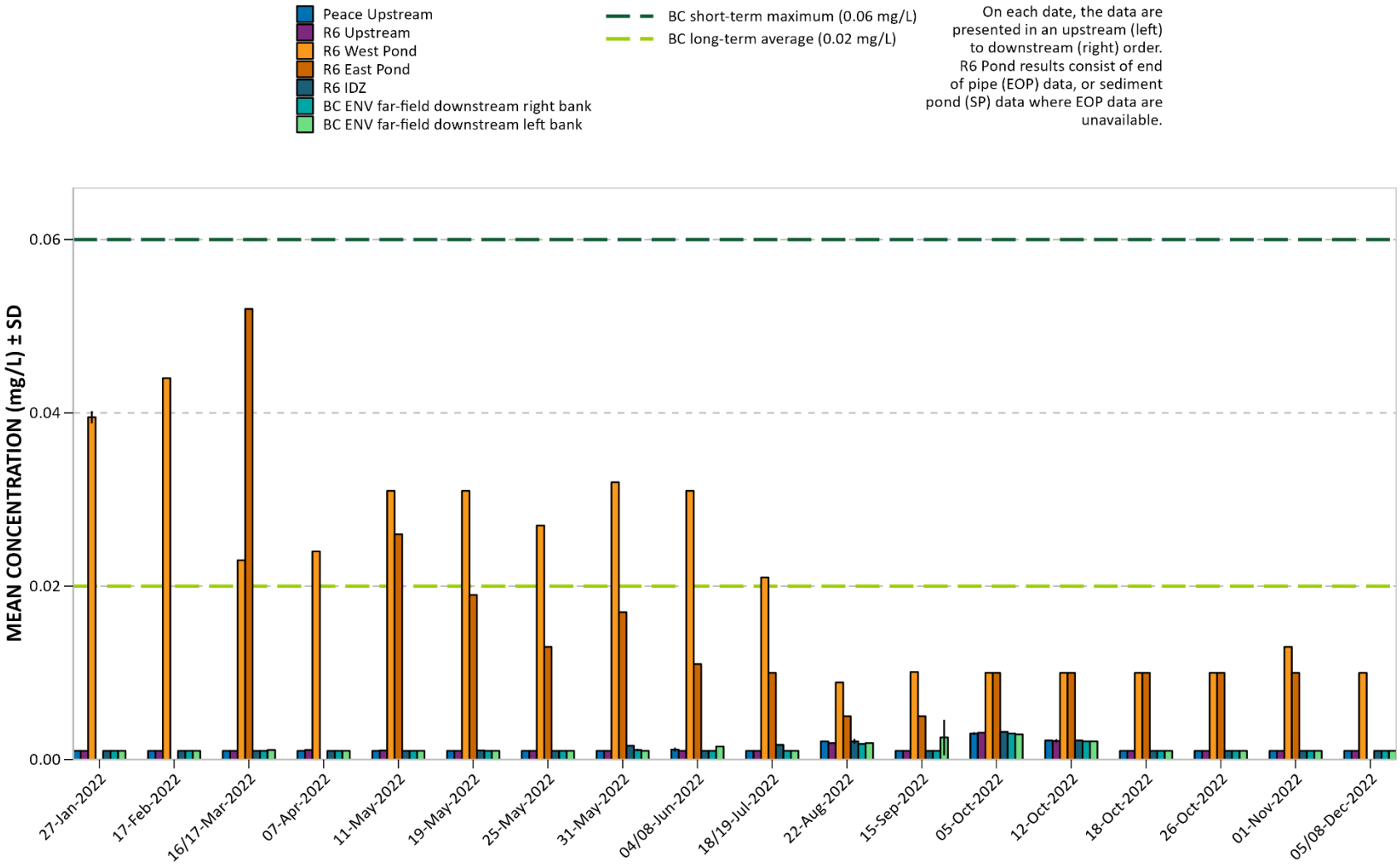


Figure 17. 2022 Peace River and RSEM R6 pond nitrite (as N).



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. 2022 Peace River and RSEM R6 pond sulfate (SO_4).

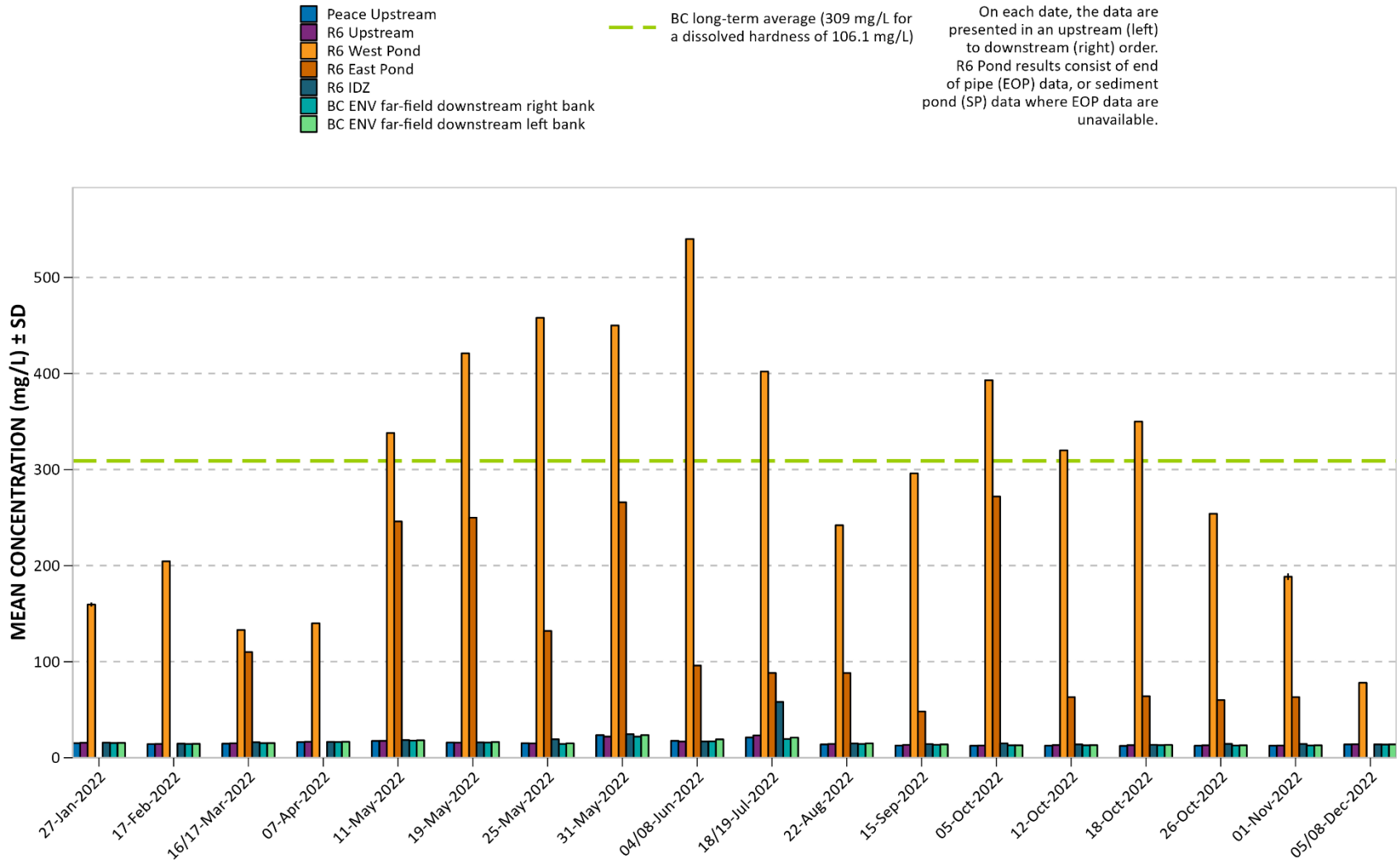


Figure 19. 2022 Peace River and RSEM R6 pond dissolved organic carbon (DOC).

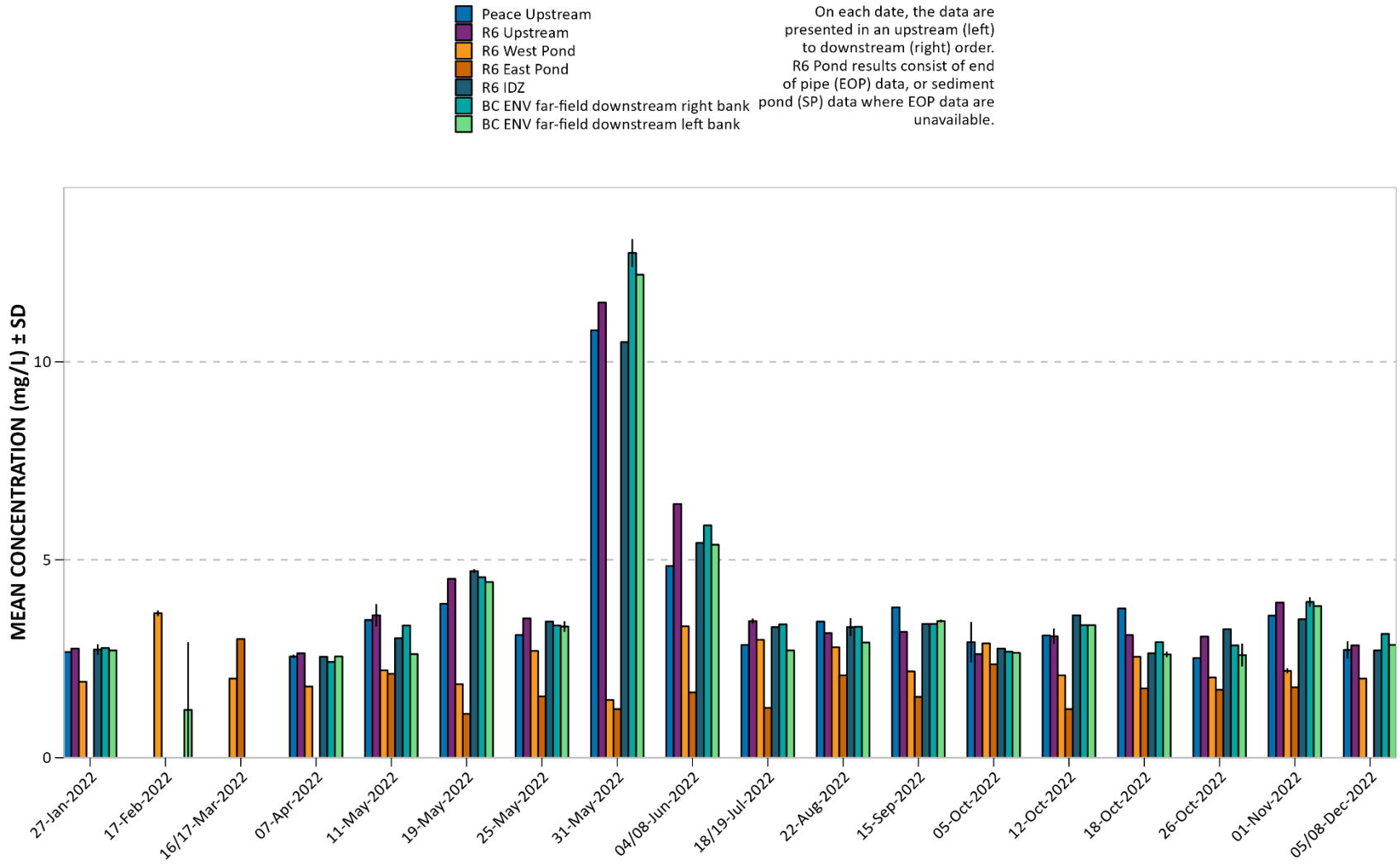


Figure 20. 2022 Peace River and RSEM R6 pond total organic carbon (TOC).

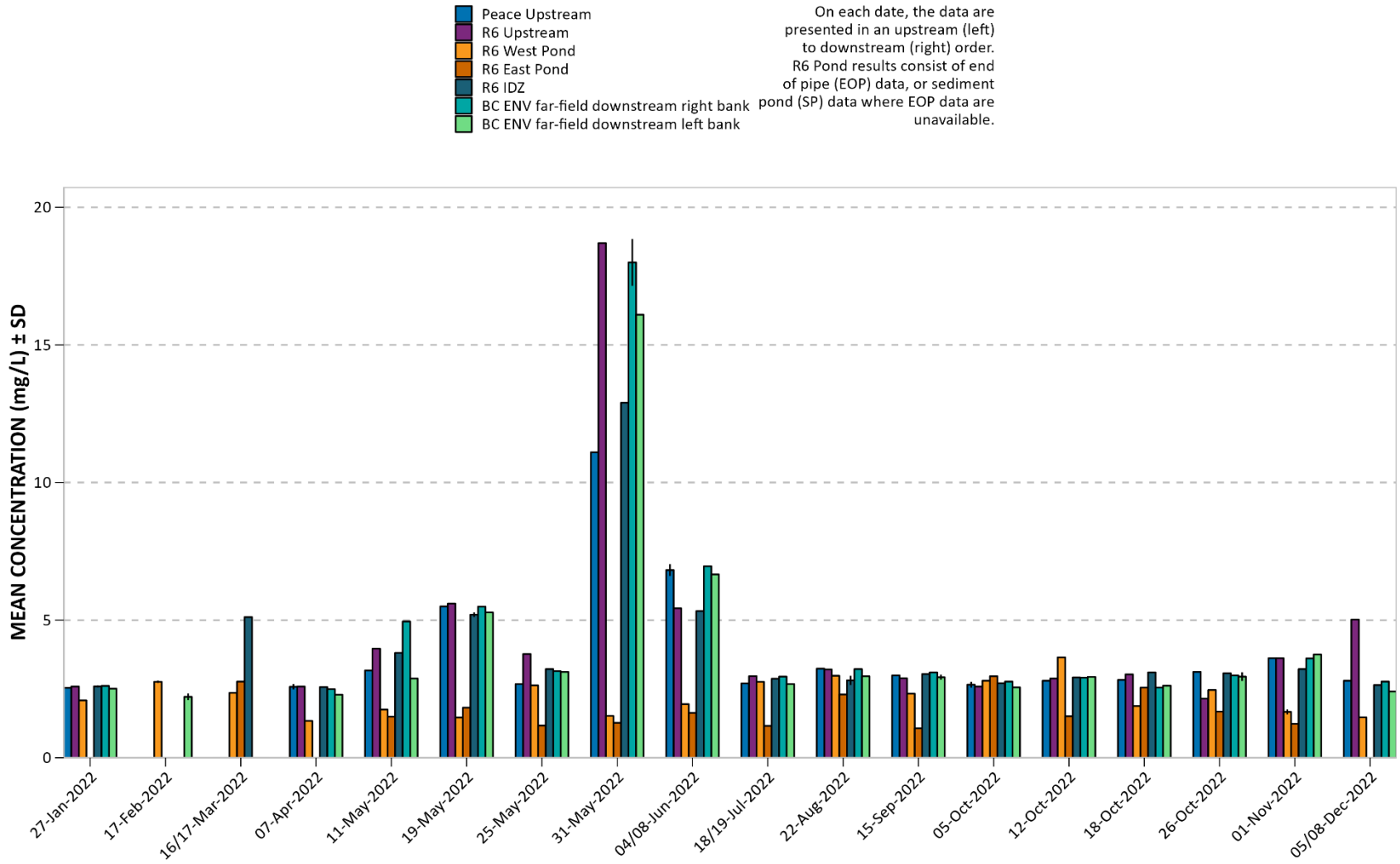


Figure 21. 2022 Peace River and RSEM R6 pond total aluminum (Al).

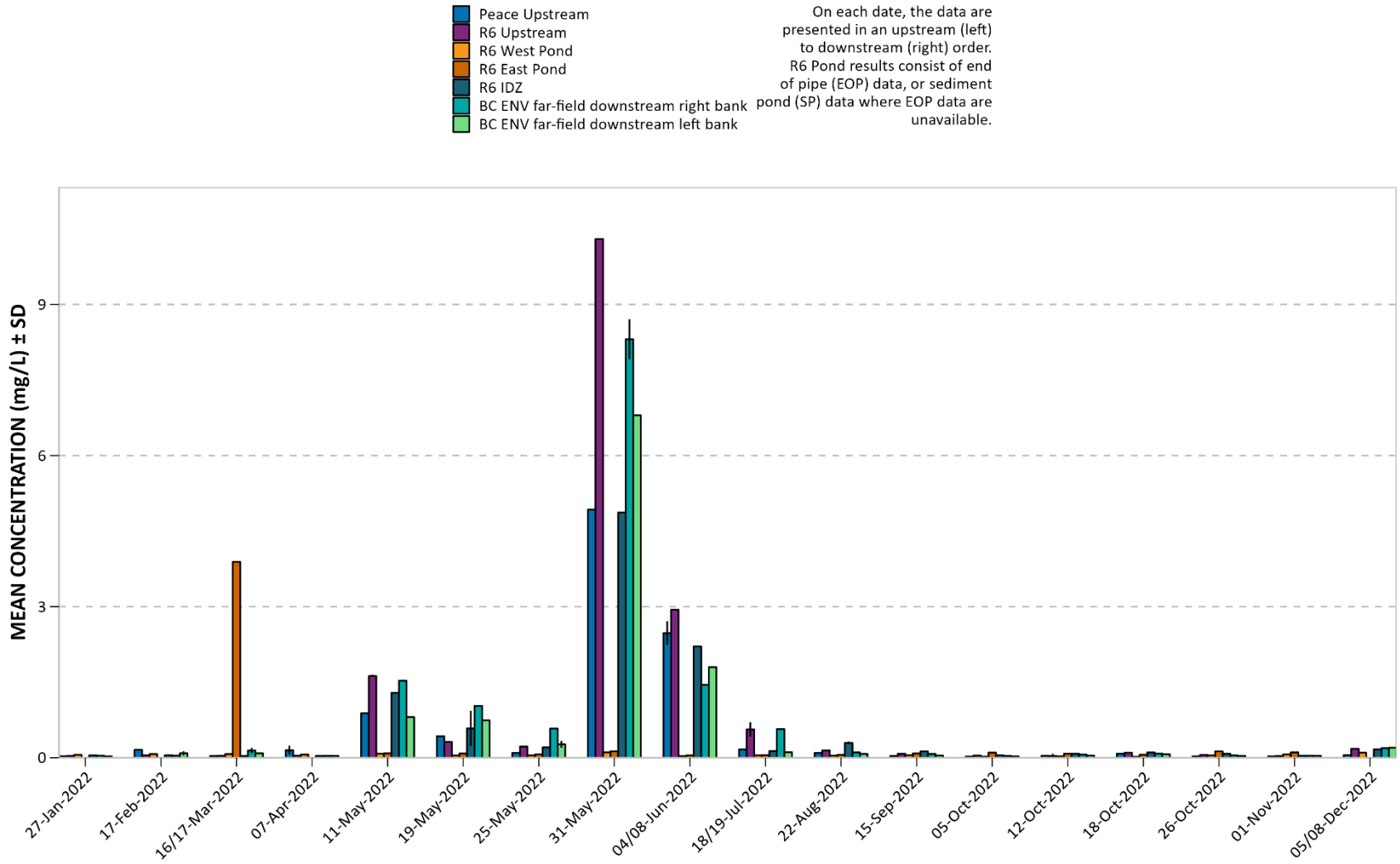


Figure 22. 2022 Peace River and RSEM R6 pond total antimony (Sb).

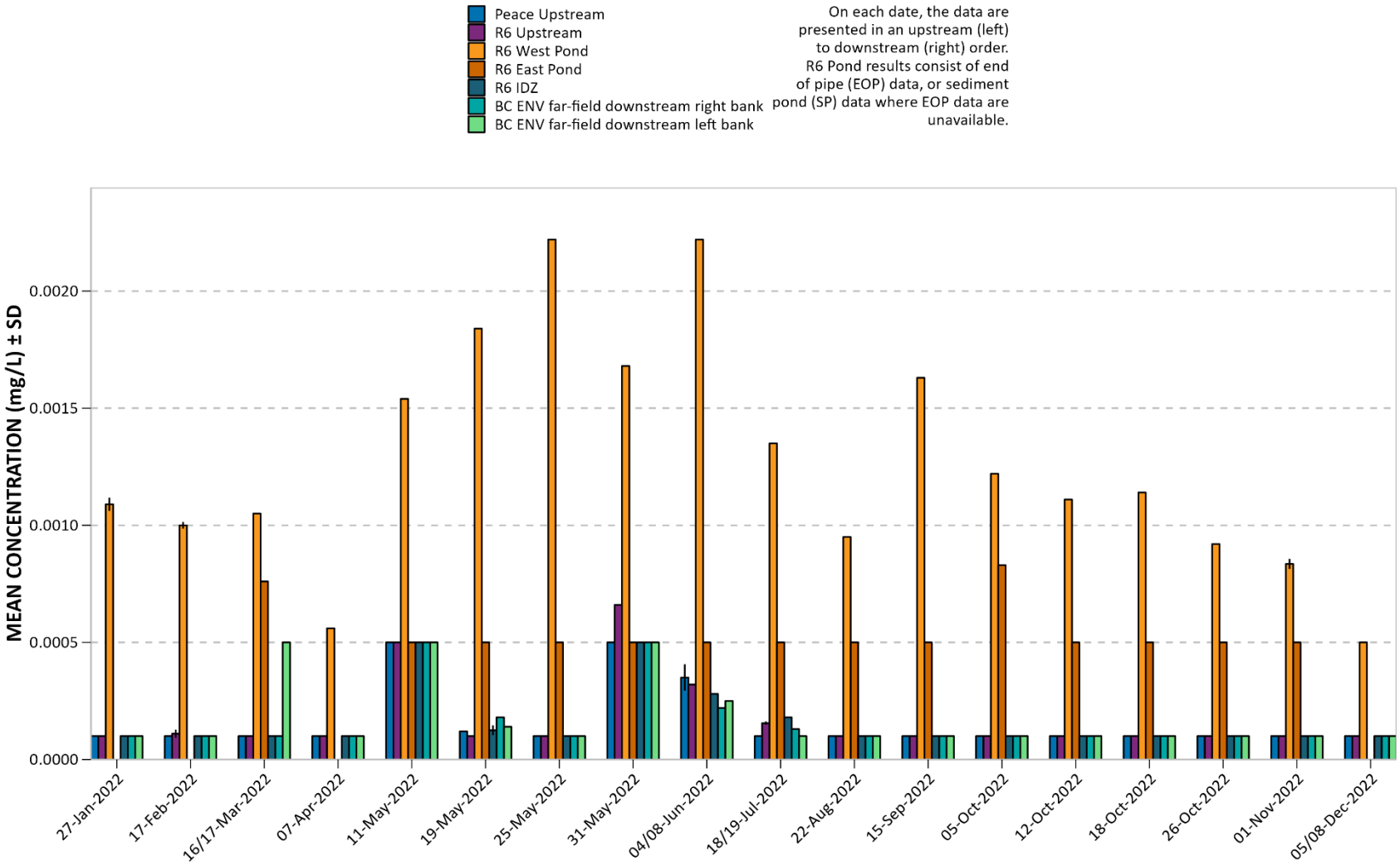


Figure 23. 2022 Peace River and RSEM R6 pond total arsenic (As).

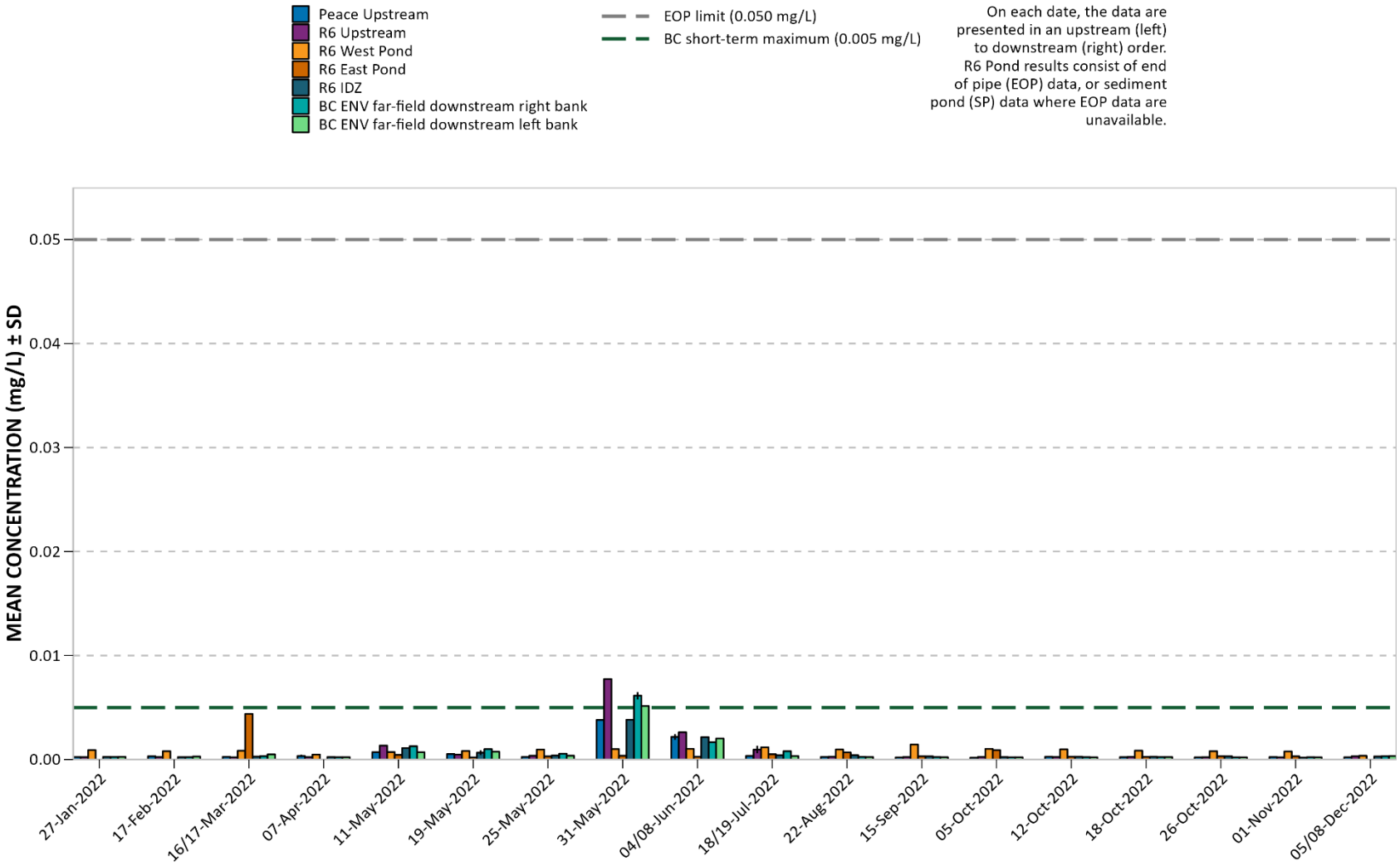


Figure 24. 2022 Peace River and RSEM R6 pond total barium (Ba).

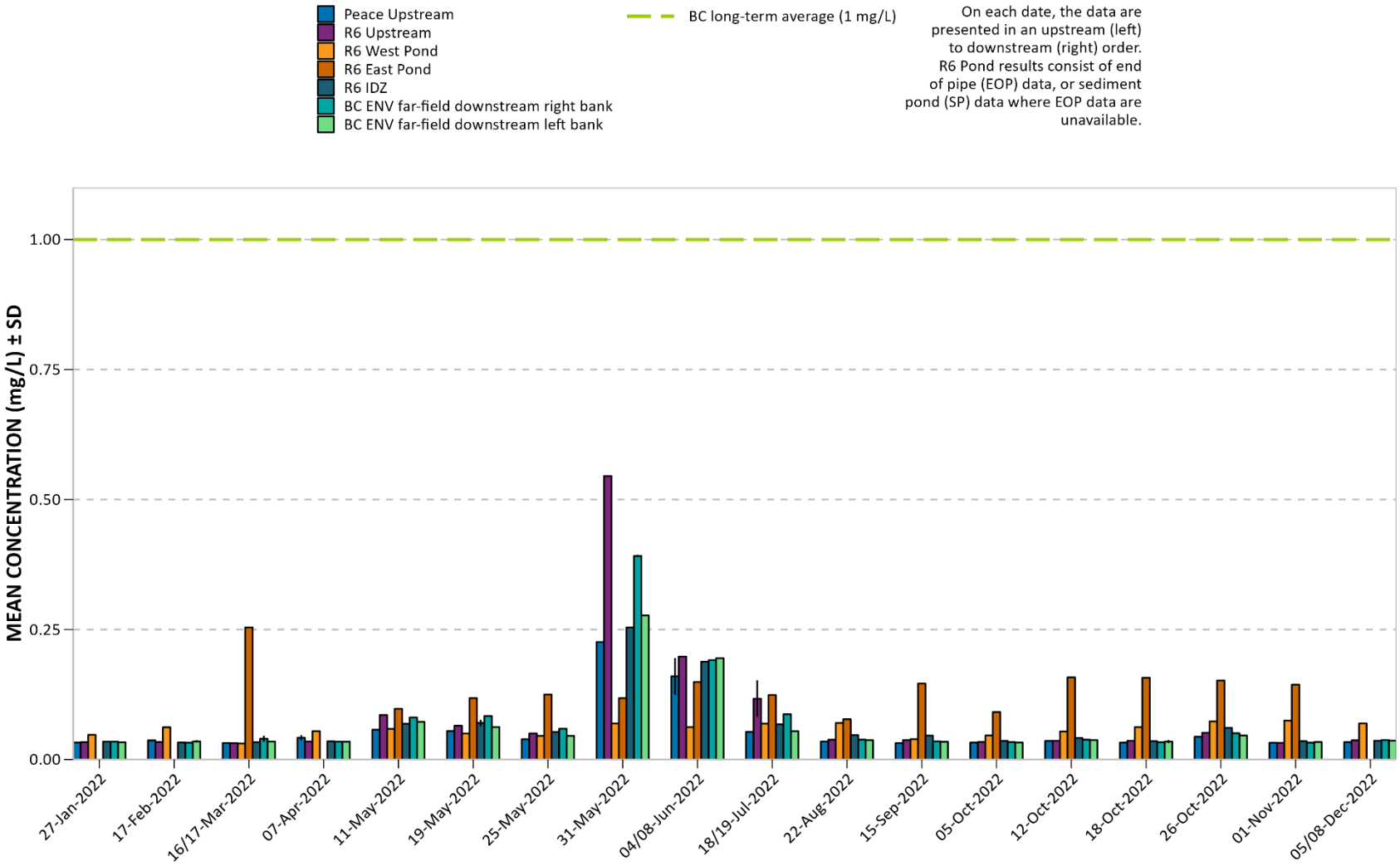


Figure 25. 2022 Peace River and RSEM R6 pond total beryllium (Be).

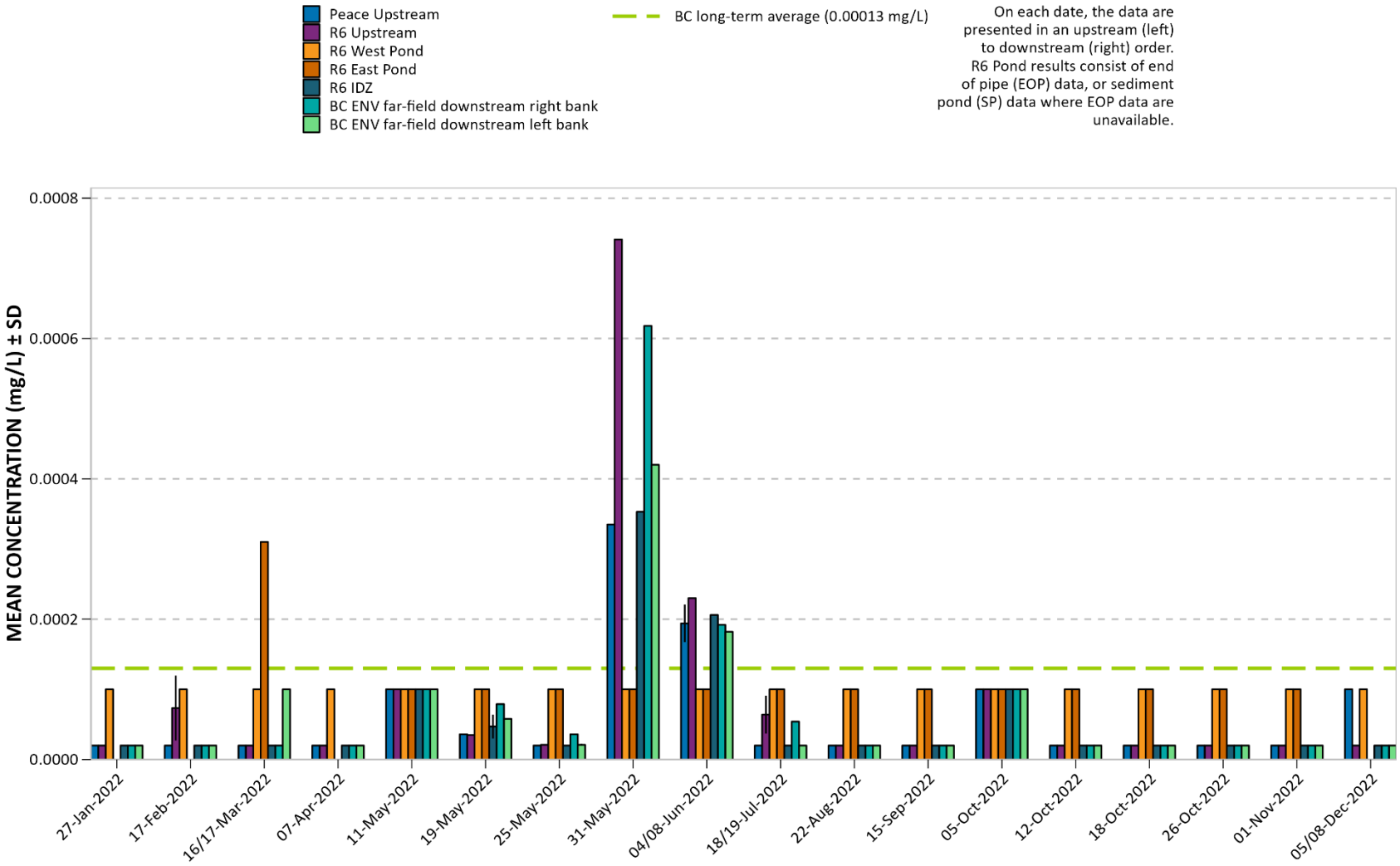


Figure 26. 2022 Peace River and RSEM R6 pond total bismuth (Bi).

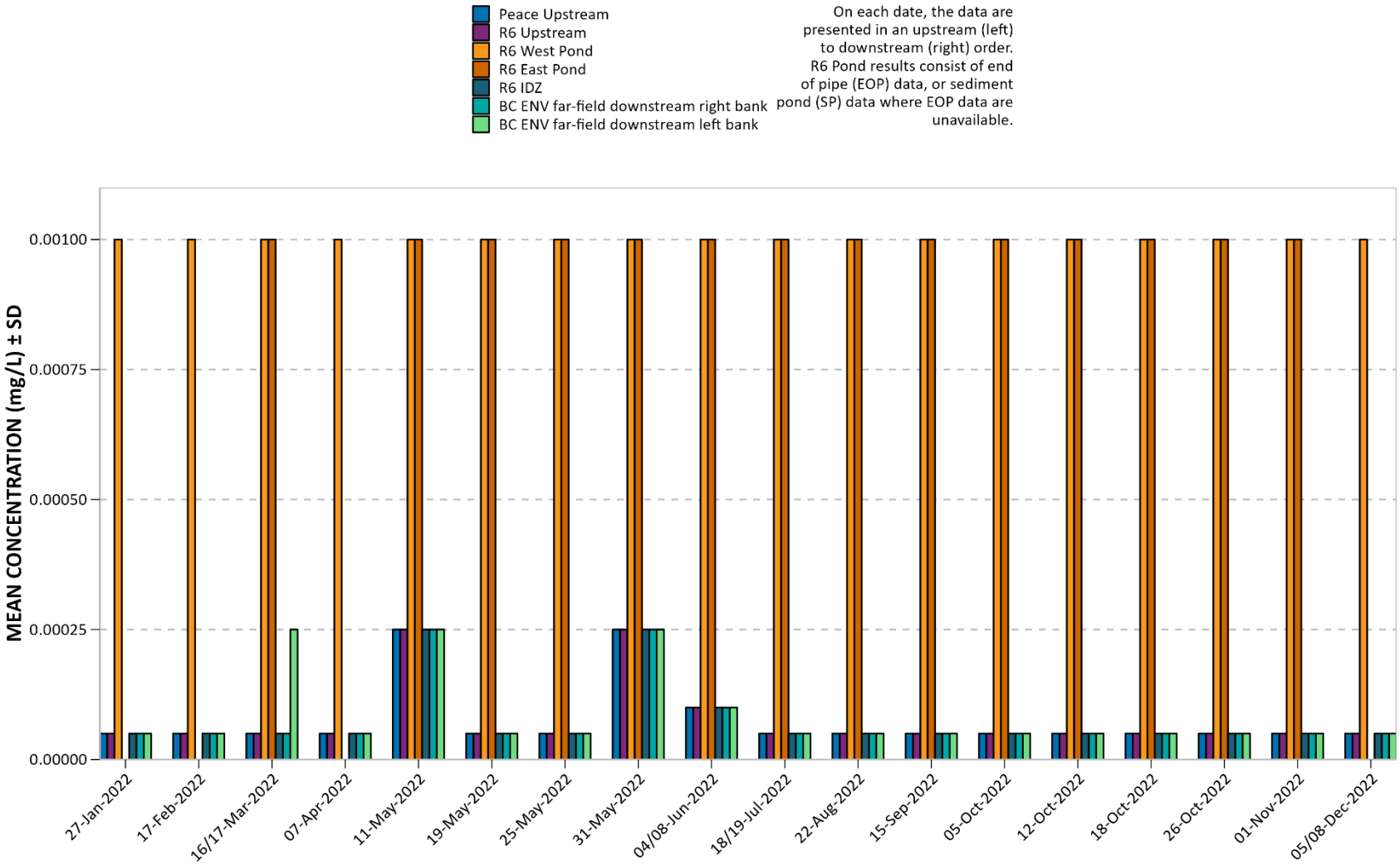


Figure 27. 2022 Peace River and RSEM R6 pond total boron (B).

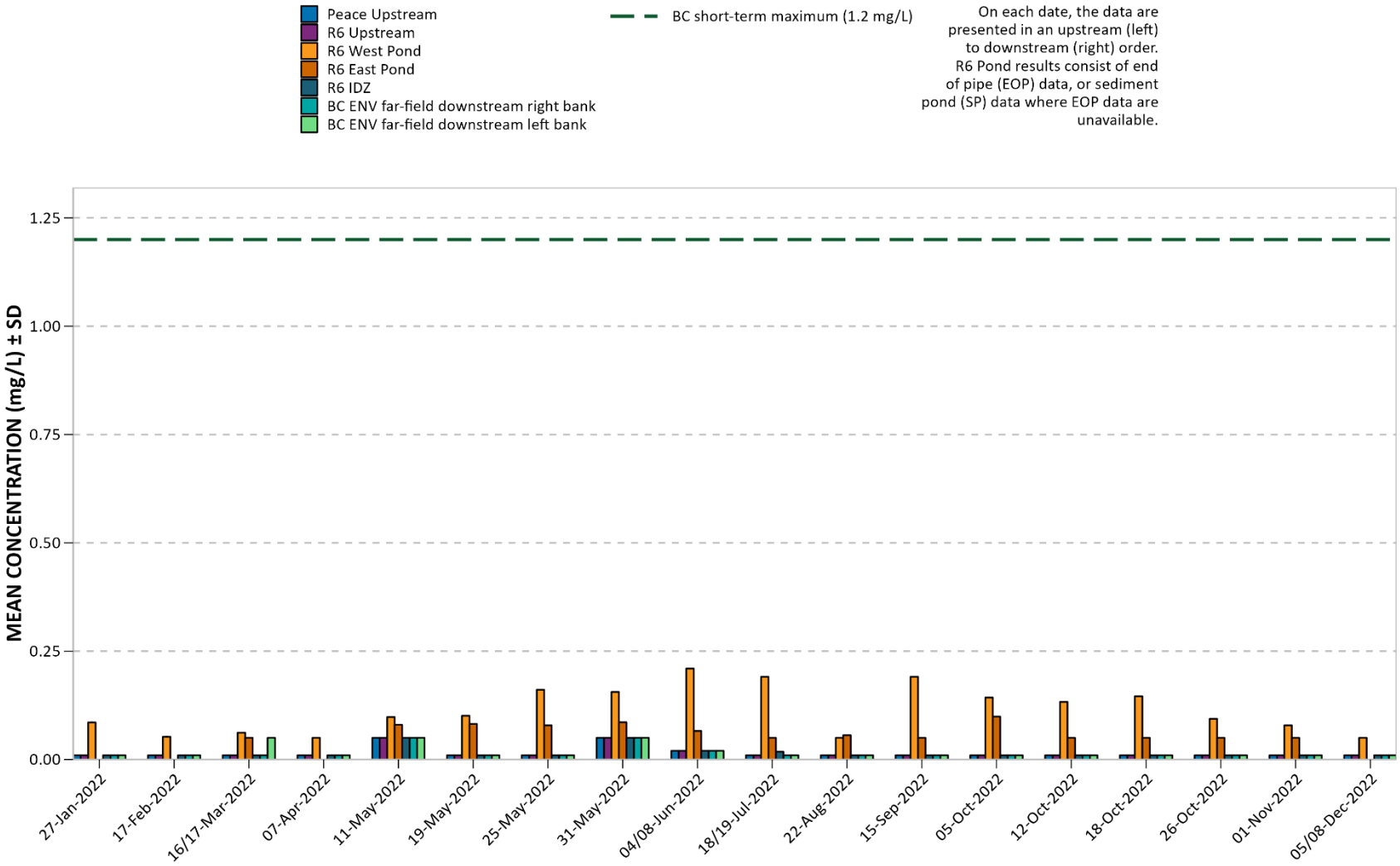


Figure 28. 2022 Peace River and RSEM R6 pond total cadmium (Cd).

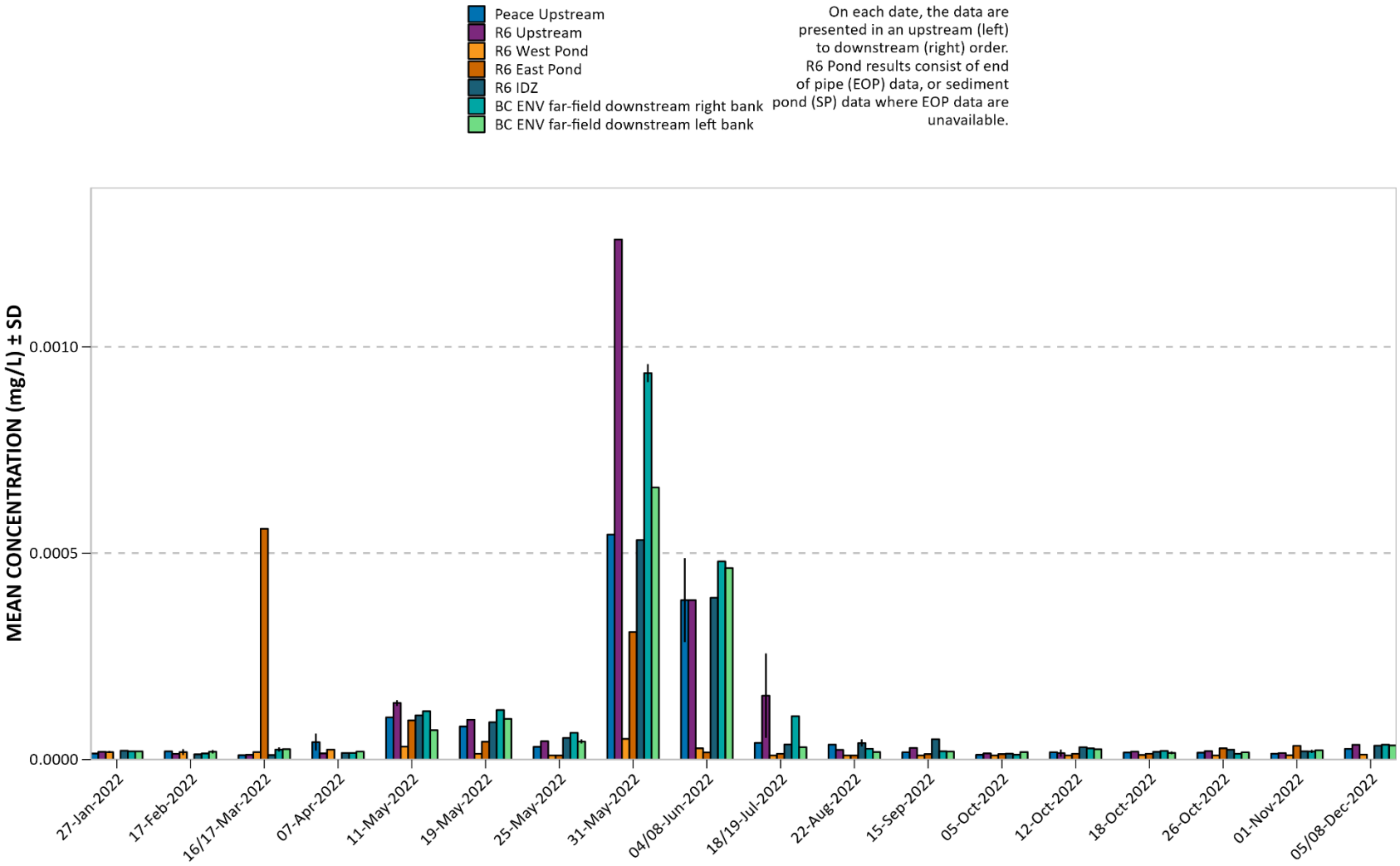


Figure 29. 2022 Peace River and RSEM R6 pond total calcium (Ca).

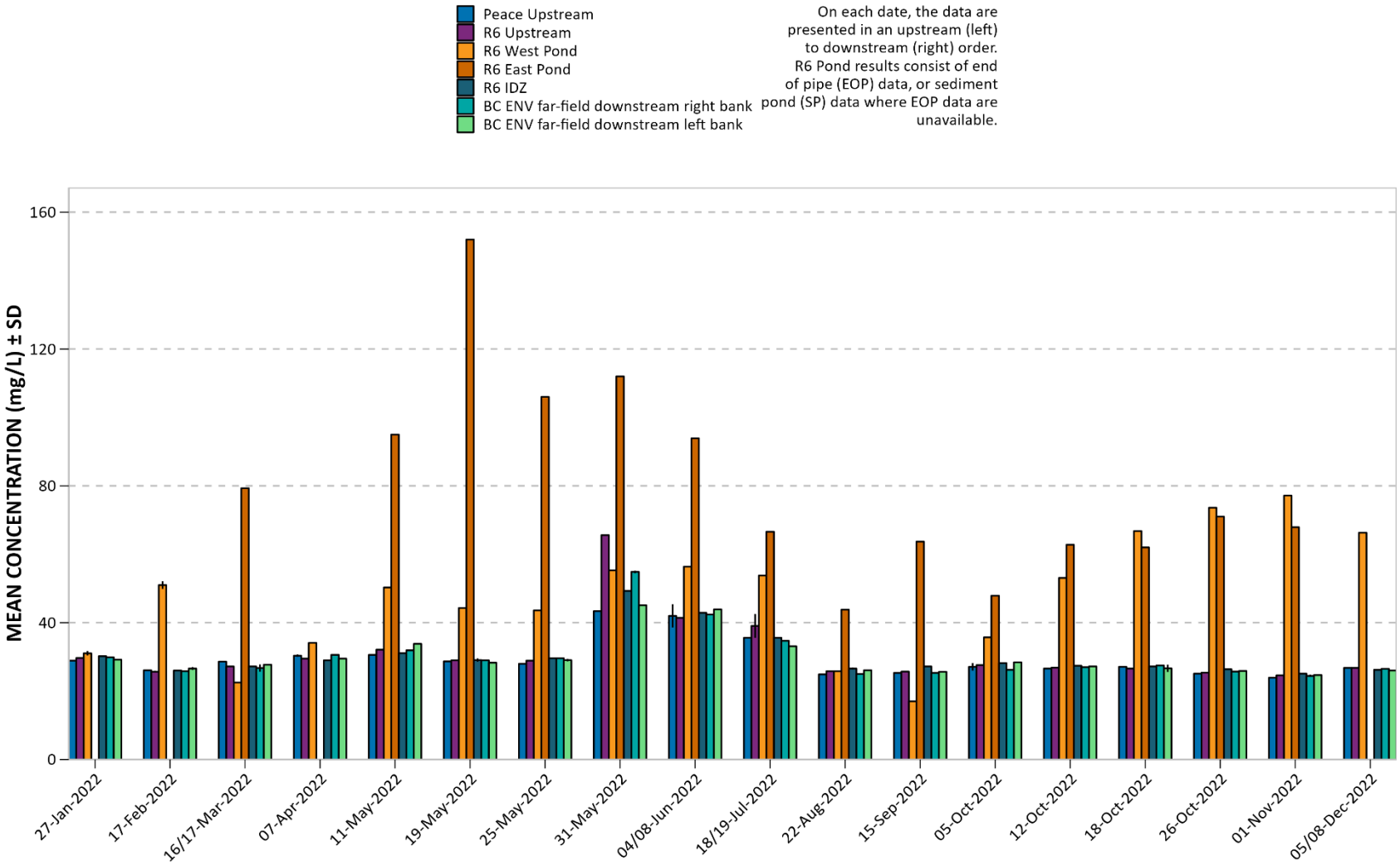


Figure 30. 2022 Peace River and RSEM R6 pond total chromium (Cr).

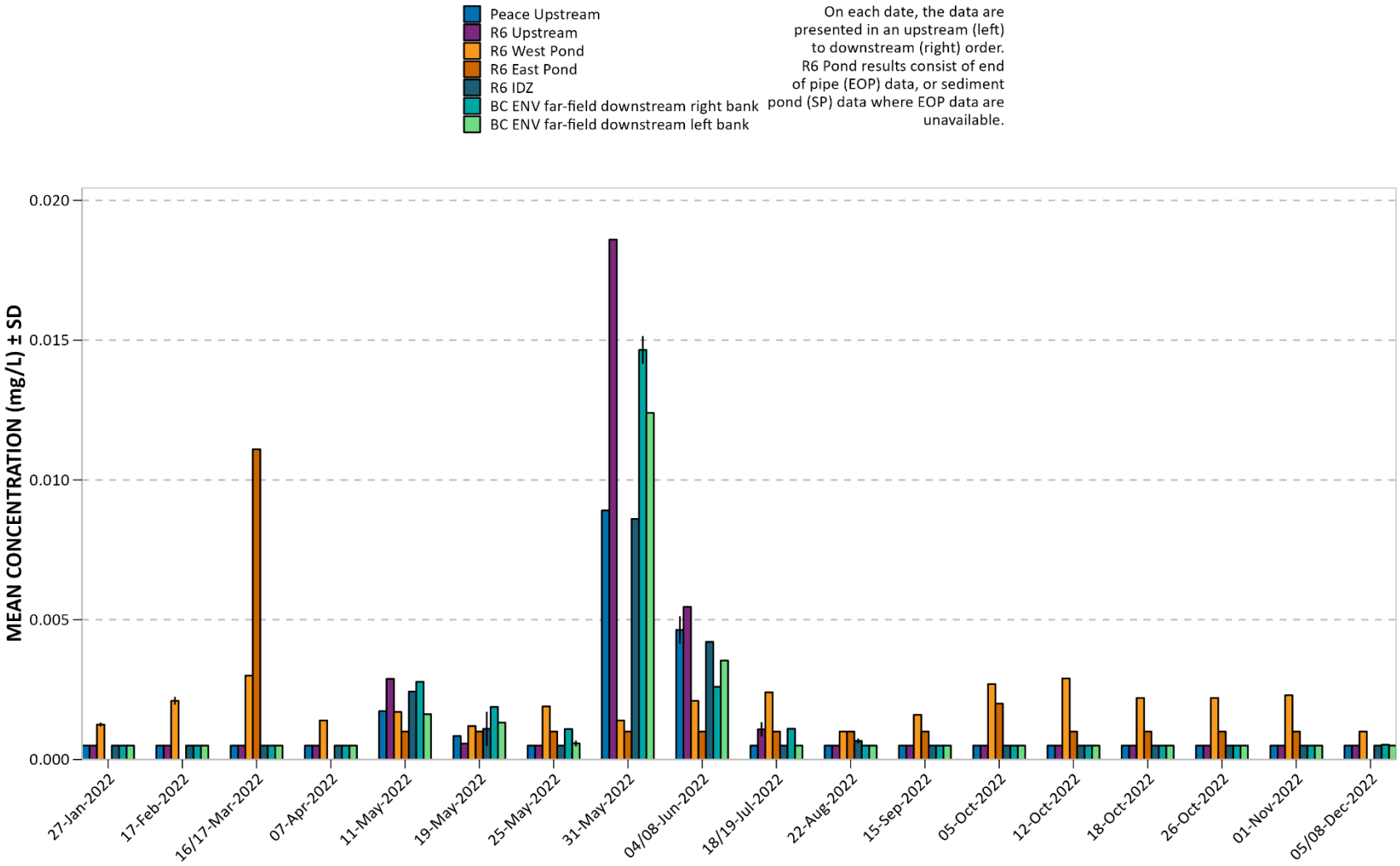


Figure 31. 2022 Peace River and RSEM R6 pond total cobalt (Co).

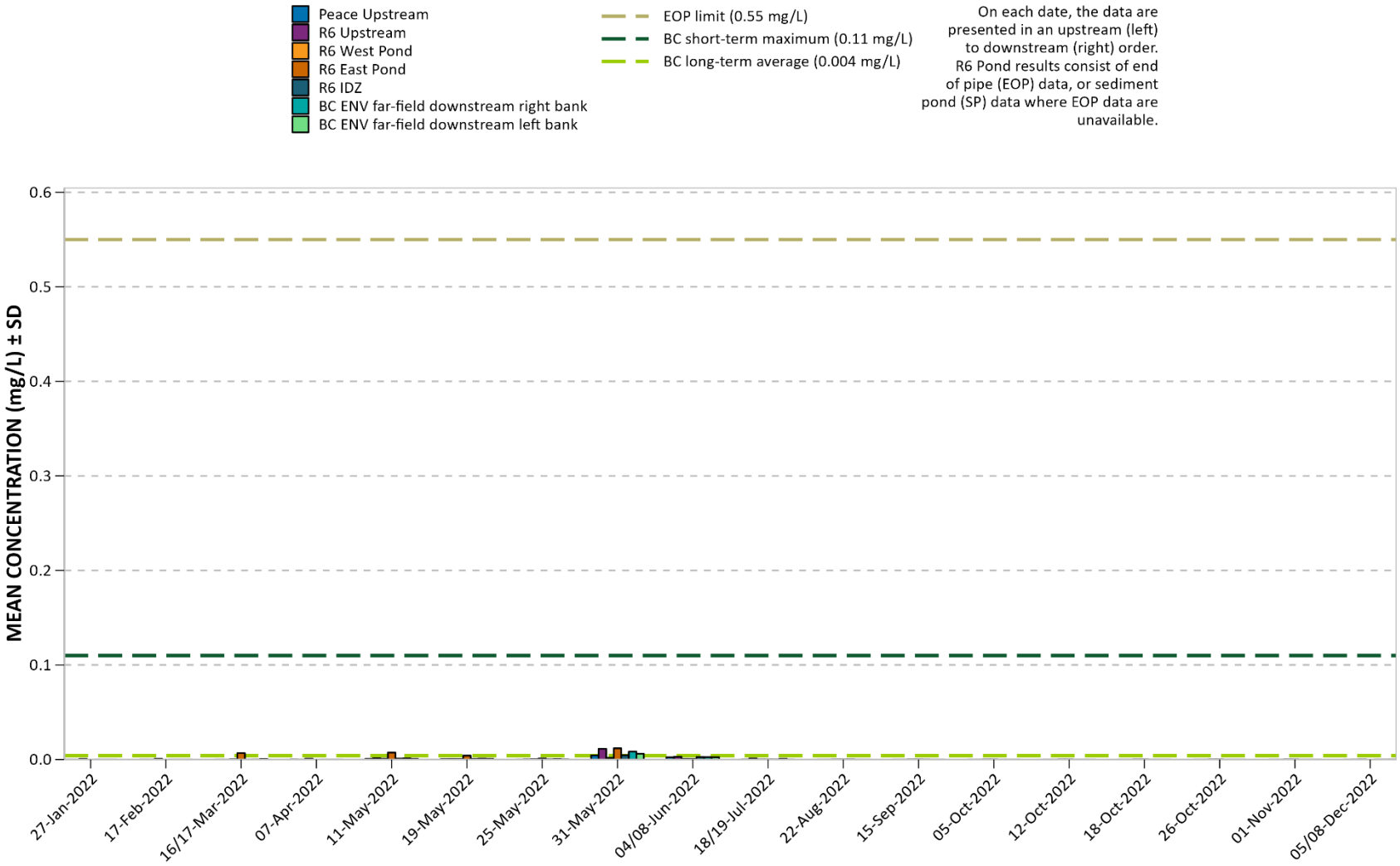


Figure 32. 2022 Peace River and RSEM R6 pond total copper (Cu).

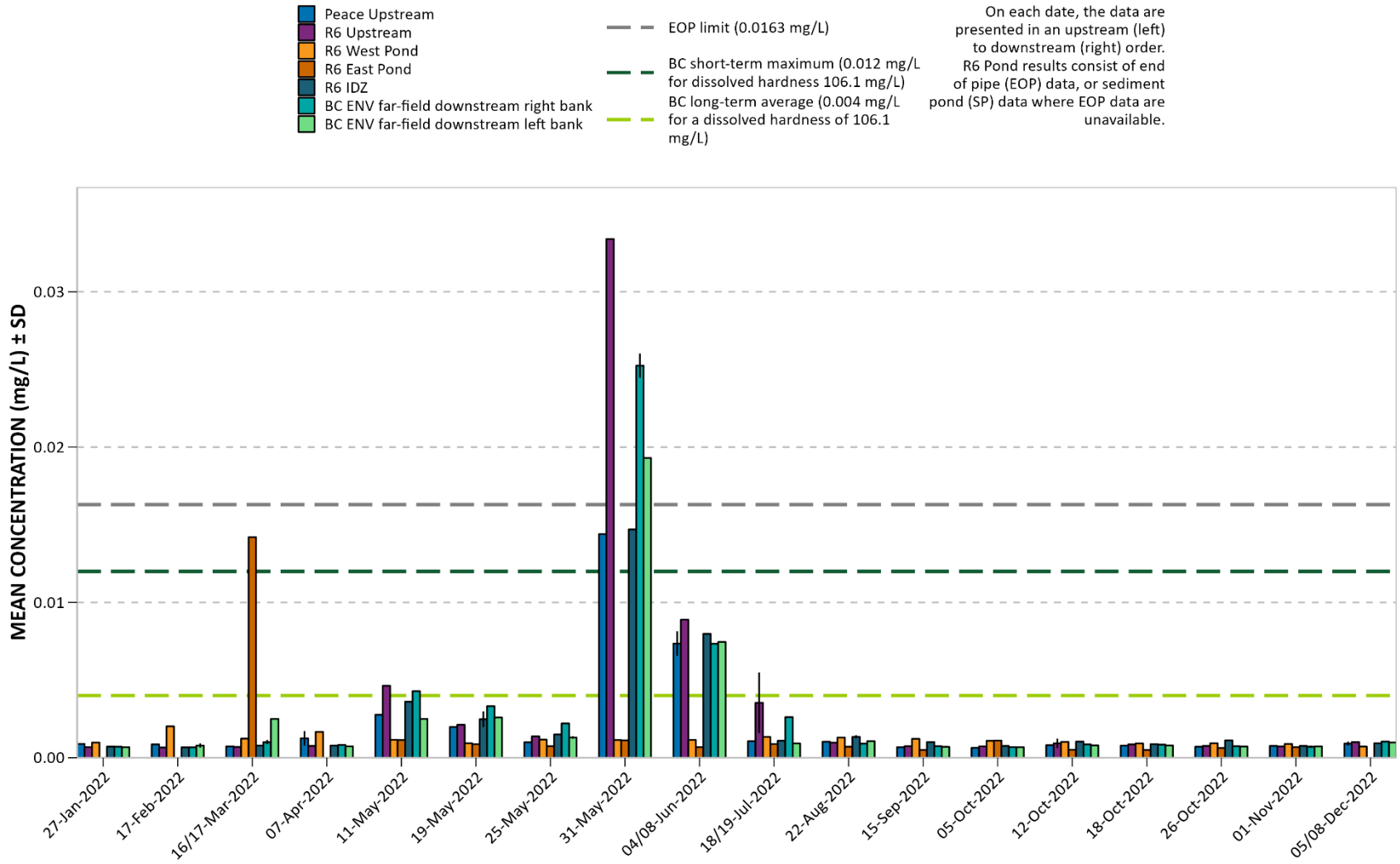


Figure 33. 2022 Peace River and RSEM R6 pond total iron (Fe).

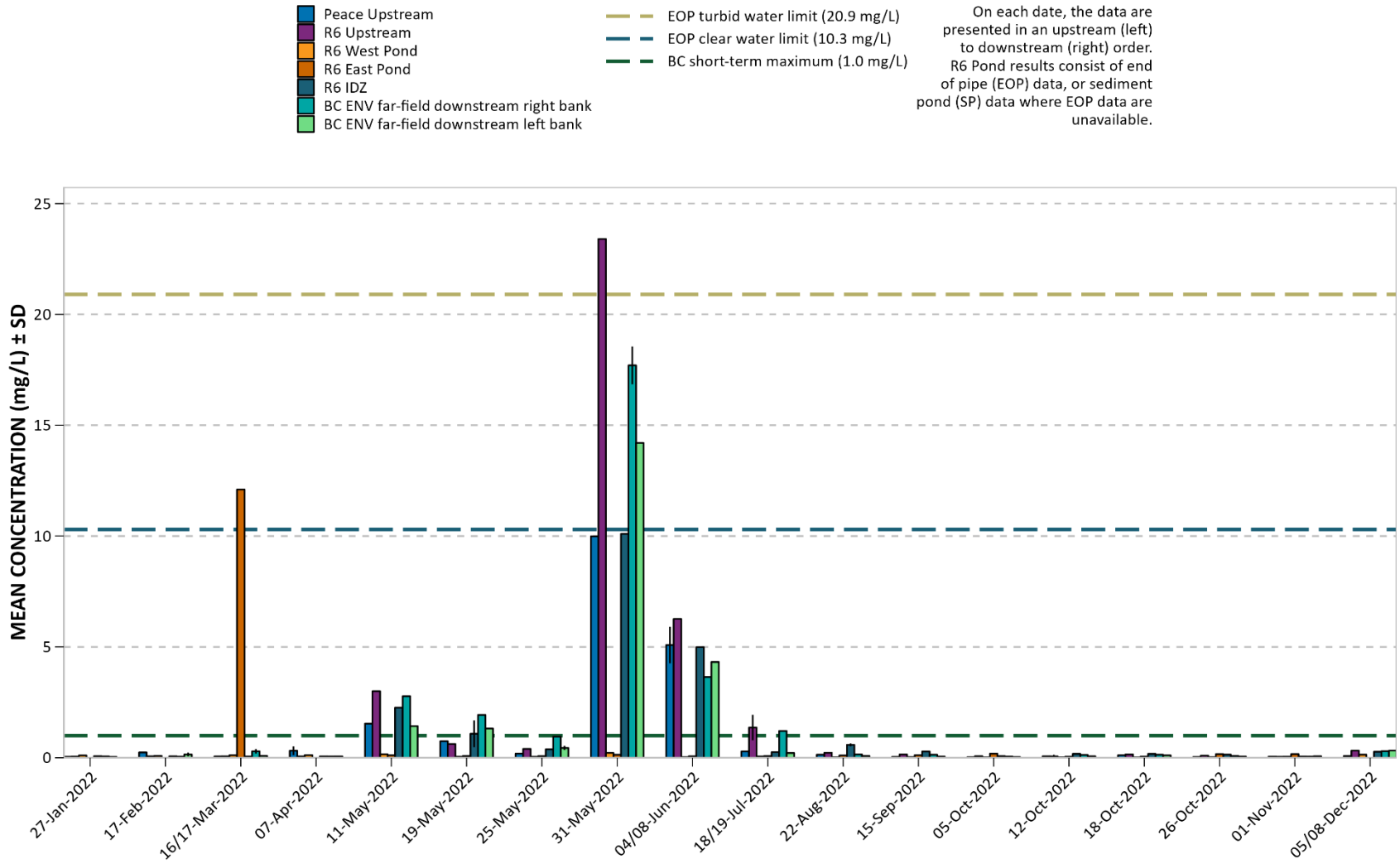


Figure 34. 2022 Peace River and RSEM R6 pond total lead (Pb).

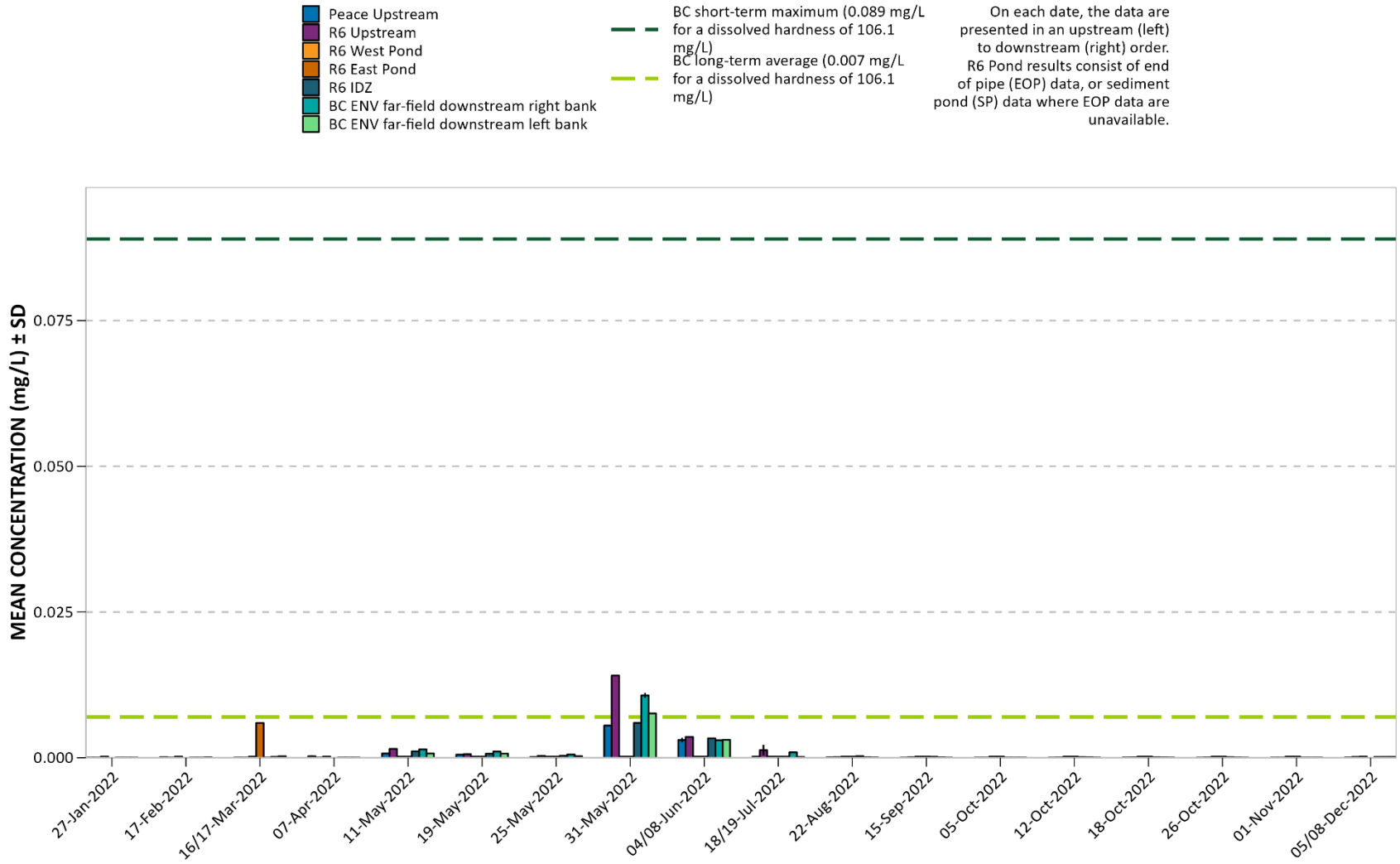


Figure 35. 2022 Peace River and RSEM R6 pond total lithium (Li).

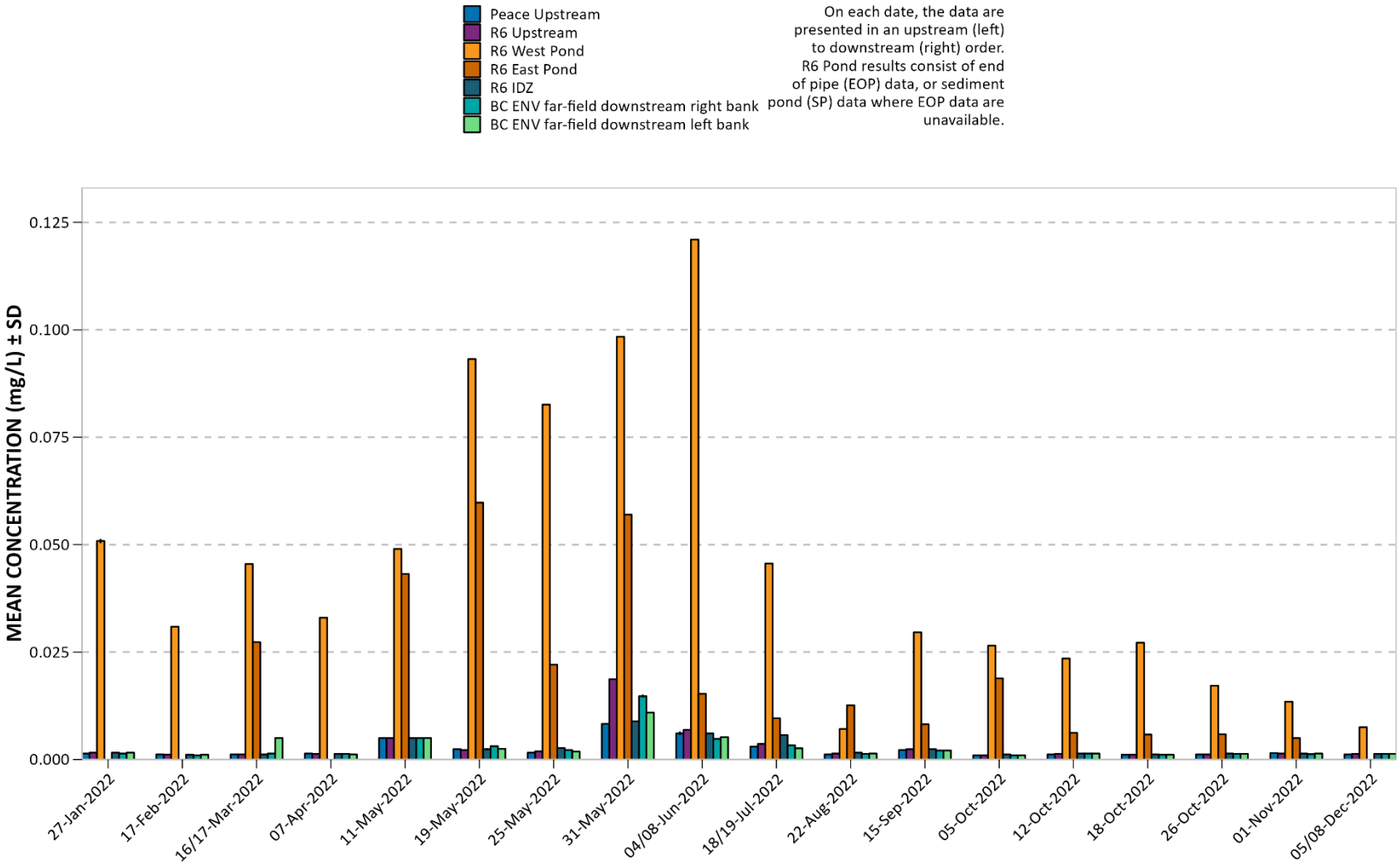


Figure 36. 2022 Peace River and RSEM R6 pond total magnesium (Mg).

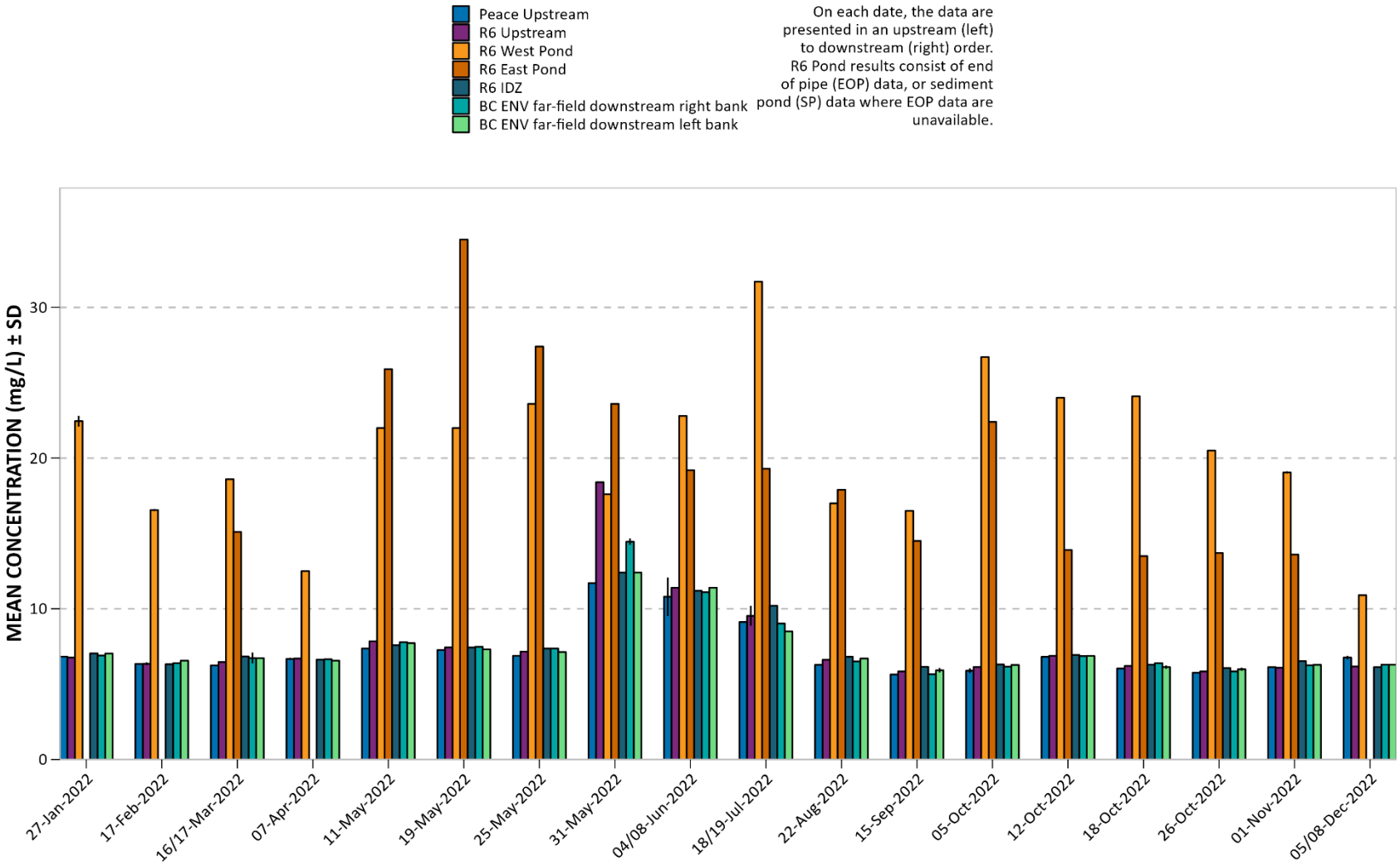


Figure 37. 2022 Peace River and RSEM R6 pond total manganese (Mn).

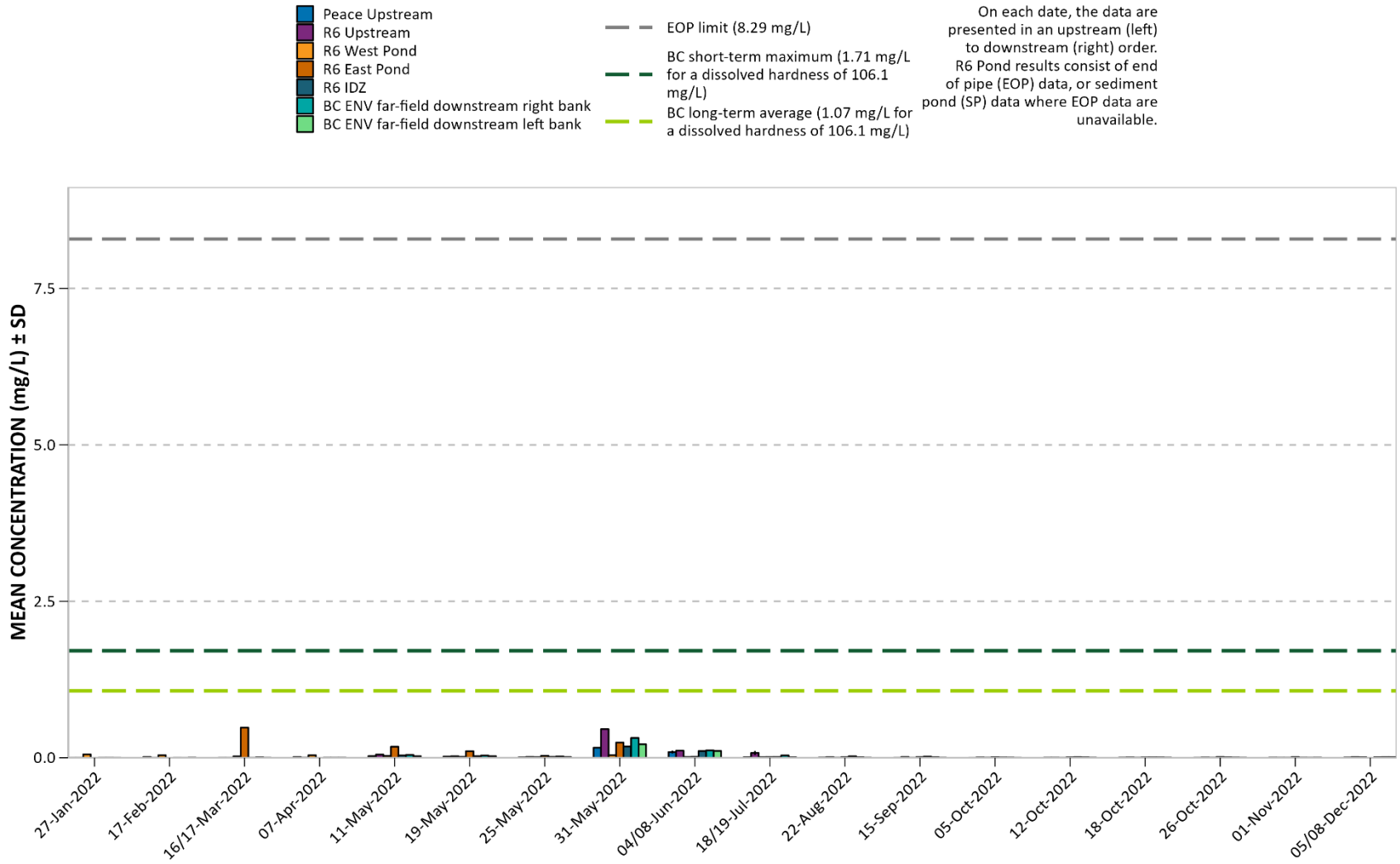


Figure 38. 2022 Peace River and RSEM R6 pond total mercury (Hg).

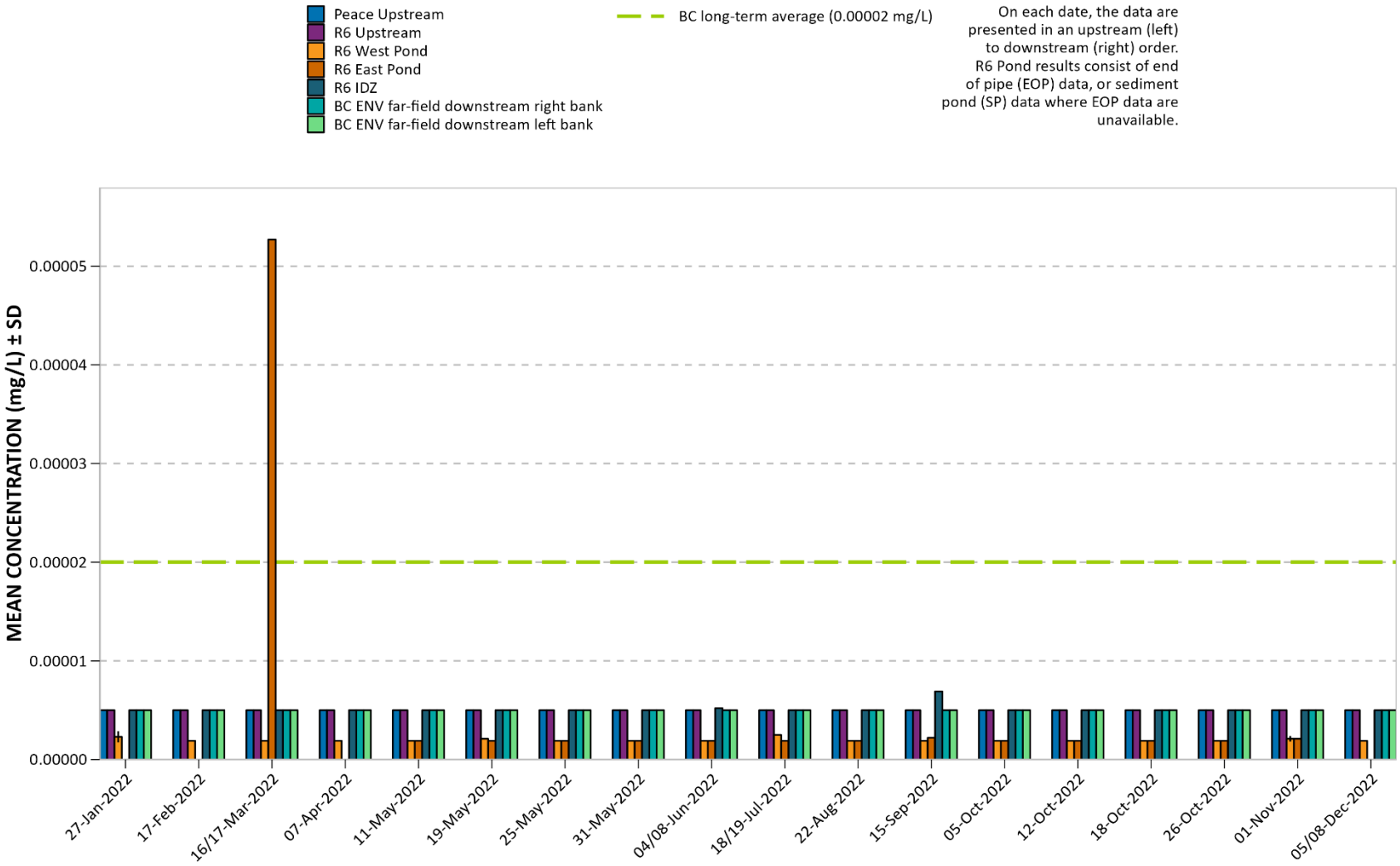


Figure 39. 2022 Peace River and RSEM R6 pond total molybdenum (Mo). Note that sample results are very low compared to guidelines and as a result the data are not visible on the plot.

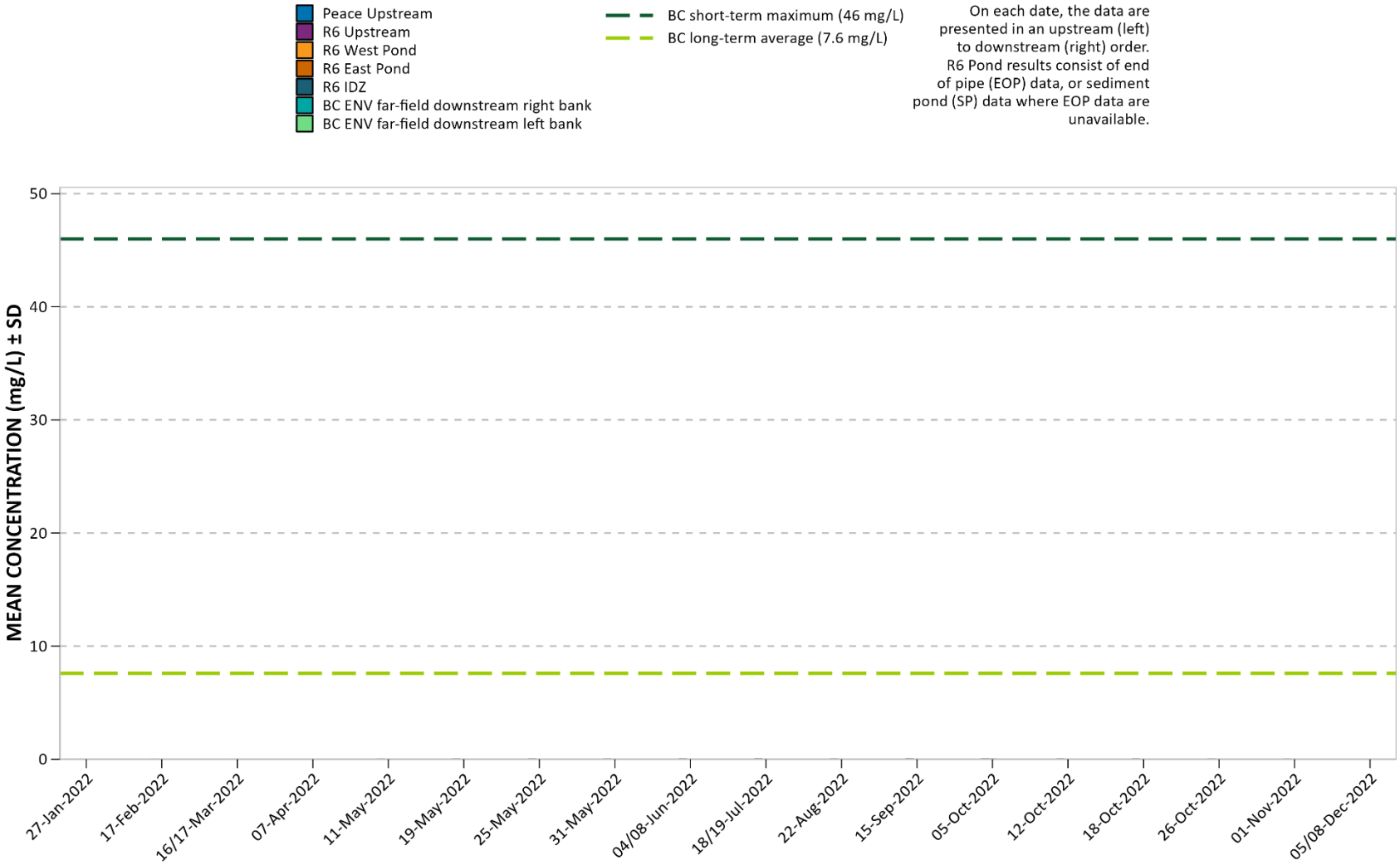


Figure 40. 2022 Peace River and RSEM R6 pond total nickel (Ni).

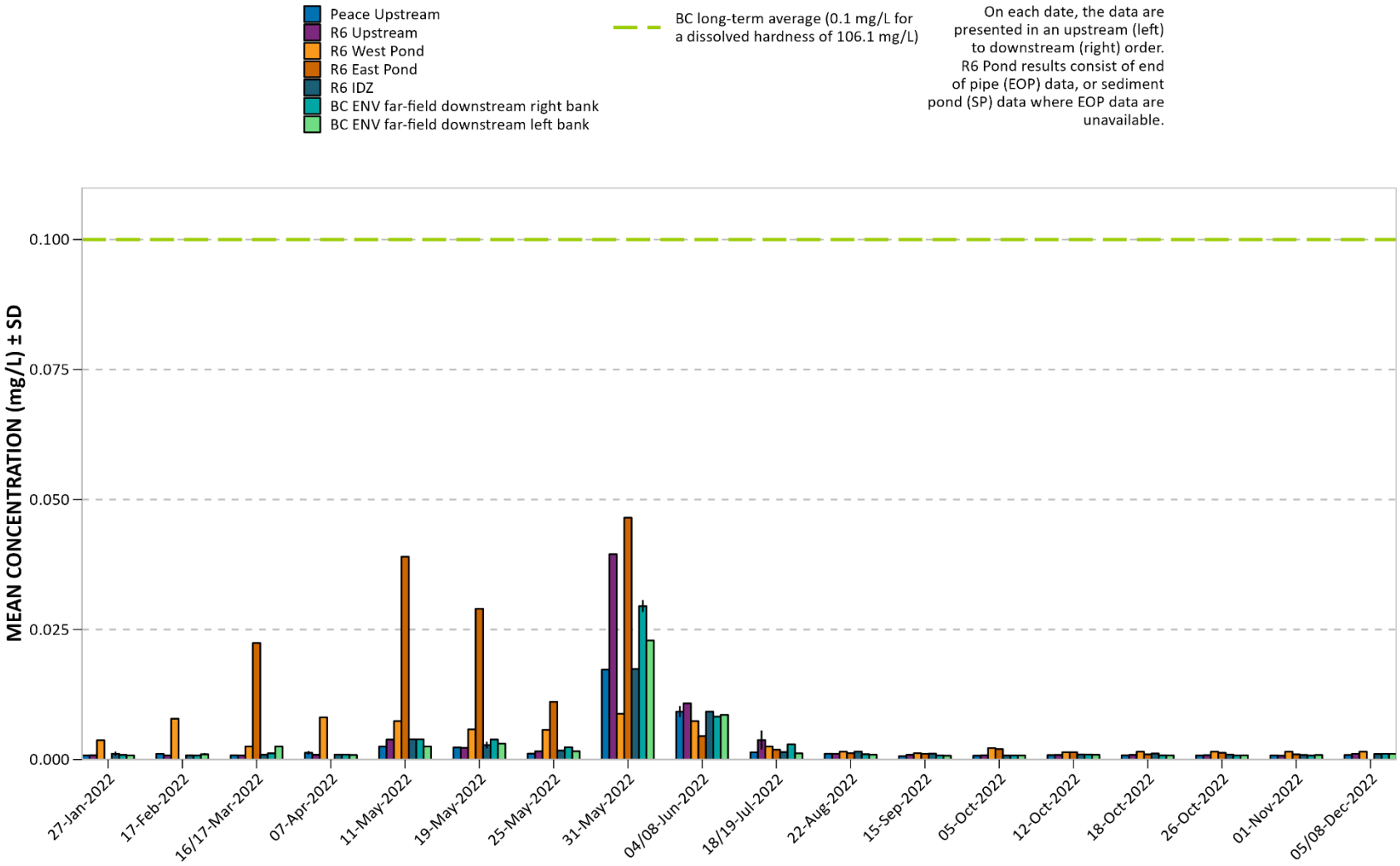


Figure 41. 2022 Peace River and RSEM R6 pond total potassium (K).

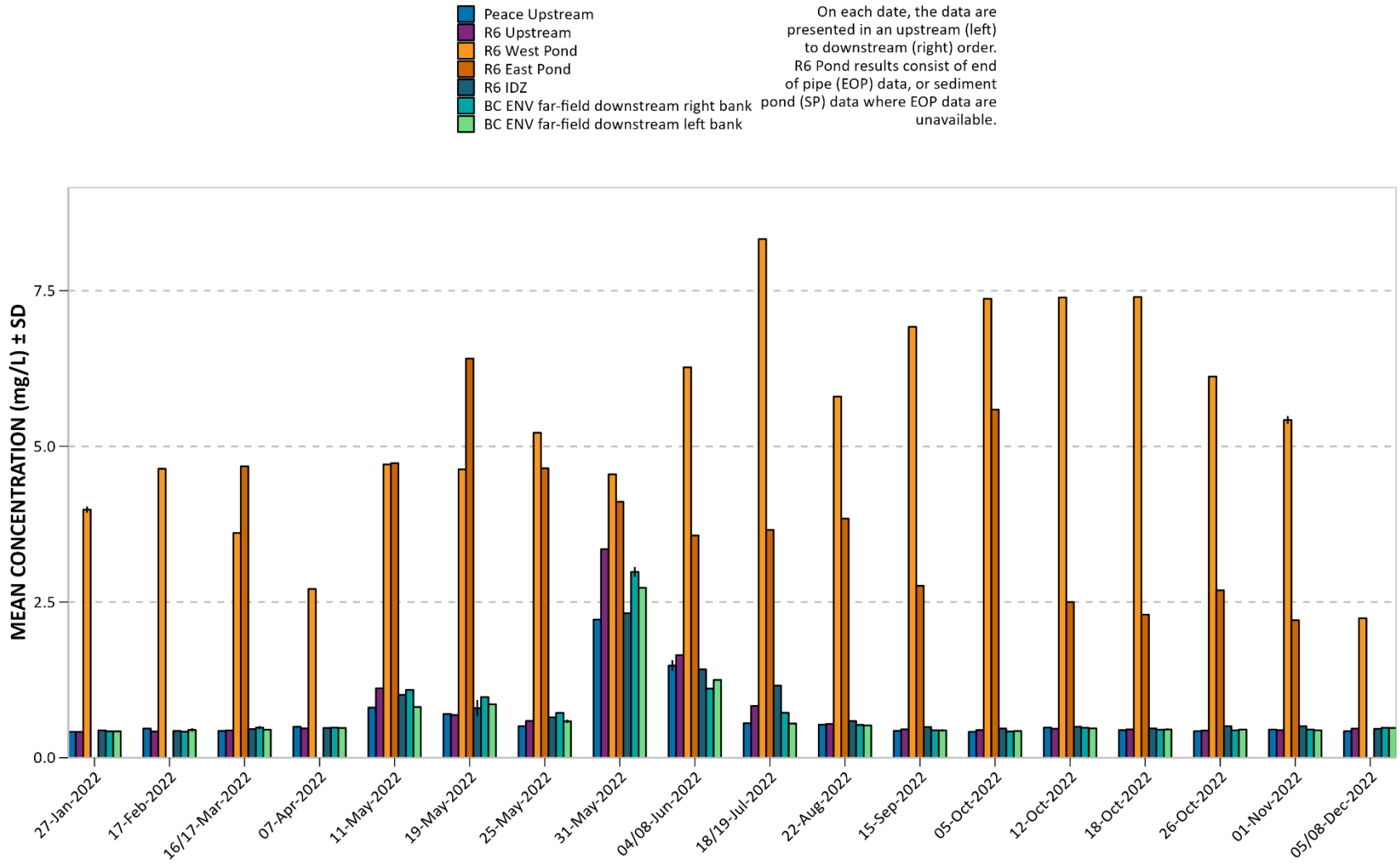


Figure 42. 2022 Peace River and RSEM R6 pond total selenium (Se).

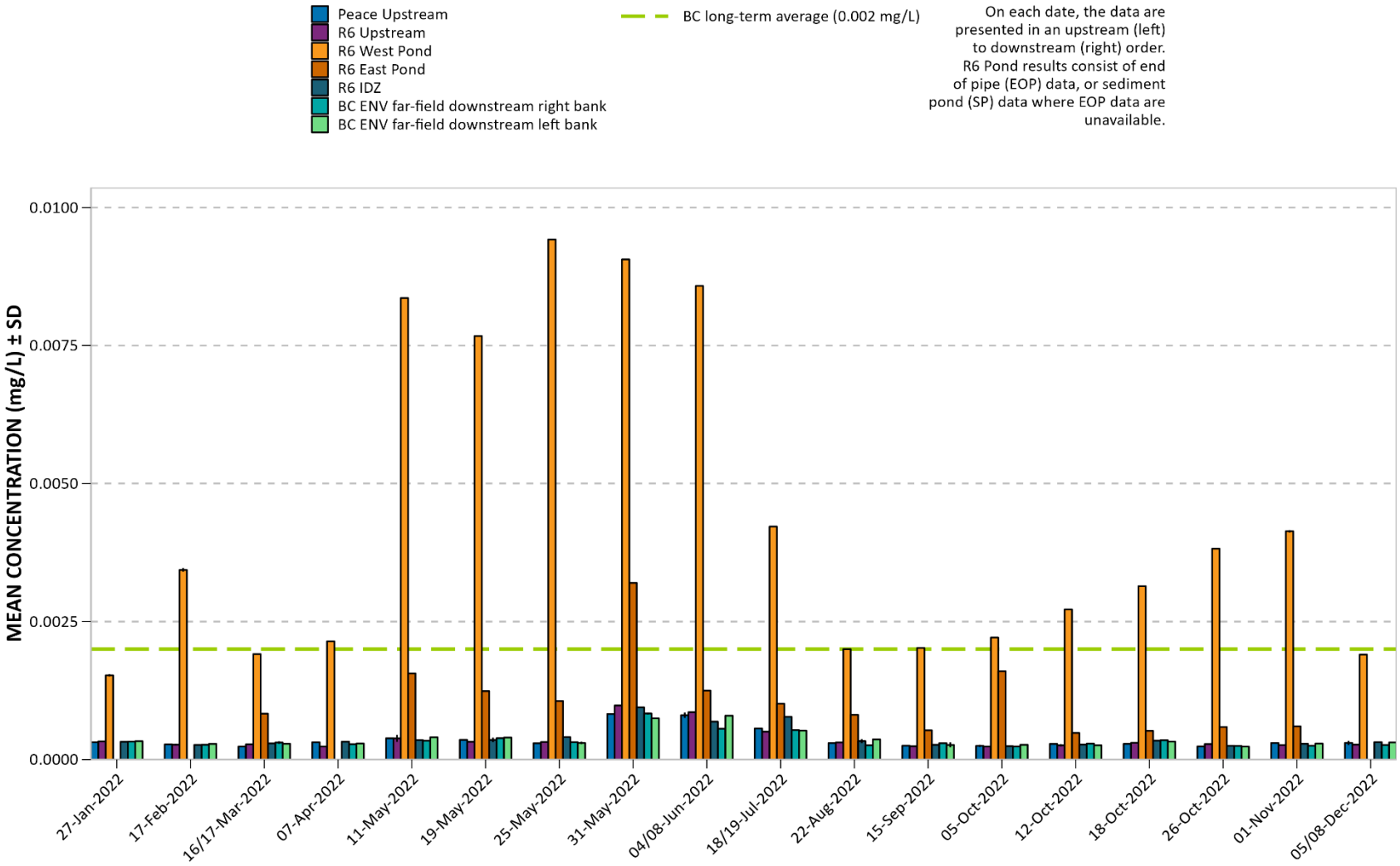


Figure 43. 2022 Peace River and RSEM R6 pond total silicon (Si).

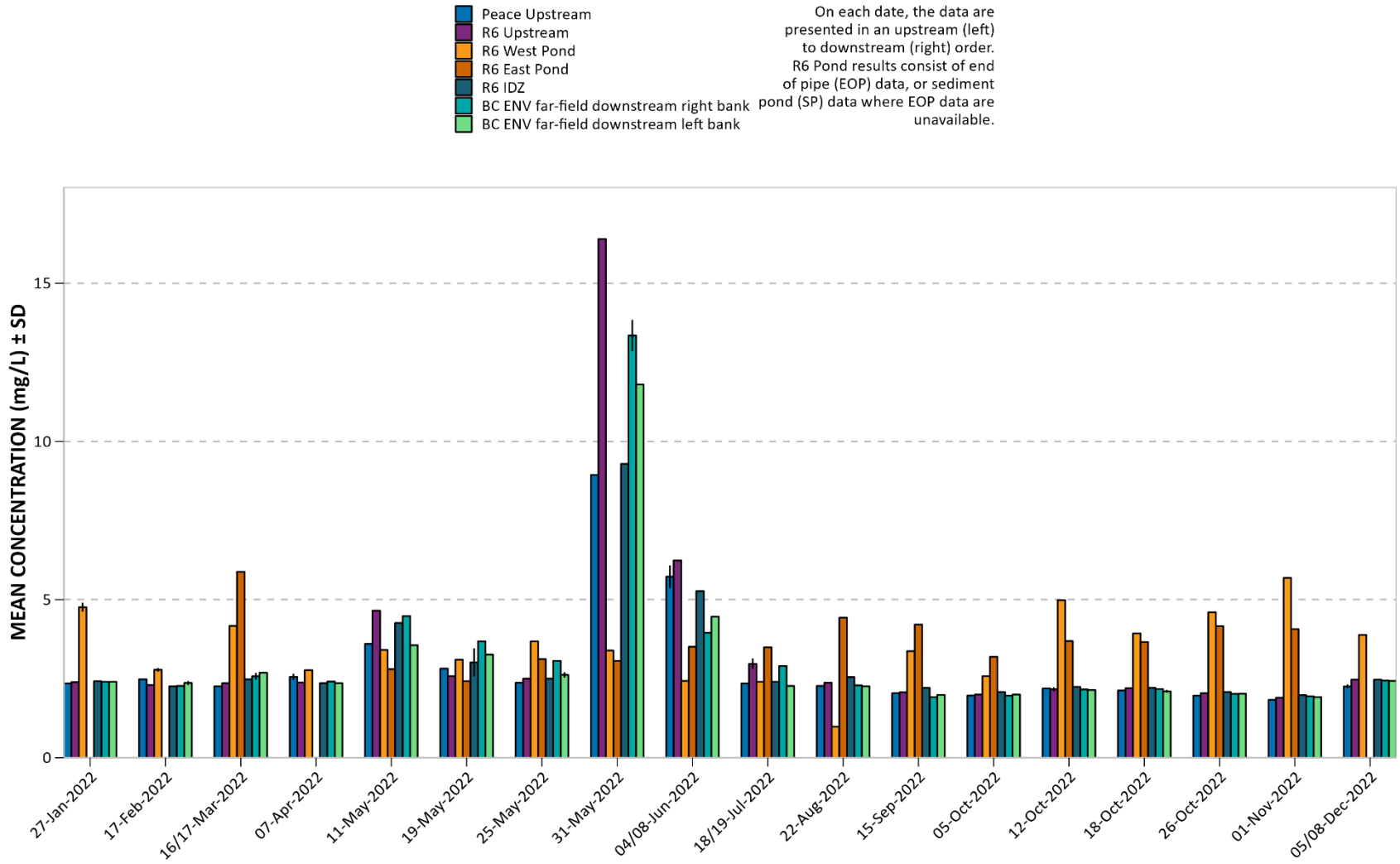


Figure 44. 2022 Peace River and RSEM R6 pond total silver (Ag).

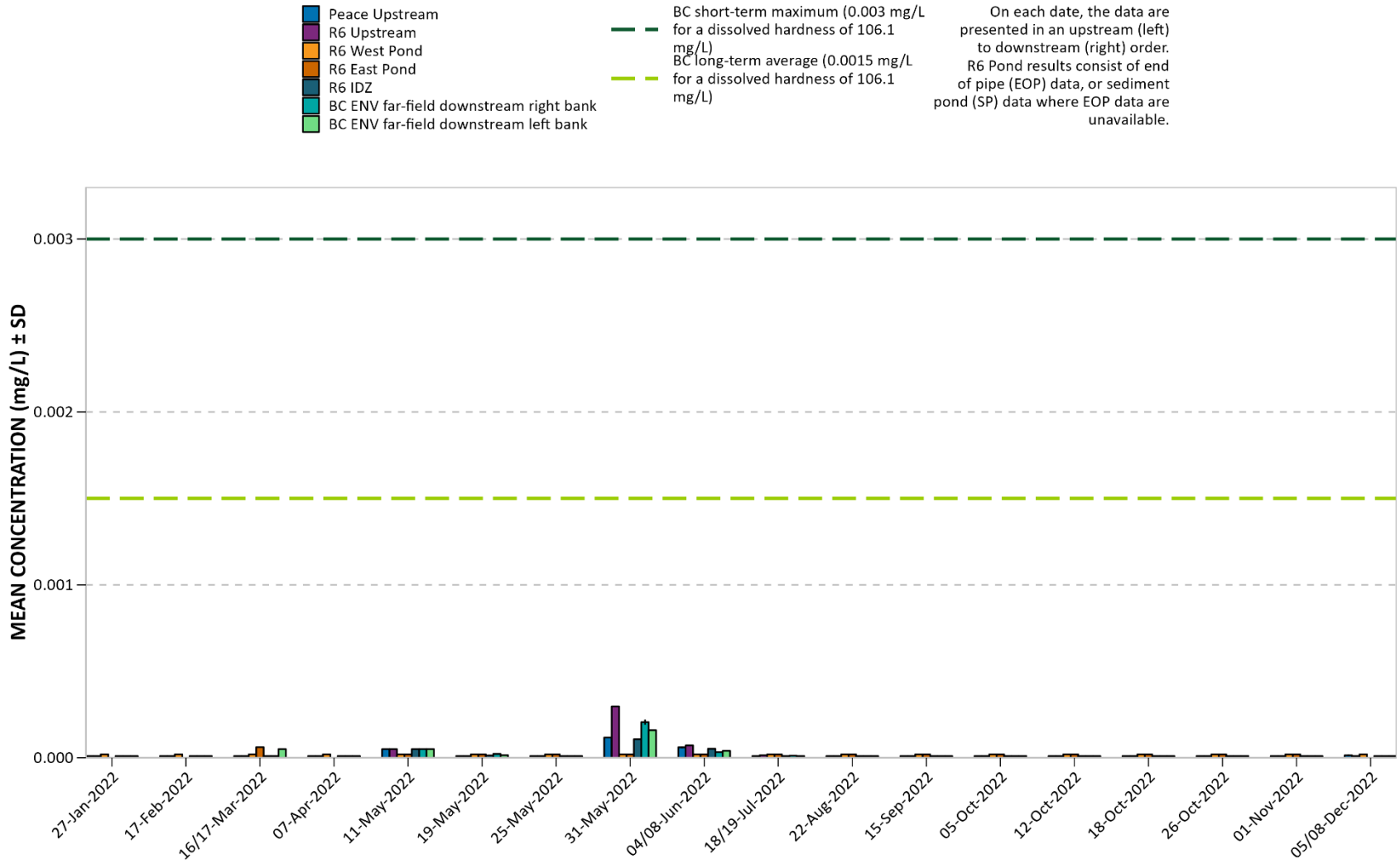


Figure 45. 2022 Peace River and RSEM R6 pond total sodium (Na).

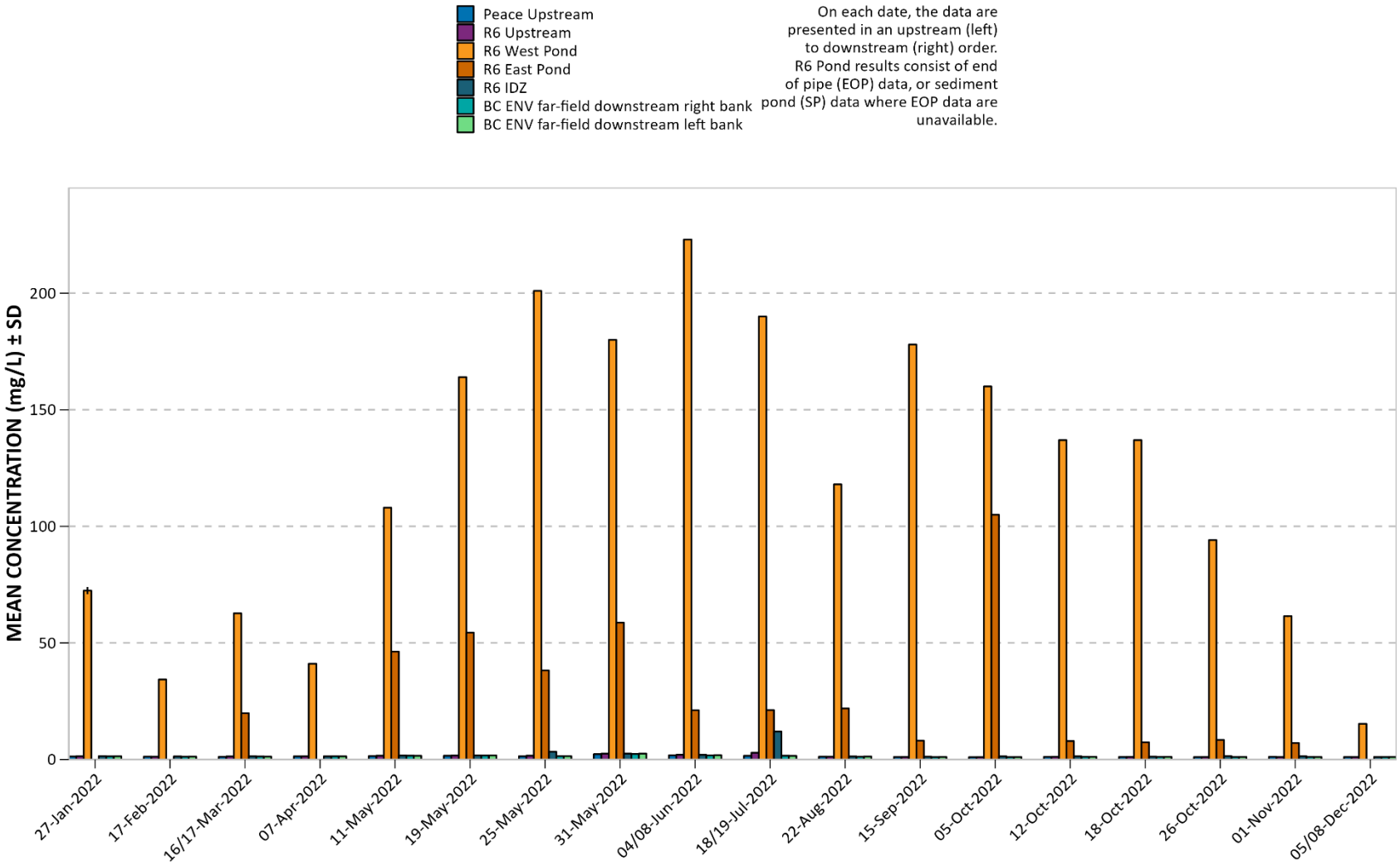


Figure 46. 2022 Peace River and RSEM R6 pond total strontium (Sr).

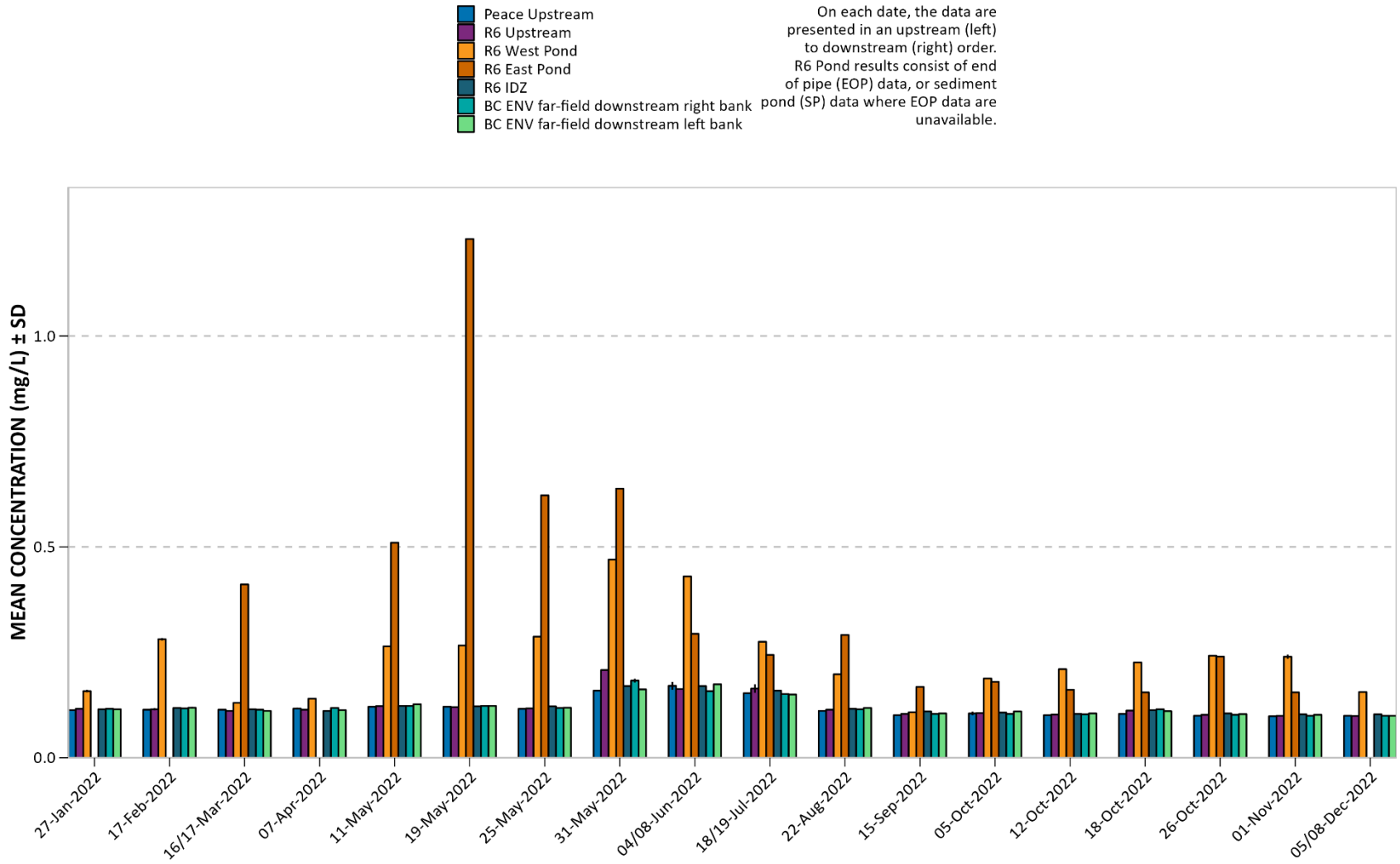


Figure 47. 2022 Peace River and RSEM R6 pond total sulfur (S).

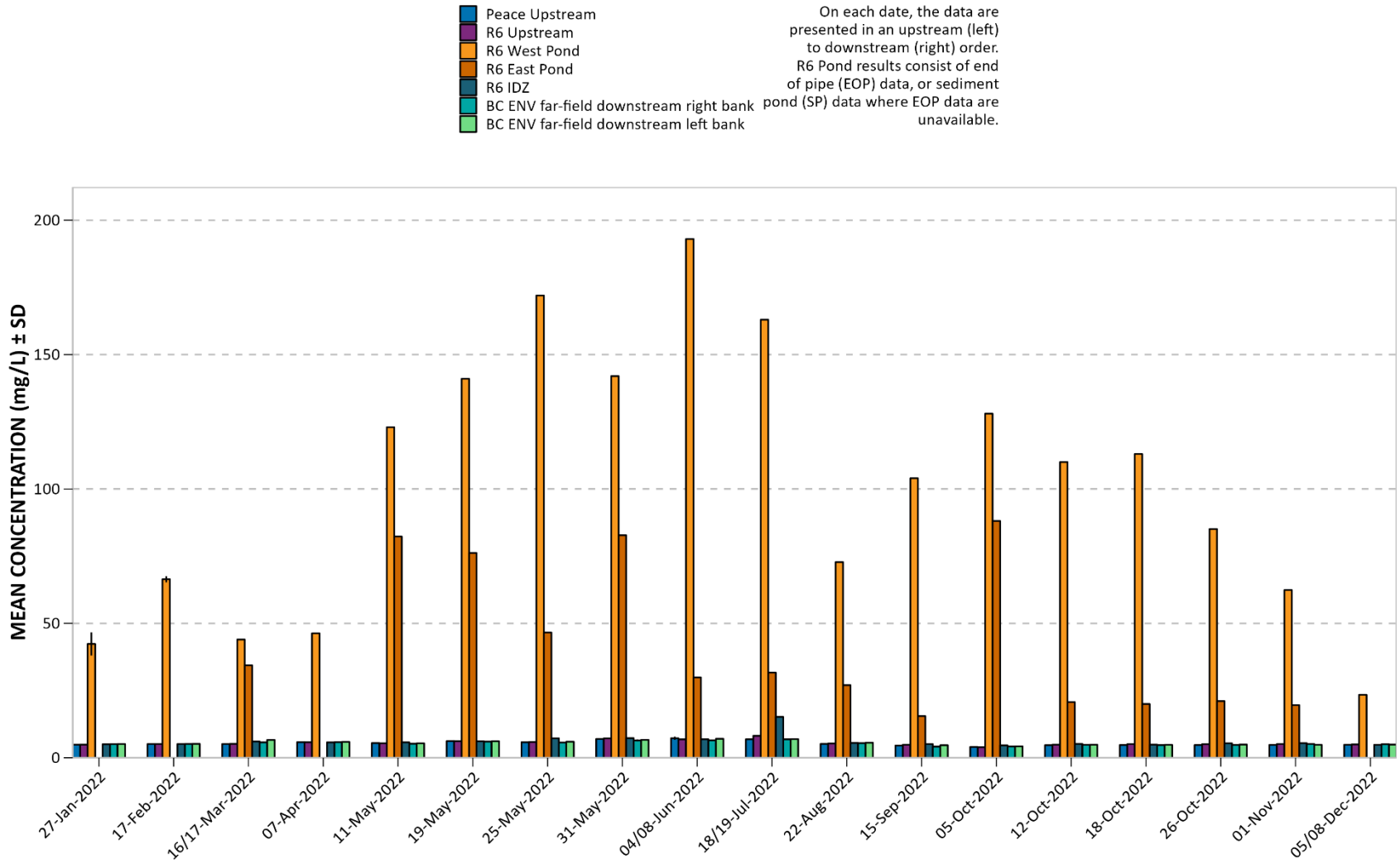


Figure 48. 2022 Peace River and RSEM R6 pond total thallium (Tl).

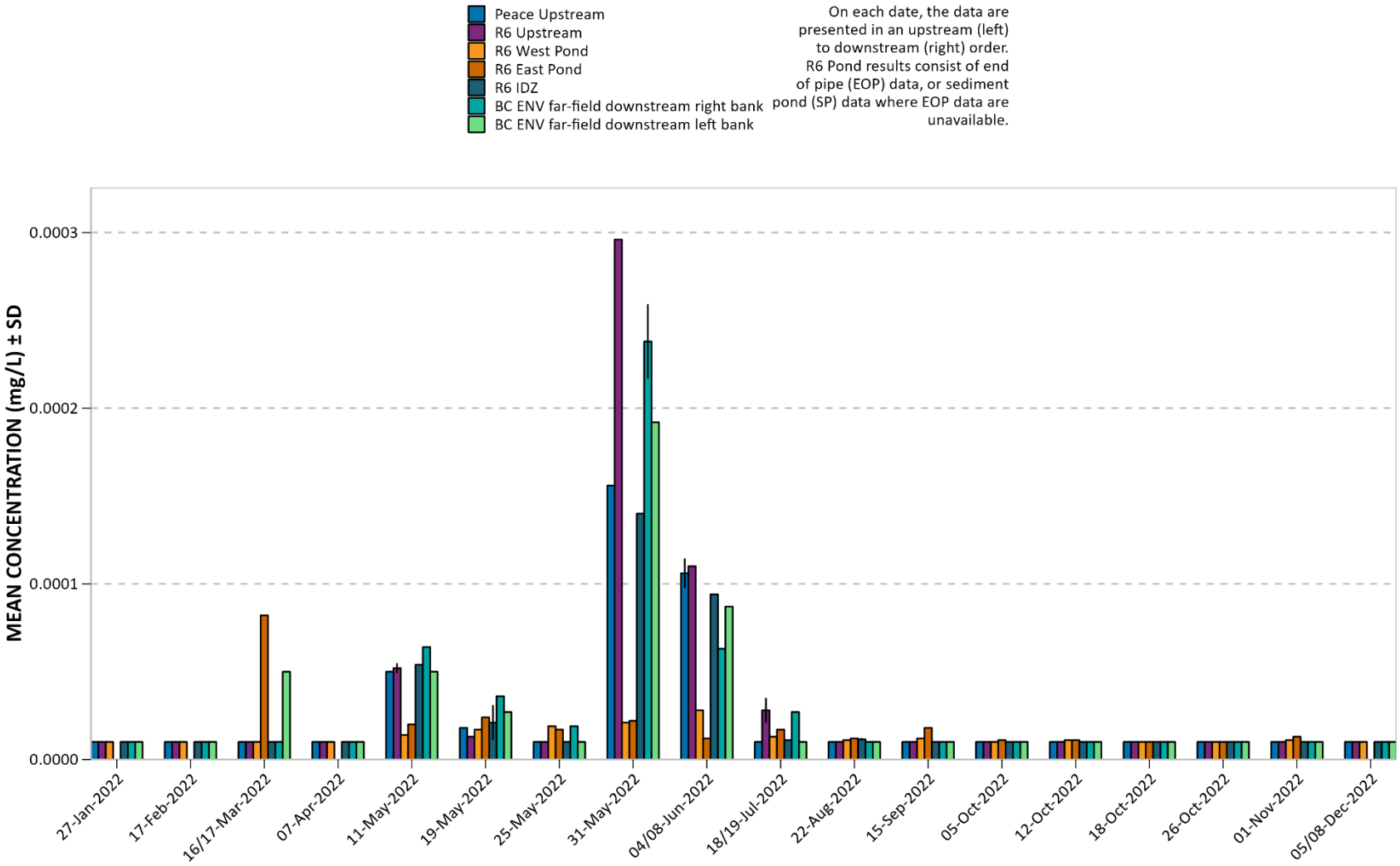


Figure 49. 2022 Peace River and RSEM R6 pond total tin (Sn).

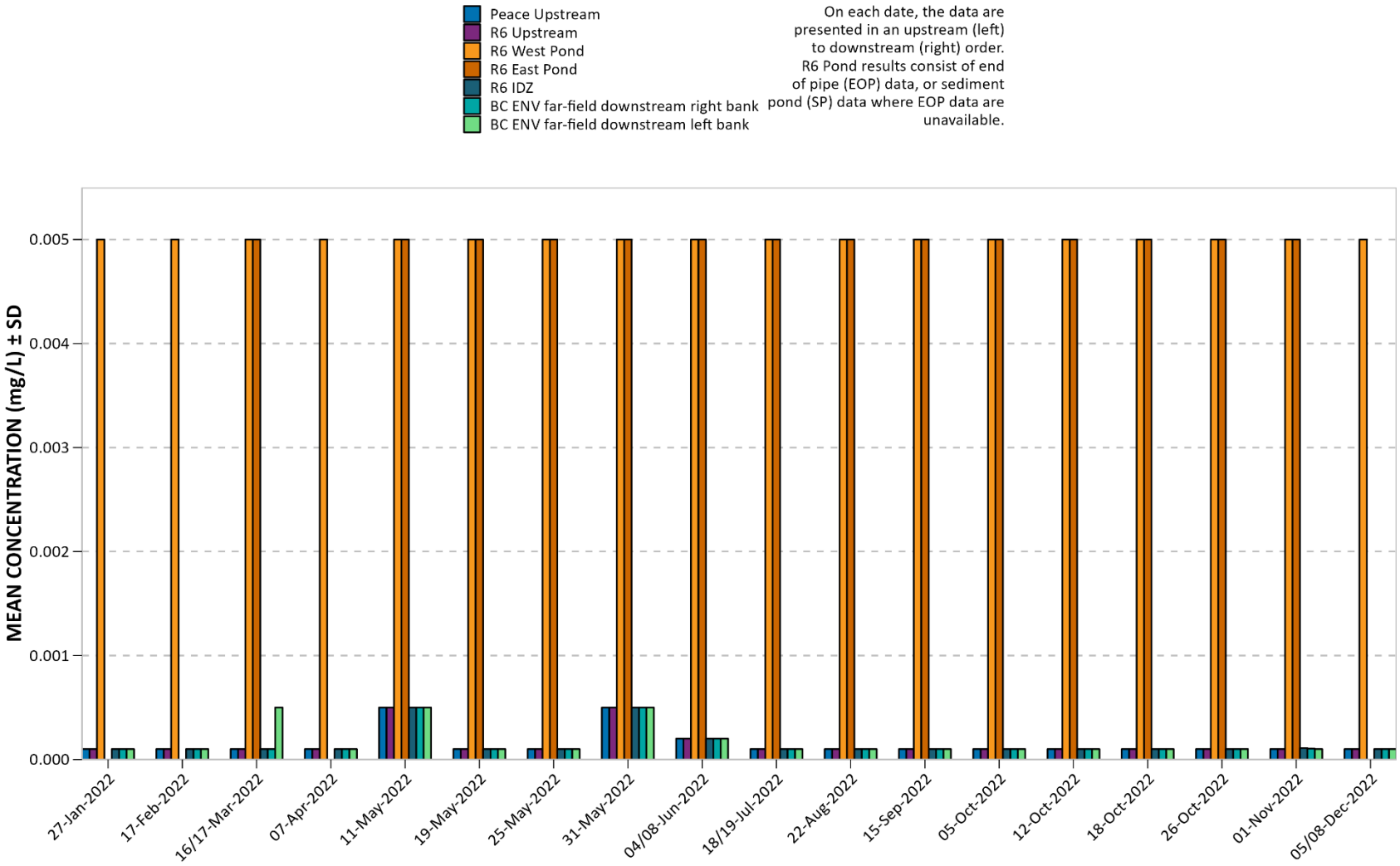


Figure 50. 2022 Peace River and RSEM R6 pond total titanium (Ti).

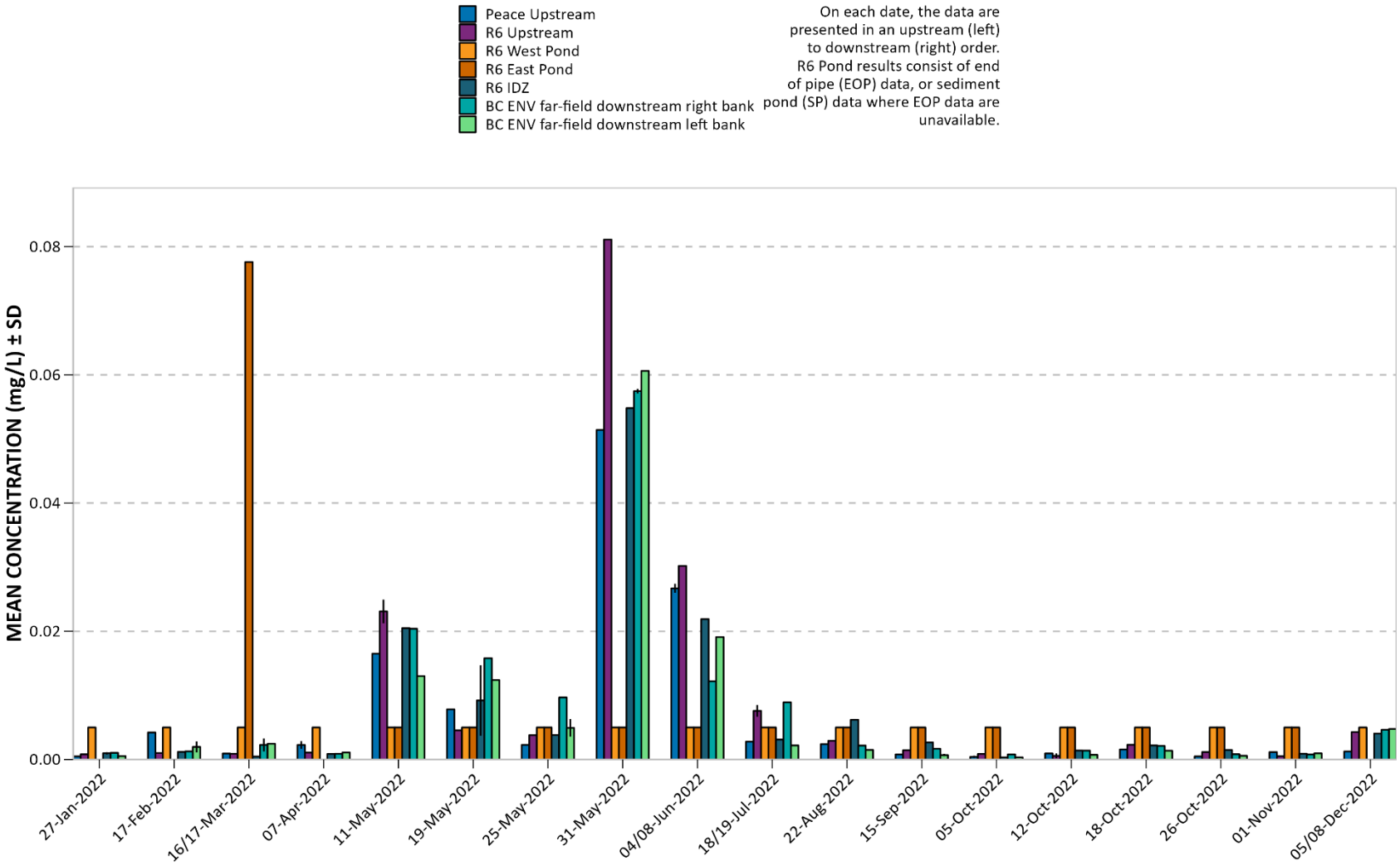


Figure 51. 2022 Peace River and RSEM R6 pond total uranium (U).

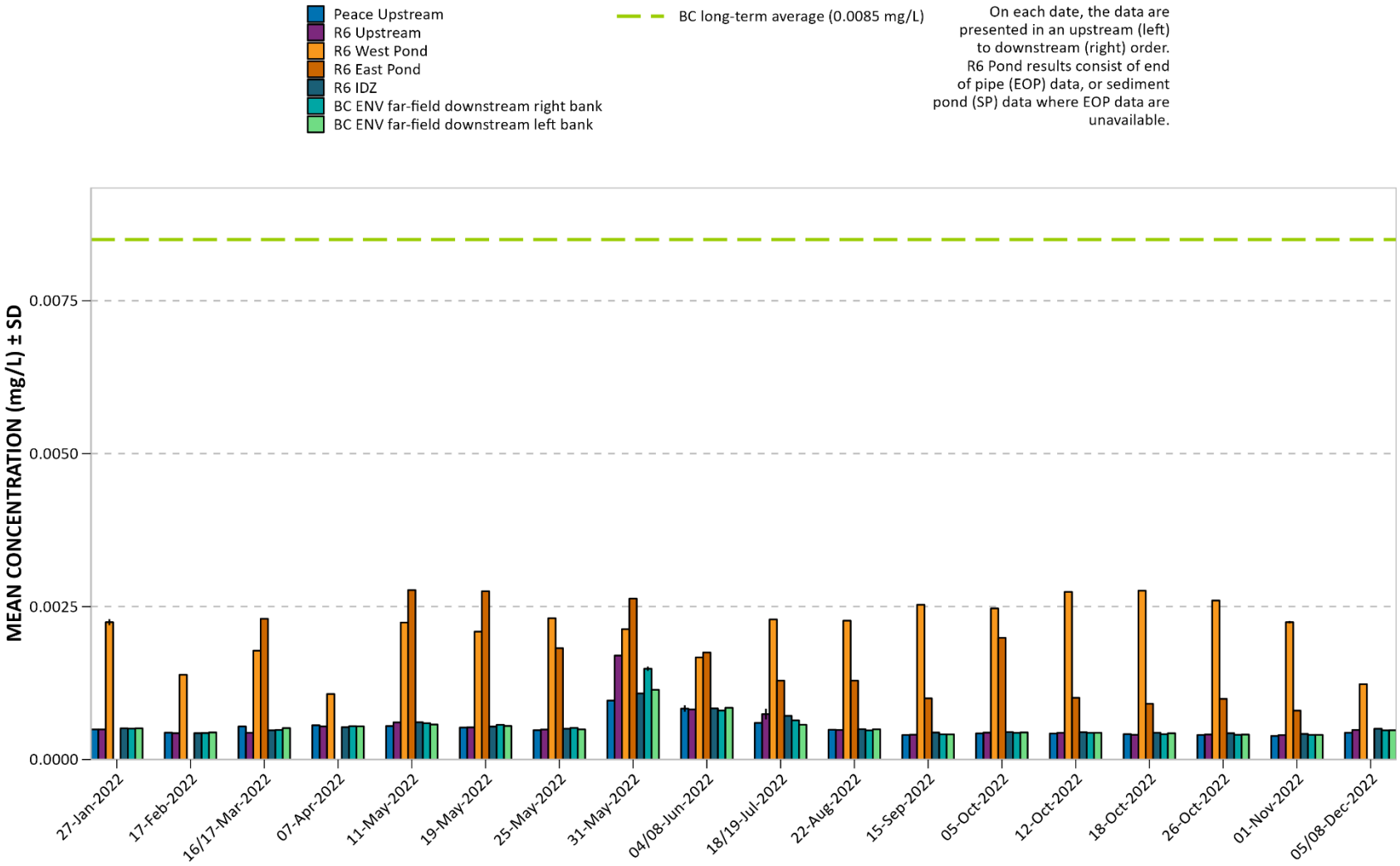


Figure 52. 2022 Peace River and RSEM R6 pond total vanadium (V).

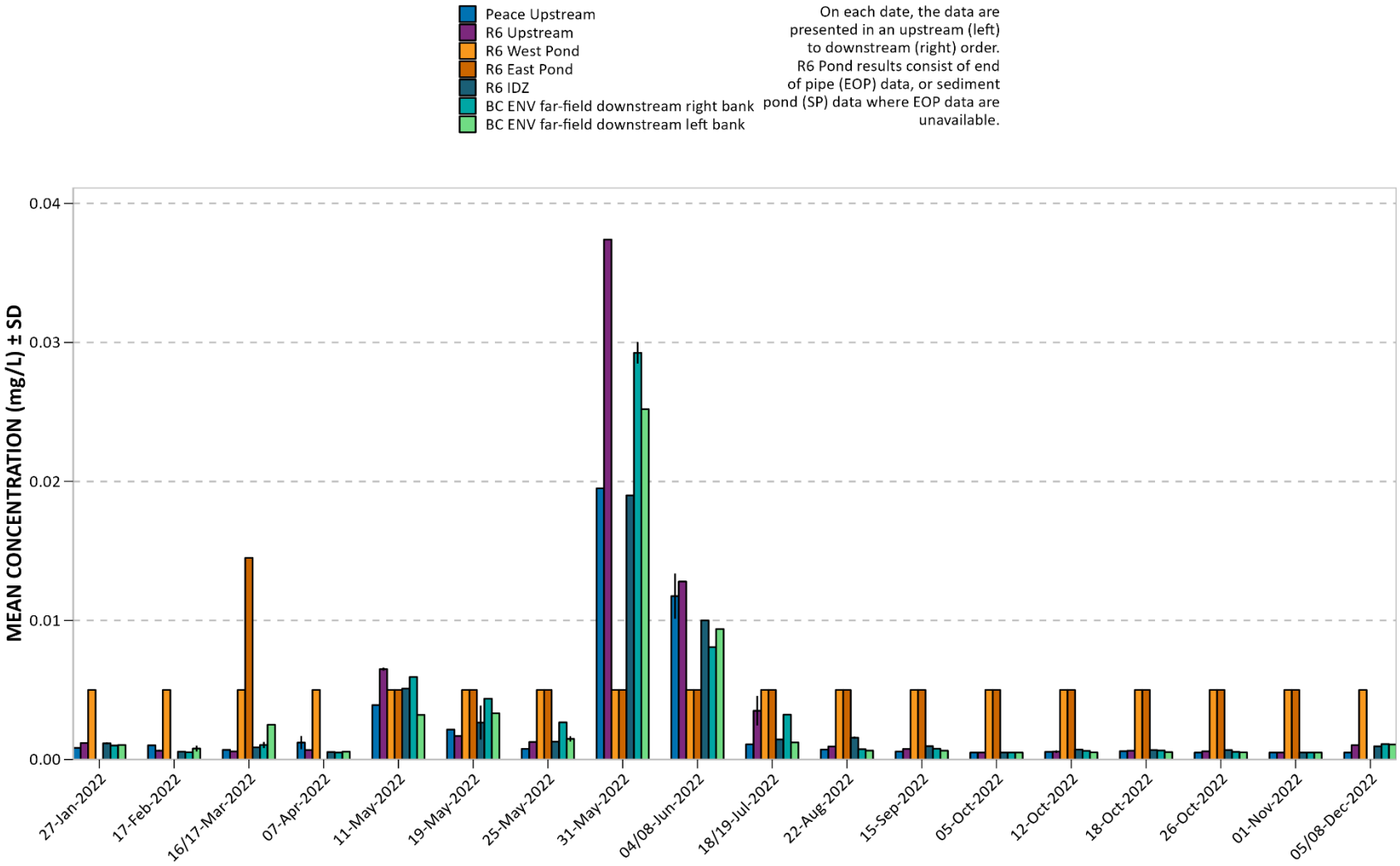
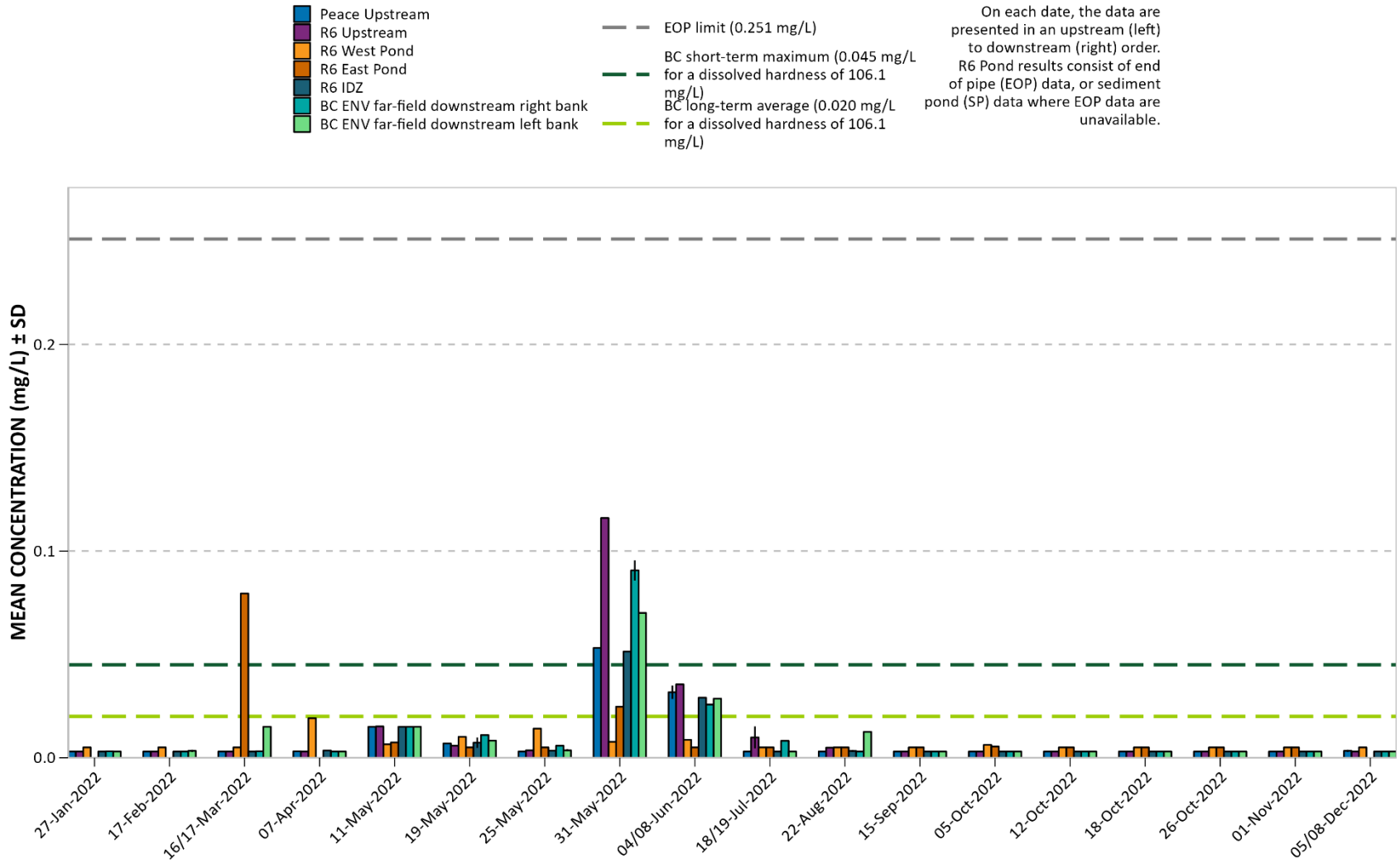


Figure 53. 2022 Peace River and RSEM R6 pond total zinc (Zn).



Note: BC WQG for total zinc is dissolved hardness dependent. An average Peace River dissolved 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 dissolved hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 54. 2022 Peace River and RSEM R6 pond total zirconium (Zr).

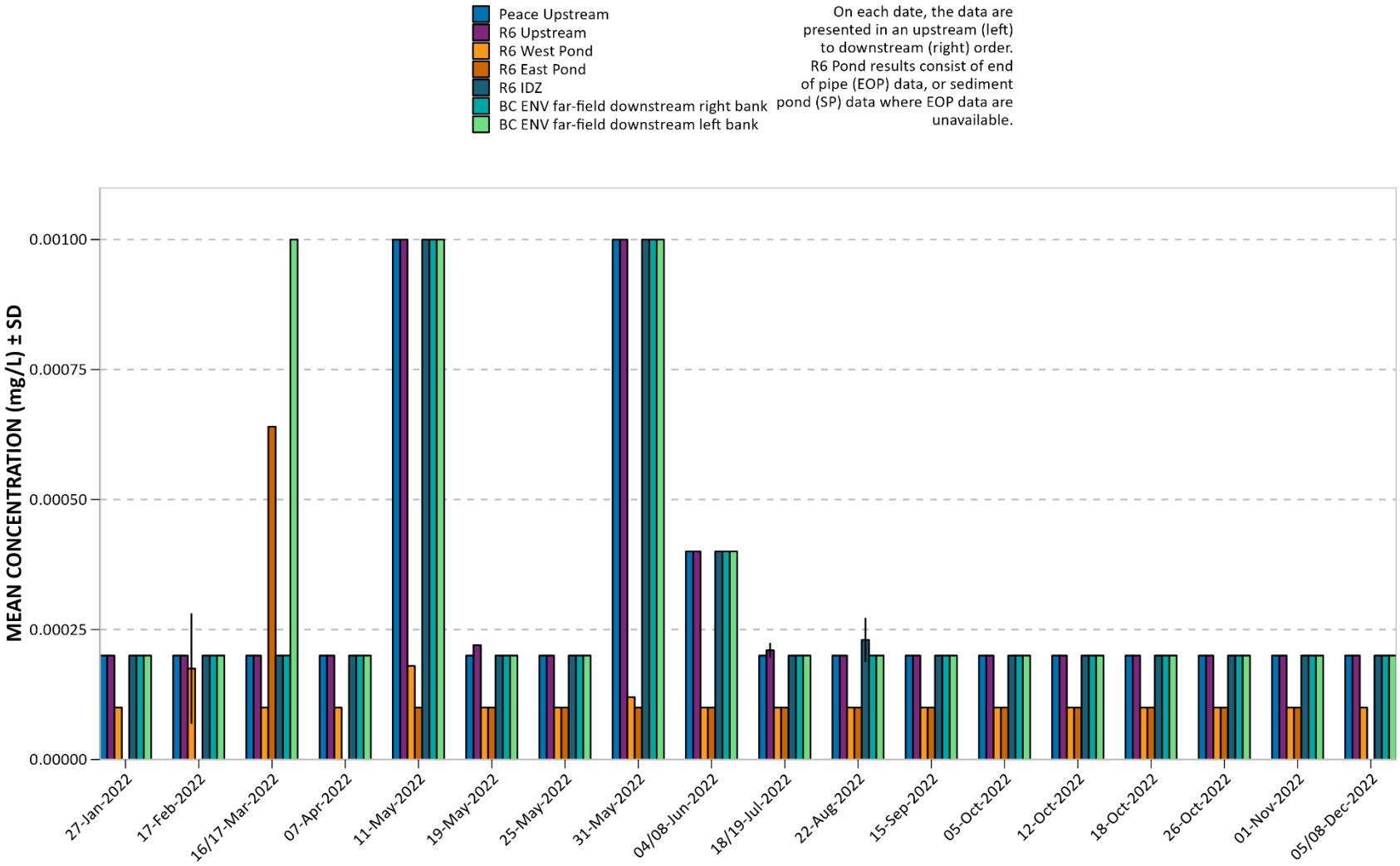


Figure 55. 2022 Peace River and RSEM R6 pond dissolved aluminum (Al).

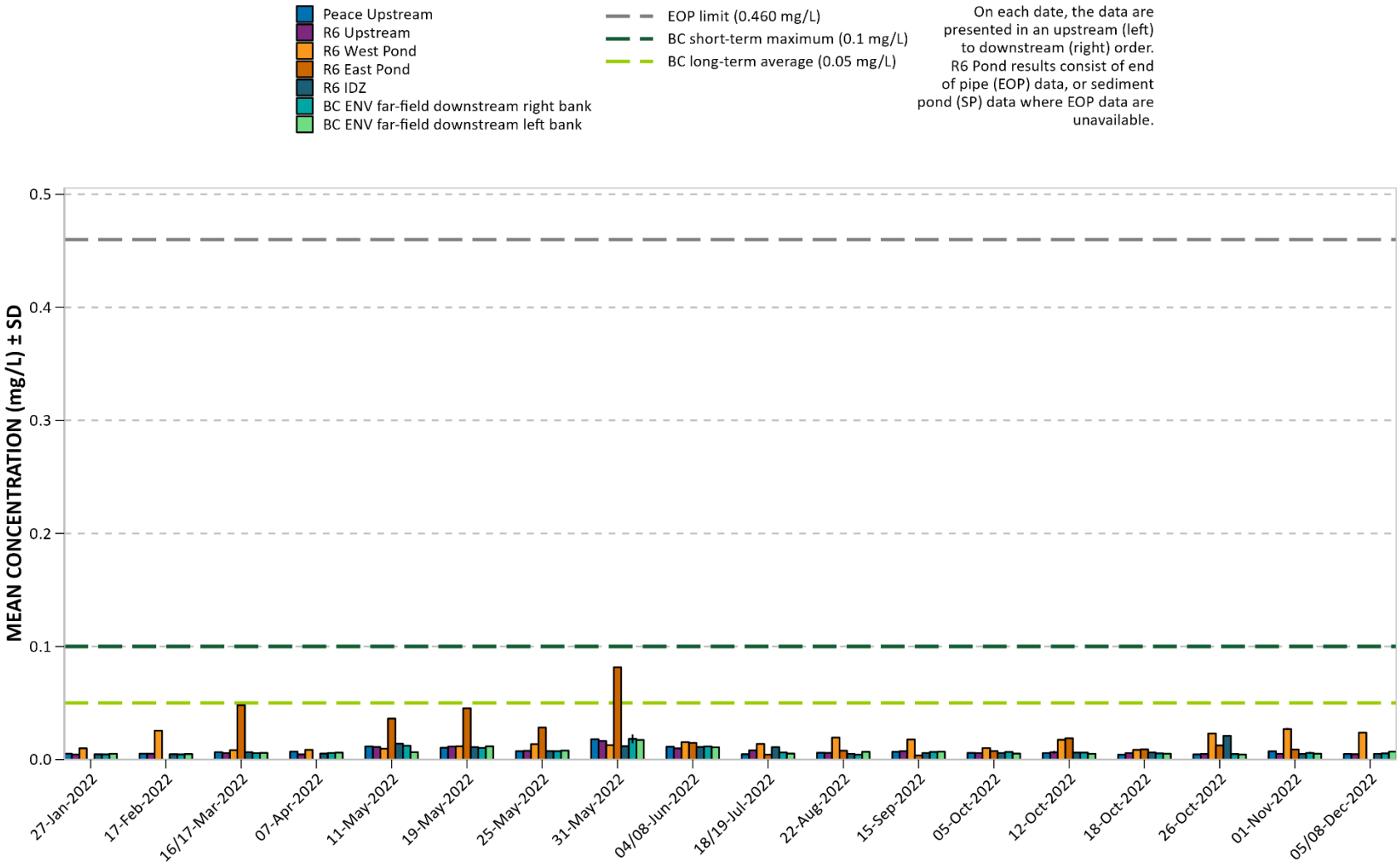


Figure 56. 2022 Peace River and RSEM R6 pond dissolved antimony (Sb).

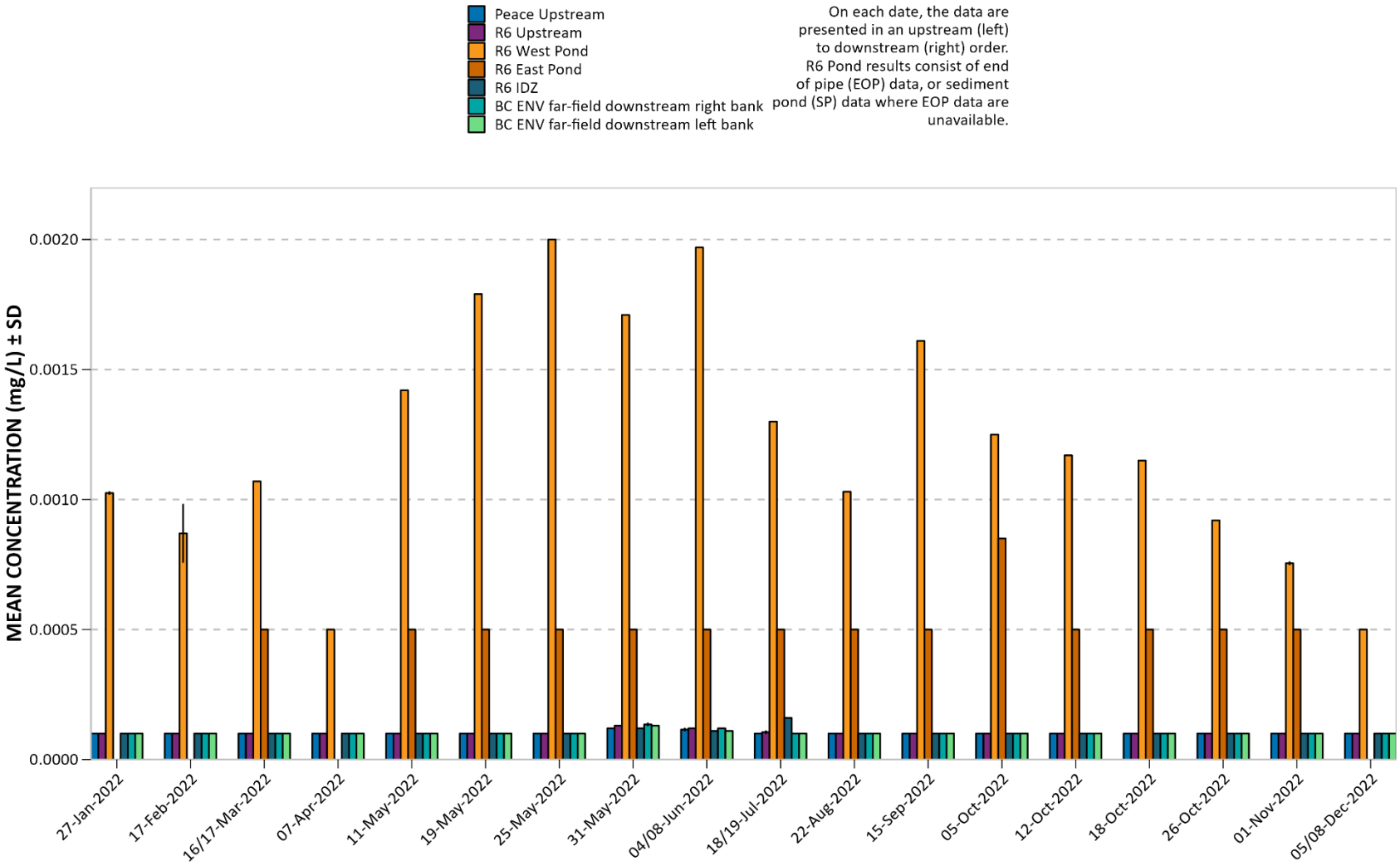


Figure 57. 2022 Peace River and RSEM R6 pond dissolved arsenic (As).

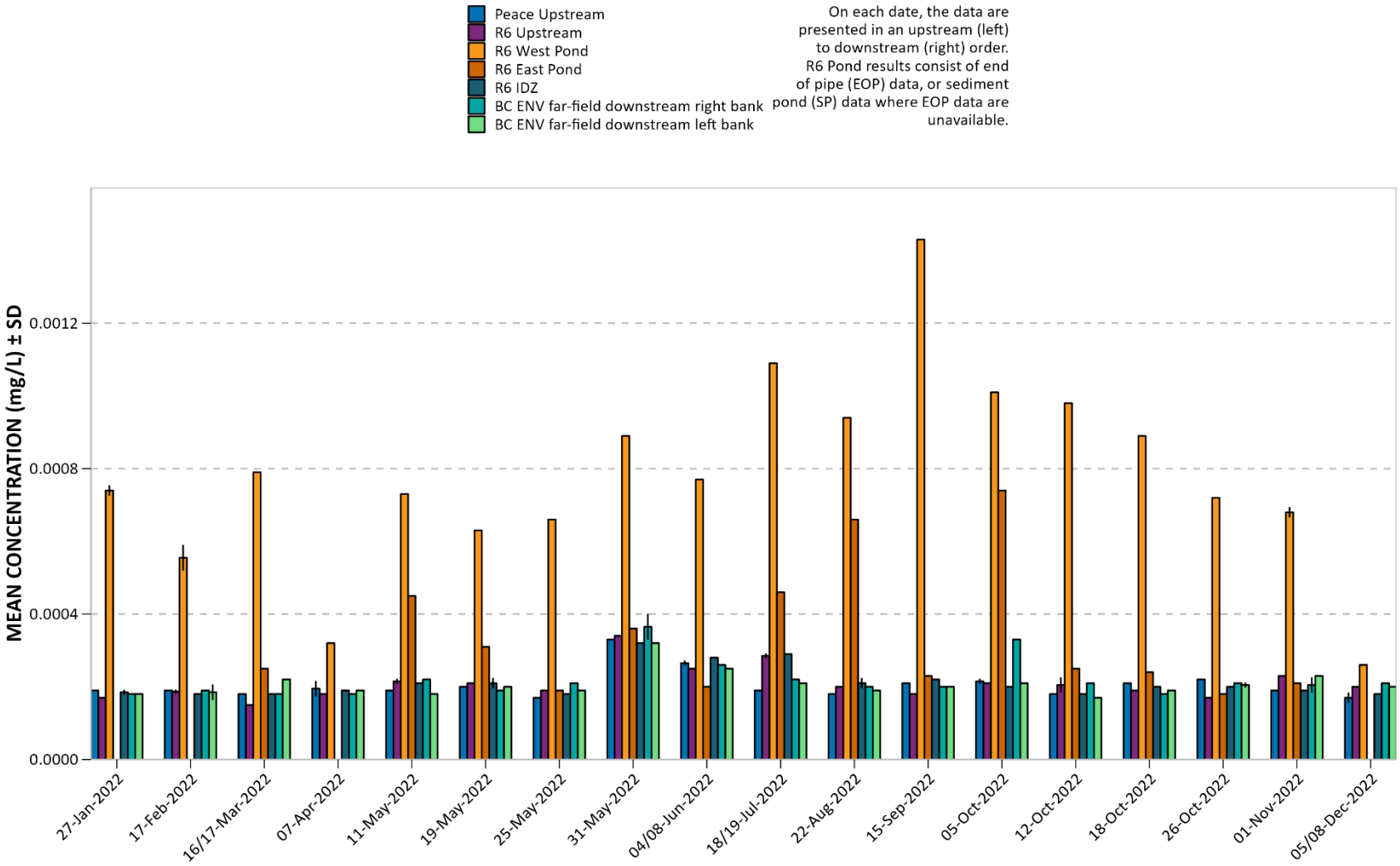


Figure 58. 2022 Peace River and RSEM R6 pond dissolved barium (Ba).

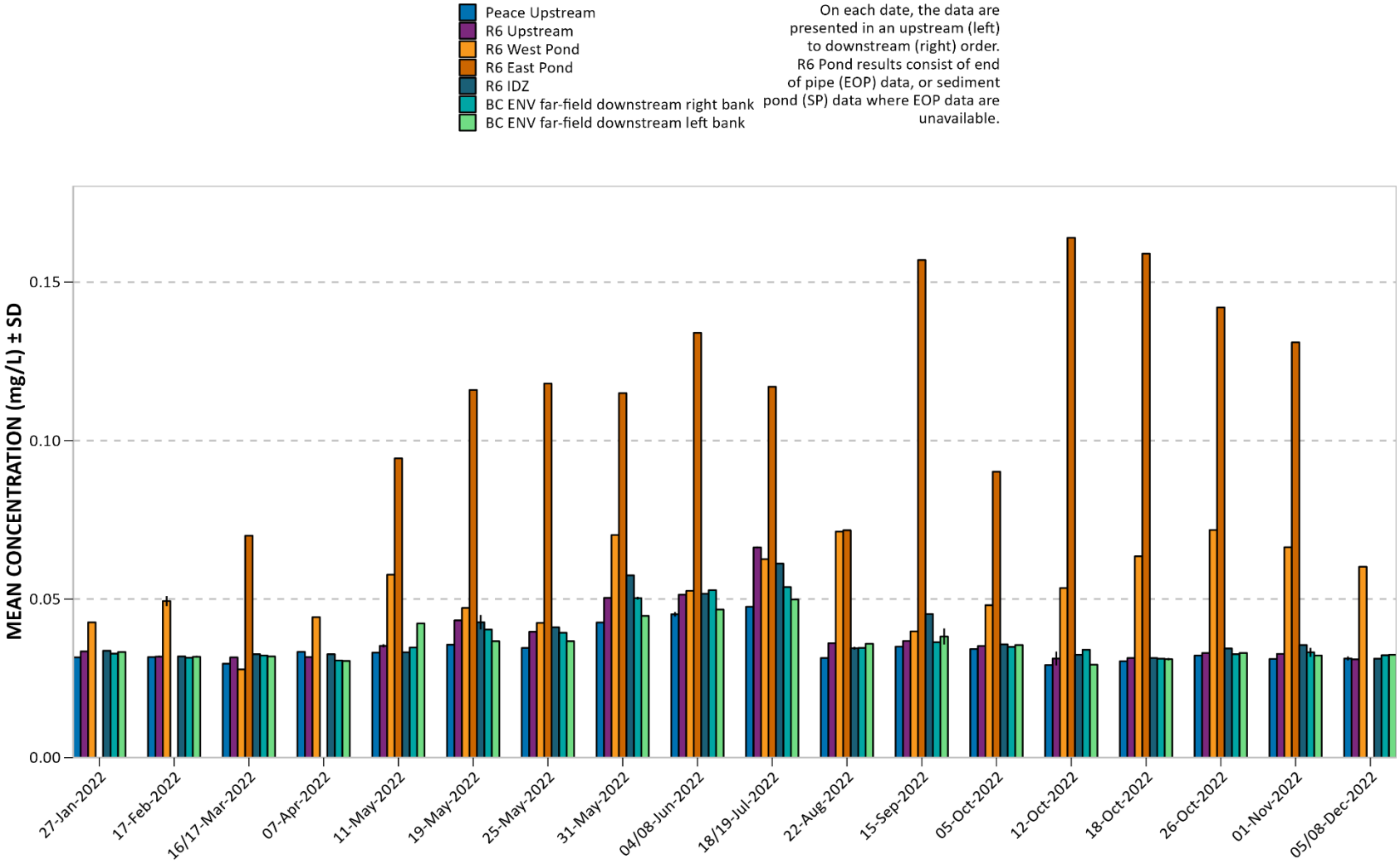


Figure 59. 2022 Peace River and RSEM R6 pond dissolved beryllium (Be).

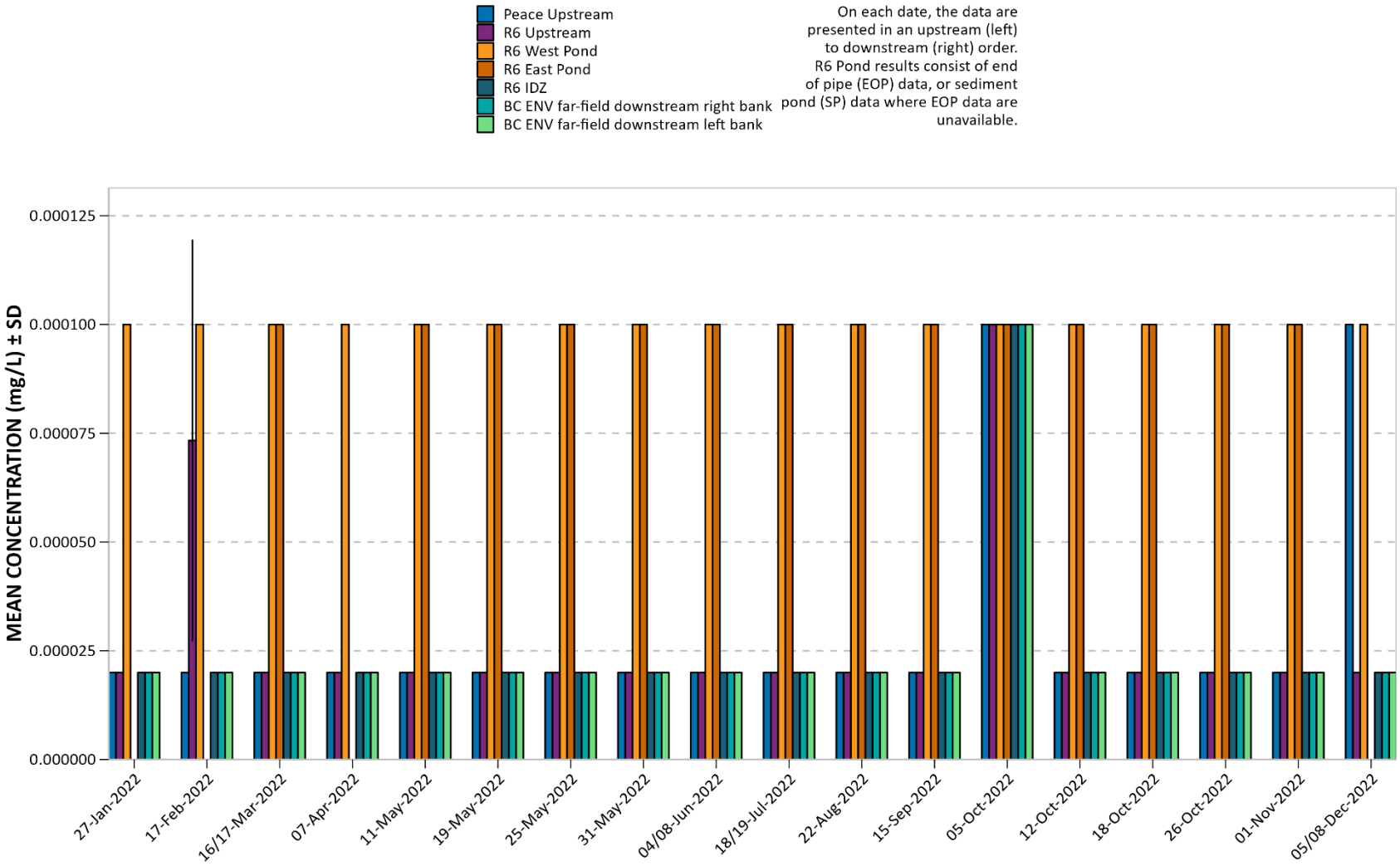


Figure 60. 2022 Peace River and RSEM R6 pond dissolved bismuth (Bi).

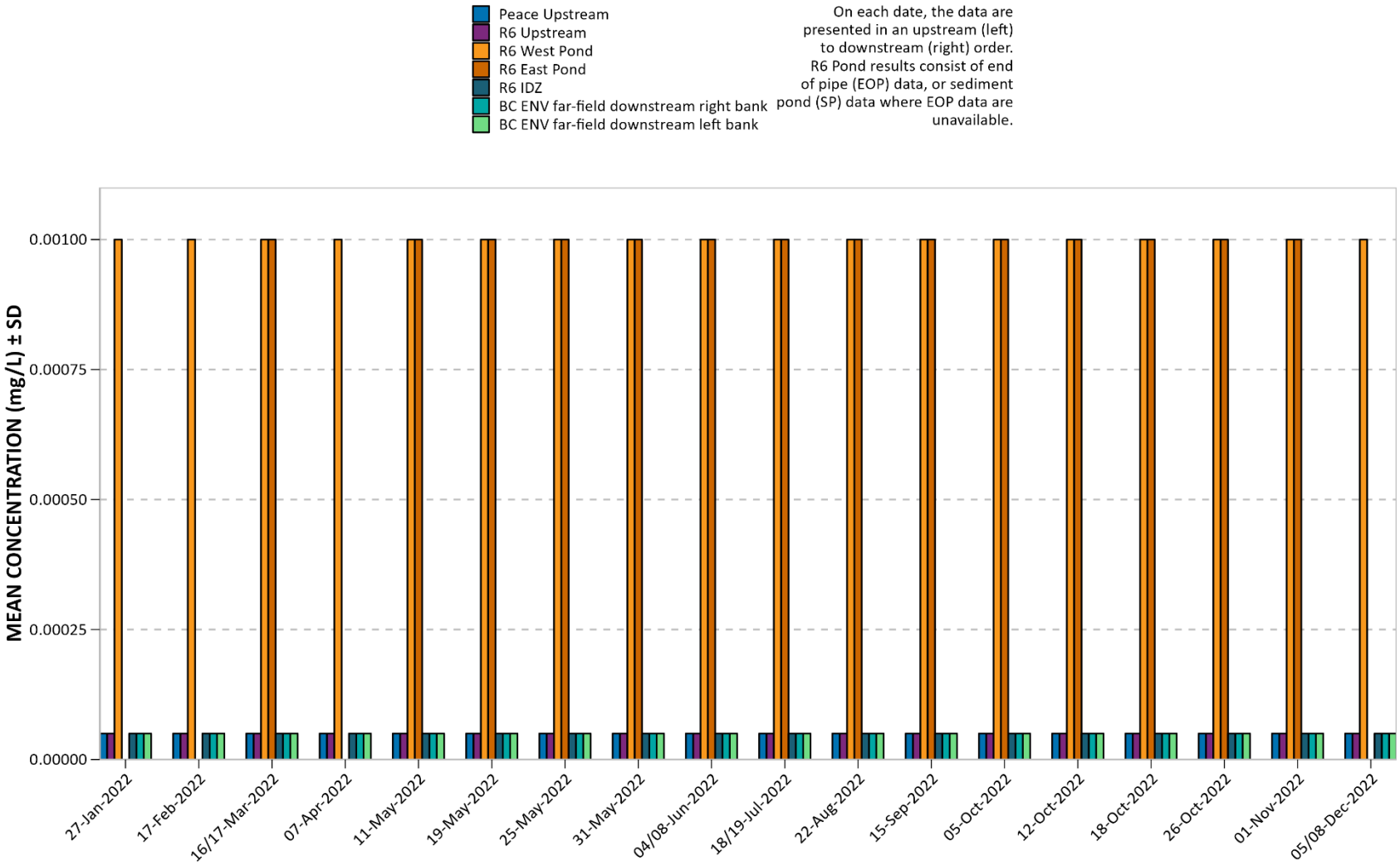


Figure 61. 2022 Peace River and RSEM R6 pond dissolved boron (B).

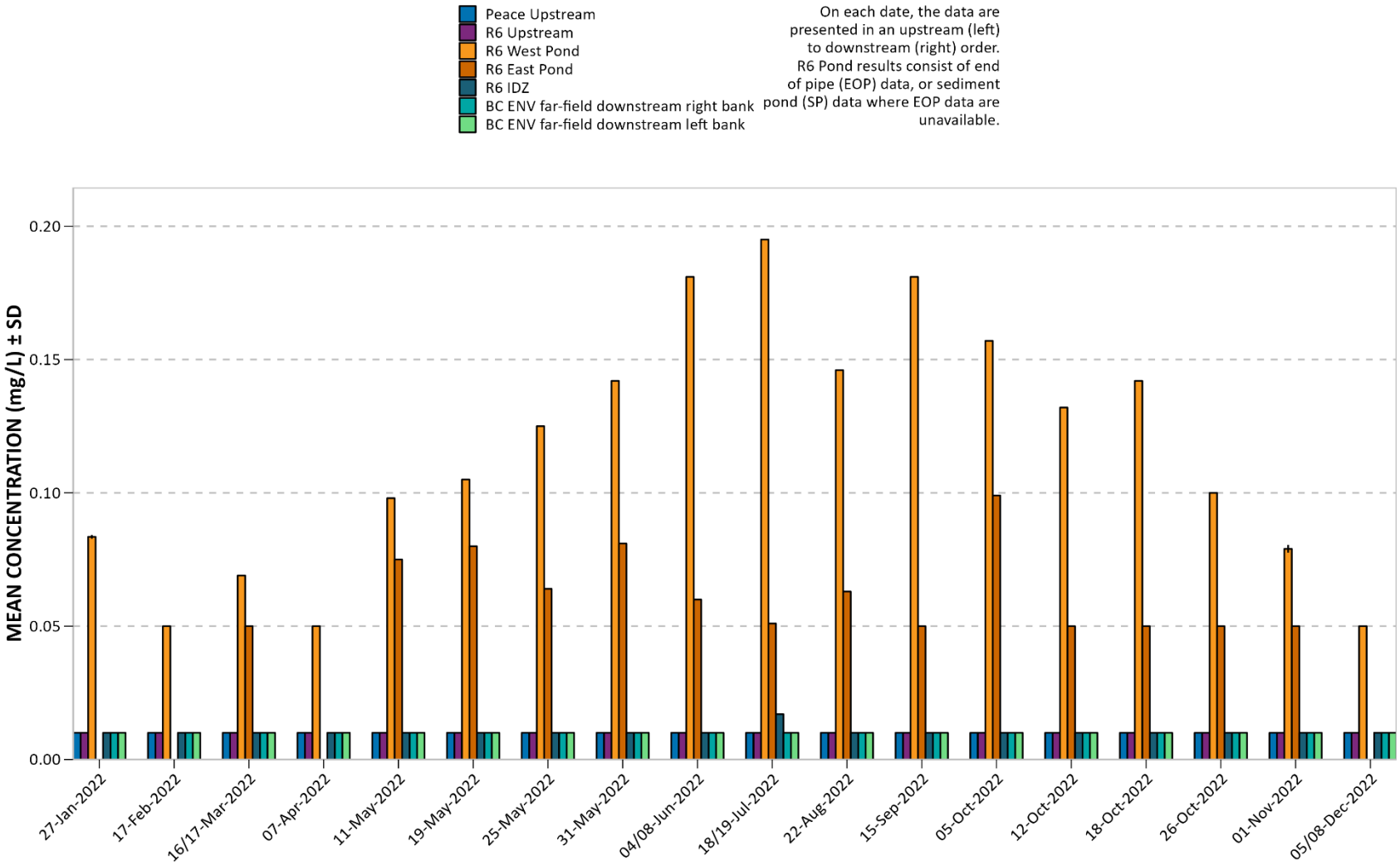


Figure 62. 2022 Peace River and RSEM R6 pond dissolved cadmium (Cd).

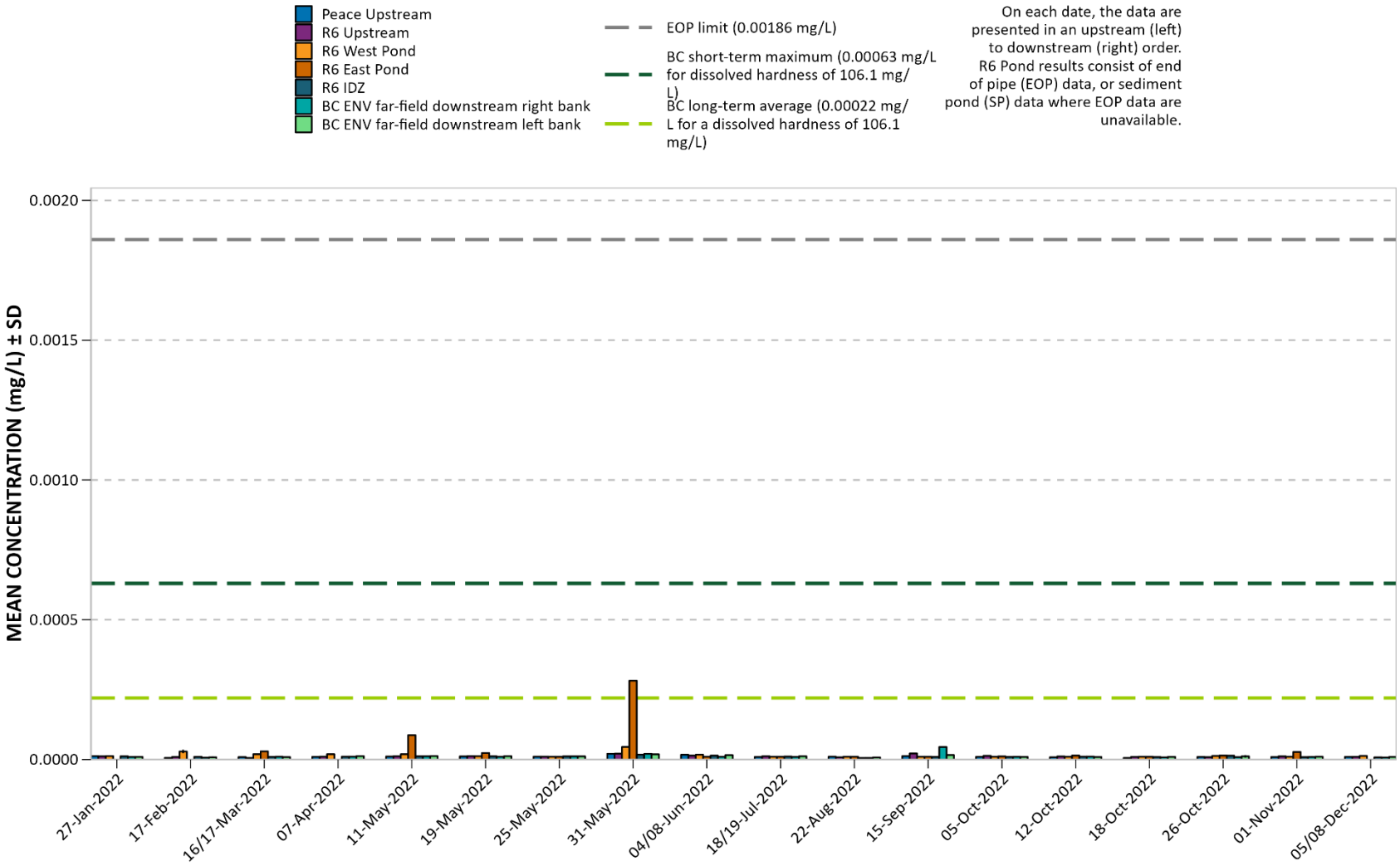


Figure 63. 2022 Peace River and RSEM R6 pond dissolved calcium (Ca).

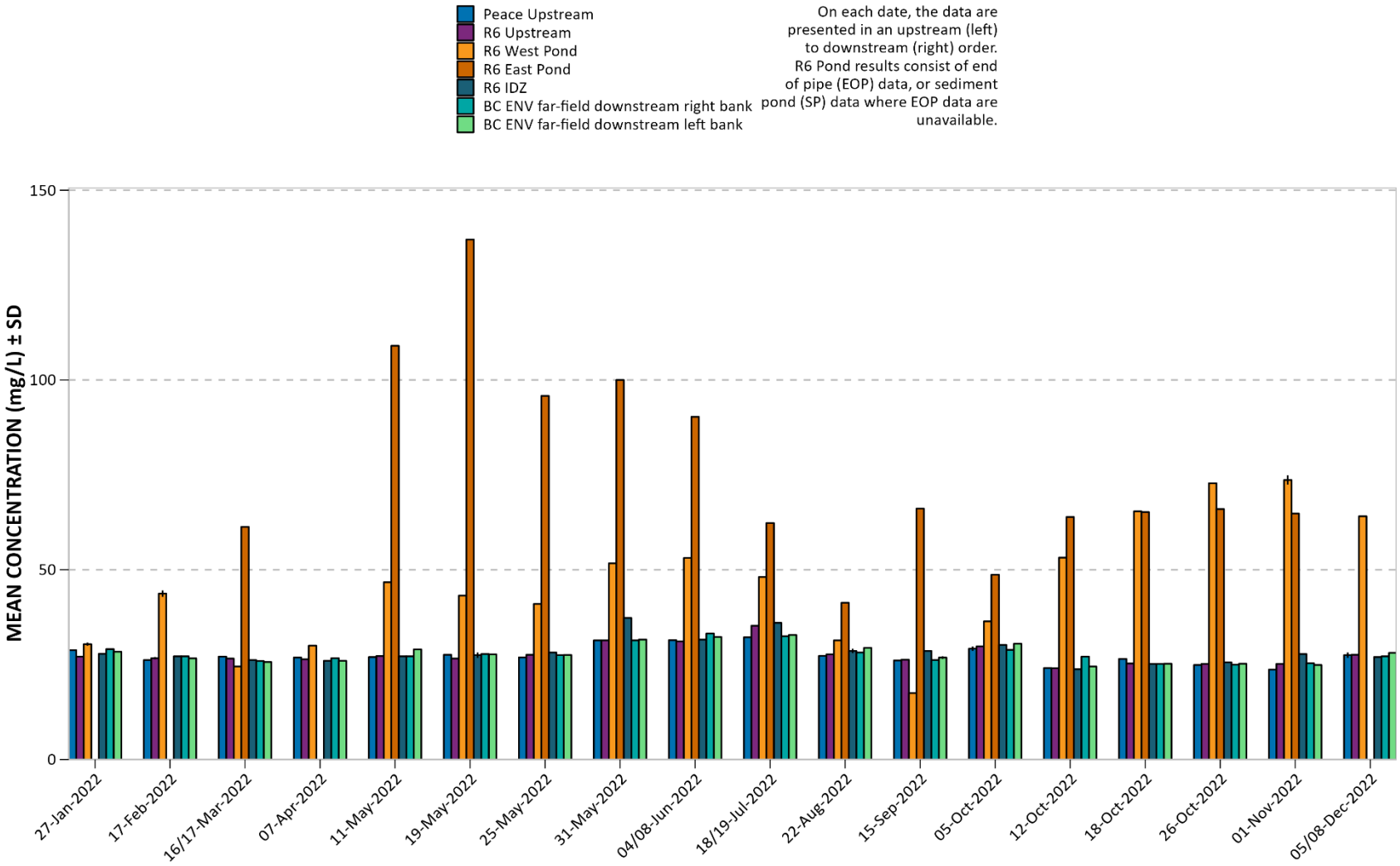


Figure 64. 2022 Peace River and RSEM R6 pond dissolved chromium (Cr).

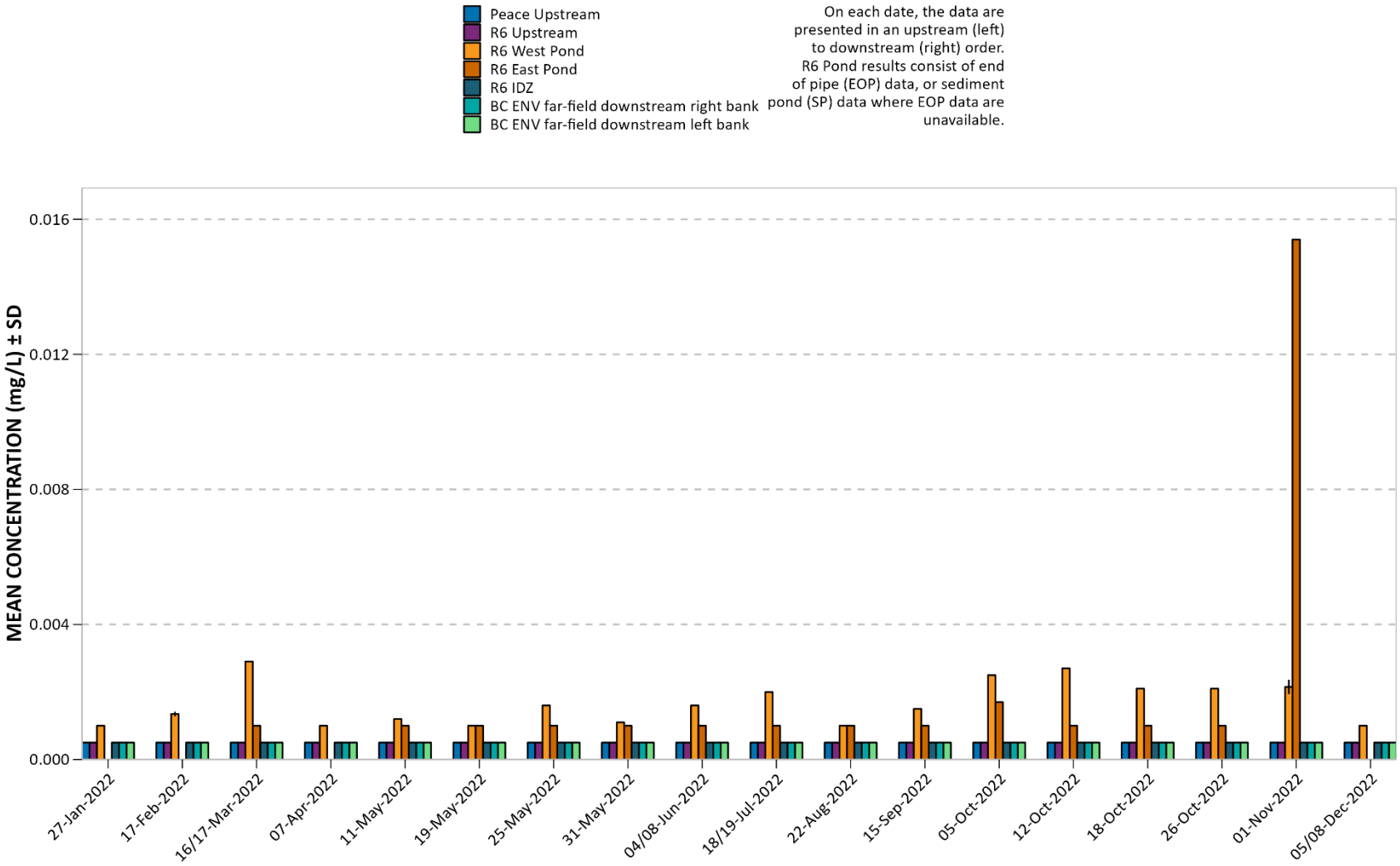


Figure 65. 2022 Peace River and RSEM R6 pond dissolved cobalt (Co).

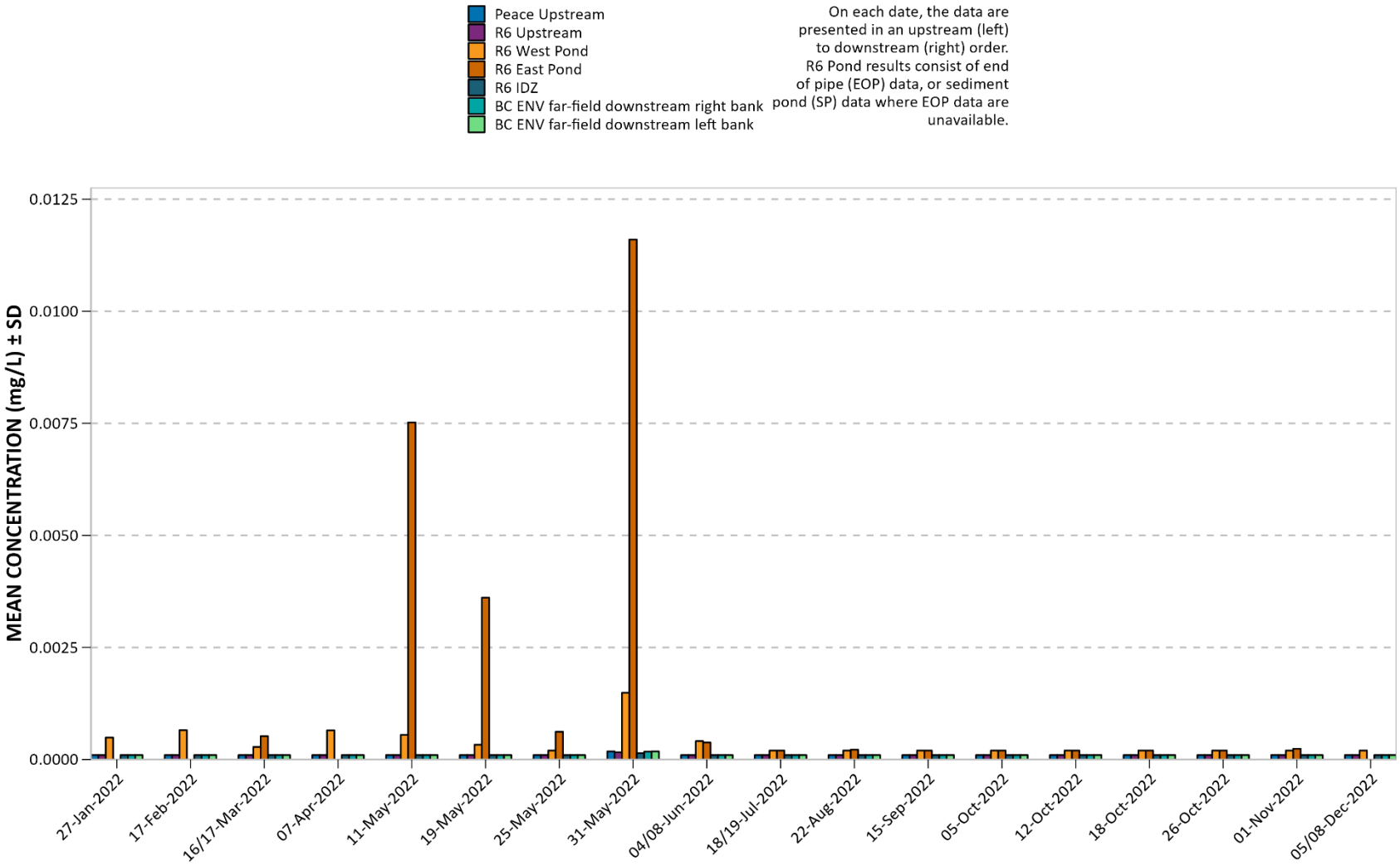


Figure 66. 2022 Peace River and RSEM R6 pond dissolved copper (Cu).

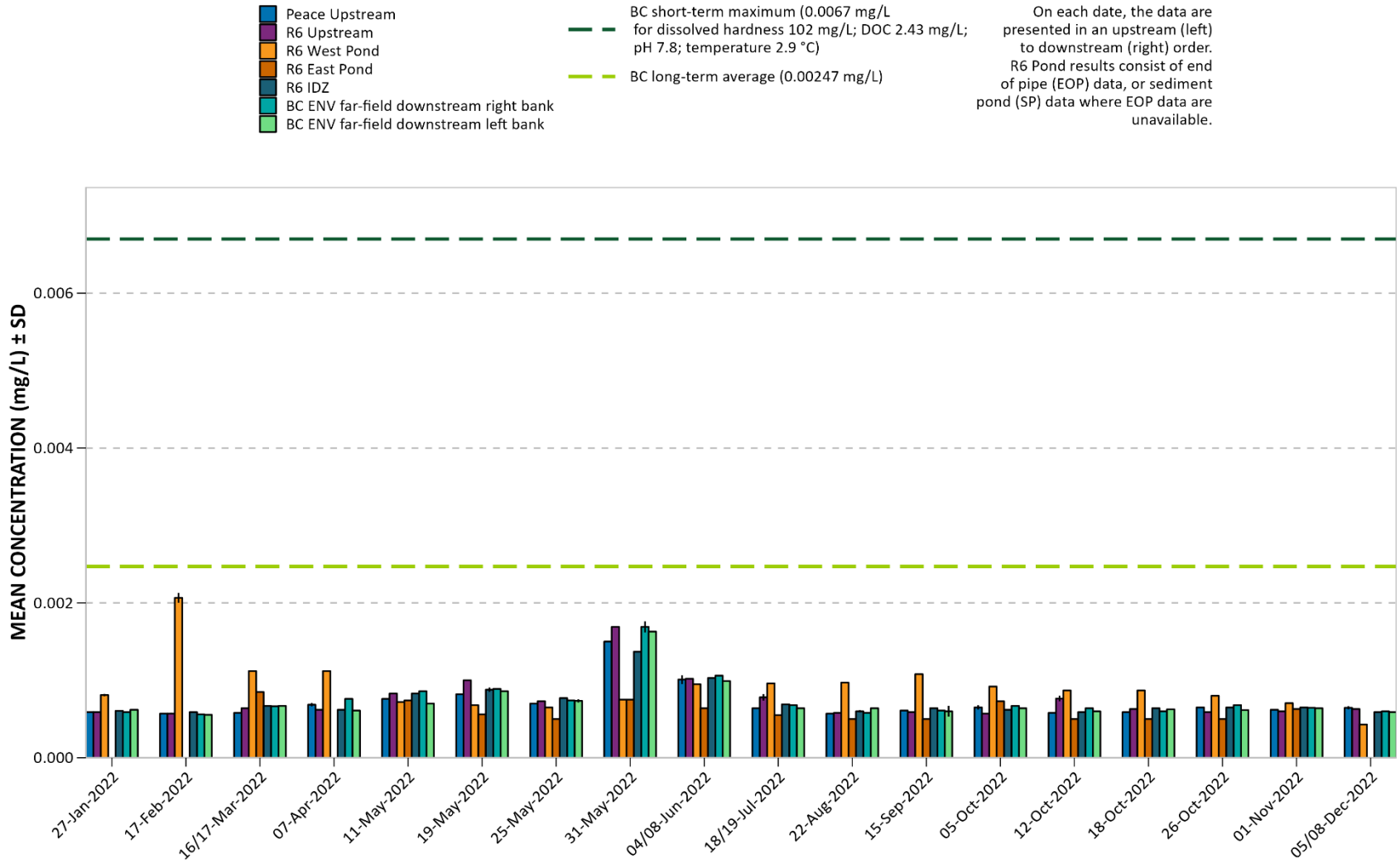


Figure 67. 2022 Peace River and RSEM R6 pond dissolved iron (Fe).

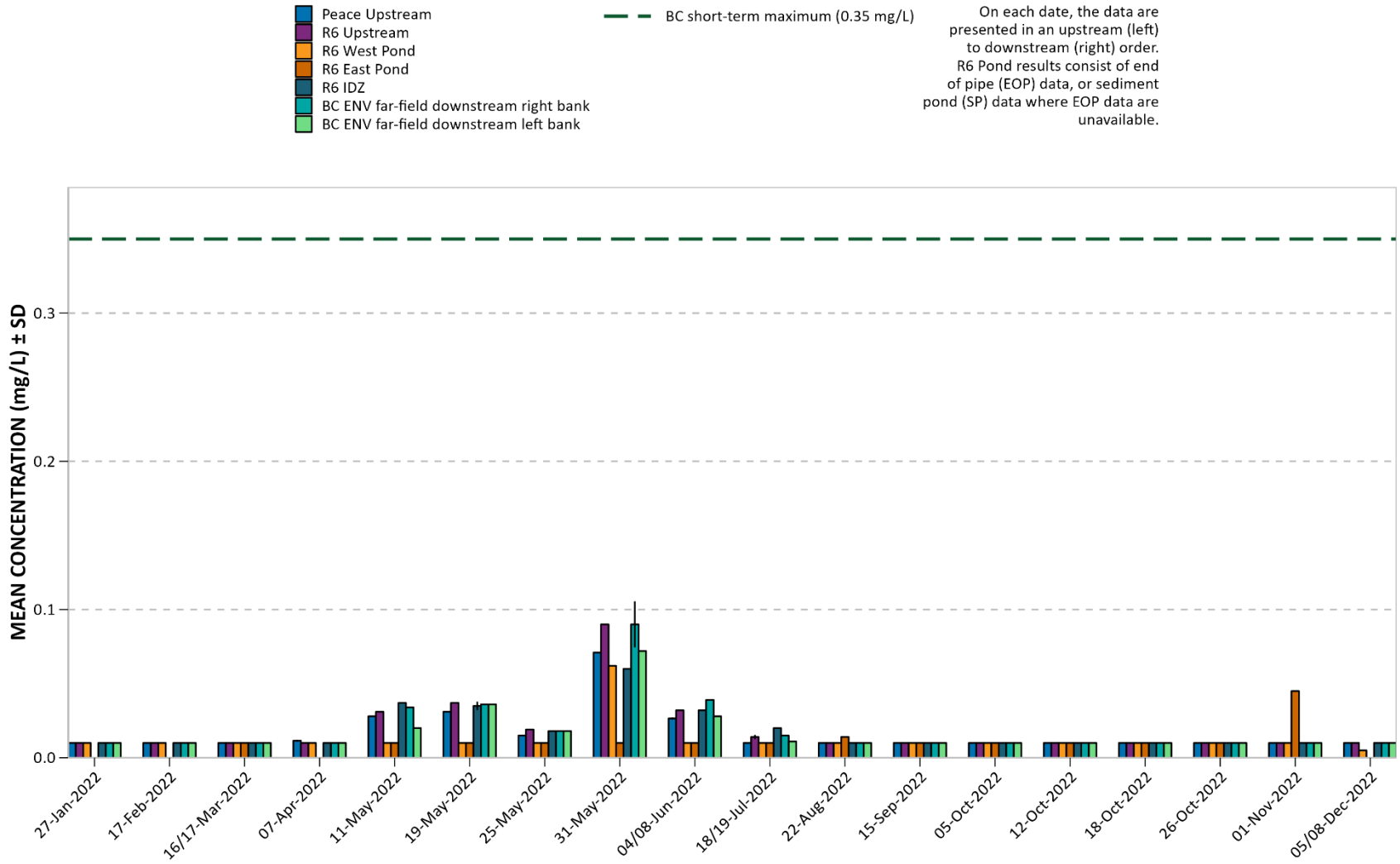


Figure 68. 2022 Peace River and RSEM R6 pond dissolved lead (Pb).

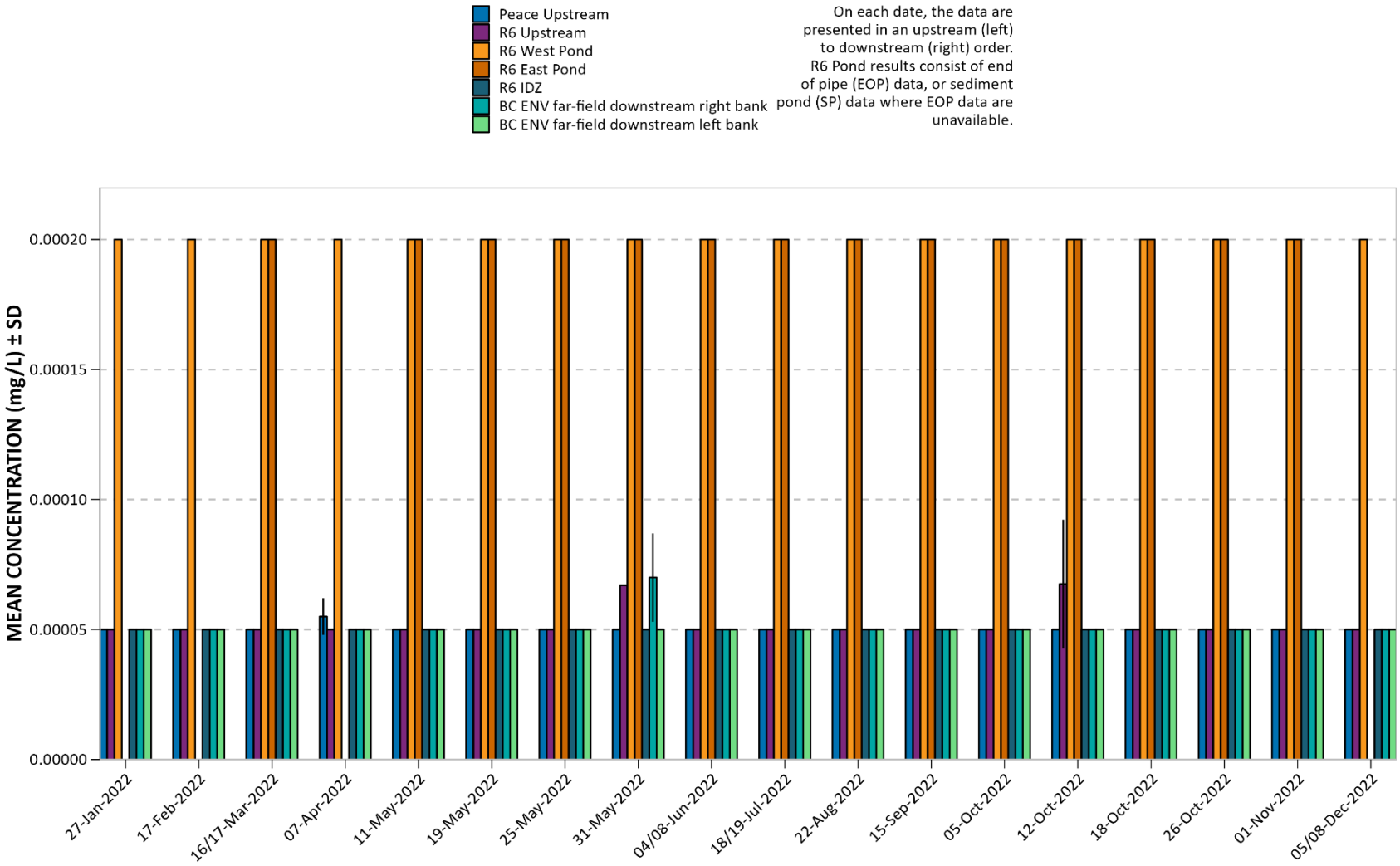


Figure 69. 2022 Peace River and RSEM R6 pond dissolved lithium (Li).

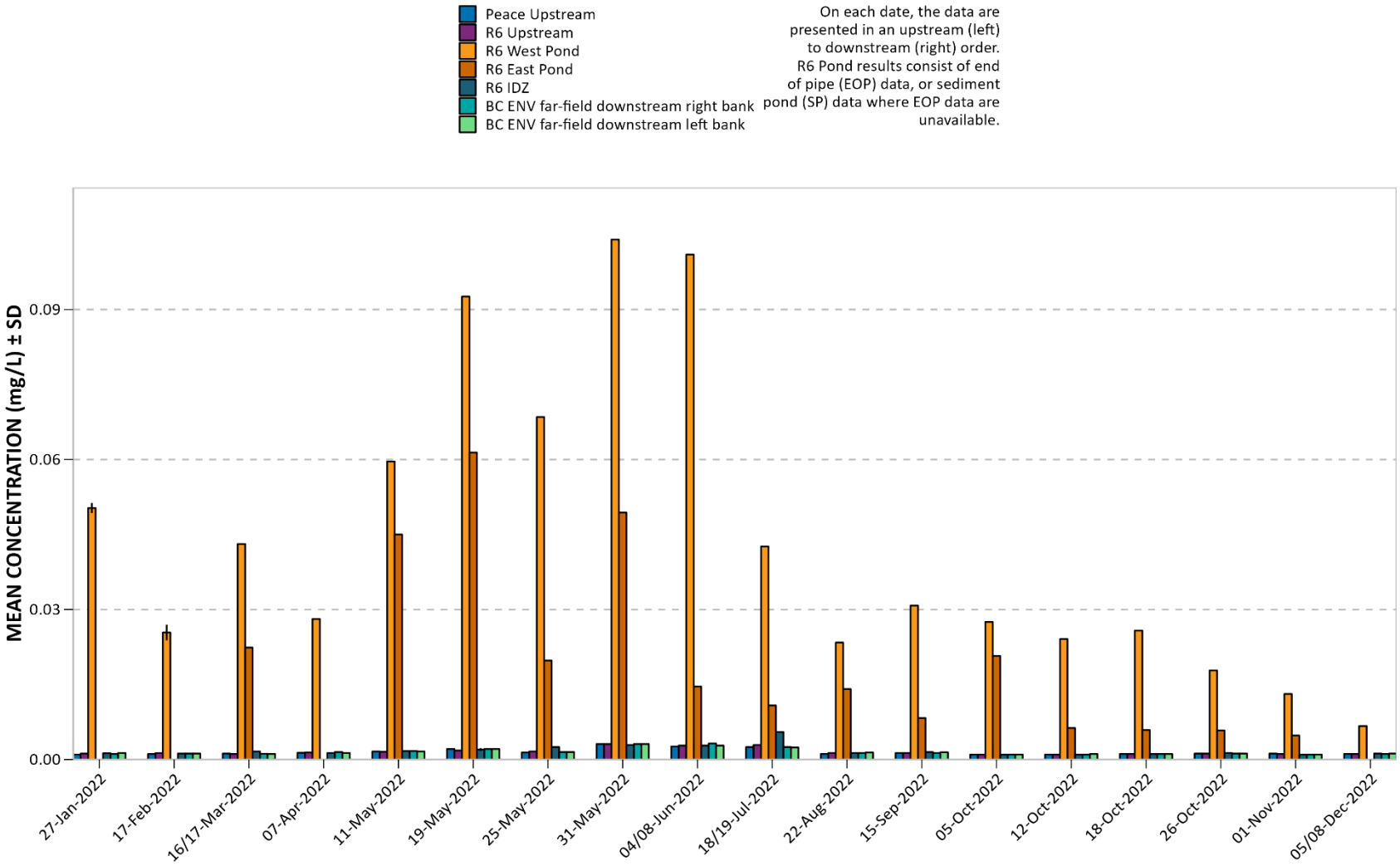


Figure 70. 2022 Peace River and RSEM R6 pond dissolved magnesium (Mg).

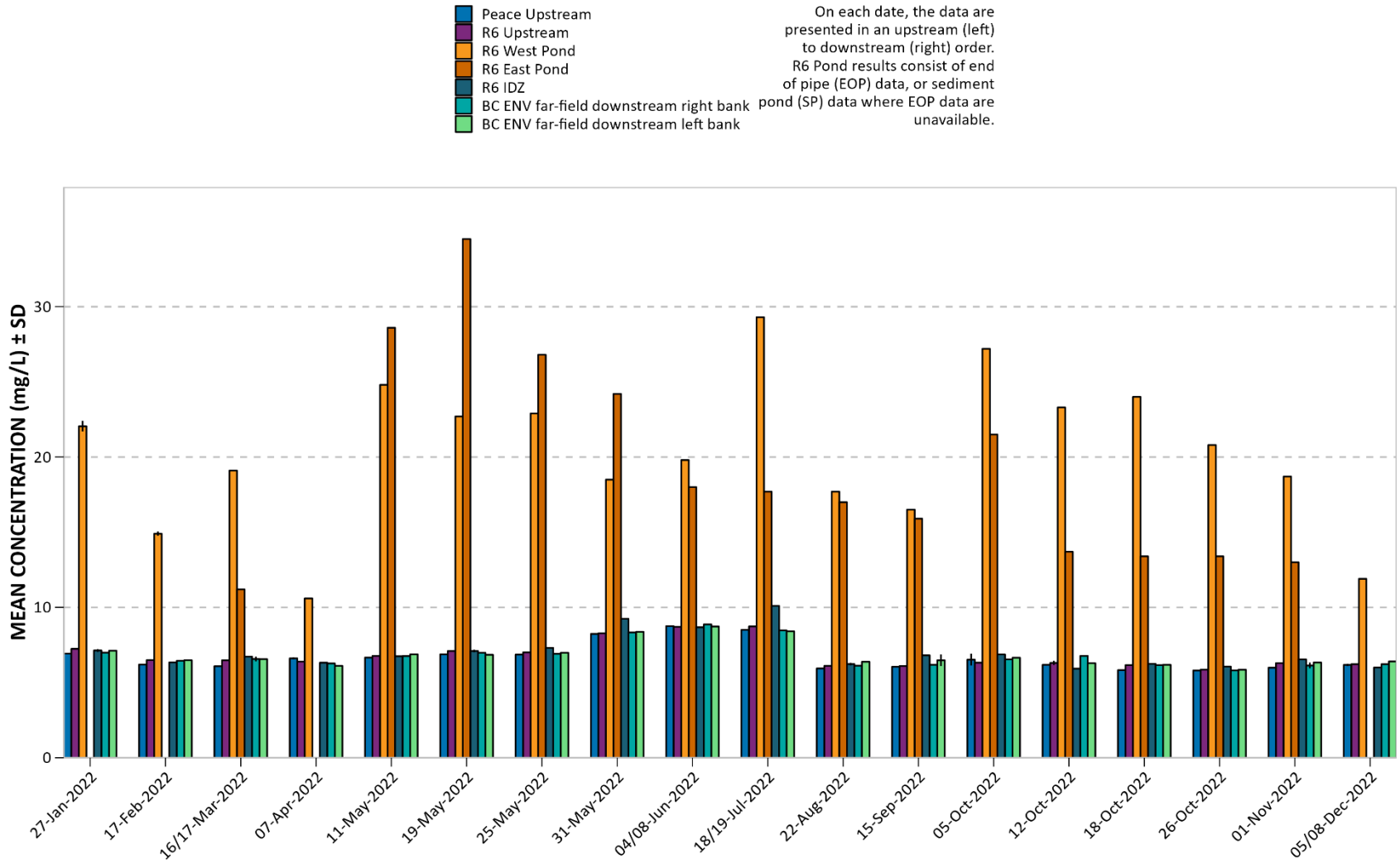


Figure 71. 2022 Peace River and RSEM R6 pond dissolved manganese (Mn).

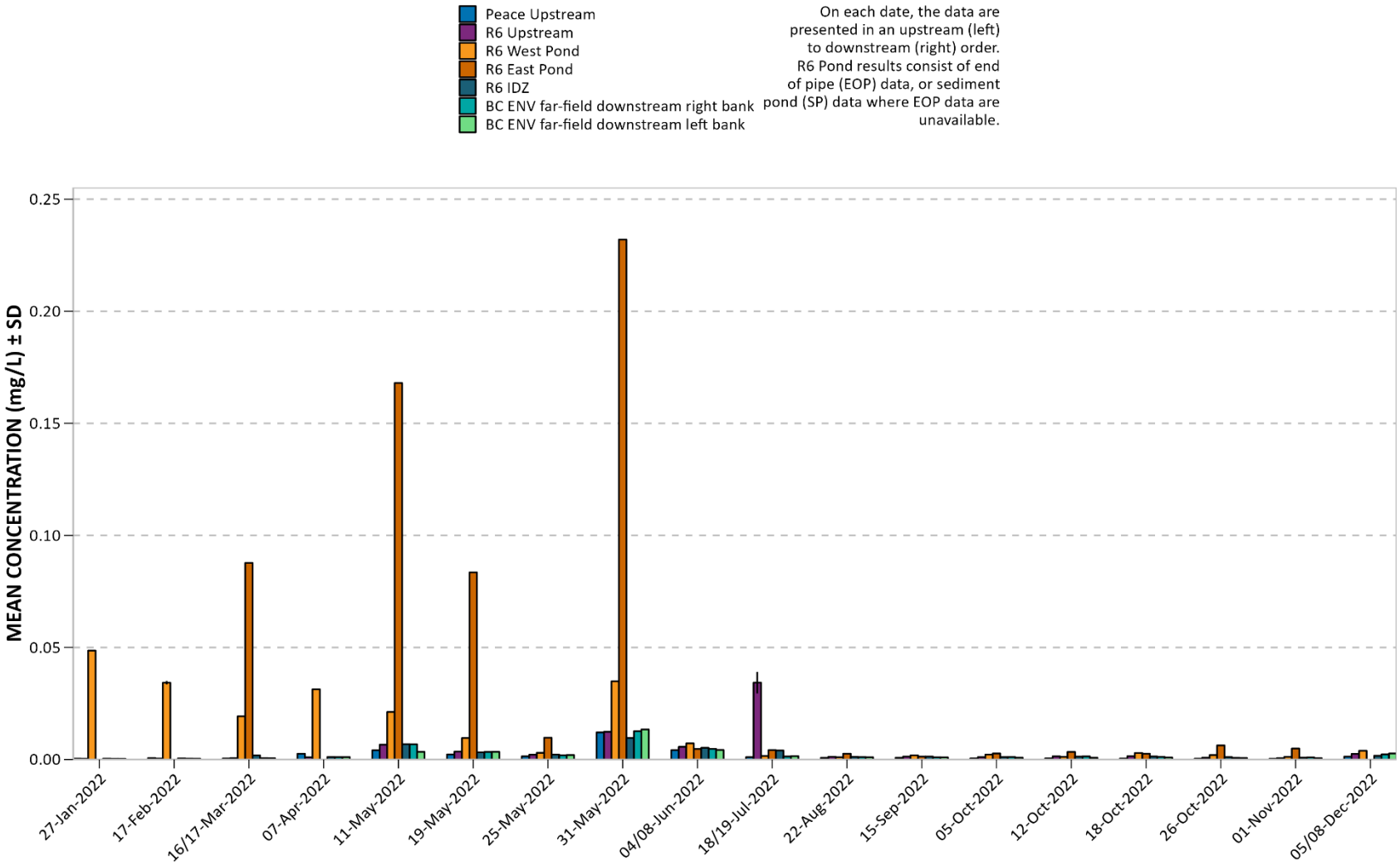


Figure 72. 2022 Peace River and RSEM R6 pond dissolved mercury (Hg).

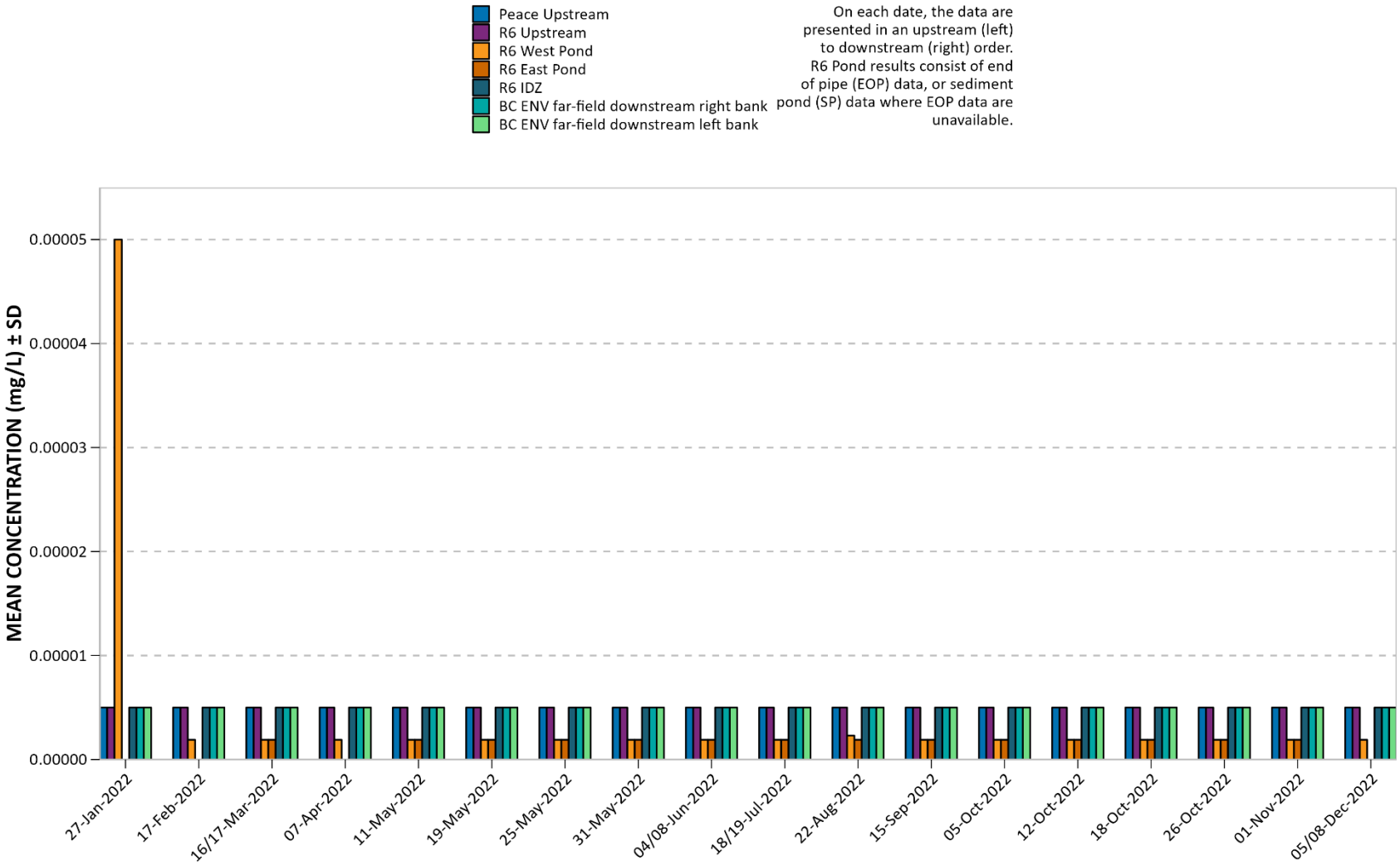


Figure 73. 2022 Peace River and RSEM R6 pond dissolved molybdenum (Mo).

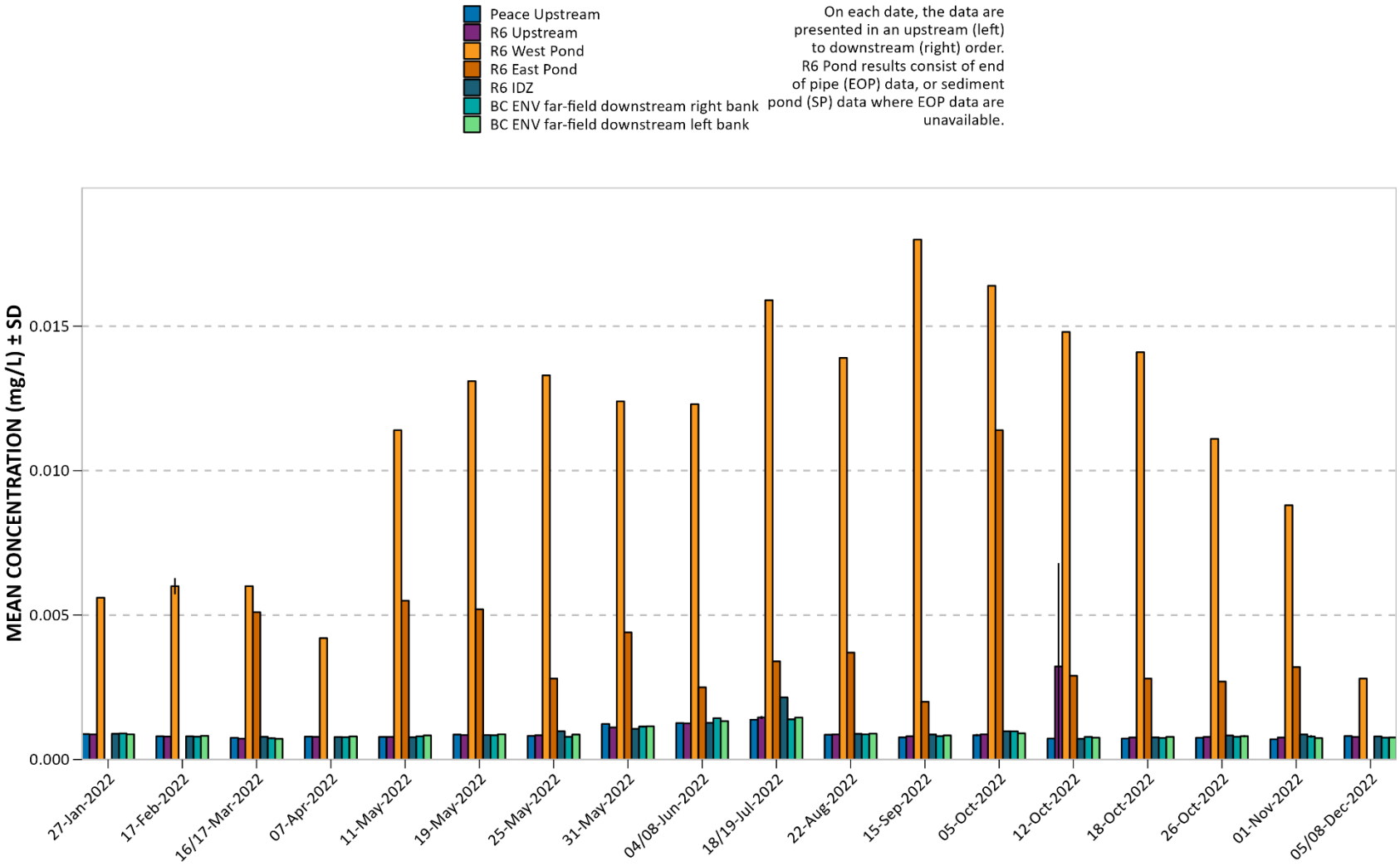


Figure 74. 2022 Peace River and RSEM R6 pond dissolved nickel (Ni).

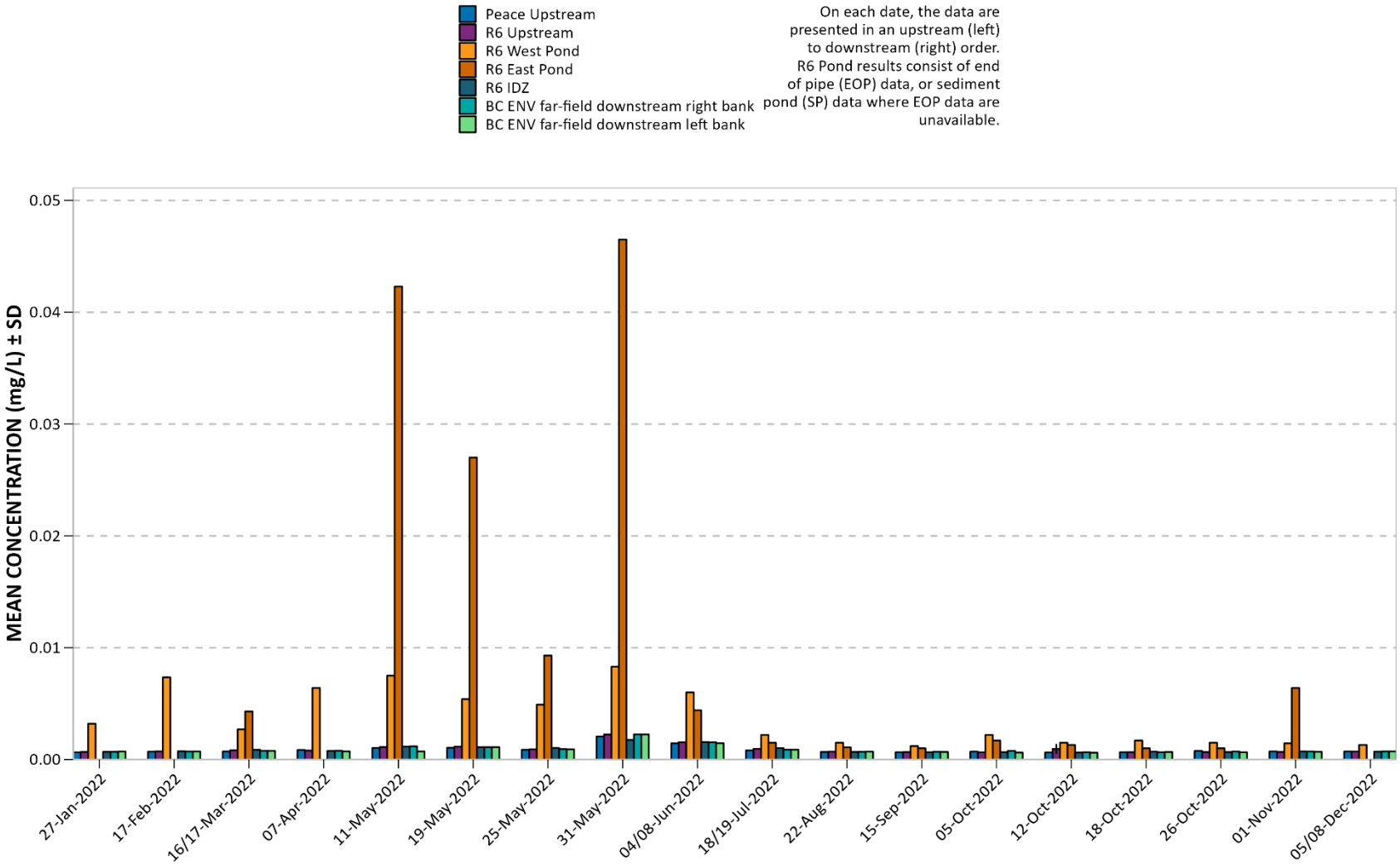


Figure 75. 2022 Peace River and RSEM R6 pond dissolved potassium (K).

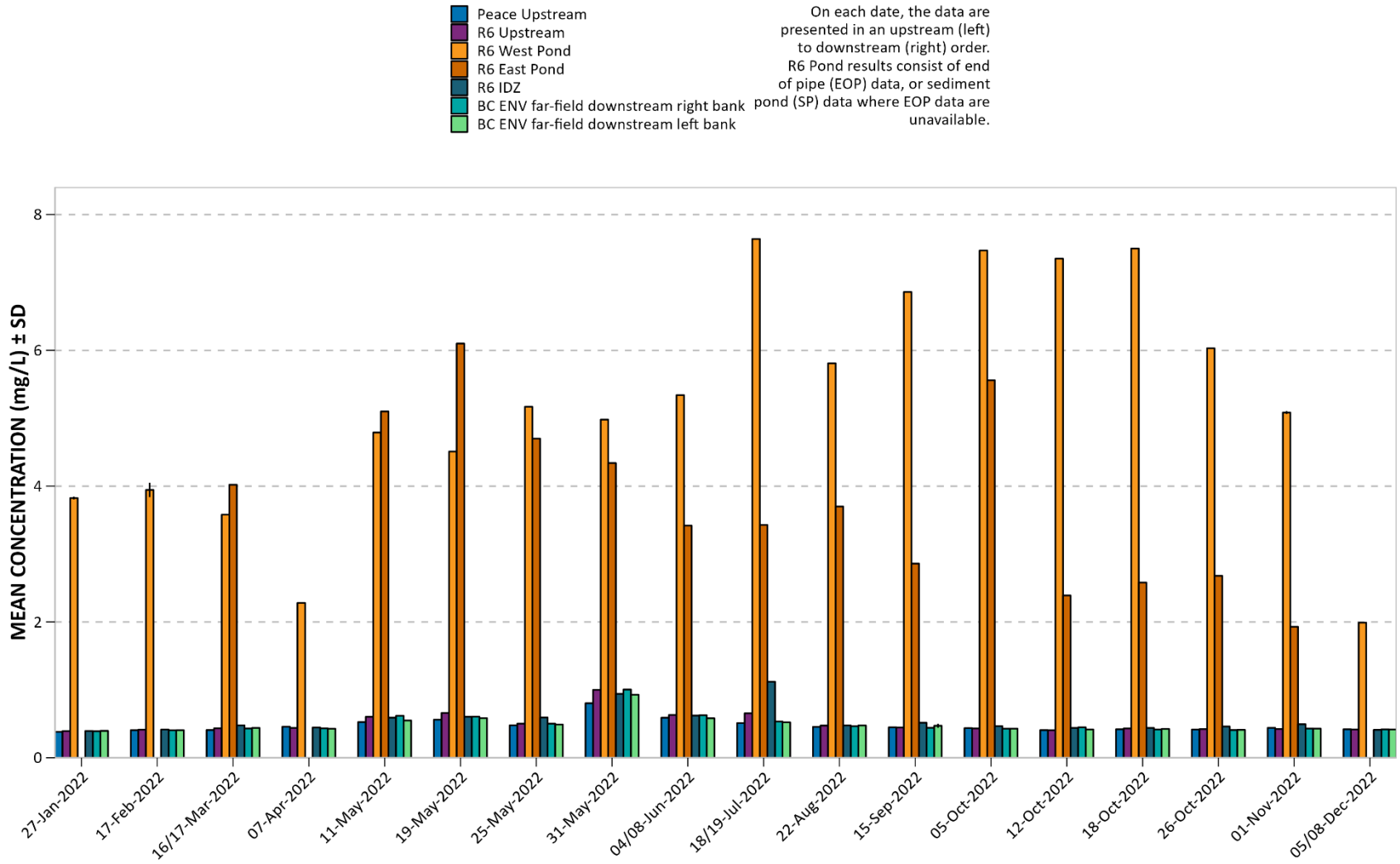


Figure 76. 2022 Peace River and RSEM R6 pond dissolved selenium (Se).

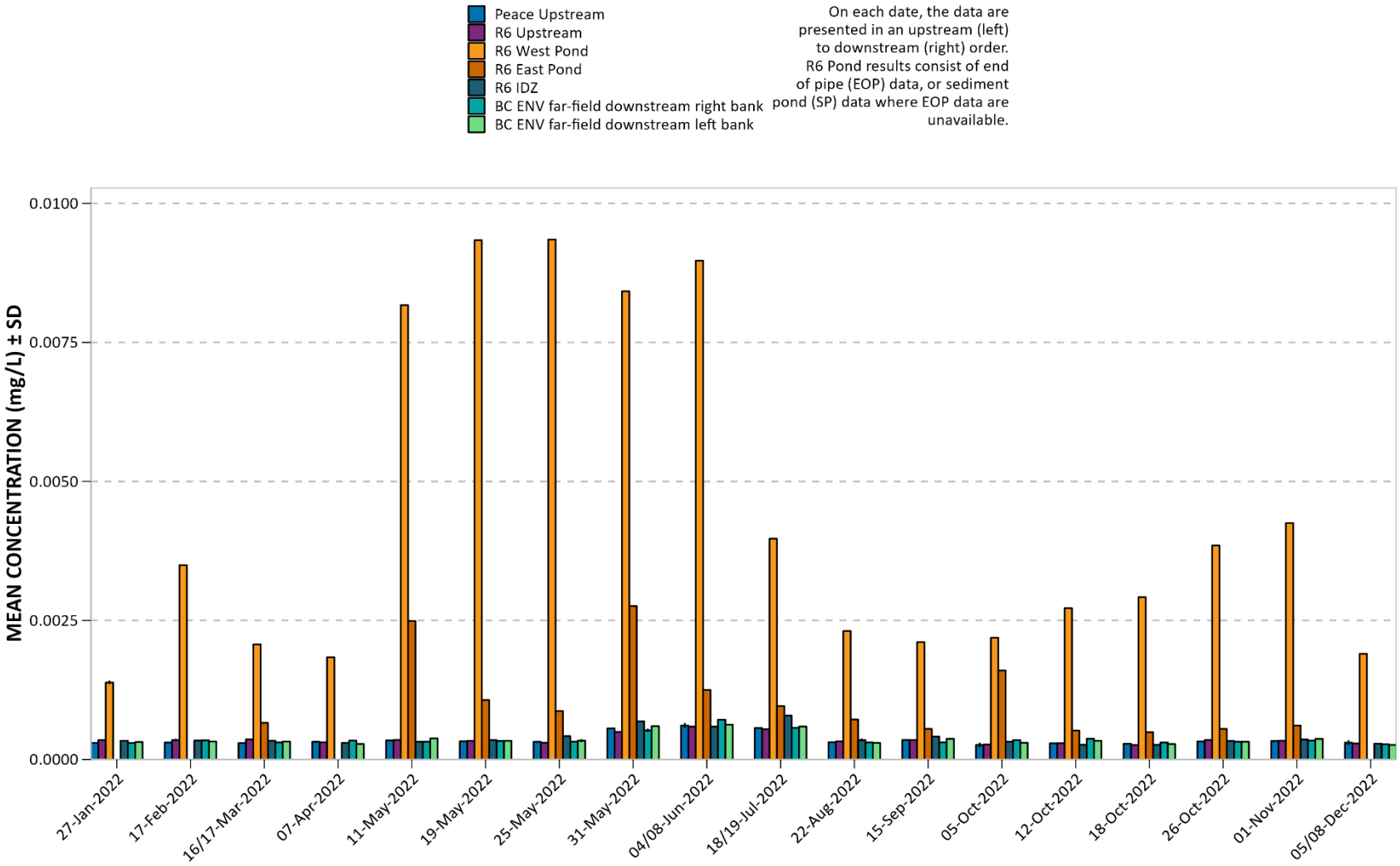


Figure 77. 2022 Peace River and RSEM R6 pond dissolved silicon (Si).

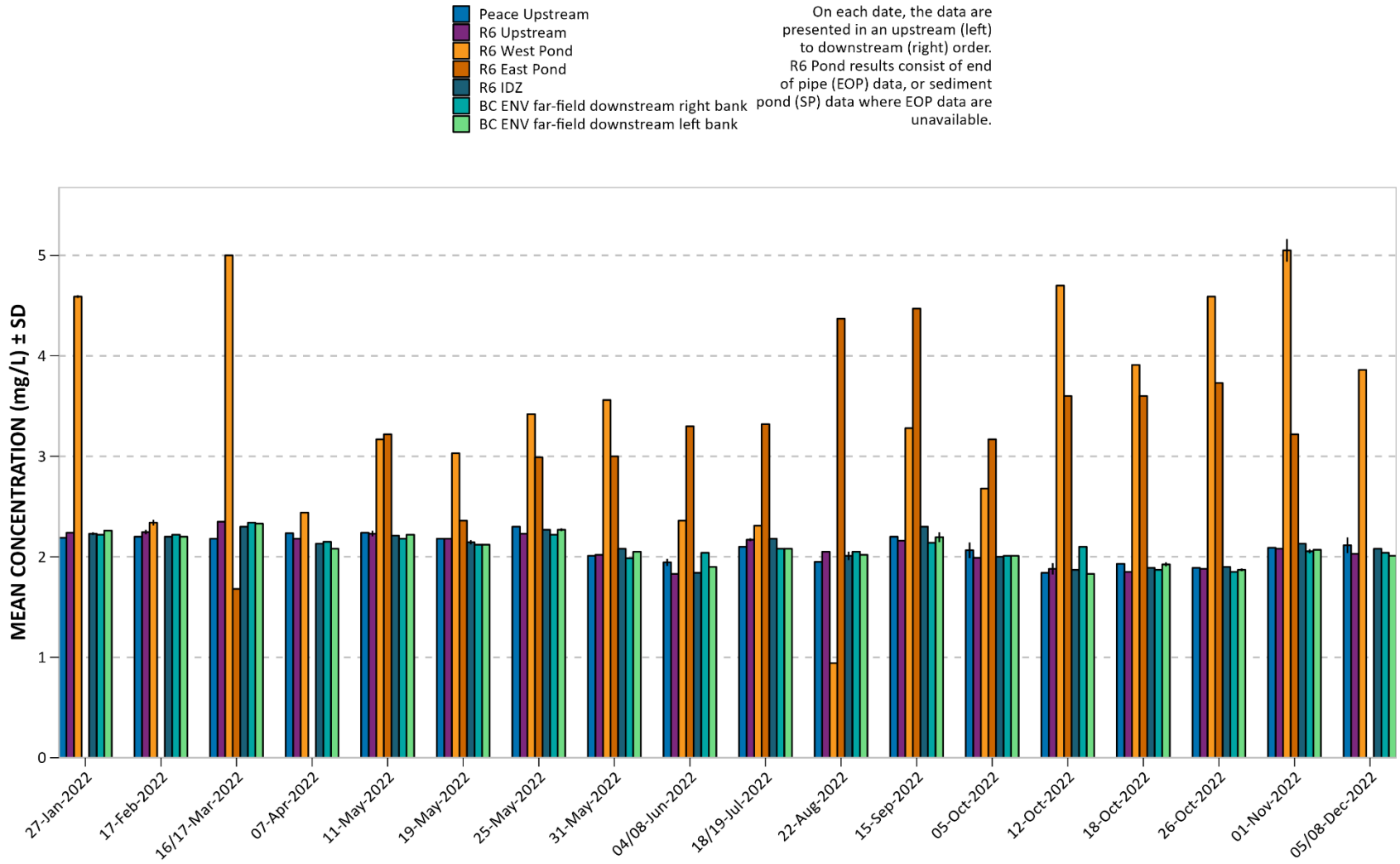


Figure 78. 2022 Peace River and RSEM R6 pond dissolved silver (Ag).

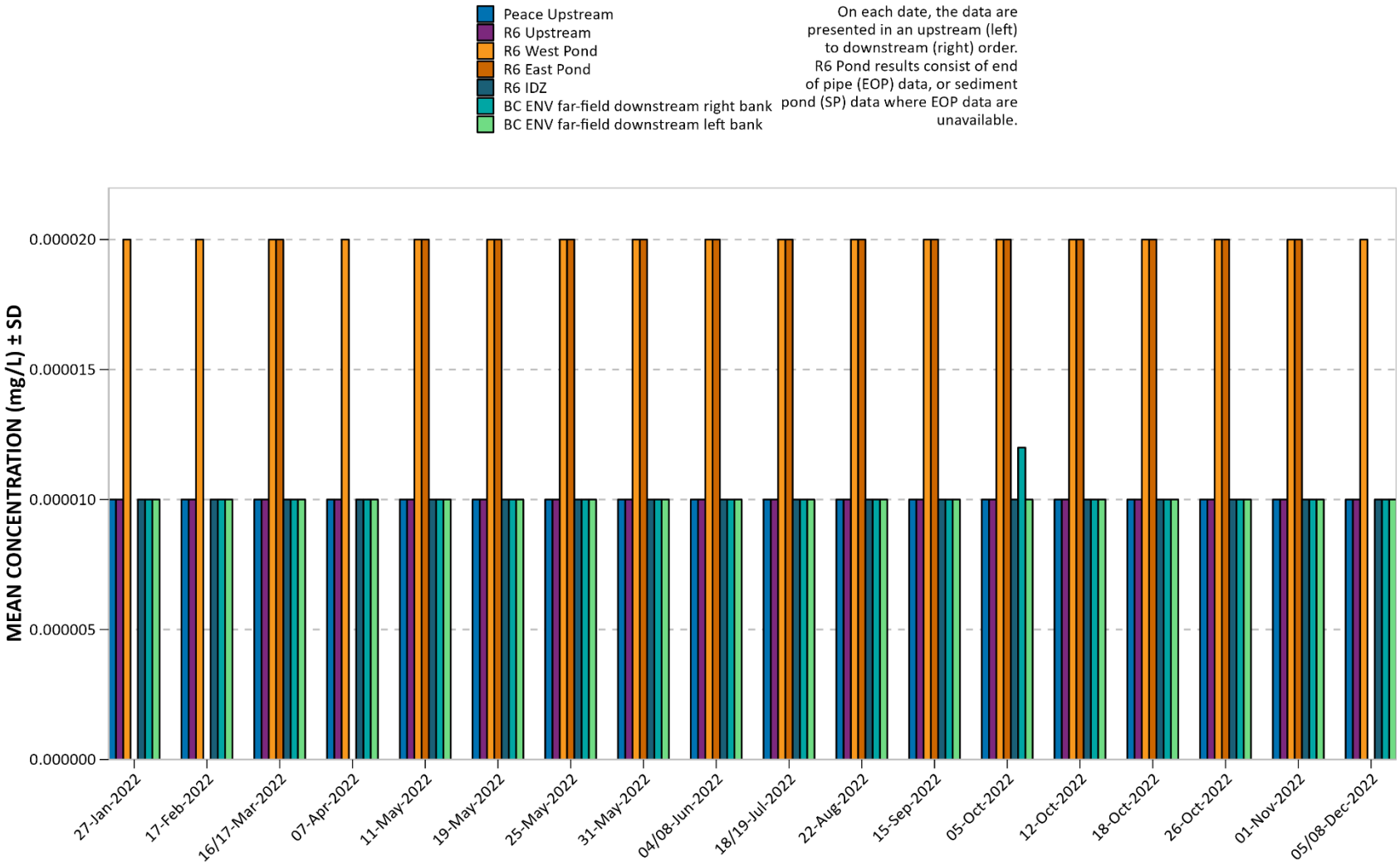


Figure 79. 2022 Peace River and RSEM R6 pond dissolved sodium (Na).

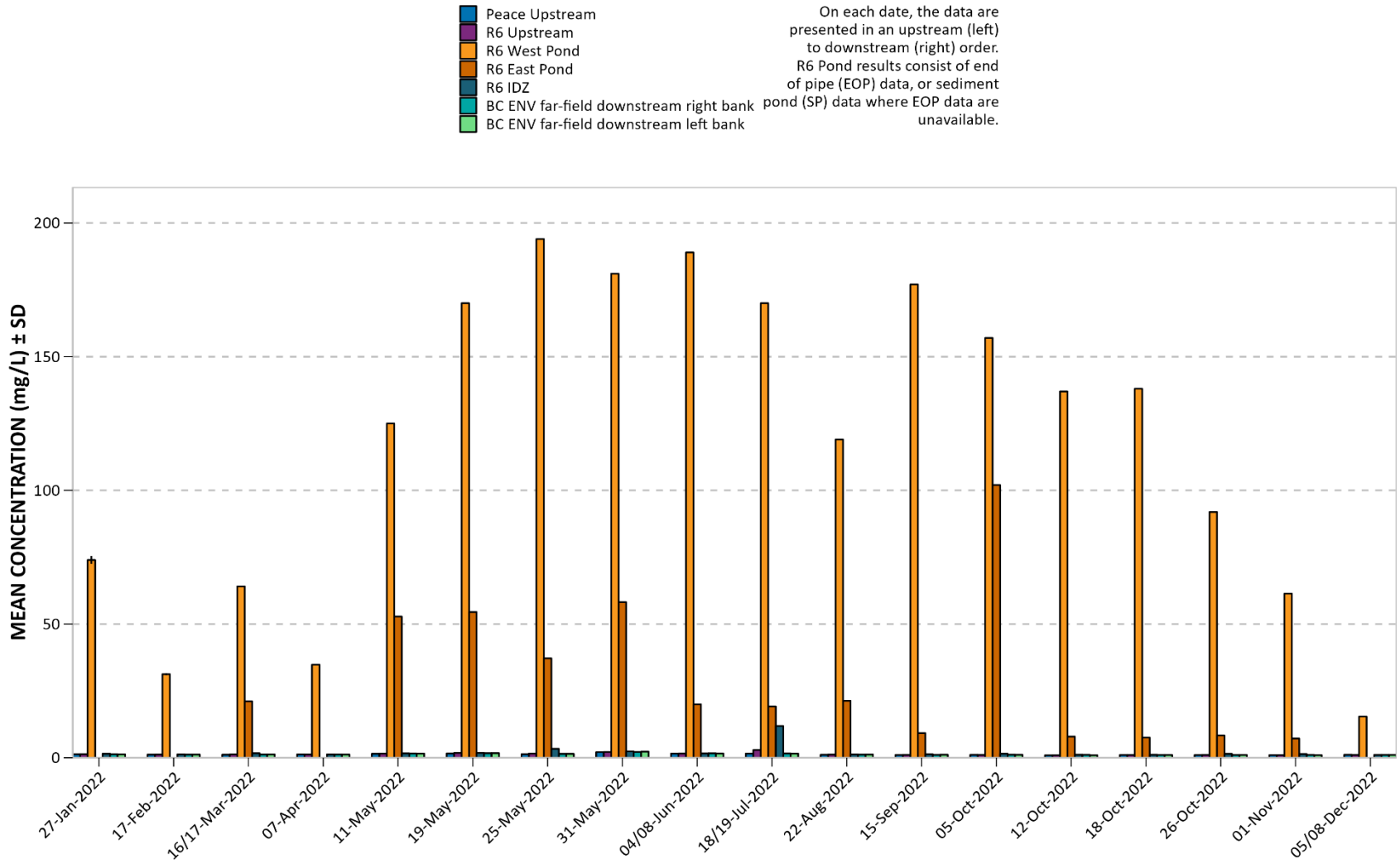


Figure 80. 2022 Peace River and RSEM R6 pond dissolved strontium (Sr).

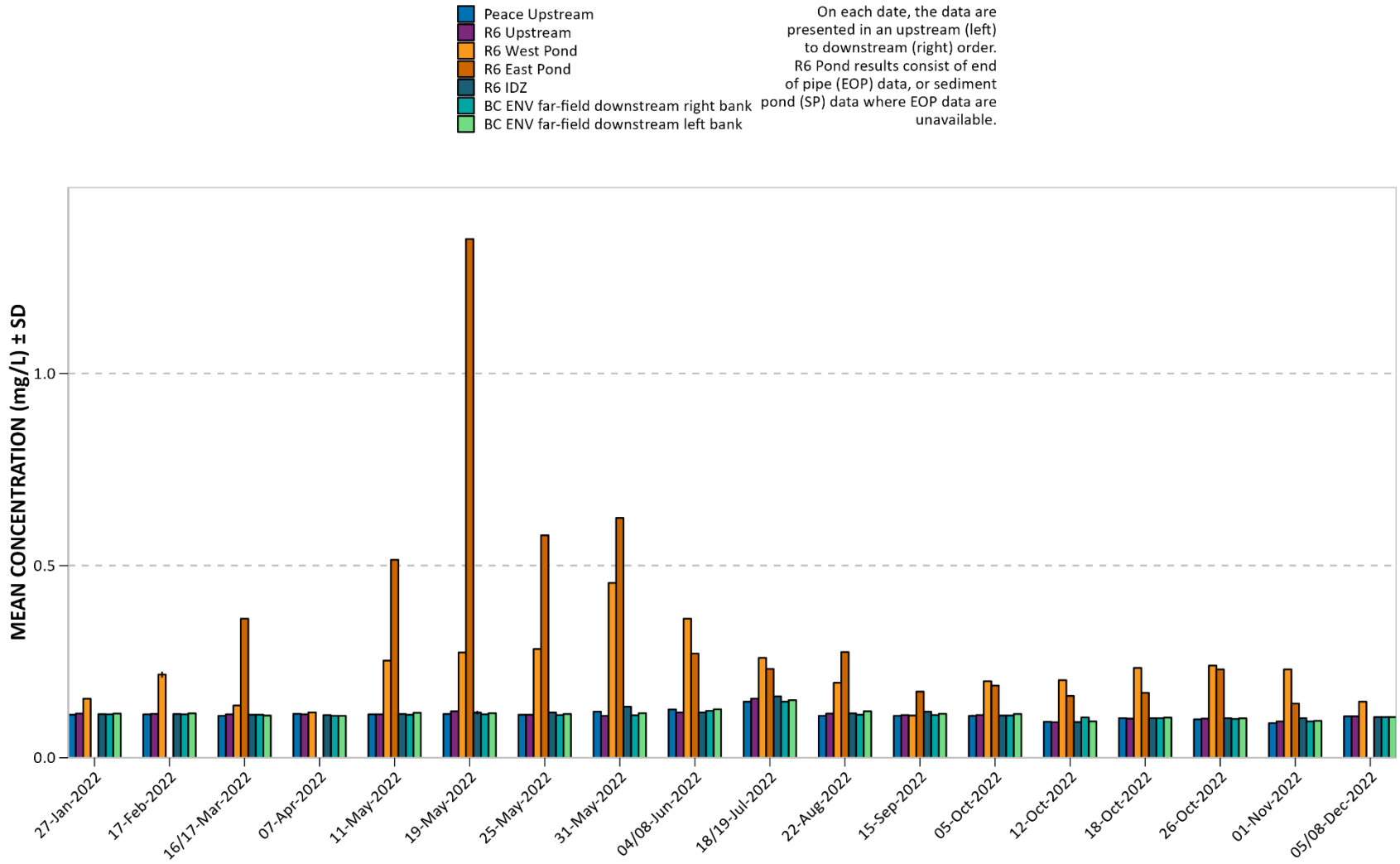


Figure 81. 2022 Peace River and RSEM R6 pond dissolved sulfur (S).

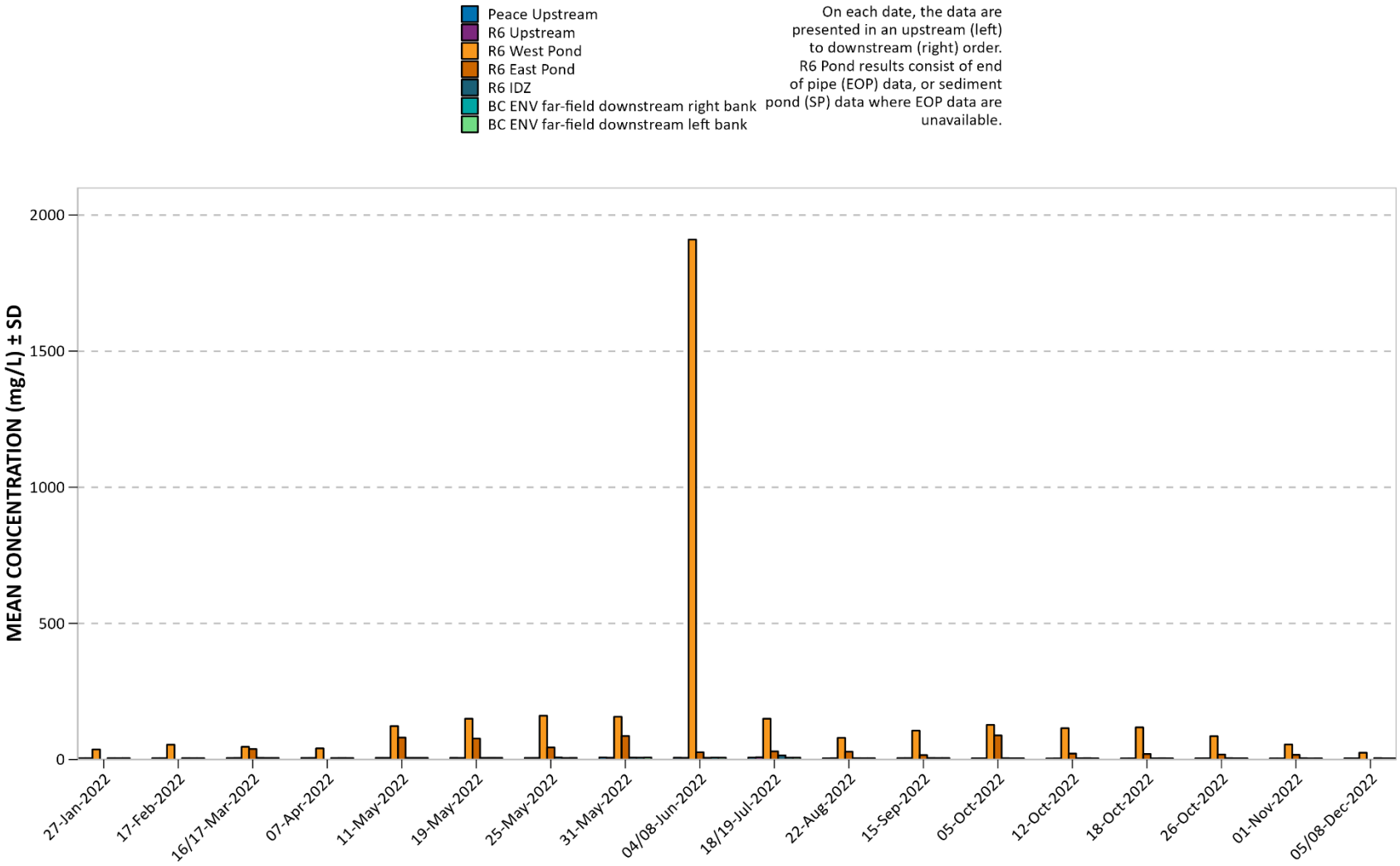


Figure 82. 2022 Peace River and RSEM R6 pond dissolved thallium (Tl).

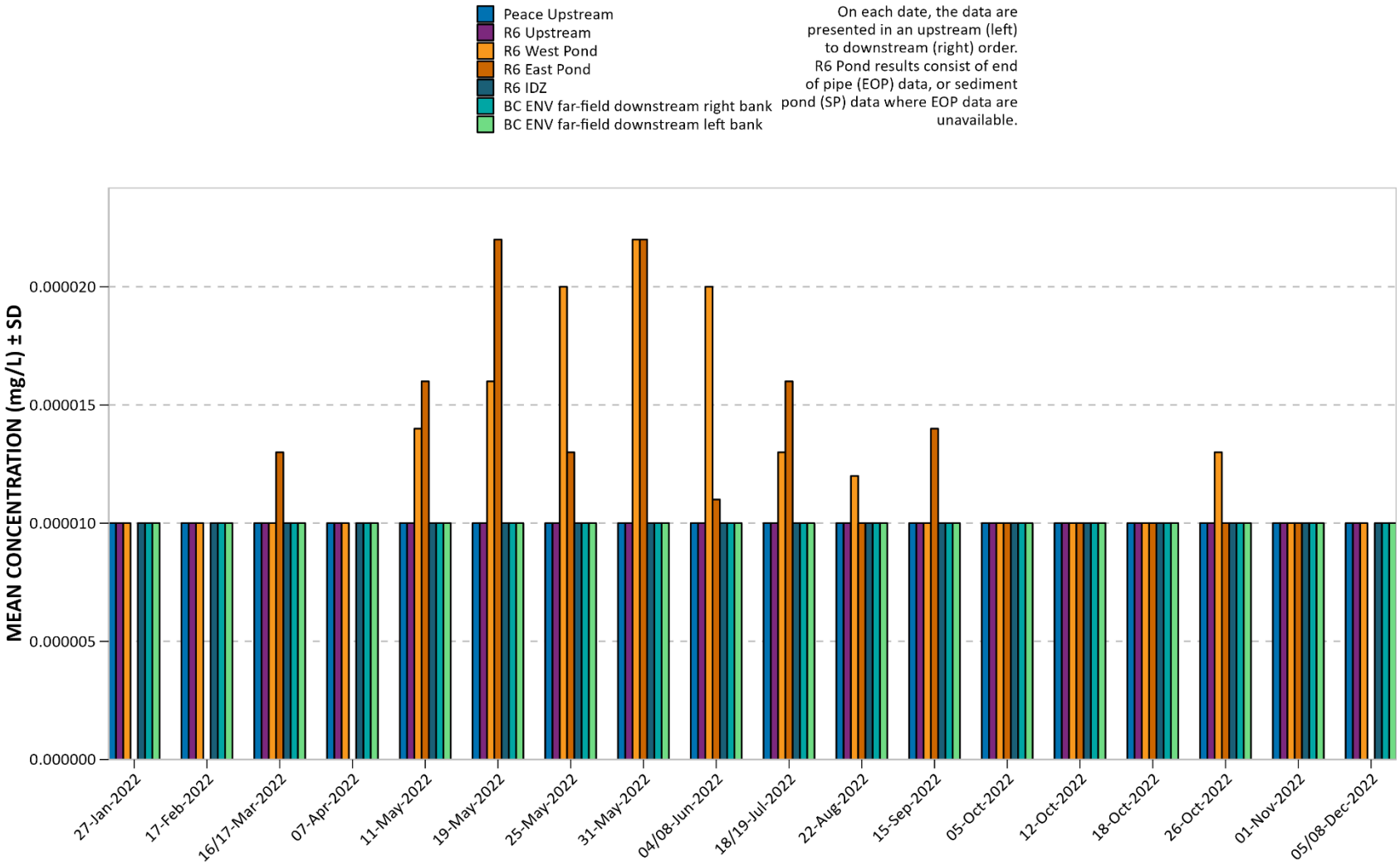


Figure 83. 2022 Peace River and RSEM R6 pond dissolved tin (Sn).

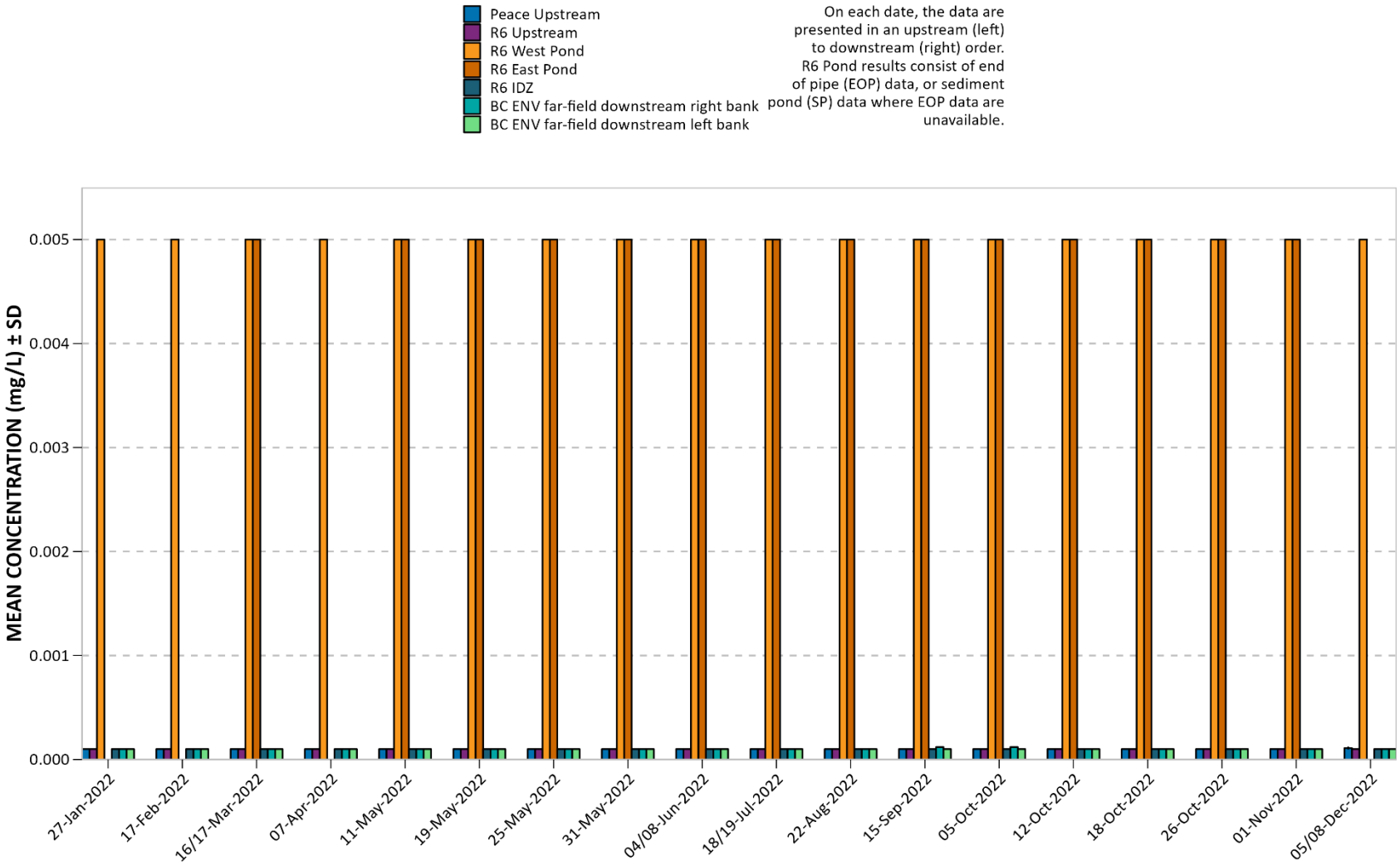


Figure 84. 2022 Peace River and RSEM R6 pond dissolved titanium (Ti).

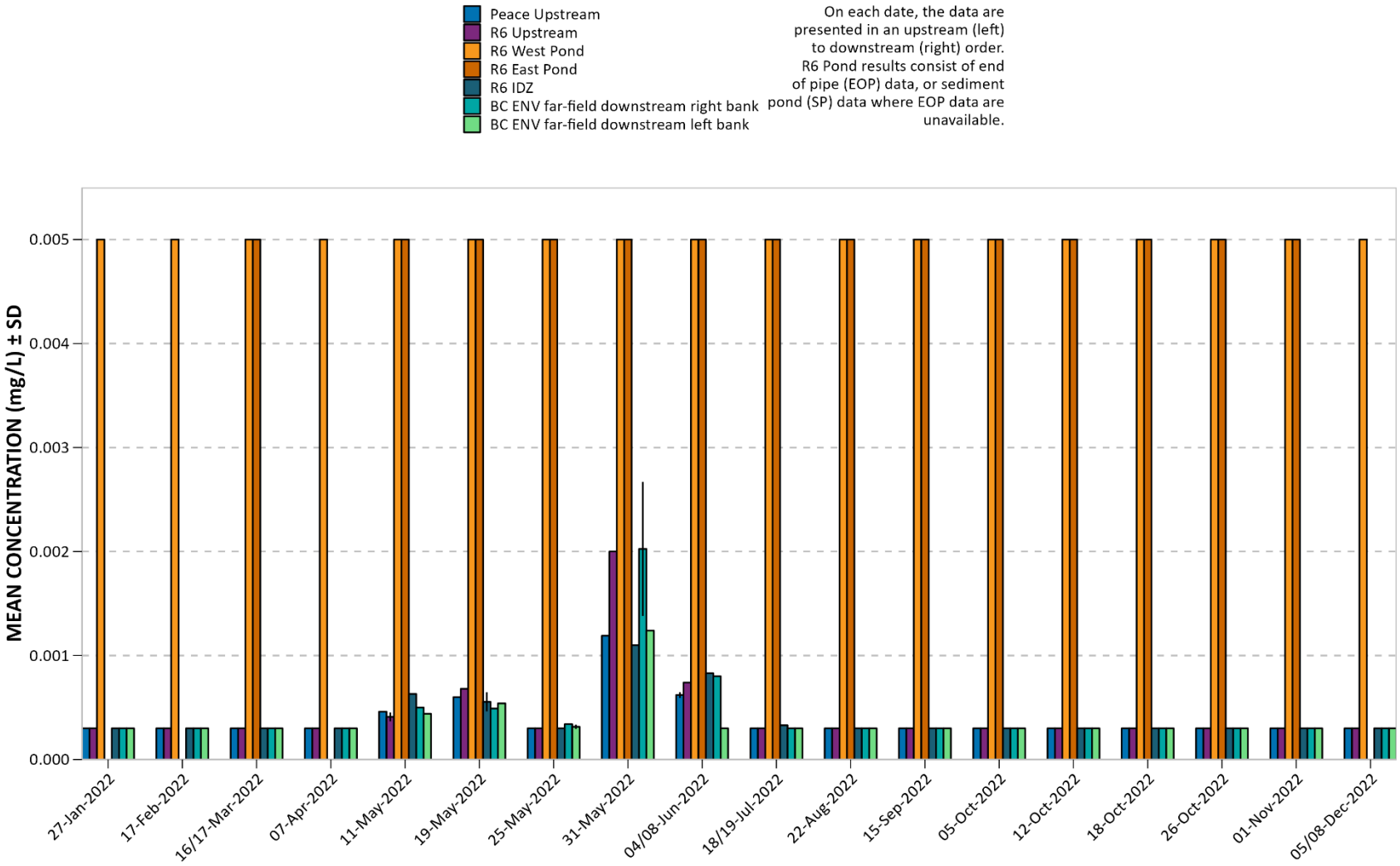


Figure 85. 2022 Peace River and RSEM R6 pond dissolved uranium (U).

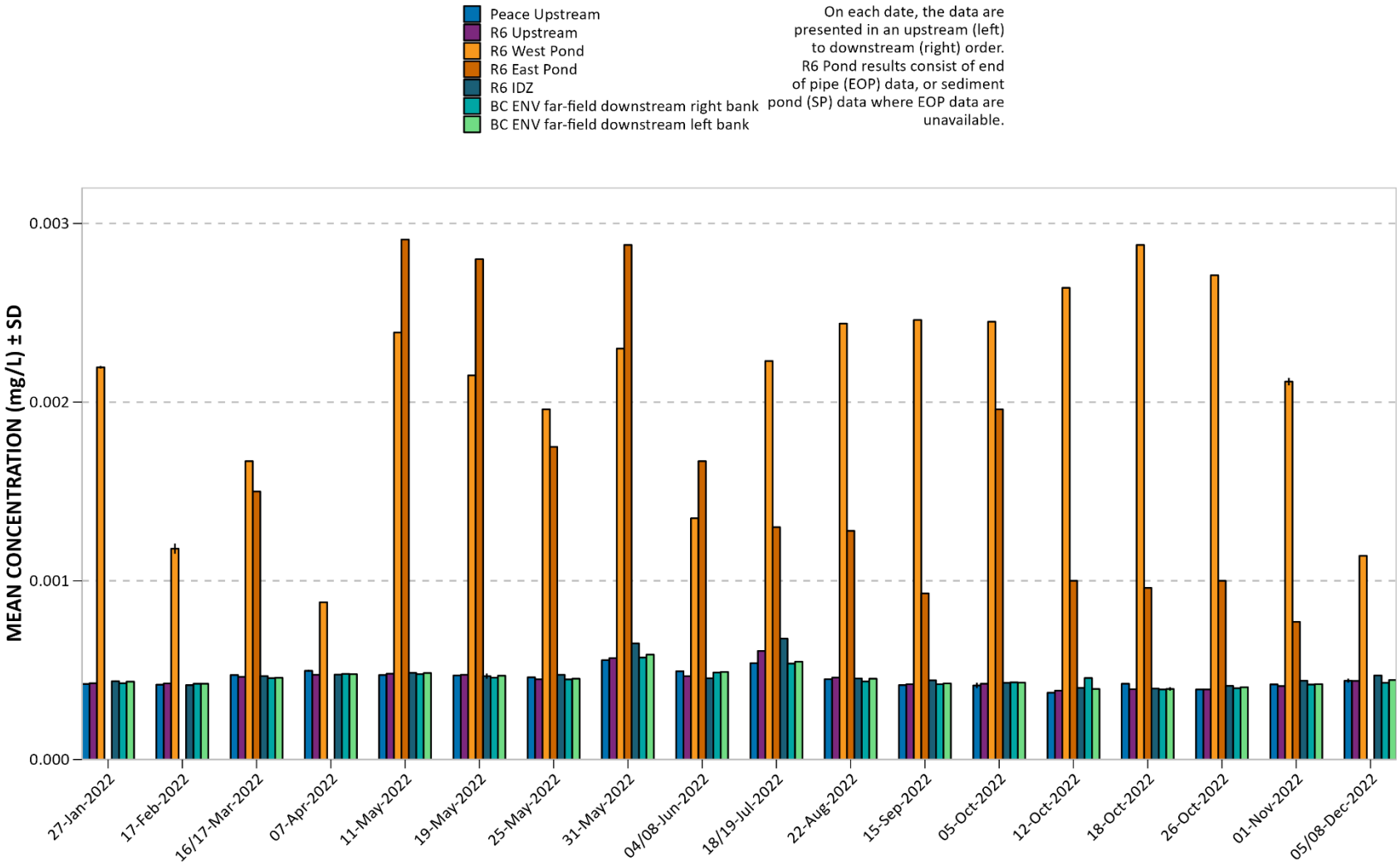


Figure 86. 2022 Peace River and RSEM R6 pond dissolved vanadium (V).

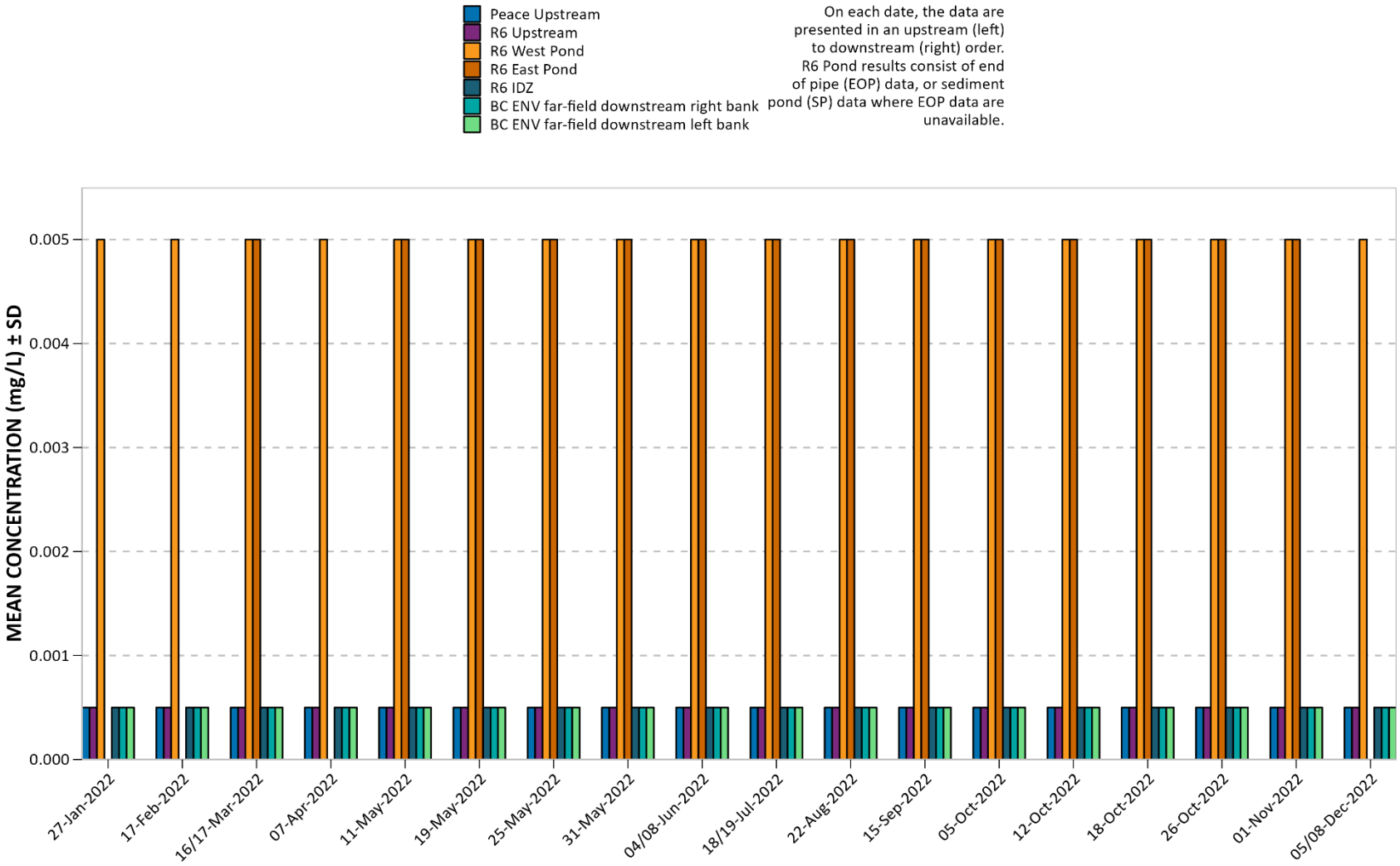
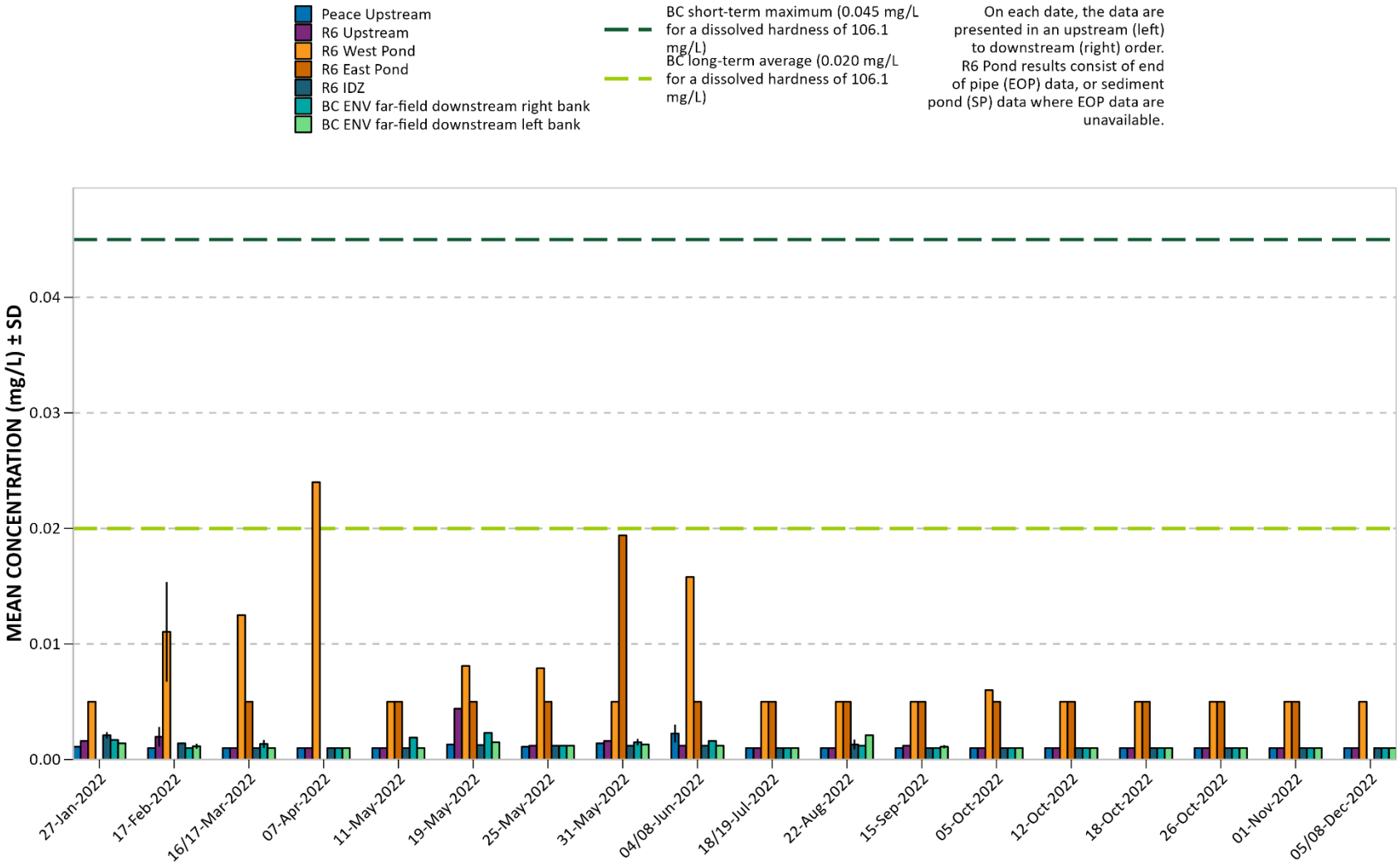
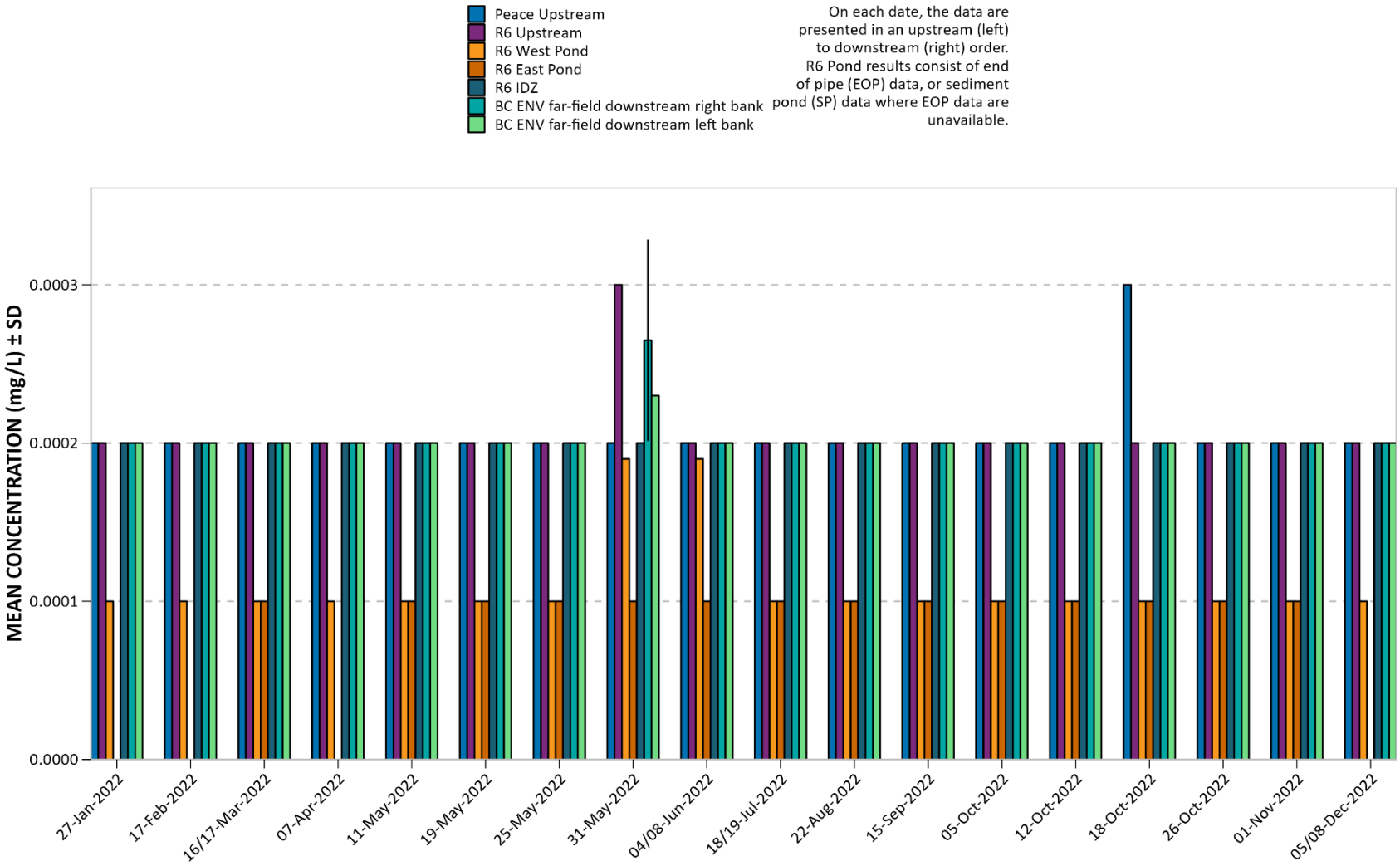


Figure 87. 2022 Peace River and RSEM R6 pond dissolved zinc (Zn).



Note: BC WQG for total zinc were used for dissolved zinc as per direction in BC ENV (2022), and are dissolved hardness dependent. An average Peace River dissolved 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 dissolved hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 88. 2022 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; from May 17 – 19, 2022 and June 4 – 5, 2022, L6 was dewatered by pumping the water in the pond to the Peace River. The following time series plots depict data collected on May 19, 2022 (L6 pond water quality samples were collected on May 18, 2022) and June 4, 2022 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 for laboratory data, and are also included for all *in situ* data where triplicate readings are recorded (error bars for *in situ* data are generally to small to be visible on the plots). 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. 2022 Peace River (*in situ*) and RSEM L6 pond (lab) specific conductivity.

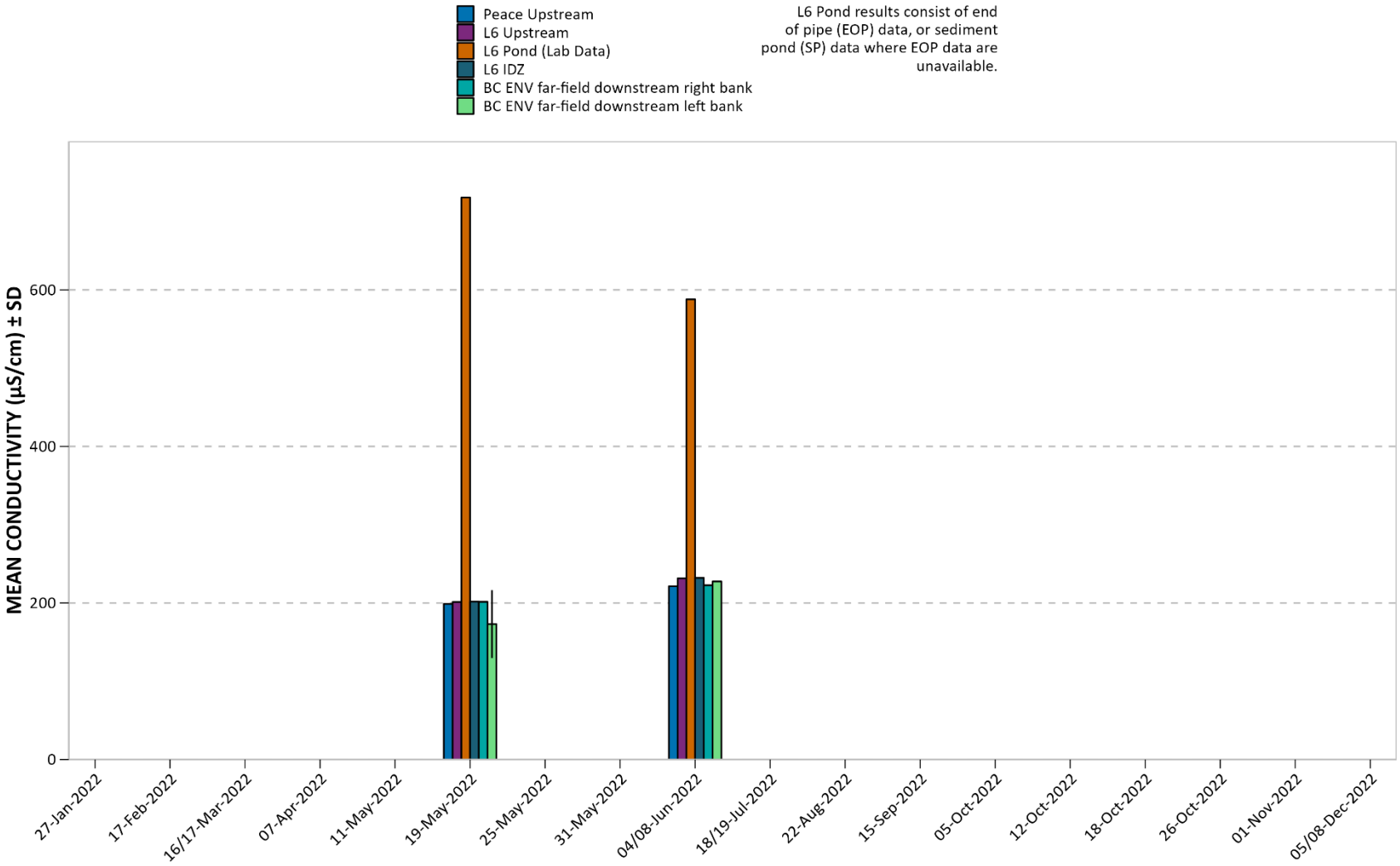


Figure 90. 2022 Peace River and RSEM L6 pond lab specific conductivity.

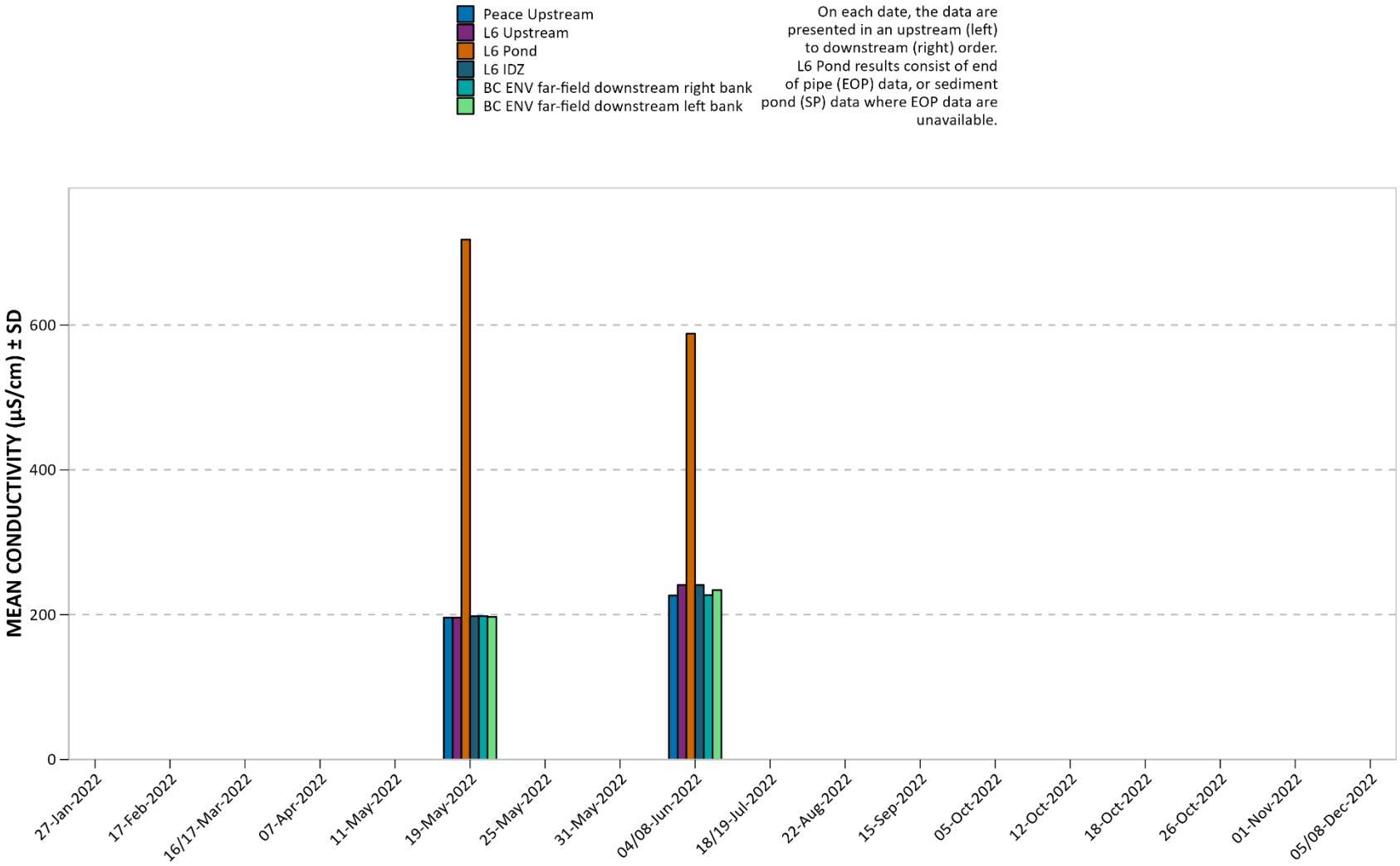


Figure 91. 2022 Peace River and RSEM L6 pond dissolved hardness (as $CaCO_3$).

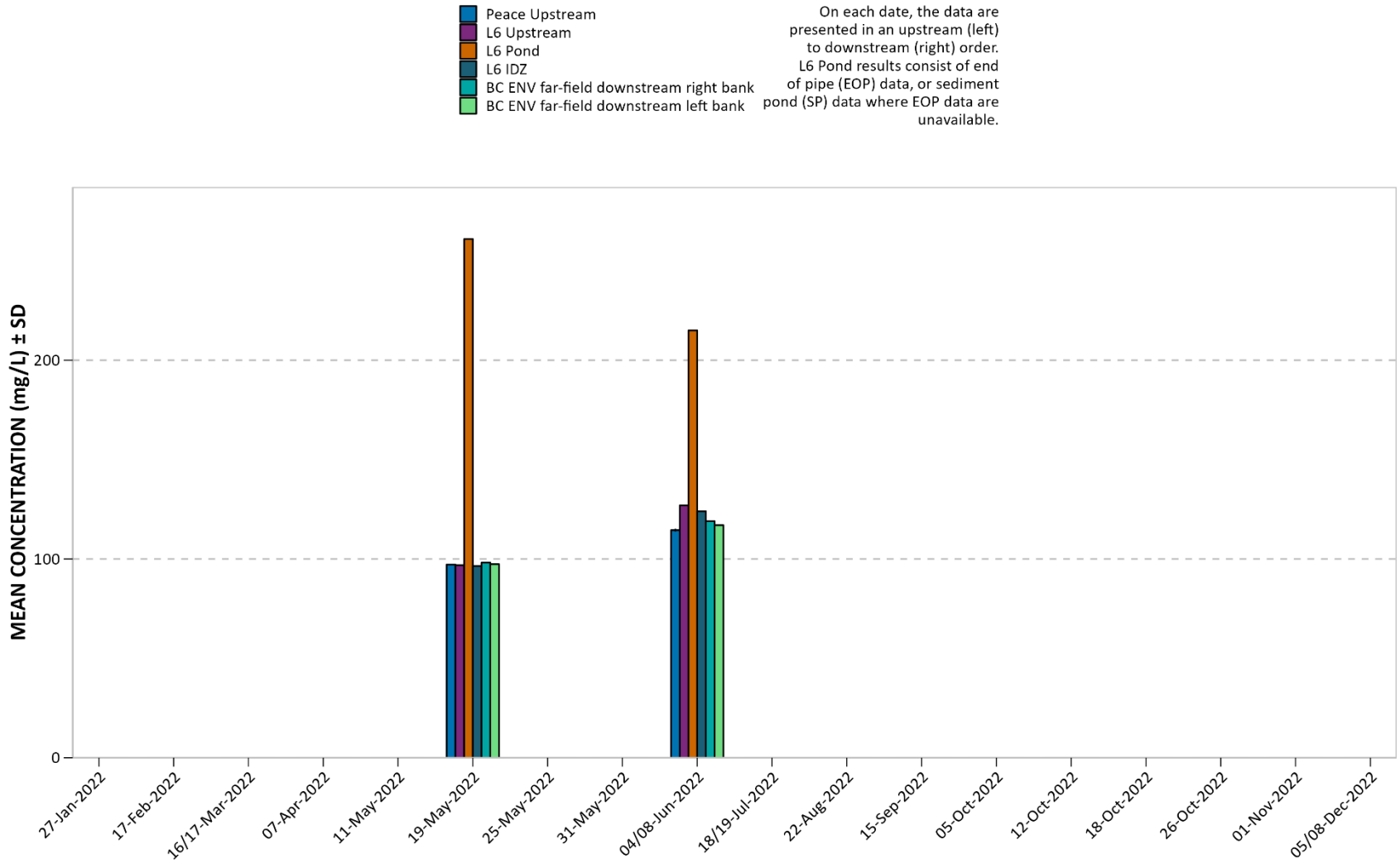


Figure 92. 2022 Peace River and RSEM L6 pond total dissolved solids (TDS).

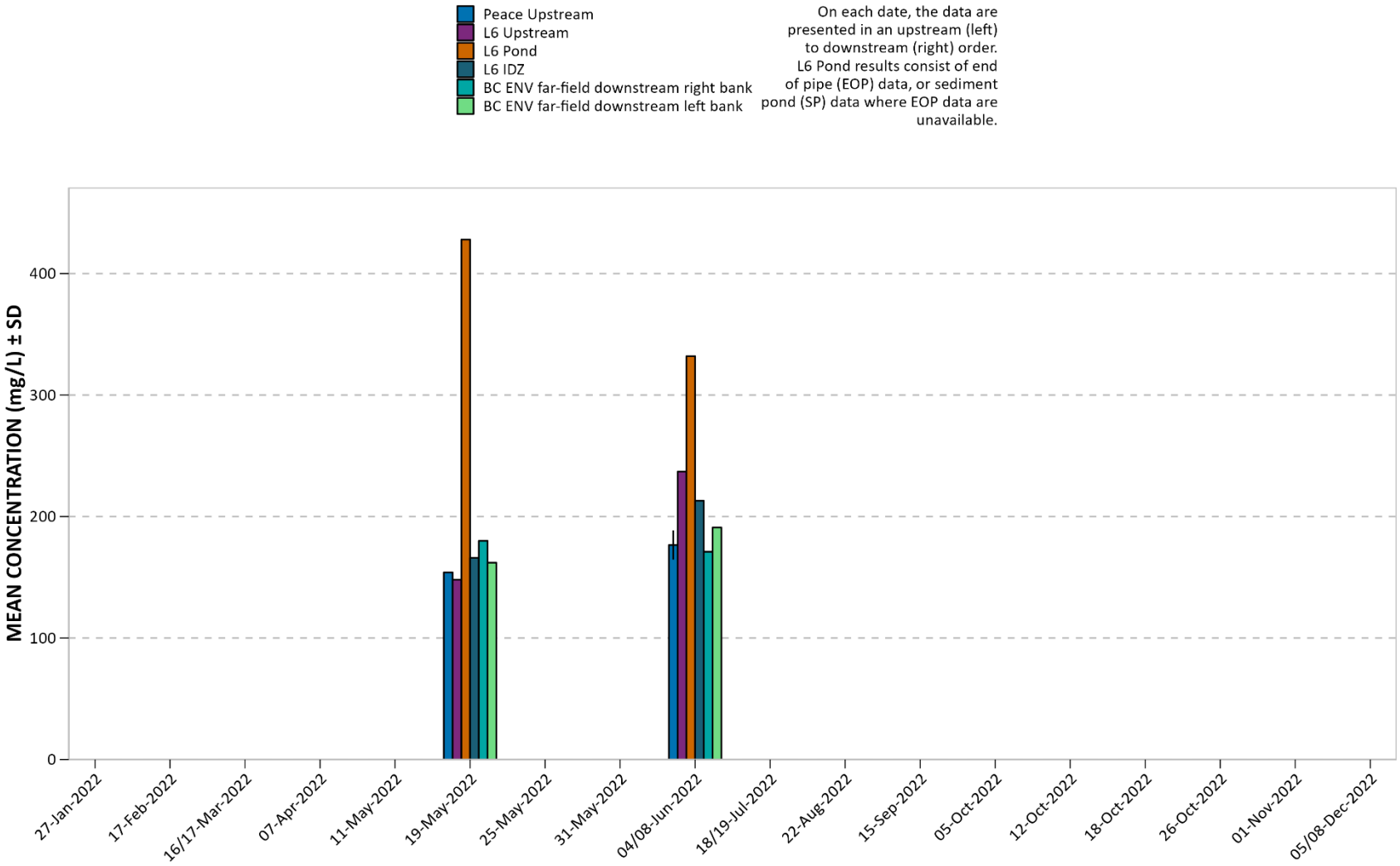


Figure 93. 2022 Peace River and RSEM L6 pond total suspended solids (TSS).

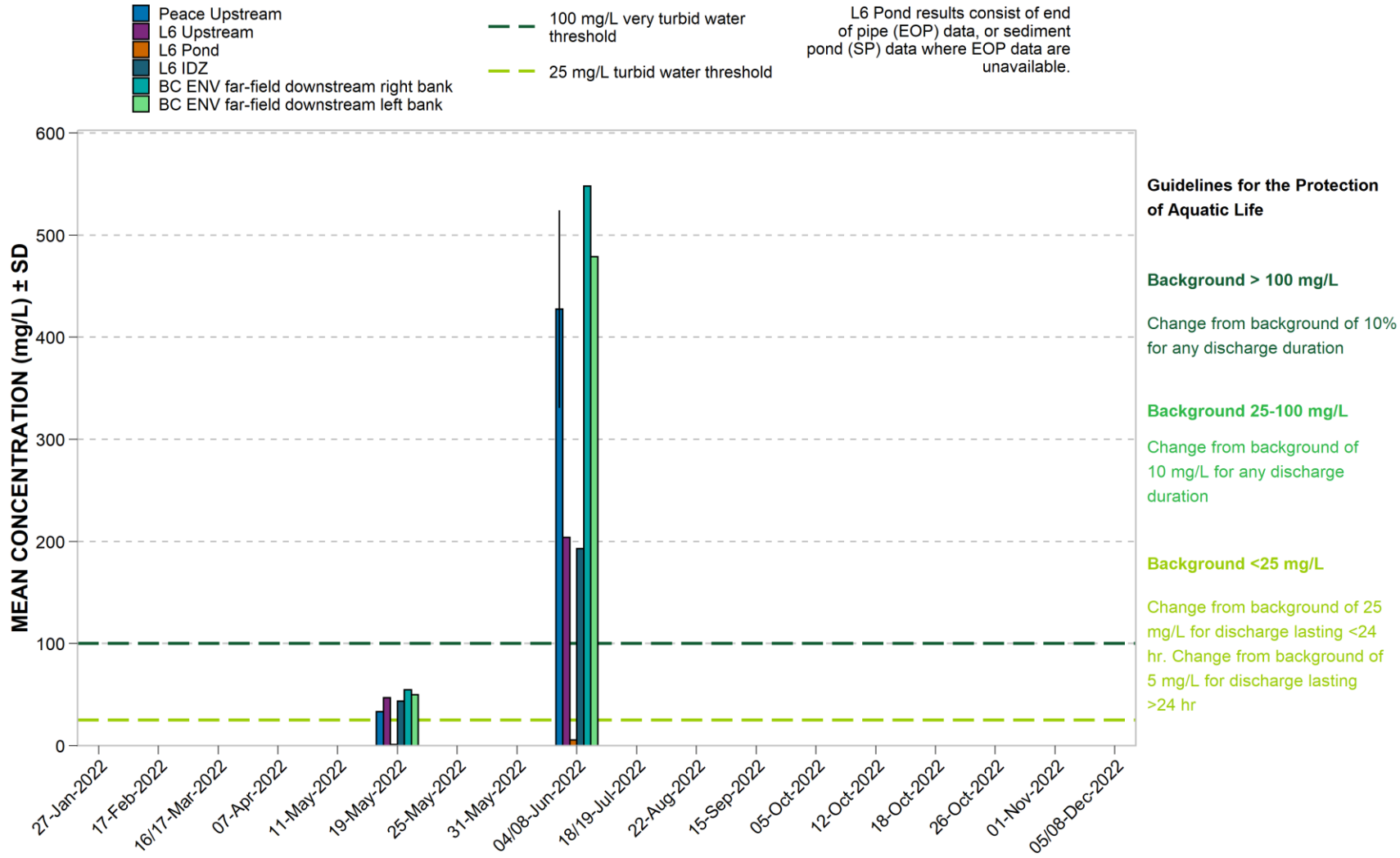


Figure 94. 2022 Peace River (*in situ*) and RSEM L6 pond (lab) turbidity.

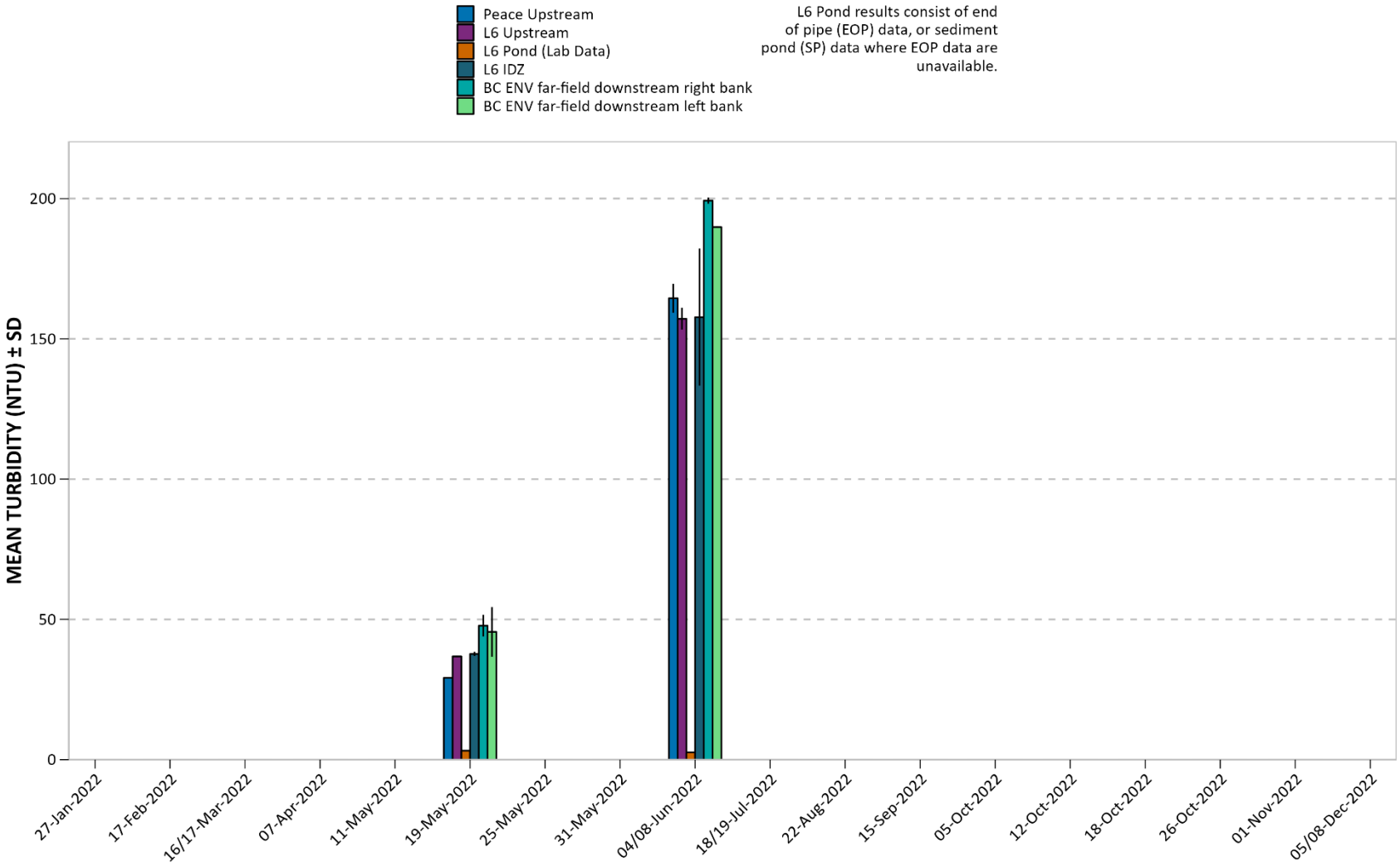


Figure 95. 2022 Peace River (*in situ*) and RSEM L6 pond (lab) pH.

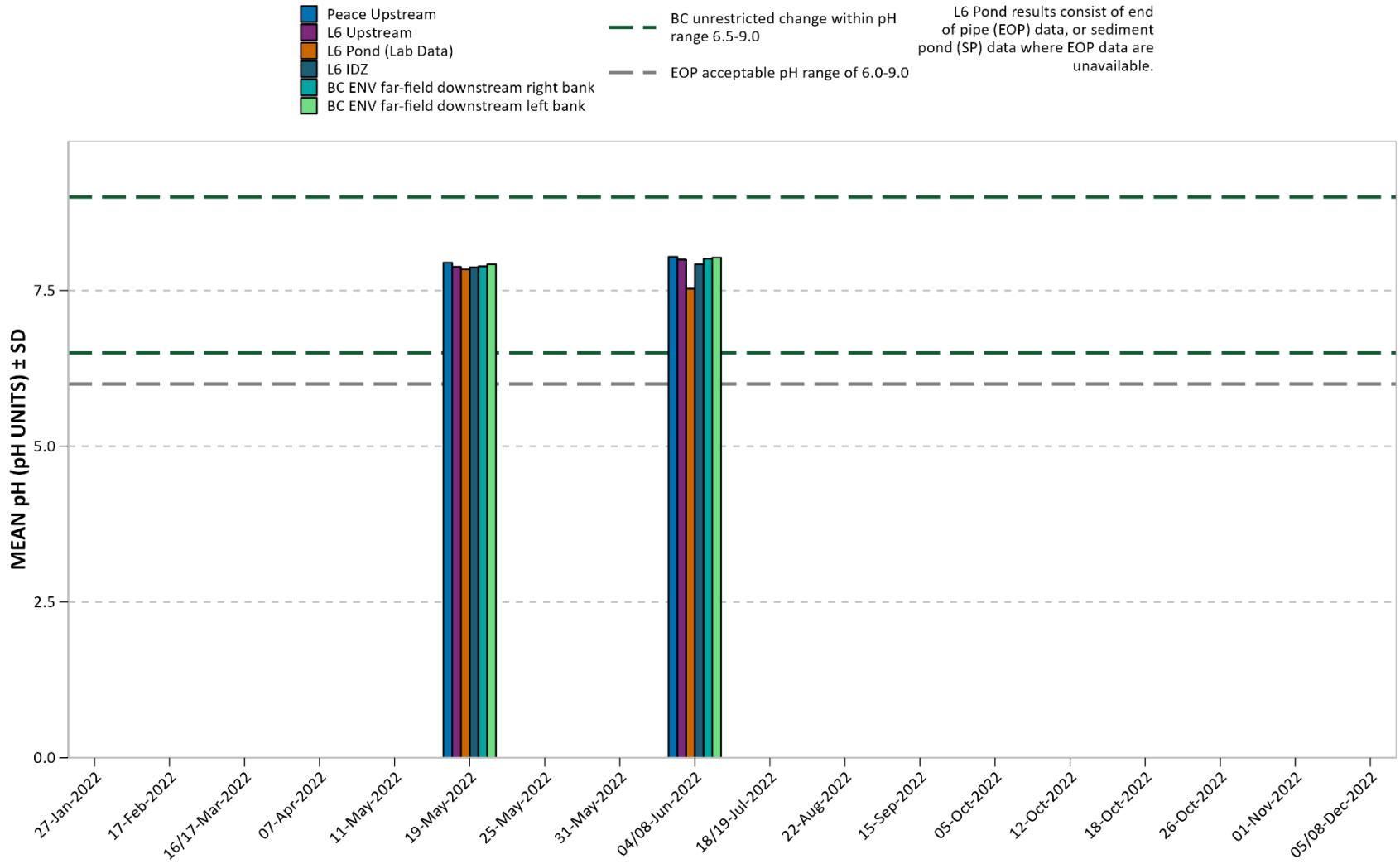


Figure 96. 2022 Peace River and RSEM L6 pond lab pH.

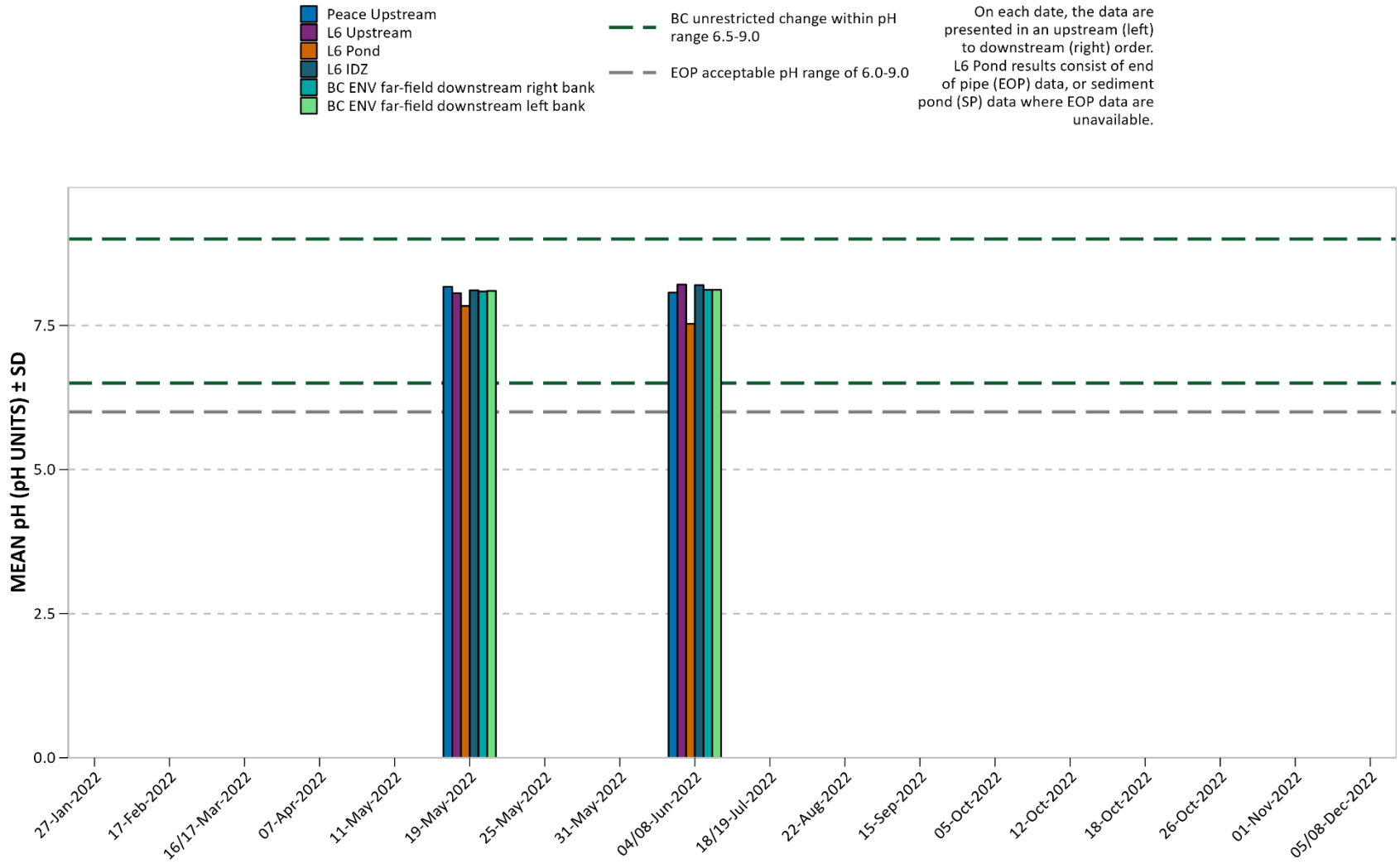


Figure 97. 2022 Peace River and RSEM L6 pond total alkalinity (as $CaCO_3$).

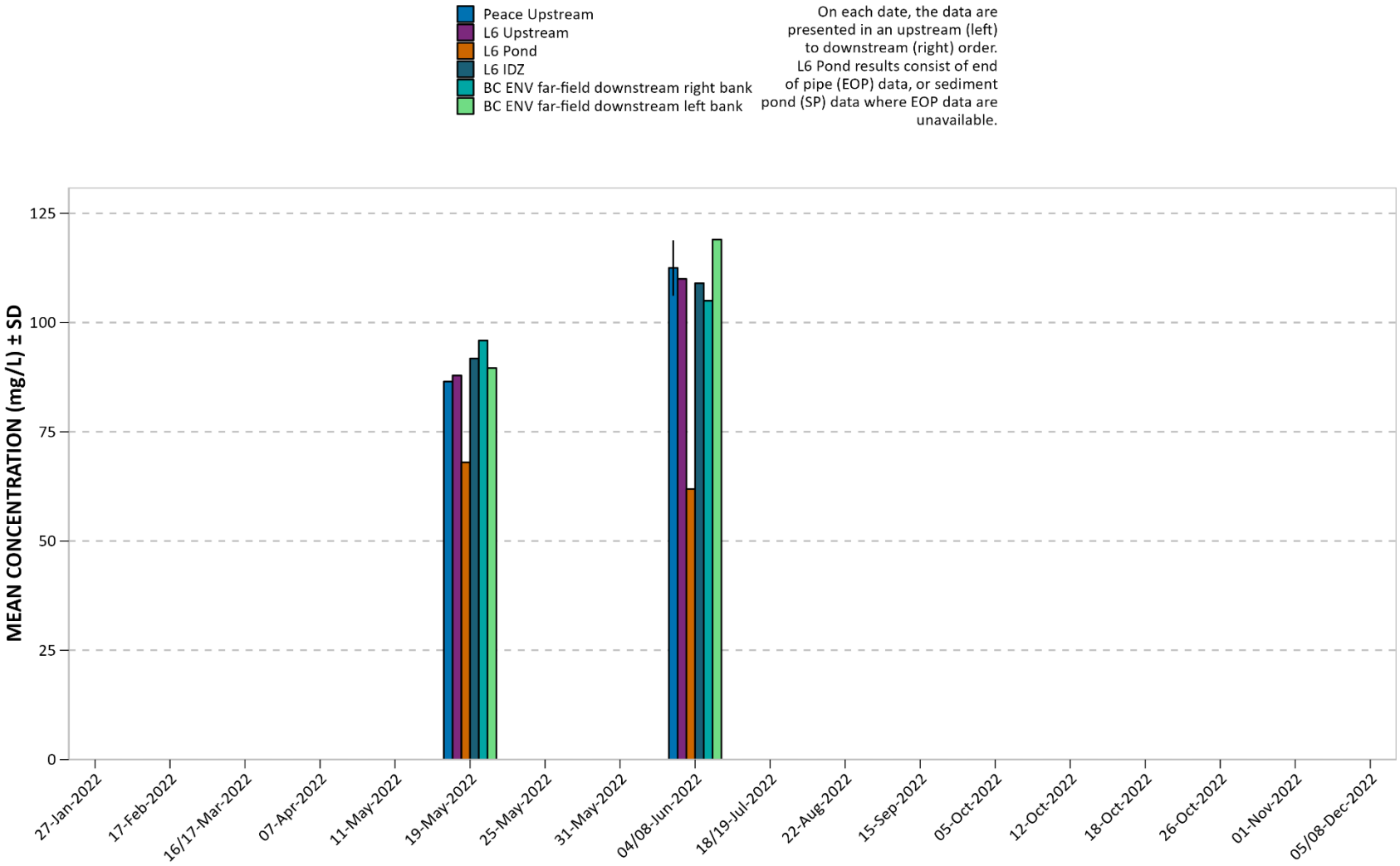
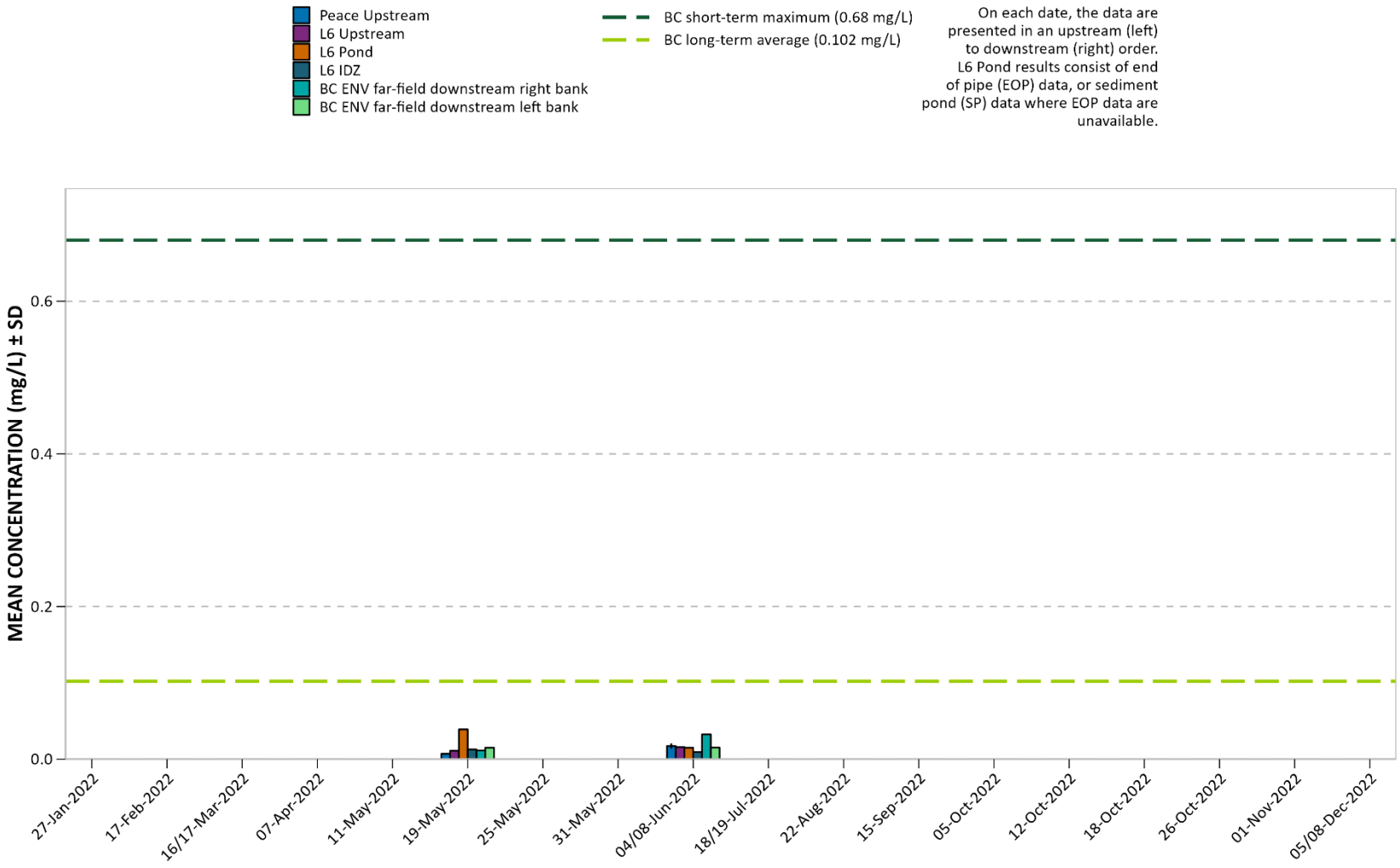


Figure 98. 2022 Peace River and RSEM L6 pond total ammonia (as N).



Note: BC WQG for total ammonia are pH and temperature dependent; guidelines used are the most conservative.

Figure 99. 2022 Peace River and RSEM L6 pond bromide (Br).

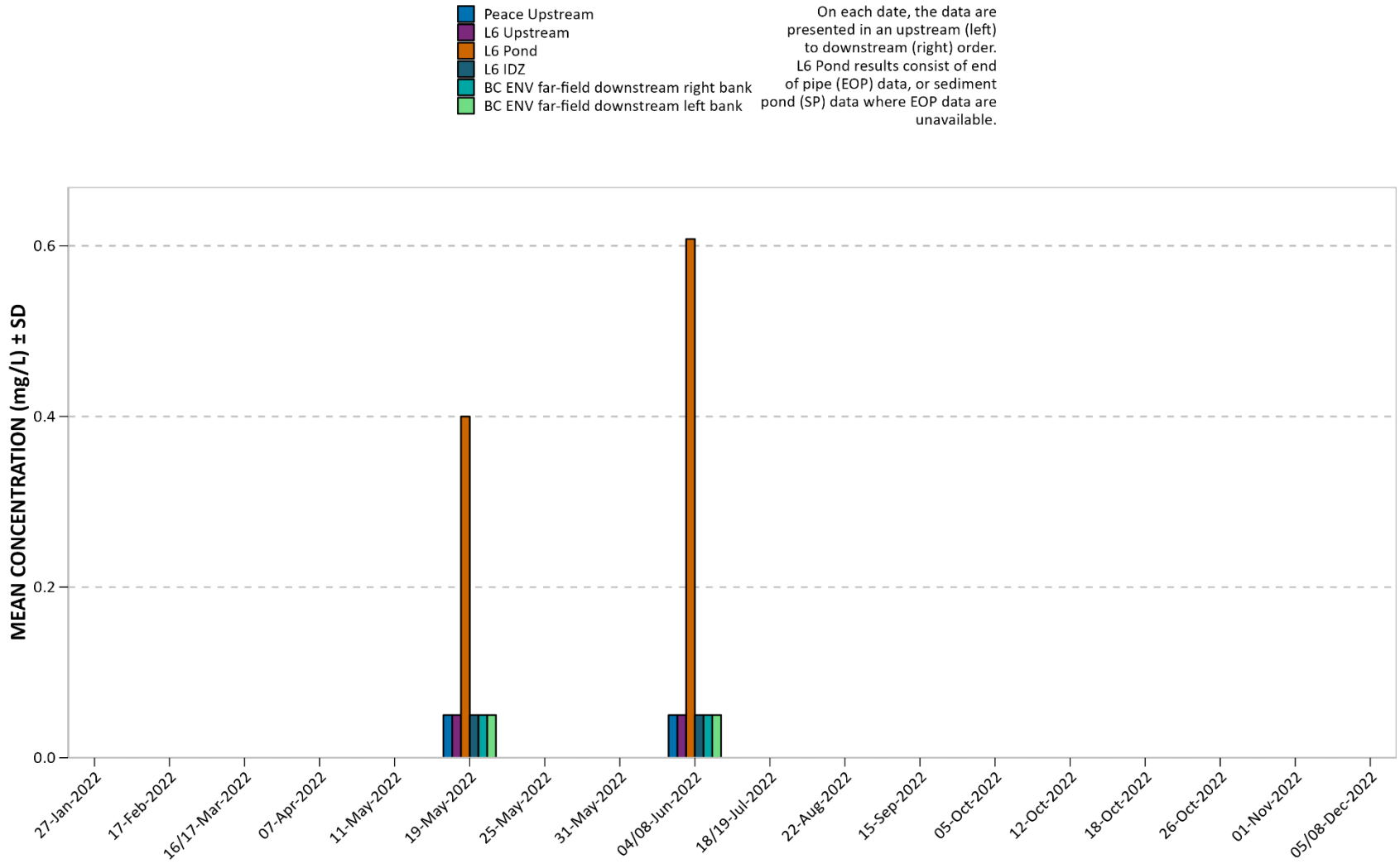


Figure 100. 2022 Peace River and RSEM L6 pond chloride (Cl).

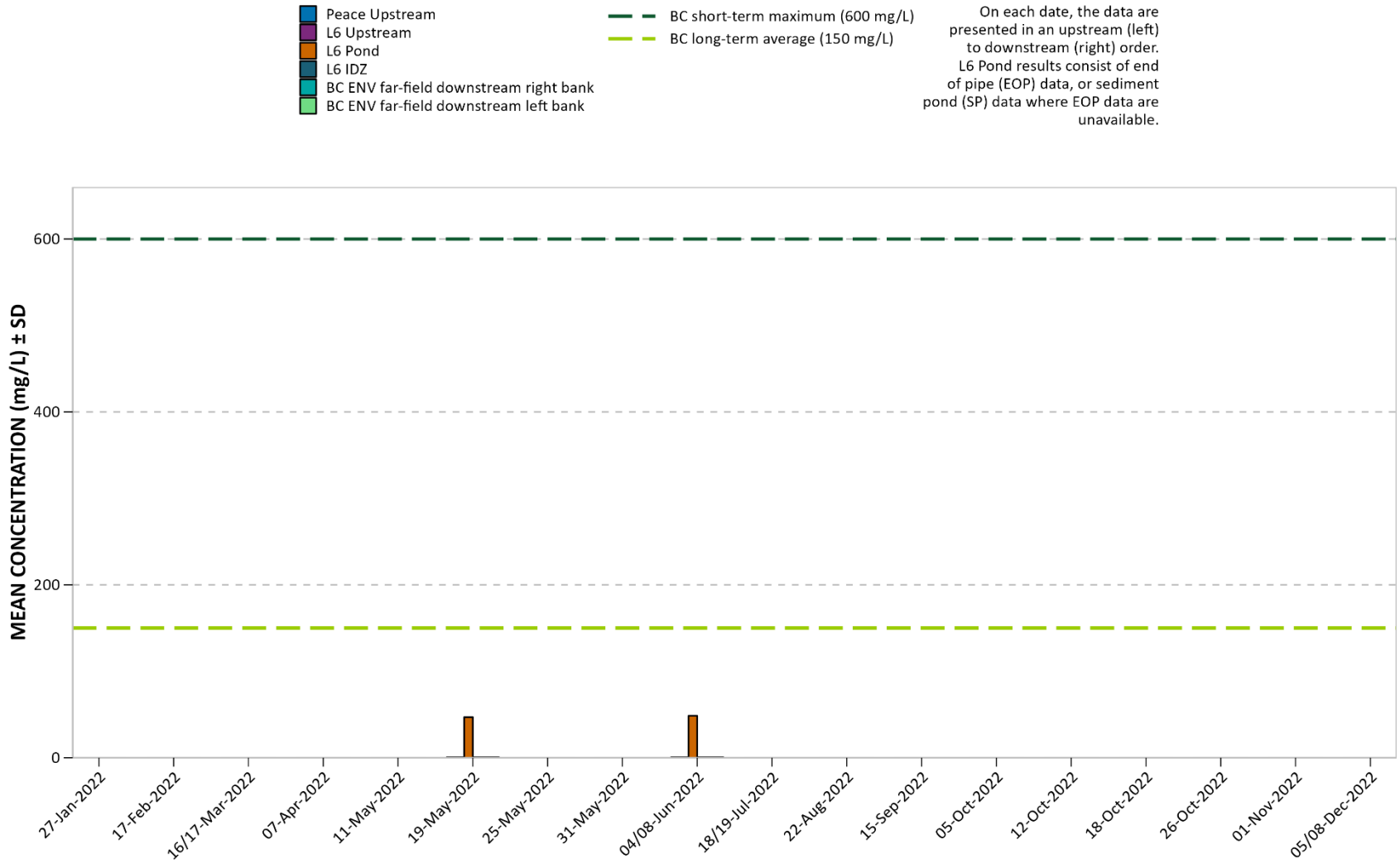


Figure 101. 2022 Peace River and RSEM L6 pond dissolved orthophosphate.

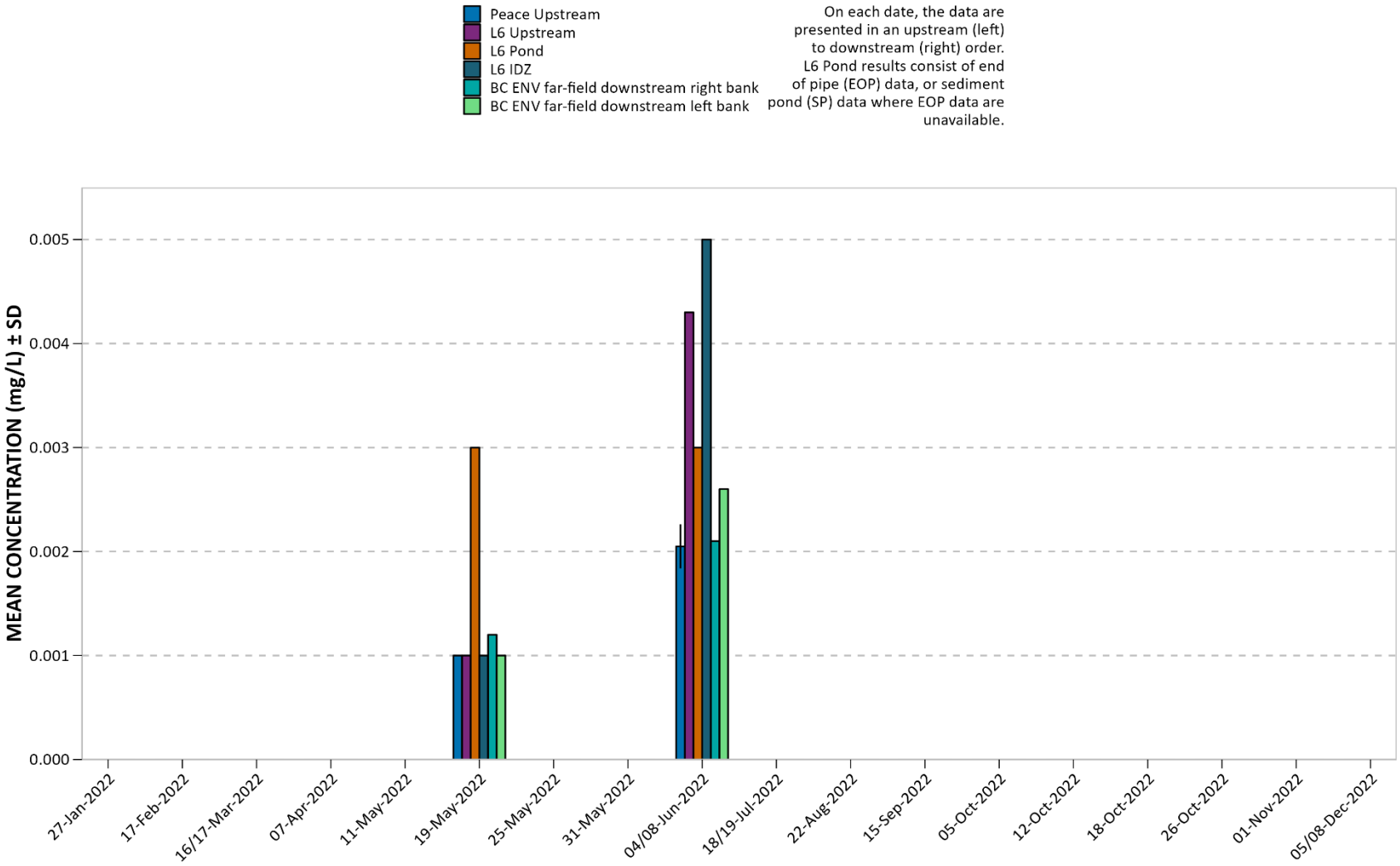


Figure 102. 2022 Peace River and RSEM L6 pond fluoride (F).

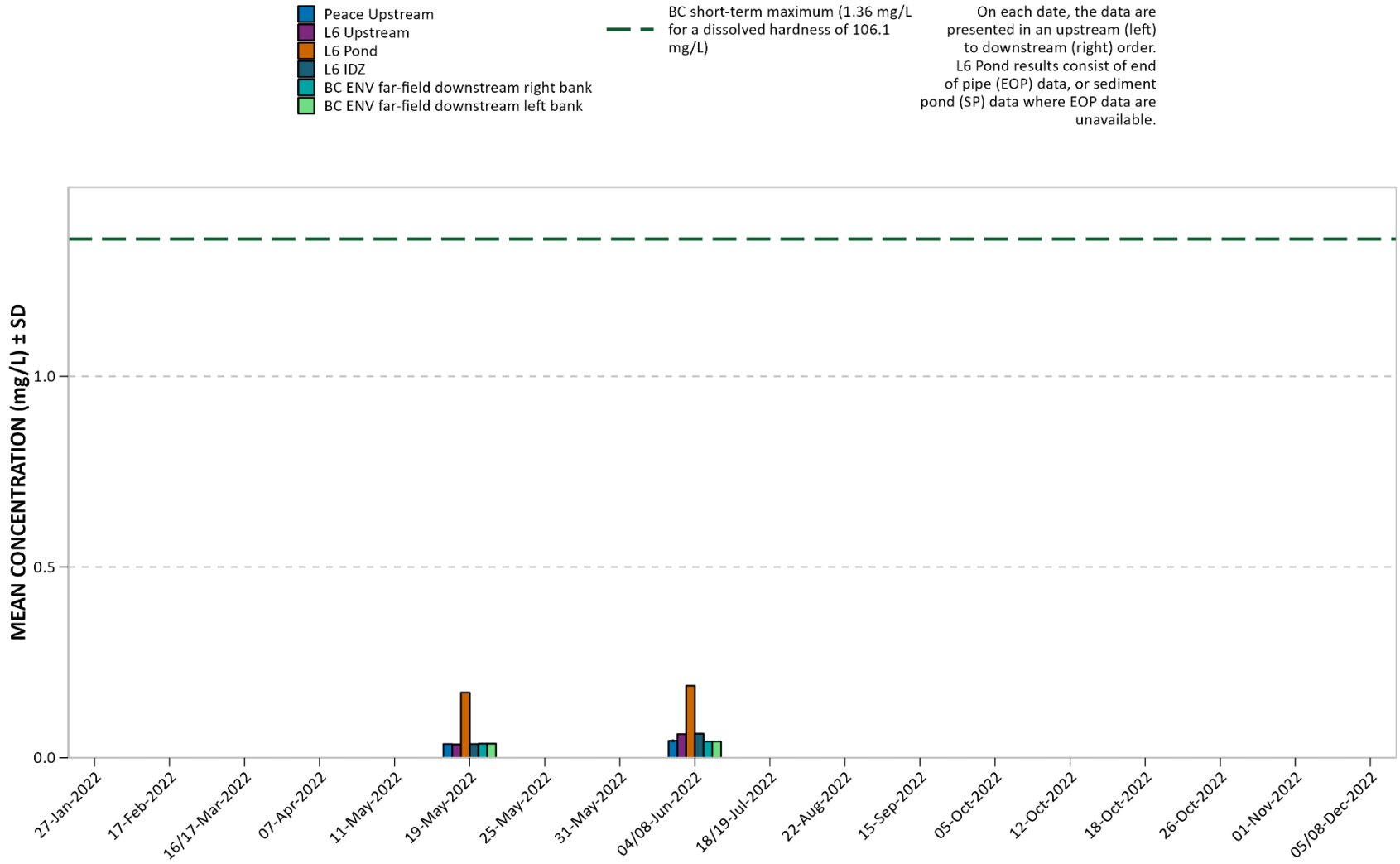


Figure 103. 2022 Peace River and RSEM L6 pond nitrate (as N).

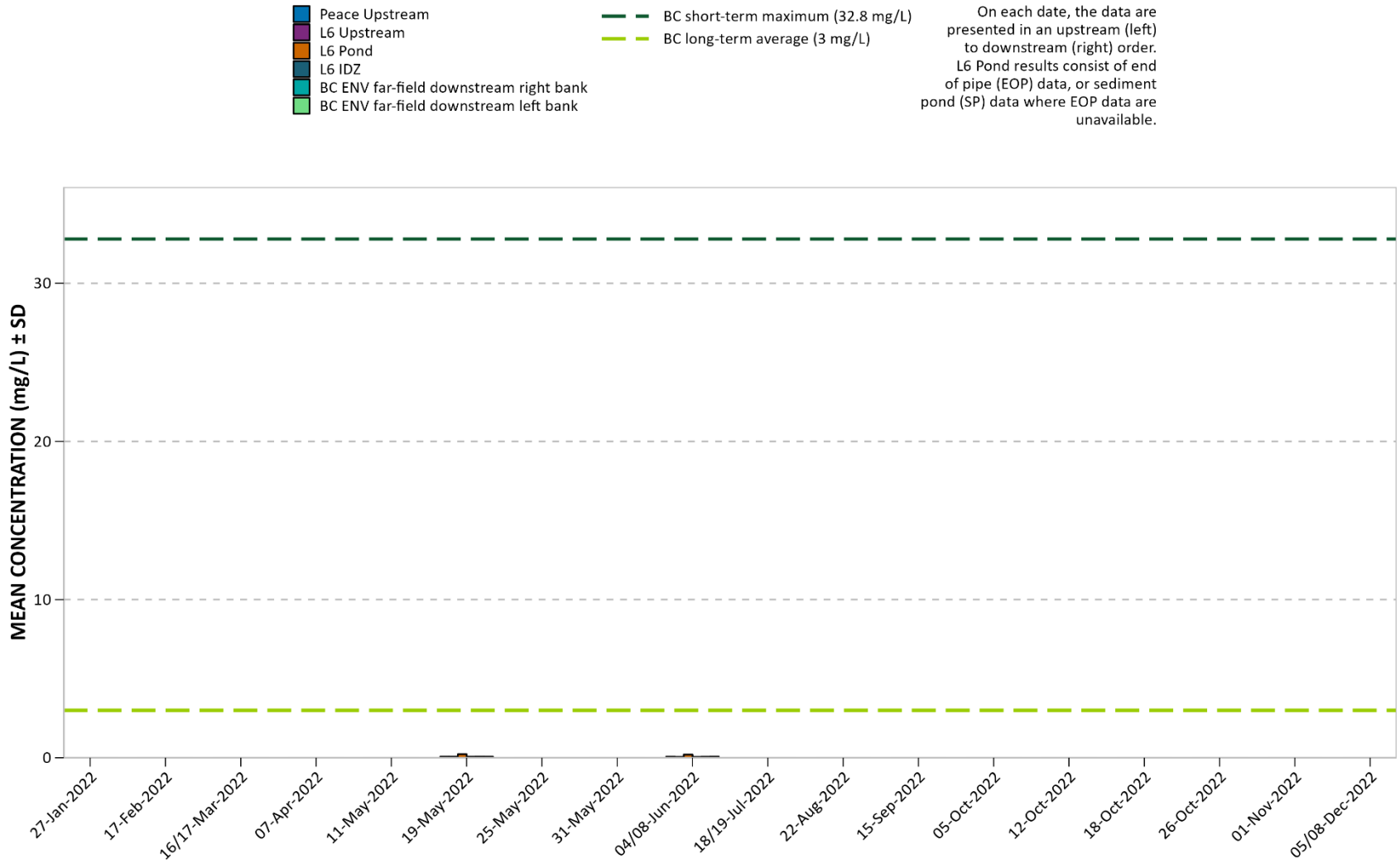
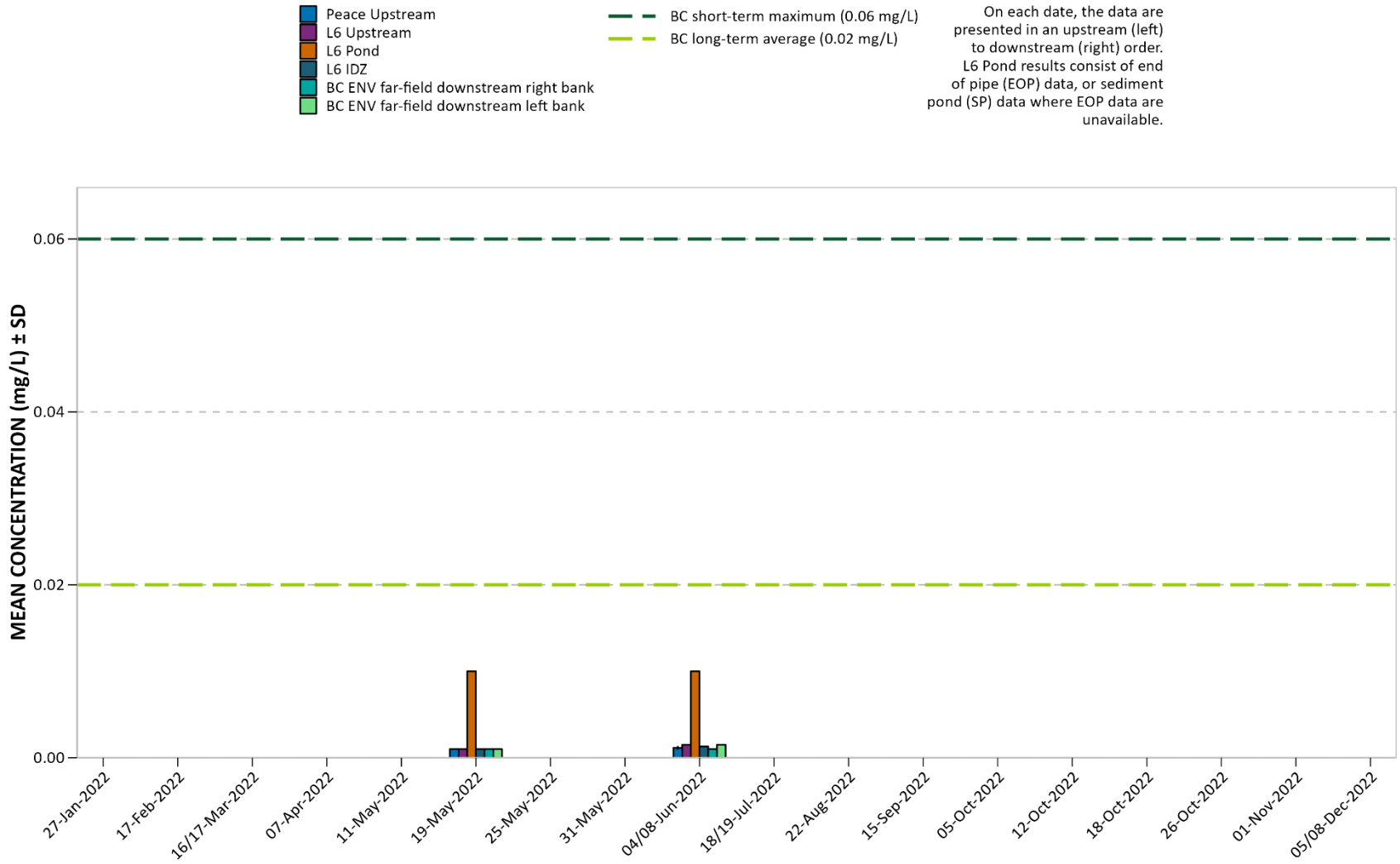


Figure 104. 2022 Peace River and RSEM L6 pond nitrite (as N).



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. 2022 Peace River and RSEM L6 pond sulfate (SO_4).

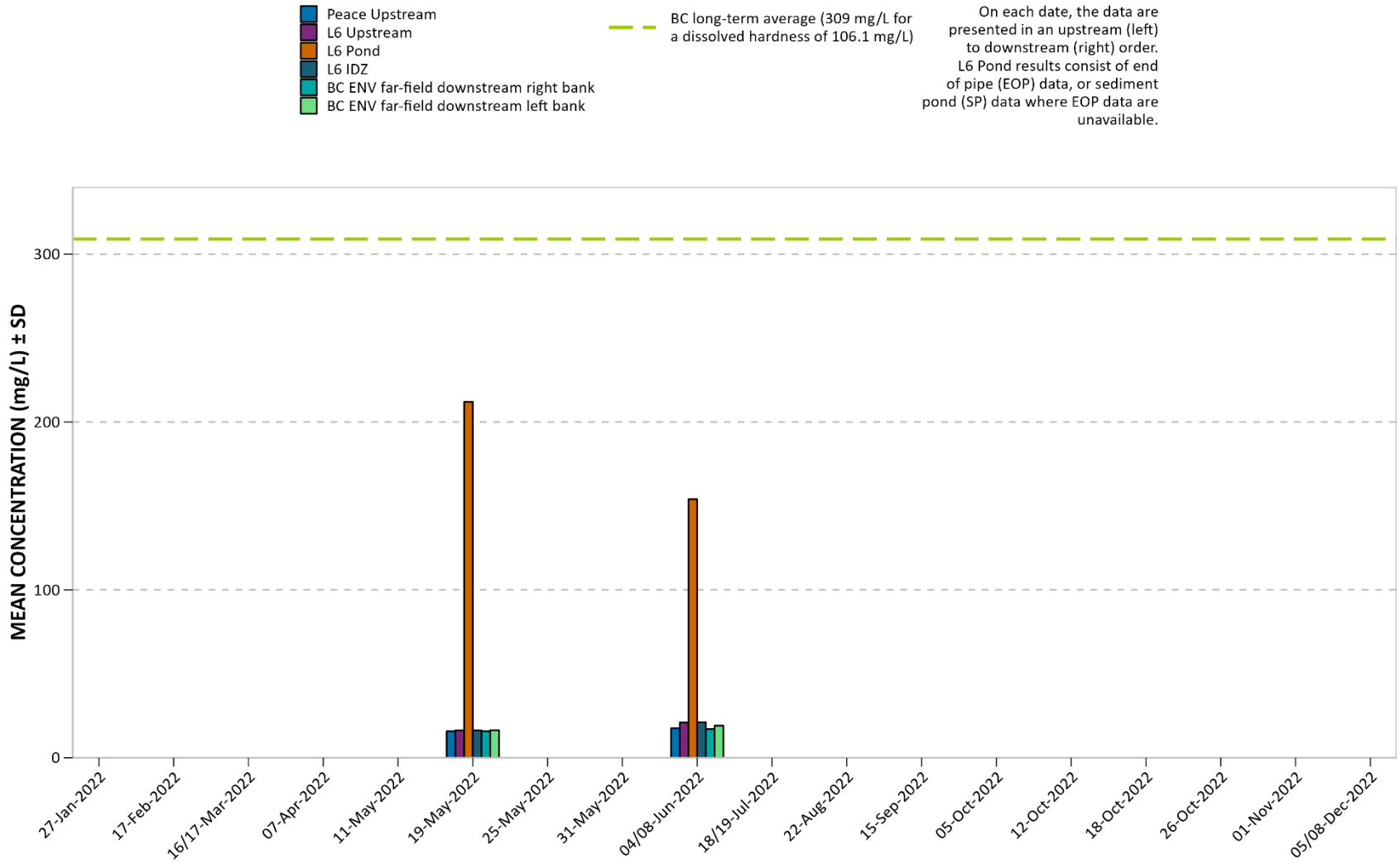


Figure 106. 2022 Peace River and RSEM L6 pond dissolved organic carbon (DOC).

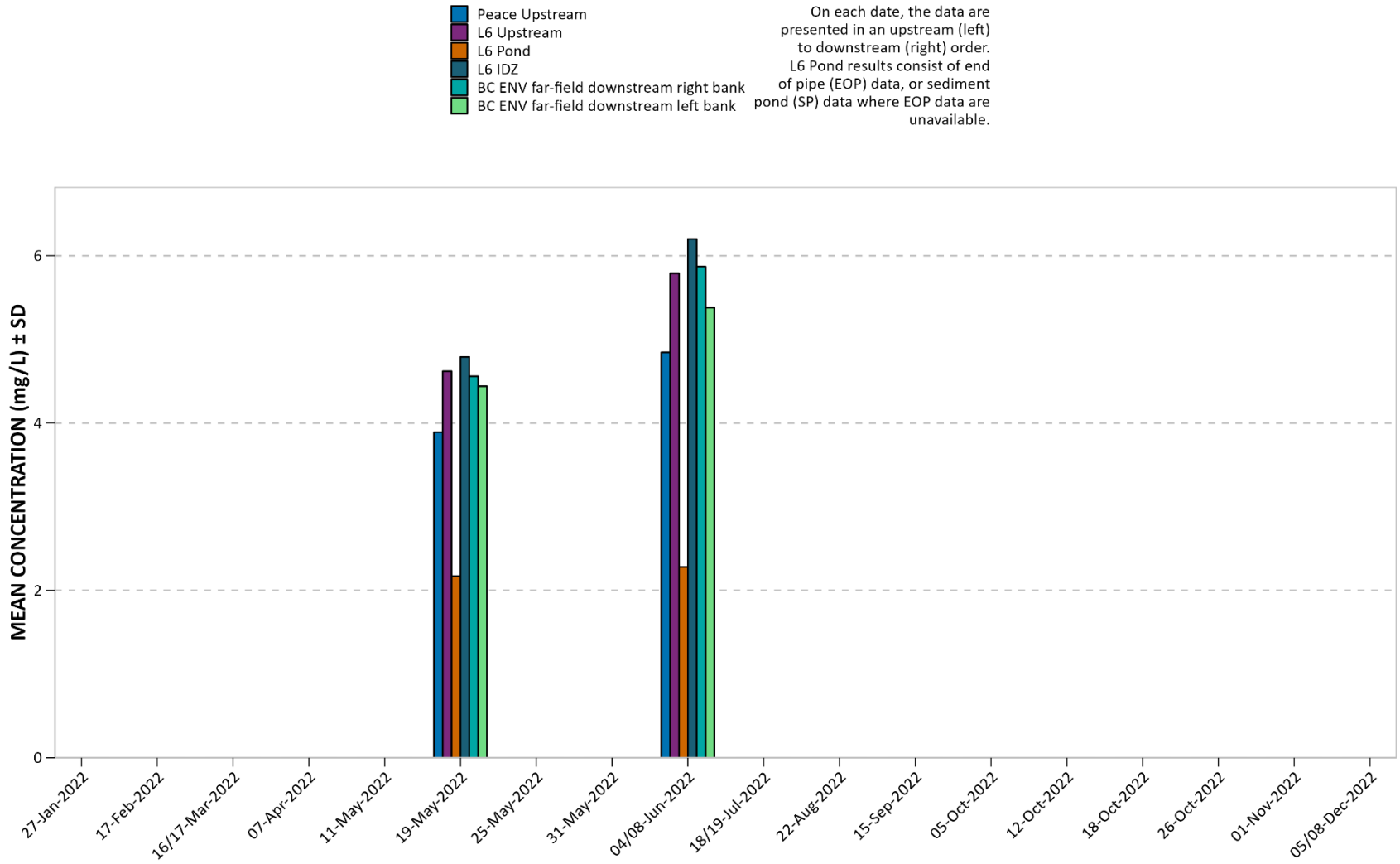


Figure 107. 2022 Peace River and RSEM L6 pond total organic carbon (TOC).

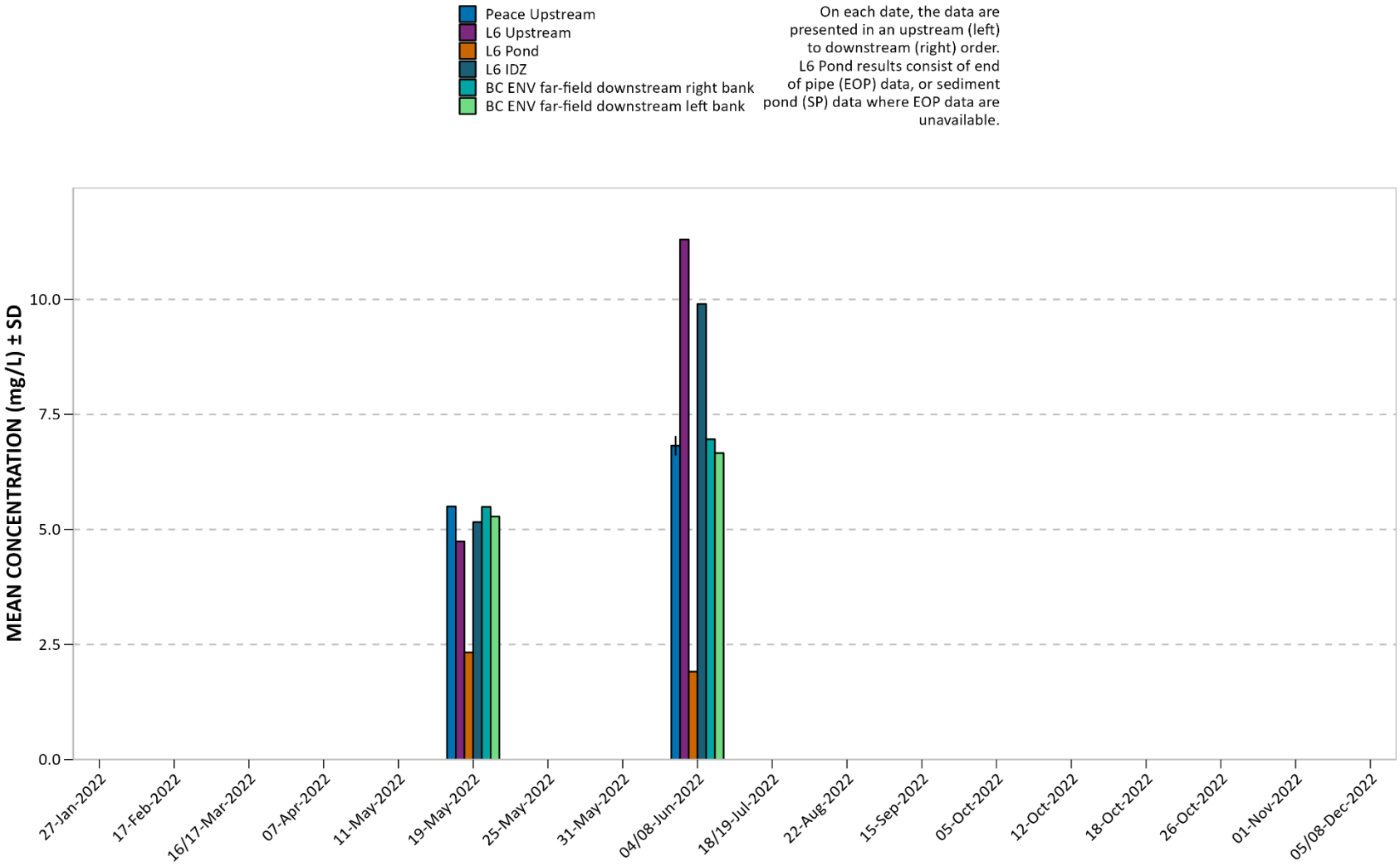


Figure 108. 2022 Peace River and RSEM L6 pond total aluminum (Al).

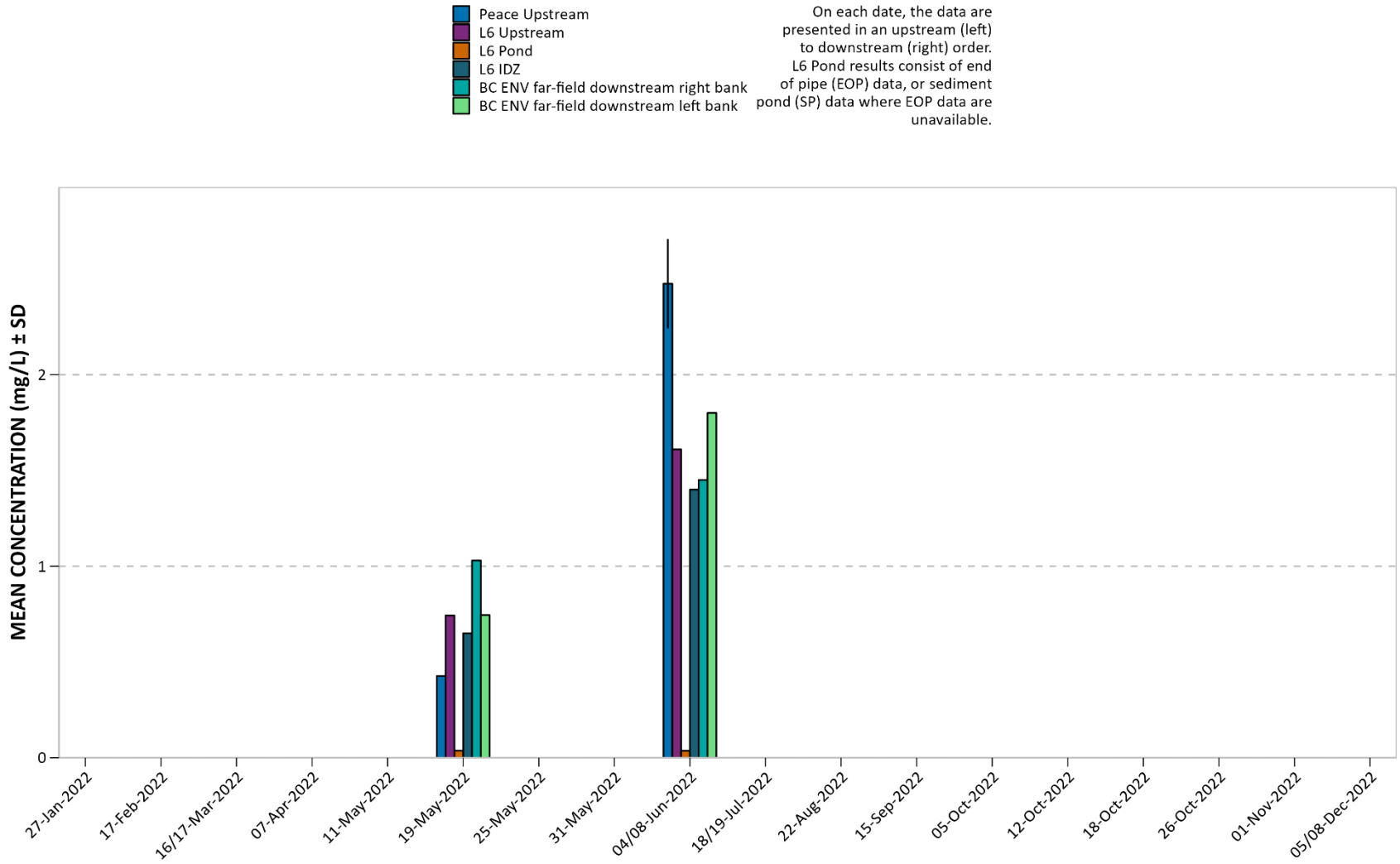


Figure 109. 2022 Peace River and RSEM L6 pond total antimony (Sb).

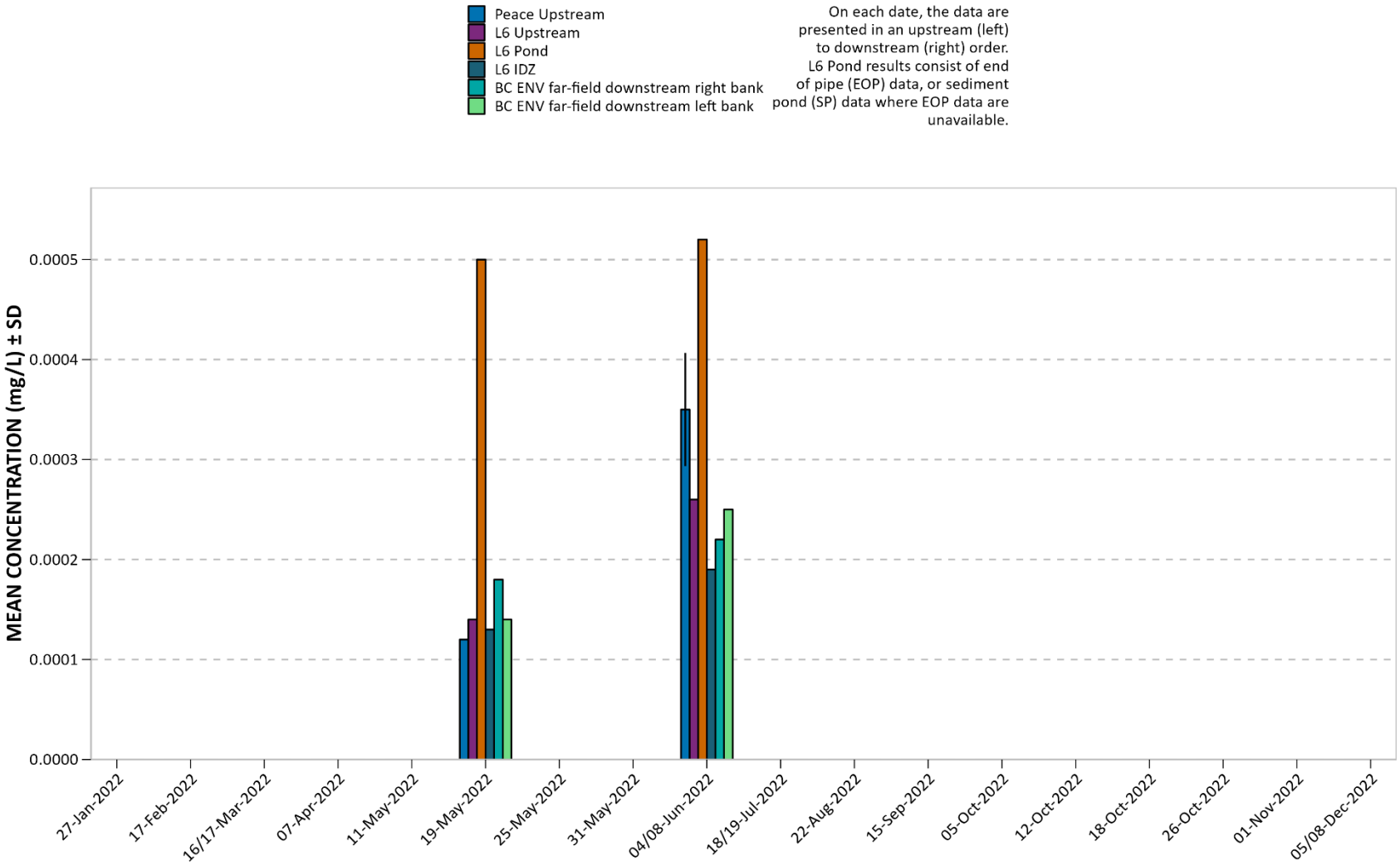


Figure 110. 2022 Peace River and RSEM L6 pond total arsenic (As).

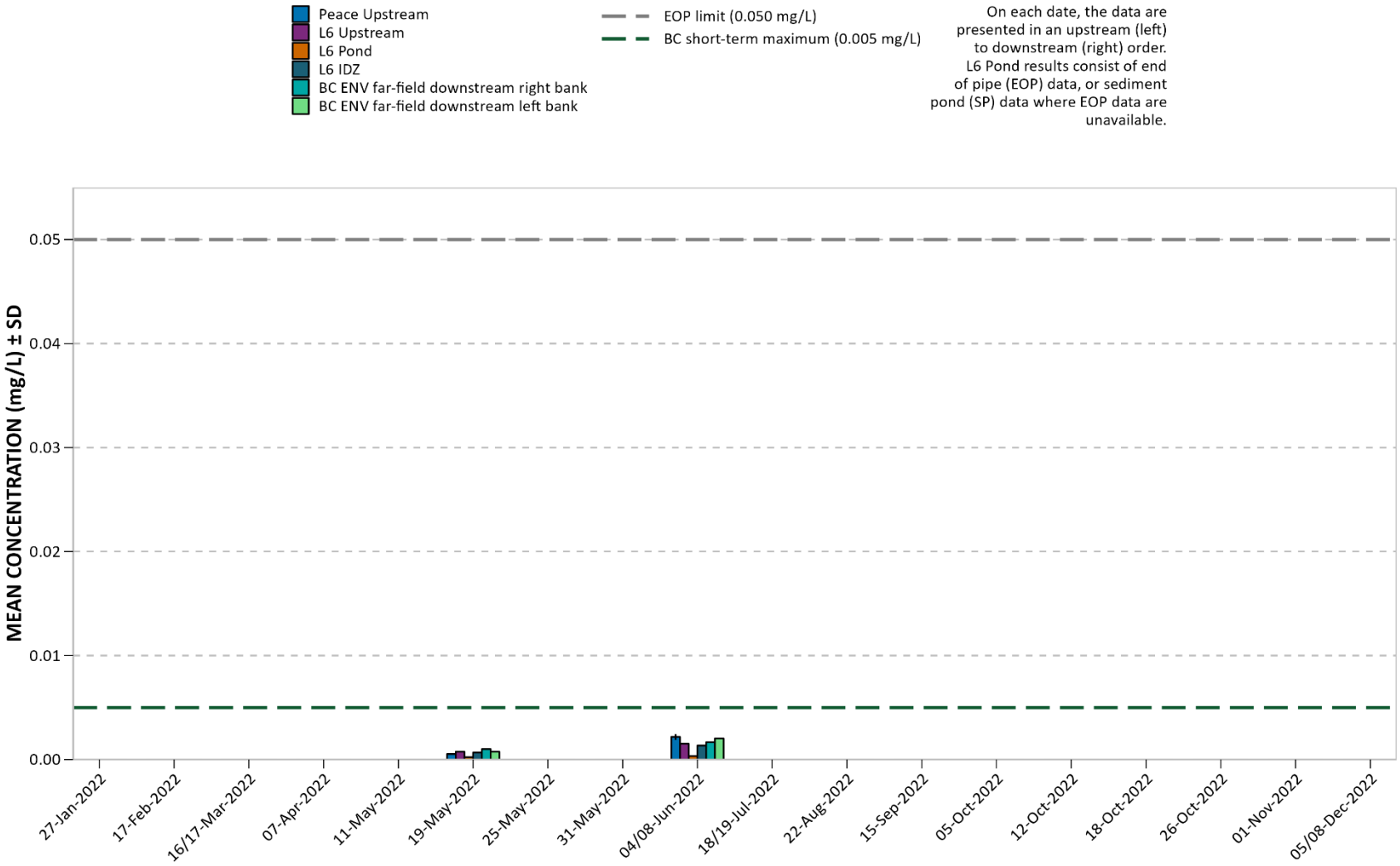


Figure 111. 2022 Peace River and RSEM L6 pond total barium (Ba).

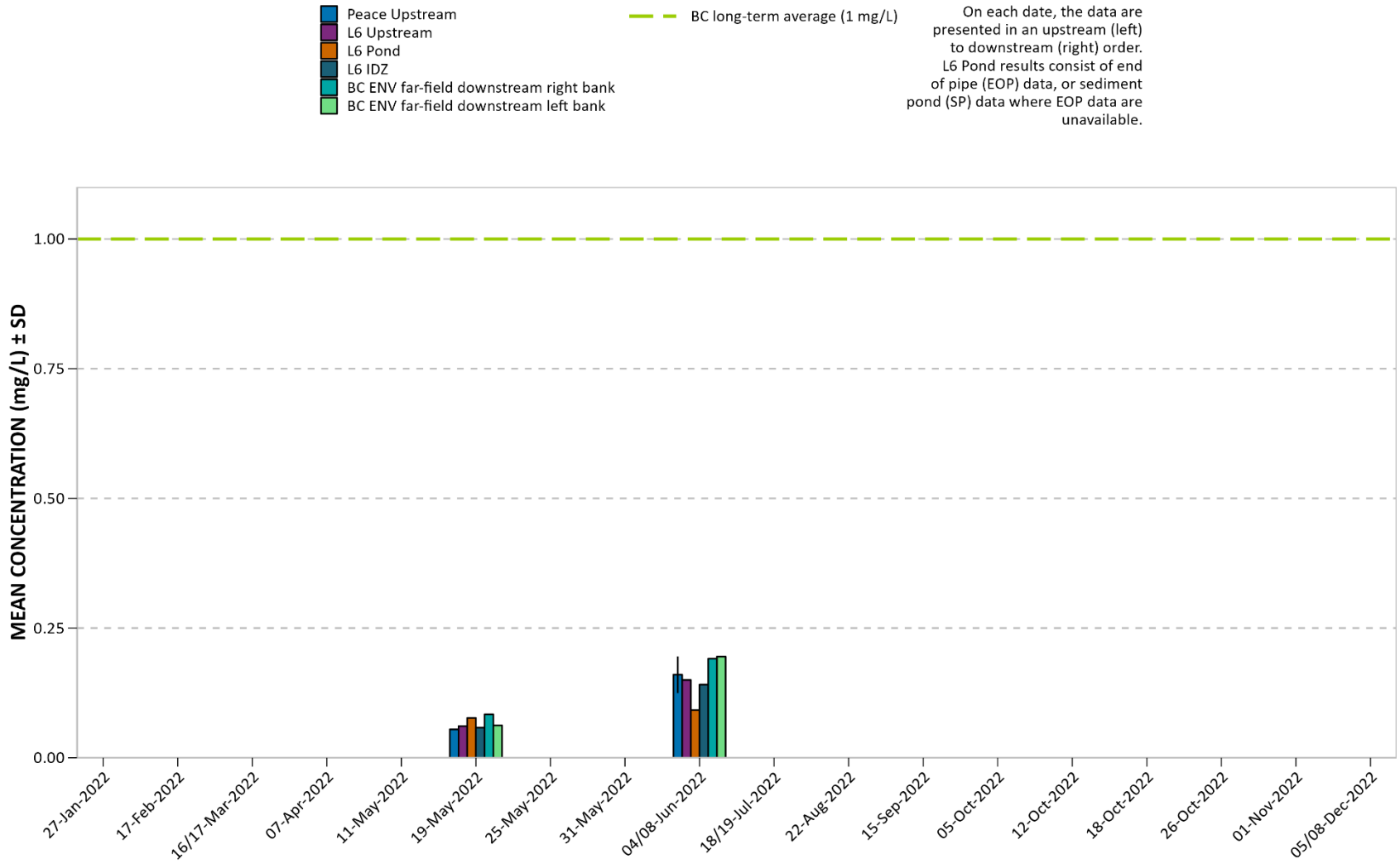


Figure 112. 2022 Peace River and RSEM L6 pond total beryllium (Be).

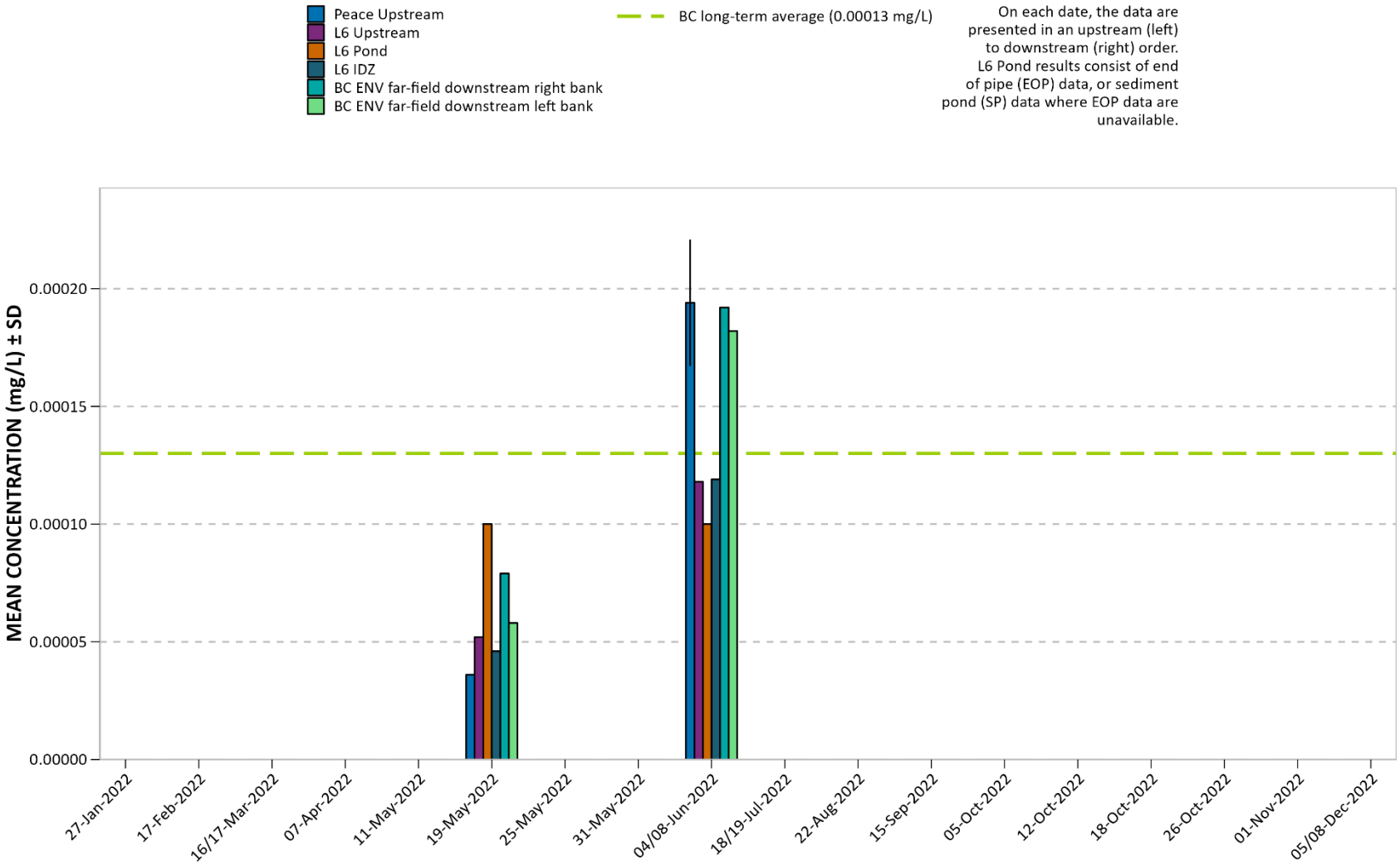


Figure 113. 2022 Peace River and RSEM L6 pond total bismuth (Bi).

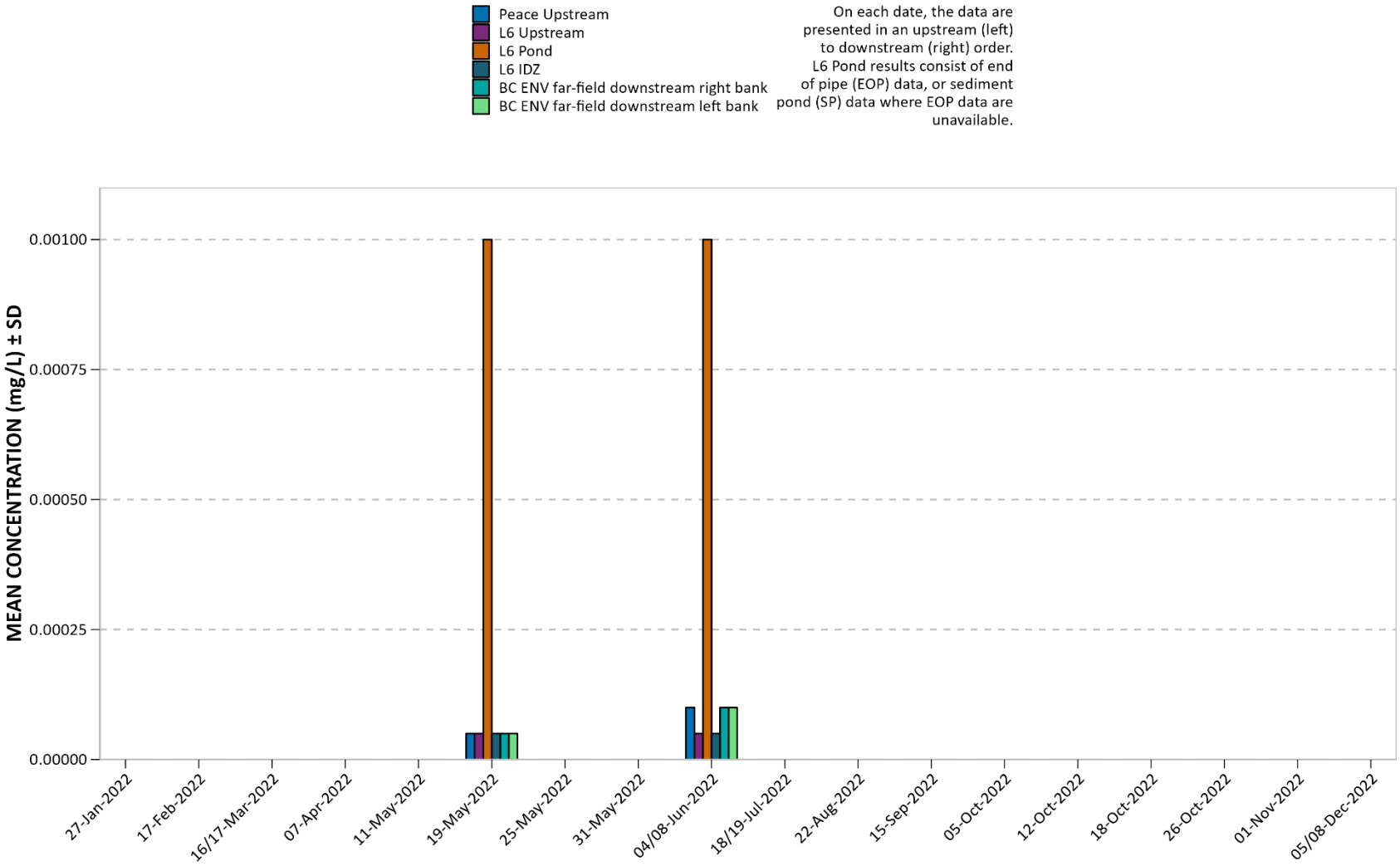


Figure 114. 2022 Peace River and RSEM L6 pond total boron (B).

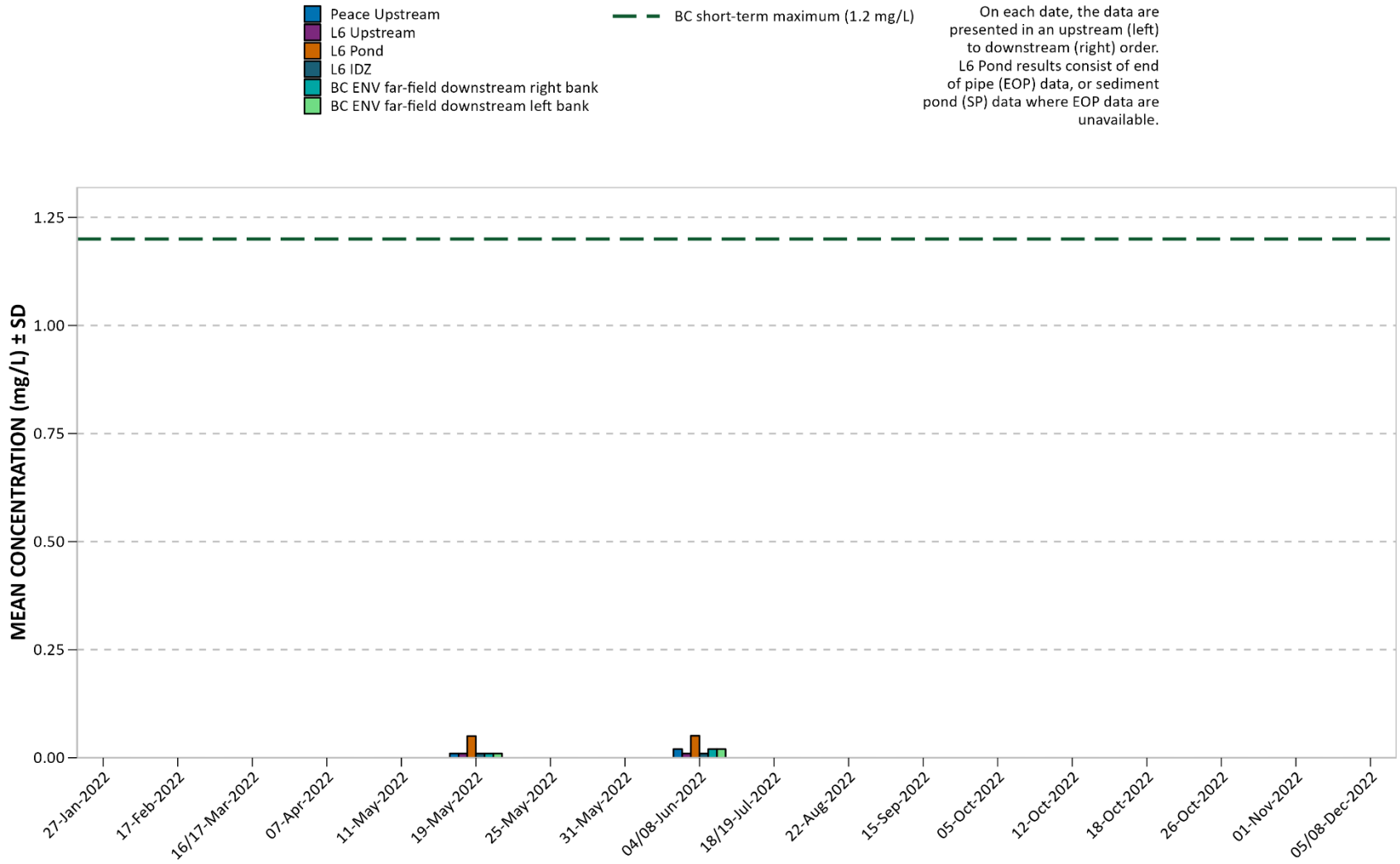


Figure 115. 2022 Peace River and RSEM L6 pond total cadmium (Cd).

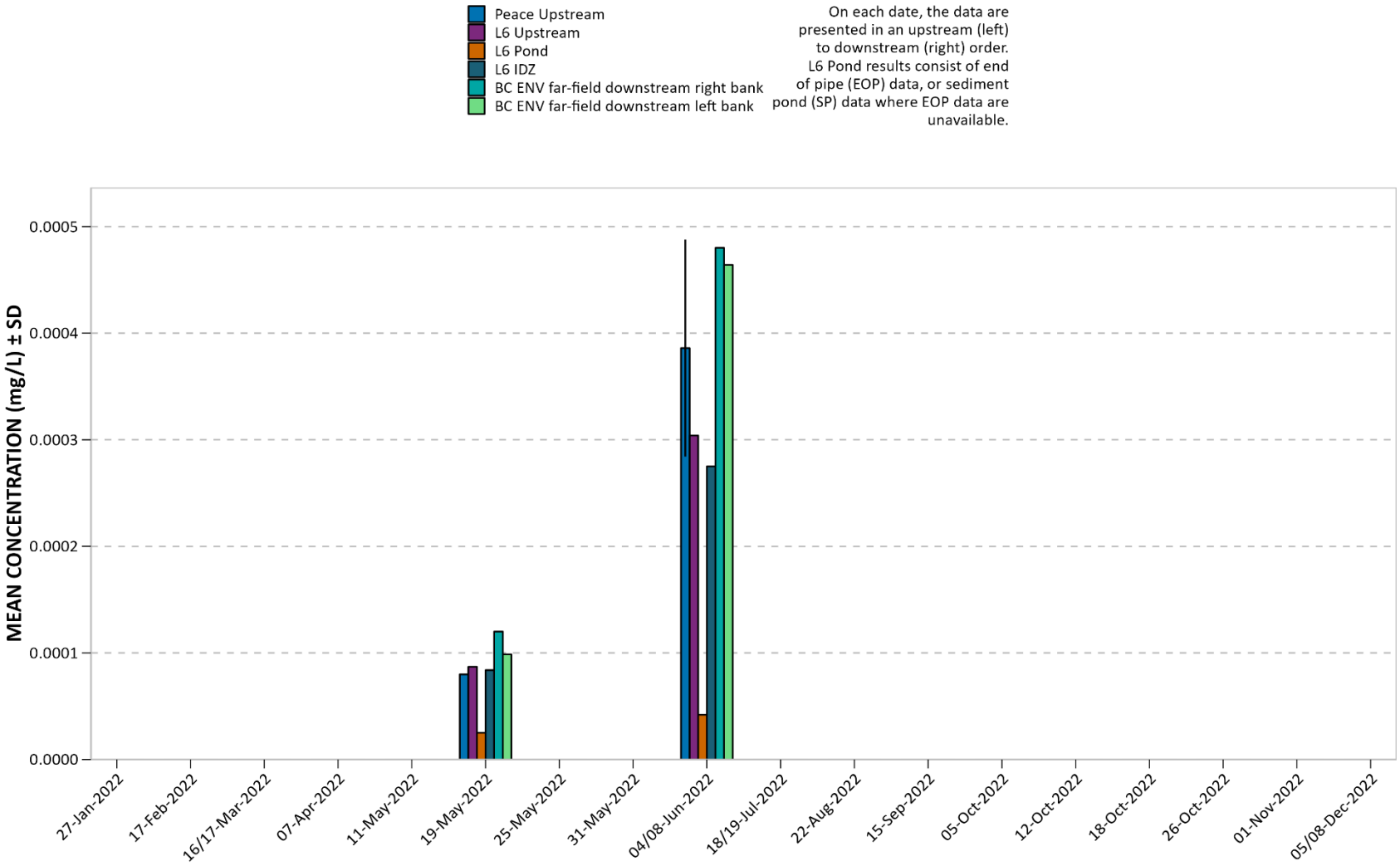


Figure 116. 2022 Peace River and RSEM L6 pond total calcium (Ca).

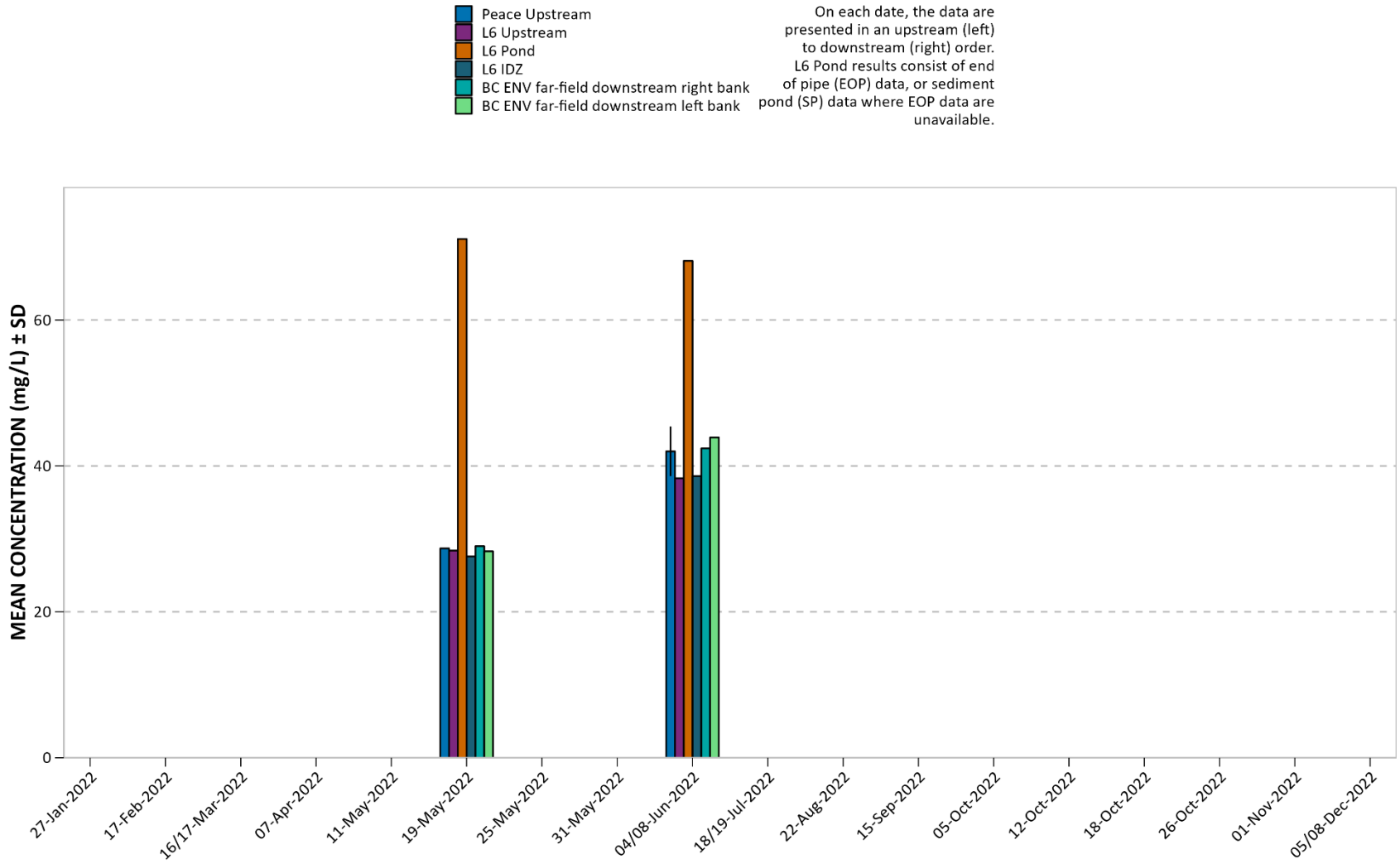


Figure 117. 2022 Peace River and RSEM L6 pond total chromium (Cr).

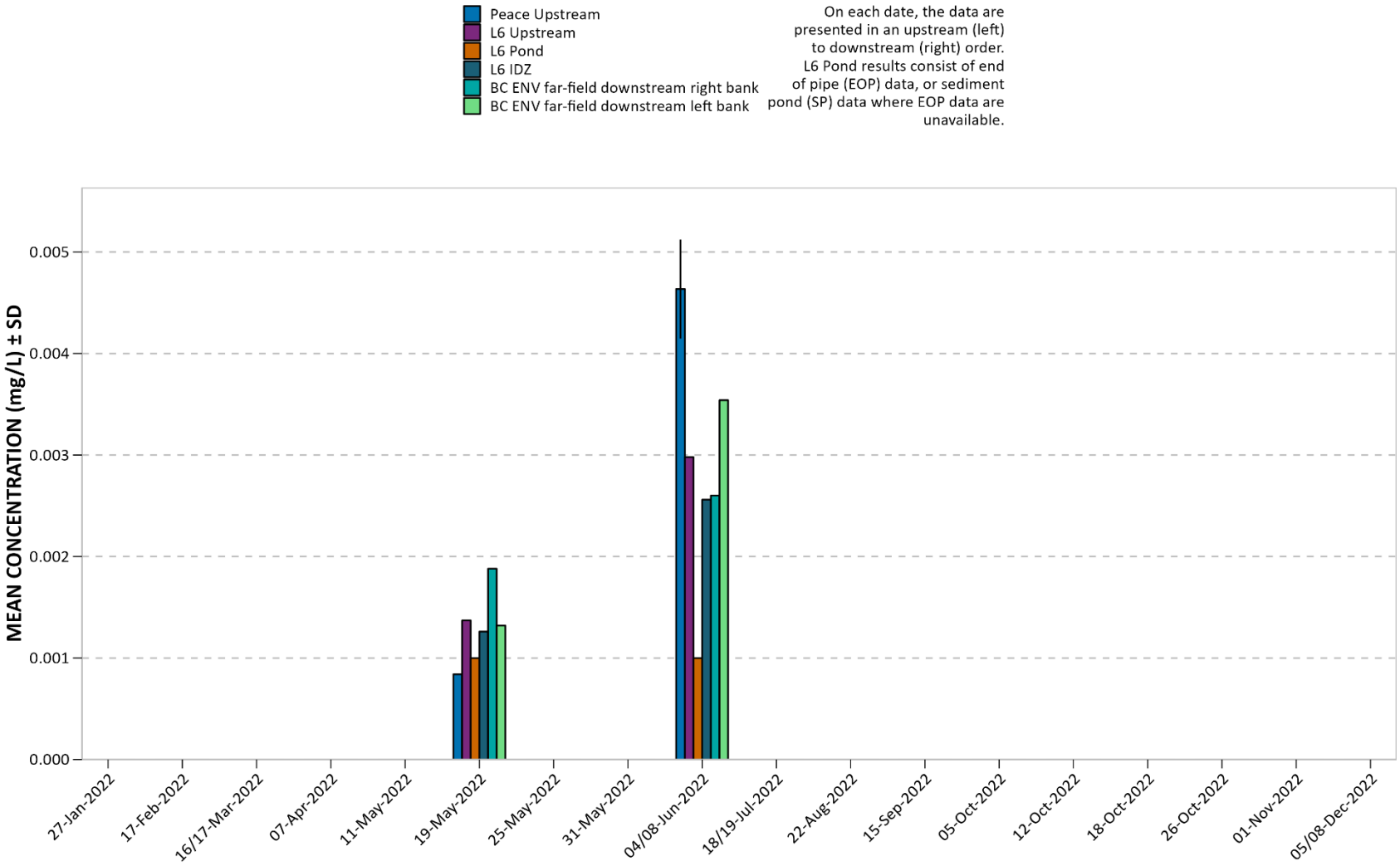


Figure 118. 2022 Peace River and RSEM L6 pond total cobalt (Co).

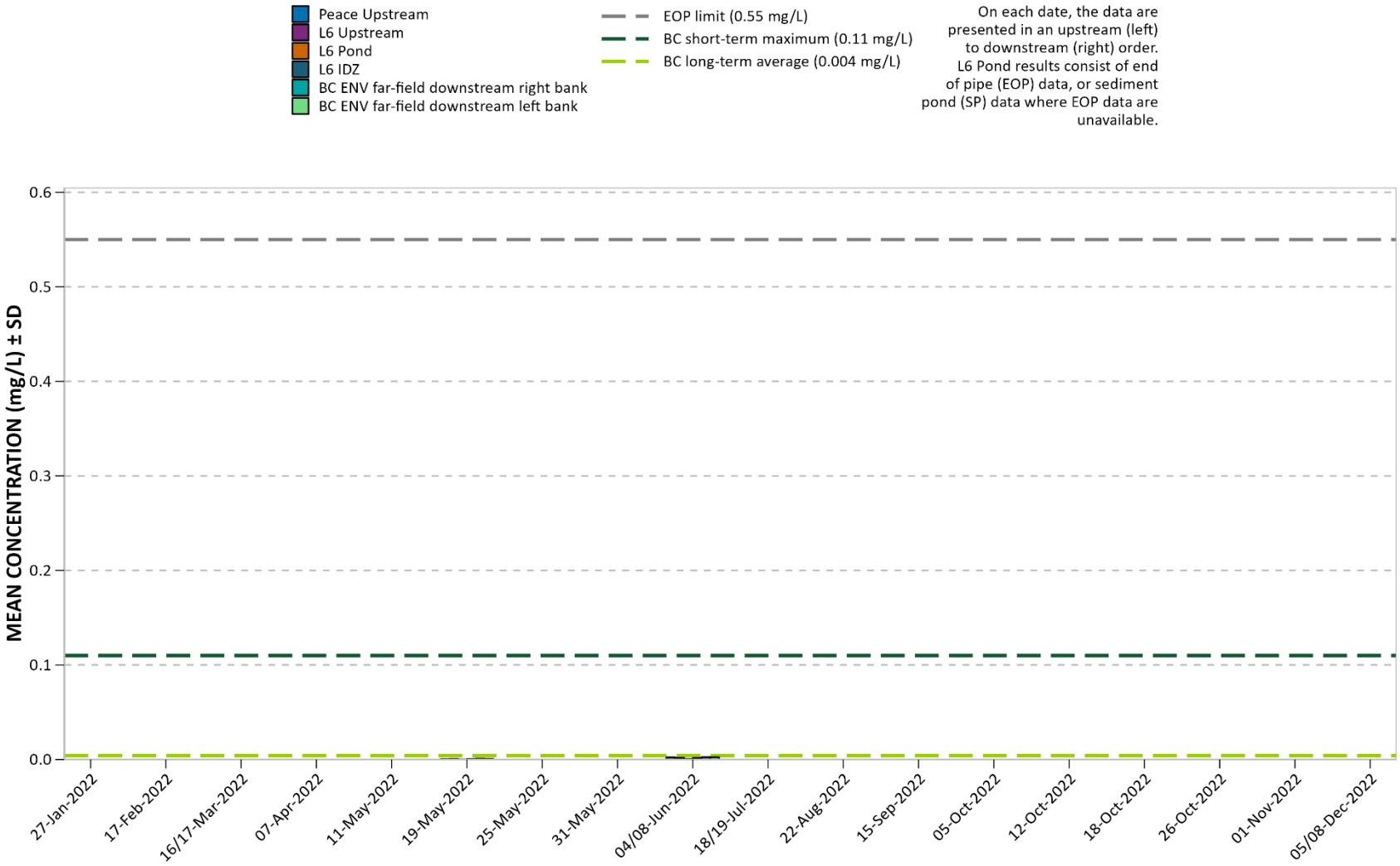


Figure 119. 2022 Peace River and RSEM L6 pond total copper (Cu).

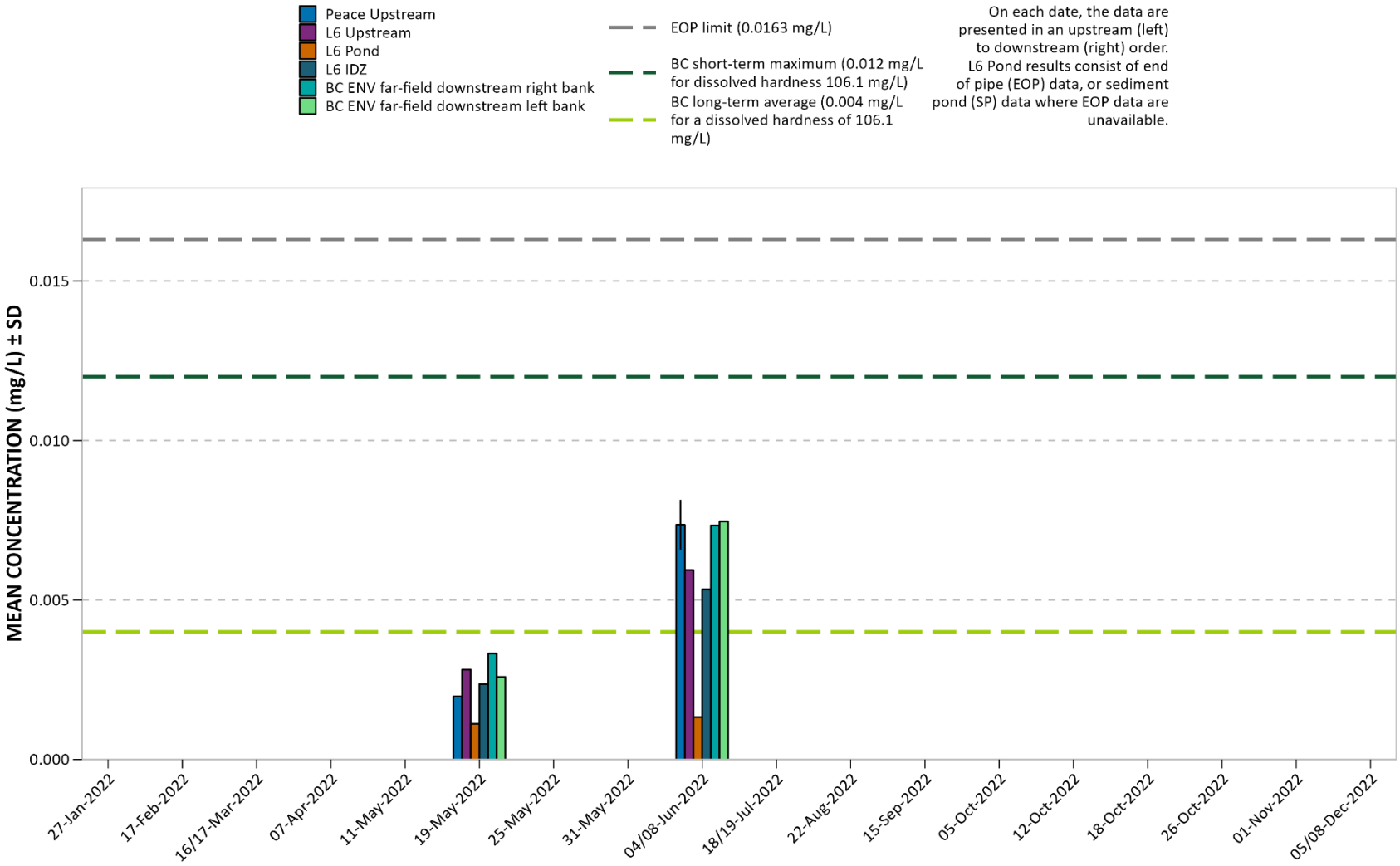


Figure 120. 2022 Peace River and RSEM L6 pond total iron (Fe).

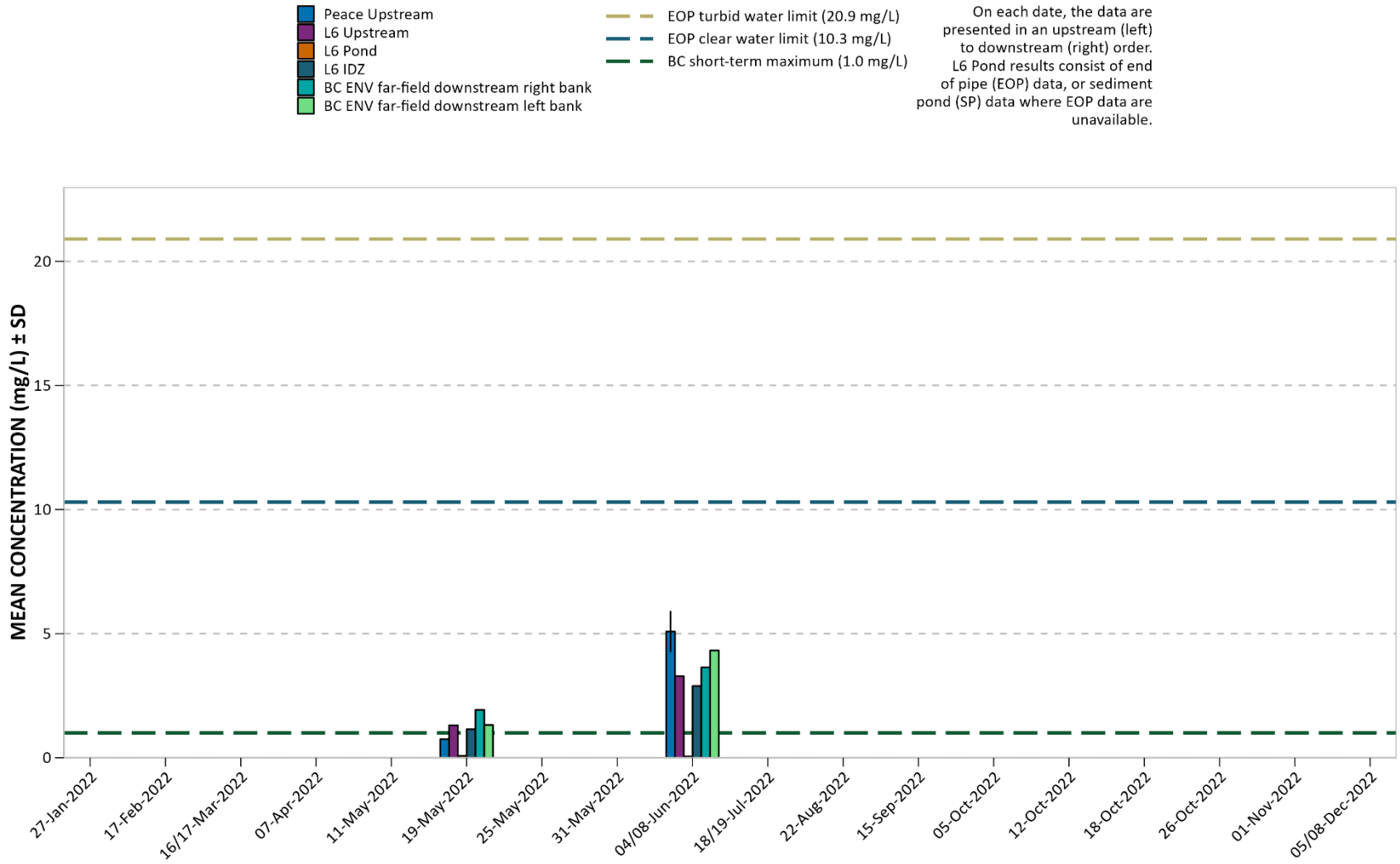


Figure 121. 2022 Peace River and RSEM L6 pond total lead (Pb).

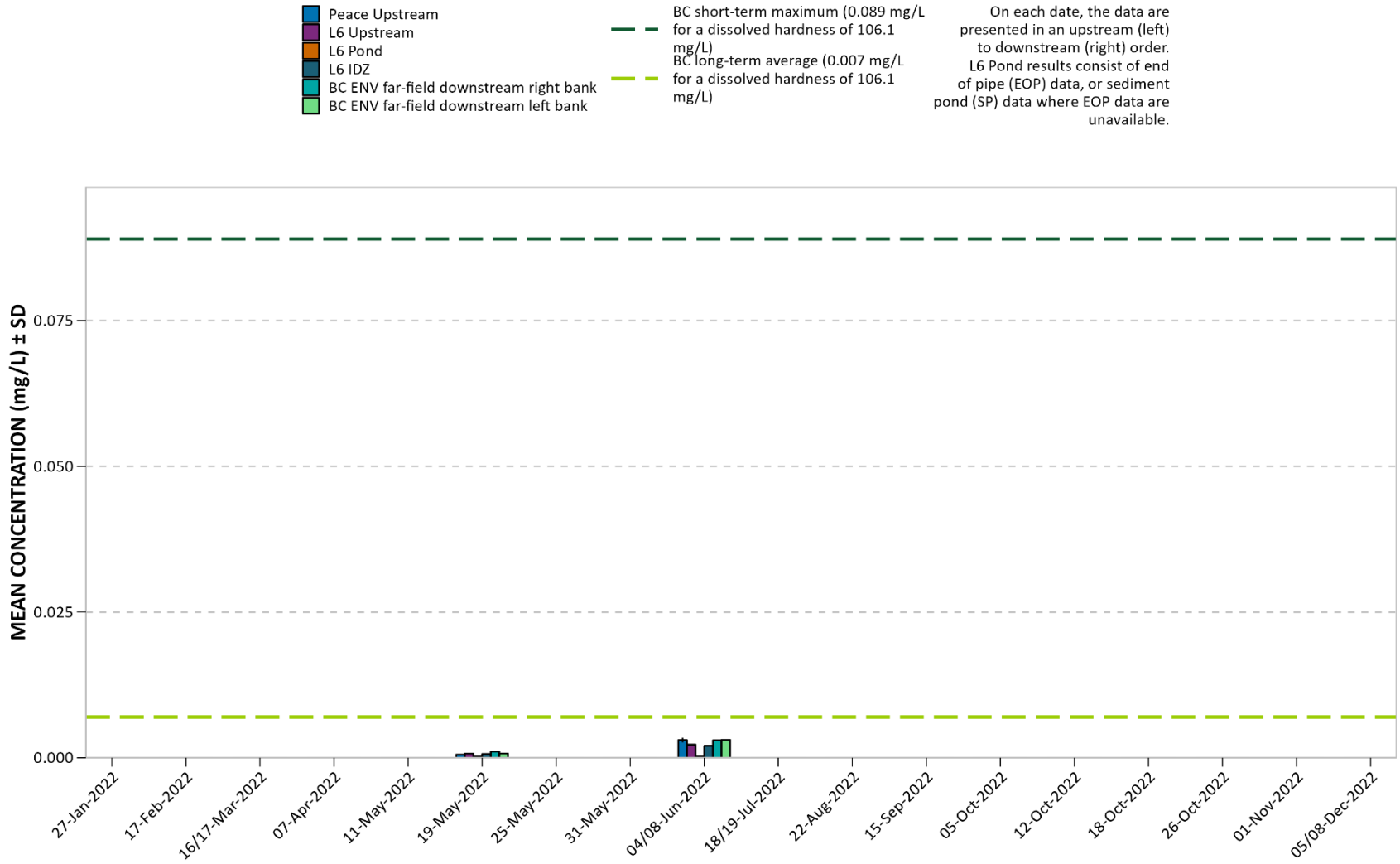


Figure 122. 2022 Peace River and RSEM L6 pond total lithium (Li).

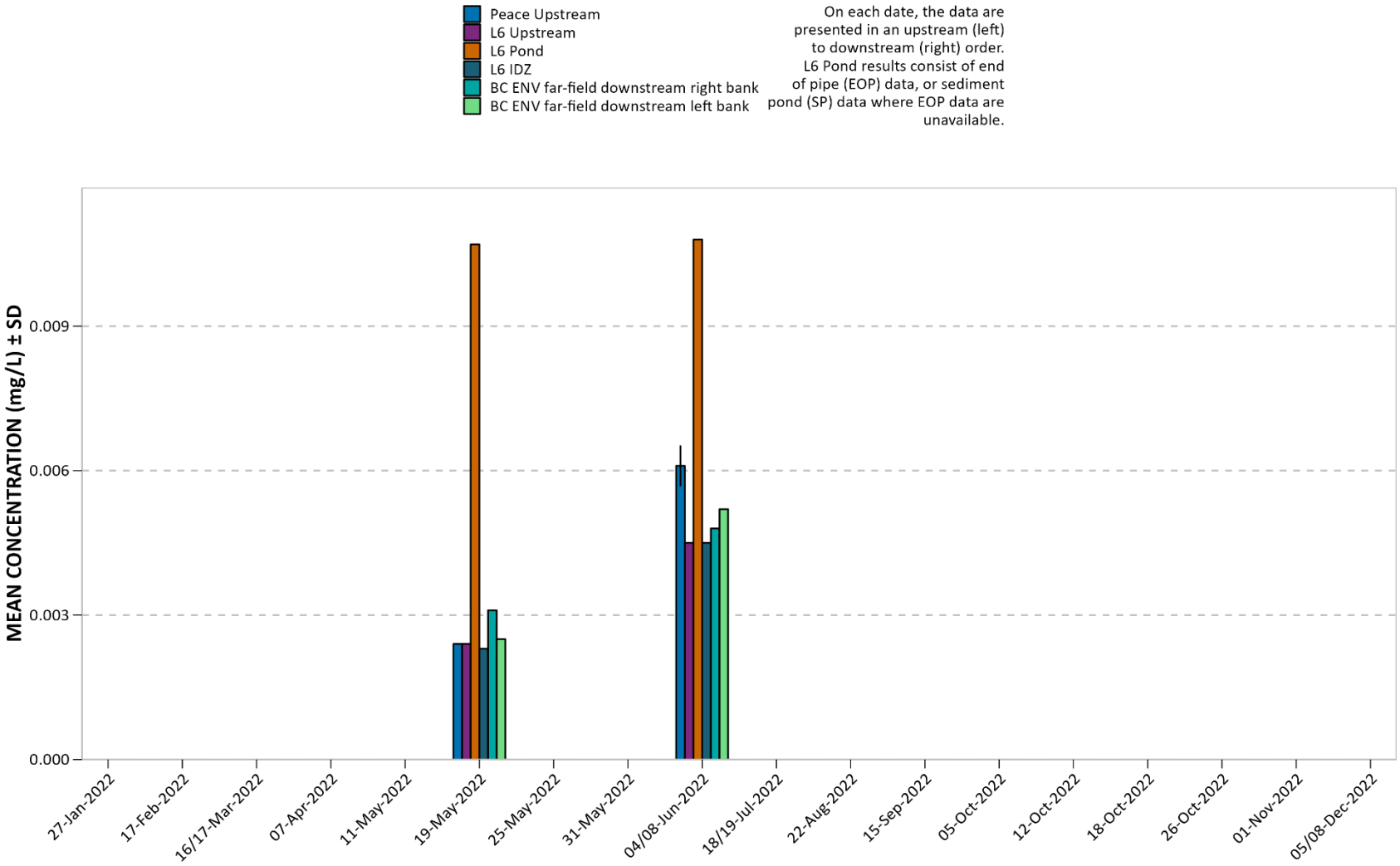


Figure 123. 2022 Peace River and RSEM L6 pond total magnesium (Mg).

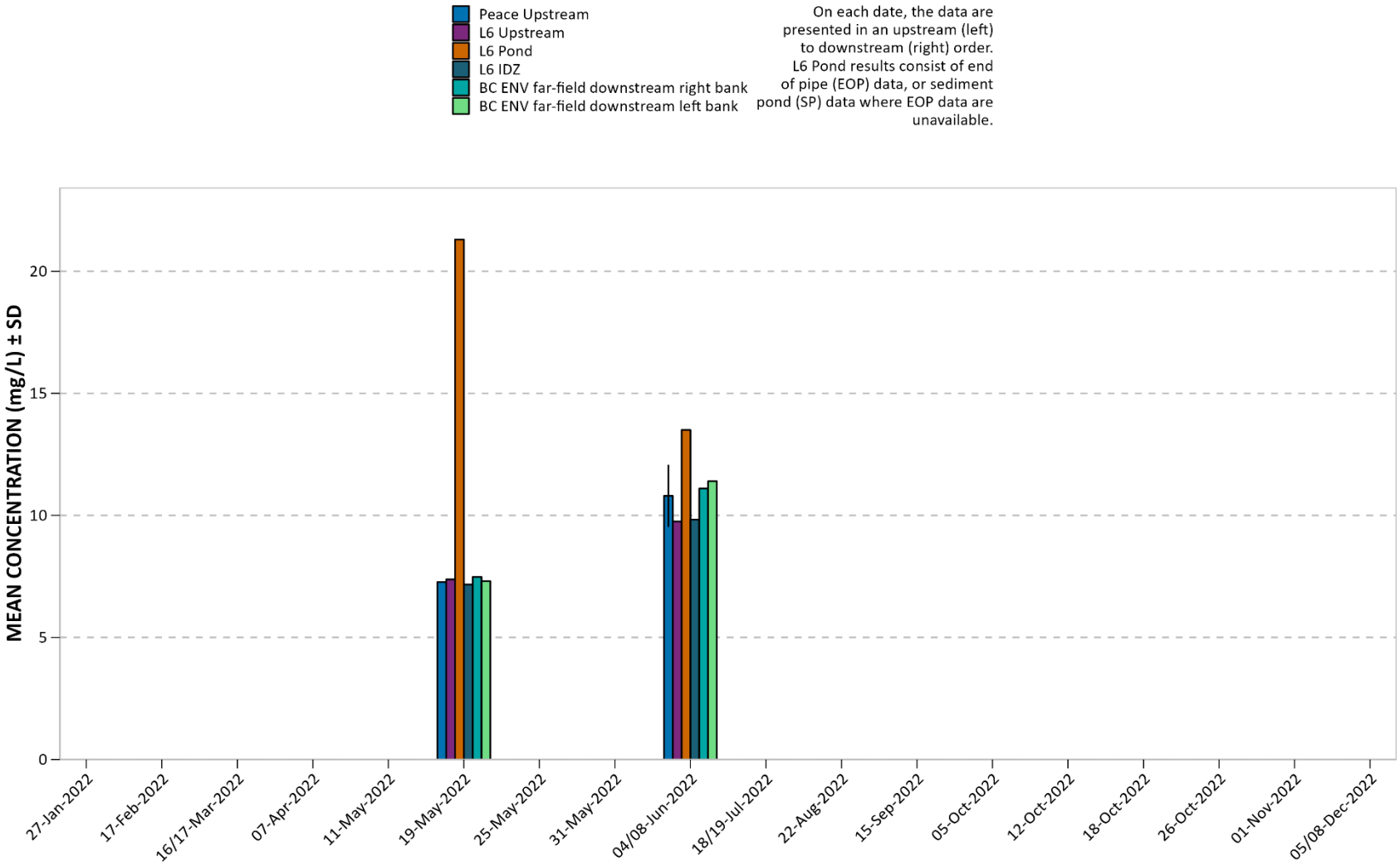


Figure 124. 2022 Peace River and RSEM L6 pond total manganese (Mn).

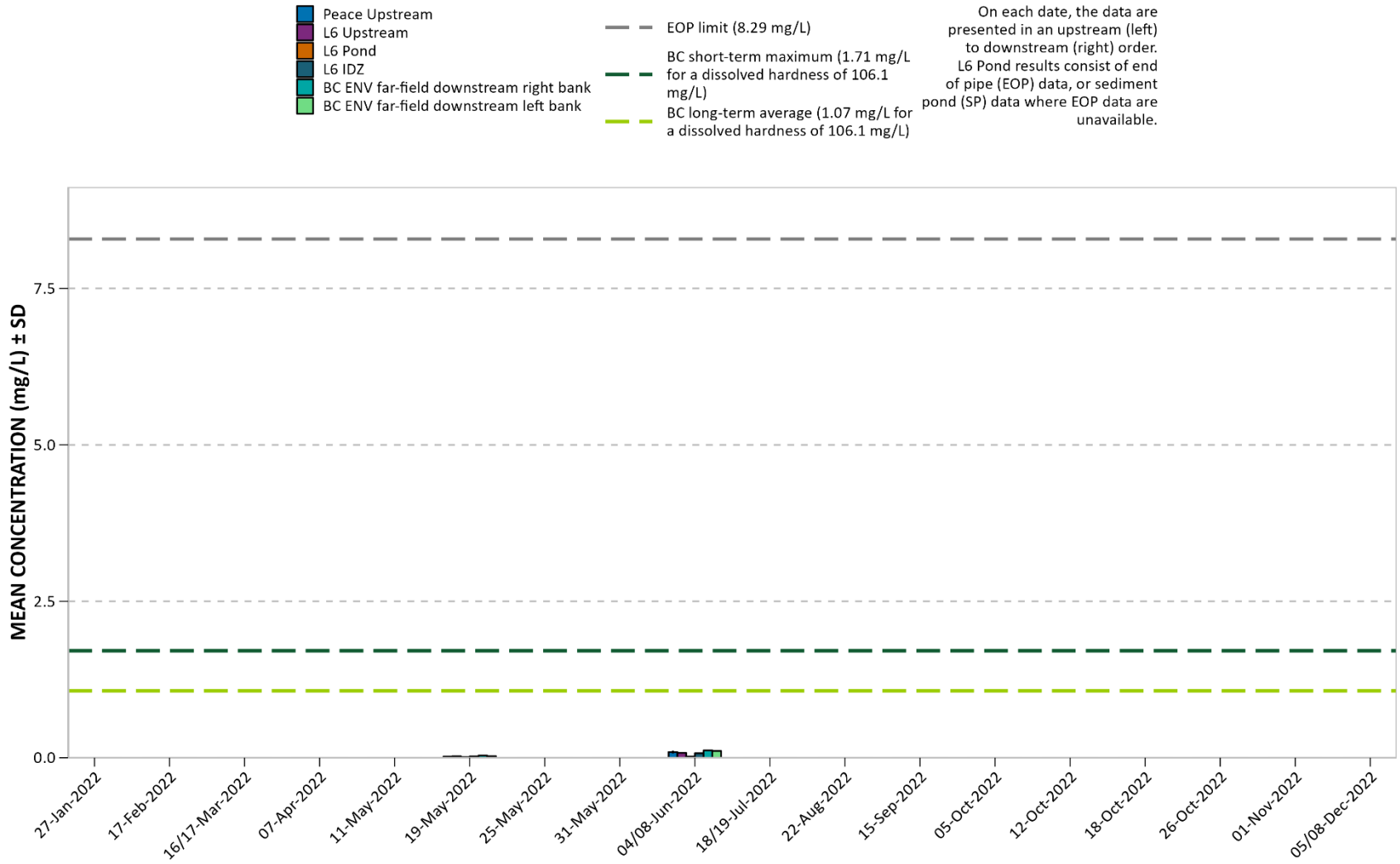


Figure 125. 2022 Peace River and RSEM L6 pond total mercury (Hg).

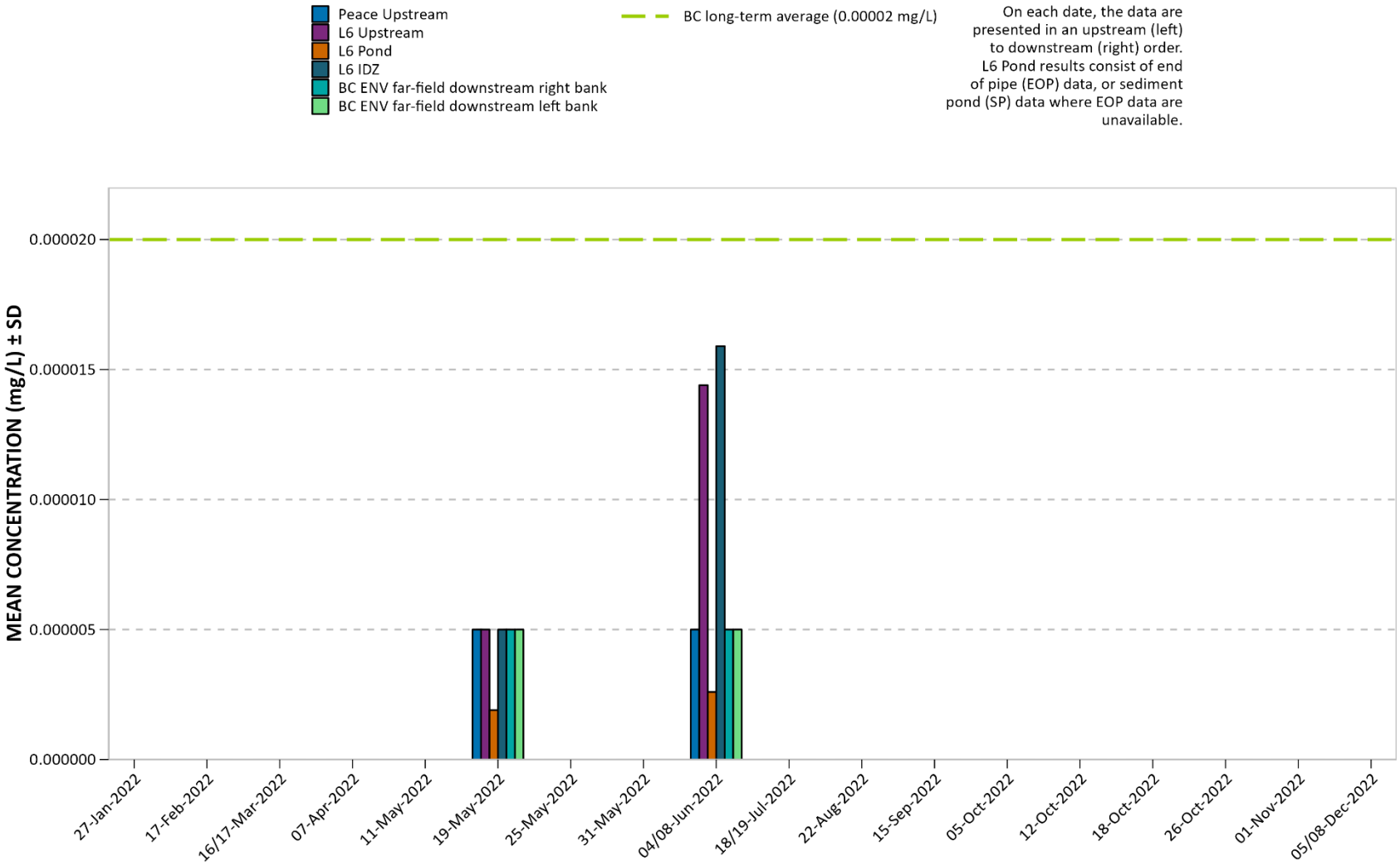


Figure 126. 2022 Peace River and RSEM L6 pond total molybdenum (Mo). Note that sample results are very low compared to guidelines and as a result the data are not visible on the plot.

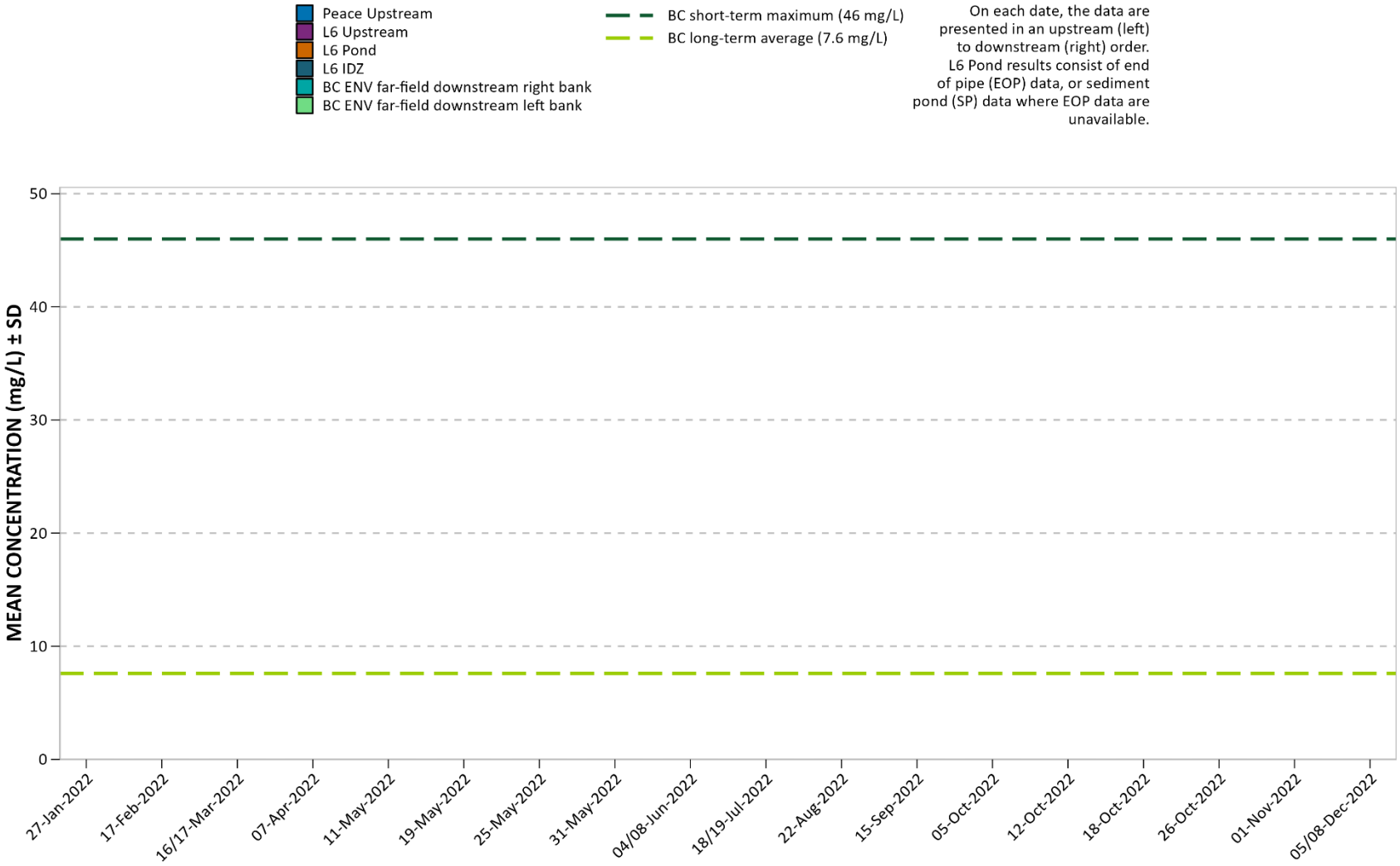


Figure 127. 2022 Peace River and RSEM L6 pond total nickel (Ni).

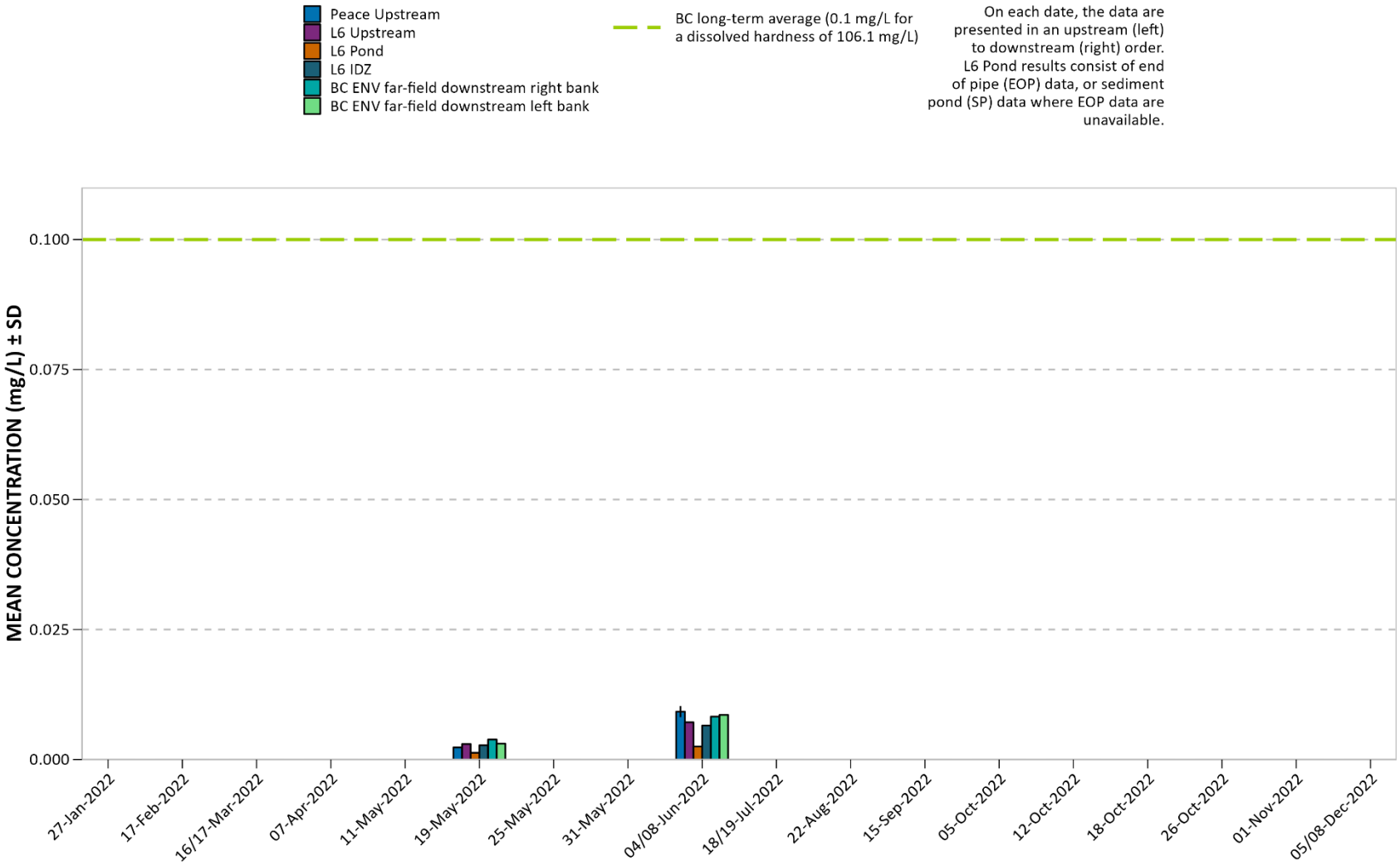


Figure 128. 2022 Peace River and RSEM L6 pond total potassium (K).

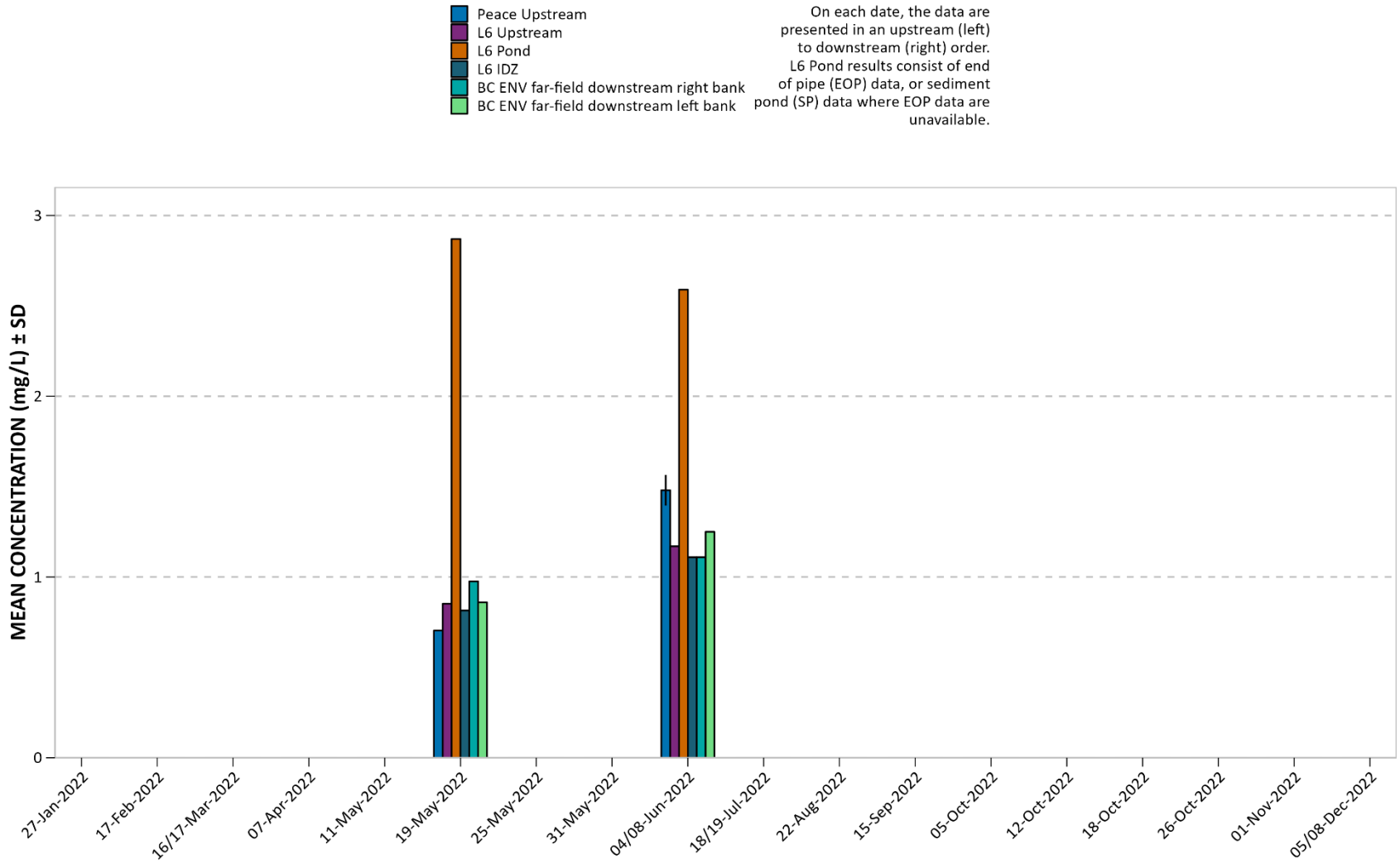


Figure 129. 2022 Peace River and RSEM L6 pond total selenium (Se).

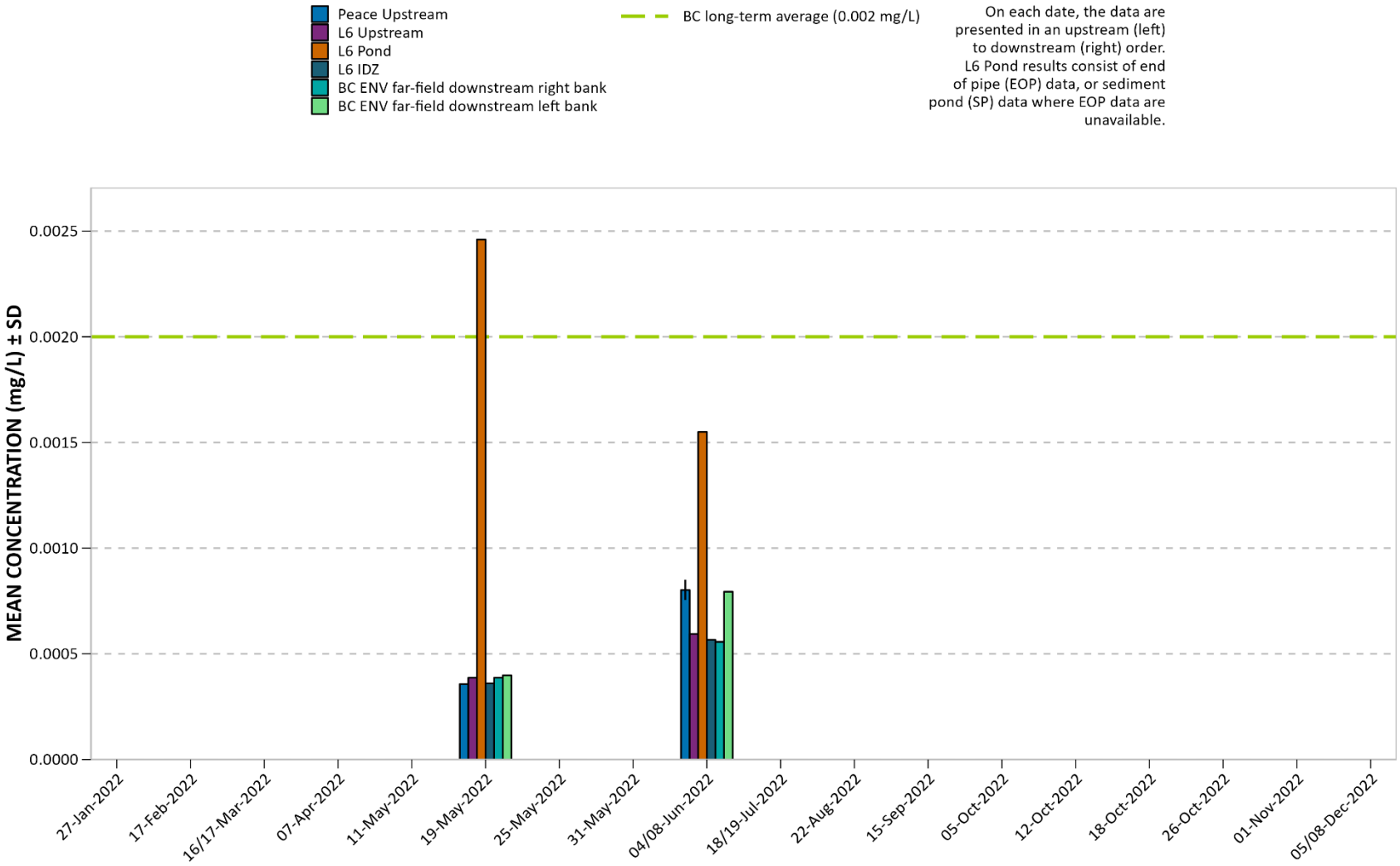


Figure 130. 2022 Peace River and RSEM L6 pond total silicon (Si).

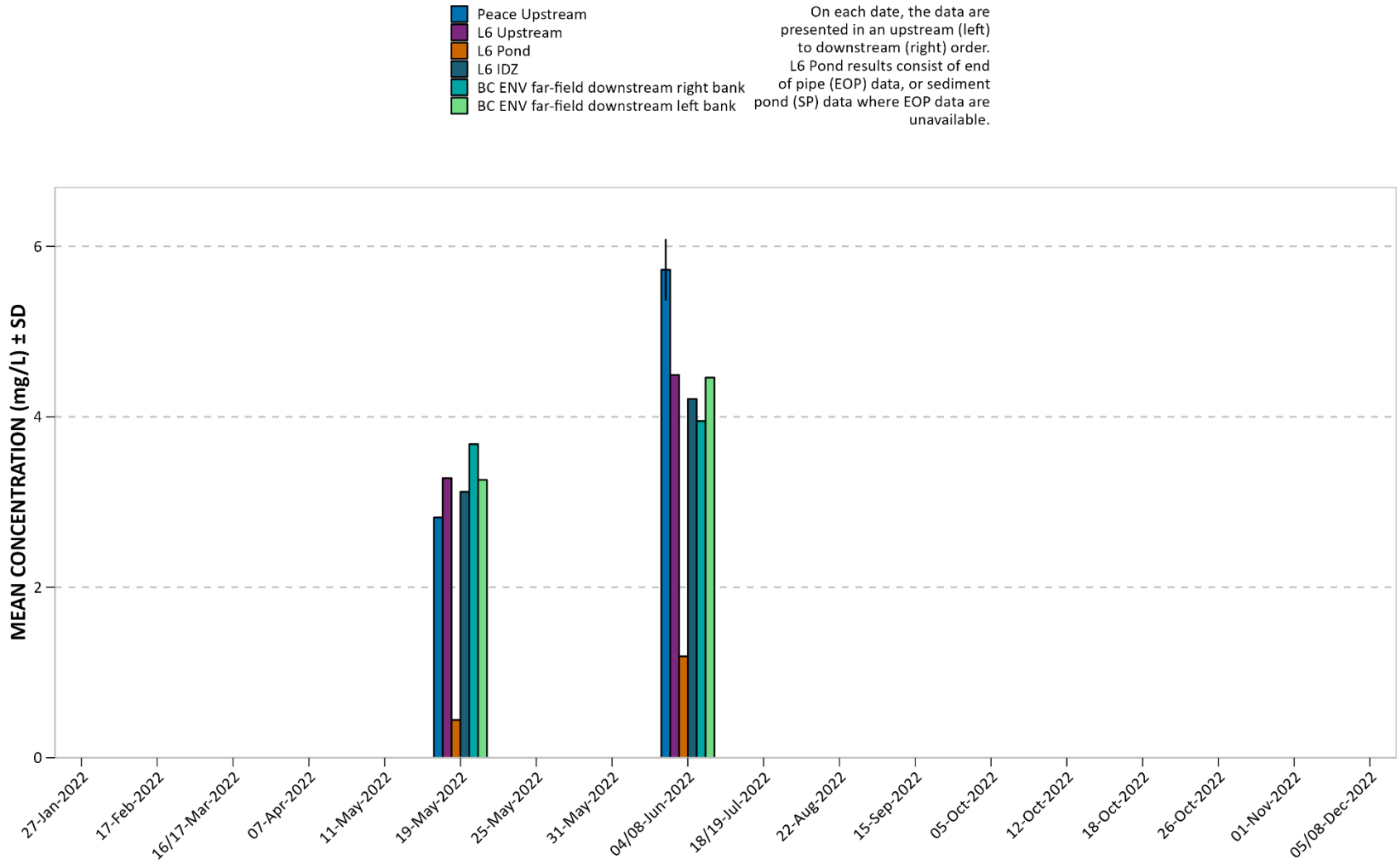


Figure 131. 2022 Peace River and RSEM L6 pond total silver (Ag).

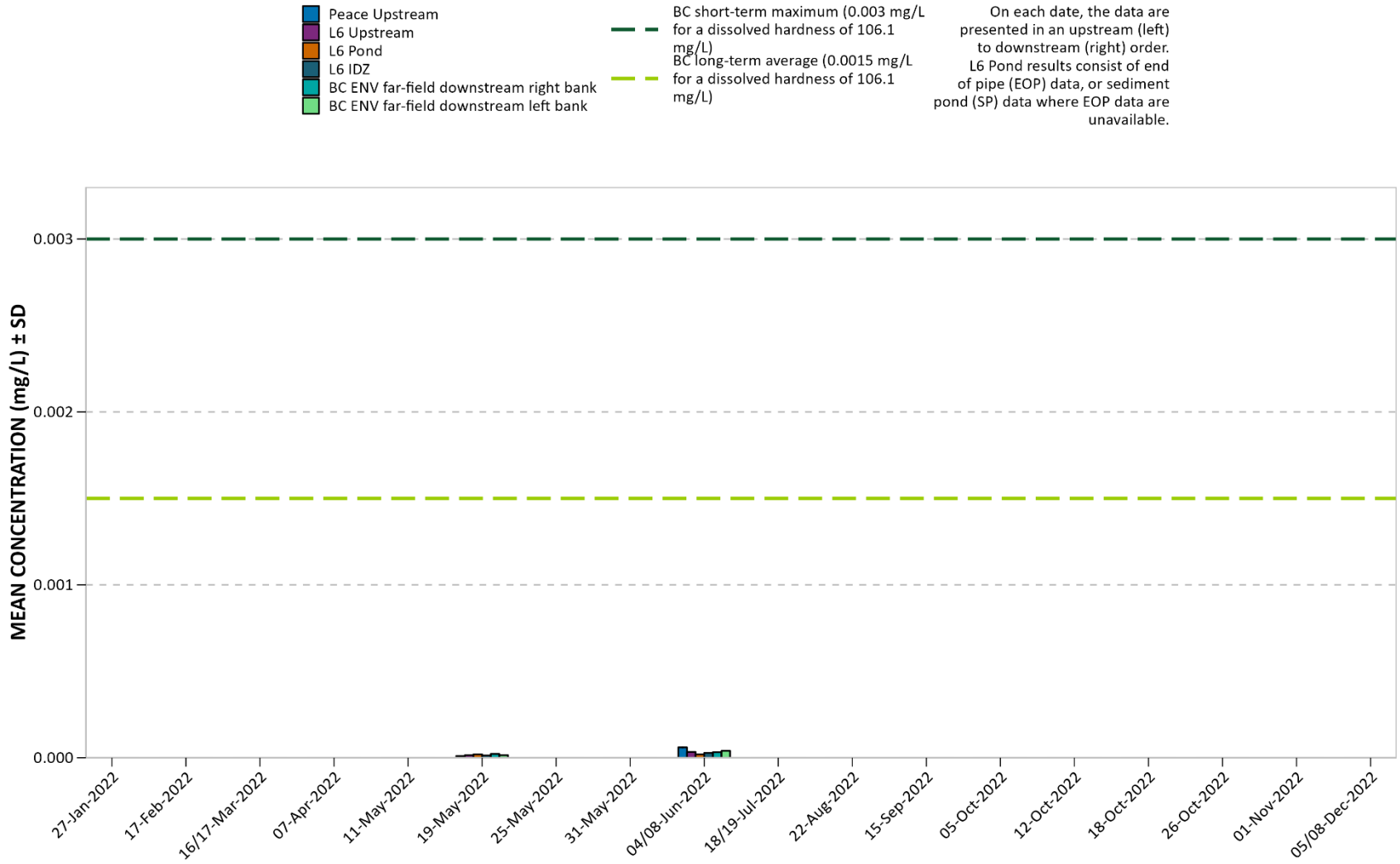


Figure 132. 2022 Peace River and RSEM L6 pond total sodium (Na).

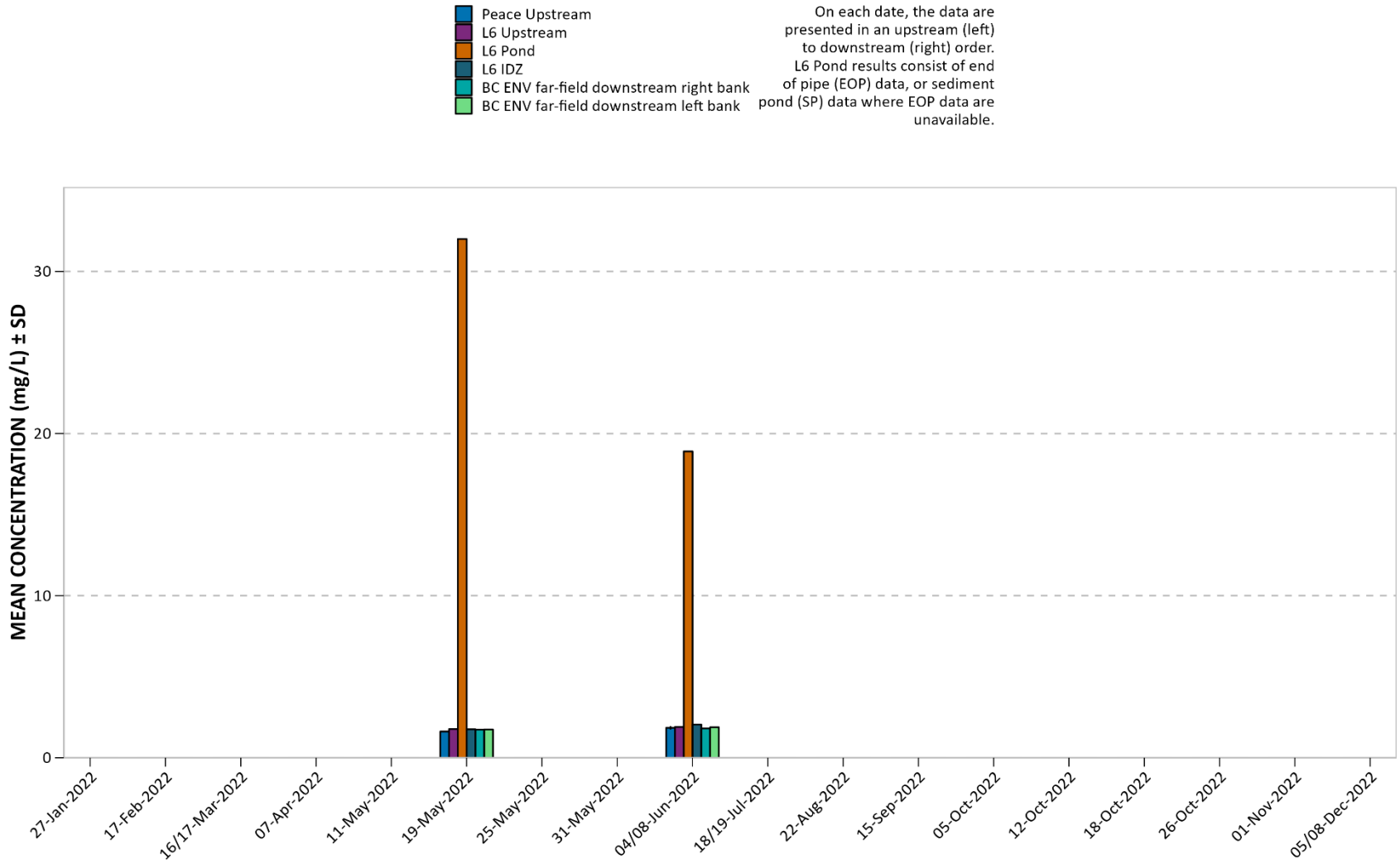


Figure 133. 2022 Peace River and RSEM L6 pond total strontium (Sr).

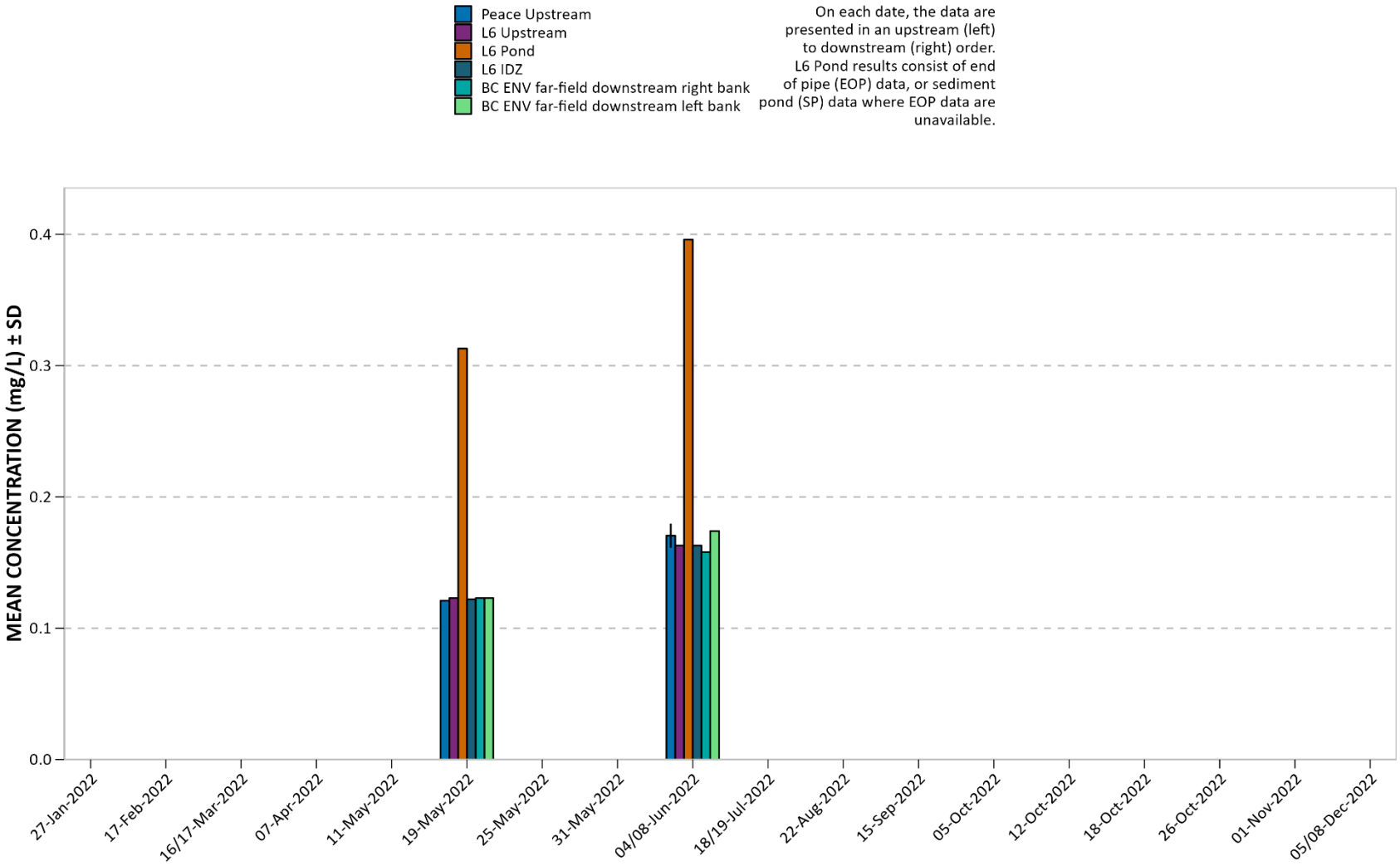


Figure 134. 2022 Peace River and RSEM L6 pond total sulfur (S).

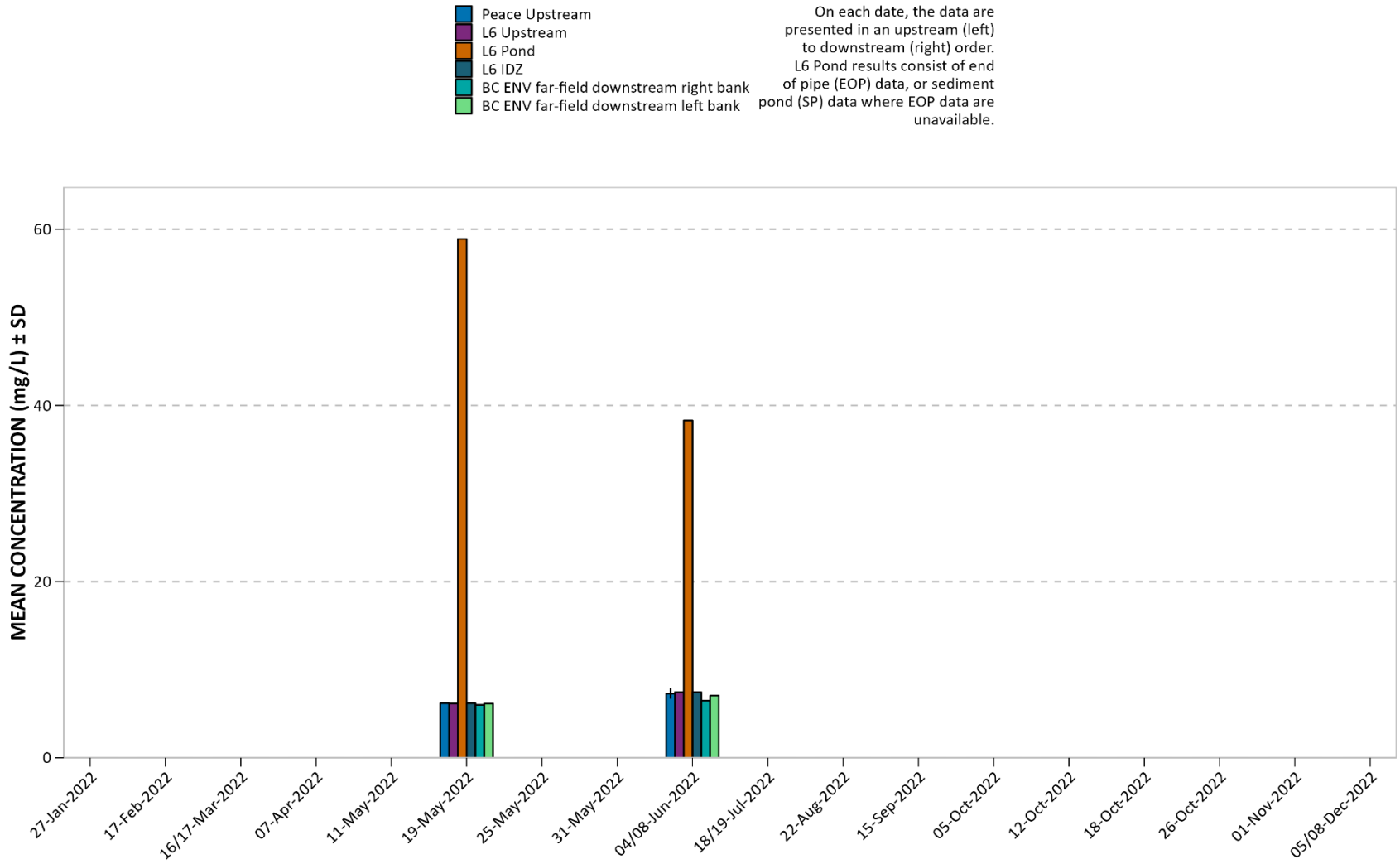


Figure 135. 2022 Peace River and RSEM L6 pond total thallium (Tl).

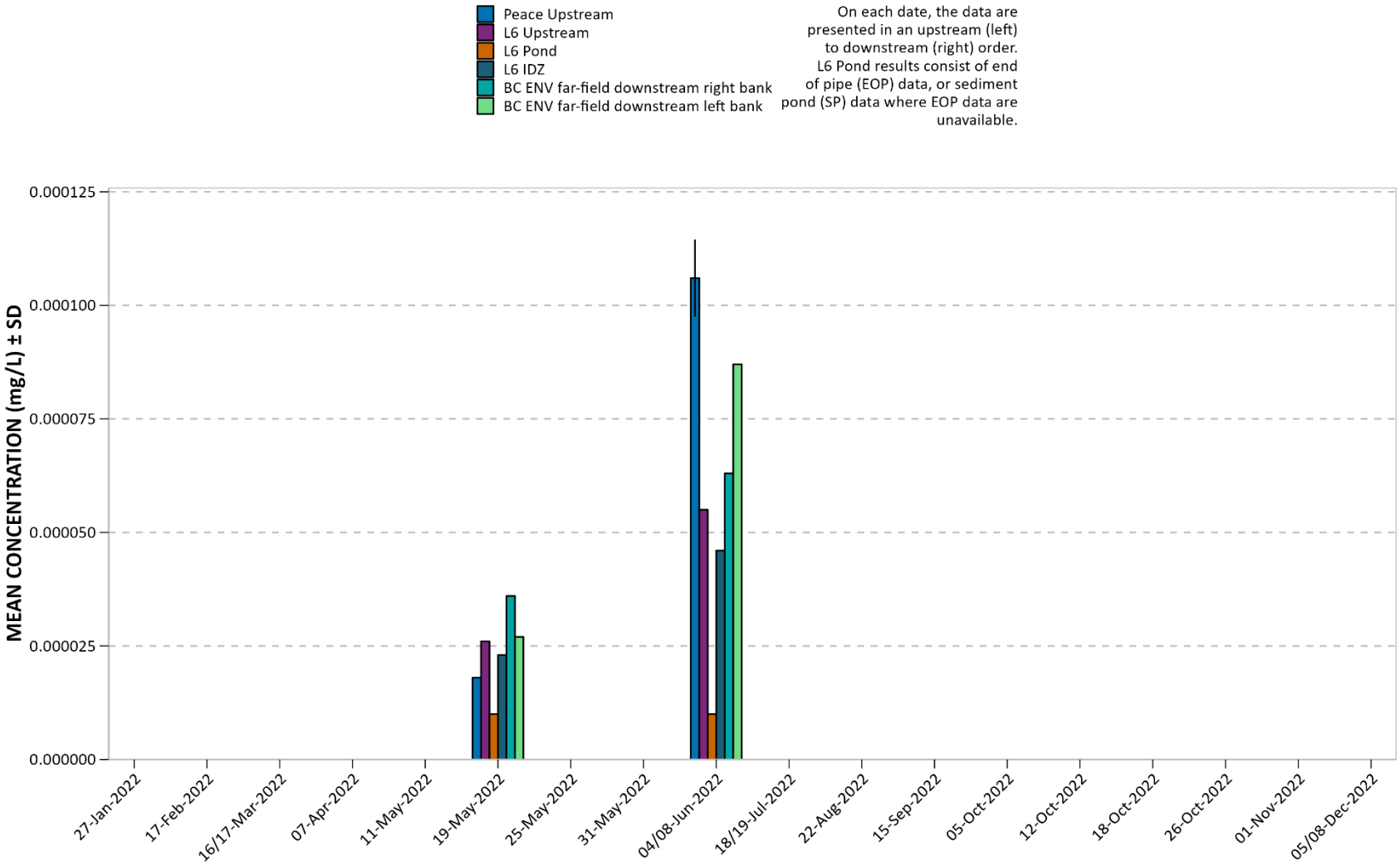


Figure 136. 2022 Peace River and RSEM L6 pond total tin (Sn).

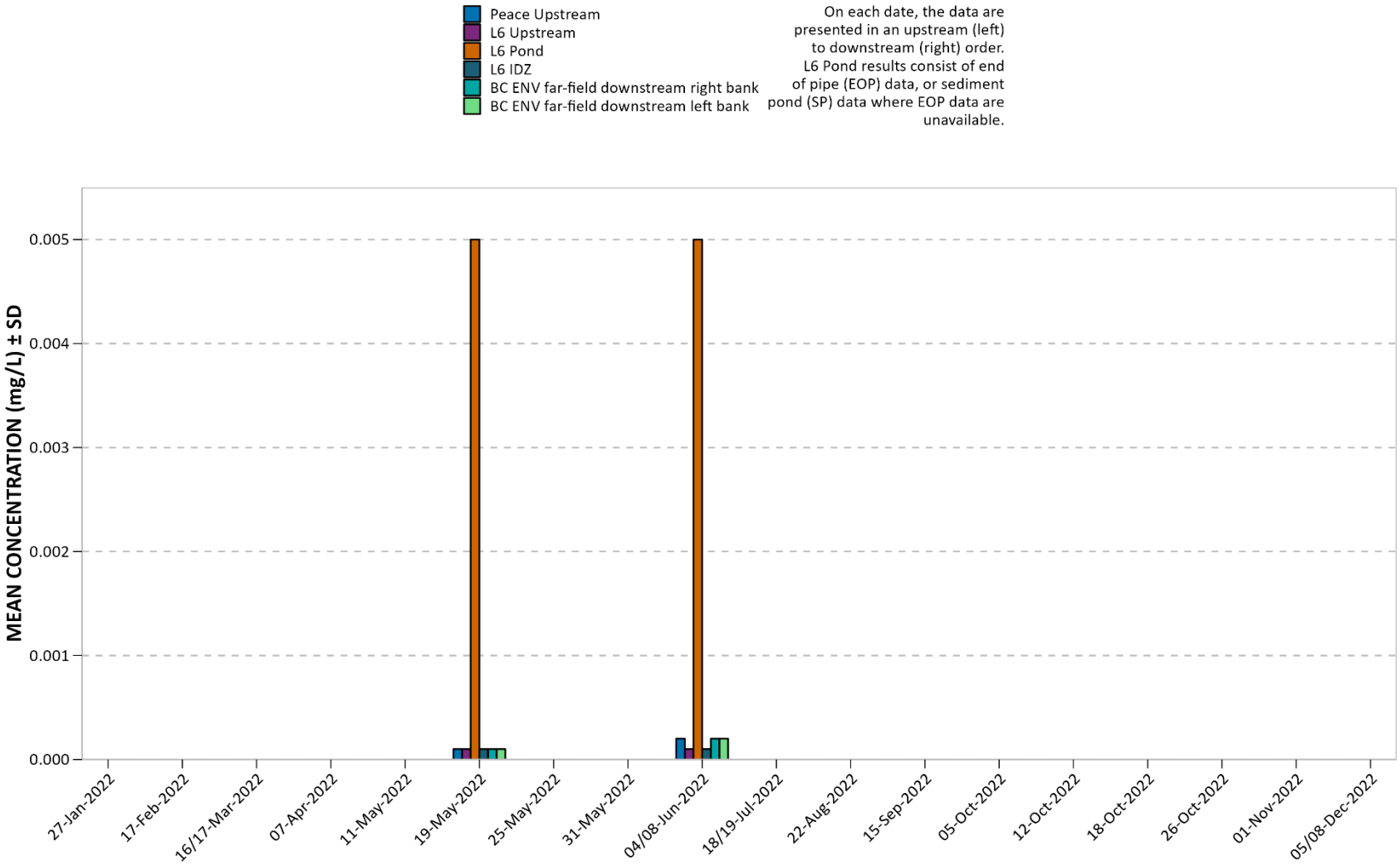


Figure 137. 2022 Peace River and RSEM L6 pond total titanium (Ti).

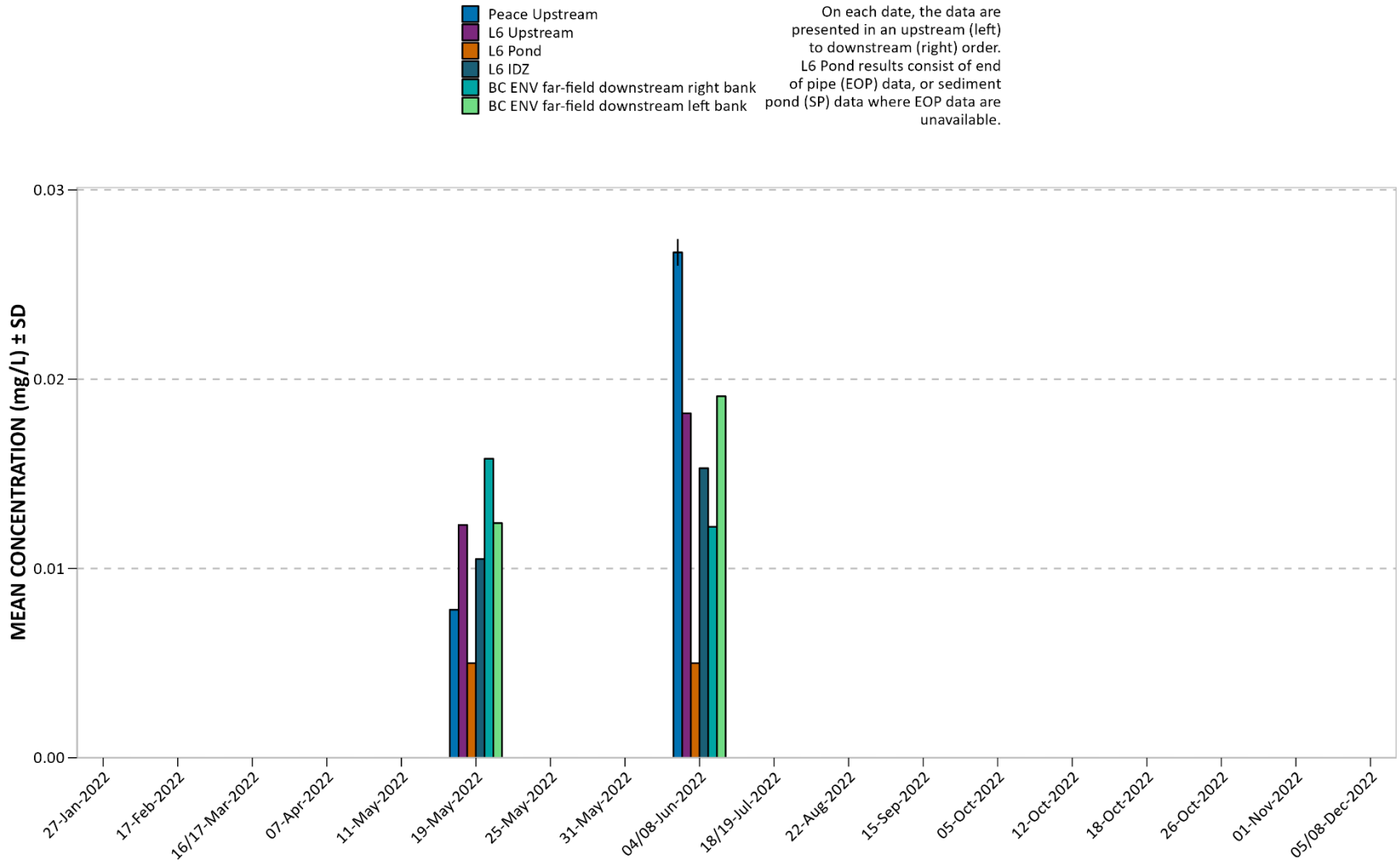


Figure 138. 2022 Peace River and RSEM L6 pond total uranium (U).

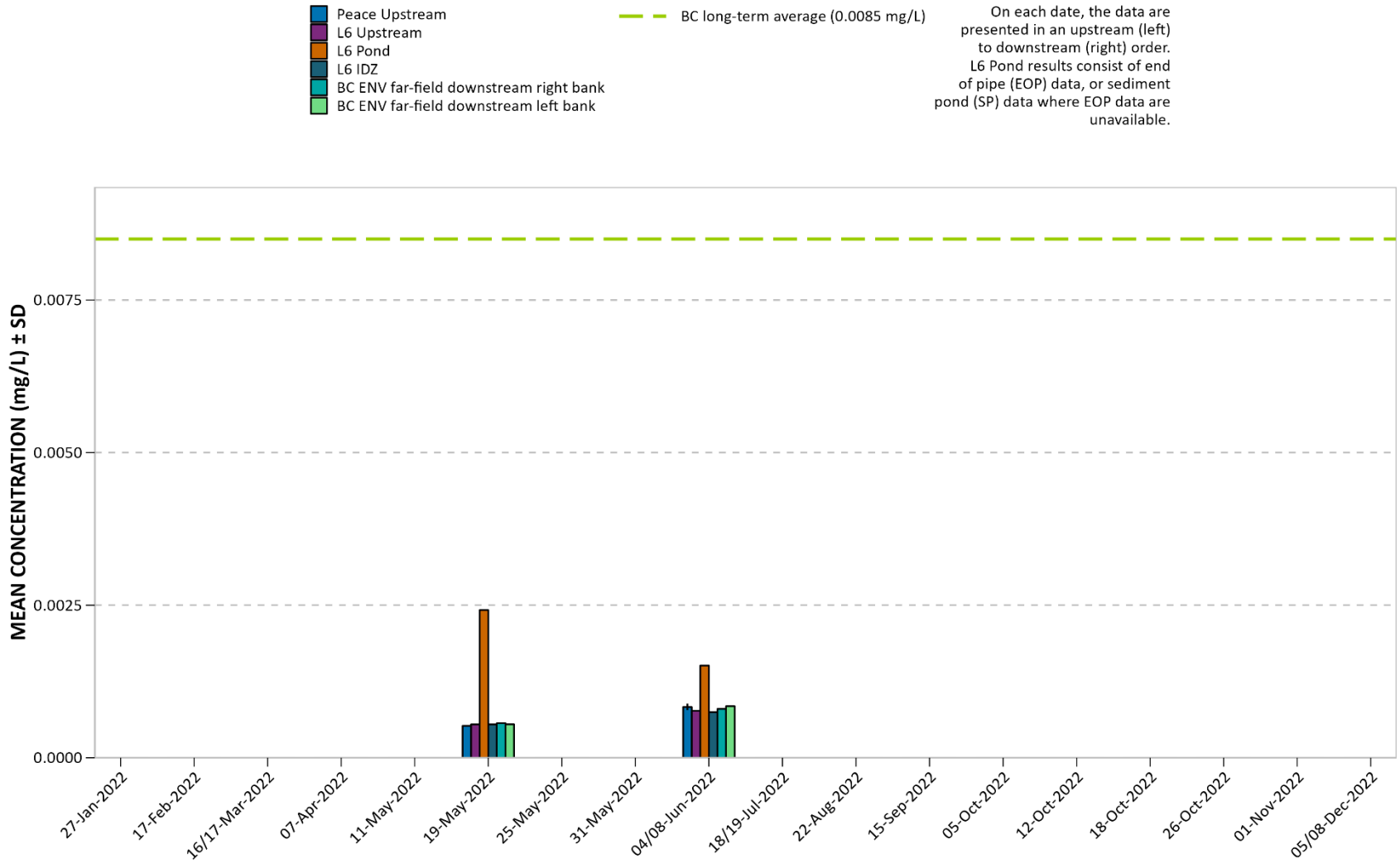


Figure 139. 2022 Peace River and RSEM L6 pond total vanadium (V).

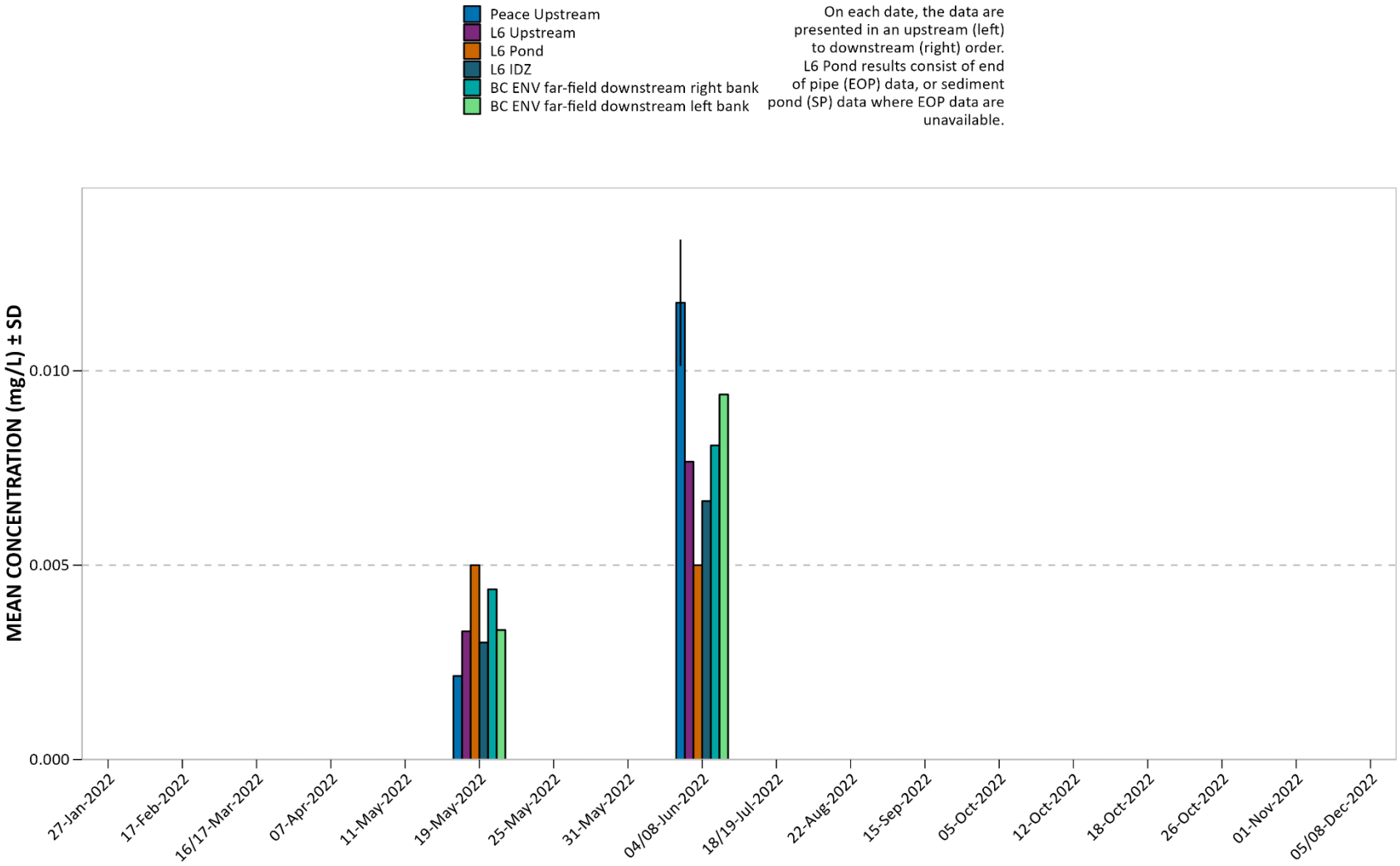
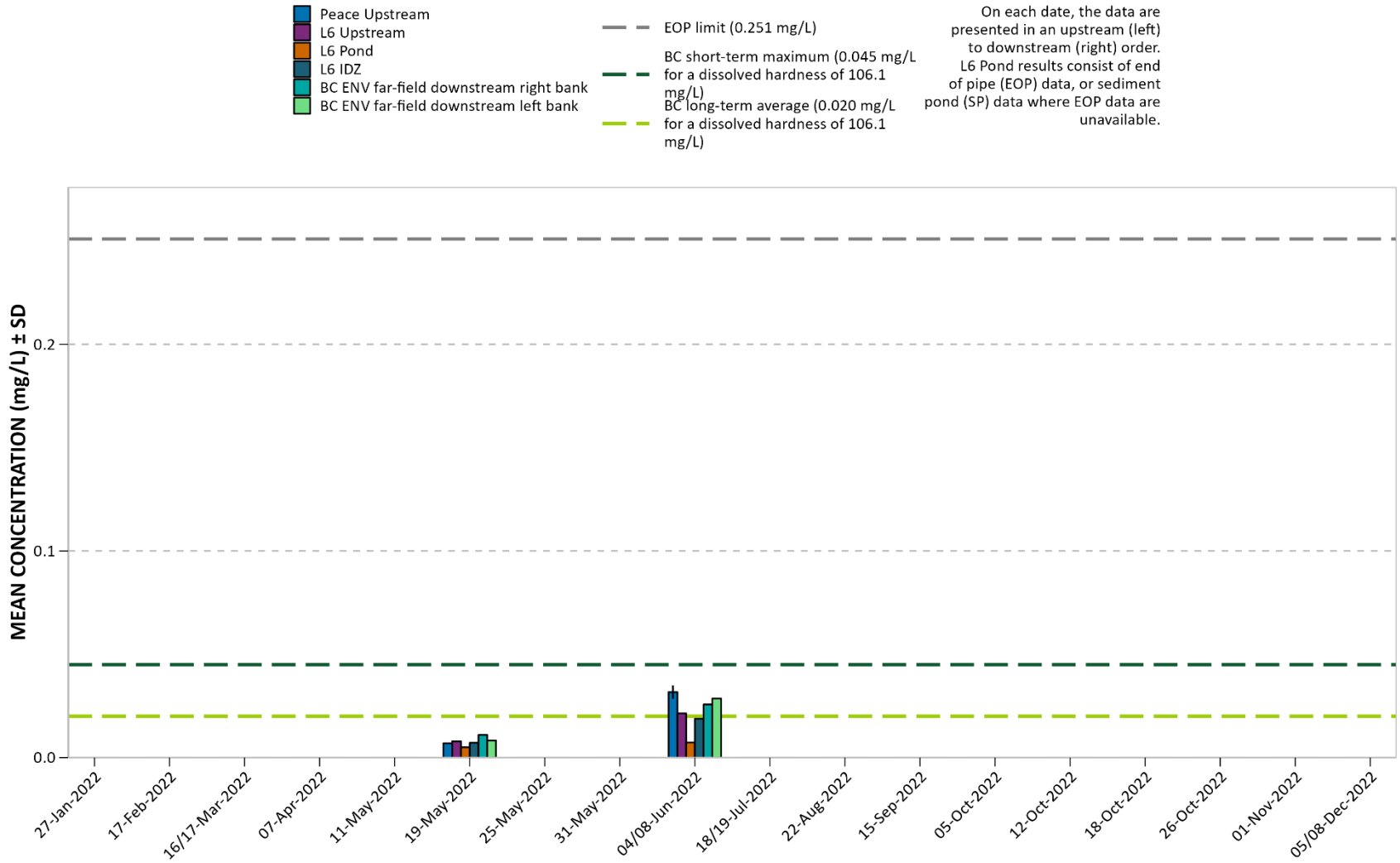


Figure 140. 2022 Peace River and RSEM L6 pond total zinc (Zn).



Note: BC WQG for total zinc is dissolved hardness dependent. An average Peace River dissolved 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 dissolved hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 141. 2022 Peace River and RSEM L6 pond total zirconium (Zr).

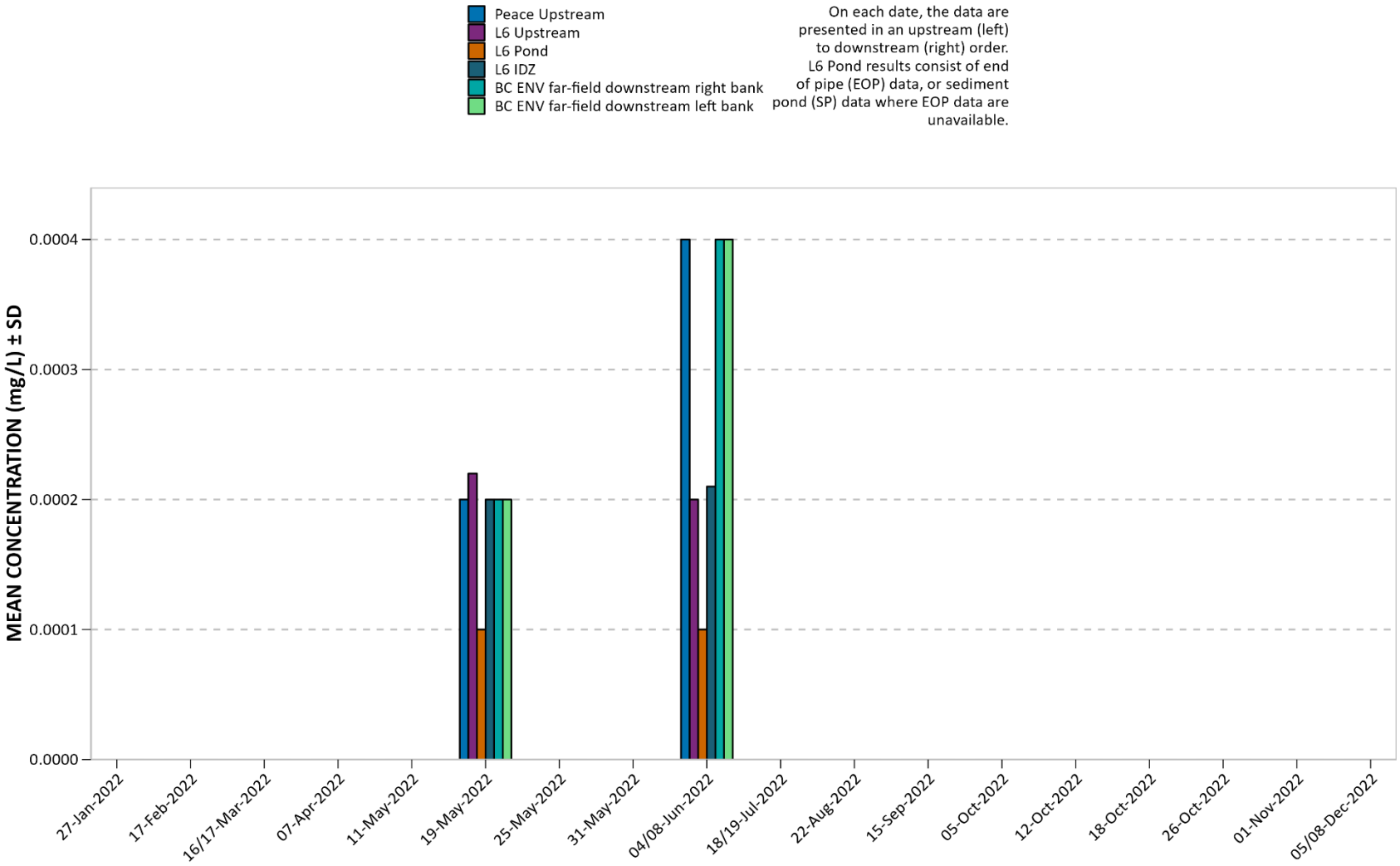


Figure 142. 2022 Peace River and RSEM L6 pond dissolved aluminum (Al).

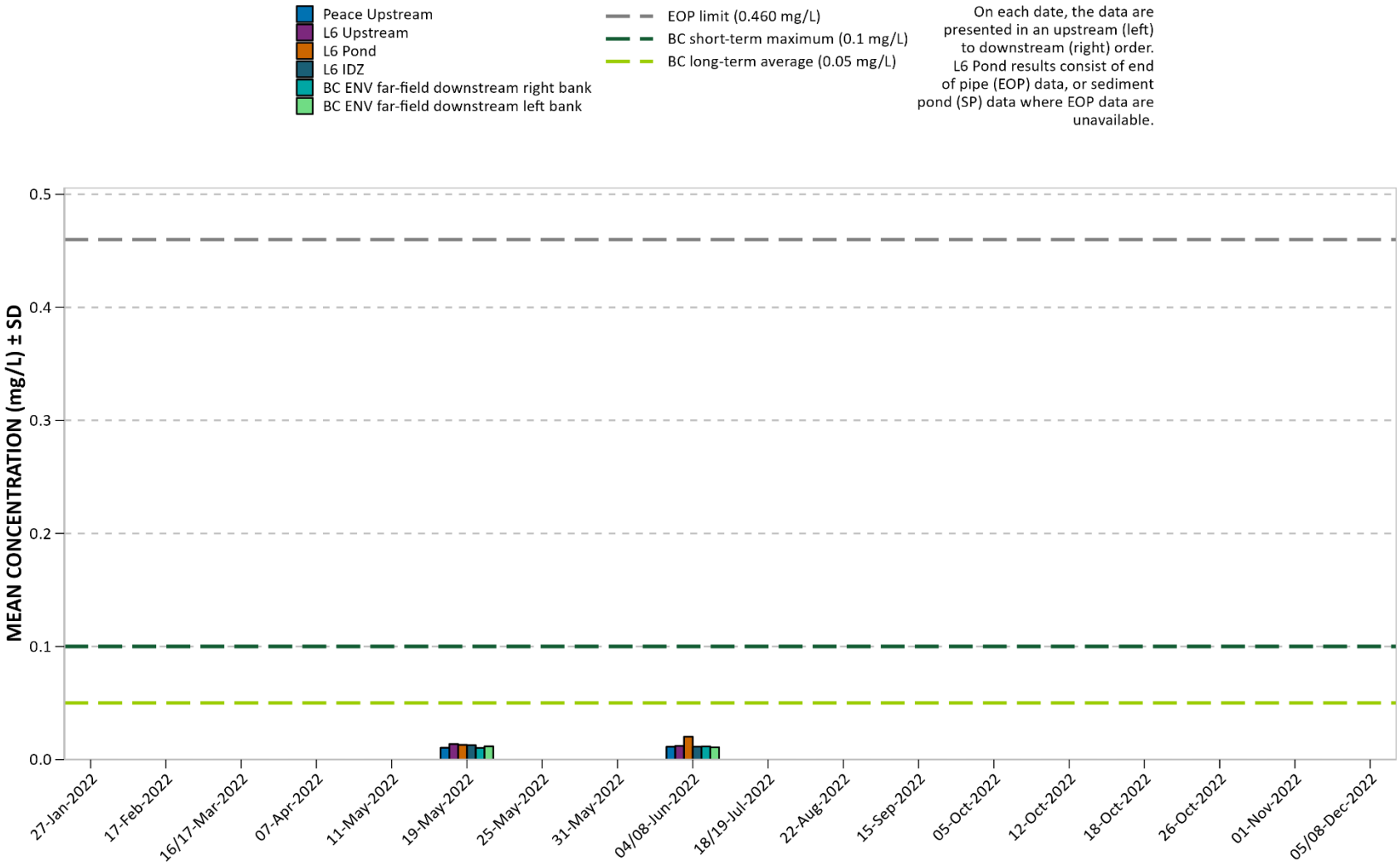


Figure 143. 2022 Peace River and RSEM L6 pond dissolved antimony (Sb).

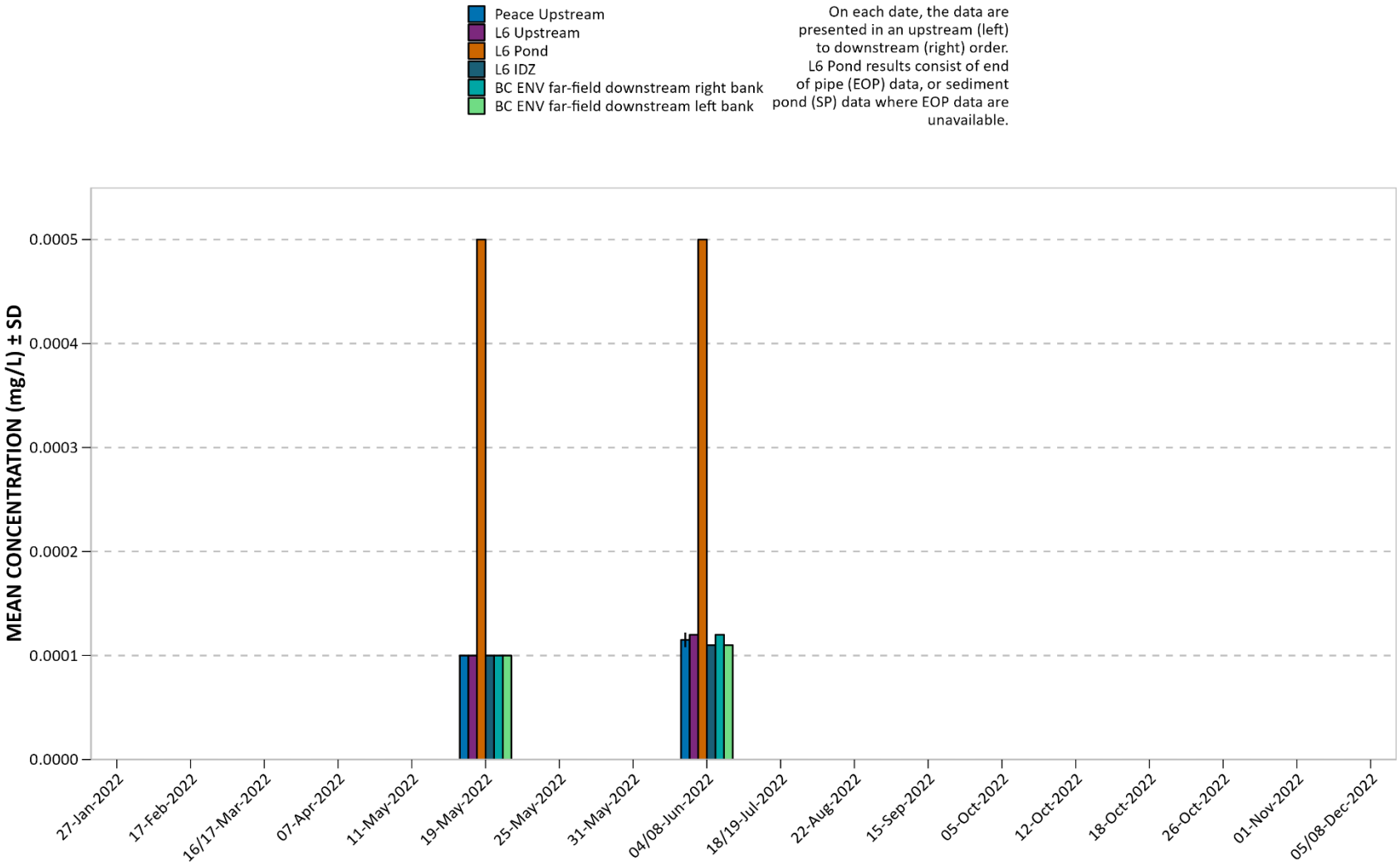


Figure 144. 2022 Peace River and RSEM L6 pond dissolved arsenic (As).

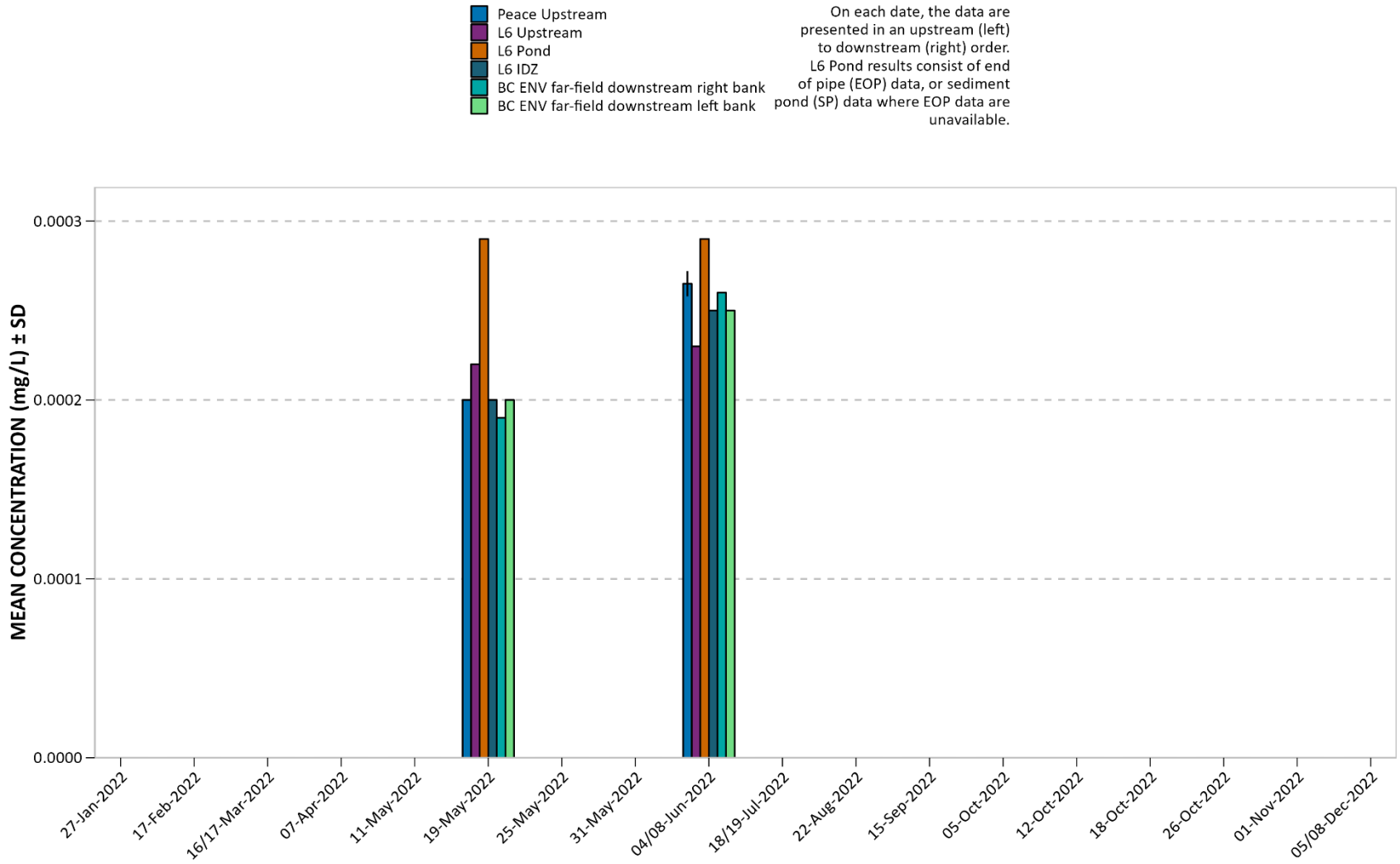


Figure 145. 2022 Peace River and RSEM L6 pond dissolved barium (Ba).

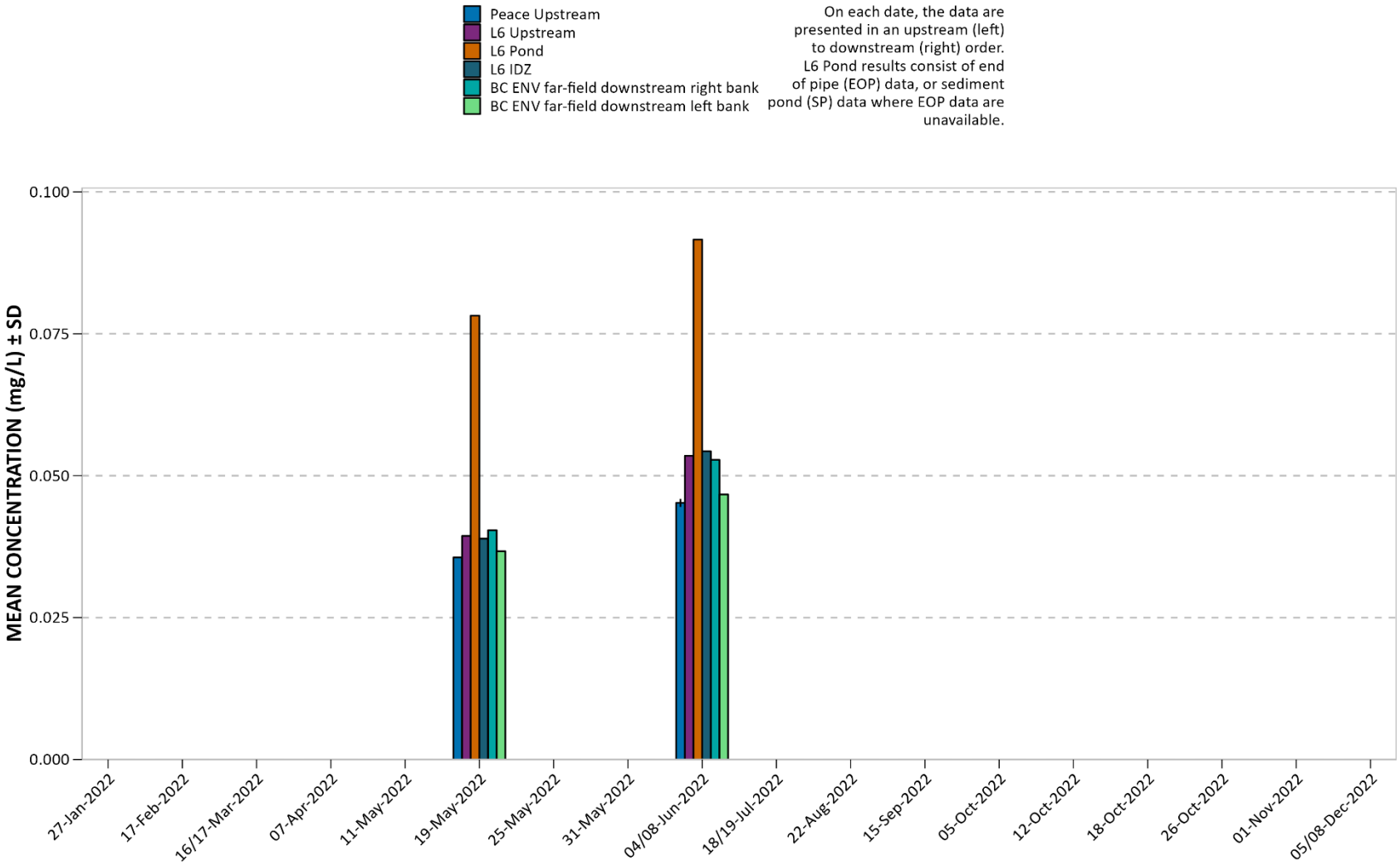


Figure 146. 2022 Peace River and RSEM L6 pond dissolved beryllium (Be).

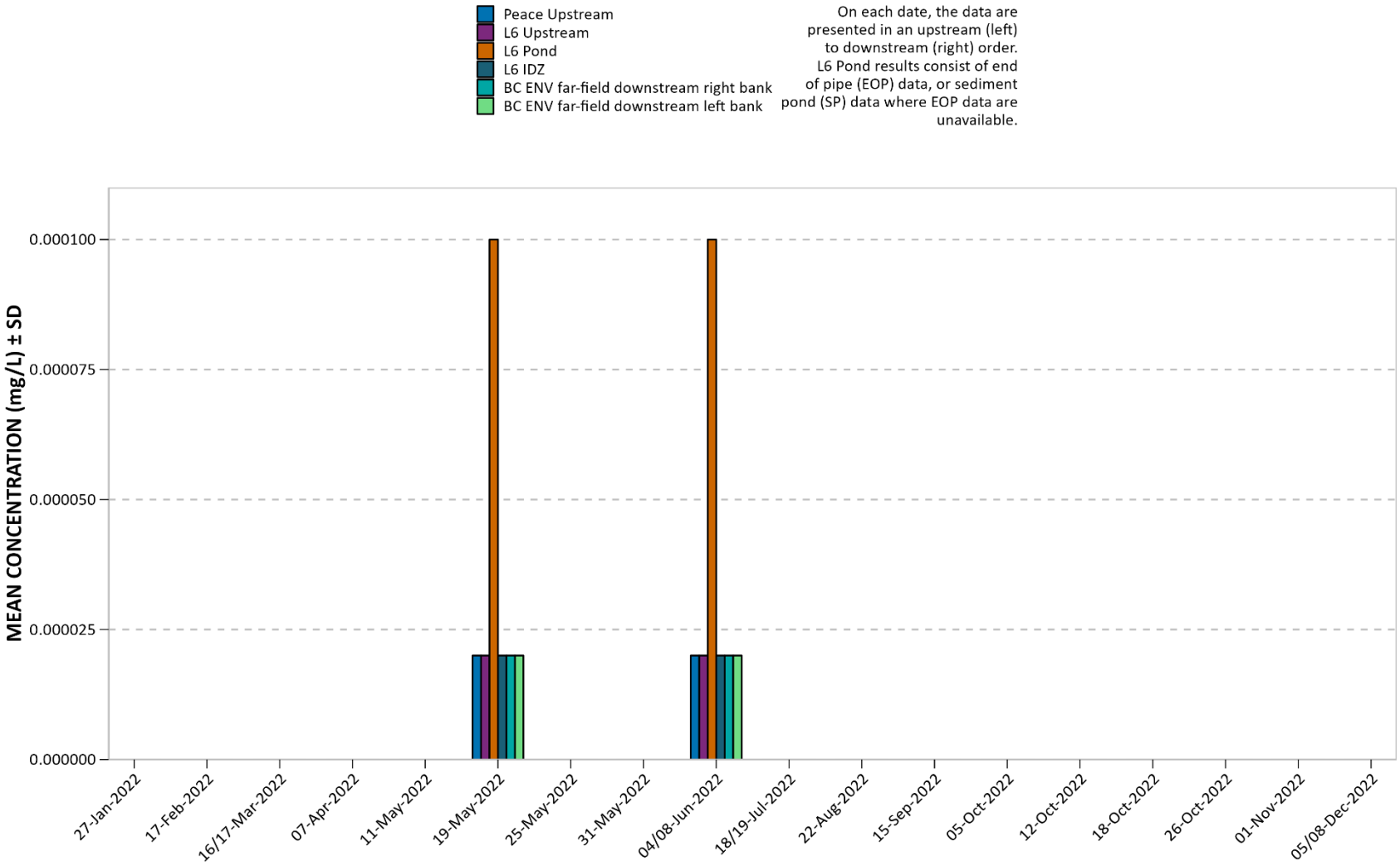


Figure 147. 2022 Peace River and RSEM L6 pond dissolved bismuth (Bi).

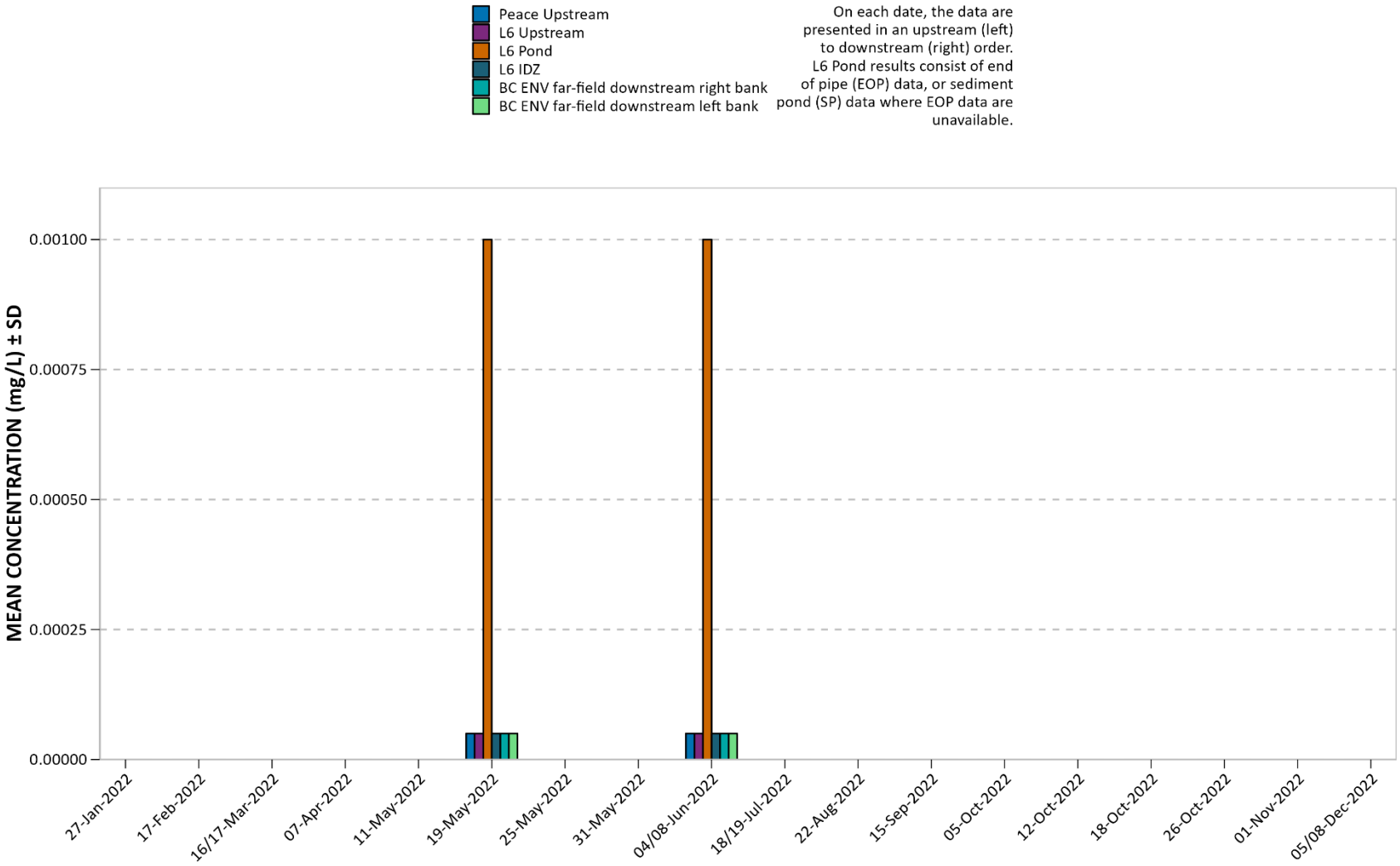


Figure 148. 2022 Peace River and RSEM L6 pond dissolved boron (B).

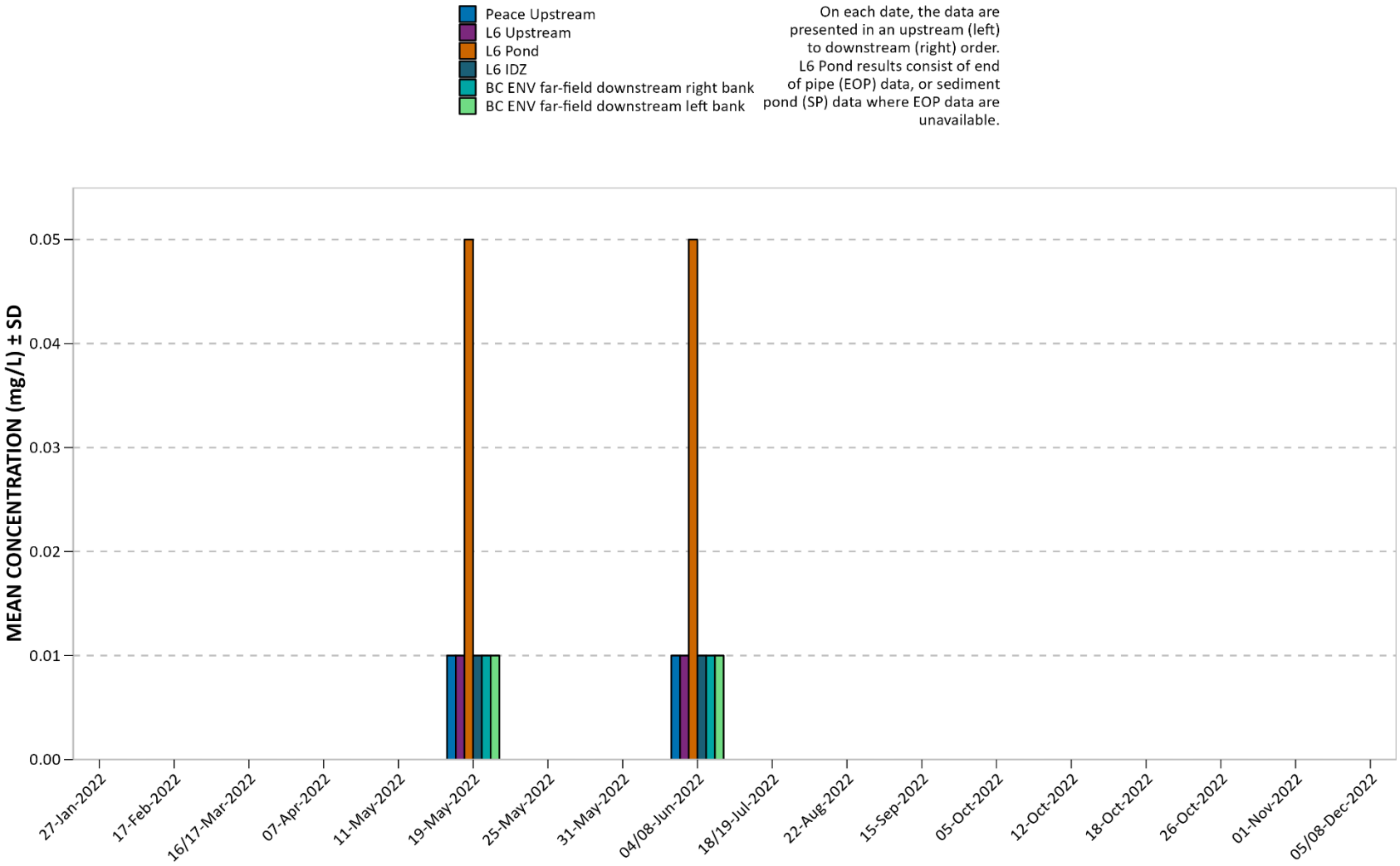


Figure 149. 2022 Peace River and RSEM L6 pond dissolved cadmium (Cd).

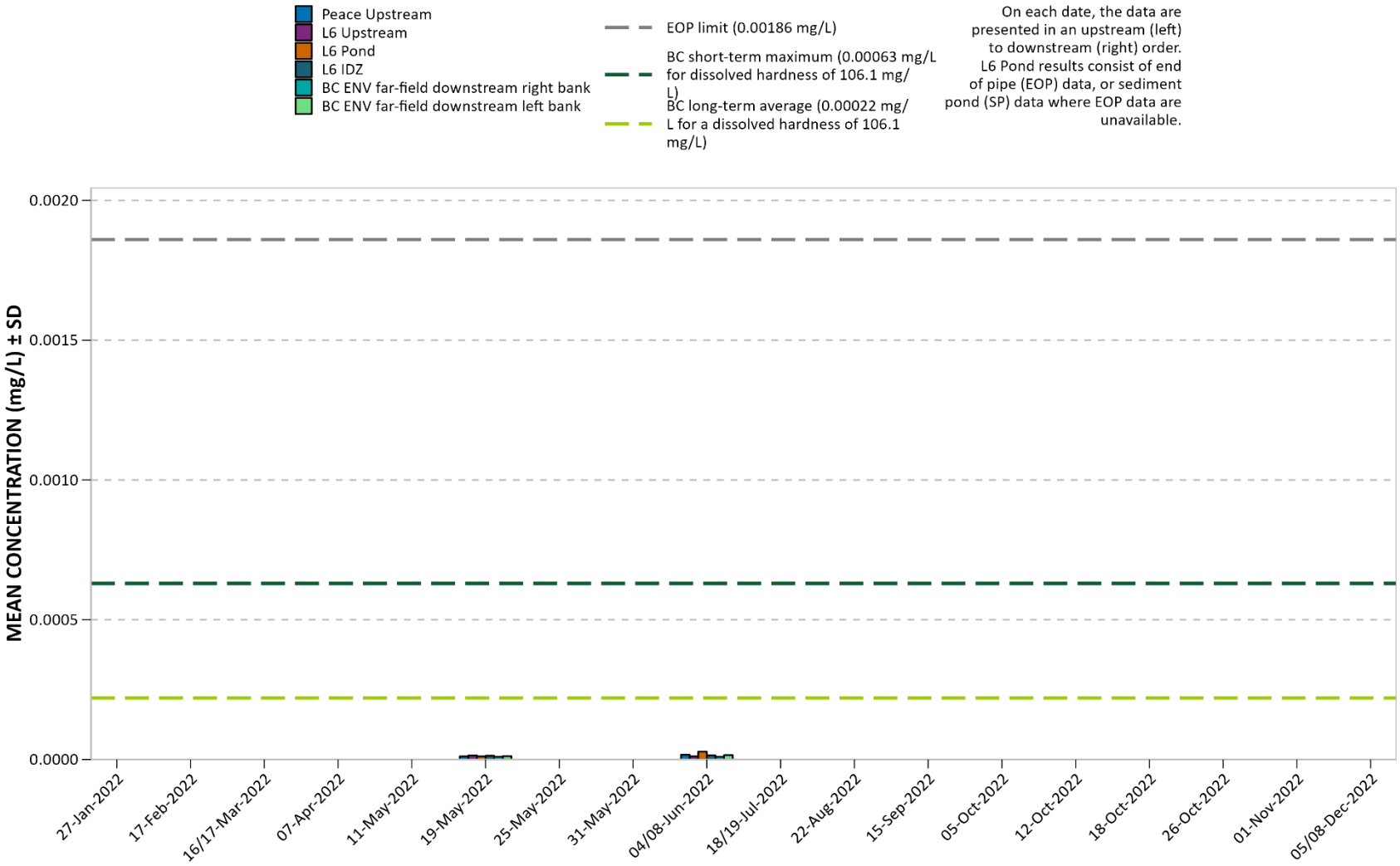


Figure 150. 2022 Peace River and RSEM L6 pond dissolved calcium (Ca).

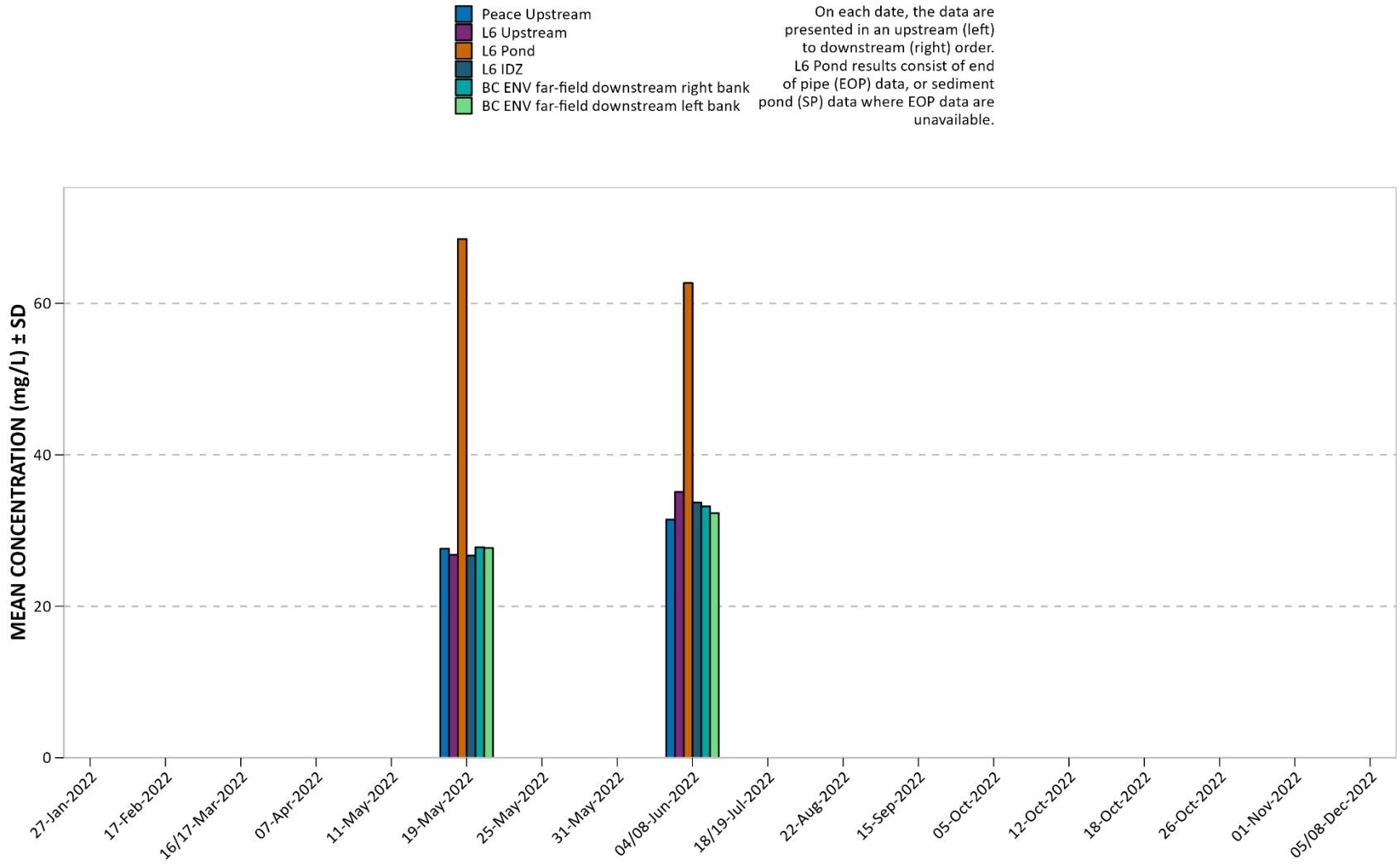


Figure 151. 2022 Peace River and RSEM L6 pond dissolved chromium (Cr).

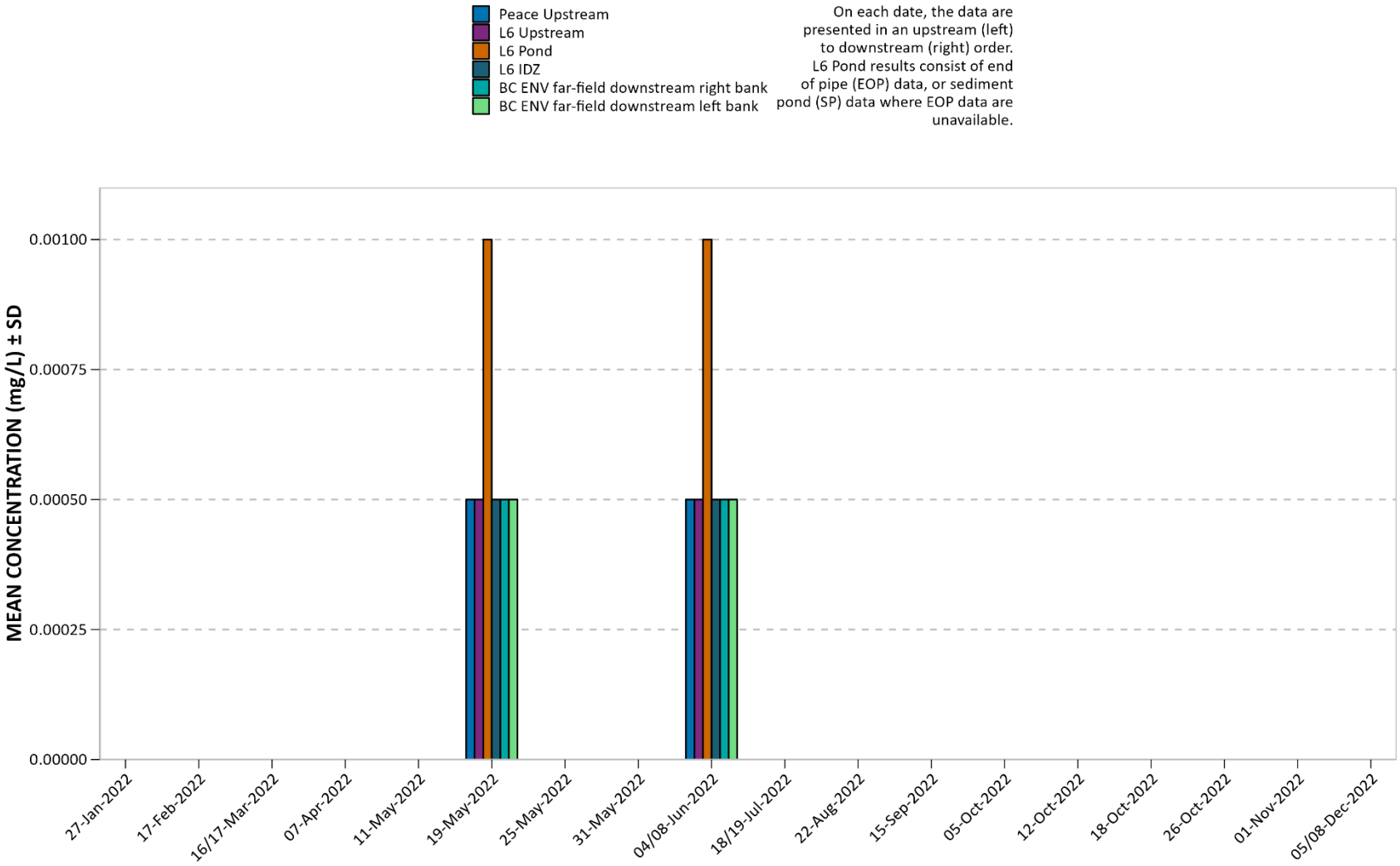


Figure 152. 2022 Peace River and RSEM L6 pond dissolved cobalt (Co).

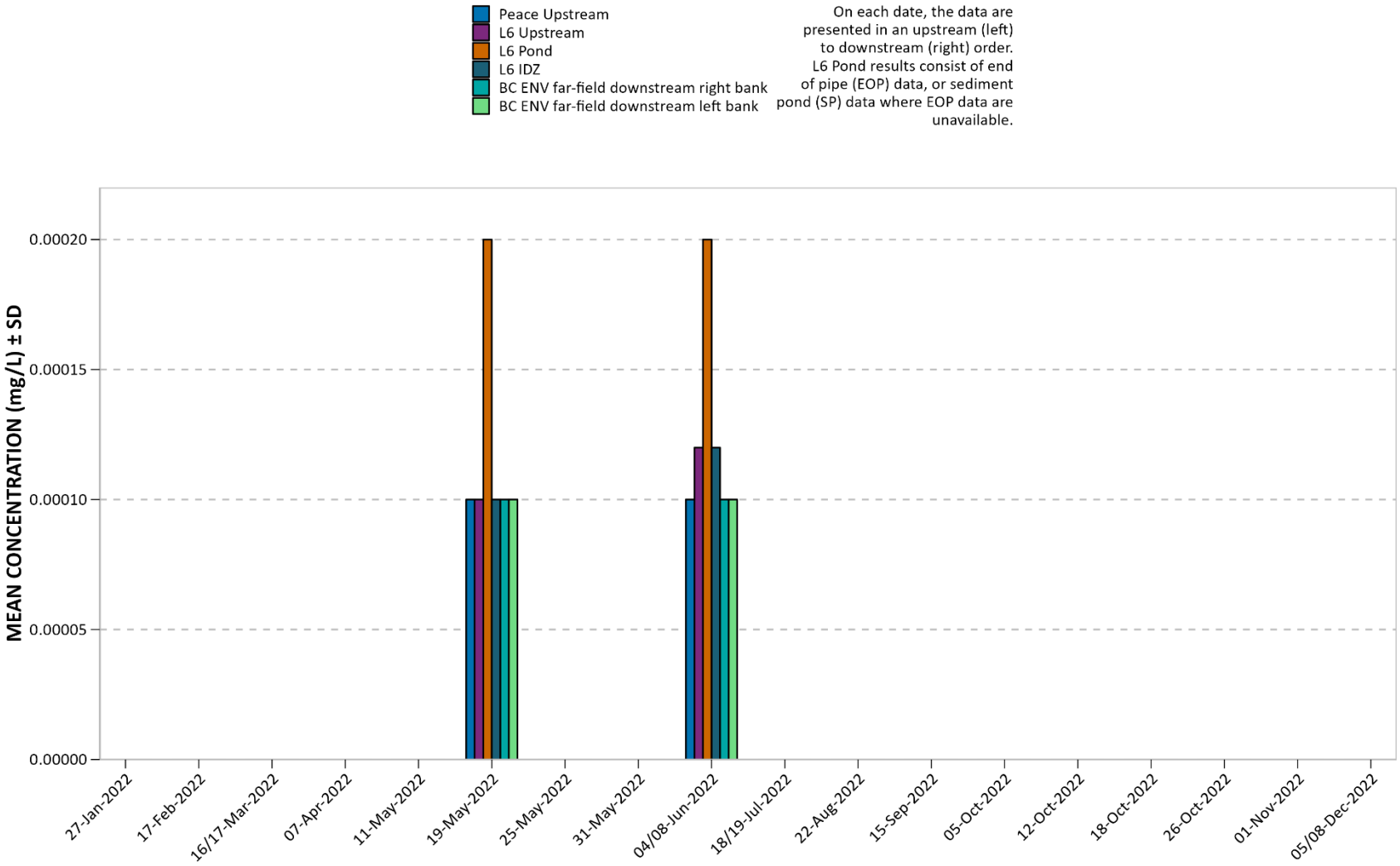


Figure 153. 2022 Peace River and RSEM L6 pond dissolved copper (Cu).

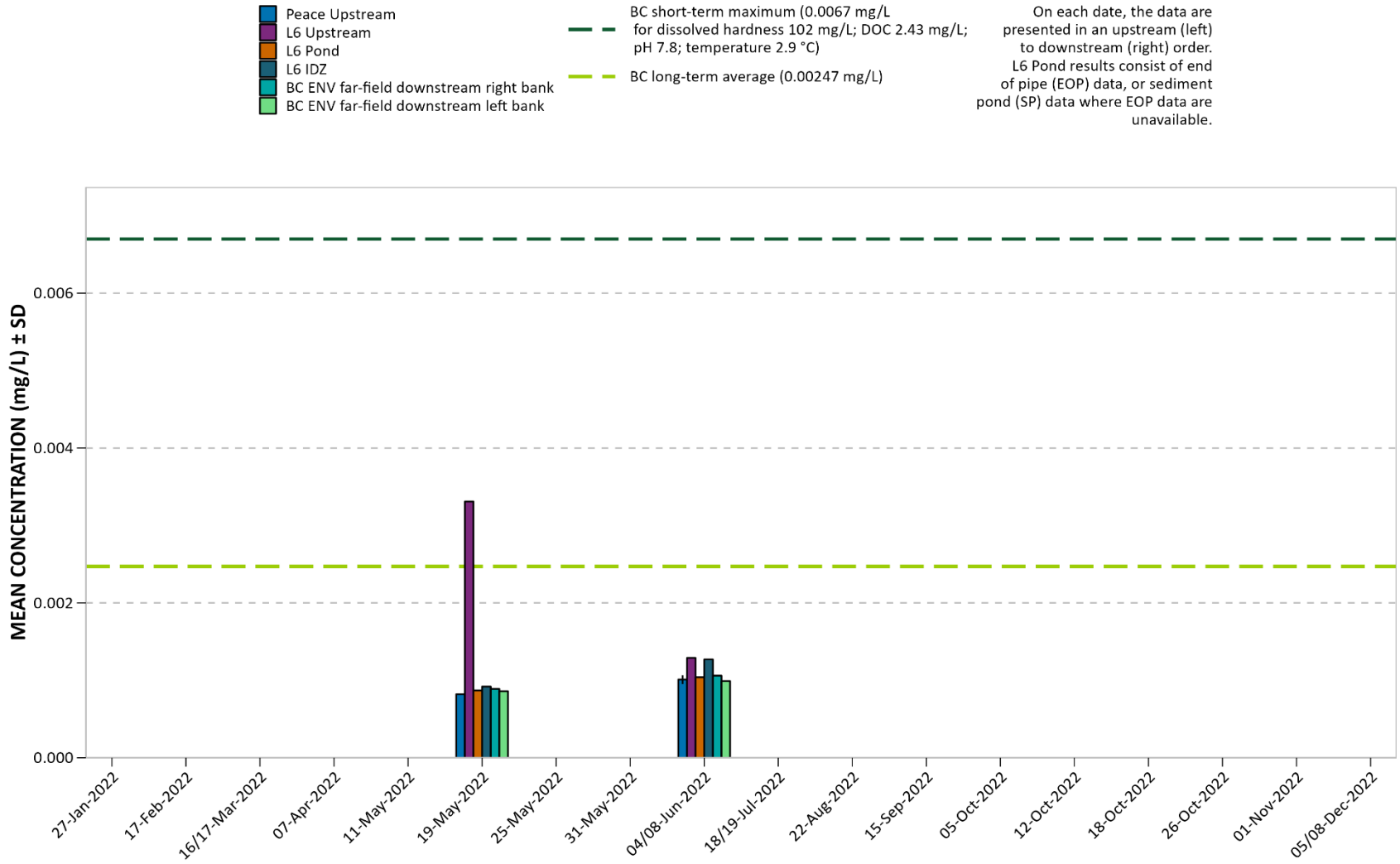


Figure 154. 2022 Peace River and RSEM L6 pond dissolved iron (Fe).

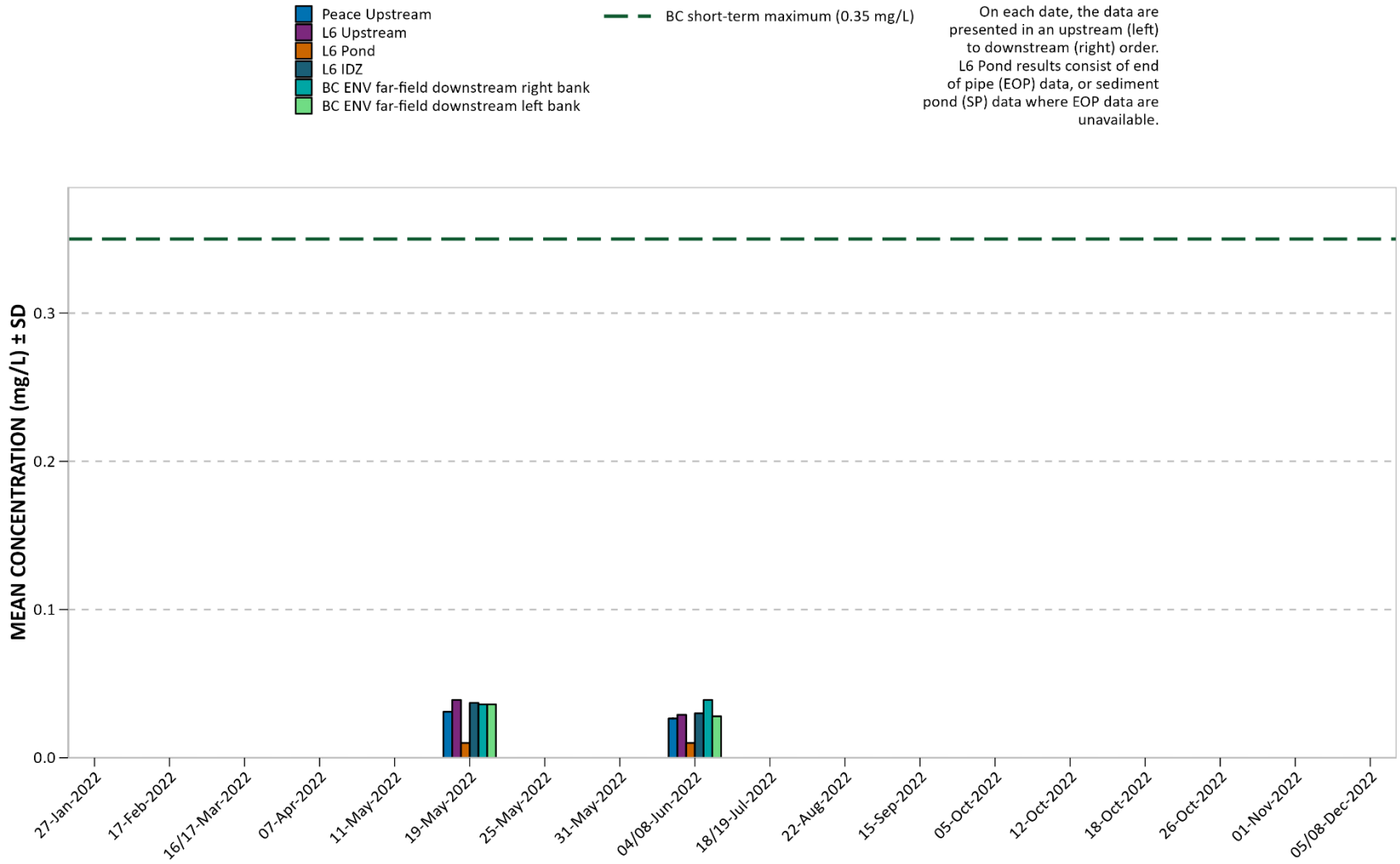


Figure 155. 2022 Peace River and RSEM L6 pond dissolved lead (Pb).

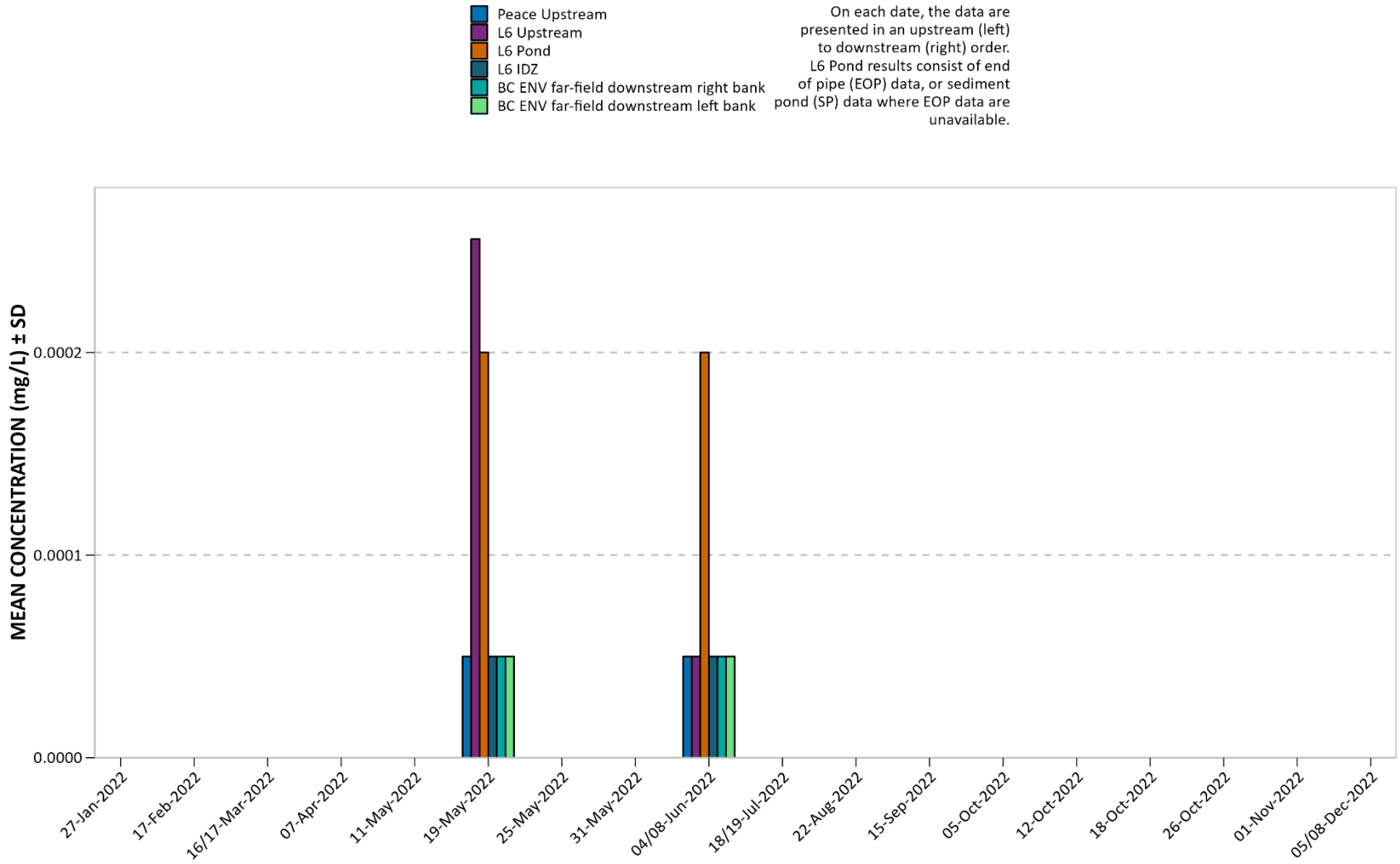


Figure 156. 2022 Peace River and RSEM L6 pond dissolved lithium (Li).

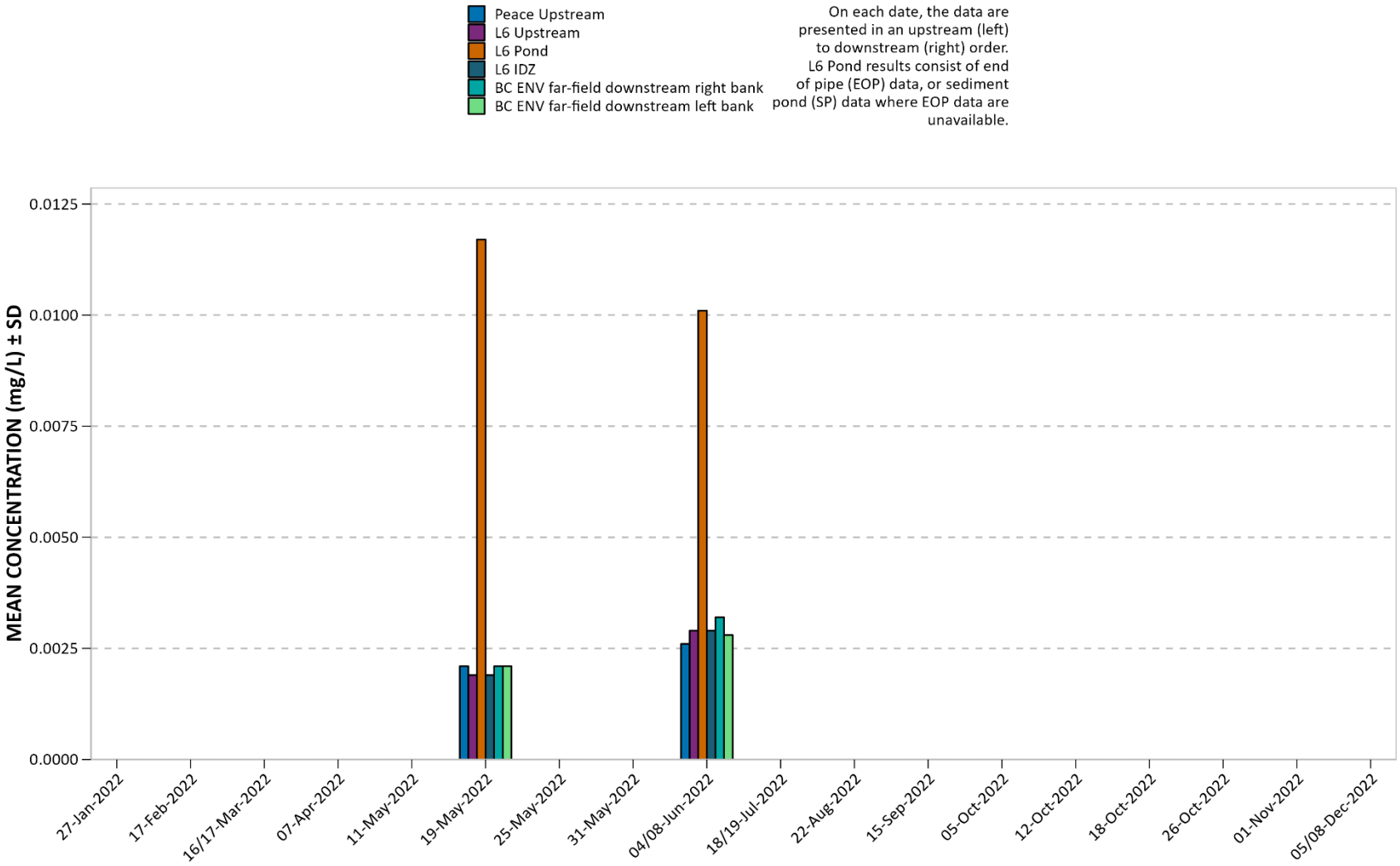


Figure 157. 2022 Peace River and RSEM L6 pond dissolved magnesium (Mg).

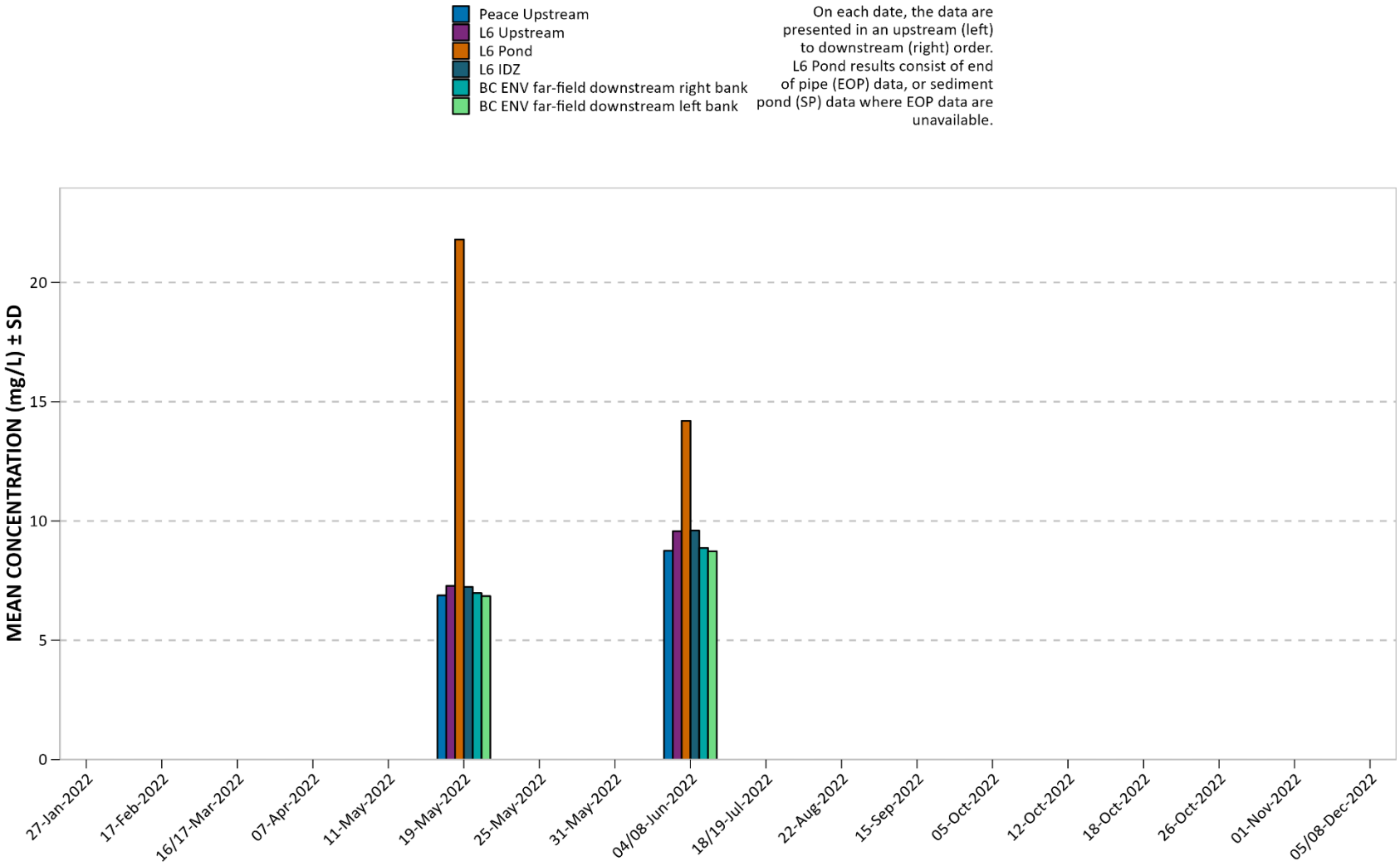


Figure 158. 2022 Peace River and RSEM L6 pond dissolved manganese (Mn).

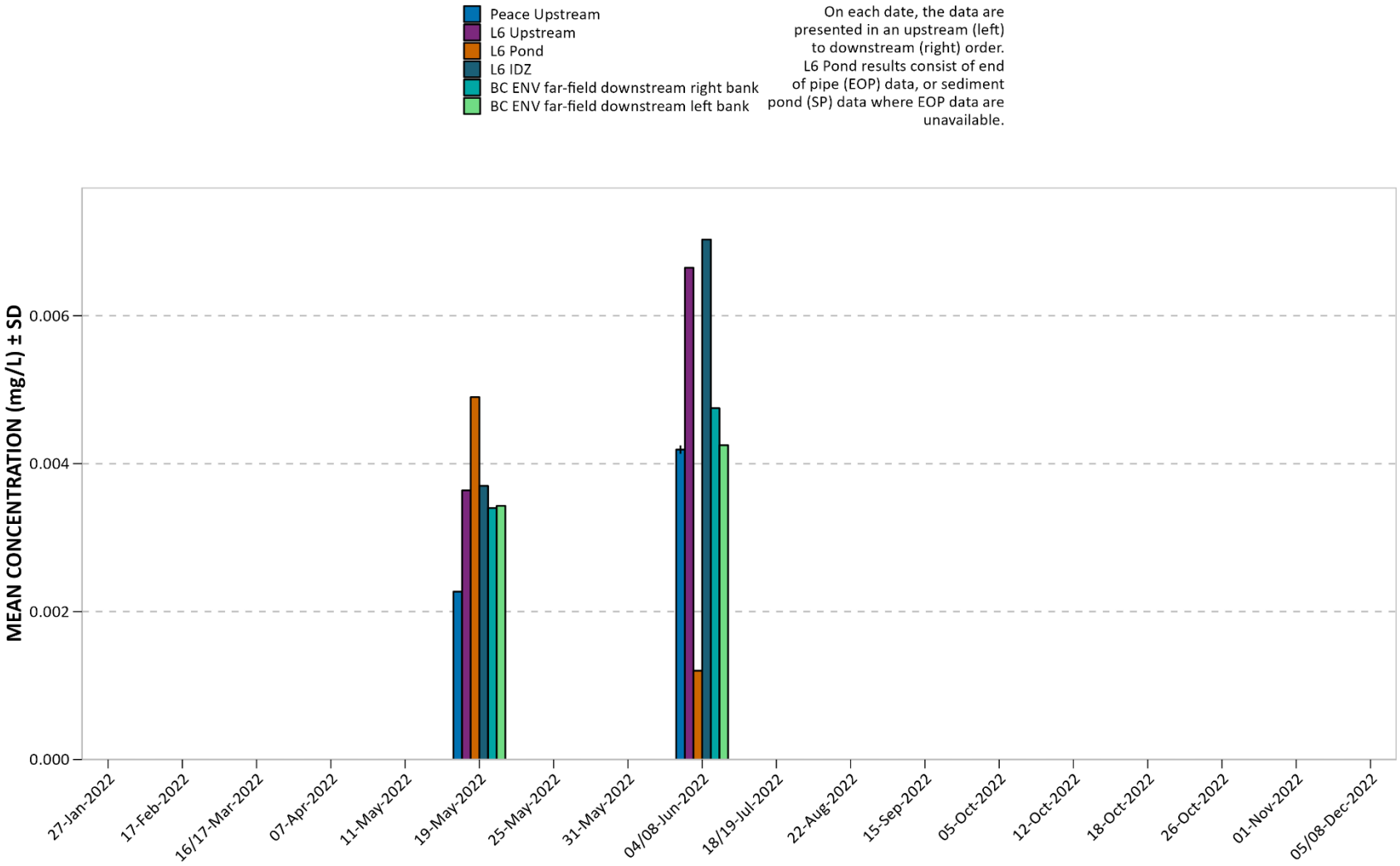


Figure 159. 2022 Peace River and RSEM L6 pond dissolved mercury (Hg).

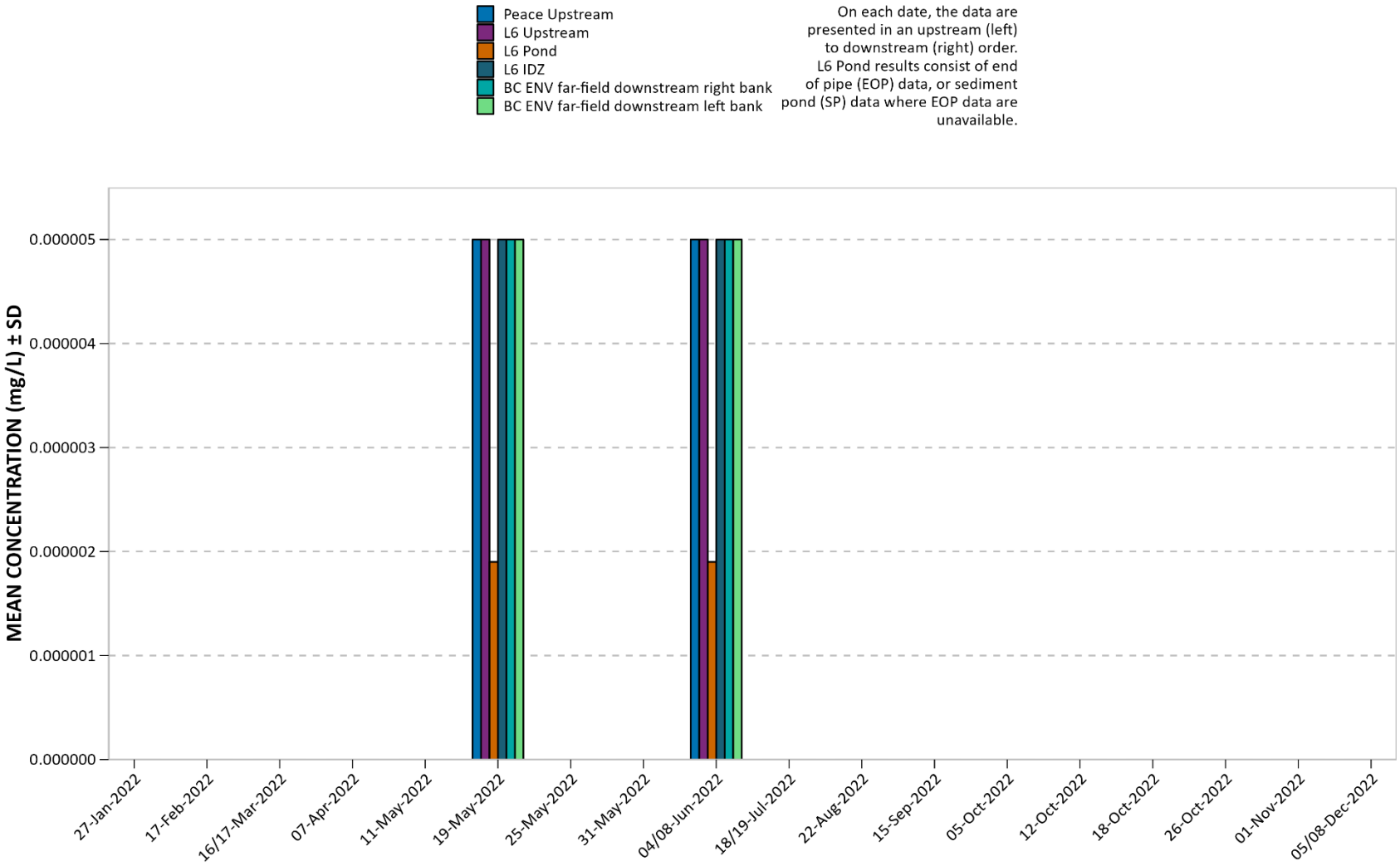


Figure 160. 2022 Peace River and RSEM L6 pond dissolved molybdenum (Mo).

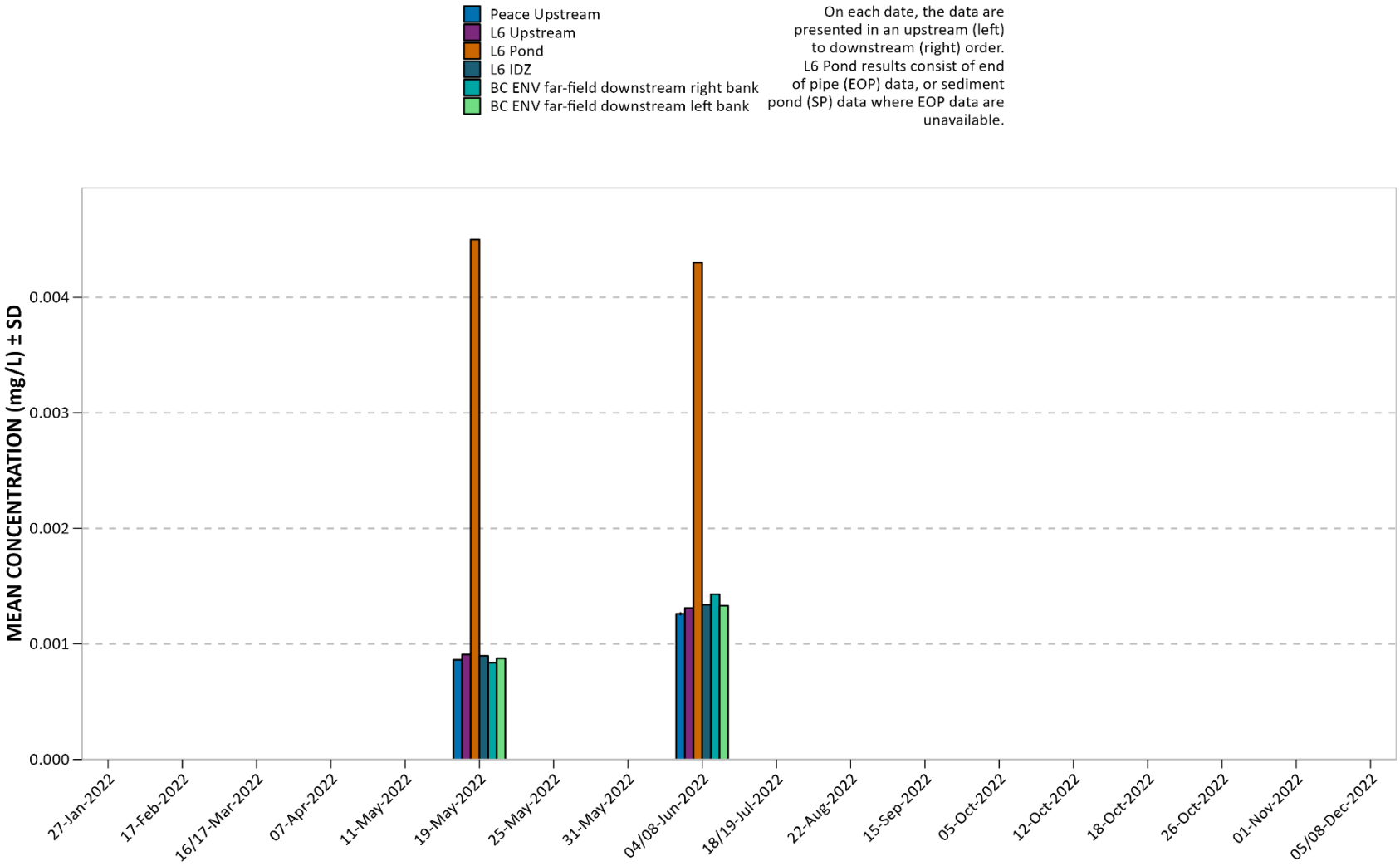


Figure 161. 2022 Peace River and RSEM L6 pond dissolved nickel (Ni).

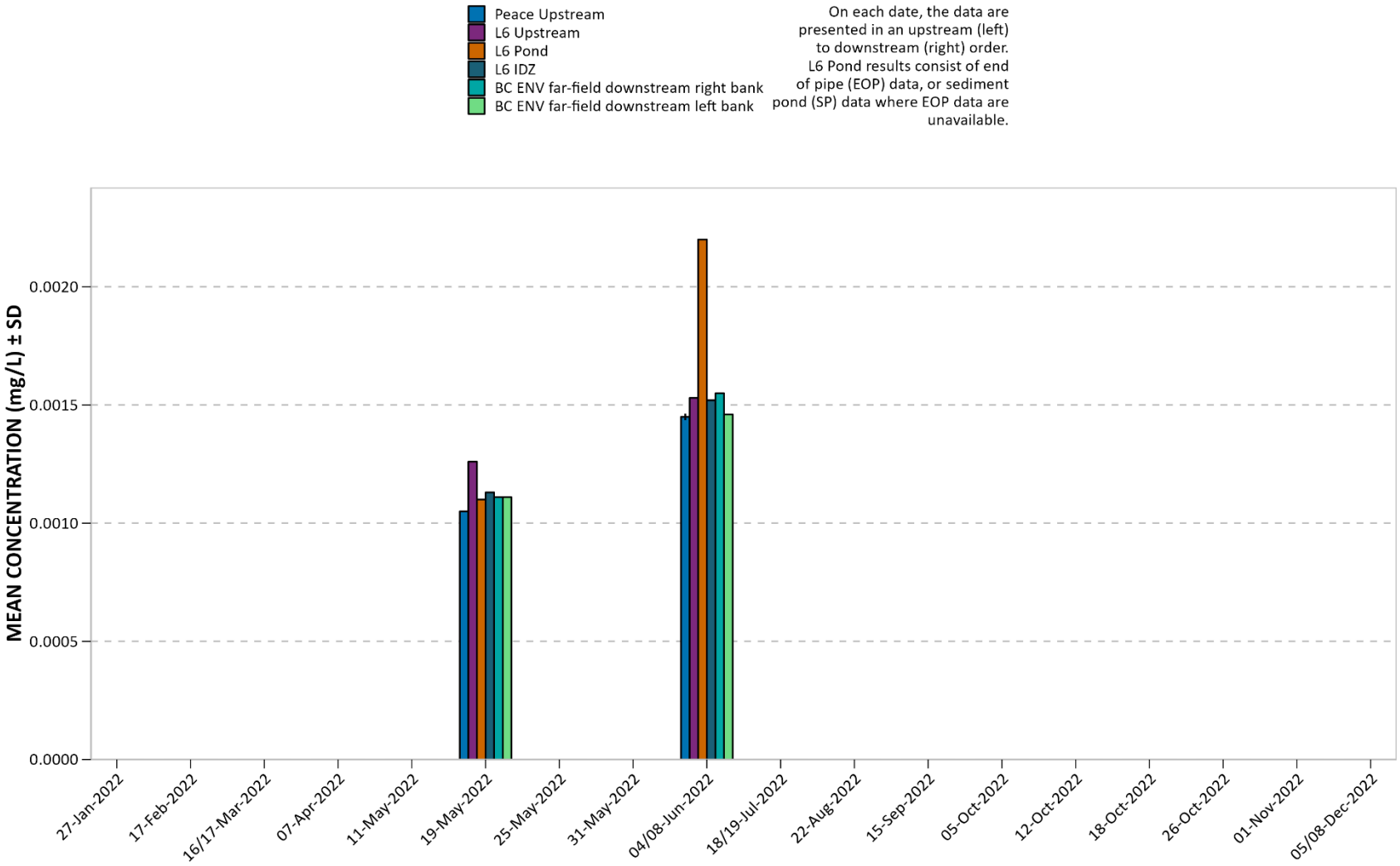


Figure 162. 2022 Peace River and RSEM L6 pond dissolved potassium (K).

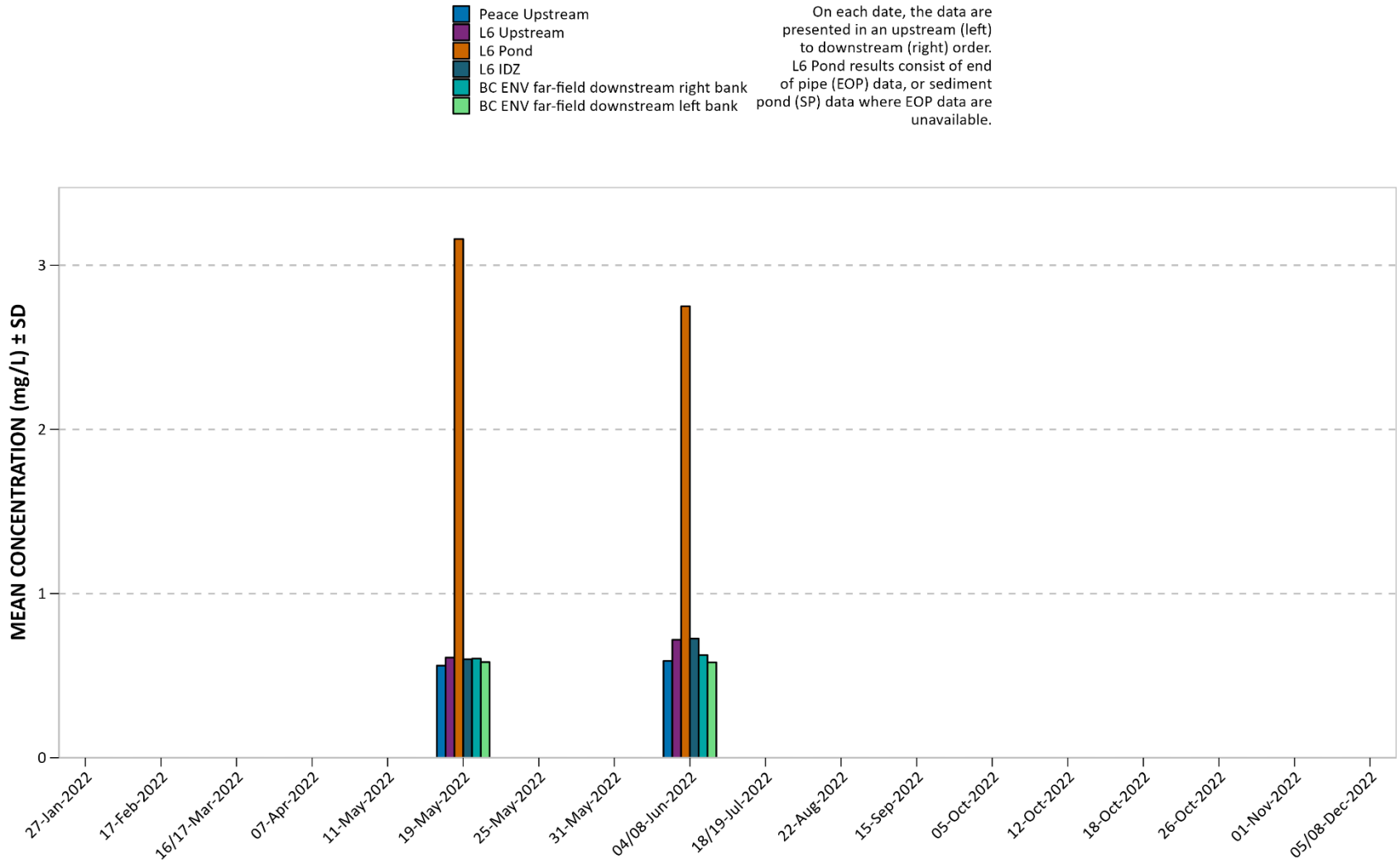


Figure 163. 2022 Peace River and RSEM L6 pond dissolved selenium (Se).

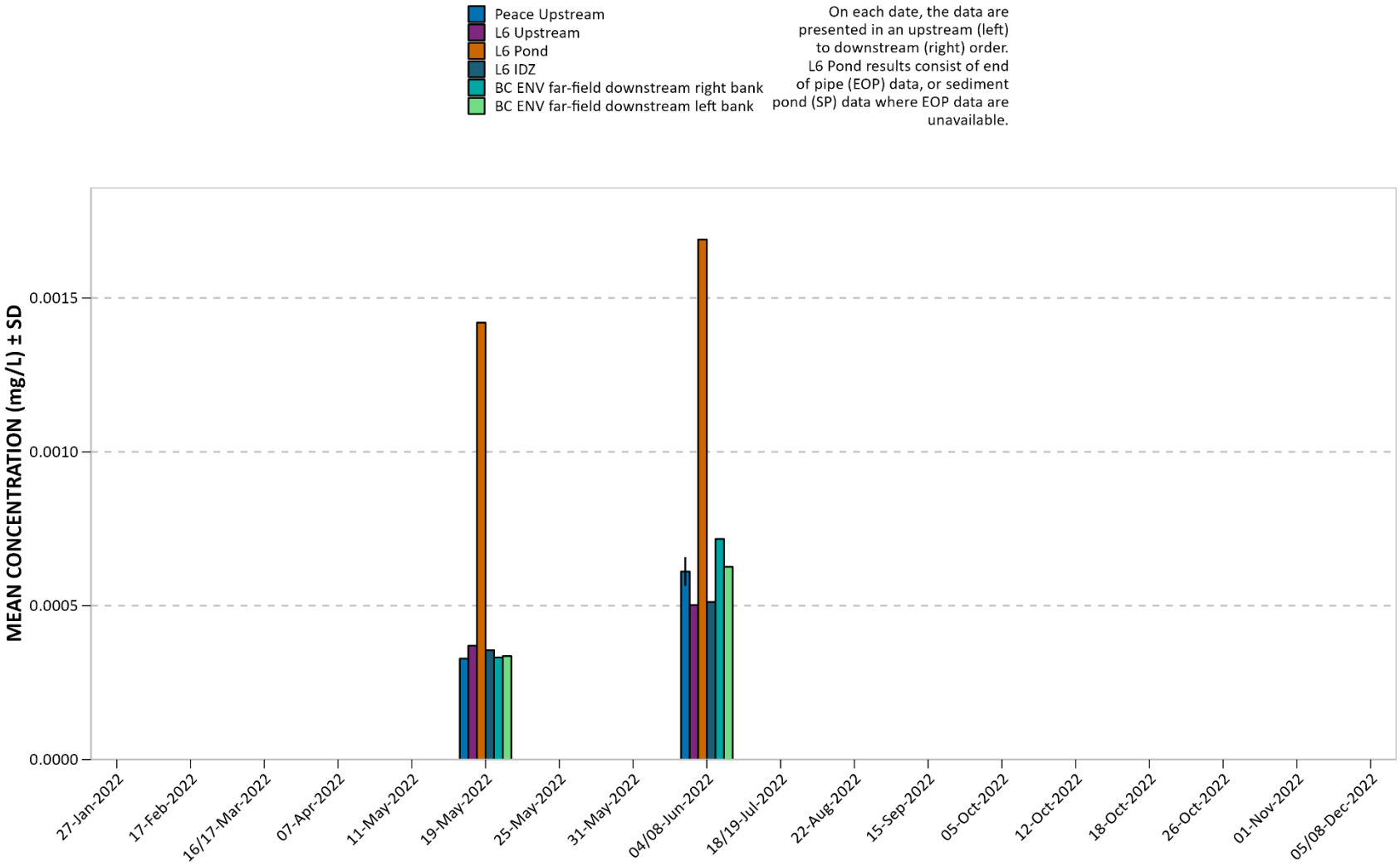


Figure 164. 2022 Peace River and RSEM L6 pond dissolved silicon (Si).

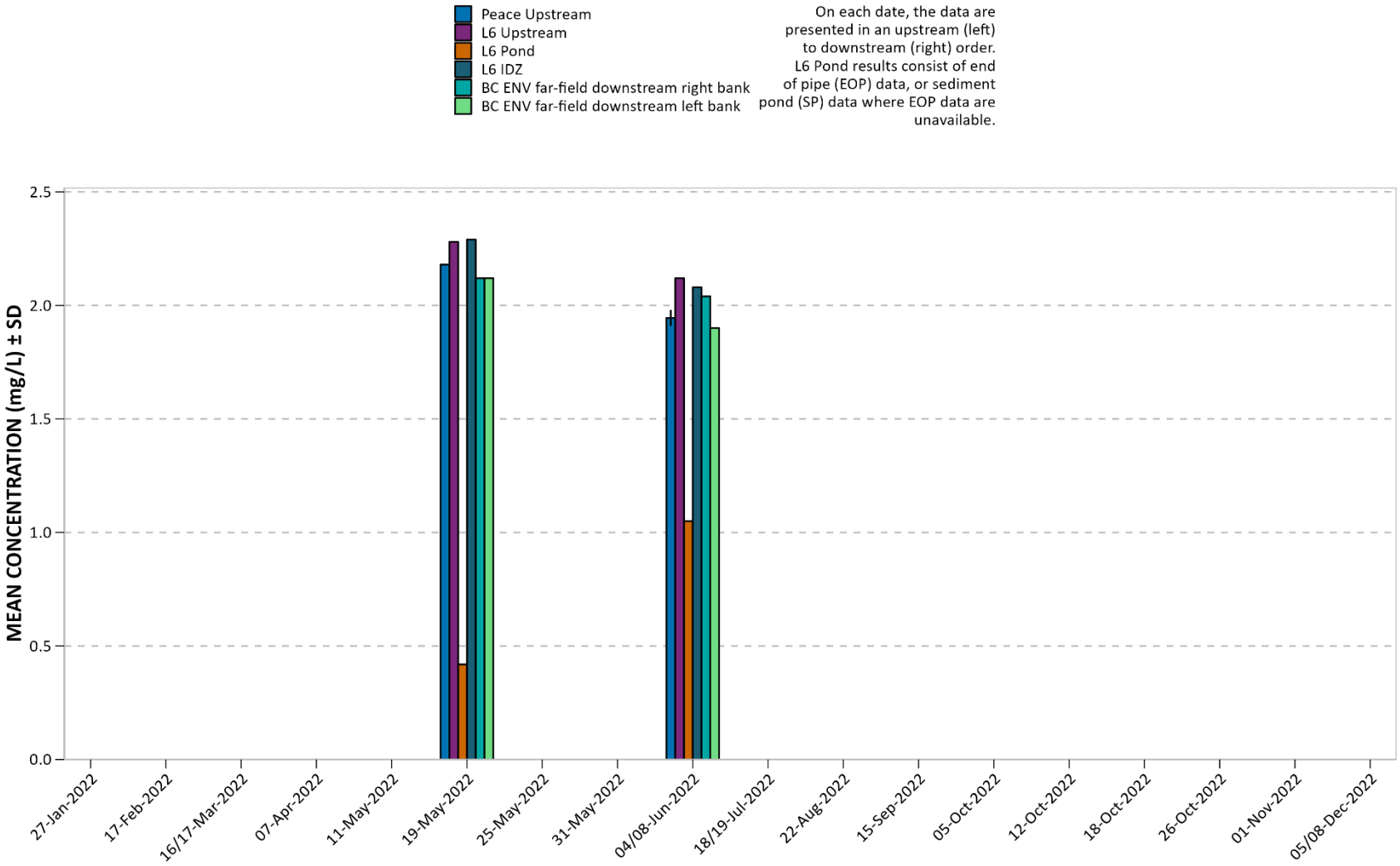


Figure 165. 2022 Peace River and RSEM L6 pond dissolved silver (Ag).

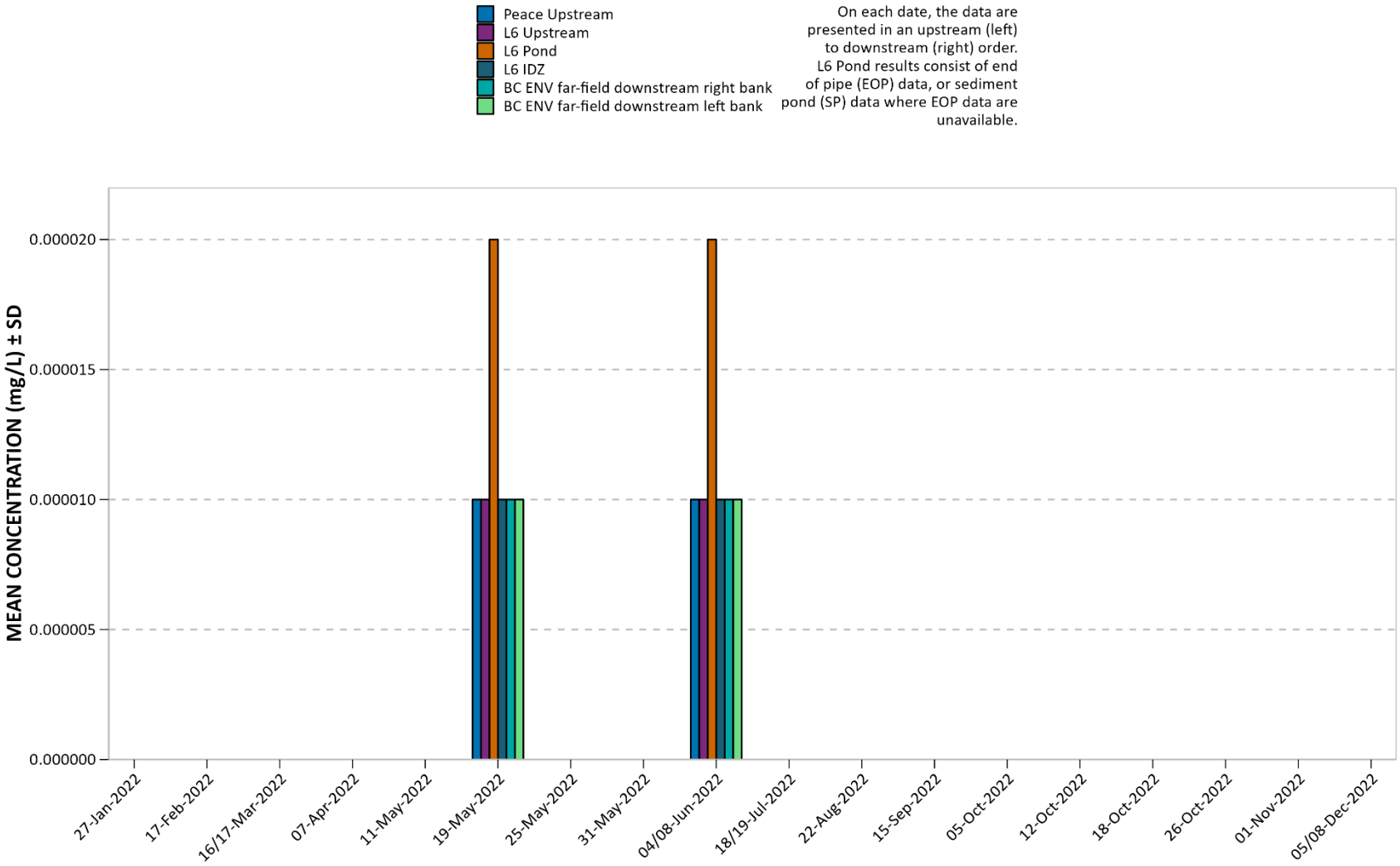


Figure 166. 2022 Peace River and RSEM L6 pond dissolved sodium (Na).

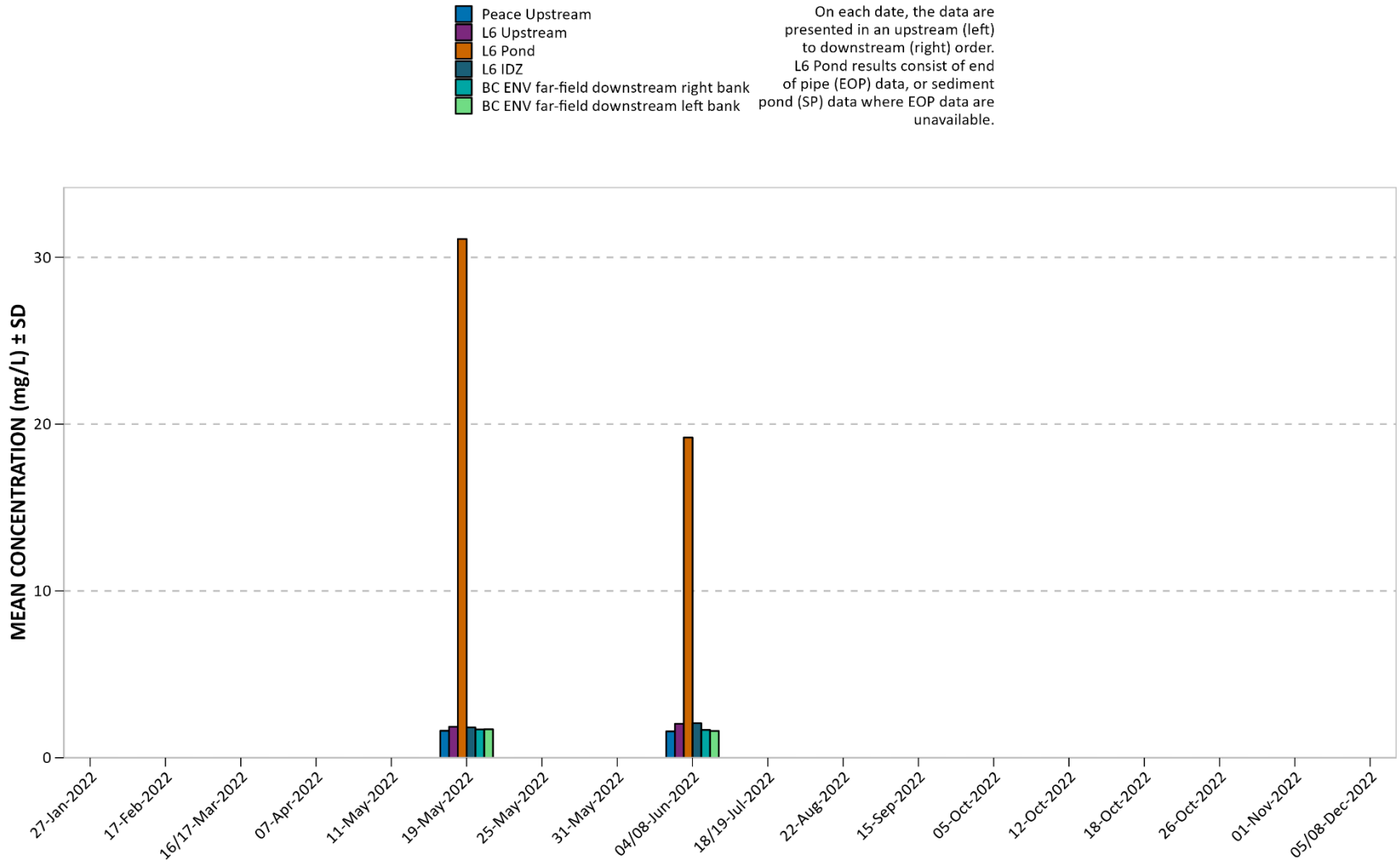


Figure 167. 2022 Peace River and RSEM L6 pond dissolved strontium (Sr).

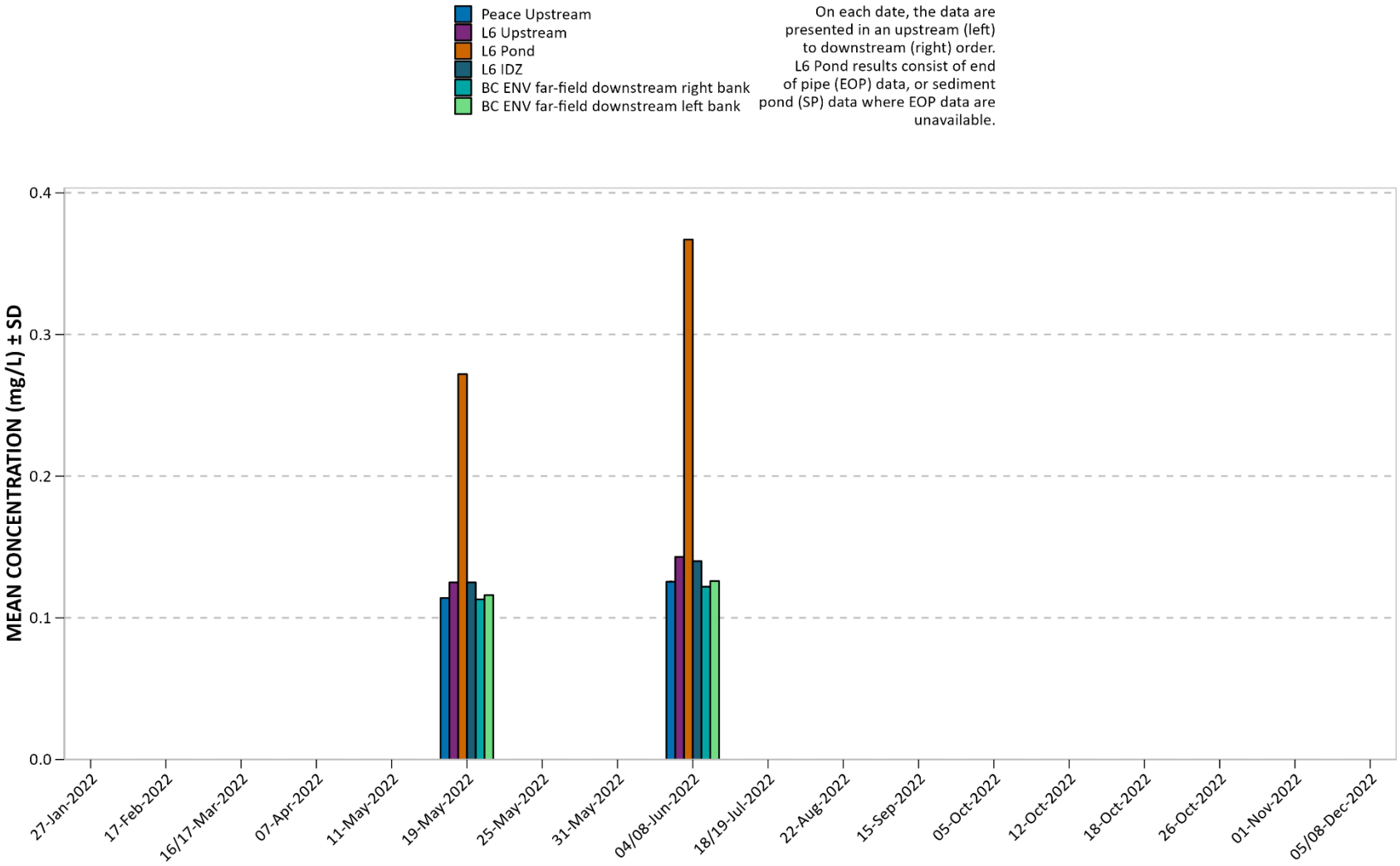


Figure 168. 2022 Peace River and RSEM L6 pond dissolved sulfur (S).

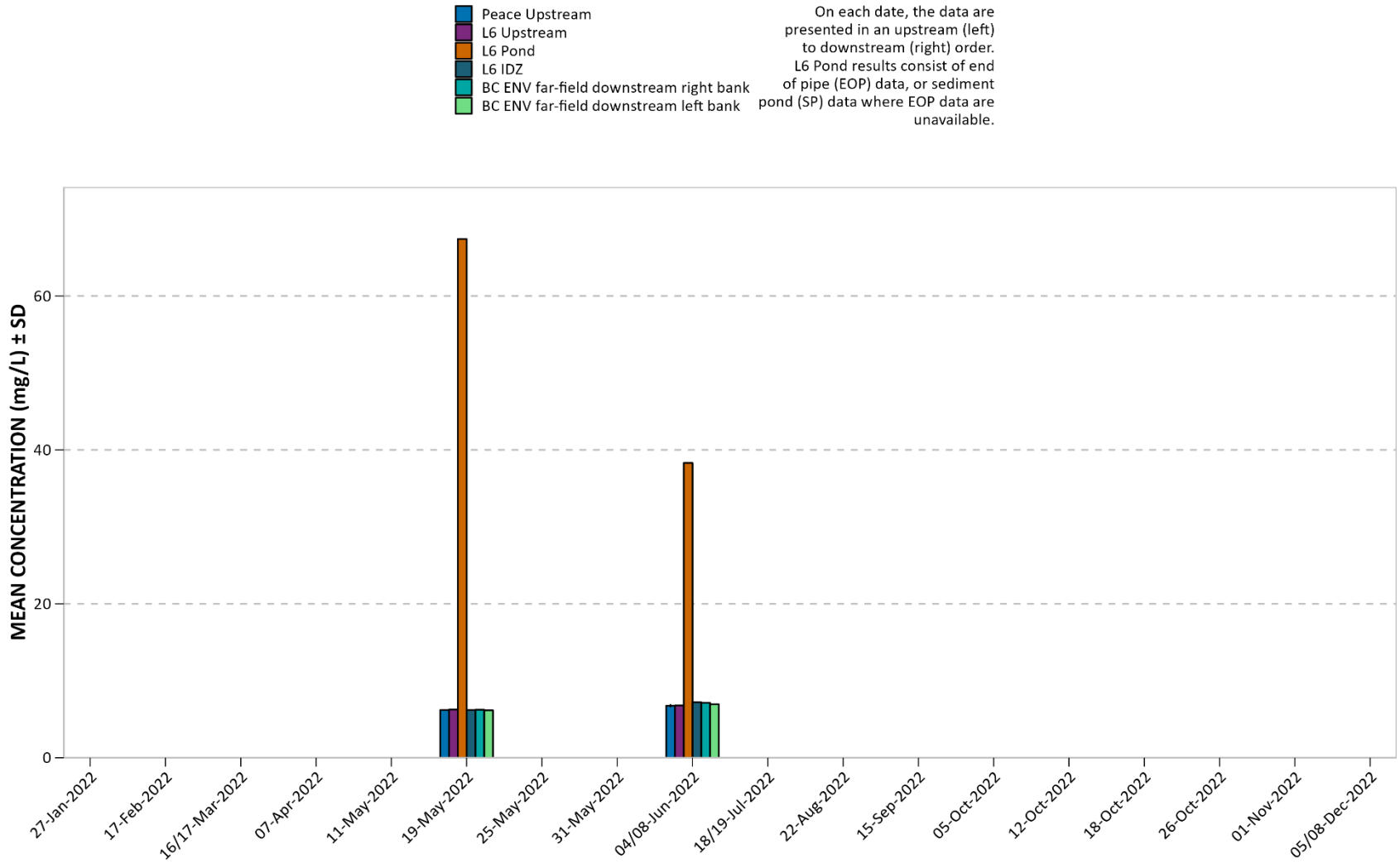


Figure 169. 2022 Peace River and RSEM L6 pond dissolved thallium (Tl).

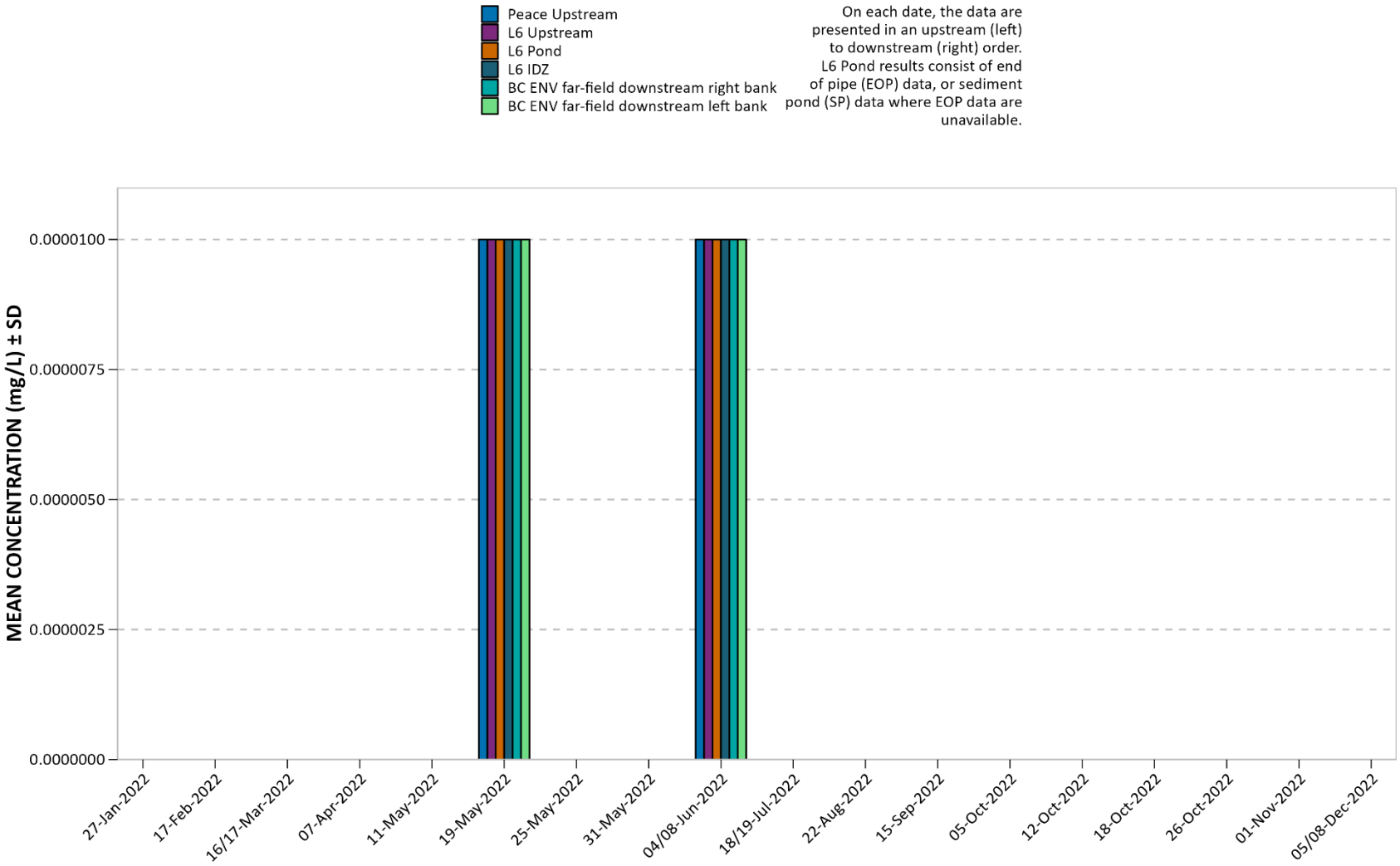


Figure 170. 2022 Peace River and RSEM L6 pond dissolved tin (Sn).

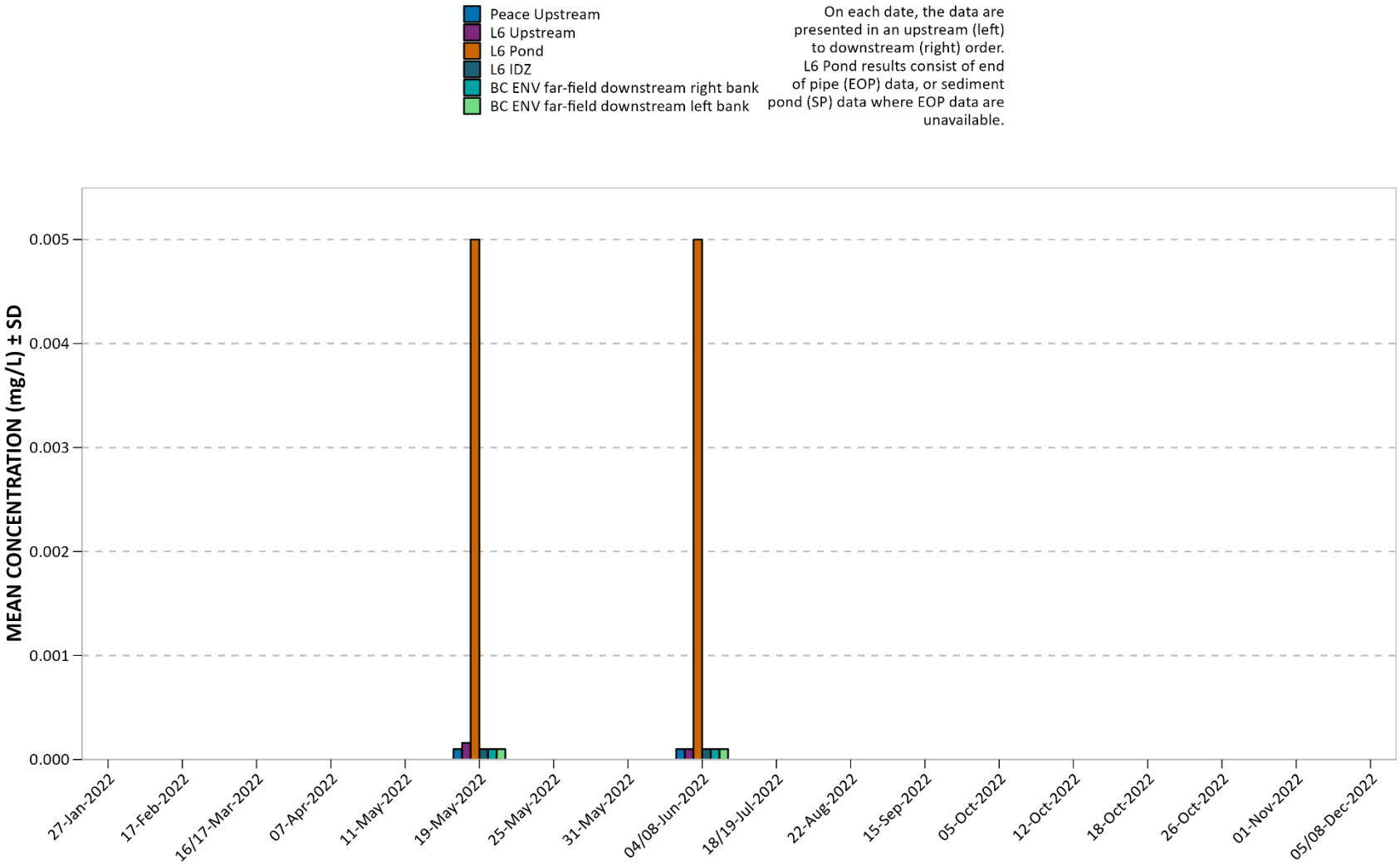


Figure 171. 2022 Peace River and RSEM L6 pond dissolved titanium (Ti).

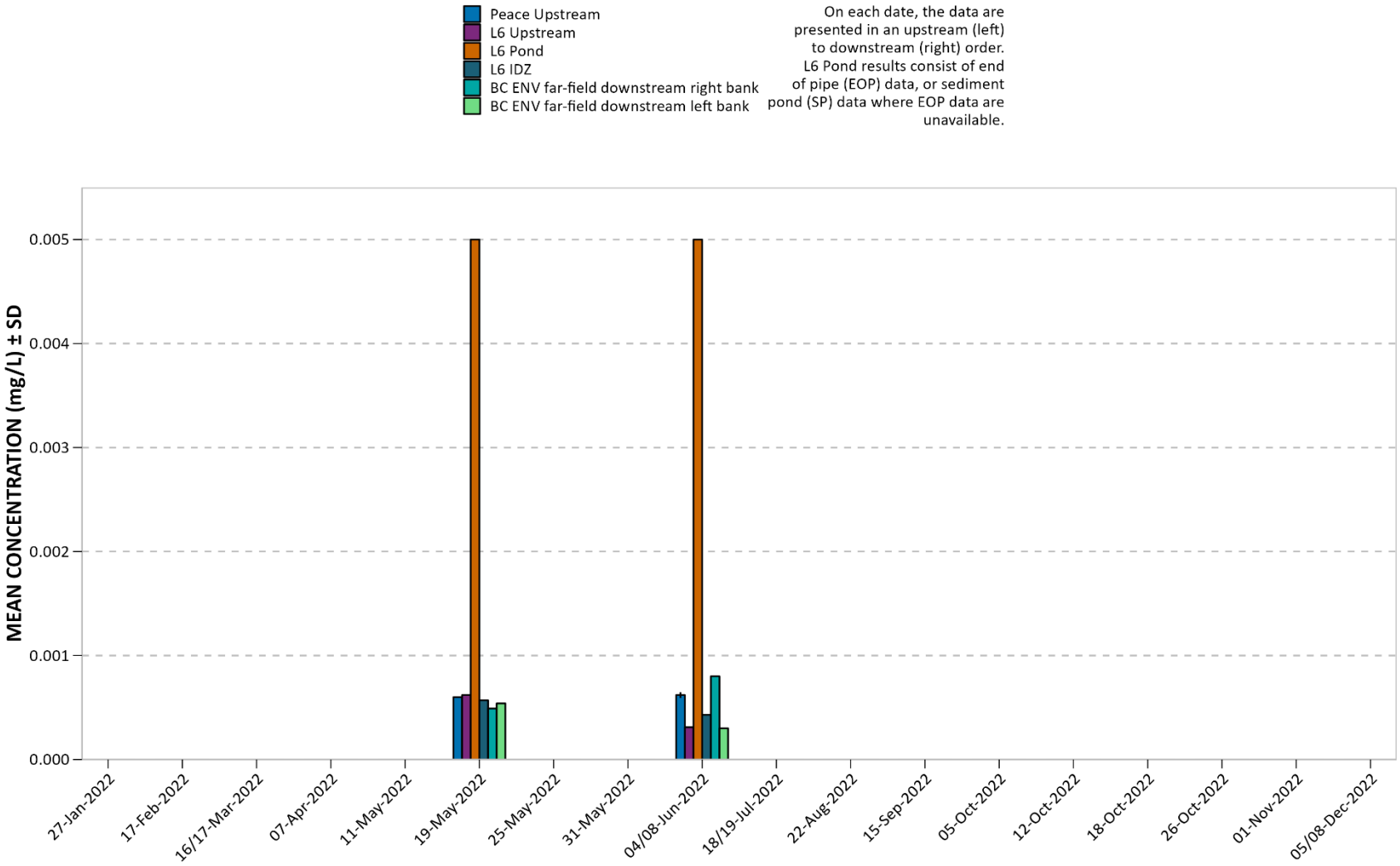


Figure 172. 2022 Peace River and RSEM L6 pond dissolved uranium (U).

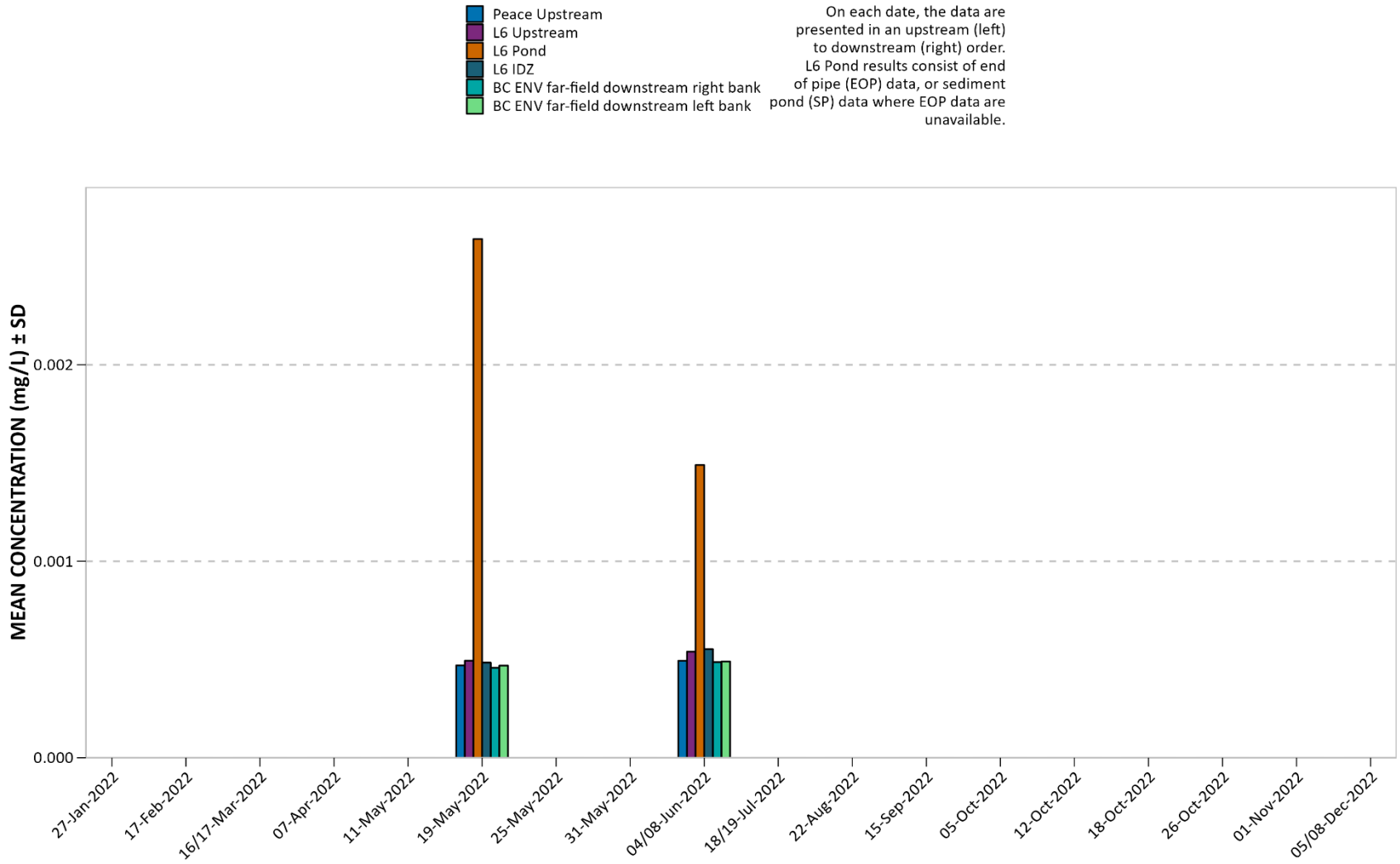


Figure 173. 2022 Peace River and RSEM L6 pond dissolved vanadium (V).

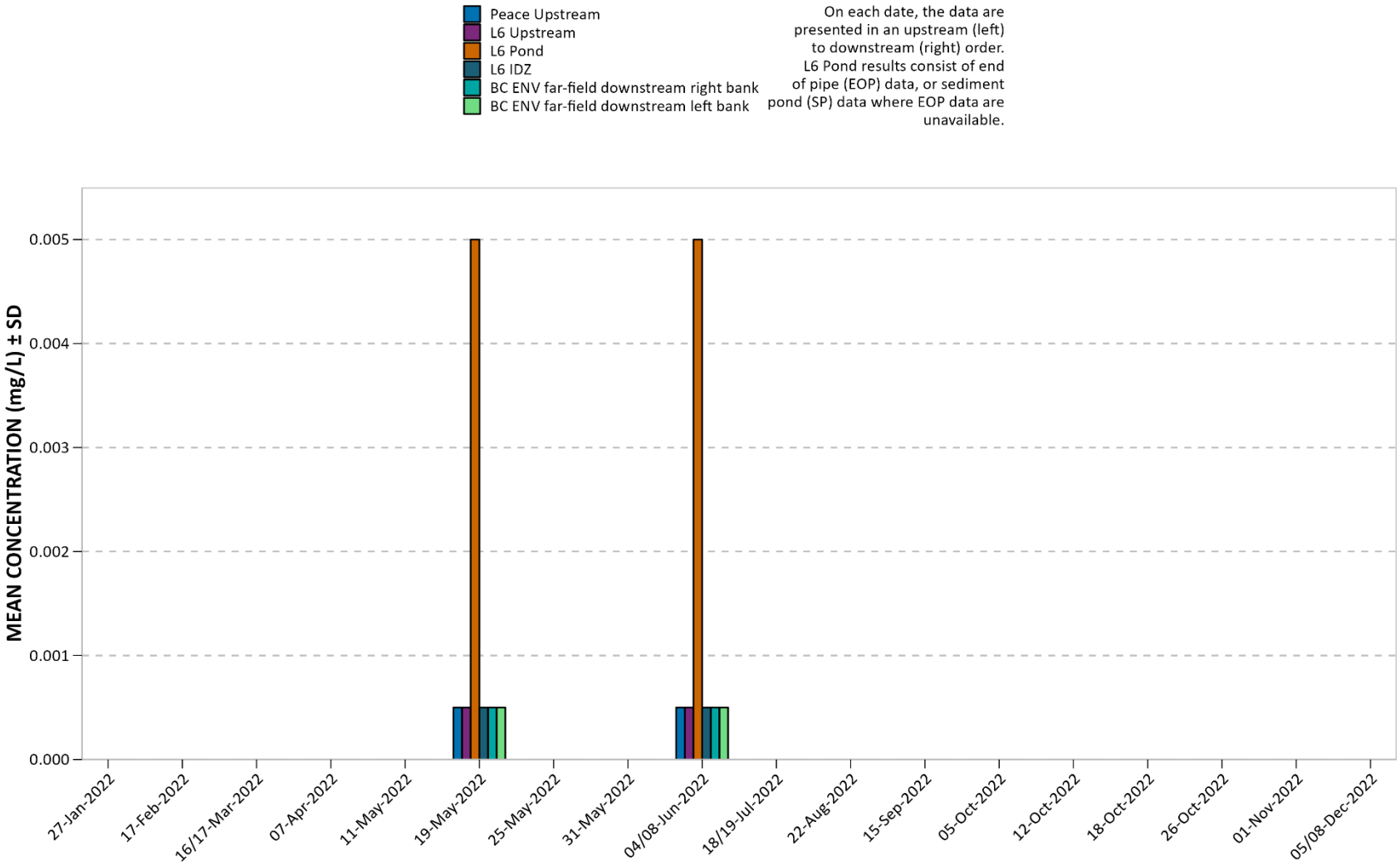
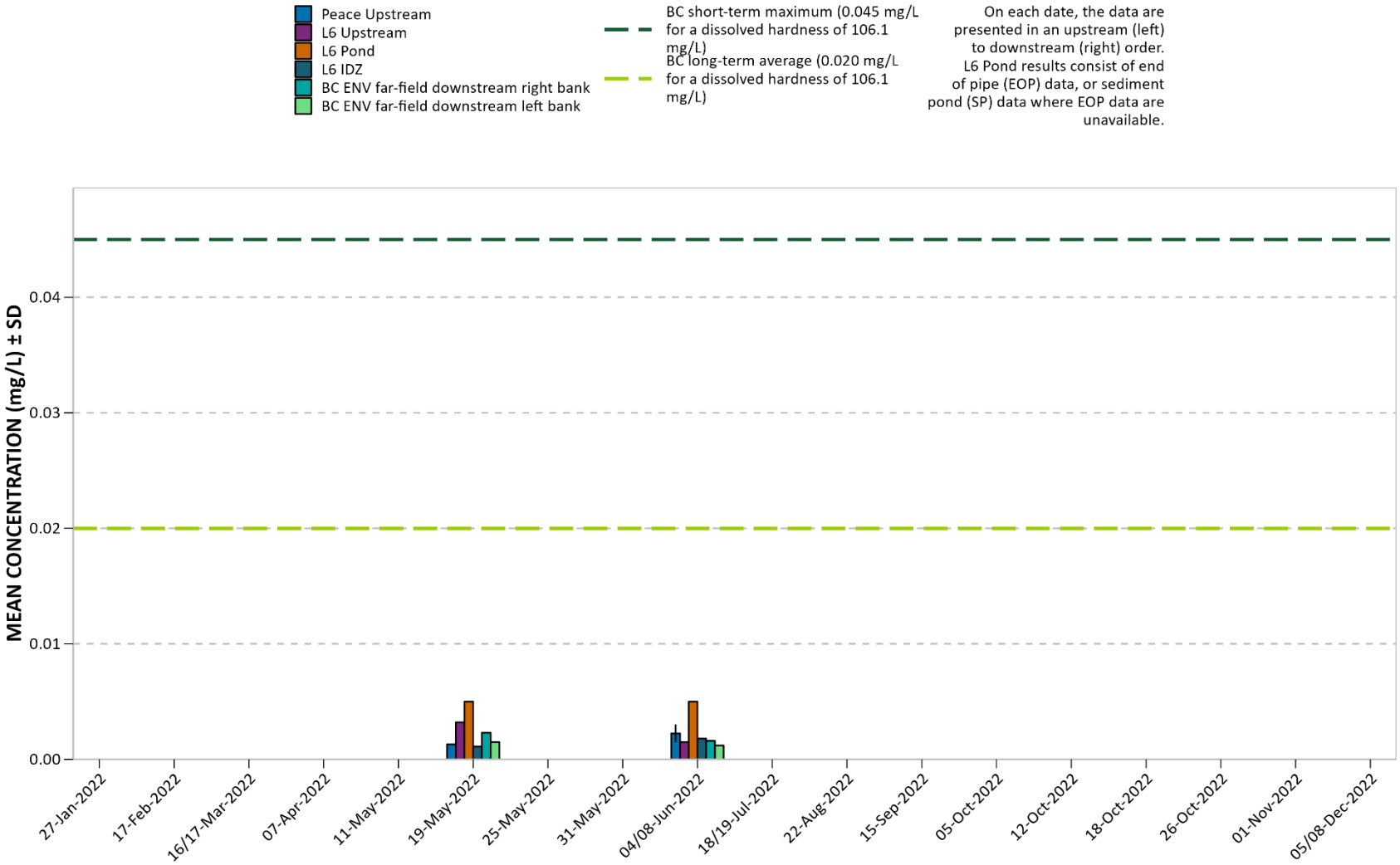
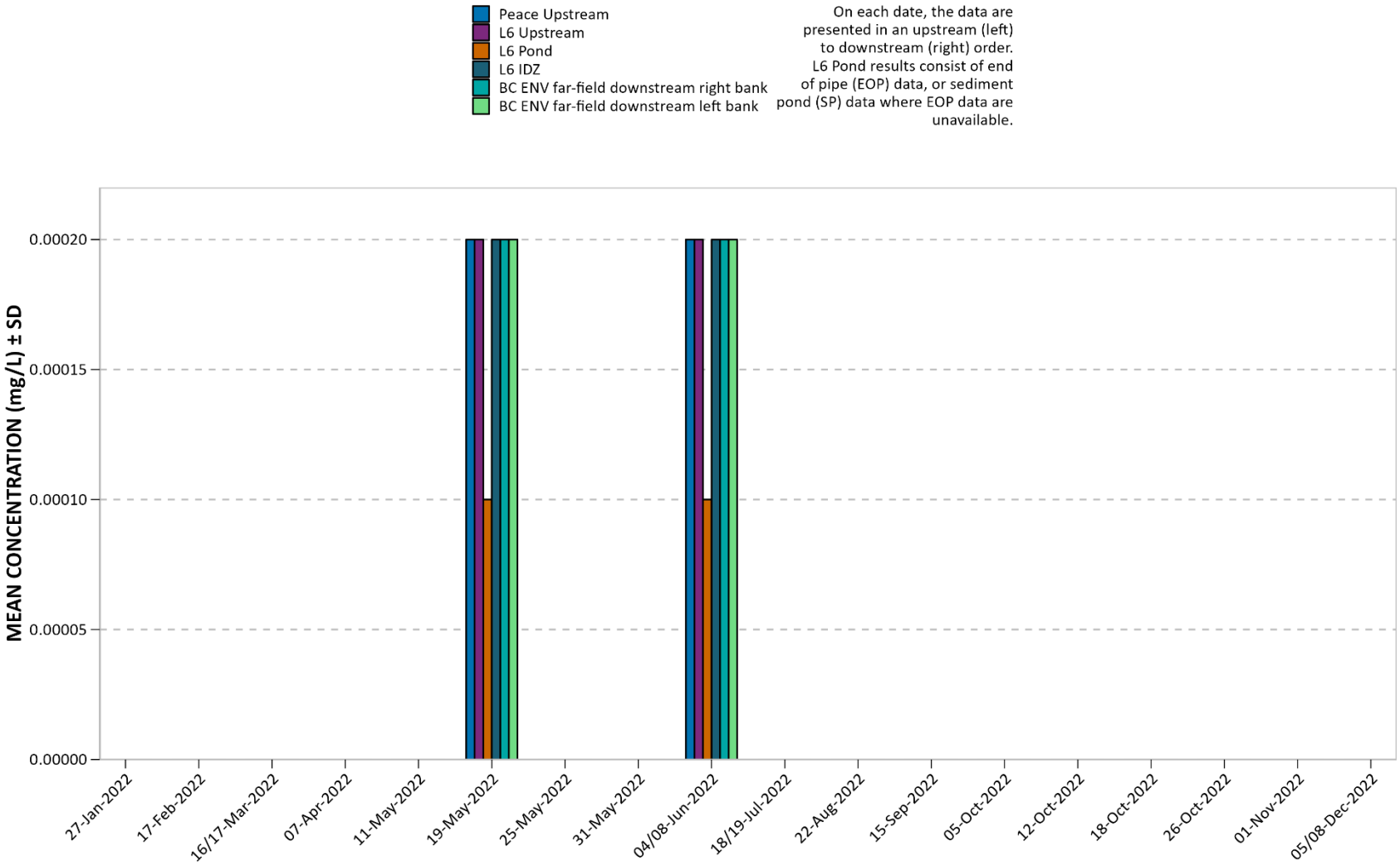


Figure 174. 2022 Peace River and RSEM L6 pond dissolved zinc (Zn).



Note: BC WQG for total zinc were used for dissolved zinc as per direction in BC ENV (2022), and are dissolved hardness dependent. An average Peace River dissolved 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 dissolved hardness was used to screen individual sample results against guidelines in the data tables (Appendix A).

Figure 175. 2022 Peace River and RSEM L6 pond dissolved zirconium (Zr).



Appendix D. 2022 Quality Assurance and Quality Control Summary

Table 26. ALS Environmental hold time exceedance summary for 2022.

Sampling Date	Description	Site	Recommended Holdtime	Actual Holdtime	Units	Qualifier
17-Feb-22	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-9.34	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-7.05	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-7.15	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	PR-2.81	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	Travel Blank	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	LBPR-9.34-A	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	LBPR-9.34-B	28	33	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-9.34-FB	28	33	days	EHT
17-Mar-22	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-7.05	28	35	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	Travel Blank	28	35	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	LBPR-9.34	28	35	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-7.15	28	35	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-9.34-A	28	35	days	EHT
	Total Phosphorus by Colourimetry (Ultra Trace)	RBPR-9.34-B	28	35	days	EHT
7-Apr-22	Conductivity in Water	PR-2.81-A	28	33	days	EHT
	Conductivity in Water	PR-2.81-B	28	33	days	EHT
	Conductivity in Water	RBPR-7.05	28	33	days	EHT
	Conductivity in Water	RBPR-7.15	28	33	days	EHT
	Conductivity in Water	LBPR-9.34	28	33	days	EHT
	Conductivity in Water	RBPR-9.34	28	33	days	EHT
	Alkalinity Species by Titration	PR-2.81-A	14	33	days	EHT
	Alkalinity Species by Titration	PR-2.81-B	14	33	days	EHT
	Alkalinity Species by Titration	RBPR-7.05	14	33	days	EHT
	Alkalinity Species by Titration	RBPR-7.15	14	33	days	EHT
	Alkalinity Species by Titration	LBPR-9.34	14	33	days	EHT
	Alkalinity Species by Titration	RBPR-9.34	14	33	days	EHT
11-May-22	Nitrate in Water by IC (Low Level)	PR-2.81-FB	3	5	days	EHT

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Table 26. Continued (2 of 3).

Sampling Date	Description	Site	Recommended Holdtime	Actual Holdtime	Units	Qualifier
19-May-22	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	RBPR-9.34	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	RBPR-7.15-A	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	RBPR-7.15-B	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	LBPR-9.34	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	PR-2.81	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	Travel Blank	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	RBPR-7..05	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	RBPR-7.05-FB	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	LBPR-6.97	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	LBPR-7.21	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-9.34	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.15-A	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.15-B	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	LBPR-9.34	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	PR-2.81	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	Travel Blank	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.05	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	RBPR-7.05-FB	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	LBPR-6.97	3	6	days	EHT
	Nitrate in Water by IC (Low Level)	LBPR-7.21	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-9.34	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.15-A	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.15-B	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	LBPR-9.34	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	PR-2.81	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	Travel Blank	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.05	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	RBPR-7.05-FB	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	LBPR-6.97	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	LBPR-7.21	3	6	days	EHT
	Turbidity by Nephelometry	RBPR-9.34	3	6	days	EHT
	Turbidity by Nephelometry	RBPR-7.15-A	3	6	days	EHT
	Turbidity by Nephelometry	RBPR-7.15-B	3	6	days	EHT
	Turbidity by Nephelometry	LBPR-9.34	3	6	days	EHT
	Turbidity by Nephelometry	PR-2.81	3	6	days	EHT
	Turbidity by Nephelometry	Travel Blank	3	6	days	EHT
	Turbidity by Nephelometry	RBPR-7..05	3	6	days	EHT
	Turbidity by Nephelometry	RBPR-7.05-FB	3	6	days	EHT
	Turbidity by Nephelometry	LBPR-6.97	3	6	days	EHT
	Turbidity by Nephelometry	LBPR-7.21	3	6	days	EHT

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Table 26. Continued (3 of 3).

Sampling Date	Description	Site	Recommended Holdtime	Actual Holdtime	Units	Qualifier
4-Jun-22	Turbidity by Nephelometry	LBPR-6.97	3	4	days	EHT
	Turbidity by Nephelometry	LBPR-7.21	3	4	days	EHT
1-Nov-22	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	PR-2.81-FB	3	7	days	EHT
5-Dec-22	Nitrite in Water by IC (Low Level)	Travel Blank	3	4	days	EHT
	Turbidity by Nephelometry	RBPR-9.34	3	8	days	EHT
	Turbidity by Nephelometry	RBPR-7.05	3	8	days	EHT
	Turbidity by Nephelometry	LBPR-9.34	3	8	days	EHT
	Turbidity by Nephelometry	RBPR-7.15	3	8	days	EHT
	Turbidity by Nephelometry	Travel Blank	3	9	days	EHT
	Turbidity by Nephelometry	RBPR-9.34-FB	3	8	days	EHT
	TDS by Gravimetry	RBPR-9.34	7	8	days	EHT
	TDS by Gravimetry	RBPR-7.05	7	8	days	EHT
	TDS by Gravimetry	LBPR-9.34	7	8	days	EHT
	TDS by Gravimetry	RBPR-7.15	7	8	days	EHT
	TDS by Gravimetry	Travel Blank	7	9	days	EHT
	TDS by Gravimetry	RBPR-9.34-FB	7	8	days	EHT
	TSS by Gravimetry (Low Level)	RBPR-9.34	7	8	days	EHT
	TSS by Gravimetry (Low Level)	RBPR-7.05	7	8	days	EHT
	TSS by Gravimetry (Low Level)	LBPR-9.34	7	8	days	EHT
	TSS by Gravimetry (Low Level)	RBPR-7.15	7	8	days	EHT
	TSS by Gravimetry (Low Level)	Travel Blank	7	9	days	EHT
	TSS by Gravimetry (Low Level)	RBPR-9.34-FB	7	8	days	EHT
8-Dec-22	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	PR-2.81-A	3	6	days	EHT
	Dissolved Orthophosphate by Colourimetry (Ultra Trace)	PR-2.81-B	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	PR-2.81-A	3	6	days	EHT
	Nitrite in Water by IC (Low Level)	PR-2.81-B	3	6	days	EHT
	Turbidity by Nephelometry	PR-2.81-A	3	5	days	EHT
	Turbidity by Nephelometry	PR-2.81-B	3	5	days	EHT

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Table 27. Field blank and travel blank detections in 2022.

Sample Type	No. of Sampling Dates (2022)	Field and Travel Blank Detections		
		No. of Parameter Results (n)[1]	No. of Detectable Results (>MDL)	% Detectable Results
Field Blanks	18	1,636	33	2.0%
Travel Blanks	18	949	11	1.2%

[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.

Table 28. Summary of cases with relative percent difference (RPD) >20% for duplicate samples in 2022.

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Detection Limit (mg/L)	RPD (%)
27-Jan-22	RBPR-7.15	Turbidity (lab, NTU)	1.55	1.92	0.10	21.3
17-Feb-22	LBPR-9.34	Aluminum (Al) - Total	0.120	0.0589	0.0030	68.3
	LBPR-9.34	Iron (Fe) - Total	0.210	0.089	0.010	80.9
	LBPR-9.34	Manganese (Mn) - Total	0.00472	0.00236	0.00010	66.7
	LBPR-9.34	Titanium (Ti) - Total	0.00258	0.00135	0.00030	62.6
	LBPR-9.34	Turbidity (lab, NTU)	1.19	0.78	0.10	41.6
17-Mar-22	RBPR-9.34	Aluminum (Al) - Total	0.182	0.108	0.0030	51
	RBPR-9.34	Barium (Ba) - Total	0.0440	0.0358	0.00010	20.6
	RBPR-9.34	Cadmium (Cd) - Total	0.0000277	0.0000204	0.0000050	30.4
	RBPR-9.34	Iron (Fe) - Total	0.362	0.218	0.010	49.7
	RBPR-9.34	Manganese (Mn) - Total	0.00835	0.00449	0.00010	60.1
	RBPR-9.34	Total Phosphorus (P)	0.0307	0.0104	0.0020	98.8
	RBPR-9.34	Titanium (Ti) - Total	0.00299	0.00156	0.00030	62.9
	RBPR-9.34	Total Suspended Solids	58.6	24.0	1.0	83.8
7-Apr-22	PR-2.81	Aluminum (Al) - Total	0.212	0.0881	0.0030	82.6
	PR-2.81	Cadmium (Cd) - Total	0.0000566	0.0000277	0.0000050	68.6
	PR-2.81	Iron (Fe) - Total	0.453	0.179	0.010	86.7
	PR-2.81	Lead (Pb) - Total	0.000366	0.000136	0.000050	91.6
	PR-2.81	Manganese (Mn) - Total	0.0142	0.00704	0.00010	67.4
	PR-2.81	Titanium (Ti) - Total	0.00269	0.00185	0.00030	37
11-May-22	RBPR-7.05	Turbidity (lab, NTU)	70.2	88.5	0.10	23.1
19-May-22	RBPR-7.15	Aluminum (Al) - Total	0.337	0.831	0.0030	84.6
	RBPR-7.15	Arsenic (As) - Total	0.00050	0.00082	0.00010	48.5
	RBPR-7.15	Cobalt (Co) - Total	0.00048	0.00071	0.00010	38.7
	RBPR-7.15	Copper (Cu) - Total	0.00212	0.00284	0.00050	29
	RBPR-7.15	Iron (Fe) - Total	0.653	1.51	0.010	79.2
	RBPR-7.15	Lead (Pb) - Total	0.000605	0.00083	0.000050	31.4
	RBPR-7.15	Nickel (Ni) - Total	0.00232	0.00322	0.00050	32.5
	RBPR-7.15	Potassium (K) - Total	0.704	0.890	0.10	23.3
	RBPR-7.15	Silicon (Si) - Total	2.70	3.33	0.10	20.9
	RBPR-7.15	Titanium (Ti) - Total	0.00532	0.0131	0.00030	84.5
	RBPR-7.15	Total Suspended Solids	40.3	49.9	1.0	21.3
	RBPR-7.15	Vanadium (V) - Total	0.00179	0.00352	0.00050	65.2

Table 28. Continued (2 of 3).

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Detection Limit (mg/L)	RPD (%)
25-May-22	LBPR-9.34	Aluminum (Al) - Total	0.315	0.219	0.0030	36
	LBPR-9.34	Iron (Fe) - Total	0.508	0.376	0.010	29.9
	LBPR-9.34	Titanium (Ti) - Total	0.00589	0.00397	0.00030	38.9
31-May-22	RBPR-9.34	Aluminum (Al) - Dissolved	0.0155	0.0210	0.0010	30.1
	RBPR-9.34	Ammonia, Total (as N)	0.0980	0.0318	0.0050	102
	RBPR-9.34	Iron (Fe) - Dissolved	0.079	0.101	0.010	24.4
	RBPR-9.34	Total Phosphorus (P)	0.0140	0.712	0.0020	192
	RBPR-9.34	Titanium (Ti) - Dissolved	0.00157	0.00248	0.00030	44.9
	RBPR-9.34	Total Suspended Solids	912	1210	3.0	28.1
08-Jun-22	PR-2.81	Barium (Ba) - Total	0.185	0.135	0.00010	31.3
	PR-2.81	Cadmium (Cd) - Total	0.000458	0.000314	0.000010	37.3
	PR-2.81	Cobalt (Co) - Total	0.00257	0.00203	0.00020	23.5
	PR-2.81	Iron (Fe) - Total	5.67	4.50	0.010	23
	PR-2.81	Manganese (Mn) - Total	0.106	0.0763	0.00010	32.6
	PR-2.81	Total Suspended Solids	359	496	1.0	32
	PR-2.81	Total Phosphorus (P)	0.276	0.502	0.010	58.1
19-Jul-22	RBPR-7.05	Alkalinity, Total (as $CaCO_3$)	148	116	1.0	24.2
	RBPR-7.05	Aluminum (Al) - Total	0.463	0.664	0.0030	35.7
	RBPR-7.05	Anion Sum	3.47	2.84	0.10	20
	RBPR-7.05	Arsenic (As) - Total	0.00070	0.00121	0.00010	53.4
	RBPR-7.05	Barium (Ba) - Total	0.0922	0.142	0.00010	42.5
	RBPR-7.05	Cadmium (Cd) - Total	0.0000823	0.000227	0.0000050	93.6
	RBPR-7.05	Cobalt (Co) - Total	0.00058	0.00154	0.00010	90.6
	RBPR-7.05	Copper (Cu) - Total	0.00216	0.00492	0.00050	78
	RBPR-7.05	Iron (Fe) - Total	0.958	1.77	0.010	59.5
	RBPR-7.05	Lead (Pb) - Total	0.000676	0.00193	0.000050	96.2
	RBPR-7.05	Manganese (Mn) - Total	0.0539	0.0994	0.00010	59.4
	RBPR-7.05	Nickel (Ni) - Total	0.00246	0.00505	0.00050	69
	RBPR-7.05	Nitrate (as N)	0.0225	0.0285	0.0050	23.5
	RBPR-7.05	Total Suspended Solids	265	111	1.0	81.9
	RBPR-7.05	Turbidity (lab, NTU)	77.5	60.2	0.10	25.1
	RBPR-7.05	Vanadium (V) - Total	0.00276	0.00426	0.00050	42.7
22-Aug-22	RBPR-7.15	Cadmium (Cd) - Total	0.0000460	0.0000338	0.0000050	30.6
	RBPR-7.15	Lead (Pb) - Total	0.000298	0.000235	0.000050	23.6
15-Sep-22	LBPR-9.34	Aluminum (Al) - Total	0.0473	0.0384	0.0030	20.8
	LBPR-9.34	Iron (Fe) - Total	0.064	0.046	0.010	32.7
	LBPR-9.34	Manganese (Mn) - Total	0.0036	0.0027	0.00010	28.6
	LBPR-9.34	Selenium (Se) - Total	0.000297	0.000231	0.000050	25
	LBPR-9.34	Total Suspended Solids	8.1	6.2	1.0	26.6
	LBPR-9.34	Turbidity (lab, NTU)	2.41	1.88	0.10	24.7

Table 28. Continued (3 of 3).

Date	Site	Parameter	Replicate A (mg/L)	Replicate B (mg/L)	Detection Limit (mg/L)	RPD (%)
05-Oct-22	PR-2.81	Dissolved Organic Carbon	3.28	2.56	0.50	24.7
	PR-2.81	Selenium (Se) - Dissolved	0.000234	0.000290	0.000050	21.4
	PR-2.81	Total Dissolved Solids	132	105	20	22.8
	PR-2.81	Total Suspended Solids	3.7	5.6	1.0	40.9
12-Oct-22	RBPR-7.05	Aluminum (Al) - Dissolved	0.0073	0.0056	0.0010	26.4
	RBPR-7.05	Aluminum (Al) - Total	0.0650	0.0066	0.0030	163
	RBPR-7.05	Iron (Fe) - Total	0.112	0.010	0.010	167
	RBPR-7.05	Manganese (Mn) - Total	0.00553	0.00162	0.00010	109
	RBPR-7.05	Molybdenum (Mo) - Dissolved	0.00575	0.000688	0.000050	157
	RBPR-7.05	Molybdenum (Mo) - Total	0.00535	0.000828	0.000050	146
	RBPR-7.05	Total Phosphorus (P)	0.0020	0.0102	0.0020	134
	RBPR-7.05	Turbidity (lab, NTU)	5.41	3.88	0.10	32.9
18-Oct-22	LBPR-9.34	Aluminum (Al) - Total	0.0795	0.0624	0.0030	24.1
	LBPR-9.34	Iron (Fe) - Total	0.129	0.088	0.010	37.8
	LBPR-9.34	Manganese (Mn) - Total	0.00429	0.00334	0.00010	24.9
	LBPR-9.34	Total Phosphorus (P)	0.0080	0.0132	0.0020	49.1
	LBPR-9.34	Total Suspended Solids	5.8	7.3	1.0	22.9
26-Oct-22	LBPR-9.34	Total Suspended Solids	8.2	6.5	1.0	23.1
	LBPR-9.34	Turbidity (lab, NTU)	0.96	1.32	0.10	31.6
1-Nov-22	RBPR-9.34	Aluminum (Al) - Dissolved	0.0065	0.0052	0.0010	22.2
	RBPR-9.34	Aluminum (Al) - Total	0.0485	0.0327	0.0030	38.9
	RBPR-9.34	Iron (Fe) - Total	0.076	0.029	0.010	89.5
	RBPR-9.34	Manganese (Mn) - Total	0.00427	0.00162	0.00010	90
	RBPR-9.34	Total Suspended Solids	8.8	13.1	1.0	39.3
	RBPR-9.34	Turbidity (lab, NTU)	2.76	3.92	0.10	34.7
8-Dec-22	PR-2.81	Selenium (Se) - Dissolved	0.000271	0.000333	0.000050	20.5

Table 29. Summary of cases with a relative standard deviation (RSD) >18% for triplicate samples in 2022.

Date	Site	Parameter	Replicate A	Replicate B	Replicate C	RSD (%)
17-Feb-22	PR-2.81	Turbidity (In Situ, NTU)	0.72	3.78	2.79	64.2
16-Mar-22	PR-2.81	Turbidity (In Situ, NTU)	0.29	0.58	0.31	41.2
17-Mar-22	LBPR-9.34	Turbidity (In Situ, NTU)	5.42	8.29	1.05	74.2
19-May-22	LBPR-9.34	Specific Conductivity (In Situ, µS/cm)	197	199	123	25.0
15-Sep-22	LBPR-9.34	Turbidity (In Situ, NTU)	1.04	1.43	1.76	25.5

Table 30. Summary of cases where the dissolved metals to total metals ratio was >1.2 in 2022.

Date	Parameter	Site	Total Concentration (mg/L)	Dissolved Concentration (mg/L)	Dissolved Metal/ Total Metal Ratio
17-Feb-22	Selenium (Se)	RBPR-9.34	0.000268	0.000344	1.28
	Selenium (Se)	RBPR-7.15	0.000265	0.000342	1.29
16-Mar-22	Selenium (Se)	PR-2.81	0.000236	0.000297	1.26
17-Mar-22	Selenium (Se)	RBPR-7.05	0.000275	0.000361	1.31
	Sodium (Na)	RBPR-7.15	1.40	1.69	1.21
7-Apr-22	Selenium (Se)	RBPR-9.34	0.000277	0.000341	1.23
	Selenium (Se)	RBPR-7.05	0.000236	0.000310	1.31
19-May-22	Molybdenum (Mo)	PR-2.81	0.000695	0.000862	1.24
25-May-22	Molybdenum (Mo)	RBPR-7.05	0.000662	0.000837	1.26
	Selenium (Se)	LBPR-9.34	0.000285	0.000360	1.26
4-Jun-22	Molybdenum (Mo)	LBPR-6.97	0.000955	0.00131	1.37
	Molybdenum (Mo)	LBPR-7.21	0.000983	0.00134	1.36
8-Jun-22	Molybdenum (Mo)	RBPR-9.34	0.000575	0.00143	2.49
	Selenium (Se)	RBPR-9.34	0.000557	0.000717	1.29
	Molybdenum (Mo)	LBPR-9.34	0.00108	0.00133	1.23
19-Jul-22	Molybdenum (Mo)	RBPR-9.34	0.00106	0.00139	1.31
15-Sep-22	Cadmium (Cd)	RBPR-9.34	0.0000200	0.0000448	2.24
	Sulfur (S)	RBPR-9.34	4.13	5.36	1.30
	Selenium (Se)	RBPR-7.05	0.000241	0.000351	1.46
	Selenium (Se)	RBPR-7.15	0.000267	0.000414	1.55
	Selenium (Se)	PR-2.81	0.000251	0.000353	1.41
	Selenium (Se)	LBPR-9.34	0.000297	0.000382	1.29
	Sulfur (S)	LBPR-9.34	4.51	5.53	1.23
	Selenium (Se)	LBPR-9.34	0.000231	0.000362	1.57
5-Oct-22	Molybdenum (Mo)	RBPR-9.34	0.000773	0.000974	1.26
	Selenium (Se)	RBPR-9.34	0.000237	0.000347	1.46
	Selenium (Se)	RBPR-7.15	0.000242	0.000320	1.32
	Selenium (Se)	PR-2.81	0.000233	0.000290	1.24
12-Oct-22	Selenium (Se)	RBPR-9.34	0.000287	0.000373	1.30
	Selenium (Se)	LBPR-9.34	0.000258	0.000336	1.30
26-Oct-22	Selenium (Se)	RBPR-9.34	0.000245	0.000319	1.30
	Selenium (Se)	RBPR-7.05	0.000280	0.000353	1.26
	Selenium (Se)	RBPR-7.15	0.000247	0.000332	1.34
	Selenium (Se)	PR-2.81	0.000238	0.000326	1.37
	Selenium (Se)	LBPR-9.34	0.000227	0.000320	1.41
	Selenium (Se)	LBPR-9.34	0.000240	0.000317	1.32
1-Nov-22	Selenium (Se)	RBPR-9.34	0.000238	0.000330	1.39
	Selenium (Se)	RBPR-9.34	0.000259	0.000351	1.36
	Selenium (Se)	RBPR-7.05	0.000261	0.000339	1.30
	Selenium (Se)	RBPR-7.15	0.000285	0.000359	1.26
	Selenium (Se)	LBPR-9.34	0.000288	0.000371	1.29