

Sport Fishing: more anglers increase pressure on fish stocks

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What is happening?

Visitor numbers to Átl'ka7tsem/Txwnéwu7ts/Howe Sound have continued to grow since 2017. Consequently, more anglers have increased pressure on local sport fishing areas and fish species. Anglers and conservationists have repeatedly asked for additional enforcement efforts in the Squamish River and Átl'ka7tsem/Txwnéwu7ts/Howe Sound; however, both federal and provincial agencies have been slow to respond.



Sport fishing in Átl'ka7tsem/Txwnéwu7ts/Howe Sound. (Credit: Dave Brown)

What is the current status?

Sport fishing in Átl'ka7tsem/Txwnéwu7ts/Howe Sound is benefiting from increases in some salmon stock. However, it is also experiencing challenges, such as threats to fish survival under certain river conditions and a reduction of data collection to support effective management.

An increase in Chinook salmon has been observed throughout Átl'ka7tsem/Txwnéwu7ts/Howe Sound by hatcheries and anglers. At the Tenderfoot Creek Hatchery, returning Chinook adults were seen in all river systems during summer 2018. This was the first time a return had been observed in the hatchery's four years of operation. Then, in summer 2019, large numbers of four and five-year-old hatchery adult Chinook were caught and reported at Tenderfoot Creek.¹ Anglers have benefited from this increase in Chinook in the Sound.²

Pink salmon (*Oncorhynchus gorbuscha*) return to spawn every two years. In odd years between 2011 and 2017, large returns of pink salmon adults to the Squamish River watershed drew anglers to the area. Because of the large returns, a commercial fishery was opened in Átl'ka7tsem/Txwnéwu7ts/Howe Sound for pink salmon in 2013. However, because there was no stock assessment of this species in Átl'ka7tsem/Txwnéwu7ts/Howe Sound to use for setting quotas, the commercial fishery was shut down in August 2015³ and has not been re-opened. Nonetheless, data from the Cheakamus River indicates a declining trend in estimated juvenile pink salmon abundance since 2015, although

there is clearly high variability in numbers.⁴ Anglers, however, continue to enjoy sport fishing for pink salmon, one of the only sport fish species allowed to be retained.

Rampingⁱ events are a concern for fish populations using rivers with hydroelectric facilities. In 2018, a fish



Happy young angler. (Credit: Dave Brown)

i) Ramping – increasing or decreasing the water flow on a run-of-river hydroelectric project, which can result in fish being stranded and dying if the water levels drop too quickly.

fryⁱⁱ stranding occurred in the Cheakamus River due to a ramping event that aimed to control the release of water from BC Hydro's hydroelectric facility at Daisy Lake Dam.⁵ In September 2019, another large ramping event on the Cheakamus River resulted in considerable numbers of dead pink salmon, many of which had not yet spawned. Additionally, this event destroyed salmon reddsⁱⁱⁱ.⁶ The number of fish being stranded and dying after ramping events and the frequency of these events is highly concerning for the local community.²

Unfortunately, the long-term monitoring programs in the Cheakamus River that were a part of a Water Use Plan for BC Hydro, ended in 2019. The monitoring provided the only consistent indicator of salmon population dynamics in the Squamish River watershed. The loss of this program will result in government agencies no longer having long-term monitoring data to guide resource management decisions such as fisheries quotas and closures.

What are the potential impacts of climate change on sport fishing?

Climate change is likely to have significant effects on the sport fishery in Átl'ka7tsem/Txwnéwu7ts/Howe Sound. Increasing water temperature, summer droughts and high discharge volumes due to extreme precipitation events are forecasted to increase under current climate change projections.^{7,8} All these conditions have negative impacts to anadromous^{iv} salmon and trout that make up a large component of the sport fish in Átl'ka7tsem/Txwnéwu7ts/Howe Sound. However, positive impacts from climate change are also being observed for particular species. In recent years, elevated ocean temperatures have been linked to the higher abundance of Northern anchovy (*Engraulis mordax*) in the Salish Sea.⁹ This positive correlation is likely to exist only up to a certain temperature threshold. Anchovy are an important forage fish in the Átl'ka7tsem/Txwnéwu7ts/Howe Sound food web.

Warmer water temperatures and droughts are likely to negatively impact the survival of all life stages of salmon from egg to adult. Energy use in fish is higher in warmer temperatures, and fish in warm water become stressed, which can lead to an increase in disease.¹⁰ Storm events can wash fish out of rivers before they are ready to migrate or damage the eggs laid in redds. High river discharges also affect the ability of migrating adult salmon to enter spawning habitats, reducing the success of spawning events.^{10,11}

ii) Fish fry – small young fish that are just emerging from their gravel nest.

iii) Redd – a depression in the riverbed where female salmon deposit eggs during spawning.

iv) Anadromous – moving into rivers from the sea to spawn.

What has been done since 2017?

The table below reports on progress made on recommended actions from the previous 2017 article, where identified. Many of these require ongoing action.

2017 ACTION	ACTION TAKEN
INDIVIDUAL AND ORGANIZATION ACTIONS	
Ensure you are familiar with the current regulations before you fish.	Three educational signs were installed in the Squamish River watershed in summer 2017. Signs display species information including identification, where to look for fishing regulations and locations of Skwxwú7mesh Úxwumixw/Squamish Nation lands. These signs were placed at high traffic areas of the Squamish River (i.e., the Squamish Spit, Fisherman's Park and at the confluence ^v of the Mamquam and Squamish rivers).
GOVERNMENT ACTIONS AND POLICY	
Support grassroots stewardship programs.	Some groups are supported by government funding. For example, the Tenderfoot Creek Hatchery (run by Fisheries and Oceans Canada [DFO]) provides fish to the Bowen Island Terminal Creek Hatchery, run by the Bowen Island Fish and Wildlife Club (BIFWC), a citizen science group.
Undertake baseline data studies to better determine fish populations, behaviours and returns so that conservation projects can be implemented, and retention, commercial harvests and industrial projects allowed only when supported by sufficient data.	The long-term monitoring programs in the Cheakamus River that were a part of a Water Use Plan for BC Hydro, ended in 2019. The monitoring provided the only consistent indicator of salmon population dynamics in the Squamish River watershed. This is a contrary move to the recommended action.

v) Confluence – the joining of two rivers.

What can you do?

A detailed overview of recommended actions relating to climate change is included in *The path to zero carbon municipalities* (OWHS 2020). In some cases, no progress was identified on previous recommended actions; these remain listed below. Additional actions marked as **NEW** also follow.



Individual and Organization Actions:

- Take fishing lessons to learn proper fish handling techniques.
- Take your garbage and used fishing line with you when you leave your fishing spot.
- Avoid unwanted and illegal rockfish by fishing away from rocky reef areas, key habitat for these fish.
- Sport fishing organisations and guides/outfitters can collect data on participants and catch and share the data to aid in quantifying the value of the activity to Átl'ka7tsem/Txwnéwu7ts/Howe Sound.
- Participate in shoreline cleanups.



Government Actions and Policy:

- Require angler education through the licensing process.
- Make angler awareness programs available in multiple languages.
- Allocate more resources toward monitoring and enforcement of recreational fishing regulations. Ensure saltwater “guides” are licensed.
- Increase levels of protection for forage fish species such as herring, eulachon and anchovy as they are main food sources for Pacific salmon and some marine mammals in Átl'ka7tsem/Txwnéwu7ts/Howe Sound.
- Require saltwater guides to be licensed and test their knowledge regularly.
- Unlink the allocation of DFO Conservation Officer enforcement funds with volume of reported infractions and increase enforcement capacity especially in heavily fished areas.
- **NEW** Implementation of ongoing long-term fish monitoring projects in this area.
- **NEW** Support surveys of angler activity and catch statistics.
- **NEW** Establish citizen enforcement officers throughout the Sound, who are granted limited enforcement powers, such as checking catch size, species, and fishing method, and handing out fines for fisheries infringements.

Methods

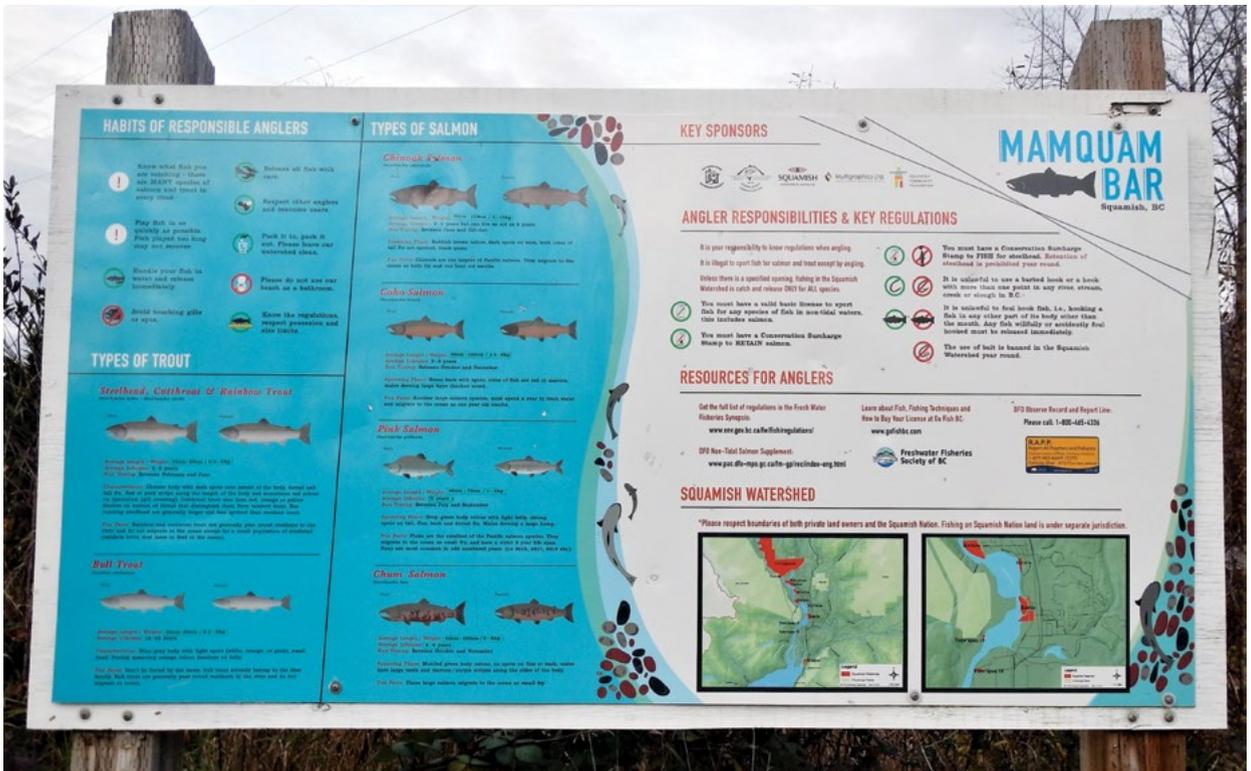
Literature was scanned for potential impacts of climate change on sport fish species.

Resources

This list is not intended to be exhaustive. Omission of a resource does not preclude it from having value.

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Educational signage placed along the Squamish River. (Credit: Stephanie Lingard)

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