Site C Project

Downstream effects on the Peace River

SEPTEMBER 2020

Once Site C comes into service, the project will have only small effects on the Peace River flows downstream of the dam.

Overall, the changes will be concentrated on the area immediately downstream of the dam within B.C. As the river flows into Alberta, water from other tributaries joining the Peace River will lessen any changes caused by the Site C project.

Water flows and levels

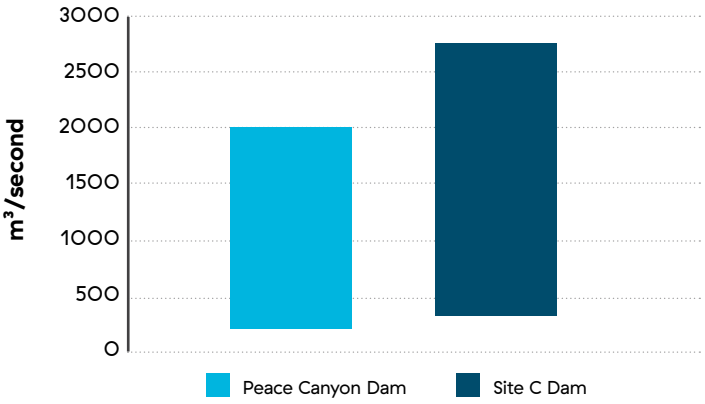
BC Hydro continually discharges water from the WAC Bennett and Peace Canyon dams into the Peace River. With the construction of Site C, the point at which the Peace River is regulated moves 85 kilometres eastwards downstream—from the Peace Canyon dam near Hudson's Hope, to the Site C dam near Fort St. John.

BC Hydro's reservoirs are used to meet provincial electricity demands. Electrical demand in B.C. is highest during the winter months, weekdays, and morning or evening hours. During these times, discharges from Site C will be higher. Reservoir operations and the resulting river flows will meet all regulatory requirements, including fisheries, industrial and recreation needs, and others.

Water discharge patterns from the Site C dam will be similar to current river flow patterns.

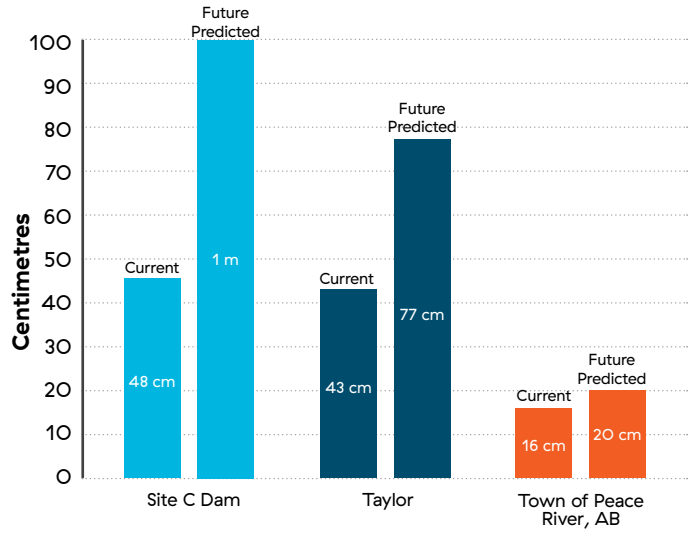
The Peace Canyon dam, 85 km upstream of Site C, normally discharges water from its turbines within the range of 283 to 1,982 m^3/second. The Site C dam, with additional inflow from local tributaries, will normally discharge water from its turbines at a rate ranging from 390 to 2,600 m^3/second. Occasionally, the Site C dam will need to discharge additional water from its spillways.

DAILY WATER DISCHARGE RANGE



Peace River Map

DAILY AVERAGE WATER LEVEL RANGE



The speed and amount of daily water level changes will decrease with distance from the dam site. The graph on the left compares the current and future daily water level ranges.

Downstream of Site C, water levels will vary, depending on flow discharges and topographic features at different locations on the Peace River.

Water clarity

Over the long term, water in the downstream Peace River will be clearer between the Site C dam and the confluence with the Pine River. This is due to the reservoir increasing the depth of the water upstream of the dam and slowing down the speed at which it flows. Sediment has more time to settle at the bottom of the reservoir, rather than washing downstream. Downstream Peace River suspended sediments are expected to lessen but would result in negligible changes to the overall river. This is due to the large sediment contributions from downstream tributaries, such as the Pine River, Beatton River, and the Smoky River.

Peace River suspended sediment levels will increase during dam construction as excavation disturbs the river bottom. This will occur from summer 2020 until the dam is completed .

Bull trout

There will also be increased suspended sediment levels during the initial period of reservoir filling, lasting several months from late 2023 to early 2024, as water picks up the sediment from previously dry land. Peace River suspended sediment levels will be regularly monitored throughout this time.

Water temperatures

Water temperatures in the Peace River immediately downstream of Site C are expected to be slightly warmer in the winter, and slightly cooler in the summer.

Temperatures will be warmer than existing conditions between July and January, with differences ranging between 0.3°C (July) and 1.5°C (October).

During the remainder of the year (February through June), water temperatures in the Peace River just downstream of the Site C dam are expected to be cooler than existing conditions, ranging between 0.4°C (March) and 0.9°C (June). In all months, the daily water temperature range with the project is expected to be lower than the existing temperature range.

During the early winter months, the ice on the Peace River begins to accumulate on the far downstream reaches of the river (northeastern Alberta), and then moves upstream, reaching as far upstream as BC in some years.

With Site C in place, the Peace River ice front will be less likely to reach BC, due to the warmer water flowing from the Site C reservoir. The ice front pattern will be unaffected in Alberta and is still expected to continue to reach the town of Peace River, Alberta in most winters. There is no likelihood of the ice front reaching the dam site near Fort St. John.

Fish habitat

Fish habitat changes in the Peace River downstream of Site C will affect the fish community. Overall, we predict an increase in fish population, mainly due to an increase in abundance of mountain whitefish due to better water clarity.

There may be more over-winter habitat for fish, due to warmer water in the winter and downstream movement of the ice front. We expect this to support increased fish populations due to higher over-winter fish survival rates.

We expect the mountain whitefish, Arctic grayling, rainbow trout and bull trout populations to remain and potentially extend their distribution further downstream in Alberta after the construction of the dam.

Greater fluctuations in water flow in the 16 km-long section of river between the dam site and the Pine River will result in a greater risk of fish stranding.

Construction of new downstream channels for fish habitat

We are addressing this risk by enhancing fish habitat in the area, which will provide permanently wetted protected channels for fish spawning and rearing.

Learn more about downstream fish habitat enhancements.

Fish methylmercury levels will temporarily increase

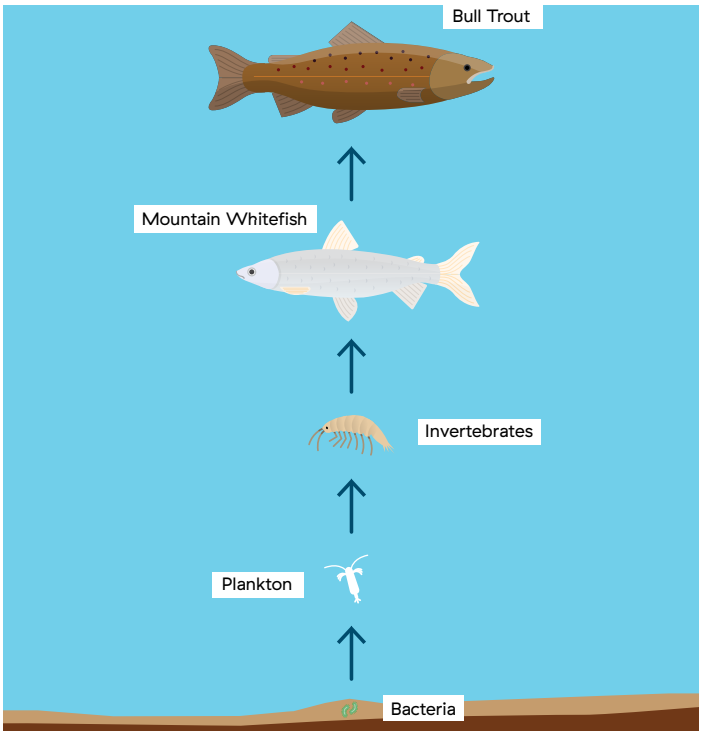
Mercury is found everywhere in the environment—in air, water, soil, plants, animals and fish.

The process of converting inorganic mercury to methylmercury temporarily speeds up when a new reservoir is created, due to the rapid decomposition of soil and vegetation previously on dry land. The amount of methylmercury increase depends on a range of environmental factors such as flooded area, reservoir size, water flow rates through the reservoir, and type of soil and vegetation.

Baseline levels of methylmercury in the Site C project area are relatively low. In fact, methylmercury levels of Peace River fish are lower than those of similar fish in other lakes and reservoirs in B.C., and among the lowest in Canada.

When we begin filling the Site C reservoir in 2023, there will be temporary changes in fish methylmercury levels. We predict fish methylmercury levels to increase by an average of three to four times the baseline level in the newly created reservoir, and slowly return to a new baseline after approximately 20–30 years.

Fish, water, sediment, and aquatic bugs containing methylmercury from the Site C reservoir will be flushed downstream. This is predicted to cause downstream fish methylmercury levels to double, possibly as far away as Many Islands, Alberta, before returning to a new baseline.



At their highest, levels of methylmercury in fish from Site C are expected to be similar to levels in fish found in many lakes and rivers elsewhere in Canada and lower than some types of fish sold in stores and restaurants.

The largest increases in methylmercury levels will be in large, predatory fish higher up the food chain, such as bull trout and lake trout.

Learn more about methylmercury in fish.