

Shuswap River Water Use Plan

Monitoring Programs and Physical Works Annual Report: 2017

Implementation Period: April 2016 to March 2017

- **SHUMON-1 Sugar Lake Reservoir Inflow Monitoring**
- **SHUMON-2 Sugar Lake Reservoir Shoreline Erosion Monitoring**
- **SHUMON-3 Flooding Risks in Middle Shuswap River**
- **SHUMON-4 Sugar Lake Reservoir Archaeology Monitoring**
- **SHUWORKS-1 Flow Disruptions at Wilsey Dam Report on Findings**

For Water Licences 120948, 120949, 120950 and 120951

April 26, 2017

BC Hydro Shuswap River Water Use Plan Monitoring Programs and Physical Works Annual Report: 2017

1 Introduction

This document represents a summary of the status and the results of the Shuswap River Water Use Plan (WUP) monitoring programs and physical works to March 31, 2017, as per the Shuswap Order under the *Water Act*, dated October 12, 2005. There are four monitoring programs and one physical works.

2 Status

The following table outlines the dates that Terms of Reference (TOR) for the Shuswap River WUP monitoring programs and physical works were submitted to and approved by the Comptroller of Water Rights (CWR).

Table 2-1: Dates of Shuswap River WUP TOR Submissions and Approvals by the CWR

Monitoring Program & Physical Works TOR	Order Clause	Original ToR Submission		Most Recent ToR Resubmission	
		Date Submitted	Date Approved	Date Submitted	Date Approved
SHUMON-1 Sugar Lake Reservoir Inflow Monitoring	Clause 5 and 7 (c)	Mar 17, 2006	May 09, 2006		
SHUMON-2 Sugar Lake Reservoir Shoreline Erosion Monitoring	Clause 7(a)	Mar 17, 2006	May 09, 2006		
SHUMON-3 Flooding Risks in Middle Shuswap River	Clause 7(d)	Mar 17, 2006	May 09, 2006	Feb 15, 2010	Mar 18, 2010
SHUMON-4 Sugar Lake Reservoir Archaeology Monitoring	Clause 7(b)	Mar 17, 2011	Jun 03, 2011		
SHUWORKS-1 Flow Disruptions at Wilsey Dam Report on Findings	Clause 6	Apr 12, 2007	May 11, 2007		

3 Schedule

The following table outlines the current schedule for the monitoring programs and physical works being delivered for the Shuswap River WUP.

Table 3-1: Monitoring Programs and Physical Works Schedule as of March 31, 2017

Monitoring Programs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017
	WLR YR1	WLR YR2	WLR YR3	WLR YR4	WLR YR5	WLR YR6	WLR YR7	WLR YR8	WLR YR9	WLR YR10	
SHUMON-1 Sugar Lake Reservoir Inflow Monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	PCR
SHUMON-2 Sugar Lake Reservoir Shoreline Erosion Monitoring		✓F									
SHUMON-3 Flooding Risks in Middle Shuswap River						✓F					PCR
SHUMON-4 Sugar Lake Reservoir Archaeology Monitoring							✓	✓	✓	✓	PCR
Physical Works											
SHUWORKS-1 Flow Disruptions at Wilsey Dam		✓F									PCR
SHUWORKS-1 Bypass Valve			✓	✓	✓	✓F					PCR

Legend:

- = Program to be undertaken/initiated in identified year
- = Year work implemented dependent on flow conditions
- ✓ = Program completed for the year
- ✓F = All field work for this project is complete. No further field work is planned.
- PCR = Project Completion Report submitted

4 Monitoring Programs and Physical Works Terms of Reference

The monitoring programs and physical works being implemented under the Shuswap River WUP are described in Terms of Reference. These Terms of Reference and the reports for work completed to date can be found here:

http://www.bchydro.com/about/sustainability/conservation/water_use_planning/southern_interior/shuswap_sugar_lake.html

5 Status of Monitoring Programs

5.1 SHUMON-1 Sugar Lake Reservoir Inflow Monitoring

The objective of this monitoring project was to review of the effectiveness of the data in improving inflow forecasting for the reservoir. It was initiated prior to the WUP in 2005 with the operation of the hydrometric gauging station, Eagle River near Malakwa (08LE024), by the Water Survey of Canada.

Data collection was complete in 2015, and has been valuable in supporting inflow forecasting and historical inflow data quality control for Sugar Lake Reservoir. The data from the gauging station has been used by BC Hydro as an index stream.

The final report is attached, and this project is now complete.

A project completion report for SHUMON-1 was submitted to the CWR office on March 22, 2017.

5.2 SHUMON-2 Sugar Lake Reservoir Shoreline Erosion Monitoring

The objective of this monitoring project was to conduct a one-time field assessment to monitor the effects of Sugar Lake Reservoir maximum pool elevation on shoreline erosion. It was initiated in 2006, and completed in 2007.

5.3 SHUMON-3 Flooding Risks in Middle Shuswap River

The objective of this monitoring project was to reduce uncertainty related to the discharge rate at which flooding begins in the middle Shuswap River. It required a target discharge, which was met in 2011. The project identified the levels at which flooding occurs resulting from the combined flows from Sugar Lake Dam and the unregulated tributary inflows from Bessette Creek. Data collection and reporting was completed in 2011.

A project completion report for SHUMON-3 was submitted to the CWR office on March 29, 2017.

5.4 SHUMON-4 Sugar Lake Reservoir Archaeology Monitoring

The objective of this monitoring project was to collect information on archaeological site locations and condition within the Sugar Lake Reservoir drawdown zone, and to complete erosion monitoring at selected sites. Two erosion monitoring stations were established at documented archaeological sites. The project was initiated in 2012. Due to safety constraints, the sampling window in 2014 was missed for one of the monitoring stations. The last visit to the missed station was completed in 2015.

A copy of the Year 4 final report is attached. This project is complete.

A project completion report for SHUMON-4 was submitted to the CWR office on March 22, 2017.

6 Status of Physical Works

6.1 SHUWORKS-1 Flow Disruptions at Wilsey Dam Report on Findings

The objective of this physical works project was to minimize the impact on fishery values by eliminating downstream flow disruptions that result from the Wilsey Dam bypass valve. Flow disruptions downstream of Wilsey Dam occurred when a generating unit at Shuswap Falls Generation Station tripped, causing sudden reductions in flow. The bypass valve minimized these flow disruptions, but was in need of upgrades.

This project was initiated in 2007. Upgrades to the valve were completed in 2008, and monitoring the effectiveness of those upgrades was completed in 2012. Monitoring results showed a reduction of the flow disruptions to zero. In 2016, the control logic was adjusted for the bypass valve to reflect the current range of operational conditions at Shuswap Falls Generating Station.

A project completion report for SHUWORKS-1 was submitted to the CWR office on March 28, 2017.

7 Monitoring Programs and Physical Works Costs

The following table summarizes the Shuswap River WUP monitoring programs and physical works costs approved by the Comptroller and the Actual Costs to March 31, 2017.

Table 7-1: Shuswap River WUP Monitoring Programs and Physical Works Costs

Monitoring Programs	Costs approved by CWR	Life to Date Actuals (LTD)	Estimated to Complete (Forecast)	Total Forecast (LTD and Forecast)	Variance Total to Approved	Explanation	Corrective Action
SHU Prepare Annual Report	\$9,674	\$8,235	\$1,438	\$9,673	\$1		
SHUM01A Sugar Lake Inflow Mon	\$80,142	\$52,931		\$52,931	\$27,211	Project completed	
SHUM01A Sugar Lake Inflow Mon - OR DM	\$10,142	\$6,885		\$6,885	\$3,257		
SHUM01A Sugar Lake Inflow Mon - OR Imp	\$70,000	\$46,046		\$46,046	\$23,954		
SHUM02A Sugar Lake Shoreline	\$37,520	\$34,312		\$34,312	\$3,208	Efficiencies found during project implementation	
SHUM02A Sugar Lake Shoreline - OR DM	\$17,120	\$12,552		\$12,552	\$4,568		
SHUM02A Sugar Lake Shoreline - OR Imp	\$20,400	\$21,760		\$21,760	(\$1,360)		
SHUM03A Flood Risks Mid-SHU	\$71,174	\$45,832		\$45,832	\$25,342	Project completed	
SHUM03A Flood Risks Mid-SHU - OR DM	\$17,517	\$12,648		\$12,648	\$4,869		
SHUM03A Flood Risks Mid-SHU - OR Imp	\$53,657	\$33,184		\$33,184	\$20,473		
SHUM04A Archaeology Mon Prgm	\$205,563	\$192,679		\$192,679	\$12,884	Project completed	
SHUM04A Archaeology Mon Prgm - OR DM	\$53,260	\$29,214		\$29,214	\$24,046		
SHUM04A Archaeology Mon Prgm - OR Imp	\$152,303	\$163,464		\$163,464	(\$11,161)		
SHUW01A Wilsey Dam Flow	\$245,524	\$195,787		\$195,787	\$49,737	Project completed	
SHUW01A Wilsey Dam Flow - OR DM	\$48,802	\$27,427		\$27,427	\$21,375		
SHUW01A Wilsey Dam Flow - OR Imp	\$196,722	\$168,359		\$168,359	\$28,363		

OR - Ordered Remissible
ONR - Ordered Non-Remissible

* Red values in parentheses denote overage.