

Environment, Climate Change and Land Reform Committee

Environmental impacts of salmon farming

Written submission from Anton Edwards

I am a retired oceanographer, now self-employed as a marine environmental consultant. I have been a research scientist and a regulatory scientist and act as a scientific advisor to the main Scottish aquacultural research funders. I have read the whole SAMS report but have particularly considered the sections where I feel most competent (1, 2, 3, 4 & 8).

My overall impression is of a well-balanced and well-reasoned review of many of the environmental interactions of aquaculture and the consequent pressures that bear on the industry. The glossary is well-founded and helpful. The sections knit well together, with very little overlap or duplication. There are very few typos and I feel the editing was both strong and unifying of the various contributors.

The review makes a very good list of issues and assembles much of their scientific context. The context is defined by a wide-ranging reference list, theory, measurements, numerical models and critical perspectives and gives confidence that the authors are competent and up-to-date in their various fields of expertise.

I detect very little bias against or for the industry, although here and there a section author is a little uncritical of received viewpoints about possible rather than demonstrated environmental effects. However, even where there seems plausible or superficial reason to expect environmental effect, the review often concludes dispassionately and with evidence that there is “no effect” or “not proven effect”.

The prominence given to various environmental effects is interesting, with each author understandably making the case for the significance of their own field of expertise. This leads in places to a slight over-emphasis, as in the case of net anti-foulants, where a purely historical account of tributyl tin (TBT) is complemented by a focus on copper, which turns out to be of low contemporary significance. Similarly, some of the sections on eco-modelling reflect more the useful development of national capacity in the field of numerical modelling rather than making firm accounts of the environmental effects themselves.

I feel that the account of regulatory matters is weak. With no regulatory scientists among the authors this seems almost inevitable, but I find it to be a gap in such a wide-ranging report. The mentions of regulatory mechanisms are cursory, in most cases merely indicating rather uncritically the existence of procedures rather than setting out either their scientific basis or their working detail in anything like the quality shown elsewhere in the review. In some cases, I think even the regulators would find it difficult to describe these matters in a convincing or entirely justified way. For example, the review implies this in its accounts of the setting of Environmental Quality Standards (EQS), or in its accounts of the effects of organic waste and medicines on seabed (benthic) condition.

This lack of clarity about the regulatory process is perhaps the greatest weakness of a report destined for parliament. The environment cannot be protected without

informed and evidence-based regulation. I do not presume to see into the mind of the parliamentary committee, but I imagine one of its purposes is to help the industry while helping the environment. If so, it seems neither equitable nor complete to place present and future environmental interactions of the industry under the microscope of review without doing the same for present and future regulatory mechanisms.

In many places in the review, it is demonstrated that more work on environmental effects is genuinely needed before firm conclusions could ever be drawn about cause and effect. If evidence-based regulation is to succeed I believe that regulatory monitoring itself should offer the prospect of feeding-back into and modifying the regulatory process. In this respect, I particularly emphasise a view expressed in the concluding section 8: "... it appears that monitoring data are not designed to feed into a learning process at farm or industry level, or to help distinguish whether changes in Scotland's marine ecosystems result from salmon farming or are due to other causes."

This view is reinforced by the several places in the review where the authors point convincingly (rather than with the ritual "more work is needed" response of fund-seeking researchers) to the need for more research, targeted on the better determination of causes and effects, and performed preferably in an interactive collaboration of industry, regulator and scientist; none of these three communities can function effectively alone.

In passing, I commend to the committee the relevant history of efforts in this collaborative direction by Scottish Aquaculture Innovation Centre (SAIC), Scottish Aquaculture Research Forum (SARF) and Aquaculture Research Collaborative Hub – UK (ARCH-UK). These are additional to the many other initiatives of industry, academia, or regulators acting alone or in expedient partnerships.