Associated Environmental

REPORT

BC Ministry of Environment

South Shawnigan Creek
Water Quality Study
Final Report

August 2017

ISO 9001 and 14001 Certified | An Associated Engineering Company

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1 Introduction

Associated Environmental Consultants Inc. (Associated) was retained by the Ministry of Environment (MOE) to conduct an independent Water Quality Study in the mainstem and selected tributaries of South Shawnigan Creek. The study included waterbodies in the vicinity of Stebbings Road Lot 23 (the Cobble Hill Holdings [CHH] contaminated soil treatment facility and contaminated soil landfill) and Stebbings Road Lot 21. It was conducted to address the concerns of residents, First Nations, local politicians, and other interested parties in the area about water quality in South Shawnigan Creek in relation to development around this key inflow to Shawnigan Lake. Concerns include water quality in the lake, which is used as a drinking water source.

The one-year water quality monitoring program called for data to be summarized in three quarterly reports and a final report in July 2017. The first quarterly report was issued in October 2016, and included data collected between July and September 2016 (the dry season) (Associated 2016a). The second quarterly report was issued in January 2017, and included data collected between October and December 2016 (Associated 2017a). The third quarterly report was issued in June 2017, and included data collected between January and March 2017 (Associated 2017b). This document is the final report, and includes a summary and interpretation of the findings from the three quarterly reports plus data collected between April and June 2017 (Q4).


S-6 (November 2016)

1.1 BACKGROUND INFORMATION

In July 2016, Dr. Brenda Miskimmin of Associated finalized a Study Design report based on the Terms of Reference to monitor water quality over a period of one year along South Shawnigan Creek (including areas around Lots 21 and 23 on Stebbings Road and key tributaries) (Associated 2016b). The report outlined the proposed sampling program and was developed in consultation with the interested parties (including methods, sampling sites, parameters to test, and frequency of sampling).

The monitoring program included monthly sampling of eight sites for one year beginning mid-July, as well as weekly sampling in late summer (August – September low flows) and during the fall rainy period (October - November). The more frequent sampling events occurred during five field trips in consecutive weeks over 30 days (“5-in-30”). Data collected at this frequency represents the long-term average or aquatic life chronic effect level (i.e., growth and reproduction), as required for certain water quality guideline parameters and captures the consistency of exposure to contaminants over one month.

1.2 OVERALL STUDY OBJECTIVES

Data collected for this Water Quality Study will add to existing data collected under the Shawnigan Lake Water Quality Objectives (WQO) attainment monitoring program (MOE 2016b) and other studies. The Water Quality Study data can be used to:

- Establish water quality at the monitoring sites during the period of study;
- Assess water quality along South Shawnigan Creek – in particular, determine if surface water quality degraded at any point in South Shawnigan Creek compared to BC water quality guidelines;
- Help determine if existing permitted activities on Stebbings Road at Lot 23 and/or historical activities on Lot 21 are impacting downstream water quality;
- Help determine if other activities in the South Shawnigan Creek watershed are influencing water quality in South Shawnigan Creek;
- Supplement any other data collected by the MOE and CHH at Lot 23; and
- Recommend future studies for the South Shawnigan Creek watershed or Shawnigan Lake and inform updates (if necessary) to the Water Quality Objectives for Shawnigan Lake (MOE 2007).

2 Methodology

2.1 SAMPLING SITES

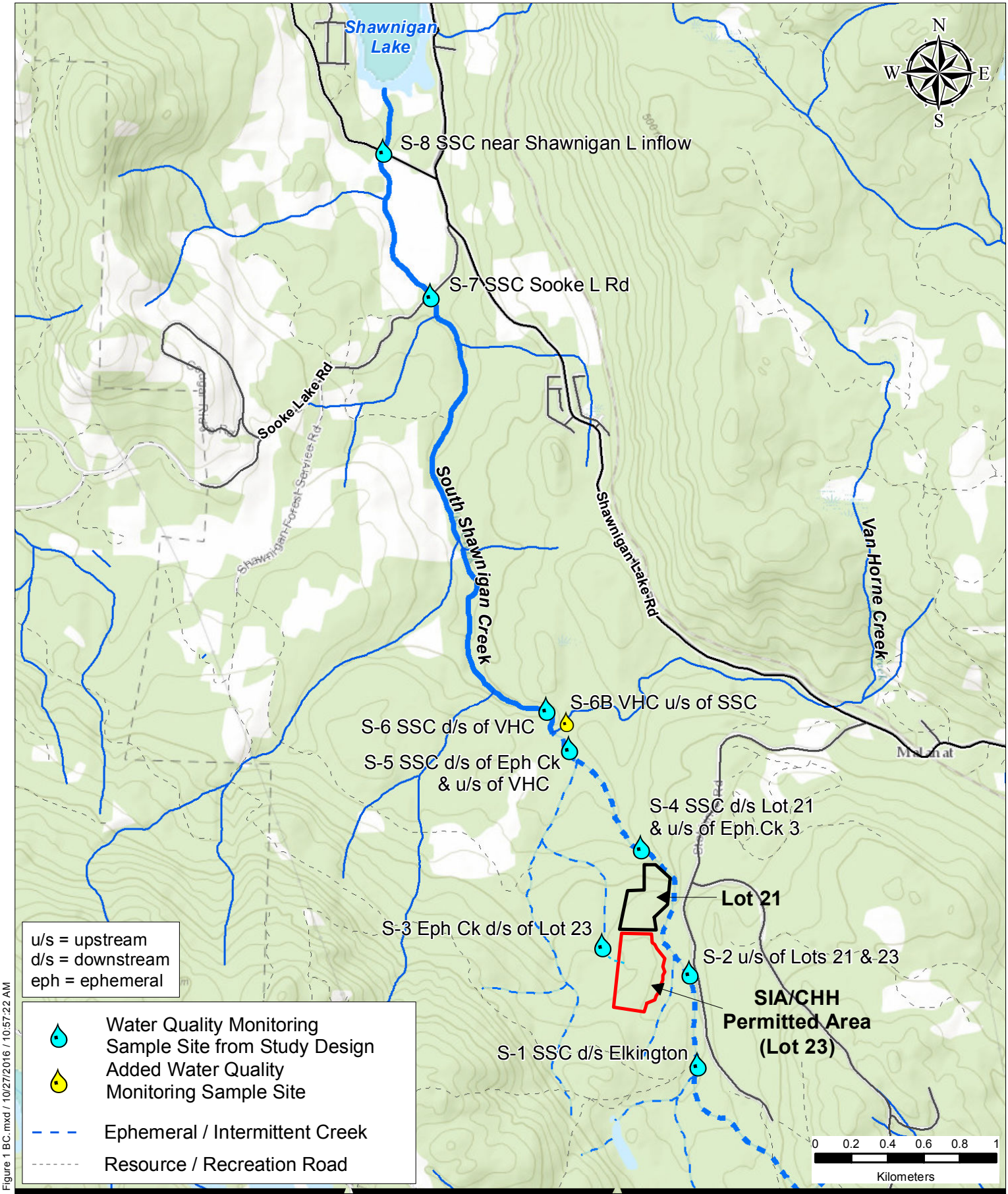
The sampling sites include those identified in the Study Design report, and represent locations upstream and downstream of the Lot 21 seepage and the ephemeral creek downstream of Lot 23 (Associated 2016b). Table 2-1 lists the eight sites that were included in the Water Quality Study and Figure 2-1 shows the site locations.

Table 2-1
Sampling sites and Environmental Monitoring Site (EMS) identification numbers

Site Number	EMS ID[1]	Sample Location
S-1	E294426	South Shawnigan Creek upstream of Lots 21 and 23 (control sample, far upstream) – downstream of Elkington Forest
S-2	E306323	South Shawnigan Creek upstream of Lots 21 and 23
S-3	E306324	Ephemeral creek downstream of Lot 23, near water treatment facility discharge,[1] upstream of the confluence with South Shawnigan Creek
S-4	E294425	South Shawnigan Creek downstream of Lot 21 and upstream of the Lot 23 ephemeral creek inflow
S-5	E306325	South Shawnigan Creek downstream of the confluence with ephemeral creek and upstream of Van Horne Creek confluence
S-6	E306326	South Shawnigan Creek downstream of Van Horne Creek
S-7	E306327	South Shawnigan Creek at Sooke Lake Road (upstream of disturbed area)
S-8	1199906	South Shawnigan Creek as near as possible to the inflow to Shawnigan Lake (downstream of all other sites).

Note:
[1]EMS = Environmental Monitoring Site

[1] Discharge from the containment/settling pond is intermittent based on storm event and other inflows.



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Associated Environmental

PROJECT NO.: 2016-8097.000.000
DATE: October 2016
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FIGURE 2-1: WATER QUALITY MONITORING SITES ON AND NEAR SOUTH SHAWNIGAN CREEK

South Shawnigan Creek Water Quality Monitoring Study

South Shawnigan Creek flows from approximately S-1 through S-2 (both of which are upstream of Lots 21 and 23) towards S-4, which is immediately downstream of the soil treatment facility and landfill (Figure 2-1). S-5 is downstream of S-4 on South Shawnigan Creek and downstream of the small inflowing tributary (i.e., ephemeral creek) located near Lot 23 (S-3). S-6 is downstream of S-5 and below the confluence with Van Horne Creek, and usually receives flows from both creeks. S-7 and S-8 are in the lower reach of South Shawnigan Creek and receive water from all upstream locations.

S-3 is the only site not on South Shawnigan Creek. It is located on the ephemeral creek downstream of Lot 23, near the water treatment facility outflow pipe. Field observations indicated that S-3 receives a combination of water from the discharge pipe from the settling pond treatment facility at Lot 23 (if flowing) and from groundwater seepage.

A sample was collected from lower Van Horne Creek (referred to as S-6B) once, on September 14 when S-5 and S-6 could not be sampled due to active logging.

Photographs of each sampling site are included in Appendix A.

2.2 SAMPLING PROTOCOL

Water samples were collected from the shore near the surface at a consistent location in the cross section, in accordance with the BC water quality sampling protocols (MWLAP 2013). Wherever it was safe and practical to do so, samples were collected at mid-stream. All samples were collected in laboratory-supplied bottles, and were filtered and preserved in the field (as necessary). A field form was filled out for each site to record site conditions, weather conditions, water temperature and relevant comments (e.g., access or safety issues).

All samples were stored in coolers with ice and delivered following chain-of-custody protocol to an ALS Depot in Victoria, and then shipped by courier to ALS Laboratories in Burnaby for analysis of the following parameters, according to the Study Design report:

- routine water chemistry (including pH, conductivity, turbidity, total suspended solids (TSS), hardness, sodium, chloride, and sulphate);
- nutrients (ammonia-N, nitrate-N, nitrite-N, total Kjeldahl nitrogen, organic nitrogen, total nitrogen, total phosphorus, and dissolved ortho-phosphate);
- total and dissolved organic carbon (TOC, DOC);
- total and dissolved metals; and
- organic contaminants (polycyclic aromatic hydrocarbons [PAHs] and light and heavy extractable petroleum hydrocarbons [LEPH/HEPH]).

2.3 QUALITY ASSURANCE AND QUALITY CONTROL

To assess the quality of the sampling and analytical results, two randomly selected sets of duplicate samples were collected at two sites during each sampling event. Collection and analysis of duplicate samples provides information on the combined (field and analytical) precision of the sampling and analytical program. The individual analytical results for each analyte in each sample of the duplicate pair were compared, and the relative percent difference (RPD) was calculated for each analyte. The RPD limits may vary somewhat depending on natural variability, the analysis involved and the concentration of the analyte. The RPD tends to increase at low levels approaching laboratory the detection limit (MWLAP 2013).

A total of 36 duplicate samples were collected. The average RPD ranged from 7.5% at S-8 to 12.4% at S-2 and the overall average (from all sites) was 9.9%, which is reasonable agreement between sample analyses.

In addition to the collection of duplicate samples, the quality assurance and quality control program included collection of trip blank and field blank samples. Trip blanks are sealed water samples of known quality (i.e., deionized water) that are taken from the laboratory to the sampling site and transported back to the laboratory without being exposed to sampling procedures. Their purpose is to detect any widespread contamination resulting from the container or preservative during transport and storage.

Field blanks are samples of deionized water that are poured into the laboratory bottles in the field, then preserved and shipped to the laboratory along with the field samples. They are exposed to the sampling environment at the sample site and handled in the same manner as the real sample (e.g., preserved, filtered); therefore, they provide information on contamination resulting from handling techniques and from exposure to the atmosphere.

A total of 33 field and blank samples were collected. The results from the blank samples were generally consistent with deionized water, with a few exceptions. In all cases, the detected concentrations were within five times the low detection limits and/or below the applicable guidelines.

2.4 WATER QUALITY GUIDELINES

All water quality data were tabulated and compared with BC Approved and Working Water Quality Guidelines for the protection of aquatic life (MOE 2015, 2016a) and with the Guidelines for Canadian Drinking Water Quality (Health Canada 2017). For some parameters, the two BC guidelines are listed: the long-term average (i.e., chronic) guidelines, which are intended to protect the most sensitive species and life-stage to long-term exposure, and the short-term maximum (i.e., acute) guidelines, which are set to protect against severe effects such as lethality to the most sensitive species and life stage over a defined short-term exposure period (e.g., 96 hours). Compliance with chronic guidelines is assessed by calculating the average concentration from five weekly samples collected in a period of 30 days (5-in-30). Compliance with acute guidelines is assessed for each individual sample (no averaging).

For screening purposes, all results were first compared with the most stringent (lowest) aquatic life guideline, including the applicable chronic guidelines. Where results from these individual samples were found to exceed the chronic guidelines, the result was further assessed by calculating the 5-in-30 average concentration (where 5-in-30 sampling had been completed) and comparing that result with the chronic guideline. Exceedances of acute or chronic guidelines are highlighted in the data tables (Appendix B).

Results were compared with the Guidelines for Canadian Drinking Water Quality (Health Canada 2017), because Shawnigan Lake is used as a drinking water source. This comparison is conservative because it assumes no dilution in the lake and that the source water is consumed without treatment.

3 Results and Discussion

3.1 SAMPLING EVENTS

Eighteen sampling trips were completed between July 2016 and June 2017 (Table 3-1). Every effort was made to sample all proposed sites during each sampling event but in some cases, samples could not be collected due to lack of sufficient water (dry season) or access issues (active logging or obstructed access). Where there was a lack of flowing water, we collected samples from isolated pools if water was at least 25 cm deep.


Active logging near S5 and 6B

During the 18 sampling trips, 122 samples were collected. Approximately 110 parameters were tested from each sample, resulting in over 13,000 water quality data points. As previously stated, water quality analyses consisted of general parameters, nutrients, organic carbon, total and dissolved metals, and hydrocarbons.

3.2 GUIDELINE EXCEEDANCES

Table 3-2 lists the parameters that exceeded either the BC aquatic life guidelines or the Health Canada drinking water guidelines throughout the one-year study, and indicates under which quarterly reporting period the exceedances occurred. Section 3.3 provides a brief discussion of the findings from the three quarterly reports completed to date (Associated 2016b, 2017a, 2017b), and includes further details on the exceedances summarized in Table 3-2. Section 3.4 summarizes the water quality data collected between April and June 2017, which has not yet been reported but represents the 4th quarter.

The guideline that was often exceeded at most of the sites was the dissolved aluminum aquatic life guideline. Aluminum occurs throughout South Shawnigan Creek at levels above the aquatic life guideline and resident biota are likely acclimated to it. Other variables often found in the creek at levels above drinking water guidelines (aesthetic) included total iron and dissolved manganese (Table 3-1). Of the organic contaminants, one naphthalene exceedance occurred in VCH (S-6B), and benzo(a)pyrene and pyrene exceedances occurred once each at S-8.

Table 3-1
Summary of sites sampled during each event

Sample Date	Report	Site sampled?							
		S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
18-Jul-16	Quarterly Report #1	✓	X[1]	X[1]	✓	✓	✓	✓	✓
16-Aug-16		✓	X[1]	X[1]	✓	X[2]	X[2]	✓	✓
23-Aug-16		✓	X[1]	X[1]	✓	✓	✓	✓	✓
30-Aug-16		✓	X[1]	X[1]	✓	✓	✓	✓	✓
6-Sep-16		✓	X[1]	X[1]	✓	X[2]	✓	✓	✓
14-Sep-16		X[3]	X[1]	✓	✓	X[2]	X[2]	✓	✓
31-Oct-16	Quarterly Report #2	✓	X[3]	✓	✓	✓	✓	✓	✓
9-Nov-16		✓	X[3]	✓	✓	✓	✓	✓	✓
16-Nov-16		✓	✓	✓	✓	✓	✓	✓	✓
23-Nov-16		✓	✓	✓	✓	✓	✓	✓	✓
29-Nov-16		✓	✓	✓	✓	✓	✓	✓	✓
12-Dec-16		✓	✓	✓	X[2]	X[2]	X[2]	✓	✓
18-Jan-17	Quarterly Report #3	✓	✓	✓	✓	✓	✓	✓	✓
20-Feb-17		✓	✓	✓	✓	✓	✓	✓	✓
20-Mar-17		✓	✓	✓	✓	✓	✓	✓	✓
19-Apr-17	Final Report (this document)	✓	✓	✓	✓	✓	✓	✓	✓
25-May-17		✓	✓	✓	✓	✓	✓	✓	✓
13-Jun-17		✓	✓	✓	✓	✓	✓	✓	✓
Total[4]		17	10	13	17	14	15	18	18

Notes:
[1] No sample because sites were either dry or had shallow puddles only.
[2] No sample due to access issues and/or safety concerns.
[3] No sample because water was too shallow.
[4] Total sample dates by site.

Table 3-2
Summary of guideline exceedances for the one-year study (July 2016 to June 2017)

Site	Report #	pH	Chromium (total)	Copper (total)	Iron (total)	Manganese (total)	Aluminum (dissolved)	Cadmium (dissolved)	Iron (dissolved)	Manganese (dissolved)	Benzo(a)pyrene	Naphthalene	Pyrene
S-1 Control	**1**	D				D				D			
	2						A						
	3						A						
S-2 upstream	**2**	D					A						
	3	D	A	A	A/D		A						
	F	D			A/D	A/D			A/D	A/D			
S-3 at CHH	**1**					D				D			
	3		A		D								
	F				D	D				D			
S-4 downstream	**2**						A						
	3				D		A	A					
S-5 downstream	**2**						A						
	3				D		A						
S-6 downstream	**2**						A	A					
	3				D		A						
S-6B VHC	**1**											A	
S-7 downstream	**1**							A					
	2						A						
	3						A						
S-8 downstream	**1**	D			D	D			D	D			
	2				D		A				A		A
	3						A						

Notes:
A = Aquatic life guidelines (BC) exceeded at least once
D = Health Canada drinking water guidelines exceeded at least once
A/D = at least one of the results exceeded both the BC aquatic life guidelines *and* the Health Canada drinking water guidelines
1 = Quarterly Report #1 (Associated 2016a): indicates exceedance occurred between July and September 2016
2 = Quarterly Report #2 (Associated 2017a): indicates exceedance occurred between October and December 2016
3 = Quarterly Report #3 (Associated 20167b): indicates exceedance occurred between January and March 2017
F = Final Report (this document): indicates exceedance occurred between April and June 2017

The guideline exceedances summarized in Table 3-2 are more specifically described in later sections of this report. All tabulated water quality data from the study, showing the results compared with the applicable water quality guidelines, are provided in Appendix B.

3.3 SUMMARY OF RESULTS FROM QUARTERLY REPORTS

3.3.1 Quarterly Report #1 (July to September 2016)

3.3.1.1 Overview of Flow Conditions

A total of six sampling events occurred between July 18, 2016 and September 14, 2016, including five weekly samples collected between August 16 and September 14 (5-in-30). This period represented the dry season and lack of flowing water was a problem with sites upstream of the confluence of South Shawnigan Creek with Van Horne Creek. With the exception of S-2, which was consistently dry, S-1 through S-5 were isolated pools (likely fed by near surface groundwater) and could not be considered connected by surface flows with the downstream sites. Flowing water was present at S-6, S-7, and S-8, which represented connected water between the confluence with Van Horne Creek and the inflow to Shawnigan Lake (Associated 2016a).


S-1 (September)


S-6B (September)

A one-time sample (S-6B) was also collected from lower Van Horne Creek when S-5 and S-6 could not be sampled due to active logging (September 14). S-3, the ephemeral creek fed by groundwater and the discharge from CHH, was also sampled only once due to lack of water. During that sampling event in September, very little water (puddle) was present. Despite the shallow depth of water at S-3, a sample was collected on this occasion because of the importance of this location.

3.3.1.2 Water Quality Results and Guideline Exceedances

The water quality results from July to September 2016 indicated that the water quality was generally good, with the following exceedances:

- **Dissolved cadmium** in S-7, which exceeded the acute aquatic life guideline on September 6;
- **Naphthalene** in S-6B (VHC), which exceeded the acute aquatic life guideline (there is no chronic guideline) on September 14;
- **Total and dissolved manganese,** which exceeded the drinking water aesthetic objective in S-1, S-3, and S-8;
- **Total and dissolved iron,** which exceeded the drinking water aesthetic objective in S-8; and
- **pH,** which was below the drinking water optimum range of 7-10.5 at S-1 and S-8.

No 5-in-30 chronic guideline exceedances were noted at any of the sites sampled at that frequency. Overall, S-8 had higher average concentrations of dissolved and total iron, turbidity and a number of other parameters than the other flowing water sites, and had a detectable hydrocarbon (acenaphthene) on September 14. This hydrocarbon, higher turbidity and other parameters were not observed at the nearest upstream site S-7. The presence of naphthalene in S-6B also suggests sources along VHC, as the site is outside of the influence of any activity on South Shawnigan Creek.

3.3.2 Quarterly Report #2 (October to December 2016)

3.3.2.1 Overview of Flow Conditions

A total of six sampling events occurred between October 31, 2016 and December 12, 2016, including five weekly samples collected between October 31 and November 29 (5-in-30). This period represented the fall rainy season (late October – late November) and early winter (December). As a result of increased precipitation, flowing water was observed in South Shawnigan Creek at all sites during most sampling events. Therefore, the sites were considered connected and upstream concentrations could be compared with downstream concentrations. S-3 was noted to be a mixture of CHH's settling pond discharge and groundwater flow (Associated 2017a).

3.3.2.2 Water Quality Results and Guideline Exceedances

The water quality results from October to December 2016 indicated the following exceedances:

- **Dissolved aluminum:** The 5-in-30 average concentration of dissolved aluminum exceeded the chronic aquatic life guideline at all sites except S-3. None of the individual results exceeded the acute guidelines. The fact that dissolved aluminum was also found at similar levels in the upstream control sites (S-1 and S-2) suggests that the dissolved aluminum is either naturally occurring or is widespread in the watershed for other reasons.
- **Dissolved cadmium:** At S-6, the 5-in-30 average concentration of dissolved cadmium exceeded the chronic aquatic life guideline, and the concentrations on three consecutive dates exceeded the acute guideline. The source of the cadmium may be partly from the Van Horne Creek watershed.
- **Polycyclic aromatic hydrocarbons:** Benzo[a]pyrene and pyrene in S-8 exceeded aquatic life guidelines during one sampling event (November 23). During that sampling event, other hydrocarbons were also detected at S-8 but did not exceed guidelines. During all other events and at all other sites, hydrocarbons were not detected. The detected concentrations could be from roadways and/or land uses between S-7 and S-8.
- **Total iron:** At S-8 on November 23, the concentration of total iron slightly exceeded the drinking water aesthetic objective.
- **pH:** At S-2, pH (6.94) was below the drinking water optimum range of 7-10.5 on November 16, although this site is not a drinking water source and the values were higher downstream.

In general, the results for the rainy period indicated that many parameters (including turbidity, sulphate, nitrate, arsenic, cadmium, copper, chromium, nickel, and iron) increased downstream on South Shawnigan Creek (Associated 2017a). Increases in many parameters from upstream to downstream locations can be expected in rivers where water flows from less developed headwater areas, and as more water is contributed through disturbed parts of the watershed (Miller et al. 2007).

Although no guideline exceedances were noted at S-3 during the fall season, concentrations of several parameters (e.g., chloride, sodium, sulphate, nitrate, conductivity) were higher here than in the other samples. S-3 had a higher average temperature than the other sites. Groundwater temperatures are more consistent over time, and are typically warmer than weather-influenced surface water during colder months. It is not unusual for groundwater concentrations of a range of variables to be higher than surface water. Some comparisons of our results to upgradient water quality are made later in this report.

3.3.3 Quarterly Report #3 (January to March 2017)

3.3.3.1 Overview of Flow Conditions

A total of three monthly sampling events occurred between January 18, 2017 and March 20, 2017. This period was designed to capture results from the winter and early spring period. During this time, flowing water was consistently found, which allowed for good comparisons between upstream and downstream conditions (Associated 2017b).

3.3.3.2 Water Quality Results and Guideline Exceedances

The water quality results from January to March 2017 indicated the following exceedances:

- **Total chromium** at S-2 and S-3 exceeded the aquatic life guideline for chromium (VI) but was below the guideline for chromium (III). Because only total chromium was tested and the different oxidation states were not determined, the more conservative guideline was applied to the data.
- **Total copper** at S-2 exceeded the aquatic life guideline.
- **Total iron** at S-2 exceeded the aquatic life guideline, and total iron at S-2, S-3, S-4, S-5, and S-6 exceeded the drinking water aesthetic guideline.
- **Dissolved cadmium** at S-4 exceeded the acute aquatic life guideline.
- **Dissolved aluminum** at S-6 marginally exceeded the acute aquatic life guideline. Concentrations were also found above the long-term chronic guideline at S-1, S-2, S-4, S-5, S-6, S-7, and S-8 (although they were in single samples, not 5-in-30), but remained below the short-term exposure guideline.
- **pH** at S-2, pH (6.96) was below the drinking water optimum range of 7-10.5 on March 20; however, as mentioned above, this site is not a drinking water source and the values were higher downstream.

With the exception of S-1, which had a relatively consistent low turbidity throughout the entire study (i.e., July 2016 to June 2017), all sites had the highest level of turbidity during the January sampling event. This is attributed to rainfall at the time of sampling and relatively warm temperatures, which would have contributed to snowmelt and runoff. This elevated turbidity likely contributed to the total chromium, copper, and iron exceedances, all of which occurred only in January. The lower turbidity at S-1 is likely because it is near the Elkington Forest, and drains a less disturbed and smaller area than the other sites.

In general, similar to the findings from Quarterly Report #2, concentrations of some parameters increased at downstream locations, and often the greatest increases occurred downstream of Van Horne Creek. Levels of some parameters were also higher at S-3, the ephemeral creek fed by groundwater and the discharge from CHH. For example, turbidity and chloride were particularly high at S-3 in January, which was sampled on a rainy day. There was no evidence that the next nearest site downstream of the ephemeral creek inflow on South Shawnigan Creek (S-5) was influenced by the levels found at S-3.

Hydrocarbons (including fluoranthene, phenanthrene, and pyrene) were detected in January at S-8, the furthest downstream site. Concentrations remained below drinking water and aquatic life guidelines. During sampling, a hydrocarbon sheen was observed on the surface near S-8 (Associated 2017b). Hydrocarbons were not detected at any other site or at S-8 in February or March. The detected concentrations at S-8 in January could be in runoff from bridges/roadways and/or land uses between S-7 and S-8.

3.4 APRIL TO JUNE 2017 RESULTS

3.4.1 Overview of Flow Conditions

This section presents the results for this period (Q4) for the first time, in summary form. A total of three monthly sampling events occurred between April 19, 2017 and June 13, 2017. During this period, flowing water was consistently found. Flows were slower during the June sampling event, suggesting a gradual return to the dry season as was recorded during the July to September 2016 period (Q1).

3.4.2 Comparison of Water Quality Between Sites

Similar to the previous reporting periods, S-3 showed markedly different chemistry than the sites on South Shawnigan Creek. Specifically, S-3 had the highest average concentrations of chloride, nitrate, conductivity, hardness, TSS, total phosphorus, sulphate, and total and

dissolved barium, boron, calcium, copper, magnesium, nickel, potassium, sodium, and uranium. However, in some cases, S-3 had a lower average concentration than the sites on South Shawnigan Creek (e.g., dissolved aluminum, iron, lead, and zinc).

Unlike the previous reporting periods, when compared with other sites on South Shawnigan Creek (i.e., all sites except S-3), S-2 had higher average concentrations of a few analytes (including chloride, total phosphorus) during the April to June period. However, except as described below (Section 3.4.3), results remained below the applicable water quality guidelines. Further discussion on seasonal differences in water quality is provided in Section 3.5.2.

With the exception of S-2, the sites downstream of the confluence with Van Horne Creek sometimes had modestly higher concentrations than sites upstream (e.g., nitrate, sulphate, total and dissolved iron and aluminum, sodium). S-1, S-4, and S-5 most often showed the lowest average concentration of any given analyte.

3.4.3 Exceedances of Water Quality Guidelines

The water quality results from April to June 2017 indicated the following guideline exceedances:

- **pH** was below the drinking water optimum range of 7-10.5 at S-2 in April (6.62) and June (6.81).
- **Total iron** exceeded the aquatic life guideline of 1 mg/L at S-2 in June (1.02 mg/L), and dissolved iron exceeded the aquatic life guideline of 0.35 mg/L at S-2 in May (0.62 mg/L) and June (0.61 mg/L). These samples from S-2 also exceeded the drinking water aesthetic objective (0.3 mg/L). Total iron exceeded the aesthetic objective at **S-3** in April, but did not exceed aquatic life guidelines.
- **Total manganese** at S-2 in May (0.952 mg/L) exceeded the acute and chronic aquatic life guidelines (calculated as 0.863 mg/L and 0.734 mg/L, respectively) and dissolved manganese (0.748 mg/L) exceeded the chronic aquatic life guideline only. Total and dissolved manganese at S-2 exceeded the drinking water aesthetic objective (0.05 mg/L) in April, May, and June. At S-3, total manganese also exceeded the drinking water aesthetic objective in all three sampling events and dissolved manganese in June only.
- **Dissolved aluminum** exceeded the chronic guideline at S-2 in April (0.0624 mg/L) and May (0.053 mg/L) and at S-8 in May (0.0744 mg/L), but results remained below the acute guideline. When pH is higher than 6.5 (which was the case for all samples), the chronic aquatic life guideline for dissolved aluminum is 0.05 mg/L and the acute aquatic life guideline is 0.1 mg/L. *Note that chronic guidelines are based on 5-in-30 sampling, which was not completed during this sampling period*.

Light extractable petroleum hydrocarbons (LEPH), for which there is no guideline, were detected at 0.063 mg/L in S-5.

3.5 COMPARISON OF WATER QUALITY BETWEEN SITES-ANNUAL AVERAGES

Figures 3-1 to 3-12 depict the annual average concentrations of key detected parameters from upstream to downstream sites.[2] Concentrations shown are the average concentrations based on all collected data throughout the study period (i.e., July 2016 to June 2017)[3], and as such indicate a wide range of variability for many parameters. Note that S-3 is not on South Shawnigan Creek and has markedly different chemistry (as described in previous sections); therefore, in some cases S-3 is not shown on the figures, but the average concentrations are indicated on the upper part of each graph.

The error bars on the figures, which are large for several sites and several parameters, represent the standard deviation from the mean. The bars indicate the range of variability over the entire year. These values may or may not be reflective of other one-year periods in the watershed. Within the previous quarterly reports, a common finding was that average concentrations of several metals and turbidity were lower at sites upstream of the confluence with Van Horne Creek than sites further downstream. This generally continued to be the case throughout the study; however, variable results through different seasons impacts averages, so the annual differences are less pronounced (see quarterly reports).

[2] For the average calculations, results that were below detection were substituted with 50% of the detection limit in each dataset (as suggested by Helsel and Hirsch [1991]).
[3] Duplicates at a site on the same date were averaged so there was only one value used per sampling date.

Figure 3-1: Average turbidity

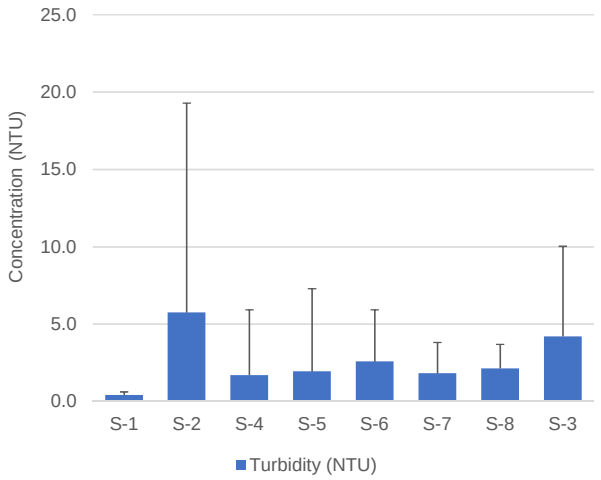


Figure 3-2: Average chloride

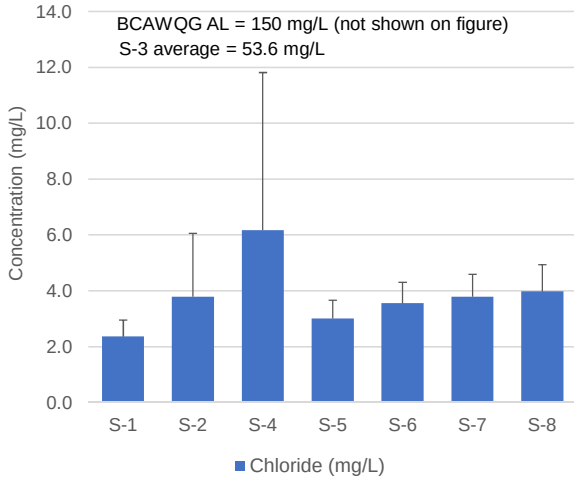


Figure 3-3: Average total and dissolved sodium

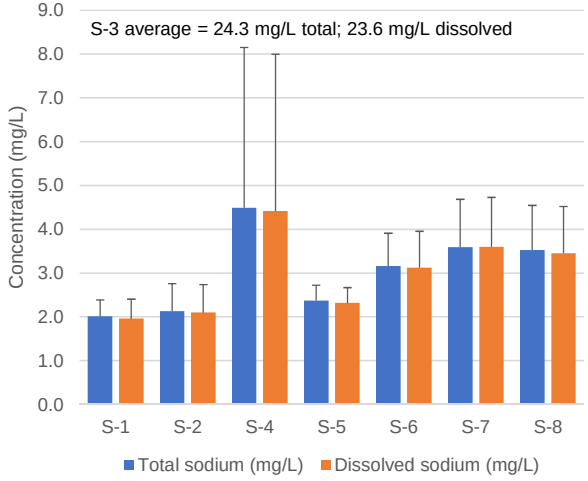


Figure 3-4: Average sulphate

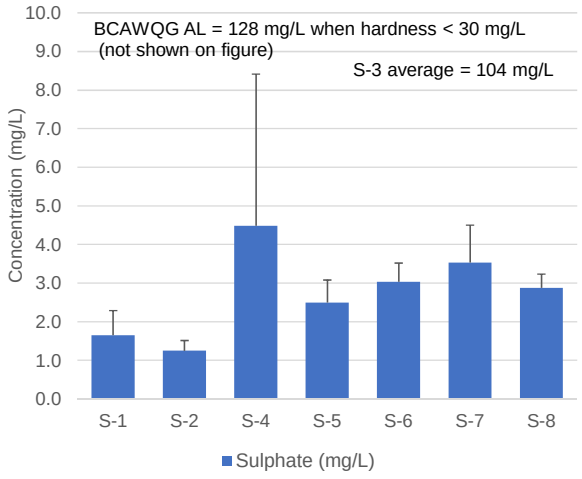


Figure 3-5: Average nitrate-N

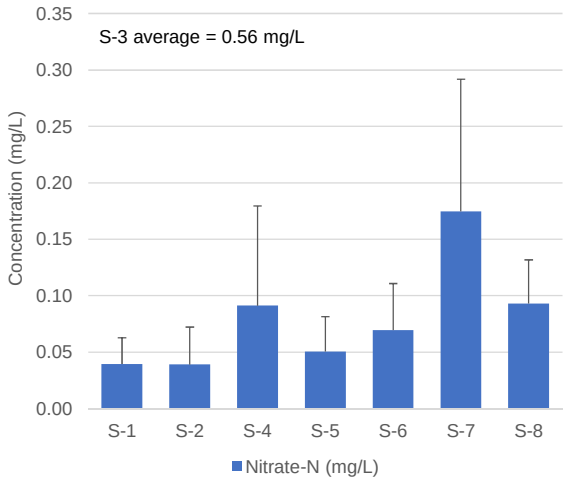
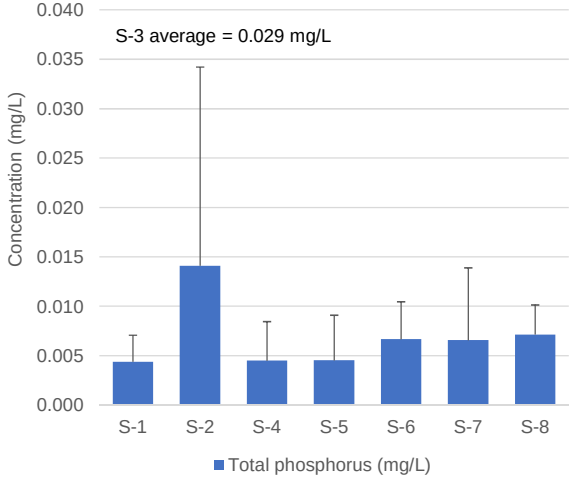


Figure 3-6: Average total phosphorus



Notes:

Graphs show average concentrations of parameters measured on South Shawnigan Creek between July 2016 and June 2017. For duplicate samples, the average of the two concentrations was used for the calculations.

Error bars show standard deviation.

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Figure 3-7: Average total and dissolved aluminum

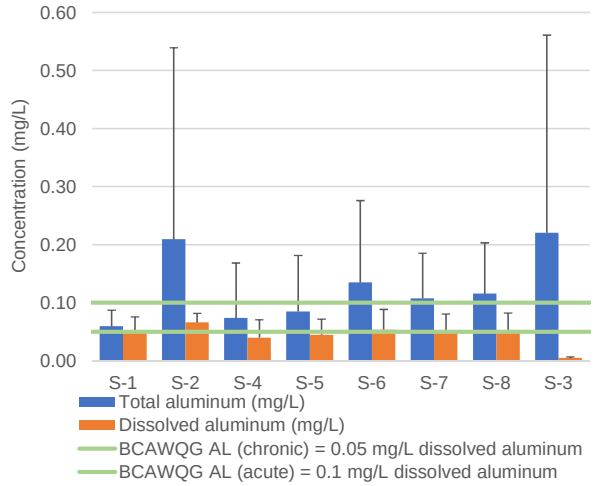


Figure 3-8: Average total and dissolved arsenic

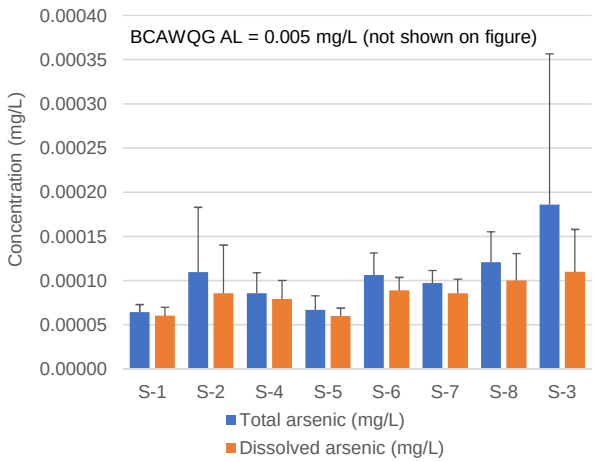


Figure 3-9: Average dissolved cadmium

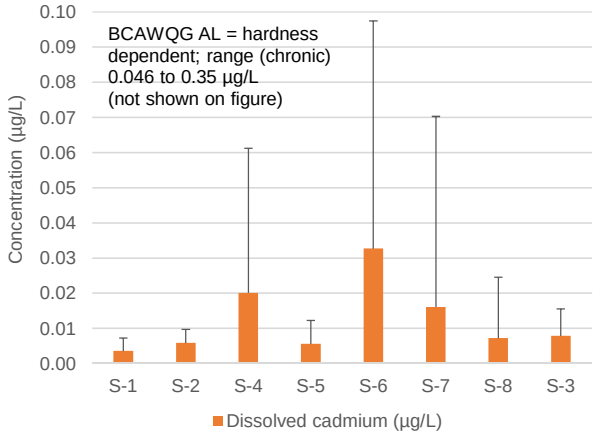


Figure 3-10: Average total and dissolved copper

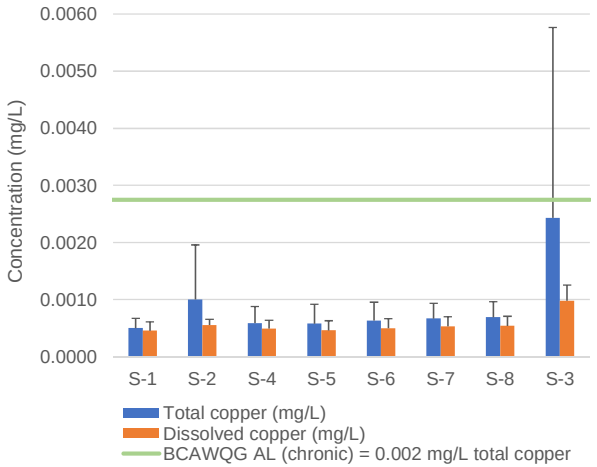


Figure 3-11: Average total and dissolved iron

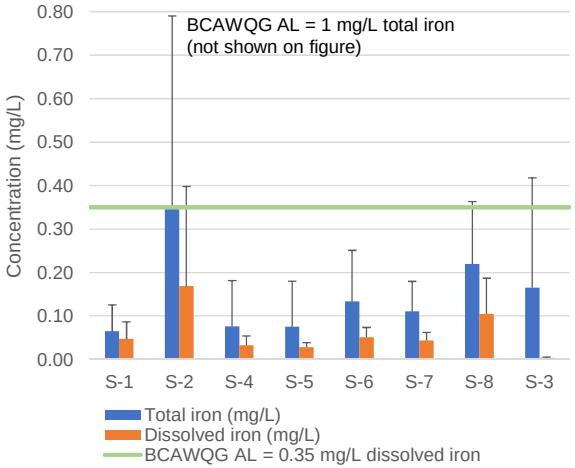
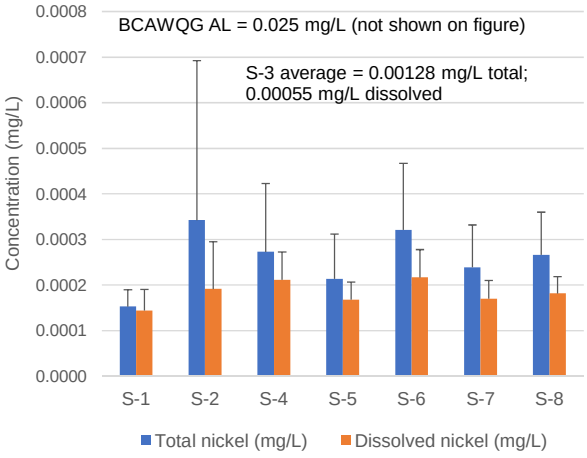


Figure 3-12: Average total and dissolved nickel



Notes:
Graphs show average concentrations of parameters measured on South Shawnigan Creek between July 2016 and June 2017. For duplicate samples, the average of the two concentrations was used for the calculations.
Error bars show standard deviation.

Associated Environmental

As previously discussed, dissolved aluminum and dissolved cadmium were the parameters most frequently found to exceed aquatic life guidelines. Dissolved aluminum exceeded the chronic aquatic life guidelines on several occasions at all sites except S-3. The fact that the average concentrations of dissolved aluminum at the upstream control sites S-1 and S-2 were the same or higher than downstream sites suggests that either the dissolved aluminum is naturally occurring or is widespread in the watershed for other reasons.

Dissolved cadmium exceeded aquatic life guidelines at S-4 in February 2017, at S-6 frequently between October and December 2016, and at S-7 in September 2016. The lowest average dissolved cadmium concentration was at S-1 and the highest at S-6.

3.5.1 Interpretation "Beyond WQ Guidelines"

The annual average concentrations of a number of parameters were found to be higher at S-3 than at any other sites as follows:

- Chloride, S-3 average at 53.6 mg/L; next highest was S-4 average at 6.2 mg/L;
- Sodium (total), S-3 average at 24.3 mg/L; next highest was S-4 average at 4.5 mg/L;
- Nitrate, S-3 average at 0.56 mg/L; next highest was S-7 average at 0.18 mg/L;
- Copper (total), S-3 average at 0.00243 mg/L; next highest was S-2 at 0.0010 mg/L; and
- Nickel (total), S-3 average at 0.00128 mg/L; next highest was S-2 at 0.00034 mg/L.

As indicated earlier, S-3 was usually a mixture of groundwater seepage and CHH discharge. We compared S-3 results with some groundwater data[4] for a site upgradient from CHH ("MW-6"). These data indicated that the tested groundwater at MW-6 had similar levels of some parameters to S-3, including sodium, chloride and sulphate. It seems that while the levels of a number of parameters are higher at S-3 where the water daylights downgradient of CHH, our brief comparison indicates the levels of some conservative[5] parameters are similar to the groundwater upgradient from the site. If this is the case, the groundwater is likely flowing under the site towards S-3. Based on our surface water sampling, it is unknown whether leachate from CHH reaches S-3 or other locations by flowing over or through the liner.[6] A brief scan of leachate data indicates it has much higher levels than S-3 of numerous parameters. Further comparisons of MW-6, leachate and S-3 water may reveal a fingerprint to check for a link between sites, although the similarities between S-3 and MW-6 results so far indicate a linkage. According to a recent assessment, "it cannot be said with certainty that the containment liner is not leaking" (Sokal 2017).

In the case of conductivity, the levels at S-3 were about one-half to one-third of the values at MW-6, and some metal concentrations are also lower at S-3 than MW-6, indicating some dilution or reaction/binding in the soils enroute. Furthermore, the water flows through the ephemeral creek at S-3, while not measured, were always either very low or not flowing at all during sampling. This means that any flows that did reach South Shawnigan Creek would be well diluted, as indicated by the results from the next site downstream

[4] Tabulated and provided to us.
[5] Conservative in this sense means it is unreactive and not affected by pH and redox conditions.
[6] We understand there should be a HDPE geomembrane liner under the waste rock site at CHH; and that Shawnigan Research Group suspects problems with the liner.

from the ephemeral creek (S-5). Later in this report (Section 3.5.3), we discuss concerns related to high discharge from the water treatment system (WTS) that may cause issues downstream.

An interesting finding is that sodium and chloride (NaCl/salt) levels, while highest at S-3, were next highest at S-4 (see bullets above). S-4 is the first site in South Shawnigan Creek downstream of the CHH site (but upstream of the ephemeral creek inflow). The site is just downstream from a location that others have observed as a seepage area (notably appearing to have oxidized iron-stained rocks). Total and dissolved iron values were relatively low at S-4. Sodium and chloride are quite water soluble, and can move through groundwater easily (White and Broadley 2001); whereas ferrous iron (Fe^{2+}) can become oxidized (forming ferric iron, Fe^{3+}) and precipitate out causing the red stain observed (Charette and Sholkovitz 2002), resulting in low iron levels in water. Again, the sodium and chloride levels at S-4 were much lower than either S-3 or the upgradient groundwater MW-6 site, so should not be considered abnormal where groundwater is seeping to the surface nearby.

The detection of hydrocarbons in some samples in the lower reach of South Shawnigan Creek is unusual in the sense that most of these contaminants are not water soluble and are usually more associated with sediments. Since the watershed has several roadways and a variety of disturbances, it is likely that the hydrocarbons found at S-8 (and once at S-6B) were associated with particulates that entered the creek. These hydrocarbons were not found in water at the nearest location to the CHH site.

3.5.2 Seasonal Differences

A number of parameters differed between the dry season and the rainy season. While there was only a single sample from S-3 during the dry season (September) due to lack of water depth, some of the parameters that showed higher average concentrations at S-3 in the dry season than the wet were: chloride, sodium, sulphate, conductivity, ammonia, arsenic, barium, calcium, magnesium, manganese and potassium. This was likely due to the groundwater quality, evaporative concentration and lack of dilution in the small puddle representing the site at the time.

Some parameters tended to be higher only during the rainy season downstream than upstream of S-6 (confluence with Van Horne Creek), including turbidity, nitrate, total aluminum (not dissolved Al), arsenic, cadmium, and total iron and nickel (not dissolved Fe or Ni). With the exception of cadmium during the rainy season, none of these concentrations at S-6 exceeded aquatic life guidelines, but runoff along Van Horne Creek appeared to be elevating some parameters downstream in South Shawnigan during the rainy season. There are a number of “fill sites,” active or past logging, and other disturbances along Van Horne Creek according to observations and the map provided to us for the Study Design Report. Some of these disturbances also occur along South Shawnigan Creek as well both upstream and downstream of the confluence with Van Horne Creek.

Some additional seasonal differences in water quality within sites was noted. On average:

- Conductivity and hardness were highest in the dry season (July to September). The next highest average concentrations were typically found in spring (April to June). Results from the rainy (October to December) and winter (January to March) seasons were similar to one another.

- Chloride, sodium, and calcium were highest during the dry season. Results were similar during the remaining sampling events, but the next highest concentrations were generally found in spring.
- Average turbidity and TSS were generally higher during the winter season, which may have reflected some snowmelt runoff.
- Dissolved aluminum and copper were highest during the rainy season.

Other parameters did not show the same seasonal consistency across the sites. For example, average total iron was highest in the winter at S-3, S-4, S-5, S-6, and S-7, in the dry season at S-1 and S-8, and in the spring at S-2. Dissolved iron was highest in the rainy season at S-4, S-5, and S-6, in the dry season in S-1, S-3, and S-8, and in the spring at S-2.

3.5.3 Non-Compliance and Spill Incidents

It is important to note that the scope of this study, while comprehensive in that it collected 18 sets of samples at 8 sites over a year, resulted in not collecting samples during non-compliance incidents at the CHH site. It was not possible to be on site for every such potential incident, but regulators and possibly others obtained some samples of discharging effluent. For example, there were incidents with guideline exceedances in the water treatment system (WTS) effluent resulting in a warning letter to CHH the month prior to when this study began (June 2016). Other correspondence can be viewed on the government website shown in the footnote below.

In October 2016, an overflow of leachate at CHH during heavy rain resulted in several non-compliances. This incident was over a week before our planned next sampling trip, at which time water quality at S-3 was below guideline levels. According to the government permitting website for SIA/CHH[7]: *On October 11, 2016 the Minister of Environment issued a letter to the permittee (CHH) indicating that the permit may be suspended or cancelled if key outstanding non-compliances were not addressed. Information was exchanged between the ministry and the permittee, but on January 27, 2017 the permit was suspended and a Spill Prevention Order (SPO) was issued*.[8] On February 27, 2017, Permit PR-105809 was cancelled by the Minister of Environment; the business is now closed.

It is not known whether the non-compliances in the discharge recorded during the above incidents caused short-term elevated parameters or guideline exceedances at sites along South Shawnigan Creek or within the lake. It appears that the design and/or condition of the leachate management system was inadequate to handle the range of weather events that might occur. The “first flush” of the storm in October likely carried the bulk of poor quality water downstream relatively quickly. While the water quality in South Shawnigan Creek might be acceptable the majority of the time, residents are understandably concerned about accidental spills, escaping leachate and long-term loading of contaminants to the lake. Any such incidents that potentially degrade water quality downstream would be exacerbated by high runoff from other fill sites (see map Appendix C) and disturbances throughout the watershed. Section 4.3 of this report describes recommendations to help with evaluating water and sediment quality Shawnigan Lake in the long term.

[7] http://www2.gov.bc.ca/gov/content/environment/air-land-water/site-permitting-compliance/sia
[8] SPO MO1701 dated January 27, 2017 was amended March 15 and June 29, 2017.

4 Summary, Conclusions and Recommendations

4.1 SUMMARY

- Water quality samples were collected from seven sites along South Shawnigan Creek (S-1, S-2, S-3, S-4, S-5, S-6, S-7, and S-8) and from an ephemeral creek (S-3) downstream of Lot 23, near the water treatment facility discharge. Guideline exceedances were tabulated, graphed and reported in the quarterly reports.
- Samples were collected at least monthly from July 2016 to June 2017. During the dry season (mid-August to mid-September) and the fall rainy season (late October to late November), additional sampling consisted of 5 weekly samples over a 30-day period to assess against chronic aquatic life guidelines, which are intended to protect the most sensitive species and life-stage to long-term exposure.
- In total, 18 sampling events occurred and 122 samples were collected. Approximately 110 parameters were tested from each sample, resulting in over 13,000 water quality data points. Water quality analysis consisted of general parameters, nutrients, organic carbon, total and dissolved metals, and hydrocarbons.
- With a few notable exceptions, the water quality overall was relatively good considering the many anthropogenic disturbances in the watershed. The water quality data were compared with BC Aquatic Life Guidelines and Health Canada Guidelines for Canadian Drinking Water Quality.
    - Aquatic life guideline exceedances were occasionally noted for dissolved aluminum and cadmium, total chromium, cobalt, and copper, total and dissolved iron and manganese, benzo[a]pyrene, and pyrene.
    - Drinking water guideline exceedances included pH and total and dissolved iron and manganese. The guidelines for these parameters are considered aesthetic objectives (i.e., based on taste and odour or operational concerns). There were no exceedances of the health-based guidelines.
- Concentrations of some parameters were sometimes higher downstream than upstream, often recorded to be highest downstream of the Van Horne Creek confluence.
- Hydrocarbons were periodically detected at S-8, in some cases at concentrations that exceeded aquatic life guidelines. Given that they were not detected at S-7 throughout the study period, the detected concentrations at S-8 are likely from the bridge/road crossing and/or other land uses upstream of S-8.
- **S-3**, the ephemeral creek fed by groundwater and sometimes by the discharge from CHH, had markedly different chemistry (in some cases higher or lower concentrations) than the sites on South Shawnigan Creek, notably for chloride, sodium, sulphate, and a few other parameters. It is not unusual for groundwater concentrations of a range of variables to be higher than surface fresh water, and samples from S-3 appeared to resemble the quality of upgradient groundwater quality.
- Water quality at S-3 would be influenced during times of WTS discharge from CHH. While we sampled during some low flow discharge events and during the regular rainy season, we missed at least one heavy rainfall event in October 2016, where non-compliances were recorded by regulators.

4.2 CONCLUSIONS

Collection of water quality data over a one-year period at sites along South Shawnigan Creek and in one ephemeral tributary stream indicated a range of variability in water chemistry related to dry and wet seasons, specific rainfall events and activities in the watershed. The ephemeral creek site (S-3) was found to resemble upgradient groundwater for some parameters, and likely had some contribution from the CHH discharge. However, while some concentrations of parameters were higher in S-3 than South Shawnigan Creek samples, we did not detect levels that would be considered notably different to the upgradient groundwater. We relied on information provided to us by others and assumed the upgradient groundwater (MW-6) is truly upgradient and that it is representative of local upgradient uncontaminated conditions.

While the study design was reasonably comprehensive, agreed to by the interested parties, and sometimes included sampling on a weekly basis, the timing resulted in missing at least one major upset event related to the CHH disposal site's leachate. Incident reports by the Ministry of Environment showed that in October 2016, there was an accidental discharge of leachate that caused a number of water quality guideline exceedances and non-compliance with the permit. Because our scheduled sampling trip was over a week later, and we were unaware of the incident, we do not know whether guideline exceedances occurred soon after at sites downstream in the ephemeral creek or South Shawnigan Creek. Based on the incident reports, we do know that the CHH leachate management system was unable to prevent the escape of contaminated water during this high rainfall event.

4.3 RECOMMENDATIONS

If there will be follow up to augment this study and provide more answers to questions from the interested parties, we recommend the following:

1. Conduct sediment sampling at locations were sediments settle to the bottom in Shawnigan Lake, since many contaminants bind to particulates and are carried downstream. Samples should be tested for a range of sediment-quality parameters, including metals and organic contaminants. Lake sites should be selected both near where South Shawnigan Creek flows into the lake as well as at the deepest site in the lake that is reasonably close to that inflow. This type of sediment sampling is best done with a gravity coring device.
2. Compare S-3 results to additional upgradient groundwater samples, possibly residential wells. This will confirm whether MW-6 accurately represents the aquifer in the area. Retain a qualified professional hydrogeologist with knowledge of surface water for this work.
3. Compare S-3 results to other groundwater sites known to be upgradient, but on Lot 23 as well as downgradient from S-3. Find out more about when and where S-3 flows. There may be existing report(s) with this information.
4. Consider updating the mapping and description of all disturbed sites in the watershed, including Van Horne Creek and smaller tributaries that might receive runoff during the rainy season. Consider starting with updating the "fill sites" map, dated September 2013 (Appendix C). Use this information for focused sampling aimed at mitigating impacts (i.e., implementing measures to prevent contaminated runoff at known problematic locations).

5. When planning future sampling events in the South Shawnigan watershed, focus during or soon after intense rainstorms, especially where there was a preceding dry period. Include Van Horne Creek in the program as it is the main tributary that flows all year long, even when South Shawnigan Creek is not. Also include the ephemeral creek as it receives overflow discharge from CHH (collect samples from the discharge as well as from S-3, if possible).
6. Install at least one hydrometric station in lower South Shawnigan Creek (possibly near S-8), which can be hooked up to satellite telemetry so that water level and flow data can be accessed in 'real time.' Flow data are needed to accurately calculate the loading rates of contaminants and other variables from the Creek to the Lake, as well as to determine the lake flushing rate[9]. Data loggers for other water quality variables (e.g. conductivity, turbidity) could be installed at the same location.
7. Sample water quality in Shawnigan Lake near drinking water intakes if this is not already being done.

Other recommendations may be generated based on dialog with the interested parties at the upcoming meeting to discuss the results of this study.

[9] Also requires other key lake inflow and outflow data.

Closure

This report was prepared for the BC Ministry of Environment and other interested parties to provide an independent Water Quality Study in the mainstem and selected tributaries of South Shawnigan Creek.

The services provided by Associated Environmental Consultants Inc. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
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Appendix A - Photographs

Photograph A-1: Site S-1 - South Shawnigan Creek downstream of Elkington Forest on April 19, 2017

Photograph A-2: Site S-2 - South Shawinigan Creek upstream of Lots 21 and 23 on November 16, 2016

Photograph A-3: Site S-3 - Ephemeral creek downstream of Lot 23 and upstream of the confluence with South Shawinigan Creek on January 18, 2017

Photograph A-4: Site S-4 - South Shawnigan Creek downstream of Lot 21 and upstream of the Lot 23 ephemeral creek inflow on May 25, 2017

Photograph A-5: Site S-5 - South Shawinigan Creek downstream of the confluence with the ephemeral creek and upstream of the confluence with Van Horne Creek on November 16, 2016

Photograph A-6: Site S-6 - South Shawnigan Creek downstream of Van Horne Creek on May 25, 2017

Photograph A-7: Site S-7 - South Shawnigan Creek at Sooke Lake Road on December 12, 2016

Photograph A-8: Site S-8 - South Shawnigan Creek near the inflow to Shawnigan Lake (downstream of all other sites) on May 25, 2017

Appendix B - Water Quality Data

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L180332-1	L1815912-1	L1815913-1	L1819437-1	L1822131-1	L1825866-1	L1852654-1	L1856747-1	L1860025-1	L1862856-1	L1864661-1	L1869598-1	L1881460-1	L1892901-1	L1903637-1	L1915519-1	L1932236-1	L1932236-2	L1942331-1	L1942331-2
						Site	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1
						Report #	Quarterly Report #1						Quarterly Report #2						Quarterly Report #3			Final Report				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		18-Jul-16	16-Aug-16		23-Aug-16	30-Aug-16	6-Sep-16	31-Oct-16	9-Nov-16	16-Nov-16	23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17		13-Jun-17	
General Parameters																										
Conductivity	uS/cm	-	-	-	-	-	59.1	59.7	51.2	55.1	55.7	33.2	33.7	33.1	34.5	30.2	29.9	30.6	25.7	24.4	30.4	37.7	37.7	38.8	38.2
Hardness (as $CaCO_3$)	mg/L	-	-	-	-	20.1	22.4	22.4	19.7	20.7	18.5	13.5	11.9	13.3	14.1	11.4	9.68	10.6	9.06	7.95	11.4	15	14.3	15.9	16.3
pH	pH	6.5-9	6.5-9	7-10.5		-	**6.88**	**6.77**	7.09	**6.80**	**6.58**	7.06	7.16	7.03	7.35	7.16	7.07	7.12	7.05	7.15	7.09	7.41	7.36	7.30	7.27
pH	pH	6.5-9	6.5-9	7-10.5		-	**6.88**	**6.77**	7.09	**6.80**	**6.58**	7.06	7.16	7.03	7.35	7.16	7.07	7.12	7.05	7.15	7.09	7.41	7.36	7.30	7.27
Total Suspended Solids	mg/L	Note 1	Note 1	-	-	4.2	1.2	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	<1.0
Turbidity	NTU	Note 2	Note 2	-	-	0.35	0.75	0.75	0.44	0.78	0.54	0.71	0.21	0.25	0.23	0.24	0.25	0.57	0.22	0.26	0.3	0.55	0.56	0.3	0.35
Chloride (Cl)	mg/L	600	150	250	-	-	2.63	2.62	3.07	3.26	3.18	2.85	2.4	2.51	2.38	2.18	2.29	2.77	1.95	1.53	1.54	1.59	1.62	1.57	1.57
Sulfate (SO_4)	mg/L	-	128	500	-	-	2.49	2.48	2.69	2.83	2.78	1.49	1.4	1.4	1.37	1.37	1.42	1.22	1.31	1.29	1.25	1.1	1.11	0.97	0.97
Nutrients																										
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-	0.008	0.0115	0.0125	0.0103	0.0172	0.0067	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0075
Nitrate and Nitrite (as N)	mg/L	-	-	-	10	-	0.0462	0.0458	0.0367	0.0459	0.0307	0.0279	0.0175	0.0243	0.0375	0.0265	0.044	0.117	0.0375	0.0243	0.0176	0.0458	0.052	0.0497	0.0495
Nitrate (as N)	mg/L	32.8	3	-	10	-	0.0462	0.0458	0.0367	0.0459	0.0307	0.0279	0.0175	0.0243	0.0375	0.0265	0.044	0.117	0.0375	0.0243	0.0176	0.0458	0.052	0.0497	0.0495
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.161	0.063	0.052	0.081	0.101	0.115	0.129	0.108	0.096	0.096	0.115	0.084	0.083	0.059	0.069	0.086	0.098	0.084	0.104	0.11
Total Nitrogen	mg/L	-	-	-	-	0.202	0.109	0.098	0.118	0.147	0.145	0.157	0.126	0.121	0.134	0.141	0.128	0.199	0.096	0.093	0.104	0.144	0.136	0.153	0.159
Total Organic Nitrogen	mg/L	-	-	-	-	0.153	0.051	<0.050	0.071	0.084	0.108	0.13	0.107	0.095	0.093	0.114	0.082	0.078	0.057	0.067	0.086	0.1	0.085	0.1	0.102
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-	-	0.065	0.061	0.093	0.083	0.102	0.148	0.097	0.1	0.098	0.106	0.09	0.062	0.071	0.075	0.11	0.142	0.094	0.106	0.128
Total Dissolved Nitrogen	mg/L	-	-	-	-	-	0.111	0.107	0.13	0.129	0.133	0.176	0.115	0.124	0.135	0.132	0.134	0.179	0.108	0.099	0.128	0.188	0.146	0.155	0.178
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0019	0.0024	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-	0.0064	0.0044	0.0027	0.0063	0.0085	0.012	0.003	0.0031	0.0021	<0.010	0.0021	0.0034	0.0046	<0.0020	0.0025	0.0031	0.0048	0.0039	0.0035	0.0032
Organic Carbon																										
Dissolved Organic Carbon	mg/L	-	Note 5	-	-	-	1.02	0.91	1.35	1.34	1.66	4.37	3.84	3.76	3.65	4.95	4.3	2.91	2.66	2.86	2.11	2.02	2.17	1.67	2.02
Total Organic Carbon	mg/L	-	Note 5	-	-	1.76	0.93	0.86	1.5	1.44	1.62	4.49	4.05	3.8	3.77	4.37	3.69	3.09	2.68	2.99	2.41	1.9	1.96	1.73	1.61
Total Metals																										
Aluminum (Al)-Total	mg/L	-	-	-	-	0.0152	0.0291	0.0305	0.0298	0.0357	0.029	0.0714	0.0821	0.0775	0.0826	0.107	0.0936	0.0828	0.0794	0.0681	0.0471	0.0412	0.0482	0.0268	0.0273
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01	0.000066	0.000088	0.000067	0.000055	0.000058	0.000067	0.000074	0.000069	0.000073	0.000067	0.000074	0.000063	0.000051	0.00007	0.000052	0.000049	0.000061	0.00007	0.000063	0.00006
Barium (Ba)-Total	mg/L	-	1	-	1	0.00472	0.00815	0.00792	0.00452	0.00457	0.00443	0.00325	0.00294	0.00281	0.00309	0.00325	0.00292	0.00227	0.00211	0.002	0.00268	0.00321	0.00363	0.00376	0.00401
Beryllium (Be)-Total	mg/L	-	0.00013	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5	0.0067	0.0059	0.0053	0.0054	0.0059	0.0054	0.0055	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	0.0052
Cadmium (Cd)-Total	mg/L	-	-	-	0.005	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	-	-	5.92	7.94	7.63	5.68	6.21	5.97	3.95	3.86	3.94	4.38	3.32	3.29	3.24	3.48	2.88	4.13	4.86	5.15	4.62	4.6
Chromium (Cr)-Total	mg/L		0.001	-	0.05	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00014	0.00013	0.00013	0.00015	0.00015	0.0001	0.00016	0.00013	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-	0.000134	0.000727	0.000723	0.000167	0.000248	0.000267	0.0000566	0.0000526	0.0000561	0.0000568	0.0000634	0.0000457	0.0000793	0.0000419	0.000041	0.0000476	0.000125	0.000126	0.0000712	0.0000756
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-	0.000287	0.000302	0.000287	0.000277	0.000261	0.000342	0.000724	0.000671	0.000628	0.00065	0.000777	0.000629	0.000498	0.00063	0.000499	0.000544	0.000397	0.000549	0.000315	0.000346
Iron (Fe)-Total	mg/L	1	-	0.3	-	0.0747	0.296	0.286	0.0567	0.0898	0.0788	0.0475	0.041	0.0464	0.0474	0.0517	0.0447	0.0461	0.0318	0.0281	0.0345	0.0538	0.0566	0.0333	0.035
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01	0.0000066	0.0000174	0.0000177	0.0000133	0.0000158	0.0000167	0.000254	0.0000166	0.0000137	0.0000139	0.0000232	0.0000189	0.0000392	0.0000165	0.0000266	0.0000226	0.0000328	0.0000494	0.0000129	0.0000124
Lithium (Li)-Total	mg/L	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-	1.07	0.952	0.898	1.13	1.32	1.29	0.704	0.723	0.7	0.716	0.743	0.671	0.591	0.669	0.537	0.726	0.923	0.882	0.806	0.851
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-	0.0269	**0.176**	**0.162**	0.0279	0.0464	**0.0561**	0.00308	0.00275	0.00276	0.00331	0.00295	0.00231	0.00695	0.00182	0.00205	0.00507	0.0147	0.017	0.0132	0.0138
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001	<0.0000050	<0.0000050	-	<0.0000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	<0.000050	<0.0000050	-	-	-	-
Molybdenum (Mo)-Total	mg/L	2	1	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-	0.000142	0.000284	0.000261	0.000137	0.000149	0.00016	0.000165	0.000167	0.000168	0.00016	0.000187	0.000141	0.00012	0.000137	0.000117	0.000135	0.0001	0.000152	0.000108	0.000118
Potassium (K)-Total	mg/L	-	-	-	-	0.202	0.327	0.305	0.293	0.312	0.328	0.156	0.129	0.109	0.112	0.116	0.136	0.0994	0.102	0.0887	0.104	0.0884	0.103	0.0841	0.0889
Selenium (Se)-Total	mg/L		0.001	-	0.05	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000044	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000048	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-	3.52	4.11	3.85	3.84	4.28	3.97	2.79	3.25	3.02	3.2	3.57	3.64	2.5	3.59	2.47	2.74	3.24	3.06	2.63	2.74
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000008	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-	2.27	2.49	2.34	2.6	2.79	2.61	1.83	1.91	1.82	1.91	1.76	1.95	1.73	1.84	1.5	1.77	1.61	1.81	1.72	1.78
Strontium (Sr)-Total	mg/L	-	-	-	-	0.0224	0.0467	0.0388	0.0184	0.02	0.0191	0.0158	0.0158	0.0156	0.0172	0.0128	0.0136	0.0136	0.0112	0.0103	0.0132	0.0164	0.0181	0.0193	0.0205
Thallium (Tl)-Total	mg/L		0.0008	-	-	0.0000021	0.000003	0.0000029	0.0000021	0.0000039	0.0000035	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000035	0.000003	0.0000056	0.0000022	<0.0000020	0.0000048	0.000002	0.0000035	0.0000035
Tin (Sn)-Total	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02	0.0000027	0.0000034	0.0000032	0.0000034	0.0000042	0.0000039	0.000009	0.00001	0.0000094	0.0000114	0.0000079	0.0000098	0.0000085	0.0000057	0.0000068	0.0000065	0.0000062	0.0000071	0.0000052	0.0000053
Vanadium (V)-Total	mg/L	-	-	-	-	<0.00020	0.00025	0.00024	<0.00020	<0.00020	<0.00020	<0.00020	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-	0.00097	0.0011	0.001	0.00053	0.00728	0.00073	0.00063	0.00043	0.00052	0.0003	0.00039	0.00057	0.00044	0.00061	0.00043	0.00044	0.00035	0.00065	0.00042	0.0004
Dissolved Metals																									
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-	**0.0624**[A]	0.0142	0.0122	0.0174	0.0176	0.017	**0.0695**	**0.0722**	**0.0774**	**0.0745**	**0.0841**	**0.0766**	**0.06**	**0.0626**	**0.0576**	0.034	0.0248	0.0295	0.0211	0.0194
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01	0.000074	0.000065	0.000063	0.000052	0.000056	0.000058	0.00007	0.000063	0.000071	0.000074	0.000069	0.000057	0.000043	0.000053	0.000045	0.000051	0.000065	0.00006	0.000065	0.000058
Barium (Ba)-Dissolved	mg/L	-	1	-	1	0.00509	0.00787	0.00772	0.00435	0.0044	0.00429	0.00311	0.00278	0.00278	0.00304	0.00244	0.00262	0.00223	0.00154	0.00189	0.00246	0.0031	0.00329	0.00381	0.0037
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5	0.0062	0.0059	0.0056	0.0053	0.0061	0.0053	0.0053	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0055	0.0051	0.0055	0.0055
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000176	<0.0000050	<0.0000050	0.0000051	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-	6.23	7.48	7.47	5.93	6.19	5.35	4.21	3.68	4.16	4.43	3.52	2.9	3.27	2.72	2.4	3.53	4.66	4.37	4.95	4.87
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00013	0.00013	0.00014	0.00018	0.00012	<0.00010	0.00013	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-	0.000234	0.000695	0.000678	0.000134	0.00019	0.000211	0.0000508	0.000043	0.000049	0.0000449	0.0000429	0.0000356	0.0000379	0.0000325	0.000027	0.0000297	0.0000778	0.0000916	0.0000614	0.0000567
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-	0.000413	0.000238	0.000236	0.000278	0.000241	0.000289	0.000699	0.000645	0.000635	0.000635	0.000634	0.00055	0.00047	0.00045	0.000423	0.000414	0.000329	0.000534	0.000322	0.000318
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-	0.135	0.167	0.159	0.0291	0.0383	0.0515	0.0413	0.0328	0.0405	0.0385	0.0401	0.0319	0.0281	0.0219	0.0228	0.0246	0.033	0.0333	0.0262	0.0246
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01	0.0000497	0.0000076	0.000006	0.0000068	0.0000063	0.0000092	0.000018	0.0000133	0.0000108	0.0000094	0.000184	0.0000124	0.0000647	0.0000093	0.0000011	0.0000119	0.0000137	0.0000597	0.0000086	0.0000064

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L180332-1	L1815912-1	L1815913-1	L1819437-1	L1822131-1	L1825866-1	L1852654-1	L1856747-1	L1860025-1	L1862856-1	L1864661-1	L1869598-1	L1881460-1	L1892901-1	L1903637-1	L1915519-1	L1932236-1	L1932236-2	L1942331-1	L1942331-2
						Site	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1	S-1
						Report #	Quarterly Report #1						Quarterly Report #2						Quarterly Report #3			Final Report				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		18-Jul-16	16-Aug-16		23-Aug-16	30-Aug-16	6-Sep-16	31-Oct-16	9-Nov-16	16-Nov-16	23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17		13-Jun-17	
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		1.1	-	0.899	1.18	1.26	1.26	0.719	0.67	0.711	0.729	0.634	0.594	0.588	0.552	0.474	0.632	0.817	0.816	0.854	1.01
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.0398	**0.164**	**0.151**	0.0223	0.0354	0.0468	0.0021	0.00164	0.00214	0.00182	0.00142	0.00132	0.00261	0.000776	0.00083	0.00252	0.00944	0.0118	0.0114	0.0112
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000057	<0.000050	<0.000050	<0.000050	0.000078	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000238	0.000255	0.000237	0.00012	0.000133	0.000168	0.000176	0.00015	0.000166	0.000153	0.000158	0.000141	0.00011	0.000097	0.00009	0.000097	0.000089	0.000135	0.000097	0.000092
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.205	0.292	0.31	0.295	0.303	0.327	0.16	0.123	0.116	0.111	0.121	0.122	0.0988	0.079	0.0758	0.0847	0.0897	0.0924	0.093	0.0943
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000045	<0.000040	0.000042	<0.000040	0.000052	<0.000040	<0.000040	0.000045	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		3.61	3.61	3.75	4.01	4.11	4.06	2.88	3.1	3.14	3.14	2.87	3.18	2.4	2.9	2.19	2.33	3.13	2.75	2.84	2.8
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		2.31	2.3	2.23	2.75	2.67	2.76	1.94	1.77	1.88	1.95	1.78	1.78	1.69	1.49	1.28	1.56	1.49	1.61	1.83	1.87
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0226	0.0424	0.0405	0.0186	0.0198	0.0187	0.0155	0.0153	0.0161	0.0166	0.0124	0.0125	0.013	0.0106	0.0105	0.0125	0.0179	0.0185	0.0211	0.0216
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		0.0000024	0.0000028	0.0000028	<0.0000020	0.000003	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000029	0.0000024	0.0000044	<0.0000020	<0.0000020	0.0000044	0.0000021	0.0000031	0.0000036
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000068	0.000002	0.0000021	0.0000026	0.000003	0.0000026	0.0000092	0.0000087	0.0000094	0.0000107	0.0000091	0.0000079	0.0000066	0.0000061	0.0000064	0.0000063	0.0000053	0.0000053	0.0000051	0.0000042
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00021	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00119	0.00102	0.00104	0.001	0.00687	0.00093	0.00045	0.00053	0.00055	0.00029	0.00059	0.00073	0.00071	0.0006	0.00027	0.0004	0.00027	0.00069	0.00018	0.00018
Biological Oxygen Demand																										
BOD	mg/L	-	-	-	-		-	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		-	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																										
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	-	<0.10	-	-	-	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		87	101.6	107.7	103.8	93.4	88	92.5	98.7	89.8	116	100.4	94.7	95.8	104	100	93.5	87.9	79.6	82.1	85.7
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.00010	<0.00010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000727
Acridine d9	%	-	-	-	-		86.7	78.3	85.2	99.9	101.4	86.4	90.7	86.4	93.1	83	66.8	112.5	92	92	120.2	93.6	91.9	94.9	70.4	67.9
Chrysene d12	%	-	-	-	-		92.4	95.3	94.9	120.3	106.3	98	87.2	101.4	81.8	60.7	78.4	118.9	80.4	87.4	94.9	99.8	96.1	103	70.7	70.6
Naphthalene d8	%	-	-	-	-		80.8	76.9	76.6	92.2	97	92.7	104.6	109.8	90.8	99.2	79.4	123.3	88.4	87.3	79.9	94	99.2	109.6	69.6	68.8
Phenanthrene d10	%	-	-	-	-		99.4	88.5	86	102.9	116.5	100.8	104.3	109.6	102.9	97.3	79	120.4	100.5	95.5	110.4	108.3	105.5	114.3	72.3	72.3

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1860023-1	L1860023-2	L1862850-1	L1864658-1	L1869591-1	L1881469-1	L1892914-1	L1892914-2	L1903641-1	L1915521-1	L1932259-1	L1932259-2	L1942299-1	L1942299-1	L1830193-1	L1852678-1	L1856746-1	L1856746-2	L1860021-1	L1862847-1
						Site	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-3	S-3	S-3	S-3	S-3	S-3
						Report #	Quarterly Report #2					Quarterly Report #3				Final Report					Quarterly Report #1	Quarterly Report #2				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		16-Nov-16		23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17	20-Feb-17		20-Mar-17	19-Apr-17	25-May-17		13-Jun-17		14-Sep-16	31-Oct-16	9-Nov-16		16-Nov-19	23-Nov-16
General Parameters																										
Conductivity	uS/cm	-	-	-	-		36.5	34.5	35.8	32.8	31	35.5	29.5	27.1	27	57	72.4	72.7	58.8	59.1	1170	740	522	545	566	566
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		14.3	14.3	13	12.3	9.79	10.2	9.34	9.44	9.76	22.1	29.6	29.3	22.8	21.8	414	257	182	195	202	197
pH	pH	6.5-9	6.5-9	7-10.5			**6.94**	**6.90**	7.37	7.15	7.07	7.06	7.42	7.28	**6.96**	**6.62**	7.13	7.36	**6.82**	**6.81**	8.17	7.73	7.77	7.76	7.51	8.05
pH	pH	6.5-9	6.5-9	7-10.5			**6.94**	**6.90**	7.37	7.15	7.07	7.06	7.42	7.28	**6.96**	**6.62**	7.13	7.36	**6.82**	**6.81**	8.17	7.73	7.77	7.76	7.51	8.05
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		<1.0	<1.0	<1.0	<1.0	<1.0	67.7	1.2	<1.0	5.9	<1.0	6	7.3	6.5	5.5	-	<1.0	3.5	1.8	<1.0	3.4
Turbidity	NTU	Note 2	Note 2	-	-		0.32	0.27	0.41	0.31	0.57	43.8	0.55	0.75	0.33	0.54	4.89	9.01	3.86	3.26	1.57	1.03	3.43	3.24	0.32	1.68
Chloride (Cl)	mg/L	600	150	250	-		2.65	2.64	2.48	2.23	2.38	2.95	2.25	2.27	1.99	7.4	5.76	5.78	7.75	7.74	134	98.1	56.9	56.7	61.8	59.6
Sulfate (SO_4)	mg/L	-	128	500	-		1.43	1.42	1.39	1.38	1.44	1.24	1.32	1.33	1.33	1.44	0.79	0.83	0.72	0.7	248	162	109	109	111	101
Nutrients																										
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0051	<0.0050	<0.0050	<0.0050	0.0131	0.0694	0.0625	0.0346	0.0336	0.0271	<0.0050	<0.0050	<0.0050	<0.0050	0.0054
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.025	0.0249	0.0415	0.028	0.0516	0.125	0.0404	0.0403	0.0328	0.0304	0.0102	0.0128	0.0053	0.0048	0.514	1.07	0.72	0.728	0.699	0.716
Nitrate (as N)	mg/L	32.8	3	-	10		0.025	0.0249	0.0415	0.028	0.0516	0.125	0.0404	0.0403	0.0328	0.0304	0.0102	0.0128	0.0053	0.0048	0.506	1.07	0.72	0.728	0.699	0.716
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0077	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.097	0.099	0.095	0.11	0.109	0.104	0.055	<0.050	0.083	0.106	0.664	0.369	0.26	0.293	0.069	<0.11	0.102	<0.080	<0.076	<0.078
Total Nitrogen	mg/L	-	-	-	-		0.122	0.124	0.137	0.138	0.16	0.229	0.095	0.088	0.115	0.137	0.674	0.382	0.265	0.298	0.583	1.11	0.822	0.797	0.757	0.783
Total Organic Nitrogen	mg/L	-	-	-	-		0.096	0.098	0.091	0.108	0.106	0.099	0.054	<0.050	0.081	0.093	0.595	0.307	0.225	0.26	<0.12	<0.22	<0.16	<0.16	<0.15	<0.16
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.105	0.098	0.1	0.098	0.09	0.067	0.052	0.051	0.088	0.107	0.516	0.41	0.167	0.179	0.076	<0.050	<0.078	0.093	<0.077	<0.079
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.13	0.123	0.142	0.126	0.142	0.192	0.092	0.091	0.121	0.138	0.526	0.422	0.172	0.184	0.589	0.189	0.779	0.82	0.773	0.788
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0014	0.0031	0.0036	0.0034	0.0033	0.0032
Phosphorus (P)-Total	mg/L	-	-	-	-		<0.0020	<0.0020	0.0027	<0.0020	0.0039	0.0482	0.0025	0.0021	0.0046	0.0046	0.0773	0.0297	0.0168	0.0217	0.0048	0.0048	0.0133	0.0152	0.0093	0.0048
Organic Carbon																										
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		3.81	3.95	3.81	3.93	4.7	3.04	2.68	2.66	2.92	1.96	3.8	3.56	1.98	1.8	3.11	1.69	2.54	1.4	1.56	1.48
Total Organic Carbon	mg/L	-	Note 5	-	-		3.88	3.89	3.9	4.18	4.11	3.62	2.74	2.65	2.75	2.49	8.26	3.75	2.47	2.15	3.47	1.79	1.59	1.77	1.59	1.46
Total Metals																										
Aluminum (Al)-Total	mg/L	-	-	-	-		0.1	0.0915	0.054	0.0849	0.099	1.14	0.0747	0.0776	0.108	0.07	0.119	0.215	0.172	0.218	0.0687	0.0397	0.147	0.143	0.0233	0.0828
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000058	0.000367	0.000302	0.000297	0.000295	0.000269
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000073	0.000067	0.000089	0.000072	0.000055	0.000188	0.000047	0.000058	0.000058	0.000085	0.000252	0.000301	0.000137	0.000161	0.000302	0.000125	0.000152	0.000141	0.000107	0.000125
Barium (Ba)-Total	mg/L	-	1	-	1		0.0031	0.00305	0.0029	0.00302	0.00274	0.0125	0.00211	0.00208	0.00267	0.00557	0.00875	0.01	0.00764	0.00857	0.0562	0.0257	0.0165	0.0172	0.0171	0.0167
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000028	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.000011	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		0.0057	<0.0050	<0.0050	0.0066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0558	0.0385	0.0307	0.0297	0.0277	0.0258
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000074	<0.0000050	<0.0000050	<0.0000050	0.0000071	0.0000127	0.0000141	0.0000071	0.0000101	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	-	-		4.28	4.2	4.16	3.39	2.82	3.49	2.89	2.93	3.21	6.36	9.93	9.77	5.82	6.6	141	80.1	63.2	65.3	65.5	63.3
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00014	0.00014	0.00012	0.00013	0.00016	**0.00178**	0.00011	0.00013	0.00016	0.00013	0.00016	0.00023	0.00017	0.00021	<0.00010	0.00016	0.0003	0.00032	0.00011	0.0002
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.00018	0.000145	0.0000706	0.0000661	0.0000828	0.000777	0.0000478	0.0000461	0.000111	0.000347	0.00309	0.00342	0.000947	0.00113	0.00125	0.000149	0.000207	0.000213	0.0000908	0.00014
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000686	0.000779	0.000678	0.000572	0.000631	**0.00367**	0.000526	0.000514	0.000704	0.000476	0.000681	0.00117	0.00116	0.00107	0.000862	0.0016	0.00173	0.00173	0.00121	0.00143
Iron (Fe)-Total	mg/L	1	-	0.3	-		0.0778	0.0749	0.0519	0.0425	0.0582	**1.1**	0.0381	0.0394	0.0577	0.226	**0.827**	**0.914**	**0.913**	**1.02**	0.0838	0.0451	0.159	0.158	0.0212	0.0837
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000344	0.0000236	0.0000164	0.0000218	0.0000256	0.000335	0.0000275	0.0000182	0.00008	0.0000304	0.0000942	0.000174	0.000142	0.000178	0.0000664	0.0000435	0.000155	0.00015	0.0000204	0.0000801
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		0.735	0.748	0.508	0.642	0.651	0.886	0.582	0.612	0.617	1.48	1.67	2.01	1.43	1.91	21.4	14.6	10.2	10.2	10.4	10.2
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.0216	0.0161	0.00459	0.004	0.00655	0.0396	0.00352	0.00338	0.0109	**0.101**	**0.776**	**0.952**	**0.21**	**0.237**	**0.357**	0.0119	0.0144	0.0152	0.0062	0.0117
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	-	<0.000050	<0.0000050	-	-	-	-	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	0.000051	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00401	0.00155	0.00127	0.00129	0.00142	0.00121
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000181	0.000219	0.000183	0.000126	0.000149	0.00123	0.000125	0.000125	0.000162	0.000215	0.000538	0.000738	0.000378	0.000412	0.000964	0.000934	0.000838	0.000889	0.00056	0.000744
Potassium (K)-Total	mg/L	-	-	-	-		0.115	0.11	0.112	0.117	0.13	0.193	0.08	0.0834	0.103	0.127	0.251	0.278	0.157	0.151	3.93	2.1	1.64	1.6	1.55	1.44
Selenium (Se)-Total	mg/L		0.001	-	0.05		0.00004	<0.000040	0.000051	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000141	0.000417	0.00036	0.000367	0.000362	0.000331
Silicon (Si)-Total	mg/L	-	-	-	-		3.15	3.19	2.83	3.06	3.26	4.39	2.43	2.48	2.63	3.88	5.7	6.08	4.65	5.15	7.61	5	5.05	5.07	4.48	4.58
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		1.87	1.84	1.89	1.71	1.76	1.78	1.55	1.56	1.64	3.12	2.95	3.2	2.83	2.96	58.5	41.4	29.4	29.9	29.5	26.6
Strontium (Sr)-Total	mg/L	-	-	-	-		0.0167	0.0164	0.0205	0.0131	0.0122	0.0174	0.0115	0.0115	0.0116	0.0251	0.035	0.0389	0.0262	0.0304	0.562	0.331	0.222	0.232	0.24	0.227
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	0.0000025	0.0000037	0.0000051	0.0000069	0.0000033	<0.0000020	0.0000027	0.0000072	0.0000057	0.0000035	0.0000038	0.0000035	0.0000062	0.0000034	0.0000035	0.0000028	0.0000028
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000143	0.0000128	0.0000117	0.0000084	0.0000091	0.0000529	0.0000071	0.0000066	0.0000102	0.0000063	0.000011	0.000017	0.0000168	0.0000209	0.0036	0.00116	0.000835	0.000869	0.000849	0.000832
Vanadium (V)-Total	mg/L	-	-	-	-		0.00025	0.00028	0.00021	<0.00020	0.00022	0.00346	<0.00020	<0.00020	0.00024	0.00024	0.00048	0.00074	0.00051	0.00062	0.0004	0.00105	0.00127	0.00128	0.00092	0.001
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00057	0.00046	0.00043	0.00033	0.00055	0.00291	0.0004	0.00039	0.00122	0.00088	0.00278	0.00419	0.00468	0.0049	0.00046	0.00175	0.00072	0.00073	0.00028	0.00038
Dissolved Metals																										
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		**0.081**	**0.0778**	**0.0641**	**0.0896**	**0.0827**	**0.0713**	**0.0584**	**0.0587**	**0.0622**	**0.0624**[A]	0.0432	**0.053**[A]	0.038	0.0366	0.00156	0.00644	0.00575	0.00579	0.00372	0.00357
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000051	0.00033	0.000312	0.000298	0.000286	0.000257
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000076	0.00008	0.000066	0.000075	0.000056	0.000052	0.000053	0.000048	0.000052	0.000077	0.000219	0.000238	0.000124	0.00012	0.00026	0.00012	0.000113	0.000117	0.000103	0.000098
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00299	0.00289	0.00303	0.0032	0.00252	0.000956	0.00194	0.00188	0.00232	0.00572	0.00702	0.00743	0.00639	0.00641	0.0542	0.0274	0.0158	0.0162	0.0163	0.0155
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.052	0.0311	0.0271	0.0308	0.0275	0.0254
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		<0.0000050	<0.0000050	0.0000149	0.0000075	<0.0000050	<0.0000050	<0.0000050	0.000009	<0.0000050	0.0000068	0.0000068	0.0000093	0.0000051	0.000005	<0.0000050	<0.0000050	**0.0000489**[B]	<0.0000050	0.0000163	0.0000122
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		4.45	4.48	3.97	3.79	2.87	3.11	2.8	2.85	2.98	6.39	9.38	8.84	6.63	6.29	131	79.1	57.6	61.6	63.6	62.9
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00015	0.00014	0.00013	0.00015	0.00014	0.00012	0.00011	0.00011	0.00012	0.00014	0.00011	0.00012	0.00012	0.00011	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.0000858	0.0000797	0.0000615	0.0000657	0.000046	0.0000556	0.000037	0.000037	0.000063	0.00035	0.00257	0.00242	0.000694	0.000655	0.000279	0.0000826	0.0000533	0.0000538	0.0000547	0.0000661
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000655	0.000633	0.000608	0.000679	0.000626	0.000532	0.000458	0.000455	0.000458	0.000574	0.000479	0.000725	0.000346	0.000361	0.000511	0.00144	0.00119	0.0016	0.00125	0.00109
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.0563	0.0689	0.0461	0.049	0.0378	0.0388	0.0253	0.0257	0.0311	0.211	**0.535**	**0.619**	**0.601**	**0.61**	0.0042	0.0034	0.0033	0.0042	0.0017	0.0019
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.000012	0.0000117	0.0000159	0.0000243	0.0000115	0.0000551	0.0000096	0.0000169	0.0000165	0.000045	0.0000412	0.0000545	0.0000325	0.0000228	0.0000149	0.0000123	0.0000094	0.000016	0.000008	0.0000122

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1860023-1	L1860023-2	L1862850-1	L1864658-1	L1869591-1	L1881469-1	L1892914-1	L1892914-2	L1903641-1	L1915521-1	L1932259-1	L1932259-2	L1942299-1	L1942299-1	L1830193-1	L1852678-1	L1856746-1	L1856746-2	L1860021-1	L1862847-1
						Site	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-2	S-3	S-3	S-3	S-3	S-3	S-3
						Report #	Quarterly Report #2					Quarterly Report #3				Final Report					Quarterly Report #1	Quarterly Report #2				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		16-Nov-16		23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17	20-Feb-17		20-Mar-17	19-Apr-17	25-May-17		13-Jun-17		14-Sep-16	31-Oct-16	9-Nov-16		16-Nov-19	23-Nov-16
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		0.784	0.766	0.741	0.675	0.637	0.599	0.568	0.567	0.567	1.48	1.5	1.75	1.53	1.48	21	14.4	9.3	9.98	10.6	9.83
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00852	0.0074	0.00479	0.00943	0.00387	0.00649	0.00261	0.00252	0.00692	**0.0999**	**0.647**	**0.748**	**0.164**	**0.167**	**0.112**	0.00453	0.00213	0.00217	0.00145	0.00399
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00434	0.0015	0.00134	0.00136	0.00133	0.00121
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000185	0.000174	0.000151	0.000167	0.00013	0.000128	0.000109	0.000104	0.000123	0.000219	0.000409	0.000501	0.000268	0.000243	0.000631	0.000867	0.000632	0.000625	0.000552	0.000599
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.119	0.118	0.106	0.123	0.13	0.103	0.0819	0.0806	0.0905	0.124	0.23	0.256	0.125	0.126	3.77	2.09	1.48	1.61	1.53	1.4
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000043	<0.000040	<0.000040	<0.000040	<0.000040	0.000154	0.000429	0.000347	0.000342	0.000351	0.000324
Silicon (Si)-Dissolved	mg/L	-	-	-	-		3.27	3.27	2.97	2.9	3.1	2.43	2.34	2.32	2.31	3.84	5	5.58	4.99	4.94	7.4	4.82	3.9	4.64	4.46	4.12
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		1.97	1.96	1.78	1.74	1.76	1.73	1.51	1.47	1.54	3.2	2.62	2.93	2.98	3.01	56.2	40.4	27.4	28.3	29	26.2
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0162	0.0161	0.0163	0.0146	0.0121	0.0124	0.0108	0.0113	0.0114	0.0246	0.0308	0.0341	0.0265	0.0261	0.559	0.283	0.177	0.223	0.241	0.226
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000031	0.0000022	0.0000036	0.0000034	<0.0000020	0.0000025	0.0000061	0.0000052	0.0000029	0.0000032	0.0000038	0.0000061	0.000003	0.0000029	0.0000029	0.0000026
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000092	0.0000089	0.0000102	0.0000085	0.0000078	0.0000069	0.0000065	0.0000066	0.0000069	0.0000062	0.0000051	0.0000055	0.0000047	0.0000045	0.0035	0.00108	0.000799	0.000794	0.000821	0.000855
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00023	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00022	0.00025	0.00029	0.00023	0.00021	<0.00020	0.00094	0.00085	0.00087	0.00089	0.00074
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00153	0.00048	0.00123	0.00074	0.00041	0.00119	0.00034	0.00081	0.00075	0.00183	0.00236	0.00309	0.00091	0.00106	0.00046	0.00109	0.00061	0.00054	0.00047	0.00037
Biological Oxygen Demand																										
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	-	-	-	-	-
Hydrocarbons																										
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-									-			-	-	<0.10	<0.10	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		97.1	92.7	110.3	101.5	104.9	94.6	106.7	106.6	100.2	86.5	95.6	84.9	88.9	94.4	108.2	94.3	89.1	83.3	82.2	90
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		103.2	96.1	99.6	74.9	90.2	79.6	99.5	94.5	124	101.5	104.4	94.1	70.5	66.6	91.3	83.6	100.9	103.7	95.8	88.3
Chrysene d12	%	-	-	-	-		92.9	84.2	63.7	79.3	100.7	86.9	105.6	102.1	98.3	97.3	100.5	100.5	78.9	65	84.5	81.3	98.8	101.2	88	60.1
Naphthalene d8	%	-	-	-	-		94.5	92.3	107.7	78.8	105.8	85.1	100.4	97	83.4	92.2	105.2	100.6	76.2	64.3	105.8	101.5	108.9	109	88.5	102.7
Phenanthrene d10	%	-	-	-	-		109	104.3	100.5	79.9	108.8	94.2	107	102.7	113.7	107.3	115.2	101.3	80.4	68.4	93.2	100.1	107.4	107.5	100.4	93.9

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1864656-1	L1864668-1	L1869573-1	L1869573-2	L1881473-1	L1892917-1	L1903642-1	L1915524-1	L1932289-1	L1942323-1	L1803307-1	L1815914-1	L1819438-1	L1822202-1	L1825987-1	L1825987-2	L1830206-1	L1852686-1	L1852686-2	L1856745-1
						Site	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4
						Report #	Quarterly Report #2				Quarterly Report #3			Final Report			Quarterly Report #1							Quarterly Report #2		
							29-Nov-16		12-Dec-16		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	16-Aug-16	23-Aug-16	30-Aug-16	6-Sep-16		14-Sep-16	31-Oct-16		9-Nov-16
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC																					
General Parameters																										
Conductivity	uS/cm	-	-	-	-		418	416	333	334	358	392	327	392	552	665	-	234	256	285	151	150	263	43.7	42	40.7
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		155	136	108	104	112	151	124	164	230	305	61.4	101	111	132	53.1	53.5	110	16	15.9	15.7
pH	pH	6.5-9	6.5-9	7-10.5			7.78	7.81	7.76	7.77	7.76	7.77	7.69	7.80	8.07	7.78	-	7.60	7.96	7.99	7.45	7.53	7.99	7.38	7.35	7.35
pH	pH	6.5-9	6.5-9	7-10.5			7.78	7.81	7.76	7.77	7.76	7.77	7.69	7.80	8.07	7.78	-	7.60	7.96	7.99	7.45	7.53	7.99	7.38	7.35	7.35
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		1.7	1.9	<1.0	<1.0	13	<1.0	28.2	4.5	141	115	1.6	5.2	3.7	<1.0	<3.0	<3.0	<1.0	<1.0	<1.0	<1.0
Turbidity	NTU	Note 2	Note 2	-	-		1.17	0.8	2.21	2.13	21.7	8.2	1.42	0.38	4.34	7.42	0.23	2.09	1.03	1.01	0.39	0.39	0.39	0.78	1.15	0.42
Chloride (Cl)	mg/L	600	150	250	-		40	40	28.7	28.7	40.4	33.6	21.5	26.6	37.6	57.6	-	12.7	15.2	17.1	9.8	9.8	15.1	3.2	3.2	2.78
Sulfate (SO_4)	mg/L	-	128	500	-		76.2	76.3	60.8	60.9	52.2	74.7	60.9	74.6	101	120	-	10.6	8.76	8.38	12.4	12.4	9.81	2.43	2.42	2.29
Nutrients																										
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		<0.0050	<0.0050	<0.0050	<0.0050	0.0166	<0.0050	<0.0050	<0.0050	0.0051	0.0187	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.572	0.575	0.503	0.505	0.43	0.553	0.454	0.462	0.377	0.269	-	0.221	0.236	0.237	0.0496	0.0489	0.236	0.0267	0.0276	0.0212
Nitrate (as N)	mg/L	32.8	3	-	10		0.572	0.575	0.503	0.503	0.427	0.553	0.454	0.462	0.377	0.267	-	0.221	0.236	0.237	0.0496	0.0489	0.236	0.0267	0.0276	0.0212
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	0.0011	0.0029	<0.0010	<0.0010	<0.0010	<0.0010	0.002	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		<0.063	<0.063	<0.054	<0.056	0.052	<0.059	0.067	0.455	0.591	0.114	0.113	0.25	0.114	0.079	0.149	0.145	<0.050	0.131	0.129	0.106
Total Nitrogen	mg/L	-	-	-	-		0.634	0.63	0.544	0.559	0.481	0.591	0.52	0.917	0.967	0.383	0.172	0.471	0.349	0.315	0.198	0.194	0.282	0.158	0.156	0.127
Total Organic Nitrogen	mg/L	-	-	-	-		<0.13	<0.13	<0.11	<0.11	<0.096	<0.12	<0.10	0.45	0.59	0.095	0.113	0.245	0.11	0.075	0.146	0.145	<0.056	0.129	0.127	0.105
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		<0.061	<0.061	<0.055	<0.054	0.065	<0.059	<0.050	0.066	0.123	0.121	-	0.094	0.126	0.086	0.13	0.124	0.053	0.14	0.124	0.119
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.607	0.607	0.552	0.54	0.494	0.591	0.503	0.528	0.5	0.391	-	0.315	0.361	0.323	0.18	0.172	0.289	0.166	0.152	0.14
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		0.0032	0.0031	0.0024	0.0026	0.0032	0.0022	0.0031	0.0013	0.0029	0.0022	-	0.0012	0.0022	0.0025	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-		0.0037	<0.010	0.0064	0.006	0.0214	0.0042	0.0081	0.105	0.187	0.0069	0.0028	0.0064	0.0064	0.0059	0.0061	0.0071	0.0021	0.0041	0.0033	0.0057
Organic Carbon																										
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		0.91	1.22	1.14	1	1.12	0.99	1.26	1.03	1.77	2.26	-	2.13	2.9	3.01	3.54	3.32	2.41	4.75	4.46	4.45
Total Organic Carbon	mg/L	-	Note 5	-	-		1.03	1.24	1.16	1.13	1.22	1.03	1.37	2.8	9.9	1.94	1.58	2.41	3.18	3.14	3.64	3.6	2.58	4.76	4.8	4.61
Total Metals																										
Aluminum (Al)-Total	mg/L	-	-	-	-		0.0999	0.0369	0.0749	0.0776	0.941	0.0951	0.0958	1.02	0.183	0.0236	0.0182	0.04	0.0118	0.012	0.0188	0.0167	0.00996	0.0951	0.0919	0.0969
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		0.000252	0.000269	0.000182	0.000178	0.000149	0.000189	0.000176	0.000182	0.000141	0.000167	<0.000020	<0.000020	<0.000020	<0.000020	0.000024	0.000024	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000112	0.000099	0.000077	0.000085	0.000238	0.000103	0.000114	0.000716	0.00014	0.000115	0.000079	0.000111	0.000109	0.000124	0.000122	0.000122	0.000097	0.000083	0.000091	0.000085
Barium (Ba)-Total	mg/L	-	1	-	1		0.0108	0.0107	0.00799	0.00797	0.0146	0.00955	0.00875	0.0288	0.017	0.022	0.0103	0.0185	0.0177	0.019	0.00845	0.00892	0.0167	0.00372	0.00381	0.00354
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	0.000022	<0.000010	<0.000010	0.000047	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		0.0218	0.0174	0.0174	0.018	0.0131	0.015	0.0138	0.0172	0.0183	0.0195	0.0087	0.0101	0.009	0.01	0.0079	0.0082	0.0092	0.0054	0.0056	0.0062
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		0.0000146	<0.0000050	<0.0000050	<0.0000050	0.0000069	<0.0000050	<0.0000050	0.0000773	0.0000096	0.0000157	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000137
Calcium (Ca)-Total	mg/L	-	-	-	-		45.4	43	33.6	33.4	35.7	48.1	45.8	65.8	79	92	17.3	32.1	32.6	36.3	16.2	15.9	29.9	4.84	5.08	5.1
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00019	0.00014	0.00017	0.00018	**0.00198**	0.00015	0.00018	0.00077	0.0003	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00018	0.00016
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.000367	0.0000956	0.0000898	0.0000863	0.000563	0.000241	0.000199	**0.00415**[A]	0.000533	0.000184	0.0000565	0.000124	0.0000526	0.0000518	0.000105	0.0000987	0.000043	0.0000705	0.0000642	0.0000694
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.00155	0.00124	0.00108	0.0011	0.003	0.00144	0.00144	**0.0134**[A]	0.00172	0.00127	0.00031	0.000465	0.000345	0.000371	0.000695	0.00064	0.000365	0.000781	0.000715	0.000793
Iron (Fe)-Total	mg/L	1	-	0.3	-		0.0956	0.0383	0.0677	0.0688	**0.933**	0.0436	0.0467	**0.409**	0.164	0.0241	0.0354	0.0545	0.0155	0.0165	0.0479	0.0425	0.0106	0.0727	0.0719	0.0649
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.000135	0.0000405	0.0000942	0.0000914	0.000578	0.0000937	0.000174	0.000612	0.000176	0.0000334	0.0000181	0.0000422	0.0000093	0.0000106	0.0000178	0.000011	0.0000071	0.0000504	0.0000411	0.0000247
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	0.00075	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		9.08	7.86	5.96	6.04	6.05	7.39	6.21	8.59	11.1	12.3	4.85	7.52	8.25	9.45	4.33	4.46	8.41	1.02	1.01	1.03
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.0421	0.006	0.00334	0.00332	0.0245	0.0326	0.0197	**0.885**	**0.0595**	**0.0876**	0.0124	0.043	0.0272	0.0307	0.0309	0.0272	0.0179	0.00451	0.00459	0.00568
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.0000050	<0.0000050	-	-	-	-	<0.000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		0.00102	0.000871	0.000785	0.000793	0.0006	0.00067	0.000714	0.000542	0.000866	0.00114	0.000052	0.000057	0.000068	0.000062	0.000096	0.000094	0.000072	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000718	0.000601	0.00052	0.000543	0.00213	0.000627	0.000564	0.00618	0.000943	0.000989	0.000206	0.000325	0.00027	0.000271	0.000364	0.00107	0.000259	0.000282	0.000254	0.00025
Potassium (K)-Total	mg/L	-	-	-	-		1.14	1.04	0.907	0.908	0.914	0.894	0.823	2.06	1.17	1.26	0.273	0.488	0.562	0.563	0.363	0.364	0.453	0.193	0.2	0.175
Selenium (Se)-Total	mg/L		0.001	-	0.05		0.000309	0.000278	0.000207	0.00021	0.000162	0.000267	0.000303	0.000333	0.000235	0.000307	<0.000040	<0.000040	0.000051	0.000055	0.000045	<0.000040	0.000048	0.000051	0.000057	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-		4.66	3.84	4.57	4.57	4.98	3.7	4.02	6.07	6.23	5.8	4.02	4.45	4.05	3.98	3.22	3.31	3.99	2.98	2.95	3.4
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000074	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		18.4	19.1	13.3	13.2	15.8	16.4	12.7	17.7	15.8	20.1	5.4	9.92	10.5	11.7	6.05	5.98	9.9	2.12	2.23	2.27
Strontium (Sr)-Total	mg/L	-	-	-	-		0.13	0.123	0.12	0.118	0.125	0.144	0.129	0.141	0.171	0.236	0.0697	0.12	0.118	0.148	0.0679	0.0642	0.121	0.0191	0.0194	0.019
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		0.000003	0.0000027	0.0000031	0.0000031	0.0000075	0.000003	0.0000023	0.0000032	0.000006	0.0000064	<0.0000020	<0.0000020	0.000003	0.0000041	0.0000044	0.0000045	0.0000037	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	0.000021	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.000655	0.000572	0.000395	0.000395	0.000398	0.000713	0.000621	0.00171	0.00156	0.00202	0.0000052	0.0000152	0.0000277	0.0000357	0.0000278	0.0000267	0.0000241	0.0000102	0.0000099	0.0000097
Vanadium (V)-Total	mg/L	-	-	-	-		0.00082	0.00073	0.00072	0.00072	0.0031	0.0007	0.00078	0.00481	0.00124	0.00072	<0.00020	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00028	0.00027	0.00027
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00068	0.00027	0.00045	0.00036	0.00294	0.00045	0.00141	0.0063	0.00056	0.00029	0.00063	0.00088	0.00045	0.00081	0.00219	0.00293	0.00036	0.00072	0.00053	0.00048
Dissolved Metals																										
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		0.00395	0.0129	0.00497	0.00469	0.00655	0.00252	0.00402	0.00286	0.00589	0.00163	0.0055	0.00598	0.00554	0.00499	0.00996	0.0105	0.00597	**0.0723**	**0.0713**	**0.0817**
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		0.000254	0.000247	0.000173	0.000167	0.000142	0.000179	0.000169	0.000162	0.000145	0.000183	<0.000020	<0.000020	<0.000020	<0.000020	0.000022	0.000024	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000099	0.000092	0.000072	0.000069	0.000067	0.00008	0.000085	0.000107	0.000116	0.000109	0.000084	0.000092	0.000113	0.000117	0.000104	0.000098	0.000105	0.00009	0.000084	0.000074
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.0108	0.0107	0.00735	0.00727	0.00724	0.00842	0.00761	0.0101	0.0152	0.0232	0.00933	0.0174	0.0177	0.0185	0.00864	0.00837	0.016	0.00348	0.00367	0.00324
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		0.023	0.0204	0.0164	0.0169	0.013	0.0157	0.0138	0.0139	0.0173	0.0211	0.0082	0.0091	0.0088	0.0096	0.0079	0.0082	0.0088	0.0055	0.0055	0.0061
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		0.0000225	0.000006	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000132	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000326
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		48.9	43.6	33.4	32.1	35.3	48.5	40.5	53.5	74.2	100	16.7	28.2	31.2	37.5	14.6	14.5	30.5	4.74	4.68	4.65
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		<0.00010	0.0001	<0.00010	0.00029	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	0.00013	0.00015
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.0000403	0.0000392	0.0000395	0.0000353	0.000058	0.0000317	0.0000291	0.0000379	0.000049	0.0000633	0.0000223	0.0000361	0.0000382	0.0000365	0.0000775	0.0000727	0.0000357	0.0000534	0.0000531	0.0000556
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000975	0.0011	0.000803	0.000834	0.000705	0.00081	0.000751	0.000842	0.000915	0.00115	0.00031	0.000364	0.000318	0.000339	0.000548	0.000537	0.00039	0.000776	0.000704	0.000713
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.002	0.0156	0.0044	0.0064	0.0059	0.0016	0.0027	0.0023	0.0032	0.0024	0.0042	0.0057	0.0049	0.004	0.025	0.0223	0.0044	0.0511	0.051	0.0647
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000437	0.0000261	0.0000118	0.0000273	0.0000176	<0.0000050	0.0000081	<0.0000050	0.0000057	0.0000103	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.0000050	<0.0000050	0.0000214	0.0000216	0.0000174

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1864656-1	L1864668-1	L1869573-1	L1869573-2	L1881473-1	L1892917-1	L1903642-1	L1915524-1	L1932289-1	L1942323-1	L1803307-1	L1815914-1	L1819438-1	L1822202-1	L1825987-1	L1825987-2	L1830206-1	L1852686-1	L1852686-2	L1856745-1
						Site	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-3	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4
						Report #	Quarterly Report #2				Quarterly Report #3			Final Report			Quarterly Report #1							Quarterly Report #2		
							29-Nov-16		12-Dec-16		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	16-Aug-16	23-Aug-16	30-Aug-16	6-Sep-16		14-Sep-16	31-Oct-16		9-Nov-16
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC																					
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		8.07	6.64	5.98	5.72	5.71	7.26	5.53	7.42	10.8	13.3	4.81	7.43	8.08	9.3	4.06	4.19	8.14	1.02	1.02	0.991
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.000888	0.000898	0.00114	0.00113	0.00577	0.000149	0.000108	0.000324	0.00247	**0.0554**	0.00447	0.0157	0.0207	0.0248	0.0196	0.0173	0.017	0.00318	0.00327	0.00357
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		0.001	0.00104	0.000735	0.000766	0.000622	0.000814	0.000808	0.00083	0.00103	0.00125	0.000058	0.000053	0.000064	0.000054	0.000093	0.000072	0.000063	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000441	0.000391	0.000543	0.000435	0.000441	0.000363	0.000303	0.00038	0.000453	0.000963	0.00019	0.000272	0.000247	0.00026	0.00034	0.000356	0.000248	0.000248	0.000257	0.000271
Potassium (K)-Dissolved	mg/L	-	-	-	-		1.17	1.09	0.873	0.824	0.787	0.909	0.707	1.04	1.06	1.39	0.28	0.428	0.541	0.551	0.374	0.363	0.475	0.187	0.186	0.172
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		0.00031	0.000277	0.00023	0.000219	0.000147	0.00026	0.000236	0.000308	0.000255	0.000291	<0.000040	<0.000040	0.000043	0.000056	<0.000040	<0.000040	0.000044	0.000049	0.000054	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		4.1	3.66	4.26	4.09	2.7	3.46	3.42	4.4	6.26	6.32	3.84	4	3.95	3.97	3.27	3.27	4.01	2.97	2.95	3.22
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		22.4	19	13.1	12.5	16	16.2	11.3	14.8	14.3	21.6	5.45	8.48	10.5	11.5	6.08	6.16	10.4	2.09	2.11	2.11
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.116	0.123	0.115	0.111	0.12	0.141	0.116	0.129	0.177	0.251	0.0682	0.109	0.113	0.145	0.0641	0.0634	0.119	0.0188	0.0191	0.0181
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		0.0000023	0.0000023	0.0000026	0.0000029	0.0000026	0.0000032	0.0000022	0.0000036	0.0000056	0.0000063	<0.0000020	<0.0000020	0.0000023	0.0000031	<0.0000020	0.0000021	0.0000027	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.000549	0.000534	0.000383	0.000371	0.000362	0.000676	0.000555	0.000778	0.00144	0.00224	0.0000045	0.000013	0.000027	0.0000346	0.0000233	0.0000233	0.000023	0.0000091	0.0000089	0.0000086
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.0007	0.00064	0.00051	0.00049	0.0004	0.00049	0.00052	0.00057	0.00071	0.00069	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00023	0.00023	0.00023
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00044	0.00042	0.00022	0.00019	0.00026	0.00011	0.00018	0.00017	0.00018	0.0002	0.00346	0.00066	0.00044	0.00054	0.00126	0.00124	0.00058	0.00083	0.00066	0.00113
Biological Oxygen Demand																										
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-
Hydrocarbons																										
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10
2-Bromobenzotrifluoride	%	-	-	-	-		106.3	113.1	107	88.7	98.5	95.9	106.7	85.8	84.2	90.7	103.2	104.1	96.6	95.7	79.9	94.8	110.2	88.9	99	85.7
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		85.5	86.9	102.3	104.1	95.8	92.4	121.9	96.3	94.5	72.2	87.2	79.1	92.1	87.6	89	86.7	88.3	84.5	92.8	102.1
Chrysene d12	%	-	-	-	-		80.8	88.5	99.8	107.5	80.3	99.3	89.9	72.6	100.7	61.5	91.3	86.1	111.4	95.2	100.3	99.2	82.2	91.2	93.9	104.7
Naphthalene d8	%	-	-	-	-		87.3	90.3	111.6	111.2	94.7	97	81.1	92.9	105.8	69.5	80	75.7	86.7	90.8	93.3	93.4	101	109	111.5	115.6
Phenanthrene d10	%	-	-	-	-		85	89	113	113.3	103	102.8	109.7	104.5	114.2	73.3	100.3	86.2	97.1	106	102.5	101.7	91.3	107.5	109.6	112.1

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1860020-1	L1862845-1	L1862845-2	L1864653-1	L1881478-1	L1892920-1	L1892920-2	L1903654-1	L1915525-1	L1932306-1	L1942324-1	L1803306-1	L1819439-1	L1822194-1	L1852566-1	L1852566-2	L1856744-1	L1860019-1	L1862841-1
						Site	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5
						Report #	Quarterly Report #2				Quarterly Report #3				Final Report			Quarterly Report #1			Quarterly Report #2				
							16-Nov-16	23-Nov-16		29-Nov-16	18-Jan-17	20-Feb-17		20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	23-Aug-16	30-Aug-16	31-Oct-16		9-Nov-16	16-Nov-16	23-Nov-16
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC																				
General Parameters																									
Conductivity	uS/cm	-	-	-	-		39.6	41.3	41	35.3	45.7	32.2	31.1	29.5	36.7	52.1	52.1	-	57.6	61.9	48	47.1	43.9	43.4	47.5
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		16	16.1	16.6	13	15.5	11.6	11.1	10.7	15.4	22.1	21.6	21	24	24.2	18.7	18.2	17.1	18	17.8
pH	pH	6.5-9	6.5-9	7-10.5			7.32	7.40	7.34	7.28	7.44	7.52	7.44	7.27	7.37	7.63	7.41	-	7.29	7.28	7.41	7.34	7.25	7.20	7.38
pH	pH	6.5-9	6.5-9	7-10.5			7.32	7.40	7.34	7.28	7.44	7.52	7.44	7.27	7.37	7.63	7.41	-	7.29	7.28	7.41	7.34	7.25	7.20	7.38
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		<1.0	<1.0	<1.0	<1.0	25.9	<1.0	<1.0	<1.0	1.1	1.1	3.5	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Turbidity	NTU	Note 2	Note 2	-	-		0.34	0.36	0.44	0.35	18	0.8	0.82	0.38	0.53	0.89	0.62	0.21	0.72	0.36	0.63	0.69	0.64	0.2	0.48
Chloride (Cl)	mg/L	600	150	250	-		2.78	2.69	2.69	2.37	3.52	2.31	2.32	1.81	1.97	2.61	2.71	-	3.51	3.59	3.9	3.89	3.17	3.17	3.28
Sulfate (SO_4)	mg/L	-	128	500	-		1.98	2.17	2.18	1.79	2.01	1.69	1.69	1.63	1.74	2.03	2.01	-	2.05	2.01	3.76	3.77	3.13	2.84	3.31
Nutrients																									
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		<0.0050	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.0278	0.0469	0.0471	0.0308	0.136	0.044	0.0436	0.032	0.0223	0.0452	0.0479	-	0.0509	0.0412	0.0343	0.0345	0.0259	0.0355	0.0598
Nitrate (as N)	mg/L	32.8	3	-	10		0.0278	0.0469	0.0471	0.0308	0.136	0.044	0.0436	0.032	0.0223	0.0452	0.0479	-	0.0509	0.0412	0.0343	0.0345	0.0259	0.0355	0.0598
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.103	0.103	0.1	0.11	0.1	<0.050	0.084	0.067	0.07	0.103	0.099	0.066	0.086	<0.050	0.12	0.11	0.11	0.097	0.096
Total Nitrogen	mg/L	-	-	-	-		0.131	0.149	0.147	0.141	0.237	0.094	0.128	0.099	0.093	0.148	0.147	0.139	0.137	0.073	0.154	0.145	0.136	0.132	0.156
Total Organic Nitrogen	mg/L	-	-	-	-		0.101	0.1	0.096	0.109	0.095	<0.050	0.082	0.066	0.07	0.103	0.097	0.066	0.082	<0.050	0.12	0.112	0.109	0.096	0.094
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.106	0.101	0.105	0.102	0.115	0.054	0.051	0.069	0.09	0.084	0.093	-	0.107	<0.050	0.11	0.116	0.104	0.091	0.096
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.133	0.147	0.153	0.132	0.251	0.098	0.095	0.101	0.113	0.129	0.141	-	0.158	0.068	0.144	0.15	0.13	0.126	0.156
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	0.0014	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-		<0.0020	<0.0020	0.0022	<0.0020	0.0179	0.0022	0.0024	0.0027	0.0024	0.004	0.0039	0.0028	0.0059	0.0037	0.0029	0.0026	0.0048	0.0083	<0.0020
Organic Carbon																									
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		3.86	3.76	4.02	3.82	3.15	2.6	2.68	2.96	2.2	2.3	1.85	-	1.63	1.15	4.01	3.83	4.27	3.54	3.73
Total Organic Carbon	mg/L	-	Note 5	-	-		4.11	4.07	3.98	4.41	3.48	2.65	3.06	2.79	2.39	2.09	1.77	1.08	1.45	1.19	4.09	3.98	4.36	3.72	3.84
Total Metals																									
Aluminum (Al)-Total	mg/L	-	-	-	-		0.0748	0.0881	0.0883	0.0728	0.422	0.0763	0.075	0.0688	0.0486	0.065	0.0312	0.015	0.0222	0.0282	0.0768	0.0773	0.106	0.0673	0.0781
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000024
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000075	0.000075	0.000077	0.000073	0.00011	0.000057	0.000055	0.000048	0.000064	0.000082	0.000058	0.000045	0.000056	0.000066	0.000077	0.00008	0.000081	0.000067	0.000076
Barium (Ba)-Total	mg/L	-	1	-	1		0.00386	0.00355	0.00356	0.00265	0.00714	0.00217	0.00218	0.00224	0.00285	0.00456	0.00393	0.00493	0.00573	0.00577	0.00407	0.00425	0.00379	0.00326	0.00392
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		0.0052	<0.0050	0.0051	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	0.0058	0.0055	0.006	0.0069	0.0074	0.007	<0.0050	<0.0050	<0.0050
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	0.0000124	<0.0000050	0.0000612	0.000101	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000293	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000927
Calcium (Ca)-Total	mg/L	-	-	-	-		4.55	5.22	4.97	3.69	4.44	3.6	3.36	3.45	4.77	7.53	5.87	6.48	7.32	7.3	5.68	5.46	5.63	4.97	5.59
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00014	0.00015	0.00015	0.00015	0.00055	0.00012	0.00012	0.00013	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	0.00027	0.00017	0.00013	0.00017
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.0000595	0.0000715	0.0000678	0.0000569	0.000348	0.0000511	0.0000509	0.000049	0.0000682	0.000164	0.000062	0.0000486	0.000076	0.000118	0.0000517	0.0000586	0.0000672	0.0000487	0.0000557
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000652	0.000666	0.000704	0.000549	0.00156	0.000554	0.000529	0.000582	0.000447	0.000554	0.000362	0.000237	0.000272	0.000249	0.000686	0.000674	0.000798	0.000596	0.000677
Iron (Fe)-Total	mg/L	1	-	0.3	-		0.0558	0.0675	0.0643	0.0549	**0.473**	0.0444	0.048	0.0402	0.0553	0.116	0.0681	0.0362	0.0283	0.0417	0.0545	0.0675	0.072	0.045	0.0542
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000113	0.0000196	0.0000213	0.0000252	0.000174	0.0000232	0.0000285	0.000042	0.0000253	0.0000616	0.0000287	0.0000098	0.0000151	0.0000199	0.0000274	0.0000288	0.0000296	0.0000134	0.000184
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		0.912	1.09	1.1	0.841	1.06	0.772	0.74	0.683	1.04	1.48	1.34	1.45	1.36	1.45	1.13	1.14	1.18	0.994	1.18
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00372	0.00626	0.00623	0.00514	0.0311	0.00496	0.00503	0.00551	0.00961	0.0314	0.0106	0.0121	0.0302	0.0456	0.00209	0.00213	0.00309	0.00186	0.00324
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	<0.000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000209	0.000234	0.000242	0.000187	0.000571	0.000177	0.000156	0.000159	0.000164	0.000228	0.00015	0.000139	0.000155	0.000164	0.000234	0.00026	0.00027	0.000199	0.000222
Potassium (K)-Total	mg/L	-	-	-	-		0.131	0.144	0.147	0.132	0.171	0.0987	0.0949	0.101	0.133	0.152	0.111	0.168	0.212	0.208	0.239	0.234	0.223	0.151	0.179
Selenium (Se)-Total	mg/L		0.001	-	0.05		<0.000040	0.000043	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000041	<0.000040	<0.000040	<0.000040	<0.000040	0.000059	<0.000040	<0.000040	0.000044	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-		3.03	3.41	3.4	2.74	3.1	2.51	2.42	2.73	2.87	3.51	2.77	3.55	3.44	3.46	3.14	3.13	3.78	3.1	3.33
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		1.95	2.28	2.18	1.89	2.18	1.83	1.67	1.66	2.13	2.43	2.18	2.86	2.82	2.81	2.53	2.46	2.52	2.22	2.53
Strontium (Sr)-Total	mg/L	-	-	-	-		0.0176	0.0202	0.0191	0.0165	0.019	0.0131	0.0127	0.0121	0.0173	0.0258	0.0238	0.0289	0.0309	0.0319	0.0222	0.0228	0.0228	0.0208	0.0225
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	0.000002	0.0000035	0.0000032	0.0000037	<0.0000020	0.000003	0.0000066	0.0000033	<0.0000020	0.0000026	0.0000037	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000089	0.0000106	0.0000112	0.0000092	0.0000179	0.0000077	0.0000079	0.0000076	0.0000092	0.000009	0.0000082	<0.0000020	0.0000025	0.0000028	0.0000084	0.000009	0.0000084	0.0000085	0.0000094
Vanadium (V)-Total	mg/L	-	-	-	-		0.00022	0.00024	0.00023	<0.00020	0.00137	<0.00020	<0.00020	<0.00020	<0.00020	0.00024	<0.00020	<0.00020	0.00024	0.00026	0.00026	0.00028	0.00034	0.00023	0.00024
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00038	0.0004	0.00037	0.00027	0.00151	0.0005	0.00047	0.00067	0.0005	0.00068	0.00038	0.00033	0.00075	0.00101	0.00029	0.00028	0.00045	0.00025	0.00047
Dissolved Metals																									
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		**0.0786**	**0.0693**	**0.0759**	**0.0624**	**0.0707**	**0.0606**	**0.0599**	**0.0598**	0.0368	0.0234	0.0172	0.0083	0.0123	0.012	**0.0602**	**0.0593**	**0.0732**	**0.0786**	**0.062**
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000074	0.000066	0.000068	0.000078	0.000057	0.000052	0.000051	0.000046	0.000056	0.000069	0.000073	0.000053	0.000059	0.000064	0.000072	0.000077	0.000071	0.00007	0.000068
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00309	0.00322	0.00338	0.00313	0.00167	0.00201	0.00202	0.00208	0.0027	0.00401	0.00387	0.00511	0.00534	0.00605	0.00409	0.00381	0.00358	0.003	0.00354
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		<0.0050	<0.0050	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.006	0.006	0.0055	0.0056	0.0065	0.0069	0.0065	0.0064	0.0056	<0.0050
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		0.000035	0.0000238	**0.0000064**[B]	0.0000618	<0.0000050	**0.000309**	0.000023	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000027	<0.0000050	0.0000078	<0.0000050	<0.0000050	0.0000117	0.0000059
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		4.76	4.81	4.95	3.85	4.49	3.45	3.25	3.18	4.57	6.59	6.37	6.14	7.34	7.27	5.62	5.42	5.05	5.53	5.39
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00014	0.00013	0.00013	0.00016	0.00012	0.00011	0.00011	0.00011	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00011	0.00017	0.00016	0.00012
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.0000586	0.0000487	0.0000051	0.000045	0.0000611	0.0000359	0.0000393	0.0000368	0.0000416	0.0000524	0.0000317	0.0000346	0.0000708	0.0000915	0.0000438	0.0000387	0.000046	0.0000455	0.0000369
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000707	0.000617	0.000639	0.000503	0.000575	0.000655	0.000484	0.000499	0.000419	0.000413	0.000373	0.000214	0.000256	0.000237	0.000624	0.000669	0.000689	0.000667	0.000568
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.0555	0.0481	0.052	0.0508	0.0466	0.0286	0.0284	0.0298	0.0395	0.0503	0.0432	0.025	0.0162	0.0207	0.0354	0.0367	0.0418	0.0348	0.0374
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000139	0.0000455	0.000024	0.0000233	0.000125	0.000092	0.0000171	0.0000109	0.0000123	0.0000146	0.00001	0.0000111	0.0000068	0.0000074	0.0000142	0.0000143	0.000021	0.0000112	0.0000105

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1860020-1	L1862845-1	L1862845-2	L1864653-1	L1881478-1	L1892920-1	L1892920-2	L1903654-1	L1915525-1	L1932306-1	L1942324-1	L1803306-1	L1819439-1	L1822194-1	L1852566-1	L1852566-2	L1856744-1	L1860019-1	L1862841-1
						Site	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-4	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5
						Report #	Quarterly Report #2				Quarterly Report #3				Final Report			Quarterly Report #1			Quarterly Report #2				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		16-Nov-16	23-Nov-16		29-Nov-16	18-Jan-17	20-Feb-17		20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	23-Aug-16	30-Aug-16	31-Oct-16		9-Nov-16	16-Nov-16	23-Nov-16
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		1	0.984	1.03	0.816	1.04	0.73	0.723	0.674	0.961	1.38	1.37	1.37	1.38	1.46	1.13	1.13	1.08	1.01	1.05
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00332	0.00349	0.00361	0.00428	0.0102	0.00378	0.00385	0.0039	0.00571	0.00919	0.00362	0.00977	0.028	0.0412	0.00109	0.0011	0.00144	0.0012	0.00145
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000231	0.000196	0.000212	0.000162	0.000181	0.000182	0.000143	0.000131	0.000128	0.000156	0.000153	0.000119	0.000142	0.000148	0.000229	0.000213	0.000218	0.00024	0.000179
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.141	0.129	0.137	0.139	0.146	0.0984	0.0937	0.092	0.122	0.149	0.131	0.16	0.206	0.204	0.236	0.225	0.205	0.162	0.152
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		0.000044	<0.000040	<0.000040	<0.000040	0.000041	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000055	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000044	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		3.37	2.98	3.09	2.24	2.67	2.36	2.34	2.71	2.63	3.12	2.9	3.46	3.51	3.5	3.1	3.09	3.33	3.19	3.01
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		2.18	2.05	2.13	1.91	2.26	1.74	1.69	1.6	1.9	2.36	2.33	2.78	2.76	2.88	2.51	2.36	2.33	2.36	2.4
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0178	0.0186	0.0198	0.0168	0.0169	0.0126	0.0129	0.0117	0.0158	0.0252	0.0257	0.0281	0.0309	0.0317	0.0213	0.0222	0.022	0.0224	0.0218
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000023	0.0000045	0.0000034	<0.0000020	<0.0000020	0.000004	0.0000035	<0.0000020	<0.0000020	0.0000029	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000091	0.00001	0.00001	0.0000054	0.0000087	0.000007	0.0000069	0.0000067	0.0000068	0.0000066	0.0000057	<0.0000020	<0.0000020	<0.0000020	0.0000076	0.0000076	0.0000076	0.0000065	0.0000087
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00022	<0.00020	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00022	0.00022	0.00022	0.00022	0.00025	0.00022	<0.00020
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.0004	0.00053	0.00049	0.00089	0.0009	0.00135	0.00098	0.00044	0.00044	0.00022	0.00063	0.00036	0.00058	0.00061	0.00066	0.00031	0.00063	0.00073	0.00033
Biological Oxygen Demand																									
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	-	-	-	-	-
Hydrocarbons																									
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		86.5	114.3	117.4	96.2	90.3	108.6	86.5	98.1	84.5	80.5	93.3	118.5	97.2	95.6	82.9	93	96.1	88.2	102.8
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		87.2	85.9	80.8	78	82.6	85.4	90.4	116.2	100.7	97.3	72.7	90.1	96.7	94.1	76.6	77.3	72	88.9	92.8
Chrysene d12	%	-	-	-	-		84.5	63.9	62.1	83.3	85.1	99.4	100.3	90.2	93.6	99.9	73.1	99.1	111.5	101.8	80	84.4	113.1	87.9	64
Naphthalene d8	%	-	-	-	-		86.3	106.8	96.5	78.2	92.4	89.8	92.5	75.6	95.2	101.2	67.7	84.8	89.9	98	94.1	96.3	101.1	88.8	107.4
Phenanthrene d10	%	-	-	-	-		98.4	105.5	92.7	79.7	101.5	94.4	98.5	104.8	108.9	110.3	73	105.4	102.3	115.4	93.9	94.6	80.3	100.4	102.2

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1864652-1	L1864664-1	L1881480-1	L1892922-1	L1903655-1	L1915528-1	L1932328-1	L1942325-1	L1803291-1	L1819440-1	L1819440-2	L1822188-1	L1825985-1	L1825985-2	L1852574-1	L1856742-1	L1860018-1	L1862839-1	L1862839-2	L1864651-1
						Site	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6
						Report #	Quarterly Report #2		Quarterly Report #3			Final Report			Quarterly Report #1						Quarterly Report #2					
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		29-Nov-16		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	23-Aug-16		30-Aug-16	6-Sep-16		31-Oct-16	9-Nov-16	16-Nov-16	23-Nov-16		29-Nov-16
General Parameters																										
Conductivity	uS/cm	-	-	-	-		38.2	37.6	46.9	33.5	31.5	38.1	48.5	47.9	-	84.1	82.8	83.4	98	98.3	49.4	45.3	45.5	49.5	49.2	40.8
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		15.8	14.2	15.3	12.3	11.4	15.3	19.1	18	30.5	31.4	34.5	34.8	33.9	33.8	18.2	17.8	18	18.1	16.7	13.7
pH	pH	6.5-9	6.5-9	7-10.5			7.24	7.27	7.34	7.16	7.19	7.26	7.48	7.23	-	7.65	7.65	7.71	7.31	7.41	7.34	7.27	7.29	7.38	7.39	7.26
pH	pH	6.5-9	6.5-9	7-10.5			7.24	7.27	7.34	7.16	7.19	7.26	7.48	7.23	-	7.65	7.65	7.71	7.31	7.41	7.34	7.27	7.29	7.38	7.39	7.26
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		<1.0	1	20.1	<1.0	<1.0	<1.0	14.3	<1.0	<1.0	1.9	1.8	4.6	<3.0	<3.0	<1.0	1.1	<1.0	2.7	2.4	1.1
Turbidity	NTU	Note 2	Note 2	-	-		0.41	0.46	20.5	0.72	0.39	0.5	0.94	0.38	0.3	1.73	1.26	1.16	0.31	0.29	1.27	2.52	0.36	5.68	6.13	1.52
Chloride (Cl)	mg/L	600	150	250	-		2.56	2.56	3.99	2.48	1.93	2.11	2.65	2.71	-	3.84	3.79	3.91	4.78	4.77	4.01	3.28	3.24	3.41	3.4	2.68
Sulfate (SO_4)	mg/L	-	128	500	-		2.3	2.3	2.58	2.09	1.95	2.15	2.14	2.12	-	3.03	2.81	2.65	2.73	2.72	4.11	3.58	3.31	3.77	3.77	2.99
Nutrients																										
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		<0.0050	0.0065	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.0363	0.0368	0.144	0.047	0.0328	0.0261	0.0539	0.07	-	0.0602	0.0593	0.0317	<0.0032	<0.0032	0.0577	0.053	0.0585	0.0922	0.0912	0.0744
Nitrate (as N)	mg/L	32.8	3	-	10		0.0363	0.0368	0.144	0.047	0.0328	0.0261	0.0539	0.07	-	0.0602	0.0593	0.0317	<0.0030	<0.0030	0.0577	0.053	0.0585	0.0922	0.0912	0.0744
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.101	0.116	0.093	<0.050	0.056	0.066	0.073	0.071	0.135	0.078	0.059	0.075	0.108	0.109	0.155	0.133	0.116	0.122	0.123	0.128
Total Nitrogen	mg/L	-	-	-	-		0.137	0.152	0.236	0.092	0.088	0.092	0.126	0.141	0.121	0.139	0.118	0.106	0.108	0.109	0.212	0.186	0.174	0.215	0.214	0.203
Total Organic Nitrogen	mg/L	-	-	-	-		0.101	0.109	0.091	<0.050	0.055	0.065	0.071	0.07	0.129	0.076	0.057	0.073	0.108	0.109	0.155	0.131	0.114	0.12	0.12	0.128
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.105	0.102	0.08	0.05	0.057	0.069	0.077	0.061	-	0.091	0.064	0.075	0.122	0.109	0.144	0.13	0.111	0.124	0.125	0.115
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.141	0.138	0.224	0.097	0.09	0.095	0.131	0.131	-	0.151	0.123	0.106	0.122	0.109	0.202	0.183	0.169	0.216	0.216	0.189
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	0.0021	0.0021	0.0028	0.0023	0.002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-		<0.0020	0.0022	0.019	0.0023	0.0027	0.0024	0.0038	0.0024	0.005	0.0057	0.0051	0.0079	0.0069	0.0067	0.003	0.0105	0.0065	0.0053	0.0051	0.002
Organic Carbon																										
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		3.8	4.08	2.9	2.62	2.97	2.06	1.72	1.31	-	1.79	1.84	1.82	2.99	2.97	4.62	5.24	3.88	4.29	4.36	4.16
Total Organic Carbon	mg/L	-	Note 5	-	-		4.21	4.67	3.13	2.9	2.72	2.29	1.77	1.36	1.93	1.96	1.78	2.1	3.11	3.14	4.87	4.98	4.1	4.39	4.49	4.61
Total Metals																										
Aluminum (Al)-Total	mg/L	-	-	-	-		0.083	0.084	0.404	0.0725	0.065	0.0439	0.0989	0.0242	0.0181	0.0289	0.047	0.0274	0.0177	0.0145	0.121	0.178	0.103	0.316	0.31	0.086
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000023	0.000023	0.000021	0.000024	0.000024	0.000021
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000063	0.000082	0.000106	0.000054	0.00005	0.000056	0.000074	0.000053	0.000108	0.000102	0.000114	0.000107	0.000115	0.000114	0.000105	0.000119	0.000066	0.000133	0.000126	0.000102
Barium (Ba)-Total	mg/L	-	1	-	1		0.00302	0.00274	0.00782	0.00229	0.00224	0.00312	0.00457	0.0041	0.00549	0.00634	0.00636	0.00573	0.00666	0.00703	0.00466	0.0047	0.00378	0.00596	0.00594	0.00307
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0051	0.0053	0.0067	0.0066	0.0066	0.0074	0.0062	0.0065	0.0069	0.0055	<0.0050	0.0051	0.0053	<0.0050
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000111	0.0000079	<0.0000050	0.0000057	0.0000073	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000133
Calcium (Ca)-Total	mg/L	-	-	-	-		4.02	4.07	4.67	3.66	3.61	5.02	6.49	5.28	8.61	9.18	9.59	9.45	10.2	9.83	5.37	5.47	5.2	5.11	5.22	4.19
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00033	0.00015	0.00056	0.00013	0.00012	0.00013	0.00013	<0.00010	<0.00010	0.00013	0.00016	0.00012	0.00011	<0.00010	0.00023	0.00028	0.00014	0.00048	0.00042	0.0002
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.0000539	0.0000363	0.000269	0.0000398	0.0000401	0.0000408	0.000169	0.0000376	0.000028	0.0000523	0.0000821	0.0000544	0.0000359	0.0000268	0.0000664	0.0000923	0.0000655	0.000157	0.000148	0.0000658
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.00064	0.000605	0.00156	0.000529	0.000474	0.000412	0.000703	0.000299	0.000297	0.00031	0.000351	0.000295	0.000322	0.0003	0.000803	0.00101	0.000455	0.00109	0.00111	0.000582
Iron (Fe)-Total	mg/L	1	-	0.3	-		0.0512	0.05	**0.433**	0.0393	0.0355	0.0363	0.098	0.0219	0.0351	0.0413	0.0667	0.0489	0.046	0.0412	0.0954	0.151	0.072	0.288	0.272	0.0888
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000217	0.0000155	0.00014	0.0000158	0.0000125	0.0000182	0.000107	0.0000142	0.0000135	0.0000236	0.0000431	0.0000214	0.0000138	0.0000113	0.0000465	0.0000807	0.0000273	0.000119	0.000119	0.0000443
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		0.919	0.883	1.11	0.828	0.777	1.11	1.39	1.26	2.43	2.37	2.36	2.44	2.9	2.93	1.2	1.2	0.968	1.28	1.28	-
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00255	0.00236	0.02	0.00266	0.00313	0.00387	0.0266	0.00596	0.0028	0.011	0.0184	0.0108	0.00677	0.00334	0.00384	0.00597	0.00325	0.00783	0.00779	0.0045
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.0000050	<0.0000050	-	-	<0.000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000079	0.000099	0.000096	0.000089	0.000114	0.000124	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000223	0.000201	0.000509	0.000153	0.000146	0.000139	0.000283	0.000154	0.000211	0.000352	0.00038	0.000368	0.000277	0.00029	0.000279	0.000352	0.000245	0.000548	0.000485	0.000197
Potassium (K)-Total	mg/L	-	-	-	-		0.153	0.159	0.199	0.115	0.113	0.158	0.224	0.13	0.363	0.467	0.477	0.461	0.698	0.675	0.341	0.33	0.221	0.281	0.274	0.249
Selenium (Se)-Total	mg/L		0.001	-	0.05		<0.000040	0.000052	<0.000040	<0.000040	<0.000040	<0.000040	0.000044	<0.000040	<0.000040	<0.000040	<0.000040	0.000044	0.000043	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-		3.13	2.94	3.2	2.51	2.96	2.74	3.45	3.01	5.01	5.14	5.15	5.2	5.91	5.91	3.66	4.13	3.38	4.45	4.3	2.69
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		2.01	2.11	2.33	1.83	1.77	2.08	2.59	2.29	4.2	4.14	4.25	4.11	4.49	4.36	2.76	2.8	2.33	2.7	2.74	2.26
Strontium (Sr)-Total	mg/L	-	-	-	-		0.017	0.016	0.0204	0.0147	0.0138	0.0175	0.0224	0.0218	0.0356	0.0386	0.0381	0.0383	0.0387	0.041	0.0222	0.0206	0.0158	0.0226	0.0222	0.0188
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	0.0000036	0.0000057	<0.0000020	<0.0000020	0.0000004	0.0000029	0.000002	0.0000022	0.0000022	0.0000035	0.0000038	0.0000037	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.0000025	0.0000029
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000083	0.0000049	0.0000176	0.000007	0.0000064	0.0000064	0.0000088	0.0000035	0.0000021	0.0000025	0.0000032	0.0000025	0.0000024	0.0000021	0.0000069	0.0000083	0.000007	0.0000109	0.0000098	0.0000073
Vanadium (V)-Total	mg/L	-	-	-	-		0.00021	0.00024	0.00127	0.00021	<0.00020	<0.00020	0.00032	<0.00020	0.00032	0.00031	0.00037	0.00031	0.00031	0.0003	0.00041	0.00058	0.0003	0.00095	0.0009	0.00035
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00022	0.00029	0.00138	0.00028	0.00025	0.00021	0.00128	0.00022	0.00065	0.0007	0.00076	0.00106	0.00046	0.00042	0.00058	0.00096	0.00039	0.00114	0.00123	0.00045
Dissolved Metals																										
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		**0.0808**	**0.0815**	**0.0626**	**0.0554**	**0.0525**	0.0336	0.0184	0.0138	0.0108	0.00869	0.00886	0.0101	0.00903	0.00929	**0.0804**	**0.0917**	**0.0839**	**0.0926**	**0.0877**	**0.0789**
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	0.000021	0.000029	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000022	0.000022	<0.000020	0.000024	0.000022	0.000029
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000072	0.000054	0.000062	0.000057	0.000049	0.00005	0.000049	0.000049	0.000098	0.000094	0.000095	0.000103	0.000115	0.000108	0.000093	0.000091	0.000087	0.000092	0.000083	0.000099
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00308	0.003	0.00234	0.00212	0.00219	0.00304	0.00353	0.00388	0.0052	0.00583	0.00593	0.00541	0.00664	0.00557	0.00442	0.00366	0.00367	0.00388	0.00395	0.00322
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	0.0051	0.0066	0.0063	0.0065	0.0072	0.0066	0.0063	0.0067	0.0055	<0.0050	0.0054	0.0055	<0.0050
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		<0.0000050	0.000008	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000012	0.0000105	<0.0000050	0.0000051	0.0000057	**<0.0000050**	**0.000016**	**0.000143**	**0.0000774**	**0.0000647**	**0.000221**
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		4.75	4.17	4.42	3.6	3.39	4.39	5.55	5.17	8.45	8.61	9.82	9.87	8.81	8.83	5.35	5.25	5.37	5.17	4.83	3.92
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00016	0.00015	0.00016	0.00011	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00011	0.00015	0.00019	0.00015	0.00017	0.00016	0.00017
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.0000453	0.0000461	0.0000423	0.0000333	0.0000281	0.0000275	0.0000271	0.0000224	0.0000177	0.0000237	0.0000243	0.0000255	0.0000189	0.0000183	0.0000504	0.0000516	0.0000486	0.000056	0.0000493	0.0000391
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000655	0.000641	0.000521	0.000483	0.000453	0.000423	0.000323	0.000332	0.000291	0.000272	0.000275	0.000262	0.00031	0.000338	0.000722	0.000775	0.000642	0.000742	0.000683	0.000599
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.0434	0.0435	0.0382	0.0231	0.0235	0.0253	0.0181	0.0106	0.0197	0.0143	0.0143	0.0225	0.0333	0.0334	0.0589	0.062	0.0608	0.073	0.0693	0.0509
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000158	0.0000309	0.000354	0.0000191	0.0000137	0.0000128	0.0000082	0.0000053	0.0000059	0.0000052	0.0000061	0.0000074	0.0000094	0.0000069	0.0000253	0.0000313	0.000018	0.0000661	0.0000323	0.000175

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1864652-1	L1864664-1	L1881480-1	L1892922-1	L1903655-1	L1915528-1	L1932328-1	L1942325-1	L1803291-1	L1819440-1	L1819440-2	L1822188-1	L1825985-1	L1825985-2	L1852574-1	L1856742-1	L1860018-1	L1862839-1	L1862839-2	L1864651-1
						Site	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-5	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6
						Report #	Quarterly Report #2		Quarterly Report #3			Final Report			Quarterly Report #1						Quarterly Report #2					
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		29-Nov-16		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17	25-May-17	13-Jun-17	18-Jul-16	23-Aug-16		30-Aug-16	6-Sep-16		31-Oct-16	9-Nov-16	16-Nov-16	23-Nov-16		29-Nov-16
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		0.957	0.922	1.03	0.807	0.709	1.05	1.27	1.24	2.28	2.4	2.41	2.46	2.89	2.85	1.18	1.15	1.12	1.26	1.14	0.949
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00196	0.00197	0.00588	0.0017	0.0017	0.00174	0.00304	0.00409	0.000986	0.00366	0.00344	0.00401	0.00158	0.00157	0.00192	0.00239	0.00238	0.00278	0.00227	0.00235
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	0.000076	<0.000050	<0.000050	<0.000050	<0.000050	0.000087	0.000089	0.000097	0.000083	0.000101	0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000217	0.000189	0.000177	0.000145	0.000129	0.000141	0.000139	0.00015	0.00018	0.00031	0.000315	0.000336	0.000274	0.000275	0.00027	0.000261	0.000212	0.000246	0.000213	0.000188
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.175	0.157	0.169	0.118	0.105	0.134	0.145	0.129	0.359	0.426	0.478	0.469	0.7	0.695	0.344	0.315	0.233	0.272	0.243	0.225
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000042	<0.000040	<0.000040	0.000044	<0.000040	<0.000040	0.000043
Silicon (Si)-Dissolved	mg/L	-	-	-	-		3.27	3.4	2.62	2.38	2.61	2.68	3.08	2.93	4.86	5.21	5.21	5.3	5.87	6.08	3.61	3.84	3.7	3.95	3.63	3.03
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	0.0000069	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		2.31	2.07	2.31	1.86	1.59	2.02	2.26	2.24	4.12	3.86	4.11	4.32	4.59	4.66	2.69	2.69	2.66	2.75	2.64	2.1
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0166	0.0141	0.0189	0.0148	0.0134	0.0174	0.0201	0.0216	0.0366	0.038	0.0365	0.0396	0.0374	0.0376	0.0208	0.0205	0.0185	0.0213	0.0205	0.0136
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	0.0000026	0.0000025	<0.0000020	<0.0000020	0.0000039	0.0000032	0.0000022	<0.0000020	<0.0000020	0.0000028	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	0.000029	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000084	0.0000062	0.0000073	0.000006	0.0000063	0.0000059	0.0000038	0.0000029	<0.0000020	<0.0000020	<0.0000020	0.0000021	<0.0000020	<0.0000020	0.0000076	0.0000065	0.0000065	0.0000069	0.0000071	0.0000051
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00021	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0003	0.00026	0.00026	0.00027	0.00026	0.00027	0.00033	0.00034	0.00031	0.00035	0.00033	0.00027
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00046	0.00035	0.00069	0.00037	0.00024	0.00028	0.00024	0.00019	0.00063	0.00079	0.00125	0.00106	0.00072	0.00069	0.0008	0.00088	0.00087	0.00057	0.00061	0.00097
Biological Oxygen Demand																										
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-
Hydrocarbons																										
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.063	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.078	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.063	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.078	<0.050	<0.050	<0.050	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		115.7	110	94.5	97.5	106.3	75.4	64.7	92.8	95.9	91.7	90.6	98.8	89.4	85.4	94.3	96.8	89.8	122.2	118.5	99
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		68.6	62.4	95.1	85.4	119.4	95.8	91	69.9	84.7	99.6	93.7	97	85.7	86.9	85.6	92.5	88.9	91.4	93.4	78.4
Chrysene d12	%	-	-	-	-		74.7	68.3	85.1	93.5	93	91.5	93.3	70.9	81.3	113.8	111.8	103.1	97.1	97.1	84.2	115.2	86.4	63.9	62.5	76.3
Naphthalene d8	%	-	-	-	-		77.4	74.2	96.7	85	76.2	86.8	94.7	67	80.4	87.3	86.6	100.1	87	89	98.5	116	90.7	110.9	112.6	79.2
Phenanthrene d10	%	-	-	-	-		77.2	70.5	102.5	91.8	108.7	101.1	103.9	71.9	95.8	100.3	99	115.6	98.3	99.4	98.8	97.3	102.5	106.1	111	82.6

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1881484-1	L1892923-1	L1903657-1	L1915531-1	L1915531-2	L1932333-1	L1942327-1	L1830210-1	L1803290-1	L1803290-2	L1815915-1	L1819441-1	L1819441-2	L1822181-1	L1822181-2	L1825982-1	L1830180-1	L1830180-2	L1852582-1
						Site	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6B	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7
						Report #	Quarterly Report #3			Final Report				Quarterly Report #1	Quarterly Report #1										Quarterly Report #2
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17		25-May-17	13-Jun-17	14-Sep-16	18-Jul-16		16-Aug-16	23-Aug-16		30-Aug-16		6-Sep-16	14-Sep-16		31-Oct-16
General Parameters																									
Conductivity	uS/cm	-	-	-	-		51.4	39	37.1	42.9	42	57.7	61.5	107	-	-	102	95.3	95.9	96	95.5	100	93.4	91.1	49.1
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		15.8	13	12.9	15.4	16.2	23.1	25.8	42.5	32.7	28.8	36.6	36.4	33.3	37.5	37.1	32.3	36.1	36.2	18.6
pH	pH	6.5-9	6.5-9	7-10.5			7.30	7.17	7.19	7.33	7.35	7.61	7.49	7.85	-	-	7.57	7.69	7.66	7.72	7.67	7.11	7.65	7.68	7.36
pH	pH	6.5-9	6.5-9	7-10.5			7.30	7.17	7.19	7.33	7.35	7.61	7.49	7.85	-	-	7.57	7.69	7.66	7.72	7.67	7.11	7.65	7.68	7.36
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		10.6	1.5	2.5	1.9	3.3	1.4	<1.0	<1.0	1.3	7.2	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	1.2	<1.0	<1.0
Turbidity	NTU	Note 2	Note 2	-	-		13.5	1.84	3.28	3.13	2.48	1.55	0.9	0.39	0.3	2.11	0.37	0.39	0.34	0.62	0.52	0.53	0.32	0.35	1.5
Chloride (Cl)	mg/L	600	150	250	-		5.16	3.22	2.59	2.64	2.64	3.31	3.65	4.39	-	-	4.41	4.39	4.38	4.49	4.49	5.08	4.61	4.61	3.86
Sulfate (SO_4)	mg/L	-	128	500	-		3.13	2.71	2.56	2.67	2.67	2.68	2.64	3.1	-	-	4.91	4.82	4.81	4.78	4.79	5.36	4.57	4.57	3.89
Nutrients																									
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		0.0052	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0134	0.0079	0.0228	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.184	0.0955	0.0728	0.0425	0.0417	0.0653	0.0872	<0.0032	-	-	0.354	0.337	0.335	0.293	0.293	0.395	0.32	0.32	0.0654
Nitrate (as N)	mg/L	32.8	3	-	10		0.184	0.0955	0.0728	0.0425	0.0417	0.0653	0.0872	<0.0030	-	-	0.354	0.337	0.335	0.293	0.293	0.395	0.32	0.32	0.0654
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.118	0.067	0.086	0.122	0.116	0.109	0.104	0.069	0.143	0.261	0.061	0.053	<0.050	<0.050	0.056	0.069	<0.050	<0.050	0.156
Total Nitrogen	mg/L	-	-	-	-		0.302	0.163	0.158	0.165	0.158	0.174	0.192	0.069	0.432	0.458	0.415	0.389	0.385	0.335	0.349	0.464	0.352	0.33	0.221
Total Organic Nitrogen	mg/L	-	-	-	-		0.113	0.066	0.084	0.12	0.115	0.107	0.102	0.055	0.135	0.238	<0.083	<0.078	<0.077	<0.067	<0.070	<0.093	<0.070	<0.066	0.156
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.139	0.065	0.116	0.109	0.14	0.149	0.098	0.069	-	-	0.073	0.088	0.055	<0.050	<0.050	0.062	<0.050	<0.050	0.153
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.324	0.161	0.189	0.151	0.182	0.215	0.185	0.069	-	-	0.427	0.425	0.39	0.32	0.334	0.457	0.337	0.334	0.218
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0038	-	-	<0.0010	0.0014	0.0011	0.0016	0.0016	0.0011	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-		0.0183	0.005	0.0057	0.0071	0.0065	0.0073	0.0046	0.0094	0.0027	0.017	<0.0020	0.0029	0.003	0.003	0.0033	0.0037	<0.0020	<0.0020	0.0052
Organic Carbon																									
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		3.28	3.07	3.18	2.37	2.42	2.51	1.92	1.83	-	-	1.56	1.85	1.94	1.63	1.73	2.16	1.53	1.41	4.65
Total Organic Carbon	mg/L	-	Note 5	-	-		3.47	3.16	2.98	3.08	3.23	2.36	2.23	2.16	1.64	2.25	1.98	1.85	1.71	1.69	1.68	2.24	1.53	1.53	4.68
Total Metals																									
Aluminum (Al)-Total	mg/L	-	-	-	-		0.56	0.121	0.162	0.155	0.149	0.0753	0.0478	0.0155	0.0186	0.147	0.0166	0.0332	0.0219	0.0155	0.0149	0.0164	0.0147	0.0137	0.152
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		0.000023	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000021	0.00003	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000029
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000176	0.000077	0.000084	0.000093	0.0001	0.000101	0.000102	0.000114	0.000099	0.000131	0.000109	0.000096	0.000093	0.00009	0.000099	0.000099	0.00009	0.000082	0.00012
Barium (Ba)-Total	mg/L	-	1	-	1		0.00821	0.00325	0.00361	0.00441	0.0043	0.00475	0.00481	0.00536	0.00484	0.00562	0.0059	0.00549	0.00508	0.00494	0.00511	0.00416	0.00441	0.00436	0.0043
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		0.000016	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	0.0059	0.0066	0.0116	0.0109	0.0138	0.0127	0.0133	0.014	0.0145	0.0121	0.0124	0.0129	0.0068
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000071	<0.0000050	<0.0000050	0.0000292
Calcium (Ca)-Total	mg/L	-	-	-	-		4.75	4.55	3.89	5.03	5.51	7.73	6.66	10.5	9.04	7.9	9.73	9.38	9.78	10.2	9.54	9.52	9.22	9.74	6.35
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00083	0.0002	0.00028	0.00024	0.00026	0.00015	0.00011	<0.00010	<0.00010	0.00026	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00029
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.000301	0.0000736	0.000085	0.000151	0.000123	0.0000834	0.0000495	0.0000253	0.0000437	0.000139	0.0000495	0.0000673	0.0000494	0.000043	0.0000454	0.0000488	0.0000405	0.0000405	0.0000848
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.00137	0.000588	0.000654	0.000724	0.000719	0.000537	0.00045	0.000195	0.000401	0.000859	0.000383	0.00039	0.00033	0.000339	0.000353	0.00044	0.000341	0.00036	0.000955
Iron (Fe)-Total	mg/L	1	-	0.3	-		**0.496**	0.0841	0.136	0.149	0.15	0.139	0.122	0.0605	0.0314	0.184	0.0336	0.0539	0.0377	0.0331	0.0311	0.0366	0.0292	0.0285	0.131
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.000237	0.0000564	0.0000687	0.000113	0.0000914	0.0000528	0.0000387	0.0000116	0.0000091	0.000202	0.0000087	0.0000251	0.0000134	0.0000084	0.0000087	0.00001	0.0000075	0.0000088	0.0000646
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00187
Magnesium (Mg)-Total	mg/L	-	-	-	-		1.19	1	0.887	1.25	1.32	1.66	1.74	3.46	2.63	2.41	2.94	2.96	2.86	2.95	2.99	2.82	2.88	2.82	1.39
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.0265	0.00509	0.00625	0.0238	0.0185	0.0109	0.00733	0.00645	0.00261	0.0117	0.00328	0.00647	0.00354	0.00253	0.0026	0.00215	0.00207	0.00196	0.00502
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		-	-	<0.000050	<0.0000050	<0.0000050	-	-	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000159	0.000077	0.000062	0.000092	0.000099	0.00009	0.000091	0.000096	0.000091	0.000085	0.000104	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000753	0.000211	0.000281	0.000305	0.000299	0.00024	0.000206	0.000089	0.000146	0.000314	0.000136	0.000163	0.000142	0.000138	0.000146	0.000146	0.000124	0.000123	0.000323
Potassium (K)-Total	mg/L	-	-	-	-		0.282	0.198	0.185	0.235	0.263	0.269	0.228	0.519	0.452	0.461	0.477	0.456	0.474	0.441	0.421	0.507	0.404	0.409	0.391
Selenium (Se)-Total	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	0.000049	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000045
Silicon (Si)-Total	mg/L	-	-	-	-		3.85	3.13	3.49	3.46	3.85	4.43	4.14	7.24	6.58	6.12	7.87	7.71	7.64	7.6	7.65	7.03	7.74	7.33	4.53
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		2.97	2.68	2.26	2.63	2.96	3.47	3.34	4.63	5.17	4.58	5.09	4.83	5.03	4.95	5.01	5.25	4.91	4.95	3.16
Strontium (Sr)-Total	mg/L	-	-	-	-		0.0194	0.0153	0.0149	0.0176	0.0187	0.0267	0.0288	0.0418	0.0385	0.0355	0.0455	0.0419	0.0424	0.0446	0.0446	0.04	0.0413	0.041	0.0216
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		0.0000044	0.0000036	<0.0000020	0.0000037	<0.0000020	0.0000035	0.000003	0.0000041	0.0000021	0.0000022	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.0000031	0.000003	0.0000032	0.0000029	<0.0000020
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000166	0.0000061	0.0000101	0.0000078	0.0000082	0.0000047	0.0000037	<0.0000020	0.0000031	0.0000057	0.0000025	0.0000029	0.0000026	0.0000023	0.0000023	0.0000031	0.0000025	0.0000027	0.0000078
Vanadium (V)-Total	mg/L	-	-	-	-		0.00157	0.00038	0.00047	0.00047	0.0005	0.00038	0.00029	0.00039	0.00059	0.0009	0.00063	0.00069	0.00061	0.00059	0.00061	0.00054	0.00051	0.00052	0.00064
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.0018	0.00073	0.00077	0.00114	0.00137	0.00082	0.001	0.00039	0.00035	0.00309	0.00031	0.00042	0.00053	0.00044	0.00043	0.00024	0.00024	0.00025	0.00194
Dissolved Metals																									
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		**0.0666**	**0.107**	**0.0617**	0.0422	0.0422	0.0324	0.0244	0.0113	0.0177	0.0152	0.0129	0.0121	0.0121	0.0116	0.0111	0.0123	0.0112	0.0115	**0.0767**
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000024	0.000021	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000028
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000069	0.000069	0.000061	0.000067	0.000074	0.000094	0.000104	0.000131	0.000108	0.000101	0.000097	0.00009	0.000087	0.000091	0.000099	0.000095	0.000088	0.000084	0.000093
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00268	0.00298	0.00241	0.00286	0.00316	0.00404	0.00457	0.00529	0.00465	0.00442	0.00564	0.00496	0.00474	0.0048	0.0057	0.00422	0.00434	0.00416	0.00391
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	0.0057	0.0064	0.0118	0.0117	0.0134	0.0127	0.0125	0.0144	0.0098	0.0118	0.0123	0.0122	0.0066
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	**0.000233**	<0.0000050	<0.0000050	0.0000156
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		4.61	3.75	3.8	4.3	4.66	6.78	7.3	10.9	8.75	7.74	9.78	10	8.72	10.2	9.92	8.41	9.56	9.7	5.46
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00011	0.00017	0.00014	0.00011	0.00013	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.00017
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.0000467	0.0000613	0.0000343	0.000035	0.000034	0.0000414	0.0000301	0.0000191	0.0000445	0.0000423	0.000047	0.0000392	0.0000415	0.0000374	0.0000407	0.0000408	0.0000392	0.0000399	0.0000446
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000509	0.000562	0.00046	0.000473	0.000477	0.000447	0.00042	0.000241	0.000469	0.000594	0.000323	0.000333	0.000345	0.000341	0.000341	0.000489	0.000334	0.00035	0.00076
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.0448	0.0771	0.0352	0.0545	0.0528	0.0781	0.0852	0.0491	0.0274	0.0221	0.0254	0.0211	0.0222	0.0206	0.0228	0.0298	0.0211	0.0213	0.0614
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000646	0.0000796	0.0000159	0.0000232	0.0000177	0.0000233	0.0000186	0.0000088	0.0000158	0.0000198	0.0000116	0.0000058	0.0000086	0.000006	0.0000073	0.0000287	0.000006	0.0000065	0.0000349

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1881484-1	L1892923-1	L1903657-1	L1915531-1	L1915531-2	L1932333-1	L1942327-1	L1830210-1	L1803290-1	L1803290-2	L1815915-1	L1819441-1	L1819441-2	L1822181-1	L1822181-2	L1825982-1	L1830180-1	L1830180-2	L1852582-1
						Site	S-6	S-6	S-6	S-6	S-6	S-6	S-6	S-6B	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7
						Report #	Quarterly Report #3			Final Report				Quarterly Report #1	Quarterly Report #1										Quarterly Report #2
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		18-Jan-17	20-Feb-17	20-Mar-17	19-Apr-17		25-May-17	13-Jun-17	14-Sep-16	18-Jul-16		16-Aug-16	23-Aug-16		30-Aug-16		6-Sep-16	14-Sep-16		31-Oct-16
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		1.05	0.885	0.82	1.13	1.11	1.49	1.84	3.75	2.64	2.3	2.97	2.76	2.79	2.9	3	2.76	2.97	2.91	1.22
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00699	0.00397	0.00241	0.00349	0.00351	0.00444	0.00365	0.00389	0.00328	0.00309	0.00259	0.00171	0.0017	0.0017	0.00191	0.00133	0.00142	0.00145	0.00221
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000152	0.000075	0.000076	0.000083	0.000085	0.000085	0.00009	0.000088	0.000077	0.000089	0.000081	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000151	0.000181	0.000132	0.000168	0.000153	0.00019	0.000171	0.000093	0.00019	0.000177	0.000163	0.00014	0.000135	0.000131	0.000133	0.000196	0.00013	0.000129	0.00024
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.224	0.187	0.158	0.217	0.217	0.217	0.247	0.248	0.549	0.48	0.46	0.496	0.453	0.477	0.45	0.45	0.519	0.41	0.39	0.329
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	0.000045	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		2.8	2.8	3.13	2.91	3.03	3.9	4.38	7.43	6.74	5.73	7.91	7.27	7.26	7.7	7.71	7.12	7.75	7.89	3.87
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		2.89	2.35	2.19	2.43	2.53	3.26	3.79	4.86	5.08	4.63	5.09	5.07	4.81	5.22	5.07	5.38	5.1	5.14	2.78
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0185	0.0149	0.0146	0.0179	0.0182	0.0258	0.0283	0.0394	0.0382	0.0347	0.0432	0.0443	0.0408	0.0474	0.0348	0.0374	0.041	0.0379	0.0209
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		0.0000023	0.0000039	<0.0000020	<0.0000020	<0.0000020	0.0000038	<0.0000020	0.0000026	0.000002	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000026	0.0000024	<0.0000020	0.0000023	0.0000023	<0.0000020
Tin (Sn)-Dissolved	mg/L	-	-	-	-		0.000014	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000058	0.0000087	0.0000054	0.0000046	0.0000047	0.0000037	0.0000028	<0.0000020	0.0000029	0.000003	0.0000022	0.0000022	0.0000022	0.0000022	0.0000021	0.0000025	0.0000025	0.0000023	0.0000069
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00022	0.00036	0.0002	0.00022	0.00021	0.00026	0.00024	0.00039	0.00059	0.00056	0.00061	0.00057	0.00055	0.00059	0.00058	0.00048	0.00053	0.00053	0.00041
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00077	0.0009	0.00039	0.00055	0.00063	0.00041	0.00026	0.00103	0.00092	0.00196	0.00039	0.00033	0.00044	0.0005	0.00038	0.0009	0.0005	0.00046	0.00086
Biological Oxygen Demand																									
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	<10	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	<10	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-
Hydrocarbons																									
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.25	<0.25	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		83.3	100.2	100.6	88.7	85.8	71.1	96.2	112.4	112.5	95.2	111.5	84.8	93.8	96.9	97.6	89.3	108.1	110	96.2
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	0.000085	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000010	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	0.00002	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	**0.00199**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000050	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		89.2	95	118.6	96.2	93.8	85.7	70.2	89.6	86.2	78	81.2	80.7	82	97.9	88.9	82.9	87.2	76.3	74.7
Chrysene d12	%	-	-	-	-		86.3	98.8	92.3	86.5	88.8	91	71	83.4	92.1	91.5	88.5	89.5	90.6	102.8	95.5	92.6	79.8	75.7	83.2
Naphthalene d8	%	-	-	-	-		92.8	98.2	78.1	87.3	94.8	94.6	68.1	101.2	79.9	83.7	76.5	76.8	69.8	95.9	90.4	86.9	103.2	92.3	95.8
Phenanthrene d10	%	-	-	-	-		100.5	89.6	108.2	101.8	105.6	100.4	72.1	91.9	96.1	88.4	88.1	87.9	88.5	114.7	106.4	94.2	89.7	80.7	95.9

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1856741-1	L1856741-2	L1860017-1	L1862837-1	L1864646-1	L1869563-1	L1881490-1	L1881490-2	L1892925-1	L1903659-1	L1903659-2	L1915532-1	L1932339-1	L1942328-1	L1803289-1	L1803289-2	L1815910-1	L1815911-1	L1819442-1
						Site	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-8	S-8	S-8	S-8	S-8
						Report #	Quarterly Report #2						Quarterly Report #3					Final Report			Quarterly Report #1				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		9-Nov-16		16-Nov-16	23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17		20-Feb-17	20-Mar-17		19-Apr-17	25-May-17	13-Jun-17	18-Jul-16		16-Aug-16		23-Aug-16
General Parameters																									
Conductivity	uS/cm	-	-	-	-		46.5	46.9	45.9	47.9	41.5	46.3	50.2	50.2	39.5	40.9	40.5	44.6	61.5	65.7	-	-	94.7	94	90.5
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		18.3	18.4	19	17.3	15.9	16.4	17	16.3	13.5	13.7	14	18.1	21.8	25.2	31.7	31.1	35.3	32	35.5
pH	pH	6.5-9	6.5-9	7-10.5			7.32	7.33	7.30	7.37	7.29	7.19	7.26	7.29	7.38	7.14	7.19	7.37	7.62	7.49	-	-	7.09	7.08	7.49
pH	pH	6.5-9	6.5-9	7-10.5			7.32	7.33	7.30	7.37	7.29	7.19	7.26	7.29	7.38	7.14	7.19	7.37	7.62	7.49	-	-	7.09	7.08	7.49
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		2.2	2.5	<1.0	1.9	9.9	1.1	8.7	8.6	6.1	3.4	4	6.1	4.8	<1.0	3.9	2.6	3.5	2.4	2.3
Turbidity	NTU	Note 2	Note 2	-	-		2.27	2.33	0.51	3.06	1.42	1.3	9.6	8.21	2.2	3.29	3.26	2.58	1.09	1.02	0.84	0.8	1.05	1.02	1.18
Chloride (Cl)	mg/L	600	150	250	-		3.17	3.17	3.11	3.15	2.65	4.32	5.09	5.09	3.35	3.02	3.02	2.74	3.26	3.65			4.88	4.88	4.96
Sulfate (SO_4)	mg/L	-	128	500	-		3.31	3.31	3.14	3.36	2.85	2.87	2.79	2.79	2.6	2.65	2.66	2.61	2.67	2.8	-	-	2.69	2.69	2.49
Nutrients																									
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0117	0.0107	0.0166	0.0165	0.0206
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.0663	0.0658	0.0731	0.102	0.0934	0.128	0.174	0.172	0.11	0.0869	0.0868	0.0645	0.111	0.2			0.0609	0.0618	0.0512
Nitrate (as N)	mg/L	32.8	3	-	10		0.0663	0.0658	0.0731	0.102	0.0934	0.128	0.174	0.172	0.11	0.0869	0.0868	0.0645	0.111	0.2			0.0599	0.0607	0.0512
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			0.0011	0.0011	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.148	0.145	0.119	0.127	0.184	0.11	0.127	0.148	0.086	0.071	0.083	0.101	0.093	0.115	0.193	0.16	0.094	0.084	0.08
Total Nitrogen	mg/L	-	-	-	-		0.214	0.211	0.193	0.229	0.278	0.238	0.3	0.32	0.196	0.158	0.169	0.165	0.204	0.315	0.308	0.275	0.155	0.146	0.131
Total Organic Nitrogen	mg/L	-	-	-	-		0.147	0.144	0.118	0.124	0.183	0.107	0.122	0.142	0.084	0.069	0.08	0.099	0.091	0.11	0.181	0.149	0.078	0.068	0.059
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.144	0.137	0.129	0.132	0.117	0.097	0.191	0.182	0.092	0.165	0.146	0.128	0.082	0.092	-	-	0.089	0.086	0.067
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.21	0.203	0.202	0.235	0.211	0.225	0.365	0.354	0.202	0.252	0.232	0.192	0.192	0.292	-	-	0.15	0.148	0.118
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		0.0012	0.0012	<0.0010	0.0011	<0.0010	<0.0010	0.0013	0.0012	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	0.0024
Phosphorus (P)-Total	mg/L	-	-	-	-		0.008	0.0083	0.034	0.0037	0.0034	0.0055	0.012	0.0089	0.0052	0.0052	0.0063	0.0065	0.005	0.0038	0.0135	0.0093	0.004	0.0047	0.0079
Organic Carbon																									
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		4.73	4.81	3.97	4.4	4.12	4.07	3.82	3.65	3.29	3.12	3.2	2.43	2.32	1.85	-	-	1.82	1.79	2.27
Total Organic Carbon	mg/L	-	Note 5	-	-		5.29	5.36	4.08	4.45	5.51	4.16	3.22	3.7	3.18	2.95	3.02	2.68	2.2	1.89	2.5	2.4	1.92	1.82	2.23
Total Metals																									
Aluminum (Al)-Total	mg/L	-	-	-	-		0.166	0.2	0.0973	0.193	0.183	0.102	0.235	0.246	0.146	0.172	0.141	0.216	0.0548	0.0317	0.0532	0.0457	0.0231	0.02	0.029
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		0.000028	0.000027	0.000026	0.000025	0.000025	0.000024	0.000024	0.000026	0.00002	0.000021	0.000022	0.000026	<0.000020	<0.000020	0.000022	0.000021	<0.000020	<0.000020	<0.000020
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000107	0.000114	0.000087	0.000093	0.000094	0.000068	0.000116	0.00012	0.000076	0.000088	0.00008	0.000108	0.000092	0.000101	0.000116	0.000123	0.00016	0.000174	0.000196
Barium (Ba)-Total	mg/L	-	1	-	1		0.00418	0.00404	0.00346	0.00501	0.00413	0.00383	0.00494	0.00526	0.00352	0.00366	0.00381	0.00655	0.00397	0.00479	0.0066	0.0067	0.008	0.00775	0.00765
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		0.0055	0.0052	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	0.0057	0.007	0.0096	0.0104	0.0111	0.0116	0.011
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050	0.0000078	0.0000068	<0.0000050	<0.0000050	<0.0000050	0.0000122	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	-	-		5.49	5.74	5.28	4.87	4.23	3.89	4.67	4.56	4.29	4.53	4.05	6.04	6.97	7.49	8.59	8.75	9.92	9.38	9.46
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00026	0.00034	0.00017	0.00028	0.00029	0.0002	0.00039	0.00039	0.0002	0.00027	0.00023	0.00029	0.00011	<0.00010	0.00014	0.00013	0.00013	0.00012	0.00015
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.0000928	0.000088	0.0000617	0.000132	0.000125	0.0000604	0.000151	0.000164	0.000114	0.0001	0.0000785	0.000255	0.0000565	0.0000445	0.00011	0.0000969	0.000235	0.000219	0.000267
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000956	0.000981	0.000674	0.000965	0.000896	0.000616	0.00119	0.00107	0.000734	0.000764	0.000629	0.00103	0.000469	0.000395	0.00054	0.000541	0.000399	0.000393	0.000363
Iron (Fe)-Total	mg/L	1	-	0.3	-		0.154	0.184	0.0818	0.196	0.168	0.0796	0.245	0.25	0.103	0.132	0.114	0.236	0.0986	0.0666	0.154	0.144	**0.358**	**0.325**	**0.514**
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000867	0.0000811	0.0000326	0.000108	0.000118	0.0000509	0.000251	0.000294	0.000105	0.0000867	0.0000743	0.0003	0.0000414	0.0000243	0.0000532	0.0000393	0.0000147	0.0000135	0.0000211
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		1.27	1.33	1.13	1.32	1.07	1.02	1.19	1.17	1.02	1.06	0.94	1.28	1.61	2.17	2.45	2.43	2.51	2.37	2.34
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00663	0.00752	0.00393	0.00888	0.0124	0.0047	0.0142	0.0156	0.0129	0.00759	0.00586	0.0443	0.00708	0.00594	0.0257	0.0238	**0.0923**	**0.0857**	**0.107**
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	-	<0.000050	<0.000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050
Molybdenum (Mo)-Total	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000058	0.000075	0.00008	0.000076	0.000075
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000318	0.000339	0.000219	0.000391	0.000306	0.000225	0.000392	0.000397	0.000225	0.000297	0.000239	0.000367	0.000171	0.000149	0.000215	0.000212	0.000229	0.000202	0.000245
Potassium (K)-Total	mg/L	-	-	-	-		0.337	0.356	0.238	0.248	0.254	0.266	0.252	0.247	0.195	0.206	0.185	0.269	0.256	0.334	0.435	0.436	0.449	0.423	0.443
Selenium (Se)-Total	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000046	<0.000040	0.00004	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-		4.61	5.36	3.93	4.13	4.23	4.02	3.28	3.32	3.32	3.55	3.7	3.69	4.68	5.09	5.92	5.9	6.1	6.15	5.87
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		2.88	2.93	2.6	2.37	2.22	2.75	3.24	3.18	2.58	2.83	2.63	3	3.27	3.8	4.77	5.01	5.14	4.82	4.73
Strontium (Sr)-Total	mg/L	-	-	-	-		0.0207	0.0212	0.0203	0.0173	0.0166	0.017	0.0191	0.0182	0.0159	0.0167	0.017	0.0193	0.0238	0.0294	0.0418	0.0424	0.0469	0.0486	0.0471
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000025	0.0000029	0.0000039	0.0000034	0.0000055	<0.0000020	<0.0000020	0.0000024	0.0000029	0.000003	<0.0000020	0.0000022	<0.0000020	<0.0000020	0.0000021
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000079	0.0000073	0.0000066	0.0000094	0.0000082	0.0000076	0.00001	0.0000109	0.000008	0.0000076	0.0000073	0.0000146	0.0000044	0.0000034	0.0000036	0.0000035	0.0000023	0.0000022	0.0000027
Vanadium (V)-Total	mg/L	-	-	-	-		0.00067	0.00082	0.00042	0.00066	0.00063	0.00039	0.00075	0.00076	0.0005	0.00056	0.00044	0.00077	0.00042	0.00036	0.00058	0.00055	0.00052	0.00047	0.00053
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00118	0.00132	0.00064	0.00103	0.0015	0.00081	0.00224	0.00335	0.00172	0.0013	0.00115	0.00396	0.0005	0.00071	0.00097	0.00086	0.00053	0.00048	0.00054
Dissolved Metals																									
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		**0.0872**	**0.0814**	**0.0788**	**0.0885**	**0.0932**	**0.0866**	**0.068**	**0.0619**	**0.0607**	**0.0593**	**0.0527**	0.043	0.0453	0.0197	0.0108	0.0101	0.0142	0.0141	0.0154
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		0.000031	0.000031	0.000023	0.000024	0.000023	0.000024	0.000021	0.000023	0.00002	<0.000020	<0.000020	<0.000020	<0.000020	0.000022	0.00002	0.00002	<0.000020	<0.000020	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000097	0.000093	0.000077	0.000087	0.000121	0.000072	0.000092	0.000081	0.000057	0.000061	0.000056	0.000064	0.000083	0.000083	0.000098	0.000101	0.000148	0.000153	0.000166
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00356	0.00358	0.00323	0.00358	0.00252	0.00353	0.0028	0.00285	0.00247	0.00231	0.00235	0.00297	0.00377	0.00462	0.00747	0.00625	0.00745	0.00788	0.00754
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		0.0059	0.0058	<0.0050	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	0.006	0.0074	0.0099	0.0102	0.0104	0.0112	0.0107
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		5.34	5.48	5.69	4.97	4.59	4.68	4.73	4.61	3.8	4.06	3.7	5.15	6.22	7.1	8.61	8.65	9.92	8.82	10.3
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00019	0.00023	0.00016	0.00016	0.00015	0.00018	0.00013	0.00013	0.00013	0.00013	0.00013	0.00013	0.00011	<0.00010	<0.00010	<0.00010	0.0001	0.0001	0.00012
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.000048	0.0000486	0.0000516	0.0000525	0.0000463	0.000044	0.0000418	0.0000397	0.000032	0.0000329	0.0000337	0.0000359	0.000046	0.0000346	0.0000638	0.0000565	0.000226	0.00021	0.000243
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.00111	0.000741	0.000645	0.000672	0.000753	0.000628	0.000544	0.000535	0.00048	0.000465	0.000455	0.000476	0.00042	0.00043	0.000456	0.000408	0.000383	0.000382	0.000356
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.0633	0.0619	0.0607	0.0711	0.0564	0.0471	0.047	0.0429	0.0339	0.0335	0.0339	0.0506	0.0794	0.0442	0.0755	0.073	0.209	0.219	**0.303**
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000417	0.0000352	0.0000192	0.0000294	0.000018	0.0000331	0.0000712	0.000107	0.0000161	0.0000178	0.0000181	0.0000226	0.0000355	0.0000129	0.0000123	0.0000115	0.0000076	0.0000079	0.000012

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1856741-1	L1856741-2	L1860017-1	L1862837-1	L1864646-1	L1869563-1	L1881490-1	L1881490-2	L1892925-1	L1903659-1	L1903659-2	L1915532-1	L1932339-1	L1942328-1	L1803289-1	L1803289-2	L1815910-1	L1815911-1	L1819442-1
						Site	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-7	S-8	S-8	S-8	S-8	S-8
						Report #	Quarterly Report #2						Quarterly Report #3					Final Report			Quarterly Report #1				
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		9-Nov-16		16-Nov-16	23-Nov-16	29-Nov-16	12-Dec-16	18-Jan-17		20-Feb-17	20-Mar-17		19-Apr-17	25-May-17	13-Jun-17	18-Jul-16		16-Aug-16		23-Aug-16
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		1.2	1.14	1.17	1.19	1.08	1.15	1.27	1.17	0.973	0.858	1.01	1.28	1.53	1.81	2.47	2.31	2.55	2.43	2.39
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		0.00269	0.00252	0.00249	0.00234	0.0022	0.00272	0.00465	0.00426	0.00166	0.00183	0.00177	0.00273	0.00527	0.00389	0.0185	0.0166	**0.0892**	**0.0879**	**0.101**
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000059	0.000087	0.000072	0.000073	0.000075	0.000074
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000234	0.000227	0.000189	0.000202	0.000233	0.000202	0.000154	0.000154	0.000131	0.000136	0.000124	0.000144	0.000146	0.000118	0.000205	0.000175	0.000216	0.000202	0.000201
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.313	0.298	0.241	0.268	0.285	0.307	0.247	0.237	0.174	0.172	0.171	0.204	0.246	0.274	0.427	0.412	0.463	0.435	0.449
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	0.000049	0.000043	0.000062	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		4.2	4.08	4.06	4.14	3.76	4.49	3.22	2.99	2.91	3.4	2.97	3.42	4.36	4.96	6.03	5.65	6.3	5.68	5.94
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		2.72	2.73	2.72	2.65	2.54	3.11	3.48	3.35	2.53	2.39	2.42	2.62	3.06	3.64	4.75	4.83	4.86	4.83	4.92
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0203	0.0202	0.0197	0.0191	0.0179	0.0191	0.0184	0.0177	0.0155	0.0148	0.0138	0.0178	0.0234	0.03	0.0422	0.0417	0.0468	0.0478	0.047
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000022	0.0000021	0.0000022	0.0000024	0.0000045	<0.0000020	<0.0000020	<0.0000020	0.0000037	0.000003	0.0000027	0.0000023	<0.0000020	<0.0000020	<0.0000020
Tin (Sn)-Dissolved	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		0.0000063	0.0000063	0.0000064	0.0000073	0.0000031	0.000007	0.000006	0.0000053	0.0000053	0.0000056	0.0000057	0.0000043	0.0000046	0.0000033	0.0000021	<0.0000020	<0.0000020	<0.0000020	0.000002
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00044	0.00042	0.00038	0.00039	0.00031	0.0003	0.00026	0.00025	0.00026	0.00025	0.00023	0.00029	0.00036	0.00034	0.00042	0.00039	0.00042	0.00039	0.00038
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.0013	0.001	0.00075	0.00061	0.00101	0.00098	0.00115	0.00084	0.00138	0.00057	0.00064	0.001	0.00056	0.00043	0.00335	0.00071	0.00051	0.00058	0.00061
Biological Oxygen Demand																									
BOD	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0
BOD Carbonaceous	mg/L	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2.0	<2.0	<2.0
Hydrocarbons																									
EPH10-19	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		88.9	95.5	91.9	100.7	98.7	80.1	97.2	85.4	110	108.6	109.4	70.5	78.7	97.9	92.4	122.1	91.7	107.5	90.8
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000018
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	<0.00010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		96.4	95.2	90.2	83.2	72.5	90.4	92.8	92.4	84.4	125.1	125.4	95.3	110	67.6	85.1	92.2	79.3	79.6	85
Chrysene d12	%	-	-	-	-		96.4	98.1	84.2	60.9	74.6	91.7	87.4	84.3	96.9	98.2	97.8	95.5	113.6	68.1	96.1	104.7	87.2	99.5	93.1
Naphthalene d8	%	-	-	-	-		107.7	107.3	85.8	100.1	73.2	95.1	95.5	92.7	88.7	83.6	80.6	89.5	102.6	67.5	85.2	87.4	72.7	74.6	80.3
Phenanthrene d10	%	-	-	-	-		105.5	105.5	97.2	96.2	72.5	98.7	101.5	100.9	93.8	114.7	113.1	107.2	110.4	71.2	99	105.1	88.4	85.9	90.9

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1822170-1	L1822170-2	L1825970-1	L1830218-1	L1830218-2	L1852604-1	L1856737-1	L1860016-1	L1860016-2	L1862833-1	L1864642-1	L1869544-1	L1869544-2
						Site	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8
						Report #	Quarterly Report #1					Quarterly Report #2							
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		30-Aug-16		6-Sep-16	14-Sep-16		31-Oct-16	9-Nov-16	16-Nov-16		23-Nov-16	29-Nov-16	12-Dec-16	
General Parameters																			
Conductivity	uS/cm	-	-	-	-		89.8	87.9	92.1	94.2	94.2	50.2	48.7	47	47	48.9	42.3	47.5	47
Hardness (as $CaCO_3$)	mg/L	-	-	-	-		36.8	35.5	29.5	34.8	35.5	19.2	18.8	19.2	18.9	17.7	14.9	15.3	14.5
pH	pH	6.5-9	6.5-9	7-10.5			7.23	7.26	**6.75**	7.69	7.61	7.33	7.35	7.30	7.29	7.33	7.30	7.18	7.19
pH	pH	6.5-9	6.5-9	7-10.5			7.23	7.26	6.75	7.69	7.61	7.33	7.35	7.30	7.29	7.33	7.30	7.18	7.19
Total Suspended Solids	mg/L	Note 1	Note 1	-	-		2.1	1.2	<3.0	2.3	2	1.7	4.9	<1.0	<1.0	6.2	2.4	2.3	2.6
Turbidity	NTU	Note 2	Note 2	-	-		1.13	1.11	0.6	2.5	2.09	2.54	4.23	0.89	1.1	4.71	1.32	1.43	1.24
Chloride (Cl)	mg/L	600	150	250	-		5.18	5.19	5.18	5.19	5.19	3.9	3.22	3.14	3.15	3.17	2.68	4.38	4.37
Sulfate (SO_4)	mg/L	-	128	500	-		2.68	2.69	3.02	2.93	2.92	3.84	3.3	3.12	3.12	3.35	2.82	2.86	2.85
Nutrients																			
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-		0.016	0.016	0.009	0.0169	0.0174	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<0.0050	<0.0050
Nitrate and Nitrite (as N)	mg/L	-	-	-	10		0.047	0.047	0.0664	0.0748	0.074	0.0639	0.0728	0.074	0.0741	0.102	0.0962	0.132	0.131
Nitrate (as N)	mg/L	32.8	3	-	10		0.047	0.047	0.0664	0.0748	0.074	0.0639	0.0728	0.074	0.0741	0.102	0.0962	0.131	0.131
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-		0.092	0.081	0.072	0.075	0.085	0.15	0.151	0.122	0.132	0.419	0.14	0.108	0.103
Total Nitrogen	mg/L	-	-	-	-		0.139	0.128	0.139	0.15	0.159	0.214	0.224	0.196	0.206	0.521	0.236	0.24	0.234
Total Organic Nitrogen	mg/L	-	-	-	-		0.076	0.065	0.063	0.058	0.068	0.148	0.149	0.12	0.131	0.414	0.138	0.105	0.1
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-		0.078	0.068	0.085	0.06	0.056	0.146	0.134	0.117	0.111	0.191	0.117	0.088	0.096
Total Dissolved Nitrogen	mg/L	-	-	-	-		0.125	0.115	0.151	0.135	0.13	0.21	0.207	0.191	0.185	0.293	0.213	0.22	0.227
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-		0.0016	0.0022	0.0012	0.0016	0.0014	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-		0.0073	0.0067	0.0059	0.0087	0.0088	0.0064	0.0104	<0.0020	0.0082	0.0153	0.002	0.0069	0.0063
Organic Carbon																			
Dissolved Organic Carbon	mg/L	-	Note 5	-	-		2.11	2.18	2.28	1.97	2.08	4.77	5.25	4.3	4.15	4.57	4.4	4.41	4.17
Total Organic Carbon	mg/L	-	Note 5	-	-		2.09	2.17	2.16	2.24	2.28	4.86	5.27	4.29	4.67	4.95	4.53	4.57	4.41
Total Metals																			
Aluminum (Al)-Total	mg/L	-	-	-	-		0.0592	0.0363	0.0162	0.0695	0.0638	0.16	0.262	0.107	0.105	0.31	0.17	0.104	0.104
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.00003	0.000031	0.000025	0.000026	0.000028	0.000024	0.000023	0.000023
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01		0.000181	0.000178	0.000123	0.000145	0.000132	0.000113	0.000134	0.000088	0.000086	0.00015	0.000103	0.000071	0.000072
Barium (Ba)-Total	mg/L	-	1	-	1		0.00818	0.00804	0.00712	0.00699	0.00699	0.00466	0.00535	0.00371	0.00368	0.00582	0.00381	0.00382	0.00369
Beryllium (Be)-Total	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5		0.0109	0.0118	0.0099	0.0104	0.0105	0.0067	0.0057	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050
Cadmium (Cd)-Total	mg/L	-	-	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000346	<0.0000050	<0.0000050	<0.0000050	0.0000082	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	-	-		10.5	10.8	9.17	9.3	8.96	5.56	6.15	5.71	5.05	5.54	4.58	4.06	3.88
Chromium (Cr)-Total	mg/L		0.001	-	0.05		0.00016	0.00014	0.00011	0.00017	0.00017	0.00027	0.00043	0.00018	0.00019	0.00046	0.0003	0.00018	0.00023
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-		0.000415	0.000317	0.000154	0.000186	0.000173	0.0000894	0.000147	0.0000645	0.0000672	0.000177	0.0000968	0.0000632	0.0000621
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000428	0.000397	0.000381	0.000539	0.000472	0.000928	0.0012	0.000701	0.00072	0.00126	0.00075	0.000603	0.000654
Iron (Fe)-Total	mg/L	1	-	0.3	-		**0.576**	**0.496**	0.288	**0.335**	**0.301**	0.156	0.279	0.0918	0.0913	**0.301**	0.135	0.0848	0.0796
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.0000389	0.0000249	0.0000105	0.0000563	0.0000464	0.0000996	0.000151	0.0000356	0.0000365	0.000171	0.0000949	0.00005	0.000052
Lithium (Li)-Total	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-		2.4	2.45	2.49	2.54	2.5	1.3	1.33	1.19	1.16	1.32	0.959	1.02	1.02
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		**0.151**	**0.117**	0.0458	**0.066**	**0.0592**	0.00521	0.00887	0.00446	0.00429	0.0124	0.0107	0.00502	0.00451
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.0000050	0.0000057	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-
Molybdenum (Mo)-Total	mg/L	2	1	-	-		0.000071	0.000077	0.00008	0.00007	0.000065	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-		0.000245	0.000234	0.000164	0.000237	0.000225	0.000339	0.000468	0.000224	0.0002	0.000486	0.000247	0.000212	0.00021
Potassium (K)-Total	mg/L	-	-	-	-		0.411	0.423	0.395	0.413	0.424	0.357	0.357	0.246	0.232	0.32	0.278	0.274	0.268
Selenium (Se)-Total	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000044	0.000044	0.00004	<0.000040	0.000041	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-		5.83	5.96	5.83	5.91	5.97	4.11	4.87	4.11	3.94	4.66	4.1	4.08	4
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-		4.9	4.96	4.75	4.77	4.78	2.66	2.97	2.67	2.63	2.86	2.43	2.66	2.71
Strontium (Sr)-Total	mg/L	-	-	-	-		0.0495	0.0504	0.0437	0.0442	0.0448	0.0215	0.0226	0.0209	0.021	0.0211	0.015	0.0169	0.0169
Thallium (Tl)-Total	mg/L	-	0.0008	-	-		0.0000027	0.0000028	0.000003	0.0000036	0.0000032	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000027	0.0000034	0.0000031	0.0000035
Tin (Sn)-Total	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02		0.0000038	0.0000029	0.0000021	0.0000036	0.0000036	0.0000096	0.0000093	0.0000072	0.000007	0.0000115	0.0000082	0.0000076	0.0000071
Vanadium (V)-Total	mg/L	-	-	-	-		0.00064	0.00052	0.00046	0.00055	0.00054	0.00064	0.001	0.00047	0.00047	0.00106	0.00064	0.00038	0.00037
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00081	0.00104	0.00028	0.00088	0.00078	0.00091	0.00178	0.00069	0.0007	0.00205	0.00102	0.00085	0.00094
Dissolved Metals																			
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-		0.0141	0.0135	0.00831	0.0151	0.0161	**0.0789**	**0.0925**	**0.0772**	**0.0792**	**0.0935**	**0.0751**	**0.0779**	**0.0758**
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	0.000028	0.00003	0.000024	0.000024	0.000023	0.000025	0.000023	0.000023
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01		0.000152	0.00015	0.000097	0.000125	0.000126	0.000088	0.000101	0.000081	0.000082	0.00009	0.000093	0.000065	0.000068
Barium (Ba)-Dissolved	mg/L	-	1	-	1		0.00864	0.00702	0.00596	0.00657	0.00673	0.00401	0.00344	0.00341	0.00337	0.00368	0.00274	0.00334	0.00331
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5		0.0119	0.0114	0.0096	0.0102	0.0105	0.0065	0.0059	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.0050
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000135	<0.0000050	<0.0000050	<0.0000050	**0.0000759**[B]	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-		10.7	10.2	7.95	9.85	10	5.58	5.44	5.7	5.52	5.13	4.5	4.39	4.14
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05		0.00011	0.00011	0.0001	0.0001	0.00011	0.00018	0.00019	0.00016	0.00016	0.00017	0.00019	0.00016	0.00014
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-		0.000251	0.000243	0.0000912	0.000137	0.000141	0.0000505	0.0000509	0.0000531	0.000053	0.0000675	0.0000486	0.0000404	0.0000407
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-		0.000351	0.000314	0.000392	0.000449	0.000362	0.000807	0.000795	0.000669	0.00066	0.000807	0.000779	0.000553	0.000521
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-		0.272	0.283	0.12	0.159	0.172	0.0669	0.07	0.0618	0.0633	0.0828	0.0569	0.0449	0.0428
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01		0.000215	0.0000091	0.0000066	0.0000184	0.0000154	0.0000379	0.0000367	0.0000211	0.0000194	0.0000421	0.0000272	0.0000203	0.0000206

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

Analyte	Units	Guidelines				Lab ID	L1822170-1	L1822170-2	L1825970-1	L1830218-1	L1830218-2	L1852604-1	L1856737-1	L1860016-1	L1860016-2	L1862833-1	L1864642-1	L1869544-1	L1869544-2
						Site	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8
						Report #	Quarterly Report #1					Quarterly Report #2							
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC		30-Aug-16		6-Sep-16	14-Sep-16		31-Oct-16	9-Nov-16	16-Nov-16		23-Nov-16	29-Nov-16	12-Dec-16	
Lithium (Li)-Dissolved	mg/L	-	-	-	-		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-		2.42	2.44	2.34	2.48	2.53	1.29	1.26	1.21	1.24	1.19	0.883	1.06	1.01
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-		**0.0933**	**0.0973**	0.0352	**0.0531**	**0.0566**	0.00253	0.00312	0.00276	0.00283	0.00474	0.00267	0.00272	0.00265
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-		0.000081	0.000071	0.000065	0.000066	0.000061	0.000061	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-		0.000199	0.000205	0.000148	0.000173	0.00018	0.000245	0.000238	0.000197	0.000203	0.000217	0.000175	0.000181	0.000183
Potassium (K)-Dissolved	mg/L	-	-	-	-		0.405	0.4	0.391	0.433	0.423	0.338	0.316	0.252	0.242	0.268	0.284	0.288	0.276
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05		<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000048	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-		5.79	5.86	5.78	5.92	6.47	4.04	4.33	4.08	4.17	4.05	3.5	4.11	3.97
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-		4.83	4.78	4.8	4.97	4.92	2.73	2.76	2.73	2.75	2.53	2.38	2.87	2.79
Strontium (Sr)-Dissolved	mg/L	-	-	-	-		0.0571	0.0494	0.0399	0.0423	0.042	0.0208	0.0206	0.0203	0.0196	0.0208	0.0183	0.017	0.0174
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-		<0.0000020	0.0000023	<0.0000020	0.0000025	0.0000023	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000021	0.0000026	0.0000033
Tin (Sn)-Dissolved	mg/L	-	-	-	-		0.00028	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02		<0.0000020	<0.0000020	<0.0000020	0.0000021	0.000002	0.0000061	0.0000062	0.0000061	0.0000059	0.0000074	0.0000062	0.0000061	0.0000063
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-		0.00037	0.00037	0.00032	0.00035	0.00037	0.00043	0.00046	0.0004	0.00042	0.00043	0.00037	0.00029	0.00028
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-		0.00047	0.00042	0.00057	0.0009	0.00112	0.00182	0.00118	0.00087	0.00061	0.00128	0.00126	0.00097	0.00109
Biological Oxygen Demand																			
BOD	mg/L	-	-	-	-		<2.0	<2.0	<2.0	<10	<10	-	-	-	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-		<2.0	<2.0	<2.0	<10	<10	-	-	-	-	-	-	-	-
Hydrocarbons																			
EPH10-19	mg/L	-	-	-	-		<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-		<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-		<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-		<0.25	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-		-	-	-	-	-	-	<0.10	-	-	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-		94.2	93.6	99.4	94.1	102.2	97.3	94.1	101	93.4	95.8	96.2	89	92.1
Acenaphthene	mg/L	-	0.006	-	-		<0.000010	<0.000010	<0.000010	0.000018	0.000015	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000027	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	**0.0000171**	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000024	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000041	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-		<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	**0.000044**	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-		71.8	73.1	89.2	81.7	85.3	75.6	91.9	89.8	92.1	99.2	71.4	103.4	84.9
Chrysene d12	%	-	-	-	-		102.6	104.9	98	78.9	82.1	82.5	97.4	82.5	86.3	109.2	81.4	105.1	104.1
Naphthalene d8	%	-	-	-	-		93.9	97.8	92.2	93.5	100	95.8	105.9	90.2	86.3	100.2	80.4	112.9	103.6
Phenanthrene d10	%	-	-	-	-		114.8	118.6	100.9	84.9	90.5	96.2	103.8	101.5	102	106.2	80.5	110.4	108

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

					Lab ID	L1881494-1	L1881494-2	L1892928-1	L1903662-1	L1903662-2	L1915533-1	L1915533-2	L1932348-1	L1942330-1
					Site	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8
					Report #	Quarterly Report #3					Final Report			
Analyte	Units	Guidelines				18-Jan-17		20-Feb-17	20-Mar-17		19-Apr-17		25-May-17	13-Jun-17
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC									
General Parameters														
Conductivity	uS/cm	-	-	-	-	52.2	51.9	40.4	39.5	39.2	45.6	46.1	62.3	68.7
Hardness (as $CaCO_3$)	mg/L	-	-	-	-	15.5	15.3	13.7	13.6	13.6	17.1	17.7	26	23.5
pH	pH	6.5-9	6.5-9	7-10.5		7.29	7.28	7.40	7.24	7.22	7.38	7.33	7.55	7.52
pH	pH	6.5-9	6.5-9	7-10.5		7.29	7.28	7.40	7.24	7.22	7.38	7.33	7.55	7.52
Total Suspended Solids	mg/L	Note 1	Note 1	-	-	9.8	5.3	22	3.5	3.2	1.7	1.5	10.1	<1.0
Turbidity	NTU	Note 2	Note 2	-	-	6.03	5.86	1.65	2.96	2.9	1.7	1.7	3.46	0.56
Chloride (Cl)	mg/L	600	150	250	-	5.23	5.25	3.4	2.83	2.81	2.84	2.84	3.46	3.91
Sulfate (SO_4)	mg/L	-	128	500	-	2.83	2.83	2.6	2.48	2.48	2.59	2.58	2.69	2.61
Nutrients														
Ammonia, Total (as N)	mg/L	Note 3	0.102 (Note 3)	-	-	0.0058	0.0066	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0066	0.0059
Nitrate and Nitrite (as N)	mg/L	-	-	-	10	0.183	0.182	0.114	0.0903	0.0904	0.0699	0.069	0.123	0.164
Nitrate (as N)	mg/L	32.8	3	-	10	0.183	0.182	0.114	0.0903	0.0904	0.0699	0.069	0.122	0.164
Nitrite (as N)	mg/L	0.06 (Note 4)	0.02 (Note 4)	-	1	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.127	0.194	0.136	0.094	0.135	0.118	0.098	0.109	0.123
Total Nitrogen	mg/L	-	-	-	-	0.311	0.376	0.25	0.184	0.226	0.188	0.167	0.233	0.287
Total Organic Nitrogen	mg/L	-	-	-	-	0.122	0.187	0.132	0.092	0.133	0.117	0.097	0.103	0.117
Dissolved Kjeldahl Nitrogen	mg/L	-	-	-	-	0.117	0.118	0.196	0.095	0.092	0.139	0.109	0.11	0.099
Total Dissolved Nitrogen	mg/L	-	-	-	-	0.3	0.301	0.31	0.185	0.182	0.209	0.178	0.234	0.263
Orthophosphate-Dissolved (as P)	mg/L	-	-	-	-	0.0011	0.0013	<0.0010	0.0016	0.0013	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	-	-	-	-	0.0082	0.0086	0.0065	0.006	0.0068	0.0054	0.0057	0.0063	0.0047
Organic Carbon														
Dissolved Organic Carbon	mg/L	-	Note 5	-	-	3.23	3.29	3.35	3.18	3.17	2.48	2.65	2.47	2.3
Total Organic Carbon	mg/L	-	Note 5	-	-	3.44	3.76	4.08	3.08	3.21	3.09	3.16	2.48	2.26
Total Metals														
Aluminum (Al)-Total	mg/L	-	-	-	-	0.248	0.265	0.114	0.145	0.14	0.102	0.102	0.0864	0.0319
Antimony (Sb)-Total	mg/L	-	0.009	-	0.006	0.000025	0.000024	0.000022	0.000021	0.000024	0.000021	0.000023	0.000021	0.000023
Arsenic (As)-Total	mg/L	0.005	0.005	-	0.01	0.000117	0.000111	0.000093	0.000082	0.000092	0.000093	0.000089	0.000112	0.000096
Barium (Ba)-Total	mg/L	-	1	-	1	0.00488	0.00496	0.003	0.00326	0.00333	0.00379	0.00386	0.00484	0.00502
Beryllium (Be)-Total	mg/L	-	0.00013	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Total	mg/L	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Total	mg/L	-	1.2	-	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0051	0.0065	0.0071
Cadmium (Cd)-Total	mg/L	-	-	-	0.005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	-	-	4.39	4.56	4.21	4.26	4.46	5.65	5.63	7.68	7.35
Chromium (Cr)-Total	mg/L		0.001	-	0.05	0.00039	0.00039	0.00021	0.00022	0.00023	0.00021	0.00019	0.00017	0.0001
Cobalt (Co)-Total	mg/L	0.110	0.004	-	-	0.000149	0.000151	0.0000751	0.0000695	0.0000764	0.000061	0.0000687	0.0000966	0.0000484
Copper (Cu)-Total	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-	0.000937	0.000971	0.000654	0.000781	0.000948	0.000547	0.000548	0.000837	0.000524
Iron (Fe)-Total	mg/L	1	-	0.3	-	0.245	0.256	0.0753	0.124	0.105	0.111	0.108	0.132	0.076
Lead (Pb)-Total	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01	0.000216	0.000179	0.0000482	0.0000625	0.0000714	0.0000522	0.0000563	0.000124	0.0000194
Lithium (Li)-Total	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	-	-	1.11	1.11	1.02	0.953	0.947	1.34	1.29	1.8	1.89
Manganese (Mn)-Total	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-	0.0128	0.0121	0.00416	0.00495	0.00521	0.00598	0.00604	0.0126	0.00764
Mercury (Hg)-Total	mg/L	-	0.00001	-	0.001	-	-	-	<0.000050	-	<0.0000050	<0.0000050	-	-
Molybdenum (Mo)-Total	mg/L	2	1	-	-	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050	<0.000050	<0.000050	0.000062
Nickel (Ni)-Total	mg/L	-	0.025 (Note 12)	-	-	0.000394	0.000391	0.000224	0.000258	0.000275	0.000216	0.000201	0.000261	0.00017
Potassium (K)-Total	mg/L	-	-	-	-	0.252	0.253	0.201	0.198	0.203	0.261	0.266	0.332	0.301
Selenium (Se)-Total	mg/L		0.001	-	0.05	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040
Silicon (Si)-Total	mg/L	-	-	-	-	3.37	3.38	3.3	3.79	3.8	3.83	3.69	5.05	5.14
Silver (Ag)-Total	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	-	-	200	-	3.01	2.94	2.47	2.43	2.54	2.79	2.9	3.66	3.71
Strontium (Sr)-Total	mg/L	-	-	-	-	0.018	0.0181	0.0156	0.0157	0.0162	0.0191	0.0186	0.0266	0.0325
Thallium (Tl)-Total	mg/L	-	0.0008	-	-	0.0000032	0.000003	0.0000034	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000029	0.0000029
Tin (Sn)-Total	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L		0.0085	-	0.02	0.0000102	0.0000101	0.0000072	0.0000066	0.000007	0.000006	0.0000056	0.0000056	0.0000033
Vanadium (V)-Total	mg/L	-	-	-	-	0.00078	0.00083	0.00041	0.00045	0.00046	0.00041	0.00041	0.00056	0.00042
Zinc (Zn)-Total	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-	0.00139	0.00144	0.00099	0.0012	0.00183	0.00096	0.00082	0.0017	0.00314
Dissolved Metals														
Aluminum (Al)-Dissolved	mg/L	0.1 (Note 17)	0.05 (Note 18)	-	-	**0.0764**	**0.0753**	**0.0579**	**0.0596**	**0.0604**	0.0412	0.0403	**0.0744**[A]	0.017
Antimony (Sb)-Dissolved	mg/L	-	0.009	-	0.006	0.000026	0.000023	0.00002	<0.000020	<0.000020	0.000021	0.000022	0.000024	<0.000020
Arsenic (As)-Dissolved	mg/L	0.005	0.005	-	0.01	0.000082	0.000081	0.000065	0.000072	0.000071	0.00007	0.000077	0.000119	0.000084
Barium (Ba)-Dissolved	mg/L	-	1	-	1	0.00288	0.00291	0.00238	0.0025	0.00235	0.00302	0.00309	0.00482	0.00443
Beryllium (Be)-Dissolved	mg/L	-	0.00013	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Boron (B)-Dissolved	mg/L	-	1.2	-	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	0.0051	0.007	0.0064
Cadmium (Cd)-Dissolved	mg/L	0.000044 (Note 19)	0.000033 (Note 20)	-	0.005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Dissolved	mg/L	Note 21	Note 21	-	-	4.45	4.36	3.96	3.96	3.88	4.72	5.03	7.66	6.57
Chromium (Cr)-Dissolved	mg/L		0.001	-	0.05	0.00021	0.00014	0.00013	0.00013	0.00012	0.00011	0.00011	0.00017	<0.00010
Cobalt (Co)-Dissolved	mg/L	0.110	0.004	-	-	0.0000526	0.0000496	0.0000313	0.0000324	0.0000332	0.0000385	0.0000371	0.0000725	0.0000372
Copper (Cu)-Dissolved	mg/L	0.00275 (Note 6)	0.002 (Note 7)	1	-	0.000531	0.000568	0.000519	0.000468	0.000471	0.000523	0.000451	0.00064	0.000371
Iron (Fe)-Dissolved	mg/L	0.35	-	0.3	-	0.0627	0.0593	0.0334	0.0347	0.0359	0.0529	0.0481	0.119	0.0495
Lead (Pb)-Dissolved	mg/L	0.003 (Note 8)	0.003 (Note 9)	-	0.01	0.000206	0.0000607	0.0000188	0.0000151	0.0000337	0.0000237	0.0000197	0.0000883	0.0000108

Shawnigan Creek Water Quality Study
2016-2017 Water Quality Results

					Lab ID	L1881494-1	L1881494-2	L1892928-1	L1903662-1	L1903662-2	L1915533-1	L1915533-2	L1932348-1	L1942330-1
					Site	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8	S-8
					Report #	Quarterly Report #3					Final Report			
Analyte	Units	Guidelines				18-Jan-17		20-Feb-17	20-Mar-17		19-Apr-17		25-May-17	13-Jun-17
		BC Aquatic Life acute	BC Aquatic Life chronic	GCDWQ AO	GCDWQ MAC									
Lithium (Li)-Dissolved	mg/L	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-	1.06	1.08	0.928	0.892	0.937	1.3	1.24	1.67	1.73
Manganese (Mn)-Dissolved	mg/L	0.64 (Note 10)	0.64 (Note 11)	0.05	-	0.00551	0.00581	0.00179	0.00196	0.00202	0.0032	0.00328	0.00913	0.00607
Molybdenum (Mo)-Dissolved	mg/L	2	1	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000051
Nickel (Ni)-Dissolved	mg/L	-	0.025 (Note 12)	-	-	0.000159	0.000159	0.000125	0.000137	0.000125	0.000146	0.000139	0.000204	0.000121
Potassium (K)-Dissolved	mg/L	-	-	-	-	0.235	0.238	0.174	0.172	0.171	0.229	0.245	0.307	0.265
Selenium (Se)-Dissolved	mg/L		0.001	-	0.05	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	<0.000040	0.000045	<0.000040	<0.000040
Silicon (Si)-Dissolved	mg/L	-	-	-	-	3.03	3.08	2.92	3.44	3.55	3.51	3.47	4.68	4.64
Silver (Ag)-Dissolved	mg/L	0.0001 (Note 13)	0.00005 (Note 14)	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Dissolved	mg/L	-	-	200	-	3.01	3	2.37	2.19	2.28	2.57	2.5	3.48	3.43
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	0.0173	0.0177	0.0151	0.0161	0.015	0.018	0.0194	0.0281	0.0302
Thallium (Tl)-Dissolved	mg/L	-	0.0008	-	-	0.0000023	0.0000026	0.0000042	<0.0000020	<0.0000020	<0.0000020	<0.0000020	0.0000036	0.0000032
Tin (Sn)-Dissolved	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Dissolved	mg/L		0.0085	-	0.02	0.0000065	0.0000061	0.0000056	0.0000056	0.0000054	0.0000045	0.0000048	0.0000052	0.0000026
Vanadium (V)-Dissolved	mg/L	-	0.006	-	-	0.0003	0.0003	0.00025	0.00025	0.00024	0.00029	0.00029	0.00048	0.00033
Zinc (Zn)-Dissolved	mg/L	0.033 (Note 15)	0.0075 (Note 16)	5.0	-	0.00101	0.00097	0.00064	0.00051	0.00054	0.00068	0.00063	0.00114	0.00028
Biological Oxygen Demand														
BOD	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
BOD Carbonaceous	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons														
EPH10-19	mg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
EPH19-32	mg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
LEPH	mg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
HEPH	mg/L	-	-	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
TEH10-30	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Bromobenzotrifluoride	%	-	-	-	-	98.7	90.4	105	118.1	98.1	69.1	95.4	69	95.4
Acenaphthene	mg/L	-	0.006	-	-	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acenaphthylene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Acridine	mg/L	-	0.00005	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Anthracene	mg/L	-	0.0001	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benz(a)anthracene	mg/L	-	0.0001	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(a)pyrene	mg/L	-	0.00001	-	0.00004	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Benzo(b)fluoranthene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(g,h,i)perylene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Benzo(k)fluoranthene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chrysene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Dibenz(a,h)anthracene	mg/L	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Fluoranthene	mg/L	-	0.0002	-	-	0.00001	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Fluorene	mg/L	-	0.012	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Indeno(1,2,3-c,d)pyrene	mg/L	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Naphthalene	mg/L	-	0.001	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Phenanthrene	mg/L	-	0.0003	-	-	0.000023	0.000033	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Pyrene	mg/L	-	0.00002	-	-	<0.000010	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Quinoline	mg/L	-	0.0034	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Acridine d9	%	-	-	-	-	90.8	90.3	91.1	120.3	129.8	91.1	91	102.9	72.6
Chrysene d12	%	-	-	-	-	83.5	87.2	95.8	92.9	100.3	89.5	86.5	107.9	70.1
Naphthalene d8	%	-	-	-	-	93.9	95.2	90.9	77.2	79.8	84.1	95.2	95.8	69.4
Phenanthrene d10	%	-	-	-	-	99.9	103.7	96.7	109.1	115.2	101.4	108.5	106.7	73.7

Legend:

BC Aquatic Life = BC Approved/Working Water Quality Guidelines for Freshwater Aquatic Life
GCDWQ AO = Guidelines for Canadian Drinking Water Quality Aesthetic Objectives
GCDWQ MAC = Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration
Result exceeds the acute BC Aquatic Life Guideline
Result exceeds the chronic BC Aquatic Life Guideline
Result exceeds the GCDWQ AO
Result exceeds both the Aquatic Life Guideline and the GCDWQ AO
Lower detection limit is higher than guideline

Result notes:

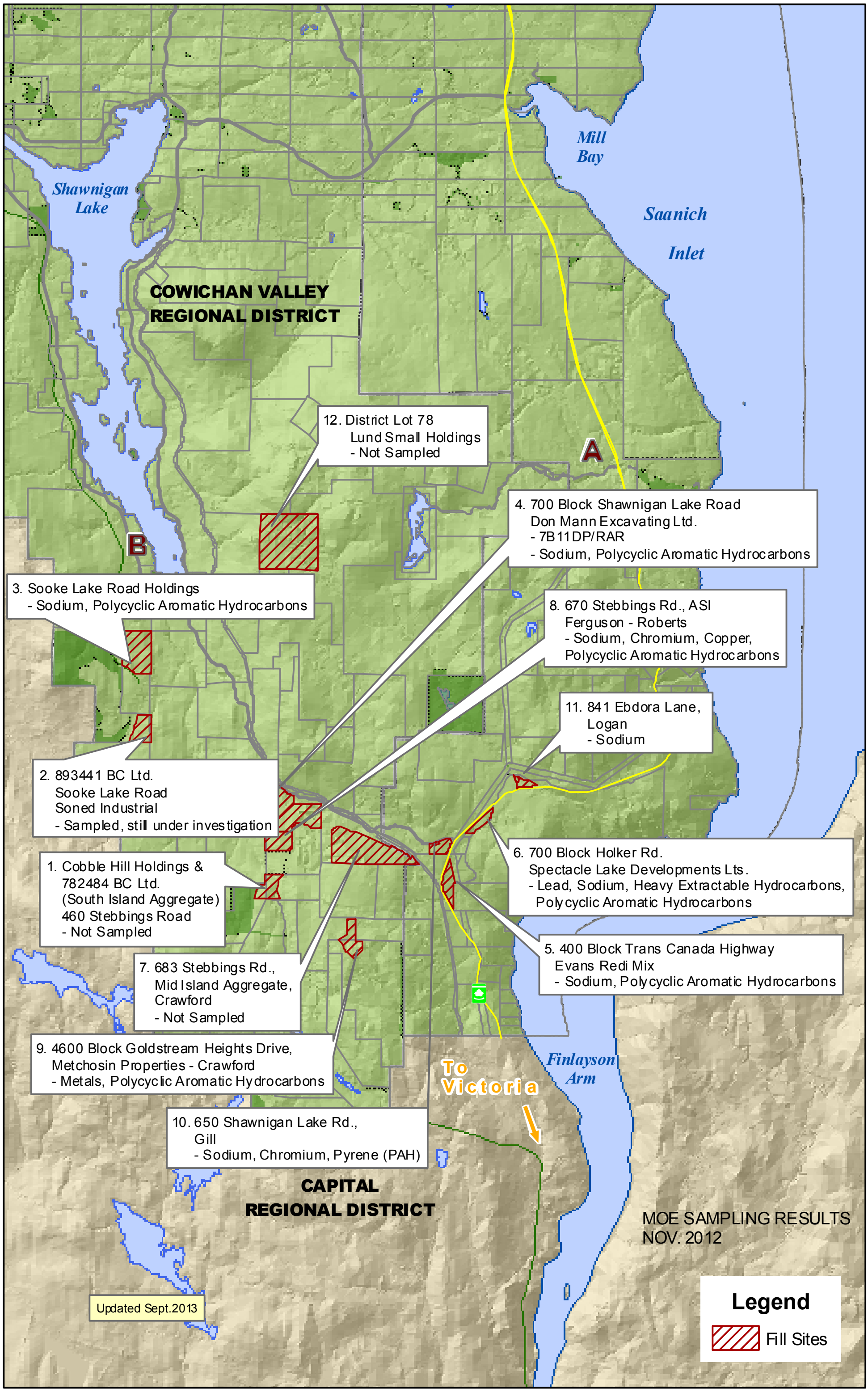
A: Result exceeds the chronic guideline, but 5-in-30 sampling not completed during this sample period. The average concentration from the Quarterly Sampling Event did not exceed the chronic guidelines.
B: Result exceeds the chronic guideline, but the 5-in-30 average did not.

Guideline Notes:

For the guidelines that are calculated based on the water hardness, hardness must be mg/L as $CaCO_3$.
For the guidelines that are calculated on a site-specific basis based on the water hardness, the value shown as the guideline maximum in the above table is calculated based on the lowest observed hardness across the entire dataset (i.e., 8 mg/L at S-1 in March 2017).

Note #	
1: TSS	Assessed based on change from background.
2: Turbidity	Assessed based on change from background.
3: Ammonia	Calculated based on the water temperature and pH.
4: Nitrite	Varies with the chloride concentration. The lowest possible guideline (for chloride < 2 mg/L) is 0.02 mg/L for chronic exposure and 0.06 mg/L for acute exposure.
5: DOC and TOC	The 30-day median for both DOC and TOC shall be within 20% of seasonally-adjusted median background levels as measured historically or at appropriate reference sites.
6: Copper - acute	Guideline = [0.094 (hardness) +2]/1000
7: Copper - chronic	When hardness ≤ 50 mg/L, the guideline is 0.002 mg/L. When hardness > 50 mg/L, the guideline = [0.04 (mean hardness)]/1000.
8: Lead - acute	When hardness < 8 mg/L, the guideline is 0.003 mg/L. When hardness > 8 mg/L, the guideline = e^(1.273 ln(hardness) - 1.460)/1000
9: Lead - chronic	When hardness > 8 mg/L, the guideline = [3.31 + e^1.273 ln (mean hardness) - 4.704]/1000. No guideline for hardness < 8 mg/L
10: Manganese - acute	Guideline = 0.01102(hardness) + 0.54
11: Manganese - chronic	Guideline = 0.0044(hardness) + 0.605
12: Nickel - chronic	When hardness ≤ 60 mg/L, the guideline is 0.025 mg/L. When hardness > 60 mg/L to ≤ 180 mg/L, the guideline is 0.11 mg/L. When hardness > 180 mg/L, the guideline is 0.15 mg/L.
13: Silver - acute	When hardness ≤ 100 mg/L, the guideline is 0.0001 mg/L. When hardness > 100 mg/L, the guideline is 0.003 mg/L.
14: Silver - chronic	When hardness ≤ 100 mg/L, the guideline is 0.00005 mg/L. When hardness > 100 mg/L, the guideline is 0.0015 mg/L.
15: Zinc - acute	When hardness ≤ 90 mg/L, the guideline is 0.033 mg/L. When hardness > 90 mg/L, the guideline = [33 + 0.75(hardness - 90)]/1000
16: Zinc - chronic	When hardness < 90 mg/L, the guideline is 0.0075 mg/L. When hardness > 90 mg/L, the guideline = [7.5 +0.75(hardness - 90)]/1000
17: Aluminum (dissolved only) - acute	When pH ≥ 6.5 (which was the case for all sites), the guideline is 0.1 mg/L.
18: Aluminum (dissolved only) - chronic	When pH ≥ 6.5 (which was the case for all sites), the guideline is 0.05 mg/L.
19: Cadmium (dissolved only) - acute	Guideline = e^[1.03*ln(hardness)-5.274]/1000
20: Cadmium (dissolved only) - chronic	Guideline = e^[0.736*ln(hardness)-4.943]/1000
21: Calcium	If dissolved calcium is < 4 mg/L, the waterbody is highly sensitive to acid inputs. If dissolved cadmium is 4-8 mg/L, the waterbody is moderately sensitive to acid inputs. If dissolved calcium > 8 mg/L, the waterbody has low sensitivity to acid inputs.

Appendix C - Fill Sites Map


Shawnigan Lake
Mill Bay
Saanich Inlet
COWICHAN VALLEY REGIONAL DISTRICT
A
B
12. District Lot 78
Lund Small Holdings
- Not Sampled
4. 700 Block Shawnigan Lake Road
Don Mann Excavating Ltd.
- 7B11DP/RAR
- Sodium, Polycyclic Aromatic Hydrocarbons
3. Sooke Lake Road Holdings
- Sodium, Polycyclic Aromatic Hydrocarbons
8. 670 Stebbings Rd., ASI
Ferguson - Roberts
- Sodium, Chromium, Copper,
Polycyclic Aromatic Hydrocarbons
11. 841 Ebdora Lane,
Logan
- Sodium
2. 893441 BC Ltd.
Sooke Lake Road
Soned Industrial
- Sampled, still under investigation
1. Cobble Hill Holdings &
782484 BC Ltd.
(South Island Aggregate)
460 Stebbings Road
- Not Sampled
6. 700 Block Holker Rd.
Spectacle Lake Developments Lts.
- Lead, Sodium, Heavy Extractable Hydrocarbons,
Polycyclic Aromatic Hydrocarbons
5. 400 Block Trans Canada Highway
Evans Redi Mix
- Sodium, Polycyclic Aromatic Hydrocarbons
7. 683 Stebbings Rd.,
Mid Island Aggregate,
Crawford
- Not Sampled
9. 4600 Block Goldstream Heights Drive,
Metchosin Properties - Crawford
- Metals, Polycyclic Aromatic Hydrocarbons
To Victoria
Finlayson Arm
10. 650 Shawnigan Lake Rd.,
Gill
- Sodium, Chromium, Pyrene (PAH)
CAPITAL REGIONAL DISTRICT
MOE SAMPLING RESULTS
NOV. 2012
Updated Sept.2013
Legend
Fill Sites