

Columbia River Project Water Use Plan Revelstoke Flow Management Plan

Monitoring Program

Annual Report: 2014

Implementation Period: February 2013 to January 2014

- **CLBMON-15a Middle Columbia River Physical Habitat Monitoring**
- **CLBMON-15b Middle Columbia River Ecological Productivity Monitoring**
- **CLBMON-16 Middle Columbia River Fish Population Indexing Surveys**
- **CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use**
- **CLBMON-18 Middle Columbia River Adult Fish Habitat Use**
- **CLBMON-53 Middle Columbia Juvenile Fish Stranding**

Conditional Water Licences for Kinbasket storage (27068 and 39432), Mica diversion (39431), Revelstoke diversion and storage (47215), and Arrow storage (27066)

February 28, 2014

BC Hydro Columbia River Project Water Use Plan Revelstoke Flow Management Plan Monitoring Programs Annual Report: 2014

1 Introduction

This document represents a summary of the status and the results of the Columbia River Revelstoke Flow Management Plan Water Use Plan (WUP) monitoring programs and physical works to January 31, 2014, as per the Columbia River Order under the *Water Act*, dated January 26, 2007. There are six monitoring programs.

2 Status

The following table outlines the dates that TOR for the Revelstoke Flow Management Plan WUP monitoring programs were submitted to and approved by the CWR.

Table: 2-1: Dates of Revelstoke Flow Management Plan 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
CLBMON-15a Middle Columbia River Physical Habitat Monitoring	Schedule C, Clause 4 (a);	Mar 05, 2007	Mar 22, 2007	May 21, 2010	Jul 19, 2010
CLBMON-15b Middle Columbia River Ecological Productivity Monitoring	Schedule C, Clause 4 (a)	Mar 05, 2007	Mar 22, 2007	May 21, 2010	Jul 19, 2010
CLBMON-16 Middle Columbia River Fish Population Indexing Surveys	Schedule C, Clause 4 (b)	Mar 05, 2007	Mar 22, 2007	Jul 12, 2013	Jul 22, 2013
CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use	Schedule C, Clause 4 (c)	Mar 05, 2007	Mar 22, 2007	May 21, 2010	Jul 19, 2010
CLBMON-18 Middle Columbia River Adult Fish Habitat Use	Schedule C, Clause 4 (d)	Mar 05, 2007	Mar 22, 2007	May 21, 2010	Jul 19, 2010
CLBMON-53 Middle Columbia River Juvenile Fish Stranding	Amended Order, Clause 2 (c)	Jul 31, 2008	Sep 11, 2008	Feb 02, 2009	Mar 26, 2009

3 Schedule

The following table (Table 3-1) outlines the current schedule for the monitoring programs and physical works being delivered for the Revelstoke Flow Management Plan WUP.

Table 3-1: Table of WUP Schedule

Monitoring Programs	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	WLR YR1	WLR YR2	WLR YR3	WLR YR4	WLR YR5	WLR YR6	WLR YR7	WLR YR8	WLR YR9	WLR YR10	WLR YR11	WLR YR12	WLR YR13
CLBMON-15a Middle Columbia River Physical Habitat Monitoring	✓	✓	✓	✓	✓	✓	u/w	■	■	■	■	■	■
CLBMON-15b Middle Columbia River Ecological Productivity Monitoring	✓	✓	✓	✓	✓	✓	u/w	■	■	■	■	■	■
CLBMON-16 Middle Columbia River Fish Population Indexing Surveys	✓	✓	✓	✓	✓	✓	u/w	■	■	■	■	■	■
CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use		✓	✓	✓	✓	✓	u/w						
CLBMON-18 Middle Columbia River Adult Fish Habitat Use		✓	✓	✓	x	x	x	■	■	■			
CLBMON-53 Middle Columbia River Juvenile Fish Stranding			✓	✓	✓	x	u/w						

Legend: ■ = Program to be undertaken/initiated in identified year
 u/w = Project is underway
 ✓ = Program completed for the year
 x = Program started, but encountered operational or hydrological delays

4 Monitoring Programs and Physical Works Terms of Reference

The Monitoring Programs and Physical Works being implemented under the Revelstoke Flow Management Plan 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/columbia_river/revelstoke-flow.html

5 Summary of Monitoring Programs

5.1 CLBMON-15a Middle Columbia River Physical Habitat Monitoring

5.1.1 Status

This monitoring program was initiated in 2007 and will be carried out over 13 years. Attached is the synthesis report for Year 1-6 dated January 27, 2014. The Year 7 (2013) draft report is in preparation.

5.2 CLBMON-15b Middle Columbia River Ecological Productivity Monitoring

5.2.1 Status

This monitoring program was initiated in July 2007 and will be carried out over 13 years. Attached is the report for Year 6 dated June 2013. The Year 7 (2013 Data) draft report is in preparation.

5.3 CLBMON-16 Middle Columbia River Fish Population Indexing Surveys

5.3.1 Status

This monitoring program was initiated in October 2007 and will be carried out over 13 years. Attached is the report for Year 6 dated August 12, 2013. The Year 7 (2013 Data) draft report is in preparation.

5.4 CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use

5.4.1 Status

This monitoring program was initiated in 2008 and will be carried out over 6 years. Attached is the report for Year 5 dated April 2013. The Year 6 (2013 data) draft report is in preparation.

5.5 CLBMON-18 Middle Columbia River Adult Fish Habitat Use

5.5.1 Status

This monitoring program was initiated in 2008 and will be carried out over 6 years. The first three years have been completed for 2008-2010. The remainder of the program has been deferred to 2014 and will continue throughout 2016. There is no report for this reporting period.

5.6 CLBMON-53 Middle Columbia River Juvenile Fish Stranding

5.6.1 Status

This monitoring program was initiated in 2009 and will be carried out over 4 years. The first three years have been completed for 2009-2011. There was no work implemented in 2012. There is no report for this reporting period. The fourth and final year has been implemented in 2013. The Year 4 (2013 data) draft report is in preparation.

6 Monitoring Programs Costs

The following table summarizes the Revelstoke Flow Management Plan WUP monitoring programs and physical works costs approved by the Comptroller and the Actual Costs to January 31, 2014.

Table 6-1: Revelstoke Flow Management Plan WUP Monitoring Programs 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
CLB MP4 Revelstoke Flow Annual Report	\$5,177	\$2,844	\$2,333	\$5,177	\$0		
CLBMON-15a Middle Columbia River Physical Habitat and Ecological Productivity Monitoring	\$4,052,513	\$2,024,345	\$1,970,330	\$3,994,674	\$57,839	Efficiencies found during project.	No Corrective action required.
C04M15A MID COL Physical Hab - OR DM	\$264,235	\$103,878	\$151,036	\$254,914	\$9,321		
C04M15A MID COL Physical Hab - OR Imp	\$3,788,278	\$1,920,467	\$1,819,293	\$3,739,760	\$48,518		
CLBMON-16 Middle Columbia River Fish Population Indexing Surveys	\$2,880,201	\$1,164,199	\$1,497,808	\$2,662,007	\$218,194	Efficiencies found during project implementation.	No Corrective action required.
C04M16A MID COL Fish Index - OR DM	\$105,704	\$63,125	\$42,579	\$105,704	\$0		
C04M16A MID COL Fish Index - OR Imp	\$2,774,497	\$1,101,074	\$1,455,229	\$2,556,303	\$218,194		
CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use - ONR	\$103,056	\$87,842	\$15,214	\$103,056	\$0	Project ending March 31 2014	No Corrective Action Required.
C04M17A MID COL Juvenile Hat - ONR Imp	\$103,056	\$87,842	\$15,214	\$103,056	\$0		
CLBMON-17 Middle Columbia River Juvenile Fish Habitat Use - OR	\$495,994	\$468,804	\$23,438	\$492,242	\$3,752	Project ending March 31 2014	No Corrective action required.
C04M17A MID COL Juvenile Hat - OR DM	\$39,494	\$34,799	\$4,688	\$39,487	\$7		
C04M17A MID COL Juvenile Hat - OR Imp	\$456,500	\$434,005	\$18,750	\$452,755	\$3,745		
CLBMON-18 Middle Columbia River Adult Fish Habitat Use - ONR	\$178,104		\$178,104	\$178,104	\$0		No Corrective Action Required.
C04M18A MID COL Adult Fish - ONR Imp	\$178,104		\$178,104	\$178,104	\$0		
CLBMON-18 Middle Columbia River Adult Fish Habitat Use - OR	\$862,641	\$539,637	\$341,617	\$881,254	(\$18,613)	Additional effort will be required to manage the delivery model and logistics of the project for the remainder of the project ending in three years.	Re-submit TOR in December 2014.
C04M18A MID COL Adult Fish - OR DM	\$42,322	\$27,088	\$34,908	\$61,996	(\$19,674)		
C04M18A MID COL Adult Fish - OR Imp	\$820,319	\$512,549	\$306,709	\$819,258	\$1,061		
CLBMON-53 Middle Columbia River Juvenile Fish Stranding	\$179,222	\$141,807	\$17,342	\$159,148	\$20,074	Efficiencies found during project. Project is ending March 31, 2014.	No Corrective action required.
C04M53A MID COL Fish Strand - ONR DM	\$58,310	\$33,480	\$15,322	\$48,801	\$9,509		
C04M53A MID COL Fish Strand - ONR Imp	\$120,912	\$108,327	\$2,020	\$110,347	\$10,565		
OR - Ordered Remissible							
ONR - Ordered Non-Remissible							

* Red values in parentheses denote overage.