Aquaculture Stewardship Council
27 Old Gloucester Street
London
WC1N 3AX

10 April 2023

Breach of the ASC's 'Salmon Standards' by Mowi's Colonsay Salmon Farm (& Mowi's Carradale & Greanem/Grey Horse Channel Outer)

Dear Aquaculture Stewardship Council,

Please consider this a formal complaint re. ASC certification of Mowi's Colonsay salmon farm in Scotland as well as Mowi's salmon farms at Carradale and Greanem/Grey Horse Channel Outer. Please pass this complaint onto the relevant department (ASI and LRQA are both copied into this complaint and it has been emailed also to: complaints@asc-aqua.org).

$camon Scotland's complaint is a very simple one and is evidenced via the juxtaposition of the ASC's 'Salmon Standard' vs data published by Marine Scotland via Scotland's Aquaculture in relation to mass escapes and a recent Freedom of Information disclosure by the Scottish Government.

The ASC 'Salmon Standard' published in September 2022 includes:

Criterion 3.4 Escapes[54]

INDICATOR	REQUIREMENT
3.4.1 Maximum number of escapees[55] in the most recent production cycle	300[56]
3.4.2 Accuracy[57] of the counting technology or counting method used for calculating stocking and harvest numbers	≥ 98%

3.4.3 Estimated unexplained loss[58] of farmed salmon is made publicly available	Yes
3.4.4 Evidence of escape prevention planning and related employee training, including: net strength testing; appropriate net mesh size; net traceability; system robustness; predator management; record keeping and reporting of risk events (e.g., holes, infrastructure issues, handling errors, reporting and follow up of escape events); and worker training on escape prevention and counting technologies	Yes

[56] A rare exception to this standard may be made for an escape event that is clearly documented as being outside the farm's control. Only one such exceptional episode is allowed in a 10-year period for the purposes of this standard. The 10-year period starts at the beginning of the production cycle for which the farm is applying for certification. The farmer must demonstrate that there was no reasonable way to predict the events that caused the episode. See auditing guidance for additional details.

[57] Accuracy shall be determined by the spec sheet for counting machines and through common estimates of error for any hand-counts.

[58] Calculated at the end of the production cycle as: Unexplained loss = Stocking count – harvest count – mortalities – other known escapes. Where possible, use of the pre-smolt vaccination count as the stocking count is preferred.

And here's the [data on escape incidents at Colonsay published online by the Scottish Government]:

Scotland's aquaculture

part of Scotland's environment

Home | Our Aquaculture | Map | Data | Resources | Glossary | Help |

Home > Data Search > Fish Escapes

Search Results

NB this list does not include details of escapes from deregistered fish sites

Fish Escapes > Escape Start Date > From date: 01/01/1900 To date: 10/04/2023

Water Type --All-- Local Authority --All--

Apply Current Filters | Show All Results | Clear All Filters | CSV Export

Show/Hide Advanced Filters

Escape Id	Escape Start Date	Escaped Species	Final Number of Fish Escaped	Site Id	Site Name	Operator	Actions
					Colonsay	Mowi	
444	16/06/2022	Atlantic Salmon	15,000 - 20,000	FS1296	Colonsay	Mowi Scotland Ltd	More
439	29/09/2021	Atlantic Salmon	0	FS1296	Colonsay	Mowi Scotland Ltd	More
160	17/01/2020	Atlantic Salmon	73,684	FS1296	Colonsay	Mowi Scotland Ltd	More
158	08/11/2019	Atlantic Salmon	none	FS1296	Colonsay	Mowi Scotland Ltd	More
159	18/10/2019	Atlantic Salmon	none	FS1296	Colonsay	Mowi Scotland Ltd	More
157	20/10/2017	Atlantic Salmon	0	FS1296	Colonsay	Mowi Scotland Ltd	More

1

6 items in 1 pages

Data supplied by Marine Scotland on 12/03/2023

About this site | Contact us | Partners | FAQs | Legal | Site Map |

natural scotland

The Colonsay incidents where mass escapes were reported are cited via:

16 June 2022: Colonsay – 15,000 to 20,000 (Hole in Net)
17 January 2020: Colonsay – 73,684 (Weather/Pen Failure)

Here's the official report for the June 2022 Colonsay escape published by the Scottish Government:

Fish Escape Details

Escape Id	444	
Operator at Time of Escape	Mowi Scotland Ltd	
Escape Water Type	S	
Escape Start Date	16/06/2022	
Escape Start Time	00:00	
Escape End Date	16/06/2022	
Escape Grid Reference	NR434967	
Escaped Species	Atlantic Salmon	
Stage	Grower fish (salmon only)	
Age	23 months	
Average Weight	3.1kg	
	Initial Notification	Final Notification
Date	16/06/2022	08/07/2022
Number of Fish Escaped	Not Known	15,000 - 20,000
Number of Fish Recovered		N/A
Escape Reason	Hole in Net - HOL	Hole in Net - HOL

Data supplied by Marine Scotland on 12/02/2023

Site Details

Site ID	FS1296
Site Name	Colonsay
Address	Stob Ban House Glen Nevis Business Park PH33 6RX
Telephone Number	
Date Registered	09/04/2015
Operator	Mowi Scotland Ltd
Aquaculture Type	Fish
Water Type	Seawater
Species	Atlantic Salmon, Lumpsucker, N/A, Wrasse
Health Surveillance Frequency	Low
Production reported to Marine Scotland within last 3 years?	Yes
National Grid Reference	NR434968
Easting	143400
Northing	696800
Marine Scotland Management Area	16e - Colonsay
Local Authority	Argyll and Bute
Region	Strathclyde
View on Map	View on map

Data supplied by Marine Scotland on 12/02/2023

Here's the official report for the January 2020 Colonsay escape:

Fish Escape Details

Escape Id	160	
Operator at Time of Escape	Mowi Scotland Ltd	
Escape Water Type	S	
Escape Start Date	17/01/2020	
Escape Start Time	12:00	
Escape End Date	17/01/2020	
Escape Grid Reference	NR434967	
Escaped Species	Atlantic Salmon	
Stage	Grower fish (salmon only)	
Age	9 months	
Average Weight	1.74kg	
	Initial Notification	Final Notification
Date	17/01/2020	21/02/2020
Number of Fish Escaped	73,600	73,684
Number of Fish Recovered		N/A
Escape Reason	Weather - WTH	Pen Failure - PEN

Data supplied by Marine Scotland on 12/03/2023

Site Details

Site ID	FS1296
Site Name	Colonsay
Address	Stob Ban House Glen Nevis Business Park PH33 6RX
Telephone Number	
Date Registered	09/04/2015
Operator	Mowi Scotland Ltd
Aquaculture Type	Fish
Water Type	Seawater
Species	Atlantic Salmon, Lumpsucker, N/A, Wrasse
Health Surveillance Frequency	Low
Production reported to Marine Scotland within last 3 years?	Yes
National Grid Reference	NR434968
Easting	143400
Northing	696800
Marine Scotland Management Area	16e - Colonsay
Local Authority	Argyll and Bute

A Scottish Government report on the mass escape at Mowi's Colonsay salmon farm in June 2022 (obtained by $camon $cotland via FOI) included:

> Since the site was registered in 2015, there have been six reported escapes (or circumstances that may have gave rise to a significant risk of escape) at Colonsay (see table below):

Date Reported	Species	Number of Fish Escaped	Reported Reason for escape
20/10/2017	Atlantic salmon	0	Other
18/10/2019	Atlantic salmon	0	Predator
08/11/2019	Atlantic salmon	0	Predator
17/01/2020	Atlantic salmon	73,684	Pen Failure
29/09/2021	Atlantic salmon	0	Hole in Net
16/06/2022	Atlantic salmon	15,000-20,000	Hole in Net

Other ASC-certified salmon farms where mass escapes have also been reported include Carradale (certified by the ASC in September 2022); Greanem/Grey Horse Channel Outer (certified by the ASC in April 2022) and Marulaig Bay (certified by the ASC in January 2021):

2 June 2022: Grey Horse Channel Outer (Greanem) – 32,463 (Equipment Damage)
20 August 2020: Eilean Grianain (Carradale) – 48,834 (Weather/Mooring Failure)
5 June 2015: Eilean Grianain (Carradale) – 16,000 (Hole in Net)
29 June 2009: Marulaig Bay – 10,534 (Human Error)

It is clear that Mowi was negligent in terms of equipment failures and the escapes were therefore not "outside the farm's control". The escapes were not 'acts of God' or caused by rogue seals but due to corporate negligence by Mowi.

Information disclosed by the Scottish Government via FOI-2023-00340514 on 28 February 2023 included a briefing to the Cabinet Secretary for Rural Affairs and Islands (Mairi Gougeon) and the Minister for Environment and Land Reform (Mairi McAllan) dated 16 September 2022:

> *Potential Escape at Colonsay fish farm*
>
> Ministers will wish to be aware that we await the final notification from a potential escape incident at another Mowi fish farming site in Colonsay from June. We expect
>
> the final notification next week and will provide an update to Ministers. Colonsay fish farm has reported 6 escape incidents and near misses since 2019, with 73,000 fish lost in 2020 in a storm event.

"Site staff attributed the damage to a seal in the first instance, however, following investigation the incident was attributed to a passive grading event which took place on 14th June 2022 when it is believed that the froyer ring connection had failed, adding strain to the already weakened net structure causing it to tear," stated the Scottish Government in an undated report on the mass escape at Mowi's Colonsay salmon farm in June 2022. "Divers repaired the 1m hole in the net of cage 5 on the same day the seal was observed in the cage. The fish were moved into four other cages on the site and the net removed for repairs. All the froyer ring connection points (16 per cage) across the site are currently being replaced. The winch dyneema lifting ropes and the tension bar bolts are also being replaced across the site……Following the breach in containment on 16/06/2022, recommendations have been made for improvement in relation to the selection and installation of pens and moorings, taking into consideration the environmental conditions that are experienced at the site, factoring in adequate safety margins to prevent any future failures in the weighting system. Recommendations for improvement were also made with regard to the standard operating procedure and inspection plan for pen and mooring components. The standard operating procedure for raising and lowering the weighting system should also be improved to ensure that these procedures are carefully planned and supervised to minimise any risk of escape. The site specific predator risk assessment should also be reviewed and improved to ensure that the equipment and farm design are sufficient in protecting the fish from predators."

"Ministers and communication colleagues will wish to be aware that we have received a final notification from the fish escape incident at a Mowi fish farming site in Colonsay from June this year," reported the Scottish Government in a briefing to the Cabinet Secretary for Rural Affairs and Islands in October 2022. "The estimated number of fish escaped is between 15,000-20,000….the incident was attributed to a passive grading event which took place on 14 June when it is believed that the froyer ring connection had failed, adding strain to the already weakened net structure causing it to tear."

A Fish Health Inspectorate Visit Report dated 12 October 2022 included:

marinescotland science

Scottish Government
Riaghaltas na h-Alba
gov.scot

FISH HEALTH INSPECTORATE VISIT REPORT

SUMMARY FOR INFORMATION OF SITE OPERATOR

BUSINESS NO	FB0119	**DATE OF VISIT**	16/06/2022
SITE NO	FS1296	**SITE NAME**	Colonsay
CASE NO	20220201	**INSPECTOR**	(REDACTED)

Escape Investigation

Following the circumstances of the reported escape of Atlantic salmon on the 16/06/2022, the following recommendations are made for improvement at the site:

Due to the failure of weighting system connections, it is recommended that a documented review is undertaken to revise and improve the standard operating procedure and inspection plan for pen and mooring components, which is based on risk assessment, in accordance with A Code of Good Practice for Scottish Finfish Aquaculture (CoGP) Chapter 4, point 4.16.

It is recommended that a documented review is undertaken of the design, quality and standard of manufacture of nets to take account of the conditions likely to be experienced on the site, including an adequate safety margin to prevent the failure of weighting system connections to meet the requirements of CoGP Chapter 4, point 4.20.

It is recommended that a documented review is undertaken of the inspection procedures and frequencies for nets and the weighting systems as required by the CoGP Chapter 4, points 4.23 and 4.24, to ensure that weighting system connection failures are prevented.

It is recommended that a documented review should be undertaken of the procedure for raising and lowering weighting systems, the associated risk assessment and contingency plan, to ensure that procedures that could increase the risk of fish escaping from pens should be carefully planned and supervised to minimise any risk and that a documented risk assessment, a standard operating procedure and a contingency plan are in place in accordance with CoGP Chapter 4, points 4.29 and 4,30, .

It is recommended that a documented review is undertaken of the predator risk assessment as required by the CoGP Chapter 4, point 4.26, to ensure that the requirement of the CoGP Chapter 4, point 5.8 are met by the equipment and farm design protecting the fish from predators.

Please ensure that these points have been addressed by 31st December 2022. Records or documentation demonstrating that these points have been addressed should be sent to the Fish Health Inspectorate (contact details below). The site may be subject to further inspection or enforcement action should the appropriate action regarding the above points not be taken within the time period stipulated.

Mowi claimed in December 2022: "There are new nets on order with upgraded construction and materials….Scale AQ manufacturer of Aqualine system pens have completed a inspection and repair and maintenance for Colonsay cages….HDPE knotted netting will be used as a upgrade to standard conventional Seal Pro style netting."

"I'm not sure that Mowi Scotland Ltd have fully understood what was required," stated the Scottish Government in an email in January 2023. "They have conducted work to repair, service, replace or refurbish the equipment, however, the documented reviews were also to consider whether the procedures and equipment in place were adequate or if they required improvement. The decisions on whether to change procedures and equipment or not being documented by the reviews. The new equipment designs being trialled are fine but the documented reviews should have established the considerations for making the changes. Do they have evidence of these discussions and decisions to satisfy the requirement for documented review? Perhaps these are just recorded in communications between themselves and manufacturers/service companies? Or they haven't really conducted a documented review and have only asked suppliers to improve the equipment spec?"

"MOWI are trialling some new gear out at Colonsay following the escape that occurred last year," stated the Scottish Government in an email in January 2023.

In January 2023, Mowi was officially asked by the Scottish Government to provide more evidence on the measures taken to prevent future escapes at Colonsay:

From: (REDACTED)@gov.scot <(REDACTED)@gov.scot>
Sent: 20 January 2023 11:42
To: (REDACTED) <(REDACTED)@mowi.com>
Cc: (REDACTED) <(REDACTED)@mowi.com>; (REDACTED) <(REDACTED)@mowi.com>; (REDACTED) <(REDACTED)@mowi.com>; (REDACTED) <(REDACTED)@mowi.com>
Subject: RE: Open NC from Marine Scotland at Colonsay
Importance: High

Hi (REDACTED)

Following on from my below email, I'm not sure that you have fully understood what was required. You have conducted work to repair, service, replace or refurbish the equipment, however, the documented reviews were also to consider whether the procedures and equipment in place were adequate or if they required improvement. The decisions on whether to change procedures and equipment or not should have been documented by the reviews. The new equipment designs being trialled are fine but the documented reviews should have established the considerations for making the changes. Do you have evidence of these discussions and decisions to satisfy the requirement for documented review?

This could just be recorded in communications between yourselves and the manufacturers/service companies? Or perhaps, you haven't conducted a documented review and have only asked suppliers to improve the equipment spec?

Let me know,
(REDACTED)

(REDACTED)
Senior Fish Health Inspector
Marine Scotland - Science

Scottish Government | Marine Laboratory | 375 Victoria Road| Aberdeen | AB11 9DB

Tel: (REDACTED)
S/B: +44 (0)131 244 2500
Mobile: (REDACTED)
e: (REDACTED)@gov.scot
w: https://www.gov.scot/marine-and-fisheries/

marinescotland science

Please note that the latest Colonsay escape took place on 16 June 2022 – just four days before the ASC announced an initial audit of the Mowi salmon farm and just over a month before the ASC certified the Colonsay salmon farm as 'responsible':

Aquaculture Stewardship Council

Certificate Holder

Company	Mowi Scotland
Farm (UoC)	Colonsay Fish Farm
Country	United Kingdom

Certification Details

ASC Certificate Number	ASC01965
CAB Certificate ID	ASC-F-0137
Status	Certified
Valid from	July 18, 2022
Valid until	July 17, 2025

Site(s)

Site name	Status	Species	Address	GIS
Colonsay (S0004923)	Certified	Salmo salar (Atlantic salmon)		SHOW ON MAP

Associated Document(s)

Document Type	Associated audit	Date Published	Download
Audit Announcement	Initial Audit	June 20, 2022	Available in English
Initial Audit Report – Draft	Initial Audit	July 12, 2022	Available in English
Initial Audit Report – Final	Initial Audit	July 18, 2022	Available in English
Certificate		July 18, 2022	Available in English

Did Mowi notify the ASC and the certifying bodies of the mass escape on 16 June 2022 during the initial audit later in June/July 2022 or did Mowi keep the mass escape - and their equipment and operational failures – hidden from auditors? If Mowi failed to provide the ASC with relevant information, surely their certification must be cancelled with immediate effect?

Mowi's mass escape of 15,000 to 20,000 farmed salmon in June 2022 at Colonsay was reported by the Scottish Government but has still not been reported by the media. An escape of 73,684 from Mowi's Colonsay salmon farm was reported by the media in January 2020 with Mowi admitting a "structural failure" and a review of the net pen's manufacturing process.

Faulty net pen enables mass salmon escape at storm-hit Mowi Scotland farm

By Jason Holland
January 22, 2020

SHARE

Roughly 73,600 salmon weighing an average of 1.9 kilograms were lost from a single net pen during a recent storm, Mowi Scotland has confirmed.

A post-storm inspection revealed structural failure of the pen, causing a tear in the netting. Mowi said the other net pens at the site have been confirmed as secure.

The loss of fish has been reported to the regulator.

"We are very disappointed that this structural failure has occurred," Mowi's regional farm manager David MacGillivray said. "Despite storm Brendan severely battering many parts of Scotland's coast last week and Colonsay being a remote and particularly exposed location, we expect our modern infrastructure to withstand these challenges."

Mowi said the farm's net pens exceed both the Scottish and Norwegian technical standards for net pen design. The company and equipment supplier are now reviewing the net pen's manufacturing process.

According to Mowi ASA's latest trading update, its Scottish operations harvested 14,000 metric tons (MT) of gutted weight equivalent (GWE) salmon in the fourth-quarter of 2019, up from 12,000 MT in the final three months of 2018.

As further background on this issue, please find enclosed below a letter to Scottish Ministers which also cites escape breaches by Mowi including at Colonsay.

$camon $cotland is still of the view that the ASC should rescind certification from all salmon farms in Scotland. As $camon $cotland wrote in a letter to the ASC in October 2022:

Please Stop Certifying Scottish Salmon as "Responsibly Farmed"!

In view of the alarming death rates on salmon farms across Scotland how can RSPCA Assured and the Aquaculture Stewardship Council continue to profiteer from welfare abuse, unnecessary suffering and mass mortalities on fish feedlots? Please end torture and cruelty on salmon farms in Scotland and stop certifying Scottish salmon as "responsibly farmed/sourced".

There's simply no escaping the conclusion that salmon farming – especially Mowi's operations in Scotland - is inherently irresponsible.

Yours sincerely,

Don Staniford

Director, $camon $cotland

Cc:
Assurance Services International: asi-info@asi-assurance.org
LRQA: asc-ca@lrqa.com

Scottish Government
St. Andrew's House
Regent Road
Edinburgh
EH1 3DG

10 April 2023

Breaches of Biosecurity & Mass Escapes at Salmon Farms

Dear Scottish Ministers,

In view of ongoing mass escapes and breaches of biosecurity from salmon farms across Scotland, what actions are Scottish Ministers taking to tackle the growing problem?

In terms of mass escapes, $camon $cotland is particularly disturbed by the lack of action taken against Norwegian-owned giant Mowi for repeated poor maintenance, equipment failures and corporate negligence.

Data published by Marine Scotland via 'Scotland's Aquaculture' shows that Mowi has reported over 433,000 farmed fish escapees since 1999 with the following mass escapes due to equipment damage, net failures and human error:

16 June 2022: Colonsay – 15,000 to 20,000 (Hole in Net)
2 June 2022: Grey Horse Channel Outer (Greanem) – 32,463 (Equipment Damage)
23 February 2021: Hellisay – 19,686 (Equipment Damage)
20 August 2020: Eilean Grianain (Carradale) – 48,834 (Weather/Mooring Failure)
17 January 2020: Colonsay – 73,684 (Weather/Pen Failure)
14 October 2019: Hellisay – 23,970 (Equipment Damage/Net Failure)
13 November 2018: Hellisay – 24,752 (Hole in Net)
5 June 2015: Eilean Grianain (Carradale) – 16,000 (Hole in Net)
29 June 2009: Marulaig Bay – 10,534 (Human Error)
13 October 2008: Loch Duich – 7,424 (Hole in Net)
25 July 2008: Ardmaddy – 5,500 (Hole in Net)
29 November 2007: Isle Ewe – 23,805 (Unknown)
8 January 2007: Seaforth – 11,900 (Hole in Net)
12 August 2004: Arbhair – 10,000 (Equipment Damage)
28 April 2003: Isle Ewe – 16,000 (Equipment Damage)
20 March 2003: Aultbea – 11,476 (Hole in Net)

$camon $cotland notes from a recent Freedom of Information disclosure by the Scottish Government that in October 2022 'Holding Lines' were prepared for the media in the wake of two mass escapes at Mowi salmon farms in June 2022; namely:

Holding lines:

- The Scottish Government is working to support fish farms towards the goal of 100% containment. In our response to the Salmon Interactions Working Group report last year, we committed to strengthening the escapes regulatory regime and to work towards introducing fines for fish farm escapes, with the ultimate goal of ring-fencing fees for wild salmonid conservation and research.
- In 2021 Scottish Government published a Code of Practice for containment to manage the interactions with marine mammals.
- We will publish a revised Technical Standard for Scottish Finfish Aquaculture to further improve containment of farmed fish.
- This latest escape event is disappointing. The Fish Health Inspectorate has attended site to conduct an investigation and will make recommendations in order to avoid similar events in future.

Scottish Ministers were briefed by the Scottish Government in September 2022:

Potential Escape at Colonsay fish farm

Ministers will wish to be aware that we await the final notification from a potential escape incident at another Mowi fish farming site in Colonsay from June. We expect the final notification next week and will provide an update to Ministers. Colonsay fish farm has reported 6 escape incidents and near misses since 2019, with 73,000 fish lost in 2020 in a storm event.

Annual Escapes Data (based on estimated and final notification reports published on Scotland's Aquaculture Website)

Year	Fish Escapes
2012	40, 957
2013	40, 754
2014	184,618
2015	18, 096
2016	11,496
2017	31,161
2018	53, 301
2019	70, 307
2020	206, 522
2021	19, 738
2022 (to date)	36, 381

Communications Activity

The details of the escape incident will be uploaded to Scotland's Aquaculture Website next week. We expect that there will be media activity at a future date. Past events of this scale have attracted significant media attention. Holding communication lines for the weekend are provided.

The escapes data detailed above by the Scottish Government shows that 713,331 farmed fish escaped since 2012 at an average of 64,848 fish per year – leaving the Scottish Government's goal of 100% containment dead in the water.

Moreover, data published by the Scottish Government between 1998 and 2014 reveals that over 3.4 million farmed fish escaped in Scotland with Mowi the worst offender (responsible for a quarter of all escape incidents):

Date	# of escapees	# of incidents
2014	182,479	5
2013	25,532	6
2012	37,523	4
2011	404,451	10
2010	17,987	7
2009	131,971	9
2008	58,641	8
2007	154,466	12
2006	155,653	20
2005	877,883	19
2004	90,594	11
2003	151,853	13
2002	309,996	8
2001	66,000	14
2000	428,000	22
1999	258,000	16
1998	67,000	4
Total:	3,418,029	188

In other words, ca. 4 million farmed fish have escaped in Scotland since 1998 – with Mowi reporting over 433,000 escapees via 30+ incidents since 1999.

Whilst Scottish Ministers pays lip service to 100% containment, other countries have taken action to stem the tide of mass escapes.

Seafood Source reported in August 2020: "Chile's Superintendency of the Environment, SMA, has levied a CLP 5.3 billion (USD 6.7 million, EUR 5.7 million) fine against Mowi for what the watchdog said was "irreparable environmental damage" resulting from the escape of more than 690,000 Atlantic salmon from one of its farms in 2018….In its sanctioning procedure SMA cited outdated water current measurements at the Los Lagos region, Calbuco district center built in 2017, failure to implement recommended moorings, and evidence of wear and tear of the nets and mooring lines to which the company did not respond, as cause for the fine."

Intrafish reported in May 2021: "Salmon farming giant Mowi has been fined NOK 3.7 million (€370,457/$450,732) by authorities in the Trondelag region of Norway for a March 2018 incident that saw 54,000 fish escape. Norwegian aquaculture equipment group Egersund Net was fined NOK 750,000 (€75,093/$91,365) for the same incident, the Norwegian Directorate of Fisheries said Friday. Police officials in Trondelag issued the fines to the companies, citing violations of federal policies on escape prevention from aquaculture facilities."

So why has Mowi escaped prosecution and punishment in Scotland for repeated mass escapes due to equipment failures and net failures?

The Scottish Parliament's Rural Economy & Connectivity Committee recommended in November 2018 that "appropriate sanctions should be developed and introduced in Scotland" in relation to escapes from salmon farms:

343. The Committee is aware that in Norway penalties are applied under the Aquaculture Act for breaches of provisions relating to escapes from salmon farms. There is a sliding scale of fines from small administrative fines for minor breaches up to large fines or even imprisonment for a maximum of one year where a breach is caused by wilful intent or gross negligence.

344. Producer companies also have to pay a fee to finance the removal of escaped fish from certain designated rivers and estuaries. All operators holding an aquaculture licence are obliged to be a member of the Aquaculture Industry Association for the recapture of escaped farmed fish which manages the recapturing of escaped fish. Last year the association paid for recapturing efforts in 52 rivers.

345. The Committee has heard from the industry that escapes do not currently appear to be a significant issue in Scotland. However, it cautions against complacency on this issue as there is potential for even a single escape event to have a significant impact on the genetic integrity of wild salmon.

346. **RECOMMENDATION 37**

The Committee notes that strict penalties are in place in Norway to deal with escapes and recommends that appropriate sanctions should be developed and introduced in Scotland.

Since the Scottish Parliament's Rural Economy & Connectivity Committee report in November 2018, a staggering 332,948 farmed fish have been reported as escaping in Scotland (according to the briefing to Scottish Ministers in September 2022).

How many more disease-ridden escapees will the Scottish Government allow to flood into Scotland (and even England's) waterways before action is taken against Mowi and other repeat offenders?

$camon $cotland, to steal a ‘holding line’ from the Scottish Government, finds it incredibly “disappointing” that Scottish Ministers have failed to take action against Mowi for repeated corporate negligence in relation to escapes. Scottish Ministers seem more interested in ‘holding lines’ than in holding the disease-ridden salmon farming industry to account.

For decades, the Scottish Government has been aware of peer-reviewed science detailing the threat of an “extinction vortex” in wild salmon due to repeated mass escapes from salmon farms. The Royal Society of London reported twenty years ago in 2003:

THE ROYAL SOCIETY PUBLISHING | All Journals | Sign in | Instit

Home Content Information for About us Sign up Submit

PROCEEDINGS OF THE ROYAL SOCIETY B

BIOLOGICAL SCIENCES

Restricted access

View PDF

Tools Share

Cite this article

Section

Abstract

Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon

Philip McGinnity, Paulo Prodöhl, Andy Ferguson, Rosaleen Hynes, Niall ó Maoiléidigh, Natalie Baker, Deirdre Cotter, Brendan O'Hea, Declan Cooke, Ger Rogan, John Taggart and Tom Cross

Published: 07 December 2003 https://doi.org/10.1098/rspb.2003.2520

Abstract

The high level of escapes from Atlantic salmon farms, up to two million fishes per year in the North Atlantic, has raised concern about the potential impact on wild populations. We report on a two-generation experiment examining the estimated lifetime successes, relative to wild natives, of farm, F_1 and F_2 hybrids and BC_1 backcrosses to wild and farm salmon. Offspring of farm and ‘hybrids’ (i.e. all F_1, F_2 and BC_1 groups) showed reduced survival compared with wild salmon but grew faster as juveniles and displaced wild parr, which as a group were significantly smaller. Where suitable habitat for these emigrant parr is absent, this competition would result in reduced wild smolt production. In the experimental conditions, where emigrants survived downstream, the relative estimated lifetime success ranged from 2% (farm) to 89% (BC_1 wild) of that of wild salmon, indicating additive genetic variation for survival. Wild salmon primarily returned to fresh water after one sea winter (1SW) but farm and ‘hybrids’ produced proportionately more 2SW salmon. However, lower overall survival means that this would result in reduced recruitment despite increased 2SW fecundity. We thus demonstrate that interaction of farm with wild salmon results in lowered fitness, with repeated escapes causing cumulative fitness depression and potentially an extinction vortex in vulnerable populations.

New Scientist [reported back in 2002]():

NEWSLETTERS
Sign up to read our regular email newsletters

NewScientist

News Podcasts Video Technology Space Physics Health More Shop Tours Events

Scottish salmon in "extinction vortex"

16 July 2002

By Danny Penman

Pampered farmed salmon are driving their wild brethren into an "extinction vortex" in rivers along the west coast of Scotland, according to new research.

"Farmed fish are bred to grow fast," says James Butler, director of the Spey Fishery Board. "Their voracious feeding ensures that they out compete native salmon."

But the farmed salmon do not then replace wild salmon in UK rivers, Butler warns: "When the farmed fish migrate to the sea they rapidly die off or are killed, so the population plummets. Another problem is that you get hybridisation, which weakens the wild stock. It's a double whammy that drives them into an extinction vortex."

The Daily Telegraph [reported in 2006]():

The Telegraph

Home Video News World Sport Business Money Comment Culture Travel Life

Politics | Investigations | Obits | Education | Science | Earth | Weather | Health | Royal | Celebr

HOME » NEWS

Wild salmon put at risk as a million farmed fish escape

By Charles Clover, Environment Editor
12:01AM BST 29 Aug 2006

More than a million farmed salmon have escaped into the wild in the past three years in accidents which scientists fear may be driving the wild salmon population towards extinction.

The figures, released by the Scottish Executive, show that a total of 1.6 million salmon have escaped from fish farms in more than 50 separate accidents since 2000, with 821,512 escaping last year alone. So far this year, official figures show 105,987 of the fish have escaped from salmon farms.

Recent scientific evidence shows that the accidental escape of farmed salmon from pens each year can lead to catastrophically reduced survival of the progeny of wild salmon which breed with the domesticated fish.

Scientists call the effect the "extinction vortex" because they say it could lead to the demise of wild salmon populations which have evolved over thousands of years in particular rivers.

Print this article

News

EXTERNAL LINKS

Pure Salmon Campaign

The Sunday Times reported in March 2013:

Invasion of the Viking salmon

Scotland's wild stocks 'tainted' by Norwegian strains used in fish farms, writes **Mark Macaskill**

31.3.13

A salmon farm on Loch Linnhe; inset, a wild Atlantic salmon

AS MANY as one in four wild Atlantic salmon from Scotland has been genetically "tainted" by Norwegian fish, a study suggests. Analysis of almost 1,500 wild salmon from the west coast found 369 possessed genetic markers unique to the Scandinavian fish.

The findings have provoked a fresh row between environmentalists and Scotland's aquaculture industry.

Opponents argue fish farmers, who depend heavily on imported eggs from Norway to build up stocks, are primarily to blame — millions of escapees over the past decade are thought to have "polluted" the gene pool by cross-breeding with their wild cousins.

Last night, however, the Scottish Salmon Producers' Organisation (SSPO) said there was no evidence fish farming was responsible.

It is known, for example, that Norwegian fish have been used to boost salmon stocks in east coast rivers such as the Spey and the Shin. It is possible, said SSPO, that these fish have migrated and bred with west coast populations.

For the study, carried out by Rivers and Fisheries Trusts of Scotland (Rafts), 1,472 Atlantic salmon across more than 50 locations, including rivers such as the Awe, Lochy and Laxford, were sampled between 2005 and 2011.

A particular set of genetic markers unique to Norwegian fish enabled scientists to identify hybrids but it was not possible to determine if a Scottish salmon had bred with a wild fish from Norway or a farmed one. Nevertheless, it found much higher levels of hybridisation than expected in wild salmon on the west coast, home to more than 400 fish farms. Since 2002, according to Scottish government figures, about 2.4m farmed Atlantic salmon have escaped into the sea.

"Most sites had a signature of hybridisation that was significantly higher than expected by chance," states the study. "Across all sites, 369 out of 1, 472 (25.1%) individuals were identified as hybrids, which is significantly higher than that seen for the east coast 'wild' baseline."

Callum Sinclair, from Rafts, added: "The main focus of the report is the detection of introgression between Norwegian aquaculture strains and Scottish fish. [It] indicates significant levels of hybridisation of wild Scottish salmon in the West Highlands and Islands with genetic strains commonly in use in the Norwegian-owned salmon aquaculture industry."

Salmon are known to travel vast distances. A study that tracked the movements of fish released from a Scottish fish farm in 2007 found them as far afield as Norway and Sweden.

It is conceivable that farmed and wild fish from Norway have made the same trip to Scottish waters and bred successfully with native Atlantic salmon. However, Tony Andrews, chairman of the Atlantic Salmon Trust, said there was a "prima facie case" for salmon farming's role in creating hybrid fish.

A spokesman for SSPO said: "It is disappointing that so much public money has been spent on this non-peer-reviewed project that revealed no real differences between wild and farmed fish."

The Sunday Times reported in March 2014:

THE SUNDAY TIMES
09.03.14 / 15

Farm escapes make stupid wild salmon

Jonathan Leake

BRITAIN'S wild salmon are getting stupider because of interbreeding with the millions of farmed salmon that escape each year, researchers have found.

Farmed Atlantic salmon are the chickens of the sea. Since the 1970s, when fish farming was industrialised, they have been intensively inbred to grow fast and taste good — but the side effect has been to lose the genes that confer the intelligence, homing instincts and predator avoidance skills found in wild salmon.

A report out this week will warn, however, that such negative traits are now being passed to wild salmon because they are interbreeding with the millions of fish escaping from fish farms each year.

Professor Matt Gage from the University of East Anglia's school of Biological Sciences has found that, despite their other defects, farmed salmon are just as fertile as wild ones and so can easily breed with them.

"Farmed Atlantic salmon are a threat to biodiversity, because they escape in large numbers and can dilute or disrupt locally adapted wild gene pools," he said in a report.

Salmon farming is now so big that it produces hundreds of times more fish than are found in the wild.

Less than 2,000 tons of wild North Atlantic salmon are now caught each year, compared with the peak of around 12,000 tons in the mid-1970s. By contrast, global fish farming produces nearly 1.3m tons — with Norway and Scotland among the leaders. It means that about 95% of the salmon in existence are farmed.

Gage's findings are backed by the EU's Genimpact study, looking at the impact of aquaculture on native populations.

It found that up to 2m farmed fish escape into the North Atlantic each year, owerwhelming many wild populations.

Studies suggest that up to 300,000 such fish return to European rivers annually so that up to 80% of "wild" salmon in Norwegian rivers come from farmed stock.

It said: "Farmed salmon are genetically different from wild fish ... Farm escapes can have significant direct and indirect negative impacts on wild populations. Modelling suggests ... escapes may lead to the extinction of wild populations."

The impacts could soon be even greater, with American scientists creating genetically modified salmon designed to grow faster and larger than any natural strain — which could well also escape.

The EU study said the obvious solution was for salmon farmers to switch to triploid salmon, with an extra set of chromosomes that makes them sterile, but said this was being rejected because of the " consumer perception that they are genetically modified organisms".

Salmon breed with escapees

It has been estimated that as many as one in four wild Atlantic salmon from Scotland has been genetically "tainted" by Norwegian fish after analysis of almost 1,500 wild salmon from the west coast found 369 possessed genetic markers unique to the Scandinavian fish.

Last week, Meridian Salmon Group confirmed that about 155,000 farmed salmon escaped from a site on the island of Yell, in the Shetland Islands, after cages were battered by strong winds and heavy seas.

Since 2002, nearly 2.5m farmed salmon have escaped in more 100 separate incidents, according to figures published by the Scottish government.

"The escape of large numbers of farmed salmon in Shetland once again underlines this threat to the genetic diversity and ultimately the survival of wild Atlantic salmon," said Tony Andrews, chief executive of the Atlantic Salmon Trust.

"An obvious long-term solution to the problem of interbreeding is complete separation of wild and farmed fish. That separation can only be achieved by closed containment salmon farming.

"A biological firewall must ensure that no interaction of cross breeding, parasites, disease or chemical treatments is permitted to endanger wild salmon or sea trout stocks."

Don Staniford, director of the Global Alliance Against Industrial Aquaculture, said: "The Scottish government must now close the net on escapes and that means rescinding licences for repeat offenders, hefty fines and perhaps even prison sentences."

Salmon & Trout Conservation (WildFish) [reported in October 2021]:

Scottish Government study confirms that many wild salmon populations in the west Highlands and Islands are severely compromised with farmed salmon genes

The levels of genetic introgression have serious implications for the "fitness" and thus the future survival prospects of already depleted wild salmon populations

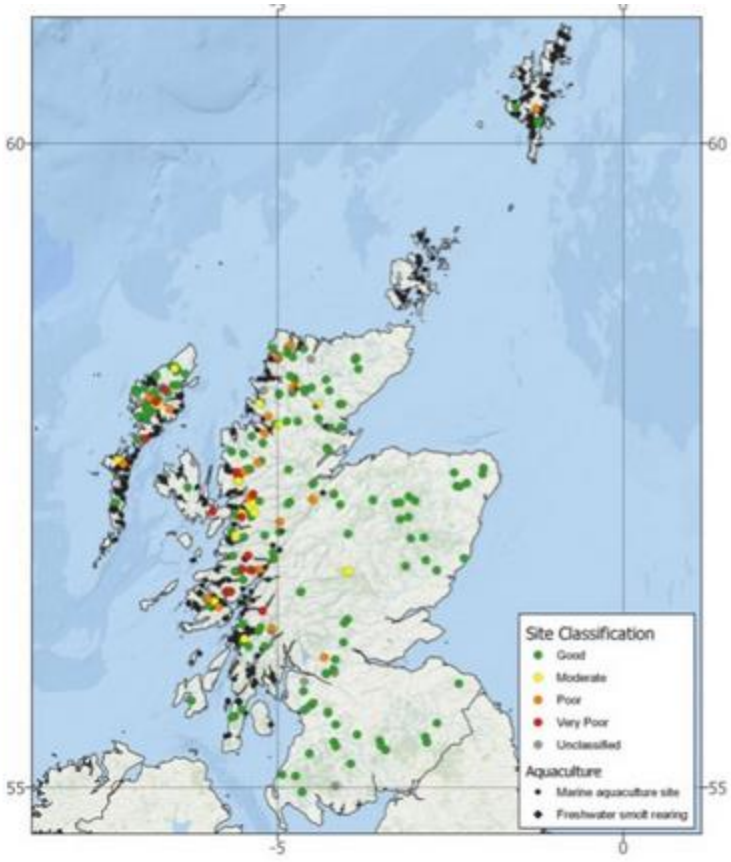
Fish samples from 237 sites across Scotland were classified. The study states that "signs of introgression were found in salmon at 55 (23.2%) of the sites with 182 (76.8%) sites classified as Good, 21 (8.9%) as Moderate, 20 (8.4%) as Poor, and 14 (5.9%) as Very Poor". The Moderate, Poor and Very Poor categories are concentrated almost entirely in areas of Scotland where salmon farms, both marine and freshwater, are located.

Andrew Graham-Stewart, Director of WildFish Scotland (formally Salmon and Trout Conservation Scotland), said:

"Farmed salmon, the great majority of Norwegian origin, are essentially domesticated animals, bred for the table. When they interbreed with our wild salmon, the offspring are inevitably unsuited and unfit to survive in the wild. The future viability of wild salmon is dependent on their genetic integrity not being compromised by domesticated strains.

"It is little wonder that this study has been published by Scottish Government without fanfare. It is a damning indictment of the insidious impact of salmon farming and the ongoing failure of the operators of salmon farms to contain their fish. It represents yet more evidence why open-net salmon farms should be closed down as soon as is practicable before further damage is done to the vital genetic integrity of our wild salmon populations."

Wild salmon populations have been affected by farmed salmon introgression in Clyde (eg River Leven), Argyll (eg River Awe), Lochaber (eg River Shiel), Wester Ross (eg River Balgy), West Sutherland, the Inner and Outer Hebrides, and the River Shin and the River Ness systems (the latter two are east coast but they host freshwater cages producing juvenile farmed salmon).



 Key. The proportion of wild and farmed (Norwegian) origin genetic material in fish samples analysed using a colour grading system: • Green – Good condition: No genetic changes observed • Yellow – Moderate condition: weak genetic changes indicated • Orange – Poor condition: moderate genetic changes detected • Red – Very Poor condition: major genetic changes detected • Unclassified – Fish numbers too low to classify

Issued by directorscotland@wildfish.org For further information contact Wildfish Scotland's Director Andrew Graham-Stewart.

The study "A national assessment of the influence of farmed salmon escapes on the genetic integrity of wild Scottish Atlantic salmon populations" (© Crown copyright 2021) is available here

Scottish Ministers will obviously have read the Scottish Government report online here

Scottish Government
Riaghaltas na h-Alba
gov.scot

A national assessment of the influence of farmed salmon escapes on the genetic integrity of wild Scottish Atlantic salmon populations

Scottish Marine and Freshwater Science Vol 12 No 12

J Gilbey, J Sampayo, E Cauwelier, I Malcolm, K Millidine, F Jackson and D J Morris

The Scottish Government report included:

> The available evidence indicates that introgression of genetic material from Norwegian farm salmon strains has altered the genetic composition of some populations within rivers near marine aquaculture production. The Shetland Isles, Hebrides and mainland west coast as far south as the Clyde were all notably affected. A substantial number of sites within these regions showed evidence of introgression, however patterns were patchy with nearby sampling sites often unaffected. This fine scale spatial variability in genetic status is similar to that observed in Norway.
>
> With sufficient additional data, spatial regression models have the potential to improve understanding of the various environmental factors affecting the presence and survival of hybrids and could potentially provide a basis for predicting the impacts of changing production locations or intensity on wild populations. Nevertheless, even from these preliminary results it is clear that the presence of marine aquaculture in an area has the potential to affect the overall genetic integrity of local salmon populations.
>
> Previous studies have shown that farm/wild hybridisation and subsequent introgression carry risks to the health of wild salmon populations. The results presented here should now allow such risks to be better quantified and managed within impacted areas. Further work on the integration of results into a quantitative regional picture, together, importantly, with modelling of the determinants of impacts could increase the understanding of the patterns observed, with the potential for predictive tools to be developed. However, it is important to highlight that these results only represent a simple snapshot of the genetic status of populations.

New Scientist [reported in December 2021]():

Life

Breeding with farmed fish is changing the life cycle of wild salmon

The evolutionary fitness of Atlantic salmon is being damaged by genetic contamination as wild fish breed with escapees from fish farms

By Adam Vaughan

22 December 2021

When wild Atlantic salmon breed with escaped farmed salmon, their descendants grow faster and mature at a younger age, undermining the ability of the species to survive and reproduce in its natural environment.

To get a better idea of how the spread of farmed salmon's genes is affecting wild fish, Geir Bolstad at the Norwegian Institute for Nature Research in Trondheim and his colleagues collected scales from 7000 adult salmon in 105 rivers in Norway, the world's biggest producer of farmed fish. By examining a scale from each fish and genotyping just over half of them, the team analysed what genetic ancestry with farmed fish means for their pace of development.

Bolstad says that as long as the flow of genes continues, "it will by all probability decline the population figures because it makes the population on average maladapted".

The overall picture masks one striking finding, which is that the impact of farmed fish genes varies drastically between populations of salmon. For example, in those communities where natural selection had already produced extremely fast-growing fish, the introduction of farmed fish genes actually acted as a brake rather than an accelerator.

The differences suggest that conservation efforts to limit the impact of farmed fish genes should be directed at local rather than national levels, says David Murray at the University of East Anglia in Norwich, UK. "This is something we haven't seen before regarding the impacts of farmed gene introgression and could only be determined from an experiment of this scale and scope," he says.

Read the scientific paper in full via [Science Advances (22 December 2021)]:

$camon $cotland cannot escape the conclusion that successive Scottish Ministers are guilty of government negligence in failing to take any action against Mowi for corporate negligence over repeated mass escapes. Surely the Scottish Government's failure to protect wild Atlantic salmon from mass escapes from disease-ridden salmon farms is a breach of wildlife laws?

If [Environmental Standards Scotland] investigated the issue of mass escapes, $camon $cotland strongly believes that the Scottish Government will face the same consequences as their [previous failures in relation to the illegal use of Acoustic Deterrent Devices on salmon farms].

Finally, in addition to genetic pollution from farmed salmon escapees there are very real biosecurity risks posed to wild fish by the spread of infectious diseases, pathogens, viruses, bacteria and parasites via escapees. $camon $cotland (Scottish Salmon Watch) has raised disease risks from salmon farming operations in previous letters to Scottish Ministers – [in May 2018 in relation to the spread of diseases, viruses and pathogens from salmon farms and processing plants]; [in August 2021 in relation to the spread of Infectious Salmon Anaemia] and [in November 2022 in relation to the spread of HSMI/PRV].

Scottish Ministers must be aware that when [48,834 farmed salmon escaped from Mowi's Eilean Grianain (Carradale) salmon farm in Kilbrannan Sound on 20 August 2020] the site was suffering from extensive disease problems. In fact, a [Fish Health Inspectorate visit on 28 August 2020] reported "complex gill pathology and Amoebic Gill Disease" with Piscine Reovirus (PRV) "diagnosed but no clinical signs". PatoGen visited Mowi's Eilean Grianain (Carradale) salmon farm on 11 August 2020 (nine days before the mass escape on 20 August 2020) and the farmed salmon tested "were positive for PRV-1":

Case No:	2020-0344			Date of visit:	28/08/2020
Time spent on site:	4 hours			Main Inspector:	[redacted]
Site No:	FS1176	Site Name:	Eilean Grianain		
Business No:	FB0119	Business Name:	Mowi Scotland Ltd		

Recent (last 4 wks) disease problems?	Y	Any escapes (since last visit)?	Y
If yes, detail:	Complex gill patholgy and AGD (gill scores about 1-2). PRV diagnosed but no clinical signs.		

7. Have increased (unexplained) mortalities been reported to vet or FHI?	Y
If yes, detail action:	Reported to company biologist, Patogen and FVG.
8. Have 'mortality events' been reported to FHI? If no, add MRT case and enter on mortality events sheet.	Y

Results of Surveillance

1. Has any animal health surveillance been carried out by, or on behalf of, the business?	Y
2. If yes, are results available for inspection?	Y
3. Any significant results?	Y
If yes, detail (if not detailed under recent disease problems).	Some gill pathology. PatoGen visited on 11/08/2020 and tested for PMCV, pasteuralle syensis, Yersinia and SAV/PD, all were negative. 12/12 were positive for PRV-1.

Figure 1: Cage 1 the day following the incidient (21/08/2020)

Yet a Fish Health Inspectorate 'Visit Report' dated 9 September 2020 revealed that no samples of Mowi's farmed salmon were taken for disease analysis as "the Inspector did not observe any clinical signs associated with the listed diseases":

> The site was inspected following notification of an escape of 48,834 Atlantic salmon on 20th August 2020. (Marine Scotland escape incident number: MSe200820SAL1)
>
> An enhanced containment inspection was conducted and a report will be issued separately.
>
> All epidemiological units were inspected.
>
> On this occasion no samples were taken for disease analysis. The Inspector did not observe any clinical signs associated with the listed diseases as described in the Aquatic Animal Health (Scotland) Regulations 2009.

Figure 5: Cage 1 on the day of the physical inspection

In what world is it acceptable for a mass escape of 48,834 farmed salmon (which just days earlier tested positive for PRV-1 - a potentially deadly pathogen to both wild and farmed salmon; and which resulted from corporate negligence) to evade scrutiny or censure by the Scottish Government?

$camon $cotland calls on Scottish Ministers to close the net on disease-ridden salmon farms – including fines for mass escapes and the testing of all salmon farms for ISA, HSMI, PRV, Pasteurella skyensis, Rickettsia, Salmon Gill Poxvirus and other deadly viruses, pathogens and diseases. The operating licence for Mowi's Colonsay salmon farm – which was controversially bankrolled after Mowi (then named Marine Harvest) bribed islanders to the tune of £50,000 – must surely be the first to be rescinded.

$camon $cotland will also be writing the Aquaculture Stewardship Council demanding the cancellation of certification for Mowi's Colonsay salmon farm due to repeated escapes. The ASC 'Salmon Standard' published in September 2022 includes:

Criterion 3.4 Escapes[54]

INDICATOR	REQUIREMENT
3.4.1 Maximum number of escapees[55] in the most recent production cycle	300[56]
3.4.2 Accuracy[57] of the counting technology or counting method used for calculating stocking and harvest numbers	≥ 98%
3.4.3 Estimated unexplained loss[58] of farmed salmon is made publicly available	Yes
3.4.4 Evidence of escape prevention planning and related employee training, including: net strength testing; appropriate net mesh size; net traceability; system robustness; predator management; record keeping and reporting of risk events (e.g., holes, infrastructure issues, handling errors, reporting and follow up of escape events); and worker training on escape prevention and counting technologies	Yes

[56] A rare exception to this standard may be made for an escape event that is clearly documented as being outside the farm's control. Only one such exceptional episode is allowed in a 10-year period for the purposes of this standard. The 10-year period starts at the beginning of the production cycle for which the farm is applying for certification. The farmer must demonstrate that there was no reasonable way to predict the events that caused the episode. See auditing guidance for additional details.

[57] Accuracy shall be determined by the spec sheet for counting machines and through common estimates of error for any hand-counts.

[58] Calculated at the end of the production cycle as: Unexplained loss = Stocking count – harvest count – mortalities – other known escapes. Where possible, use of the pre-smolt vaccination count as the stocking count is preferred.

Since Mowi's Colonsay salmon farm has reported six escape incidents since the site was established in 2015 – including 15,000 to 20,000 escapees in June 2022 and 73,684 escapees in January 2020 – it begs the question: how on earth is Mowi's Colonsay salmon farm currently certified as 'responsible' by the ASC up to July 2025?

Yours sincerely,

Don Staniford

Director, $camon $cotland

Cc:
Scottish Greens
Scottish Environment Protection Agency
Nature Scotland
Aquaculture Stewardship Council