

Whatshan Project Water Use Plan

Monitoring Program and Physical Works

Annual Report: 2016

Implementation Period: July 2015 – June 2016

- **WGSMON-1 Lower Whatshan River Fish Habitat Enhancement Physical and Biological Effectiveness Monitoring**
- **WGSMON-2 Reservoir Vegetation Monitoring**
- **WGSMON-3 Reservoir Wildlife Monitoring**
- **WGSMON-4 First Nations Heritage and Archaeology Monitoring**
- **WGSWORKS-1 Habitat Complexing Assessment and Enhancement Structures**
- **WGSWORKS-2 Inonoaklin Recreation Site Boat Launch Extension**

For Water Licences 120711 and 120712

July 31, 2016

BC Hydro Whatshan Project Water Use Plan Monitoring Programs and Physical Works Annual Report: 2016

1 Introduction

This document represents a summary of the status and the results of the Whatshan Project Water Use Plan (WUP) monitoring programs and physical works to June 30, 2016, as per the Whatshan Order under the *Water Act*, dated July 14, 2005. There are four monitoring programs and two physical works.

2 Status

The following table outlines the dates that Terms of Reference (TOR) for the Whatshan Project WUP monitoring programs and physical works were submitted to and approved by the CWR.

Table: 2-1: Dates of Whatshan Project WUP TOR Submissions and Approvals by the Comptroller of Water Rights

Monitoring Program & Physical Works TOR	Order Clause	Original ToR Submission		Most Recent ToR Resubmission	
		Date Submitted	Date Approved	Date Submitted	Date Approved
WGSMON-1 Lower Whatshan River Fish Habitat Enhancement Physical and Biological Effectiveness Monitoring	Clause 3	Nov 14, 2005	Feb 15, 2006	May 09, 2010	Jun 30, 2010
WGSMON-2 Reservoir Vegetation Monitoring	Clause 4(a)	Nov 14, 2005	Feb 15, 2006		
WGSMON-3 Wildlife Monitoring	Clause 4 (a)	Nov 14, 2005	Feb 15, 2006	Jul 29, 2009	Oct 13, 2009
WGSMON-4 First Nations Heritage and Archaeology Monitoring	Clause 4 (b)	Mar 17, 2011	May 17, 2011		
WGSWORKS-1 Habitat Complexing Assessment and Enhancement Structures - Feasibility	Clause 3	Nov 14, 2005	Feb 15, 2006		
WGSWORKS-1 Construction Implementation	Clause 3	May 04, 2009	Jun 06, 2009	Jul 29, 2009	Oct 13, 2009
WGSWORKS-2 Inonoaklin Recreation Site Boat Launch Extension	Clause 2	Nov 14, 2005	Feb 15, 2006	Jun 12, 2006	Aug 02, 2006

3 Schedule

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

The Whatshan Project WUP completed its last year of monitoring in 2015 and this report will represent the final annual report.

Table 3-1: Monitoring Programs and Physical Works Schedule as of June 30, 2016

Monitoring Programs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	WLR YR1	WLR YR2	WLR YR3	WLR YR4	WLR YR5	WLR YR6	WLR YR7	WLR YR8	WLR YR9	WLR YR10
WGSMON-1 Lower Whatshan River Fish Habitat Effectiveness Monitoring	✓	✓	✓		✓		✓			✓
WGSMON-2 Reservoir Vegetation Monitoring	✓					✓				✓
WGSMON-3 Reservoir Wildlife Monitoring	✓		✓	✓	✓					
WGSMON-4 Whatshan Lake Reservoir Archaeological Study							✓			
Physical Works										
WGSWORKS-1 Habitat Complexing Assessment and Enhancement Structures	✓	✓	x	✓						
WGSWORKS-2 Inonoalkin Recreation Site Boat Launch Extension	✓									

Legend: ✓ = Program completed for the year
x = Project encountered delays due to hydrological or operational events

4 Monitoring Programs and Physical Works Terms of Reference

The monitoring programs and physical works being implemented under the Whatshan Project 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/whatshan.html

5 Status of Monitoring Programs

5.1 WGSMON-1 Lower Whatshan River Fish Habitat Enhancement Physical and Biological Effectiveness Monitoring

This monitoring program was initiated in 2006 and completed in Years 1-3, 5, 7 and 10.

The objective of this monitoring program was to evaluate the general ecological and fish habitat benefits expected from the physical works habitat enhancement structures installed in Reach W3 of the Lower Whatshan River in lieu of an operational change (minimum flow). The monitoring included two major components: 1) monitoring physical habitat, and 2) biological response. Monitoring indicators included measures of physical habitat, fish abundance, biomass, and biological characteristics.

Three years of pre-treatment monitoring were completed 2006-2008. Post-treatment monitoring was completed in 2010, 2012, and 2015.

All field work is complete. The final report will be submitted by September 30, 2016.

5.2 WGSMON-2 Reservoir Vegetation Monitoring

This monitoring program was initiated in 2006 and completed in Years 1, 6 and 10.

The primary objective of the monitoring study was to reduce uncertainty related to the effects of reservoir operations on reservoir vegetation in the Whatshan Lake Reservoir. The geographic scope of the monitoring was limited to the drawdown zone and the associated riparian zone of the Whatshan Lake Reservoir (all three basins). Much of the reservoir is steep-sided and monitoring focused on key locations where aquatic vegetation is present. Monitoring examined large-scale changes in the boundaries of vegetation communities.

All field work is complete. The final report will be submitted by September 30, 2016.

5.3 WGS MON-3 Reservoir Wildlife Monitoring

This three-year monitoring program was completed in 2010.

The primary objective of the monitoring study was to reduce uncertainty in the relationship between wildlife and reservoir vegetation. The program undertook a pilot survey, selected an indicator species and then designed and implemented a monitoring strategy.

5.4 WGS MON-4 First Nations Heritage and Archaeology Monitoring

This one-year monitoring program was completed in 2012. The purpose of this Archaeological Study was to collect information on archaeological sites in the drawdown zone that could be used in further WUP processes. In 2012 a non-intrusive inventory of portions of the draw down zone was completed.

6 Status of Physical Works

6.1 WGS WORKS-1 Habitat Complexing Assessment and Enhancement Structures

The objective of this physical work was to achieve effective long-term river habitat in the lower Whatshan River through the addition of complexing structures within Reach 3. This work was completed in 2009.

6.2 WGS WORKS-2 Inonoaklin Recreation Site Boat Launch Extension

The purpose of this work was to extend the existing boat launch ramp at the Inonoaklin Recreation site on the Whatshan reservoir to 635.50 m to provide recreation benefits.

As noted in the Completion Report (May 5, 2006), the existing boat ramp was to be extended, but due to insufficient gradient at lower elevations it was not a valid option. As a result, a second concrete boat launch was constructed within the recreation site 150 m to the left (north) of the existing boat ramp. This work was completed in 2006.

7 Monitoring Programs and Physical Works Costs

The following table summarizes the Whatshan Project WUP monitoring programs and physical works costs approved by the Comptroller and the Actual Costs to June 30, 2016.

Table 7-1: Whatshan Project 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
Whatshan WUP Annual Report	\$5,642	\$5,578	\$64	\$5,642	(\$0)		
WGSM01A Lower Whatshan	\$248,493	\$235,976	\$2,535	\$238,511	\$9,982	Project complete. Final reporting outstanding.	
WGSM01A Lower Whatshan - OR DM	\$42,791	\$32,545	\$2,535	\$35,080	\$7,711		
WGSM01A Lower Whatshan - OR Imp	\$205,702	\$203,431		\$203,431	\$2,271		
WGSM02A Reservoir Vegetation	\$162,160	\$148,631	\$5,035	\$153,666	\$8,494	Project complete. Final reporting outstanding.	
WGSM02A Reservoir Vegetation - OR DM	\$27,760	\$25,315	\$2,535	\$27,850	(\$90)		
WGSM02A Reservoir Vegetation - OR Imp	\$134,400	\$123,317	\$2,500	\$125,817	\$8,583		
WGSM03A Wildlife Monitoring	\$75,279	\$62,539	\$2,535	\$65,074	\$10,205	Project complete. Completion report outstanding.	
WGSM03A Wildlife Monitoring - OR DM	\$27,218	\$14,380	\$2,535	\$16,914	\$10,304		
WGSM03A Wildlife Monitoring - OR Imp	\$48,061	\$48,159	\$0	\$48,159	(\$98)		
WGSM04A Archaeology Inventory	\$86,283	\$77,181	\$2,535	\$79,716	\$6,567	Project complete. Completion report outstanding.	
WGSM04A Archaeology Inventory - OR DM	\$25,334	\$13,808	\$2,535	\$16,343	\$8,991		
WGSM04A Archaeology Inventory - OR Imp	\$60,949	\$63,373	\$0	\$63,373	(\$2,424)		
WGSW01A Habitat Enhancement	\$280,590	\$254,018	\$2,535	\$256,553	\$24,037	Project complete. Completion report outstanding.	
WGSW01A Habitat Enhancement - OR DM	\$14,373	\$13,752	\$2,535	\$16,286	(\$1,913)		
WGSW01A Habitat Enhancement - OR Imp	\$266,217	\$240,267	\$0	\$240,267	\$25,950		
WGSW02A Inonoaklin Rec Site	\$69,504	\$36,352	\$2,535	\$38,886	\$30,618	Project complete. Completion report outstanding.	
WGSW02A Inonoaklin Rec Site - OR DM	\$18,104	\$33,492	\$2,535	\$36,026	(\$17,922)		
WGSW02A Inonoaklin Rec Site - OR Imp	\$51,400	\$2,860	\$0	\$2,860	\$48,540		

OR - Ordered Remissible
ONR - Ordered Non-Remissible

* Red values in parentheses denote overage.