Duncan Dam Water Use Plan
Monitoring Program Terms of Reference

CULTURAL RESOURCES MONITORING PLAN

- DDMMON-12 Duncan Reservoir Archaeological Overview Assessment

December 15, 2008
CULTURAL RESOURCES MONITORING PLAN
TERMS OF REFERENCE

1.0 OVERVIEW

This document presents Terms of Reference for the monitoring programs in the Duncan Dam Cultural Resources Monitoring Plan (Table 1). These programs will implement archaeological overview and erosion monitoring assessments focused on the effects of normal reservoir operations on heritage sites situated within the drawdown zone of the Duncan Lake reservoir.

This document provides detailed Terms of Reference for the following programs:

1) DDMMON 12 – Archaeological Overview Assessment: a one-year archaeological overview assessment of the drawdown zone of the Duncan Lake reservoir drawdown zone.

2) DDMMON-13 – Erosion Monitoring of Archaeological Resources: a five-year erosion monitoring study of archaeological resources located in the drawdown zone of the Duncan Lake reservoir.

<p>| Table 1: Cultural Resources Monitoring Program Terms of Reference Submission Information |
|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|</p>
<table>
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<tr>
<th><strong>Name of Monitoring Program</strong></th>
<th><strong>Order Clause Fulfilled</strong></th>
<th><strong>Submitted with this Package</strong></th>
<th><strong>Previously Submitted To CWR</strong></th>
<th><strong>Submission Date</strong></th>
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<td>Section 5.f</td>
<td>Yes</td>
<td>No</td>
<td>7 Dec 2009</td>
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<td>DDMMON-13 Erosion Monitoring of Archaeological Resources</td>
<td>Section 5.g</td>
<td>Yes</td>
<td>No</td>
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2.0 FIRST NATION INTERESTS

BC Hydro recognizes that heritage management is an important issue for First Nations who have particular heritage management interests in the Duncan watershed. As part of the implementation of this Cultural Resources Monitoring Plan, BC Hydro will seek to work with representatives of the Ktunaxa Nation Council, the Okanagan Nation Alliance, the Shuswap Nation Tribal Council, and their communities.
Terms of Reference for the Duncan Dam Water Use Plan Monitoring Programs
Cultural Resources Monitoring Plan

1.0 MONITORING PROGRAM RATIONALE

During the Duncan Dam Water Use Planning (WUP) process, the WUP Committee recognized the importance of cultural sites and locations of historic and ongoing cultural activity to the First Nations with an interest in the area. The effects of reservoir operations on cultural sites represented by archaeological materials were a key concern raised during the WUP process. Two archaeological sites were identified in the draw down zone of Duncan reservoir during an archaeological overview conducted in 2002 (Choquette 2005) and it is expected that other undocumented cultural sites of significance may exist within areas affected by reservoir operations. Concern for the maintenance of the cultural, aesthetic and ecological context of cultural resource areas and spiritual sites was also raised. The WUP Committee was not able to fully evaluate the potential effects of operations on heritage and cultural sites due to incomplete information on their locations and condition.

A Cultural Resources monitoring plan was recommended by the WUP Committee to provide a more accurate understanding of the impacts of BC Hydro operations on cultural sites. The WUP Committee recommended a two-part program to be implemented over a five-year timeline consisting of an archaeological survey of the reservoir basin and a erosion study that would combine the collection of traditional use and cultural preference information, site investigations through excavation and an erosion monitoring study.

Subsequently, the Comptroller of Water Rights (CWR) clarified that only non-intrusive heritage work could be included in an Order issued under the Water Act, thereby excluding any study that would require a permit under the Provincial Heritage Conservation Act such as: 1) inventories involving subsurface testing; 2) placement of physical structures onto an archaeological site for monitoring purposes; or 3) investigative excavations. As a result, terms of reference (TOR) for studies in the Cultural Resources Monitoring Plan have been designed as non-intrusive studies to reflect this new understanding.

DDMMON-12 Archaeological Overview Assessment is a one-year study intended to address a knowledge gap regarding the number, location, elevation, condition, use, susceptibility to erosion and relative importance of cultural sites within the Duncan reservoir. This study will provide base information for DDMMON-13.

DDMMON-13 Erosion Monitoring of Archaeological Resources will be conducted annually for five years. Erosion monitoring techniques will be used at one or more locations to measure the effect of current reservoir operations on cultural sites. This study together with DDMMON-12 will provide information for the next Duncan Dam WUP review.
The detailed approach, methods and budget for these two studies are presented in the attached terms of reference.

A note on terminology: the language of professional archaeology uses the term “monitoring” for a specific purpose which can lead to confusion regarding the way this term is used in the WUP process. For the purpose of this document, a monitoring program is a general reference for scientific study intended to provide information to future WUP processes by the collection of data distinguishable from a program of physical works which typically involves a construction project such as a boat ramp.
Monitoring Program No. DDMMON-12
Duncan Dam – Archaeological Overview Assessment

1.0 INTRODUCTION

During the Duncan Dam Water Use Planning (WUP) process, the WUP Committee recognized the importance of cultural sites and locations of historic and ongoing cultural activity to the First Nations with an interest in the area. The WUP Committee was not able to fully evaluate the effects of reservoir operations on cultural sites due to gaps in existing documented information. The WUP Committee report recommended a Cultural Resources Monitoring Plan that would address the Duncan Dam WUP objectives to:

1) Protect cultural sites and resources from erosion in Duncan Reservoir;
2) Protect cultural sites and resources from exploitation in the Duncan Reservoir;
3) Provide opportunities for archaeological investigation in the Duncan Reservoir; and
4) Maintain the cultural, aesthetic and ecological context of important cultural resources and spiritual sites.

As part of the Cultural Resources Monitoring Plan, DDMMON-12 is intended to provide information on the location, condition and relative significance of the archaeological sites in the Duncan Reservoir. Information gained as result of this study will help inform future WUP discussions regarding the stated objectives.

Based on the four objectives outlined by the WUP Heritage and Culture subcommittee a performance measure was developed for use in evaluating operating alternatives with regard to cultural resource values. This performance measure is described as:

The number of days the reservoir elevation is operated in each band where cultural sites exist multiplied by a weighting factor to consider the impacts of dewatering or inundation.

Recognizing that this performance measure needed the support of archaeological evidence in order to have a comprehensive understanding of where cultural sites exist and how they may be affected by reservoir operations within the study area, the WUP Committee recommended the studies that comprise the Cultural Resources Monitoring Plan.

Subsequent to the completion of the WUP Committee recommendations, the Comptroller of Water Rights clarified that only non-intrusive heritage work could be included in an Order issued under the Water Act, thereby excluding any study that would require a permit under the Provincial Heritage Conservation Act (e.g., subsurface testing or the collection of artifacts).
In a parallel process, established through a Memorandum of Understanding, by which the Archaeology Branch of the Ministry of Tourism, Culture and the Arts and BC Hydro are in engaged in for the purpose of managing archaeological sites, a Reservoir Archaeology Program is in development. This Program is expected to address the aspects of long-term archaeological management, such as mitigative excavations, recommended by the Duncan Dam consultative committee that are not included in these Terms of Reference. It should be noted that Heritage Conservation Act permits have requirements over and above Water Use Plan requirements and that the Archaeology Branch will likely require an AIA be completed before alterations to archaeological sites resulting from operation of the Duncan Reservoir will be authorized.

2.0 STUDY RATIONALE

2.1 Background

The Duncan Dam was constructed in 1967 as a result of the Columbia River Treaty between Canada and the United States. The dam impounds the Duncan Reservoir which provides storage and flood control downstream. There are no power generation facilities at the Duncan Dam. The Duncan Reservoir lies north of the dam and is 45 km long covering an area of 7,150 ha at full pool (Fig 2-1).

In accordance with Provincial heritage law at the time of dam construction, an archaeological inventory study was carried out along the shoreline of then Duncan Lake. A period of 30 years passed with no formal archaeological assessments taking place at the Duncan Reservoir. Then, in the late 1990s, a number of archaeological impact assessments were conducted within and adjacent to the reservoir in relation to specific forestry developments (Arcas 2006). Following these assessments, information collection aimed at supporting WUP discussions included an archaeological overview staged over four years beginning in 2002 (Choquette 2005).

Collectively, 11 archaeological sites have been documented along and adjacent to the shoreline of the Duncan Reservoir through these various archaeological overview and impact assessments (Arcas 2006). Several documented sites appear to contain materials that are considered scientifically significant from an archaeological perspective as well as being of importance to local First Nation communities. Not all land within the Duncan Reservoir draw down zone has been intensively surveyed for archaeological sites and it is expected that additional undocumented heritage sites may exist in unexamined areas.

In 2005, as part of the WUP archaeological overview, a monitoring station consisting of a grid of rebar stakes installed for the purpose of formal geospatial mapping was established in the vicinity of one known cultural site, EbQf-7, located at the Glacier Creek recreational use site. This grid was installed in an effort to capture information regarding the effects of erosion and deposition on cultural resources due to ongoing reservoir operations. This monitoring station was revisited in 2006 for the purpose of detailed topographic mapping and recording of observations on site condition based on surface visibility of artifacts and intact native soils (Choquette 2006). High water levels in 2007 limited the research to cursory observations of a portion of the site’s surface area. The monitoring at Glacier Creek has indicated that a blanket of silt is
alternately laid down and eroded away by the actions of the reservoir in this location. Cultural materials are variously exposed on the surface of the parent soil and then obscured by the silt deposits. Quantitative measures could be obtained by measuring changes in soil depth in relation to the established grid.

A review of documented First Nation traditional use and traditional ecological knowledge undertaken during the WUP indicates that, aside from a brief ethnographic mention of the general area, information of this nature has not been comprehensively captured for the study area due in part to the distance from modern communities (Keefer 2002).

### 2.2 Archaeological Overview Purpose

The primary purpose of this archaeological overview is to provide information that can be used in future WUP processes and assist in developing any operating or non-operating proposals to address impacts at cultural sites for the next Duncan Dam WUP review period. During the WUP discussions, it became clear that an information gap exists regarding the number, location and condition of cultural sites in the Duncan Reservoir. The contents and significance of documented sites within the reservoirs have not been comprehensively reviewed, and it is possible that additional undocumented cultural sites exist in areas which have not been previously surveyed. This study will provide information critical for identifying heritage sites suitable for long-term erosion monitoring in DDMMON-13 and identify the need for further study or monitoring.
Figure 2-1: Location of Duncan Reservoir - Archaeological Overview Assessment Study Area
3.0 ARCHAEOLOGICAL OVERVIEW STUDY PROPOSAL

3.1 Objective and Scope

The objective of this archaeological overview is to collect information on cultural resource potential or sensitivity within portions of the drawdown zone of the Duncan reservoir and, based on this research, identify cultural site locations suitable for long-term erosion monitoring under DDMMON-13.

This project will involve documentary research and analysis as well as an in-field survey component that will ground-truth areas expected to be of high potential for heritage sites particularly those that may be suitable for long-term monitoring due to their location in areas affected by reservoir operations, the presence of cultural material on the surface and accessibility. Documentary research for this overview will pertain to the entire study area described above. The field survey component will be undertaken at selected locations within the overall study area. The typical drawdown elevation of the Duncan Reservoir is between 549.0 m and 576.7 m. This drawdown area constitutes the geographical scope of the study area.

3.2 Approach

The archaeological overview study will follow the guidelines established for Overview and Preliminary Field Reconnaissance in the Archaeological Impact Assessment Guidelines (Archaeology Branch 1998, Sect 3.4.3). The overview will provide an opportunity to review existing heritage data in detail and consolidate documented information. This information will be used to develop a landscape-based model of archaeological potential founded on hypotheses regarding the relationship of landform types to archaeological potential. The overall geomorphological context of the Duncan reservoir in addition to micro-topographic features present within the reservoir drawdown zone will be considered in the model development.

A preliminary field reconnaissance will be used to ground-truth the archaeological landscape hypotheses. The development of a preliminary evaluative framework for assessing site significance is expected. A key deliverable of this archaeological overview will be information regarding suitable candidate locations for erosion monitoring of archaeological resources. The project will be directed by a professional archaeologist.

Through review of these terms of reference local First Nations will have been given the opportunity to comment on the overview plan before it is carried out. All reports will be shared with local First Nations.

In addition to methods described in Archaeological Impact Assessment Guidelines, the archaeologist will conduct accurate surveys in accordance with BC Hydro’s General and Technical Standards for Reservoir Archaeological Work, meeting all relevant requirements.
3.3 Methods

The overview will involve four basic tasks outlined below:

3.3.1 Task 1: Project Management

Project management will involve the general administrative and technical oversight of the project. This task will include, but not be limited to: 1) budget management, 2) study team management, 3) logistic coordination, 4) technical oversight of field and analysis components, and 5) facilitation of data transfer among other investigators, as required.

A safety plan must be developed and submitted to the BC Hydro contact for all aspects of the study involving field work, in accordance with BC Hydro procedures and guidelines.

3.3.2 Task 2: Documentary Research

This task includes, but is not limited to:

1) a review of published and unpublished reports;
2) a review of all documented archaeological sites within the study area described in Section 3.1;
3) direct contact with persons or organizations knowledgeable about the archaeological resources in the study area where this information has the potential to expand on available documentary information;
4) a review of available air photos, orthophotos and digital elevation models of the drawdown zone;
5) the development of landscape-based hypotheses on archaeological potential; and
6) the development of a preliminary evaluative framework for assessing site significance.

It is expected that the research team will work with First Nations to determine key locations of interest to the communities to incorporate into the research design where possible.

3.3.3 Task 3: Preliminary Field Reconnaissance

Using survey sampling techniques assess the archaeological resource potential of sampled portions of the drawdown zones with reference to the documentary research, archaeological landscape hypotheses and First Nations interest. A minimum of five survey transects totaling no less than 50 ha of survey area is expected. It is expected that a variety of landforms will be visited during the preliminary field reconnaissance to achieve a comprehensive ground truthing of the archaeological landscape hypotheses. Pedestrian survey methods supported with vehicle and/or boat access will be employed.
The Duncan Reservoir drawdown zone will be accessible for the preliminary field reconnaissance in the late spring while water levels are low and snow coverage on the shoreline is minimal. The optimal period for fieldwork is typically from March to the end of May. Actual reservoir levels are dependent on weather variability during spring runoff and on reservoir operations. Areas subject to inspection will be selected based on a review of maps, air photos and the landforms they exhibit, First Nations interest and the professional judgment of the project archaeologist. Also, it may be necessary to exempt certain areas from intensive inspection owing to topographic constraints (excessive slope, landslides, etc.) or status (land ownership or land use).

3.3.4 Task 4: Analysis and Reporting

A draft report that summarizes the methods employed and study findings will be prepared shortly after the conclusion of the preliminary field reconnaissance. The draft report will include all the components expected in a final report to support thorough review at the draft stage. A final report for the study will include:

- an executive summary;
- a description of the methods employed;
- results of research on documented and/or known sites in the reservoir;
- a detailed landscape-based hypotheses on archaeological potential;
- site significance evaluation matrix;
- a detailed summary of the preliminary field reconnaissance findings;
- hard copy and digital maps, in an acceptable format, showing survey coverage and the location of all documented archaeological sites; and
- specific recommendations regarding the suitability for long-term erosion monitoring of specific heritage sites and the scope of further studies.

Reports will follow the standard format that is being developed for WUP monitoring programs. All reports will be provided in hard-copy and as Microsoft Word and Adobe Acrobat (*.pdf) format, and all maps and figures will be provided both as embedded objects in the Word file and as separate shapefile layers in accordance with BC Hydro’s Reservoir Archaeology Standards.

The preparation and submission of B.C. Archaeological Site Inventory Forms for all newly identified sites or updates to previously documented site data records is also required.

3.4 Schedule

The study will take place during one year with a preliminary field reconnaissance survey taking place in 2010. The exact timing will depend on site conditions, but it is expected that the greatest amount of the drawdown zone will be exposed between March and May. Low water levels and minimal snow cover on the ground are needed for an effective survey.

3.5 Budget

The total budget for the Duncan Dam Archaeological Overview Assessment study is estimated at $47,000.
3.6 References

Arcas Consulting Archeologists Ltd. 2006. Archaeological Data Summary to 2005 in BC Hydro Reservoirs Archaeological Data Collection Project. Prepared for BC Hydro (Duncan Reservoir section).


