



# Wild Fish Conservancy

N O R T H W E S T

S C I E N C E   E D U C A T I O N   A D V O C A C Y

Kenneth I. Warheit, Ph. D.  
600 Capitol Way N.  
Olympia, WA 98501

Dear Kenneth Warheit,

I am writing you once again in regard to the testing of Washington's farmed Atlantic salmon for Piscine Reovirus (PRV). As we have previously discussed, Wild Fish Conservancy had organ tissue samples from 19 Atlantic salmon (3 tissues from three organs of each fish) that escaped from Deepwater Bay Net Pen #2 on August 19<sup>th</sup>, 2017 tested for PRV. Of a total 57 tissue samples, 56 tested positive for PRV. The full-length S1 segment of nine of these were subsequently sequenced, and all were determined to be sub-genotype Ia, of Norwegian origin. All nine clustered very tightly with a PRV isolate from Iceland. The results of these analyses are currently in the process of being published. In addition to the four samples of fish from the same escape reported to have been tested by WDFW/NWIFC and found positive for PRV, **I believe that the results from our 19 samples, when combined with recent information on the potential negative impact to native Pacific wild salmonids from exposure to PRV from farmed Atlantic salmon, make it urgent that currently operating Atlantic salmon net pens and the Atlantic salmon hatchery in Rochester, WA be tested for PRV** (including sequencing of genes from a subset of both fish currently growing in marine pens and juveniles and eggs at the hatchery). These fish and eggs pose a credible risk to wild salmonids in the Salish Sea.

In the course of the emails you and I exchanged in late November/early December 2017, you stated that WDFW "could not make sampling requirements of commercial aquaculture that are more restrictive than what we impose on ourselves," and noted that the "rule does not specifically mention PRV." You referenced one RCW (77.115.010(6)) and one WAC (220-370-190(2)). You qualified this by noting that the WAC employs the operative words "a reasonable risk of disease transmission" and referred to an attachment to your email, a September 2017 summary report on the risk posed to wild Pacific salmonids by PRV prepared by The Pacific Northwest Fish Health Protection Committee and by Tony Myers of ADF&G.

The Myers report focuses entirely on the association of the presence of PRV and the risk of an outbreak of Heart and Skeletal Muscle Inflammatory disease (HSMI) in light of the evidence that PRV is the sole causative agent of HSMI. In brief, the report completely ignores the risk posed by potential sub-lethal effects of PRV infection in wild juvenile salmonids. In addition, in assessing the risk of PRV causing HSMI in wild fish, the report only refers to results of laboratory studies and neglects to note that there are no comparable studies of wild Pacific salmonids in the wild or under experimental conditions likely to provide credible proxies of conditions in the wild, which at a minimum are required to provide a credible risk assessment of the risk to wild juvenile salmonids of sub-lethal effects of PRV infection and the risk of such infection producing HSMI or even HSMI-like symptoms. Further, the report repeats the claim that PRV is likely native to the Pacific Northwest marine environment, a claim that relies almost entirely on one test of one tissue sample of one steelhead in 1977. The significance of this single (alleged) PRV-positive sample has been solidly criticized by Kibenge et al. 2017<sup>1</sup> in their criticism of Siah et al. (PlosOne, 2016), who themselves backed away from their reliance on this sample in the 2017 correction to their 2016 paper.<sup>2</sup>

The recent paper in PlosOne by Morton et al.<sup>3</sup> is directly relevant to this issue. The analyses in this paper provide the best current assessment of the likelihood that PRV poses a risk to the health of wild salmonid population in the Pacific Northwest. The authors adopted an exploratory approach given the non-ideal conditions under which the data had to be acquired (in large part due to intransigence by the aquaculture industry to readily provide fresh samples of farmed Atlantic salmon from the net pens), and were clear regarding the shortcomings of some of the data and the effect of these shortcomings on the strength of the conclusions that could be derived from the analyses:

The results of this work suggest that exposure to salmon farms has a strong association with increased risk of PRV infection in wild salmonids, and that the proportion of PRV-infected wild vs. farmed salmon can vary synchronously between years. In addition, the decline in PRV infection between the low and high migration challenge groups suggests that PRV infection may reduce a host's capacity to complete a challenging upriver migration, thereby reducing reproductive fitness. We stress the correlational nature of the present findings, but believe, in keeping with the

---

<sup>1</sup> Kibenge MJT, Wang Y, Morton A, Routledge R, Kibenge FSB (2017) Formal comment on: Piscine reovirus: Genomic and molecular phylogenetic analysis from farmed and wild salmonids collected on the Canada/US Pacific Coast. PLoS ONE 12(11): e0188690. <https://doi.org/10.1371/journal.pone.0188690>

<sup>2</sup> Siah A, Morrison DB, Fringuelli E, Savage P, Richmond Z, Johns R, et al. (2016) Correction: Piscine Reovirus: Genomic and Molecular Phylogenetic Analysis from Farmed and Wild Salmonids Collected on the Canada/US Pacific Coast. PLoS ONE 11(10): e0164926. doi:10.1371/ journal.pone.0164926

<sup>3</sup> Morton A, Routledge R, Hrushowy S, Kibenge M, Kibenge F (2017) The effect of exposure to farmed salmon on piscine orthoreovirus infection and fitness in wild Pacific salmon in British Columbia, Canada. PLoS ONE 12 (12): e0188793. <https://doi.org/10.1371/journal.pone.0188793>

Precautionary Principle, that they warrant further research attention due to the high ecological, economic, and cultural value of wild Pacific salmon (page 9/18).

concluding that:

This study provides the first evidence that (i) exposure to farmed Atlantic salmon is associated with infection of wild Pacific salmon with PRV, a virus of significant concern to both the aquaculture industry and wild fisheries management, and (ii) that PRV infection may impair the capacity of wild salmon to complete a challenging spawning migration, with the potential for population-level impacts. The evidence, based solely on molecular screening tests from this observational study, and constrained by limited access to farmed Atlantic salmon samples of known provenance, cannot be definitive. Nonetheless, we view it as providing an early warning sign of a potentially serious problem that warrants immediate and ongoing research. Research into the fitness impacts to wild Pacific salmonids of farmed salmon pathogens is needed in wild fish populations in addition to controlled laboratory environments, and could provide valuable insights useful for the management of critically declining wild salmon populations (page 14/18).

Regarding the duties of WDFW and its ability to require testing of marine aquaculture facilities, their freshwater hatchery facilities, or imported eggs for PRV, WAC (220-370-190(2)) clearly provides the director with the authority to require the testing of Atlantic salmon eggs as well as hatchery juveniles and adults for PRV or other pathogens and parasites that may reasonably be considered to pose threats to the health of native salmon and steelhead populations. You provided the relevant text from the WAC in your email of November 29<sup>th</sup>, 2017: “[t]he director may impose conditions on a transport permit as necessary to ensure the protection of aquaculture products and native finfish from disease when the director concludes that there is a reasonable risk of disease transmission associated with finfish aquaculture products.”

The results of the analyses conducted by Morton et al. as detailed in Morton et al. 2017 provide clear evidence of a probable positive relationship between the proximity of native salmon spawning streams to Atlantic salmon net pen aquaculture facilities and the prevalence of PRV infection in wild salmon populations, and related evidence of a negative relationship between the number of PRV-infected adult wild salmon on the spawning grounds and the distance and difficulty of a populations’ migration pathway to its spawning grounds. The fact that this data is correlational and not (yet) causal is irrelevant to the obligations of the precautionary approach and WDFW’s primary obligation to protect Washington State’s wild salmon resources for present and future generations. The data clearly suffice to show that there is a credible (“reasonable”) risk posed to native wild salmon from PRV shed from infected

farmed Atlantic salmon. The state and the public need to know if Washington's farmed Atlantic salmon are infected with PRV and if farmed salmon are transmitting the virus to native wild salmonids, and if so, where the PRV from those farmed fish originates. Washington State clearly has the authority to require the requisite testing pursuant to WAC(220-370-190(2)). If you doubt this, I would respectfully request that you seek clarification from the Attorney General's office and provide me with a copy of the AG's analysis and recommendation to the department concerning this issue.

That the spread of PRV from Atlantic salmon farming operations poses a potential and significant risk to wild native salmonids in Washington waters seems undeniable. **Currently, one or more of the current marine net pen operations are ready to be restocked with juveniles. It is imperative that these fish (as well as fish currently growing in the remaining pens) be tested for PRV before they are permitted to be released into the pens, and not be permitted for release into public waters if the tests for PRV are positive.**

I look forward to hearing from you, and from Acting Director Joe Stohr, in regards to this manner.

Sincerely,

Kurt Beardslee



Executive Director  
Wild Fish Conservancy Northwest

CC Joe Stohr, WDFW Acting Director  
Bradley Smith, WDFW Commission Chair  
Robert Duff, Senior Environmental Policy Advisor to WA Governor Jay Inslee  
Hilary Franz, WDNR Commissioner of Public Lands