

## EXECUTIVE SUMMARY

A Water Use Plan (WUP) is a technical document that, once reviewed by provincial and federal agencies and accepted by the provincial Comptroller of Water Rights, defines how water control facilities will be operated. The purpose of a water use planning process is to develop recommendations defining a preferred operating strategy using a participatory process.

The Bridge River Water Use Plan consultative process was initiated in September 1999 and completed in December 2001. The consultative process followed the steps outlined in the 1998 *Water Use Plan Guidelines*. This report summarizes the consultative process and records the areas of agreement and disagreement arrived at by the Bridge River Water Use Plan Consultative Committee (CC). It is the basis for the Bridge River Draft Water Use Plan simultaneously submitted by BC Hydro to the provincial government and the Comptroller of Water Rights.

The Bridge River flows into the Fraser River near Lillooet. The Bridge River hydroelectric system is complex, comprised of:

- three impoundment dams; La Joie, Terzaghi and Seton;
- three reservoirs; Downton, Carpenter and Seton Lake;
- four generating stations; La Joie, Bridge No. 1, Bridge No. 2 and Seton.

In addition, a privately owned generating station, Walden North, is capable of diverting Cayoosh Creek water into Seton Lake Reservoir by means of a tunnel. All components of the system are connected so that changes in operations at one point in the system will affect water flows, operations and environmental impacts elsewhere in the system.

The Consultative Committee was comprised of thirteen members reflecting a variety of interests including: power, recreation, cultural use and heritage sites, fish, wildlife, water quality, socio-economic and First Nations. The Consultative Committee members represented local residents, environmental groups, BC Hydro, and federal and provincial agencies. The consultative process included numerous committee meetings to work through the steps outlined in the *Water Use Plan Guidelines*.

The Bridge River, Seton Lake Reservoir, Seton River and Cayoosh Creek are in the traditional territory of the Stl'atl'imx Nation. Participation by Stl'atl'imx in the Consultation Committee was not continuous throughout the water use planning process (see Section 2.2). However, Stl'atl'imx did attend all Consultative Committee meetings in steps 6 through 8 of the process.

The Consultative Committee explored issues and interests affected by the operations of BC Hydro's facilities and agreed to the following objectives for the Bridge River Water Use Plan:

- Fisheries: Maximize the abundance and diversity of fish in all parts of the system.
- Wildlife: Maximize the area and productivity of wetland and riparian habitat.
- Recreation and Tourism: Maximize the quality of recreation and tourism experience in all parts of the system.
- Power: Maximize the value of the power produced at the Bridge, Seton and La Joie facilities.
- Flood Management: Minimize adverse effects of flooding on personal safety or property.
- Dam Safety: Ensure that facility operations meet requirements of BC Hydro's Dam Safety Program.
- Water Supply/Quality: Preserve access to and maintain the quality of water for domestic and irrigation use.

Performance measures to show movement toward or away from these objectives were identified based on these objectives. Where possible, performance measures were modelled quantitatively. Operating alternatives were then developed to address the various objectives. In total, more than 20 alternatives were run through BC Hydro's operations model and their consequences for each objective were discussed by the Consultative Committee based on the agreed-to performance measures. Preferences and values were documented and areas of agreement sought.

With the exception of one member representing the community of Lillooet<sup>1</sup> (who abstained), Consultative Committee members agreed upon a single recommended operating alternative. The recommended alternative and the operating constraints are outlined in Section 9. As shown in Table 1 and Table 2, the recommended operating alternative includes new operating constraints, relaxation of existing licence constraints, physical works (i.e., a 5-year re-vegetation program) and an active adaptive management program.

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<sup>1</sup> The Lillooet resident did indicate in post-meeting communications that he did not disagree with decisions of the Consultative Committee. Stl'atl'imx Nation members indicated a preference to be considered observers rather than Consultative Committee members and provided separate comments on the final outcome.

**Table 1: Recommendations of the Bridge River Water Use Plan Consultative Committee**

Decision	Description	Level of Support
Base Operating Strategy	Alternative N2-2P	Consensus with one abstention
Lower Bridge River Adaptive Management Program	Flow trials of 3-1-6 m <sup>3</sup> /s over an 11-year period with monitoring of fish and wildlife responses	Consensus with one abstention
Seton Generating Station Upgrade	Recommend further study	Consensus with one abstention
Licence Changes	Remove licence restrictions on BR1/2 and SON diversions & La Joie	Consensus with one abstention
Monitoring Program	Implement combined fish/wildlife/water quality program	Consensus with one abstention
Review Period	11 years (at conclusion of flow trials) with check at 5 years to assess need to trigger an early Bridge River Water Use Plan	Consensus with one abstention
Monitoring Committee	Multi-party committee to oversee monitoring and nurture cooperative learning	Consensus with one abstention

The final recommendations for the Bridge River hydroelectric system reflect a balance between fish and wildlife interests in the reservoirs while protecting and enhancing like values in the rivers.

In the main reservoirs, flexibility was maintained although soft targets and guidelines were established. Specifically, minimum and maximum elevations were targeted to mitigate entrainment risks in Downton Reservoir and enhance fish and wildlife conditions in Carpenter Reservoir, respectively. A tension between fish and wildlife benefits became apparent in determining the final operating strategy, resulting in a recommendation for a five-year re-vegetation program to enhance riparian habitat in Carpenter Reservoir.

Maintaining flexibility in the main reservoirs was required in part to manage spills and flows in the three rivers: Middle Bridge River, Lower Bridge River and Seton River. Spill events were of most concern in the Lower Bridge River for fish, wildlife and monitoring reasons; consequently, the recommended operating strategy sets a priority to spill first at Seton River and limits spill events in the Lower Bridge River.

For the Middle Bridge River flow constraints were specified. Determining a flow regime in the Lower Bridge River proved more difficult. Because the Lower Bridge River did not until recently (2002) have regular flows, the understanding of flow needs and ecosystem response is extremely poor. The recommended adaptive management program is intended to improve that knowledge through base flow trials (of 3, 1 and 6 m<sup>3</sup>/s) and associated monitoring and provide a basis for a flow prescription in the future.

For the Seton River, a flow shape and magnitude was specified. Operation of the Cayoosh Diversion was assumed to be open year round, but could be modified outside of the key flow mix period to facilitate agreements between Fisheries and Oceans Canada and the management of Walden North generating plant.

As noted in Table 1 the final recommendation of the Consultative Committee includes elimination of existing licence constraints at Bridge 1 & 2 Generating Stations, diversions constraints at La Joie and Seton and restrictions on turbine operations at Seton generating station. These changes all have positive environmental impacts while increasing power benefits. After these changes, power impacts did not vary significantly across the final set of alternatives considered by the Consultative Committee.

Relative to current operations, outcomes of the final recommendations are expected to benefit wildlife habitat, fish conditions, power generation, aesthetics and flood management. No interests are adversely affected by the change in operations.

**Table 2: Expected Outcomes of Recommendations**

Objective	Summary of Consequences
Flooding	- Reduction in flooding on all rivers, from expected frequency of four days (status quo) to zero (1 year out of 10)
Fish - DOW	- No change
Fish - MBR	- Improvements in whitefish egg survival
Fish - CAR	- 30% improvement in the fisheries index
Fish - LBR	- Reduction in spill frequency and duration on Lower Bridge River - Improvement in juvenile salmonid biomass (is a proxy for multiple instream benefits) from a 90% confidence interval of 500 to 1,200 up to 800 to 1,400
Fish - SONL	- No change
Fish - SONR	- Reduction in the frequency of significant negative impacts from operations from nearly 100% of years, to roughly 10% of years. Net effect expected to produce positive population level response in at least some species - Significant reduction (about 200 000 annually) in mortality from entrainment in turbines during peak sockeye outmigration; residual mortality at the dam remains at about 2% to 5%; no change to entrainment of outmigrants outside the peak window
Wildlife - DOW	- Preservation of Grizzly Flats
Wildlife - CAR	- Increase of about 500 hectares of new sedge-grass community on Carpenter Reservoir from Gun Creek to Tyax, and enhancements to willow community at upper end of Carpenter Reservoir - Improvements for wildlife that rely on sedge-grass and willow communities expected
Fish and Wildlife - Learning	- Implementation of the Lower Bridge River adaptive management program and the system monitoring program will provide key information about the impact of water management on fish and wildlife. This will provide greater certainty for future flow management decisions
Recreation/Aesthetics - CAR	- Increase of about 500 hectares of new sedge-grass community on Carpenter Reservoir from Gun Creek to Tyax - Improvements in aesthetics and dust control over about 500 ha

Objective	Summary of Consequences
Water Quality - SONL	- No change
Power	- Gain in annual revenues estimated at \$1.8 million per year before monitoring program relative to current operations - Monitoring estimated at an average cost of \$560,000 per year (undiscounted) over 11 years, ranging from about \$352,000 to \$813,000 in any particular year

In addition, the Consultative Committee reviewed the possibility of expanding the capacity of the Seton generating station, based on the availability of water, the desire to manage spills on Seton River and increased flexibility to other parts of the system. Consequently, the Consultative Committee recommended by consensus (with one abstention) that BC Hydro undertake within five years, a detailed feasibility study of an upgrade to Seton Generating Station.

Sources of uncertainty associated with each outcome were discussed by the Consultative Committee. Those most relevant to the decision process and to future decisions were addressed by the Consultative Committee's monitoring recommendations. The major components of the monitoring program support the Lower Bridge River adaptive management program, Carpenter Reservoir riparian vegetation and fish monitoring, and water quality. Specific programs for Downton Reservoir, Seton Lake Reservoir, Middle Bridge River and Seton River were also recommended.

The annual costs of the monitoring plan, including development of detailed terms of references and synthesis of monitoring results, vary from \$352,000 to \$813,000 with an overall average cost of \$560,000 per year (undiscounted) over the period of the plan.

The Consultative Committee recommends that the Bridge River Water Use Plan be reviewed in 2012 at the conclusion of the adaptive management program (11 years). It further recommends that a formal review of the results of the monitoring programs be conducted after the fifth year of implementation. At that time, a recommendation may be forwarded to the Comptroller of Water Rights to trigger an earlier review of the Water Use Plan, if there is evidence of significant unexpected and unacceptable impacts from facility operations at that time.

It is recommended that a Monitoring Committee be formed consisting of representatives of:

- BC Hydro
- Fisheries and Oceans Canada
- Stl'atl'imx Nation
- Ministry of Water, Land and Air Protection
- Public representative (from existing Consultative Committee, if possible)

- Representative of local government (from existing Consultative Committee, if possible)

The Monitoring Committee's mandate should include:

- To review mid-term results and determine need for early Water Use Plan review (Year 5)
- To recommend improvements to monitoring programs within existing budgets (Year 5)
- To review LBR flow trial results (every 4 years)
- To support periodic communication with the public (annual)
- To oversee publication of monitoring reports (as needed, but as a minimum in years 5 and 10)
- To nurture cooperation and collaboration to improve the environmental database and to build common understanding (ongoing)

The task of the Bridge River Water Use Plan Consultative Committee revolved around a very complex hydroelectric system, one that encompasses three reservoirs, three rivers, three impoundment dams and four generating stations. Social, economic and environmental interests were also diverse, adding to the challenge of finding a balance among competing values. The Consultative Committee discovered synergies and some opportunities to modify operations that enhanced all interests simultaneously but it also had to contend with choices between fish, wildlife and recreation. The final result, supported by all (with one abstention), offers the potential to enhance all key objectives relative to current operations. It also builds the foundation for learning and productive communications among interested parties.

We submit this report as a true and comprehensive record of our deliberations and decisions.