

## **Walter Hardman Project Water Use Plan**

### **Monitoring Programs and Physical Works Annual Report: 2012**

**Implementation Period: December 2011 to November 2012**

- **WHNMON-1 Lower Cranberry Creek Kokanee Spawning and Incubation Habitat Monitoring**
- **WHNMON-2 Lower Cranberry Creek Rainbow Trout Rearing Habitat Monitoring**
- **WHNMON-3 Walter Hardman Headpond Drawdown Impacts (Fish) Monitoring**
- **WHNMON-4 Lower Cranberry Creek Temperature Effects Monitoring**
- **WHNMON-5 Lower Cranberry Creek Rainbow Trout Abundance/Biology Monitoring**
- **WHNMON-6 Walter Hardman Generating Station Tailrace Habitat Monitoring**
- **WHNWORKS-1 Walter Hardman Diversion Dam Minimum Flow Release Facility**
- **WHNWORKS-2 Cranberry Creek Annual Gravel Placement**

**For Water Licences 121741 and 121742**

**December 31, 2012**

## **BC Hydro Walter Hardman Project Water Use Plan Monitoring Programs and Physical Works Annual Report: 2012**

### **1 Introduction**

This document represents a summary of the status and the results of the Walter Hardman Water Use Plan (WUP) monitoring programs and physical works to November 30, 2012, as per the Walter Hardman Order under the *Water Act*, dated March 22, 2006. There are six monitoring programs and two physical works:

- a) WHNMON-1 Lower Cranberry Creek Kokanee Spawning and Incubation Habitat Monitoring
- b) WHNMON-2 Lower Cranberry Creek Rainbow Trout Rearing Habitat Monitoring
- c) WHNMON-3 Walter Hardman Headpond Drawdown Impacts (Fish) Monitoring
- d) WHNMON-4 Lower Cranberry Creek Temperature Effects Monitoring
- e) WHNMON-5 Lower Cranberry Creek Rainbow Trout Abundance/Biology Monitoring
- f) WHNMON-6 Walter Hardman Generating Station Tailrace Habitat Monitoring
- g) WHNWORKS-1 Walter Hardman Diversion Dam Minimum Flow Release Facility
- h) WHNWORKS-2 Cranberry Creek Annual Gravel Placement.

### **2 Background**

The water use planning process for BC Hydro's Walter Hardman project was initiated in September 2003 and completed in February 2004. The conditions proposed in the WUP for the operation of the project reflect the May 2004 recommendations of the WUP Consultative Committee.

A revised Walter Hardman WUP dated March 21, 2006 was submitted for acceptance to the Comptroller of Water Rights (Comptroller). On March 22, 2006, BC Hydro was ordered to implement the conditions proposed in the Walter Hardman WUP and prepare the monitoring programs and physical works terms of reference (TOR). The TOR submitted for the Minimum Flow Release Facility was for a plan for installation of the facility.

On September 22, 2006, the Walter Hardman WUP monitoring programs and two physical works TOR were submitted to the Comptroller for review and approval.

On November 8, 2006, the TOR for the six monitoring programs and the two physical works programs were accepted by the Comptroller. On March 22, 2007, the second TOR involving the design and construction of the Minimum Flow Release Facility for WGSWORKS-1 was submitted to the Comptroller and was accepted on June 18, 2007.

The following table outlines the pertinent clauses from the Walter Hardman Order and dates the Walter Hardman Water Use Plan TOR were submitted to and approved by the CWR.

**Table 2-1: Pertinent clauses and submission and approval dates for Walter Hardman WUP Monitoring Programs and Physical Works Terms of Reference.**

| Monitoring/Physical Works Program ToR   | Order Clause          | Original ToR Submission        |                             | Most Recent ToR Resubmission |               |
|---|-----------------------|--------------------------------|-----------------------------|------------------------------|---------------|
|   |                       | Date Submitted                 | Date Approved               | Date Submitted               | Date Approved |
| WHNMON-1 Lower Cranberry Creek Kokanee Spawning and Incubation Habitat Monitoring | Schedule C, Clause 1a | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNMON-2 Lower Cranberry Creek Rainbow Trout Rearing Habitat Monitoring           | Schedule C, Clause 1b | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNMON-3 Walter Hardman Headpond Drawdown Impacts (Fish) Monitoring               | Schedule C, Clause 1c | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNMON-4 Lower Cranberry Creek Temperature Effects Monitoring                     | Schedule C, Clause 1d | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNMON-5 Lower Cranberry Creek Rainbow Trout Abundance/Biology Monitoring         | Schedule C, Clause 1e | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNMON-6 Walter Hardman Generating Station Tailrace Habitat Monitoring            | Schedule C, Clause 1f | Sept 22, 2006                  | Nov 8,2006                  | Dec 21, 2009                 | Mar 8, 2010   |
| WHNWORKS-1 Walter Hardman Diversion Dam Minimum Flow Release Facility             | Schedule A            | Sept 22, 2006 and Mar 22, 2007 | Nov 8,2006 and Jun 18, 2007 | Dec 19, 2008                 | -             |
| WHNWORKS-2 Cranberry Creek Annual Gravel Placement Program                        | Schedule B, Clause 5  | Sept 22, 2006                  | Nov 8,2006                  | -                            | -             |

### 3 Status

The following table outlines the status and schedule for the Walter Hardman WUP monitoring programs and physical works. As outlined in the Walter Hardman WUP, a formal review is recommended within six years of implementation. However, the review of this WUP has been delayed to 2014 due to the extension of WHNMON-4 and WHNMON-5 for an additional year.

**Table 3-1: Status of Walter Hardman WUP Monitoring Programs and Physical Works Implementation.** Refer to Sections 4.4.3, 4.5.3, and 5.2.2 for an explanation of the additional year in 2012.

| Monitoring Programs   | 2007    | 2008    | 2009    | 2010    | 2011    | 2012    |
|---|---------|---------|---------|---------|---------|---------|
|   | WLR YR1 | WLR YR2 | WLR YR3 | WLR YR4 | WLR YR5 | WLR YR6 |
| WHNMON-1 Lower Cranberry Creek Kokanee Spawning and Incubation Habitat Monitoring |         |         |         | x       | √       | √       |
| WHNMON-2 Lower Cranberry Creek Rainbow Trout Rearing Habitat Monitoring           |         |         |         | √       | √       | √       |
| WHNMON-3 Walter Hardman Headpond Drawdown Impacts (Fish) Monitoring               |         | x       | √       |         |         |         |
| WHNMON-4 Lower Cranberry Creek Temperature Effects Monitoring                     | √       | √       | √       | √       | √       | √       |
| WHNMON-5 Lower Cranberry Creek Rainbow Trout Abundance/Biology Monitoring         | √       | √       | √       | x       | √       | √       |
| WHNMON-6 Walter Hardman Generating Station Tailrace Habitat Monitoring            | √       | √       | √       | √       | √       |         |
| <b>Physical Works</b>   |         |         |         |         |         |         |
| WHNWORKS-1 Walter Hardman Diversion Dam Minimum Flow Release Facility             | √       | x       | √       |         |         |         |
| WHNWORKS-2 Annual Gravel Placement  | √       | √       | √       | √       | √       | √       |

Legend:

|     |   |   |
|-----|---|---|
| ■   | = | Program to be undertaken/initiated in identified year. Red indicates extended timeline. |
| u/w | = | Project is under way  |
| √   | = | Program completed for the year  |
| x   | = | Program started, but encountered operational or hydrological delays                     |

## 4 Walter Hardman WUP Monitoring Programs

This section outlines the status of the Walter Hardman WUP monitoring programs as per the Order under the *Water Act*, dated March 22, 2006.

### 4.1 WHNMON-1 Lower Cranberry Creek Kokanee Spawning and Incubation Habitat Monitoring

#### 4.1.1 Status

Data input, analysis, and draft reporting were completed in 2012. A final report is expected in early 2013 and will accompany the 2013 annual report.

## **4.2 WHNMON-2 Lower Cranberry Creek Rainbow Trout Rearing Habitat Monitoring**

### **4.2.1 Status**

Field work was completed in 2011. Data input, analysis, and draft reporting were completed in 2012. A final report is expected in early 2013 and will accompany the 2013 annual report.

## **4.3 WHNMON-3 Walter Hardman Headpond Drawdown Impacts (Fish) Monitoring**

### **4.3.1 Status**

This project is complete.

## **4.4 WHNMON-4 Lower Cranberry Creek Temperature Effects Monitoring**

### **4.4.1 Status**

Year 5 (2011) of this five-year study was continued using in-house BC Hydro resources. Due to the need to extend WHNMON-5 (see Section 4.5.1) into 2012, will continue to collect temperature data and extend the timeline for this project as well to provide the necessary data within the existing approved budget (Table 6.1).

## **4.5 WHNMON-5 Lower Cranberry Creek Rainbow Trout Abundance/Biology Monitoring**

### **4.5.1 Status**

This project was extended for an additional year due to high water conditions in 2010 and cancellation of field work for that year. Data input, analysis and draft reporting will be completed in 2012. A final report is expected in early 2013 and will accompany the 2013 annual report.

## **4.6 WHNMON-6 Walter Hardman Generating Station Tailrace Habitat Monitoring**

### **4.6.1 Status**

Year 5 of this five-year study was completed in 2011 using BC Hydro in-house staff and resources. A final report is scheduled for completion in early 2013 and will accompany the 2013 annual report.

## **5 Walter Hardman WUP Physical Works**

This section outlines the status of the Walter Hardman WUP physical works as per the Order under the *Water Act*, dated March 22, 2006.

### **5.1 WHNWORKS-1 Minimum Flow Release Facility**

#### **5.1.1 Status**

This project is complete.

### **5.2 WHNWORKS-2 Annual Gravel Placement**

#### **5.2.1 Status**

The final year of WUP-related, annual gravel placement was conducted April 19-22, 2012. This project is now complete.

## **6 Walter Hardman WUP Monitoring Programs and Physical Works Costs**

The following table summarizes the Walter Hardman WUP monitoring programs and physical works costs approved by the Comptroller and the actual costs to November 30, 2012.

**Table 6-1: Walter Hardman WUP Monitoring Programs and Physical Works Expenditures**

| Monitoring Programs  | Activity | Costs approved by CWR | Total Forecast (Life to Date Actuals and Forecast) | Variance Total to Approved | Explanation  | Corrective Action   |
|--|----------|-----------------------|--|----------------------------|--|---|
| Walter Hardman Annual Report   | ONR      | \$3,558               | \$5,180  | (\$1,622)                  | Additional reporting effort associated with additional year added to the WUP & changing staff meant that the 2010 forecasted reduction in effort was not fully realized.     | ToR resubmission by April 30, 2013 requesting cost based on forecasted costs.   |
| <b>SPAWNING AND INCUBATION HABITAT MONITORING</b>                                    | ONR      | \$50,071              | \$50,071   | \$0                        |  |   |
| WHNMON#1 Direct Management 001   | ONR      | \$10,469              | \$10,469   | \$0                        |  |   |
| WHNMON#1 Implementation 002  | ONR      | \$39,602              | \$39,602   | \$0                        |  |   |
| <b>WHNMON#2 LOWER CRANBERRY CREEK RAINBOW TROUT REARING HABITAT MONITORING</b>       | ONR      | \$49,124              | \$49,124   | \$0                        |  |   |
| WHNMON#2 Direct Management 001   | ONR      | \$9,522               | \$9,522  | \$0                        |  |   |
| WHNMON#2 Implementation 002  | ONR      | \$39,602              | \$39,602   | \$0                        |  |   |
| <b>WHNMON#3 WALTER HARDMAN HEADPOND DRAWDOWN IMPACTS (FISH) MONITORING</b>           | ONR      | \$10,579              | \$12,092   | (\$1,513)                  | Project completed.   |   |
| WHNMON#3 Direct Management 001   | ONR      | \$4,945               | \$7,251  | (\$2,306)                  |  |   |
| WHNMON#3 Implementation 002  | ONR      | \$5,634               | \$4,842  | \$792                      |  |   |
| <b>WHNMON#4 LOWER CRANBERRY CREEK TEMPERATURE EFFECTS MONITORING</b>                 | ONR      | \$46,783              | \$46,783   | \$0                        |  |   |
| WHNMON#4 Direct Management 001   | ONR      | \$13,779              | \$13,779   | \$0                        |  |   |
| WHNMON#4 Implementation 002  | ONR      | \$33,004              | \$33,004   | \$0                        |  |   |
| <b>WHNMON#5 LOWER CRANBERRY CREEK RAINBOW TROUT ABUNDANCE/BIOLOGY MONITORING</b>     | ONR      | \$100,093             | \$100,093  | \$0                        |  |   |
| WHNMON#5 Direct Management 001   | ONR      | \$30,214              | \$30,214   | \$0                        |  |   |
| WHNMON#5 Implementation 002  | ONR      | \$69,879              | \$69,879   | \$0                        |  |   |
| <b>WHNMON#6 WALTER HARDMAN GENERATING STATION TAILRACE HABITAT MONITORING</b>        | ONR      | \$18,433              | \$18,433   | \$0                        |  |   |
| WHNMON#6 Direct Management 001   | ONR      | \$4,830               | \$4,830  | \$0                        |  |   |
| WHNMON#6 Implementation 002  | ONR      | \$13,603              | \$13,603   | \$0                        |  |   |
| <b>WHNWORKS#1 WALTER HARDMAN DIVERSION DAM MINIMUM FLOW RELEASE FACILITY CAPITAL</b> | CAPITAL  | \$254,100             | \$643,015  | (\$388,915)                | Costs exceed the approved budget amount as a result of difficulties encountered during construction. Full documentation is provided in the Final Construction Report (2009). | CWR notified on Feb 19 and Dec 19, 2008, of cost overruns and implementation issues. Details can be found in the 2009 Annual Report Section 5.1 and Final Construction Report (2009). |
| WHNWORKS#1 Direct Management 001   | CAPITAL  | \$33,500              | \$63,724   | (\$30,224)                 |  |   |
| WHNWORKS#1 Implementation 002  | CAPITAL  | \$220,600             | \$579,291  | (\$358,691)                |  |   |
| <b>WHNWORKS#2 CRANBERRY CREEK ANNUAL GRAVEL PLACEMENT PROGRAM</b>                    | ONR      | \$139,346             | \$83,555   | \$55,791                   | The original budget overestimated the costs. The project is complete.  | Project completed.  |
| WHNWORKS#2 Direct Management 001   | ONR      | \$32,108              | \$13,168   | \$18,940                   |  |   |
| WHNWORKS#2 Implementation 002  | ONR      | \$107,238             | \$70,387   | \$36,851                   |  |   |
| <b>OR - Ordered Remissible</b>   |          |                       |  |                            |  |   |
| <b>ONR - Ordered Non-Remissible</b>  |          |                       |  |                            |  |   |

Red values in parentheses denote overage.