

## **EXECUTIVE SUMMARY**

The Puntledge River water use planning consultative process was initiated in June 2001 and completed in June 2003. The consultative process followed the steps outlined in the 1998 provincial government's *Water Use Plan Guidelines*. The purpose of a water use planning process is to develop recommendations defining a preferred operating regime using a multi-stakeholder consultative process.

This report summarizes the consultative process and records the input received from the Puntledge River Water Use Plan Consultative Committee. It is the basis for the Puntledge River Water Use Plan which, once reviewed by provincial and federal agencies and accepted by the provincial Comptroller of Water Rights, will define how water control facilities on the Puntledge River will be operated.

Both the Puntledge River Water Use Plan Consultative Committee Report and the Puntledge River Water Use Plan will be submitted to the Comptroller of Water Rights.

### **Puntledge River Hydroelectric Facility**

The Puntledge River hydroelectric facility is located within the Regional District of Comox–Strathcona, approximately nine km southwest from the City of Courtenay.

The Puntledge River hydroelectric facility is a one-reservoir system. Comox Dam is located on the Puntledge River about 300 m downstream of the east end of Comox Lake Reservoir. Comox Dam provides flow regulation for the downstream Puntledge Diversion Dam, approximately 3.7 km downstream of Comox Dam. The diversion dam forms the headpond for the intake for the 5 km long woodstave and steel penstock that connects the power intake to the powerhouse which houses a single 24 MW generating unit. Flows are also released from the Puntledge Diversion Dam to maintain fish habitat in the Puntledge River.

### **The Consultative Committee**

The Consultative Committee consisted of 18 members representing a wide range of interests. These interests included power, fish, wildlife, domestic and irrigation water, heritage and culture, recreation, and flood control. Organizations represented on the Consultative Committee included BC Hydro, provincial and federal agencies, Comox First Nation, the Hamatla Treaty Society, local non-government organizations and industry. The main Consultative Committee held a total of nine meetings, and ultimately reached unanimous acceptance of a preferred operating alternative for the Puntledge River hydroelectric facility, and a specified monitoring program. Additional Subcommittee meetings were held in support of the Consultative Committee.

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

- *Domestic and Irrigation Water*  
Maintain and enhance the quality and quantity of raw water for drinking, irrigation, and conservation purposes.
- *First Nation Heritage and Culture*  
Enhance opportunities for cultural activities.
- *Fisheries*  
Maximize the production and diversity of fish stocks in Comox Lake Reservoir and the Puntledge River.
- *Flood Management*  
Minimize flooding impacts in Comox Lake Reservoir and on the lower Puntledge and Courtenay rivers.
- *Power*  
Maximize the value of electricity to BC Hydro and the Province of British Columbia.
- *Recreation*  
Maximize diversity and quality of the outdoor recreation experience in the Comox Lake Reservoir and the Puntledge River.
- *Wildlife*  
Maximize wildlife habitat along the Puntledge River.

### **Consensus on a Preferred Operating Alternative**

The Consultative Committee developed performance measures for the seven water use planning objectives. Where possible, performance measures were modelled quantitatively. In other cases, they were described qualitatively. Operating alternatives were then developed to address the various objectives. In total, 20 operating alternatives were run through BC Hydro's computer-based operations model. The output of the modelling process provided the Consultative Committee with a description of consequences for each operating alternative based on the performance measures. After considering all of the operating alternatives, the Consultative Committee reached agreement by consensus for a recommended operating alternative, accompanied by some gravel placement and a specified monitoring program.

Table 1 summarizes the recommended preferred operating conditions for the Puntledge River hydroelectric facility.

**Table 1: Recommended Operating Conditions for the Puntledge River Hydroelectric Facility**

<b>System Component</b>	<b>Condition</b>	<b>Time of Year</b>	<b>Purpose</b>
Comox Lake Reservoir	Maximum normal level 135.33 m	16 February to 14 October	Flood routing
	Maximum normal level 134.42 m	15 October to 15 February	
	Minimum normal level 130.75 m		
Puntledge Diversion Dam Forebay – Reach B	No special conditions		
Puntledge River Reach C	Minimum 5.7 m <sup>3</sup> /s (daily average)	Year-round	Provide the opportunity for fish migration, rearing and spawning
	Four, 48-hour 12 m <sup>3</sup> /s pulse flows	15 January to 15 February	
	Four, 48-hour 12 m <sup>3</sup> /s pulse flows	15 March to 15 April	
	Five, 48-hour 12 m <sup>3</sup> /s pulse flows	2 July to 15 August	
	Four, 48-hour 12 m <sup>3</sup> /s pulse flows	1 to 31 October	
Two, 8-hour 85 m <sup>3</sup> /s pulse flows on a scheduled weekend <sup>1</sup>	Between 15 May and 15 June	Provide the opportunity for a planned kayaking event	
Puntledge River Reach D	Minimum 15.6 m <sup>3</sup> /s if available	Year-round	Fish habitat
	Any discretionary power generation that increases flow at Gauge 8 above 15.6 m <sup>3</sup> /s up to 20.7 m <sup>3</sup> /s, must be maintained for the remainder of the period. Increases in discretionary flows when Gauge 8 flows are above 20.7 m <sup>3</sup> /s need not be maintained.	21 September to 31 December	
Puntledge Diversion Dam Maximum Ramp Rates	When Gauge 6 flow is 5.7 m <sup>3</sup> /s to 19.8 m <sup>3</sup> /s, the maximum rate of increase or decrease of discharge is 2.8 m <sup>3</sup> /s per hour  When Gauge 6 flow is 19.8 m <sup>3</sup> /s and above, there is no maximum rate of increase or decrease of discharge	Year-round	Prevent fish stranding

**Table 1: Recommended Operating Conditions for the Puntledge River Hydroelectric Facility (cont'd)**

System Component	Condition	Time of Year	Purpose
Powerhouse Maximum Ramp Rates	When releases are 0 to 11.3 m <sup>3</sup> /s, maximum rate of increase of discharge is 2.8 m <sup>3</sup> /s per hour	1 August to 30 September	Prevent fish stranding
	When releases are 11.3 to 15.6 m <sup>3</sup> /s, the maximum rate of increase of discharge is 8.5 m <sup>3</sup> /s per hour		
	When releases are 15.6 m <sup>3</sup> /s and above, there is no maximum rate of increase of discharge		
	There is no maximum rate of reduction of discharge		
	0 to 8.5 m <sup>3</sup> /s, then wait 15 minutes	1 October to 31 July	Prevent fish stranding
	8.5 m <sup>3</sup> /s to 14.2 m <sup>3</sup> /s, then wait 15 minutes		
	14.2 m <sup>3</sup> /s to 15.6 m <sup>3</sup> /s, then wait 1 minute		
	There is no maximum rate of reduction of discharge		
Penstock <sup>2</sup>	Fisheries and Oceans Canada withdrawal from BC Hydro penstock	Year-round with monthly maximums as per schedule	Provide flows to the lower Puntledge River fish hatchery

1. Measured below Browns River. A formal Land and Water BC application must be submitted each year by the kayak event proponent and be approved by the Comptroller before the pulse flow is released.
2. Regional District of Comox–Strathcona draws water from the penstock for consumptive use under a separate agreement with BC Hydro.

Subsequent to the final June 2003 Consultative Committee meeting, a technical subcommittee, which included representatives from BC Hydro, the Regional District of Comox–Strathcona, Fisheries and Oceans Canada, and the Ministry of Water, Land and Air Protection, met to prioritize minimum flow requirements for fish in the Puntledge River. The subcommittee agreed to the following:

- The minimum flow in the Puntledge River Reach C should be a 5.7 m<sup>3</sup>/s daily average minimum flow with a 5.1 m<sup>3</sup>/s instantaneous minimum flow measured at Gauge 6, in order to allow BC Hydro some flexibility in the provision of the flows for fish.
- A methodology for timely reduction of the minimum flow at Gauge 8 during very dry conditions.
- Lower Hatchery return flows should be included in measuring of instream flows below the Puntledge River Powerhouse at Gauge 8.

- In unusually low flow conditions, priority for fish flows should be:
  1. Minimum flow below the Puntledge Diversion Dam.
  2. Summer pulse flow in the Puntledge River Reach C.
  3. Fall, Winter and Spring pulse flows in the Puntledge River Reach C.
  4. Minimum flow below the Puntledge River Powerhouse.

The Technical Subcommittee concluded that the modified conditions would have no impact on the fish performance measures, but improve the power generation performance measure.

### **Consequences of the Preferred Alternative**

Benefits over the existing water licence include enhanced fish habitat, migration and spawning conditions, and planned kayaking opportunities in the Puntledge River.

Although the Consultative Committee members expressed interest in recreation, fish, wildlife, traditional use, and domestic water in the Comox Lake Reservoir and the Puntledge Forebay, discussion confirmed that current operations were acceptable in relation to those interests. The Consultative Committee's focus then shifted to water use below the Puntledge Diversion Dam.

During the Puntledge River water use planning process, it was determined that large storm events could provide good kayaking opportunities. In response, BC Hydro agreed to work with Vancouver Island Whitewater Paddling Society to develop communications mechanisms to allow kayakers to take advantage of those opportunities. In 2003, Gauge 6 real-time data was posted on the BC Hydro Web site to allow kayakers to view flows downstream of the Puntledge Diversion Dam. In addition, BC Hydro committed to develop a Web site to post one or two days' notice of the possibility of high flows. BC Hydro will consider releasing increased flows from the Comox Dam during daylight hours on weekends during large fall and winter inflow events – this will only occur when there are no operational impacts to fish, power generation and flood management.

Table 2 summarizes the expected outcomes of the recommended preferred operating alternative.

**Table 2: Expected Outcomes of the Recommended Operating Alternative for the Puntledge River Hydroelectric Facility**

<b>Interest</b>	<b>Expected Outcomes</b>
Chinook and steelhead migration and spawning habitat	Pulse flows in July, August and October will facilitate migration of returning chinook salmon to use better spawning habitat upstream of the Puntledge River Powerhouse.  Pulse flows in January through April will facilitate migration of returning steelhead to use better spawning habitat upstream of the Puntledge River Powerhouse.  Gravel placed in the Puntledge River at the confluence of Supply Creek will increase spawning area for returning chinook salmon.
Power Generation	Foregone annual revenue of \$173,000 relative to current operations.
Recreation: Kayaking	Quality of kayaking will be enhanced by providing two eight-hour planned kayaking flows in the last two weeks of May. As a side benefit, it will also encourage smolt migration
All Other Interests	No change to current conditions.

The recommendations developed at the final Consultative Committee meeting were based on annual estimated costs<sup>1</sup> of:

Power	\$322,500
Physical Works	\$20,000
Monitoring	<u>\$46,400</u>
Total	\$388,900

Final modelling of the combined package concluded that the power costs would be \$311,000, which is sufficiently close to the power value used by the Consultative Committee to confirm the integrity of the trade-offs made by the Committee. The revisions to the operating conditions proposed at the subsequent technical committee meeting maintain the fisheries values expected by the Consultative Committee, but credit the power account by \$138,000 per annum as a result of allowing BC Hydro some flexibility in the provision of minimum flows. Final annual costs are therefore estimated to be:

Power	\$173,000
Physical Works	\$20,000
Monitoring	<u>\$46,400</u>
Total	\$239,400

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<sup>1</sup> Annual cost = Net present value of each year's cost amortized at 8 % for 20 years.

## **Monitoring Program**

The Consultative Committee discussed sources of uncertainty associated with implementing the preferred operating alternative. Through the Puntledge River water use planning process and trade-off process, the Consultative Committee discussed various monitoring studies to address these uncertainties. Five studies satisfied the eligibility criteria for monitoring studies under the Water Use Plan Program. These included a monitoring program to measure and assess:

1. Economic costs and benefits of planned kayaking events.
2. Adequacy of minimum flows for salmon egg incubation.
3. Ensure there are no disbenefits of modified ramping rates for fish.
4. Steelhead production in the Puntledge River.
5. The effectiveness of pulse flows to promote adult steelhead and chinook migration (which may be beneficial to other species such as coho) in the Puntledge River.

The Consultative Committee recommends that a review of the monitoring studies be conducted annually by the Puntledge River Water Use Plan Fish Technical Subcommittee and the Vancouver Island Whitewater Paddling Society.

## **Physical Works**

The Consultative Committee considered an increase in minimum flows in Reach C to improve spawning for Chinook. Given the high cost of this change, the Consultative Committee agreed to the placement of gravel to achieve the same benefits. In lieu of increased minimum flows for spawning, 2000 m<sup>2</sup> of gravel will be placed in strategic locations in the Puntledge River.

## **Review Period**

Five years after the implementation of the Puntledge River Water Use Plan, the Puntledge River Fish Technical Subcommittee and the Vancouver Island Whitewater Paddling Society will review the results of the monitoring program and assess the need to recommend to BC Hydro an early review of the Puntledge River Water Use Plan. Alternatively, if the studies suggest that a review of the Puntledge River Water Use Plan is not needed, the Water Use Plan will be reviewed ten years after implementation.