

## First Nations-owned and -operated Science Lab Monitors Salmon Health

“Viruses are very difficult to grow. After all they’re not alive and can’t reproduce on their own,” says Chad Fuller, the Okanagan Nation Alliance (ONA) Fisheries Research and Diagnostic Biologist.

Infectious diseases in British Columbia’s wild salmon have contributed to their sharp population declines over the past thirty years. And disease is also believed to be hampering efforts to enhance salmon populations. However, little is known about the prevalence of viruses and other infectious agents during the various life stages of salmon.

That’s why Fuller is replicating fish viruses and other microbes at the ONA’s *kł c̓p̓alk̓ stiṃ* lab in Penticton, BC: to monitor the health of wild salmon and ensure the health of salmon in the *kł c̓p̓alk̓ stiṃ* hatchery. The lab has been operating since 2015 to provide a variety of services to the eight member communities in the Okanagan region to help increase the numbers of sockeye salmon. This year the *kł c̓p̓alk̓ stiṃ* lab will establish a state-of-the-science Fluidigm BioMark™ technology that can test a single sample for 46 different microbes at once, dramatically increasing the lab’s capabilities.

Endangered chinook and sockeye salmon are considered keystone species, playing a pivotal role in sustaining the ecosystems where they live while supporting Indigenous populations for thousands of years. Salmon are also complex with seven different life stages and over 8,000 combinations of species and streams where they spawn in BC alone.

Last fall, scientists discovered three new viruses infecting wild and farmed salmon, one of which is related to respiratory coronavirus. This is no risk to humans, researchers emphasized. More troubling was one of the new viruses infected more than 15 per cent of chinook in hatcheries. This discovery was made possible through the use of BC’s one and only Fluidigm BioMark™ system found at Fisheries and Oceans Canada’s Pacific Biological Station, a research facility in Nanaimo.



Chad Fuller, Research and Diagnostic Biologist, *kł c̓p̓alk̓ stiṃ* lab.  
Photo Credit: Okanagan Nation Alliance.

The Fluidigm high-throughput genomics testing allows rapid detection of genomes and enables researchers to search for a much wider range of pathogens at a lower cost than other methods. This makes it ideal for testing the distribution and prevalence of pathogens in both farmed and wild salmon.

“It’s quite an exciting tool,” says Fuller. The same Fluidigm BioMark™ technology is being installed this year in the *kł c̓p̓alk̓ stiṃ* lab. The ONA has a highly successful history of restoring salmonid species in the Okanagan Basin and the lab has played a key role in that success since its creation. Now it will be the home of the first independent, First Nations-owned and -operated lab for pathogen monitoring, e-DNA processing, genetic stock identification, and chemical assays with funding from the BC Salmon Restoration and Innovation Fund.

The *kł c̓p̓alk̓ stiṃ* lab is already being used to test samples of young salmon from industry hatcheries for piscine orthoreovirus (PRV) as a result of a partnership between ‘Namgis First Nation and the ONA.

## Compendium of Indigenous Socio-economic Best Practises in Fisheries and Oceans Sectors

This partnership is linked to a landmark Letter of Understanding signed in 2019 between First Nations in the Broughton Archipelago and the Province of British Columbia. Under the agreement First Nations will do independent scientific monitoring of fish farms in the Broughton Archipelago to ensure farmed fish meet First Nations health standards. Monitoring activities will occur over four years and will result in a considerable volume of samples to be analyzed and tested.

*“These investments will build technical capacity for First Nations communities,” says James Mack, Assistant Deputy Minister at the BC Ministry of Agriculture, Science & Policy. First Nations will generate the data themselves and obtain a better understanding of what’s happening in their territories says Mack.*

This cutting-edge science will be integrated with traditional ecological knowledge says Fuller. There is also a clear business case to build the expanded lab, rather than contracting it out. In same way it was more cost-effective to build the lab in 2015 to do the health monitoring of the ONA hatchery, he says.

Most importantly it will create jobs for local community members. “In collaboration with DFO, some of our people are being trained at the Pacific Biological Station,” he says. The Fluidigm technology for use on salmon was developed there.

With this technology, the salmon samples collected by the Broughton group can be screened for 46 pathogens and “that will give us a really good idea of the overall health of their fish,” says Fuller.

“When we’re up and running early in 2021 we will be able to provide health monitoring services for salmon and other fish species for many First Nations.”

**Best Practise:**  
*First Nation-to-First Nation Partnerships*



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Photo Credit: Okanagan Nation Alliance.

