**Response to recent articles and activities fearmongering**

**about PRV in farmed salmon.**

**Summary**

Anti-farm salmon activists in a variety of venues and media, are erroneously suggesting PRV (Piscine orthoreovirus) is a serious threat to wild salmon in BC. PRV is a common, relatively benign, and widely distributed marine virus of salmon and trout.

A specific example is Investment Manager Tony Allard and chair of the activist Group Wild First in a recent Newswatch Op-ed where Allard opines that PRV is transferred from farmed salmon to wild salmon and that research on this virus was suppressed by the federal Department of Fisheries and Oceans. Those statements are false. In recent weeks, a coordinated activist-driven campaign spreading these misinformed claims has created confusion and fear in coastal Indigenous and non-Indigenous communities.

**IS PRV a threat to wild salmon? Answer: NO**

Wild and farmed salmon are exposed to PRV after entering saltwater and wild salmon may also be exposed by their parents after spawning. Farmed salmon are tested and PRV-free when transferred from freshwater hatcheries into ocean farms. Viruses are the most common biological entity in the oceans, a teaspoon of seawater typically contains about 50 million viruses. Most viruses are harmless and infect bacteria and control bacterial abundance, influence marine communities and force biogeochemical cycles. Pathogens of marine animals, however, constitute a very small fraction of marine viruses.

There are multiple forms of the Piscine orthoreovirus globally. [The form of PRV found in BC, PRV-1(a), does not cause transitory heart and muscle inflammation](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0146229) (HSMI) in Atlantic salmon or jaundice syndrome in Chinook and is not considered of any clinical significance by fish health professionals. In BC, smolts are screened for the presence of PRV before leaving hatcheries. PRV is not related to any human health concerns.

In the last ten years, many scientific studies have confirmed this lack of clinical significance from PRV.

In 2016, lab researchers found [they could not produce jaundi](https://onlinelibrary.wiley.com/doi/full/10.1111/jfd.12329)ce after injecting PRV from jaundiced Chinook salmon into Chinook, Atlantic, and sockeye salmon.

In [2015](http://waves-vagues.dfo-mpo.gc.ca/Library/363813.pdf) and [2019](https://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2019/19-39/publications.gc.ca/collections/collection_2019/mpo-dfo/fs70-5/Fs70-5-2019-036-eng.pdf), Canadian Science Advisory Secretariat (CSAS) assessments concluded that PRV, attributable to Atlantic Salmon farms in the Discovery Islands area, poses no more than minimal risk to Fraser River Sockeye Salmon abundance and diversity.

A [US-based study in 2020](https://pubmed.ncbi.nlm.nih.gov/32476167/) Injected PRV extracted from Atlantic Salmon into juvenile Chinook, coho, and rainbow trout and failed to produce any notable disease or mortality.

Other work in [2020 reviewed global distribution of PRV](https://onlinelibrary.wiley.com/doi/10.1111/jfd.13228) in farmed and wild fish and found there are multiple genotypes of PRV. The paper includes a summary of a decade of studies on the virus:

A [2021 study found the virus poses a “very low risk”](https://link.springer.com/article/10.1186/s12915-021-01069-2) to BC’s population of wild Pacific salmon. The salmon remained physically fit with no change in respiratory fitness even when infected..

**Was PRV introduced to BC from farmed salmon? Answer: NO**

A 2015-study, that included archival samples from 1977, found [PRV existed in BC well before salmon farming](https://doi.org/10.1111/jfd.12285) and is believed to be an endemic (normally found) virus.

A [2018 survey of wild salmon in Alaska and Washington](https://pubmed.ncbi.nlm.nih.gov/29159930/) state (locations where there are no salmon farms) found that PRV was widespread in wild populations.

**Did Fisheries and Oceans Canada repeatedly suppress, ignore, and misrepresent scientific evidence of harm to its own decision-makers? Answer: NO**

In 2011, Tofino-based farmed-Chinook producer Creative Salmon initiated a proactive study of jaundice (a yellowing of the abdominal and/or periorbital regions) in a very small number of farmed Chinook salmon. Researchers included Dr. Kristi Miller, DFO who studies the molecular identification of viruses, Dr. Gary Marty, BC Animal Health Center (Veterinarian/Certified Pathologist), and Dr. Sonja Saksida, Private (Veterinarian/ MSc in Veterinary Epidemiology.

PRV was identified from samples of jaundiced fish and control fish that did not exhibit jaundice. But there was no definitive link to causation between PRV and jaundice. All fish that exhibited jaundice were PRV-positive. Although the study showed there was a significant association with PRV and jaundice – causation could not be proven.

At the end of the study, the main report authors could not agree on the interpretation of the data and conclusions proposed by Dr. Miller, who is neither a trained virologist or epidemiologist. This disagreement among the authors is an important point. According to widely accepted ethical standards for publishing scientific research papers, all authors must agree to the contents of the paper and be accountable for all aspects of the work. All salmon farmers support the dissemination of sound science released in the context of a peer reviewed published paper.

The detection of the presence of a virus does not mean there is disease as pointed out in a [study review released in April 2022](https://afspubs.onlinelibrary.wiley.com/doi/10.1002/aah.10155), new advanced molecular techniques are more sensitive in detecting the presence of infectious agents than traditional methods, but the biological significance of these new detections are difficult to interpret. This important review notes that “*Fish health specialists from several of these agencies and organizations advise that any policy changes should be made only after further investigations to avoid wasting resources to conduct surveillance for organisms that are not significant to fish health or for non-infectious genetic material that does not represent a viable [disease causing] agent*.”

Non-publication of this one study is far from being a conspiracy or a news item. The information has long been public.

In 2011, Dr. Miller discussed her findings publicly during the Cohen Commission. As part of the 2016-court case, Namgis vs. Minister of Fisheries, a summary of the study by Miller was submitted by the lawyers representing the Namgis (now public documents). Without permission, Dr. Miller used data from the study in another paper on PRV that she published in June 2017.

Copies of the draft project report and manuscript appear to have been leaked to the Pacific Salmon Foundation in 2017 and that same year Dr. Miller accused one of the coauthors of conflict of interest. This led to an investigation into the BC Provincial diagnostics laboratory (AHC). T[his investigation](https://news.gov.bc.ca/files/Review_of_Animal_Health_Centre_Memo_March_15_2018.pdf) cleared the coauthour and his laboratory and found that there was “no evidence of financial or technical conflict regarding the diagnostic activities of the AHC” and that the “AHC operates at the highest levels of quality”.

The Globe and Mail wrote about this study in a [2020-article](https://www.theglobeandmail.com/politics/article-scientist-at-department-of-fisheries-and-oceans-says-ottawa-is-too/) That article led to [further articles](https://seawestnews.com/wild-rhetoric-about-aquaculture-does-nothing-to-save-wild-salmon/) about the lack of agreement by coauthors on the original study

Dr. Miller has repeatedly stated she believes PRV is a threat to wild Pacific salmon, notably Chinook and Coho, and that there is a transmission risk between farmed and wild salmon. However, additional research produced and reviewed by other DFO and non-DFO scientists does not support this claim.

**Conclusion**

Mr. Allard and others have made several outrageous claims and allegations against Fisheries and Oceans (DFO) scientists and the department’s management of salmon aquaculture.

The Canadian salmon farming industry is comprehensively managed by DFO and accepted peer reviewed science from distinguished scientists and fish health professionals, within and outside Canada, do not support recent claims regarding PRV.

In [2015](http://waves-vagues.dfo-mpo.gc.ca/Library/363813.pdf) and [2019](https://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2019/19-39/publications.gc.ca/collections/collection_2019/mpo-dfo/fs70-5/Fs70-5-2019-036-eng.pdf), Canadian Science Advisory Secretariat (CSAS) assessments concluded that PRV, attributable to Atlantic Salmon farms in the Discovery Islands area, poses no more than minimal risk to Fraser River Sockeye Salmon abundance and diversity.

Peer-reviewed science is critical for establishing science-based regulations. The finfish farming sector does not have the ability to restrict science being published or released. The Cohen Commission and nine further Canadian government CSAS reviews concluded salmon farming presents no more than minimal risk to wild salmon in coastal BC. As with our neighbours in Indigenous and non-Indigenous communities, the salmon farming sector is committed to coexisting and supporting the restoration of wild salmon populations. Baseless and outrageous claims only drive division in communities, create confusion and distrust, and do not contribute to developing better outcomes for coastal BC.