

My ref: GLA/S&TCS

16th August 2016

European Commission
Environment DG
B - 1049 Brussels
BELGIUM

FAO Paul Speight
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Dear Sirs

Complaint against United Kingdom for failure to comply with the Marine Strategy Framework Directive with respect to the impact of marine cage fish farming on wild salmonid fish CHAP(2016)01939

Additional information concerning the genetic introgression by farmed fish genes of wild Atlantic salmon populations of the Langavat and other west coast SACs in Scotland designated for the protection of wild Atlantic salmon

In parallel to the complaint recently submitted concerning the failure of the UK to comply with the Marine Strategy Framework Directive by failing adequately to put in place measures to control sea-lice from marine cage salmon farms, we would like to raise a further fish-farming related issue for wild Atlantic salmon populations from west coast SACs.

As the Scottish Government has acknowledged for some time, "*escapes from fish farms are a cause for concern....for conservation and wild fish interests, escaped fish may represent a disease hazard, occupy valuable habitat to the exclusion of wild fish and have the potential to interbreed with wild fish, leading to dilution of genetic integrity*"¹.

¹ <http://www.gov.scot/Topics/archive/18364/18692>

It is this latter threat of dilution of genetic integrity that concerns S&TC Scotland, both in relation specifically to the Langavat SAC designated under the Habitats Directive for Atlantic salmon, but also to the many west coast rivers in the aquaculture zone, including other SACs designated for Atlantic salmon. The latest summary of the threats of genetic introgression are detailed in the attached paper from the Norwegian Institute for Nature Research. There is no reason to think the threat in Scotland is any less.

This introgression risks those sites not achieving the conservation objectives set under the Habitats Directive.

The Langavat SAC and evidence of genetic introgression in the Atlantic salmon population

The Langavat catchment rises from the glens of the North Harris hills and flows northwards through Lewis and discharges into East Loch Roag at Grimersta. The catchment covers an area of approximately 105km² and contains over 20 significant lochs, of varying size, connected by a system of burns and rivers. The largest loch in the catchment is Loch Langavat, which is over 11 km long, has 45km of shoreline and is the largest freshwater loch in the Outer Hebrides.

Atlantic salmon (Annex II species) is the primary reason for the Langavat SAC designation (SAC EU code UK0030255). The Grimersta river and loch system is comparatively small, but it is the most productive salmon system in the Western Isles.

In 2009, fin clips were taken from 22 wild Atlantic salmon parr from the Langadale Burn, the main spawning burn on the Grimersta / Langavat system. In 2005, samples were also taken from the March Burn on Langavat.

This material was subsequently analysed by a population geneticist and two reports were produced in November 2012 and February 2013. The reports are to be found at

<http://www.outerhebridesfisheriustrust.org.uk/wp-content/uploads/2013/02/MIAP-Genetic-Report.pdf>

<http://www.outerhebridesfisheriustrust.org.uk/wp-content/uploads/2012/11/OHFT-FASMOP-report.pdf>

Of the 22 samples taken in 2009 from the Langadale Burn, the report concludes that 14 of the fish were of Scottish origin. However, 8 fish showed signs of admixture – their genetic

make-up showed that these were farmed fish /wild fish hybrids. Of the 21 samples taken from the March Burn in 2005, 3 showed signs of admixture.

The Outer Hebrides Fisheries Trust concluded that *“the degree of admixture within samples varied with the Langadale River showing the greatest number of individuals with mixed Scottish/Norwegian ancestry (37%)....The high degree of admixture that was evident in samples taken from the Langadale River [is] of particular concern to OHFT as this system is situated at the head of Loch Langabhat, a loch with SAC status because of its Atlantic salmon populations.”*

Note that this issue is not confined to the Langavat SAC. As the OFHT reports *“of the 164 samples that were collected from sites within the Hebrides, 0% were identified as direct fish farm escapees, 141 salmon or 86% of the sample were classified as being pure Scottish wild strains and 23 salmon or 14% of the sample showed signs of admixture i.e. farmed/wild hybrids”*².

In the context of the Langavat SAC, the Scottish Government has acknowledged the threat posed by genetic introgression of wild salmon populations - *“salmon populations have genetic structures that may be inherently different between neighbouring tributary and riverine populations and key to allowing each to cope with particular environmental conditions than the other. Therefore intermixing of the populations may not be desirable. In many cases farmed salmon are not native to the river system in which they are farmed, and thus there may be potential impacts from their interbreeding with wild fish in the event of their escape. This may affect their overall fitness in terms of growth, survival and reproduction”*³.

What causes are there for the genetic introgression?

It appears that there are only two possible explanations for the damage to the genetic integrity of fish in the Grimersta / Langavat system and indeed to the wider west coast populations.

Firstly, there could have been inter-breeding between wild fish and farmed fish that have escaped from fish farms in or near Loch Roag, into which the Langavat SAC flows.

² Outer Hebrides Fisheries Trust Annual Review 2013 - <http://www.outerhebridesfisheriestrust.org.uk/wp-content/uploads/2014/05/OHFT-Annual-Review-of-2013.pdf>

³ Habitats Regulation Appraisal Kyles Vuia 20th May 2013

Secondly, eggs from fish of Norwegian origin have been introduced via deliberate stocking from a hatchery.

However, this latter explanation can be dismissed as any hatchery operations conducted on the Grimersta proprietors are understood only to have used eggs from Grimersta / Langavat fish, when those hatcheries were operational.

It appears therefore that the only plausible explanation is that escapee farmed fish have interbred with wild stocks.

The potential impacts of escapee farmed salmon on the wild salmon populations in Scotland and elsewhere are widely documented in the peer-reviewed scientific literature⁴. Although the precise mechanism by which genetic introgression took place in the Langavat SAC is not currently known, nevertheless, the peer-reviewed scientific literature on the behaviour of escaped farmed salmon in Scotland points to this as the only likely explanation.

This would also be entirely consistent with the prolonged and poor record of escapes over the last decade in the Loch Roag / Loch Langavat fish farms⁵. The marine farms on East and West Loch Roag (into which the Grimersta / Langavat system flows) have a poor record of escapes. The table below shows escapes recorded on the Scotland's Aquaculture website:

Date	No. of escaped fish	Site
13/11/2010	2,766	Vacasay
27/07/2009	0 ⁶	Taranaish
30/11/2008	0	Taranaish
22/11/2008	0	Taranaish
29/08/2008	7,437	Taranaish
06/08/2007	1,000	Kyles of Vuia

⁴ Youngson, A. F., Hansen, L. P. and M. L. Windsor (1998) Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: The Scientific and Management Issues. Norwegian Institute for Nature Research (NINA). Tungasletta 2, N-7005, Trondheim, Norway. 142pp.

Hansen, L. P. & Windsor, M. (2006) Interactions between aquaculture and wild stocks of Atlantic salmon and other diadromous fish species: science and management, challenges and solutions. NINA Special Report 34. 74pp. Trondheim, October 2006.

Thorstad, E. B., Fleming, I. A., McGinnity, P., Soto, D., Wennevik, V & Whoriskey, F. (2008) Incidence and impacts of escaped Atlantic salmon *Salmo salar* in nature. NINA Special Report 36. 110 pp."

⁵ http://aquaculture.scotland.gov.uk/data/fish_escapes.aspx

⁶ A nil entry here usually signifies that an initial report of an escape was made, due for example, to operators finding a breach or hole in the cage nets, but upon fish count or harvest, it was considered by the operator that no fish had escaped

13/09/2006	100	Kyles of Vuia
30/03/2005	0	Kyles of Vuia
11/01/2005	20,928	Gousam
11/01/2005	12,943	Vuiabeag
17/10/2002	500	Kyles of Vuia

There is also very wide acceptance that fish farms constantly 'leak' farmed fish in a way that is not recorded in the major escapes data, such as that above. As the Scottish Government has recognised, "*alongside reported escapes there are also concerns about ongoing 'drip' or 'trickle' escapes, which have been associated with inappropriate mesh sizes on nets or screens, undetected 'below the waterline' damage to nets or when fish simply jump over the level of the net. Drip escapes can remain undetected until farmed fish' are caught in neighbouring catchments or at harvest when a farmer counts stock and discovers a shortfall*"⁷.

What can be done to rectify the introgression?

Article 2(2) of the Habitats Directive requires that "*measures taken pursuant to this Directive shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*". Emphasis added.

In addition, Article 11 requires that "*Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species*".

Given the findings of the genetic introgression studies above, S&TCS is concerned to ensure that a programme of regular annual genetic monitoring of the wild Atlantic salmon populations of the Langavat SAC and all other SACs designated for Atlantic salmon in the Scottish aquaculture zone is put in place.

Other measures that should be considered could include a statutory requirement to kill all fish farm escapees caught in the Grimersta / Langavat and other SAC systems and the catching-up and removal of hybrids found on spawning beds.

⁷ Aquaculture and Fisheries (Scotland) Bill Policy Memorandum, para 52, October 2012
http://www.scottish.parliament.uk/S4_Bills/Aquaculture%20and%20Fisheries/b17s4-introd-pm.pdf

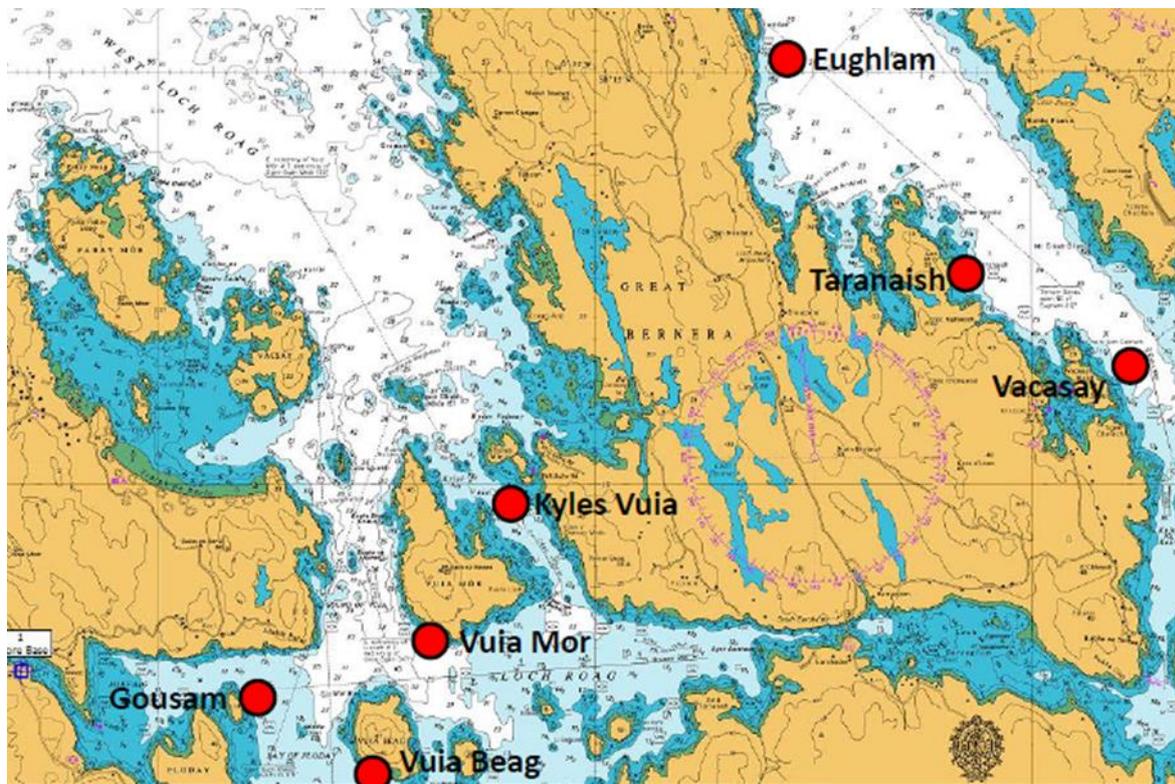
Further, despite many studies casting doubt on the efficacy of hatcheries, consideration may need to be given to re-stocking from the progeny of selected native / non-hybrid stock where introgression has already occurred to SAC stocks, but only where appropriate fisheries experts advise.

Avoiding further introgression in the Langavat SAC and other SACs in Scotland – the application of Article 6(3) of the Habitats Directive

Patently, preventing introgression is far better than seeking to remedy such damage after the event. Therefore, S&TCS is keen to ensure that there is no further introgression in the Langavat SAC salmon population, or indeed any SAC populations in Scotland.

There are currently seven marine salmon farms that have the potential to have a very direct impact on Langavat SAC salmon by way of escapee farmed fish.

Of these, three farms are in East Loch Roag (Eughlam, Taranaish, Vacasay) and four farms in west Loch Roag (Kyles Vuia, Vuia Mor, Vuia Beg and Gousam).



Many other small or 'mothballed' marine sites have been closed under a Site Optimisation Plan⁸. Nevertheless, production has increased to the following permitted biomasses and cage numbers and applications have been made recently for increases in proposed biomass at some sites, with associated increases in the number or sizes of cages to be used, which will increase the number of farmed fish in Loch Roag still further⁹ (as at May 2016):

Farm site	Current biomass	Current cage config	Proposed biomass
Eughlam	1897 tonnes	16 x 90m cages ¹⁰	3544 tonnes
Taranaish	1466	14 x 90m cages ¹¹	1710
Vacasay	1100	12 x 90m cages	
Kyles Vuia	1390	14 x 90m cages	
Vuia Mor	1667	14 x 90m cages ¹²	2300
Vuia Beg	1290	16 x 90m cages ¹³	
Gousam	850	12 x 90m cages	
Current total:	9,660 tonnes	Proposed total:	12,184 tonnes

While there has been progress in containment across the industry as a whole, and the Loch Roag Site Optimisation Plans may have reduced the risk of escapes to the Langavat SAC population of Atlantic salmon, it is important to note that Article 6(3) of the Directive requires that, for these farms, it must be beyond reasonable scientific doubt that they will not damage the integrity of the Langavat SAC.

⁸ Western Isles Aquaculture Association (2005) A proposed rationale for the ratification of the Site Optimisation Plan for salmon farming in Loch Roag, Lewis, Western Isles. Dec 2005.

<http://www.gov.scot/Resource/Doc/295194/0120318.pdf>

⁹ <http://aquaculture.scotland.gov.uk/> 12th April 2016

¹⁰ Site granted planning permission January 2016 (ref 15/00389/FFPAES) to replace the existing marine fish farm (comprising 16 x 90m cages) with 16 x 120m cages and a permanently moored automated feed barge. Includes proposal to increase biomass to 3544 tonnes. See

<https://www.sepa.org.uk/regulations/consultations/advertised-applications-under-car/cars-hidden/1140563/> for current application to SEPA for CAR licence variation.

¹¹ Site granted planning permission 2014 (ref14/00440/FFPA) to install two additional 90m fish cages (to allow a total of 16). Includes proposal to increase biomass to 1710 tonnes

¹² Application made for Screening and Scoping (ref 15/00069/FFSCSC) to replace the existing marine fish farm, comprising, 14 x 90m cages, with 12 x 120m cages Decision was that an Environmental Impact Assessment is required June 2015. Proposal is to increase maximum biomass to 2300 tonnes.

¹³ Application made for Screening and Scoping (ref 14/00156/FFSCSC) for existing marine fish farm comprising of 16 x 100m cages (arranged in 2 groups 8x2 & 8x2) within 60m grid layout and feed barge.

If that test cannot be passed then Article 6(3) requires that the competent national authorities cannot grant and should not have granted relevant consents or permissions to the fish farms concerned.

To this end, there have been a number of recent appropriate assessments carried out under Article 6(3) concerning the retrospective grant of planning permission to several of the farms by Scottish Government under the 'audit and review' process¹⁴.

The relevant fish farms in Loch Roag granted permanent planning permission centrally by Scottish Ministers are Vuia Mor, Vacasay, Kyles Vuia and Taranaish¹⁵.

Taking the Kyles Vuia appropriate assessment as an example of the appropriate assessment carried out by Scottish Ministers carried out in 2013 prior to the grant of planning permission, the preventative measures employed to address farmed salmon escapes are described: *"A number of measures following industry guidelines are built into the SOP [Site Optimisation Plan] to prevent and, in the event of, respond to salmon escapes, in particular as set down in "A code of practice on the containment of farmed fish, official notification following escape of fish and possible measures to be employed to attempt recapture" (SQS 2002) and "What to do in the event of an escape of fish from a fish farm" (SEERAD 2002)".*

The appropriate assessment also states that:

"Equipment specifications appear to considerably exceed site-specific model-based design and are highly likely to be well within the proposed specifications of the draft Scottish Standard for fish culture pens, nets and moorings.

A Loch Roag 'Site Optimisation Plan' (SOP) has been prepared for this area specifically to address concerns over the impact of possible stock escapes as well as sea lice issues (Fish Vet Group, 2005). The introduction of measures to protect wild salmon through the SOP was considered an essential element of the Management Agreement for the loch. The SOP preventative measures adopted under the SOP are both proactive and reactive in nature:

¹⁴ See <http://www.gov.scot/Topics/marine/Fish-Shellfish/18716/fish-farm/fish-farm> for details of the audit and review process

¹⁵ See <http://www.gov.scot/Resource/0048/00489482.pdf> for a list of those fish farms in the Western Isles (covering the Langavat SAC) granted permission by Scottish Ministers

- *adequate specification and siting of salmon farm installations in respect of hydrography, in particular of wave climate*
- *separation of navigation and salmon farm installations*
- *correct navigational marking of all salmon farm installations*
- *full registration of all escapes*
- *loch wide measures aimed at recapture and prevention of ingress into the Langavat system.*

The Kyles Vuia site has a specific Escape Contingency Plan with an escape response and stock recovery plan. All nets are designed to exceed the industry standards laid out in the Code of Good Practice for Scottish Finfish Aquaculture, as well as taking into account likely environmental conditions found on the site. Mooring equipment is designed by Gael Force and installed by competent staff taking into account the stress loading of the equipment, depth and tidal current data to ensure that all moorings supplied are tailored to meet the needs of individual sites. The grid mooring system installed allows for even spread of stresses and loads imposed by tidal currents and allows a degree of flex on each individual cage”.

The authors of the appropriate assessment at Kyles Vuia felt able to conclude that: *“the above appraisal has ascertained that the proposal will not undermine the conservation objectives for the following features of the Langavat SAC: - Atlantic salmon *Salmo salar* It can therefore be concluded that the proposal will not adversely affect the integrity of the Langavat SAC”.*

A far more cursory appropriate assessment has been carried out very recently in 2015 by the Western Isles Council, with advice from Scottish Natural Heritage, in relation to the proposed expansion of the Eughlam site from 16 x 90m cages to 16 x 120m circumference cages with an increase in permitted biomass from 1897t to 3544t. Concerning the risk of escapes, what the appropriate assessment records is reproduced below¹⁶:

¹⁶ Western Isles Council, advised by SNH, 12th November 2015 Appropriate Assessment for proposed expansion of Eughlam fish farm site, document ref 15_00389_FFPAES-APPROPRIATE_ASSESSMENT-660970

<p>The fish farm equipment (pens and associated connectors) shall be designed and constructed: a) To be suitable for the environmental conditions stated on the pen specification sheet; b) Be suitable for the envisaged environmental conditions and all conceivable operations at the site(s) at which it is to be deployed; c) Be suitable for all primary and secondary equipment and boats which the mooring designer has been informed will be used at the site; and d) To be able to withstand the forces imposed from all loads acting upon them; e) So as not to chafe and/or snag the net or mooring system in the environmental conditions for which it has been designed (assuming the net and weighting systems are handled and installed in accordance with the manufacturer's instructions); f) So that it is capable of being towed to and from the site in the environmental conditions that may be encountered without damage - any restrictions in this regard shall be documented in the manufacturer's instructions; g) So that the net, top net and weighting system is easily installed; h) So that it is easy to keep clean and remove marine growth; and, i) To minimise the retention of water and debris.</p>	<p>To ensure that the fish farm equipment is of a standard to satisfactorily contain farmed fish in order to prevent adverse impacts to the integrity of Langavat SAC.</p>
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The appropriate assessment relies, in general, on the technical merits of the equipment to be used, rather than the operational use of the equipment and the causes of escapes that are not associated solely with the technical specification of equipment used. Nevertheless, the assessors here also felt able to conclude that *“the combination of these considerations provides sufficient science in the form of knowledge and rationality to conclude that, ‘beyond all reasonable scientific doubt’, the proposed development will not adversely affect the integrity of the Langavat SAC and that the conservation objectives of the SAC will not be compromised”*.

While a Technical Standard for Scottish Finfish Aquaculture was published in 2015 and details equipment standards for fish farms across Scotland to be introduced over the next few years with *“all equipment expected to meet the requirements by 2020 at the latest”*, as the authors acknowledge *“escapes from fish farms can occur as a result of routine farming operations”*, which would not be dealt with by such technical standards.

The preventative measures described and listed in both the Kyles Vuia and Eughlam appropriate assessments are therefore, to a considerable degree, dependent upon there being proper and error-free carrying out of the many routine operations of a fish farm.

However, while increased technical specifications and training of staff on fish farms will undoubtedly reduce the likelihood of escapes, it is highly unlikely that the risk of escapes can be eliminated sufficiently to prevent escapes occurring.

The question is whether the reduction in escapes of farmed fish will be sufficient to reduce those escapes to a level at which introgression in the wild population does not increase and indeed, can be reduced over time.

The record and causes of farmed fish escapes in Scotland

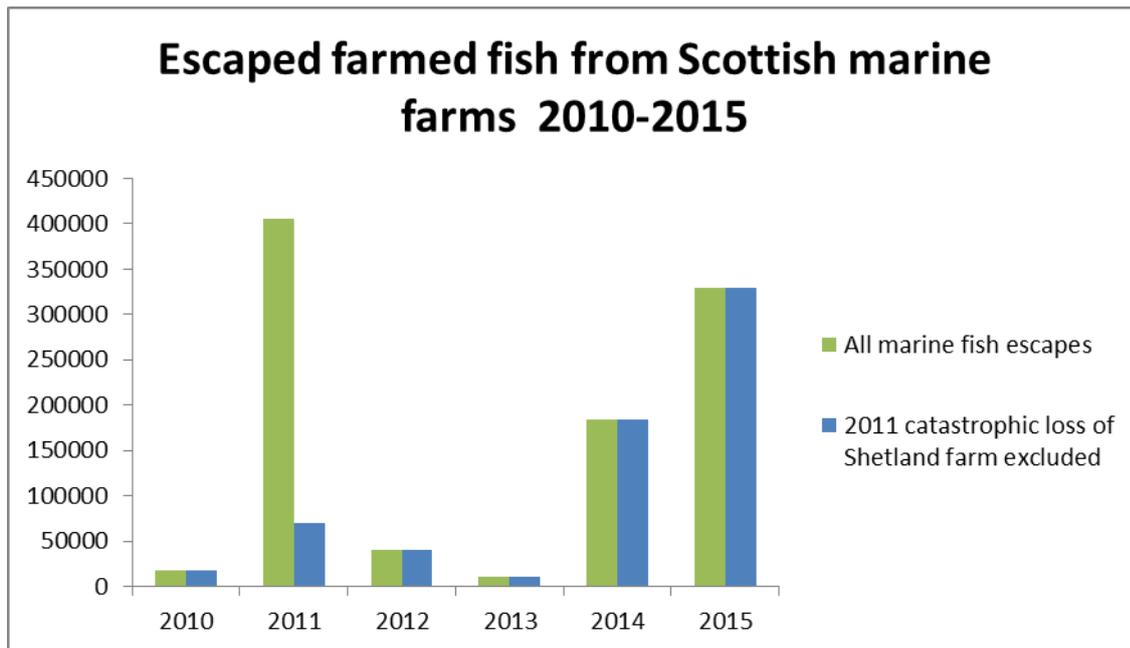
Article 5 of the Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks – the NASCO Williamsburg Resolution¹⁷ – lays down measures to minimise the impact of aquaculture with respect to escapes.

Each party, including the UK is required to take measures to minimise escapes of farmed salmon to a level that is as close as practicable to zero.

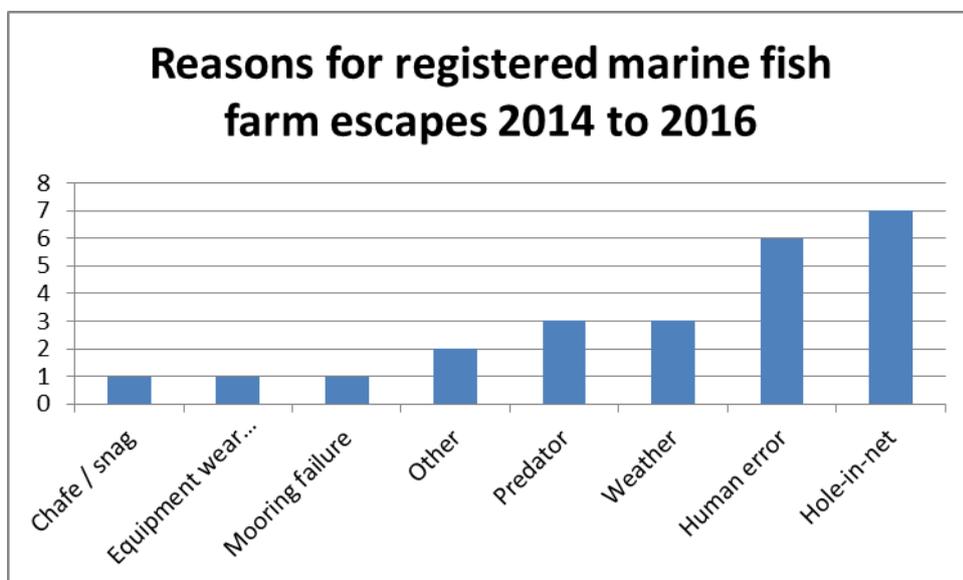
However, containment cannot be taken for granted.

The graph below appears to show a downward trend in escapes in Scotland, but with the catastrophic loss of a whole farm in Shetland in 2011 excluded from the data, any supposed downward trend in escapes is harder to see.

¹⁷ Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks - The Williamsburg Resolution (Adopted at the Twentieth Annual Meeting of NASCO in June 2003 and amended at the Twenty-First Annual Meeting of NASCO in June 2004 and at the Twenty-Third Annual Meeting of NASCO in June 2006)



Further an analysis of the reasons for the registered marine fish farm escapes from 2014 to 2016 in Scotland, as given on the Scotland's Aquaculture database, show that more than half are not due to technical or equipment failure but involve human error, the weather, predator interactions and others not necessarily linked to technical specifications of the equipment used.



It is worth noting that Marine Harvest, one of the largest fish farm operators in the world, is reported as developing new closed farm technology based on the closed-containment "egg"

concept, aimed at massively reducing the risk of escapes¹⁸. The technology which Marine Harvest began developing in 2015 was conceived in response to a poor year for fish escapes in which there were 16 reported escape incidents with more than 94,000 fish lost. Marine Harvest has adopted a target of zero fish escapes and states that “*we strive constantly to prevent escapes and improve methods, equipment and procedures that can minimise or eliminate them*”. This demonstrates that one of the biggest operators currently views escapes using existing open-net cage systems as an inevitable part of its operations, albeit one it wishes to reduce or eliminate in future.

In the light of the practical likelihood of more escapes (whether larger recorded or merely ‘drip’ escapes), including from the fish farms on Loch Roag and Loch Langavat, S&TCS would suggest that the conclusions reached in various appropriate assessments for planning permission for existing or the modification of fish farms in East and West Loch Roag (and indeed for those farms near other SACs designated for Atlantic salmon on the west coast and in the Western Isles of Scotland) are not supportable and should not have been reached.

While it may be true that the probability of escapes may indeed be falling, S&TCS nevertheless believes it is impossible to conclude that it is beyond all reasonable scientific doubt that containment issues will not affect the integrity of SACs designated for Atlantic salmon on the west coast and in the Western Isles of Scotland.

S&TCS is of the view that the ‘beyond reasonable scientific doubt’ test may only be passed by the deployment of closed containment technology (such as the “egg” concept being developed by Marine Harvest).

Until that occurs, relevant fish farms should be considered for early relocation out of Loch Roag.

Article 6(2) of the Habitats Directive requires that “*Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been*

¹⁸ Undercurrent News 12 April 2016 “Sea lice control, R&D top Marine Harvest farming agenda”
https://www.undercurrentnews.com/2016/04/12/sea-lice-control-rd-top-marine-harvest-farming-agenda/?utm_source=Undercurrent+News+Alerts&utm_campaign=c92ebf7b93-Europe_briefing_Apr_12_2016&utm_medium=email&utm_term=0_feb55e2e23-c92ebf7b93-92481529

designated, in so far as such disturbance could be significant in relation to the objectives of this Directive”.

Given that there are very few SACs designated for Atlantic salmon in the aquaculture zone in Scotland, S&TCS would suggest that, on a precautionary basis alone, given the evidence of introgression shown by recent genetic studies, and given the inability to eliminate substantially the risk from open cage fish farming in the marine environment, there should have been a withdrawal of fish farm licences, consents and permissions in the immediate vicinity of those SACs, including those in Loch Roag near to the Langavat SAC and that no new permissions, consents or licences should have been granted or renewed after the genetic introgression was first revealed.

Yours sincerely

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Solicitor to S&TC Scotland Aquaculture Campaign