

## **RURAL ECONOMY AND CONNECTIVITY COMMITTEE**

### **SALMON FARMING IN SCOTLAND**

#### **SUBMISSION FROM COMPASSION IN WORLD FARMING**

##### **1. Do you have any general views on the current state of the farmed salmon industry in Scotland?**

The Scottish salmon industry has expanded beyond all sensible limits. There are well known negative impacts on wild salmon populations, biodiversity and the environment. However one very important issue typically given less attention, and the main area we focus on in this consultation submission, is fish welfare. Salmon farming causes several considerable fish welfare problems. Rearing salmon in cages restricts their natural swimming behaviour, preventing them from migrating the great distances that are normal for wild salmon. They are also kept at high stocking densities in relatively barren environments. Many farmed salmon suffer from fin damage, skin and scale damage, vertebral deformities, deafness, eye cataracts and heart problems.

Sea lice infestations are a key issue for the industry and cause huge financial losses, but they are also a major welfare problem for both the farmed fish and local fish populations. If untreated, sea lice infestation can lead to fish suffering greatly and dying. The methods traditionally used to prevent lice infestations cause damage to other marine organisms and the environment, and are also losing their effectiveness. However newer methods used to mitigate environmental damage cause major welfare problems to the salmon and, in some cases, high mortalities.

Salmon farm escapes are another serious issue affecting wild salmon populations. Scottish Government data show that 16,005 fish escaped from seawater Atlantic salmon sites in 2015.<sup>i</sup> This undermines wild populations as the escaped fish can transfer diseases and parasites to the wild fish and can breed with them, leading to dilution of genetic integrity and impaired survival. Breeding of sterile (triploid) salmon is not a solution. There is a large body of evidence that triploidy causes severe health and welfare problems in Atlantic salmon, including: increased incidence of cataracts, blindness, lethargy, inability to feed, skeletal deformities, higher proportion of short opercula (gill covers) and absence of primary gill filaments, reduced gill surface area (decreasing ability to respire under strenuous exercise or poor environmental conditions), and reduced disease resistance.

##### **2. There have been several recent reports which suggest how the farmed salmon industry might be developed. Do you have any views on action that might be taken to help the sector grow in the future?**

The sector should not be encouraged to grow. The sea lice problem alone shows that it is operating beyond its limits. Recirculating aquaculture systems (RAS) have been suggested as a solution. However, we are concerned about the welfare implications of these systems. In order to run economically, RAS are likely to involve high stocking densities, well above those permitted by welfare schemes such as RSPCA Assured. This risks higher levels of stress, aggression, and injuries, e.g. fin damage. Increasingly, consumers are demanding less intensive and more free-range methods of production for terrestrial farm animals; it is unlikely that consumers would

accept the further intensification of salmon farming as they become more aware of aquaculture issues.

Therefore within current confines of how these systems operate we do not see them as a solution. Further research into the ethological needs of salmon, and how these can be accommodated in aquaculture, is also needed before there is any further expansion of the industry.

### **3. The farmed salmon industry is currently managing a range of fish health and environmental challenges. Do you have any views on how these might be addressed?**

Currently, the only humane way of controlling sea lice is fallowing a site for a period sufficient to break the louse's life-cycle after a group of salmon is sent to slaughter. This is much more effective if all the farms in the same area are fallowed at the same time. Reducing the numbers of salmon kept on a site can also reduce the opportunity for sea lice to flourish. The same may also apply to the prevalence of diseases such as Amoebic Gill Disease (AGD). However, the main methods being used to tackle the lice problem are chemical and mechanical treatments, and there are many serious welfare issues associated with these.

Use of Thermolicers has raised great concern. There are many reports, from both Scotland and Norway, of high levels of fish mortality following Thermolicer treatments. For example, according to Freedom of Information requests, 95,400 fish died over two weeks ending 08/08/16 following Thermolicer treatment at a farm in Loch Greshornish (Isle of Skye)<sup>ii</sup>. In Norway, this treatment has likewise caused major fish mortalities<sup>iii, iv</sup>. Despite these incidents, Thermolicer treatments have not been subjected to a full welfare assessment. The process is highly stressful for the salmon and involves crowding, removal from water, and exposure to much warmer water (up to 34 °C which is not in the salmon's natural range) for 30 seconds which is most likely painful to the fish. Salmon do not experience sudden temperature changes like this in the wild and it is physically challenging – if not life-threatening. During this treatment, salmon also suffer injuries such as gill haemorrhage, degeneration of nasal epithelium, vacuolation of thymic tissue, skin, fin and scale damage, brain haemorrhage, lack of oxygen due to crowding and reduced oxygen content of warmer water. Build-up of ammonia can also be an issue. There are also questions over its effectiveness. This is demonstrated by a Norwegian study which found many of the farms using the Thermolicer were back to pre-treatment levels of lice just 3 weeks later<sup>v</sup>.

There are a range of other treatments which involve the stressful and potentially damaging process of transferring the fish to a vessel and back, i.e. the Hydrolicer, The "Skamik" delouser, freshwater immersion (for several hours), and chemical delousers. The first three are considered environmentally friendly but, along with crowding and pumping, cause substantial stress, pain and injury to the fish. Scottish Environment Protection Agency (SEPA) data show that the use of hydrogen peroxide as a lice treatment in Scottish fish farms has increased enormously in recent years, with 19.6 million litres being used in 2015.<sup>vi</sup> Hydrogen peroxide is an irritant for fish; the harmful effects caused by hydrogen peroxide delousing treatments include damage to the delicate gill tissue and associated mucosal layers. Moreover, research reveals that the fish need at least two weeks to recover; during

this time, they may be more susceptible to pathogens as their primary immune defence (the mucosa) is compromised.<sup>vii</sup>

The use of medicines and therapeutics also raises concerns about long-term accumulation of certain compounds (or their breakdown products) and the impacts on non-target crustacean species present on the seafloor near fish farms. There is also strong evidence that lice are becoming less susceptible to chemical treatments. The effects of these treatments also seem to be temporary, since the fish lice rapidly multiply again from the survivors. The numbers of lice are a product of the unsustainability of a system which keeps unnaturally large numbers of fish in a confined space - the perfect conditions for these parasites to multiply.

The use of 'cleaner fish' (i.e. wrasse or lumpsuckers) to eat the lice off the salmon brings with it a new set of welfare issues. This includes welfare during capture from the wild (which also raises questions of sustainability), predation by the salmon (especially during feed withdrawal), transfer of bacterial infection and parasites, behavioural and ecological needs not being met (e.g. requirement for shelter as protection from currents in the water), a lack of supplementary feed when lice numbers are not sufficient, and stressful handling when moving salmon and cleaning cages and nets.

Worryingly, most 'cleaner fish' fisheries are unregulated and therefore their welfare is not protected and measured against basic standards. As stated by the Farm Animal Welfare Committee (2014), the welfare of cleaner fish is no less important an issue than the welfare of the fish being farmed for food. It is essential that future guidelines and standards for the welfare of cleaner fishes should be integrated into those of farmed fish species, and to include behavioural and cognitive components as well as physical body condition scores. The recognition of the species-specific needs of different cleaner fish is also fundamental to safeguarding their welfare.

The full impact of (largely unregulated) wrasse fisheries on wild populations in the coastal waters of Scotland and the SW of England is unknown, but is likely to be considerable. However, lumpfish are now on the IUCN Red List of threatened species as near threatened (NT) (<http://www.iucnredlist.org/details/18237406/1>).

Despite major efforts by industry to develop lice control methods there has been no effective solution and salmon mortalities are astonishingly high. This is a complex problem, currently with no clear answer. Any expansion of the industry before this issue can be fully addressed would be nonsensical.

#### **4. Do you feel that the current national collection of data on salmon operations and fish health and related matters is adequate?**

No. We would like to see the following reported and publically available (only some of these are collected):

- Mortality figures at each stage of life and their causes
- Treatments used and the mortalities caused by treatments, specifying any over 0.5%
- Fish lice numbers
- Prevalence of specific diseases including AGD
- Numbers of predators shot

- Numbers of animals caught in netting
- Data on welfare outcome measures such as fin erosion, cataracts, etc.

**5. Do you have any views on whether the regulatory regime which applies to the farmed salmon industry is sufficiently robust?**

Species-specific statutory guidelines are needed to regulate the rearing, transport and slaughter of farmed fish. These should include limits on stocking densities, requirements for providing suitable substrate and shelter and for meeting any other ethological needs of the fish. Regulations should include a requirement for new treatments (e.g. for removal of sea lice) to be approved in advance after being assessed for their impact on fish welfare and the environment. A thorough welfare analysis should include assessment of mortality, physical trauma (such as damage to eyes, skin, snouts or fins) any other health effects, and behavioural responses (during and subsequent to treatment).

**6. Do you have any comments on how the UK's departure from the European Union might impact on the farmed salmon sector?**

It is vital that we do not relax any environmental or welfare requirements after leaving the EU, and indeed that we take the opportunity to strengthen them.

Compassion in World Farming  
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<sup>i</sup> Scottish Government Data. 2015. Scotland's Aquaculture: Fish Escapes. [http://aquaculture.scotland.gov.uk/data/fish\\_escapes.aspx](http://aquaculture.scotland.gov.uk/data/fish_escapes.aspx).

<sup>ii</sup> FOI report quoting email from Manager, Greshornish, Marine Harvest Scotland 12th September 2016.

<sup>iii</sup> Atle Andersson et al. 2016. 400.000 oppdrettsfisk døde. <http://www.bt.no/nyheter/okonomi/400000-oppdrettsfisk-dode-308277b.html>

<sup>iv</sup> Intrafish. De-lousing kills 32700 fish at marine harvest operation. <http://www.intrafish.com/news/751778/de-lousing-kills-32700-fish-at-marine-harvest-operation>

<sup>v</sup> Grøntvedt R.N et al. 2015. Thermal de-licing of salmonid fish - documentation of fish welfare and effect <http://bit.ly/2lyEHaS>

<sup>vi</sup> The Global Alliance Against Industrial Aquaculture. 2017. Sky-Rocketing Chemical Use on Scottish Salmon Farms. <http://donstaniford.typepad.com/files/pr-hydrogen-peroxide-skyrocketing-use-feb-2017.pdf>

<sup>vii</sup> Fish Farming Expert. 2016. H2O2 treatment concerns. <http://www.fishfarmingexpert.com/news/h2o2-treatment-concerns>