

Environment, Climate Change and Land Reform Committee

Environmental impacts of salmon farming

Written submission from the Sustainable Inshore Fisheries Trust

Introduction

The Sustainable Inshore Fisheries Trust commends the Committee on the commissioning of SAMS 'Review of the Environmental Impacts of Salmon Farming in Scotland' report ('the SAMS report'), which provides a valuable summary of the impacts salmon farming has on the environment, from the local to the global. SIFT's primary interest in this issue relates to its overall purpose, which is to help support the development of economically robust and diverse inshore wild capture fisheries. That economic success must, of course, be built on a flourishing inshore marine ecosystem that can support a wide range of target species at a level where significant landings can be sustainably made.

The SAMS report, in our view, shows two consistent themes which are worth highlighting before setting out the recommendations we wish to make to ECCLR to be considered for their report to REC. The first is the **limited data available** across a wide range of issues the authors considered. The second problem is the **weaknesses of the current planning and regulatory regime** for salmon farming.

1. Data availability

Across almost every aspect of the SAMS report, the authors found gaps in data, varying from Norwegian-only data sets which may have reduced relevance to the Scottish environment, old information, and in many cases, no data at all. SIFT agrees with this finding and calls for a significant increase in relevant scientific research. In particular we note:

1.1. The Precautionary Principle is being ignored

We share the Convener's concerns, raised in the 30th January session, where he asked the panel: "*Given the lack of information and available science that we have discussed today and which is touched upon in your report, I am struggling to see where the precautionary principle has been applied in allowing this sector to expand in the way that it has. Is that harsh?*" SIFT believes the precautionary principle has not been sufficiently applied with regard to the environmental impact of salmon farms.

1.2. Science needs to be coordinated and prioritised

As John Scott MSP observed, the correct science is vital, and study of the spread and effect of emamectin in relation to the nature of the sediment "*would be an area hugely worthy of further investigation to enable guidelines to be provided on suitable locations for future fish farms in respect of the composition of the sea bed and its sludges, rather than just species.*". This observation addresses the wider point that scientific research into the environmental impacts of salmon farming needs to be coordinated and prioritised.

1.3. Scientific research funded by the salmon farming industry is insufficient

Professor Verspoor, in the same session, noted that Norwegian industry "spend on sea lice research alone is larger than the entire budget for all research on farm-wild interactions here". SIFT agrees with this analysis and believes that funding for research on environmental impacts by the salmon farming industry is inadequate.

1.4. Impact on non-target organisms is poorly understood

The report states [page x] that "*Because these chemicals [emamectin and bath treatments] are designed as biocides, their persistence in the environment can create pressures on populations of non-target organisms. There is a lack of knowledge about diffuse, far-field effects of these chemicals on benthic and pelagic ecosystem components, and this renders uncertain the amount of precaution needed in setting EQS [Environmental Quality Standards].*" SIFT agrees with these concerns and notes that the "non-target organisms" referred to include target species for commercial fisheries, as well as other non-commercial species, which may subsequently be part of the human food chain. In view of these concerns, and noting concerns surrounding the objectivity of some research into the effects of Emamectin, SIFT believes that there is a strong case both for the phasing out of the use of Emamectin and for a review of the setting of EQS.

1.5. Wild capture of cleaner fish is not based on sound science

SIFT is concerned about the growing use of wrasse as a cleaner fish in salmon farms. As the SAMS report notes, "*Wrasse naturally predate invertebrates, such as urchins, which are grazers on seaweeds (Figueiredo et al., 2005). Removal of wrasse might lead to a proliferation of grazers with subsequent negative impacts on the macroalgae*" [Para 7.2.5] SIFT's view is that the impact of an increase of such grazers is a potentially significant environmental issue, as kelp beds ('macroalgae') can be an important nursery environment for whitefish. Accordingly there are potential economic implications for the fishing industry arising from this environmental risk. Robust and up-to-date science on the ecosystem impacts of the wild-capture wrasse fishery should be a research priority.

Furthermore, as noted in *Riley, A., Jeffery, K., Cochrane-Dyett, T., White, P. and Ellis, J. (2017) Northern European Wrasse – Summary of commercial use, fisheries and implications for management. Cefas Report to Defra*, the wrasse wild capture fishery lacks a range of fundamental data:

- There are no stock assessments for any species of wrasse in British waters, with biological data limited, and the quantities of wrasse being taken (as well as the species composition, size composition and sex ratio) largely unrecorded.
- The scale of the fisheries is uncertain.
- Where there is landings data it is believed to be subject to under-reporting (see Table below):

Year	4.a	4.b	4.c	6.a	6.b	7.a	7.d	7.e	7.f	7.g	7.h	8.b	7.j	Total
2000		60	18			18	4901	16192	1303	9	4	9		22514
2001		264	5		206	23	7728	14679	2657	2	2			25566
2002			62	102		2	6868	12558	1477	9	67			21145
2003		1000	47			8	5549	9653	137	24	3			16421
2004			13				5559	9525	640	8	4			15749
2005		12	7	0		39	5492	4198	323	84				10155
2006		89	1			18	3608	9885	562	1	2		0	14166
2007		16	115			11	4954	11679	1960	0	18			18753
2008		20	55			5	4771	7491	1299	44	0			13685
2009		30	27			72	5978	10904	1095	51	0			18157
2010	2	114	96			29	3357	9661	1316	5	2			14582
2011		243	60			34	1859	9029	720	12	9			11966
2012	32	24	5			89	3498	13291	1230	135				18304
2013	160	54	54			9	3365	12530	1178	100	0			17450
2014		25	7	51111		13	2719	11557	3471	102	2		2	69009
2015	737	37	14	30288		16	2649	6514	2202	127	16			42600
2016	116	29	6	56508		91	3377	6032	2504	88	60			68811
Total	1047	2017	592	138009	206	477	76232	175378	24074	801	189	9	2	419033

Wrasse landings (kg) by ICES Division 2000–November 2016 (Source: MMO). The rapid increase in landings in 6.a suggests that landings have not been reported consistently over time, and so these values may be underestimates. [NB Division 6a is west coast of Scotland.] Source: Riley et al, 2017

2. Shortcomings in the planning and regulatory regime

The report establishes the significant limitations to the current planning and regulatory regime. In particular, SIFT believes that:

2.1. Better modelling is needed

The SAMS report notes [p. viii] that "*Better modelling when selecting sites, and Adaptive Management of site use, could help to prevent the Assimilative Capacity (AC) of the seabed of a loch or voe for organic waste from being exceeded within the footprint of the farm*". More effective modelling must be developed, and mandated, as part of the granting of planning permission for salmon farms. Without such improved modelling, the interests of salmon farmers are prioritised over the economic interests of other stakeholders – including the environment. Given that the Report [Section 3, p22] notes that "*Scotland's target of producing 200,000 tonnes salmon in 2020 will likely emit organic waste equivalent to that of about half of Scotland's human population of 5.3 million.*", this is not a trivial issue.

2.2. Better enforcement is needed

Even where regulation exists, there is evidence it is not being effectively applied. As the report states [para 3.3.5], "*In principle, existing regulatory procedures, including accurate assessment of sites before operating licences are issued, should avoid the farm-scale effects described here for UKBAP habitats. However, this has not always been the case, as the maerl example shows.*" The concern about maerl provides a

striking illustration that even the most highly protected marine features are ill-served by the current aquaculture regulatory regime - a concern which is applicable to many of the other impacts detailed in the SAMS report (many of which also have economic implications).

2.3. Monitoring regime is unsatisfactory

SIFT believes that the monitoring regime is unsatisfactory both in terms of sensitivity and other monitoring parameters, such as frequency and duration of sampling. The SAMS report [para 4.12] states that *"Monitoring is a key part of regulatory procedures. It could be improved in two ways: first by increasing the sensitivity of measurement of chemicals, and second by harmonising chemical sampling with sampling of the seabed community. A long-term research study of benthic and pelagic community change in relation to chemical use in a typical sea-loch would be useful for the better understanding of subtle and long-term effects on marine ecosystems."*

2.4. Greater use of spatial management is needed to ensure that the environment is protected

SIFT endorses the observation in the SAMS report [para 3.4.2] that there is a role to play for spatial planning and management. *"These suggested mitigation techniques are not widely adopted in Scotland. Therefore, it is likely that the main method for mitigating the environmental effects of salmon waste and nutrients during the next decade lies in spatial planning and management"*. Adopting spatial planning and management, underpinned by science, especially benthic science, would provide a far more robust basis to ensure non-damaging interactions between economic actors and the environment (and also between non-damaging interactions between different economic actors).

2.5. Offshore environmental impacts need to be established

The report also raises a specific need for planning in offshore environments, albeit ones that may still be technically within Scotland's inshore waters [para 3.4.2]: *"The application of marine spatial planning may be of great benefit as salmon farming moves offshore, into more dispersive environments, and links up with other 'blue' industries."* Again, SIFT endorses this observation. Regional science-led spatial management must be adopted in Scotland for environmental protection as well as fisheries management purposes both in the close inshore and other sea areas, both for aquaculture and wild fisheries, as it is in all the most modern and well-managed fisheries around the world.

2.6. The wrasse fishery is being undertaken without adequate fisheries management

As a directly affected inshore wild fishery, SIFT is particularly concerned about the current under-regulated wild capture of wrasse. We quote a question and answer in full (emphasis ours), this is an area where we strongly recommend wider consultation beyond the aquaculture industry before the adoption of regulation and management measures, not voluntary codes of practice.

Angus MacDonald: *During the course of the Aquaculture and Fisheries (Scotland) Bill, the Rural Affairs, Climate Change and Environment Committee went on a fact-finding visit to Lochaber. At that time, Marine Harvest was already using wrasse to control sea lice infestations. I am not sure when that policy was introduced, but there now seems to be more widespread use of wrasse. According to the report, official statistics show that 1.7 million lumpsuckers and 1 million wrasse were bought by the Scottish farming industry in 2016. Overall, does the evidence show that the commercial rearing of wrasse and lumpsuckers is a sustainable approach to controlling lice the Scottish salmon industry? Do you have any concerns about future increased demand for cleaner fish, particularly given that salmon production is set to increase significantly in Scotland and in Norway? Presumably, there are only so many wrasse available to be bought, so demand will be pretty excessive.*

Professor Tett: *The information that we have is that the cultivation of lumpsuckers seems to be capable of satisfying the demand. The situation with wrasse is not so clear cut. Information from the industry suggests that by 2019 it would like to be able to cultivate all the wrasse that it uses, but it is not clear whether that is an achievable target. If it is not achievable, clearly the demand for wild wrasse will continue. In that case, there will be a need for fisheries management of the wrasse fishery, following the example that has begun to be developed in south-west England, where a local fisheries management board has successfully managed the wrasse fishery in such a way that it provides a sustainable source of employment for people in that part of the country. Many of those wrasse exports come to Scotland.*

More specifically, SIFT believes that the wild capture and use of wrasse must be strictly regulated, and effective management measures relating to the wild capture of wrasse in Scottish waters must be introduced. As noted in Riley et al, 2017 (ante) precautionary management measures could include quota management applied over zoned areas of coastline, spatial management aligned with marine protected areas, seasonal restrictions to minimise impacts in the spawning season and size restrictions to balance market demands with the need to ensure an appropriate size range and sex ratio of fish in the wild.

3. Concluding remarks

In light of the existing problems in the salmon industry, illustrated in such detail by the SAMS report, SIFT recommends adopting the following broad policy approaches:

- 3.1. Salmon farming in Scotland currently externalises many of its environmental costs. This is unacceptable. The industry should abide by the Polluter Pays Principle and take responsibility for the costs that it imposes on the environment and society.

- 3.2. Many of the salmon farming industry's environmental impacts could be mitigated by engineering solutions. We recommend that this Committee should propose a timescale for a full transition to Recirculating Aquaculture Systems and Closed Containment.
- 3.3. Given the absence of sound science and the inadequacies of the regulatory regime it is SIFT's view that until RAS and CC are adopted, the consenting of additional new marine salmon farms should not be permitted. Even with improved data and more robust regulation and planning, it is possible that the proposed doubling of the sector will prove unsustainable, both economically and environmentally.
- 3.4. SIFT recognises that ECCLR's remit is on the environmental impacts of salmon farming, and REC will focus on the economic issue. However, there is a risk in considering these issues in isolation. SIFT urges that the ecosystem approach which is already recognized in Scottish environmental legislation and the marine planning framework, is taken into account in the management of the salmon farming industry.