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## **RE: SEA LICE RESERCH FINDINGS**

In 2006, I spoke about your sea lice research in a public inquiry of the Special Committee on Sustainable Aquaculture. I urged our government to take your findings seriously. I even went so far as to ask whether sea lice might be the marine equivalent of the pine beetle. Since then, new facts have come to light that have forced me to change my views.

The purpose of this letter is to express my opinions and concerns, and to appeal to you to provide accurate and complete information about your actual sea lice research findings and the origins of your funding. I am writing to you as a concerned member of the public. As this is a matter of public interest, this is an open letter.

For several years now, you claim that your research findings show that sea lice originating from salmon farms are causing high levels of mortality among juvenile salmon in the wild. The David Suzuki Foundation and Alexandra Morton say that your studies "prove" that sea lice from fish farms are killing wild salmon. Alexandra Morton says that the pink salmon in the Broughton Archipelago are now just four years away from extinction.<sup>1</sup>

If your research findings supported your claims, I believe that salmon farming should be banned. In my opinion, however, your claims are not supported by your own research. In other words, your actual findings do not show what you say they do. Here's why:

1. The published prediction of mortality due to sea lice was actually a very wide range, from **9 to 95 per cent**.<sup>2</sup> The fact is, the published paper by Krkosek et al. (2006) actually predicted both high mortality *and high survival*. For example, Krkosek et al. (2006) reports a prediction of 69 to 91 per cent *survival* of juvenile wild chum salmon from Knight Inlet. Your press releases selectively publicize your prediction of high mortality but not your own prediction of high survival.<sup>3,4,5,6</sup>
2. In stark contrast to your claims and predictions, wild salmon returns and studies suggest that salmon farming and wild salmon populations can co-exist sustainably in the Broughton Archipelago. Here's the evidence:
  - In 2000, *after 13 years of salmon farming in the Broughton*, **3.1 million** wild pink salmon returned to spawn in the area. According to Fisheries and Oceans Canada (DFO), this exceptionally *high* return was roughly eight times the historical average and *higher* than all previous returns observed in the past 50 years.<sup>7</sup>
  - The marine survival of the wild pink salmon offspring of 2002 was estimated at 34 per cent, an unprecedented *high*.<sup>8</sup>
  - In 2004, the return of wild pink salmon to Glendale Creek - the largest watershed in the Broughton - was *the third highest return* since 1953.<sup>9</sup>

Clearly, your computer-generated, hypothetical prediction that sea lice from salmon farms are putting wild pink salmon at risk of extinction is at odds with these facts. Indeed, if 34 per cent of the offspring of 2002 survived, it is mathematically impossible that "up to 95 per cent" are being killed by sea lice from salmon farms.

Studies from the 1960s - when there were no salmon farms - found that between 59 and 77 per cent of juvenile salmon die within the first 40 days after entering the ocean from their natal streams.<sup>10</sup> And yet, The David Suzuki Foundation says "sea lice infestations frequently kill over 80 per cent of wild salmon returns."<sup>11</sup> Again, your numbers don't ring true.

3. In 2000, the return of wild pink salmon to the Broughton Archipelago was extremely low: 147,000 fish. Extremely low returns also followed extremely high returns in the 1970s and 1980s. Wild pink salmon returns are known to vary widely from year to year. In Alaska, for example, the return of pink salmon in 2006 was less than 10 per cent of the average, the lowest return since 1975.<sup>12,13</sup>
4. According to data from Fisheries and Oceans Canada (DFO), wild pink salmon returns to the Glendale *increased* from about 16,000 in 2002 to about 668,000 two years later.<sup>14</sup> In the analysis on which your extinction prediction is based, data for Glendale Creek was excluded.<sup>15</sup> Dr. Krkosek reports that Glendale data was excluded because Glendale Creek has a spawning channel. And yet, data for the Kakweikan - which also has a spawning channel - was not excluded.<sup>16</sup> Dr. Brian Riddell and others indicate that hatchery-born juvenile salmon are no less susceptible to sea lice than those which are not hatchery-born.<sup>17</sup> The exclusion of Glendale data, therefore, appears to be unjustified.

5. Sea lice are found on many species of wild fish, including herring, rockfish and sticklebacks.<sup>18,19</sup> A method to determine whether a sea louse originated from wild fish or from a fish farm, is under development but currently does not exist.<sup>20,21</sup> In the meantime, there is no way to tell where sea lice originate. It follows that your many claims about "farm-origin sea lice," "fish farm lice," "farm-induced sea lice" and "sea lice from salmon farms," are flagrantly unsubstantiated (read: bogus).
6. An Alaskan scientist reports a study which found that approximately 25 per cent of juvenile pink salmon had sea lice, ranging from one to six lice per fish.<sup>22,23</sup> Another group of Alaskan scientists found that the prevalence of sea lice on juveniles was about 3 - 4 per cent for pinks and chums, 8 per cent for sockeye and 53 per cent for coho. These findings are from Alaska where there are no salmon farms.<sup>24</sup> Despite these findings, you claim that sea lice rare on juvenile wild salmon are rare.<sup>25</sup>
7. You claim that sea lice from salmon farms cause high levels of mortality among juvenile wild salmon.<sup>26</sup> For example, the title of the press release issued by the University of Alberta on 27 September 2006 reads, "Wild Salmon Mortality Caused By Fish Farms."<sup>27</sup> According to Hansard transcripts, Dr. Martin Krkosek admitted in a public hearing of the B.C. government that his data is "all correlative."<sup>28</sup> As we know, a correlation is not evidence of causality.

8. The term extinction does indeed make a catchy tag-line for the Smarten Up Safeway campaign. Extinction is the death of an entire species. According to Dr. Riddell and others, there are no detectable genetic differences between some of the populations of pink salmon in the Broughton Archipelago (eg. even and odd years).<sup>29</sup> Consequently, pink salmon from some streams can re-colonize other streams without loss of genetic diversity. Thus, even in an unacceptable scenario in which salmon populations in some streams are lost, the death of the entire species would not occur. Your use of the term "extinction," therefore, is inappropriate.



9. Senior scientists and experts have noted serious flaws in your sea lice research: inadequate baseline data, inadequate quality assurance, selective use and reporting of data, flawed assumptions and misreporting.<sup>30,31,32,33,34,35</sup>

In the Science Bulletin of the David Suzuki Foundation, Dr. Martin Krkosek reports, "These data, due to the massive sampling effort and the unequivocal nature of the conclusions, satisfy even the most conservative benchmark for proof..."<sup>36</sup> According to Dr. Krkosek himself, the "massive sampling effort" was conducted over 14 days of fieldwork. That's hardly a "massive effort" by the standards of the scientific community. Moreover, according to the company that operates one of the salmon farms studied, during part of the data collection there were *no fish at the farm*.<sup>37</sup>

10. According to Canadian government data, when all watersheds in the Broughton Archipelago are considered, wild pink salmon populations are actually *increasing*. Twenty scientists from the U.S., Canada and Europe, have endorsed this view.<sup>38</sup>

You may believe or fear that sea lice from salmon farms are harming wild salmon but in light of the points raised in this letter, I believe that when you say *that your research findings show* that sea lice originating from salmon farms are causing high levels of juvenile salmon mortality in the wild, you are mistaken.

I believe that what your research does tell us is that sea lice are indeed found on juvenile salmon from the wild. In this sense, your research confirms those of Alaskan scientists who have also observed sea lice on juvenile wild salmon.

Your research does not tell us whether the sea lice that you observed came from salmon farms or from other wild fish nor does your research tell us about the actual impact of sea lice on wild salmon populations. In my opinion, your computer-generated, hypothetical predictions lack merit because they were produced using highly selective data and flawed assumptions.

In my view, if you would have accurately reported your actual, computer-generated, hypothetical predictions of both high mortality *and high survival*, and how your predictions were manufactured in Edmonton using highly selective data and flawed assumptions, British Columbia would not have the sea lice controversy that we do today.

I believe that you have an opportunity to set the record straight. I appeal to you to do so. Specifically, I request that you please tell the truth and publicly clarify that your research findings do not show that sea lice originating from salmon farms are causing high levels of juvenile salmon mortality in the wild.

You may reach me at [vivian.krause@mac.com](mailto:vivian.krause@mac.com) or at 604.618.8110.

Sincerely,

Vivian Krause

## SOURCES

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<sup>3</sup> [http://www.davidsuzuki.org/files/Oceans/SEA\\_LICE\\_BROCHURE\\_FINAL.pdf](http://www.davidsuzuki.org/files/Oceans/SEA_LICE_BROCHURE_FINAL.pdf)

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<sup>5</sup> <http://farmedanddangerous.org/page/2005-2006>

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