

# Cheakamus Adaptive Stranding Protocol

## Interim Report

**Report**

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For decades, the Cheakamus generating station has been providing British Columbians with low cost, clean electricity. The dam, located about 40 kilometres north of Squamish, provides power to 96,000 homes per year.

Like all of BC Hydro's hydroelectric facilities, BC Hydro must balance the need to generate power and maintain public safety with its commitment to protect the environment. This report will examine the challenges faced on the Cheakamus River and how BC Hydro is mitigating its impact on the fish now and in the future.

## About Cheakamus

The Cheakamus generating station, located about 40 kilometres north of Squamish, was originally built in 1926 and replaced in 1984. Daisy Lake Dam impounds water flowing south from the headwaters of the Cheakamus River in Daisy Lake Reservoir. Water is released from the dam down a 26 kilometre stretch of Cheakamus River to its confluence with the Squamish River or is diverted through a tunnel that runs through Cloudburst Mountain to the Cheakamus generating station on the Squamish River.

BC Hydro operates the dam, its discharge facilities, and the generating station in accordance with its water licences and the 2006 Water Use Plan (WUP), which sets guidelines to balance power generation with fish and flood protection, as well as recreation.

Over the past 10 years, BC Hydro has undertaken several fish studies, including studies on Chum, Pink, Coho, and Chinook salmon and Steelhead trout. It also works closely with the Department of Fisheries and Oceans (DFO), the Ministry of Forest, Lands, Natural Resources and Rural Development (MFLNRORD), stakeholders and local contractors in the development and ongoing improvement of the studies.

## Cheakamus Adaptive Stranding Protocol (CASP)

Following observations of higher than anticipated numbers of stranded Steelhead fry in August 2018, BC Hydro committed to implementing the Cheakamus Adaptive Stranding Protocol (CASP) to study the effects of flow reductions on the Cheakamus River.

The study's objectives include:

- better understanding the risk of fish stranding on the Lower Cheakamus River,
- testing the effectiveness of different mitigation measures during those types of operations that may strand fish, and
- identifying effective fish stranding mitigation options for consideration for long-term implementation.

Since the implementation of the CASP in Fall 2018, BC Hydro has deployed fish monitoring crews on the Cheakamus River during planned flow reductions.

A moderate fall rainfall event took place in the Cheakamus watershed in mid-September 2019. To manage spill and flood risks at the Daisy Lake Reservoir, additional water was released from Daisy Dam to the Cheakamus River. This is typical during fall storms. Once enough water had been removed from the Daisy Lake Reservoir and forecasted inflows had declined, BC Hydro reduced flows as soon as possible to reduce the number of adult fish spawning in soon-to-be dewatered areas. This particular flow reduction operation implemented ramp rates slower than those ordered under the Water Use Plan.

This approach was effective at reducing juvenile stranding; however, it resulted in the stranding of adult pink salmon—a result that was not anticipated. BC Hydro immediately mobilized crews to save stranded fish. BC Hydro then worked with local contractors, stakeholders, DFO and MFLNRORD to adapt the CASP to mitigate for future adult and spawning stranding events, including reconnaissance prior to rampdown events and increased crew resources to salvage stranded fish.

## First year results

The first year of the study took place from August 2018 to September 2019. Instream Fisheries Research carried out the study which was focusses on bar stranding (fish stranded in gravel bars) and pool stranding (fish stranded in pools). It discovered the following:

Bar stranding	Stranding risk is the highest when more juveniles are present (e.g. during spring outmigration or over the summer months).
	Stranding risk is generally reduced with lower ramp rates.
	The current monitoring approach is working well; however, additional sampling is recommended outside of spring and summer months to address any uncertainty.
Pool stranding	Stranding risk is higher at high flows.
	Although helpful at mitigating bar stranding, slower ramp rates are not as effective at mitigating pool stranding.
	Significant changes in monitoring are recommended to better align with bar stranding estimate.

At the same time, BC Hydro has also worked with Indigenous groups, regulators and stakeholders to improve the study. This includes a workshop in December 2019 that led to BC Hydro implementing three key changes:

1. Improve monitoring methods by increasing the frequency to improve the comparability between bar and pool stranding estimates.
2. Take a more conservative approach to implementing flow reductions on the Cheakamus River. Where possible, BC Hydro will reduce the flow at a slower rate over a longer period of time in an effort to reduce stranding.
3. Be more transparent in the selection of mitigation measures to address impacts from flow reductions by increasing communication. In the future, BC Hydro plans to establish a technical committee to discuss ramping events prior to each event.

## Habitat enhancement highlights

In addition to implementing the studies under the Cheakamus Adaptive Stranding Protocol, the Fish & Wildlife Compensation Program provided nearly \$260,000 in funding to the Squamish Central Estuary Restoration Project this year. The project, now in its third year and led by the Squamish River Watershed Society, aims to improve fish passage at key locations in the Cheakamus River Watershed. It will provide fish access to more than 77 hectares of tidally-influenced habitat for out-migrating juvenile salmon.

The Fish and Wildlife Compensation Program is funded by BC Hydro and compensates for the historical impacts to fish, wildlife and their supporting habitats affected by generation facilities. The program is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations and public stakeholders. In the past 5 years, the program has invested \$1,148,255 in habitat-enhancing projects in the Cheakamus River Watershed.

## What to expect in year two

The CASP program has been updated to address the recommendations discussed in the December 2019 workshop. Starting with its annual August rampdown, BC Hydro will be applying ramp down rates according to DFO guidelines. In addition, BC Hydro plans to initiate a technical committee process, which would include Indigenous Groups, DFO, FLNRORD, and local stakeholders to discuss ramp down mitigation at six month intervals.

BC Hydro anticipates this committee will be in place through the Water Use Plan Order Review process, which is expected to resume after being put on hold due to the COVID 19 pandemic. Starting this fall, virtual engagement sessions are planned to review how BC Hydro is managing its operations to balance how the water is used against competing priorities. Through this process, BC Hydro wants to ensure its operating in a way that ensures it continues to protect the environment while producing affordable, clean electricity.

