Environment, Climate Change and Land Reform Committee

Environmental impacts of salmon farming

Written submission from Migdale Smolt Ltd

We cannot help but wonder why the review has not included a thorough analysis of hydro schemes, predator abundance, global warming, industrial pollution, agriculture and forestry run-off and over fishing at sea instead of concentrating on what appears to be an obsessive and illogical focus on fish farming clearly driven by a minority sector. Any review should be unbiased, democratic and thoroughly examine ALL possible impacts on the marine environment. The report should therefore have been entitled 'Review of All Stakeholders and their Impacts on the Environment.'

From SNH 'Ecological Impacts of Hydro Schemes on Scottish Fresh Waters'
http://www.snh.org.uk/publications/on-line/advisorynotes/37/37.html

> 3.2.8 Fish alterations to invertebrate and macrophyte communities, caused by hydropower schemes, can lead to reduced shading and food availability for fish
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> 3.2.9 Dams clearly present a formidable physical barrier to the movement of migratory fish, such as salmon, sea trout, eels, and lampreys, both upstream and downstream. The Atlantic salmon has an ability to leap about 3.3 metres which is not nearly enough to surmount most major hydro dams in Scotland. Fish passes for such dams are therefore essential Proudfootfor fish to reach their spawning grounds and nursery areas.
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> 3.2.10 Migrating fish can become trapped or delayed in pools when a power station stops operating and may be killed in summer by overheating or become more susceptible to predation by, e.g. pike, goosanders, and mink. Small-scale schemes also present restrictions to the movement of fish where there are longer periods of low flow, or where small weirs and intake pipes block upstream migration.
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> 3.2.11 When a power station is in operation strong currents occur which can draw downstream migrating fish into the turbine intakes, rather than safely passing through turbine outlets and fish passes Approximately 10-40% of salmon smolts may be killed or injured after passing through turbines, depending on the type and size of turbine blades, and difference between upstream and downstream water level Smolt screens are used to prevent migratory fish entering the turbines. However, smolt mortalities may occasionally occur if fish are trapped against the screens by the force of water being drawn off at the intake.
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> 3.2.12 Salmon and sea trout require clean, fast-flowing water through clean gravel or small stones to spawn successfully. Reservoirs in upstream areas may have inundated spawning areas and created silted, static conditions. It is therefore essential that below a dam compensation flows are adequate to maintain spawning reaches.

3.2.13 Reservoirs can provide an opportunity for brown trout fisheries to expand and become more available for exploitation. On the other hand, coarse fish such as perch or pike may colonize these new and then prey on or compete with trout and salmon.

From SNH 'Seals'

There are 33 species of seal world-wide, two of which live around Britain. Scotland is an important breeding area for grey seals. The grey seal population is estimated to be increasing by seven per cent a year. Neither grey seals nor common seals are an endangered species. http://www.snh.org.uk/publications/on-line/naturallyscottish/seals/sealsinscotland.asp

According to SNH there were 99,400 grey seals in 1994 increasing by 7% per annum = 504,000 by 2018. (compound interest). Non compound interest results in 266,000 this year. Same figures produce 134,000 and 172,000 for Common or Harbour seals (compound and non compound interest).

However St Andrews produced a lengthy study which shows for 2016 Greys total UK population is 140,000 and 40k for Commons:
http://www.smru.st-andrews.ac.uk/files/2017/04/SCOS-2016.pdf

These are incredibly diverse estimates.

Global Warming:

NASA Evidence: https://climate.nasa.gov/evidence/

"Scientific evidence for warming of the climate system is unequivocal."

"Ninety-seven percent of climate scientists agree that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position." - Intergovernmental Panel on Climate Change

From The New Scientist : : https://www.newscientist.com/article/dn22042-climate-change-drives-salmon-evolution/

and Species Survival Commission:
https://cmsdata.iucn.org/downloads/fact_sheet_red_list_salmon.pdf

From The Spey Fishery Board (pollutino)
https://www.speyfisheryboard.com/salmon-information/
"The migratory habits of salmon and its reliance on a range of different habitats mean that salmon are exposed to a range of threats. Within the river the main threats to adult salmon are exploitation by anglers, predation, disease, barriers to upstream migration and pollution. Barriers to upstream migration can be physical structures, e.g. a weir or dam, culvert etc., but low flows can also limit or prevent fish

migration. Low flows occur naturally but a more insidious threat is abstraction which can permanently reduce flows making parts of the catchment unsuitable for salmon. During the incubation period in the gravel eggs are reliant on there being an adequate flow of water through the gravel to bring oxygen and to remove waste products. Excessive siltation can block the voids in the gravel matrix suffocating eggs or entombing the alevins

Phosphorous run off from Forestry and Agriculture:
https://www.forestry.gov.uk/pdf/FCRN016.pdf/$FILE/FCRN016.pdf

"The other significant issue concerning forest harvesting is the long-term risk of consecutive harvesting cycles contributing to soil and water acidification by the accumulated removal of base cations in harvested produce. Much depends on the overall balance between base cation inputs from the atmosphere and soil weathering, and losses in biomass and soil leaching. Losses in biomass generally represent a small contribution to the effect compared to the other mechanisms, making it difficult to determine the long-term outcome when set against the errors involved (Helliwell et al., 2011). Modelling suggests that it could take many rotations/several centuries for such an effect to become significant on most soils (Helliwell et al., 2011), with little evidence of observable impacts on soil base cations after the first forest rotation (Neal and Reynolds, 1998). The greatest risks are associated with very base-poor soils such as peats and the much higher base cation losses resulting from the removal of needles/leaves, branches and tree-tops in whole-tree harvesting or by harvesting tree stumps. For this reason, the UKFS Guidelines on Forests and water stipulate against these practices on high-risk soils (Forestry Commission, 2011a,b)."

In other words, felling trees on peatland is a bad idea which results in excess phosphorous released into watercourses. See the study from Coford Connects:
http://www.coford.ie/media/coford/content/publications/projectreports/cofordconnects/ENV13-LR.PDF Summarised here:

The phosphorous study done in Ireland by Coford Connects on harvesting of the blanket peat forest showed that "TRP (Total Reactive Phosphorous concentrations) could last for more than 4 years and Phosphorous concentrations increased from 6 micro grams per litre during tree felling to a peak one year later of 429 micro grams per litre." - which equates to an increase of 7,150%!"

Other factors affecting the environment and wild fish are;

- Drift netting at sea for salmon;
- Salmon feed on sand eels;
- Burgeoning mackerel stocks also feed on sand eels thereby consuming the eels before the salmon can get to them;
- Sand eels are being over fished by industrial trawlers for fertiliser; and

- Many years of unrecorded trout stocking worldwide has introduced voracious feeders into salmon systems which consume ova, fry, parr and smolts.

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