Salmon inquiry

Letter from Dr Martin Jaffa, Callander McDowell

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It should be remembered that the 2018 salmon inquiry was prompted by PE01598 by Salmon & Trout Conservation (Now Wild Fish). The petition was titled “Protecting wild salmonids from sea lice from Scottish salmon farms. Unfortunately, the claims made in the petition were unfounded but a n inquiry into salmon farming was proposed regardless.

Sea lice remain the driving force behind the current inquiry as illustrated by the 426 times sea lice were mentioned with the breakdown of each session as follows:

Session 1 136 mentions
Session 2 90 mentions
Session 3 47 mentions
Session 4 157 mentions

What is disappointing is that the current inquiry did not call anyone with real knowledge of sea lice associated with salmon farms and the interactions with wild fish to give evidence.

In his evidence to the inquiry Dr Alan Wells of Fisheries Management Scotland referred to the Scottish Government’s ‘Summary of Sea Lice Science’ saying that the information is relatively clear that salmon farms have the ability to impact wild fish. However, the most recent observational data cited in this summary which relates to whether sea lice have had an actual impact on Scottish wild fish stocks, was published in 2009 using data from 2002 meaning that it is now 22 years out of date. The summary also states that the scientists involved stressed that their observations did not prove a causative link between declines of wild fish with salmon farms. Marine Directorate scientists have consistently refused to discuss the science cited in the summary and elsewhere despite clear concerns that the science used is selective and misleading.

There is a great deal of science and evidence which shows that the claims that salmon farms are having a negative impact on wild is incorrect, but this submission will focus on just one aspect of this science and evidence. This key issue is not even included in the Scottish Government’s ‘Summary of Sea Lice Science’ and this concerns whether the larval sea lice claimed to be in Scottish sea lochs in large concentrations actually exist.

Section 3.4 of the summary begins:

Infection of wild salmonid smolts by sea lice emanating from salmon farms depends on environmental dispersal patterns and behaviours of sea lice and fish

The established narrative states that adult female sea lice attached to farmed fish release eggs into the sea where they hatch into larval stages. These larval stages are then dispersed away from the farm by wind and currents with the larvae infesting any wild fish they encounter.
According to some accounts, larval sea lice can be dispersed up to 70km away from a farm.

On Thursday 28th of March, Fisheries Management Scotland held their annual conference. One of the speakers was Peter Pollard, Head of Ecology at SEPA who talked about the new SEPA sea lice risk framework. He told the delegates that:

"What the framework is focused on is the infective stage sea louse and what we're trying to do is manage concentration in the environment so they don't reach levels that will lead to harmful numbers of lice on the salmon as they leave the rivers and head off to the high seas."

However, the only concentrations of sea lice that SEPA manage are those in their sea lice dispersal model. They, nor any other researcher has shown that the larval sea lice exist in the sea in the concentrations predicted by the model.

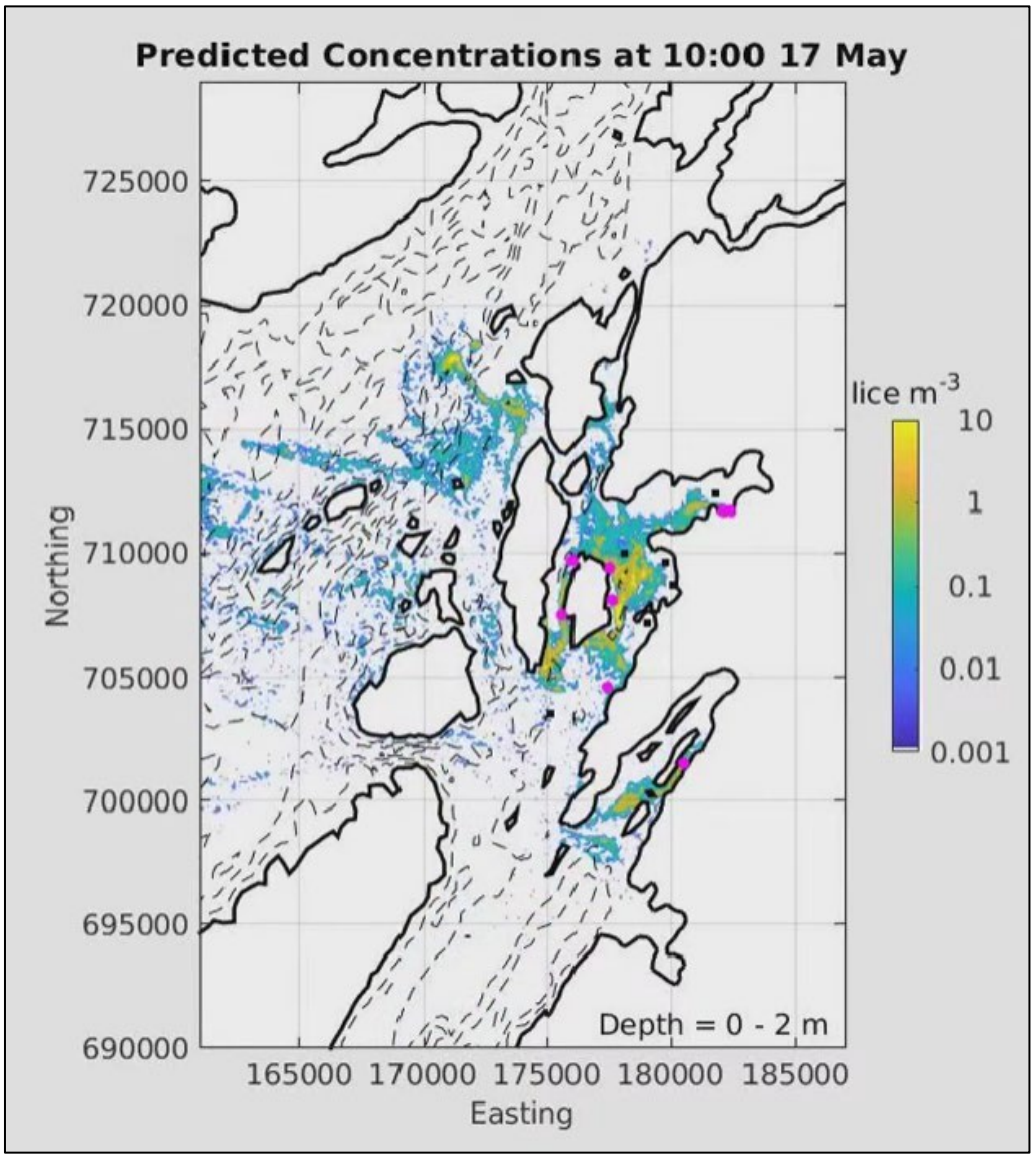
In the session of 26th of June 2024, Committee member Ariane Burgess said to John Goodlad, Chair of The Salmon Interactions Working Group that she had heard anecdotally that there are 'curtains' of sea lice in lochs where there are fish farms. Other narratives describe the lice as a 'cloud' or a 'soup'.

In March 2023, Wild Fish published a report in which they stated that a single farm can emit up to 2 billion larval sea lice into the sea every week. With about 200 farms operating in Scotland, this means that 400 billion larval sea lice are dispersed through Scottish seas each week amounting to 20,000 billion larval sea lice every year.

However, there is a fundamental problem with this narrative. With such numbers of larval sea lice in the sea, or even fewer if it is accepted that the wild fish sector could be prone to exaggeration, it should be relatively easy to locate and identify these curtains, clouds or soup of lice in the sea, especially as the models used by scientists can predict the location and the concentration of the lice at any time in the sea.

An example of one model can be viewed at
https://marine.gov.scot/information/salmon- parasite-interactions-linnhe-lorn-and-shuna-spills

The model runs over a period of time from April to October. A screenshot of the model is shown below. The yellow areas are where the highest concentration of larval sea lice is predicted.



One of the intentions of the Scottish Governments' SPILLS project (which is not included in the summary) was to identify these larval sea lice in the sea. The area around Shuna is home to ten farms so there could be up to 20 billion larval lice in the vicinity each week. During the summer of 2021, scientists from the Scottish Association for Marine Science (SAMS) sampled the area a total of 372 times but they only identified 20 larval sea lice. The SPILLS researchers suggest that just because they couldn't find any sea lice larvae does not mean that they are not there.

Such difficulty in locating larval sea lice in the sea is not new. In 1997, a Norwegian researcher from the Institute of Marine Research, and who is now a member of the Norwegian Sea Lice Steering Group, failed to find any larval sea lice around the vicinity of the Austevoll Aquaculture Research Station.

Another study from a paper published in 1996 from a group of Irish researchers also failed to identify any sea lice in the west coast sea fjord known as Killary Harbour. However, they then adopted a different tack to other researchers and began their

search for larval sea lice at the source i.e. the salmon farm. They then radiated away from the farm sampling at increasing distances away.

The following graph shows their findings.

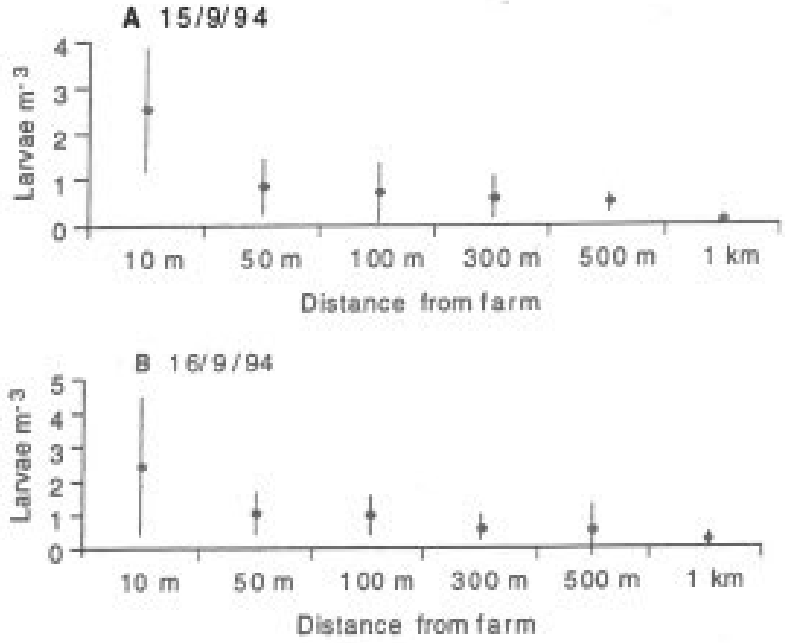


Figure 5. Mean densities, with standard deviations, of the combined *Lepeophtheirus salmonis* larvae densities recorded at set distances from a salmonid farm on (A) 15 and (B) 16 September 1994.

The number of larval sea lice identified in the water column decreased significantly as the distance from the farm increased. By one kilometre from the farm, the number of lice larvae was so diluted, that they became almost impossible to measure. The idea that sea lice larvae are so dense as to form clouds, curtains or a soup is not borne out by this evidence. A second paper from Canada in 2016 detailed similar findings.

Data from the Marine Directorate's Scottish Coastal Observatory also confirms very low levels of this type of larvae in the sea with similar very low levels being detected equally on both Scotland's east and west coasts. There are o salmon farms on the east coast.

Unfortunately, the Marine Directorate's 'Summary of Sea lice Science' does not include this
research because it does not fit in with the established narrative.

This research is critical to the new regulation launched by SEPA as their model assumes that large numbers of infective sea lice pass through the sea lochs and infest wild fish they encounter when the evidence shows that this is not what happens, except in close proximity to salmon farms. In common with the Marine Directorate, SEPA also refuse to discuss this fundamental weakness to their model. This is because they argue that they have been commissioned to introduce a sea lice regulatory framework by the Scottish Government and this they intend to do regardless of what the science and the evidence shows.

It has been suggested that researchers from SAMS have been attempting to identify sea lice again this summer but this time in Loch Linnhe, but no results are yet forthcoming.

Clearly, if the predicted larval sea lice are not present in the open sea or are so dilute that they cannot be identified, then they cannot represent a threat to wild salmon. Other science that is currently ignored supports this position and this evidence can be provided to the committee if so requested.