EXECUTIVE SUMMARY

Water use planning was introduced in 1996 as an approach to ensuring provincial water management decisions reflect changing public values and environmental priorities. The Water Use Plan is a technical document that, once reviewed by provincial and federal agencies and First Nations, 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 for a facility using a multi-stakeholder consultative process.

The Spillimacheen water use planning consultative process was initiated in May 2002 and completed in April 2003. The consultative process followed the steps outlined in the provincial government’s Water Use Plan Guidelines published in 1998. This report summarizes the consultative process and records the areas of agreement and disagreement arrived at by the Spillimacheen Water Use Plan Consultative Committee. It is the basis for the Spillimacheen Draft Water Use Plan which will be submitted to the Comptroller of Water Rights for review and approval.

Spillimacheen Hydroelectric Project

The Spillimacheen project is located within the Regional District of East Kootenay on the Spillimacheen River, in southeastern British Columbia, approximately 40 kilometres (km) north of Radium Hot Springs. The 90-km long river flows southeasterly from the Purcell Mountain range into the Rocky Mountain Trench, where it joins the Columbia River. The Spillimacheen project is part of BC Hydro’s integrated generation system and generates on average 21 GWh per annum, enough energy to meet the demands of 2100 homes for one year.

The Spillimacheen Dam is located on the Spillimacheen River about five km above its confluence with the Columbia River. It impounds a small headpond (2.4 ha), which has a storage capacity of 600 000 m³. Water is delivered from the Spillimacheen headpond to a surge tower through a 1.1 km tunnel. From the surge tower, two short steel penstocks deliver the water to the powerhouse, which contains three generating turbines. Water from the turbines is discharged into the Spillimacheen River via a tailrace downstream of the facility.

Consultative Committee Process

The Spillimacheen Water Use Plan Consultative Committee consisted of seven representatives and their designated alternates. Key interests included fish, wildlife, First Nations’ traditional use and power generation. The representatives included provincial and federal agencies, the Ktunaxa–Kinbasket Tribal Council (KKTC), and the Secwepemc Fisheries Commission (SFC), BC Hydro and local residents. The Canadian Columbia River Inter–Tribal Fisheries Commission (CCRIFC) also participated in fisheries technical discussions.
The Consultative Committee (CC) and its Fisheries Technical Committee (FTC) held a total of 10 meetings, ultimately reaching consensus on a preferred operating alternative for the Spillimacheen hydroelectric project and a monitoring program.

**Objectives and Performance Measures**

The Consultative Committee explored issues and interests affected by operations of the Spillimacheen hydroelectric project, and agreed to the following objectives for the Spillimacheen Water Use Plan.

- **Power**: Maximize the financial value of power generation at the Spillimacheen facility by maximizing revenue from energy sales, minimizing operating and maintenance costs, and minimizing negative effects on ancillary services; ensure electrical reliability of the BC Hydro system.

- ** Recreation**: Maximize appropriate recreational opportunities.

- **Fish and Fish Habitat**: Maximize native fish abundance and diversity by minimizing the entrainment of fish, maximizing habitat suitability, minimizing fish stranding, minimizing sediment effects and minimizing impacts associated with maintenance and operational procedures.

- **Wildlife and Wildlife Habitat**: Maximize wildlife habitat quality, quantity and diversity.

- **Cultural Use and Heritage Resources**: Maximize abundance and diversity of fish and wildlife populations to support First Nations harvesting and associated activities.

- **Flood and Erosion**: Minimize flooding and erosion impacts.

- **Irrigation**: Minimize irrigation impacts.

Given the Spillimacheen project is a run-of-river facility which has limited capacity through operations to affect many of the identified objectives, the Consultative Committee focused on two objective areas: fish and fish habitat, and power.

The Consultative Committee developed performance measures for the power-related objectives; however, agreed that it would not be necessary to develop performance measures to assess the impacts of operating alternatives on the fish objectives because of the degree of uncertainty. It was agreed that the most appropriate means of determining whether operating alternatives were effective in achieving fishery benefits would be through professional judgment based on available data and a research study that was carried out during the consultative process.

No performance measures were developed for wildlife or heritage and culture, as it was agreed that the degree to which the fish objectives are met would provide an indication of how well operation of the Spillimacheen facility meets these other objectives. As well,
no performance measures were developed for recreation, flood, erosion and irrigation because operations¹ were not thought to significantly affect these interests.

Reaching Consensus on an Operating Alternative

In all cases, operating alternatives developed for the Spillimacheen facility were assessed qualitatively based on the best available information and professional judgment of the Fisheries Technical Committee members.

The Consultative Committee unanimously accepted implementation of one operating alternative on the condition that specified monitoring studies also be implemented. The Consultative Committee reached their decision at the final meeting held on 18 February 2003.

The endorsed operating alternative was representative of current operations, which included a minimum flow release from the dam of approximately 0.85 m³/s through the low level undersluice gate.

Other Water Use Plan Recommendations

The Committee also recommended the testing of different ramping rates to determine an appropriate rampdown rate for the generating units when down ramping affects greater than 20 per cent of the river flows downstream of the powerhouse. This recommendation was developed because of the high concern related to the potential effects of planned (e.g., annual maintenance) and unplanned (e.g., trashrack cleaning) plant outages on river flow and stage and its impacts on fish stranding and spawning success. As a starting point, the Committee accepted an interim two-hour ramp rate pending the results of the monitoring study designed to test the effects of different rates.

The Committee also endorsed a review to be undertaken by BC Hydro to determine the feasibility of narrowing the range of headpond level fluctuations during non-spill periods. This was to minimize the time required to restore downstream flows and river stage during forced plant outages.

Expected Outcomes of the Recommendations

The expected outcomes of the final recommendations are as follows:

Minimum Flow: This recommendation is expected to better ensure that overwintering fish habitat within the canyon channel below the dam is maintained during sustained periods of cold weather. In addition, it recognizes that operation of the undersluice should remain unchanged, as it is associated with benefits to downstream gravel recruitment and overall fish production.

¹ Spillimacheen is a run-of-river facility, which means that there is no significant volume of water stored in the headpond upstream of the dam: what flows in, flows out.
**Ramping Rate:** The recommendation to determine a suitable ramping rate for planned and unplanned plant outages is to reduce the incidence of fish stranding (including mountain whitefish and burbot eggs), increase spawning success, and improve overwintering habitat in the lower Spillimacheen River.

**Narrower Operating Range of Headpond Levels:** This is expected to lead to a reduction in fish/egg stranding and an improvement in overwintering habitat downstream of the powerhouse.

**Monitoring Program**

Throughout the water use planning process, the Consultative Committee discussed a number of monitoring studies to address uncertainties regarding implementing the preferred operating alternative and its potential benefits to fish. The resulting monitoring program recommended by the Committee consists of three studies, which are aimed at providing improved information for future operating decisions.

**Assessment of Rampdown Rates to Minimize River Stage Change during Full Plant Outages:** The objective of this study is to assess a two-hour rampdown rate for planned and unplanned outages and, if found to be inadequate, to test slower rates up to a five-hour rate. The results of this study will form the basis for selecting a rampdown rate during the review period. The underlying purpose of this study is to minimize the risk of fish/egg stranding in the lower Spillimacheen River. The estimated cost for this study is $27,000.

**Monitoring of Habitat Maintenance Flow within the Canyon Channel:** The objective of this study is to assess whether the current minimum flow of 0.85 m³/s from the gated undersluice is sufficient to prevent total freeze-up of pool refuge habitat and maintain habitat connectivity for overwintering fish. The estimated cost for this study is $14,000.

**Assessment of Gravel Recruitment:** The objective of this study is to assess whether operation of the headpond influences the transport of gravels through the Spillimacheen River. This gravel is associated with productivity for fish and providing suitable spawning substrate in the lower Spillimacheen River. The estimated cost for this study is $11,800.

**Review Period**

The Consultative Committee recommended that a formal review of the Spillimacheen Water Use Plan be undertaken 10 years after its implementation. However, a review may be triggered after five years if significant new risks or opportunities are identified. The two triggers that could reduce the review period to five years are: 1) if it was found that the minimum flow release is inadequate in maintaining overwintering habitat for fish residing within the canyon channel; or 2) if there were biologically significant concerns over gravel recruitment (sediment transport) affecting the lower Spillimacheen River and there are operational changes that could address this issue.