



Scottish Ministers
St. Andrew's House
Regent Road
Edinburgh
EH1 3DG
scottish.ministers@gov.scot

22 January 2024

Dear Scottish Ministers,

Please Ban the Use of Cleaner Fish in Thermolicers as in Norway!

The position of \$camon \$cotland (formerly called Scottish Salmon Watch) as vehemently opposed to the use of mechanical de-licers such as Thermolicers, Optlicers and Hydrolicers is well known to the Scottish Government. Scottish Salmon Watch [wrote to Scottish Ministers in June 2020 questioning the legality of mechanical de-licers](#) and reiterated our call for a ban made in letters to Scottish Ministers in [November 2019](#) and [October 2019](#).

Our position against the use of mechanical de-licers remains but this letter focuses on the use of cleaner fish (wrasse and lumpfish) in the Thermolicer. [Video evidence from Mowi's Camas Glas salmon farm in Loch Sunart in June and July 2023](#) – coupled with [Norway's ban on the use of cleaner fish in Thermolicers announced in June 2023](#) and [welfare audits of salmon farms in 2024 \(the first of which will be published in March\)](#) – demands immediate action in Scotland.



Workers on Mowi’s Camilla Eslea - [“officially the highest capacity Thermolicer in the world”](#) - can be seen in [video footage shot in June 2023](#) using metal and wooden poles to dislodge wrasse and lumpfish caught in the de-licing machinery. Is this standard practice or due to a technical fault? Whatever the case, this practice is clearly welfare abuse.



In July 2023, in a [‘Mortality Event Report’ to the Scottish Government](#) Mowi cited “technical issues” with an “error” in the Thermolicer at Camas Glas salmon farm ([certified as ‘organic’ by the Soil Association](#) and [‘responsible’ via RSPCA Assured](#) and the [Aquaculture Stewardship Council](#)) causing 10,597 dead salmon (cleaner fish mortalities were not reported but [79,430 lumpfish were officially reported on site in February 2023](#)):

Mortality Event No	Reporting Business Name	Site Name	Date reported	Start Date	End Date	Average weight of affected population	Weekly Mortality rate recorded (%)	Explained reasons	Total mortality during event	Additional information	Action taken by FHI
MRT04134	Mowi Scotland Ltd	Camas Glas	19/07/2023	10/07/2023	16/07/2023	1.25Kg	1.01	Treatment loss - thermolicer	10,597	Increase in sealice on site prompted thermolicer intervention. Technical issues were experienced during treatment. Issue was fixed on the day of occurrence but mortalities had already happened as a result. The business is currently reviewing procedures relating to treatment vessels to ensure this error is mitigated against in future. No other health issues have been observed on site, with low level PGD seen.	Business correspondent contacted for further information. FHI to monitor.

Video footage [shot on 11 July 2023](#) (a day after the start date of the ‘Mortality Event Report’ filed by Mowi) shows workers on the Camilla Eslea standing on the Thermolicer pipes sweeping fish down the pipes (presumably due to the technical fault):



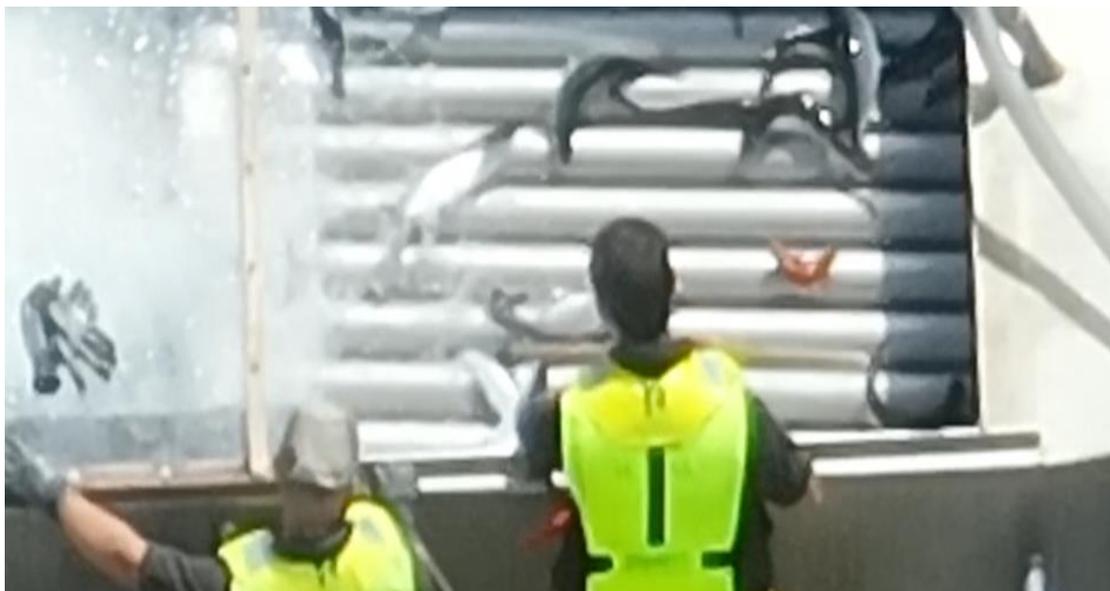
The [video footage shot on 11 July 2023](#) appears to have captured evidence of Mowi workers dealing with the Thermolicer technical error – here you can see the Mowi workers stood over the Thermolicer pipes in [video footage shot on 20 June 2023](#):



Three weeks later in [drone footage shot on 11 July 2023](#) (zoomed in [online here](#)), Mowi workers were captured climbing into the machinery (presumably to deal with the technical error which appears – in the grainy video footage – to have led to a back up of dead and dying fish trapped in the pipes):

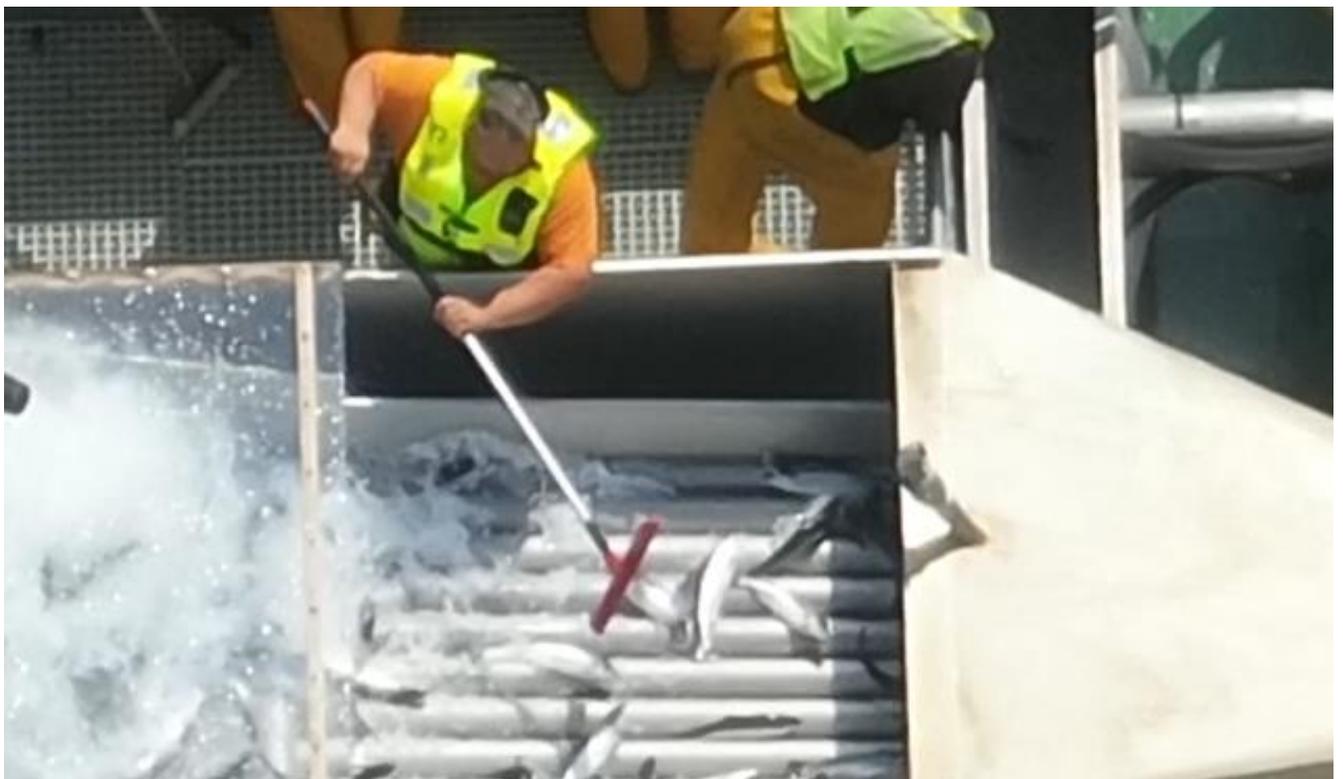


[Mowi claims](#) that the Camilla Eslea Thermolicer “is operated by specialist and skilled technicians with extra focus on fish health and welfare” and “has specially designed dewatering systems to aid the safe removal of cleanerfish from the salmon so that they can be safely returned to the pen”. However, the [drone footage shot in June and July 2023](#) raises serious questions. Please watch the video evidence and judge for yourselves if this is welfare abuse or not (the wrasse can be seen in red and the lumpfish in blue):





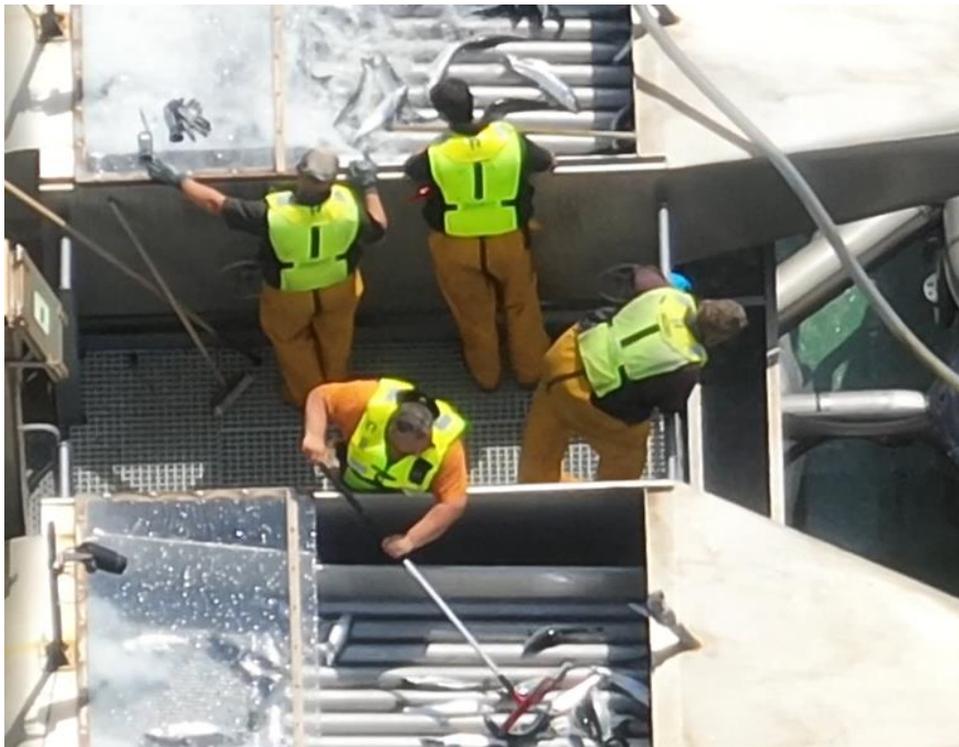
Watching the Mowi's ["specialist and skilled technicians"](#) is like watching the Winter Olympics with Team GB brushing furiously in the hope of beating Norway to the Gold medal at curling:



From 14 seconds in this [video clip from June 2023](#) watch the Mowi worker prod, brush and wipe the small cleaner fish down the pipes (it is not clear how many fish die immediately from this abuse, how many die a few days later or how many survive the welfare abuse):



In this [video footage from June 2023](#), compare and contrast the different styles of the two Mowi workers – one with a wooden pole with no visible attachment (perhaps with just a rubber end) and the second with a metal pole with a red window-cleaning style attachment. One has a more piercing action like a heron and the other tends to scrape and push like a road sweeper:





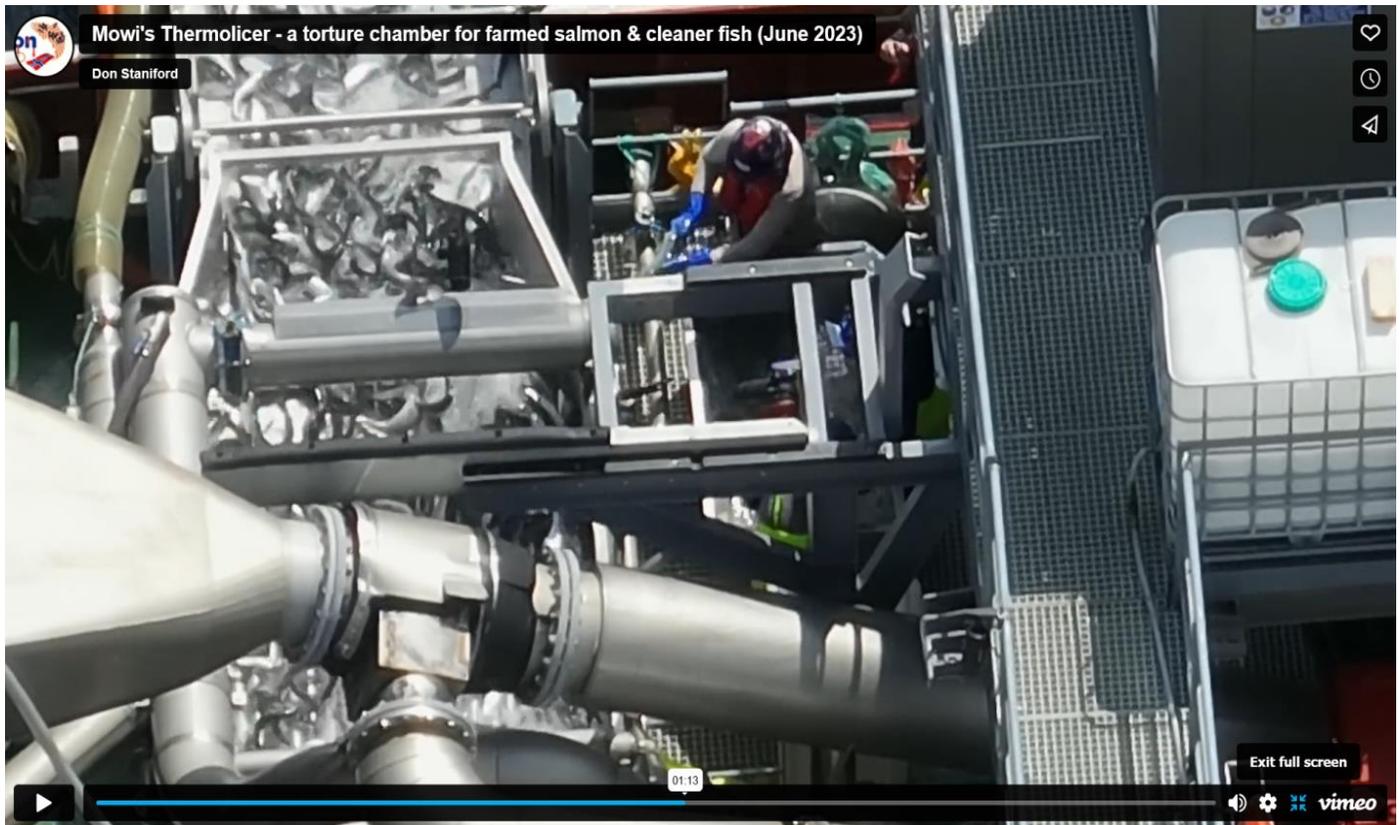
Even the bigger Atlantic salmon are in danger of being caught on the Thermolicer pipes but the risks of welfare abuse and mortality are magnified for the smaller wrasse and lumpfish:



It is not clear from the video footage where [Mowi's "specially designed dewatering systems to aid the safe removal of cleanerfish from the salmon so that they can be safely returned to the pen"](#) are located aboard the Camilla Eslea:



From 58 seconds in this [video clip from June 2023](#) you can see workers sorting through selected salmon before they are dumped back into the cage (perhaps checking for sea lice):



This [video clip shot in June 2023](#) shows a dead – or dying – salmon on the surface of the cage following the Thermolicer treatment alongside what appears to be dead cleaner fish:



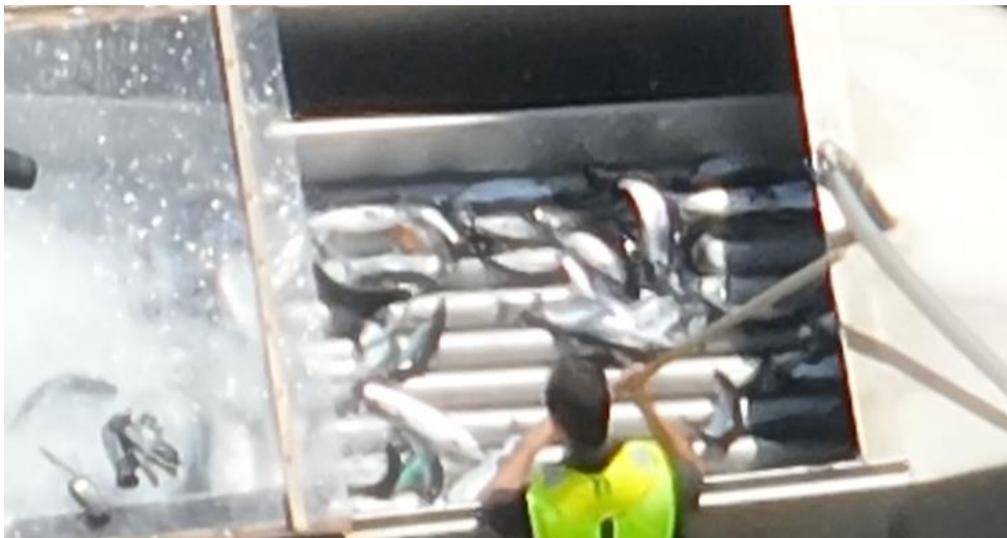
It is not clear how many fish died in the June 2023 Thermolicer treatment.



The same [video clip shot in June 2023](#) appears to show cleaner fish going back into the cage following the Thermolicer treatment (i.e. they were not taken out):



This wooden pole does not appear to be fitted with a window wiper device but may have another home-made connection at the end. Perhaps this is what [Mowi really means by “the level of sophisticated technology onboard” the Camilla Eslea](#)? Surely this is unacceptable and represents a case of ‘unnecessary suffering’ and a breach of [Section 19](#) of the [Animal Health and Welfare \(Scotland\) Act 2006](#)?



It is not immediately obvious how this technique fits in with [Mowi’s claims](#) that the Camilla Eslea Thermolicer is “an optimal environment for treating the salmon”, that “fish handling is very gentle which reduces potential stress for the fish” or that “bigger is better”.

For the fish forced through the heated torture chamber it does not look optimal at all.



It is difficult seeing the translucent blue colour of the lumpfish but it does appear that there are lumpfish as well as wrasse going through the Thermolicer:



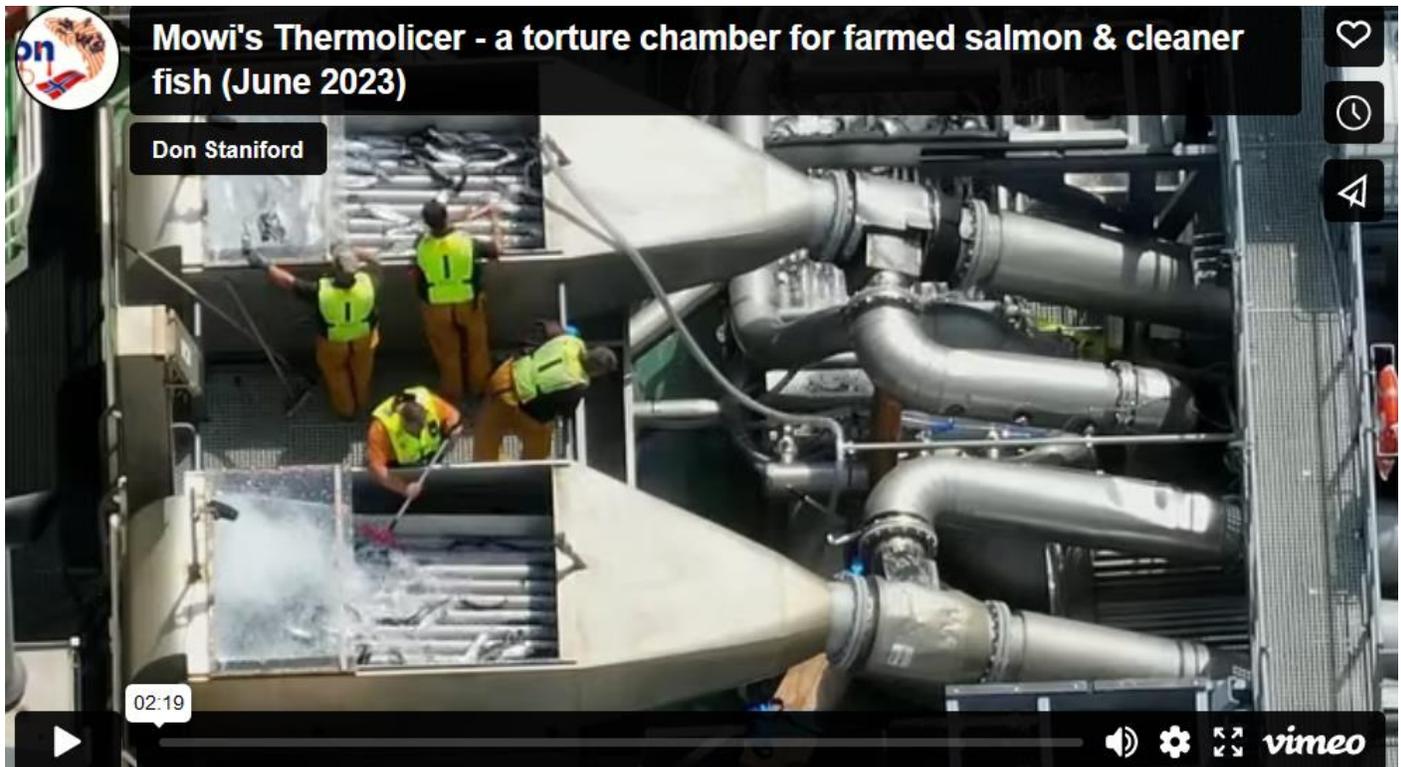
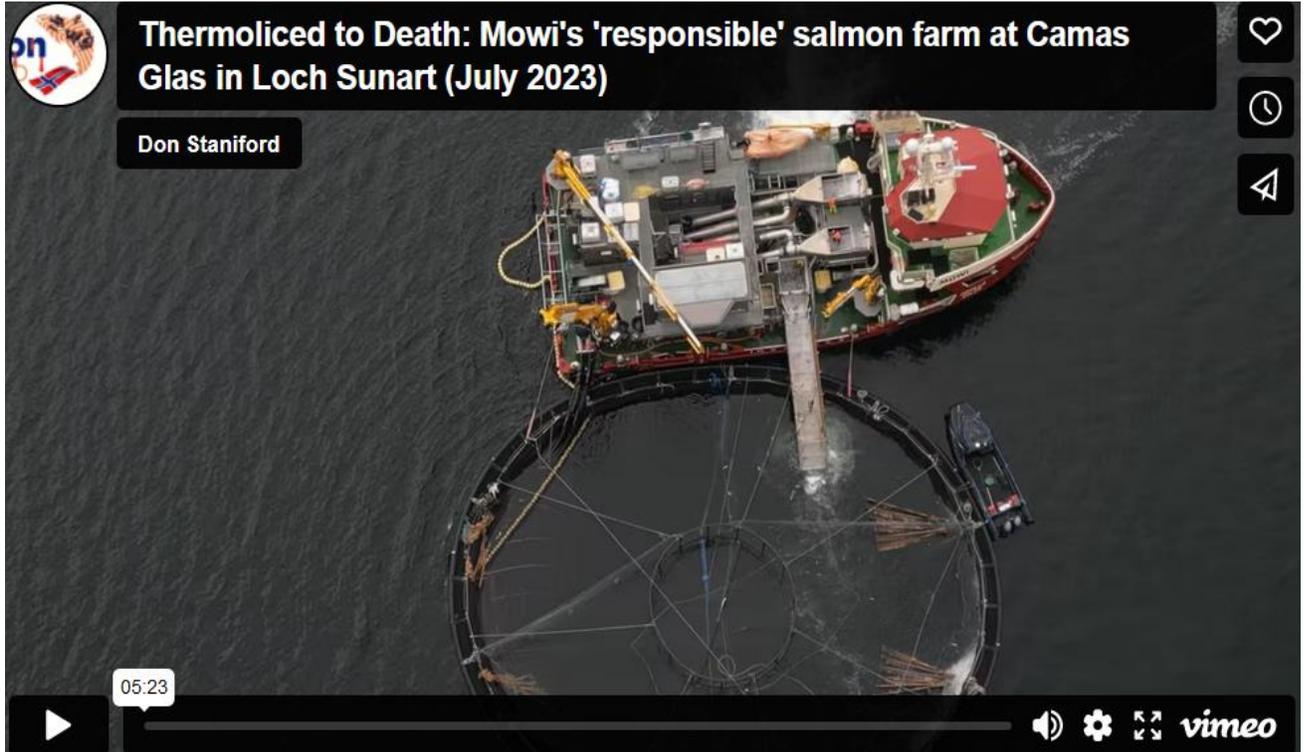
The Mowi workers appear to struggle to keep an eye out on all the cleaner fish - predominantly wrasse (although their red colour may mean that they are just easier to pick out) - coming past on the Thermolicer's badly designed conveyor pipes:



It's hot work for the workers who require bottles of water to keep going – with [the fish tortured by temperatures up to 34 degrees](#):



Longer video footage – shot via drones in [June 2023](#) and [July 2023](#) – is available below:



Unedited drone footage shot on 20 June 2023 is available via:



At 53 seconds a worker throws a fish from the Camilla Eslea's Thermolicer into the salmon cage:



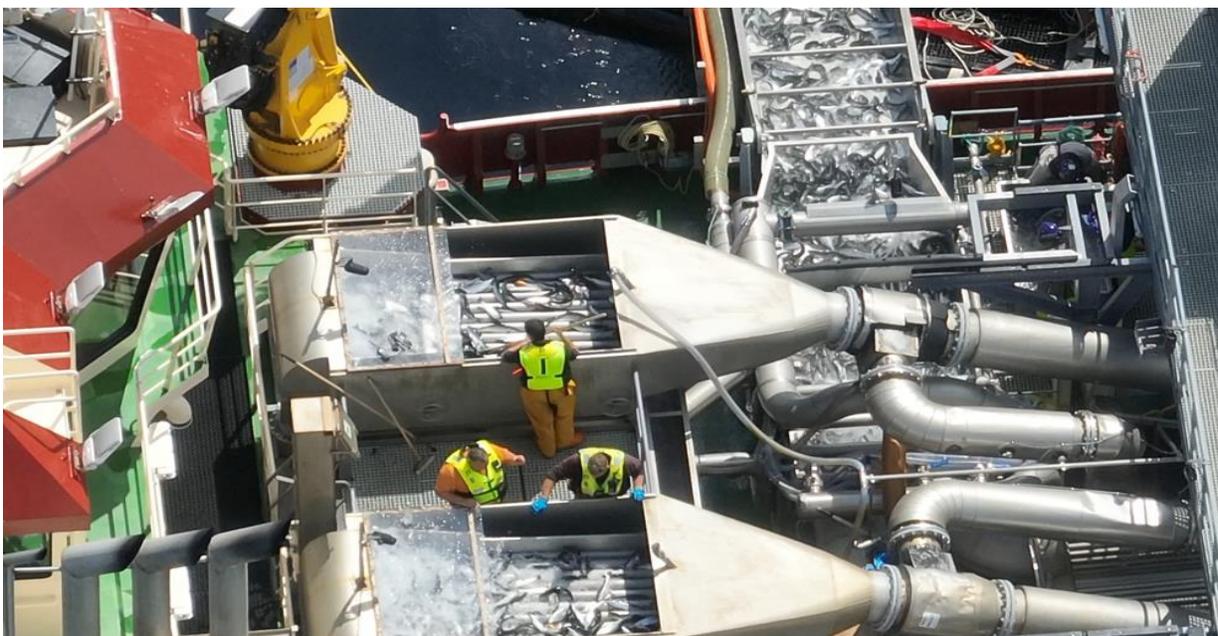
More video footage shot on 20 June 2023 is available below:



The sheer volume of fish passing through the Thermolicer – [Inverlussa claims the Camilla Eslea “has a throughput of 300 tonnes of fish per hour”](#) - is staggering to the naked eye:



The salmon farming sectors only thinks of all the jobs this fish torture device has spawned. “That’s 13 jobs that boat has created,” [said Ben Wilson of Inverlussa when the Camilla Eslea was unveiled](#). “They’re good quality jobs and we’re lucky to have lots of good people.”



Jobs at all costs – at the expense of welfare laws - is not a policy the Scottish Government should follow. \$camon \$cotland therefore urges Scottish Ministers to follow welfare legislation and ban mechanical de-licers.

Mowi's glaringly obvious technical errors in Loch Sunart in 2023 compare with the operation of a Thermolicer [on board the Simon Princess at a Scottish Sea Farms site in Loch Creran in 2020](#):

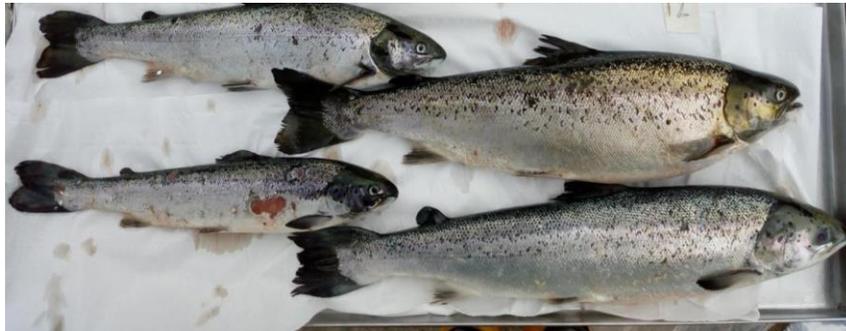


Another [Thermolicer operation on board the Voe Earl at Mowi's Loch Leven salmon farm in 2019](#) also featured cleaner fish – this photo still clearly shows a wrasse (in red) – but does not show Mowi workers with wooden sticks and poles and the water flow seems more powerful:



This is not the first time that Mowi's lethal operations in Loch Sunart have been exposed. Mowi [reported 9,127 salmon mortalities at Camas Glas in May 2022](#) following another Thermolicer treatment (no data on cleaner fish mortalities was reported). A [Fish Health Inspectorate report – 2021-0270 – in August 2021](#) detailed over 10,000 lumpfish mortalities at Mowi's Camas Glas salmon farm in Loch Sunart. Mortality data [published by Salmon Scotland for August 2023](#) detailed 15% salmon mortality at Mowi's Camas Glas farm due to bacterial disease with [11.9% mortality in September 2023](#) (but again no data on cleaner fish mortalities was reported).

A [Fish Health Inspectorate 'Case Information' report – 2023-0424 – relating to Mowi's Camas Glas salmon farm in September 2023](#) detailed Piscine Reovirus, Salmonid Alphavirus, Amoebic Gill Disease, Pasteurella skyensis, Piscirickettsia and Salmon Gill Poxvirus in the farmed salmon (see photo) with 152,565 salmon mortalities over the last 4 weeks (cleaner fish mortalities were not reported). The report detailed Thermolicer treatments from 19 to 23 June 2023 and 10 to 13 July 2023 "to deal with lice levels".



The [Fish Health Inspectorate 'Case Information' report – 2023-0424 – relating to Mowi's Camas Glas salmon farm in September 2023](#) detailed 83,097 wrasse (both farmed and wild) on site with no lumpfish and 840,346 Atlantic salmon. Another [Fish Health Inspectorate report – 2023-0058 – relating to Mowi's Camas Glass salmon farm in February 2023](#) detailed 79,430 lumpfish (farmed by Mowi's Ocean Matters in Wales) but no wrasse and 1,100,061 Atlantic salmon – the suspicion being that all the lumpfish present in February 2023 had died by the Summer of 2023 and were replaced by an input of wrasse (ca. 300,000 salmon were moved onto another Mowi site in March/April 2023 so some lumpfish could have been moved too).

Did 79,430 lumpfish die at Mowi's Camas Glas salmon farm between February 2023 and September 2023?



Scamon Scotland believes that there is enough evidence to prosecute Mowi for [breaches of welfare laws](#).

In September 2019, the Animal and Plant Health Agency (APHA) [warned Mowi that they were breaching welfare laws over cleaner fish](#) at the aptly named 'Bay of the Dead Heads' salmon farm in the Sound of Jura.



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Mowi Scotland Limited

Farms Office

Glen Nevis Business Park
Fort William
PH33 6RX

16 September 2019

Dear [REDACTED]

Failure to Comply with Welfare Legislation

Animal Health and Welfare (Scotland) Act 2006

Following my visit on 2/08/19 to inspect your livestock at Marine Fin Fish farm (Atlantic Salmon) FFMC54 BDNC- Bagh Dail nan Ceann (Bay of the Dead Heads) in the Sound of Jura, in the presence of [REDACTED] (site Manager), [REDACTED] (Mowi's Area Manager), [REDACTED] (APHA VA) and [REDACTED] (FHI Marine Scotland), I must advise you that I found the following non-compliances with current welfare legislation.

Mortality in lumpfish has been a known ongoing issue, affecting the 80% of the lumpfish stocked during this production cycle at the above fish site under your responsibility.

On the day of the visit at the site (02/08/19), data provided by your staff regarding your investigation of mortality and consequential actions was not satisfactory. [REDACTED]

[REDACTED] Seeking for a health plan for lumpfish at the site at the time of the visit and further clarification regarding the health management for the investigated period, a second meeting as part of the investigation took place at APHA Perth office on Tuesday 13/08/19 with yourself, [REDACTED] (Lead Vet) and [REDACTED] (Health Manager).

During this meeting, evidence were provided of investigations and actions taken to try and minimise an increasing mortality trend in lumpfish from May 2019 until the treatment provided in between 01/07/19 to 03/07/19. After this day, there is little evidence of actions taken whilst the mortality in lumpfish continued to increase.

During the meeting on the 13/08/2019 you confirmed that a decision to humanely cull the remaining lumpfish had be taken the day before and had already started.

You have not been able to show that adequate actions were taken in the period between the 10/07/19 to the 12/08/19 in order to promote the welfare of the lumpfish under your responsibility. Not taking effective decision at earlier date has prolonged the period while the lumpfish still at the site have been in need to be protected from suffering and disease.

This is a failing to comply with the Animal and Welfare (Scotland) Act 2006, Part 2-24 (1) and 3(e) that states that:

"a person commits an offence if the person do not take such steps as are reasonable in the circumstances to ensure that the needs of an animal for which the person is responsible are met to the extent required by good practice";

An animal's needs include *"its need to be protected from suffering, injury and disease."*

As discussed during the onsite visit and the second meeting, it would be helpful to keep separated records for mortality and culled animal not only for salmon as you are correctly doing, but also for lumpfish and wrasse in order to have a detailed monitoring system for all species under your responsibility.

This letter is without prejudice to any further enforcement or other action, which may be taken at a later date.

APHA's welfare warning followed [covert video surveillance by Scottish Salmon Watch at Mowi's Bagh Dail Nan Ceann \(Bay of the Dead Heads\) salmon farm in the Sound of Jura in July 2019](#) and [welfare complaints filed on 18 & 20 July 2019](#).

 **Don Staniford**  @TheGAAIA · Apr 23, 2020

Censored: Welfare Abuse on Salmon Farms - redacted FOI documents reveal welfare breaches of Animal Health & Welfare Act @rspcaassured @MowiScotlandLtd tinyurl.com/yb9wr3nk @APHAgovuk @marinescotland @ProfCMDwyer @SSPCA_Mike @SSPOsays @ChrisGPackham @markruskell @scotgp



The image block contains two photographs. The left photograph is a close-up of a salmon's mouth, showing its tongue and the interior of its mouth. The right photograph shows a salmon in a net, with its body partially obscured by the mesh. Below the photographs is a large black redaction box covering several lines of text.

 **Dying a Slow Death at RSPCA Assured Mowi's 'Bay of the Dead Heads'**

Don Staniford



03:59

The video player shows a close-up of a salmon in a net, with its body partially obscured by the mesh. The video is titled 'Dying a Slow Death at RSPCA Assured Mowi's 'Bay of the Dead Heads'' and is by Don Staniford. The video player includes a play button, a progress bar showing 03:59, and icons for volume, settings, and fullscreen. The Vimeo logo is also visible.

Scamon Scotland is of the view that the use of Thermolicers – even without cleaner fish – is illegal. Advocates for Animals wrote to the Scottish Government in March 2020 [challenging the lawfulness of Thermolicers under animal welfare legislation](#). “The Thermolicer is unlawful and a more adequate framework needs to be put in place to ensure unlawful treatments are not being used,” [wrote solicitor Alice Collinson in a letter dated 9 March 2020](#).

The legal issues surrounding the Thermolicer are as follows:

1. Failing to enforce systematic breaches of Section 19 of the Animal Health and Welfare (Scotland) Act 2006
2. Failing to enforce systematic breaches of the Code of Good Practice, created by the Scottish Salmon Producers’ Organisation
3. Alternatively or in addition, failing to ensure the Code of Good Practice adequately advises fish farmers of their animal welfare responsibilities when undertaking lice treatments
4. Breach of Article 13 of the Treaty on the Functioning of the European Union (TFEU)

In April 2020, the Scottish Government [replied claiming that “the Scottish Government takes animal welfare seriously, including that of farmed salmon”](#) (the same line used in a [Scottish Parliamentary reply from Fergus Ewing in March 2020](#)).

In June 2020, Advocates for Animals [took issue with the Scottish Government's legal opinion](#):

ADVOCATES FOR ANIMALS

Making full use of the law to help animals



Statement from Edie Bowles, Solicitor, Advocates for Animals:

"The Scottish Government has re-asserted its view that the thermal treatment used to delouse salmon does not breach Section 19 of the Animal Health and Welfare (Scotland) Act 2006, which outlaws unnecessary suffering. There is no question that the device causes a high degree of suffering to salmon and scientific evidence shows that there are more welfare-friendly alternatives available. On this basis, we believe the Scottish Government's position is legally wrong."

Fish welfare expert Dr. Lynne Sneddon (then of the University of Liverpool) [wrote to the Animal Welfare Commission, the Scottish Government, the Scottish Parliament's Cross Party Group on Animal Welfare and the RSPCA in January 2020:](#)

7th January 2020

For the attention of:

Animal Welfare Commission

Scottish Government: Animal Health and Welfare

RSPCA Assured Science Group/Technical Advisory Group

Cross-Party Group on Animal Welfare

Opinion on the use of thermal treatments to delouse Atlantic Salmon, *Salmo salar*

To whom it may concern,

Please note the following is my personal expert opinion and does not reflect the opinion or views of my employer.

Atlantic salmon farming has increased over recent years and due to the high stocking density of sea-caged adults there is a high prevalence of disease including infestation by salmon lice, *Lepeophtheirus salmonis* (Overton et al. 2019). These lice can cause large sores and make the fish more vulnerable to secondary infections and thus seriously reduce health and welfare. Treatment has previously employed chemotherapeutants (e.g. hydrogen peroxide) to kill salmon lice but since 2015 there has been an increase in the use of mechanical (physical) and thermal (heat) methods (Overton et al. 2019). The Thermolicer® and Optilicer® treats salmon by exposing them to high temperatures which kills the lice (temperatures above 30°C and typically 34°C and above; Overton et al. 2019; Gismervik et al. 2019; Nilsson et al. 2019). These temperatures sit outside the natural temperature range Atlantic salmon inhabit or can tolerate. Elliot and Hurley (1997) determined the lower and upper temperature limits for growth of Atlantic salmon as 6.0°C and 22.5°C, with 15.9°C as the optimum temperature for growth. Salmon shows signs of stress at approximately 22°C and that the upper lethal limits were between 25° and 28°C (Anttila et al., 2014; Elliott & Elliott, 2010; Garside 1973). Further, I was the first to show that fish have nociceptors, nerve endings that respond to painful stimuli (Sneddon 2002), and demonstrated that a closely related salmonid species, the rainbow trout, *Oncorhynchus mykiss*, possessed nociceptors that responded to temperatures that would give rise to pain in humans (Sneddon 2003; Sneddon et al. 2003). These nociceptors are strikingly similar to those found in mammals including humans (Sneddon 2018; 2019) and those on the skin and cornea of the eye are excited by temperatures from 29°C and above (Ashley et al. 2006; 2007). Therefore the Thermolicer® and Optilicer® exposes Atlantic salmon to painful temperatures. Behavioural studies have demonstrated that Atlantic salmon exposed to temperatures above 28°C perform abnormal behaviours and lose equilibrium (the ability to maintain an upright position) which is a precursor to mortality (Gismervik et al. 2019; Nilsson et al. 2019). Tissue injuries in gills, eyes, brain, nasal cavity and thymus were recorded in Atlantic salmon exposed to water temperatures of 34 - 38 °C (Gismervik et al. 2019). Therefore, the high temperature treatment exposes Atlantic salmon to painful temperatures resulting in altered behaviour and damage which could lead to mortality. Indeed there are cases where the use of the Thermolicer resulted in the mortality of 96,000 salmon (Holen et al. 2019) and these heat methods result in greater mortality rates than other treatments (Overton et al. 2019).

The Farm Animal Welfare Council (FAWC) stipulates in their five freedoms that farmed animals should have “Freedom from pain, injury or disease” and “Freedom from fear and distress”. FAWC also state in their recent report farmed fish have “the capacity to experience pain” (FAWC 2014) and RSPCA (2018) agrees with this opinion in their report on the welfare standards of farmed Atlantic salmon stating “fish need to be protected from pain”. The Thermolicer® and Optilicer® expose Atlantic salmon to painful temperatures, result in injuries and this process is likely to cause fear and distress. Further the Animal Welfare Act (2006) states clearly that harm should be prevented and welfare promoted.

Therefore, in my expert opinion and based upon scientific studies from other laboratories, both of these thermal treatment methods contravene the FAWC five freedoms, the RSPCA (2018) welfare standards for farmed Atlantic salmon and the Animal Welfare Act (2006) resulting in harm and poor welfare and should not be employed within the Atlantic salmon farming industry.

I would be very grateful if you could please consider my opinion within your respective organisations.

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Here are some scientific papers turning up the heat on Thermolicer use:



Thermal injuries in Atlantic salmon in a pilot laboratory trial

[Kristine Gismervik](#)^a  , [Siri K. Gåsnes](#)^a  , [Jinni Gu](#)^a  , [Lars H. Stien](#)^b  ,
[Angelico Madaro](#)^b  , [Jonatan Nilsson](#)^b  

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Abstract

Thermal delousing is a new method for removing sea lice from farmed Atlantic salmon (*Salmo salar* L). We investigated thermally-related tissue injuries in Atlantic salmon in a pilot laboratory trial to describe the acute effect of high water temperatures (34–38 °C). Acute tissue injuries in gills, eyes, brain and possible also nasal cavity and thymus were seen in salmon exposed to water temperatures of 34 - 38 °C in 72 to 140s. This implies that exposing salmon to such water temperatures is a welfare risk, not only due to the direct tissue injuries that may also be dependent on exposure time, but also due to risk of thermal pain and aversion, including flight reactions.



Does the thermal component of warm water treatment inflict acute lesions on Atlantic salmon (*Salmo salar*)?

[L. Moltumyr](#)^{a, b}  , [K. Gismervik](#)^c, [J. Gu](#)^c, [S.K. Gåsnes](#)^c, [T.S. Kristiansen](#)^a, [I. Rønnestad](#)^b,
[J. Nilsson](#)^a, [L.H. Stien](#)^a



Exploring the impact of thermal delousing on gill health and microbiome dynamics in farmed Atlantic Salmon

[Ahmed Elsheshtawy](#)^{a, b}, [Benjamin Gregory James Clokie](#)^a, [Amaya Albalat](#)^a, [Are Nylund](#)^c, [Birgit Lilletveit Kvåle](#)^c, [Linda Andersen](#)^c, [Lindsey Jane Moore](#)^c, [Simon MacKenzie](#)^a  



Warm water treatment increased mortality risk in salmon

[Samantha Bui](#)^a, [Angelico Madaro](#)^a, [Jonatan Nilsson](#)^a, [Per Gunnar Fjelldal](#)^b, [Martin Haugmo Iversen](#)^c, [Monica Fengsrud Brinchman](#)^c, [Birger Venås](#)^d, [Merete Bjørgan Schrøder](#)^d, [Lars Helge Stien](#)^a  

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Highlights

- Increased temperature gave higher mortality.
- The fish group that was not handled had no mortality.
- Eye damages were more prevalent in warm water treated groups.
- The salmon had clear behavioural reactions to the 27°C water despite low Δt .



Sudden exposure to warm water causes instant behavioural responses indicative of nociception or pain in Atlantic salmon

[Jonatan Nilsson](#)^a , [Lene Moltumyr](#)^a, [Angelico Madaro](#)^a, [Tore Sigmund Kristiansen](#)^a, [Siri Kristine Gåsnes](#)^b, [Cecilie Marie Mejdell](#)^b, [Kristine Gismervik](#)^b, [Lars Helge Stien](#)^a



Thermal injuries in Atlantic salmon in a pilot laboratory trial

[Kristine Gismervik](#)^a , [Siri K. Gåsnes](#)^a , [Jinni Gu](#)^a , [Lars H. Stien](#)^b , [Angelico Madaro](#)^b , [Jonatan Nilsson](#)^b



Eva B. Thorstad

@EvaThorstad



Exposing fish to warm water (28–34°C, sometimes higher) has become a common method to reduce lice levels in fish farms. Two new studies show instant behavioural responses of salmon from 28°C and tissue injuries at 34–38°C (72–140 s) [sciencedirect.com/science/articl...](https://www.sciencedirect.com/science/article/abs/S0007-1226(19)30076-8)
[sciencedirect.com/science/articl...](https://www.sciencedirect.com/science/article/abs/S0007-1226(19)30081-9)



Havforskningsinstituttet and Veterinærinstituttet

6:16 PM · Oct 21, 2019

Scamon Scotland is calling for a ban on the use of cleaner fish in Thermolicers following a [landmark ruling in June 2023 by the Norwegian Food Safety Authority](#) which concluded that the use of cleaner fish in de-licing machines represents a breach of the Animal Welfare Act. Fish Farmer [reported in June 2023](#):

Farmers warned over cleaner fish welfare

June 13, 2023 | [Robert Outram](#) | [News](#), [News Archive](#)

Norwegian fish farmers have been told they must not treat cleaner fish for problems they do not have.

The country's Food Safety Authority (FSA) said the instruction applies particularly to unnecessary treatment for lice.

The FSA is calling on companies to sort and treat cleaner fish in a gentler manner before they begin de-licing work on salmon.

It is reminding salmon farmers that it is contrary to the Animal Welfare Act to allow cleaner fish to undergo salmon lice treatment, either with or without the use of medication.

The authority statement says: "The rationale is that animals or groups of animals should generally only be treated when it/they have been examined and the conclusion is that treatment is needed.

"Cleaner fish are not a susceptible species for salmon lice, and will therefore not be diagnosed with salmon lice. Salmon lice treatment is also burdensome for the cleaner fish, and this burden does not benefit the cleaner fish either. Drug-free deworming in particular is today considered one of the biggest welfare threats to cleaner fish.

"The appeals unit has therefore concluded that it is contrary to the Animal Welfare Act, the Aquaculture Operation Regulations and the IK Aquaculture Regulations to allow cleaner fish to remain in the production unit when treating salmon against salmon lice in the same unit.

The statement adds tersely: "The appeal decision from the Norwegian Food Safety Authority's appeals unit is final and forms new practice.

"There is no right of appeal. Cleaning fish must therefore be sorted out in a documented, gentle manner before salmon lice treatments with and without drugs. The exception is if deworming methods are used that do not affect the cleaning fish, such as e.g. lice laser."

The Norwegian Food Safety Authority (Mattilsynet) [reported on 27 June 2023](#) (translated into English via Google Translate):

Cleaner fish must be sorted out before salmon lice treatment

Cleaner fish should not be treated for something he does not have, as to be called salmon lice. Therefore, he must be sorted out in a documented gentle and defensible manner before salmon lice treatments with and without drugs.

"Cleaner fish" are lumpfish and various wrasse species that fish farmers use to reduce the number of salmon lice on salmon in cages. The Animal Welfare Act applies just as much to cleaner fish as to other animals.

In general, animals or groups of animals should only be treated when they have been examined and the conclusion is that treatment is needed. The cleaner fish is not a susceptible species for salmon lice, and will therefore not have a diagnosis of salmon lice.

Sea lice treatment is also a burden on reindeer fish, and reindeer fish do not benefit from this burden either. Particularly drug-free delousing is currently regarded as one of the largest welfare lanes for cleaner fish.

It is therefore contrary to the requirements of the Animal Welfare Act (§§ 9 and 30) to allow cleaner fish to remain in production when treating salmon against salmon lice in the same species.

Cleaner fish must therefore be sorted out in a documented gentle and safe manner before salmon lice treatment with and without drug.

The exception to the requirement for sorting out is if there are useful methods that do not apply to the reindeer fish, such as t.d. lice lasers.

The Aquaculture Operations Regulations are subordinate to the Animal Welfare Act

Section 28 of the Aquaculture Operations Regulations states the requirement to sort out reindeer fish before treatment against salmon lice:

"Before operations are carried out at the facility that can put a strain on the cleaner fish, cleaner fish must be sorted out and protected from injury and unnecessary stress.

After consultation with veterinarian/fish health personnel, cleaner fish may remain in the production area if this is due to the welfare of the fish."

The Aquaculture Operations Regulations are subordinate to the Animal Welfare Act. Therefore, the regulations cannot be understood in a way that contradicts the law. This means that neither fish farmers nor animal health personnel can legally decide to allow cleaner fish to be treated for salmon lice.

The second paragraph of the paragraph stating that cleaner fish "may remain in production after consultation with a veterinarian/fish health biologist" therefore does not include operations that involve treatment against salmon lice.

Appeal case fence establishes the requirement for sorting out

The clarification on the sorting of cleaner fish before salmon lice treatment follows from a complaint fence by the Norwegian Food Safety Authority's complaint case.

In the case, the appeal case raised a decision that the fish farmer had to sort out lumpfish before salmon lice treatment. The appeal case fence has been made in accordance with the Animal Welfare Act, the Aquaculture Operations Regulations and the Regulations relating to IC-aquaculture.

The appeal decision from the Norwegian Food Safety Authority's appeal process is final, and there is no right of appeal against it.

[The appeal case held up the region's decision that lumpfish must be sorted out before delousing.](#)

The appeal case cited above is detailed [online here](#) in a case involving Grieg Seafood (whose businesses in Scotland were [bought by Scottish Sea Farms](#) and [Loch Duart](#)):

GRIEG SEAFOOD FINNMARK SJØ AS
Postboks 234
5804 BERGEN

Deres ref:
Vår ref: 2021/97812
Dato: 12.04.2023
Org.nr: 985 399 077

Statens tilsyn for planter, fisk, dyr og næringsmidler

Mattilsynet

KLAGESAKSENHETEN OPPRETTHOLDER REGIONENS VEDTAK OM AT ROGNKJEKS MÅ SORTERES UT FØR AVLUSING

Dette brevet inneholder klagevedtak i saken der dere den 5. november 2021 klaget på vedtaket om å sortere ut rognkjeks før avlusing fattet av region Nord (regionen).

Klage på vedtak om å bruke legemidler med god effekt mot lakselus og to vedtak om tvangsmulkt i samme sak behandles for seg i egne brev.

Mattilsynet er organisert med to nivåer, regionene og hovedkontoret. Klagesaksenheten er plassert på hovedkontoret, som er overordnet regionen. Klagesaksenheten behandler klager på regionens vedtak.

Klagesaksenheten kan overprøve regionens vurderinger av de faktiske og juridiske sidene av saken, og skjønnset som er lagt til grunn for vedtaket som er klaget på. Vi gjør en ny, selvstendig vurdering av saken, og kan ta hensyn til nye omstendigheter. Dette følger av forvaltningsloven § 34.

Hovedspørsmålet i denne saken er om rensesfiske må fiskes (sorteres) ut før laksen blir behandlet mot lakselus.

Vi har etter vår gjennomgang av regionens vedtak, klagen og sakens øvrige opplysninger fattet dette vedtaket i klagesaken:

The [Norwegian Food Safety Authority press release \(27 June 2023\)](#) cited at the end:

Regulations

§ Animal Welfare Act



§ Aquaculture Operations Regulations



The Norwegian Food Safety Authority (Mattilsynet) [reported on 3 August 2023](#) (updated from April 2023):

Appeal case

Cleaner fish should not undergo treatment for salmon lice

Provisions in the Animal Welfare Act do not permit cleaner fish to be treated against

salmon lice

Published

03.08.2023

Settled date

12.04.2023

Case number

2021/97812

Result

Not upheld

Background

When treating salmon lice, lumpfish were not fished from the cages until the salmon were bathed with azamethiphos.

Evaluation

Section 28, second paragraph, of the Aquaculture Operations Regulations deals with the protection of cleaner fish in fish farms. The second and third sentences state that: "Before operations are carried out at the facility that may put stress on the cleaner fish, cleaner fish must be sorted out and protected against injury and unnecessary stress. After consultation with veterinarian/fish health personnel, cleaner fish can remain in the production unit if this takes better account of fish welfare."

The lice treatment is stressful for the fish. It is of no use to the strain that cleaner fish undergo, and we have little knowledge about the pressures that cleaner fish experience from different delousing methods.

When cleaner fish are included in the fish group that is being considered for treatment, consideration must also be given to the welfare of cleaner fish. Medical and non-medicinal delousing methods are not used to treat cleaner fish.

This is contrary to the requirements of Section 9 of the Animal Welfare Act; § 3, to allow cleaner fish to undergo treatment against salmon lice.

The Aquaculture Operations Regulations are subordinate to the Animal Welfare Act, and the regulations cannot be understood in a way that is contrary to the law. The requirement in the regulations that "Before operations are carried out at the facility that may cause strain on cleaner fish, cleaner fish must be sorted out and protected against injury and unnecessary stress" is in line with the Animal Welfare Act. The requirement in the Animal Welfare Act means that neither fish farmers nor animal health personnel can legally decide to allow cleaner fish to be treated against salmon lice. The choice proposed by the last sentence in the second paragraph of Section 28 of the Aquaculture Operations Regulations cannot therefore apply to delousing.

Conclusion

The provisions in Section 9 of the Animal Welfare Act and Section 28 of the Aquaculture Operations Regulations mean that cleaner fish shall not undergo treatment against salmon lice.

Regulations

Animal Welfare Act

Aquaculture Operations Regulations

Norwegian Fish Farmer [reported \(6 June 2023\)](#) (translated from Norwegian to English via Google Translate):



The Norwegian Food Safety Authority has now decided that fish farmers must document that they want to sort cleaner fish out in a gentle manner when delousing salmon. Photo: Erlend Astad Lorentzen/Institute of Marine Research.

The Norwegian Food Safety Authority has decided: Cleaner fish must be sorted out before delousing

Cleaner fish must now be sorted out in a gentle manner before delousing.



Magnus Johan Marøy
JOURNALIST

PUBLISHED Tuesday, June 06, 2023 - 2:23 p.m. LAST UPDATED ON Tuesday, June 06, 2023 - 2:29 p.m.



Sea lice are and remain a stick in the wheels for fish farmers. Many years of warfare against lice have meant that fish farmers today have an arsenal of different methods and tools to keep lice numbers down, but they do not always work so well together.

Many fish farmers use cleaner fish, but several believe that the efficiency is not good enough for this alone to be enough. Today, thermal, mechanical and drug treatment is therefore used as well. A dilemma that often arises is whether the cleaner fish should go through lice treatment together with the salmon.

[The rest of the article is pay per view and unavailable]

Norwegian Fish Farmer [reported \(9 June 2023\)](#) (translated via Google Translate):



Lise Rokkones, Head of Section, Section for Fish Health and Fish Welfare in the Norwegian Food Safety Authority is clear that cleaner fish should never undergo lice treatment. Photo: Bård Gudim/The Norwegian Food Safety Authority

Provides one exception to cleaner fish decisions

The Norwegian Food Safety Authority announces fines and possible reports if their new regulations are not followed up by fish farmers. "Cleaner fish should not undergo salmon lice treatment," says section manager Lise Rokkones.

 Ole Andreas Drønen
REDAKTØR

PUBLISHED Friday, 09 June 2023 - 08:13



Earlier this week, the Norwegian Food Safety Authority's complaints unit stated that cleaner fish must now [be sorted out in a documented](#) gentle manner before salmon lice treatment is performed, regardless of whether drugs are to be used during delousing or not.

Mons Eivind Troland, general manager of Troland Salmon Farming, said during the cleaner fish conference at Stord that he feared the Norwegian Food Safety Authority is creating such difficult rules that fish farmers [will have to cut out both lumpfish and wrasse](#).

"The question is what alternatives do we have left if we are going to farm here in Norway?" If we do not use wrasse and lumpfish, then it is certain that at a much earlier stage you will have to treat a small fish, the breeder pointed out.

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“The continued use of barbaric torture devices like Thermolicers represents the Scottish salmon industry’s inability to recognise the serious harm it inflicts – not just to farmed salmon but also the millions of cleaner fish they exploit every year,” said Lex Rigby, head of campaigns at Viva! in January 2024 via a [press statement to The Sunday Mail](#). “Scientific researchers in Norway have shown that salmon exposed to water temperatures above 28 degrees Celsius behaved as if they were in pain, crashing into tank walls and displaying a sidewise bending of their body. It is clear that Thermolicers contravene the five freedoms of animal welfare and this latest footage of cleaner fish passing through one of these vile contraptions represents a complete double standard within Mowi’s modus operandi, which ultimately prioritises profit above all else.”



Don Staniford
@TheGAATA

Lex Rigby of vegan charity Viva! called the video "a complete double standard within Mowi's modus operandi". Last July, Mowi reported that technical issues with the Thermolicer at the farm killed 10,597 salmon, although it did not report on cleaner fish deaths @Daily_Record @lexrigby @vivacampaigns @MowiScotlandLtd @AnimallawFDN @ScotGovMarine @MairiGougeon



11:11 AM · Jan 21, 2024

“It is difficult to see how the Thermolicer, with all the pain and suffering it can cause, is compatible with the Animal Health and Welfare (Scotland) Act 2006, which prohibits unnecessary suffering,” said Edie Bowles, Solicitor, Advocates for Animals in January 2024. “In addition, following a letter from The Animal Law Foundation, the government now accepts that a breach of industry code can be used as evidence of an offence of welfare law, the Code of Good Practice at 5.10 states: ‘Equipment should be designed in such a way as to avoid creating welfare problems for the fish.’ The Scottish government should investigate the compatibility of the use of the thermolicer with the Animal Health and Welfare (Scotland) Act 2006.”

The evidence against the use of mechanical de-licers is blindingly obvious and is staring Scottish Ministers in the face (see Appendix). Photos [published by the Scottish Government](#) reveal eye damage on salmon farms including exophthalmia (pop-eye) caused by de-licing mechanical treatments.



A [Parliamentary Reply in 2020](#) revealed that over half a million salmon died during de-licing treatments (2016-2019) but data on cleaner fish mortality was sadly not published.

Question S5W-27713: Mark Ruskell, Mid Scotland and Fife, Scottish Green Party, Date Lodged: 03/03/2020

To ask the Scottish Government what information it has regarding how many (a) farmed salmon and (b) cleaner fish have been killed because of the use of (i) thermolicers, (ii) optilicers and (iii) hydrolicers in each year since 2016.

Answered by Fergus Ewing (17/03/2020):

The figures recorded as involving thermal treatments in 2016, 2017, 2018 and 2019 are shown in the following table.

	2016	2017	2018	2019
Hydrolicer	89,466	115,445	7,516	57,247
Thermolicer	47,982	52,798	35,841	40,980
Optilicer	-	-	15,610	59,817

There is no record of mortality kept for cleaner fish.

Data [published on 3 January 2024 by the Scottish Government's Fish Health Inspectorate](#) detail 189 'Mortality Event Reports' involving 1.34 million fish since September 2016 which cite the Thermolicer, Hydrolicer, Optilicer and/or mechanical treatments – here's the top 51 most deadly incidents (Mowi's Camus Glas features twice including the last incident in May 2022):

Mortality Event No	Reporting Business Name	Site Name	Date reported	Mortality rate	Explained reasons	Total mortality	Additional information	Action taken by FHI
MRT02839	Mowi Scotland Ltd	Seaforth	04/02/2022	2.79	Mechanical treatment losses / Pasteurella skyensis infection	48,880		Continuation of the issues that have affected the site since November 2021. P.skyensis and gill health issues the main cause. Antibiotics have been administered however mortalities remain high. Site to be inspected w/b 14/02/22. FHI to monitor.
MRT00102	Marine Harvest (Scotland) Ltd	Loch Greshornish	08/09/2016	9.00	Treatment	47,000	Morts occurred following treatment with thermolicer. Treatment was stopped when extent of mortality was realised. Lice tested as 60% resistant to chemical treatments. Have been carrying out 3 hour salmosan treatment in a well boat but this is causing increased morts. Harvest plan has been accelerated and site will be fallow by end of September 2016	PSI case 20160379 Mort levels have dropped, currently 0.132%/site/wk. Awaiting further details on mortality figures for the cycle.
MRT03398	Bakkafrost Scotland	Strondoir Bay	10/10/2022	9.96	Gill Health Related; Handling (Post-treatment)	40,312	Monitor following FW in wk 38.	Site contacted for further information. Environmental insult from a bloom of jellyfish has compromised gill health onsite. AGD and anemia contributing to mortality along with some treatment loss from FW and hydrolicer treatments. FHI to monitor.
MRT03958	Mowi Scotland Ltd	Creag an T'Sagairt (Loch Hourn)	23/05/2023	3.01	Thermolicer Treatment	31,099		Called for further information - handling during thermolicer treatment caused mortalities in population that has CMS, treatment was aborted. Treatment has now been conducted with FW and improvements seen. FHI to monitor.
MRT01453	Mowi Scotland Ltd	Loch Duich	04/12/2019	3.58	Malfunction with mechanical lice treatment boat resulting in treatment mortality	25,966	Boat issues addressed so problem should not recur.	FHI to inspect site week 50
MRT00514	The Scottish Salmon Company	Druimyeon Bay	13/11/2017	4.44	post treatment hydrolicer losses.	25,607	further hydrolicer treatment planned, fish on functional feed.	Site inspection delayed until wk 48. figures updated 23/11/17
MRT02097	The Scottish Salmon Company	Portree	29/03/2021	2.57	Post treatment	22,650	mortality reduced week 12 <1%	Thermolicer treatment conducted in synch with sites in Skye, after 3 pens high mortalities observed and treatment stopped. Investigation underway into cause of mortalities, no health issues and no thermal issues, potentially a mechanical issue on wellboat. Will update when further info available following investigation - FHI to monitor.
MRT02626	Mowi Scotland Ltd	Seaforth	19/11/2021	1.08	Thermolicer acute losses	21,501		First mortality report of cycle. Mortalities reduced the following week (0.54%). FHI to monitor.
MRT01504	Mowi Scotland Ltd	Loch Greshornish	17/01/2020	3.07	Mechanical lice treatment in fish affected by AGD	21,445		
MRT02867	SSF Shetland Ltd	Bight of Foraness	24/02/2022	4.13	Viral Disease / Sea Lice Related	21,379		Mortality related to HSMI and physical lesions from recent hydrolicer treatments. FHI to monitor, site being visited 7/3/22

MRT02665	Mowi Scotland Ltd	Seaforth	06/12/2021	1.07	Thermolicer acute losses	21,061		Continued mortality from thermolicer treatment. Mortality reduced below 1% in week 47. FHI to monitor.
MRT02866	Mowi Scotland Ltd	Seaforth	22/02/2022	1.30	Pasteurella	20,051		Site visited last week, post treatment mortality from thermolicer observed on site. Fish have been treated with antibiotics, company is hopeful this will further reduce mortality. FHI to monitor.
MRT00253	Grieg Seafood Shetland Ltd	Langa Isle (East)	30/05/2017	5.75	Treatment	19,131	Thermolicer treatment losses	No action taken. Not informed at time of event
MRT01589	Grieg Seafood Shetland Ltd	Setterness North (Bomlo)	24/03/2020	3.43	CMS	18,270	Post-treatment losses following optilicer treatment w/b 2nd March 2020.	Contacted site for further information. Full scale harvest will begin next week (30/03/2020), specifically targetting pens with larger fish and where CMS is causing higher mortalities. This will be reviewed in 2-3 weeks time by site management staff. FHI to monitor mortality levels in the coming weeks.
MRT00252	Grieg Seafood Shetland Ltd	Langa Isle (East)	30/05/2017	5.30	Treatment	18,232	Thermolicer treatment losses	No action taken. Not informed at time of event
MRT01148	Grieg Seafood Shetland Ltd	West of Burwick	05/08/2019	3.63	Post treatment (optilicer)	16,500		NFA - information gathered during site inspection 5/8/19
MRT04210	Mowi Scotland Ltd	Linnhe	10/08/2023	1.81	HSMI / Thermolicer mortality	15,648		FHI to monitor
MRT01520	Mowi Scotland Ltd	Seaforth	31/01/2020	1.28	Mechanical treatment	15,329	Mortality levels fell below reporting levels following week.	Mortality levels have since dropped. No further action
MRT01505	Mowi Scotland Ltd	Loch Greshornish	17/01/2020	2.21	Mechanical lice treatment in fish affected by AGD	14,961		
MRT01151	Grieg Seafood Shetland Ltd	West of Burwick	05/08/2019	3.46	Post treatment (optilicer)	14,529		NFA - information gathered during site inspection 5/8/19
MRT02484	Mowi Scotland Ltd	Caolas A Deas	11/10/2021	1.69	Treatment losses (Hydrolicer)	14,475	Prev issues on site with Yersinia ruckeri and jellyfish bloom.	Site visited by FHI on 15/9/21 (case 20210309). FHI to monitor.
MRT02458	Mowi Scotland Ltd	Bagh Dail Nan Cean	04/10/2021	2.42	Mortality after thermolicer treatments	13,997		Wait to see if mortalities reduce post transfer and post treatment. Week to 1/10/21 reported to be 0.39% (5 day figure)
MRT01282	Mowi Scotland Ltd	Shuna SW (Rubh'an Trilleachain)	03/10/2019	3.08	Suspect recent environmental gill insult involving gill bleeding. Mortalities with recent hydrolicer treatment, with fish with poor gills not surviving treatment	13,920	Worst affected pens are being harvested out	Assess if inspection required

MRT02337	Dawnfresh Farming Ltd	Etive 4	02/09/2021	3.37	Hydrolicer and environmental gill irritation and possibly phytoplankton	12,982	No ongoing excess mortality suspected. Diver removal of mortalities ongoing. Total mortality at site over weeks 25,303 (6.12%)	Company health rep concluded; "This is all related to removal of the mortalities incurred by the hydrolicer event between 11 and 13/8/21 and we don't suspect any new events. ...histology from right across Loch Etive taken 20/8/21 which is now strongly indicating a loch-wide low-level gill insult at some point. Although it doesn't seem likely that this has caused mortality directly by itself, it does now seem likely that it was a significant factor when coupled with the hydrolicer event." FHI to pay a visit when in area W/B 20/9/21
MRT01447	Mowi Scotland Ltd	Ardintoul	04/12/2019	1.83	Compromised gill health, anaemia due to gill bleeding + piscirickettsia infection. Fish also treated with mechanical lice system.	12,858	AGD treatment planned. Rickettsial infection to be closely monitored	FHI inspected Week 42, diagnostic samples taken.
MRT02224	The Scottish Salmon Company	Portree	20/07/2021	2.16	Handling (Pumping/Grading), Sea Lice Related	12,219		Mix of thermal and hydrolicer treatments being conducted on site with all cages being treated. CMS has been suspected on site and samples have been taken. Awaiting results. Mortality reduced <1% last week (wk28) following the treatments. FHI to monitor.
MRT00930	Grieg Seafood Shetland Ltd	Leinish	04/03/2019	3.06	Treatment	11,828	Post treatment morts from optilicer trial and salmosan treatments (pen 1 & 3)	mortality fell below threshold on week 47, no further action required
MRT01628	Grieg Seafood Shetland Ltd	Loch Snizort East	12/05/2020	2.23	Treatment losses	11,820		PSI to be completed. PSI conducted 15/05/2020 - mortality attributed to physical damage as a result of an Optilicer treatment NYL (2020-0198).
MRT01582	The Scottish Salmon Company	Taranaish	17/03/2020	2.15	Treatment handling	11,296	Hydrolicer treatment	FHI in scheduled to be in area w/b 30/03/2020, however inspection work currently under review following coronavirus advice
MRT01598	Mowi Scotland Ltd	Soay	10/04/2020	1.95	Acute Morts and Physical damage due Thermolicer treatments	11,198		Site manager contacted. Incident mortality due to lice treatment, fish recently diagnosed with PD & CMS. Mortality down to background levels the following week (below 1%). PSI conducted 13/05/2020
MRT02424	Dawnfresh Farming Ltd	Etive 6	27/09/2021	2.41	Previous hydrolicer event + treatment	11,123	Pockets of old morts found by divers	Sites visited last week and diagnostic samples taken, Awaiting results
MRT02086	Mowi Scotland Ltd	Scalpay	12/03/2021	1.63	CMS and Hydrolicer Treatments	11,031		Treatment was completed on 2nd March and mortality has since dropped to 0.07% for w/b 08/03 at time of reporting (not including the upcoming weekend). No further action.
MRT00233	Grieg Seafood Shetland Ltd	Score Holms	14/03/2017	3.70	Treatment	10,619	Mortalities post Thermolicer treatment,	No further action - Retrospective information.

MRT04134	Mowi Scotland Ltd	Camas Glas	19/07/2023	1.01	Treatment loss - thermolicer	10,597	Increase in sealice on site prompted thermolicer intervention. Technical issues were experienced during treatment. Issue was fixed on the day of occurrence but mortalities had already happened as a result. The business is currently reviewing procedures relating to treatment vessels to ensure this error is mitigated against in future. No other health issues have been observed on site, with low level PGD seen.	Business correspondent contacted for further information. FHI to monitor.
MRT03653	Mowi Scotland Ltd	Torrison	19/12/2022	4.67	Treatment Loss - Thermolicer	10,473		Mortalities below threshold in week 50. FHI to monitor.
MRT03155	The Scottish Salmon Company	Ardgadden	29/08/2022	1.62	Gill-health Related; Sea lice related (Post-mechanical treatment)	10,416	Freshwater scheduled wk 35	AGD confirmed on site, post treatment loss occurring from a recent hydrolicer treatment. The site is scheduled to treat with freshwater on the 03/08/2022. FHI to monitor.
MRT02232	Grieg Seafood Shetland Ltd	Seterness North (Bomlo)	19/07/2021	2.12	Treatment	10,303	Post-treatment (optilicer). CMS.	Mortality noted during inspection. No further action.
MRT02315	Dawnfresh Farming Ltd	Etive 6	26/08/2021	2.37	Hydrolicer treatments and low dissolved oxygen	10,292		Continuation of mortality even that occurred in wk 32, issues with staff and diver availability has resulted in a delay in removing the morts from the pens. Morts in wk 34 (reported up until 27/8/21) are 0.2% 828.
MRT01451	Mowi Scotland Ltd	Ardintoul	04/12/2019	1.49	Compromised gill health, anaemia due to gill bleeding + piscirickettsia infection. Fish also treated with mechanical lice system.	10,252	AGD treatment performed. Rickettsial infection to be closely monitored. Supportive measures (eg supplemental oxygen during treatment/handling, functional feed) used in this population.	FHI inspected Week 42, diagnostic samples taken.
MRT02925	Mowi Scotland Ltd	Grey Horse Channel	20/04/2022	1.91	Predation / Physical Damage/ Treatment Loss	10,209		Business correspondent contacted. Predator/seal attacks had already been previously reported. Wk15 has seen an increase in mortalities. The majority of the mortality has been attributed to predation. The other causes are acute loss of thermolicer treatment and presence of AGD. Site is in the process of changing nets to HDPE nets to try and reduce seal damage. FHI to consider inspection. FHI to monitor.
MRT03980	Mowi Scotland Ltd	Creag an T'Sagairt (Loch Hourn)	30/05/2023	1.01	Thermolicer Treatment	10,093	Alternative treatment conducted	Health director called for more information. Occurred during crowding of fish before thermolicer treatment. The treatment was aborted and a new method of treatment was organised using the FLS system. This new system uses a combination of two physical treatments to first weaken the lice and then removed them with water. This method of treatment is reportedly more gentle on the fish. This reduced mortality and removed lice. FHI to monitor

MRT02614	Mowi Scotland Ltd	Caolas A Deas	11/11/2021	2	Thermolicer losses	9,676		Site visited by FHI on 15/9/21 (case 20210309). Current mortality attributed to treatments. FHI to monitor.
MRT02252	Mowi Scotland Ltd	Muck	30/07/2021	1.15	High mortality related to Hydrolicer treatment	9,636		First report of the year. Losses due to hydrolicer. In following week 30 mortality level has reduced to 0.13%. FHI to monitor.
MRT01320	Mowi Scotland Ltd	Shuna SW (Rubh'an Trilleachain)	10/10/2019	3.25	Complex gill disease + hydrolicer treatments	9,557	Harvesting out worst affected pens	FHI to monitor ongoing mortality levels, plan to visit next time in area, brought fwd if mortality levels increase.
MRT02225	The Scottish Salmon Company	Portree Outer	20/07/2021	2.70	Handling (Pumping/Grading), Sea Lice Related	9,547		Mix of thermal and hydrolicer treatments being conducted on site with all cages being treated. CMS has been suspected on site and samples have been taken. Awaiting results. Mortality remained elevated (>1%) last week (wk28). FHI to monitor.
MRT02400	The Scottish Salmon Company	Druimyeon Bay	20/09/2021	1.56	Viral Diseases, Sea Lice Related	9,525		First mortality event in this cycle of fish. PD is present on site but fish are reported to be recovering well. Recent hydrolicer treatments have exacerbated mortalities but have now been completed. FHI to monitor.
MRT01844	The Scottish Salmon Company	Reibinish	17/09/2020	1.47	Post treatment	9,360		Senior Biologist contacted. Treatment with Optilicer. Mort levels for wk 36 0.28% and wk 37; 0.24%
MRT01630	Grieg Seafood Shetland Ltd	Uig	12/05/2020	2.24	Treatment losses	9,337		PSI to be completed. PSI completed on 15/05/2020 - mortality was attributed to physical damage as a result of an Optilicer treatment NYL (2020-0194).
MRT00264	Marine Harvest (Scotland) Ltd	Creag an T'Sagairt (Loch Hourn)	12/07/2017	1.09	Treatment	9,331	Thermolicer	Visit scheduled
MRT01452	Mowi Scotland Ltd	Loch Alsh (Sron)	04/12/2019	1.11	Compromised gill health + mechanical lice treatment	9,306	Lice treatment had to be performed due to lice numbers. Supportive measures (eg supplemental oxygen, functional feed) used in this population.	FHI inspected week 44. Mortality levels to be monitored.
MRT02956	Mowi Scotland Ltd	Camas Glas	18/05/2022	2.52	Treatment mortalities (Thermolicer)	9,127		Mortalities increased following thermolicer treatment, business correspondent expects mortality levels to be below the reporting threshold this week.

Shamefully, the Scottish Government still does not publish mortality event reports on cleaner fish deaths on salmon farms in Scotland. In February 2022, [Scamon Scotland wrote to the Scottish Government](#) calling on Scottish Ministers to report and record monthly cleaner fish mortalities – the letter included.

Scamon Scotland calls on Scottish Ministers to:

- Establish a public register of shipments/imports/transfers of cleaner fish
- Record and report monthly cleaner fish mortalities
- Test for infectious diseases, pathogens and viruses in cleaner fish prior to transfer to salmon farms and during their short lives on salmon farms
- record antibiotic use on cleaner fish



The letter followed information – sourced from the Scottish Government’s Fish Health Inspectorate – [detailing over 330,000 dead cleaner fish at salmon farms in Scotland during 2021](#) (although it was [guesstimated that ca. 5 million cleaner fish die each year](#) on Scottish salmon farms).

Cleaner fish 'Case Information' published by the Fish Health Inspectorate in 2021								
Date	Company	Site	Species	# on site	Mort #s	% Mortality	% stocking	Details recorded by FHI 'Case Information'
Oct	Scottish Sea Farms	Toyness	Wrasse	5,953	5,765	47	6	First cycle of stocking wild caught wrasse (12,187 input in Sept 2021)
Oct	Mowi	North Shore	Both	149,728	117,414	49	46	234,028 lumpfish from Ocean Matters in Wales & 63,668 wild wrasse
Oct	Mowi	Tabhaigh	Both	67,650			12	Farmed lumpfish and wild caught wrasse on site
Oct	The Scottish Salmon Co	Druimyeon Bay	Lumpfish	50,000			14	Lumpfish on site from Ocean Matters
Oct	The Scottish Salmon Co	Portree	Lumpfish	90,980		12.4		Lumpfish (Ocean Matters) morts "attributed to general background losses"
Oct	The Scottish Salmon Co	East Tarbert Bay	Lumpfish	70,000			17	Lumpfish from Ocean Matters & Otter Ferry
Oct	Scottish Sea Farms	Westerbister						"Site to stock wrasse (local wild caught from Orkney) to help combat rising sea lice levels"
Sept	Mowi	Caolas a Deas	Both	90,720	53,596		100	Morts in lumpfish due to sealice treatment (freshwater) & Tenacibaculum
Sept	Scottish Sea Farms	Scallastle Bay	Wrasse	16,705			3	Ballan wrasse caught from the wild; hoping to get lumpfish
Aug	Mowi	Invasion Bay	Both	135,046	4,971		24	Lumpfish morts due to "emancipation", Pseudomonas, wounds & fin damage
Aug	Mowi	Camas Glas	Both	79,506	16,323		12	Morts due to decomposition, wounds, fin damage & culling
July	The Scottish Salmon Co	West Strome	Lumpfish	61,013			12	Lumpfish from Otter Ferry & Swansea University
July	Mowi	Ardintoul	Lumpfish	216,733	48,499	22.3	12	Florfenicol (antibiotic) treatment for Pseudomonas infection in lumpfish
July	Mowi	Duich	Both	48,409	27,000	37	7	Lumpfish morts "attributed to a Flavivirus infection that was transferred from the supplier" (Ocean Matters); wild caught wrasse from Skye & Weymouth
July	The Scottish Salmon Co	Sgian Dubh	Wrasse	27,000			3	Wild wrasse
June	Mowi	Ornish Island	Lumpfish	19,072	2,612	5.13	5	Lumpfish came from Ocean Matters in May 2021
June	Loch Duart	Calva Bay	Wrasse	1,400			0.3	
June	The Scottish Salmon	Gometra	Both	37,121	43,945		11	Issues with "black loss" (less fish retrieved at end of cycle than expected) "Mortality is not being identified when cleaner fish stick to sides of pen and don't end up in mort basket before rotting away"
June	The Scottish Salmon	Geasgill	Lumpfish	90,711	1,414		12	"Black loss" with cleaner fish described as "most vulnerable to bad weather"

Scamon Scotland's [letter to Scottish Ministers \(February 2022\)](#) included:

Assessing total mortality of cleaner fish on salmon farms in Scotland is currently impossible given the lack of data. A report [published by the Nordic Council of Ministers in December 2021](#) cited a recent study by the Norwegian Food Safety Authority which revealed that salmon farmers reported a mortality rate of around 40% but that the real mortality rate was closer to 60% (see at the end of this letter for more details). If the mortality rate of cleaner fish on salmon farms in Scotland is anything like 40-60% then millions of wrasse and lumpfish could be dying horrible deaths.

Whatever the true figure for the use of cleaner fish on salmon farms in Scotland, it is clear in the secret filming conducted since 2018 by Scottish Salmon Watch that cleaner fish mortality is a significant problem. For example, [video footage inside a Billy Bowie skip captured evidence of mass mortalities of wrasse and lumpsuckers](#) at The Scottish Salmon Company's Toward processing and transportation facility near Dunoon in September 2020 (presumably dumped out when farmed salmon were transported for harvest):



When Scottish Salmon Watch [visited Mowi's Sconser salmon farm on the Isle of Skye in November 2018](#) we found dead lumpfish in bins with farmed salmon:



When Scottish Salmon Watch [visited Mowi's RSPCA Assured and ASC-certified Gorsten salmon farm in Loch Linnhe in November 2018](#) (as featured on Netflix's *Seaspiracy*) in November 2018 we discovered dozens of dead cleaner fish in a skip full of diseased salmon:



When Scottish Salmon Watch [visited The Scottish Salmon Company's salmon farm at Quarry Point in Loch Fyne in September 2018](#) the dead bodies of lumpfish littered a skip full of diseased salmon:



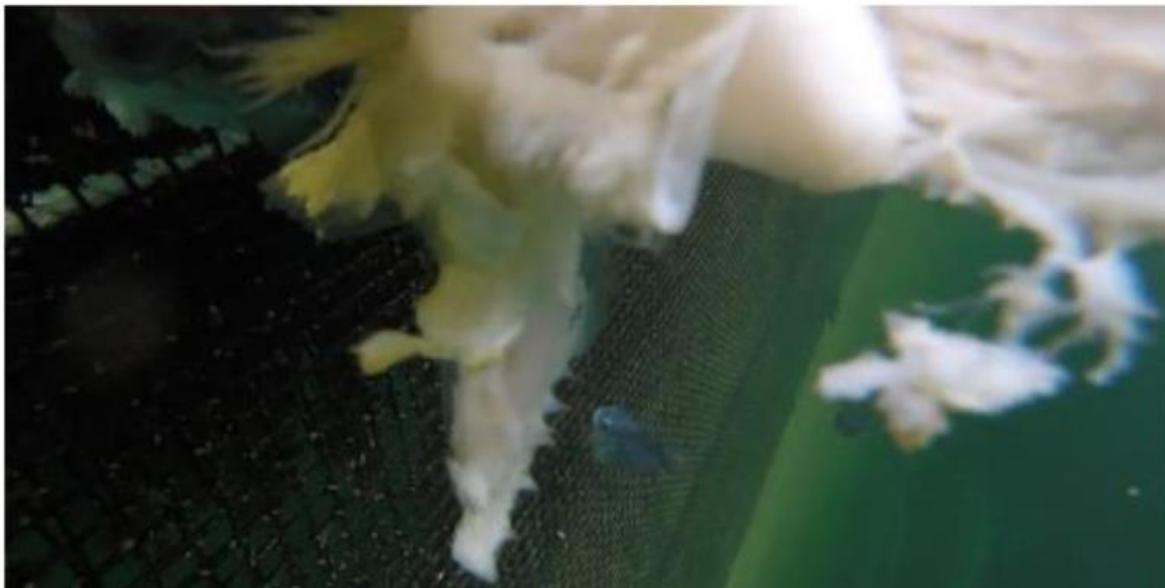
The mortality of cleaner fish was on display when Scottish Salmon Watch [visited South Shian processing plant operated by Scottish Sea Farms in Loch Creran in September 2018](#) (presumably the lumpfish are dumped out with the farmed salmon morts after processing):



In July 2021, when Scottish Salmon Watch [visited Mowi's RSPCA Assured salmon farm at Poll Na Gille in the Sound of Jura](#) ([rated by OneKind as the worst salmon farm in Scotland](#)) we found dead lumpfish on the surface of the cages and wild fish swimming inside the cages with lice-infested salmon:



As well as dead cleaner fish, [video footage shot at Mowi's Poll Na Gille salmon farm on 17 July 2021](#) shows lumpsuckers foraging near a dead farmed salmon floating on the surface of a cage:



More recently, video footage [shot at Mowi's RSPCA Assured Invasion Bay salmon farm in Loch Sunart in August 2023](#) - a site neighbouring Mowi's RSPCA Assured Camas Glas salmon farm – shows the collateral damage of cleaner fish:



The sheer scale of cleaner fish mortalities is huge. Salmon Business [published a photo in January 2024](#) which shows dead cleaner fish at a Mowi harvesting station in Mallaig:

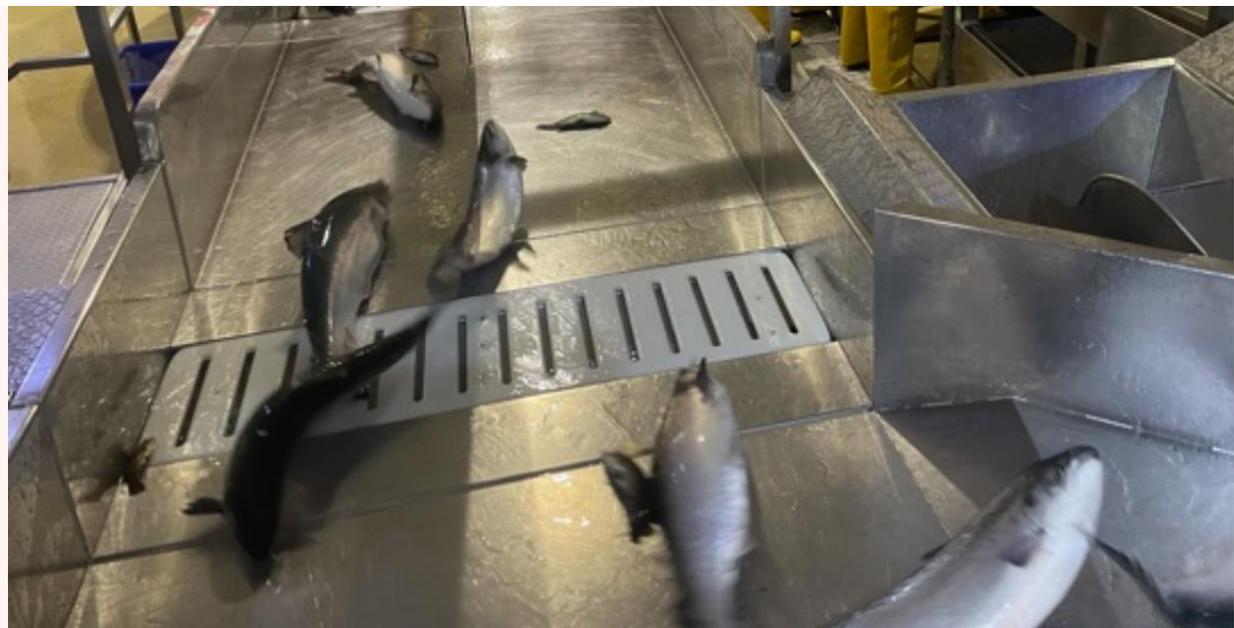


Photo: Matthew Wilcox

Has the Scottish Government's position changed since the [reply from Graham Black to Advocates for Animals in July 2020](#):

marine scotland
Graham Black, Director



Scottish Government
Riaghaltas na h-Alba
gov.scot

T: 0131-244 6034 F: 0131-244 7163
E: DirectorMarineScotland@gov.scot

Edie Bowles
Advocates for Animals
International House
64 Nile Street
London
N1 7SR6
31 July 2020

Dear Ms Bowles

In response to your letter dated 30 June, I would like to thank you for letting us know the intent of your client. I appreciate their willingness to engage constructively.

While both Salmon Watch and the Scottish Government agree about the importance of animal health and welfare, it is clear that we have divergent views with regards to how that is being achieved within Scottish aquaculture. You will appreciate that at this time I have no additional comment to make with regards to the points raised in previous correspondence with Advocates for Animals on this issue.

I am, however, able to provide an update on research being undertaken in Scotland regarding the Thermolicer. The work referred to previously has been delayed because of restrictions associated with the coronavirus epidemic in Scotland. As a result, it seems likely that the research will be undertaken in 2021. I appreciate that this will be a frustration to your client, but I do believe that the work is a necessary step in better understanding the Thermolicer and assuring the continued welfare of farmed fish.

I note that your client intends to submit a full legal and scientific opinion to the Scottish Government. Marine Scotland will, of course, consider the contents of that opinion. I confirm that we will be open to dialogue to discuss issues arising in the opinion, however I am sure that your client will understand that there may be limitations on what additional comment we can offer, or the scope of the discussions that can be had, while we await the outcome of the studies mentioned above.

Yours sincerely

Graham Black

Victoria Quay, Edinburgh EH6 6QQ
www.gov.scot



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[Graham Black, as you will be aware, [accused the then Fisheries Minister \(Fergus Ewing\) of bullying back in 2020](#)].

Yesterday's [Sunday Mail \(21 January 2024\)](#) quoted the Scottish Government saying that a scientific study by the Scottish Aquaculture Innovation Centre (SAIC) was "in its final stages of evaluating the impacts of new-generation thermal delicing technology on fish health and welfare":



HISTORIC James IV coin
Collector to coin it in with Scottish set
 BY GEORGE MAIR

A SET of rare Scottish coins dating back 900 years could fetch up to £50,000 at auction this week.

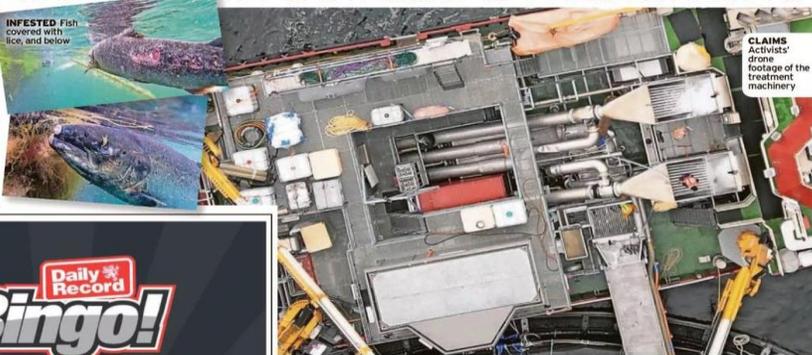
The 180 coins were amassed by a collector over more than 50 years.

They range from David I – the first Scottish king to produce his own coinage in the 12th century – to Queen Anne, who was on the throne when the Edinburgh Mint produced its last batch in 1709.

They will sold by Noonans on Wednesday.

ANIMAL WELFARE BLAST FOR SALMON FIRM

You're in hot water with the fish torture machine



Campaigners demand answers after footage at site shows use of controversial equipment

BY DAWN THOMPSON

ONE of Scotland's largest salmon producers is being asked to explain why it uses controversial equipment said to "torture" fish.

Campaigners claim drone footage from a Mowi site in the Highlands shows staff clearing away small lumpfish and wrasse, known as cleaner fish, which are designed to remove sea lice, trapped in the pipes of machinery.

Masses of salmon are pumped through the thermolicer which washes them in warm water to kill the parasites. But it's claimed the footage shows the cleaner fish getting stuck in the device.

The practice of putting the smaller fish through the machine is banned in Mowi's native Norway and UK RSPCA Assured guidelines advise against it.

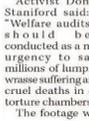
Campaigners claim that while salmon are at risk of being caught on the pipes, the risk of injury or death is higher for smaller species. Mowi, which supplies



CHOPPY WATERS A Mowi fish farm on Loch Torridon

last year on the 114ft Camus Glas site in Loch Sunart, certified organic by the Soil Association.

Activists say images show staff jabbing at fish using poles and attachments to sweep them through the system with red wrasse and blue lumpfish.



ETHICS ALERT Don Staniford

Lex Rigby of vegan charity Viva! called the video "a complete double standard within Mowi's modus operandi".

Last July, Mowi reported that technical issues with the thermolicer at the farm killed 10,597 salmon,

although it did not report on cleaner fish deaths.

Ian Roberts, the communications director of Mowi Scotland said: "Our company employs over 700 dedicated farmers who attend to all fish under their care daily, which includes a team of fish health professionals, veterinarians and independent animal welfare organisations."

"The images do not support the allegations made by an individual who, in the words of a Canadian court justice is 'akin to a zealot who twists facts and will say almost anything to further his own agenda' and therefore is an 'unreliable reporter of facts.'"

A Scottish Government spokesperson said: "A Sustainable Aquaculture Innovation Centre-funded study is in its final stages of evaluating the impacts of new-generation thermal delicing technology on fish health and welfare. We await the findings with interest."

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Could the Scottish Government please provide an update on the SAIC report on thermal delousing? Please consider this a Freedom of Information request under the relevant FOI and Environmental Information regulations.

Instead of awaiting the findings of the SAIC report “with interest” surely Scottish Ministers should act immediately and follow Norway’s lead in banning the use of cleaner fish in de-licers?

Whilst the Scottish Government delays, millions of cleaner fish (not to mention salmon and other fish species such as [herring which can be caught up in mechanical de-licers](#)) are being killed unnecessarily.

The [RSPCA’s latest salmon standards](#) - even before the [200 revisions scheduled for 2024](#) - recommend the removal of cleaner fish before Thermolicing:



Where possible, cleanerfish should be removed from the crowd or prevented from participating in the crowd prior to any salmon operation, such as thermolicing, hydrolicing, bath treatments or wellboat treatments.

The Soil Association is [proposing changes to their organic standards](#) (deadline for comment is [29 January 2024](#)) including specific recommendations on cleaner fish but they do not explicitly rule out the use of wrasse and lumpfish in Thermolicers. \$camon \$cotland will be writing to the Soil Association recommending that explicit reference banning the use of cleaner fish in de-licers is inserted into their new ‘organic’ salmon standards.

Last month (19 December 2023), [Fish Farmer reported](#) that Norway’s ‘big six’ salmon farming companies including Mowi, SalMar and Leroy Seafood – the latter two are co-owners of Norskott Havbruk (Scottish Sea Farms) - would be subject to closer scrutiny by the Norwegian Food Safety Authority who are conducting welfare and health audits during 2024. “The audit reports will be published on the Norwegian Food Safety Authority's website after each individual audit,” [reported Intrafish \(13 December 2023\)](#). “The first audit report is scheduled to be published in March.”

\$camon \$cotland calls on the Scottish Government – in conjunction with the Animal and Plant Health Agency (and the [Scottish Veterinary Service when it becomes operational](#)) – to audit salmon farms in the same way. If the use of mechanical de-licers is not banned immediately, salmon farms using Thermolicers should allow independent observers and CCTV on board the de-licing boats.

More background on this vital issue is available via [Timeline: Turning up the heat on the Thermolicer!](#)

Yours sincerely,

Don Staniford

Director, \$camon \$cotland

APPENDIX:

'Case Information' [published by the Scottish Government Fish Health Inspectorate](#) which references the Thermolicer includes:

Scottish Sea Farms – Bight of Bellister – November 2022:

Case No:	2022-0599	Date of visit:	23/11/2022
Time spent on site:	2 hours	Main Inspector:	
Site No:	FS1121	Site Name:	Bight of Bellister, Dury Voe
Business No:	FB0125	Business Name:	Scottish Sea Farms Ltd

Additional Case Information:

Mortalities are collected by Hendersons and sent to Pelagia for biogas generation.

Pens 1-4 (4 the worst 23,000 since input) have been quite badly affected, pens had a higher stocking density (since split down). 10,11

WK42 - 5203 (1.26%) WK40 12,161 (2.84%) WK38 17838 (3.97%)

WK40 - Treatments - Peroxide treatment WK38 (cages 1 and 3) - peroxide treatment was abandoned following high mortalities on the treated cages

WK38 - Thermolicer treatment cages 1, 3, 7, 8, 9, 10, 11 cages 5 and 6 were unstocked, cage four was done with freshwater as fish were thought to be unable to cope with treatment

Health reports - 12/11/2022 - Gill damage was highly variable throughout the site with around 70% of fish having poor GH. AGD was tested for and found to be present on the site, however there was little evidence of clinical signs.

40% of fish shown to have moderate levels of gill damage, but with a high level of visually healthy gill tissue remaining. Remainder (30%) were significantly affected with little healthy tissue on the gills.

Lice levels were relatively high in all stages and treatments were continuing. There was little evidence of grazing on the fish's skin.

13/09 - Overall fish appeared to be in good condition, with some lesion/scale damage. Gill health was continuing to decrease at this time, with higher PGD scores. Gills were bleeding in the anaesthetic water

Sea lice - Moderate - high.

Inspection by [REDACTED], observed by [REDACTED]

Physical inspection of cages could not be undertaken due to weather.

Scottish Sea Farms – Loch Creran – July 2022:

Case No:	2022-0262	Date of visit:	18/07/2022			
Time spent on site:	4.5 hours	Main Inspector:				
Site No:	FS1047	Site Name:	Loch Creran (D)			
Business No:	FB0125	Business Name:	Scottish Sea Farms Ltd			
Case Types:	1 REP	2 DIA	3 WEL	4	5	6
Water Temp (°C):	13.55	Thermometer No:	T308	FHI 045 completed		
Observations:	Region:	ST	Water type:	S	CoGP MA	M-36
Dead/weak/abnormally behaving fish present?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.				
Clinical signs of disease observed?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.				
Gross pathology observed?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.				
Diagnostic samples taken?	<input type="checkbox"/>					

Additional Case Information:

Treatment Timeline:

- Wk 9- thermolicer treatment (all pens)
- Wk 12- thermolicer treatment (all pens)
- Wk 17- thermolicer light treatment (all pens)
- Wk24- light thermolicer treatment (all pens)
- Wk 27- hydrolicer 10/12 pens
- W/b 11/07/2022- hydrolicer remaining two pens

Mortality events:

- Wk 19- 2.7%, 12191; following thermolicer treatment in wk 17
- Wk20- 2.1%, 9032; continuation of previous week mortality
- Wk21- 1.3%, 5429
- Wk24- 1.6%, 6826; following thermolicer
- Wk25- 2%, 8175
- Wk26- 4%, 15943
- Wk27- 3.8%, 14441

Inspection of site was conducted in conjunction with APHA, following 3 weeks of notifications of increased mortality above the threshold, as well as a response to investigate claims of a welfare complaint.

Stocking of wrasse on site 24/06/2022; wild caught from Orkney.

Timeline of recent disease:

Routine vet visit conducted in week 9, confirmed PRV +ve results for the whole site (100%), but no increased mortality associated with it seen on site. In Wk 14, histology again confirmed PRV +ve site with moderate levels, and slight increase in mortality seen but still below reporting threshold. Skin lesions seen on site were tested and were found to be a result of secondary bacterial infection; bad weather earlier in the year had affected the fish previously. *P. skyensis* was tested for during diagnostic taken in Wk 15 but result were negative and mortality remained below reporting threshold until wk 18. Wk 19 samples were positive for furunculosis (5/5). No moribunds were seen at vet visit in Wk 21. As mortality increased from Wk 24-present, PCR samples continued to be positive for furunculosis in Wk 25. As a result, decision to remove leading mort pens through harvest, and as of 18/07/2022 site is potentially following within next 3 weeks. Next pens to harvest out are pen 7, 9 and 11. Site has been using diet with supplementary health ingredients called Assit Skin with Resist Lice from 5th to 25th May. Presently, fish are on Resist lice diet.

Observations on site:

From the first pen, moribunds were observed exhibiting exthalmia and lethargy. Two pens in particular were observed to have the highest mortality; pen 9 and 11, with ~20 moribunds seen upon pen inspection. Fish removed from pen 1 for diagnostic purpose were observed to have enlarged atriums of the heart, and some moderate petechial haemorrhaging on the liver too. Raised scales or 'furuncle-like' bubbles were also seen in sampled fish from pen 1 and 9. Upon observation of pens 4 and 6, fish were seen with more such skin lesions/boils, none of which were observed to be open or ruptured. Lastly, a few fish were observed to be belly up approx. 3-4m below the water surface hanging on the side of the net.

Site Details (include cleaner fish for all sections)							
Total No facilities		14	Facilities stocked		12	No facilities inspected	12
Species	SAL	WRS					
Age group	Q3 2021	wild caught					
No Fish	298,038	10,833					
Mean Fish Wt	2.8kg	250g					
Next Fallow Date (Site)	08/08/2022			Next Input Date (Site)	Undecided		
Recent (last 4 wks) disease problems?				Y	Any escapes (since last visit)?		
If yes, detail:	PRV, HSMI, Furunculosis (clinical signs in the pens seen first time today)						

Treatments and Medicines Records	
1. Recent treatments (see comment)?	N
If yes, detail:	
	Thermolicer and Hydrolicer
If other, detail:	

Additional comments:

Fish 1 was found to have mildly pale and frayed gills. Internally, fish 1 was found to appear relatively normal, with the exception of a swollen atrium in the heart and yellow pseudofaeces in the gut.

Fish 2 was found also to exhibit pale and frayed gills. Externally, raised scales were also visible. In addition, the fish exhibited exophthalmia with slight haemorrhaging on the upper eye surface. Internally, fish 2 also exhibited a heart with a slightly swollen atrium and bloody cavity. The Liver showed medium levels of petechial haemorrhaging. The body cavity was found to possess bloody ascites. The gut possessed yellow pseudofaeces also.

Fish 3 also possessed pale and frayed gills. In addition, raised scales and 'bubbles' under the scales/skin layer were observed. Internally, the heart was also found to have an enlarged atrium. The fish's cavity was found to have bloody ascites. Very slight petechial haemorrhaging was found on the liver and in the body cavity/flesh. The pyloric caeca showed very slight haemorrhaging also. The gut possessed yellow pseudofaeces.

Fish 4 exhibited frayed gills, as well as strong exophthalmia of the eyes. Raised scales/ bubbles in the skin were evident on the flanks of the fish. Internally, the cavity possessed bloody ascites and the spleen was slightly enlarged. The gut also possessed yellow pseudofaeces.

Fish 5 again was found to have frayed gills. A very large 'bubble' was found on the left flank of the fish and upon rupturing exhibited a bloody fluid (extra bacteriology sample taken). Internally the fish possessed a slightly greyish kidney and again, the gut possessed yellow pseudofaeces.

Section 2: Case Detail

Observations

Following 3 weeks of notifications of increased mortality above the reporting threshold a site inspection was conducted. The inspection was also conducted as a response a welfare complaint. On site, a high number of lethargic and moribund fish were observed in all pens. Some fish were observed to exhibit exophthalmia. Two pens in particular were observed to have the highest mortality and approximately 20 moribunds were seen on pen inspection in each pen.

All fish sampled were lethargic and moribund. A few fish were observed to be belly up approximately 3-4m below the water surface, on the side of the nets. Raised scales or furuncles were also seen in some sampled fish from pen 1 and 9. These were also observed in pens 4 and 6. The gills of all fish were zoned and in F3 and F5 were pale.

Internally, all fish displayed enlarged spleens and yellow pseudo faeces was present within the hind gut. In F2-F5 bloody ascites were observed. Some petechial haemorrhaging in F2 on the liver and in F3 on the pyloric caeca.





Figure 5 Region of raised scales/ 'bubbles' under the skin on fish 3.



Figure 9 External image of fish 4 and 5. Evidence of raised scales/'bubble' under skin on fish 5 below the dorsal fin. See figure 12 for closer image.



Figure 12 Region of raised scales/ 'bubble' under skin. No open lesion and when ruptured, bloody fluid escapes

Scottish Sea Farms – Bight of Bellister – April 2022:

Case No:	2022-0108	Date of visit:	26/04/2022			
Time spent on site:	5 hours	Main Inspector:				
Site No:	FS1121	Site Name:	Bight of Bellister, Dury Voe			
Business No:	FB0125	Business Name:	Scottish Sea Farms Ltd			
Case Types:	1 ECI	2 CNI	3 SLI	4 VMD	5	6
Water Temp (°C):	8.1	Thermometer No:	T304	FHI 045 completed		
Observations:	Region:	SH	Water type:	S	CoGP MA	S-5
Dead/weak/abnormally behaving fish present?	<input type="checkbox"/> If yes, see additional information/clinical score sheet.					

Additional Case Information:

Remote inspection conducted 19/04/22 by [REDACTED], observed by [REDACTED]

Site inspection, collection of movement records and VMD sampling 26/04/22 by [REDACTED], observed by [REDACTED]

All cages have double nets installed these have stopped issues with seal predation that had affected previous cycles. There was an increased pressure on site due to predation by cormorants, two cages particularly affected, these had additional top net supports put in place and this alleviated the problem.

Fish were deep in the water, but appeared to be shoaling well, 9 lethargic fish observed across site, attributed to Thermolicer treatment the previous week, varying degrees of physical damage on these fish. Fish sampled for VMD appeared in very good condition.

Site is counting 10 fish per cage and sea lice treatments are targeted at cages with higher numbers, rather than treat the whole site. This was reported to work well and reduces handling on cages where the sea lice numbers are low.

Nets washed by Ocean Farms Services, net washing on-going at time of inspection.

Excellent visibility at time of inspection.

Cages 5 & 6 are most exposed to tides and weather on site, due to this they are currently fallow, cages 1 to 4 were stocked with more fish, that will be split down to cages 5 & 6 in the summer once the fish have acclimatised to conditions on site and are at a size that will cope with the tides.

Mowi – Bagh Dail Nan Cean – November 2021:

Case No:	2021-0505	Date of visit:	12/11/2021
Time spent on site:	0	Main Inspector:	
Site No:	FS0805	Site Name:	Bagh Dail Nan Cean
Business No:	FB0119	Business Name:	Mowi Scotland Ltd

Additional Case Information:

PSI conducted following reported increased mortality on site. PSI conducted by [REDACTED], shadowed by [REDACTED].

Recent mortalities

Week 43 - 13,645 Q4 fish at 3.57kg (2.44%)

Week 44 - 17,222 Q4 fish at 3.75kg (3.16%)

Week 45 - 7000 (~1.5%) so far - 90% are treatment related. Suspect peak was environmental insult on gills. Some CMS also reported. Vet report from 28/10/2021 - Gill anaemia and CMS suspected (fragile atrium and/or congestion distal intestine), seal damage, general congestion, poor performer, ERM suspected in one fish. 174 fish investigated in total. Samples collected and results from Patogen - 03/11/2021 - PMCV 4/4. Previous report from samples on 19/10 - negative for skyensis and Yersinia. 3/4 positive PMCV.

Mortality attributed to gill problems as well as CMS, 2 pens (2 and 10) responsible for significant share of mortality, harvesting these pens has commenced on site, both will be empty by end of the week. Site manager reported that mortality numbers at beginning of this week have improved. Wrasse mortality - 17% since stocking. Background mortality reported as pretty low - single figures normally, main mortality is due to treatment but also some Atypical furunculosis in last few weeks. Last few weeks wrasse mortality - wk 43 - 3.53%, wk 44 - 4.46%, wk 45 - 3.18%, wk 46 - 0.26%.

Other peaks in mortality (salmon):

Week 31 - 1,561 Q2 fish at 6.26kg (1.01%) gill disease

Week 32 - 4,199 Q2 fish at 6.43kg (2.75%) gill disease

Week 33 - 2,007 Q2 fish at 6.55kg (1.71%) gill disease

Mortalities attributed to microjellies. Site fallow on 24/08/2021

Week 36 - 15,715 Q4 fish at 2.88kg (3.27%) mortality in fish transferred from Loch Erisort

Week 37 - 11,918 Q4 fish at 2.86kg (2.02%) mortality related to fish recently transferred

Week 38 - 13,997 Q4 fish at 3.07kg (2.42%) mortality after thermolicer treatment

Sea Lice

Sea lice above CoGP levels from wb 14/06/2021 to wb 30/08/2021 and between wb 20/09/2021 to present.

Salmosan and physical treatments carried out to reduce the lice load.

Average adult females/fish above 2 in weeks 25 (2.06), 31 (2.39), 38 (2.75), 39 (3.88), 40 (2.61)

Average adult females/fish for the last 4 weeks: week 40 2.61, week 41 1.49, week 42 1.19, week 43 1.34.

8 cages stocked as of 13/11 as harvest ongoing. Another 90000 due to be harvested over next couple of weeks.

Stocked from Loch Erisort - 03/09/2021

Ensiled material collected to go to Energen.

3 or 4 pens treated with thermolicer following input. 10% wrasse input within 3 weeks of current stock.

Some AGD about - 19/10 AGD swabs - 16/19 positive - CT values from 23.56 - ~30.

FMA usually fallows synchronously but this year did not.

Salmosan treatment has been fairly effective - full site treated. Current numbers 1.7 Thermolicer due next Thursday. Probable gill treatment after that - H2O2 due to wrasse. Wrasse reported to be in good condition.

Site Details				
Total No facilities		12	No facilities stocked	9
Species	SAL	WRS		
Age group	2020 Q4	Mixed		
No Fish	440,000	36,000		
Mean Fish Wt	3.75kg	80g		

Scottish Sea Farms – Bloody Bay – November 2021:

Case No:	2021-0479		Date of visit:	10/11/2021	
Time spent on site:	5hrs		Main Inspector:	[REDACTED]	
Site No:	FS0964	Site Name:	Bloody Bay		
Business No:	FB0125	Business Name:	Scottish Sea Farms Ltd		
Case Types:	1 ECI	2 CNI	3 SLI	4 VMD	5 DIA
Water Temp (°C):	12.3	Thermometer No:	T152	FHI 045 completed	<input type="checkbox"/>
Observations:	Region:	ST	Water type:	S	CoGP MA: M-34
Dead/weak/abnormally behaving fish present?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.			
Clinical signs of disease observed?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.			
Gross pathology observed?	<input type="checkbox"/>	If yes, see additional information/clinical score sheet.			
Diagnostic samples taken?	<input type="checkbox"/>				

Additional Case Information:

Fish came on from Barcaldine Smolt Unit and originated from Stofnfiskur.

Mortalities started increasing in wk33 and have remained above 1% across the site since. Samples taken by Pharmaq in September 21 confirmed the presence of AGD, HSMI and SGPV.

Site has been destocking through harvesting. Worst affected cages have been targeted first. Harvest ongoing and site will likely be fallow by the end of the year.

Weekly lice counts have remained relatively low since input, although the site has been treated to prevent lice counts increasing. Site received thermolicer treatments in wk17, wk25, wk26 and wk28 and a hydrolicer treatment in wk30. Alphamax bath treatments were done in wk29 and wk32, but the site manager has reported that the addition of cleanerfish has significantly helped reduce and keep lice numbers low.

Combined cleanerfish mortality since input (July 21) is at 2%. Cleanerfish observed during site inspection appeared healthy - no cleanerfish moribunds or mortalities were observed across the site.

The majority of the fish on site appeared in good health and were active. 3 mortalities and 8 moribunds were observed across the site, 5 moribund fish were removed for diagnostic samples.

Site Details (include cleaner fish for all sections)

Total No facilities	9		Facilities stocked	5	
Species	SAL	WRA	LUM		
Age group	2020 Q1	Wildcaught	2020		
No Fish	155,700	12,035	8,744		
Mean Fish Wt	3.5kg	229g	155g		
Next Fallow Date (Site)	Jan 22		Next Input Date (
Recent (last 4 wks) disease problems?				<input type="checkbox"/>	An
If yes, detail:	AGD, HSMI, SGPV				

Additional comments:

F1 and F3 - gut was full of fluid.

F4 - left eye has burst.

Observations

The site was inspected following continued reports of elevated mortality levels and to carry out a routine inspection. Increased mortalities had been attributed to gill health, AGD, HSMI and SGPV. Three mortalities and eight moribunds were observed across the site. Five moribund fish were removed for diagnostic sampling.

Externally, F1 had a darkened body and F1 and F5 were anorexic. The opercula on F5 was shortened and the eyes of F5 were also haemorrhagic. All fish had pale gills with zoning also noted on the gills of F2 and F5. Lice loads on all the fish sampled were <5.

Internally, all fish had pale/anaemic hearts and F2, 3 and 5 also had enlarged livers. There was a notable lack of fat on the pyloric caeca of F1, 3 and 5. The spleen of F4-5 were enlarged and there was yellow pseudo-faeces present in the gut of all five fish.





The Scottish Salmon Company (Bakkafrost) – Plocrapol – November 2020:

Case No:	<input type="text" value="2020-0499"/>	Date of visit:	<input type="text" value="17/11/2020"/>			
Time spent on site:	<input type="text" value="4hrs"/>	Main Inspector:	<input type="text" value=""/>			
Site No:	<input type="text" value="FS1256"/>	Site Name:	<input type="text" value="Plocrapol"/>			
Business No:	<input type="text" value="FB0169"/>	Business Name:	<input type="text" value="The Scottish Salmon Company"/>			
Case Types:	1 <input type="text" value="ECI"/>	2 <input type="text" value="CNI"/>	3 <input type="text" value="SLI"/>	4 <input type="text" value="VMD"/>	5 <input type="text" value="DIA"/>	6 <input type="text" value=""/>
Water Temp (°C):	<input type="text" value="11"/>	Thermometer No:	<input type="text" value="Site"/>	FHI 045 completed	<input type="text" value="Y"/>	
Observations:	Region:	WI	Water type:	S	CoGP MA	W-8
Dead/weak/abnormally behaving fish present?	<input type="text" value="Y"/>	If yes, see additional information/clinical score sheet.				
Clinical signs of disease observed?	<input type="text" value="Y"/>	If yes, see additional information/clinical score sheet.				
Gross pathology observed?	<input type="text" value="Y"/>	If yes, see additional information/clinical score sheet.				
Diagnostic samples taken?	<input type="text" value="Y"/>					

Additional Case Information:

Lumpfish came onto site from Otterferry over 2 inputs. 1st input october 2019, 2nd input April 2020.

Mortality over 1% since input:

- 30/3 - 1.86% - Treatment combined with PD and CMS
- 21/9 - 1.32% - Treatment combined with PD and CMS
- 05/10 - 3.97% - Treatment combined with PD and CMS
- 12/10 - 5.21% - Treatment combined with PD and CMS

Site has begun selective harvest. 4 cages harvested out over the last couple of weeks to reduce biomass on site. Remaining cages were split to reduce stocking density in each. Site is also conducting prophylactic treatments for sea lice.

Live haul harvests taken to Arnish processing plant.

Numerous moribunds observed in almost every cage across the site. Many fish were displaying lesions, physical damage and were hanging around at the surface.

Site used a thermolicer earlier in the cycle, however experienced large mortalities suspected to have been linked to the presence of CMS in the population in combination with the stress of the treatment. Fish seem to be responding better to hydrolicer treatments.

Mortality Records	
1. Mortality records available for inspection?	<input type="checkbox"/> Y
2. How are mortalities disposed of?	<input type="checkbox"/> Other (detail)
If other detail:	Collected at a common skip at the shorebase then taken to White shore cockles.
3. Mortality records complete and correctly entered?	<input type="checkbox"/> Y
4. Recent mortality (last 4 wks):	Wk42: 17,439 (5.21%), Wk43: 25,818 (8.31%), Wk44: 17,925 (6.7%), Wk45:
5. Evidence of recent increased/atypical mortalities?	<input type="checkbox"/> Y
If yes, facility nos/no mortality per facility/no stock per facility/reason:	
Post-treatment losses exacerbated by CMS, HSMI and PD on site.	
6. Any other peaks in mortality during period checked?	<input type="checkbox"/> Y

Additional comments:
F1, F2 and F4's eyes had burst,

Observations

The above site was inspected following reported mortality events attributed to PD and CMS. The site reported increased mortality above the reporting threshold every week from the 5th October 2020 to 9th November 2020, totalling 756, 500 mortalities across the site during that time; with an average weekly mortality rate of 4.4%. The site has since begun harvesting, prioritising the worst affected pens.

A number of lethargic and moribund fish were observed across the site, the majority of which were displaying lesions. Five fish were removed for diagnostic sampling. Externally, all fish apart from fish four, appeared underweight and all the fish sampled displayed torn fins. Fish one had a sunken left eye, fish two's left eye was completely absent and fish four had a ruptured left eye. Fish one and four displayed mild haemorrhaging on the ventral surface and at the base of the fins respectively, and all fish displayed pale gills. All the fish had a low lice load, with fish four having the highest, estimated at around ten.



Mowi – Ardintoul – April 2020:

Case No:	2020-0031	Date of visit:	27/04/2020
Time spent on site:	0 hrs	Main Inspector:	
Site No:	FS0245	Site Name:	Ardintoul
Business No:	FB0119	Business Name:	Mowi Scotland Ltd

Additional Case Information:

Mortality report received from business on 24/04/2020.

w/b 13/04/2020 - 5215 (1.03%) attributed to CMS and physical damage from recent sealice treatment (Thermolicer), majority attributed to CMS.

FHI contacted business for further information and to conduct a PSI.

A previous mortality event was reported by the business:

w/b 30/03/2020 - 5625 (1.08%) attributed to CMS and physical damage from recent sea lice treatment.

Additional weeks checked for mortality during inspection:

w/b 06/04/2020 - 4796 (0.9%), w/b 20/04/2020 - 5532 (1.1%) - both weeks mortality attributed to CMS.

Sea lice have been kept below reporting levels since week 14 2020, following average adult female lice numbers being above 2 from week 8 2020. These were reported to FHI, numbers reduced following a combination of mechanical and medicinal treatments. Average adult female lice numbers currently at 0.7

Site is currently harvesting out pens worst affected by CMS, pen 6 to be empty by 03/05/2020 and pen 11 to be empty by 10/05/2020.

Site Details					
Total No facilities	12			No facilities stocked	11
Species	SAL	LUM	WRA		
Age group	2019 Q1	2019	2019		
No Fish	468,152	37,000	9360		
Mean Fish Wt	3.6 kg	150g	Mix		