

Ash River Project Water Use Plan

Monitoring Programs Annual Report: 2009

- **Assessment of Adult Fish Passage at Dickson Falls during Pulse Flow Releases from Elsie Lake Dam**
- **Elsie Reservoir Archaeological Investigations**

For Water Licences FL119975 and FL119976

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BC Hydro Ash River Project Water Use Plan Monitoring Programs Annual Report: 2009

1 Introduction

This document represents a summary of the status and the results of the Ash River Water Use Plan (WUP) monitoring programs to 30 September 2009 as per the Ash River Order under the *Water Act*, dated 4 October 2004. There are two monitoring programs:

- a) Assessment of Adult Fish Passage at Dickson Falls During Pulse Flow Releases from Elsie Lake Dam
- b) Elsie Reservoir Archaeological Investigations

2 Background

The water use planning process for BC Hydro's Ash River project was initiated in September 2000 and completed in June 2002. The conditions proposed in the WUP for the operation of the project reflect the June 2003 recommendations of the Ash River WUP Consultative Committee.

In June 2003, the Ash River WUP was submitted to the Comptroller of Water Rights (Comptroller).

On 4 October 2004, BC Hydro was ordered to implement the conditions proposed in the Ash River WUP and prepare the monitoring programs Terms of Reference (TOR).

On 10 June 2005, the Ash River monitoring programs TOR was submitted to the Comptroller for review and approval. On 21 June 2005, TOR for the monitoring program Assessment of Adult Fish Passage at Dickson Falls During Pulse Flow Releases from Elsie Lake Dam was accepted by the Comptroller. On 26 January 2006, TOR for the monitoring program Elsie Reservoir Archaeological Investigations was accepted by the Comptroller. On 16 July 2007, BC Hydro submitted to the Comptroller a Notification of Change to the TOR for the Assessment of Adult Fish Passage at Dickson Falls During Pulse Flow Release from Elsie Lake Dam identifying an increase in the cost of the monitoring program.

As outlined in the Ash River WUP, five years after the implementation of this WUP BC Hydro will review the results of the monitoring programs and assess the need to review the Ash River WUP. A review of the WUP could be triggered sooner if significant risks are identified that could result in a recommendation to change operations.

3 Status

The following table outlines the status and schedule for the Ash River WUP monitoring programs.

Table 3-1: Status of Ash River WUP Monitoring Programs Implementation

	2005	2006	2007	2008	2009	2010	2011
	WLR YR1	WLR YR2	WLR YR3	WLR YR4	WLR YR4	WLR YR5	WLR YR6
Monitoring Programs							Final Review
Assessment of Adult Fish Passage at Dickson Falls During Pulse Flow Releases from Elsie Lake Dam	✓	✓	✓	✓	u/w	■a	
Elsie Reservoir Archaeological investigations		✓	x	✓	u/w	■	■b

■a Note final report due in spring 2010.

■b Note final report due in early summer 2011.

x Note fieldwork for the program in 2007 could not be completed due to reservoir elevations (i.e., the reservoir did not go below 318 m asl).

■ = Program to be undertaken/initiated in identified year

u/w = Project is underway

✓ = Program completed for the year

4 Ash River WUP Monitoring Programs

This section outlines the status of the Ash River WUP monitoring programs as per the Order under the *Water Act*, dated 4 October 2004.

4.1 Assessment of Adult Fish Passage at Dickson Falls During Pulse Flow Releases from Elsie Lake Dam

4.1.1 Overview

The objective of this monitoring program is to assess the benefits of the pulse flow release to steelhead passage at Dickson Falls. The study area will include sections of the middle and lower Ash River and focus on Dickson Falls.

The Consultative Committee (CC) for the Ash River WUP expressed concern that flow conditions at Dickson Falls in the lower Ash River during August and September may impede the upstream passage of adult summer-run steelhead trout and other salmon species.

Monitoring Indicator: (a) Steelhead passage rates at Dickson Falls during pulse flow release and non-release periods.

This monitoring program involves snorkel counts, radio telemetry of tagged fish, and observations of leap attempts.

4.1.2 Status

This monitoring program was initiated in August 2005 and will be carried out over five years. All data required for Year 1 to 5 of this monitoring program was collected during August and September 2005, 2006, 2007, 2008 and 2009. A copy of the annual study reports for Years 1, 2 and 3 were submitted with previous Annual report submissions. Year 4 annual study report is included with this Annual report submission.

Year 5 of this monitoring program commenced in June 2009. In 2009, the August pulse flow was carried out on Aug 29, 30 and 31 and the September

pulse flow was carried out on Sept 18 and 19. A total of 19 fish were radio tagged in July and August 2009. The submission of the final report covering 5 years of study is anticipated in spring 2010.

4.1.3 Interpretation of Data

As outlined in the TOR, Year 5 of data collection focused on continued snorkel and leap attempt observations. The telemetry work was also successfully implemented this year and will continue until late October or early November, as per the TOR. As outlined in the TOR, interpretation of data is to be performed after the completion of data collection in Year 5.

4.2 Elsie Reservoir Archaeological Investigations

4.2.1 Background Pre-Order

Baseline archaeological site inventory and impact assessments were carried out in August and October of 2001 during a deep drawdown of Elsie Reservoir for dam seismic upgrades. This assessment discovered and recorded 26 new archaeological sites in the drawdown zone of the reservoir; 11 lithic scatter areas and 15 culturally modified trees (CMTs). Site significance was evaluated using criteria outlined in the BC Archaeological Impact Assessment Guidelines. One site was determined to be of high significance, four to be of moderate significance and the rest to be of moderate low or low significance.

The draft impact assessment report indicates that additional sites are likely in the permanently inundated portion of the reservoir. Additional sites may be discovered in the operational range of the reservoir. The draft report recommended that site DiSH –17, the site categorized as having high archaeological significance, be investigated for the possibility of mitigation of erosion impacts through protective capping. The report further recommended that a mitigative salvage be carried out at the site to recover artifacts and samples for carbon dating.

Further reconnaissance work was recommended during future drawdowns (at or below 318 masl) to identify potential new sites and to monitor rates of erosion and artifact exposure from known sites. It recommended that known and discovered CMT sites are to be sampled for age analysis (tree ring counts).

In October of 2002, BC Hydro and Hupacasath First Nation agreed to move forward on investigation of erosion impacts and further characterization of site DiSH-17. An erosion monitoring system was established at the site in early October of 2002. Additional archaeological investigations of the site were carried out in mid-November of 2002 in order to delineate the extent of the site and assess the need for mitigative salvage work if erosion was substantial and other mitigation strategies were not feasible.

4.2.2 Overview

The objective of the Elsie Reservoir Archaeological Investigation monitoring program was to assess whether the current operating regime used for the Elsie Reservoir is having an impact on significant archaeological sites in the reservoir drawdown zone.

The monitoring program was to include three main components: annual monitoring of a known significant site (DiSH-17), evaluation of options to protect

this site, and opportunistic surface surveys of other known sites during periods of low reservoir levels.

4.2.3 Status

2005

In the fall of 2005, based on the monitoring data collected to date, combined with observations of other erosion factors, it was determined that the erosion forces on site DiSH-17 were very slow and that there was no need to continue to monitor the erosion rates. It was recommended that a portion of site DiSH-17 be excavated completely, and that the rest of the site DiSH-17 be covered with a geotextile blanket anchored with cobbles. The recommendation was supported by the Archaeological Branch and Hupacasath First Nation.

In September 2005, it was observed that site DiSH-17 had been vandalized and additional damage from recreational vehicle tracks was apparent across the site.

On 30 September through 3 October 2005, site DiSh-17 was partially excavated according to a systematic data recovery protocol under HCA Section 14 Heritage Investigation Permit 2005-401, and then covered with geotextile fabric to mitigate further erosion and vandalism, under HCA Section 12 Site Alteration Permit 2005-404.

The geotextile installation at site DiSH-17 is to be inspected twice per year, conditions allowing, monitoring the performance of the geotextile protection, collecting any artifacts that may be exposed on the surface and monitoring the general condition of the site. This monitoring was initiated in September 2006 and will be carried out annually.

2006

In 2006 the work was conducted under a two-year contract and HCA Section 14 Heritage Investigation Permit 2006-366. Due to higher reservoir elevations (greater than 318 masl) in 2007, fieldwork did not commence.

As per the monitoring program terms of reference, opportunistic surface surveys of other known sites during periods of low reservoir levels was initiated September 2006 under the same two-year contract and HCA Section 14 Heritage Investigation Permit 2006-366 as noted above. The objective of these opportunistic surveys is to monitor the rate of artifact exposure at known sites in the reservoir. The monitoring program is scheduled to proceed for at least five years followed by a review and opportunity for further work, based on the results of the initial five years of monitoring.

A total of seven visits to Elsie Lake were undertaken during September and October of 2006. DiSh-17 was visited five times and eleven other sites were revisited during this period. The first program report was received 24 June 2007. A report was not provided for Year 2 as field work did not commence due to reservoir elevations.

2008

As of 2007, there were a total of 29 archaeological sites recorded in the inundation zone of Elsie Reservoir. These sites consist of surface scattered lithics and/or cultural modified tree remnants. Archaeological site, DiSh-17, has a

significant subsurface component, while other sites have had limited or no subsurface testing conducted.

The work conducted in 2008 was under a three-year contract. The HCA Section 14 Heritage Investigation Permit number issued for this contract is 2008-0362. The Hupacasath First Nation selected Duncan McLaren, PhD, of Cordillera Archaeology as a subcontractor to the Hupacasath First Nation for the remaining 3 years of the monitoring study.

DiSh-17 was visited on February 27, 2008 and on September 19, 2008. A total of five visits to Elsie Lake were undertaken during September 29 to October 3 of 2008. Eight sites were revisited at this time. Erosion log stations were installed at these locations to monitor the rate of artifact exposure. A new site (DiSg-Dam1) located upstream of Elsie Lake Dam was discovered on Oct 3, 2008. An erosion log station was also installed at this site. Hupacasath First Nation recommended mitigation measures be provided for the new site in October or November of 2008.

2009

Field work was undertaken between September 28 and October 2. The following tasks were conducted.

- Erosion monitoring stations A, B, D, E, G, and H were revisited and remeasured. Two erosion monitoring stations (F and C) were still submerged at the time of our research.
- Three archaeological sites were inspected: DiSh-15, DiSh-17, and DiSg-31. Artifacts were collected from the surface of all three of these sites.
- Subsurface testing was undertaken at DiSh-15 and DiSh-17. Archaeological deposits were found and sampled at DiSh-17.
- Geotextile installations at DiSg-31 and DiSh-17 were inspected. The geotextile at DiSg-31 were found to be in good condition. The installation at DiSh-17 was found to need some repairs, which was undertaken during the scheduled 2009 field work.

The Year 4 annual study report is expected on March 15, 2010.

4.2.4 Interpretation of Data

2006

In 2006, no new sites were identified during the monitoring visits. Artifacts exposed on the surface of DiSh-17, DiSg-18 and DiSg-22 were collected. Those artifacts suggested ongoing erosive effects were taking place within the reservoir draw down zone, but the 2006 annual interim report did not quantify these effects.

It was observed that the geotextile barrier that had been placed over DiSh-17 in the fall of 2005 failed along the seams, ostensibly as a result of the lifting of staples caused by wave action. Sandbag and boulder anchors were intact. Repositioning of the geotextile and the placement of additional boulder anchors along the seams was carried out during the initial monitoring visit to this site. Virtually no sediment had accumulated on top of the geotextile during the 2005/2006 winter inundation period. Other than the possibility of human interference with the geotextile mat, no evidence of recreational impacts to archaeological sites was observed during the monitoring visits. Rainfall appears

to have accelerated the exposure of artifacts on that area of DiSh-17 which lies outside the zone protected by geotextile.

2008

The geotextile material was intact at DiSh-17. Significant subsurface components, intact deposits and bone pieces were discovered at DiSg-Dam1 on October 3, 2008.

2009

In March 2009, the yearly report for research activities undertaken in 2008 was submitted to BC Hydro, the Hupacasath First Nation, and the BC Archaeology Branch by Cordillera Archaeology. This report details the results of fieldwork undertaken in 2008 which resulted in the installation of eight new erosion monitoring stations (A through H), the discovery of four archaeological sites (DiSg-27, DiSg-28, DiSg-30, and DiSg-31), and the revisiting of ten previously recorded archaeological sites (DiSg-6, DiSg-8, DiSg-14, DiSg-15, DiSg-17, DiSg-16, DiSg-21, DiSg-22, DiSh-16, and DiSh-17). Evaluative testing was undertaken at the newly found site DiSg-31 where scientifically significant archaeological materials were found. An additional archaeological inventory project was also undertaken in the study area under BC Hydro's Reservoir Archaeology Program (permit 2008-422).

Cordillera Archaeology is currently analyzing the materials collected in 2009, and preparing to catalogue and write up the 2009 results. It is anticipated that the findings for this monitor will continue to contribute significant evidence to land use and long-term livelihood of the study area. Further data interpretation will be provided for this monitoring program in the Year 4 annual report, which is expected on March 15, 2010.

5 Ash River WUP Monitoring Programs Costs

The following table summarizes the Ash River WUP monitoring programs costs accepted by the Comptroller on 21 June 2005 and 26 January 2006, and actual costs to 30 September 2009.

Table 5-1: Ash River WUP Monitoring Program Costs

Monitoring Programs	Costs approved by CWR	Total Forecast (Actuals and Forecast) Life to Date	Variance Total to Approved	Explanation	Corrective Action
Annual Watershed Program Report	\$ 26,000	\$ 4,270	\$ 21,730	Report scope reduced from original scope; reporting streamlined	Resubmit to CWR
ASHMON#1 ASSESSMENT OF ADULT FISH PASSAGE DURING PULSE FLOW RELEASES	\$ 364,530	\$ 329,618	\$ 34,912		
ASHMON#1 Direct Management	\$ 75,190	\$ 52,056	\$ 23,134	To be managed over time remaining in contract	none
ASHMON#1 Implementation	\$ 289,340	\$ 277,562	\$ 11,778	To be managed over time remaining in contract	none
ASHMON#2 ELSIE RESERVOIR ARCHAEOLOGICAL INVESTIGATIONS	\$ 133,219	\$ 131,532	\$ 1,687		
ASHMON#2 Direct Management	\$ 45,287	\$ 31,110	\$ 14,177	To be managed over time remaining in contract	none
ASHMON#2 Implementation	\$ 87,932	\$ 100,422	\$ (12,490)	Contractor change after year 1	Resubmit to CWR