

Coquitlam-Buntzen Water Use Plan

Monitoring Programs and Physical Works Annual Report: 2014

Implementation Period: April 2013 to March 2014

- **COQMON-1 – Assessment of Fisheries Access to Streams Tributary to Coquitlam River**
- **COQMON-2 – Coquitlam Dam Flow Release Interim Ramping Rate Monitoring**
- **COQMON-3 – Lower Coquitlam River Fish Habitat Requirements Study**
- **COQMON-4 – Assessment of Pink Salmon Passage in Lower Coquitlam River**
- **COQMON-5 – Coquitlam River Periphyton and Benthic Invertebrate Monitoring**
- **COQMON-6 – Lower Coquitlam River Temperature Monitoring**
- **COQMON-7 – Lower Coquitlam River Fish Productivity Index**
- **COQMON-8 – Lower Coquitlam River Substrate Quality Assessment**
- **COQWORKS-1 – Modification of Coquitlam Dam Release Facilities (Flow Release Valve)**

For Water Licences 119709, 119710 and 119711

April 30, 2014

BC Hydro Coquitlam-Buntzen Water Use Plan Monitoring Programs and Physical Works Annual Report: 2014

1 Introduction

This document represents a summary of the status and the results of the Coquitlam-Buntzen Water Use Plan (WUP) monitoring programs and physical works to March 31, 2014, as per the Coquitlam-Buntzen Order under the *Water Act*, dated April 21, 2005 and the amendment dated March 8, 2006. There are eight monitoring programs and one physical works.

2 Status

The following table outlines the dates that TOR for the Coquitlam-Buntzen WUP monitoring programs and physical works were submitted to and approved by the CWR.

Table: 2-1: Dates of Coquitlam-Buntzen 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
COQMON-1 – Assessment of Fisheries Access to Streams Tributary to Coquitlam River	Schedule E.1	Oct 24, 2005	Jan 03, 2006		
COQMON-2 – Coquitlam Dam Flow Release Interim Ramping Rate Monitoring	Schedule E.2	Oct 24, 2005	Jan 03, 2006	Feb 09, 2009	Mar 23, 2009
COQMON-3 – Lower Coquitlam River Fish Habitat Requirements Study	Schedule E.2 portion for COQMON#3 rescinded Mar 13, 2005	Jan 10, 2007	Feb 01, 2007	Feb 09, 2009	Mar 23, 2009
COQMON-4 – Assessment of Pink Salmon Passage in Lower Coquitlam River	Schedule E.2	Oct 24, 2005	Jan 03, 2006	Feb 09, 2009	Mar 23, 2009
COQMON-5 – Coquitlam River Periphyton and Benthic Invertebrate Monitoring	Schedule E.2	Oct 24, 2005	Jan 03, 2006	Feb 09, 2009	Mar 23, 2009
COQMON-6 – Lower Coquitlam River Temperature Monitoring	Schedule E.2	Oct 24, 2005	Jan 03, 2006	Feb 09, 2009	Mar 23, 2009
COQMON-7 – Lower Coquitlam River Fish Productivity Index	Schedule E.2	Feb 08, 2006	Mar 08, 2006	Feb 10, 2012	Sep 19, 2012
COQMON-8 – Lower Coquitlam River Substrate Quality Assessment	Schedule E.2	Oct 24, 2005	Jan 03, 2006	Feb 09, 2009	Mar 23, 2009
COQWORKS-1 – Modification of Coquitlam Dam Release Facilities (Flow Release Valve)	Schedule B	Oct 24, 2005	Dec 02, 2005	Apr 29, 2009	App not required

3 Schedule

The following table (Table 3-1) outlines the current schedule for the monitoring programs and physical works being delivered for the Coquitlam-Buntzen WUP.

Table 3-1: Status of Coquitlam-Buntzen WUP Monitoring Programs and Physical Works Implementation

Monitoring Programs	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	WLR Yr1	WLR Yr2	WLR Yr3	WLR Yr4	WLR Yr5	WLR Yr6	WLR Yr7	WLR Yr8	WLR Yr9	WLR Yr10	WLR Yr11	WLR Yr12 ³
COQMON-1 – Assessment of Fisheries Access to Streams Tributary to Coquitlam River	✓	✓	Study Complete									
COQMON-2 – Coquitlam Dam Flow Release Interim Ramping Rate Monitoring	✓	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
COQMON-3 – Lower Coquitlam River Fish Habitat Requirements Study	DEL ¹	DEL ¹	DEL ¹	✓	✓	✓	Data Collection Complete				Analysis Required	
COQMON-4 – Assessment of Pink Salmon Passage in Lower Coquitlam River		✓		✓		✓		✓	■	■		
COQMON-5 – Coquitlam River Periphyton and Benthic Invertebrate Monitoring	✓	DEL ¹	DEL ¹	✓	✓	✓	Study Complete					
COQMON-6 – Lower Coquitlam River Temperature Monitoring	✓	✓	✓	✓	✓	✓	Study Complete				Analysis Required	
COQMON-7 – Lower Coquitlam River Fish Productivity Index	Smolt and Fry Outmigration Assessment	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
	Fry and Juvenile Standing Stock Assessment	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
	Fall Adult Salmon Escapement Surveys	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
	Steelhead Redd Surveys	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
	Recruitment Analysis	✓	✓	✓								
COQMON-8 – Lower Coquitlam River Substrate Quality Assessment	✓	✓	✓	✓	✓	✓	✓	✓	■	■	■	■
Physical Works												
COQWORKS-1 – Modification of Coquitlam Dam Release Facilities (Flow Release Valve)	DEL ²	DEL ²	✓	✓								
Legend:	■ = Program to be undertaken/initiated in identified year ✓ = Program completed for the year DEL = Program is delayed for this year											
Footnotes:	1. Program delayed due to postponement of required flow release structure modification and associated modified flow regime to 23 October 2008. 2. The installation of the release valve was delayed due to existing dam seismic upgrade repairs. 3. To fulfill committed 9 years of modified flow regime effectiveness monitoring program is expected to continue through 2017, however, based on Monitoring Committee support monitoring may terminate in 2016 based on sufficient data collection to confirm flow treatment to compare productivity benefits associated with two flow treatments.											

4 Monitoring Programs and Physical Works Terms of Reference

The Monitoring Programs and Physical Works being implemented under the Coquitlam-Buntzen 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/lower_mainland/coquitlam_buntzen.html

5 Summary of Monitoring Programs

5.1 COQMON-1 – Assessment of Fisheries Access to Streams Tributary to Coquitlam Reservoir

5.1.1 Status

This program is complete.

5.2 COQMON-2 – Coquitlam Dam Flow Release Interim Ramping Rate Monitoring

5.2.1 Status

Assessment of stranding risk associated with ramping rate operations was initiated in 2003 at the conclusion of the Coquitlam-Buntzen WUP, with the objective of refining a ramping-rate schedule prior to the start of the monitoring program. A ramping rate schedule was drafted into the monitoring TOR for implementation and monitoring over the review period.

The program reports for Years 1 to 7 (2005 to 2012) have been received by BC Hydro and have been submitted previously. The Year 8 report (April 1, 2012 to April 2, 2013) is attached.

5.3 COQMON-3 – Lower Coquitlam River Fish Habitat Requirements Study

5.3.1 Status

Initiation of this monitoring program had been delayed several years due to the inability to provide the required modified flow release from Coquitlam Dam. Based on the provision of the modified flow release in October 2008 this monitoring program was initiated in November 2008 to observe habitat requirements for chum and coho salmon. The two other components: steelhead spawning and juvenile rearing commenced in 2009. Program reports from Years 1 to 3 (2010, 2011, and 2012) have been received by BC Hydro and have been submitted previously. These reports are in the form of a memo as they mainly detail the work, methodology and results conducted during 2008-2011. Now that sufficient data has been collected, a technical specialist will summarize the program results.

5.4 COQMON-4 – Assessment of Pink Salmon Passage in Lower Coquitlam River

5.4.1 Status

This monitoring program was initiated in August 2007 with the onset of pink salmon migration in the Coquitlam River and continued through the low flow September period. The fourth program report based on the August 2013 field assessment is attached. This monitoring program will resume in the summer of 2015 for the return of pink salmon.

5.5 COQMON-5 – Coquitlam River Periphyton and Benthic Invertebrate Monitoring

5.5.1 Status

This program is complete.

5.6 COQMON-6 – Lower Coquitlam River Temperature Monitoring

5.6.1 Status

This program is complete.

5.7 COQMON-7 – Lower Coquitlam River Fish Productivity Index

5.7.1 Status

This program was started in 2000 and enhanced in 2003 as part of a commitment to the Coquitlam-Buntzen WUP Consultative Committee to undertake monitoring at the conclusion of the WUP process. As a result, it is in its eleventh year of full implementation. All sampling to date has been completed. The 2010/2011 is attached, and the 2011/2012 report has been received, and is in the process of being finalized.

Delays in modification of the Coquitlam Dam release facility resulted in the extension of the Treatment 1 flow regime through 2008 with an additional two years of assessment (2000-2008). The modified flow regime (Treatment 2) assessment commenced in fall 2008 and is expected to extend through to spring 2017.

5.8 COQMON-8 – Lower Coquitlam River Substrate Quality Assessment

5.8.1 Status

A preliminary survey in 2003 was conducted to evaluate best practices for substrate sampling, which then formed the basis of the recommended monitoring program. Reports were received for monitoring Years 1 to 5, from 2006 to 2011 and have been submitted previously. As requested by the Coquitlam Monitoring Advisory Committee the Year 5 report included recommendations for refining the study methods. Field work for Year 6 started in October 2012. A draft report received in November 2013 is under review and will be submitted with next year's annual report. A status update of the Year 5 recommendations will be included in the 2015 Annual Report.

6 Summary of Physical Works

6.1 COQWORKS-1 – Modification of Coquitlam Dam Release Facilities (Flow Release Valve)

6.1.1 Status

This program is complete.

7 Monitoring Programs and Physical Works Costs

The following table summarizes the Coquitlam-Buntzen WUP monitoring programs and physical works costs approved by the Comptroller and the Actual Costs to March 31, 2014.

Table 7-1: Coquitlam - Buntzen 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
Coquitlam WUP Annual Report	\$32,353	\$15,494	\$7,402	\$22,895	\$9,458	Efficiencies found during project implementation.	
COQM01A Access to Streams	\$26,582	\$20,615	\$0	\$20,615	\$5,967	Efficiencies found during project implementation.	
COQM01A Access to Streams - OR DM	\$16,322	\$8,434	\$0	\$8,434	\$7,888		
COQM01A Access to Streams - OR Imp	\$10,260	\$12,181	\$0	\$12,181	(\$1,921)		
COQM02A Dam Flow Release R	\$160,791	\$85,196	\$61,577	\$146,773	\$14,019	Efficiencies found during project implementation.	
COQM02A Dam Flow Release R - OR DM	\$55,353	\$22,422	\$22,610	\$45,031	\$10,322		
COQM02A Dam Flow Release R - OR Imp	\$105,438	\$62,774	\$38,967	\$101,741	\$3,697		
COQM03A Fish Habitat Suitabil	\$115,374	\$44,984	\$20,152	\$65,136	\$50,238	Efficiencies found during project implementation.	
COQM03A Fish Habitat Suitabil - OR DM	\$31,018	\$12,305	\$5,151	\$17,456	\$13,562		
COQM03A Fish Habitat Suitabil - OR Imp	\$84,356	\$32,679	\$15,001	\$47,680	\$36,676		
COQM04A Pink Salmon Passage	\$70,698	\$40,037	\$11,955	\$51,991	\$18,707	Efficiencies found during project implementation.	
COQM04A Pink Salmon Passage - OR DM	\$32,947	\$10,916	\$3,455	\$14,370	\$18,577		
COQM04A Pink Salmon Passage - OR Imp	\$37,751	\$29,121	\$8,500	\$37,621	\$130		
COQM05A Periphyton & Benthic	\$268,770	\$238,560	\$0	\$238,560	\$30,210	Project Completed	
COQM05A Periphyton & Benthic - OR DM	\$29,883	\$14,087	\$0	\$14,087	\$15,796		
COQM05A Periphyton & Benthic - OR Imp	\$238,887	\$224,473	\$0	\$224,473	\$14,414		
COQM06A Lower COQ River Temp	\$62,539	\$62,128	\$0	\$62,128	\$411	Project Completed	
COQM06A Lower COQ River Temp - OR DM	\$12,969	\$12,547	\$0	\$12,547	\$422		
COQM06A Lower COQ River Temp - OR Imp	\$49,570	\$49,580	\$0	\$49,580	(\$10)		
COQM07A Fish Productivity Ind	\$2,870,711	\$1,869,842	\$993,476	\$2,863,317	\$7,394	Efficiencies found during project implementation.	
COQM07A Fish Productivity Ind - OR DM	\$116,638	\$93,280	\$26,502	\$119,781	(\$3,143)		
COQM07A Fish Productivity Ind - OR Imp	\$2,754,073	\$1,776,562	\$966,974	\$2,743,536	\$10,537		
COQM08A Substrate Quality Ass	\$416,664	\$233,764	\$163,590	\$397,353	\$19,311	Efficiencies found during project implementation.	
COQM08A Substrate Quality Ass - OR DM	\$80,392	\$29,048	\$12,175	\$41,223	\$39,169		
COQM08A Substrate Quality Ass - OR Imp	\$336,272	\$204,715	\$151,415	\$356,130	(\$19,858)		
COQW01A Mod COQ Dam Release	\$867,977	\$868,191	\$0	\$868,191	(\$214)	Project Completed	
COQW01A Mod COQ Dam Release - OR DM	\$9,279	\$57,185	\$0	\$57,185	(\$47,906)		
COQW01A Mod COQ Dam Release - OR Imp	\$858,698	\$810,794	\$0	\$810,794	\$47,904		
COQW01A Mod COQ Dam Release - ONR DM Over Spent		\$212		\$212	(\$212)		
OR - Ordered Remissible							
ONR - Ordered Non-Remissible							

* Red values in parentheses denote overage.