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Environment, Climate Change and Land Reform Committee

Environmental impacts of salmon farming

Written submission from Marine Conservation Society

The Marine Conservation Society (MCS) is the UK's leading marine charity. We work to ensure our seas are healthy, pollution free and protected. We welcome the opportunity to provide written evidence on the above report.

MCS has a dedicated Aquaculture Programme within our Fisheries and Aquaculture programme within which we work on many levels including: European policy via the Aquaculture Advisory Council; UK policy; Aquaculture Certification standards development and application; Aquaculture feeds as a founding member of the Marine Ingredients Organisation (IFFO) Responsible Sourcing standard; Aquaculture industry liaison including a unique hands-on, practical experience programme; and Seafood supply chain advice and consumer awareness. We feel that we are therefore able to provide well-informed evidence based on extensive experience.

Please do let us know if we can help clarify or elaborate on anything in this submission. We would welcome the opportunity to discuss our feedback in more detail.

Sincerely,

Dawn Purchase
Aquaculture Programme Manager
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WRITTEN EVIDENCE

Overall we found the report to be well researched and comprehensive, it covers nearly all of the issues that we would expect to find in a report of this remit.

MCS would like to focus our attention on a number of key aspects, this does not mean that other issues are not worthy of comment but reflects the limit of four pages for comments and our expertise. Broadly these comments are limited to:

- Knowledge gaps
- Adaptive Management
- Feed resources
- Cleaner fish



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KNOWLEDGE GAPS AND ADAPTIVE MANAGEMENT

Our overarching view on this report is that there still **remains huge knowledge gaps in many areas**, we seem to know little more than we did upon publication of the 2002 Review and Synthesis of the Environmental Impacts of Aquaculture.¹ For example we still do not know:

- Population level effects of sea lice on wild salmonids
- Risk of disease transfer between wild and farmed populations
- Impacts of sea lice treatments both long term and low level on benthic diversity and vulnerable species such as crustaceans
- Data to set suitable trigger levels for sea lice treatments
- Diffuse, far-field effects of chemicals on benthic and pelagic ecosystem components
- Monitoring of long term impacts on protected species
- The extent of genetic mixing between escaped farmed and wild salmonids
- The indirect effects of escaped farmed salmon
- The efficacy of ADD's.
- The impact of the wrasse fisheries on wild populations

Given the emphasis contained within this report on adaptive management being a mitigation tool to many of these impacts, this **continued lack of knowledge and data it is a cause of grave concern**. For adaptive management to be successful, data collection needs to be implemented and the results analysed, these results then need to be presented to decision makers and acted upon. Therefore it is **imperative that comprehensive monitoring and data collection needs to take place consistently, comprehensively and without bias**.

As well as adaptive management there remains an increasingly urgent need to fill those knowledge gaps highlighted above as well as others mentioned in the report. **The fact that we know little more now that we did 16 years ago despite industry growth is shocking, particularly as the industry has a growth target of 300,000 tonnes production**. That fact the Norwegian research budget for sea lice alone exceeds the total research budget for Scottish aquaculture is indicative of the level of work necessary to gain a thorough understanding of many of these complex issues to which the report refers. The report itself draws on much of the Norwegian research due to the lack of Scottish data but as the environments differ it is unsafe to base decisions on this proxy information.

Of particular concern is the rather light consideration of a range of PMFs and Scottish MPA designated features within the report. We simply do not know the impacts of salmon farms on most individual PMFs and MPA designated features, or the wider cumulative impact of multiple farms in sea loch systems containing many PMFs, underlining the importance of the precautionary principle when planning and licensing.

¹ The Scottish Association for Marine Science and Napier University.2002. REVIEW AND SYNTHESIS OF THE ENVIRONMENTAL IMPACTS OF AQUACULTURE.

. Scottish Executive Central Research Unit

FEED RESOURCES

With regard to Section 6 - Sustainability of feed supplies including substitution with plant derived ingredients, there are some errors within the report. Namely:

- Whilst Norway has a high level of non-marine feed ingredients in their diets and could be a net producer of marine protein I don't believe this is the case for Scottish salmon. The market for Scottish salmon is UK, France and USA predominantly. In the UK, it is the retailers that specify the LC - PUFA (Omega 3) content of their salmon products as many retailers market a "premium" range with a high Omega 3 content. In France the Label Rouge certification scheme dictates the amount of fishmeal and fish oil fed to the fish and these requirements have always been consistently higher than industry average and have excluded substitution. It is only the USA that does not have such stipulation, however, some producers with a large US customer base specifically market their fish with a high Omega 3 content derived from wild fish. These requirements are not conducive to plant-derived substitutions in feed formulation.
- **It is incorrect to refer to Scottish finfish aquaculture feed as "sustainable"** (section 6.2.2), this term can only also be used if the raw marine ingredients used to make feed are certified as sustainable by the Marine Stewardship Council². Nearly all of the marine ingredients being used in the diets of Scottish salmon are produced in IFFO RS certified feed mills, thus making them "responsibly produced" as opposed to sustainable – an important difference. I have included a comparison document with my response.
- The report suggests that 20-25% of marine protein and oil requirement are currently met by the use of trimmings, this figure is now around 35%.³

In addition.

- **An omission within the report in relation to feed and the Feed Conversion Ratio (FCR) is the use of cleaner fish.** As you will be aware, cleaner fish require a supplementary feed in addition to the lice that they pick off salmon. These feeds are now being specially formulated to fulfil their dietary needs. **If we are to accurately calculate the food fish dependency ratio, or the feed conversion ratio of farmed salmon we have to include all inputs into their production, this would then include the feed given to the cleaner fish, who are part of the production process and the weight of the cleaner fish themselves** as they have no value as a harvested product nor are they utilised as a protein source post-harvest. They are in effect "inputs" into the production of farmed salmon and should therefore be included in FCR calculations until such a time as they have a secondary purpose.
- **The report refers to alternative feed ingredients yet fails to incorporate both insect meal and processed animal proteins as an option.** There is a growing interest in the use of insect meal⁴ as a viable alternative feed ingredient, which much potential to contribute significant volumes. The barriers to its inclusion in the UK are volumes of scale of production and reticence at a retailer level to include it due to perceived consumer adverse reactions. Processed Animal Proteins (PAPs) also offer an alternative ingredient source and are used elsewhere in Europe, also in Chile and Canada. Porcine blood meal was used in Scottish

² <https://www.msc.org/>

³ Food and Agriculture Organization of the United Nations. Rome 2016. The State of World Fisheries and Aquaculture. Available online: <http://www.fao.org/3/a-i5555e.pdf>. Accessed 01/02/2018

⁴ [Fernando G. Barroso^a Carolinade Haro^a María-José Sánchez-Muros^a Elena Venegas^b Anabel Martínez-Sánchez^c Celeste Pérez-Bañón. 2014. The potential of various insect species for use as food for fish. *Aquaculture Volumes 422–423*, 20 February 2014, Pages 193–201](#)



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aquaculture prior to the Bovine spongiform encephalopathy (BSE) outbreak and was considered a valuable feed ingredient due to its high histidine levels. Recent European regulation changes⁵ allow the use of non-ruminant PAP's in aquafeed and have classed them safe to use, once again the barrier for uptake is at a retailer level.

- **The report mentions the potential use of mesopelagic fisheries as a feed resource, MCS has grave concerns regarding this option in relation to biodiversity and food web impacts as well as the reduction in oceans ability to sequester carbon.**⁶ Understanding of mesopelagic species and their role in the ecosystem is in its infancy, to consider the exploitation of this resource without a thorough knowledge and appropriate management measures in place to ensure true ecological sustainability would be irresponsible at best.

CLEANER FISH

The report highlights the increasing use of cleaner fish as a non-chemical method of sea lice control. Whilst we would advocate non-chemical methods we feel the use of cleaner fish is cause for concern, in particular:

- **In 2020 an estimated 50 million cleaner fish will be required for salmon production, 10 million of these in Scotland.**⁷ This is a cause of concern in relation to the exploitation of a wild caught species for which there are **no management measures in place** to ensure their sustainable exploitation; the ability for cleaner fish to transmit diseases to farmed salmon and, as mentioned, the amount of feed required to support these fish which, post-harvest are incinerated leading to a significant protein loss.

MCS have developed a cleaner fish briefing paper that is included with our response that provides greater detail.

⁵ EFPR A .The facts about aquafeed. Available online: <http://efpra.eu/wp-content/uploads/2016/11/The-facts-about-aquafeed.pdf> Accessed: 01/02/2018

⁶ [M.A. St. John, A. Borja, G. Chust, M. Heath, I. Grigorov, P. Mariani, A. P. Martin and R. S. Santos](#). 2016. A Dark Hole in Our Understanding of Marine Ecosystems and Their Services: Perspectives from the Mesopelagic Community. *Frontiers in Marine Science*. March 2016. Volume 3. Article 31

⁷ Powell, A; Tresurer, J; Pooley, C; Keay, A; Lloyd, R; Imsland, A & Garcia de Leaniz, C. 2017. Use of lumpfish for sea lice control in salmon farming: challenges and opportunities. *Reviews in Aquaculture*. (2017) 0, 1-20