

Columbia River Project Water Use Plan Kinbasket Fish and Wildlife Information Plan

Monitoring Programs Annual Report: 2014

Implementation Period: January 2013 to December 2013

- **CLBMON-1 – Mica Dam Total Gas Pressure Monitoring and Abatement Program**
- **CLBMON-2 – Kinbasket and Revelstoke Reservoirs Kokanee Population Monitoring**
- **CLBMON-3 – Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program**
- **CLBMON-4 – Kinbasket Reservoir Fish Stranding Assessment**
- **CLBMON-5 – Kinbasket Reservoir Burbot Life History and Habitat Use Assessment**
- **CLBMON-6 – Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment**
- **CLBMON-7 – Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment**
- **CLBMON-8 – Kinbasket Reservoir Monitoring of the Valemount Peatland**
- **CLBMON-55 – Revelstoke Reservoir Macrophyte Overview**
- **CLBMON 56 – Ecological Productivity**
- **CLBMON 59 – Nagle Creek**
- **CLBMON 60 – Fish Indexing**
- **CLBMON 61 – Wetland Vegetation**
- **CLBMON 62 – TGP Monitoring**

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

January 31, 2014

BC Hydro Columbia River Project Water Use Plan Kinbasket Reservoir Fish and Wildlife Information Plan Monitoring Programs Annual Report: 2014

1 Introduction

This document represents a summary of the status and the results of the Kinbasket Reservoir Fish and Wildlife Information Plan Water Use Plan (WUP) monitoring programs to December 2013, as per the Columbia River WUP Order under the *Water Act*, dated January 26, 2007 and the Amended Order dated August 23, 2007. There are fourteen monitoring programs.

2 Status

The following table outlines the dates that TOR for the Kinbasket Reservoir Fish and Wildlife Information Plan WUP monitoring programs were submitted to and approved by the CWR.

Table: 2-1: Dates of Kinbasket Reservoir Fish and Wildlife Information 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-1 Mica Dam Total Gas Pressure Monitoring and Abatement Program	Schedule A 5(a)	Oct 24, 2007	Dec 03, 2007	Feb 02, 2009	Mar 26, 2009
CLBMON-2 Kinbasket and Revelstoke Reservoirs Kokanee Population Monitoring	Schedule A 5(b) & Schedule B 1(a)	Oct 24, 2007	Dec 03, 2007	Jun 27, 2012	Jul 11, 2012
CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program	Schedule A 5(c) & Schedule B 1(b)	Oct 24, 2007	Dec 03, 2007	-	-
CLBMON-4 Kinbasket Reservoir Fish Stranding Assessment	Schedule A 5(d)	Oct 24, 2007	Dec 03, 2007	Feb 02, 2009	Mar 26, 2009
		Oct 22, 2008	Dec 10, 2008		
CLBMON-5 Kinbasket Reservoir Burbot Life History and Habitat Use Assessment	Schedule A 5(e)	Oct 24, 2007	Dec 03, 2007	Oct 22, 2008	Dec 10, 2008
CLBMON-6 Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment	Schedule A 5(f)	Oct 24, 2007	Dec 03, 2007	-	-
CLBMON-7 Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment	Schedule A 5(g)	Oct 24, 2007	Dec 03, 2007	Feb 02, 2009	Mar 26, 2009
CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland	Schedule A 5(h)	Oct 24, 2007	Dec 03, 2007	-	-
CLBMON-55 Revelstoke Reservoir Macrophyte Overview	Clause 2(f) Amended Order	Jan 07, 2009	Mar 19, 2009	-	-
CLBMON-56 Ecological Productivity	Clause 2(c) Amended Order	Aug 12, 2011	Nov 07, 2011		
CLBMON-59 Nagle Creek	Clause 1(d) Amended Order	Dec 15, 2011	Jan 20, 2012	Oct 01, 2012	Oct 16, 2012
CLBMON-60 Fish Indexing	Clause 1(b) Amended Order	Aug 12, 2011	Nov 07, 2011		
CLBMON-61 Wetland Vegetation	Clause 1(a) Amended Order	Jan 16, 2012	Apr 19, 2012		
CLBMON-62 TGP Monitoring	Clause 1.c Mica 5/6 Addendum	Deferred to June 30, 2014			

3 Schedule

The following table (Table 3-1) outlines the current schedule for the monitoring programs and physical works being delivered for the Kinbasket Reservoir Fish and Wildlife Information Plan WUP.

Table 3-1: Table of WUP Schedule

Monitoring Programs	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	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 Final Review
CLBMON-1 Mica Dam Total Gas Pressure Monitoring and Abatement Program			✓	x	x	x	■	■	■				
CLBMON-2 Kinbasket and Revelstoke Reservoirs Koknaee Population Monitoring	✓	✓	✓	✓	✓	✓	■	■	■	■	■	■	
CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program	✓	✓	✓	✓	✓	✓	■	■	■	■	■	■	
CLBMON-4 Kinbasket Reservoir Fish Stranding Assessment			✓								■	■	
CLBMON-5 Kinbasket Reservoir Burbot Life History and Habitat Use Assessment							■	■	■				
CLBMON-6 Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment								■	■	■			
CLBMON-7 Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment							■	■	■				
CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland	✓	✓							■				
CLBMON-55 Revelstoke Reservoir Macrophyte Overview		✓	✓				■						
CLBMON-56 Addendum to CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring					✓	✓	■	■	■	■	■	■	
CLBMON-59 Monitoring of Impacts on Nagle Creek Wetland from Mica Units 5 and 6					✓								
CLBMON-60 Mica Tailrace Fish Indexing Study					✓	✓				■	■		
CLBMON-61 Wetland Vegetation					x	✓	■	■	■	■			
CLBMON-62 TGP Monitoring										■			

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

4 Monitoring Programs Terms of Reference

The monitoring programs and Physical Works being implemented under the Kinbasket Reservoir Fish and Wildlife Information 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/kinbasket-fish-wildlife.html

5 Summary of Monitoring Programs

5.1 CLBMON-1 Mica Dam Total Gas Pressure Monitoring and Abatement Program

5.1.1 Status

Data collected in 2010 as planned, and the project is undergoing a technical review. A new Terms of Reference will be developed and submitted in F15. There are no reports completed to date.

5.2 CLBMON-2 Kinbasket and Revelstoke Reservoirs Kokanee Population Monitoring

5.2.1 Status

This monitoring program was initiated in 2008 and will be carried out over 12 years. Attached is the 2008-2011 Synthesis Report for CLBMON-2 and CLBMON-3 completed in June 2013. The Year 5 (2012) report is still in draft format.

5.3 CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program

5.3.1 Status

This monitoring program was initiated in 2008 and will be carried out over 12 years. Attached is the 2008-2011 Synthesis Report for CLBMON-2 and CLBMON-3 completed in June 2013. The Year 5 (2012) report is still in draft format.

5.4 CLBMON-4 Kinbasket Reservoir Fish Stranding Assessment

5.4.1 Status

This monitoring program was initiated in 2010. The next implementation period is currently scheduled for 2018 and 2019.

5.5 CLBMON-5 Kinbasket Reservoir Burbot Life History and Habitat Use Assessment

5.5.1 Status

This monitoring program has not yet been initiated. It is scheduled for implementation in Spring 2014 to Fall 2016.

5.6 CLBMON-6 Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment

5.6.1 Status

This monitoring program has not yet been initiated. It is currently scheduled for implementation in 2015 to 2017.

5.7 CLBMON-7 Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment

5.7.1 Status

This monitoring program has not yet been initiated. Implementation is currently scheduled for 2014 to 2016.

5.8 CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland

5.8.1 Status

This monitoring program was initiated in 2008, and two of the three years of study are now complete. The final year of the monitoring program is scheduled for 2016.

The final program report is expected in December 2016.

5.9 CLBMON-55 Revelstoke Reservoir Macrophyte Overview

5.9.1 Status

This monitoring program was initiated in 2009. Year 2 is scheduled for implementation in 2014, four years after the In Service Date for the fifth unit at Revelstoke.

Final report is due in October 2014.

5.10 CLBMON-56 Ecological Productivity

5.10.1 Status

This monitoring program was initiated in 2012 and will be carried out over 9 years.

Year 1 study report is in currently in draft.

5.11 CLBMON-59 Monitoring of Impacts on Nagle Creek Wetland from Mica Units 5 and 6

5.11.1 Status

This one year monitoring program was initiated in 2012 and completed in 2013. Attached is the final report dated December 11, 2013.

5.12 CLBMON-60 Mica Tailrace Fish Indexing Study

5.12.1 Status

This monitoring program was initiated in 2012 and will be carried out in the fall of 2013, 2017, and 2018. Attached is the annual report for Year 1 dated November 2013.

5.13 CLBMON-61 Wetland Vegetation

5.13.1 Status

This monitoring program was initiated in 2012 and will be carried out over 6 years. Attached is the Year 1 report dated August 2013.

The first two years of baseline collection occurred under conditions of surcharge on Kinbasket Reservoir; the sample size collected in the two years is too small to adequately characterize pre-Mica conditions. We plan to conduct another year of data collection in 2014, just prior to the In Service Date. As this has cost implications, we will resubmit once the 2013 report is finalized.

5.14 CLBMON-62 TGP Monitoring

5.14.1 Status

Terms of Reference will be submitted with the resubmission of CLBMON-1 Terms of Reference. As the two programs are closely linked, we are awaiting the results of the independent review of CLBMON-1 to finalize the CLBMON-62 Terms of Reference.

6 Monitoring Programs Costs

The following table summarizes the Kinbasket Reservoir Fish and Wildlife Information Plan WUP monitoring programs costs approved by the Comptroller and the Actual Costs to December 31, 2013.

Table 6-1: Kinbasket Reservoir Fish and Wildlife Information 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 MP1 Kin Fish & WL Annual Report	\$10,022	\$5,708	\$6,206	\$11,914	(\$1,892)	The addition of Mica 5/6 projects to this annual report has resulted in additional reporting efforts.	Resubmission of Annual Report costs will occur by June 2014.
C01M01A MCA DAM TGP MON	\$100,425	\$28,108	\$91,233	\$119,341	(\$18,916)	Preliminary review of data indicates more DM time likely required to complete project.	TOR will be re-submitted in June 2014.
C01M01A MCA DAM TGP MON - OR DM	\$20,758	\$16,115	\$39,279	\$55,394	(\$34,636)		
C01M01A MCA DAM TGP MON - OR Imp	\$79,667	\$11,992	\$51,954	\$63,946	\$15,721		
C01M02A KIN & REV Kokanee Pop	\$1,362,811	\$522,252	\$840,463	\$1,362,715	\$96	Efficiencies found during project implementation.	No corrective action required.
C01M02A KIN & REV Kokanee Pop - OR DM	\$28,502	\$8,557	\$20,413	\$28,970	(\$468)		
C01M02A KIN & REV Kokanee Pop - OR Imp	\$1,334,309	\$513,695	\$820,050	\$1,333,745	\$564		
C01M03A KIN & REV Ecological	\$4,313,829	\$1,684,597	\$2,619,095	\$4,303,692	\$10,137	Efficiencies found during project implementation.	No corrective action required.
C01M03A KIN & REV Ecological - OR DM	\$157,106	\$84,902	\$78,098	\$163,000	(\$5,894)		
C01M03A KIN & REV Ecological - OR Imp	\$4,156,723	\$1,599,695	\$2,540,998	\$4,140,693	\$16,030		
C01M04A KIN: Stranding	\$253,427	\$21,082	\$233,145	\$253,427	\$0		
C01M04A KIN: Stranding - OR DM	\$29,033	\$13,522	\$15,511	\$29,033	\$0		
C01M04A KIN: Stranding - OR Imp	\$224,394	\$7,560	\$217,634	\$224,394	\$0		
C01M05A KIN: Burbot Life	\$573,070	\$14,082	\$558,988	\$573,070	(\$0)		
C01M05A KIN: Burbot Life - OR DM	\$42,658	\$14,082	\$28,576	\$42,658	(\$0)		
C01M05A KIN: Burbot Life - OR Imp	\$530,412	\$0	\$530,412	\$530,412	\$0		
C01M06A KIN: Bull Trout	\$512,596	\$6,176	\$506,420	\$512,596	\$0		
C01M06A KIN: Bull Trout - OR DM	\$38,207	\$6,176	\$32,031	\$38,207	\$0		
C01M06A KIN: Bull Trout - OR Imp	\$474,389	\$0	\$474,389	\$474,389	(\$0)		
C01M07A KIN: Rainbow	\$519,961	\$6,118	\$513,843	\$519,961	\$0		
C01M07A KIN: Rainbow - OR DM	\$39,617	\$6,118	\$33,499	\$39,617	\$0		
C01M07A KIN: Rainbow - OR Imp	\$480,344	\$0	\$480,344	\$480,344	\$0		
C01M08A KIN:Valemont Peatland	\$143,546	\$116,934	\$24,664	\$141,598	\$1,948	Efficiencies found during project implementation.	No corrective action required.
C01M08A KIN:Valemont Peatland - OR DM	\$34,593	\$27,683	\$4,971	\$32,654	\$1,939		
C01M08A KIN:Valemont Peatland - OR Imp	\$108,953	\$89,251	\$19,693	\$108,944	\$9		
C01M55A REV Res Macrophyte	\$147,184	\$66,639	\$80,545	\$147,184	(\$0)		
C01M55A REV Res Macrophyte - ONR DM	\$28,017	\$14,103	\$13,914	\$28,017	(\$0)		
C01M55A REV Res Macrophyte - ONR Imp	\$119,167	\$52,536	\$66,631	\$119,167	(\$0)		
C01M56A ARROW Eco Pro	\$816,901	\$211,166	\$592,427	\$803,592	\$13,309	Efficiencies found during project implementation.	No corrective action required.
C01M56A ARROW Eco Pro - ONR DM	\$31,371	\$9,300	\$18,946	\$28,246	\$3,125		
C01M56A ARROW Eco Pro - ONR Imp	\$785,530	\$201,866	\$573,481	\$775,347	\$10,183		
C01M59A ARROW Nagle Creek	\$69,185	\$58,448	\$8,188	\$66,636	\$2,549	Efficiencies found during project implementation.	No corrective action required.
C01M59A ARROW Nagle Creek - ONR DM	\$17,426	\$14,415	\$2,188	\$16,604	\$822		
C01M59A ARROW Nagle Creek - ONR Imp	\$51,759	\$44,033	\$6,000	\$50,033	\$1,726		
C01M60A ARROW Fish Indexing	\$553,666	\$219,402	\$383,743	\$580,716	(\$27,050)	Additional effort was required to manage new internal procurement processes, delivery model and the logistics of the project.	Re-submit TOR in December 2014.
C01M60A ARROW Fish Indexing - ONR DM	\$39,620	\$30,080	\$36,590	\$66,670	(\$27,050)		
C01M60A ARROW Fish Indexing - ONR Imp	\$514,046	\$189,323	\$347,153	\$514,046	\$0		
C01M61A ARROW Wetland Veg	\$795,159	\$330,723	\$448,426	\$779,149	\$16,010	Surcharge conditions have prevented data collection in Year 1; will add 3rd year of pre-In Service Date monitoring.	TOR will be re-submitted in April 2014.
C01M61A ARROW Wetland Veg - ONR DM	\$72,200	\$19,621	\$39,109	\$58,730	\$13,470		
C01M61A ARROW Wetland Veg - ONR Imp	\$722,959	\$311,102	\$409,317	\$720,420	\$2,539		
OR - Ordered Remissible							
ONR - Ordered Non-Remissible							

* Red values in parentheses denote overage.