PERFORMANCE MEASURE INFORMATION SHEET #25

SOFT CONSTRAINTS FOR ARROW LAKES RESERVOIR

Description

At the final meeting of the Columbia WUP Consultative Committee, decisions were made to develop soft constraints for Arrow Lakes Reservoir that would reflect the interests and stated objectives of the Committee. No new maximum or minimum constraints would be placed on BC Hydro's water licences for the reservoir, but these soft targets would be reflected in the System Operating Orders and serve as a guide to the BC Hydro operators in making operational decisions for Arrow Lakes Reservoir on an annual basis. The soft constraints were structured based on the potential impacts of the modeled alternatives on objectives for the reservoir.

The Committee recognized that there are a number of conflicting objectives for Arrow Lakes Reservoir and this is evident across the soft constraints. It was agreed that these trade-offs would always exist, and the degree to which they are met in any given year depends on weather and runoff conditions, Treaty and NonTreaty obligations and system requirements. Rather than prioritizing the soft constraints, BC Hydro would need to balance these tradeoffs internally through choosing its water management strategy. This balance would be informed by the expressed values of the Committee members, the performance measures developed for the WUP process, the efficacy of the physical works, and knowledge gained from the monitoring plans to guide its operational decisions.

Performance

Each year, BC Hydro attempts to achieve a balanced outcome for the Arrow Lakes Reservoir soft constraints. In determining where efforts should be made within existing operational flexibility to meet some of these targets, consideration is given to supplemental operating agreements (by mutual agreement) with the U.S., the extent to which targets were met in previous years (i.e., multi-year balanced outcome approach), water supply forecasts and power cost implications. In addition, BC Hydro operations planners meet routinely with BC Hydro Water License Requirements staff to discuss near term projections in operations, WUP monitoring program objectives and to examine opportunities to meet the soft constraints.

Since approval of the Columbia River WUP by the Provincial Comptroller of Water Rights in January 2007, BC Hydro has been reporting out on the performance of meeting the soft constraints each year. The following provides a summary of this.

Performance in meeting Arrow Reservoir soft constraints, 2007-2009






RECREATION	WILDLIFE	FISH	VEGETATION	EROSION	CULTURE & HERITAGE
TARGET					
Reservoir water levels between 1435 ft and 1440 ft from 24 May to 30 September	Ensure inundation of nesting bird habitat by rising reservoir water levels in early summer is no worse than average over recent history (1984-1999). Ensure availability of fall migratory bird habitat is no worse than recent average targeting a reservoir level of 1438 ft or lower by 7 August.	Reservoir levels above 1424 ft to ensure tributary access during kokanee spawning period from late August to early November	Maintain 2004 level of vegetation in drawdown zone by maintaining lower reservoir levels during growing season. If vegetation is showing signs of stress as a result of flooding during the early part of growing season (May-July), target lower levels during latter part of the growing season.	Minimize duration of full pool events and reservoir water levels of 1440 ft are ideal. Avoid sudden drawdown once full pool has been reached (particularly if high runoff has saturated reservoir banks) to avoid slumping of the shores.	Maintain reservoir levels at or below 1430 ft for as long as possible. First Nations willing to accept water levels above this 20 percent of the time (2.5 months) provided that it is timed in accordance with vegetation efforts.
PERFORMANCE					
2007					
• Above 1435 ft for about 40% of the time from 24 May to 30 September	• Below 1424 ft for 31 days or 40% of time between 30 April and 16 July for nesting birds • Below 1437 ft for 86 days or 100% of the time between 7 August and 31 October for fall migrating birds. • Compared to recent average (1984-1999), conditions were slightly better for ground and shrub nesting landbirds but grassland and late nesting waterfowl had lower nesting success • Higher reservoir levels reduced fall migratory waterfowl habitat relative to other years since 2000. However, since 2000, habitat availability has been relatively high compared to most years in the 1980s and 1990s	• Above 1424 ft for 35 days or 43% of time between August 25 and November 15.	• Below 1424 ft for 30 days or 33% of the time between May 1 and July 31 • Below 1424 ft for 16 days or 26% of time between August 1 and September 30.	• Below 1440 ft for 365 days or 100% of the time during the year.	• Below 1430 ft for 283 days or 78% of the time during year.

2008					
• Above 1435 ft for about 82% of the time from 24 May to 30 September. • Above 1440 ft for 42 days over this period.	• Below 1424 ft for 28 days or 36% of the time between 30 April and 16 July for nesting birds • Below 1437 ft for 27 days or 34% of the time between August 7 and October 31 for fall migratory birds. • Reservoir elevations were high relative to most other years, including 2006 and 2007. This resulted in very low habitat availability and nesting success for all bird groups. • Bird PM statistics in 2008 were the lowest or near lowest on record for five of eight bird groups, including ground nesting landbirds, late nesting waterfowl, shorebird fall migration, short-eared owls, and shrub nesting landbirds.	• Above 1424 ft for 83 days or 100% of time between August 25 and November 15.	• Never below 1424 ft between May 1 and July 31 • Never below 1424 ft between 1 August and 30 September.	• Below 1440 ft for 315 days or 86% of the time during the year.	• Below 1430 ft for 155 days or 42% of the time during year.
2009					
• Above 1435 ft for about 5% of the time from 24 May to 30 September	• Below 1424 ft about 47% of the time between April 30 and July 16 for nesting birds • Lower reservoir elevations during the summer 2009 resulted in much improved conditions for all nesting bird groups relative to 2006-2008. • Below 1437 ft for 100% of the time between Aug 7 and Oct 31 for fall migratory bird habitat • Lower reservoir levels during the fall period resulted in more habitat being available than in recent years, particularly for migrating waterfowl.	• Above 1424 ft for 48% of time between August 25 and November 15.	• Below 1424 ft 39% of the time between May 1 and July 31 • Never below 1424 ft between 1 August and 30 September. • Water surface elevations gently declined through the growing season in 2009, were typically 3m lower than in 2008, and were similar to those in 2007.	• Did not reach full pool in 2009 due to low inflows • Peak level was 1435.6 ft on June 30 and reservoir drafted gradually to 1432.6 ft on July 31 and 1430.3 ft on August 31.	• Below 1430 ft for 78% of the year.