SCOTTISH SALMON WATCH

WELFARE

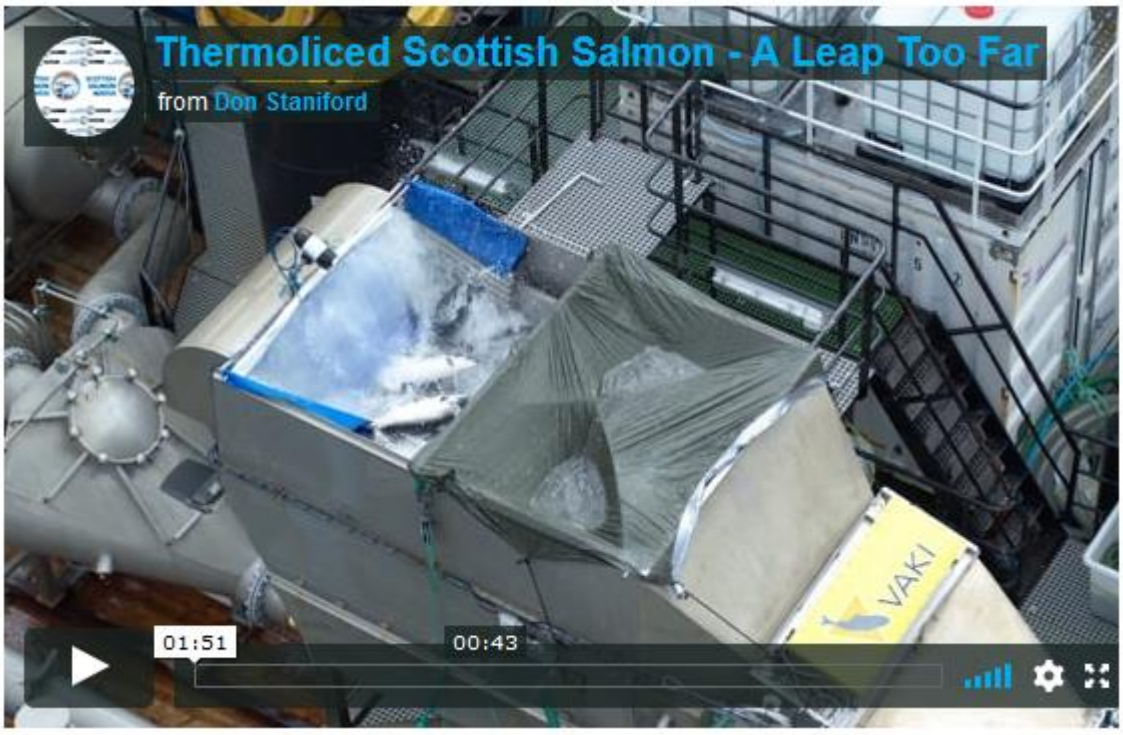
Scottish Ministers
St. Andrew's House
Regent Road
Edinburgh
EH1 3DG
scottish.ministers@gov.scot

9 October 2019

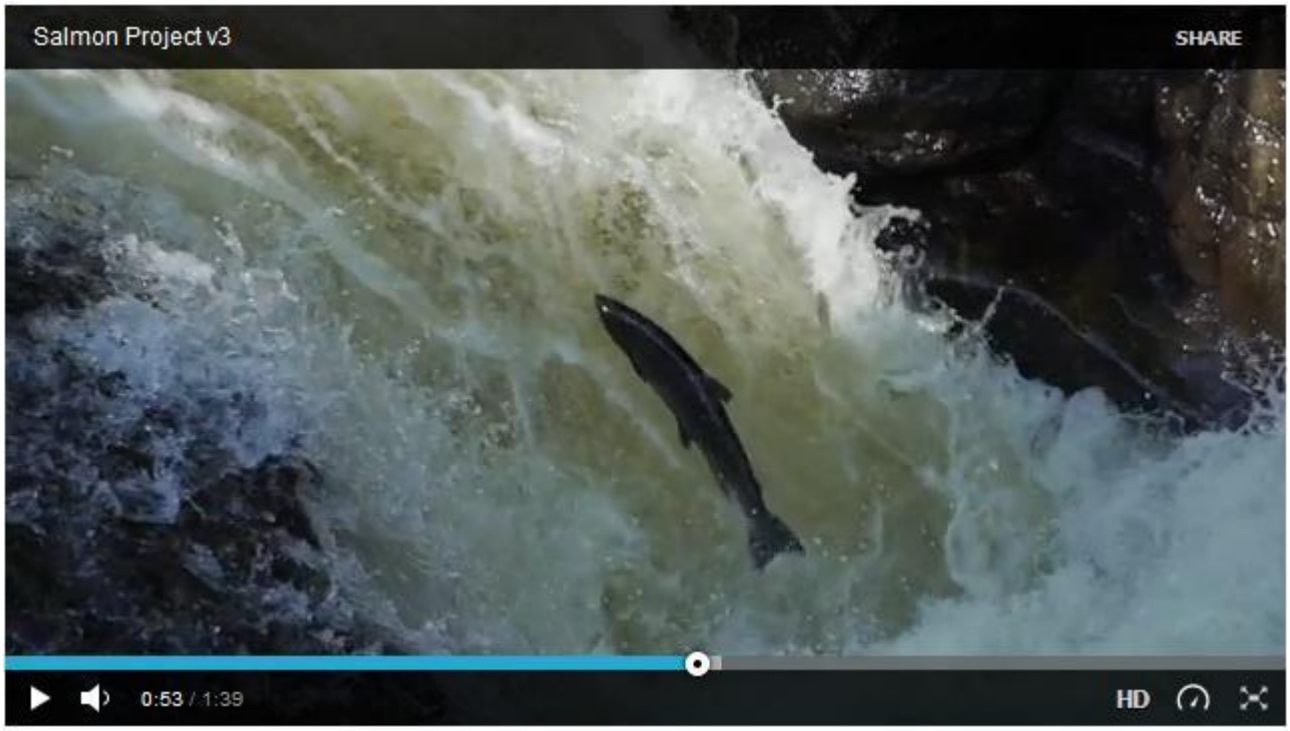
Dear Scottish Ministers,

Ban the Thermolicer & Hydrolicer for breaching the Animal Health & Welfare (Scotland) Act 2006

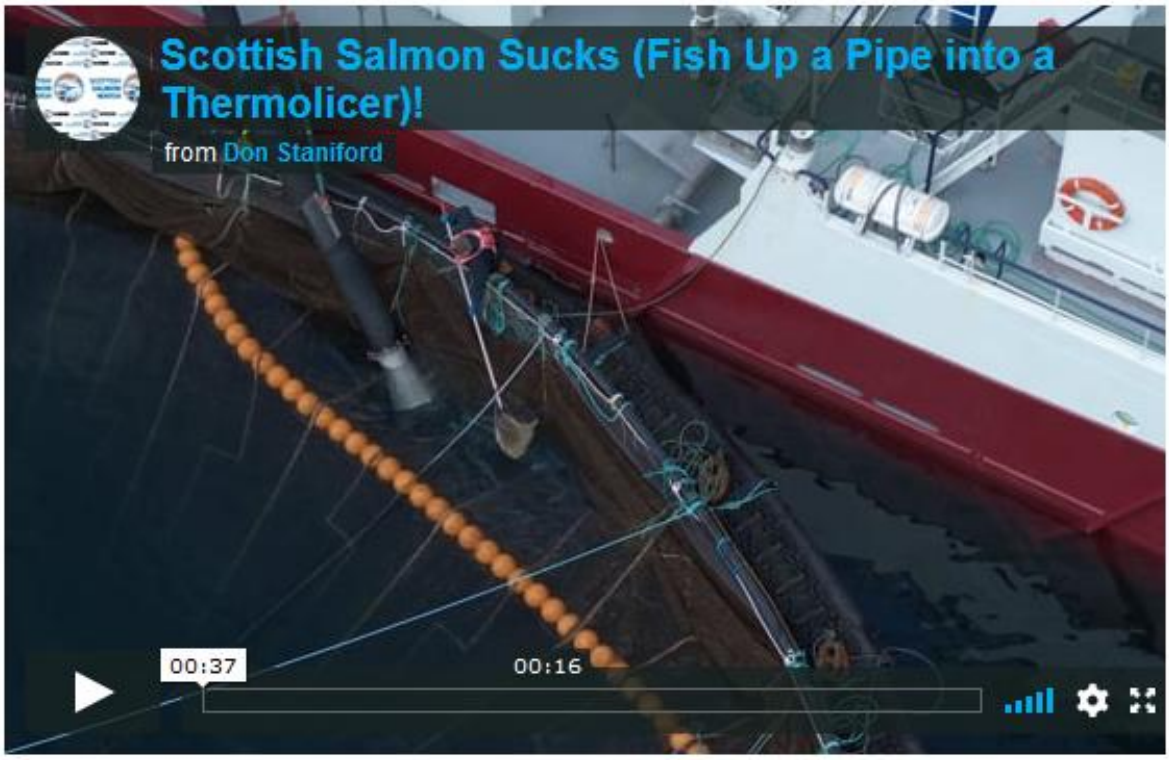
Please ban the Thermolicer & Hydrolicer for breaching the Animal Health & Welfare (Scotland) Act 2006. Scottish Salmon Watch believes that salmon farms across Scotland are breaching Section 19 ("Unnecessary Suffering"); Section 21 ("Cruel Operations") and Section 24 ("Ensuring Welfare of Animals"). Video footage published today shows how Scotland's iconic Atlantic salmon - *Salmo salar* in Latin meaning 'the Leaper' - is being systematically abused via the use of mechanical treatments.



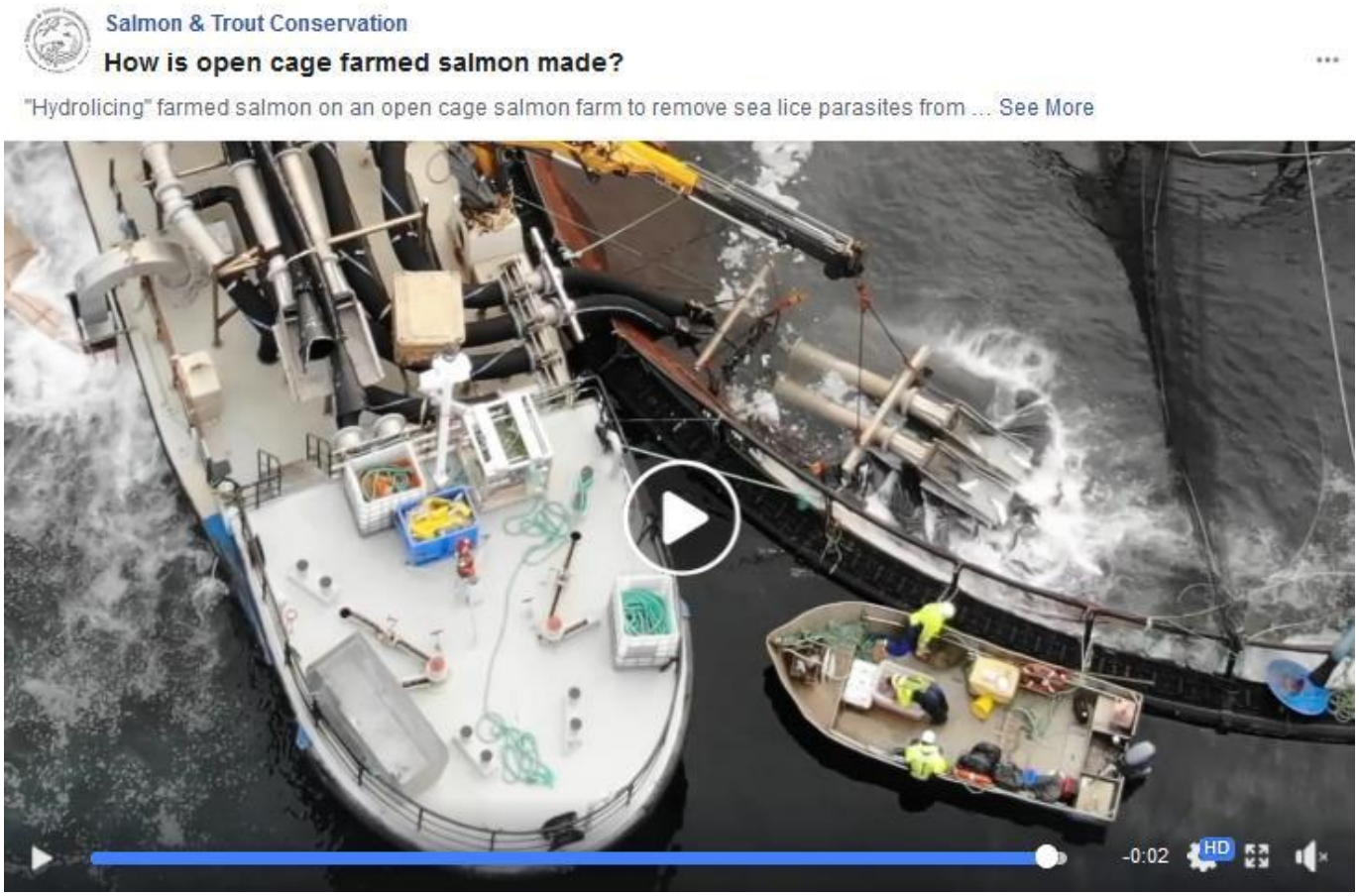
Scottish salmon no longer leaps up waterfalls like a wild and majestic athlete.



Instead, the King of Fish is crammed like a couch potato into battery cages and [treated inhumanely](#).



Here's [video footage from Salmon & Trout Conservation Scotland of a Hydrolicer in operation on a Scottish salmon farm].



Mass mortalities due to mechanical 'treatments' (a euphemism for torture chambers) are eye-popping in their horror and cruelty. For example, [the latest mortality data on Scottish salmon farms published by the Scottish Government's Fish Health Inspectorate] lists dozens of cases involving the Thermolicer, Hydrolicer and other mechanical treatments - including:

"Thermolicer treatment started on 24th June for 4 days. Fish with bleeding gills, "collision damage" and heart damage" (Mowi's Craig an Tsagairt salmon farm in Loch Hourn in July 2019)

"Biomarkers showed muscle fatigue, but a physical treatment for sea lice was required causing the increase in mortalities" (The Scottish Salmon Company's salmon farm at Taranaish in Loch Roag in June 2018)

"Thermolicer treatment on one cage. Decided not to treat other cages with Thermolicer" (Mowi's salmon farm at Caolas A Deas in Loch Shell in November 2017)

"Losses following Thermolicer treatment. Thought to be fish weakened by HSMI" (Scottish Sea Farms' salmon farm at Nevis A in Loch Nevis in April 2017)

"Post Hydrolicer treatment, fish with compromised health did not survive the treatment well - mechanical damage" (The Scottish Salmon Company's salmon farm at Quarry Point in Loch Fyne in March 2017)

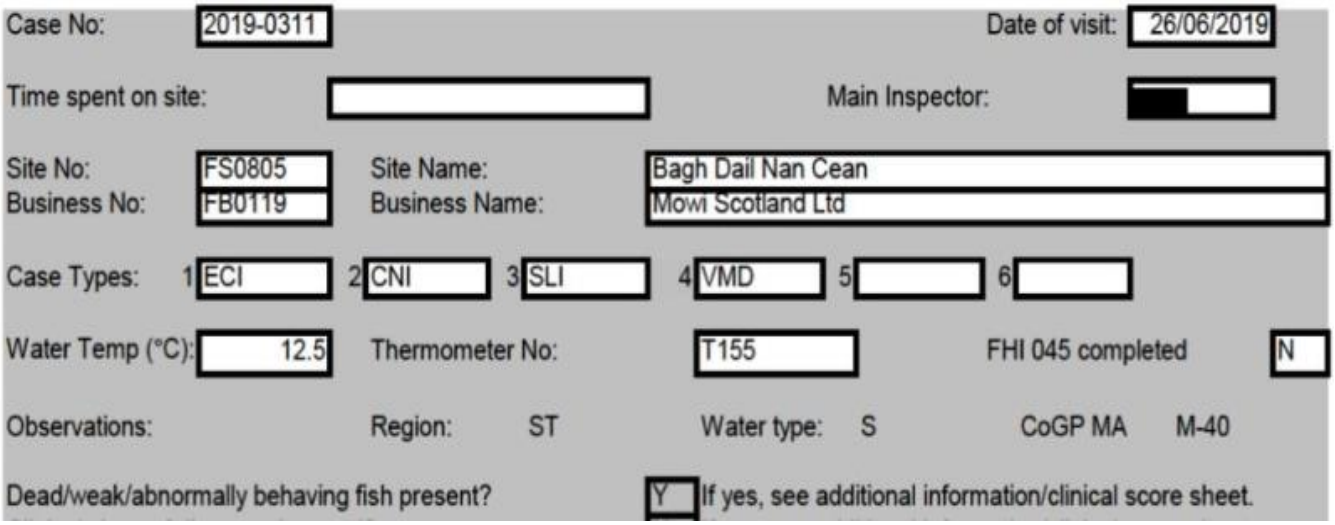
Here's mortality event reports where physical treatments such as a Thermolicer and Hydrolicer are cited by the Scottish Government's Fish Health Inspectorate (data published on 16 September 2019):

	Reporting Business Name	Site Name	Date reported	Mortality rate recorded (%)	Explained reasons	Total mortality during event	Additional information
2	Scottish Sea Farms Ltd	Loch Creran (D)	02/10/2018	4.46	Complex gill issues, post treatment morts	15894	Vets have taken samples. On site physical treatment for lice completed 27/9/18. Many morts due to treating fish with complex gill issues
3	The Scottish Salmon Company	Inch Kenneth	03/01/2018	1.75	Treatment	1204	Treatment with hydrolicer
4	Mowi Scotland Ltd	Craig an Tsagairt (Loch Hourn)	02/07/2019	1.37	Treatment Losses	7000	Thermolicer treatment started on 24th June for 4 days. Fish with bleeding gills, "collision damage" and heart damage. Not aware of any disease issues at the site but health team have been in and they are awatiing histo results. Mort levels appear to be back to normal. Only treated 10 of the 12 pens. Current lice levels 0.4 average adult females. Site should be fallow by end July.
5	Marine Harvest (Scotland) Ltd	Caolas A Deas	07/11/2017	1.89	PGD, Treatment	4663	Thermolicer treatment on one cage. Decided not to treat other cages with thermolicer.
6	Grieg Seafood Shetland Ltd	Langa Isle (East)	30/05/2017	5.75	Treatment	19131	Thermolicer treatment losses
7	Grieg Seafood Shetland Ltd	Langa Isle (East)	30/05/2017	5.3	Treatment	18232	Thermolicer treatment losses
8	Marine Harvest (Scotland) Ltd	Creag an T'Sagairt (Loch Hourn)	12/07/2017	1.09	Treatment	9331	Thermolicer
9	Scottish Sea Farms Ltd	South Sound	29/01/2018	2.19	Physical damage, thermolicer post-treatment	4253	Storm at site, fish showed damage from rubbing against net. Company biologist attended site, mortalities dropped below 1% following week.
10	The Scottish Salmon Company	Tarbert South	07/06/2019	3.99	CMS, Hydrolicer treatment	1698	Site is currently being harvested and will be empty by the end of June.
11	The Scottish Salmon Company	Tarbert South	07/06/2019	1.77	CMS, Hydrolicer treatment	655	Site is currently being harvested and will be empty by the end of June.
12	Scottish Sea Farms Ltd	Nevis B	24/07/2017	1.23	Treatment	3256	Residual diver clearance of pens related to aboveThermolicer treatment on wk27
13	Grieg Seafood Shetland Ltd	Langa Isle (East)	20/05/2019	2.09	Treatment		Post-optilicer losses
14	Grieg Seafood Shetland Ltd	Leinish	04/03/2019	3.06	Treatment	11828	Post treatment morts from optilicer trial and salmosan treatments (pen 1 &3)
15	Grieg Seafood Shetland Ltd	Leinish	04/03/2019	1.01	Treatment	3782	Post treatment morts from optilicer trial and salmosan treatments (pen 1 &3)
16	Scottish Sea Farms Ltd	Lismore North	18/10/2018	4.27	Complex gill issues and sea lice treatment (physical treatment)	8585	Post treatment losses following physical lice removal
17	The Scottish Salmon Company	Quarry Point	02/03/2017	2.8	Treatment	4247	Post Hydrolicer treatment, fish with compromised health did not susrvive the treatment well - mechanical damage
18	The Scottish Salmon Company	Quarry Point	02/03/2017	2.8	Treatment	4247	Post Hydrolicer treatment, fish with compromised health did not susrvive the treatment well - mechanical damage

19	Marine Harvest (Scotland) Ltd	Cairidh	17/05/2017	1.3	Treatment	8561	Pen 1 and 2 affected post Thermolicer treatment the rest of the site was not treated
20	Scottish Sea Farms Ltd	South Sound	01/06/2017	1.06	Treatment	3460	No action taken. Mortality due to treatment with thermolicer. Mortalities reduced significantly the following week
21	The Scottish Salmon Company	Kenmore Loch Torridon	23/06/2017	1.91	Treatment	1851	No action by company. Had been treating with hydrolicer.
22	The Scottish Salmon Company	Kenmore Loch Torridon	23/06/2017	1.17	Treatment		No action by company. Had been treating with hydrolicer.
23	The Scottish Salmon Company	Loch Odhairn/Gravir	06/11/2017	1.45	post treatment hydrolicer losses.	2652	mortalty event considered to be the result of treatment and numbers should reduce next week
24	Grieg Seafood Shetland Ltd	Score Holms	14/03/2017	3.7	Treatment	10619	Mortalities post Thermolicer treatment,
25	Scottish Sea Farms Ltd	Nevis B	11/07/2017	1.81	Treatment	5345	Losses from sea lice treatment with thermolicer, no suspected underlying condition
26	Scottish Sea Farms Ltd	Nevis A	04/04/2017	1.58	Treatment	4129	Losses following Thermolicer treatment. Thought to be fish weakend by HSMI.
27	Scottish Sea Farms Ltd	Nevis B	24/07/2017	1.45	Treatment	3876	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
28	Scottish Sea Farms Ltd	Nevis C (Ardintigh)	24/07/2017	1.82	Treatment	5924	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
29	Scottish Sea Farms Ltd	Nevis C (Ardintigh)	31/07/2019	2.37	Complex gill syndrome, post physical delousing	Not provided	Intervention review, increased health surveillance, mortality returned to below reporting threshold
30	Scottish Sea Farms Ltd	Grunna Voe	12/07/2019	5.94	CMS, Physical treatment losses	Not provided	Intervention review, increased health surveillance & biosecurity measures
31	Scottish Sea Farms Ltd	Loura Voe	12/07/2019	6.01	CMS, Physical treatment losses	Not provided	Intervention review, increased health surveillance & biosecurity measures
32	Scottish Sea Farms Ltd	Teisti Geo	12/07/2019	1.72	Post-physical treatment losses	Not provided	Intervention review
33	Scottish Sea Farms Ltd	Grunna Voe	12/07/2019	1.1	Post-physical treatment losses	Not provided	Increased health surveillance
34	The Scottish Salmon Company	Scadabay	24/01/2019	1.2	Post treatment	Not provided	Hydroliser treatment, CMS also detected on site.
35	The Scottish Salmon Company	Sgeir Dughall	09/08/2017	1.21	Treatment	3864	Hydroliser post-treatment losses,
36	The Scottish Salmon Company	Sgeir Dughall	09/08/2017	1.15	Treatment	3229	Hydroliser post-treatment losses
37	The Scottish Salmon Company	Kenmore Loch Torridon	11/08/2017	1.75	Treatment	1556	Hydrolicer treatment. Harvesting and general handling may have exacerbated mortalities. No action taken, site due to be harvested out by end of August 2017.
38	The Scottish Salmon Company	Kenmore Loch Torridon	09/08/2017	1.23	Treatment	1106	Hydrolicer treatment. Harvesting and general handling may have exacerbated mortalities. No action taken, site due to be harvested out by end of August 2017.
39	The Scottish Salmon Company	North Uiskevagh	02/10/2017	1.43	Complex gill issues, Post mechanical treatment		Harvesting
40	The Scottish Salmon Company	Strome	13/11/2017	1.83	post treatment hydrolicer losses.	3546	Further treatment with salmosan planned
41	The Scottish Salmon Company	Druimyeon Bay	13/11/2017	4.44	post treatment hydrolicer losses.	25607	further hydroliser treatment planned, fish on functional feed.
42	The Scottish Salmon Company	Druimyeon Bay	23/11/2017	8.69	post treatment hydrolicer losses, handling, CMS.	45089	further hydroliser treatment planned, fish on functional feed, harvesting.
43	The Scottish Salmon Company	Tarbert South	29/04/2019	1.1	Post physical	1500	Fish also suffering from CMS, harvest being brought forward
44	Marine Harvest (Scotland) Ltd	Ornish Island	30/07/2018	1.92	Post treatment	19000	during/post thermolicer treatment
45	Scottish Sea Farms Ltd	Loura Voe	12/07/2019	1.78	CMS, Post-physical treatment losses	Not provided	Destocking, increased health surveillance & biosecurity measures.
46	Scottish Sea Farms Ltd	Grunna Voe	12/07/2019	1.81	CMS, Post-physical treatment losses	Not provided	Destocking, increased health surveillance & biosecurity measures
47	The Scottish Salmon Company	Strome	11/01/2018	1.92	Post hydrolicer treatment	not disclosed	Company unwilling to disclose the % of the mortality or the number of fish involved. Only that the figure is over 1%.
48	The scottish salmon company	Taranaish	07/06/2018	1.2	Post treatment	not disclosed	biomarkers showed muscle fatigue, but a physical treatment for sea lice was required causing the increase in mortalities
49	Marine Harvest (Scotland) Ltd	Tabhaigh	17/10/2017	3.7	H2O2 and thermolicer		Also affected 2016 Q4. Vet visited.
50	Marine Harvest (Scotland) Ltd	Tabhaigh	17/10/2017	6.57	H2O2 and thermolicer		Also affected 2016 Q4. Vet visited.

51	Marine Harvest (Scotland) Ltd	Tabhaigh	17/10/2017	2.54	H2O2 and thermolicer		Also affected 2016 Q4. Vet visited.
52	Mowi Scotland Ltd	Rum	30/06/2019	2.79	Treatment Losses		37000 fish morts for June up until 24/6/19. 12 hour freshwater treatment in Intercaledonia. Mainly from; Pen 11 lost approximatly 45% and pen 5 lost 15%. Swimbladder issue and mechanical damage.
53	Mowi Scotland Ltd	Rum	30/06/2019	2.16	Treatment Losses		37000 fish morts for June up until 24/6/19. 12 hour freshwater treatment in Intercaledonia. Mainly from; Pen 11 lost approximatly 45% and pen 5 lost 15%. Swimbladder issue and mechanical damage.
54	The Scottish Salmon Company	Sgian Dubh	21/12/2017	1.16	Treatment	8737	2 x hydrolicer treatments have resulted in scale loss. Vet attending on 22/12/17.
55	Mowi Scotland Ltd	Rum	01/07/2019	1.09	Treatment Losses	8400	12 hour freshwater treatment in Intercaledonia. Mainly from; Pen 11 lost approximatly 45% and pen 5 lost 15%. Swimbladder issue and mechanical damage.
56	The Scottish Salmon Company	Strome	25/01/2018	1.63	Post hydrolicer	not disclosed	>1% - numbers expected to drop to below reporting threshold
57	The Scottish Salmon Company	Strome	26/03/2018	1.5	Post hydrolicer	not disclosed	% figures now below the reporting threshold.
58	The Scottish Salmon Company	Rubha Stillaig	29/04/2019	1.1	Post physical	800	
59	The Scottish Salmon Company	Strondoir Bay	29/04/2019	1.1	Post physical	800	

'Case Information' published by the Scottish Government's Fish Health Inspectorate also cites welfare problems and mortalities due to the Thermolicer and Hydrolicer. For example, here's a [case report in June 2019 for Mowi's Bagh Dail Nan Cean](#) ([Bay of the Dead Heads](#)) salmon farm:



Case No: 2019-0311 Date of visit: 26/06/2019

Time spent on site: Main Inspector: [redacted]

Site No: FS0805 Site Name: Bagh Dail Nan Cean

Business No: FB0119 Business Name: Mowi Scotland Ltd

Case Types: 1 ECI 2 CNI 3 SLI 4 VMD 5 6

Water Temp (°C): 12.5 Thermometer No: T155 FHI 045 completed N

Observations: Region: ST Water type: S CoGP MA M-40

Dead/weak/abnormally behaving fish present? Y If yes, see additional information/clinical score sheet.

Additional Case Information:

FS in movement records not recorded

Currently treating on site with a thermolicer. Treatment abandoned today as fish were not taking to it very well. (Hot weather) Fish in the pen that had been treated looked very lethargic, the fish were visible a brighter shade of blue (probably due to the stress of crowd, water temperature). The weather was very hot on the day of inspection which probably contributed to the abandoning of the treatment.

Video footage of mortalities at Mowi's 'Bay of the Dead Heads' salmon farm in Scotland was [posted last month by diver David Ainsley]:

Another [case report in June 2019 for Mowi's Port Na Cro salmon farm] cited "obvious mechanical damage from the Thermolicer treatment":

Case No:	2019-0312								Date of visit:	26/06/2019	
Time spent on site:	8hrs							Main Inspector:			
Site No:	FS0859	Site Name:	Port Na Cro								
Business No:	FB0119	Business Name:	Mowi Scotland Ltd								
Case Types:	1 ECI	2 CNI	3 SLI	4 VMD	5	6					
Water Temp (°C):	12.5	Thermometer No:	T155				FHI 045 completed	N			
Observations:		Region:	ST	Water type:	S		CoGP MA	M-40			
Dead/weak/abnormally behaving fish present?	Y	If yes, see additional information/clinical score sheet.									

Additional Case Information:

Salmosan treatment - pen 1 (Thursday the second of may.) post treatment mortality - 2.4% Cumulative mortality lost from pen.

Thermolicer treatment. 15th of June. Good clearance reported after treatment. Pens that had been treated with the thermolicer more recently had some lethargic fish visible in the pens, some of which had obvious mechanical damage from the thermolicer treatment.

Here's photos from a Fish Health Inspectorate visit to The Scottish Salmon Company's salmon farm at Portree in February 2019 - including "visible damage to the heads of fish", skeletal muscle necrosis, dermatitis, lesions "likely associated with mechanical damage", anorexia, bilateral exopthalmia, petechial haemorrhaging, salmon gill poxvirus, *Neoparamoeba perurans* (the causative agent of Amoebic Gill Disease), *Paranculeospora theridon*, *Vibrio spp*, *Photobacterium sp* and Infectious Pancreatic Necrosis virus:

Photos of a Scottish Government Fish Health Inspectorate visit in March 2019 to the North Papa salmon farm operated by Norwegian-owned Grieg Seafood reveal physical damage "attributed to a recent Optilicer treatment".

2019-0135 – North Papa Fish 1-3

2019-0135 North Papa – Fish 2 exophthalmia

Read more via [Meet Pop-Eye the Scottish Salmon - Tortured by an Optilicer!]

Authorities in Norway are considering a ban on thermal delousing after welfare experts questioned whether it violates the Animal Welfare Act. Salmon Business [reported in August 2019]:

Authorities mull over ban on thermal delousing

News by **editorial staff** - 22 August 2019

Most-used non-chemical method to remove lice may be phased out.

The Norwegian Food Safety Authority has warned this week that it may be phasing out thermal delousing over two years, the Norwegian Animal Protection Alliance wrote in a press release.

"This is too passive. It is high time that the suffering of the fish is taken seriously," said Animal Protection Alliance zoologist Susanna Lybæk.

Thermal delousing is a method that uses hot water to remove lice from fish in Norwegian fish farming. The use of thermal treatment has increased greatly in recent years and has become the most widely used drug-free lice treatment in Norwegian fish farming.

Several experts on fish health and welfare have questioned in recent years whether the method violates the Animal Welfare Act.

This week, the Norwegian Food Safety Authority has warned that thermal delousing may be prohibited, unless "new knowledge proves that it can be used in a well-mannered manner". The phase-out period is set at two years. Zoologist and scientific advisor in the Animal Protection Alliance, Susanna Lybæk, thinks this is the right time.

"We have known for several years that thermal delousing causes panic behaviour and increased salmon mortality, and that treatment is likely to be painful. Two years is too long for the salmon to wait. Such torture chambers for salmon should never have been allowed in the first place," she added.

A study conducted by the Norwegian Veterinary Institute and the Institute of Marine Research on behalf of the Norwegian Food Safety Authority confirms that the method is painful for the salmon. Desalination with hot water above 28 degrees gives clear pain behaviour in the form of the fish swimming in panic into the vessel wall, shaking their heads and splashing on the surface.

The recommended treatment temperature is 28-34 degrees, which causes pain and panic in the salmon. The Fish Health Report 2018 reveals that some use temperatures up to 36.1 degrees. This points out the Food Safety Authority is in violation of the Animal Welfare Act.

"We are pleased that the Food Safety Authority is clear that one must not exceed the maximum temperature of 34 degrees," she said.

"In addition, doubts have been raised as to whether the water in the treatment chamber actually maintains the desired temperature when quickly treating a large number of fish. Questions are being asked as to whether the temperature can be a degree higher or lower than one thinks," the press release wrote.

"Here, the researchers have uncovered two major challenges for the salmon. Not only is the most common non-drug method painful, but the system in place to safeguard against it has grossly failed. This is suffering put into the system," said Lybæk.

Susanna Lybæk. PHOTO: Ihne Pedersen

In January 2018 a Norwegian veterinarian "highlighted major head injuries she has seen to fish treated with warm water delousing machinery".

fishfarmingexpert

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Vet warns of head injury risk to fish during delousing

Fish vet Kristin Ottesen warned that whatever mechanical delousing method is used, it kills some fish. Photo: Linn Therese Skår Hosteland.

By Linn Therese Skår Hosteland

Kristin Ottesen, of Norwegian firm HaVet, addressed lice treatment with warm water and the Thermolicer or Optilicer, during the Fisheries and Aquaculture Industry Research Fund (FHF) conference "Prevention and Control of Lice" in Trondheim.

"No matter what non-drug method you use for delousing, it kills. Same if it's Skamik, FLS, Thermolicer and Optilice. Both the method and the logistics," Ottesen began.

She noted that temperatures of 30-34 degrees that are lukewarm for humans can be searing for farmed salmon.

'Hear the fish panic'

"But we do not know. When you stand with these machines you can still hear that something happens. One can hear that the fish panic. So the thoughts around this are not from out of the blue," she said.

She says they often see apparently healthy fish that just die after treatment, without finding the fish.

"But is it [the fish] fine? Are we looking for the right things when we look at the fish afterwards?" she asked, adding that surviving fish are not necessarily OK.

"Especially 12 to 24 hours after treatment. You will begin to see 'spare tyres' around the eyes and fluid collections in the palate after warm water treatment. This seeps in gradually. Fish farmers often say they see unconscious and lethargic fish."

Bleeding around the brain

Ottesen said that after opening such fish, she saw large bleeding around the brain and the palate of some of the fish.

"Classically, we are coming to a farm that says they have had some mortality, but are satisfied."

What farmers classify as satisfactory mortality, she adds, ranges from maybe 0.2% to 3%.

"A few weeks later we come to the same farm and see that the fish are falling and there are some sick fish. They look wrong, the eyes of the fish look strange."

Also, on fish that look fine two weeks after treatment, she finds major bleeding in the head region.

Stress-induced damage

"The fish health service has tried to document the trends in this, and the analysis companies they work with conclude that there have been major acute injuries in the head region, which can't be explained by anything other than the lice treatment.

"I see a lot of stress-induced damage to the fish after these treatments in addition to handling. I think we should think about how to build these machines. Is warm water treatment safe? It's something we must ask ourselves."

She says that as a fish health worker she has also fought a hard battle to know what the farmers treat the fish in, besides that it is hot water.

This is not the first time Scottish Salmon Watch has raised welfare concerns. In May 2018, Scottish Salmon Watch wrote to the Cross-Party on Animal Welfare raising welfare concerns with respect to the operation of the Thermolicer and suggesting that its operation was in breach of the Animal Health & Welfare (Scotland) Act 2006 (letter attached in full here for easy reference).

In July 2018, Scottish Salmon Watch called for a ban on the use of Thermolicer and Hydrolicer 'torture chambers' (our press release is attached here for easy reference).

In July 2018, a legal complaint filed with Police Scotland's Wildlife Crime Unit and the Animal & Plant Health Agency (copied to Scottish Ministers) included:

In assessing the scientific case against the use of the Thermolicer, Compassion In World Farming stated in 2016:

COMPASSION in world farming

Factory farming | Farm animals | Take action | Donate

Our mission is to end factory farming

Philip Lymbery, Compassion CEO

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PHILIP LYMBERY > BLOG > 2016 > 11 > SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS

SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS

Fish farm

Reports that Scottish salmon farms have killed tens of thousands of fish accidentally by overheating them have sent shockwaves through an industry already under fire for shooting seals.

Seals are all too often shot as part of 'predator control' around intensive fish farms that are effectively factory farms in the sea.

Now nearly a hundred thousand salmon are reported to have been killed after the use of a new device, the 'thermolicer'. The device was used in the latest desperate bid to rid intensively farmed fish from lice, a parasite infestation which is inevitable when so many fish are crammed in a confined space.

Welcome

"Compassion in World Farming campaigns to end factory farming. My book, Farmageddon, explodes the myths behind our broken food system and sets out an alternative vision that will benefit animals, people and the countryside."

Philip Lymbery

Information from the Scottish Government, received following a Freedom of Information request by the Global Alliance Against Industrial Aquaculture (GAAIA), reveals that 95,000 fish died on a single Scottish fish farm following the use of a thermolicer.

The thermolicer procedure involves crowding the fish used to the cold coastal waters of Scotland, pumping them into heated water and then dumping them back into their seawater cages. Salmon would never normally experience such sudden temperature changes. Little wonder that so many seem to have died as a result.

Killing fish by overheating, whether accidental or not, is simply inhumane.

The use of rough handling and heat treatment to tackle problems of sea lice is unacceptable on welfare grounds.

Here's Compassion in World Farming's scientific assessment of the Thermolicer prepared by Phil Brooke (Scientific Manager - research and education):

Thermolicer:

Scientific Assessment by Compassion in World Farming (6 November 2016)

The Thermolicer appears to be a brutal treatment which has not been subjected to a full and proper welfare assessment. It involves a series of steps which are inherently stressful and will cause poor welfare to the fish.

1. The salmon are crowded in a net
2. They are pumped in water through a tube into a boat with the Thermolicer on board
3. They are taken out of water – the dewaterer is a metal grid which lets the water through. They bounce along a metal grid into the treatment water
4. They then pass into seawater heated to 30-34 degrees centigrade. Salmon would never normally experience sudden temperature changes like this
5. Finally, they are pumped back into their seawater cage

Improved design and management could reduce this stress but cannot be expected to eliminate it.

Background information

We have seen one report from the Norwegian Veterinary Institute ("Thermal de-licing of salmonid fish - documentation of fish welfare and effect") which documented statistically significant increases in:

- snout injury following treatment. It is suggested that this should be caused by the effects of crowding the fish before pumping onto the Thermolicer vessel
- fin damage
- scale damage following treatment on one of the sites
- cataracts on one site 3 weeks after treatment

The Fish Site reported in May 2018 via 'Study questions fish welfare in thermal delousing':

Immersing farmed salmon in warmed water as a means of removing sea lice presents serious fish health and welfare issues according to a new study.

The authors of the study, which was led by researchers at Pharmaq Analytiq, suggested that "a better regulatory framework for mechanical treatment of fish in general" is needed and "the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish."

Mechanical treatments that use warm water to remove lice, such as Thermolicers, have been widely adopted by the salmon farming industry – in particularly in Norway and Scotland – and have been shown to remove over 95 percent of the parasites. They have been increasingly popular at a time when a number of therapeutants against sea lice are losing their efficacy, or their use is being limited by regulations.

Cooke Aquaculture has recently acquired a Thermolicer for its operations on the east coast of Canada

However, as the researchers note, high mortality and serious lesions associated with thermal sea lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage.

The new paper – which was published in the *Norsk veterinærtidsskrift* journal – does, the authors argue, demonstrate "beyond doubt that fish can feel pain and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage."

Here's the English summary of the paper referred to above:

ENGLISH SUMMARY

High mortality and serious lesions associated with thermal sea-lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage. It is demonstrated beyond doubt that fish can feel pain

and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage.

The present documentation of thermal sea-lice treatment on welfare is in the opinion of the authors based on a weak scientific basis and not calibrated for the use in field situations. Furthermore, a better regulatory framework for mechanical treatment

of fish in general is called upon. It is concluded that the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish.

Scottish Ministers and salmon farmers have a duty of care to fish under the Animal Health & Welfare (Scotland) Act 2006. Why is the salmon farming industry being allowed to get away with murder?

Scottish Salmon Watch asked Scottish Ministers and in particular Mairi Gougeon as Minister for Rural Affairs and the Natural Environment with specific responsibility for "Animal health

and welfare" to conduct an in-depth investigation into the operation of the Thermolicer and Hydrolicer on salmon farms as a matter of urgency and ban their use immediately.

Scottish Salmon Watch was shocked to discover via a Parliamentary Reply from Fergus Ewing in 2016 that no safety and welfare review of use of the Thermolicer had been carried out by the Scottish Government and that no licence for operation is required.

Question S5W-04592: Mark Ruskell, Mid Scotland and Fife, Scottish Green Party, Date Lodged: 09/11/2016
To ask the Scottish Government whether it has conducted a safety and welfare review of use of the Thermolicer device in salmon farms.

Answered by Fergus Ewing (17/11/2016):

No safety and welfare review of the use of the Thermolicer has been carried out by Scottish Government. The aquaculture industry is responsible for overseeing the use of treatments for disease and/ or parasites. The health and welfare of the fish on site are primarily the responsibility of the operator of the fish farm.

Current Status: Answered by Fergus Ewing on 17/11/2016

Question S5W-04593: Mark Ruskell, Mid Scotland and Fife, Scottish Green Party, Date Lodged: 09/11/2016
To ask the Scottish Government whether the Thermolicer is licensed for use in Scotland and, if not, what information it has regarding whether Marine Harvest had a Home Office licence to carry out experiments using the device.

Answered by Fergus Ewing (17/11/2016):

The Thermolicer is a commercially available treatment system for sea lice control. The use of the Thermolicer is not part of an experiment and as such does not require a Home Office Licence for operation.

Current Status: Answered by Fergus Ewing on 17/11/2016

Is this still the case in 2019?

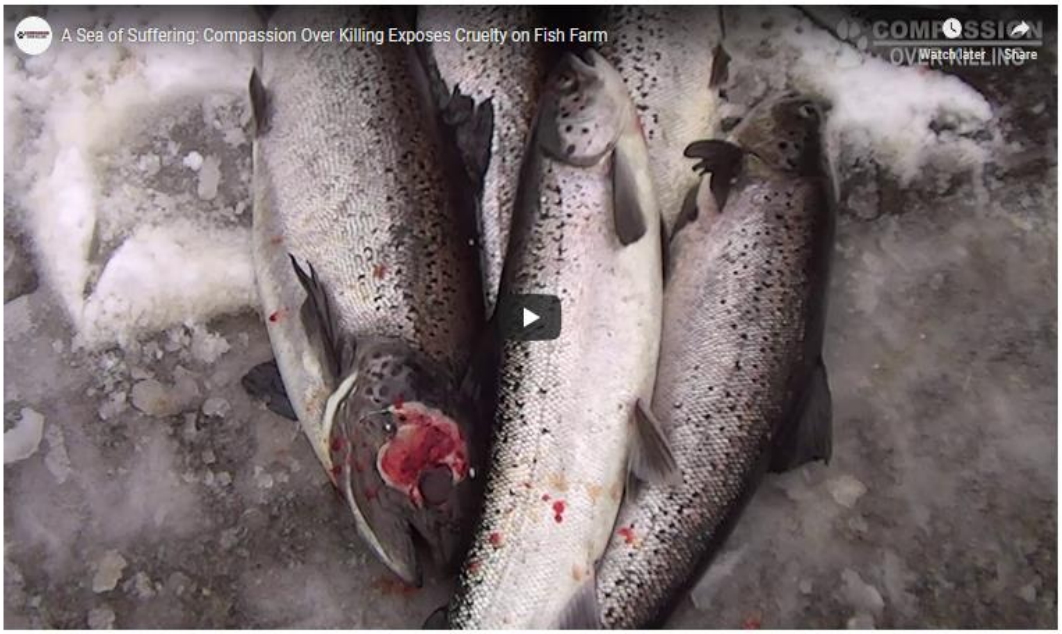
Moreover, how many farmed salmon died in 2018 and how many have died in 2019 thus far due to the operation of the Thermolicer and Hydrolicer? How many salmon farms used a Thermolicer and Hydrolicer in 2018 and 2019 thus far?

Scottish Salmon Watch hopes that Scotland's Animal Welfare Commissioner and Cross-Party Group on Animal Welfare (both copied in here) can also investigate the issue.

There is more information via today's blog: "Video Nasty: Thermolicer - the Heated Torture Chamber for Scottish Salmon".

Finally, the welfare of farmed salmon is in the news this week with shocking video footage from an undercover investigation by Compassion Over Killing of Cooke Aquaculture in Maine (Cooke Aquaculture is one of Scotland's salmon farming's largest operators).

COK's investigator worked inside Cooke Aquaculture in Bingham, Maine, exposing senseless violence against these sentient animals at an industrial Atlantic salmon hatchery supplying Martha Stewart's new True North Seafood line.



It makes you wonder what conditions are really like inside Scottish salmon farms.

Yours sincerely,

Don Staniford

Director, Scottish Salmon Watch

Cc:

Professor Cathy Dwyer (Scotland's Animal Welfare Commissioner)
Christine Grahame (Convenor of the Cross-Party Group on Animal Welfare)

SCOTTISH SALMON WATCH
WELFARE

Scottish Salmon Watch, 10 July 2018

Ban Water Torture on Scottish Salmon Farms
- Over 100,000 farmed fish Thermoliced & Hydroliced to death since August 2017

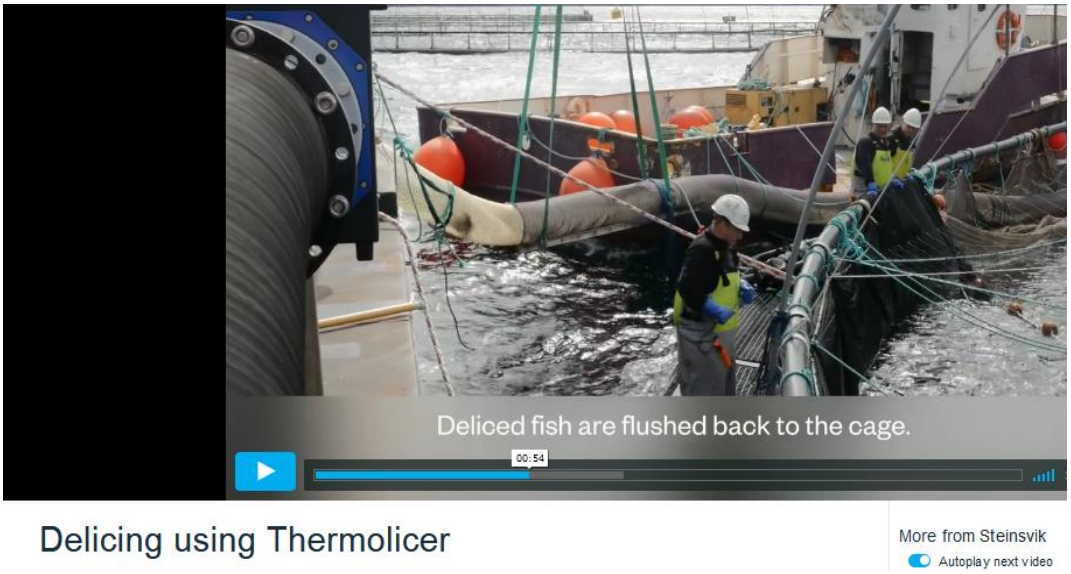
SCOTTISH SALMON WATCH WELFARE

Campaigners are calling for a ban on 'torture chambers' used on salmon farms to kill parasites and treat for diseases. Data disclosed by the Scottish Government via Freedom of Information (FOI) reveals that over 100,000 farmed salmon died in 14 incidents between August 2017 and January 2018 due to lethal Thermolicer and Hydrolicer treatments **[1]**. Since 2016, over 230,000 fish have died on Scottish salmon farms following the use of 'mechanical treatments' intended to kill sea lice and treat Amoebic Gill Disease **[2]**.

In 2016, Compassion In World Farming called for a ban on Thermolicers following a mass mortality of 95,000 farmed salmon at Marine Harvest's salmon farm in Loch Greshornish. Earlier this year, Norwegian veterinarian Dr. Kristin Ottesen warned against the use of the Thermolicer due to the risk of head injury including "large bleeding around the brain" and "stress-induced damage".

A study published in a Norwegian veterinary journal in May concluded that “the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish”. An English summary of the scientific paper included:

"High mortality and serious lesions associated with thermal sea-lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage. It is demonstrated beyond doubt that fish can feel pain and that the temperatures used during thermal de-lousing (28-34℃) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage." **[3]**



"The Thermolicer and Hydrolicer are torture chambers for fish," said Don Staniford, Director of Scottish Salmon Watch. "Heating salmon up to 34 degrees Celcius - that's over 90 degrees Fahrenheit - is a welfare nightmare which must be stopped before tens of thousands more fish die a horrible death. These Heath Robinson contraptions act as monstrous washing machines in a desperate and failed attempt to clean tonnes and tonnes of lice-infested and disease-ridden farmed salmon. No wonder fish are dying due to bleeding brains and head damage."

'Mortality Event Reports' reported between August 2017 and January 2018 included 95,751 deaths in 8 separate incidents due to the Thermolicer and/or Hydrolicer:

45,089 - Scottish Salmon Company: Druimyeon Bay (Sound of Gigha), 13 November 2017
25,607 - Scottish Salmon Company: Druimyeon Bay (Sound of Gigha), 6 November 2017
8,737 - Scottish Salmon Company Sgian Dubh (Loch Striven), 11 December 2017
4,663 - Marine Harvest: Caolas A Deas (Loch Shell), 21 August 2017
4,253 - Scottish Sea Farms: South Sound (Mangaster Voe), 1 January 2018
3,546 - Scottish Salmon Company: Strome (Loch Carron), 30 October 2017
2,652 - Scottish Salmon Company: Gravir (Loch Odhairn), 30 October 2017
1,204 - Scottish Salmon Company: Inch Kenneth (Loch na Keal), 25 December 2017

Another six 'Mortality Event Reports' provided no data on the number of dead fish but at least one incident was reported as "over 1% mortality". The 'Mortality Event Report' (1 January 2018) for The Scottish Salmon Company's salmon farm at Strome in Loch Carron stated that the estimated number of fish lost was "not disclosed" with the: "Company unwilling to disclose the % of the mortality or the number of fish involved. Only the figure is over 1%. Discussions ongoing to get actual figures" (further mortality reports followed on 8 January and 15 January 2018).

According to the Scotland's Aquaculture database, 20,440 kg - that's 20.4 tonnes - of mortalities came from The Scottish Salmon Company's salmon farm at Strome in January 2018. If the average weight of the farmed salmon was 1 kg then there would be over 20,000 morts (even if the average weight of the farmed salmon was 4 kg then there would be over 5,000 morts).

Another mortality incident where no figure is provided started on 7 August 2017 at Marine Harvest's salmon farm at Tabhaigh in Loch Erisort (further mortality reports followed on 14 August and 21 August 2017). According to the Scotland's Aquaculture database, 265,069 kg - that's 265 tonnes - of mortalities came from Marine Harvest's salmon farm at Tabhaigh in Loch Erisort in August 2017 (that could be over 250,000 and most likely over 50,000 morts).

Scottish Salmon Watch has now filed another FOI asking for specific figures.

In May 2016, Marine Harvest Scotland's Managing Director Ben Hadfield described the Hydrolicer as a "natural solution" for the problems of sea lice and Amoebic Gill Disease. According to Marine Harvest, their Inter Caledonia Hydrolicer "uses reverse osmosis technology to turn seawater into fresh water at a capacity of 200m^3/hour, and will be able to completely fill her wells every ten hours, allowing the fish to be bathed in fresh water, ideal for treating them against sea lice and AGD" **[4]**.

A Scottish Parliament briefing published in February 2018 included:

OTHER METHODS OF CONTROL

Mechanical methods are also used to control lice [12] .

- A thermolicer works by pumping salmon through lukewarm water. Lice have a low tolerance for sudden changes in temperature
- A hydrolicer washes lice off the salmon
- A fish wash or skamik system uses brushes and water spray to remove lice.

However, as Marine Harvest (2017, p22) note "...new methods generate new challenges, as we experienced at our Greshornish site in Scotland. At Greshornish, we lost 115 283 fish during our first full-scale thermolicer treatment because we lacked experience and failed to fully anticipate the consequences of treating fish compromised by amoebic gill disease with water of up to 34ºC."

In May 2018, Scottish Salmon Watch wrote to the Scottish Ministers raising welfare concerns surrounding the operation of the Thermolicer. The letter cited Compassion In World Farming's written submission to the Rural Economy & Connectivity Committee's ongoing salmon farming inquiry:

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

Later this week, Scottish Salmon Watch will be filing a legal challenge against salmon farms for systematic breaches of the Animal Health & Welfare (Scotland) Act 2006.

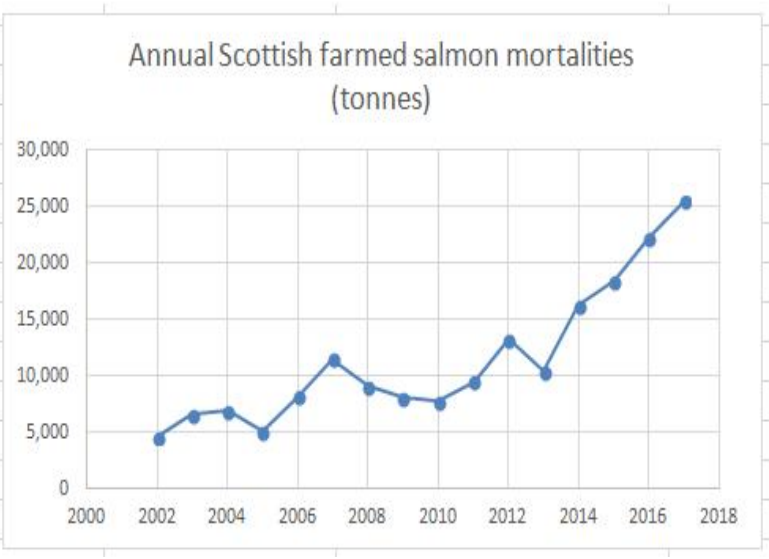
Read more via:
Letter to Scottish Ministers re. Welfare Abuses at Scottish Salmon Farms
Deaths, Deformities & Welfare Abuse at Scottish Salmon Farms - Breach of the Animal Health & Welfare (Scotland) Act?
Letter to the Cross-Party Group on Animal Welfare: Thermoliced to death
Study questions fish welfare in thermal delousing
Vet warns of head injury risk to fish during delousing
Thermal treatment for lice blamed for salmon deaths - new 'Thermolicer' method under spotlight as 6,000 fish die
Thousands of fish poached alive in lice treatment bungle that could hit Christmas salmon prices
Thousands of salmon are poached alive when a lice treatment process went horribly wrong in a mistake that could see prices soar ahead of Christmas
Fish farm firm kills 175000 salmon by accident
Revealed: how Scottish fish farm cooked thousands of salmon alive
'Thermolicer' Back-Fires Killing 95,400 Farmed Salmon - £2.7 million up in flames for Marine Harvest on Isle of Skye

Last month, Scottish Salmon Watch published gruesome photos cataloguing serious welfare abuses at salmon farms across Scotland.

Read more via:
EXPOSED: Gruesome Photos of Deformed & Diseased Scottish Salmon
Horror photos of farmed salmon spark legal threat
GRAPHIC: More Proof That Fish Are Suffering in Food Industry (Photos)
New photos expose shocking welfare issues on Scottish salmon farms

Data published by the Scottish Government via Scotland's Aquaculture database in March 2018 revealed that mortalities on Scottish salmon farms exceeded 25,000 tonnes in 2017 (up from less than 10,000 tonnes in 2011 and just over 5,000 tonnes in 2005):

Mortalities at Scottish Salmon Farms	
Year	Mortalities (Tonnes)
2017	25,435
2016	22,232
2015	18,373
2014	16,245
2013	10,424
2012	13,234
2011	9,475
2010	7,713
2009	8,064
2008	9,088
2007	11,495
2006	8,183
2005	5,100
2004	6,907
2003	6,537
2002	4,578



Download Excel spreadsheet in full online here

The BBC's Joe Crowley (who exposed leaking wastes from diseased farmed salmon on The One Show's 'Dead Salmon Run' in December 2017) Tweeted:

Note that the increase in mortalities cannot be explained simply as a function of an increase in salmon farming production - in fact the ratio of mortalities to salmon farming production is now the worst ever:

Year	Production (t)	Mortalities (t)	P/M	Ratio M:P
2002	144,589	4,578	31.58344255	1:32
2003	169,736	6,537	25.96542757	1:26
2004	158,099	6,907	22.88967714	1:23
2005	129,588	5,100	25.40941176	1:25
2006	131,847	8,183	16.112306	1:16
2007	129,930	11,495	11.30317529	1:11
2008	128,606	9,088	14.15118838	1:14
2009	144,247	8,064	17.88777282	1:18
2010	154,164	7,713	19.98755348	1:20
2011	158,018	9,475	16.67736148	1:17
2012	162,223	13,234	12.25804745	1:12
2013	163,234	10,424	15.65943975	1:16
2014	179,022	16,245	11.02012927	1:11
2015	171,722	18,373	9.346432265	1:9
2016	162,817	22,232	7.323542641	1:7
2017	177,202	25,435	6.966856694	1:7

An Excel spreadsheet of the data for mortalities during 2017 and back to 2002 - including graphs summarising the data - is available online here

In January 2018, the Cabinet Secretary for Rural Economy (Fergus Ewing) revealed that the mortality rate on Scottish salmon farms was a staggering 26.7% - with an estimated 20 million farmed salmon dying each year on Scottish salmon farms.

Read more via:
Hard Evidence: Dossier of Data on Lice, Diseases & Mortalities at Scottish Salmon Farms
The Herald: "Video: Disease concern as Scots salmon farmers' produce "stomach-churning" record levels of fish deaths"
Scottish Salmon's Mort Mountain Leaps Over 10 Million - FOI reveals 2.3 million dead salmon at Marine Harvest farms in 2017
Photo Gallery: Dead Salmon from Scotland's Disease-Ridden Salmon Farms

Contact:

Don Staniford: 07771 541826 (dstaniford@gaaia.org)

Notes to Editors:

[1] Information supplied by the Scottish Government on 18 June 2018: FoI-18-01466 - Mortality Event Reports - June 2018

Download the covering letter from the Scottish Government dated 18 June 2018 online here

'Mortality Event Reports' included 95,751 deaths in 8 separate incidents due to the Thermolicer and/or Hydrolicer:

45,089 - Druimyeon Bay (The Scottish Salmon Company), 13 November 2017
25,607 - Druimyeon Bay (The Scottish Salmon Company), 6 November 2017
8,737 - Sgian Dubh (The Scottish Salmon Company), 11 December 2017
4,663 - Caolas A Deas (Marine Harvest), 21 August 2017
4,253 - South Sound (Scottish Sea Farms), 1 January 2018
3,546 - Strome (The Scottish Salmon Company), 30 October 2017
2,652 - Loch Odhairn/Gravir (The Scottish Salmon Company), 30 October 2017
1,204 - Inch Kenneth (The Scottish Salmon Company), 25 December 2017

Mortality Event Report

Mortality Event ID	MRT00529
Site Name:	Druimyeon Bay
Site No:	FS0336
Start date of mortality:	13/11/2017
Period of mortality:	Weekly
Percentage mortality:	8.69
Explained/unexplained:	Explained
Reason (if explained):	post treatment hydrolicer losses, handling, CMS.
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	2.8kg
Age:	2016 S0
Estimated number of fish lost:	45089
Additional information:	further hydroliser treatment planned, fish on functional feed, harvesting.
MS action:	Site inspection planned for wk 48.

Mortality Event Report

Mortality Event ID	MRT00514
Site Name:	Druimyeon Bay
Site No:	FS0336
Start date of mortality:	06/11/2017
Period of mortality:	Weekly
Percentage mortality:	4.44
Explained/unexplained:	Explained
Reason (if explained):	post treatment hydrolicer losses.
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	2.5 kg
Age:	2016 S0
Estimated number of fish lost:	25607
Additional information:	further hydroliser treatment planned, fish on functional feed.
MS action:	Site inspection delayed until wk 48. figures updated 23/11/17

Mortality Event Report

Mortality Event ID	MRT00550
Site Name:	Sgian Dubh
Site No:	FS1281
Start date of mortality:	11/12/2017
Period of mortality:	Weekly
Percentage mortality:	1.16
Explained/unexplained:	Explained
Reason (if explained):	Treatment
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	2.1kg
Age:	2017 S1
Estimated number of fish lost:	8737
Additional information:	2 x hydrolicer treatments have resulted in scale loss. Vet attending on 22/12/17.
MS action:	FHI to monitor situation going forward.

Mortality Event Report

Mortality Event ID	MRT00501
Site Name:	Caolas A Deas
Site No:	FS1291
Start date of mortality:	21/08/2017
Period of mortality:	Weekly
Percentage mortality:	1.89
Explained/unexplained:	Explained
Reason (if explained):	PGD, Treatment
Business Name:	Marine Harvest (Scotland) Ltd
Business Number:	FB0119
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	~4.5Kg
Age:	2016 Q3
Estimated number of fish lost:	4663
Additional information:	Thermolicer treatment on one cage. Decided not to treat other cages with thermolicer.
MS action:	FHI not informed at time. Site inspected 7/11/17.

Mortality Event Report

Mortality Event ID	MRT00584
Site Name:	South Sound
Site No:	FS0183
Start date of mortality:	01/01/2018
Period of mortality:	Weekly
Percentage mortality:	2.19
Explained/unexplained:	Explained
Reason (if explained):	Physical damage, thermolicer post-treatment
Business Name:	Scottish Sea Farms Ltd
Business Number:	FB0125
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	4.8kg
Age:	2016 S0
Estimated number of fish lost:	4253
Additional information:	Storm at site, fish showed damage from rubbing against net. Company biologist attended site, mortalities dropped below 1% following week.
MS action:	FHI to monitor

Mortality Event Report

Mortality Event ID	MRT00513
Site Name:	Strome
Site No:	FS0570
Start date of mortality:	30/10/2017
Period of mortality:	Weekly
Percentage mortality:	1.83
Explained/unexplained:	Explained
Reason (if explained):	post treatment hydrolicer losses.
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	3.2kg
Age:	2016 S0
Estimated number of fish lost:	3546
Additional information:	Further treatment with salmosan planned
MS action:	Site due to fallow early 2018. FHI to monitor situation going forward with view to visiting when inspector in area

Mortality Event Report

Mortality Event ID	MRT00492
Site Name:	Loch Odhairn/Gravir
Site No:	FS0242
Start date of mortality:	30/10/2017
Period of mortality:	Weekly
Percentage mortality:	1.45
Explained/unexplained:	Explained
Reason (if explained):	post treatment hydrolicer losses.
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	2kg
Age:	2016 S0s
Estimated number of fish lost:	2652
Additional information:	mortalty event considered to be the result of treatment and numbers should reduce next week
MS action:	FHI monitoring. Site inspected 16/8/17 and diag samples taken

Mortality Event Report

Mortality Event ID	MRT00574	
Site Name:	Inch Kenneth	
Site No:	FS0593	
Start date of mortality:		25/12/2017
Period of mortality:	Weekly	
Percentage mortality:	1.75	
Explained/unexplained:	Explained	
Reason (if explained):	Treatment	
Business Name:	The Scottish Salmon Company	
Business Number:	FB0169	
Species:	SAL	
Water Type:	S	
Weight (site average):	≥750g	
Weight (affected population average):	3.8Kg	
Age:	2016 S0	
Estimated number of fish lost;		1204
Additional information:	Treatment with hydrolicer	
MS action:	No further action	

Another six 'Mortality Event Reports' provided no data on the number of dead fish but at least one incident was reported as "over 1% mortality":

Mortality Event Report

Mortality Event ID	MRT00577
Site Name:	Strome
Site No:	FS0570
Start date of mortality:	01/01/2018
Period of mortality:	Weekly
Percentage mortality:	1.92
Explained/unexplained:	Explained
Reason (if explained):	Post hydrolicer treatment
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAl
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	
Age:	2016 S0
Estimated number of fish lost:	not disclosed
Additional information:	Company unwilling to disclose the % of the mortality or the number of fish involved. Only that the figure is over 1%.
MS action:	Discussions ongoing to get actual figures. % figure collected during visit to office; 26/3/18

Mortality Event Report

Mortality Event ID	MRT00599
Site Name:	Strome
Site No:	FS0570
Start date of mortality:	08/01/2018
Period of mortality:	Weekly
Percentage mortality:	1.5
Explained/unexplained:	Explained
Reason (if explained):	Post hydrolicer treatment
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	3.5kg
Age:	2016 S0
Estimated number of fish lost:	not disclosed
Additional information:	% figures now below the reporting threshold.
MS action:	% figure collected during visit to office; 26/3/18

Mortality Event Report

Mortality Event ID	MRT00582
Site Name:	Strome
Site No:	FS0570
Start date of mortality:	15/01/2018
Period of mortality:	Weekly
Percentage mortality:	1.63
Explained/unexplained:	Explained
Reason (if explained):	Post hydrolicer treatment
Business Name:	The Scottish Salmon Company
Business Number:	FB0169
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	3.5kg
Age:	2016 S0
Estimated number of fish lost:	not disclosed
Additional information:	>1% - numbers expected to drop to below reporting threshold
MS action:	% figure collected during visit to office; 26/3/18

Note that the Scotland's Aquaculture database reports that 20,440 kg - 20.4 tonnes - of mortalities came from The Scottish Salmon Company's salmon farm at Strome in January 2018.

Mortality Event Report

Mortality Event ID	MRT00465
Site Name:	Tabhaigh
Site No:	FS1297
Start date of mortality:	07/08/2017
Period of mortality:	Weekly
Percentage mortality:	3.7
Explained/unexplained:	Explained
Reason (if explained):	H2O2 and thermolicer treatment
Business Name:	Marine Harvest (Scotland) Ltd
Business Number:	FB0119
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	4.3kg
Age:	2016 Q3 & Q4
Estimated number of fish lost:	
Additional information:	Vet visited.
MS action:	Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.

Mortality Event Report

Mortality Event ID	MRT00466
Site Name:	Tabhaigh
Site No:	FS1297
Start date of mortality:	14/08/2017
Period of mortality:	Weekly
Percentage mortality:	6.57
Explained/unexplained:	Explained
Reason (if explained):	H2O2 and thermolicer treatment
Business Name:	Marine Harvest (Scotland) Ltd
Business Number:	FB0119
Species:	SAL
Water Type:	S
Weight (site average):	≥750g
Weight (affected population average):	4.3kg
Age:	2016 Q3 & Q4
Estimated number of fish lost:	
Additional information:	Vet visited.
MS action:	Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.

Mortality Event Report

Mortality Event ID	MRT00467	
Site Name:	Tabhaigh	
Site No:	FS1297	
Start date of mortality:		21/08/2017
Period of mortality:	Weekly	
Percentage mortality:	2.54	
Explained/unexplained:	Explained	
Reason (if explained):	H2O2 and thermolicer treatment	
Business Name:	Marine Harvest (Scotland) Ltd	
Business Number:	FB0119	
Species:	SAL	
Water Type:	S	
Weight (site average):	≥750g	
Weight (affected population average):	4.3kg	
Age:	2016 Q3 & Q4	
Estimated number of fish lost:		
Additional information:	Vet visited.	
MS action:	Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.	

Note that according to the Scotland's Aquaculture database, 265,069 kg - that's 265 tonnes - of mortalities came from Marine Harvest's salmon farm at Tabhaigh in Loch Erisort in August 2017.

[2] Scottish Parliamentary question and answer in May 2017:

SCOTTISH PARLIAMENT

WRITTEN ANSWER

15 May 2017

Index Heading: Economy

Donald Cameron (Highlands and Islands) (Scottish Conservative and Unionist Party): To ask the Scottish Government what information it has on how many mortalities of salmon there have been due to the use of mechanical lice treatments on salmon farms in each year since 2007.

S5W-08947

Fergus Ewing:

Information regarding fish farm mortality is collected as part of fish health inspections conducted by Marine Scotland's fish health inspectorate. Case information is published here: http://www.gov.scot/Topics/marine/Fish-Shellfish/FHI/CaseInformation

In 2014 the Ministerial Group for Sustainable Aquaculture Farmed Fish Health and Welfare Working Group recommended that mortality over certain thresholds be reported to Marine Scotland's fish health inspectorate. Mortality thresholds were incorporated into the voluntary Code of Good Practice for Scottish Finfish Aquaculture in 2015. The following information provides details of fish mortalities which were reported to the fish health inspectorate and included mechanical lice treatment as one of the reasons for mortality.

Year	Total Mortality
2015	0
2016	115,950
2017	18,995

SCOTTISH GOVERNMENT

Mortality events [reported by the Scottish Salmon Company in 2017] include eight cases involving 90,000 dead salmon due to using a Hydrolicer:

Site Name	Start date:	End date:	Mortality rate recorded(%):	If explained, select reason(s):	Total mortality during event	Additional information (e.g. action taken):
Druimyeon Bay	13/11/2017	19/11/2017	8.69	post treatment hydrolicer losses, handling, CMS.	45089	further hydroliser treatment planned, fish on functional feed, harvesting.
Druimyeon Bay	06/11/2017	12/11/2017	4.44	post treatment hydrolicer losses.	25607	further hydroliser treatment planned, fish on functional feed.
Sgian Dubh	11/12/2017	17/12/2017	1.16	Treatment	8737	2 x hydrolicer treatments have resulted in scale loss. Vet attending on 22/12/17.
Sgeir Dughall	05/06/2017	11/06/2017	1.21	Treatment	3864	Hydroliser post-treatment losses,
Sgeir Dughall	19/06/2017	25/06/2017	1.15	Treatment	3229	Hydroliser post-treatment losses
North Uiskevagh	02/10/2017	08/10/2017	1.64	Severe gill health issues, losses post hydrolicer treatment	2,721	Harvesting
Kenmore Loch Torridon	31/07/2017	04/08/2017	1.75	Treatment	1556	Hydrolicer treatment. Harvesting and general handling may have exacerbated mortalities. No action taken, site due to be harvested out by end of August 2017.
Inch Kenneth	25/12/2017	31/12/2017	1.75	Treatment	1,204	Treatment with hydrolicer

Mortality events reported by [Scottish Sea Farms in 2017] include six cases involving over 25,000 dead salmon due to using a Thermolicer:

Site Name	Start date:	End date:	Mortality rate recorded (%):	If explained, select reason(s):	Total mortality during event	Additional information (e.g. action taken):
Nevis C (Ardintigh)	26/06/2017	10/07/2017	1.82	Treatment	5924	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
Nevis B	22/05/2017	28/05/2017	1.81	Treatment	5345	Losses from sea lice treatment with thermolicer, no suspected underlying condition
Nevis A	20/02/2017	26/02/2017	1.58	Treatment	4129	Losses following Thermolicer treatment. Thought to be fish weakend by HSMI.
Nevis B	03/07/2017	17/03/2017	1.45	Treatment	3876	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
South Sound	01/05/2017	07/05/2017	1.06	Treatment	3460	No action taken. Mortality due to treatment with thermolicer. Mortalities reduced significantly the following week
Nevis B	10/07/2017	17/03/2017	1.23	Treatment	3256	Residual diver clearance of pens related to aboveThermolicer treatment on wk27

Mortality events reported by [Marine Harvest in 2017] include three cases involving over 20,000 dead salmon due to using a Thermolicer:

Site Name	Start date	End date	Size of fish	Average weight of affected population	Mortality rate recorded (%)	If explained, select reason(s)	If unexplained, select observations:	Total mortality during event (if applicable)	Additional information (e.g. action taken)
Creag an T'Sagairt (Loch Hourn)	19/06/2017	25/06/2017	≥750g	2.75Kg	1.09	Treatment		9331	Thermolicer
Cairidh	05/01/2017	12/01/2017	≥750g	~3kg	1.3	Treatment		8561	Pen 1 and 2 affected post Thermolicer treatment the rest of the site was not treated
Caolas A Deas	21/08/2017	27/08/2017	≥750g	~4.5Kg	1.89	PGD, Treatment		4663	Thermolicer treatment on one cage. Decided not to treat other cages with thermolicer.

Online via: "[Scottish Salmon's Mort Mountain Leaps Over 10 Million - FOI reveals 2.3 million dead salmon at Marine Harvest farms in 2017]".

Nearly 100,000 farmed salmon were 'Thermoliced' to death by Marine Harvest during 2016:

Environmental news 06.11.16 29

Revealed: how Scottish fish farm cooked thousands of salmon alive

EXCLUSIVE
BY ROS EDWARDS

ONE of the world's largest fish farming companies has accidentally killed more than 175,000 of its caged salmon in Scotland while trying to treat them for lice and disease, according to internal Government memos.

Blunders by Norwegian multinational Marine Harvest have cost millions of pounds and led to more than 600 tonnes of salmon having to be incinerated. The losses have contributed to a 16 per cent drop in the company's Scottish salmon production.

Campaigners have accused Marine Harvest of treating salmon cruelly, and warn that lice and diseases are "choking the Scottish salmon farming industry to death".

The worst incident took place in July and August on a salmon farm in Loch Greshornish on the Isle of Skye. Some 95,400 fish were killed by a new device called a thermolicer, which is designed to rid salmon of the sea lice that plague them.

But the way it does this – by suddenly immersing fish in water much warmer than they are used to – can also kill the fish themselves. What happened on Skye was explained in a memo on September 12 from government officials to Rural Economy Minister Fergus Ewing.

The "sudden temperature change" caused by the thermolicer killed 95 per cent of the lice but also caused "significant mortalities" among the salmon, it said. Officials estimated that the losses cost Marine Harvest more than £2.7 million.

"This report highlights the ongoing difficulties and costs faced by industry with regards to sea-lice management," concluded the memo, which was released under Freedom of Information law.

Another 26,000 salmon were killed at Loch Greshornish fish farm by other attempts to rid them of sea lice using chemicals. There are concerns that lice are becoming increasingly resistant to chemical treatment.

In a second memo to Ewing on September 26, officials revealed more incident deaths, this time at a Marine Harvest fish farm in Seay Sound off the Isle of Harris. Earlier that month 60,000 salmon had been killed by hydrogen peroxide used to treat them for amoebic gill disease.

In the last few months, Marine Harvest fish farms in the Hebrides and Wester Ross have suffered a series of outbreaks of gill disease. Hundreds of thousands of dead fish have reportedly been transported to Wigan, near Manchester, to be incinerated.

According to the company's latest quarterly report to investors, its production of salmon in Scotland has dropped by 16 per cent since last year. Costs increased due to "incident-based mortality" that was "mainly related to gill disease and sea-lice treatment losses," the report said.

On October 28, the fish farming industry launched a plan to double its business from £1.8 billion this year to £3.6bn by 2030. The plan was backed by Ewing, who promised to set up an "industry leadership group".

But the ambition has been derided by anti-fish farm campaigners. "With lice infestation and gill disease already plaguing salmon farming, this is sheer lunacy," said Don Staniford, director of the Global Alliance Against Industrial Aquaculture.

It was Staniford who obtained the Government memos revealing the accidental deaths. "That Marine Harvest is desperate enough to resort to a decidedly dodgy thermolicer shows how deep-rooted the industry's disease problems are," he said.

The animal welfare group, Compassion in World Farming, described the thermolicers as "a very brutal form of treatment which clearly causes distress and suffering to the fish". It currently opposes its commercial use.

"Killing fish by overheating, whether accidental or not, is simply inhumane," said the group's chief executive, Philip Lymbery.

The Green MSP Mark Ruskell has lodged a parliamentary question asking for a list of fish farming incidents over the last two years.

Marine Harvest pointed out that the salmon killed in the "unfortunate" thermolicer incident had been weakened by gill disease. "We regret any loss of fish and are always mindful of the welfare of the fish and aim to continuously improve our methods to address changing environmental circumstances," said the company's manager Steve Bracken.

"We have also faced challenges with amoebic gill disease, which is increasing in this part of the world as a result of climate change."

According to the Scottish Salmon Producers' Organisation, "unexpected incidents" can happen with new treatment technology.

"Any growth will be achieved responsibly and sustainably," said chief executive Scott Landsburgh.

The Scottish Government welcomes new ways of dealing with sea lice that avoided the use of medicines.

"Industry is undertaking research with a number of partners to improve the effectiveness of these innovative treatments and enhance their reliability so that they do not cause accidental killing of fish," said a spokesperson.

Lice infestation and gill deseases are plaguing salmon fish farms owned by companies like Norway's Marine Harvest which has operations all over the Western Isles

Photograph: PA/ David Cheskin

Read more via "[Thermolicer' Back-Fires Killing 95,400 Farmed Salmon]"; [Fish farm firm kills 175,000 salmon by accident]; "[Oops: fish farm firm kills 175,000 of its salmon by accident]" and "[Thousands of fish poached alive in lice treatment bungle]"

A Thermolicer treatment caused the deaths of 5,794 salmon at Grieg Seafood Shetland's North Havra site in November 2016:

THE PRESS AND JOURNAL
Tuesday, January 17, 2017

Thermal treatment for lice blamed for salmon deaths

Fish farming: New 'Thermolicer' method under spotlight as 6,000 fish die

BY KEITH FINDLAY

Innovative technology used to combat the scourge of sea lice on Scottish salmon farms has been blamed for the deaths of nearly 6,000 fish at a site in Shetland.

The salmon at North Havra, operated by Norwegian-owned Grieg Seafood Shetland (GSS), were given the Thermolicer hot water treatment.

But instead of just eradicating any sea lice, the process killed 5,794 fish and led to Grieg launching an investigation into the "unexpected mortality".

"We had some unexpected mortality during the procedure"

According to salmon farming arch-critic Don Staniford, the Thermolicer system – developed in Norway – is behind tens of thousands of deaths on fish farms around Scotland.

"The Thermolicer sucks and kills," Mr Staniford said yesterday, adding: "This is the second known lethal incident in Scotland after only six months of operation, with other mass mortalities reported in Norway."

GSS managing director Grant Cumming said: "Grieg Seafood Shetland is using many alternative methods of treating lice.

"We use these new and alternative treatments as part of our integrated pest management strategy in order to reduce the reliance on traditional medicines.

"This is important to minimise our impact on the environment and to maximise the working life of the medicines by guarding against resistance, while at the same time ensuring our salmon have a good quality of life free from sea lice infection.

"The salmon at North Havra were treated using a Thermolicer hot water treatment. Unfortunately we had some unexpected mortality during the procedure."

Mr Cumming added: "We have investigated the reasons behind the event and have altered our procedures to minimise the risk of it reoccurring."

The Thermolicer works by gently crowding and pumping fish through the machine, where they are exposed to an elevated temperature of a maximum of 34C for 25 to 30 seconds.

Because sea lice have a low tolerance to temperature change, the warmer water kills them.

Responding to national media reports of thousands of fish being "poached alive" at one of its Scottish fish farms last year, industry giant Marine Harvest said the stories were a "gross exaggeration and completely misleading".

It added: "The Thermolicer has been rigorously tested over a nine-year period and is recommended by the Norwegian Veterinary Institute. The machine has safely treated hundreds of thousands of tonnes of salmon in Norway and Scotland.

"It is extremely regrettable we lost fish at Gresbornish which we believe was the result of treating fish that had been weakened from other treatments, particularly for amoebic gill disease, in the preceding two months.

"The Gresbornish experience has understandably raised much internal and external discussion. In particular, it highlights the fine line in judgment required on how and when we treat our fish stocks. We aim to prevent this happening again by raising awareness with staff and increased training."

SOMETHING FISHY: Reports of salmon being 'poached alive' are a 'gross exaggeration' say Marine Harvest

Read more via "Thermal treatment for lice blamed for salmon deaths" and "Treatment leads to morts in Shetland"

[3] A research project by the Norwegian Food Safety Authority (Mattilsynet) is investigating the use of the Thermolicer in Norwegian salmon farming:

Forsøksdyr: Effekt av avlusingstemperatur på velferd til laks

Godkjenningsdato 25.11.2016 Skriv ut Del denne siden

Prosjektbeskrivelse:
Undersøkelsene sikter på å utrede om selve varmebehandlingen som laksen opplever i en thermolicer er i overensstemmelse med gjeldende reglement for dyrevelferd hos oppdrettsfisk. Bruk av thermolicer har vist en del varierende resultater mht velferd/overlevelse. Noe av denne variasjonen kan skyldes tid på året, og en annen faktor kan være sykdomshistorie. I thermoliceren utsettes laksen for både temperatursjokk og mekanisk belastning. I denne utredningen ønsker vi å fokusere på, og isolere effekten av temperaturøkningen. Verdiene som temperatur og eksponeringstid legges nært inn til det som i dag brukes i avlusing. Fisken vil bli holdt levende etter behandlingen for å se på langtidseffekter på blodparametre og hud/gjeller

The Fish Site reported in May 2018 via 'Study questions fish welfare in thermal delousing':

Immersing farmed salmon in warmed water as a means of removing sea lice presents serious fish health and welfare issues according to a new study.

The authors of the study, which was led by researchers at Pharmaq Analytiq, suggested that "a better regulatory framework for mechanical treatment of fish in general" is needed and "the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish."

Mechanical treatments that use warm water to remove lice, such as Thermolicers, have been widely adopted by the salmon farming industry – in particularly in Norway and Scotland – and have been shown to remove over 95 percent of the parasites. They have been increasingly popular at a time when a number of therapeutants against sea lice are losing their efficacy, or their use is being limited by regulations.

Cooke Aquaculture has recently acquired a Thermolicer for its operations on the east coast of Canada

However, as the researchers note, high mortality and serious lesions associated with thermal sea lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage.

The new paper – which was published in the *Norsk veterinærtidsskrift* journal – does, the authors argue, demonstrate "beyond doubt that fish can feel pain and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage."

Here's the English summary of the paper referred to above:

ENGLISH SUMMARY

High mortality and serious lesions associated with thermal sea-lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage. It is demonstrated beyond doubt that fish can feel pain

and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage.

The present documentation of thermal sea-lice treatment on welfare is in the opinion of the authors based on a weak scientific basis and not calibrated for the use in field situations. Furthermore, a better regulatory framework for mechanical treatment of fish in general is called upon. It is concluded that the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish.

In January 2018, a Norwegian veterinarian also warned:

A fish vet has highlighted major head injuries she has seen to fish treated with warm water delousing machinery.

By Linn Therese Skår Hosteland

Kristin Ottesen, of Norwegian firm HaVet,
addressed lice treatment with warm water and
the Thermolicer or Optilicer, during the Fisheries and Aquaculture Industry Research Fund (FHF) conference "Prevention and Control of Lice" in Trondheim.

"No matter what non-drug method you use for delousing, it kills. Same if it's Skamik, FLS, Thermolicer and Optilice. Both the method and the logistics," Ottesen began.

She noted that temperatures of 30-34 degrees that are lukewarm for humans can be searing for farmed salmon.

'Hear the fish panic'

"But we do not know. When you stand with these machines you can still hear that something happens. One can hear that the fish panic. So the thoughts around this are not from out of the blue," she said.

She says they often see apparently healthy fish that just die after treatment, without finding the fish.

"But is it [the fish] fine? Are we looking for the right things when we look at the fish afterwards?" she asked, adding that surviving fish are not necessarily OK.

"Especially 12 to 24 hours after treatment. You will begin to see 'spare tyres' around the eyes and fluid collections in the palate after warm water treatment. This seeps in gradually. Fish farmers often say they see unconscious and lethargic fish."

Bleeding around the brain

Ottesen said that after opening such fish, she saw large bleeding around the brain and the palate of some of the fish.

"Classically, we are coming to a farm that says they have had some mortality, but are satisfied."

What farmers classify as satisfactory mortality, she adds, ranges from maybe 0.2% to 3%.

"A few weeks later we come to the same farm and see that the fish are falling and there are some sick fish. They look wrong, the eyes of the fish look strange."

Also, on fish that look fine two weeks after treatment, she finds major bleeding in the head region.

Stress-induced damage

"The fish health service has tried to document the trends in this, and the analysis companies they work with conclude that there have been major acute injuries in the head region, which can't be explained by anything other than the lice treatment.

"I see a lot of stress-induced damage to the fish after these treatments in addition to handling. I think we should think about how to build these machines. Is warm water treatment safe? It's something we must ask ourselves."

She says that as a fish health worker she has also fought a hard battle to know what the farmers treat the fish in, besides that it is hot water.

Read in full via "Vet warns of head injury risk to fish during delousing"

Scottish Salmon Watch concurs with the statement by Philip Lymbery, Chief Executive of Compassion in World Farming, in November 2016:

COMPASSION in world farming

Factory farming | Farm animals | Take action | Donate

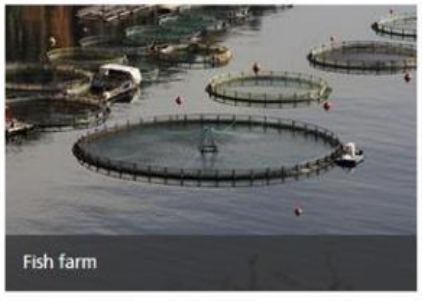
Our mission is to end factory farming

Philip Lymbery, Compassion CEO

ABOUT PHILIP | BOOKS | BLOG | GUEST ARTICLES | SPEAKING DATES

PHILIP LYMBERY › BLOG › 2016 › 11 › SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS

SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS



Fish farm

Reports that Scottish salmon farms have killed tens of thousands of fish accidentally by overheating them have sent shockwaves through an industry already under fire for shooting seals.

Seals are all too often shot as part of 'predator control' around intensive fish farms that are effectively factory farms in the sea.

Now nearly a hundred thousand salmon are reported to have been killed after the use of a new device, the 'thermolicer'. The device was used in the latest desperate bid to rid intensively farmed fish from lice, a parasite infestation which is inevitable when so many fish are crammed in a confined space.

Welcome

"Compassion in World Farming campaigns to end factory farming. My book, Farmageddon, explodes the myths behind our broken food system and sets out an alternative vision that will benefit animals, people and the countryside."

Philip Lymbery

Information from the Scottish Government, received following a Freedom of Information request by the Global Alliance Against Industrial Aquaculture (GAAIA), reveals that 95,000 fish died on a single Scottish fish farm following the use of a thermolicer.

The thermolicer procedure involves crowding the fish used to the cold coastal waters of Scotland, pumping them into heated water and then dumping them back into their seawater cages. Salmon would never normally experience such sudden temperature changes. Little wonder that so many seem to have died as a result.

Killing fish by overheating, whether accidental or not, is simply inhumane.

The use of rough handling and heat treatment to tackle problems of sea lice is unacceptable on welfare grounds.

Moreover:

Here's Compassion in World Farming's scientific assessment of the Thermolicer prepared by Phil Brooke (Scientific Manager - research and education):

Thermolicer:

Scientific Assessment by Compassion in World Farming (6 November 2016)

The Thermolicer appears to be a brutal treatment which has not been subjected to a full and proper welfare assessment. It involves a series of steps which are inherently stressful and will cause poor welfare to the fish.

1. The salmon are crowded in a net
2. They are pumped in water through a tube into a boat with the Thermolicer on board
3. They are taken out of water – the dewaterer is a metal grid which lets the water through. They bounce along a metal grid into the treatment water
4. They then pass into seawater heated to 30-34 degrees centigrade. Salmon would never normally experience sudden temperature changes like this
5. Finally, they are pumped back into their seawater cage

Improved design and management could reduce this stress but cannot be expected to eliminate it.

Background information

We have seen one report from the Norwegian Veterinary Institute ("Thermal de-licing of salmonid fish - documentation of fish welfare and effect") which documented statistically significant increases in:

- snout injury following treatment. It is suggested that this should be caused by the effects of crowding the fish before pumping onto the Thermolicer vessel
- fin damage
- scale damage following treatment on one of the sites
- cataracts on one site 3 weeks after treatment

[4] A statement by Marine Harvest in November 2016 included:

We wish to clarify the position in response to a recent article "Poached alive – fish die as farm overheats water" which appeared in The Telegraph (19th November) and subsequently in the Mail on Line.

The Telegraph article was based on a story in The Sunday Herald the week before based on a Freedom of Information enquiry made by them.

Our fish were most definitely not poached alive or boiled alive as these stories state. This is gross exaggeration and completely misleading.

Attached is a background note on how the Thermolicer operates which explains fish are only ever exposed to an elevated temperature of a maximum of 34^0C for 25 to 30 seconds.

BACKGROUND TO THE THERMOLICER

The Thermolicer is a machine for commercial scale dip or bath treatment to remove sea lice from farmed salmon.

Salmon are gently crowded and pumped into the machine where they pass through the processing loop in 25–30 seconds from where they can then be returned to the same pen or an empty pen. The treatment water has a temperature of 30–34^{0} C, depending on the ambient sea temperature, and because sea lice have a low tolerance to temperature change the higher water temperature will kill the lice. The treatment water is then filtered, aerated, oxygenated and reused in the system.

Read in full via "Clarification on Salmon Mortality"

Cross-Party Group on Animal Welfare
Scottish Parliament
Holyrood Road
Edinburgh
EH99 SP

17 May 2018

Welfare Concerns of Scottish Salmon Farming
- Thermoliced to Death: Breach of the Animal Health & Welfare (Scotland) Act 2006?

Scottish Salmon Watch is pleased that 'Farmed Fish' is on the agenda of your meeting on 5 June 2018. As background for that discussion you may wish to read our written submission - 'Hard Evidence: Dossier of Data on Lice, Diseases & Mortalities at Scottish Salmon Farms' - to the Scottish Parliament's salmon farming inquiry.

Compassion In World Farming's written submission to the Rural Economy & Connectivity Committee's ongoing salmon farming inquiry also included specific reference to welfare concerns regarding the 'Thermolicer' (effectively a heated washing machine for farmed salmon infected with lice).

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

One Kind's written submission to the Environment, Climate Change and Land Reform Committee's salmon farming inquiry in February 2018 also included reference to deaths due to the Thermolicer:

Treatment of parasites and diseases

As well as impacting the environment, treatment of parasites and diseases can have a detrimental impact on fish welfare. FOI data[8] shows that "treatment" was the most frequently cited reason for the cause of mortality events between January 2016 and September 2017. The below table highlights four treatments that have compromised fish welfare.

Treatment	Method	Welfare Concern	Example
Thermolicer	Uses warm water to remove sea lice.	The warm water may cause severe harm, or death, to the fish.	In 2016, 95,000 fish were killed during the use of thermolicer[9]
Azamethiphos (Salmosan®)	Fish are exposed to Salmosan® using a bath treatment.	Bath treatments require crowding, which can cause stress. Salmosan® has been shown to cause fish balance problems[10].	Salmosan® was listed as a cause of mortality when over 30,000 salmon died on one site[11].
Hydrogen Peroxide	Exposed using a bath treatment.	Using a chemical irritant compromises the welfare of fish. It can cause them stress[12], often to the point that the fish die.	More than 60,000 salmon were killed during treatment for amoebic gill disease[13]
SkaMic	Using brushes and soft jets of water to remove sea lice.	Can harm and remove the scales of fish.	On one site, fish were descaled following the use of SkaMic[14].

Any debate over the use of treatments for diseases and parasites should therefore include consideration of the welfare implications of such treatment, with the aim of minimising suffering.

Scottish Salmon Watch's written submission to the RECC's salmon farming inquiry in March 2018 included:

Other data on mortalities include this 'Mortality Event Report' obtained by GAAIA from the Scottish Government via FOI detailing 60,000 morts at Marine Harvest's Soay farm in 2016 due to hydrogen peroxide treatment for Amoebic Gill Disease:

Mortality Event Report

Site Name: Soay

Site No: FS0646

Start date of mortality: week 37

Period of mortality: Weekly

Percentage mortality: 60,000 (13%), Post hydrogen peroxide treatment for AGD

Reason (if explained): «If_explained_select_reasons»

Company: Marine Harvest Scotland - FB0119

Species: SAL

Water Type: SW

Weight (site average): 2.5 kg

Weight (affected population average): 2.5 kg

Age: 2016 Q4

Estimated number of fish lost: 60,000

Additional information: Mortalities have dropped to double figures per cage, a further H_2O_2 treatment is planned for coming weeks.

MS action: PSI conducted and site inspection to be scheduled.

Nearly 100,000 farmed salmon were 'Thermoliced' to death by Marine Harvest during 2016:

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Revealed: how Scottish fish farm cooked thousands of salmon alive

EXCLUSIVE
BY ROB EDWARDS

ONE of the world's largest fish farming companies has accidentally killed more than 175,000 of its caged salmon in Scotland while trying to treat them for lice and disease, according to internal Government memos.

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The worst incident took place in July and August on a salmon farm in Loch Gresbornish on the Isle of Skye. Some 95,400 fish were killed by a new device called a thermolicer, which is designed to rid salmon of the sea lice that plague them.

But the way it does this – by suddenly immersing fish in water much warmer than they are used to – can also kill the fish themselves. What happened on Skye was explained in a memo on September 12 from government officials to Rural Economy Minister Fergus Ewing.

The "sudden temperature change" caused by the thermolicer killed 99 per cent of the lice but also caused "significant mortalities" among the salmon, it said. Officials estimated that the losses cost Marine Harvest more than £2.7 million.

"This report highlights the ongoing difficulties and costs faced by industry with regards to sea-lice management," concluded the memo, which was released under Freedom of Information law.

Another 26,000 salmon were killed at Loch Greshornish fish farm by other attempts to rid them of sea lice using chemicals. There are concerns that lice are becoming increasingly resistant to chemical treatment.

In a second memo to Ewing on September 26, officials revealed more inadvertent deaths, this time at a Marine Harvest fish farm in Soay Sound off the Isle of Harris. Earlier that month 60,000 salmon had been killed by hydrogen peroxide used to treat them for amoebic gill disease.

In the last few months, Marine Harvest fish farms in the Hebrides and Wester Ross have suffered a series of outbreaks of gill disease. Hundreds of thousands of dead fish have reportedly been transported to Wigan, near Manchester, to be incinerated.

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On October 28, the fish farming industry launched a plan to double its business from £1.8 billion this year to £3.6bn by 2030. The plan was backed by Ewing, who promised to set up an "industry leadership group".

But the ambition has been derided by anti-fish farm campaigners. "With lice infestation and gill diseases already plaguing salmon farming, this is sheer lunacy," said Don Staniford, director of the Global Alliance Against Industrial Aquaculture.

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"Killing fish by overheating, whether accidental or not, is simply inhumane," said the group's chief executive, Philip Lymbery.

The Green MSP Mark Ruskell has lodged a parliamentary question asking for a list of fish farming incidents over the last two years.

Marine Harvest pointed out that the salmon killed in the "unfortunate" thermolicer incident had been weakened by gill disease. "We regret any loss of fish and are always mindful of the welfare of the fish and aim to continuously improve our methods to address changing environmental circumstances," said the company's manager Steve Bracken.

"We have also faced challenges with amoebic gill disease, which is increasing in this part of the world as a result of climate change."

According to the Scottish Salmon Producers' Organisation, "unexpected incidents" can happen with new treatment technology.

"Any growth will be achieved responsibly and sustainably," said chief executive Scott Landsburgh.

The Scottish Government welcomes new ways of dealing with sea lice that avoided the use of medicines.

"Industry is undertaking research with a number of partners to improve the effectiveness of these innovative treatments and enhance their reliability so that they do not cause accidental killing of fish," said a spokesperson.

Lice infestation and gill deseases are plaguing salmon fish farms owned by companies like Norway's Marine Harvest which has operations all over the Western Isles

Photograph: PA/ David Cheskin

Read more via "'Thermolicer' Back-Fires Killing 95,400 Farmed Salmon"; Fish farm firm kills 175,000 salmon by accident; "Oops: fish farm firm kills 175,000 of its salmon by accident" and "Thousands of fish poached alive in lice treatment bungle"

A Thermolicer treatment caused the deaths of 5,794 salmon at Grieg Seafood Shetland's North Havra site in November 2016:

THE PRESS AND JOURNAL
Tuesday, January 17, 2017

Thermal treatment for lice blamed for salmon deaths

Fish farming: New 'Thermolicer' method under spotlight as 6,000 fish die

BY KEITH FINDLAY

Innovative technology used to combat the scourge of sea lice on Scottish salmon farms has been blamed for the deaths of nearly 6,000 fish at a site in Shetland.

The salmon at North Havra, operated by Norwegian-owned Grieg Seafood Shetland (GSS), were given the Thermolicer hot water treatment.

But instead of just

"We had some unexpected mortality during the procedure"

eradicating any sea lice, the process killed 5,794 fish and led to Grieg launching an investigation into the "unexpected mortality".

According to salmon farming arch-critic Don Staniford, the Thermolicer system – developed in Norway – is behind tens of thousands of deaths on fish farms around Scotland.

"The Thermolicer sucks and kills," Mr Staniford said yesterday, adding: "This is the second known lethal incident in Scotland after only six months of operation, with other mass mortalities reported in Norway."

GSS managing director Grant Cumming said: "Grieg Seafood Shetland is using many alternative methods of treating lice.

"We use these new and alternative treatments as part of our integrated pest management strategy in order to reduce the reliance on traditional medicines.

"This is important to minimise our impact on the environment and to maximise the working life of the medicines by guarding against resistance, while at the same time ensuring our salmon have a good quality of life free from sea lice infection.

"The salmon at North Havra were treated using a Thermolicer hot water treatment. Unfortunately we had some unexpected mortality during the procedure."

Mr Cumming added: "We have investigated the reasons behind the event and have altered our procedures to minimise the risk of it reoccurring."

SOMETHING FISHY: Reports of salmon being 'poached alive' are a 'gross exaggeration' say Marine Harvest

The Thermolicer works by gently crowding and pumping fish through the machine, where they are exposed to an elevated temperature of a maximum of 34C for 25 to 30 seconds.

Because sea lice have a low tolerance to temperature change, the warmer water kills them.

Responding to national media reports of thousands of fish being "poached alive" at one of its Scottish fish farms last year, industry giant Marine Harvest said the stories were a "gross exaggeration and completely misleading".

It added: "The Thermoliser has been rigorously tested over a nine-year period and is recommended by the Norwegian Veterinary Institute. The machine has safely treated hundreds of thousands of tonnes of salmon in Norway and Scotland.

"It is extremely regrettable we lost fish at Gresbornish which we believe was the result of treating fish that had been weakened from other treatments, particularly for amoebic gill disease, in the preceding two months.

"The Gresbornish experience has understandably raised much internal and external discussion. In particular, it highlights the fine line in judgment required on how and when we treat our fish stocks. We aim to prevent this happening again by raising awareness with staff and increased training."

Read more via "Thermal treatment for lice blamed for salmon deaths" and "Treatment leads to morts in Shetland"

Mortality events reported by the Scottish Salmon Company in 2017 include eight cases involving 90,000 dead salmon due to using a Hydrolicer:

Site Name	Start date:	End date:	Mortality rate recorded(%):	If explained, select reason(s):	Total mortality during event	Additional information (e.g. action taken):
Druimyeon Bay	13/11/2017	19/11/2017	8.69	post treatment hydrolicer losses, handling, CMS.	45089	further hydroliser treatment planned, fish on functional feed, harvesting.
Druimyeon Bay	06/11/2017	12/11/2017	4.44	post treatment hydrolicer losses.	25607	further hydroliser treatment planned, fish on functional feed.
Sgian Dubh	11/12/2017	17/12/2017	1.16	Treatment	8737	2 x hydrolicer treatments have resulted in scale loss. Vet attending on 22/12/17.
Sgeir Dughall	05/06/2017	11/06/2017	1.21	Treatment	3864	Hydroliser post-treatment losses,
Sgeir Dughall	19/06/2017	25/06/2017	1.15	Treatment	3229	Hydroliser post-treatment losses
North Uiskevagh	02/10/2017	08/10/2017	1.64	Severe gill health issues, losses post hydrolicer treatment	2,721	Harvesting
Kenmore Loch Torridon	31/07/2017	04/08/2017	1.75	Treatment	1556	Hydrolicer treatment. Harvesting and general handling may have exacerbated mortalities. No action taken, site due to be harvested out by end of August 2017.

Inch Kenneth	25/12/2017	31/12/2017	1.75	Treatment	1,204	Treatment with hydrolicer

Mortality events reported by Scottish Sea Farms in 2017 include six cases involving over 25,000 dead salmon due to using a Thermolicer:

Site Name	Start date:	End date:	Mortality rate recorded (%):	If explained, select reason(s):	Total mortality during event	Additional information (e.g. action taken):
Nevis C (Ardintigh)	26/06/2017	10/07/2017	1.82	Treatment	5924	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
Nevis B	22/05/2017	28/05/2017	1.81	Treatment	5345	Losses from sea lice treatment with thermolicer, no suspected underlying condition
Nevis A	20/02/2017	26/02/2017	1.58	Treatment	4129	Losses following Thermolicer treatment. Thought to be fish weakend by HSMI.
Nevis B	03/07/2017	17/03/2017	1.45	Treatment	3876	Losses arising during sealice treatment using Thermolicer. No underlying condition suspected.
South Sound	01/05/2017	07/05/2017	1.06	Treatment	3460	No action taken. Mortality due to treatment with thermolicer. Mortalities reduced significantly the following week
Nevis B	10/07/2017	17/03/2017	1.23	Treatment	3256	Residual diver clearance of pens related to aboveThermolicer treatment on wk27

Mortality events reported by Marine Harvest in 2017 include three cases involving over 20,000 dead salmon due to using a Thermolicer:

Site Name	Start date	End date	Size of fish	Average weight of affected population	Mortality rate recorded (%)	If explained, select reason(s)	If unexplained, select observations:	Total mortality during event (if applicable)	Additional information (e.g. action taken)
Creag an TSagairt (Loch Hourn)	19/06/2017	25/06/2017	≥750g	2.75Kg	1.09	Treatment		9331	Thermolicer
Cairidh	05/01/2017	12/01/2017	≥750g	~3kg	1.3	Treatment		8561	Pen 1 and 2 affected post Thermolicer treatment the rest of the site was not treated
Caolas A Deas	21/08/2017	27/08/2017	≥750g	~4.5Kg	1.89	PGD, Treatment		4663	Thermolicer treatment on one cage. Decided not to treat other cages with thermolicer.

Online via: "Scottish Salmon's Mort Mountain Leaps Over 10 Million - FOI reveals 2.3 million dead salmon at Marine Harvest farms in 2017".

A Parliamentary Question from Donald Cameron also provided the following information:

SCOTTISH PARLIAMENT

WRITTEN ANSWER

15 May 2017

Index Heading: Economy

Donald Cameron (Highlands and Islands) (Scottish Conservative and Unionist Party): To ask the Scottish Government what information it has on how many mortalities of salmon there have been due to the use of mechanical lice treatments on salmon farms in each year since 2007.

S5W-08947

Fergus Ewing:

Information regarding fish farm mortality is collected as part of fish health inspections conducted by Marine Scotland's fish health inspectorate. Case information is published here: http://www.gov.scot/Topics/marine/Fish-Shellfish/FHI/CaseInformation

In 2014 the Ministerial Group for Sustainable Aquaculture Farmed Fish Health and Welfare Working Group recommended that mortality over certain thresholds be reported to Marine Scotland's fish health inspectorate. Mortality thresholds were incorporated into the voluntary Code of Good Practice for Scottish Finfish Aquaculture in 2015. The following information provides details of fish mortalities which were reported to the fish health inspectorate and included mechanical lice treatment as one of the reasons for mortality.

Year	Total Mortality
2015	0
2016	115,950
2017	18,995

SCOTTISH GOVERNMENT

You can read more via a "Thermolicer Backgrounder"

The Cross-Party Group on Animal Welfare may wish to lodge a Parliamentary Question requesting data on Thermolicer deaths during the whole of 2017 (Donald Cameron MSP's question was filed in May 2017 so obviously missed a mountain of mortalities) and thus far in 2018?

Another question which the deaths and flagrant abuse of animal welfare on Scottish salmon farms raises is whether a prosecution could be made via the Animal Health and Welfare (Scotland) Act 2006?

Looking at the legislation is seems clear that given the suffering on Scottish salmon farms and mass mortalities that a strong case against 'Unnecessary Suffering' and 'Cruel Operations' could be made. Indeed, even the most rabidly pro-salmon farming MSP would struggle to argue that forcing lice-infested salmon through a heated torture chamber such as the Thermolicer is 'normal behaviour':

Prevention of harm

19 Unnecessary suffering

(1) A person commits an offence if—

(a) the person causes a protected animal unnecessary suffering by an act, and

(b) the person knew, or ought reasonably to have known, that the act would have caused the suffering or be likely to do so.

(2) A person who is responsible for an animal commits an offence if—

(a) the person causes the animal unnecessary suffering by an act or omission, and

(b) the person knew, or ought reasonably to have known, that the act or omission would have caused the suffering or be likely to do so.

(3) A person ("person A") who is responsible for an animal commits an offence if—

(a) another person causes the animal unnecessary suffering by an act or omission, and

(b) person A—

(i) permits that to happen, or

(ii) fails to take such steps (whether by way of supervising the other person or otherwise) as are reasonable in the circumstances to prevent that happening.

(4) The considerations to which regard is to be had in determining, for the purposes of subsections (1) to (3), whether suffering is unnecessary include—

(a) whether the suffering could reasonably have been avoided or reduced,

(b) whether the conduct concerned was in compliance with any relevant enactment or any relevant provisions of a licence or code of practice issued under an enactment,

(c) whether the conduct concerned was for a legitimate purpose, for example—

(i) the purpose of benefiting the animal, or

(ii) the purpose of protecting a person, property or another animal,

(d) whether the suffering was proportionate to the purpose of the conduct concerned,

(e) whether the conduct concerned was in the circumstances that of a reasonably competent and humane person.

21 Cruel operations

(1) A person commits an offence if the person performs an operation on a protected animal without due care and humanity.

(2) A person ("person A") who is responsible for an animal commits an offence if—

(a) another person performs an operation on the animal without due care and humanity, and

(b) person A—

(i) permits that to happen, or

(ii) fails to take such steps (whether by way of supervising the other person or otherwise) as are reasonable in the circumstances to prevent that happening.

Promotion of welfare

24 Ensuring welfare of animals

(1) A person commits an offence if the person does 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.

(2) The circumstances to which, for the purposes of subsection (1), regard is to be had include—

(a) any lawful purpose for which the animal is kept,

(b) any lawful activity undertaken in relation to the animal.

(3) For the purposes of subsection (1), an animal's needs include—

(a) its need for a suitable environment,

(b) its need for a suitable diet,

(c) its need to be able to exhibit normal behaviour patterns,

(d) any need it has to be housed with, or apart from, other animals,

(e) its need to be protected from suffering, injury and disease.

The Cross-Party Group on Animal Welfare should be aware of ongoing research in Norway which is raising worrying conclusions with regard to the welfare problems caused by the Thermolicer.

A research project by the Norwegian Food Safety Authority (Mattilsynet) is investigating the use of the Thermolicer in Norwegian salmon farming:

Forsøksdyr: Effekt av avlusingstemperatur på velferd til laks

Godkjenningsdato 25.11.2016 Skriv ut Del denne siden

Prosjektbeskrivelse:
Undersøkelsene sikter på å utrede om selve varmebehandlingen som laksen opplever i en thermolicer er i overensstemmelse med gjeldende reglement for dyrevelferd hos oppdrettsfisk. Bruk av thermolicer har vist en del varierende resultater mht velferd/overlevelse. Noe av denne variasjonen kan skyldes tid på året, og en annen faktor kan være sykdomshistorie. I thermoliceren utsettes laksen for både temperatursjokk og mekanisk belastning. I denne utredningen ønsker vi å fokusere på, og isolere effekten av temperaturøkningen. Verdiene som temperatur og eksponeringstid legges nært inn til det som i dag brukes i avlusing. Fisken vil bli holdt levende etter behandlingen for å se på langtidseffekter på blodparametre og hud/gjeller

The Cross-Party Group on Animal Welfare may wish to ask the Norwegian Food Safety Authority for an update on this project and it may wish to reach out to MPs in Norway who have similar concerns.

The Fish Site reported in May 2018 via 'Study questions fish welfare in thermal delousing':

Immersing farmed salmon in warmed water as a means of removing sea lice presents serious fish health and welfare issues according to a new study.

The authors of the study, which was led by researchers at Pharmaq Analytiq, suggested that "a better regulatory framework for mechanical treatment of fish in general" is needed and "the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish."

Mechanical treatments that use warm water to remove lice, such as Thermolicers, have been widely adopted by the salmon farming industry – in particularly in Norway and Scotland – and have been shown to remove over 95 percent of the parasites. They have been increasingly popular at a time when a number of therapeutants against sea lice are losing their efficacy, or their use is being limited by regulations.

Cooke Aquaculture has recently acquired a Thermolicer for its operations on the east coast of Canada

However, as the researchers note, high mortality and serious lesions associated with thermal sea lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage.

The new paper – which was published in the *Norsk veterinærtidsskrift* journal – does, the authors argue, demonstrate "beyond doubt that fish can feel pain and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage."

Here's the English summary of the paper referred to above:

ENGLISH SUMMARY

High mortality and serious lesions associated with thermal sea-lice treatments are of concern in the aquaculture industry. Lesions most commonly observed include gill haemorrhage, scale and skin loss, haemorrhage and vacuolation of thymic tissue, degeneration of nasal epithelium and brain haemorrhage. It is demonstrated beyond doubt that fish can feel pain

and that the temperatures used during thermal de-lousing (28-34 °C) are most likely painful to the fish. This pain will also initiate panic reactions where fish are likely to inflict serious self-damage.

The present documentation of thermal sea-lice treatment on welfare is in the opinion of the authors based on a weak scientific basis and not calibrated for the use in field situations. Furthermore, a better regulatory framework for mechanical treatment of fish in general is called upon. It is concluded that the present use and technical solutions for thermal de-lousing are inadequate and likely to cause pain and serious lesions in treated fish.

In January 2018, a Norwegian veterinarian also warned:

A fish vet has highlighted major head injuries she has seen to fish treated with warm water delousing machinery.

By Linn Therese Skår Hosteland

Kristin Ottesen, of Norwegian firm HaVet,
addressed lice treatment with warm water and
the Thermolicer or Optilicer, during the Fisheries and Aquaculture Industry Research Fund (FHF) conference "Prevention and Control of Lice" in Trondheim.

"No matter what non-drug method you use for delousing, it kills. Same if it's Skamik, FLS, Thermolicer and Optilice. Both the method and the logistics," Ottesen began.

She noted that temperatures of 30-34 degrees that are lukewarm for humans can be searing for farmed salmon.

'Hear the fish panic'

"But we do not know. When you stand with these machines you can still hear that something happens. One can hear that the fish panic. So the thoughts around this are not from out of the blue," she said.

She says they often see apparently healthy fish that just die after treatment, without finding the fish.

"But is it [the fish] fine? Are we looking for the right things when we look at the fish afterwards?" she asked, adding that surviving fish are not necessarily OK.

"Especially 12 to 24 hours after treatment. You will begin to see 'spare tyres' around the eyes and fluid collections in the palate after warm water treatment. This seeps in gradually. Fish farmers often say they see unconscious and lethargic fish."

Bleeding around the brain

Ottesen said that after opening such fish, she saw large bleeding around the brain and the palate of some of the fish.

"Classically, we are coming to a farm that says they have had some mortality, but are satisfied."

What farmers classify as satisfactory mortality, she adds, ranges from maybe 0.2% to 3%.

"A few weeks later we come to the same farm and see that the fish are falling and there are some sick fish. They look wrong, the eyes of the fish look strange."

Also, on fish that look fine two weeks after treatment, she finds major bleeding in the head region.

Stress-induced damage

"The fish health service has tried to document the trends in this, and the analysis companies they work with conclude that there have been major acute injuries in the head region, which can't be explained by anything other than the lice treatment.

"I see a lot of stress-induced damage to the fish after these treatments in addition to handling. I think we should think about how to build these machines. Is warm water treatment safe? It's something we must ask ourselves."

She says that as a fish health worker she has also fought a hard battle to know what the farmers treat the fish in, besides that it is hot water.

Read in full via "Vet warns of head injury risk to fish during delousing"

Scottish Salmon Watch certainly agrees with the statement by Philip Lymbery, Chief Executive of Compassion in World Farming, in November 2016:

COMPASSION in world farming

Factory farming | Farm animals | Take action | Donate

Our mission is to end factory farming

Philip Lymbery, Compassion CEO

ABOUT PHILIP | BOOKS | BLOG | GUEST ARTICLES | SPEAKING DATES

PHILIP LYMBERY › BLOG › 2016 › 11 › SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS

SCOTTISH INTENSIVE SALMON FARMING PLUMBS NEW DEPTHS

Fish farm

Reports that Scottish salmon farms have killed tens of thousands of fish accidentally by overheating them have sent shockwaves through an industry already under fire for shooting seals.

Seals are all too often shot as part of 'predator control' around intensive fish farms that are effectively factory farms in the sea.

Now nearly a hundred thousand salmon are reported to have been killed after the use of a new device, the 'thermolicer'. The device was used in the latest desperate bid to rid intensively farmed fish from lice, a parasite infestation which is inevitable when so many fish are crammed in a confined space.

Welcome

"Compassion in World Farming campaigns to end factory farming. My book, Farmageddon, explodes the myths behind our broken food system and sets out an alternative vision that will benefit animals, people and the countryside."

Philip Lymbery

Information from the Scottish Government, received following a Freedom of Information request by the Global Alliance Against Industrial Aquaculture (GAAIA), reveals that 95,000 fish died on a single Scottish fish farm following the use of a thermolicer.

The thermolicer procedure involves crowding the fish used to the cold coastal waters of Scotland, pumping them into heated water and then dumping them back into their seawater cages. Salmon would never normally experience such sudden temperature changes. Little wonder that so many seem to have died as a result.

Killing fish by overheating, whether accidental or not, is simply inhumane.

The use of rough handling and heat treatment to tackle problems of sea lice is unacceptable on welfare grounds.

Moreover:

Here's Compassion in World Farming's scientific assessment of the Thermolicer prepared by Phil Brooke (Scientific Manager - research and education):

Thermolicer:

Scientific Assessment by Compassion in World Farming (6 November 2016)

The Thermolicer appears to be a brutal treatment which has not been subjected to a full and proper welfare assessment. It involves a series of steps which are inherently stressful and will cause poor welfare to the fish.

1. The salmon are crowded in a net
2. They are pumped in water through a tube into a boat with the Thermolicer on board
3. They are taken out of water – the dewaterer is a metal grid which lets the water through. They bounce along a metal grid into the treatment water
4. They then pass into seawater heated to 30-34 degrees centigrade. Salmon would never normally experience sudden temperature changes like this
5. Finally, they are pumped back into their seawater cage

Improved design and management could reduce this stress but cannot be expected to eliminate it.

Background information

We have seen one report from the Norwegian Veterinary Institute ("Thermal de-licing of salmonid fish - documentation of fish welfare and effect") which documented statistically significant increases in:

- snout injury following treatment. It is suggested that this should be caused by the effects of crowding the fish before pumping onto the Thermolicer vessel
- fin damage
- scale damage following treatment on one of the sites
- cataracts on one site 3 weeks after treatment

In conclusion, Scottish Salmon Watch encourages the Cross-Party Group on Animal Welfare to investigate the issue of welfare abuses on Scottish salmon (in particular the operation of the Thermolicer). You can find out more about the welfare nightmare on salmon farms online here.

Finally, Scottish Salmon Watch would be happy to present the case against the Thermolicer in person on 5 June. If you have any questions please do not hesitate to contact me.

Yours sincerely,

Don Staniford

Director, Scottish Salmon Watch

SCOTTISH SALMON WATCH

WELFARE