

Clowhom Project Water Use Plan

Monitoring Programs

Annual Report: 2016

Implementation Period: May 2015 to April 2016

- **COMMON-1 Monitor of Aquatic Wildlife in Wetlands Affected by Dam Operations**
- **COMMON-2 Role of Littoral Zone in Governing Clowhom Reservoir Productivity Capacity**
- **COMMON-3 Validation of the Effective Littoral Zone Performance Measure**
- **COMMON-4 Archaeological Sites Monitoring**

For Water Licences 120562, 120565, and Conditional Water Licence 119822

May 31, 2016

BC Hydro Clowhom Project Water Use Plan Monitoring Programs Annual Report: 2016

1 Introduction

This document represents a summary of the status and the results of the Clowhom Project Water Use Plan (WUP) monitoring programs to April 30, 2016, as per the Clowhom Order under the *Water Act*, dated April 20, 2005. There are four monitoring programs.

2 Status

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

Leave to commence was not received for the COMMON-4 Archaeological Sites Monitoring TOR. As per the October 28, 2005 letter, this work will proceed under the *Heritage Conservation Act*.

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

Monitoring Program TORs	Order Clause	Original ToR Submission		Most Recent ToR Resubmission	
		Date Submitted	Date Approved	Date Submitted	Date Approved
COMMON-1 Monitor of Aquatic Wildlife in Wetlands Affected by Dam Operations	Schedule A.1.a	Sep 23, 2005	Oct 28, 2005		
COMMON-2 Role of Littoral Zone in Governing Clowhom Reservoir Productivity Capacity	Schedule A.1.b	Sep 23, 2005	Oct 28, 2005	Apr 02, 2015	Apr 23, 2015
COMMON-3 Validation of the Effective Littoral Zone Performance Measure	Schedule A.1.c	Sep 23, 2005	Oct 28, 2005		
COMMON-4 Archaeological Sites Monitoring	Schedule A.2	Sep 23, 2005	Oct 28, 2005		

3 Schedule

The following table outlines the current schedule for the monitoring programs being delivered for the Clowhom Project WUP.

Table 3-1: Monitoring Programs Schedule as of April 30, 2016

Monitoring Program	Study	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
		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	WLR YR14	WLR YR15	WLR YR16	WLR YR17	WLR YR18	WLR YR19	WLR YR20
COMMON-1 Monitor of Aquatic Wildlife in Wetlands Affected by Dam Operations	Wildlife Census	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	■	■	■	■	■	■	■	■	■	■
	Air Photography	✓				✓	✓				X ¹	■				■					■
COMMON-2 Role of Littoral Zone in Governing Clowhom Reservoir Productive Capacity	Fish Survey	✓		✓	✓	✓	✓				X ¹	■				■					■
	Juvenile Habitat Use Survey		X	✓	X	✓	✓					■									
COMMON-3 Validation of the Effective Littoral Zone Performance Measure		✓	✓	✓	✓	✓	✓				X ¹	■				■					■
COMMON-4 Archaeological Sites Monitoring			X	✓	✓																

Legend: ■ = Project to be undertaken in identified year
 ✓ = Project is completed for the year
 X = Encountered operational or hydrological delays
 X¹ = Work delayed due to program review

4 Monitoring Programs Terms of Reference

The monitoring programs being implemented under the Clowhom 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/toolbar/about/sustainability/conservation/water_use_planning/lower_mainland/clowhom.html

5 Status of Monitoring Programs

5.1 COMMON-1 Monitor of Aquatic Wildlife in Wetlands Affected by Dam Operations

The wildlife census component of this monitoring program was initiated in 2006 and will be carried out annually over 20 years. The wildlife census field work has been completed for 2015. Attached are the reports for Year 9 (2014) dated March 31, 2015 and Year 10 (2015) dated March 31, 2016.

Air photography was last completed in 2011. Aerial photography for the third census rotation (i.e., third period of each of the four year periods in the monitor) was not flown as scheduled in 2015 due to contractual issues, however this work is planned for summer 2016. It is anticipated that the vegetation classification and mapping will be completed using the 2016 aerial photography.

5.2 COMMON-2 Role of Littoral Zone in Governing Clowhom Reservoir Productivity Capacity

This monitoring program was initiated in 2006 and will be carried out over 20 years.

The fish survey and juvenile habitat survey was last completed in 2011. These studies were not undertaken as scheduled in Year 10 (2015) due to contractual issues; however, they are scheduled for 2016. A ten year summary report of fish productivity and juvenile fish habitat use data collected in 2016 will be provided in the 2017 Annual Report, or earlier if we have that information in place.

In 2015, a re-evaluation of the Clowhom Water Use Plan monitoring programs was initiated. To date we have completed a workplan review with input from our aquatic Subject Matter Expert (SME). Currently our SME is reviewing the monitoring program results against the TOR management questions to ensure the study activities are

adding value and meeting the intent of the Order. An update will be provided in the 2017 Clowhom Water Use Plan Annual Report.

Your letter dated April 23, 2015 accepts that the creel study will no longer be undertaken and will not affect the results of the program.

5.3 COMMON-3 Validation of the Effective Littoral Zone Performance Measure

This monitoring program was initiated in 2006 and data collection was completed in 2010.

A 10-year report summarizing field data collected through 2010 will be undertaken over the next year, as well, a validation of the Effective Littoral Zone (ELZ) Model used to measure littoral productivity will be undertaken. Deliverables for Year 15 (2020) and Year 20 (2025) will be re-evaluated and will likely focus on calculating proportional loss in littoral development for other components of the monitoring study. The 10 year summary report will be provided in the next Annual Report.

5.4 COMMON-4 Archaeological Sites Monitoring

This monitoring program was initiated in 2008, was carried out over two years, and is complete.

6 Monitoring Programs Costs

The following table summarizes the Clowhom Project WUP monitoring programs costs approved by the Comptroller and the Actual Costs to April 30, 2016.

Table 6-1: Clowhom Project WUP Monitoring Program 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
COM Prepare Annual Report	\$43,186	\$12,238	\$17,207	\$29,445	\$13,741		
COMM01A Mon Aquatic Wildlife	\$364,673	\$102,546	\$174,629	\$277,175	\$87,498	Efficiencies found during project implementation	
COMM01A Mon Aquatic Wildlife - ONR DM	\$174,773	\$24,938	\$76,329	\$101,268	\$73,505		
COMM01A Mon Aquatic Wildlife - ONR Imp	\$189,900	\$77,608	\$98,300	\$175,908	\$13,992		
COMM02A Role Littoral Zone	\$188,424	\$52,676	\$85,608	\$138,284	\$50,140	Project work paused pending monitoring program re-evaluation.	
COMM02A Role Littoral Zone - ONR DM	\$85,324	\$20,686	\$35,579	\$56,265	\$29,059		
COMM02A Role Littoral Zone - ONR Imp	\$103,100	\$31,990	\$50,029	\$82,019	\$21,081		
COMM03A Valid Littoral Zone	\$155,909	\$102,987	\$15,157	\$118,144	\$37,765	Project work paused pending monitoring program re-evaluation.	
COMM03A Valid Littoral Zone - ONR DM	\$57,909	\$16,243	\$13,757	\$30,000	\$27,909		
COMM03A Valid Littoral Zone - ONR Imp	\$98,000	\$86,744	\$1,400	\$88,144	\$9,856		
COMM04A Archaeological Sites	\$0	\$7,350	\$0	\$7,350	(\$7,350)	Project Completed	
COMM04A Archaeological Sites - ONR DM	\$0	\$6,681	\$0	\$6,681	(\$6,681)		
COMM04A Archaeological Sites - ONR Imp	\$0	\$669	\$0	\$669	(\$669)		

OR - Ordered Remissible
ONR - Ordered Non-Remissible

* Red values in parentheses denote overage.