



## **Friends of Loch Hourn submission of objection to the Highland Council Planners**

Application Ref no: Ref. No: 21/05582/FUL

**January 31, 2022**

### **Structure of FoLH Report**

*Background on Friends of Loch Hourn*

*Introduction and Summary*

- 1) Absence of Social Licence to Operate
- 2) Planning Policy
- 3) Wild Salmonids and Sea Lice
- 4) PMFs Species and Habitats
- 5) Landscape and Seascape Impacts
- 6) Mowi's history of accidents, mortality, chemical usage etc.:
- 7) Economic Impact - Employment opportunities
- 8) Overview

*Background on Friends of Loch Hourn*

Friends of Loch Hourn is an unincorporated, voluntary community group formed to advance environmental protection and ecological sustainability with particular reference to Loch Hourn and the surrounding area. It was created in response to Mowi's intention to expand their salmon farm but has since taken on projects to monitor and restore protected species and habitats in the loch. FoLH is also intended as a vehicle to educate and inform about the loss of biodiversity in the loch and to suggest possible ways forward to restore its once abundant flora and fauna and to enhance what little there is left. It is a collective response to the dismay of the people who live around its shores regarding the dramatic decline in biodiversity in a loch once celebrated for its abundance.

Over one hundred residents, landowners, fishermen and regular visitors with a public or private interest in Loch Hourn and the surrounding area are members. FoLH is also a member of the Coastal Community Network (CCN) comprised of nineteen community groups, located in coastal and island areas across Scotland, guided by the belief that coastal communities are well placed to harness long-term solutions to ensure healthy, well-managed seas.

See Appendix 1 for FoLH's Articles of Association and list of members' names and addresses.

## **Introduction and Summary**

Salmon farming has been a feature of Loch Hourn since 1987, beginning with Ian Anderson's Strathaird Salmon Ltd at small sites in the mid and inner loch. Marine Harvest was granted a lease over the Creag An T-Sagairt site close to the mouth of the loch in 1998 and all salmon production was then located at this site with an initial maximum biomass of 2000 tonnes increased by degrees, reaching a high of 3300 tonnes in 2015 resulting in 'unsatisfactory' benthic damage. As a result, SEPA revoked the CAR licence and required a reduction to 2500 tonnes maximum biomass. The present application to increase production to 3100 tonnes represents an increase of 24% of the maximum biomass, a massive increase in infrastructure and the appearance of an industrial site. This in spite of the fact that previous expansions resulted in unacceptable ecological damage being recognised by the regulatory authorities.

Loch Hourn is the eighth slowest flushing loch on the west coast (out of 39 lochs)<sup>1</sup> resulting in long residence times (11 days)<sup>2</sup> for large quantities of organic and inorganic waste (N,P &C) that emanate from open pen salmon farms. Since there has never been a baseline survey of the marine environment before salmon farming was established in Loch Hourn, nor have the regulators required farm operators to monitor ecological changes at more than a few hundred metres distance from the farm, it is impossible to show that open pen salmon farming is indeed sustainable. The same applies to the continued use of sea lice pesticides that are harmful to the reproductive capacity of molluscs and crustaceans. Furthermore, salmon farms are known to proliferate and disperse sea lice which have been shown to be the main cause of the decline in wild salmonids<sup>3</sup> leading to the present dire situation where salmon and sea trout (both priority species in the UK Biodiversity Action Plan list, the Scottish Biodiversity List and NatureScot's PMFs) are now rare and endangered. THC has a duty to protect marine biodiversity and to apply the Precautionary Principle.

Mortality rates of salmon over Mowi's last two production cycles (2018-19 and 2020-21) were as high as twenty percent. The causes of consistent high mortality are related to sea lice treatments and to viral diseases such as Cardiomyopathy Syndrome (CMD) and Amoebic Gill Disease (AGD), both of which have been prevalent during the last two growth cycles. Both infectious diseases are capable of spreading to wild fish. These animal welfare issues alone should be enough to curtail such irresponsible (and cruel) farming practices.

The incremental expansion of the farm over the last 23 years has resulted in a large capital-intensive industrial factory farm associated with village noise, road traffic, stinking waste removal, light pollution and plastic debris that has fundamentally changed the character of this quiet, traditional west Highland village for the worse.

The local community is overwhelmingly against this application. From a social, economic and environmental perspective, Mowi has never shown a willingness to listen to local concerns

---

<sup>1</sup> SEPA (2021) Temporary Regulatory Position Statement, January 28 January 2021.

<sup>2</sup> Highland Council (2001) Loch Hourn Aquaculture Framework Plan, September 2001.

<sup>3</sup> Marine Scotland (2021) Impacts of lice from fish farms on wild sea trout and salmon: the scientific evidence. <https://www.gov.scot/publications/summary-of-information-relating-to-impacts-of-salmon-lice-from-fish-farms-on-wild-scottish-sea-trout-and-salmon/>

about the impact they are having on the marine ecology and the industrialisation of the area. **We do not oppose the present farm, nor do we wish to see a reduction in employment opportunities.** However, we believe that this application, if approved, will lead to further unsustainable practices, more pollution and fundamentally contradict the Council's own planning guidelines in the Highland-wide Local Development Plan, Loch Hourn Aquaculture Framework Plan (2001), the National Marine Plan (2015), Scottish Planning Policy (2014) and the National Planning Framework 4 (draft).

Employment in such small rural communities is important but Mowi's planning application will reduce the number of workers from ten to nine "at peak". We believe Mowi's motivation for this expansion is to increase economies of scale thereby reducing costs and making more profit, discounting the additional risk of harm to the natural environment. If the principle of 'polluter pays' were enforced, open pen salmon farms would soon be phased out.

### **1.0 Absence of Social Licence to Operate**

The Loch Hourn community is overwhelmingly against Mowi's expansion plan. Mowi has lost its social licence to operate by refusing to acknowledge the effects of its environmental impacts and by ignoring our concerns.<sup>4</sup> At no time have we been consulted by Mowi in a way which allowed us to fully express our views and negotiate an alternative plan.

Community meetings that have taken place with Mowi, either online or in person, have not proved to be a forum for them to take our views on board, but rather more like PR exercises where Mowi employees tell us what they are planning and dismiss our worries as being unfounded when they are not. As a member of the Salmon Producers Association, Mowi has signed up to the concept of Social Licence but in the case of Loch Hourn it has been totally ignored.

### **2.0 Planning Policy**

This application to expand Mowi's Loch Hourn farm contravenes the following Highland-wide Local Development Plan policies:

**2.1 - Policy 28: Sustainable Design.** *The Council will support developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland.* None of these criteria are met by Mowi's expansion application:

- It is not compatible with public service provision (there is none)
- The impact on individual and community residential amenities is negative.

Arnisdale can be regarded as an island community, separated from the nearest village (Glenelg) by a nine-mile single track road that ends in the townships of Arnisdale and Corran. Ten other settlements around Loch Hourn are even more remote, all of which are accessed only by boat. Mowi provides no additional service provision and all transport in and out of

---

<sup>4</sup> Marine Scotland, 2014. Marine Scotland: Aquaculture Science & Research Strategy. The Scottish Government.

Arnisdale is by car and lorry.

The impact including pollution and discharges on the following resources, particularly within designated areas (Knoydart National Scenic Area) are all negative. There is no baseline from which to monitor the marine ecology and the impacts of increased nutrients from salmon faeces and pesticides used to reduce sea lice infestations. Furthermore, there is no monitoring of the loch's habitats or marine biota outside the immediate vicinity of the farm itself. In the absence of statutory monitoring we are forced to fall back on the observations of the local community, who report declines in many species, from salmonids to molluscs, crustaceans to anemones, coupled with an increase in algal blooms and growths of certain seaweeds. And these are only the most obvious consequences.

Marine habitats have changed visibly, especially during the last fifteen years when the farm expanded from 2350t maximum biomass to 3300t maximum biomass and over 6000t of harvested salmon. However, SEPA repealed this license in 2016 due to two 'unsatisfactory' benthic surveys in 2013 and 2015: beggiatoa bacterial mats had colonized the seabed in the vicinity of the farm and the maximum biomass was reduced to 2500t. MOWI present no evidence (apart from modelling) that the proposed increase to 3100t will not result in a similar benthic dead zone to that of 2015.

Meanwhile sea lice infestations have continued to occur. During the last complete growth cycle (2018-2019) over 18kg of the organophosphate pesticide Azamethiphos (AZA) was dispersed into Loch Hourn along with smaller quantities of the toxic insecticides Emamectin Benzoate and Deltamethrin. SEPA's reporting of sea lice chemicals has been curtailed since September 2021. Up until that time 15.2 kg of AZA was dispersed into Loch Hourn during the latest growth cycle (2020-21).

- The design is not in keeping with local character and historic and natural environment
- It does not promote varied, lively and well-used environments that will enhance community safety and security
- Nor does it accommodate the needs of all sectors of the community or contribute to the economic and social development of the community.

The only benefit that Mowi brings to the local community and the local economy is the employment of five full-time local people, none of whom are residents of Arnisdale or Corran: five are based in Glenelg and the others are made up of temporary migrant workers who leave very little behind in the community. There have been times when Mowi has brought in workers from Europe, the latest being from Portugal, on a temporary revolving basis similar to the work patterns on North Sea oil rigs. This adds very little to the local economy or the social development of the community.

In comments to the Highland Council on this application it is notable that though several respondents refer to their own employment with Mowi, a large proportion say that employment was an early work experience, enabled them to get a foot on the employment ladder, or helped further their education. These are valuable and worthwhile outcomes but are not evidence of building a strong community with youngsters being able to remain in the

area with families of their own. In any event, five is a very small proportion of the local population.

Mowi plans to reduce employment to nine workers “at peak”, implying that there will be fewer than nine jobs during much of the production cycle. They also fail to explain how twenty-three construction jobs over two years will be justified in order to remove twelve cages and replace them with eight larger ones. Mowi’s Economic Impact Assessment is opaque and based on highly questionable assumptions.

Again, Mowi’s primary motivation for this expansion is to increase economies of scale thereby reducing costs and making more profit at the expense of the natural environment. Mowi may engage in gestures such as giving football strips to the local team, but their real economic contribution to the community is negligible.

**2.2 - Policy 36 Development in the Wider Countryside** - *Outwith Settlement Development Areas, development proposals will be assessed for the extent to which they are compatible with landscape character and capacity; avoid incremental expansion of one particular development type within a landscape whose distinct character relies on an intrinsic mix/distribution of a range of characteristics.*

Loch Hourn is surrounded by a National Scenic Area and Wild Land Area designations. Several ancient woodland SSSIs, and an internationally important Special Conservation Area are adjacent to Mowi’s Loch Hourn farm. Mowi’s plan to expand further will make it the third largest salmon farm in Scotland. It should be obvious that this is inconsistent with the character and capacity of this nationally important area.

**2.3 - Policy 49 Coastal Development** - *Development proposals for the coast or for installations in nearshore waters should, in both their location and their design, show consideration to the range of existing interests ensuring best use of resources taking account of existing and planned marine activities and development. Proposals should not have an unacceptable impact on the natural, built or cultural heritage and amenity value of the area. Proposals will be assessed against the requirements of the Highland Coastal Development Strategy which in turn refers to Aquaculture Framework Plans (AFP).*

The Loch Hourn Aquaculture Framework Plan has been in place for over twenty years. It defines Loch Hourn as a Category 2 loch where the prospects for further substantial developments are likely to be limited although there may be potential for modifications of existing operations particularly where proposals will result in an overall reduction in environmental impacts, so enhancing the qualities of the area and hydrological conditions. It affirms a presumption **against** further expansion of finfish farming at the Mowi farm site (Creag an t-Sagairt). Future development of finfish culture in this area (Zone J) should take account of landscape impacts at this gateway into the National Scenic Area. (See section 2.7 below)

**2.4 - Policy 50 Aquaculture** - *The Council supports the sustainable development of finfish and shellfish farming subject to there being no significant adverse effect, directly, indirectly, or cumulatively on: the natural, built and cultural heritage, taking into consideration:*

- *landscape character, scenic and visual amenity with reference to SNH commissioned report: landscape/seascape carrying capacity for aquaculture.*

Mowi proposes to increase the visible spatial area of site equipment by 12%. Since 2000 the cage area will have expanded by 42% and the mooring area has more than doubled to 64 ha. Increased noise, light pollution and road traffic are a daily disruption to this quiet remote community. Well boats and fish transporters of over 70 metres in length, ships with thermolicer/hydrolicer equipment, large craft carrying chemicals, landing craft and speed boats (often all there at the same time) create a significant industrial presence in this wilderness area.

The expansion will intensify the negative impact on this last truly remote part of mainland Scotland. If this application is approved, Mowi's Loch Hourn farm will become one of the largest in Scotland. This is inconsistent with HC local planning policy and with national planning policy with respect to wilderness areas.

- *wild fish populations*

There are countless scientific peer-reviewed papers on the topic of the relationship between sea lice, salmon farms and wild fish without citing them here. Both the Scottish government's ECCLR and the REC Committee Reports conclude that there is a serious risk of harm to wild salmonids even at relatively low levels of 0.2 female lice per fish (CoGP). (See section 3 below for further details).

- *biological carrying capacity.*

SEPA issues a range of licences designed to control activities that could lead to pollution or environmental damage. Compliance with these licences is important in ensuring that the environment and human health are protected. SEPA's Compliance Assessment Scheme (CAS) has been designed to demonstrate the level of compliance associated with specific licence conditions, including aquaculture, with six categories of: excellent, good, broadly compliant, at risk, poor and very poor. The compliance reports for Creag an t-Sagairt were **Poor** for two out of the last four CAS reports.

- *cumulative benthic and water column impacts*

Benthic environmental monitoring results during 2006, 2013 and 2015 were all 'unsatisfactory' requiring reduction in biomass and reconfiguration of pens. Twenty hectares of seabed below and within 50m of the pen edges are now anoxic and totally devoid of biodiverse marine species apart from two or three worm taxa, according to the latest benthic sampling (2019). Open pen salmon farming with maximum biomass of 3,100 tonnes will discharge on average more than 10 tonnes per day (over the growth cycle of 20 months) of dissolved organic and inorganic carbon, NH<sub>4</sub> and PO<sub>4</sub> to the surrounding waters<sup>5</sup>. Published research indicates that such inputs will promote the growth and production of biotoxins by many species of HAB's.

- *habitats and species, including designated sites and protected species*

PMFs (as listed in Section 4.0 below) at risk of harm include FWPMs, the mortality of Blue mussel beds spanning the head to the mouth of the loch; the dying out of native oysters,

---

<sup>5</sup> M R Heath et al. (2002) "Modelling the behaviour of nutrients in the coastal waters of Scotland. Final Report. Fisheries Research Services Marine Scotland.

<https://pure.strath.ac.uk/ws/portalfiles/portal/67176598/strathprints018568.pdf>

horse mussels, cockles and razor fish; the depletion of lobsters; and the massive increase in macro algae including the green alga *Ulva lactuca* and *Saccharina latissima* both of which are especially prolific in areas where nutrients are abundant.

- *existing activity, taking into consideration commercial inshore fishing grounds*

The Ross, Sutherland, Skye and Lochalsh Fisherman's Association have 'objected strongly' to Mowi's proposed expansion due to (i) the harmful impact on the marine environment and (ii) lost revenue due to displacement from traditional fishing grounds' and (iii) Mowi's drive for profit now far outweighing any previous commitment they had to the sensibilities and concerns of local communities and traditional commercial fishing activities generally.

(see their letter sent to THC dated December 8, 2021).

**2.5 - Policy 58 Protected Species** - *Where there is good reason to believe that a protected species may be present on site or may be affected by a proposed development, we will require a survey to be carried out to establish any such presence and if necessary, a mitigation plan to avoid or minimise any impacts on the species, before determining the application.*

This is an area where there are frequent cetacean sightings, including porpoise, dolphin, minke whales and occasional Killer whale (*Orcinus orca*). The use of chemicals should be prohibited here. Similarly, white-tailed sea eagles occupy this area and could be impacted adversely. Several protected species are not considered by this application and so it is non-compliant with Policy 58. PMFs include protected species of freshwater pearl mussels (FWPMs), native oysters, sea grass, maerl, firework anemone, tall sea pens. (See section 4 for more details)

*Otters.* Mowi' EIA claims to have consulted the National Biodiversity Network (NBN) but instead of 5 'unconfirmed sightings of otter (*Lutra lutra*)' on the north side of the loch, the NBN records 13 sightings. However, anyone who lives or works in Loch Hourn will be aware that there are at least 5 otter dens (holts) located along the south shore of Loch Hourn within 5km of the farm indicating that there are probably more than twice that number present on that shore. Residents report that although otters are regularly seen along that section of coast they are not seen as often as previously, when they were commonplace.

*Cetaceans.* Harbour porpoise are a common sight in Loch Hourn and the NBN records are surely an underestimate. No mention has been made of the frequent appearance of Bottlenose Dolphins which are "sensitive to organic pollutants, which can accumulate in tissues; death or injury from underwater noise or as a result of collision with vessels; as well as disturbance from recreational activities"<sup>6</sup>. Minke whales, Pilot whales and Orca whales are occasional visitors to Loch Hourn. All cetaceans are protected as a European Protected Species (EPS).

*Native oysters.* Atlantic oysters have long been present in Loch Hourn. Remnant populations still exist, the closest being just over 2km from Mowi's farm. Others can be found within 4km

---

<sup>6</sup> NatureScot. <https://www.nature.scot/plants-animals-and-fungi/mammals/marine-mammals/bottlenose-dolphin>

of the tidal plume on the south shore of the loch. They are a Scottish Priority Marine Feature and included in the Scottish Marine Protected Area network.

## **2.6 - Highland Council Aquaculture Planning Guidance 2016**

The following sections of the aquacultural guidance are in conflict with the plan to expand the farm.

### 2.6.1

*DC 3.1 Designated habitats and species: Where planned developments or use have the potential to impact PMFs, mitigation, including alternative locations, should be considered. Actions should be taken to enhance the status of PMFs where appropriate. To the satisfaction of the Planning Authority, planning applications must be supported by an assessment of the likely impact and the potential mitigation measures. Species and habitat surveys may also be required to accompany the application. Where the level of impacts on protected areas, habitats or species remains uncertain and there are scientific grounds for believing that significant adverse impacts could occur, the Precautionary Principle will apply. (See section 4 below for details about designated habitats and PMFs)*

### 2.6.2

*DC 3.2 Wild Salmonids and Sea Lice*

*Aquaculture development will only be permitted where: there is no significant adverse impact on wild salmonid populations; cumulative impacts on wild salmonids have been assessed and mitigated where appropriate. Where appropriate, mitigation measures to be followed in relation to the management of sea lice and their potential impacts on biodiversity must be contained within an environmental management plan to be submitted in support of the planning application.*

Planners routinely require Environmental Management Plans (EMPs) for new or expanded fish farms but a great deal of scepticism exists as to their efficacy in controlling sea lice.

- They are widely acknowledged to be inadequate for controlling sea lice numbers (for instance by Fisheries Management Scotland)
- EMPs have no legally enforceable mechanism for providing feedback to rapidly reduce sea lice numbers on farms in time to protect wild smolts
- Mitigation is left to the discretion of the operator
- Farms located to the north and south of Loch Hourn are responsible for sea lice emissions that interact with wild fish here
- EMPs do not include a mechanism for assigning responsibility to adjacent farms that exceed CoGP limits to reduce these emissions.

Sea Lice are a significant risk of harm to wild fish and there is uncertainty about ‘the movement of salmonids and the impacts of fish farms on wild stocks’, as Mowi’s EIA puts it. THC lacks sufficient information to safely give consent for this development, which would be granted in perpetuity. Under these circumstances THC should apply the precautionary principle and not allow this proposal to advance.”<sup>7</sup>

**(See section 3 below ‘Wild Salmonids and Sea Lice’)**

---

<sup>7</sup> John Aitchison. Comments to THC, January 9, 2022



### 2.6.3

#### *DC 4.1 Water Quality*

*Proposals for extensions to existing sites will not be permitted in locations where they would have a significant adverse impact on water quality. The impacts would be assessed on an individual site basis, as well as on a cumulative basis, across the water body, and will take into consideration the spatial standards as detailed in the Scotland River Basin District (Standards) Directions 2014.*

#### *Pesticide discharges*

Azamethiphos (AZA) is a toxic pesticide, an organophosphate capable of harming aquatic species and able to cause cumulative damage to the nervous system of people. Mowi has applied to increase the quantities of azamethiphos it discharges into Loch Hourn by 20% due to biomass increases and larger pens.

Mowi's AZA modelling calculates environmental quality standards (EQS) on the basis of a half-life of 5.6 days replacing the commonly accepted half-life of 8.9<sup>8</sup>. SEPA is unable to provide any peer-reviewed evidence showing what research this half-life estimate is based on. Furthermore, the 5.6 day estimate is temperature dependent, based on a temperature of 12°C, but during the smolt migration in April and May, sea surface temperatures near Mallaig are between 2 and 4 degrees lower than this<sup>9</sup>, indicating a longer half-life.

FoLH commissioned a modelling report from MTS-CFD to investigate the dispersal of AZA based on the proposed expansion of the Loch Hourn farm in 2021<sup>10</sup>. Initially this was based on Mowi's April 2021 Method Statement<sup>11</sup> which assumed 8.17kg of AZA per treatment over an 11 day period, also assuming SEPA's half-life standard of 8.9 days. Since surface waters are affected by wind speed and direction the model ran two scenarios: zero wind and average prevailing wind speed and direction (15MPH steady SW wind). For a moderate SW wind, the general distribution of AZA subsequent to treatment-end plus 72 hours, shows a significant portion of the loch close to Arnisdale and Corran is exposed to high levels of AZA which exceed SEPA's EQS. Also, the zero wind scenario shows a maximum allowable concentration (MAC) that also exceeds the 0.5 km<sup>2</sup> limit (see Appendix 2). However, when the model is re-run using the 5.6 day half-life, and 8 day treatment of AZA dispersal at 9.84kg, the concentration levels are below the EQS of 40 ng/L and within the MAC limit.<sup>12</sup>

---

<sup>8</sup> Half-life 8.9 days @ 12°C. UK Veterinary Medicines Directorate, 2015. [http://mri.cts-mrp.eu/download/UK\\_V\\_0528\\_001\\_PAR.pdf](http://mri.cts-mrp.eu/download/UK_V_0528_001_PAR.pdf)

<sup>9</sup> <https://seatemperature.info/scotland-water-temperature.html>

<sup>10</sup> See: <https://docs.google.com/document/d/1mKdoxu6wwnR7Spq0g-PbuFn17WtiUEPH/edit>

<sup>11</sup> Mowi, 2021, *Hydrodynamic and Waste Dispersion Modelling at Loch Hourn Fish Farm Site*, METHOD STATEMENT, Mowi Scotland Limited, Philip Gillibrand, Oceanography and Modelling Manager.

<sup>12</sup> Scanlon, T. (Dec 2021) *Hydrodynamic Modelling of Azimethiphos Dispersion from the Proposed Extension at Mowi's Loch Hourn Salmon Farm*. MTS-CFD Ltd. Available on Request from FoLH.

When Mowi applied for planning permission SEPA agreed to increase the eight-day treatment rate to 9.84kg and reduced the default half-life to 5.6 days. It is very convenient for Mowi that SEPA has reduced the half-life of AZA from 8.9 days to 5.6 days. This allows farm pen size and biomass expansion in places where this would not previously have been possible, while increasing pesticide discharges. If a new half-life can be set simply by averaging the results of two studies, then half-life data relevant to the sea temperature can also be averaged across the range of temperatures experienced in Scotland. However, some differences between Mowi's modelling and that of MTS should be pointed out:

1) MTS have used a 3D modelling approach which takes the vertical component of flow speed explicitly into account while using twelve vertical layers to represent the water depth. Mowi have used a 2D approach where their results for current speed are averaged over the water depth. It would be up to Mowi to show that there is no difference in their results if they had used a 3D model instead of 2D. The results in 3D may be particularly sensitive to wind shear on the loch surface and also the bathymetry of Loch Hourn which covers a wide range of depths from shallow sills to deep canyons. 3D effects may play a role in such a case for the general flow patterns in the loch and this may not be adequately captured by a 2D model. Mowi argue that the 2D assumption is valid as Loch Hourn is slow-flushing and well-mixed in terms of salinity and temperature. However, to back this up they (Mowi) could have carried out a sensitivity analysis with a 3D model to assess any vertical hydrodynamic effects e.g. due to wind shear and turbulent mixing at the mouth of the loch as it enters the fast-flowing Kyle Rhea.

2) With regard to the eddy (turbulent) diffusivities used in Mowi's particle-tracking model for AZA they have used a very insensitive, one-size-fits-all single value for horizontal and vertical eddy diffusivity. It would have been more appropriate scientifically to employ a suitable turbulence model to provide a range of eddy diffusivities such as those covered by the values shown in their dye experiments.

3) MTS considered what we felt was a worst-case scenario for AZA dispersion, i.e. a dry period in May with no freshwater input. So our model has no effects of density-driven stratified flow, only tides and winds are considered. It is not clear whether the Mowi model includes the effects of salt and freshwater mixing.

4) Our wind conditions (zero or 15 mph SW) are different from those of Mowi (<https://www.ecmwf.int/>) which will affect the AZA distribution. Our start day (8th May 2019) is also different from theirs (14th May 2019).

Using the 5.6 day half-life, Mowi calculates the concentration levels to be below the EQS level of 40 ng/L. although in Fig. 10 of their AZA modelling report, after 7 days there appears to be a patch of "medicine" located near Arnisdale. This could have possible consequences for anyone swimming at that time.

Mowi's claim that it is safe to more than triple the amount of azamethiphos that can be discharged in a three-hour period, and more than double the amount discharged in a 24-hour period, should be treated with caution. It is only possible for Mowi to request such a large increase in azamethiphos discharges in Loch Hourn because SEPA has recently reduced

the compound's half-life (used in modelling its dispersion) from 8.9 days to 5.6 days, following the Veterinary Medicines Directorate. This new half-life is based on a sea temperature of 12°C, which is unrealistic in Scotland for much of the year.

SEPA accepts that its EQS for azamethiphos is long overdue for review and that the entire regulatory system for bath chemicals needs to be overhauled. SEPA regulates the area and time over which the impact can occur in spite of the risk of harm to aquatic species. The current EQS for azamethiphos allows harm to crustaceans.

### *Risk to Lobsters*

Figure 1 gives an indication of the sea bed AZA concentration levels and exposure times at certain points within the Max AZA contour zones at zero wind. The levels and duration times are within the range of the lobster larvae experiments described below. The 15 mph SW wind case will no doubt show a greater Aza spread on the sea bed but likely with lower concentrations.

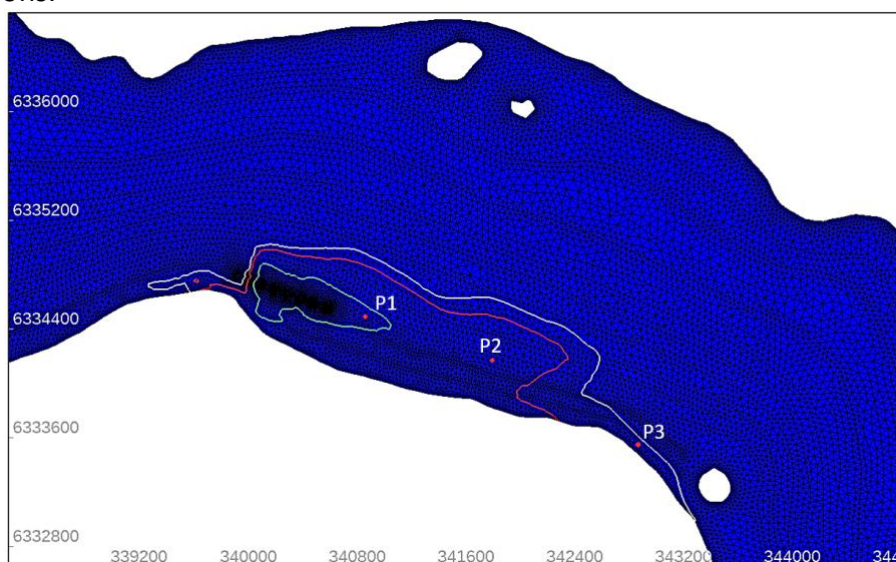


Figure 1: AZA concentrations on the seabed. The area surrounding P1 (blue line) = 1000 ng/l, P2 = 100 ng/l, P3= 50ng/l

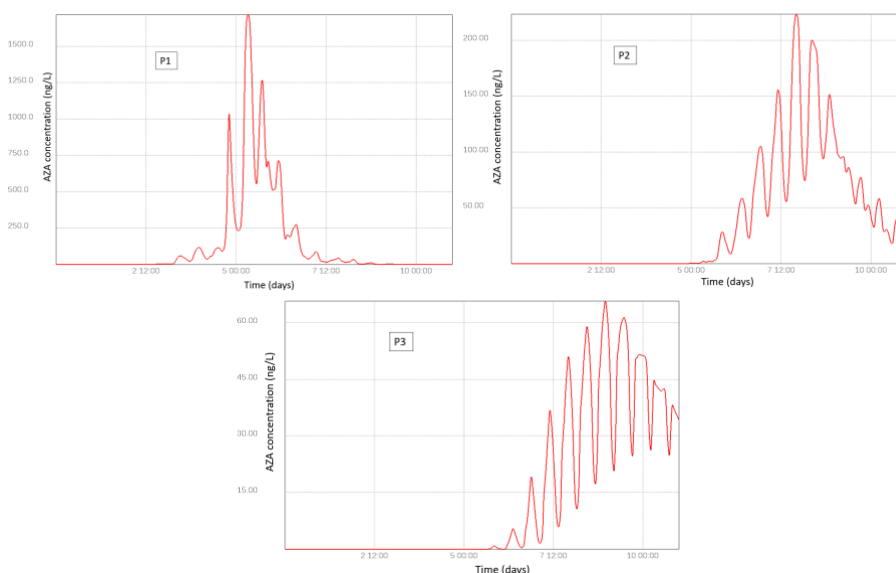


Figure 2: AZA concentrations in area P1, P2 and P3 plotted against time (days).

The azamethiphos toxicity data used for setting SEPA's environmental standards is based on the risk of harm to lobster larvae. The impact on lobster larvae in an area of water receiving say 8 plumes of AZA over 11 days should not only be assessed at the end of the 11 day period. There is a cumulative impact of repeatedly exposing lobster larvae to AZA pulses as each cage is treated and from multiple treatments too. It's a complex overlapping series of risks. It does not seem out of the question that lobster larvae will be killed by AZA in Loch Hourn. SEPA does not claim otherwise. Its standards are set to reduce the number killed and how often this occurs.

Mowi claim that it is safe to discharge more than triple the amount of azamethiphos in a three-hour period, and more than double the amount discharged in a 24-hour period. THC should treat this with scepticism.

### *Wild swimming*

A recent report into the use of pesticides by the Scottish Salmon Producers Organisation (SSPO) finds Azamethiphos is capable of causing cumulative damage to the nervous system of people and a health risk to swimmers.<sup>13</sup> It shows that people who swim regularly are at risk of harm if they swallow small quantities of water containing AZA. The MTS-CFD and the Mowi reports show that plumes of AZA can be carried close to the Arnisdale/Corran shores during certain weather and tidal conditions and it is important that the THC understands this risk to human health in the context of the SSPO report.

The health risks of exposure to hydrogen peroxide are greater still. Typically, Mowi uses over 120 tonnes of hydrogen peroxide during each treatment event at farms of similar size. Mowi claims that hydrogen peroxide "rapidly dissociates to water and oxygen [and] is considered to pose a low risk to the environment". However, research<sup>14</sup> shows that degradation of H<sub>2</sub>O<sub>2</sub> in sea water is temperature dependent and that the half-life for this process can be up to 28 days.<sup>15</sup> THC does not know how much hydrogen peroxide is dispersed in Loch Hourn, or how often, nor does THC know the H<sub>2</sub>O<sub>2</sub> concentration in water where people swim in Loch Hourn. SEPA does not publish figures on the quantities of hydrogen peroxide discharged into the sea, so in light of these uncertainties about the effect, THC should insist on the precautionary principle and not give their approval.

*"Large farms using open-net pens will need to operate in locations with sufficiently strong tides to disperse the organic wastes they produce. In more sheltered locations, small size farms would be accommodated but the development of large farms would require the*

---

<sup>13</sup> Assessment of potential risk to human health following use of azamethiphos, deltamethrin and hydrogen peroxide in fish farms report to Scottish Salmon Producers Organisation from WCA. December 2021  
<https://portal360.argyll-bute.gov.uk/civica/Resource/Civica/Handler.ashx/Doc/pagestream?cd=inline&pdf=true&docno=22585306>

<sup>14</sup> Lyons MC, et al. (2014) 'Degradation of hydrogen peroxide in seawater using the anti-sea louse formulation Interlox Paramove50'. Science Branch, Maritimes Region Fisheries and Oceans Canada.  
[https://publications.gc.ca/collections/collection\\_2014/mpo-dfo/Fs97-6-3080-eng.pdf](https://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs97-6-3080-eng.pdf)

<sup>15</sup> Lyons, M.C., Wong, D.K.H. and Page, F.H. 2014. Degradation of hydrogen peroxide in seawater using the anti-sea louse formulation Interlox® Paramove™50. Can. Tech. Rep. Fish. Aquat. Sci. 3080: v + 19p  
[https://publications.gc.ca/collections/collection\\_2014/mpo-dfo/Fs97-6-3080-eng.pdf](https://publications.gc.ca/collections/collection_2014/mpo-dfo/Fs97-6-3080-eng.pdf)

*capture and removal/ treatment of a substantial proportion of the organic wastes that are produced.”*

The Creag an T-Sagairt farm site, because it is located in a very slow flushing loch, does not comply with this SEPA regulation.

## **2.7 - Loch Hourn Aquaculture Framework Plan 2001**

This is the only plan specifically addressing aquaculture developments in Loch Hourn. It is a useful reminder of how THC viewed aquaculture development going forward into the future and they have not been minded to update it in the intervening years.

At that time THC classified this loch as Category 2: “requiring an environmental impact Assessment for a cumulative increase of 25% or more in biomass or equipment which would result in a development holding a biomass of 250 tonnes or more, or a cage area of more than 2000 square metres. The guidance also indicates that the prospects for further development in Category 2 areas are likely to be limited.” The Framework Plan describes the loch as having a very slow flushing rate of 11 days and describes the Creag an T-Sagairt farm as one of the largest in Scotland in terms of biomass (p.4). Mowi’s planning application does not comply with the framework set out in this plan.

The Framework recognises salmon as an Annex 2 listed species and mentions that freshwater pearl mussels (FWPMs) may be present. *“These would need to be considered if their presence was confirmed. Salmon and sea trout, whilst important species in their own right, are essential for the survival of freshwater pearl mussels since they form the intermediate host for the larvae.”* (p.10) The presence of one of the largest salmon farms in Scotland presents a serious risk of harm to this critically endangered (and protected) species. It has been suggested by NatureScot that a monitoring programme to record levels of sea lice on sea trout smolts in Loch Hourn as part of an EMP would provide an indication of the risk of harm to the future of FWPMs in Loch Hourn. However, the risk of harm is already apparent and simply monitoring the few remaining smolts will do nothing to reverse an already dire decline in salmonids and the reproduction of FWPMs.

The lack of follow-through on this Aquaculture Framework Plan in 2001 is similar to the fate of the recommendations from the ECCLR and RECC 2018 Parliamentary Committee reports. The following quote from the Loch Hourn Aquacultural Framework Plan provides an earlier example of this:

*The Tripartite Working Group (TWG) made up of the Scottish Executive Rural Affairs Department, Scottish Quality Salmon and wild fisheries interests has recommended that area management agreements (AMA) be drawn up between all fish farm operators in a given loch system and the freshwater fisheries interests in the area. The aims of the AMA should be to mitigate or eliminate threats to wild salmonids through:*

- i) a target of zero egg-bearing sea lice on farms*
- ii) improved fallowing strategies*
- iii) effective single-bay management*
- iv) robust contingency plans for escapes*
- v) free exchange of relevant information*

*The TWG and the Joint Government Industry Working Group on ISA have recommended that the Loch Hourn system should be considered as a single area. In addition, the Scottish Salmon Growers Association have suggested **that Loch Hourn should be included in the same management area as the Loch Duich, Long and Alsh system**. It is therefore recommended that one AMA should be prepared and maintained for this larger area. In common with recommended practise elsewhere this management agreement should include:*

- a) synchronised stocking of smolts throughout all sites in the area at the same time*
- b) strategic and co-ordinated sea lice treatments*
- c) the development of integrated pest management strategies*
- d) synchronised fallowing across all sites*

*As far as possible a robust AMA should be in place prior to any modification of the existing finfish farm sites in Loch Hourn (p11).*

Finally, the LH Aquaculture Framework Plan states that there is a “Presumption against further expansion of finfish farming. Stocking and harvesting of this site should be synchronised with those in Loch Duich, Long and Alsh” (p 17). Given the migration patterns of sea lice, and the neighbouring finfish farms in Loch Nevis, this loch should also have been included in the AMA for Loch Hourn.

Similar proposals to reform and restructure mitigations measures to promote sustainability have arisen many times since the Framework Plan of 2001. Needless to say, few of these recommendations have been implemented by the Scottish Government which continues to tinker around the edges of what has become an ecological disaster on the west coast of Scotland.

### **3.0 Wild Salmonids and Sea Lice**

Consideration of impacts of aquaculture development on wild salmonids is a material consideration for the Local Authority at the planning stage. This is done, in consultation with statutory consultees, to ensure the Planning Authority’s biodiversity duty is upheld through compliance with the relevant policies of its Development Plan. The declines in wild salmon in west coast rivers is well documented. Several reasons put forward for this decline include 1) climate change, 2) predation by seals, 3) offshore fishing and 4) the impact of sea lice emanating from open pen salmon farms. The first three potential causes of decline are beyond the scope of this planning application but the fourth poses a potential risk of harm germane to the whole issue of declining salmonid populations. However, comparison of the realities between the East Coast, which is subject as we are to the first three factors but not the fourth, and the West Coast, shows just how dominant the issue of sea lice is.

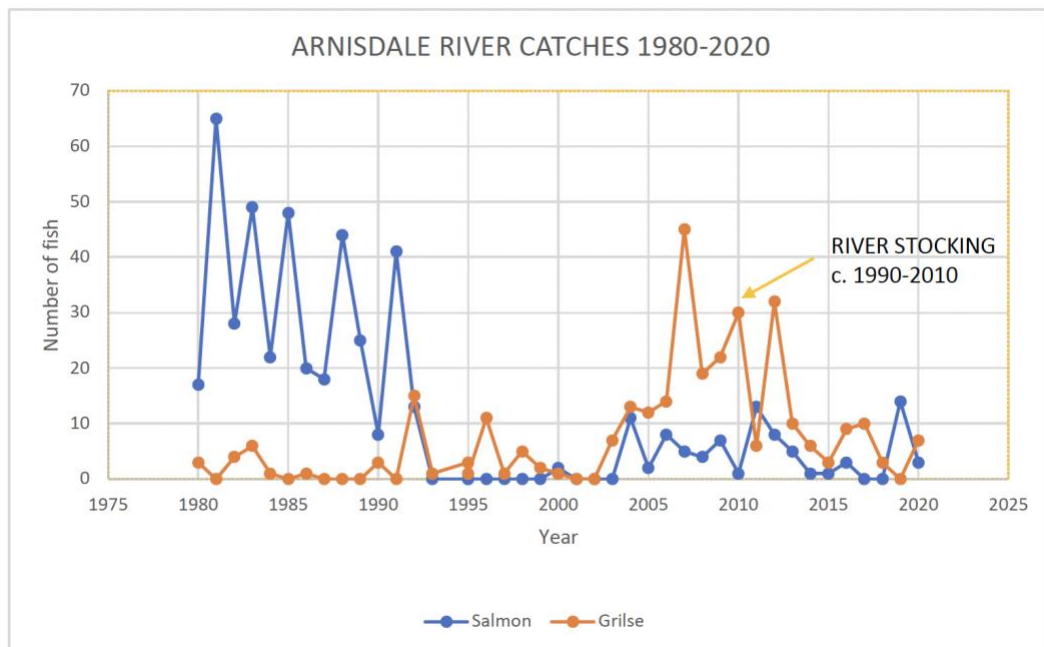


Figure 3: Chart showing salmon and grilse numbers per year since 1980. Salmon numbers have dropped significantly during this period, but it is especially noticeable after 1990 after the arrival of Strathaird Salmon Farm in 1987. Grilse remained low apart from during the period when Arnisdale Estate was restocking with juvenile hatchery bred salmon. There is now a presumption against restocking due to the adverse effects this can have on existing wild salmon populations.

In two smaller salmon rivers in Loch Hourn (Kinlochhourn and Barisdale) salmon populations have become extinct since the late 1990s. The Guiserin River has declined to such an extent that during the last two years, no salmon have returned to spawn. Further afield, the Glenmore and Glenbeag rivers are similarly depleted of salmon populations.

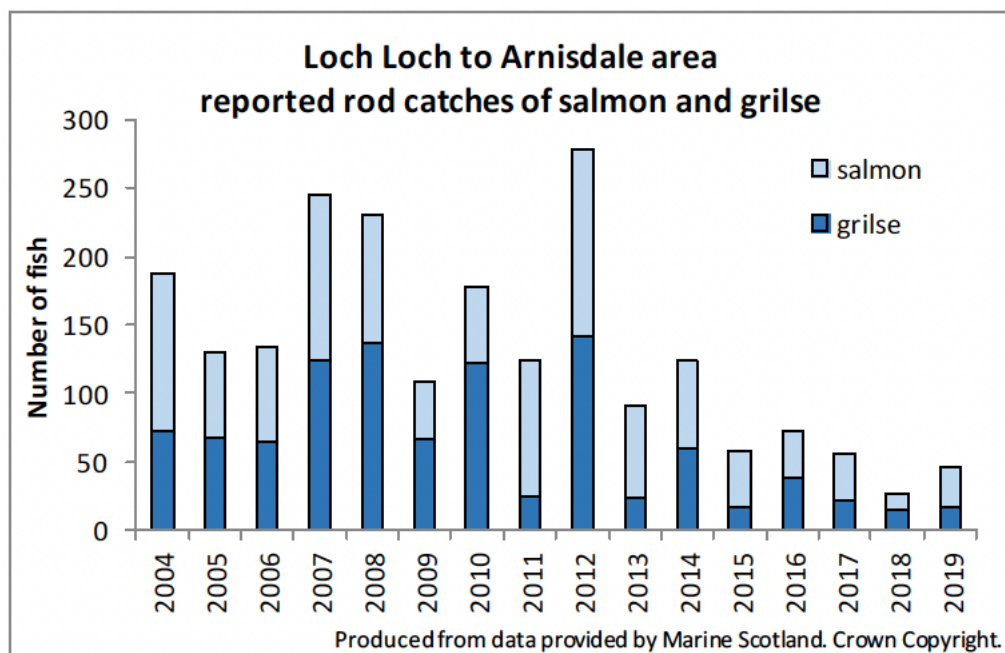


Figure 4: Loch **Long** to Arnisdale. The rod catch reports for salmon and grilse from 2004 to 2019 show a continuous decline. Skye and Wester Ross Fisheries Trust Review, Sept 2020.



The Scottish Government<sup>16</sup> and the Skye and Wester Ross Fisheries Trust classes the Glenmore, Glenbeag, Arnisdale, Guiserin, Inverie and Carnoch Rivers as Category 3 rivers, meaning that “exploitation is unsustainable”.<sup>17</sup> Marine Scotland categorise Loch Hourn as 5<sup>th</sup> most sensitive to risk of harm by sea lice.

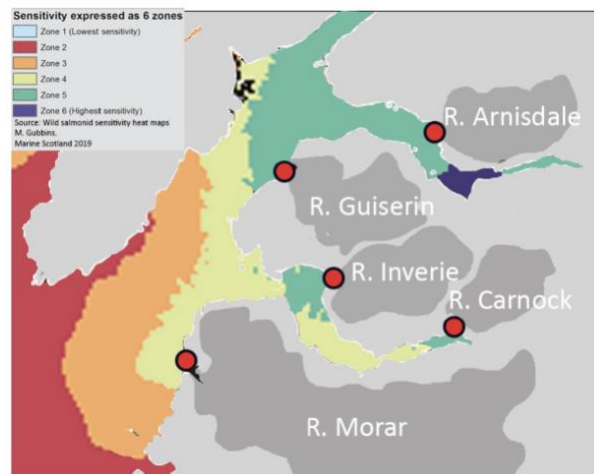


Figure 5: Draft heat map of wild salmon sensitivity (Gubbins, M. and Watret, R., Marine Scotland Science, 2019). From unpublished briefing for Technical Working Group of the Scottish Government’s Salmon Interactions Working Group. Disclosed under FOI/EIR. The locations of salmonid breeding rivers have been superimposed (catchments in grey, mouths as red dots) and were not included in the MSS map.

Fisheries Management Scotland produced a similar heat map showing locational guidance and zones of sensitivity showing Loch Hourn in the highest two categories.

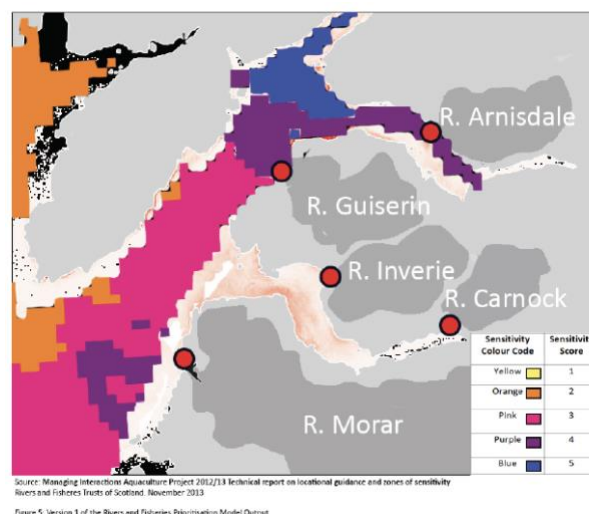


Figure 6: Heat map of wild salmon conservation sensitivity. The locations of salmonid breeding rivers have been superimposed (catchments in grey, mouths as red dots) and were not included in the MIAP report’s map. From the ‘Technical Report on Locational Guidance and Zones of Sensitivity, Managing Interactions Aquaculture Project 2012/13’. Rivers and Fisheries Trust for Scotland. Blue and purple show the areas of highest sensitivity.

<http://fms.scot/wp-content/uploads/2018/05/MIAP-Locational-Guidance-Report-2013.pdf>

<sup>16</sup> <https://www.gov.scot/publications/salmon-fishing-proposed-river-gradings-for-2022-season/#proposed%20river%20gradings%202022>

<sup>17</sup> SWRFT Review Sept 2020 and <https://www2.gov.scot/Resource/0054/00548161.pdf>



Consequently, the issue of salmon population decline needs to be addressed in any finfish application to identify the likely effect on wild salmonids, on an individual and cumulative site basis and to suggest potential mitigation measures. Applications should be accompanied by a site specific Sea lice Management Plan. In critiquing the Mowi EMP we can do no better than quote John Aitchison's letter to Mark Harvey (January 9, 2022) in the following sections 3.1 to 3.8

### **3.1 Wild fish interactions**

The Highland Council has responsibility to ensure that wild salmon and sea trout are protected from potential harm caused by parasitic sea lice produced and discharged into the sea by finfish farms. Both wild fish species are Scottish Government Priority Marine Features. Both are in severe decline.

Increasing the biomass of farmed salmon in Loch Hourn by 24% will increase the number of fish hosts for sea lice, and the number of infective sea lice larvae released by the farm, by the same percentage. The risk to wild fish will therefore increase unless the farm managers can greatly improve their control of lice on the farm. As sea lice larvae disperse widely, the managers of all the other farms in the area into which lice larvae from Loch Hourn can disperse, must also permanently and substantially improve control of sea lice numbers. This is by no means certain to be possible and you should not give permanent consent for the expansion of the farm in Loch Hourn on this basis. If it does prove impossible to keep sea lice numbers within the very low safe limits for wild fish, the Highland Council has no effective means to alter management on the farms to safeguard wild fish because the EMP for controlling sea lice numbers is inadequate and unenforceable (see below).

### **3.2 Sea lice from fish farms present a risk to wild salmonids**

The statutory advice provided to you by Marine Scotland Science includes the webpage 'Impacts of lice from fish farms on wild Scottish sea trout and salmon: Summary of science'.<sup>18</sup> This was updated in March 2021 and now states: 'The body of scientific information indicates that there is a risk that sea lice from aquaculture facilities negatively affect populations of salmon and sea trout on the west coast of Scotland.'

MS's letter to you adds that this development 'has the potential to increase the risks to wild salmonids'. The MS Summary of science also says that 'risks can be mitigated by reducing sea lice on farms or locating farms in areas that reduce interactions with wild salmonids.'

The Loch Hourn farm's location means it is certain to interact with wild salmonids. The nearby rivers Arnisdale, Guiserin, Inverie, Carnach, Morar, Glenmore and Glenbeag all have populations of breeding salmonids. Marine Scotland has placed six of these rivers in the most at risk conservation category, as their breeding fish have less than 60% probability of meeting their conservation limits. The River Morar has a proposed grading of 2 for 2022 (60%-80% probability of meeting its conservation limits).<sup>19</sup>

In 2020, SEPA and NatureScot concluded that Loch Hourn is one of only ten west coast sea lochs where any increase in the biomass of fish being farmed would put wild salmonids at

---

<sup>18</sup> <https://www.gov.scot/publications/summary-of-information-relating-to-impacts-of-salmon-lice-from-fish-farms-on-wild-scottish-sea-trout-and-salmon/>

<sup>19</sup> <https://www.gov.scot/publications/salmon-fishing-proposed-river-gradings-for-2022-season/>

the greatest risk of harm (see table below).<sup>20</sup> This is because Loch Hourn's water flushes unusually slowly, so parasites (and pollution) are retained for longer in the loch than at almost any other fish farm site in Scotland.

Table 1: List of slowest flushing lochs with high interaction potential. From SEPA's Temporary Regulatory Position Statement January 2021

High interaction potential (excluding Shetland)	
Little Loch Broom	Loch Hourn
Loch Duich	Loch Linnhe North
Loch Etive	Loch Long (South)
Loch Fyne - Upper Basin	Loch Nevis
Loch Gairloch	Loch Sunart
Loch Goil	Loch Torridon

For this reason, SEPA's temporary relaxation of its biomass regulations due to Covid-19 disallowed any increase of farmed fish biomass in these ten lochs (Table below).<sup>21</sup>

Table 2: General environmental risk assessment criteria: temporary breaches of biomass limits at marine finfish farms. From SEPA's Temporary Regulatory Position Statement January 2021

Factors affecting risk posed by biomass increase	Increase above authorised biomass limits			
	No increase	Up to 10%	Up to 20%	Up to 25%
Interaction potential of area in which farm located (during smolt migration period only <sup>(a)</sup> )	High	Medium	Low/not yet categorised	Low/not yet categorised

Loch Hourn's flushing rate has not changed and nor has the sea lice risk to wild salmonid smolts, but Mowi is asking planners to allow a permanent increase in farmed fish biomass in the loch. **You should not allow this unless you are certain that the 2021 assessment made by SEPA and NatureScot is wrong.**

Two other studies have also identified that wild salmonids in Loch Hourn face the highest level of risk of being harmed by sea lice: The Government-funded RAFTS 'Managing Interactions Aquaculture Project 2012/13' (MIAP)<sup>22</sup>, and an unpublished report produced by Marine Scotland for the Technical Working Group of the Scottish Government's Salmon Interactions Working Group.

<sup>20</sup> See Annex 3 Technical Working Group Interim Advice: sea lice and wild salmonid interaction potential. 7 April 2020 <https://regulatoryapproach.sepa.org.uk/media/1013/covid19-fish-aquaculture.pdf>

<sup>21</sup> See <sup>3</sup> above, Table 1: General environmental risk assessment criteria: temporary breaches of biomass limits at marine finfish farms

<sup>22</sup> <http://fms.scot/wp-content/uploads/2018/05/MIAP-Location-Guidance-Report-2013.pdf>

### 3.3 Cumulative impacts and sea lice modelling

When sea lice from Loch Hourn's farm leave the loch, they combine with lice from other farms to present a cumulative risk to wild fish. Similarly, modelling predicts that lice from other farms also find their way to Loch Hourn. MS's 'Summary of science' says: 'Potential for infection can be identified in broad terms using modelling approaches to assess likelihood of lice from farms infecting migrating salmon smolts. A growing information base is available to model distributions of sea lice emanating from salmon farms.' The risk to wild salmonids is a product of the density of infective sea lice larvae (copepodids) in the sea and the time the fish spend exposed to them. Modelling informs both aspects.

SEPA's consultation on the risk posed to wild salmon by sea lice<sup>23</sup> includes a map of proposed wild salmon protection zones, based on modelling swimming speeds through geographical bottlenecks for migrating fish.<sup>24</sup> Fish passing through these bottleneck areas are exposed to sea lice for a longer period, increasing the risk.

The map extract below shows that wild salmonids in the Sounds of Sleat and the Inner Sound of Skye have the longest passage times, amplifying the risk of harm by sea lice. On the whole west coast of Scotland, only two other areas pose equivalent risk to wild fish. The attrition of migrating smolts must be high given the quantity of sea lice and the time it takes to reach open water.

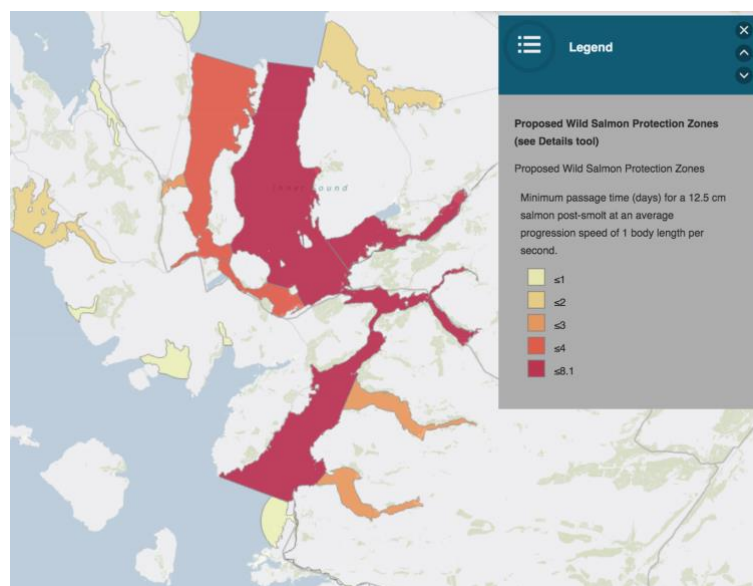


Figure 7: Estimated minimum passage times through wild salmon protection zones for a 12.5cm salmon post-smolt at a progression speed of 1 body length per second. SEPA 2021. For salmon smolts leaving the Arnisdale River, it could take as long as 11 days to reach 'open water' after having passed through Loch Hourn and the Sound of Sleat, both heavily infected with sea lice.

<sup>23</sup> Proposals for a risk-based framework for managing interaction between sea lice from marine finfish farm developments and wild Atlantic salmon in Scotland. (2021) SEPA.

<sup>24</sup> <https://scottishepa.maps.arcgis.com/apps/View/index.html?appid=e3887f7888f94fda98b73ef9bfd567a1>

The community group Friends of Loch Hourn has commissioned sea lice dispersion and density modelling from MTC-CFD Ltd<sup>25</sup>, based on the proposed expanded biomass in Loch Hourn and the biomass of fish in six other local farms in the same year. Its purpose is to map the predicted sea lice density along the migration routes of wild salmon smolts. This modelling assumes that no farm will exceed the industry's non-binding CoGP springtime average sea lice target of 0.5 adult female lice per farmed fish. The map below comes from this modelling report. It shows the predicted average infective sea lice densities (copepodids/m<sup>2</sup>/day) from 20<sup>th</sup> May – 3<sup>rd</sup> June.

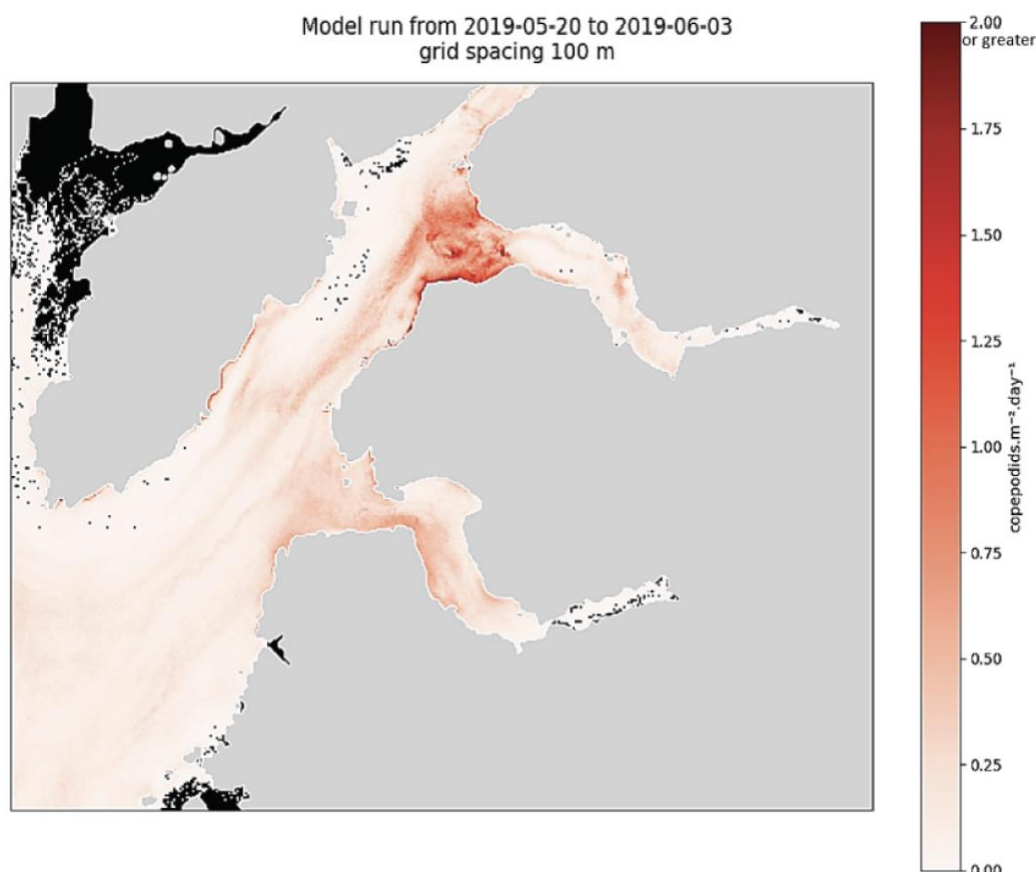


Figure 8: Average sea lice densities (copepodids m<sup>-2</sup>/day<sup>-1</sup>) over 15 days of the 61-day run (20<sup>th</sup> May – 3<sup>rd</sup> June 2019). Black areas indicate zones where no lice were encountered. The darkest red areas, around the mouth of Loch Hourn and along the shores of the Sound of Sleat, show predicted sea lice densities that would threaten wild salmon and sea trout smolts.

Densities greater than or equal to two lice larvae per square metre of sea surface exceed the threshold accepted by Norwegian state regulators as posing a threat to wild salmonid populations. The Loch Hourn sea lice EMP uses the same threshold values.<sup>26</sup> Young salmon and sea trout entering the sea from their breeding rivers would be put at risk if exposed to these predicted lice densities for 24 hours in total, over their entire migration.

<sup>25</sup> Scanlon T. and Moreau J. (2021) "A Hydrodynamic Model of the Loch Hourn with Coupled Sea Lice Dispersion" [https://www.researchgate.net/publication/354699230\\_A\\_Hydrodynamic\\_Model\\_of\\_the\\_West\\_Coast\\_of\\_Scotland\\_and\\_with\\_Coupled\\_Sea\\_Lice\\_Dispersion](https://www.researchgate.net/publication/354699230_A_Hydrodynamic_Model_of_the_West_Coast_of_Scotland_and_with_Coupled_Sea_Lice_Dispersion)

<sup>26</sup> <https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=R3C8H9IHL1J00>  
See Risk Assessment: Interpretation of Wild Fish Monitoring, page 18 in 21\_05582\_FUL-  
ENVIRONMENTAL\_MANAGEMENT\_PLAN\_FOR\_LOCH\_HOURN\_\_LOCH\_ALSH\_AND\_LOCH\_DUICH-2573572.pdf

Mowi includes its own sea lice modelling in its EIA for the proposed expansion. This says, *'the sea lice modelling exercise also demonstrated that the farmed derived sea lice from the proposed modification are found predominantly in the Sound of Sleat and, at low densities (< 0.2 lice m<sup>-2</sup>), within Loch Hourn itself.'*

The EIA adds that *'the assumptions made to evaluate significance are based on a level of uncertainty'*. This is correct. There are no modelling standards for sea lice dispersion but the modelling commissioned by Friends of Loch Hourn uses virtually the same assumptions as Mowi's about sea lice behaviour and biology and its conclusions that wild fish are likely to encounter sea lice densities around two lice/m<sup>2</sup> in some key areas, putting them at risk of harm, are equally valid.

The interpretation of risk in sea lice modelling results depends heavily on how the results are presented. The two modelling studies differ in this respect. Mowi has used a log scale to display lice densities, which makes it difficult for non-experts to interpret the degree of risk and obscures the results around the critical threshold level of two lice/m<sup>2</sup>. Despite this, Mowi's modelling does show high lice density in mouth of Loch Hourn. Mowi has chosen to average sea lice densities over a two-month period, which smooths out the peaks of high lice density that pose the greatest risk to fish exposed to them for a short time. The modelling commissioned by Friends of Loch Hourn shows the average lice density over a shorter period, more closely matched to the length of time taken by wild salmon smolts to migrate through this area (as per the SEPA sea lice risk map).

Mowi has also chosen to average sea lice densities over larger spatial grid sizes than the FoLH study, which also smooths out the high densities of lice that will accumulate in some areas, for instance at the mouth of Loch Hourn. FoLH's modelling takes careful account of the number of particles that must be tracked to make its density mapping statistically valid.

To enter the Sound of Sleat, salmon smolts from the River Arnisdale must swim through the sea lice accumulation at the mouth of Loch Hourn, and fish from rivers to the south will also encounter these lice if they swim north. Wild salmon and sea trout smolts are harmed by the worse case scenario, not the average. The low modelled sea lice densities in some areas matter less to wild fish than high densities in areas they cannot avoid, where harm can occur during short periods of exposure.

When migrating wild salmon smolts leave their natal rivers, they have to travel on up the coast to reach their feeding ground in the Arctic. They have no choice but to risk encountering sea lice from other farms along that journey. Mowi's EIA says 'there is little systematic information on the (migration) routes used by salmonids', but fish leaving the area around Loch Hourn have only two options, to swim north or south around and then north around the west side of Skye. Mowi's EIA's (Figure 29, below) shows some of the many farms on the northward route.

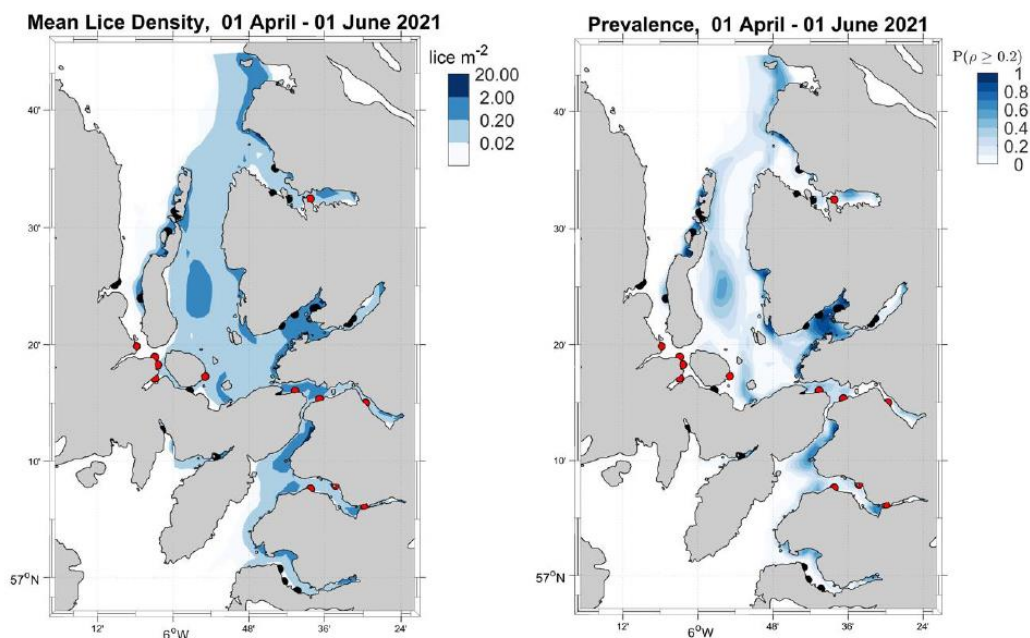


Figure 9: Predicted mean infective lice density (left, lice m<sup>-2</sup>) and prevalence (right) for April – May. Mowi sites are marked in red. All sites are assumed to be at maximum biomass and with an average adult female lice count of 0.5 AF per fish. The proposed maximum biomass at Loch Hourn (3100T) is used here. Note that the density colour scale is logarithmic, indicating orders of magnitude of density.

The lice densities in the sea, and the threat they pose to wild fish, are a consequence of all the fish farms in the area through which they must pass, regardless of their ownership. These farms are all in the Highland Council's area so you should consider this ongoing risk of exposure as well. It is not sufficient to say that there is too little information to judge this risk. In such circumstances you should apply the precautionary principle. This problem cannot be solved by an EMP which includes only four Mowi farms. THC should not consent any increase in biomass at Loch Hourn or at other farms, unless sea lice numbers on all farms can always be kept very close to zero by all the operating companies. Given past performance, this seems highly unlikely to be achieved.

### 3.4 Inability of farms to control sea lice numbers

The weekly sea lice counts for all Scottish fish farms, that are now being published by SEPA, show that it is not always possible for fish farm operators to keep sea lice numbers at the very low levels required to prevent harm to wild fish (See Appendix 4 - 'Sea lice counts reported by companies with west coast farms').

MS's consultation response to you states that the number of adult female sea lice at the Loch Hourn farm exceeded the industry's CoGP criteria for three weeks during the current production cycle, and during one of these weeks they were also above the MS reporting level of 2 adult females/fish, despite the measure taken by the company. Mowi plan to operate to an intervention level of 0.2 adult female lice all year round where cleaner fish are stocked on site as is proposed at Loch Hourn. This 0.2 female lice limit has been exceeded in 28 weeks between January and October 2021.



Mowi's Sea Lice Management Efficacy and Attestation report for Loch Hourn<sup>27</sup> (see table below) shows that CoGP sea lice levels were exceeded in the previous two production cycles as well.

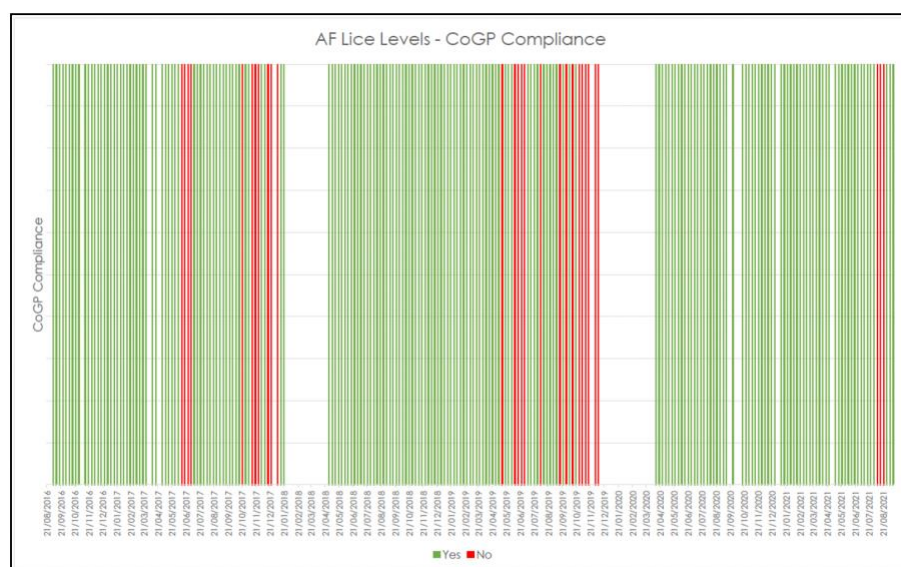


Figure 10: Loch Hourn Adult Female Lice Levels, COGP Compliance (2016-2021)

Many farmed fish die if they are treated for sea lice when their gills have been compromised by disease, injured by micro-jellyfish (hydrozoans), or when the fish are stressed by high water temperatures. Mowi's 2020 annual report ('Main causes of reduced survival' table) lists gill infections as the second most common infectious killer of its farmed fish, with 'treatments' for sea lice/disease as the main non-infectious killer.<sup>28</sup>

Table 3:

#### MAIN CAUSES OF REDUCED SURVIVAL

	INFECTIOUS		NON-INFECTIOUS	
	FISH NUMBERS	BIOMASS	FISH NUMBERS	BIOMASS
1	CMS	CMS	Treatments	Treatments
2	Winter sores	Gill infections	Environmental	Environmental
3	Gill infections	PD	Poor performers	Poor performers
4	PD	Winter sores	Other non-infectious	Physical damage

(CMS, Cardiomyopathy Syndrome; PD, Pancreas Disease)

Mowi reports that jellyfish blooms affected 10% of its Scottish farms last year. In Loch Hourn specifically, Mowi reports that 'there has also been evidence of gill damage by hydrozoans in the water column, but sampling, monitoring and mitigation options are still in their early stages'.<sup>14</sup> Such blooms are becoming more common as climate change warms the sea and

<sup>27</sup> <https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=R3C8H9IHL1J00>  
DOCUMENT 3. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT. Mowi. 29/11/2021 (21\_05582\_ FUL-SEA\_LICE\_MANAGEMENT\_\_EFFICACY\_AND\_ATTTESTATION-2573553.pdf)

<sup>28</sup> [https://corpsite.azureedge.net/corpsite/wp-content/uploads/2021/03/Mowi\\_Integrated\\_Annual\\_Report\\_2020.pdf](https://corpsite.azureedge.net/corpsite/wp-content/uploads/2021/03/Mowi_Integrated_Annual_Report_2020.pdf)

farmed fish are suffering a great deal as a result - hydrozoans killed more than 600,000 salmon in Greig farms around Skye in 2020 and many more elsewhere, including in some of Mowi's farms at South Uist.

The cumulative mortality figures published by Marine Scotland, for the whole industry, reflects the fact that there is no effective solution to the growing problem of gill injury and disease. Mortality levels of farmed fish have not improved for years. Of the most recent cohort to have spent two years at sea, 24% died.<sup>29</sup>

The inability or unwillingness to treat compromised farmed fish for sea lice increases the numbers of lice that can harm wild fish. Before consenting more biomass, THC should wait for the industry to prove that the promised innovations (such as lice skirts on the new 160m cages) can reliably bring sea lice numbers close to zero, even when chemical and physical treatments have been ruled out by gill health problems.

### **3.5 Cleaner fish**

Mowi says it has 'been able to maintain lower lice levels on site without compromising the welfare of our livestock' because it has improved 'the overall robustness of our stock and the increased experience of using the new lice treatment technology we have progressively invested in over the past 4 production cycles'. This includes 'early medicinal treatments on a pen-by-pen basis along with early cleaner fish introduction'.

This approach does seem to have made some difference but at the expense of the inhumane use of cleaner fish, which are frequently killed by temperature extremes, disease and freshwater treatment. Mowi promises that new 'grader technology' on well boats 'provides the ability to efficiently separate both wrasse and lumpfish during freshwater treatments, so cleaner fish can be returned safely and untreated to the destination pen'<sup>14</sup>, but wrasse are extremely sensitive to stress and being crowded in tarpaulins, or roughly handled in physical treatment vessels is likely to kill many of them. All surviving cleaner fish are then killed when the salmon are harvested because they can spread disease if redeployed. The proposed ratios of at least 12% lumpfish and 6% Ballan wrasse to salmon represent very large numbers of cleaner fish (30% of the number of salmon in the farm, according to Fig 6). All these fish will die in order to deal with sea lice; a problem that could be entirely avoided by switching to closed-containment production methods.

Wester Ross Area Salmon Fishery Board asked at the scoping stage that the applicant should demonstrate that the reported declines in catches of wild sea trout and salmon in the Loch Hourn area from 2016 to 2017 were not associated with sea lice infestation associated with the Loch Hourn salmon farm. Mowi's EIA has failed to answer this question, referring only to its sea lice treatment methods. Skye & Lochalsh Rivers Trust pointed out that, 'very few adult sea trout (were) seen in Loch Hourn this year and those that were caught had a high sea lice loading, suggesting that the wild fish populations were being exposed to increase levels of lice in the sea loch.' Mowi did not address this either except to say that sea lice levels in the farm had been high in July and August, and were brought down by September.

---

<sup>29</sup> See Table 28: Survival and production in smolt year classes during 2001-2020

<https://www.gov.scot/publications/scottish-fish-farm-production-survey-2020/pages/5/>



These questions suggest that sea lice from the fish farm at its present biomass are having an effect on wild salmonids in the Loch Hourn area. Mowi ought to be required by THC to demonstrate that its farm is not responsible before it can expand.

### **3.6 Environmental Management Plans**

Marine Scotland's consultation response says, 'information from the west coast of Scotland suggests lice from fish farming can cause a risk to local salmon and sea trout. This information can be used to give an idea of the relative risk to salmon and sea trout which is governed, and can be mitigated, by a number of factors, in particular the siting of the farm and its ability to effectively control sea lice', and that 'adherence to the suggested criteria for treatment of sea lice stipulated in the industry CoGP may not necessarily prevent release of substantial numbers of lice from aquaculture installations'.

Environmental Management Plans for controlling sea lice numbers on fish farms are supposed to mitigate this risk until no harm occurs, but they are widely acknowledged to be inadequate (for instance by Fisheries Management Scotland). One LPA planning officer described them to the REC Committee of the Scottish Parliament as a sticking plaster. These EMPs have no legally enforceable mechanism for providing feedback to rapidly reduce sea lice numbers on farms in time to protect wild smolts. Such actions are left to the discretion of the operator. EMPs cannot be applied to existing farms and when multiple farms are responsible for sea lice emissions, EMPs do not include a mechanism for apportioning action to reduce these emissions, according to the quantity that each one discharges or to the contribution they each make to the total load of lice in the sea. Marine Scotland's response acknowledges this inadequacy when it points out that, 'sea lice on wild fish are likely to be obtained from multiple sources, including other nearby farms. The applicant appears to be aware that wild fish sampling will generate data that could only be used to inform on general environmental sea lice loads.'

To illustrate the effect of this: The EMP for Loch Hourn also covers three of Mowi's farms to the north, at Alsh, Ardintoul and Duich. Their production cycles are managed out of phase with Loch Hourn, making cumulative impacts less likely. In contrast, the farms in Loch Nevis to the South are managed in phase with Loch Hourn. The hydrodynamic modelling commissioned by Friends of Loch Hourn shows that lice from Loch Hourn and these southern farms can have a cumulative impact on wild salmonids, but as these farms are owned by Scottish Sea Farms, the Loch Hourn EMP does not include them and cannot influence their management of sea lice.

The sea lice EMP for Loch Hourn is incapable of mitigating the overall risk to wild fish. It is because EMPs are not fit for this purpose that Scottish Government Ministers have asked SEPA to take responsibility for ensuring that sea lice do not threaten wild salmonids. This new system is expected to be in place by the end of the year.

THC knows there is a significant risk of harm to wild fish and that there is uncertainty about 'the movement of salmonids and the impacts of fish farm on wild stocks', as Mowi's EIA puts it. It lacks sufficient information to safely give consent for this development, which would be granted in perpetuity. Under these circumstances THC should apply the precautionary

principle and not allow the proposed farmed salmon biomass expansion in Loch Hourn until SEPA's new system is in place.

### 3.7 Particulate pollution

Mowi says that its Loch Hourn farm has been selected for expansion because it has proven to be an environmentally compliant farm, but the farm's most recent environmental assessment was made more than two years ago, in December 2019. According to the EIA, its June 2021 assessment has not even been submitted to SEPA and additional monitoring submitted by Mowi to SEPA on 21/04/2021 has not yet been assessed by SEPA. Unless THC sees the results of these assessments, how can planners assess whether the farm has had an unacceptable impact on the seabed at its existing biomass, during the last two years? Without this information you cannot tell if it can safely expand by 24%.

The farm has not been compliant in the past. The diagram below is from Scotland's Environment website<sup>30</sup> (for the west half of the farm). It shows that as many Environmental Monitoring failures as passes. Mowi blames these failures on 'an inappropriate sampling strategy based on old AutoDepomod modelling results', but these impacts were real and in response, in 2016, SEPA obliged Mowi to reduce the total biomass from 3300t to 2500t.<sup>31</sup> The farm pens were reconfigured and subsequent changes to SEPA's regulatory regime have made it easier for this farm to become compliant, while still heavily impacting the seabed around the pens with its benthic pollution. Now Mowi wants to raise its biomass once more. It is far from clear that this increase will not cause the same problems that farming a similar biomass of fish in the same location did before.

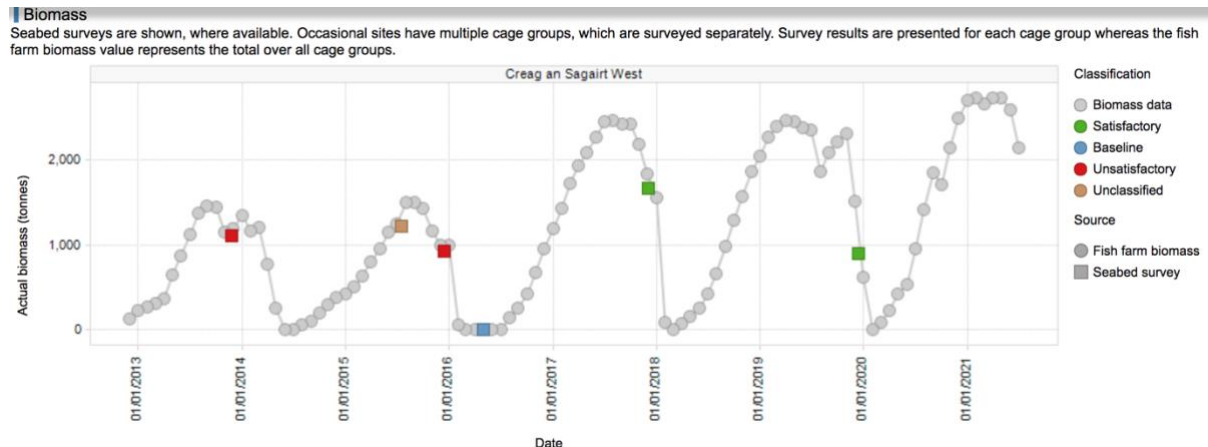


Figure 11: Compliance record for Mowi's Creag an T-Sagairt West 2013-2021.

### 3.8 Impact on Priority Marine Features

Mowi's EIA<sup>32</sup> says that, 'northern feather stars, tall seapens, and fireworks anemones PMFs were identified (Section 10.5.2.2). All three PMF listed species were found in close proximity

<sup>30</sup> <https://informatics.sepa.org.uk/MarineFishFarm/> (Loch Hourn MFF is registered as Creag an Sagairt West)

<sup>31</sup> Between 2012 and 2016 the site had been split into two farms (east and west). The particulate accumulation resulted in a sulphur-rich environment, absent of living benthic fauna and colonised by dense mats of bebbiata bacteria, a species indicating severe pollution.

<sup>32</sup> [https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=R3C8H9IHL1J00\(21\\_05582\\_FUL-ENVIRONMENTAL\\_IMPACT\\_ASSESSMENT-2573565.pdf\)](https://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=documents&keyVal=R3C8H9IHL1J00(21_05582_FUL-ENVIRONMENTAL_IMPACT_ASSESSMENT-2573565.pdf))

to the fish farm, between approximately 70m and 380m from the pen edges, which indicates either no or only minor impact from fish farm activities. It appears that the distribution and hence close proximity of these PMF species to the Loch Hourn fish farm was more likely to be attributed to the natural variation in substrate across the survey area. Due to the classification of PMF habitats, seabed identified to the north and east of the fish farm is considered to be of high sensitivity.'

Mowi's EIA accepts that next to nothing is known about the susceptibility of northern feather stars, tall seapens or fireworks anemones to fish farm pesticides ('it is also acknowledged that assessments of impacts of priority habitats to potential pressures are limited'), so the company has no basis for stating that the risk of harm due to its pesticide discharges is 'negligible', or that the PMFs are unlikely to make a 'contribution to the PMF network'. The presence of these high sensitivity PMFs close to the farm operating at 2500t biomass does not guarantee that they will survive the discharge of 24% more particulate pollution (1264.9 T per year), or very large increases in azamethiphos discharges. Why is there no consideration of the impacts on the other PMFs that have been recorded in Loch Hourn, including FWPMs, native oysters, seagrass and European spiny lobsters?

Mowi asserts that 'the magnitude of the impact arising from the modified site infrastructure on the benthic community is assessed as minor, due to the reversible impact on the existing benthic species assemblage'. In fact the company has published no plans to decommission this farm in the future and it will have planning permission in perpetuity, which does not depend on not harming PMFs. There is no obligation for farm operators to check the health of PMFs, or to alter farm management if they are being harmed. For SEPA's environmental monitoring purposes, seabed sediment grab samples are taken on a few prescribed transects, to assess IQI (fauna diversity in the sediment) but these grab surveys do not sample PMFs and if benthic surveys were to show that these PMFs have disappeared in years to come, Mowi would be under no obligation to reduce the size or impact of the farm.

With many thanks to John Aitchison for the preceding detailed account.

### **3.9 Sea lice and wild fish – modelling**

"For many of the mainland rivers from the Loch Torridon area south to **Loch Hourn**, and in some parts of the Isle of Skye, there is increasing concern for the future of rod fisheries for wild migratory fish, as a result of the cumulative impacts associated with open cage salmon farming." (Skye and Wester Ross Fisheries Trust, Review 2018).

Marine Scotland classify salmon rivers according to ability to achieve conservation status. The conservation status of each stock is defined by the probability of the stock meeting its conservation limit over a five-year period. Rather than a simple pass or fail, stocks are allocated to one of three grades, each with its own recommended management actions. The four closest salmon rivers (Glenmore, Glenbeag, Arnisdale and Guiserin) are all rated Class 3: "Exploitation is unsustainable therefore management action, including mandatory catch and release (all methods), is required to reduce exploitation".

Farmed salmon are hosts for parasitic sea lice which are proven to harm wild salmon and sea trout (Johnsen, 2020; Sandvik, 2020, ScotGov 2021). In order to assess the risk that wild

salmon and sea trout will be harmed by the proposed Loch Hourn farm expansion, the community group Friends of Loch Hourn, part of the Coastal Communities Network Scotland (CCN), has commissioned the development of a detailed hydrodynamic and biological model of the area. The model simulates water levels and flows (i.e., currents and tides), which govern the transport of organic material and sea lice emanating from the fish farms. The proposed expanded farm and six existing farms in the local area are included in the model.

The use of hydrodynamic modelling to predict sea lice densities and the risk presented to wild salmonids is increasingly common, particularly in Norway (Johnsen, 2020; Asplin, 2020). Marine Scotland and SEPA are working on similar projects here. The integrated biological model draws on the methods and assumptions used by Scottish and Norwegian modellers working for government agencies, as well as other peer-reviewed research.

The modelling outputs (See 3.3 Cumulative impacts and sea lice modelling above and Appendix 3) show how lice densities change spatially and over time. To best assist decision-makers' assessments of the long-term risks to salmon populations, this data needs to be presented in such a way that the most significant risk is apparent. The risk of infestation by sea lice varies according to the density of lice to which the fish are exposed and the duration of that exposure. The wild salmon smolt migration may take place across a period of two months, but individual fish are likely to take only a few days to travel through local lochs to the open sea, so sea lice densities averaged over two months (as in the Mowi model) do not best represent the risk they face. In this report the model outputs are presented in two ways, to demonstrate how the lice density and therefore the apparent risk vary:

1. Infective lice (copepodids) densities averaged over a 15-day period in May/June 2019 - a typical year when four of the seven modelled farms contain high fish biomasses, shown as a heat map.
2. Copepodid densities calculated every hour, and converted to equivalent daily lice density, shown as an animated series of lice density maps. These are the peak levels that migrating fish are likely to encounter. During their migration journey through the coastal area they may pass through multiple areas of high lice density.

The underlying hydrodynamic and biological modelling assumptions are identical. The animations show that infective lice copepodids accumulate along tidal and salinity fronts, at the mouths of sea lochs and along shorelines, in different places according to the neap/spring tidal cycle. Densities in these areas can be very much higher than the long-term, large-scale average. These lice aggregations are displaced locally by the flow of water but the high densities are conserved for many days. Migrating fish may be at significant risk of infestation when exposed to such high copepodid densities, even for short times. This risk is not apparent when densities are displayed as longer-term averages.

Mowi's Loch Hourn site lice numbers increased during the second half of 2021 surpassing the CoGP 0.5 threshold and even reached an unacceptable 3.26 females/fish in August.

Mowi has completely ignored threats to sea trout, which are also protected as PMFs, and unlike salmon, are at risk all year, being resident in coastal waters rather than migrating. Recent Environmental Management Plans for salmon/sea louse interactions (for instance Shuna Sound, to which Mowi is a signatory) list the levels of risk to salmon populations

represented by different numbers of sea lice found of wild fish. This assessment should also be done for Loch Hourn<sup>33</sup>.

**The full 61-day series of sea lice migration maps can be viewed as animations on YouTube at: [Dispersion](#) (sea lice per farm) and [Density](#) (sea lice densities). The video takes about 15 seconds (5 days) for the animations to show the sea lice larvae change into parasitic copepodids<sup>34</sup>.**

#### **4.0 PMFs Species and Habitats**

As mentioned in section 2.1, there has never been a baseline survey to record the presence of PMFs and habitats in Loch Hourn. A series of unstructured, uncoordinated surveys were carried out by five institutions<sup>35</sup> between 1984 and 2017 that recorded PMFs in a variety of locations in the loch. PMFs were recorded on Burrowed Mud, including tall sea pens (*Funiculina quadrangularis*) and firework anemones (*Pachycerianthus multiplicatus*), as well as Northern Feather Stars (*Leptometra celtica*), Kelp and seaweed communities on sublittoral sediment (one of which is within a few meters of Mowi's Craig an T-Sagairt farm and *Laminaria hyperborea* at Red Point); Maerl Beds (Inner Loch Hourn, Barisdale Bay and Sandaig), Basking Sharks, Cod, and Otters.

Other PMFs that are known to be present in Loch Hourn include sea grass beds, Atlantic salmon, sea trout, Atlantic mackerel (*Scomber scombrus*), Blue mussel beds, Horse mussel beds, Basking sharks, Killer whales, Minke whales - the list goes on. But we have no definitive record of abundance, locations, time of sightings or indications of decline or increase in occurrence for most of the species and habitats of importance. In other words, the baseline is very patchy and incomplete. However, a few high priority PMFs are reasonably well documented and must be taken into account in relation to the proposed biomass increase.

#### **4.1 Fresh Water Pearl Mussels**

Freshwater systems are considered to be of great cultural and ecological value given the presence of multiple protected or endangered species. FWPMs have never been taken into account during CAR Licence and aquaculture planning applications for Loch Hourn in spite of the fact that they continue to be present and endangered.

FWPMs were presumed extinct by NatureScot: "We were aware of anecdotal reports and these were investigated by specialists in the field in 1997 but none were re-found" (pers. comm. Alex Turner July 28, 2021). If the so-called experts had bothered to enquire of local residents, this oversight would have been avoided. NatureScot is now in possession of the FWPM locations and photo documents so that it is now incumbent upon the regulatory

---

<sup>33</sup> See Appendix 4: Sea lice counts (average adult females, April – May 2021) reported by companies with west coast farms. Note: Some of the farms listed are in Orkney and Shetland.

<sup>34</sup> A summary of the MTS sea lice modelling report can be found online here:

<https://www.friendsoflochhourn.org.uk/wp-content/uploads/Loch-Hourn-Sea-Lice-Modelling-Report-Summary.pdf>

The full MTS sea lice modelling report is available online here:

[https://www.researchgate.net/publication/354699230\\_A\\_Hydrodynamic\\_Model\\_of\\_the\\_West\\_Coast\\_of\\_Scotland\\_and\\_with\\_Coupled\\_Sea\\_Lice\\_Dispersion](https://www.researchgate.net/publication/354699230_A_Hydrodynamic_Model_of_the_West_Coast_of_Scotland_and_with_Coupled_Sea_Lice_Dispersion)

<sup>35</sup> Queen's University 1984; Scotland Fisheries Research Services 1995-2000; SNH ROV Survey, 1996; Seasearch Scotland, 2007-2017; Marine Scotland, 2011.

authorities to put in place protective measures to safeguard the existence of FWPMs in the rivers that empty into Loch Hourn. The increase in biomass at Mowi's LH farm presents an increase in risk to FWPMs which depend on salmonid interaction to reproduce. It is time that THC and NatureScot prioritise the protection of FWPMs in Loch Hourn when considering Mowi's biomass expansion.

#### 4.2 Molluscs

FoLH have reported the presence of three Atlantic oysters (*Ostrea edulis*) remnant populations in Loch Hourn to NatureScot, along with the presence of Horse mussels (*Modiolus modiolus*) although a more thorough appraisal of the extent to which they are found in circalittoral environments requires further investigation. The recent die-off in blue mussel (*Mytilus edulis*) beds are an unexplained phenomenon which is not confined to Loch Hourn although the impact from the proximity to open pen salmon farms cannot be ruled out.

#### 4.3 Salmonids

Atlantic salmon and sea trout are PMFs that deserve special consideration by THC when considering the increase in farmed salmon biomass. This is due not only to the impact of sea lice on wild salmonids but also the role that salmonids play in the reproduction of the high priority FWPMs. (See section 3.0 for detailed information about the impact of salmon farming on salmonids in Loch Hourn)

### 5.0 Landscape and Seascape<sup>36</sup>

#### 5.1 The Highland-wide Local Development Plan (HwLDP)

The current HwLDP on National Scenic Areas (NSA) states: "They (NSAs) are defined as areas of "national scenic significance ...of unsurpassed attractiveness which must be conserved as part of our national heritage." However, the Planning etc (Scotland) Act 2006 renews the powers of Scottish Ministers to designate NSAs where an area is of outstanding scenic value in a national context. Thereafter **special attention** is to be paid to the desirability of **safeguarding or enhancing** an NSA's character or appearance. These areas are protected by national policy in that the integrity of the area **or** the qualities for which it has been designated should not be adversely affected."

**Our interpretation is that:**

- **There is a strong presumption for safeguarding and enhancing NSAs as indicated by the use of both 'must' and 'special'.**
- **Even if a development does not detract from the overall integrity of the NSA, the use of 'or' in '..the integrity of the area or the qualities...' indicates that it can adversely affect the special qualities of the NSA in a local context.**

**We believe that Mowi's proposed development in its extended form would adversely impact on the special qualities of the NSA and that the impact of the development in its**

---

<sup>36</sup> In line with the European Landscape Convention and the UK Marine Policy Statement (2011), we regard seascapes and marine environments as being included in the definition of landscape. The UK Marine Policy Statement (2011), Seascope 2.6.5.1 'The effects of activities and developments in the marine and coastal area on the landscape, including seascope, will vary on a case-by-case basis according to the type of activity, its location and its setting.'

**entirety (once changed) must be considered. The preservation of an NSA should be prioritised and awarded the ‘special attention’ it deserves: for its intrinsic worth and for the values it has for people.**

It follows that there must be a strong justification of public benefit flowing from the extension of the fish farm, which overrides the presumption for safeguarding and enhancing. The Draft NPF4 Natural Places, S32 (d) states that:

“Development proposals that will affect a [ . . . ] **National Scenic Area**...should only be supported where the objectives of designation and the overall integrity of the area will not be compromised; **or** any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance.” This replicates what is already in Scottish Planning Policy (para. 137) (emphasis added).

This is not classed as a development of national importance. Its social benefits in terms of national employment are insignificant and cannot be validated. Moreover, the sector is increasingly automated and the extension is likely to need less labour, not more. Furthermore, there will be increased national disbenefits in terms of operational carbon and methane emissions and negative impacts on PMF habitats in Loch Hourn, which are of value for carbon sequestration and are also biodiversity-rich. Even less-than-substantial harm to a national asset should require clear and convincing justification, but none has been given as to why the farm needs to be expanded in this particular place, when Mowi have other options for expansion away from these important national assets. Any level of harm to an NSA should be wholly exceptional and neither this proposed extension, nor the farm in its entirety pass this test.

## **5.2 Shifting Baselines (SBS) (Also known as ‘boiled frog syndrome’ or ‘eroding goals’)**

“...this trap occurs when a system drifts downhill slowly enough for the actors in the system to forget how much better things used to be. Everyone is lulled into lower and lower expectation...The system requires a balancing feedback mechanism, a burst of energy to raise standards to where they once were.”<sup>37</sup>

A key issue in the determination of whether there are adverse effects on the NSA is how the incremental increases in the farm’s size will be evaluated. There is no doubt in our opinion, that were Mowi to apply for consent for a farm in 2022, at even its current size, it would be refused permission on landscape grounds based on NatureScot’s (then SNH) 2011 presumption against development in areas of isolated coast, which are distant from centres of population and lacking in obvious signs of development and often inaccessible. The Friends of Loch Hourn community feel that the farm has grown too large already; that it is diminishing the sense of place and having a negative impact on this special landscape. It has already reached a ‘tipping point’ and many question whether a threshold beyond which it should not be allowed to expand actually exists.

---

<sup>37</sup> Henry Dimbleby, *The National Food Strategy: The Plan* (2021)

In this respect, an assessment based on the assumption that previous extensions are already in the landscape and that the incremental change to the baseline due to yet another addition will be negligible and result in a negligible cumulative impact is unsatisfactory. The limitation of this ‘additional’ approach is that it fails to consider whether the landscape has the capacity to accommodate this growth without serious damage to its special qualities and to its inhabitants’ tolerance.

We suggest that a ‘total effects’ appraisal is more appropriate to avoid providing an overly favourable assessment – as Mowi has done – which might prevent an understanding of the true cumulative effect of the farm’s incremental growth.<sup>38</sup> If a ‘significance threshold’ for NSAs does not exist, there seems little point in the designation.

‘Shifting Baseline Syndrome’ initially described a marine dilemma, where each generation of fisheries scientists began with smaller fishing stocks than the one before and used their generational baselines as thresholds when evaluating marine change. This effect of this was to stimulate fish decline.<sup>39</sup> Instead of this ‘generational amnesia’ we suggest that in the landscape evaluation for Loch Hourn, we should apply a historical perspective. Others have commented on the loch in the 1960’s and 1970’s and ‘Scotland’s Scenic Heritage (1978) includes the following phrases:

“outstanding scenic value...remote and rugged mountain country ...extensive coastline contributes significantly to the character of the area [. . .] an archetypal western sea loch [. . .] reminiscent of a Norwegian fjord [. . .] magnificent views of Skye and the Small Isles [. . .] one of the wildest and most beautiful parts of mainland Scotland.”

It is worth noting that this description is not that different to Pennant’s in 1772: ‘There is no part of our dominions so remote’. The outer loch has become an industrial landscape and it is losing its special qualities. This is a statement of fact, but also a perception of many local people.

**5.3 The extension is contrary to The Landscape Character Assessment** (Caroline Stanton 1996) relating to Fjords. She describes the impact of aquaculture on Fjord landscape: (emphasis added):

“The impact of aquaculture is **greater** within the fjord sub-type due to its enclosed, tranquil and perceived **remote** character. The landscape will probably only be able to accommodate **only a small amount** of this type of development. The relative impact may be reduced if it is concentrated close to existing settlement or near the wider waters of fjord mouth and **if it is small scale and creates only very intermittent noise and activity.**” (emphasis added)

---

<sup>38</sup> FoLH adopt this definition of ‘cumulative effects’: Cumulative effects are: ‘...those that result from additive effects caused by other past, present or reasonably foreseeable actions together with the plan, programme or project itself and synergistic effects (in- combination) which arise from the reaction between effects of a development plan, programme or project on different aspects of the environment’ This definition is also that included in the British Standard 2015 guide to EIA for offshore renewable energy projects (PD6900:2015)2

<sup>39</sup> Jimmy Jönsson, Erland Mårald and Tomas Lundmark, ‘The Shifting Society Syndrome: Values, Baselines, and Swedish Forest Conservation in the 1930s and 2010s’ 3 Conservation Science and Practice, citing Jackson et al., 2001; Jackson, Sala, & Alexander, 2011; Pauly, 1995; Pitcher, 2005



This proposed extension represents a 12% increase in sea surface area. There may be fewer cages, but each cage is 77% bigger than the existing cages. They take up more sea space and their alignment creates a visual barrier between the sea and the land. The pen size and associated 24% increase in biomass will require more shipping, adding to the visual disturbance, which already exists. The increased lighting will detract from the sense of remoteness in a dark sky area. The farm will be the third largest in Scotland, so cannot be described as small in scale and the noise from the feed barge is constant. It is not adjacent to the existing settlement (Corran) but instead acts as a focus in views across water from Corran, from Ben Sgritheall and from the coastal path above it on Knoydart.<sup>40</sup>

We therefore take issue with the comments by the applicant's EIA consultants, LUC, in Appendix 19 para. 3.2) that '*the current proposal is for larger but fewer pens, therefore there will be no increase of the overall extent of the farm*'. This is misleading. The extent of area farmed has increased, within a planning boundary, which has remained the same.

The screening and scoping opinions relate to the first iteration of the application design, since when it has changed. There has been no reasoned explanation of why the planning authority accepted the applicant's consultant's opinion that a Seascape/Landscape Visual Impact Assessment was not necessary or why NatureScot required only a commentary on the impact of the special qualities. From their own guidance (2018) on the visual impact of fish farms they state at paragraph 3 that "[. . .] images offer a key means of showing the likely effects of a proposed development, although they can never replace the full experience of seeing a fish farm on site" and paragraph 8 states that "the relationship between land and sea should be considered."<sup>41</sup> There have been no photomontages of the impact of the farm as seen from the sea, so we are unable to provide these to compensate for this deficiency.

The impact of the extended farm in its totality would be contrary to the objectives of the NSA special qualities, which seek to protect the uniqueness and drama of 'the most fjord-like of any sea loch in Scotland', an '**exemplar of a previously glaciated landscape**' and 'the epitome of a West Highland Landscape'.<sup>42</sup> It is '**One of Scotland's last great wild areas**', the combination of wildness, naturalness and remoteness being a major draw to those seeking an escape from the pressures of life in urban and more populated areas of the country. The '**views across to the Inner Hebrides**' across the Sound of Sleat to Skye and its Cuillins are outstanding from the mountains and from the sea.

**The sight of an industrial complex diminishes the quality of the experience of visitors to the area, as it introduces an incongruous element into 'Britain's last wilderness.'** Of course, there is no area of Britain which can be described thus, but Knoydart and Loch Hourn is as near as it gets and is the main reason for its designation: to provide the wilderness experience and the benefits this brings to human wellbeing.<sup>43</sup> It is a place of superlatives and

---

<sup>40</sup> See photographs 10 and 16: <https://theperimeter.uk/2021/10/26/day-274-rubha-ard-slisneach-to-rubha-ruadh-a-slug-in-my-mug/>

<sup>41</sup> Scottish Natural Heritage, *Visualisations for Aquaculture - Guidance* (2018)

<sup>42</sup> Scottish Natural Heritage, *SNH Commissioned Report No.374* (2010)

the NSA is meant to protect the standard of experience for this and future generations. The extension would exacerbate the adverse impacts on landscape and seascape character for walkers along this section of the Knoydart coast and for those on boats, bearing in mind that transport by boat has long been the only method of transport up and down the loch. The farm already dominates the seascape from a boat. SNH's 2011 guidance expects that all developments respect the landscape character of the area within which they are located and sustain the qualities, which reinforce experience of place. We do not feel that the sense of place has been sustained.

#### **5.4 Wild Land: The Kinlochhourn-Knoydart-Morar Wild Land Area (WLA)**

The farm's location is immediately adjacent to the WLA. The **NPF 3** (2014) regards Wild Land as meriting strong protection because it contributes to quality of life, national identity and visitor economy. It states "We also want to continue our strong protection for our wildest landscapes - wild land is a nationally important asset."

The 2017 SNH consultation response on wild land states that Lochs Nevis and Hourn are 'remarkable' examples of fjords and makes clear that the views of the WLA are important 'from outside its edges... including the minor road between Shiel Bridge and Corran in the north west...' The WLA therefore merits due consideration.

The attribute and quality reasons for the designation emphasise the strong sense of naturalness, awe, remoteness and sanctuary. Nature Scot comments on the impacts of developments on wild land and their effects, which can harm the sense of solitude. They refer to 'visibility, noise and / or movement of the proposal; impacts that vary over time, for example drawdown margins associated with a loch storage hydro scheme affecting the sense of naturalness, or artificial lighting affecting the sense of sanctuary or risk' and 'attrition of qualities through cumulative effects.'<sup>44</sup> These factors all apply to the fish farm. NatureScot are obviously considering the reduction in the sense of solitude over time, due to incremental change. If NS does not afford the same consideration to the cumulative impact on the NSA, this represents an inconsistency in approach and is not in accord with the Principle of Consistency (TFEU Art. 7).

#### **5.5 The upcoming NPR 4 draft S32(1) Natural Places states that:**

*Development proposals for development in areas identified as **wild land** should only be supported where:*

- the proposed development cannot be reasonably located outside of the wild land area; or,*
- it is for small scale development directly linked to a rural business, croft or required to support a fragile population in a rural area; and,*
- a site based assessment of any significant effects on the qualities of the areas is undertaken, and use of siting, design or other mitigation minimises adverse impacts.*

This proposal *can* be reasonably located away from the WLA; the area is *not* in the most fragile economic zone (SIMD, 2020) and we are not aware that there *has* been a site assessment by NatureScot in line with their 2018 guidance on visual impact.

---

<sup>44</sup> Nature Scot, *Assessing Impacts on Wild Land, Technical Guidance* (2020)

As the Highland Council has previously raised concern about the impact of such a scale of development on the NSA and Wild Land special qualities (in its screening and scoping opinions for this application in 2018) and as a SLVIA examines the effects of change resulting from development on landscape/seascape in its own right and on people's views and visual amenity, we reiterate our concern that there is no updated SLVIA, which considers total effects.

## **5.6 Conclusion**

- Mowi's expansion proposal conflicts with HwLDP Policies 28, 36, 50, 57 and 61 in that it does not demonstrate sensitive siting, taking account of the local landscape characteristics and capacity.
- It is not in accord with NPF3 support for NSAs and WLAs and the draft NPF4, where development in rural areas should be supported where the proposals are suitably scaled, sited, and designed to be in keeping with the rural character of the area.
- It would represent a tipping point in the nearby community's tolerance in terms of the intensification of noise, traffic on land and sea and lighting, all of which diminish their visual and sensual appreciation of the setting of their homes and has an adverse effect on their wellbeing.

## **6.0 Mowi's history of accidents, mortality, chemical usage etc.**

**6.1 Mortality:** Several incidents have occurred at the Creag an t-Sagairt farm during the last 22 years. In 1999 the death of 240,000 salmon (600 tonnes) occurred due to overstocking by Marine Harvest. The entire shoreline of outer Loch Hourn was covered in the greasy scum - remains of the fish that had rotted in the bottom of the pens and dispersed with the tide. Mooring ropes, buoys, the waterlines of local boats and the shoreline of the loch were affected for several weeks. It stank. Marine Harvest was fined (the paltry sum of ) £500 in the Portree Sheriff Court two years later. For more details see:  
(<https://archive.parliament.scot/business/committees/historic/x-transport/reports-02/trr02-05-vol02-04.htm>)

In 2019, mortality of farmed salmon in Loch Hourn reached 257 tonnes due mainly to Cardiomyopathy Syndrome (CMD). Sea lice treatment of salmon with this disease are particularly prone to result in mortality due to excess stress occasioned by sea lice treatments: average salmon death rates due to lice treatments with chemicals, mechanical hydrolicers and thermolicers cause up to 1% mortality during each treatment. Mortality total rates at the end of the last growth cycle (2020-21) was 19%.

Mowi's record elsewhere on the west coast is dire. For example, in three months (July to September) 2019 Mowi recorded 700,000 mortalities across twelve of its farms. The Fish Health Inspectorate record all mortality rates per week on the following website. If anyone thinks high mortalities on Scottish salmon farms are not a problem they should view: <https://www.gov.scot/publications/fish-health-inspectorate-mortality-information/>

**6.2 Disease:** Salmon suffer from various diseases including amoebic gill disease (AGD), infectious salmon anaemia (ISA), cardiomyopathy syndrome (CMS), and pancreas disease

(PD). In 2019 across the salmon farming sector in Scotland, the FHI recorded 4,031,528 mortalities out of a total of 6,281,720 due to a range of diseases and their treatments (Fish Health Inspectorate, 2020). CMD and AGD have both been problems at the LH farm during the last growth cycle (2020-2021).

**6.3 Escapes:** Interbreeding between escaped farmed Atlantic salmon and wild indigenous salmon (hybridisation) introduces genetic material from farmed stocks into wild populations (introgression) with resulting disruption of the adaptive genetic composition of individuals and populations. This can impact their fitness resulting in a significant negative pressure on the viability of wild populations. Farmed Atlantic salmon differ genetically from wild salmon because they are selectively bred for captivity, adaptation to pellet feed and fast growth. This results in the loss of genetic variation and subsequent genetic drift compared with wild salmon. There is a concern that genetic introgression of escaped farmed salmon to wild salmon might reduce the viability of wild Atlantic salmon.

In August 2020 48,000 mature salmon escaped from Mowi's Carradal North farm. Mowi's recent record elsewhere in the region is suspect; 73,000 salmon escaped from its farm off Colonsay in January 2021.

Mowi's Hellisay site was inspected following notification of an escape of 23,970 Atlantic salmon on the 10 October 2019 and 24,752 Atlantic salmon on the 12 November 2018. The only penalty imposed on Mowi by the FHI was a recommendation that Mowi produce a review document of the situation.

The West region, to the north of the Clyde had the greatest concentration of sites with evidence of introgression (Figure 5). This area also contains most of the mainland marine aquaculture production in Scotland. Of the 98 sites classified in this region, 37.8% showed evidence of introgression, with 24.5% classified as either Poor or Very Poor (Table 2).

**6.4 Harmful Algal Blooms (HABs):** Evidence from a Scottish Parliamentary Report in 2002 states: "SEPA do not have the ability to examine the accumulative effects of salmon farms in a given area, for both chemical contamination and nutrient enhancement, their model treats each farm in isolation. [ . . . ] The consequences of intensive fin fish aquaculture as has happened in Loch Sunart, **Loch Hourn** and most recently and alarmingly at Urafirth, Shetland, where 75% of shellfish stock (king and queen scallops) losses were experienced due to a nutrient enhanced red tide."

Loch Hourn Mussel Growers were subject to harvesting restrictions between June and August each year during the late 1990s to the early 2000s due to HABs causing DSP and PSP in shellfish. Prior to this, testing was done on a weekly basis but there were no restrictions. Was this coincidentally related to the presence of the Marine Harvest salmon farm? A toxic event of dinoflagellate PSP toxin seafood poisoning in Loch Hourn occurred in June and July 2002.<sup>45</sup> Shortly after this Loch Hourn Mussel Growers ceased to operate due to longer harvesting restrictions throughout the summer months.

---

<sup>45</sup> *Environmental Health* (2011) 10, 54 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3123625/>

LH aquaculture framework plan 2001: “Loch Hourn had a provisional seasonal classification of Category ‘A’ from August to May inclusive and Category ‘B’ for June and July only. During the season of the ‘B’ classification, mussels must be depurated. Shellfish production can also be affected by the presence in the water column of certain harmful but naturally occurring algae. When these algae occur in high concentrations they can cause the accumulation of toxic compounds within filter-feeding bivalves and can lead to fisheries and aquaculture operations being temporarily closed down on public health grounds. Closures of this nature are not uncommon in Loch Hourn and other west coast sea lochs during summer months.” (p 6)

**6.5 Mowi’s record elsewhere:** In 2017 Marine Harvest exceeded its biomass limits 11 times across its 37 farm sites, breaching the sea lice trigger levels 64 times, with monthly mortality  $\geq 10\%$  eleven times and had the second worst welfare score out of eight salmon companies. [One Kind, Scotland] <https://www.onekind.scot/wp-content/uploads/salmon-farming-league-table-report.pdf>

## **7.0 Economic Impact - Employment opportunities**

Mowi’s motivation for this expansion is simply to increase economies of scale thereby reducing costs and making more profit at the expense of the natural environment. According to Mowi’s COO<sup>46</sup>, the Loch Hourn farm “presently employs 10 people”. None of these employees are residents of Arnisdale: five are based in Glenelg and the others are made up of temporary migrant workers who leave very little behind in the community. According to Mowi’s Loch Hourn Economic Impact Assessment, they plan to reduce employment to nine workers “at peak”. This is in line with Mowi’s plans to reduce world-wide workforce by 10% by 2024<sup>47</sup>

We do not underestimate the positive impact that Mowi’s employment of local people has had on the community. It must however be recognised that although many young (mostly men) have benefited from the work opportunity, few have stayed for more than a year or two before moving on, often out of the area to find more rewarding employment elsewhere.

Mowi fails to explain how twenty-three construction jobs over two years (2020-2022) will be justified in order to remove 12 cages and replace them with 8 larger ones. Much of the information in the Economic Impact Assessment is general and does not apply specifically to the local community. The economic benefits are opaque and based on highly questionable assumptions. The fact is, Mowi’s economic contribution to the community is negligible. In fact, the community of Arnisdale provides Mowi with super high-speed internet through a community funded internet project, without which Mowi would be unable to operate in Loch Hourn.

## **8.0 Overview**

*The Scottish Government and Scottish Green Party believe that Scotland should have a sustainable, diverse, competitive and economically viable aquaculture industry. It must operate within environmental limits and with social licence and ensure there is a thriving*

---

<sup>46</sup> Ben Hadfield letter to Kate Forbes MSP Feb 23, 2021.

<sup>47</sup> Fish Farming Expert 26.08.2020. [www.fishfarmingexpert.com/article/mowi-plans-10-reduction-in-staff-by-2024/](http://www.fishfarmingexpert.com/article/mowi-plans-10-reduction-in-staff-by-2024/)

*marine ecosystem for future generations. [. . .] We agree with the Scottish Parliament's Rural Economy and Connectivity and Environment, Climate Change and Land Reform Committees **that the status quo of aquaculture regulation is not an option.***<sup>48</sup>

### 8.1 Sustainability

The issue of environmental sustainability covers many facets of salmon farming. The source and content of fish feed, eutrophication from farm waste nutrients, chemical and medicine discharge into open waters, the high levels of mortality of both salmon and cleaner fish, the infection of wild fish from viral diseases, the impact that increased loads of sea lice have on the reproductive capacity of wild salmon and sea trout, before even mentioning the effects on non-salmonid species.

Start with the origins of fishmeal and fish oil (FMFO) from wild fish used in feed pellets. Twenty percent of world's annual catch of wild fish is used to make FMFO as one ingredient in feed for farmed salmon. Key species such as sardines are overfished in the oceans adjacent to some of the world's poorest countries leading to the depletion of stocks and in unsustainable 'reduction fisheries' such as West Africa and Peru. The aquafeed industry deprives vulnerable communities of a staple food, leaving small-scale fisheries struggling and people going hungry. This situation is likely to deteriorate further if salmon farmers' plans to double production in the near future come to pass.

Antarctic krill are a keystone species that is increasingly being harvested as an additive to salmon feed pellets but there is concern that increased harvesting of krill will impact the food chain in the Antarctic region. Is this an indication of what we're doing to our oceans? Have the oceans been so depleted by industrial fishing that it is now necessary to harvest krill, the foundation of the entire ocean's food chain?

The salmon farming industry claims that it achieves efficient conversion ratios as low as 1.2 for weight of feed pellets to weight of salmon produced. However, salmon are made up of 22% dry matter whereas feed pellets have 94.3% dry matter. If one compares like with like (dry matter of fish to dry matter of fish feed) the true ratio is closer to 4.5 to 1. Over 60% of the dry matter mass in the feed is discharged in the form of highly bio reactive dissolved compounds. This amounts to over 3,400 tonnes of raw animal waste discharged into the once pristine waters of Loch Hourn during the 2018-19 production cycle (the last one with available statistics on feed quantities).

Andrew Graham-Stewart, Director of Salmon and Trout Conservation Scotland puts it succinctly<sup>49</sup>:

- Where in the world has the goal of sustainable salmon farming actually been achieved?
- How can an industry that sources much of its feed from poor countries in South America and West Africa, transports it for thousands of miles and subsequently

---

<sup>48</sup> Scottish Government and Scottish Green Party (2021) Draft Shared Policy Programme, WORKING TOGETHER TO BUILD A GREENER, FAIRER, INDEPENDENT SCOTLAND. (p.45) <https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/documents/>

<sup>49</sup> Letter to Mairi Gougeon MSP, Cabinet Secretary for Rural Affairs and Islands, 22 September 2021.

airfreights the finished product (those fish that do not perish before harvest due to disease and parasites) worldwide, be deemed sustainable?

- Can a business model that incorporates some 20% mortality before harvest be deemed sustainable?
- Can an industry, that is responsible for ecocide or the severe degradation of Scottish coastal ecosystems in the “aquaculture zone” and the destruction of significant and valuable fauna and flora that depend on unpolluted waters, be deemed sustainable?
- Can an industry that takes tens of thousands of wrasse from the wild, confines them in salmon cages before killing them at the end of the salmon production cycle, be deemed sustainable?
- Where in the world has the growth of intensive salmon farming not coincided with the collapse of wild salmon runs? (It is no coincidence that the only remaining abundant salmon runs are in Alaska, with no salmon farms, and Russia, with hardly any salmon farms)

## 8.2 Climate Change and the ‘Climate crisis’

More extreme weather and warming sea temperatures are creating disruption to salmon farms. Not only does climate change worsen parasitic sea lice infestations but may also lead to increased incidents of HABs resulting in high mortality events.

The absence of a **Climate Resilience** strategy in Mowi’s Environmental Report (ER) concerns us for two main reasons:

- Climate-related welfare and health issues for farmed salmon and cleaner fishes due to predicted increases in lice numbers and diseases, will reduce the survival chances of wild salmonids in Loch Hourn even at current stocking levels. A 24% increase in biomass could well mean further extinctions in our rivers.
- In terms of Mowi’s socio-economic impact document, the risk to productivity and local jobs due to climate-related sea warming, sea level rise, infrastructure damage, fresh water shortages has not been addressed.

Part 3 of the draft NPF4 states that climate change and nature recovery will be the guiding principles in planning decision making including ‘[. . .] **the adaptations we need to make in order to be resilient** to the risks created by a warmer climate.’ This echoes the legal commitment under the Paris Agreement (PA Art.7(1)).

We see no mention of climate mitigation or adaption (Annex IV, pt.4 and pt.5(f)) in the ER, let alone a forecast of potential climate threats – the so called ‘do nothing scenario’, as required by EIA, nor an evaluation of reasonable alternatives. In contrast, FoLH has already started sea grass and native oyster restoration planning with the objective of increased ecosystem resilience in order to avoid a catastrophic regime change with adverse consequences for our coastal community.

Mowi should reduce the pressures they already put on the marine system, not increase them, rather than pursue what seems to be a ‘business as usual’ approach. We therefore ask for a precautionary approach to be taken regarding this extension in line with UNFCCC Art. 3.

### **8.3 Escapes and genetic ingress**

There's also an issue with genetic pollution. Fish escaping from the pens is to be expected. However, when they escape they merge with wild salmon populations and breed with them. This has caused a decline in the wild salmon sea survival because farmed salmon have been bred to grow quickly and never become as big as wild salmon. Because of this, "they do not reproduce at the same rate as the larger wild fish" and ultimately contaminate wild salmon populations with their modified genetics.

### **8.4 Disease**

The spread of diseases to the wild population is also a major negative impact caused by escapees. Farmed salmon living in such close proximity provide optimal conditions for the transmission of sea lice between individuals, often resulting in a large percentage of farmed salmon populations carrying the parasite. Similarly, cage conditions are perfect for the spread between fish of viral diseases. These diseases will also spread from farmed fish to wild salmonids as the virus particles pass unimpeded through the cage netting.

### **8.5 Eutrophication**

The huge quantities of organic waste discharged from a fish farm with a maximum biomass of 3100 tonnes can have multiple effects on the environment. Some are seen, as in the proliferation of certain species of seaweed, others are more subtle such as the uptake by marine bacteria leading to imbalance in the ecosystem, or the increased incidence of HABs.

### **8.6 Precautionary Principle**

Regulatory authorities in Scotland ignore the damage caused by salmon farming to wild fish which on the west coast are already at critically low levels. The 2018 REC and ECCLR Committee Reports list urgent recommendations for reform, most of which have not been taken up by the Scottish Government. Effective regulation is needed that takes the Precautionary Principle seriously so that preventive action can avert environmental damage.

About the only aspect of open pen salmon farming that is 'sustainable' is the economic returns for the handful of large corporations who operate internationally. How long that will last is anyone's guess but eventually salmon farming will of necessity have to move to land-based Recirculating Aquaculture Systems.

To borrow the phrase of Al Gore from another context, it is an inconvenient truth that open pen salmon farming has a lethal effect on wild salmon populations and the environment generally. Many parties to this enterprise are either in denial of this, or really do understand what is happening but do not care. Looking at the actions of the farmers, but also regrettably the government, it is hard to escape the conclusion that a calculation has been made that the perceived economic benefits outweigh the survival of salmon in West Coast rivers and lochs.

No amount of Environmental Impact Assessments can disguise the reality of what has already happened, and it is inevitable that the remaining rivers will follow their neighbours into extinction if the situation is not taken seriously. We could be the generation that oversees the total loss of West Coast salmon - analogous to the generation that presided over the collapse of West Coast herring. But the salmon will never come back. The



population of a particular river is unique to that river. Once the salmon are gone from these rivers they will not return, there will be no wild salmon that even know these rivers exist.

SEPA's current stance is that the subject of wild salmonid health is a matter for the Highland Council, falling under their duty to the environment, and not one of the things, such as effluent and chemical pollution, that SEPA are responsible for. This planning committee represents the one chance to address this and to try to halt this decline.

It is time to be honest about this. If this farm is allowed to expand we will lose the wild salmon and the sea trout. If that is the decision of the Highland Council, then they need to be explicit about it and say that the economic interests of Mowi are more important than biodiversity, the health of the environment and wild salmon. There is no middle way where everyone can be happy.

### **8.7 Finally!**

It needs to be said that Friends of Loch Hourn are not opposed to any progress in the salmon farming industry, or are in some way marginal and ill-informed. Our views have wide support in the other groups belonging to the Coastal Communities Network, suffering the same incursions from the industry, but also further afield both nationally and internationally.

In this country the tide is turning against the salmon industry as more people become aware of its deficiencies. There are campaigns to persuade Marks and Spencer to stop labelling their salmon Responsibly Sourced and for Sainsburys to stop using the term Sustainable. In the USA Mowi agreed to pay \$1.3million in settlement of a class action suit over the misuse of the words 'sustainable' and 'eco-friendly'. Some institutions such as the Tate Gallery, are choosing not to serve farmed salmon in their cafes. Worries about the industry are widespread.

Scottish salmon farming is a growth industry, with plans to increase production to 350,000 tonnes of fish a year by 2030 from the current 200,000 tonnes. But while the current Scottish government supports aquaculture growth, many other nations and regions take a radically different view.

Concerns about pollution, the effect of fish farms on tourism and the damage to wild salmon populations have led to moratoriums on salmon farm expansion - and even outright bans:

- Canada has promised to end open-net pen farming in British Columbia waters by 2025. Last year the closure of 19 fish farms in the Discovery Islands was announced.
- In Australia, Tasmania's state government announced a 12 month halt on salmon farm expansion.
- Denmark's government will no longer support the growth of fish farms in open waters because of the industry impacting negatively on the marine environment by releasing nutrients and other pollutants into the water.
- The Norwegian government is urgently seeking solutions to escapees, high mortality rates and sea lice infestations. It stresses that any growth must be proved sustainable and it is encouraging closed containment farming in its fjords.
- Argentina's Tierra del Fuego Province banned the development of intensive open-net salmon farms last June, effectively banning all finfish farming in that country.

- Washington state banned open-net salmon farming in 2017 after a pen at Cooke Aquaculture collapsed.
- Chile has blocked the establishment of new salmon farms between 2010 and 2020. Earlier this year an enormous algal bloom led to the death of 5000 tonnes of salmon, and there are now calls for another moratorium on aquaculture expansion.

It seems very wrong that in this climate it falls upon the local communities to oppose this reckless expansion in Scottish waters. Some higher authority should be stepping in to take responsibility for the environment but it is just not happening, witness the frightening number of new farms and expansions that have been approved even since the ECCLR and REC reports. Members of the Friends of Loch Hourn community have spent literally hundreds of hours reading books, papers, reports, corresponding with other concerned individuals and organisations and trying to formalise their objections. We have spent many thousands of pounds commissioning modelling of sea lice and pesticide dispersion, some of which has highlighted the inadequacy of Mowi's own contributions (notably the difference between considering peak and average levels of contamination and sea lice densities). Yet at the end of all this we are faced with the impossibility of doing justice to all the information we have unearthed. Some of the topics may well involve an academic study that takes forty or fifty pages to set out its methods and conclusions – we may have to summarise that in a few sentences, or, for reasons of space, not at all. The sheer volume of information means it is literally impossible to present a comprehensive case.

What is particularly galling is that at least two government commissions have tried to do this but have had their findings largely ignored. If their voices were listened to then we would not find ourselves having to go over the same ground almost four years later, without the authority of the respected figures who were on those committees and without the space to set out the arguments in full. If they were listened to, then all expansion, new farms or old, would be halted right now, perhaps indefinitely. The Precautionary Principle is central to their conclusions – do not proceed if you cannot say for sure that no harm will be done.

Earlier we mentioned the matter of progress in the industry. It's not that we are against progress but that relentless expansion does not seem to be the way to go. Ultimately the farms should be in closed containment systems where the incoming water could be filtered for parasites and the effluent could be treated to remove solids and anything else harmful. Such installations are already being built in other countries. For too long the industry has been able to run cheap systems reliant on dumping all their waste in the sea and using chemicals and harsh physical treatments to deal with disease and infestation. If salmon farming is to progress then it needs to do so responsibly. It could be hugely to its benefit.

In presenting all these objections we are not calling for the removal of the Loch Hourn farm. We are just saying that if the evidence is beginning to mount regarding the ill effects of farming, then at the very least it would be madness to allow this farm to grow any larger. It is simply the expansion we are challenging, and that is all that is at issue in this application before the Highland Council.

**Friends of Loch Hourn, January 31, 2022**