INTENT
Identify an optimal reservoir operation for archaeological sites that would:

1. Minimize impacts to archaeological sites from both wave and wind erosion and destructive human behaviour;
2. Maintain access to archaeological sites for appropriate uses; and,
3. Maintain the cultural, aesthetic, and ecological context of important cultural resources and spiritual sites.

SOFT CONSTRAINT TARGET
- Maintain reservoir water levels at or below 436 metres (1430 feet) for as long as possible.
- First Nations willing to accept higher water levels 20 percent of the time (or for 2.5 months) provided it is timed in accordance with the vegetation efforts.
- First Nations would be willing to relax this constraint if the archaeological site protection plan is underway.

The information that provided the baseline for the soft constraint target of maintaining water levels at or below 436 metres was limited. The Water Use Plan (WUP) Consultative Committee (CC) understood at the time that a particular landform situated at 436 metres elevation in Arrow Lakes reservoir had particularly high archaeological value; however, through subsequent archaeological assessment and review, it was demonstrated that the entire elevation range within the drawdown zone contains landforms with variable archaeological potential and a decision to hold levels for the purpose of protecting one landform would come at the expense of another.

Information needed to develop more sensitive performance measures continues to be collected under a heritage management plan directly aimed at reducing operational impacts to archaeological sites in the Columbia system.
PERFORMANCE (2008 TO 2012)
The Arrow Lakes Reservoir water level was within the soft constraint target range 67% of the time. Figure 1 shows the actual reservoir water level over each year in relation to the target range and Table 2 provides the number of days within the target range each year.

Figure 1: Reservoir operation from 2008 to 2012 in relation to the soft constraint target range. Yellow shading indicates water levels outside of the optimal range identified by the soft constraint target for archaeological sites.

Figure 2. Percentage of days reservoir water levels were above or below 436 metres
PRELIMINARY RESULTS FROM MONITORING PROGRAMS

The following monitoring studies were developed for the Arrow Lakes Reservoir to answer key questions of the WUP Consultative Committee.

- What is the nature of the archaeological resources that are present within the reservoir?
- What effects do reservoir operations have on these archaeological resources?
- In what ways could archaeologically sensitive locations within the reservoir be impacted by potentially intrusive WUP-recommended projects including vegetation planting, woody debris removal or recreation?
- Conversely, could re-vegetation techniques be used to protect archaeological sites?

CLBMON-50 Arrow Lakes Reservoir Heritage Monitoring Wind and Wave Erosion

The objective of this five-year erosion monitoring study is to collect quantitative measures of the magnitude, severity, rate of change, and estimated duration of erosion effects caused by reservoir operations on selected landforms considered to have archaeological potential situated within the drawdown zone of the Arrow Lakes Reservoir. The monitoring program is expected to provide information that can be used to better understand the effects of Arrow Lakes Reservoir operations.

To date the study has demonstrated that the monitoring stations at six sites are being impacted by reservoir operations and by recreational use of the reservoir. However, so far there is no obvious patterning to the erosion or accumulation of sediments mapped for the sites, or the movement of monitoring points. A number of factors may be contributing to the absence of any meaningful relationships, the most significant of which may be the relatively short time span of the project. More sophisticated analyses are to be conducted in the last year of the study and included in the project completion report. However, the time line may still be too short for a consistent pattern to emerge from the data.

CLBMON-52 Archaeological Overview Assessment of the Arrow Lakes Reservoir

This Arrow Lakes Reservoir archaeological study was an overview assessment of present conditions. The management questions pertaining to this study focused on the potential for physical works, such as vegetation, debris removal or recreation management plans to affect archaeological sites within the reservoirs.

Over the course of this two season study, a total of 26 new archaeological site locations were identified and documented. During the 2007 field survey, nine proposed vegetation polygons, seven potential wildlife habitat physical works sites and 12 bank erosion locations (delineated by Northwest Hydraulic Consultants (NHC) in 2006) within Revelstoke Reach were traversed on foot. A total of 13 archaeological sites were discovered during the field visits. Seven of these sites were located within proposed vegetation areas, and six were banks that were thought to be susceptible to erosion.

In 2008, portions of four large areas in the southern two thirds of the reservoir identified for revegetation planting were surveyed along with several other localities in the higher elevations of the reservoir draw down zone. A total of 13 archaeological sites were recorded in 2008. Relic delta-fans at Taite, Octopus, Johnston, Bowman, Sunshine, Mosquito, McDonald and Twobit Creeks were also examined.

For more information

More information on the Columbia River Water Use Plan heritage programs, including annual reports, and monitoring program results can be found online by searching for ‘heritage management plan’ at www.bchydro.com. Questions? Please contact a BC Hydro Community Relations Representative:

SABRINA LOCICERO  
Stakeholder Engagement Advisor, Castlegar  
Phone: 250 365 4565  
Email: sabrina.locicero@bchydro.com

JENNIFER WALKER-LARSEN  
Stakeholder Engagement Advisor, Revelstoke  
Phone: 250 814 6645  
Email: jennifer.walker-larsen@bchydro.com