

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. A Water Use Plan (WUP) 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 water use planning is to understand public values and develop recommendations defining a preferred operating strategy for a facility using a multi-stakeholder consultative process.

The Whatshan water use planning process was initiated in March 2002 and completed in May 2003. The consultative process followed the steps outlined in the provincial government's *Water Use Plan Guidelines* (Province of British Columbia, 1998). This report summarizes the consultative process and records the areas of agreement and disagreement arrived at by the Whatshan Consultative Committee. It is the basis for the *Whatshan Draft Water Use Plan*, which will be submitted to the Comptroller of Water Rights for review and approval.

Whatshan Hydroelectric Project

The Whatshan project is located within the Central Kootenay Regional District, near Edgewood, British Columbia. The Whatshan project is part of BC Hydro's integrated generation system and produces approximately 121 gigawatt-hours (GWh) annually, which is enough electricity to serve 12 000 homes for one year.

The Whatshan project consists of: two dams which impound the 17 kilometre (km) long Whatshan Lake Reservoir, a penstock on the southeast side of the reservoir, and a 50 megawatt (MW) hydroelectric power plant located on the Arrow Lake Reservoir. Instream flows in the Whatshan River below the Whatshan Dam are dependent on local inflow from tributaries, dam leakage and periodic spill events. These flows are supplemented by Barnes Creek which joins the Whatshan River 1.2 km downstream of the dam to form the lower Whatshan River which enters the Arrow Lake Reservoir at Edgewood a further 5 km downstream.

Consultative Process

The Whatshan Water Use Plan Consultative Committee consisted of representatives (and their designated alternates) from 12 organizations including:

- BC Hydro
- B.C. Ministry of Water, Land and Air Protection
- Canadian Columbia River Inter-tribal Fisheries Commission (CCRIFC)
- Central Kootenay Regional District

- Edgewood Community Association
- Fisheries and Oceans Canada
- Inonoaklin Recreation Commission
- Lower Arrow Lakes Conservation Club
- Nakusp Conservation Association
- Shuswap Nation Fisheries Commission (SNFC)
- Village of Nakusp
- Whatshan Retreat Society.

The Consultative Committee and its Fish Technical Subcommittee, Wildlife Technical Subcommittee and Recreation Subcommittee held a combined total of 10 meetings, ultimately reaching consensus on a preferred set of operating constraints and a monitoring program.

Issues, Objectives and Performance Measures

The broad issues considered by the Committee included the influence of operations on: recreation, reservoir fish, river fish, reservoir wildlife, river wildlife, heritage and cultural resources, power revenues and flood protection. Where it was clear that operational alternatives could significantly advance or affect these interests, the Committee developed fundamental objectives:

- Maximize the recreational quality of the reservoir.
- Maximize the population of fish in the reservoir.
- Maximize the population of rainbow trout in the river downstream of the dam.
- Maximize the power revenues generated by the Whatshan Project.
- Minimize the impacts on wildlife using the area.

The Committee also articulated more specific subobjectives with associated performance measures (indicators) in each category. The performance measures were used to compare the impacts of various possible operating alternatives across the range of interests expressed.

Creating Operating Alternatives

The Consultative Committee considered the following opportunities to influence operations in the development of operating alternatives:

- Raising the reservoir earlier in the spring, to improve boat and beach access and increase watershed fish and wildlife values.

- Reducing the range of drawdown in the reservoir to improve watershed fish and wildlife values.
- Releasing a minimum flow discharge from the low level outlet (LLO) at Whatshan Dam to benefit fish habitat in the Whatshan River.

The Consultative Committee considered 12 operating alternatives (different combinations of the three bulleted items above) during their discussions. Through a structured decision-making process that involved the analysis of trade-offs between objectives and alternatives, a consensus agreement was reached on a preferred operating regime that demonstrated the best balance across stakeholder values.

Recommended Operating Changes and Physical Works

The operating alternative recommended by the Consultative Committee included both a series of desired operating changes and two cost-effective physical works proposed in lieu of operating changes:

- The reservoir elevation should reach elevation (El.) 639.00 metres (m) by 15 May and El. 640.35 m by 15 June.
- There shall be a year-round minimum reservoir elevation of El. 636.5 m.
- There shall be a minimum reservoir elevation of El. 640.35 m between 15 June and 1 October.
- The existing elevation alarm level of El. 640.9 m shall remain in place year-round (BC Hydro shall generate at full capacity if this elevation is ever reached).
- There are no other restrictions on generation.
- Fish salvages are required following all releases from the dam into the Whatshan River.
- In lieu of an operational change designed to improve fish habitat values in the river (using a minimum flow discharge from the dam), BC Hydro will instead construct a series of 15 to 20 fish habitat enhancement structures in Reach W3 of the Whatshan River.
- In lieu of an operational change designed to improve recreational quality in the reservoir (via minimum reservoir elevation requirements), BC Hydro will instead extend the existing boat launch to facilitate boat access to the reservoir from 1 April onwards through the summer.

The estimated costs of implementing the Committee's recommended operational changes and physical works are outlined in Table 1 of this Executive Summary.

Anticipated Benefits of Recommended Operating Alternative

Based on the modelling results used by the Committee to evaluate and compare the expected outcomes of all the alternatives they considered, the anticipated benefits and impacts of the operating alternative they recommended are:

- **Significant Gains in Recreation Values:** While beach access will not change significantly, overall recreation values will improve with the addition of 65 weighted boat access days in the median year, some of which will result from the extension of the boat launch to ensure boat access to the reservoir from 1 April.
- **Improved Reservoir Operations for Fish:** Fish values in the reservoir are expected to improve – the effective littoral zone measure should increase by around 8 per cent in the median year.
- **Significantly Improved River Fish Habitat:** River fish will significantly benefit from the creation of approximately one effective hectares of new habitat, resulting from physical works in lieu of operations. However, river fish will also be subject to 10 more days of unintended discharges from the dam approximately once every ten years.
- **Minor Negative Power Revenue Impact:** Power revenues will decrease by approximately \$68,000 per year due to reduced reservoir storage and project flexibility.
- **Minor Negative Impact on River Frog Habitat:** Frog habitat will be subject to the “minor” impacts associated with the increased frequency of unintended discharges from the dam.

Recommended Monitoring Program

To assess the effectiveness of the recommended operational changes and physical works, and to provide better information to assist future water use decisions, the Committee agreed on a schedule of monitoring studies. Of the six proposed monitoring studies it evaluated, the Committee rejected one (for reasons described immediately below) and could not reach consensus on another (see wildlife monitoring described below).

The rejected study was attempting to address an identified lack of baseline information that hindered the understanding of operational impacts on reservoir fish. While the Committee agreed this is an important issue, when they evaluated the proposed study using standard eligibility criteria applied across all water use planning processes, they were unable to justify the collection of this data. Instead, the Committee recommended that studies designed to improve understanding of fish and supporting trophic levels in the reservoir proceed independent of the water use planning process through a partnership arrangement of various organizations.

Brief descriptions of the key monitoring studies that were put forward by the Committee for implementation are as follows:

- ***Fish Habitat Enhancement Effectiveness Monitoring in the Lower Whatshan River:*** This monitoring is designed both to demonstrate that fish benefits will result from the enhancement structures in the river, and to provide information to inform decisions on possible minimum flows in future Water Use Plans. It has two key components: 1) a ***reach-based habitat assessment*** that will confirm *whether the presence of the structures improve available fish habitat in Reach W3 over time*; and 2) a river ***fish response study*** that will confirm *whether the presence of the structures is resulting in an increase in the number, size and condition of the fish*.
- ***Vegetation and Wildlife Monitoring in the Whatshan Reservoir:*** This monitoring is designed to increase understanding of the influence of reservoir operations on vegetation, and wildlife and fish habitat. It has two key components: 1) ***submergent/emergent vegetation monitoring*** using aerial photography and vegetation mapping to *determine if any changes in operations influence submergent and emergent plant communities* which are important wildlife and fish habitat; 2) ***wildlife monitoring*** that will provide *improved understanding of the relationship between submergent and emergent vegetation communities and their impacts on wildlife species*. Note that the Committee could not reach consensus on whether to endorse the second component (wildlife monitoring). Nonetheless, the study is put forward for consideration during the provincial government's review of the *Whatshan Draft Water Use Plan*.
- ***First Nations Archaeological Study in the Whatshan Reservoir:*** The archaeology study undertaken as part of the Whatshan water use planning process did not take place at the full drawdown elevation of the reservoir, and was therefore considered incomplete in its findings. This follow-up study is designed to *identify archaeological sites throughout the drawdown zone that may be influenced by ongoing operations* (e.g., increased risk of erosion due to exposure during drawdown).

The expected costs of the studies and operational changes are outlined in Table 1. Some of these studies require that baseline information be collected to allow for valid comparison of the benefits/impacts of the current operating regime with those of the recommended operational changes and physical works (pre-implementation vs. post-implementation). Recognizing the trade-off inherent in delaying the implementation of their recommended changes to improve the quality of the baseline information collected, the Committee decided that baseline studies should delay the implementation of operational changes and physical works by no more than one year.

Water Use Plan Review Period

The Consultative Committee recommended that the Water Use Plan be reviewed 10 years after approval by the Comptroller of Water Rights, with a review of monitoring studies to be undertaken in year 5. The Consultative Committee also recommended that prior to the issuance of a water licence to divert Barnes Creek, Whatshan Water Use Plan stakeholders should be consulted collectively and have opportunities to provide comments on the project.

Implementation Costs

The anticipated costs associated with implementing the operational changes, constructing the physical works, and carrying out the monitoring studies recommended by the Consultative Committee are presented in Table 1 below.

Table 1: Whatshan Water Use Plan Summary of Costs

Recommendation	Total Cost (000's of \$)	Annual Costs (in 000's of \$)									
		1	2	3	4	5	6	7	8	9	10
Operating Changes	680	68	68	68	68	68	68	68	68	68	68
Physical Works	250	90	80	80	-	-	-	-	-	-	-
Lower Whatshan River:											
Fish Habitat Enhancement	200	40	80	80	-	-	-	-	-	-	-
Whatshan Reservoir:											
Boat Launch Extension	50	50	-	-	-	-	-	-	-	-	-
Monitoring Program	242.5	76.5	26.5	19.5	0.5	46.5	0.5	19.5	0.5	0.5	52
Lower Whatshan River:											
<i>Fish Habitat Enhancement Effectiveness</i>											
1a – Reach-Based Habitat Assessment	20	4	-	4	-	4	-	4	-	-	4
1b – Fish Response Study	75	15	-	15	-	15	-	15	-	-	15
Whatshan Reservoir:											
<i>Vegetation and Wildlife Monitoring</i>											
3.1/3.2 – Submergent/Emergent Vegetation Monitoring	107.5	27.5	26	-	-	27	-	-	-	-	27
3.3 – Wildlife Monitoring	25	15	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	6
<i>Heritage and Culture</i>											
4.0 – First Nations Heritage Archaeology Study	15	15	-	-	-	-	-	-	-	-	-
TOTAL	1,172.5	234.5	174.5	167.5	68.5	114.5	68.5	87.5	68.5	68.5	120

Study 1a and 1b: Equal costs in Years 1, 3, 5, 7, 10 – based on 10 year review.

Year 1: Pre-Implementation operational changes and physical works.

These numbers are confirmed with Final CC meeting minutes and study information in Consultative Committee report. Figure for monitoring is approximately \$40,000 less than approved by the Consultative Committee and is reflective of changes in wildlife monitoring scope.