

Peace River Water Use Plan

Peace River Baseline TDGP/Temperature

GMSWORKS-2

Year 11 Monitoring Program - Annual Report

January 2019 to December 2019

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MARCH 2020

PEACE RIVER WATER USE PLAN
IMPLEMENTATION PROGRAM

PEACE RIVER BASELINE TDGP/TEMPERATURE
GMSWORKS-2
YEAR 11 MONITORING PROGRAM - ANNUAL REPORT
January 2019 to December 2019

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EXECUTIVE SUMMARY

Long-term monitoring of baseline water temperature and total dissolved gas pressure (TDGP) in the vicinity of the WAC Bennett and Peace Canyon dams is an essential component of the Peace Spill Protocol and the Peace River Flood Pulse Plan as set out by the Peace Water Use Plan Committee and the Peace Water Use Plan (WUP; BC Hydro 2010). Data collected through the monitoring of these parameters are used to help assess and quantify the environmental effects of spills, as well as to provide information on the temperature regime of the Peace River under normal operating conditions and the influence of reservoir operations on downstream temperature. Long-term baseline temperature data are also available for use in other projects and monitoring programs within and outside of the Peace WUP. This report summarizes data collection and maintenance activities conducted at 18 monitoring sites located between the WAC Bennett Dam forebay (Williston Reservoir) and a point approximately 6.5 km downstream of the confluence of the Pine and Peace rivers during Year 11 (Jan 01, 2019 to Dec 31, 2019).

In situ reference temperatures were recorded at the time of each field download event using a YSI® multi-parameter meter, for comparison to the corresponding hourly logger readings. Mean calibration errors for all temperature loggers were $\leq 0.4^{\circ}\text{C}$.

Results of Year 11 water temperature monitoring over the 132 km length of the study area indicate a moderating effect of hypolimnetic withdrawal from Williston Reservoir and seasonal effects associated with ambient air temperature. Minimum winter temperatures decrease and maximum summer temperatures increase with distance downstream from the facilities.

March 31, 2019 marked the end of the 10-year monitoring program originally implemented under the Peace Water Use Plan. Downloading and maintenance of monitoring stations was suspended for a 4-month period between April 1 and August 1, 2019, while a decision was made whether to extend the monitoring program beyond 10 years. The timing of this suspension coincided with the freshet and post-freshet periods and contributed to data losses due to delayed removal of debris and prolonged stranding at some stations, particularly those in the path ice flows originating from the break-up of the Halfway and Beaton rivers. In most cases, gaps were filled by functioning back-up loggers at these locations.

No spill events occurred in Year 11 and no TDGP recorders were deployed.

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1.0 INTRODUCTION

Long-term monitoring of baseline water temperature and total dissolved gas pressure (TDGP) in the vicinity of the WAC Bennett and Peace Canyon dams has been identified as an essential component of the Peace Spill Protocol (PSP) and the Peace River Flood Pulse Plan as set out by the Peace Water Use Plan Committee and the Peace Water Use Plan (WUP; BC Hydro 2010). Data collected through the monitoring of these parameters are used to help assess and quantify the environmental effects of spills, as well as to provide information on the temperature regime of the Peace River under normal operating conditions and the influence of reservoir operations on downstream temperature. Long-term baseline temperature data are also available for use by other projects and monitoring programs within and outside the Peace WUP.

The objectives of this program were to collect data on spatial and temporal variations in water temperature between the WAC Bennett Dam forebay (Williston Reservoir) and a point 6.5 km downstream of the Pine River confluence for 10 years, and to maintain TDGP data loggers and related equipment for immediate deployment in the event of a spill at either the Gordon M. Shrum (GMS) or Peace Canyon (PCN) generating stations that is likely to meet the PSP criteria (2 days at 1,500cms or 500cms for 7+ days at PCN; 205cms for 2 days or more at GMS). This report summarizes data collection activities completed during Year 11 of the monitoring program.

2.0 METHODS

Temperature data presented in this summary were recorded between January 01, 2019 and December 31, 2019.

2.1 Temperature Monitoring

Upon commencement of the Peace River baseline temperature monitoring program in September 2008 (Year 1), 20 Tidbit v2 Model #UTBI-001 temperature sensor/logger units (0.2°C accuracy over 0°C to 50°C; 0.02°C resolution @ 25°C; Onset Corp., Bourne, MA) were deployed at 18 locations between the WAC Bennett Dam forebay and a site approximately 6.5 km downstream of the confluence of the Pine and Peace rivers (Fig. 1). During Years 2 and 3, revisions were made to monitoring site positioning and configuration to account for changes in bank conditions, to reduce the potential for logger stranding due to debris and flow level extremes, to increase redundancy in case of logger failure or loss, and to improve accessibility during high flow stage.

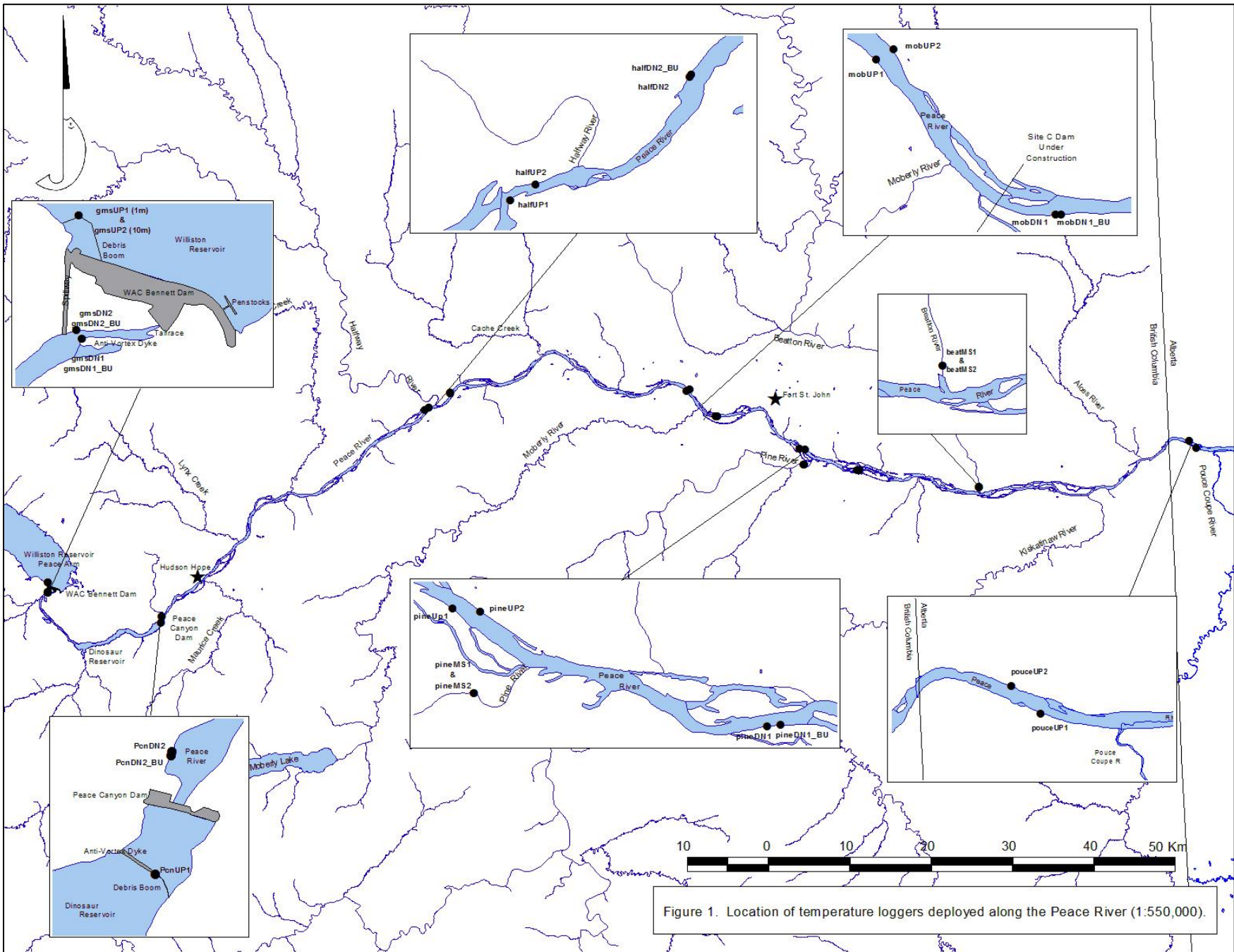


Figure 1. Location of temperature loggers deployed along the Peace River (1:550,000).

Monitoring stations are typically maintained in pairs at each general location in order to minimize the risk of data gaps in the event of logger stranding, failure, or loss. At Peace River locations upstream of major tributaries (Halfway, Moberly, and Pine rivers), monitoring stations are maintained on opposing banks of the river in order to provide redundancy and confirm temperature consistency across the channel. At Peace River locations downstream of major tributaries, paired station configuration was revised in 2011 (Year 3) from opposing banks to common banks in order to provide better redundancy in tributary outflow paths prone to stranding by passing ice and debris.

By late in Year 3, monitoring site configuration had been revised to include 21 data loggers at 18 monitoring sites. This configuration was maintained throughout Years 4 to 11. A summary of temperature monitoring station location information as of the end of Year 11 appears in Appendix I. A description of site configuration changes prior to Year 3 can be found in DES 2013.

In April 2016, six additional temperature loggers were added at 3 monitoring sites in the project area at the request of BC Hydro's Site C project (Fig. 1). These included 2 loggers on the left downstream bank of the lower Pine River mainstem (pineMS1 and pineMS2), 2 loggers on the left downstream bank of the lower Beatton River mainstem (beatMS1 and beatMS2), and 2 loggers on the left and right downstream banks of the Peace River, approximately 3 km upstream of the confluence with the Pouce Coupe River (pouceUP1 and pouceUP2). Although these additional sites were maintained and downloaded in conjunction with the Peace WUP monitoring program in 2019, results were reported in a separate summary report submitted to the Site C project. For information purposes, monitoring site details for the 6 additional loggers appear in Figure 1 and Appendices I and V.

Temperature loggers were programmed to record water temperature (°C) at 1 hour intervals throughout Year 11. Loggers continued to be housed in 38 mm x 100 mm steel nipples with threaded steel end caps, weighted with 5 kg steel anchors, and tethered to rooted trees or large bedrock fragments using 3.18 mm stainless steel cable or 3.5 mm (7/32") steel chain.

Temperature data recorded and stored on each logger during 2019 were downloaded at approximately 3 month intervals by field transfer to a Model U-DTW-1 Hobo® waterproof shuttle (Onset Corp., Bourne, MA). Data from the shuttle were then downloaded to a desktop computer after each field session. Logger sites at the WAC Bennett Dam and Peace Canyon Dam forebay and tailrace locations were accessed by vehicle, while all Peace River mainstem sites were accessed by riverboat. Conditions and observations at the time of each download event were documented in the field on

hardcopy Download Information Forms and subsequently entered into digital format. *In situ* reference temperatures were recorded at the time of each field download event using a YSI® Professional Plus handheld multi-parameter instrument (Model No. E-528-ProPlus) for comparison to the corresponding hourly logger readings (within 30 minutes of reference temperature).

Monitoring sites located within the downstream influence of the Halfway, Moberly, and Pine rivers have proven more susceptible to dislodgement by passing ice and debris, particularly after significant high water events (halfDN2, halfDN2BU, mobDN1, mobDN1BU, pineDN1, pineDN1BU). In addition to scheduled download events, temperature loggers at some Peace River mainstem locations were visually checked and re-positioned by DES staff during the course of activities unrelated to the temperature monitoring program.

Data files were exported as .csv files using Onset® Hoboware Pro software (Ver. 3.7.16), amalgamated into single Excel worksheets for each data logger, and plotted relative to time. Readings representing air temperature during periods of logger stranding above the waterline have been removed from data displayed graphically in this summary report.

2.1.1 Year 11 Site Logistics

Occasional stranding of loggers above the waterline during Year 11 was largely associated with ice flows originating from the break-up of the Halfway and Beatton rivers and the accumulation of debris on tether cables during tributary freshet. Stainless steel cable at stations located in the path of tributary outflows was replaced with steel chain in 2018 and 2019. This measure appeared to partially alleviate data losses associated with passing debris.

March 31, 2019 marked the end of the 10-year monitoring program originally implemented under the Peace Water Use Plan. Downloading and maintenance of monitoring stations was suspended for a 4-month period between April 1 and August 1, 2019, while a decision was made whether to extend the monitoring program and an interim maintenance contract could be put in place. The timing of the suspension of operations coincided with the freshet and post-freshet period and contributed to increased data losses in 2019 due to delayed removal of debris and prolonged stranding at some stations.

Seven stations suffered data losses due to severed tether cables in 2019. These included 3 cases of suspected tampering by unknown persons (GMS tailrace and Site C construction zone), one case of

twisting off due to prolonged debris entanglement, one case of shear ice during Pine River break up, one case of steel capsule failure due to corrosion, and one of unknown cause. In all but one case (gmsD1), data for the affected periods was successfully recovered from back-up or redundant loggers.

2.2 Total Dissolved Gas Pressure (TDGP)

Six Model TBO-DL6(F) TDGP monitors (Common Sensing Inc., Clark Fork, ID) were purchased by BC Hydro in Year 1, and stored at the office of Diversified Environmental Services (DES) in Fort St. John, BC. Appendix II contains an inventory of dissolved gas pressure meters and probes. Meters and probes were checked for functionality on a quarterly basis when not in use and battery charge was maintained. None of the TDGP monitors were deployed in 2019.

3.0 RESULTS AND DISCUSSION

3.1 Temperature Monitoring

Reference temperatures recorded during download events are presented in Appendix III along with corresponding logger temperatures and indicated error values. None of the loggers in use in 2019 exhibited a consistent linearity or zero error. Variability between reference values and corresponding logger fixes averaged 0.14°C and ranged as high as 0.4°C.

Two loggers assumed to be nearing the end of their battery lives were replaced in 2019 (gmsUP1 and pcnUP1). Logger serial numbers listed in Appendix I correspond to the units in use at the time of the last quarterly downloads of 2019 data, completed in February 2020.

A summary of temperature data collection results and related conditions and limitations are discussed in the following 6 sections, which correspond to the 6 major generating station and tributary features. Download Information Forms completed during each download are provided in Appendix IV.

3.1.1 WAC Bennett Dam Forebay and Tailrace

The WAC Bennett Dam forebay temperature monitoring station is located at the GMS spillway log boom and consists of a vertical cable suspended from the northernmost log boom steel buoy. Temperature is recorded with 2 loggers, the first located at 1 m depth (gmsUP1) and the second at a depth of 10 m (gmsUP2). Both GMS forebay loggers recorded seamless water temperature data in Year 11. Although seasonal thermal stratification of Williston Reservoir is evident (Fig. 2), the relatively small temperature differential between the 2 loggers (mean=0.4°C) suggests the primary

thermocline lies deeper than 10 m. Maximum temperature differentials up to 6.7°C were recorded during a period of significant daytime surface warming in early July. Temperature profiles recorded further up the Peace Reach during unrelated work in 2017 and 2018 indicated significant thermal stratification between 20 m and 26 m (B. Culling, pers. obs.).

The GMS tailrace monitoring sites are located on opposite banks, approximately 700 m downstream of the outflow manifolds. Logger gmsDN1 records the temperature of water flowing from the south tailrace manifold, which originates from the shallowest penstock depth. Logger gmsDN2 samples water from the north tailrace manifold, which originates from a deeper withdrawal point. The tethered steel capsule at both stations contains a back-up logger in addition to the primary unit (gmsDN1BU and gmsDN2BU). Both loggers located in the north tailrace manifold (gmsDN2 and gmsDN2BU) collected continuous data through Year 11. The cable tethering the 2 south manifold loggers (gmsDN1 and gmsDN1BU) was found pulled to shore and cut during the February 2020 download resulting in the loss of 2019 data from October 17 to December 31.

As in previous years, water temperatures at gmsDN2 showed the lowest annual variation and are consistently cooler in the summer and warmer in the winter than gmsDN1 flow, which originates closer to the surface of Williston Reservoir. Temperatures recorded at gmsUP1 (forebay surface) exhibit greater annual variation than tailrace values (Fig. 3). Temperatures recorded at gmsDN1 and gmsDN2 exhibit a wide range of hourly and daily fluctuations during the summer period compared to gmsUP1, due to operational changes in water intake for power generation and maintenance activities.

3.1.2 Peace Canyon Dam Forebay and Tailrace

The data logger recording temperature at the Peace Canyon Dam forebay (pcnUP1) is attached to the anti-vortex dam log boom, located approximately 450 m upstream of the dam face. This station collected continuous data throughout 2019.

The Peace Canyon Tailrace loggers (pcnDN2 and pcnDN2BU) are located on the left downstream bank of the Peace River approximately 200 m downstream of the dam outflow manifold. Peace Canyon Tailrace logger pcnDN2 was discovered missing during the February 2020 download, due to a corroded-off capsule end cap, resulting in the loss of 2019 temperature data between October 17 and December 31. However, its back-up logger pcnDN2BU recorded continuous data throughout 2019.

A comparison of PCN tailrace temperature (pcnDN2BU) and GMS tailrace temperature (mean of gmsDN1 and gmsDN2) indicates a relatively small temperature change through Dinosaur Reservoir

during all seasons (Fig. 4). For example, a mean temperature differential of 0.4°C was recorded over the winter months of November through March and a mean differential of 1.3°C was recorded in summer (June through August). Figure 4 also illustrates some thermal stratification of the Peace Canyon forebay associated with surface warming during peak ambient temperatures between the late June and early August 2019. For example, PCN forebay temperatures at 1 m depth (pcnUP1) were as much as 10.1 °C warmer than water exiting the PCN powerhouse (pcnDN2BU) during mid July 2019.

3.1.3 Halfway River Confluence

Peace River water temperature was monitored at points approximately 1 km upstream and 2.5 km downstream of the Halfway River confluence. Halfway upstream stations were maintained on opposing banks throughout Year 11 (halfUP1 and halfUP2). Both Halfway-upstream loggers collected seamless data through Year 11. No cross-channel differential was recorded between the opposing upstream stations.

Both Halfway downstream loggers (halfDN2 and halfDN2BU) were located on the left downstream bank within the influence of Halfway River inputs. Both Halfway-downstream loggers were dislodged by out flowing ice and debris from the Halfway River during freshet and remained periodically exposed during the post-freshet suspension of maintenance activities. This resulted in intermittent data collection between March 16 and August 6, when operations resumed. Stainless steel tether cables on both loggers have now been replaced with steel chain, which appears more resistant to passing debris.

As in previous years, Peace River temperature values recorded at stations upstream and downstream of the Halfway River confluence differed markedly. Temperatures collected downstream of the confluence exhibited a higher degree of daily and annual variability (Fig. 5). Halfway River inputs typically have a cooling effect during the winter (October through April) and a warming effect during the summer (May through September). Temperatures within the Halfway River mainstem upstream of its confluence with the Peace are not recorded as part of this project.

3.1.4 Moberly River Confluence

Peace River water temperature was monitored at points approximately 2.6 km upstream and 2.5 km downstream of the Moberly River confluence. Upstream stations were maintained on opposing banks throughout Year 11 (mobUP1 and mobUP2). During the February 2020 download session, the cable tethering logger mobUP2 was found cut and coiled on shore, resulting in a 2019

data gap from October 11 to December 31. Redundant logger mobUP1 logged continuous temperature data through 2019. No cross-channel differential was recorded.

The Moberly downstream logger and downstream back-up logger are both located on the south bank of the Peace River, within the influence of outfall from the Moberly River, and immediately downstream of the footprint of the Site C dam, which is presently under construction. Both loggers recorded continuous water temperature data in 2019.

As in previous years, Peace River water temperatures recorded within the influence of the Moberly River were cooler than the Moberly upstream stations from January through March and warmer than the upstream stations from May through July in Year 10 (Fig. 6). The influence of the Moberly River is significantly less than that of the Halfway River and appears to correspond to the difference in relative contributed volumes. Temperatures within the Moberly River upstream of its confluence with the Peace River are not recorded as part of this project.

3.1.5 Pine River Confluence

Peace River water temperature was monitored at points approximately 2.0 km upstream and 6.5 km downstream of the Pine River confluence. During Year 11, upstream stations were maintained on opposing banks (pineUP1 and pineUP2) and both downstream loggers (pineDN1 and pineDN1BU) were located on the south river bank, within the influence of inputs from the Pine River. Upstream logger pineUP2 was lost between freshet and the resumption of maintenance activities in August 2019, resulting in the loss of data from March 19 to August 7. Its redundant counterpart, pineUP1, logged continuous data throughout 2019.

Downstream logger pineDN1 was lost due to a parted cable resulting in a 2019 data gap from October 11 to December 31. Its corresponding back-up (pineDN1BU) recorded continuous data through Year 11. Both tethers have been converted to steel chain.

Temperature values recorded within the downstream influence of the Pine River were typically cooler than the Pine River upstream stations from late September through December and slightly warmer from July through mid-September (Fig. 7). Temperatures within the Pine River mainstem upstream of its confluence with the Peace were recorded as part of the Site C monitoring program in 2019 (sites pineMS1 and pineMS2; Fig. 1), as reported in DES 2020.

Figure 8 presents comparative seasonal temperature changes over the 132 km length of the study area between the WAC Bennett Dam tailrace (gmsDN2) and the Pine River confluence (pineUP1) during 2019 and Figure 9 compares daily mean ambient air temperature at the Fort St. John airport with daily mean Peace River water temperature above Pine river confluence (pineUP1). Data appearing in these figures include Halfway and Pine confluence stations not directly influenced by their respective tributary inputs. The graphs illustrate the moderating effect of hypolimnetic withdrawal from Williston Reservoir on downstream temperatures in the Peace River and the seasonal impact of ambient air temperature on downstream water temperatures, i.e., winter temperatures decrease and summer temperatures increase with distance downstream. Brief periods of homogeneity occurred in mid-March and early October, with gradients inverting on either side of these dates to form the typical annual pattern.

Figures 10 and 11 represent temporal comparisons of daily mean water temperature during Year 11 (2019) against the average of 2009 to 2018 daily mean temperatures for WAC Bennett Dam tailrace (gmsDN2) and Pine River confluence (pineUP1) sites, respectively. Water temperatures recorded in the WAC Bennett Dam tailrace (north manifold) closely tracked the 2009-2018 average. Variability in tailrace temperature is largely due to operational factors at the GMS generating station and may include variations in reservoir elevation and changes in volume contribution from hypolimnetic and epilimnetic withdrawal at various generating outputs. An analysis of these influences is beyond the scope of this summary report. Downstream Peace River water temperatures recorded immediately above the Pine River confluence (pineUP1) during Year 11 also closely tracked the 2009-2018 average, with occasional variation due to weather events including above and below normal periods in ambient temperature and increased tributary contributions during precipitation events.

4.0 RECOMMENDATIONS

The 6.35 mm galvanized cable used during the initial years of the program was proven to have low resistance to corrosion. All galvanized cable tethers have been replaced with stainless steel cable.

Monitoring sites downstream of major tributary inputs such as the Halfway, Moberly and Pine rivers have proven the most susceptible to dislodgement by ice and debris flow. As of the end of Year 11, the cable tethers of loggers at tributary downstream stations was replaced with steel chain which conforms to the river bottom and appears less susceptible to debris accumulation and dislodgement.

The battery life of the Tidbit v2 Model #UTBI-001 temperature sensors is estimated at approximately 5-6 years. Scheduled replacement of units should continue in 2020 as per the table presented in Appendix V.

In 2015, aluminum information tags reading “DATA RECORDER, PLEASE DO NOT DISTURB” were attached to the tether cables of loggers potentially accessible to the public and previously subject to tampering by curious persons. These tags should be monitored and maintained through Year 12.

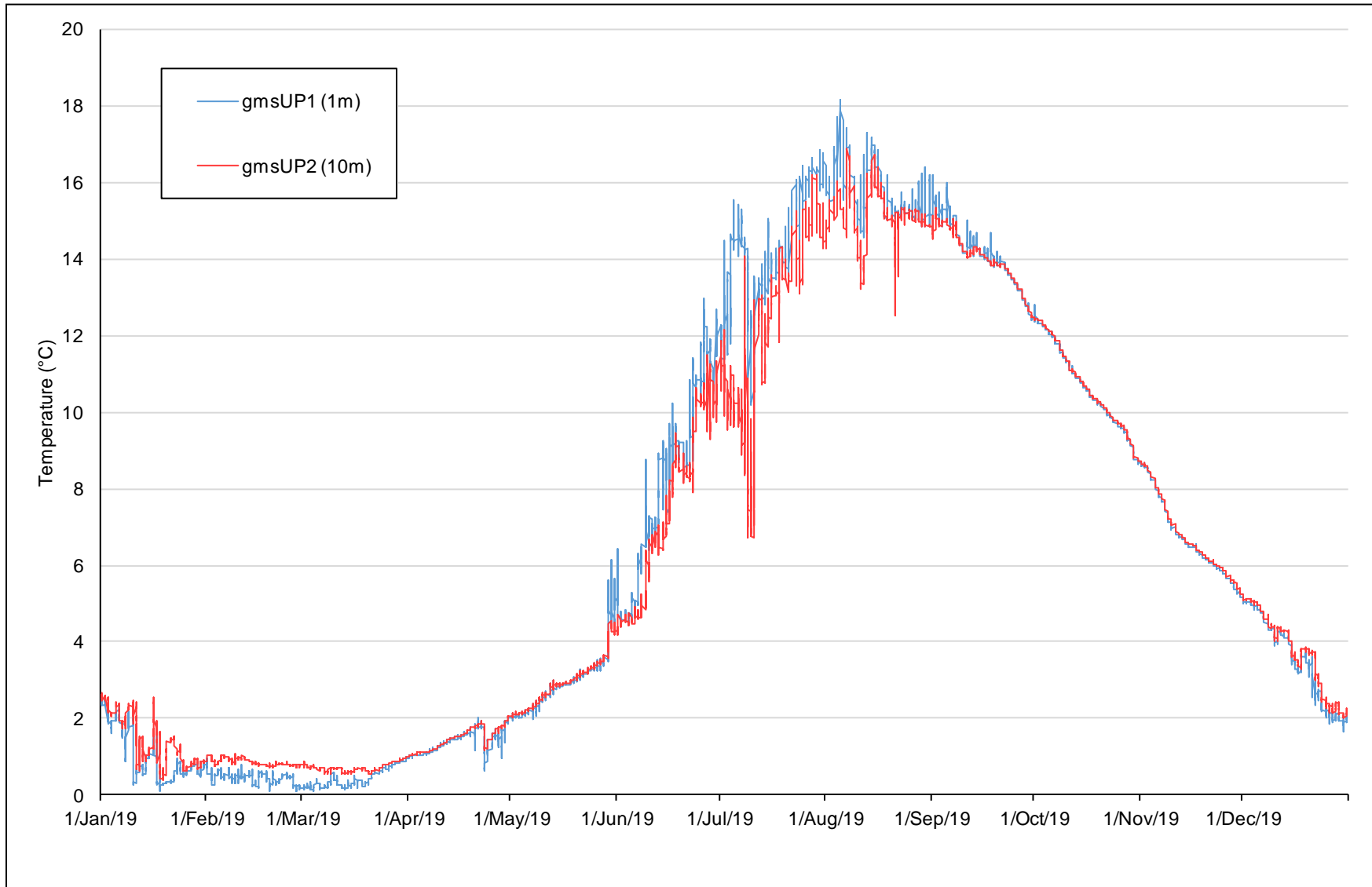


Figure 2. Comparison of hourly water temperature at WAC Bennett Dam forebay station from 1 m depth (gmsUP1) and 10 m depth (gmsUP2) during Year 11, January 01, 2019 – December 31, 2019.

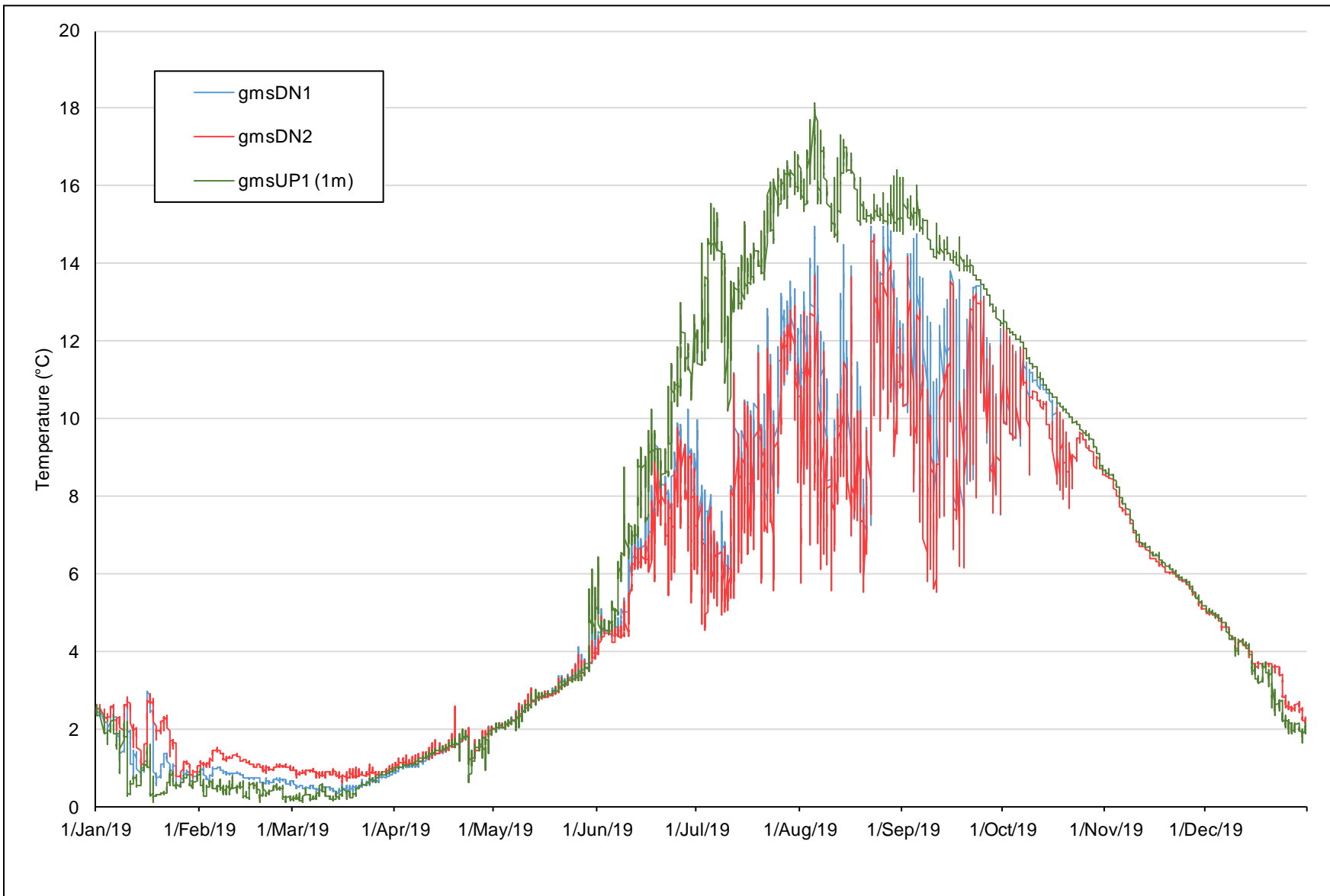


Figure 3. Comparison of hourly water temperature at WAC Bennett Dam forebay surface (gmsUP1), and WAC Bennett Dam tailrace (gmsDN1 and gmsDN2) during Year 11, January 01, 2019 – December 31, 2019.

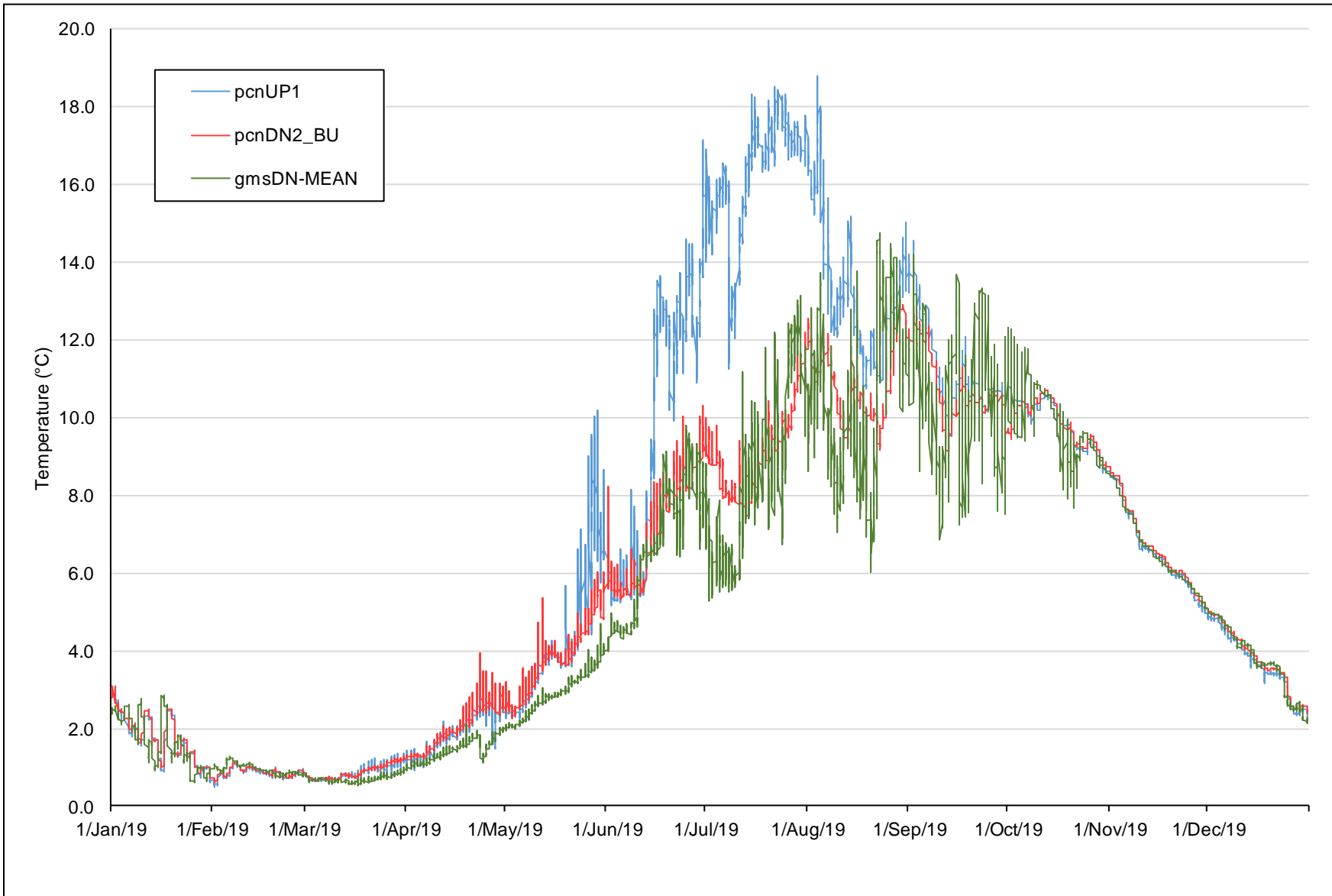


Figure 4. Comparison of hourly water temperature at Peace Canyon forebay surface (pcnUP1), Peace Canyon tailrace (pcnDN2), and WAC Bennett Dam tailrace (gmsDN-MEAN) during Year 11, January 01, 2019 – December 31, 2019.

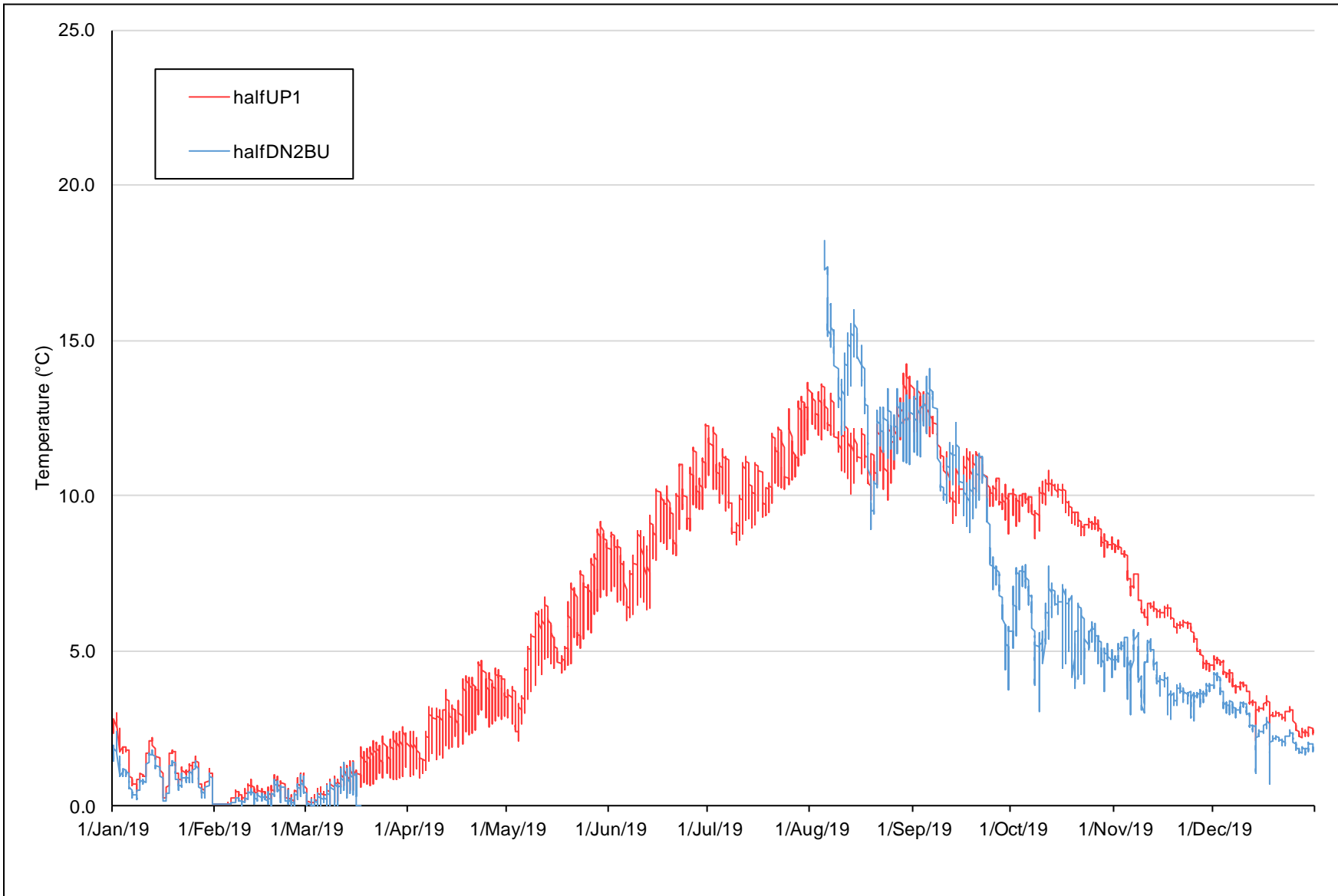


Figure 5. Comparison of Peace River hourly water temperature upstream of Halfway River confluence (halfUP1) and downstream of Halfway River confluence (halfDN2BU) during Year 11, January 01, 2019 – December 31, 2019. Note: Data for halfDN2BU missing between Mar 16 and Aug 4 due to logger displacement by debris.

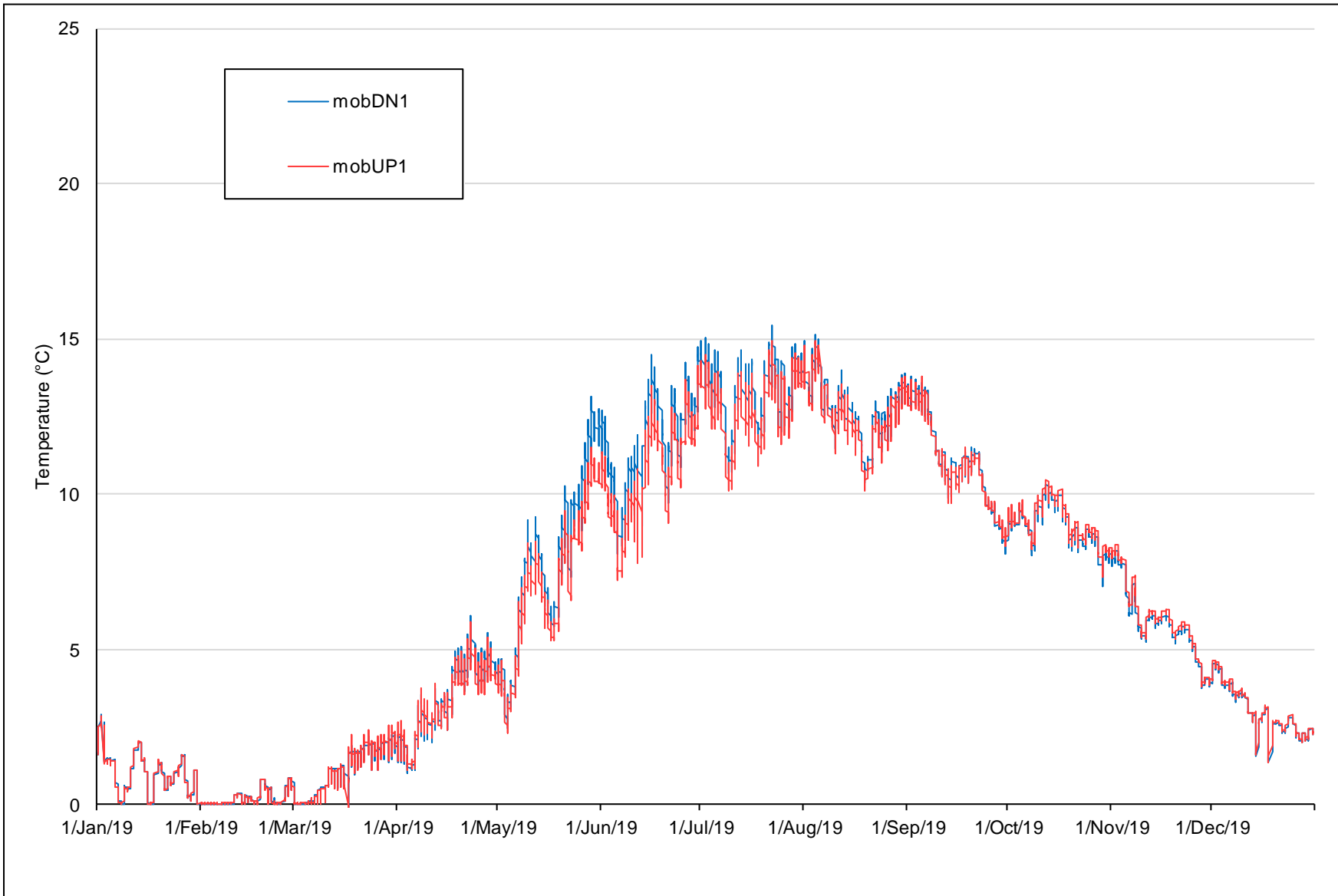


Figure 6. Comparison of Peace River hourly water temperature upstream of Moberly River confluence (mobUP1) and downstream of Moberly River confluence (mobDN1) during Year 11, January 01, 2019 – December 31, 2019.

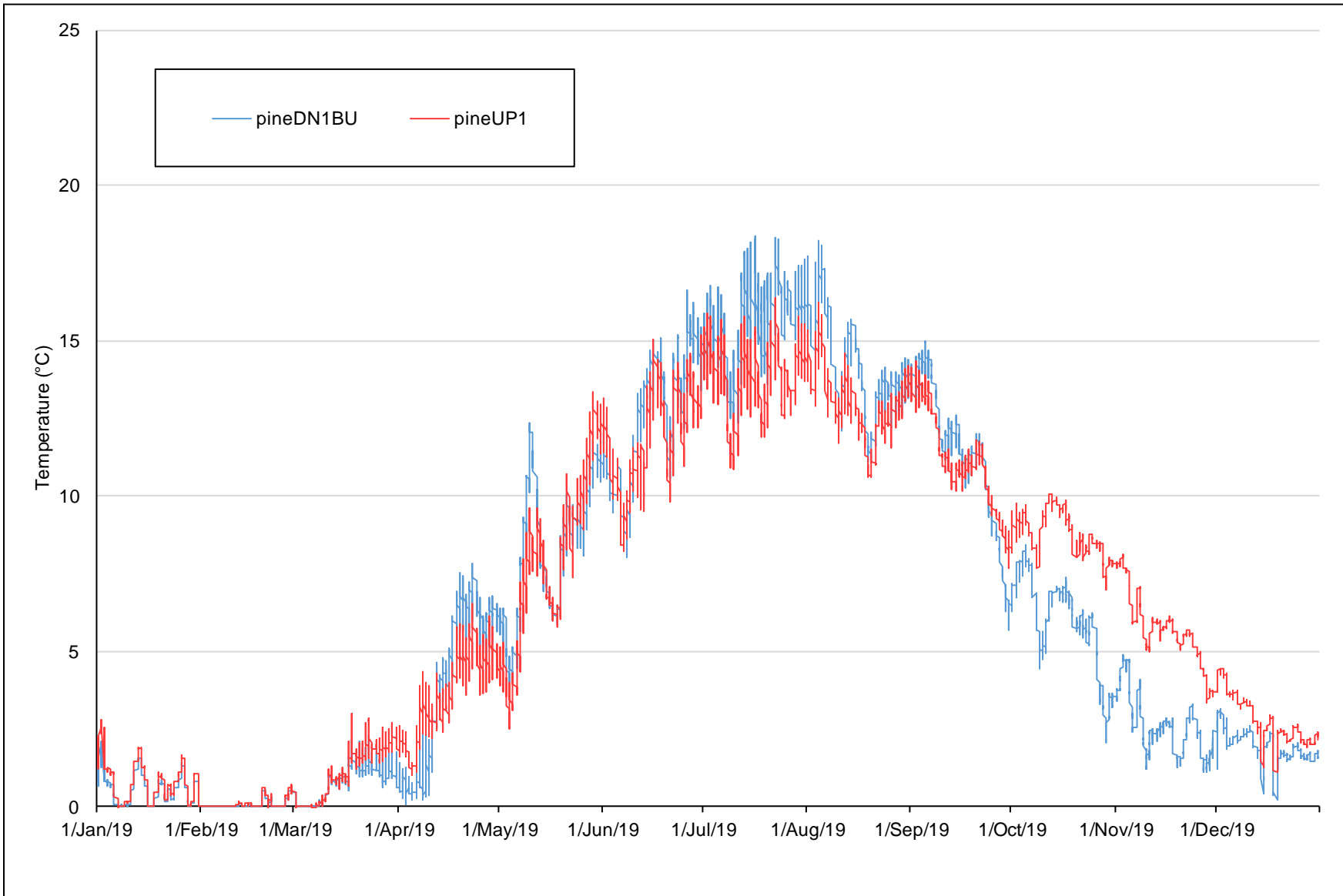


Figure 7. Comparison of Peace River hourly water temperature upstream of Pine River confluence (pineUP1) and downstream of Pine River confluence (pineDN1BU) during Year 11, January 01, 2019 – December 31, 2019.

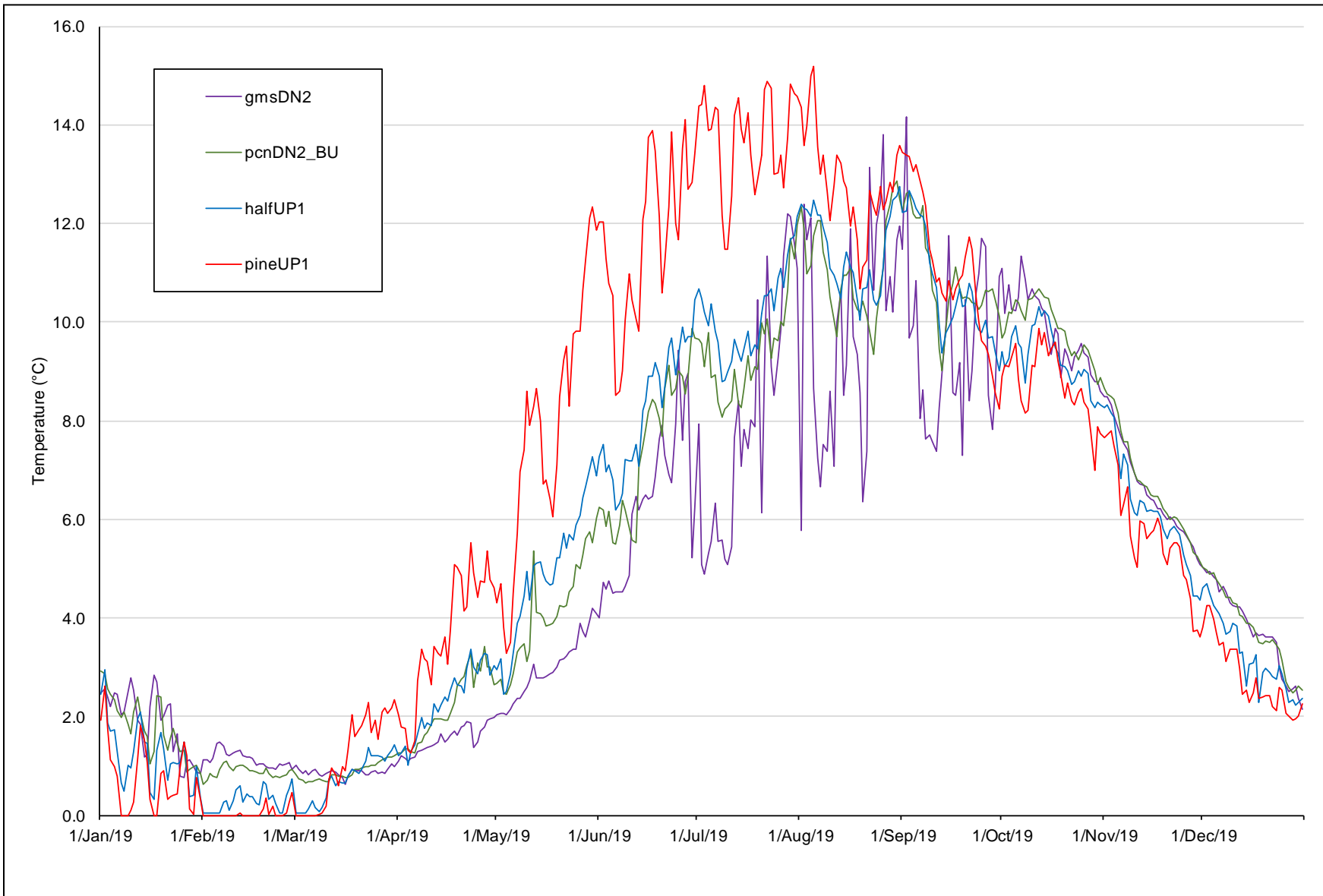


Figure 8. Daily mean Peace River water temperature gradient from WAC Bennett Dam tailrace (gmsDN2), downstream to Pine River confluence (pineUP1), during Year 11, January 01, 2019 – December 31, 2019.

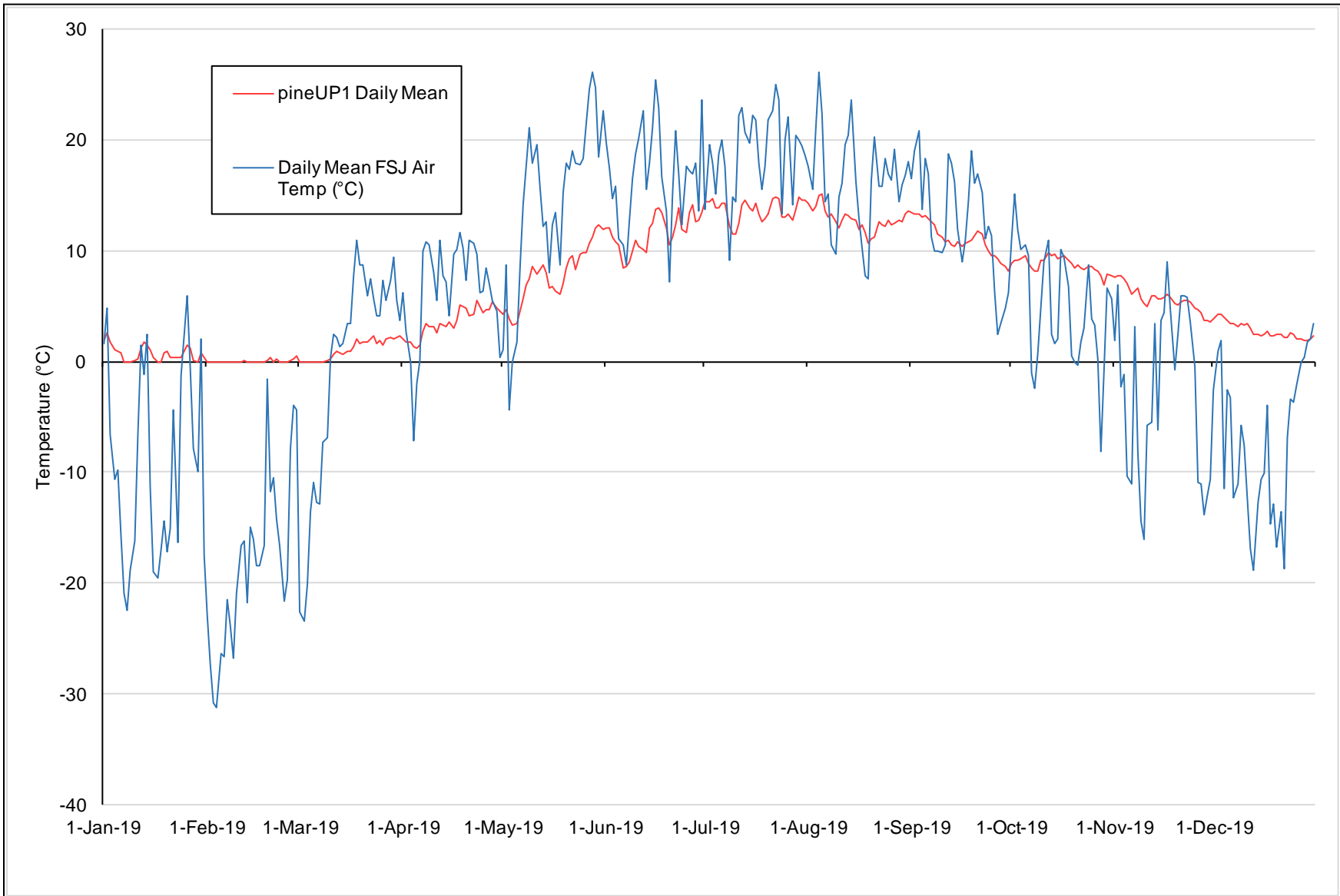


Figure 9. Comparison of Peace River daily mean water temperature upstream of the Pine River confluence (pineUP1) with daily mean ambient air temperature at the Fort St. John airport during Year 11, January 01, 2019 to December 31, 2019.

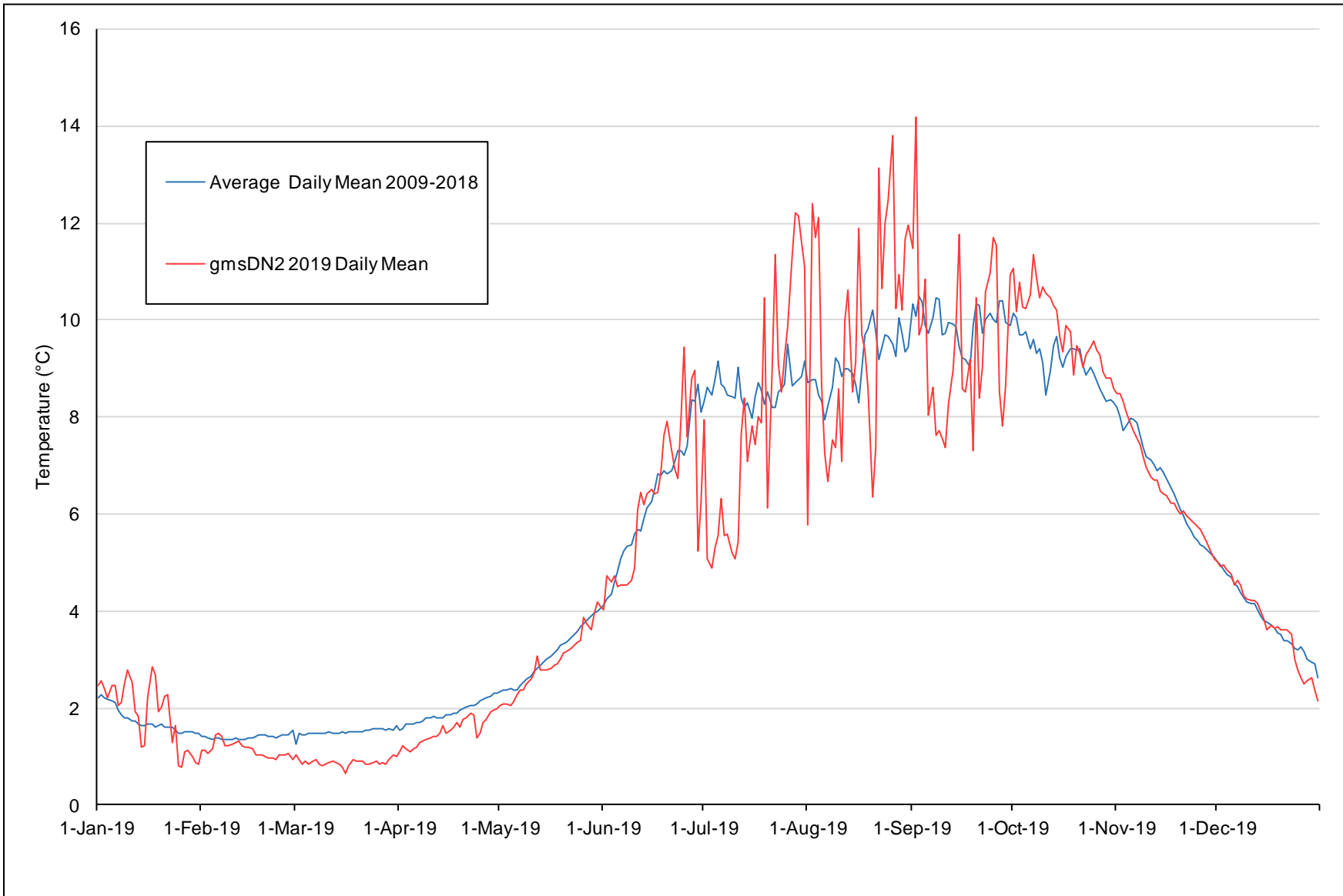


Figure 10. Comparison of Year 11 daily mean water temperature at WAC Bennett Dam tailrace north manifold (gmsDN2) with average of 2009 to 2018 daily mean water temperature at gmsDN2.

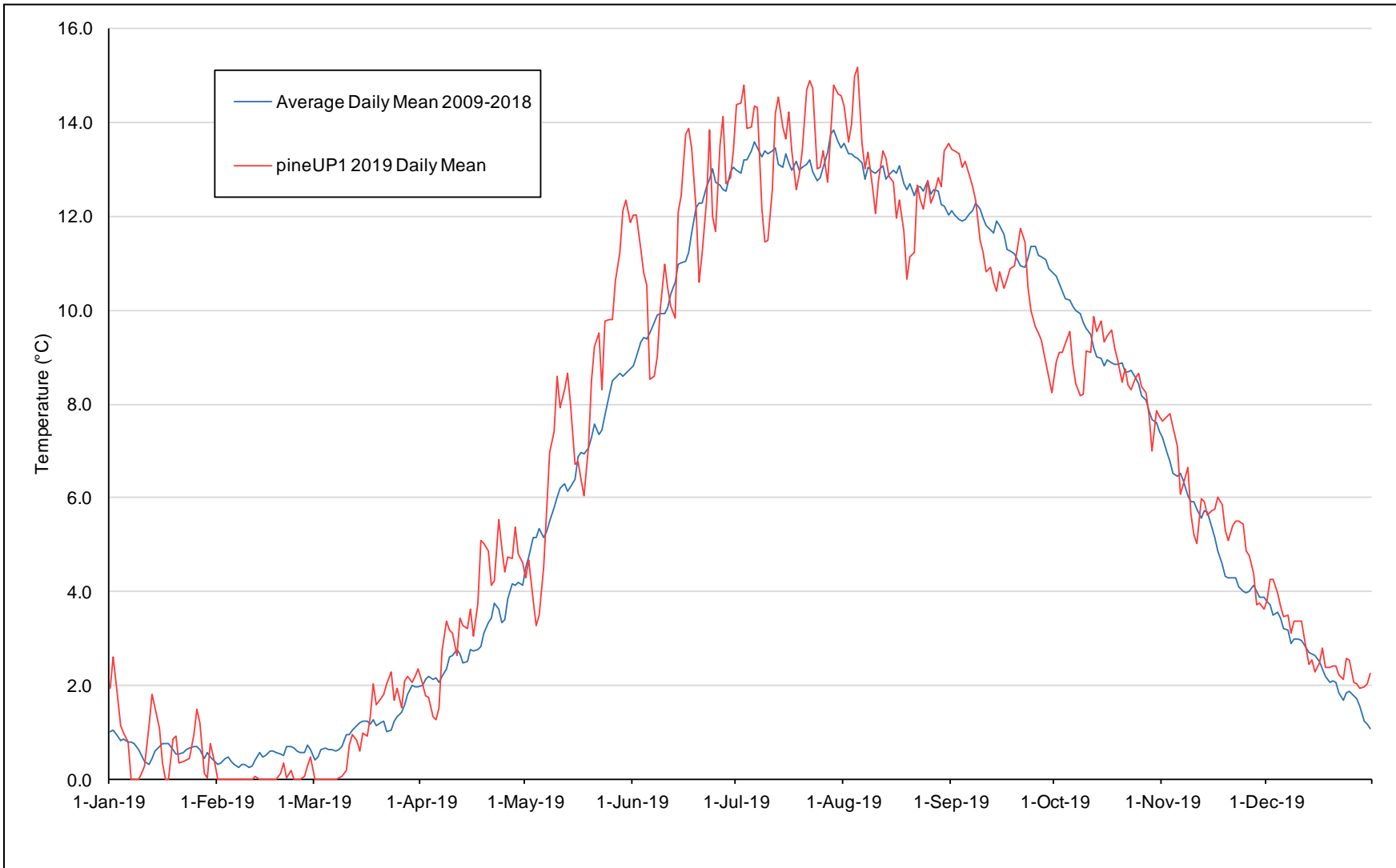


Figure 11. Comparison of Year 11 daily mean water temperature upstream of the Pine River confluence (pineUP1) with average of 2009 to 2018 daily mean water temperature at pineUP-COMP.

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- BC Hydro. 2010. Peace River Water Use Plan; monitoring program terms of reference – Peace River Baseline TGP/Temp. BC Hydro, Vancouver, BC. 7pp.
- DES (Diversified Environmental Services). 2013. Peace River Water Use Plan Peace River Baseline TDGP/Temperature GMSWorks-2 - Year 4 Monitoring Program - Interim Report January 2012 to December 2012. Prepare for BC Hydro, Vancouver, BC. 24pp + appendices.
- DES (Diversified Environmental Services). 2020. BC Hydro Peace River Baseline Temperature Monitoring Year 11 Summary – January 01 to December 31, 2019. Prepare for BC Hydro Site C Project, Vancouver, BC.

Appendix I. Temperature monitoring station location information for Year 11, January 01, 2019 to December 31, 2019.

Site ID	Serial #	Location	UTM (Zone 10)		Comment
			East	North	
gmsUP1	20332187	WAC Bennett Forebay	548841	6209022	steel buoy; 1 m depth
gmsUP2	10676160	WAC Bennett Forebay	548841	6209022	steel buoy; 10 m depth
gmsDN1	10635063	GMS Tailrace	548881	6207761	southbank; deflection wier riprap
gmsDN1BU	20332152	GMS Tailrace	548881	6207761	southbank; deflection wier riprap
gmsDN2	10669739	GMS Tailrace	548828	6207836	north bank; riprap below Tunnel portal #3
gmsDN2BU	20332121	GMS Tailrace	548828	6207836	north bank; riprap below Tunnel portal #3
pcnUP1	20332186	Peace Canyon Forebay	562710	6204068	anti-vortex log boom; 1 m depth
pcnDN2	10156317	Peace Canyon Tailrace	562803	6204854	north bank; rock slab
pcnDN2BU	10635061	Peace Canyon Tailrace	562803	6204854	north bank; rock slab
HalfUP1	20332123	Halfway Confluence - upstream	595165	6230094	south bank; spruce tree
HalfUP2	20030829	Halfway Confluence - upstream	595569	6230541	north bank; spruce tree
HalfDN2	10669748	Halfway Confluence - downstream	598313	6232378	north bank; willow
HalfDN2BU	10156314	Halfway Confluence - downstream	598286	6232332	north bank; willow
MobUP1	10887852	Moberly Confluence - upstream	627158	6232349	south bank; alder
MobUP2	10669754	Moberly Confluence - upstream	627501	6232563	north bank; spruce tree
MobDN1	10676146	Moberly Confluence - downstream	630583	6229281	south bank; alder
MobDN1BU	10676147	Moberly Confluence - downstream	630402	6229303	south bank; alder
PineUP1	10669747	Pine Confluence - upstream	641034	6225375	south bank; alder
PineUP2	20332129	Pine Confluence - upstream	641653	6225304	north bank; balsam poplar
PineDN1	20332124	Pine Confluence - downstream	648073	6222796	south bank; alder
PineDN1BU	10893055	Pine Confluence - downstream	648362	6222823	south bank; alder
PineMS1	10893069	Pine Mainstem - upstream of Peace	641762	6223599	north bank; steel piling
PineMS2	20097150	Pine Mainstem - upstream of Peace	641762	6223599	north bank; steel piling
BeatMS1	20322122	Beatton Mainstem - upstream of Peace	663101	6220759	east bank; spruce
BeatMS2	20030828	Beatton Mainstem - upstream of Peace	663101	6220759	east bank; spruce
PouceUP1	10635062	Pouce Coupe confluence - upstream	*316873	6225211	south bank; birch; *UTM Zone 11
PouceUP2	10893068	Pouce Coupe confluence - upstream	*315887	6226158	south bank; birch; *UTM Zone 11

Appendix II. Inventory of dissolved gas pressure meters and probes.

Meter Number	Serial Number	Probe Number	Cable Length (ft)
1	231	1	50
2	228	2	100
3	230	3	100
4	227	4	100
5	226	5	100
6	229	6	100

Appendix III. Reference temperature values and corresponding logger fix values recorded during download events in Year 11, January 01, 2019 to December 31, 2019.

Logger ID	Date	Fix Temp	Ref Temp	Error
gmsUP1	22-Mar-19	0.6	0.6	0.0
	6-Aug-19	15.7	15.8	-0.1
	17-Oct-19	10.4	10.5	-0.1
gmsUP2	22-Mar-19	0.6	0.6	0.1
	6-Aug-19	15.1	15.2	-0.1
	17-Oct-19	10.4	10.5	-0.1
gmsDN1	11-Jan-19	1.7	1.8	-0.1
	6-Aug-19	12.6	12.7	-0.1
	17-Oct-19	10.4	10.4	0.0
gmsDN1_BU	11-Jan-19	1.7	1.9	-0.2
	6-Aug-19	12.6	12.8	-0.2
	17-Oct-19	10.4	10.5	-0.1
gmsDN2	11-Jan-19	2.5	2.5	0.0
	6-Aug-19	7.7	7.8	-0.1
	17-Oct-19	9.9	9.9	0.0
gmsDN2_BU	11-Jan-19	2.5	2.7	-0.2
	6-Aug-19	7.7	7.9	-0.2
	17-Oct-19	9.9	10.0	-0.1
pcnUP1	22-Mar-19	1.0	1.2	-0.2
	6-Aug-19	15.3	15.4	-0.1
	17-Oct-19	9.8	9.9	-0.1
pcnDN2	11-Jan-19	2.1	2.2	-0.1
	6-Aug-19	12.1	12.1	0.0
	17-Oct-19	9.6	9.9	-0.3
pcnDN2_BU	11-Jan-19	2.1	2.2	-0.1
	6-Aug-19	12.1	12.2	-0.1
	17-Oct-19	9.6	10.0	-0.4
halfUP1	3-Jan-19	1.7	1.8	-0.1
	6-Aug-19	11.9	12.1	-0.2
	16-Oct-19	9.9	10.0	-0.1
halfUP2	3-Jan-19	1.7	1.9	0.3
	6-Aug-19	11.9	12.1	0.0
	16-Oct-19	9.9	10.0	0.2

Appendix III. Reference temperature values and corresponding logger fix values recorded during download events in Year 11, January 01, 2019 to December 31, 2019, cont.

Logger ID	Date	Logger Temp	Reference Temp	Error
halfDN2	3-Jan-19	0.8	1.1	-0.3
	6-Aug-19	15.6	15.5	0.1
	16-Oct-19	6.3	6.6	-0.3
halfDN2_BU	3-Jan-19	0.8	1.1	-0.3
	6-Aug-19	15.6	15.8	-0.2
	16-Oct-19	6.3	6.5	-0.2
mobUP1	19-Mar-19	1.2	1.3	-0.1
	7-Aug-19	12.9	13.1	-0.2
	11-Oct-19	9.2	9.4	-0.2
mobUP2	19-Mar-19	1.2	1.1	0.1
	7-Aug-19	13	13.2	-0.2
	11-Oct-19	8.7	8.8	-0.1
mobDN1	19-Mar-19	1.2	1.2	0.0
	7-Aug-19	13.1	13.0	0.1
	11-Oct-19	9.0	9.1	-0.1
mobDN1_BU	19-Mar-19	1.2	1.4	-0.2
	7-Aug-19	13.1	13.3	-0.2
	11-Oct-19	9.0	9.0	0.0
pineUP1	19-Mar-19	1.9	1.8	0.1
	7-Aug-19	14.0	13.6	0.4
	11-Oct-19	8.8	9.0	-0.2
pineUP2	19-Mar-19	1.5	1.5	0.0
	7-Aug-19	13.1	13.4	-0.3
	11-Oct-19	8.8	9.0	-0.2
pineDN1	19-Mar-19	1.4	1.4	0.0
	7-Aug-19	15.9	15.9	0.0
	11-Oct-19	5.1	5.4	-0.3
pineDN1_BU	19-Mar-19	1.4	1.4	0.0
	7-Aug-19	15.9	16.1	-0.1
	11-Oct-19	5.1	5.4	-0.3

Appendix IV. Year 11 download information forms, January 01, 2019 to December 31, 2019.

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	gmsUP1		LOCATION	GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676155			UTM	548841	6209022	
DOWNLOAD DATE	22	Mar	2019	DOWNLOAD TIME	13:08			CREW	BC DC	
TEST RECORDER TYPE	YSI		WATER TEMP	0.6	AIR TEMP	8	ICE CONDITIONS	Res. Frozen		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	steel buoy		
COMMENTS										
RPL#19										
Low battery; Logger replaced w ith RPL#43 (SN 20332187)										
Dow nload OK										
SITE ID	gmsUP2		LOCATION	GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676180			UTM	548841	6209022	
DOWNLOAD DATE	22	Mar	2019	DOWNLOAD TIME	13:11			CREW	BC DC	
TEST RECORDER TYPE	YSI		WATER TEMP	0.6	AIR TEMP	8	ICE CONDITIONS	Res. Frozen		
LOGGER CONDITIONS										
WATER DEPTH	1000	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	steel buoy		
COMMENTS										
RPL#20										
Dow nload OK										
SITE ID			LOCATION				BANK			
LOGGER TYPE			LOGGER SERIAL #				UTM			
DOWNLOAD DATE				DOWNLOAD TIME				CREW		
TEST RECORDER TYPE			WATER TEMP		AIR TEMP		ICE CONDITIONS			
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED		REASON					
BURIED			FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE			
COMMENTS										
SITE ID			LOCATION				BANK			
LOGGER TYPE			LOGGER SERIAL #				UTM			
DOWNLOAD DATE				DOWNLOAD TIME				CREW		
TEST RECORDER TYPE			WATER TEMP		AIR TEMP		ICE CONDITIONS			
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED		REASON					
BURIED			FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE			
COMMENTS										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	pcnUP1		LOCATION	PCN Forebay			BANK	north		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10635067			UTM	562710	6204068	
DOWNLOAD DATE	22	Mar	2019	DOWNLOAD TIME	11:44			CREW	BC DC	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	8.0	ICE CONDITIONS	W. side of boom		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no			REASON			
BURIED	no		FUNCTIONAL	wet			IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	log boom
COMMENTS										
fail light indicated but download OK										
all stainless steel cable ok										
Rpl #10, SN 10635067										
logger replaced with RPL#42 (SN 2033186)										
SITE ID			LOCATION				BANK			
LOGGER TYPE			LOGGER SERIAL #				UTM			
DOWNLOAD DATE				DOWNLOAD TIME				CREW		
TEST RECORDER TYPE			WATER TEMP		AIR TEMP		ICE CONDITIONS			
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED				REASON			
BURIED			FUNCTIONAL				IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	
COMMENTS										
SITE ID			LOCATION				BANK			
LOGGER TYPE			LOGGER SERIAL #				UTM			
DOWNLOAD DATE				DOWNLOAD TIME				CREW		
TEST RECORDER TYPE			WATER TEMP		AIR TEMP		ICE CONDITIONS			
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED				REASON			
BURIED			FUNCTIONAL				IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	
COMMENTS										
SITE ID			LOCATION				BANK			
LOGGER TYPE			LOGGER SERIAL #				UTM			
DOWNLOAD DATE				DOWNLOAD TIME				CREW		
TEST RECORDER TYPE			WATER TEMP		AIR TEMP		ICE CONDITIONS			
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED				REASON			
BURIED			FUNCTIONAL				IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	
COMMENTS										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	mobUP2		LOCATION	u/s of Moberly River			BANK	north		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10669754			UTM	627501	6232563	
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	12:21			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.2	AIR TEMP	6.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	150	cm	DISLODGED	no	REASON					
BURIED	yes	FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	birch	
COMMENTS										
RPL#16, SN 10669754										
down load OK										
SITE ID	mobUP1		LOCATION	u/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10887852			UTM	627158	6232349	
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	12:39			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.2	AIR TEMP	6.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	30	cm	DISLODGED	yes	REASON		ice			
BURIED	no	FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	alder	
COMMENTS										
RPL# 21, SN10887852										
stainless cable ok										
down load ok										
sw ung to shore but w et										
SITE ID	mobDN1		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676146			UTM	630776	6229287	
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	12:59			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.2	AIR TEMP	6.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	30	cm	DISLODGED	yes	REASON		ice			
BURIED	no	FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	alder	
COMMENTS										
RPL#17, S/N10676146										
down load OK										
partially sw ung to shore but w et										
replaced cable w ith chain										
SITE ID	mobDN1_BU		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676147			UTM	630875	6229275	
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	13:10			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.2	AIR TEMP	6.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH		cm	DISLODGED	yes	REASON		ice			
BURIED	no	FUNCTIONAL		dry	IF DRY, HEIGHT ABOVE WATER	40	cm	TETHER TYPE	alder	
COMMENTS										
down load OK										
Rpl # 18, S/N10676147										
sw ung to shore and dry										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	pineUP2	LOCATION	u/s of Pine River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	9767573			UTM	641653	6225304		
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	13:47		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.5	AIR TEMP	6.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	180	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	balsam pop			
COMMENTS										
dow nload OK										
Stainless steel cable OK										
Logger "half UP1R" SN 9767573 replaced with RPL#40 S/N20332129										
SITE ID	pineUP1	LOCATION	u/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669747			UTM	641034	6225372		
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	13:52		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.9	AIR TEMP	6.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	80	cm	DISLODGED	yes	REASON	ice				
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
dow nload OK										
partially sw ung to shore but w et										
Rpl # 14, SN 10669747										
Stainless steel cable OK										
SITE ID	pineDN1_BU	LOCATION	d/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10893055			UTM	648362	6222823		
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	14:17		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.4	AIR TEMP	6.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	90	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
RPL# 25										
dow nload ok										
stainless steel cable ok										
SITE ID	pineDN1	LOCATION	d/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156319			UTM	648101	6222802		
DOWNLOAD DATE	19	Mar	2019	DOWNLOAD TIME	14:17		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.4	AIR TEMP	6.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	80	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
Stainless steel cable OK										
Logger RPL# 1, 10156319 replaced with RPL#41, S/N20332124										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM											
SITE ID	gmsUP1		LOCATION		GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #		20332187			UTM	548841	6209022	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	11:49			CREW	BC TE		
TEST RECORDER TYPE	YSI		WATER TEMP	15.7	AIR TEMP	14	ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	no	REASON						
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	steel buoy		
COMMENTS											
Dow nload OK											
Stainless steel cable OK											
Replac#43											
SITE ID	gmsUP2		LOCATION		GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #		10676160			UTM	548841	6209022	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	11:52			CREW	BC TE		
TEST RECORDER TYPE	YSI		WATER TEMP	15.1	AIR TEMP	14	ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	10	m	DISLODGED	no	REASON						
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	steel buoy		
COMMENTS											
Dow nload OK											
Stainless steel cable OK											
Replac#20											
SITE ID	gmsDN2		LOCATION		GMS Tailrace RDB			BANK		north	
LOGGER TYPE	Tidbit		LOGGER SERIAL #		10669739			UTM	548828	6207836	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	10:58			CREW	BC TE		
TEST RECORDER TYPE	YSI		WATER TEMP	7.7	AIR TEMP	14	ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	no	REASON						
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock		
COMMENTS											
Primary Logger - Replac#11, SN 10669739											
Back-up logger gmsDN2BU in same capsule; Replac#37, SN 20332121 dow nloaded @ 10:57											
both dow nloads OK											
cable ok (stainless steel cable section attached to galvanized cable around rock)											
SITE ID	gmsDN1		LOCATION		GMS Tailrace LDB			BANK		south	
LOGGER TYPE	Tidbit		LOGGER SERIAL #		10635063			UTM	548881	6207761	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	11:15			CREW	BC TE		
TEST RECORDER TYPE	YSI		WATER TEMP	12.6	AIR TEMP	14	ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	no	REASON						
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock		
COMMENTS											
Primary Logger - Replac#7, SN 10635063											
Back-up logger gmsDN1BU in same capsule; Replac#38, SN 20332152 dow nloaded @ 11:15											
both dow nloads OK											
cable ok (stainless steel cable section attached to galvanized cable around rock)											

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM

SITE ID	pcnUP1	LOCATION	PCN Forebay		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332186		UTM	562684	6204075	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	12:51		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	15.3	AIR TEMP	14.0		ICE CONDITIONS	none

LOGGER CONDITIONS

WATER DEPTH	100	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	log boom	

COMMENTS

dow nload OK
 stainless steel cable OK
 Replac#42

SITE ID	pcnDN2	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156317		UTM	562803	6204854	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	13:05		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	12.1	AIR TEMP	14.0		ICE CONDITIONS	none

LOGGER CONDITIONS

WATER DEPTH	150	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	rock	

COMMENTS

dow nload OK
 stainless steel cable OK
 Replac#2

SITE ID	pcnDN2_BU	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10635061		UTM	562803	6204854	
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	13:13		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	12.1	AIR TEMP	14.0		ICE CONDITIONS	none

LOGGER CONDITIONS

WATER DEPTH	100	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	rock	

COMMENTS

dow nload OK
 stainless steel cable ok
 Anchored to same rock as pcnDN2
 Replac#9

SITE ID		LOCATION			BANK		
LOGGER TYPE		LOGGER SERIAL #			UTM		
DOWNLOAD DATE				DOWNLOAD TIME			
TEST RECORDER TYPE		WATER TEMP		AIR TEMP		ICE CONDITIONS	

LOGGER CONDITIONS

WATER DEPTH		cm	DISLODGED		REASON			
BURIED		FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE		

COMMENTS

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM											
SITE ID	halfUP2	LOCATION	u/s of Halfway River			BANK	north				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20030829			UTM	595559	6230543			
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	14:24		CREW	BC TE			
TEST RECORDER TYPE	YSI	WATER TEMP	11.9	AIR TEMP	14.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	-	cm	DISLODGED		yes	REASON	ice	debris			
BURIED	no	FUNCTIONAL	dry	IF DRY, HEIGHT ABOVE WATER	80	cm	TETHER TYPE	spruce			
COMMENTS											
logger sw ung to shore by spring ice and debris; high and dry											
download OK											
Replac#33											
stainless steel cable OK											
SITE ID	halfUP1	LOCATION	u/s of Halfway River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	26332123			UTM	595181	6230117			
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	14:32		CREW	BC TE			
TEST RECORDER TYPE	YSI	WATER TEMP	11.9	AIR TEMP	14.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	150	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	spruce tree			
COMMENTS											
download OK											
Replac#39											
stainless steel cable OK											
SITE ID	halfDN2	LOCATION	d/s of Halfway River			BANK	north				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669748			UTM	598310	6232377			
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	14:56		CREW	BC TE			
TEST RECORDER TYPE	YSI	WATER TEMP	15.6	AIR TEMP	14.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	-	cm	DISLODGED		yes	REASON	ice	debris			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	balsam pop			
COMMENTS											
logger sw ung to shore by spring ice and debris; high and dry											
download OK											
Replac#15											
stainless steel cable OK											
SITE ID	halfDN2_BU	LOCATION	d/s of Halfway River			BANK	north				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156314			UTM	598287	6232344			
DOWNLOAD DATE	6	Aug	2019	DOWNLOAD TIME	14:48		CREW	BC TE			
TEST RECORDER TYPE	YSI	WATER TEMP	15.6	AIR TEMP	14.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	30	cm	DISLODGED		yes	REASON	ice	debris			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	balsam pop			
COMMENTS											
logger partially sw ung to shore by spring ice and debris; still functional											
download OK											
Logger file name: halfDN2BU											
tether chain OK											

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	mobUP2		LOCATION	u/s of Moberly River			BANK	north		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10669754			UTM	627501	6232563	
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	13:21			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	13.0	AIR TEMP	16.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	Birch	
COMMENTS										
download OK										
Replac#16										
stainless steel cable OK										
SITE ID	mobUP1		LOCATION	u/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10887852			UTM	627158	6232349	
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	13:29			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	12.9	AIR TEMP	16.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	alder	
COMMENTS										
download OK										
Replac#21										
stainless steel cable OK										
SITE ID	mobDN1_BU		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676147			UTM	630875	6229303	
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	12:39			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	13.1	AIR TEMP	16.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	40	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	alder	
COMMENTS										
download OK										
Replac#18										
stainless steel cable OK										
water level very low										
SITE ID	mobDN1		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676146			UTM	630776	6229287	
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	13:08			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	13.1	AIR TEMP	16.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	40	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	alder	
COMMENTS										
download OK										
Replac#17										
steel chain OK										
water level very low										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM											
SITE ID	pineUP1	LOCATION	u/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669747			UTM	641032	6225367			
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	14:01			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	14.0	AIR TEMP	16.0		ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
download OK											
Replac#14											
Stainless steel cable OK											
SITE ID	pineUP2	LOCATION	u/s of Pine River			BANK		north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332129			UTM	641655	6225305			
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	-			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	13.1	AIR TEMP	16.0		ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	-	cm	DISLODGED	yes	REASON	debris					
BURIED		FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	poplar stump				
COMMENTS											
Logger lost; cable twisted off and parted											
Stainless steel cable replaced											
Lost logger Replac#40 (SN 20332129) replaced with Replac#46 (SN 20655135)											
SITE ID	pineDN1	LOCATION	d/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332124			UTM	648074	6222792			
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	14:50			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	15.9	AIR TEMP	18.0		ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
download OK											
Replac#41											
Stainless steel cable OK											
SITE ID	pineDN1_BU	LOCATION	d/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10893055			UTM	648371	6222823			
DOWNLOAD DATE	7	Aug	2019	DOWNLOAD TIME	14:59			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	15.9	AIR TEMP	18.0		ICE CONDITIONS	none			
LOGGER CONDITIONS											
WATER DEPTH	30	cm	DISLODGED	yes	REASON	tampered					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
chain pulled to shallow water by persons unknown but still functional											
download OK											
Replac#25											
Steel chain OK											

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	gmsUP1		LOCATION	GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #	20332187			UTM	548841	6209022	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	11:38			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	10.4	AIR TEMP	8	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	steel buoy
COMMENTS										
Dow nload OK										
Stainless steel cable OK										
Replac#43										
SITE ID	gmsUP2		LOCATION	GMS Forebay			BANK			
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676160			UTM	548841	6209022	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	11:41			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	10.4	AIR TEMP	8	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	10	m	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	steel buoy
COMMENTS										
Dow nload OK										
Stainless steel cable OK										
Replac#20										
SITE ID	gmsDN2		LOCATION	GMS Tailrace RDB			BANK			north
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10669739			UTM	548828	6207836	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	10:42			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	9.9	AIR TEMP	8	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	200	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	rock
COMMENTS										
Primary Logger - Replac#11, SN 10669739										
Back-up logger gmsDN2BU in same capsule; Replac#37, SN 20332121 dow nloaded @ 10:43										
both dow nloads OK										
cable OK (stainless steel cable section attached to galvanized cable around rock)										
SITE ID	gmsDN1		LOCATION	GMS Tailrace LDB			BANK			south
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10635063			UTM	548881	6207761	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	10:58			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	10.4	AIR TEMP	8	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	200	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	rock
COMMENTS										
Primary Logger - Replac#7, SN 10635063										
Back-up logger gmsDN1BU in same capsule; Replac#38, SN 20332152 dow nloaded @ 10:58										
both dow nloads OK										
cable ok (stainless steel cable section attached to galvanized cable around rock)										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM

SITE ID	pcnUP1	LOCATION	PCN Forebay		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332186		UTM	562684	6204075	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	9:27		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	9.8	AIR TEMP	1.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	100	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	log boom

COMMENTS

dow nload OK
 stainless steel cable OK
 Replac#42

SITE ID	pcnDN2	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156317		UTM	562803	6204854	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	9:44		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	9.6	AIR TEMP	2.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	200	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock

COMMENTS

dow nload OK
 stainless steel cable OK
 Replac#2

SITE ID	pcnDN2_BU	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10635061		UTM	562803	6204854	
DOWNLOAD DATE	17	Oct	2019	DOWNLOAD TIME	9:45		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	9.6	AIR TEMP	2.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	200	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock

COMMENTS

dow nload OK
 stainless steel cable ok
 Anchored to same rock as pcnDN2
 Replac#9

SITE ID		LOCATION		BANK			
LOGGER TYPE		LOGGER SERIAL #		UTM			
DOWNLOAD DATE		DOWNLOAD TIME		CREW			
TEST RECORDER TYPE		WATER TEMP		AIR TEMP		ICE CONDITIONS	

LOGGER CONDITIONS

WATER DEPTH		cm	DISLODGED		REASON			
BURIED		FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	

COMMENTS

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	halfUP2	LOCATION	u/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20030829			UTM	595559	6230543		
DOWNLOAD DATE	16	Oct	2019	DOWNLOAD TIME	13:02			CREW	BC TE	
TEST RECORDER TYPE	YSI	WATER TEMP	9.9	AIR TEMP	8.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	80	cm	DISLODGED	no	REASON	tapered				
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	spruce			
COMMENTS										
logger pulled to shore, cable coiled on shore; wet today but likely intermittently exposed										
download OK										
Replac#33										
stainless steel cable OK										
SITE ID	halfUP1	LOCATION	u/s of Halfway River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	26332123			UTM	595181	6230117		
DOWNLOAD DATE	16	Oct	2019	DOWNLOAD TIME	13:27			CREW	BC TE	
TEST RECORDER TYPE	YSI	WATER TEMP	9.9	AIR TEMP	8.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	200	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	spruce tree			
COMMENTS										
download OK										
Replac#39										
stainless steel cable OK										
SITE ID	halfDN2	LOCATION	d/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669748			UTM	598310	6232377		
DOWNLOAD DATE	16	Oct	2019	DOWNLOAD TIME	13:53			CREW	BC TE	
TEST RECORDER TYPE	YSI	WATER TEMP	6.3	AIR TEMP	8.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	80	cm	DISLODGED	yes	REASON	debris				
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	balsampop			
COMMENTS										
logger partially swung to shore by debris; wet today but likely intermittently exposed										
download OK										
Replac#15										
stainless steel cable OK										
SITE ID	halfDN2_BU	LOCATION	d/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156314			UTM	598287	6232344		
DOWNLOAD DATE	16	Oct	2019	DOWNLOAD TIME	14:05			CREW	BC TE	
TEST RECORDER TYPE	YSI	WATER TEMP	6.3	AIR TEMP	8.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	120	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	balsampop			
COMMENTS										
logger partially swung to shore by debris; still functional										
download OK										
Logger file name: halfDN2BU										
tether chain OK										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	mobUP2		LOCATION	u/s of Moberly River			BANK	north		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10669754			UTM	627501	6232563	
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	11:28			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	8.7	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	200	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	Birch
COMMENTS										
download OK										
Replac#16										
stainless steel cable OK										
SITE ID	mobUP1		LOCATION	u/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10887852			UTM	627158	6232349	
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	11:41			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	9.2	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	150	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	alder
COMMENTS										
download OK										
Replac#21										
stainless steel cable OK										
SITE ID	mobDN1_BU		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676147			UTM	630875	6229303	
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	11:12			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	9.0	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	alder
COMMENTS										
download OK										
Replac#18										
stainless steel cable OK										
SITE ID	mobDN1		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676146			UTM	630776	6229287	
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	11:02			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	9.0	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER			cm	TETHER TYPE	alder
COMMENTS										
download OK										
Replac#17										
steel chain OK										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM											
SITE ID	pineUP1	LOCATION	u/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669747			UTM	641032	6225367			
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	10:32			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	8.8	AIR TEMP	2.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	150	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
dow nload OK											
Replac#14											
Stainless steel cable OK											
SITE ID	pineUP2	LOCATION	u/s of Pine River			BANK		north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20655135			UTM	641655	6225305			
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	10:22			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	8.8	AIR TEMP	2.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	100	cm	DISLODGED	yes	REASON	tamped					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	poplar stump				
COMMENTS											
Logger partially pulled to shore by persons unknow n; cable coiled on shore											
dow nload OK											
Replac#46											
Stainless steel cable OK											
SITE ID	pineDN1	LOCATION	d/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332124			UTM	648074	6222792			
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	12:43			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	5.1	AIR TEMP	4.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	120	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
dow nload OK											
Repalc#41											
Stainless steel cable OK											
SITE ID	pineDN1_BU	LOCATION	d/s of Pine River			BANK	south				
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10893055			UTM	648371	6222823			
DOWNLOAD DATE	11	Oct	2019	DOWNLOAD TIME	12:53			CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	5.1	AIR TEMP	4.0	ICE CONDITIONS	none				
LOGGER CONDITIONS											
WATER DEPTH	150	cm	DISLODGED	no	REASON						
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder				
COMMENTS											
dow nload OK											
Repalc#25											
Steel chain OK											

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	gmsUP1		LOCATION			GMS Forebay		BANK		
LOGGER TYPE	Tidbit		LOGGER SERIAL #			20332187		UTM	548841	6209022
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME		13:28		CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	0.0	AIR TEMP	-3		ICE CONDITIONS		none
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	steel buoy	
COMMENTS										
Dow nload OK										
Stainless steel cable OK										
Replac#43										
SITE ID	gmsUP2		LOCATION			GMS Forebay		BANK		
LOGGER TYPE	Tidbit		LOGGER SERIAL #			10676160		UTM	548841	6209022
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME		13:24		CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	0.6	AIR TEMP	-3		ICE CONDITIONS		none
LOGGER CONDITIONS										
WATER DEPTH	10	m	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	steel buoy	
COMMENTS										
Dow nload OK										
Stainless steel cable OK										
Replac#20										
SITE ID	gmsDN2		LOCATION			GMS Tailrace RDB		BANK		north
LOGGER TYPE	Tidbit		LOGGER SERIAL #			10669739		UTM	548828	6207836
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME		12:05		CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	-3		ICE CONDITIONS		none
LOGGER CONDITIONS										
WATER DEPTH	150	cm	DISLODGED	no	REASON					
BURIED	no		FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock	
COMMENTS										
Primary Logger - Replac#11, SN 10669739										
Back-up logger gmsDN2BU in same capsule; Replac#37, SN 20332121 dow nloaded @ 12:04										
both dow nloads OK										
cable OK (stainless steel cable section attached to galvanized cable around rock)										
SITE ID	gmsDN1		LOCATION			GMS Tailrace LDB		BANK		south
LOGGER TYPE	Tidbit		LOGGER SERIAL #			10635063		UTM	548881	6207761
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME		12:31		CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	0.6	AIR TEMP	-3		ICE CONDITIONS		none
LOGGER CONDITIONS										
WATER DEPTH	-	cm	DISLODGED	yes	REASON		tampered			
BURIED			FUNCTIONAL	no	IF DRY, HEIGHT ABOVE WATER		cm	TETHER TYPE	rock	
COMMENTS										
cable pulled to shore and cut; both loggers lost										
Lost primary logger Replac#7 (SN 10635063) replaced w ith Replac#47 (SN 20655136)										
Lost backup logger Replac#38 (SN 20332152) replaced w ith Replac#19 (SN 10676155)										
Back-up logger gmsDN1BU in same capsule; Replac#38, SN 20332152 dow nloaded @ 10:58										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM

SITE ID	pcnUP1	LOCATION	PCN Forebay		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332186		UTM	562684	6204075	
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME	14:38		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	6.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	100	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	log boom	

COMMENTS

dow nload OK
 stainless steel cable OK
 Replac#42

SITE ID	pcnDN2	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156317		UTM	562803	6204854	
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME	-		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	0.7	AIR TEMP	6.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	-	cm	DISLODGED	yes	REASON	corrosion		
BURIED	no	FUNCTIONAL	no	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	rock	

COMMENTS

logger lost - end cap corroded off steel capsule
 logger Replac#2 (SN 10156317) replaced w ith Replac#1 (SN10156319); launched @ 16:00
 stainless steel cable OK

SITE ID	pcnDN2_BU	LOCATION	PCN Tailrace		BANK	north		
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10635061		UTM	562803	6204854	
DOWNLOAD DATE	19	Feb	2020	DOWNLOAD TIME	9:45		CREW	BC TE
TEST RECORDER TYPE	YSI	WATER TEMP	0.7	AIR TEMP	6.0	ICE CONDITIONS	none	

LOGGER CONDITIONS

WATER DEPTH	150	cm	DISLODGED	no	REASON			
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	rock	

COMMENTS

dow nload OK
 stainless steel cable ok
 Anchored to same rock as pcnDN2
 Replac#9

SITE ID		LOCATION		BANK			
LOGGER TYPE		LOGGER SERIAL #		UTM			
DOWNLOAD DATE		DOWNLOAD TIME		CREW			
TEST RECORDER TYPE		WATER TEMP		AIR TEMP		ICE CONDITIONS	

LOGGER CONDITIONS

WATER DEPTH		cm	DISLODGED		REASON			
BURIED		FUNCTIONAL		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE		

COMMENTS

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	halfUP2	LOCATION	u/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20030829			UTM	595559	6230543		
DOWNLOAD DATE	28	Feb	2020	DOWNLOAD TIME	13:08		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.0	AIR TEMP	4.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	140	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	spruce			
COMMENTS										
download OK										
Replac#33										
stainless steel cable OK										
SITE ID	halfUP1	LOCATION	u/s of Halfway River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	26332123			UTM	595181	6230117		
DOWNLOAD DATE	28	Feb	2020	DOWNLOAD TIME	13:19		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	4.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	200	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	spruce tree			
COMMENTS										
download OK										
Replac#39										
stainless steel cable OK										
SITE ID	halfDN2	LOCATION	d/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669748			UTM	598310	6232377		
DOWNLOAD DATE	28	Feb	2020	DOWNLOAD TIME	13:50		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	4.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	40	cm	DISLODGED	yes	REASON	tampered				
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	balsam pop			
COMMENTS										
logger pulled to shore by persons unknown and left in shallow water; wet today but likely intermittently exposed										
download OK										
Replac#15										
stainless steel cable OK										
SITE ID	halfDN2_BU	LOCATION	d/s of Halfway River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10156314			UTM	598287	6232344		
DOWNLOAD DATE	28	Feb	2020	DOWNLOAD TIME	13:39		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	4.0		ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	80	cm	DISLODGED	yes	REASON			debris		
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	balsam pop			
COMMENTS										
logger partially swung to shore by debris; still functional										
download OK										
Logger file ID: halfDN2BU										
tether chain OK										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	mobUP2		LOCATION	u/s of Moberly River			BANK	north		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10669754			UTM	627501	6232563	
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	-			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	5.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH			cm	DISLODGED	yes		REASON	tampered		
BURIED			FUNCTIONAL	no		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	Birch	
COMMENTS										
Cable pulled to shore and cut - logger and capsule gone lost logger Replac#16 (SN 10669754) replaced with Replac#49 (SN 20655180)										
SITE ID	mobUP1		LOCATION	u/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10887852			UTM	627158	6232349	
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	15:45			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	5.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	80	cm		DISLODGED	no		REASON			
BURIED	no		FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder	
COMMENTS										
download OK Replac#21 stainless steel cable OK										
SITE ID	mobDN1_BU		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676147			UTM	630875	6229303	
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	15:01			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm		DISLODGED	no		REASON			
BURIED	no		FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder	
COMMENTS										
download OK Replac#18 stainless steel cable OK										
SITE ID	mobDN1		LOCATION	d/s of Moberly River			BANK	south		
LOGGER TYPE	Tidbit		LOGGER SERIAL #	10676146			UTM	630776	6229287	
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	15:09			CREW	BC TE	
TEST RECORDER TYPE	YSI		WATER TEMP	1.0	AIR TEMP	4.0	ICE CONDITIONS	none		
LOGGER CONDITIONS										
WATER DEPTH	100	cm		DISLODGED	no		REASON			
BURIED	no		FUNCTIONAL	wet		IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder	
COMMENTS										
download OK Replac#17 steel chain OK										

BC HYDRO PEACE RIVER TEMPERATURE MONITORING - DOWNLOAD INFORMATION FORM										
SITE ID	pineUP1	LOCATION	u/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10669747			UTM	641032	6225367		
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	16:21		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.0	AIR TEMP	5.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
download OK										
Replac#14										
Stainless steel cable OK										
SITE ID	pineUP2	LOCATION	u/s of Pine River			BANK	north			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20655135			UTM	641655	6225305		
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	16:31		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	1.0	AIR TEMP	5.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	100	cm	DISLODGED	yes	REASON	tampered				
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	poplar stump			
COMMENTS										
download OK										
Replac#46										
Stainless steel cable OK										
SITE ID	pineDN1	LOCATION	d/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	20332124			UTM	648074	6222792		
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	-		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	5.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	-	cm	DISLODGED	yes	REASON					
BURIED		FUNCTIONAL	no	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
cable severed - logger gone										
Lost logger Replac#41 (SN20332124) to be replaced next session - no more spares available today										
SITE ID	pineDN1_BU	LOCATION	d/s of Pine River			BANK	south			
LOGGER TYPE	Tidbit	LOGGER SERIAL #	10893055			UTM	648371	6222823		
DOWNLOAD DATE	27	Feb	2020	DOWNLOAD TIME	16:50		CREW	BC TE		
TEST RECORDER TYPE	YSI	WATER TEMP	0.9	AIR TEMP	5.0	ICE CONDITIONS	none			
LOGGER CONDITIONS										
WATER DEPTH	120	cm	DISLODGED	no	REASON					
BURIED	no	FUNCTIONAL	wet	IF DRY, HEIGHT ABOVE WATER	cm	TETHER TYPE	alder			
COMMENTS										
download OK										
Replac#25										
Steel chain OK										

Appendix V. Summary of temperature logger deployment dates and anticipated replacement dates.

Site ID	Serial #	Location	Date Deployed	Replace Date
gmsUP1	20332187	WAC Bennett Forebay	Mar 2019	2025
gmsUP2	10676160	WAC Bennett Forebay	Jan 2016	2022
gmsDN1	20655136	GMS Tailrace	Feb2020	2026
gmsDN1BU	10676155	GMS Tailrace	July 2018	2024
gmsDN2	10669739	GMS Tailrace	Apr 2015	2021
gmsDN2BU	20332121	GMS Tailrace	July 2018	2024
pcnUP1	20332186	Peace Canyon Forebay	Mar 2019	2025
pcnDN2	10156319	Peace Canyon Tailrace	July 2014	2020
pcnDN2BU	10635061	Peace Canyon Tailrace	Apr 2015	2021
HalfUP1	20332123	Halfway Confluence - upstream	July 2018	2024
HalfUP2	20030829	Halfway Confluence - upstream	Oct 2017	2023
HalfDN2	10669748	Halfway Confluence - downstream	Apr 2015	2021
HalfDN2BU	10156314	Halfway Confluence - downstream	Jul 2013	2018
MobUP1	10887852	Moberly Confluence - upstream	Oct 2015	2021
MobUP2	20655180	Moberly Confluence - upstream	Feb 2020	2026
MobDN1	10676146	Moberly Confluence - downstream	Jan 2016	2021
MobDN1BU	10676147	Moberly Confluence - downstream	Jan 2016	2021
PineUP1	10669747	Pine Confluence - upstream	Apr 2015	2021
PineUP2	20655135	Pine Confluence - upstream	Aug 2019	2025
PineDN1	20332124	Pine Confluence - downstream	Mar 2019	2025
PineDN1BU	10893055	Pine Confluence - downstream	Jan 2017	2023
PineMS1	10893069	Pine Mainstem - upstream of Peace	Jul 2016	2022
PineMS2	20097150	Pine Mainstem - upstream of Peace	Apr 2018	2024
BeatMS1	20322122	Beatton Mainstem - upstream of Peace	Apr 2018	2024
BeatMS2	20030828	Beatton Mainstem - upstream of Peace	Nov 2016	2022
PouceUP1	10635062	Pouce Coupe confluence - upstream	April 2018	2024
PouceUP2	10893068	Pouce Coupe confluence - upstream	Apr 2016	2022