Scamon Scotland, 15 March 2022

Exposed: 40 Million+ Litres of Toxic Hydrogen Peroxide Used on 'Responsibly Farmed', RSPCA Assured & 'Organic' Scottish Salmon Since 2016!

- FOI reveals use of shellfish-killing Hydrogen Peroxide at over 200 salmon farms
- Mowi heads toxic list with 17 million litres followed by The Scottish Salmon Company with 7 million+ litres, Grieg Seafood with 5 million+ litres, Cooke Aquaculture with 4.5 million+ litres & Scottish Sea Farms with 4 million+ litres used since 2016

- Hydrogen Peroxide cited in death reports of nearly one million farmed salmon since 2017
- Peer reviewed science shows Hydrogen Peroxide kills shellfish, seaweed & salmon
- Campaigners call for a ban on toxic chemicals and a public register of use on salmon farms including use of Hydrogen Peroxide, Azamethiphos & Deltamethrin via wellboats
- "SEPA are working towards ensuring all data is made easily accessible by publication"

A Freedom of Information disclosure by the Scottish Environment Protection Agency reveals the use of over 40 million litres of Hydrogen Peroxide at over 200 salmon farms across Scotland since 2016 **[1].** Hydrogen peroxide is a toxic chemical shown by peer-reviewed science to be lethal to shellfish, seaweed/kelp and even farmed salmon yet it is permitted for use via the Soil Association's 'organic' standards, RSPCA Assured and by the Aquaculture Stewardship Council's salmon standard which deceptively markets Scottish salmon as "farmed responsibly".

"If consumers knew how many toxic chemicals were used in the salmon pharming industry they would avoid Scottish salmon – even so-called 'organic' salmon, RSPCA Assured 'welfare friendly' salmon and 'responsibly farmed' ASC salmon - like the plague," said Don Staniford,

Director of Scamon Scotland (formerly Scottish Salmon Watch). "Scottish salmon is chemically embalmed with a cocktail of hazardous chemicals used to kills lice parasites and treat for infectious diseases. Peer-reviewed scientific research has shown that Hydrogen Peroxide kills shellfish, seaweed and salmon yet over 40 million litres have been used on over 200 salmon farms since 2016. Shamefully, the Soil Association, the Aquaculture Stewardship Council and RSPCA Assured all sanction the use of Hydrogen Peroxide and other toxic chemicals such as Deltamethrin as well as antibiotics such as Oxytetracycline. The greenwashing of toxic Scottish salmon must stop. The next time you see 'responsibly sourced' Scottish salmon in Tesco, Sainsbury's, Aldi, Lidl or other supermarkets please steer clear."

Here's a summary of SEPA's FOI disclosure (F0192861) dated 1 March 2022:

Hydrogen Peroxide Use on Salmon Farms in Scotland (2016 to 2021)* in Litres

2016	11,873,925
2017	9,504,379
2018	5,277,756
2019	6,671,591
2020	5,181,717
2021	2,224,225
Total	40,733,593

* May or may not include use via wellboats

2021 Use of Hydrogen Peroxide in Litres

Scottish Sea Farms	773,513	Used at 26 sites
Mowi	509,741	Used at 21 sites
Cooke Aquaculture	375,713	Used at 8 sites
Grieg Seafood	294,200	Used at 8 sites
Loch Duart	140,568	Used at 7 sites
The Scottish Salmon Company	116,459	Used at 3 sites
Wester Ross Fisheries	14,026	Used at 3 sites

2020 Use of Hydrogen Peroxide in Litres		
Mowi	1,957,984	Used at 22 sites
The Scottish Salmon Company	1,378,697	Used at 12 sites
Grieg Seafood	572,370	Used at 13 sites
Cooke Aquaculture	512,676	Used at 9 sites
Scottish Sea Farms*	339,851	Used at 14 sites
Loch Duart	262,900	Used at 4 sites
Kames	141,786	Used at 1 site
Wester Ross Fisheries	15,452	Used at 3 sites

* Scottish Sea Farms also reported use via well boats with Marine Scotland (see separate data)

Hydrogen Peroxide Use (2016 to 2019)*

Mowi	14.7 million litres
The Scottish Salmon Company	5.7 million litres
Grieg Seafood	4.6 million litres
Cooke Aquaculture	3.8 million litres
Scottish Sea Farms	2.9 million litres
Loch Duart	1.1 million litres
Kames	0.4 million litres
Wester Ross	0.05 million litres

* May or may not include use via wellboats

Salmon farms reporting the use of toxic Hydrogen peroxide – shown by peer-reviewed science to be lethal to shellfish and seaweed/kelp – during 2021 and 2020 include sites certified as 'organic' by the Soil Association (Mowi's Portnalong salmon farm in Loch Harport; Mowi's salmon farm at Sconser in Balmeanach Bay and Mowi's Invasion Bay salmon farm in Loch Sunart); sites certified as "farmed responsibly" by the Aquaculture Stewardship Council (Mowi's salmon farms at MacLeans Nose, Rum, Stulaigh Island, Invasion Bay) and sites currently being audited by the Aquaculture Stewardship Council (Mowi's salmon farms at Ardintoul, Camus Glas, Caolas a Deas East, Caolas a Deas West, Sron (Alsh) and Grey Horse Channel; and salmon farms operated by Scottish Sea Farms at Tanera (Summer Isles), Westerbister and Toy Ness):

Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres)
2021	Westerbister	Scottish Sea Farms Ltd	80471
2021	Ardintoul	Mowi Scotland Ltd	66775
2021	Camus Glas	Mowi Scotland Ltd	64640.75
2021	MacLeans Nose	Mowi Scotland Ltd	42120.25
2021	Groatay	Mowi Scotland Ltd	39962.5
2021	Invasion Bay	Mowi Scotland Ltd	36651
2021	Grey Horse Channel	Mowi Scotland Ltd	34850
2021	Sron	Mowi Scotland Ltd	29983
2021	Caolas a Deas West	Mowi Scotland Ltd	15047.5
2021	Portnalong	Mowi Scotland Ltd	14599.5
2021	Tanera 2	Scottish Sea Farms Ltd	10880
2021	Bring Head, Hoy	Scottish Sea Farms Ltd	10481
2021	Tanera 1	Scottish Sea Farms Ltd	9832
2021	Duich	Mowi Scotland Ltd	9750
2021	Stulaigh Island	Mowi Scotland Ltd	8950
2021	Sconser, Balmeanach Bay	Mowi Scotland Ltd	7979
2021	Toy Ness	Scottish Sea Farms Ltd	4412
2021	Caolas a Deas East	Mowi Scotland Ltd	2227.5
2021	Isle of Rum	Mowi Scotland Ltd	1500

Year	Site Name	Operator	Hydrogen Peroxide (litres)
2020	Toy Ness	Scottish Sea Farms Ltd	10991
2020	Marulaig Bay	Mowi Scotland Ltd	271459
2020	Bagh Dail nan Ceann	Mowi Scotland Ltd	184153
2020	Grey Horse Channel	Mowi Scotland Ltd	124574
2020	Portnalong	Mowi Scotland Ltd	109408
2020	Sconser, Balmeanach Bay	Mowi Scotland Ltd	91318
2020	Stulaigh Island	Mowi Scotland Ltd	91000
2020	Bay of Meil	Cooke Aquaculture Scotland	53404

Here's the salmon farms reporting the most Hydrogen Peroxide use in 2021 (the Top 25) – headed by Scottish Sea Farms in Loch Kishorn and including Mowi's Invasion Bay salmon farm in Loch Sunart which is currently certified as 'organic' by the Soil Association (76 salmon farms reported use of Hydrogen Peroxide to SEPA in 2021 – including Mowi's Mowi's Portnalong salmon farm in Loch Harport which is also currently certified as 'organic' by the Soil Association):

Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres
2021	Allt a Chois (Kishorn North Shore)	Scottish Sea Farms Ltd	133523
2021	Balta Island	Cooke Aquaculture Scotland	83995
2021	Westerbister	Scottish Sea Farms Ltd	80471
2021	Spelve B (Dalnaha)	Scottish Sea Farms Ltd	75364
2021	Reibinish	The Scottish Salmon Company	73555
2021	Ardintoul	Mowi Scotland Ltd	66775
2021	Wick of Belmont North	Cooke Aquaculture Scotland	65304.5
2021	Camus Glas	Mowi Scotland Ltd	64640.75
2021	Setterness North	Grieg Seafood Shetland Ltd	63100
2021	Ness of Copister	Cooke Aquaculture Scotland	60879
2021	Veantrow Bay	Scottish Sea Farms Ltd	53336
2021	Linga (South of Linga)	Grieg Seafood Shetland Ltd	52400
2021	Oldany	Loch Duart Ltd	49401
2021	Point of Burkwell (Site 5)	Cooke Aquaculture Scotland	48308.5
2021	Setterness South	Grieg Seafood Shetland Ltd	46800
2021	Bight of Foraness	Grieg Seafood Shetland Ltd	45600
2021	MacLeans Nose	Mowi Scotland Ltd	42120.25
2021	Sound of Harris (Groay-Lingay)	Loch Duart Ltd	40518.8
2021	Groatay	Mowi Scotland Ltd	39962.5
2021	Bloody Bay	Scottish Sea Farms Ltd	39293
2021	Scallastle Bay	Scottish Sea Farms Ltd	39187
2021	Scadabay	The Scottish Salmon Company	37376
2021	Invasion Bay	Mowi Scotland Ltd	36651
2021	Grey Horse Channel	Mowi Scotland Ltd	34850
2021	Cole Deep	Grieg Seafood Shetland Ltd	34500

Here's the salmon farms reporting the most Hydrogen Peroxide use in 2020 (the Top 25) – headed by Scottish Sea Farms in Loch Kishorn and including Mowi's Mowi's Portnalong salmon farm in Loch Harport which is currently certified as 'organic' by the Soil Association and Mowi's Sconser salmon farm at Balmeanach Bay on the Isle of Skye which was certified as organic up to at least 24 February 2022 (78 salmon farms reported use of Hydrogen Peroxide to SEPA in 2020):

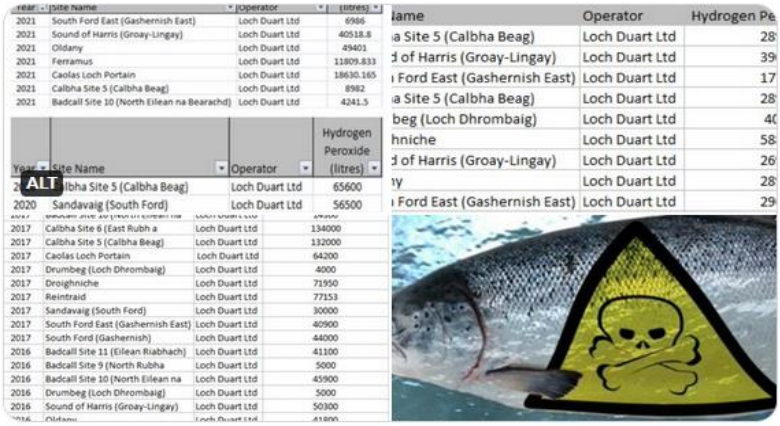
Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres)
2020	Marulaig Bay	Mowi Scotland Ltd	271459
2020	Scadabay	The Scottish Salmon Company Ltd	233752
2020	Reibinish	The Scottish Salmon Company Ltd	197335
2020	Bagh Dail nan Ceann	Mowi Scotland Ltd	184153
2020	Creag an Sagairt West	Mowi Scotland Ltd	176760
2020	Maragay Mor	The Scottish Salmon Company Ltd	172656
2020	Skipport Outer (Ornish)	Mowi Scotland Ltd	170124
2020	East of Loch Uiskevagh	The Scottish Salmon Company Ltd	169030
2020	Greanamul	The Scottish Salmon Company Ltd	163588
2020	Rubh an Trilleachain	Kames Fish Farming Ltd	141786
2020	Poll na Gille	Mowi Scotland Ltd	133600
2020	Grey Horse Channel	Mowi Scotland Ltd	124574
2020	Flaeshins	Cooke Aquaculture Scotland	118014
2020	Portnalong	Mowi Scotland Ltd	109408
2020	Plocrapol	The Scottish Salmon Company Ltd	107099
2020	Uig Bay	Grieg Seafood Shetland Ltd	97300
2020	Sconser, Balmeanach Bay	Mowi Scotland Ltd	91318
2020	Stulaigh Island	Mowi Scotland Ltd	91000
2020	Eport Outer (Sgeir n Lolla)	The Scottish Salmon Company Ltd	90762
2020	South Ford East (Gashernish East)	Loch Duart Ltd	88700
2020	Sconser Quarry	Mowi Scotland Ltd	83900
2020	Aird Ardheslaig	The Scottish Salmon Company Ltd	82485
2020	An Camus	Mowi Scotland Ltd	82304
2020	Taranaish	The Scottish Salmon Company Ltd	73344
2020	Hogan (Site 1)	Cooke Aquaculture Scotland	72116

Documents disclosed by SEPA to Scamon Scotland on 1 March 2022 via F0192861:

SEPA FOI reply letter 1 March 2022 Hydrogen Peroxide Use on Salmon Farms EIR Response F0192861
Excel #1 Hydrogen Peroxide 2021
Excel #2 Hydrogen Peroxide 2020
Excel #3 Hydrogen Peroxide 2016 to 2019
Excel #4 Marine Scotland Wellboats Treatments 2020

Don Staniford
@TheGAAIA

Revealed: 1.5 million litres of shellfish-killing Hydrogen Peroxide doused @LochDuartSalmon since 2016 according to FOI disclosure @ScottishEPA
Why is Loch Duart endorsed @rspcaassured @friendofthesea @GLOBALGAP @lloydsregister @Creelers2 @UKAS @ScotlandSalmon @SaumonLabel ?



Year	Site Name	Operator	Hydrogen Peroxide (litres)
2021	South Ford East (Gashernish East)	Loch Duart Ltd	6986
2021	Sound of Harris (Groay-Lingay)	Loch Duart Ltd	40518.8
2021	Oldany	Loch Duart Ltd	49401
2021	Ferramus	Loch Duart Ltd	11809.833
2021	Caolas Loch Portain	Loch Duart Ltd	18630.165
2021	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	8982
2021	Badcall Site 10 (North Eilean na Bearachd)	Loch Duart Ltd	4241.5
2020	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	65600
2020	Sandavaig (South Ford)	Loch Duart Ltd	56500
2017	Calbha Site 6 (East Rubh a	Loch Duart Ltd	134000
2017	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	132000
2017	Caolas Loch Portain	Loch Duart Ltd	64200
2017	Drumbeg (Loch Dhrombaig)	Loch Duart Ltd	4000
2017	Droighniche	Loch Duart Ltd	71950
2017	Reintraid	Loch Duart Ltd	77153
2017	Sandavaig (South Ford)	Loch Duart Ltd	30000
2017	South Ford East (Gashernish East)	Loch Duart Ltd	40900
2017	South Ford (Gashernish)	Loch Duart Ltd	44000
2016	Badcall Site 11 (Eilean Riabhach)	Loch Duart Ltd	41100
2016	Badcall Site 9 (North Rubha	Loch Duart Ltd	5000
2016	Badcall Site 10 (North Eilean na	Loch Duart Ltd	45900
2016	Drumbeg (Loch Dhrombaig)	Loch Duart Ltd	5000
2016	Sound of Harris (Groay-Lingay)	Loch Duart Ltd	50300

ame	Operator	Hydrogen Pe
a Site 5 (Calbha Beag)	Loch Duart Ltd	28
d of Harris (Groay-Lingay)	Loch Duart Ltd	39
Ford East (Gashernish East)	Loch Duart Ltd	17
a Site 5 (Calbha Beag)	Loch Duart Ltd	28
beg (Loch Dhrombaig)	Loch Duart Ltd	4(
hniche	Loch Duart Ltd	58
d of Harris (Groay-Lingay)	Loch Duart Ltd	26
ıy	Loch Duart Ltd	28
Ford East (Gashernish East)	Loch Duart Ltd	29

Highland News Group and 9 others

Don Staniford
@TheGAAIA

Here's data obtained @ScottishEPA via FOI which shows over 75,000 litres of Hydrogen Peroxide used by Wester Ross Fisheries in Loch Broom, Little Loch Broom & Ardmair Bay since 2018! @WesterRossSalmo @AilsaMcL @UllapoolCraic @SaversSea @FinlayPringle @klondyker @liusaidhbeattie

Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres)
2021	Isle Martin, Ardmair Bay	Wester Ross Fisheries Ltd	8098.2
2021	Ardessie B	Wester Ross Fisheries Ltd	2879.23
2021	Ardessie A	Wester Ross Fisheries Ltd	3048.89

Site ID	Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres)
LIT1	2020	Ardessie A	Wester Ross Fisheries Ltd	3345
LIT2	2020	Ardessie B	Wester Ross Fisheries Ltd	3967.5
KAN2	2020	Isle Martin, Ardmair Bay	Wester Ross Fisheries Ltd	8140

Year	Site Name	Operator	Hydrogen Peroxide (litres)
2019	Corry, Loch Broom	Wester Ross Fisheries Ltd	23320
2019	Ardessie A	Wester Ross Fisheries Ltd	9710
2019	Ardessie B	Wester Ross Fisheries Ltd	11772
2018	Ardessie A	Wester Ross Fisheries Ltd	2720
2018	Ardessie B	Wester Ross Fisheries Ltd	4260

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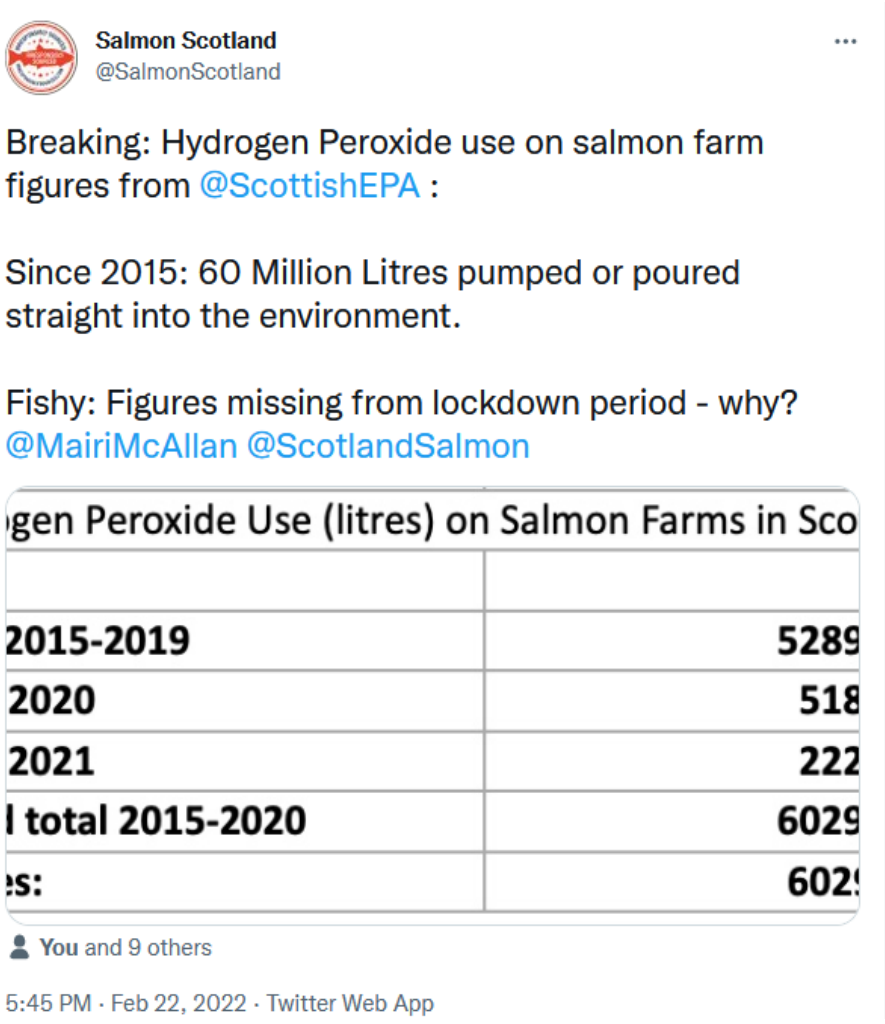
Scamon Scotland (formerly Scottish Salmon Watch) is calling on the Scottish Environment Protection Agency to establish a public register of all toxic chemical use – including Hydrogen Peroxide, Formaldehyde (Formalin), antibiotics and the banned neonicotinoid Imidacloprid which salmon farmers are seeking approval to use in Scotland.

"SEPA are working towards ensuring all data is made easily accessible by publication," explained SEPA's FOI reply letter dated 1 March 2022. "We are currently exploring how we could make information hydrogen peroxide available via Scotland's Aquaculture Website. This requires development of the website and we are exploring with partners how we best achieve this as we prioritise improvements to our Information systems post the serious cyber-attack SEPA experienced at the end of 2020. We can advise that treatments at fish farms can either be carried out directly in the pens or onboard wellboats adjacent to the pens. Authorisation and regulation of discharge treatment solutions from wellboats passed from Marine Scotland to SEPA on 9 November 2020."

SEPA disclosed further information on the use of Hydrogen Peroxide since 2015 last month (21 February 2022) via F0193863 – with 60 million litres used since 2015 (a staggering 19.6 million litres were used in 2015).



Salmon Scotland
@SalmonScotland

Breaking: Hydrogen Peroxide use on salmon farm figures from @ScottishEPA :

Since 2015: 60 Million Litres pumped or poured straight into the environment.

Fishy: Figures missing from lockdown period - why? @MairiMcAllan @ScotlandSalmon

gen Peroxide Use (litres) on Salmon Farms in Sco	
2015-2019	5289
2020	518
2021	222
l total 2015-2020	6029
s:	602

You and 9 others

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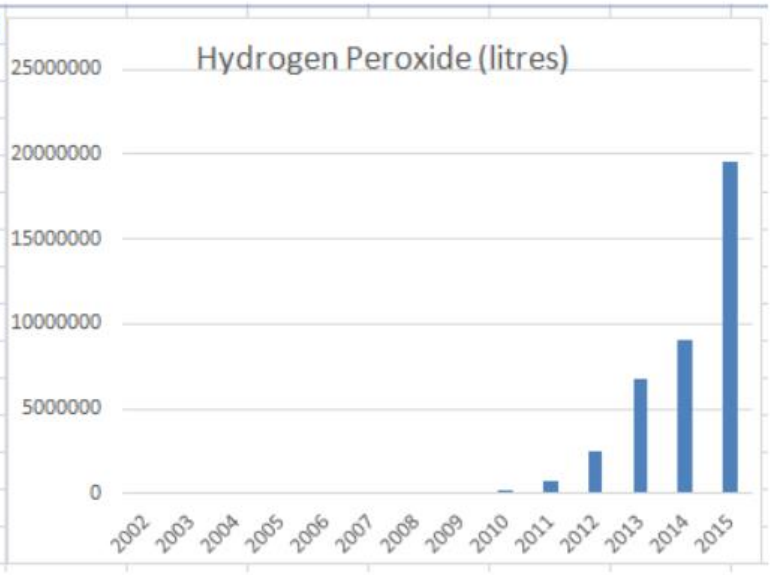
Here's the Top 25 salmon farms using the most Hydrogen Peroxide in 2015 – headed by Marine Harvest (renamed Mowi in 2019) in Loch Torridon where over 1 million litres was used at one salmon farm and 369,250 litres were used at Mowi's Isle of Ewe salmon farm (a site which harvested their first 'organic' salmon – as certified by the Soil Association – in 2020):

Year	Site Name	Operator	Hydrogen Peroxide (litres)
2015	Camas an Leim (Torridon)	Marine Harvest (Scotland) Ltd	1018616
2015	Ardintoul	Marine Harvest (Scotland) Ltd	753450
2015	Creag an Sagairt West	Marine Harvest (Scotland) Ltd	464529
2015	North Havra	Grieg Seafood Shetland Ltd	424000
2015	Easter Score Holm	Grieg Seafood Shetland Ltd	417700
2015	East of Langa	Grieg Seafood Shetland Ltd	398600
2015	Greanamul	The Scottish Salmon Company Ltd	394091
2015	Poll na Gille	Marine Harvest (Scotland) Ltd	387150
2015	Sgeir Dughall	The Scottish Salmon Company Ltd	382272
2015	Rubh an Trilleachain	Kames Fish Farming Ltd	376000
2015	Isle of Ewe	Marine Harvest (Scotland) Ltd	369250
2015	Spoose Holm (Oxna)	Grieg Seafood Shetland Ltd	368600
2015	Aird Ardheslaig	The Scottish Salmon Company Ltd	343548
2015	West of Burwick	Grieg Seafood Shetland Ltd	335700
2015	Soay Sound	Marine Harvest (Scotland) Ltd	287455
2015	Sron	Marine Harvest (Scotland) Ltd	281700
2015	Papa, East Head of	Grieg Seafood Shetland Ltd	277000
2015	Stulaigh Island	Marine Harvest (Scotland) Ltd	276959
2015	Ardmaddy South	Marine Harvest (Scotland) Ltd	271903
2015	Erisort, North Shore East	Marine Harvest (Scotland) Ltd	271215
2015	Erisort, North Shore	Marine Harvest (Scotland) Ltd	252498
2015	Creag an Sagairt South	Marine Harvest (Scotland) Ltd	250281
2015	North Nesting Site 2	Scottish Sea Farms Ltd	247637
2015	Uiskevagh North	The Scottish Salmon Company Ltd	239521
2015	Hellisay	Marine Harvest (Scotland) Ltd	234466

The Global Alliance Against Industrial Aquaculture obtained further information on Hydrogen Peroxide use on salmon farms in Scotland in 2017 – detailing data on the use of Hydrogen Peroxide at salmon farms from 2002 to 2015.

Year	Hydrogen Peroxide (litres)
2002	64600
2003	48950
2004	14600
2005	19200
2006	0
2007	0
2008	95000
2009	0
2010	217392
2011	739145
2012	2441625
2013	6788634
2014	9082650
2015	19564988



The Sunday Times [reported in February 2017]:

THE SUNDAY TIMES

Record chemical use 'of concern' to salmon giant

Hydrogen peroxide tackles parasites but weakens the fish
DAVID CHESKIN/PA ARCHIVE

The world's largest salmon farmer has expressed "concern" over the use of chemicals to fight disease after a record 20m litres of hydrogen peroxide — a substance harmful to fish — were dumped into coastal waters around Scotland.

More than 160 farms resorted to the chemical in 2015 to tackle parasites such as sea lice, according to the Scottish Environment Protection Agency (Sepa).

Enough hydrogen peroxide was used to fill eight Olympic-size swimming pools, including more than 1m litres at a site operated by Marine Harvest, the Norwegian-owned firm.

Taking the FOI disclosures together, 79.8 million litres of ‘environmentally friendly’ Hydrogen Peroxide has been reported as used on salmon farms in Scotland since 2002 – with 2015 by far the worst year (however it is unclear if use via well boats has been fully reported):

Hydrogen Peroxide Use in Litres The Worst Years since 2002	
2015	19,564,988
2016	11,873,925
2017	9,504,379
2014	9082650
2013	6788634
2019	6,671,591
2018	5,277,756
2020	5,181,717
2012	2441625
2021	2,224,225
2011	739145
2010	217392
2008	95000
2002	64600
2003	48950
2005	19200
2004	14600

The decline in the use of Hydrogen Peroxide in Scotland has been mirrored in Norway according to data published by the Norwegian Veterinary Institute in 2021:

Table 2.4 Pharmaceutical products prescribed for farmed fish (in kg active substance with the exception of hydrogen peroxide figures in tons). Figures from the Norwegian Institute for Public Health.

	2015	2016	2017	2018	2019	2020
Anti-salmon lice medication						
Azamethiphos	3904	1269	204	160	154	286
Deltamethrin	115	43	14	10	10	8
Diflubenzuron	5896	4824	1803	622	1296	1000
Teflubenzuron	2509	4209	293	144	183	1603
Emamectin	259	232	128	87	114	117
Hydrogen peroxide (tonn)*	43246	26597	9277	6735	4523	5084

* Total consumption of hydrogen peroxide, includes both treatment against salmon lice and amoebic gill disease (AGD).

Last week (8 March 2022), the Norwegian Veterinary Institute published data for 2021 including the use of the banned neonicotinoid Imidacloprid which started in 2021:

Tabell 7.1.1 Antall resepter av en gitt kategori virkestoff på lusebehandling i 2011 - 2021. Pyretroider er resepter på virkestoffene deltametrin og cypermetrin, mens flubenzuroner er resepter på virkestoffene teflubenzuron og diflubenzuron. Antall rekvisisjoner er hentet fra Veterinært legemiddelregister (VetReg) 28.01.22.

Virkestoff kategori	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Azametifos	418	695	483	752	621	262	59	39	82	119	144
Pyretroider	460	1163	1130	1049	664	280	82	56	73	51	42
Emamektinbenzoat	294	169	163	481	523	612	351	371	451	415	437
Flubenzuroner	24	133	171	195	202	173	81	40	61	51	22
Hydrogenperoksid	179	110	255	1021	1284	629	214	96	82	47	45
Imidakloprid	0	0	0	0	0	0	0	0	0	0	29
Sum legemidler	**1375**	**2270**	**2202**	**3498**	**3294**	**1956**	**787**	**602**	**749**	**683**	**719**

Tabell 2.4.1 Antibakterielle midler benyttet til oppdrettsfisk (kg aktiv substans). Data er beregnet ut fra Veterinært legemiddelregister (VetReg). For 2015-2020 er tallene validert mot salgstall rapportert fra Folkehelseinstituttet; tallene for 2021 er foreløpige. VetReg tall per 28. januar 2022.

Antibakterielle midler	2015	2016	2017	2018	2019	2020	2021
Florfenikol	188	136	269	858	156	115	892
Oksolinsyre	84	66	343	54	66	107	57
Oksytetracyklin	-	-	-	20	-	0,72	-
Enrofloxacin	0,02	0,05	0,01	-	0,01	0,12	0,25
Amoksicillin	-	-	-	-	-	0,09	-
Sum antibiotika	273	201	612	931	222	223	949

Mortality data published by the Scottish Government's Fish Health Inspectorate on 7 March 2022 cites the use of Hydrogen Peroxide (also referred to as H202 and Paramove 50) in 71 'Mortality Event Reports' involving 957,261 dead farmed salmon since 2017 – including:

October 2021: Camus Glas (Mowi) – 34,396 morts: "Reported mortality is a continuance of post peroxide treatments"

October 2021: Camus Glas (Mowi) – 8, 146 morts: "Three peroxide treatments recently on 05/09, 25/09 and 18/10. Mortality elevated after each treatment attributed to a poor stock of fish"

October 2021: Camus Glas (Mowi) – 27,987 morts: "Mortality after peroxide treatment".

January 2021: Lismore West (Scottish Sea Farms): 7,348 morts: "Post peroxide tarp treatment. Treatment was aborted early. Unsure what exactly the issue was"

January 2021: Nevis (Scottish Sea Farms) - 7,114 morts: "Peroxide treatment for CGD, treatment caused mortality due to the gills being so compromised"

January 2021: Cairidh (Mowi) - 8,700 morts: "Acute losses due to Peroxide and FW treatments"

December 2020: South West Shuna (Mowi) - 10,314 morts: "Acute mortality due to Peroxide treatments"

December 2020: Sconser Quarry (Mowi) – 9,427 morts: "Acute losses following peroxide treatment"

September 2020: Loch Carnan (Loch Duart) - 4,323 morts: "Treatment with Paramove 50 treatments were initiated resulting in the increased morts"

November 2019: Bloody Bay (Scottish Sea Farms) – 51,430 morts: "Post treatment - hydrogen peroxide for gills"

November 2019: Bloody Bay (Scottish Sea Farms) – 8,035 morts: "Post treatment - hydrogen peroxide for gills"

October 2019: Seaforth (Mowi) – 15,092 morts: "Treatment losses - AGD peroxide treatment"

August 2019: Swinning 3 (Grieg Seafood) – 7010 morts: "Peroxide treatments and failed smolts"

December 2018: Nevis (Scottish Sea Farms) – 3,714 morts: "AGD treatment losses (peroxide treatment)"

November 2018: Plocrapol (The Scottish Salmon Company) – 1,620 morts: "Post peroxide treatment, Some PGD"

November 2018: Kishorn (Scottish Sea Farms) - 8,370 morts: "Treatment with peroxide for AGD"

September 2017: Vuia Mor (The Scottish Salmon Company) – 13,246 morts: "Gill health issues with some post treatment losses but treatment (Hydrogen peroxide) still ongoing so are expecting further losses"

August 2017: North Voe (Grieg Seafood) - 5,316 morts: "Losses post treatment with hydrogen peroxide for AGD"

August 2017: Loch Odhairn (The Scottish Salmon Company) - 26,960 morts: "Tried a peroxide treatment which was unsuccessful"

August 2017: Loch Odhairn (The Scottish Salmon Company) - 10,327 morts: "Tried a peroxide treatment which was unsuccessful"

August 2017: Inch Kenneth (The Scottish Salmon Company) – 3,937 morts: "Post treatment (H2O2) losses. Fish recovering from PD"

March 2017: Ardcastle Bay (The Scottish Salmon Company) – 8,310 morts: "Post H202 treatment, compromised gills"

Mowi reported mass mortalities at their Ardintoul salmon farm – certified as 'welfare friendly' via RSPCA Assured and currently being audited by the ASC as "farmed responsibly" – including over 22,000 morts in February 2022 linked to the use of Hydrogen Peroxide (H202):

Event #	Business	Site Name	Date	Explained reasons	Total mortality during event	Action taken by FHI
MRT02848	Mowi Scotland	Ardintoul	16/02/2022	Complex gill diseases and SRS.	13441	Site was visited 08/02/2022. SRS confirmed on site and treated with antibiotics, now no longer detected in stock. H202 treatments were also carried out on site, but were aborted following increased mortalities. Moribund fish were examined during inspection but no clinical signs of disease were observed so no samples were taken. Mortalities reduced the following week. FHI to monitor.
MRT02846	Mowi Scotland	Ardintoul	15/02/2022	Complex gill disease issues ongoing on site causing significant mortality.	8934	Site was visited 08/02/2022. SRS confirmed on site and treated with antibiotics, now no longer detected in stock. H202 treatments were also carried out on site, but were aborted following increased mortalities. Moribund fish were examined during inspection but no clinical signs of disease were observed so no samples were taken. Mortalities have reduced from previous week. FHI to monitor.

Here's some of the '[Mortality Event Reports]' involving Hydrogen Peroxide reported since 2017:

Event #	Business Name	Site Name	Date reported	Mort %	Explained reasons	Mort #s	Action taken by FHI
MRT02563	Mowi Scotland Ltd	Camas Glas	29/10/2021	5.83	Peroxide Treatment and AGD	34396	Peroxide treatment administered. Mortalities are reducing. Reported mortality is a continuance of post peroxide treatments. FHI to monitor.
MRT02546	Mowi Scotland Ltd	Camas Glas	27/10/2021	1.36	Peroxide Treatment and AGD	8146	Site contacted for further information. Three peroxide treatments recently on 05/09, 25/09 and 18/10. Mortality elevated after each treatment attributed to a poor stock of fish. Is now back to background levels at ~3,000-5,000 fish per week.. No other issues on site. Mortality increased to 5.83% wb 18/10/2021. FHI to consider inspection next week based on mortality level in wb 25/10/2021
MRT02481	Mowi Scotland Ltd	Camas Glas	11/10/2021	4.44	Mortality after peroxide treatment	27987	Mortalities still high following treatments on 25th and 28th Sept. Await to see if mortalities decrease post treatment - business contact stating that mortalities for following week reportedly 0.74% to date.
MRT02455	Mowi Scotland Ltd	Camas Glas	04/10/2021	1.27	Mortality after peroxide treatment	8142	Site visited by FHI in August. Wait to see if figures drop post treatment. Week to 1/10/21 reported to be 4.08% (5 day figure)
MRT02048	Scottish Sea Farms	Lismore Wes	06/01/2021	3.27	CGD - Post peroxide tarp treatment	7348	Contacted business. Treatment was aborted early. Unsure what exactly the issue was. Mortality below reporting threshold the following week. FHI to monitor.
MRT02049	Scottish Sea Farms	Nevis B	06/01/2021	2.11	CGD - Post peroxide tarp treatment	7114	Site inspected 18/11/20 (2020-0497) no issues at the time. Company contacted. Peroxide treatment for CGD, treatment caused mortality due to the gills being so compromised. Following week mortality back below reporting threshold. FHI to monitor.
MRT02039	Mowi Scotland Ltd	Cairidh	02/01/2021	1.36	Acute losses due to Peroxide and FW treatments	8700	Business contacted. Mortality following week down to 0.2% (attributed to CMS). First notification for this cycle with mortality decreased below threshold the following week.FHI to monitor.
MRT02038	Mowi Scotland Ltd	South West S	29/12/2020	1.42	Acute mortality due to Peroxide treatments	10314	Mortality dropped to 0.07% w/b 21/12 following treatment. NFA.
MRT02036	Mowi Scotland Ltd	Sconser Quar	21/12/2020	1.08	Acute losses following peroxide treatment	9427	FHI inspected site 3/11/20 (20200462) no problems observed but AGD present on site. FHI to monitor mortality rate following treatment.

MRT01871	Loch Duart Ltd	Loch Carnan	28/09/2020	1.48	AGD. Paramove 50 treatment.	4,323 fish	Contacted the company, vets reports were made available via TEAMS, AGD confirmed by PCR/Histo. Treatment with Paramove 50 treatments were initiated resulting in the increased morts. It is hoped that cooler sea temperatures will have a positive effect. Additional treatments way be required but at the moment monitoring will continue. FHI to monitor the situation.
MRT01416	Scottish Sea Farms	Bloody Bay	14/11/2019	2.9	Post peroxide tarp treatment, CGD	8035	FHI inspected 12/11/19 Update; Picked up during inspection. No clinical signs of disease observed during inspection of site. Recent mortality has been 0.41% over the past 4 weeks Mortalities reported by company on 14/11/19.
MRT01421	Scottish Sea Farms	Bloody Bay	14/11/2019	6.5	Post peroxide tarp treatment, CGD	51430	FHI inspected 12/11/19 Update; Picked up during inspection. No clinical signs of disease observed during inspection of site. Recent mortality has been 0.41% over the past 4 weeks Mortalities reported by company on 14/11/19.
MRT01299	Mowi Scotland Ltd	Seaforth	07/10/2019	1.44	Treatment losses - AGD peroxide treatment	15092	FHI to monitor ongoing mortality levels.
MRT01251	Scottish Sea Farms	Loch Spelve (	26/09/2019	1.99	AGD, Post H2O2 tarp treatment	Not provided	Morts subsequently fallen.
MRT00875	Scottish Sea Farms	Nevis C (Ardir	03/12/2018	1.7	AGD treatment losses (peroxide treatment)	3714	Site inspected 11/10/18. Diagnostic samples found complex gill pathology including AGD, salmon gill poxvirus and Paranucleospora theridion
MRT00888	The Scottish Salmo	Plocrapol	21/11/2018	2.29	Post peroixide treatment, Some PGD	1620	
MRT00431	Dawnfresh Farming	Etive 6	18/10/2017	2.8	Treatment (Peroxide) - Lice treatment	3840	Mort levels retuned to below reporting threshold, FHI to monitor.
MRT00465	Marine Harvest (Sc	Tabhaigh	17/10/2017	3.7	H2O2 and thermolicer treatment		Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.
MRT00466	Marine Harvest (Sc	Tabhaigh	17/10/2017	6.57	H2O2 and thermolicer treatment		Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.
MRT00467	Marine Harvest (Sc	Tabhaigh	17/10/2017	2.54	H2O2 and thermolicer treatment		Sister site visited wk 42 - morts now dropped. Wk 41 - 0.05%.
MRT00396	The Scottish Salmo	Vuia Mor	02/10/2017	11.91	AGD, Post H2O2 treatment		FHI due to visit next couple of weeks

"Salmon pharmers are killing hundreds of thousands of farmed salmon – not to mention shellfish and other marine life - each year with toxic chemicals," said Don Staniford, Director of Scamon Scotland. "Salmon farming is Scotland's 'Silent Spring of the Sea'. Norway publishes data on the use of toxic chemicals every year on salmon farms so why is there no public register in Scotland? Salmon farms should come clean on their use of Hydrogen Peroxide and other shellfish-killing chemicals such as Deltamethrin, Azamethiphos and Emamectin benzoate in addition to Formaldehyde (Formalin), antibiotics such as Oxytetracycline and Florfenicol and the banned neonicotinoid Imidacloprid. Data on sea lice infestation rates and mortalities are routinely published but data on the use of toxic chemicals and infectious diseases is woefully lacking. Shame on the Soil Association, RSPCA Assured and the Aquaculture Stewardship Council for sanctioning the use of toxic chemicals on salmon farms across Scotland."

Last month (27 February 2022), Scamon Scotland revealed how salmon farms in Scotland had increased their use of antibiotics (Oxytetracycline and Florfenicol) by 5000% (a 51-fold increase since 2016) with Mowi accounting for 88% of antibiotic use.

Scamon Scotland revealed (3 February 2022) that Mowi's claim on BBC TV that it used "hardly any chemical treatments at all" was complete and utter bullshit.

In January 2022, Scottish Salmon Watch revealed how the use of toxic chemicals (Azamethiphos, Deltamethrin and Emamectin benzoate) on salmon farms in Scotland more than doubled since 2018.

In November 2020, Scottish Salmon Watch reported on the lack of official government reporting of toxic chemical use – including the use of Azamethiphos and Deltamethrin via wellboats and the use of other toxic chemicals such as Formaldehyde (Formalin) and Hydrogen Peroxide.

On 7 March 2022, Scamon Scotland requested further information and clarification on the 'organic' status of salmon farms in a letter sent to the Soil Association - download in full as a PDF online here. The Soil Association's salmon standards permit the use of both Hydrogen Peroxide and Deltamethrin.

Read more via:
The Ferret/Sunday National: "Use of Drugs At Fish Farms Rises 50 Times in Six Years"
Drug Addict Alert: Scottish Salmon's Fifty-Fold Increase in Antibiotics Since 2016!
Media Backgrounder: "Mowi's Increasing Disease Problems Drives Increases in Antibiotic Use"
Mowi's Pure Bullshit (#1 in a regular series): "hardly any chemical treatments at all"
Toxic Scottish Salmon - Chemical Use Doubles Since 2018!

Slicegate: How SEPA Opened the Floodgates to Toxic Scottish Salmon (Following Intense Lobbying from the Salmafia)!
Mowi's 'Host' With the Most....Toxic Chemicals & Antibiotics (certified as "responsibly farmed" by the ASC)!
Salmon Pharming's 'Silent Spring' of the Sea
The Guardian: "'Novichok for insects' may be approved for Scottish fish farms"
Please Ban Deltamethrin Use by Scottish Salmon Pharmers!
Toxic Salmon Corrodes Soil Association's 'Organic' Principles
The Devil is in the Data - why no published figures on use of toxic chemicals via wellboats?
Fury as fish farm pesticide pollution rises 72% in a year
Closing the Net on Salmon Farming's Use of Toxic Chemicals
Public Register of Toxic Chemicals Used in Scottish Salmon Farming?
Anyone for ASC-Certified Scottish Salmon Doused in Carcinogenic Formaldehyde?
Under the Cloak of Coronavirus: SEPA open the floodgates to lobster-killing chemicals!
Media Backgrounder: Chemically Embalmed Scottish Farmed Salmon
Slicegate: Anatomy & Chronology of an Environmental Lobotomy - How the Scottish Environmental Protection Agency was Sliced to death by the Scottish Government and salmon farming lobby
Salmon farming in crisis: 'We are seeing a chemical arms race in the seas'
The Sunday Times: "Salmon industry toxins soar by 1000 per cent"
Scottish Salmon's Lethal Legacy - Ten-fold Increase in Toxic Chemical Use in Ten Years
Scientific Backgrounder: Ecotoxicity & Chemical Resistance
Media Backgrounder: Scotland's 'Silent Spring' of the Sea
Daily Mail: "The toxic chemicals in farmed salmon straight from the loch"
Scottish Salmon Overdoses on Toxic Chemical
Scottish fish farmers use record amounts of parasite pesticides
Chemicals to control salmon parasites
Silent Spring of the Sea

Contact:

Don Staniford: 07771 541826 (salmonfarmingkills.com)

Media Backgrounder: Hydrogen Peroxide – the Salmon & Shellfish Killer endorsed by the Aquaculture Stewardship Council, RSPCA Assured & the Soil Association!

Peer-reviewed scientific research has shown how toxic Hydrogen Peroxide is to the marine environment – including shellfish such as shrimp and seaweed/kelp. A scientific paper published in the journal *Ecotoxicology and Environmental Safety* in September 2019 concluded that "treatment water with toxic concentrations of H_2O_2 (1.5 mg/L) could reach *P. borealis* living more than 1 km from a treated salmon farm":

ELSEVIER

Ecotoxicology and Environmental Safety

Volume 180, 30 September 2019, Pages 473-482

Gill damage and delayed mortality of Northern shrimp *(Pandalus borealis)* after short time exposure to anti-parasitic veterinary medicine containing hydrogen peroxide

Renée Katrin Bechmann [a], Maj Arnberg [a, 1], Alessio Gomiero [a], Stig Westerlund [a, 2], Emily Lyng [a], Mark Berry [a, 3], Thorleifur Agustsson [a], Tjalling Jager [b], Les E. Burridge [c]

Highlights

- The anti-parasitic hydrogen peroxide product PARAMOVE® negatively affected shrimp.
- Negative effects at 1000 times diluted salmon treatment concentration of PARAMOVE®.
- Gill damage after 1 h exposure to 1.5 mg/L hydrogen peroxide.
- Mortality after 2 h exposure to 1.5 mg/L hydrogen peroxide for 3 consecutive days.

"Norwegian fishermen have observed that Northern shrimp (*Pandalus borealis)* have disappeared from several shrimp fields in areas with salmon farms and this observation was confirmed by the Institute of Marine Research for the coast of Helgeland (Eraker, 2016; Steinhold and Thonhagen, 2017)," reported the paper. "The fishermen claim that shrimp disappear from areas where chemicals are used to treat salmon against lice. Concern has also been raised about potential negative effects on the kelp community, due to the sensitivity of sugar kelp *(Saccharina latissimi)* to H_2O_2 (Haugland et al., 2019)….. Results from dispersion modelling (literature data) together with the current experiments indicate that treatment water with toxic concentrations of H_2O_2 (1.5 mg/L) could reach *P. borealis* living more than 1 km from a treated salmon farm."

The *Bulletin of Environmental Contamination and Toxicology* reported in September 2020:

Bulletin of Environmental Contamination and Toxicology (2020) 105:705–710
https://doi.org/10.1007/s00128-020-02996-6

The Acute and Delayed Mortality of the Northern Krill (*Meganyctiphanes norvegica*) When Exposed to Hydrogen Peroxide

Rosa H. Escobar-Lux[1] · Ole B. Samuelsen[2]

Received: 2 July 2020 / Accepted: 14 September 2020 / Published online: 26 September 2020

Abstract
Bath treatment pharmaceuticals used to control sea lice infestations in the salmonid industry, such as hydrogen peroxide (H_2O_2), are released directly into the environment where non-target organisms are at risk of exposure. The aim of this study was to determine the threshold concentrations for mortality of the Northern krill, *Meganyctiphanes norvegica,* a major component of the north Atlantic marine ecosystem. To assess the lethal effects of H_2O_2, we carried out a series of 1 h acute toxicity tests and assessed mortality through a 48 h post-exposure period. One-hour exposure to 170 mg/L, corresponding to 10% of the recommended H_2O_2 treatment, caused 100% mortality and a subsequent acute median-lethal concentration LC50 value of 32.5 mg/L. Increased mortality was observed with time in all exposed groups, resulting in successively lower LC_{50} values during the post-exposure period. The suggested H_2O_2 concentrations have the potential of causing negative effects to the Northern krill.

Keywords Crustacean · Toxicity · LC_{50} · Aquaculture

This study has shown that a bath treatment with H_2O_2 has a detrimental effect on *M. norvegica.* However, it is important to assess whether these laboratory-based concentrations are likely to pose a significant risk to krill at the proximity of salmonid aquaculture sites. Due to differences in experimental set-ups the variation in half-lives reported for H_2O_2 in seawater in large, with results between 1 and 58 days (Bruno and Raynard 1994; Lyons et al. 2014; Fagereng 2016; Parsons and Samuelsen unpubl. data). Several factors affect both the toxicity and the degradation of H_2O_2, for example the water temperature or the irradiance (Stratford et al. 1984; Treasure et al. 2000)". However, even the shortest degradation time reported (1 day) is significantly longer than the 1 h exposure needed in the present study to cause considerable mortality of the Northern krill. Even though H_2O_2 is extensively used around the world as an anti-sea lice bath treatment, few studies have initiated the use of mathematical models to predict its' dispersal and its' impact on non-target species. One such study from Norway has indicated that the spread of H_2O_2 may be larger than previously thought (Refseth et al. 2017). According to the model, concentrations up to 300 mg/L may occur within a 1 km radius from the farm and 100 mg/L within a radius of 2 km. Furthermore, the model also suggested that a concentration of 100 mg/L can be present in surface waters for several hours after discharge. The presented model simulations therefore suggest that the Northern krill within 2 km of a salmonid farm may be exposed to lethal concentration of H_2O_2.

Parsons et al. (2020) used dispersion models to predict the spreading of pharmaceuticals from salmonid farms in Norway, following bath treatment. Based on the models and LC_{50} values (1 h exposure followed by 24 h post-exposure period) for European lobster larvae (stage I and II) they calculated impact zones around 23 Norwegian fish farms for the pesticides azamethiphos and deltamethrin. This model however, did not take into account the degradation of the compounds due to the presence of organic matter in the water. While the azamethiphos impact zones around farms were relatively small (mean area of 0.04–0.2 km^2), deltamethrin impact zones covered much larger areas (mean area of 21.1–39.0 km^2). The difference in impact zone is due to the difference in toxicity between the two drugs. For azamethiphos the 1 h-LC_{50} values (95% CIs) for stage I and II larvae were 43.1 µg/L (13.0–131.0 µg/L) and 20.5 µg/L (13.2–30.9 mg/L), respectively, representing approximately 2- and fivefold dilutions of the treatment concentration (100 µg/L) used on Norwegian fish farms. For deltamethrin the 1 h-LC_{50} values (with 95% CIs) for stage I and II larvae were estimated to be 2.6 ng/L (0.6–11.0 ng/L) and 2.9 ng/L (1.5–5.7 ng/L), representing approximately 800-fold dilution of the treatment concentration of 2000 ng/L. Considering the sensitivity of krill towards H_2O_2 found in the present study, where the LC_{50} ranged from 52- to 2000-fold dilution with increasing post-exposure period, impact zones like those calculated for deltamethrin in Parsons et al. (2020) will be most relevant for impact zones for H_2O_2 and krill.

Meganyctiphanes norvegica can be found around the North Atlantic, with the Norwegian sea being a major hotspot for its distribution (Melle et al. 2004). Due to their distribution, krill can often be found in waters close to aquaculture sites and therefore be negatively impacted by the dispersal of effluent plumes after treatments. Based on our findings and the information from previous mathematical models, H_2O_2 may cause a larger impact than it was previously believed. Therefore, that some cases of mass mortality of krill observed in past years may have been caused by H_2O_2 exposure, cannot be overlooked.

The scientific journal *Ecotoxicology and Environmental Safety* reported in November 2020:

ELSEVIER

Ecotoxicology and Environmental Safety

Volume 204, November 2020, 111111

Short-term exposure to hydrogen peroxide induces mortality and alters exploratory behaviour of European lobster (*Homarus gammarus*)

Rosa H. Escobar-Lux [a], Aoife E. Parsons [b], Ole B. Samuelsen [b], Ann-Lisbeth Agnalt [b]

Highlights

- Exposure to hydrogen peroxide concentrations used salmon aquaculture are lethal to all *Homarus gammarus* pelagic stages.
- Sensitivity to hydrogen peroxide is stage-specific; stage I being more sensitive.
- Immobilization and bubble formation within the carapace after exposure to hydrogen peroxide were observed.
- Sub-lethal concentrations of hydrogen peroxide negatively affect the shelter seeking behavior of the benthic life stages.

The [scientific paper] included:

> ### 4.3. Effects of H_2O_2 on the shelter-seeking behaviour
>
> Here we have shown that short (1 h) exposures to sub-lethal concentrations of H_2O_2 negatively affected several behavioural parameters associated with shelter-seeking in stage V *H. gammarus* lobsters when examined immediately after the exposure period. In all H_2O_2 treatment groups (85–510 mg/L), the lobster juveniles moved significantly less (total distance travelled) and inspected the shelter fewer times compared with control juveniles. Such negative impacts on locomotion observed in short-term sub-lethal exposures to pesticides have previously been linked to a failure in predator avoidance for other crustacean species (Farr, 1977; Rasmussen et al., 2013). Furthermore, juveniles exposed to the two higher H_2O_2 concentrations (170 and 510 mg/L) spent a longer period of time exploring their surroundings and to locate and recognise the shelter. As far as we are aware, no published studies to date have examined the effect of H_2O_2 on the shelter seeking behaviour of *H. gammarus* or any other lobster species, though exposure to H_2O_2 did have measurable effects on the escape behaviour of *Calanus* spp. (Escobar-Lux et al., 2019).

In other words:

A scientific paper published in the journal *Aquaculture Environment Interactions* in January 2019 reported:

Vol. 11: 1–17, 209
https://doi.org/10.3354/aei00292

AQUACULTURE ENVIRONMENT INTERACTIONS
Aquacult Environ Interact

Published January 10

Mortality and reduced photosynthetic performance in sugar kelp *Saccharina latissima* caused by the salmon-lice therapeutant hydrogen peroxide

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Institute of Marine Research, 5005 Bergen, Norway

ABSTRACT: Sugar kelp *Saccharina latissima* is one of the dominating kelp species on sheltered sublittoral sites along the Norwegian coastline, providing important habitats and ecosystem services. In finfish aquaculture in Norway, infections caused by salmon lice *Lepeophtheirus salmonis* are one of the biggest challenges the industry is currently facing, and presently the most-used therapeutant is hydrogen peroxide (H_2O_2). Commonly, this treatment involves bathing the fish in a solution of approximately 1700 mg H_2O_2 l^{-1} seawater before releasing the solution into the surrounding waters. The present study was conducted to increase the knowledge on how these H_2O_2 emissions from farm operations could impact juvenile *S. latissima*. This was achieved by determining the effects of a 1 h exposure to realistic H_2O_2 levels on *S. latissima* mortality and photosynthesis. Effects on photosynthesis were determined by incubating plants at 3 time intervals post-exposure. Toxicity potentials including lethal concentration for 50% of the population (LC_{50}) and effective concentration (EC_{50}) for photosynthetic capacity (P_{MAX}) and efficiency (α) were determined based on these data. Juvenile *S. latissima* was highly sensitive, having an LC_{50} of 80.7 mg H_2O_2 l^{-1}, which is less than 5% of the dose commonly used at farms and emitted to the environment. A concentration of 85 mg l^{-1} caused an immediate 90% reduction in both P_{MAX} and α. The EC_{50} was found to be 27.8 and 35.4 mg l^{-1} for P_{MAX} and α, respectively. This may indicate that natural *S. latissima* populations in the vicinity of fish farms can be negatively affected by H_2O_2 bath treatments.

Fig. 2. Effects of different concentrations of H_2O_2 on lamina of juvenile *Saccharina latissima* plants at different time intervals. (A) Normal lamina with no visible damages 15 d post-exposure to concentrations ≤17 mg l^{-1} (left), and discoloured and pale lamina 3 d post-exposure to 170 mg l^{-1} (right); (B) discoloured lamina due to pigment loss 8 d post-exposure to 85 mg l^{-1} (left), and lamina with loss of tissue due to cell death 15 d post-exposure to 85 mg l^{-1} (right)

A scientific paper published in *FACETS* in December 2019 reported:

FACETS
a multidisciplinary open access science journal

RESEARCH ARTICLE

The effects of hydrogen peroxide on mortality, escape response, and oxygen consumption of *Calanus* spp.

Rosa H. Escobar-Lux[a*], David M. Fields[b], Howard I. Browman[a], Steven D. Shema[a], Reidun M. Bjelland[a], Ann-Lisbeth Agnalt[c], Anne Berit Skiftesvik[a], Ole B. Samuelsen[c], and Caroline M.F. Durif[a]

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Abstract

Hydrogen peroxide (H_2O_2), a pesticide used in salmonid aquaculture, is released directly into the environment where nontarget organisms are at risk of exposure. We determined threshold concentrations for mortality of *Calanus* spp., the dominant zooplankton species in the North Atlantic, and assessed sublethal effects, focusing on the escape response and oxygen consumption rates (OCRs) as behavioral and physiological assays. One-hour exposure to 170 mg·L^{-1} (i.e., 10% of the recommended H_2O_2 treatment) was lethal to copepodite stage V (92% mortality) and adult females (100% mortality). The acute median lethal concentration (1h-LC_{50}) was 214.1 (150.67–277.4) and 48.6 (44.9–52.2) mg·L^{-1} for copepodite V and adults, respectively. The 25-h LC_{50} was 77.1 (57.9–96.2) and 30.63 (25.4–35.8) mg·L^{-1} for copepodite V and adults, respectively. At concentrations of 0.5% and 1% of the recommended treatment level, *Calanus* spp. showed a decrease in escape performance and lower OCRs with increased concentration. At H_2O_2 concentrations of 5% of the recommended treatment levels (85 mg·L^{-1}), exposed copepods showed no escape reaction response. These results suggest that sublethal concentrations of H_2O_2 will increase the risk of predation for *Calanus* spp. Furthermore, this study provides supporting evidence that theoretical "safe" values, traditionally used for predicting toxicity thresholds, underestimate the impact of H_2O_2 on the physiological condition of nontarget crustaceans.

Key words: aquaculture, behavior, ecotoxicology, hydrogen peroxide, sublethal effects, zooplankton

Citation: Escobar-Lux RH, Fields DM, Browman HI, Shema SD, Bjelland RM, Agnalt A-L, Skiftesvik AB, Samuelsen OB, and Durif CMF. 2019. The effects of hydrogen peroxide on mortality, escape response, and oxygen consumption of *Calanus* spp.. FACETS 4: 626–637. doi:10.1139/facets-2019-0011

Our results indicate that the No Observable Effect Concentration for *Calanus* spp. is between 8.5 and 17 mg·L^{-1}. This is considerably higher than the concentration reported for another calanoid copepod species, *A. hudsonica*, for which the sublethal concentration level of 2.6–10.0 mg·L^{-1} (EC_{50}) was determined based on feeding rate measurements (Van Geest et al. 2014). This suggests that the impact of H_2O_2 on copepods is species specific. Copepods as a group may be more sensitive to H_2O_2 than other planktonic crustaceans. For example, Gebauer et al. (2017) reported a LC_{50} for the mola rock crab larvae (*M. edwardsii*) of 1642 mg·L^{-1}, two orders of magnitude higher than thresholds for *Calanus* spp.

While it is clear that even 0.5% of the standard treatment concentration of H_2O_2 has a detrimental effect on *Calanus* spp., the dispersal and dilution processes that affect the effluent plumes after treatments at aquaculture sites are still unclear (Ernst et al. 2001). Development and testing of dispersion models, including field studies to verify the models, will be important to evaluate the broader impact of H_2O_2 on the organisms living around salmon farms.

Hydrogen Peroxide can also be lethal to farmed salmon as well as non-target species. The Institute of Marine Research in Bergen, Norway, reported in December 2017:

Colder seawater reduces salmon mortality when delousing

Bath treatment with hydrogen peroxide is an effective method to remove sea lice on farmed Atlantic salmon, but treatments can be associated with high mortalities. Findings from researchers at the Institute of Marine Research (IMR) and the University of Melbourne have developed a new treatment concept that can reduce salmon mortality and improve welfare.

Published: 11.12.2017 Updated: 21.08.2018 Author: Gunvar Mikkelsen

Hydrogen peroxide (H_2O_2) is a widely used delousing chemical in Norwegian salmon farming, but it can become toxic when seawater temperatures are high. Because of this, the Norwegian Medicines Agency has stated that the chemical shall not be used when seawater temperatures exceed 13 °C. Therefore, this chemical cannot be used during a large part of the year. In July and August 2016, a total of 143 199 salmon died at three localities after being deloused with hydrogen peroxide, where water temperatures could have played a role.

– By treating salmon with hydrogen peroxide at lowered seawater temperatures relative to ambient seawater temperatures, we eliminated mortality without decreasing delousing efficiency, says one of the authors of the published article, Kathy Overton from the University of Melbourne.

During an experiment at Matre Research Station (IMR), salmon that were held in tanks, with ambient seawater temperatures of 13 °C, and treated with hydrogen peroxide at lowered treatment temperatures of 7 °C. After treatment, salmon were returned to the ambient seawater temperature of 13 °C, to replicate them being returned from a well boat to a sea-cage with higher temperature. This treatment group experienced zero mortalities, whereas a treatment group deloused at 13°C experienced over 20 % mortality after treatment.

– Our preliminary conclusion is that to reduce salmon mortality, farmed salmon held in seawater at 13 °C should be deloused at 7 °C. This treatment concept of lowering treatment temperature down to 7 °C could be applied when ambient seawater temperatures are above 10 °C to reduce mortality risk, Overton further explains.

Overton K, Samsing F, Oppedal F, Stien LH og Dempster T. 2017. Lowering treatment temperature reduces salmon mortality: a new way to treat with hydrogen peroxide in aquaculture. Pest Management Science. DOI: 10.1002/ps.4751.

The Fish Site reported in April 2018:

Solving the sea lice burden: a question of concentration

SEA LICE · HEALTH

by Samantha Andrews
12 April 2018, at 9:00am

With sea lice an increasingly tough problem for salmon farmers to treat, new research suggests that managing water temperature might be more effective than blitzing the parasites with more chemicals

Sometimes it seems like no matter how hard salmon farmers fight, sea lice always win in the end. With the parasites increasingly developing resistance to treatments like hydrogen peroxide the temptation might be to boost dosages. However, as new research from Kathy Overton (Institute of Marine Research, Norway) shows, more is not necessarily better.

Hydrogen peroxide is arguably one of the longest-running and most widely used delousing treatments employed by salmon aquaculture. Unlike other treatments such as emamectin benzoate and flubenzurons, when hydrogen peroxide hits the sea it breaks down into its natural components – hydrogen and oxygen – making it one of the most environmentally friendly solutions available. It is also one of the riskiest treatments in terms of salmon survival, but also among the most effective for delousing.

Given the risks, it may seem strange that farmers would consider upping the amount of hydrogen peroxide they expose their fish to, but the impacts of sea lice can be devastating.

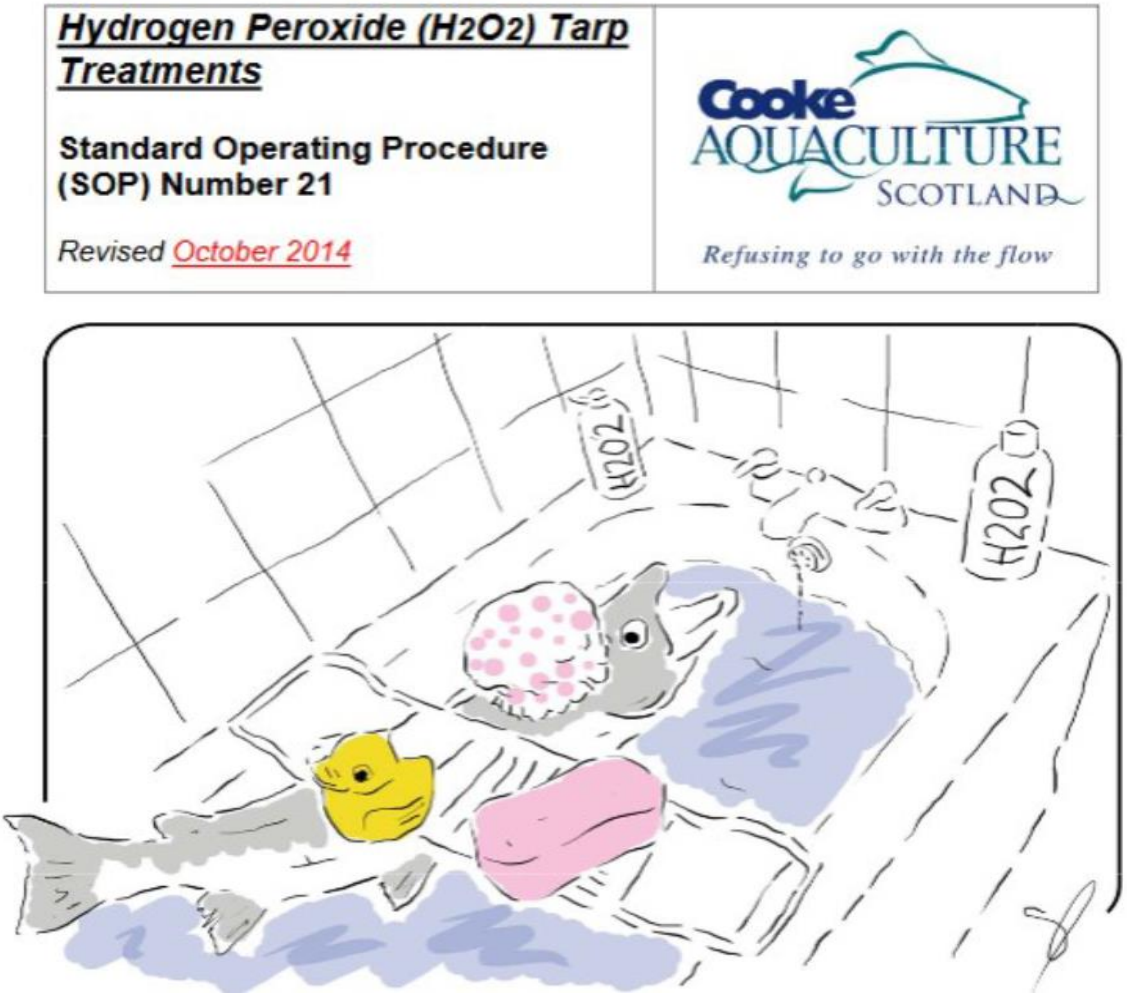
In an added complication, hydrogen peroxide resistance may also be built up outside of delousing protocols.

"Hydrogen peroxide plays an important role in fish health management, not just for sea lice treatments," Bracken explains, highlighting the potentially fatal amoebic gill disease as also being treated with hydrogen peroxide. As long as the fish's gills are in good shape and water temperatures do not exceed 14°C, hydrogen peroxide is an effective treatment against the disease. The trouble is gill-disease treatment requires less hydrogen peroxide than delousing – around $1g/L^{-1}$. As Overton highlighted in her report: "If the fish are infected with lice when they are being treated for amoebic gill disease, we are actually giving a dose that might contribute towards resistance in lice."

Overton's work on hydrogen peroxide concentrations has come hot on the heels of another study in which she explored how temperature impacts salmon mortality and the efficacy of salmon delousing in hydrogen peroxide baths.

"Especially at high temperatures, hydrogen peroxide becomes more toxic to fish… previous researchers have found that the [fish] gills tend to be a bit more damaged when hydrogen peroxide is administered at higher temperatures," she said.

Yet salmon pharmers have presented Hydrogen Peroxide as an environmentally benign bath. Here's Cooke Aquaculture's rose-tinted view of bath time on the salmon farm (in a document published by the Scottish Government – now deleted):



In the warped world of chemically embalmed salmon, pharmers see bath treatments as beauty treatments not instruments of torture.

The Advocate reported in April 2017:

Health & Welfare

In sea lice fight, salmon farmers phasing out hydrogen peroxide

H2O2 among the chemical sea lice treatments waning in favor of biological, mechanical measures

Two years ago, Marine Harvest used 8 million liters of hydrogen peroxide to treat sea lice and amoebic gill disease at its salmon farms along the coast of Scotland.

2015 marked peak usage of chemicals and medicines, said Ben Hadfield, COO, fish feed and managing director of Marine Harvest Scotland.

The following year, total usage dropped to 6 million liters as the company invested in non-chemical controls like cleaner fish – wrasse and the aptly named lumpsucker fish that swim with the salmon, plucking the sea lice that adhere to the fish's skin to feed.

Fish Farming Expert reported in September 2018:

No ban yet on hydrogen peroxide after Norway shrimp alert

Norway's fisheries minister Harald Tom Nesvik has said it is too soon to change rules about the use of hydrogen peroxide in salmon farming following new research showing that the lice-killing chemical can also damage shrimp.

By Editors

In the ongoing study by Renée Bechmann and colleagues at the International Research Institute of Stavanger (IRIS), half of the deep-water shrimp *Pandalus borealis* that were exposed to a low concentration of hydrogen peroxide for two hours died within three days.

The scientists, who used a concentration of the chemical 100 times smaller than that used in de-lousing operations, have called for the use of hydrogen peroxide to be stopped following the results which they say surprised them.

Salmon Business [reported in September 2018]:

Hydrogen peroxide supplier on delousing: "We will create resistance"

News by **Ole Alexander Saue** - 7 September 2018

"If we treat a fjord with the same method many times, we will create resistance in lice," said Chemco.

However, hydrogen peroxide supplier Chemco believes that the lice's sensitivity for chemicals are on its way back.

Mechanical treatment has become the preferred alternative to the treatment of salmon lice however Chemco biologist Jan Rune Nordhagen feels one has to be careful with the industry's overuse of chemicals in delousing.

"I think it's dangerous that the industry is falling into the same trap as before, which they have a tendency to do. The lice will eventually become resistant against the methods," he says.

"We have to swap the use of delousing methods. That's clear. It's stupid to start with one treatment if one knows it's not effective", he continues.
"You need to use all the methods you have," says Chemco general manager, Eivind Solheimsnes.

Reputation

Hydrogen peroxide has had a bad reputation for a number of years, and various studies have researched how it affects the environment as well as fish health. The Norwegian Food Safety Authority and the Veterinary Institute have said that the use of chemicals should decrease.
"The reputation is unfair. I have tested the spread after several H2O2 treatments. Even at one meter from the plant, the peroxide concentrations are very low," biologist Nordhagen claims.
Time will show how much hydrogen peroxide they will sell this autumn.

"I do not know for sure. The ones who used hydrogen peroxide in winter had surprisingly good effect. Where the lice had reduced sensitivity before, the effect returns,"

A paper published in the journal *Aquaculture* in February 2017 reported:

ELSEVIER

Aquaculture

Volume 468, Part 1, 1 February 2017, Pages 135-140

Increased catalase activity — A possible resistance mechanism in hydrogen peroxide resistant salmon lice (*Lepeophtheirus salmonis*)

Kari O. Helgesen, Marit J. Bakke, Kiranpreet Kaur, Tor E. Horsberg

Highlights

- Resistance towards delousing agents including hydrogen peroxide is becoming a problem for salmon lice control.
- A good correlation was found between hydrogen peroxide sensitivity, catalase gene expression and catalase enzymatic activity.
- Molecular screening methods can be developed for this mechanism.

In the current study, two strains of salmon lice differing in sensitivity towards H_2O_2 were used. Four different groups of salmon lice were included per strain: pre-adult I females and males, pre-adult II females and adult males. In comparison to the sensitive strain, both the catalase activity and the expression of the catalase gene were increased in the resistant salmon louse strain. This was true for all investigated life stages. The least square mean catalase activity was 2.0 units per mg protein in the sensitive strain and 6.5 units per mg in the resistant strain.

The results obtained in this study indicate that increased catalase activity plays a role in H_2O_2 resistance in salmon lice. To the best of our knowledge, this is the first possible H_2O_2 resistance mechanism described in arthropods.

CNN [reported in 2017]():

CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

Ingesting hydrogen peroxide can be fatal, researchers say

By Johanzynn Gatewood, CNN

Updated 0942 GMT (1742 HKT) February 20, 2017

Photos: Common household poisons

Hydrogen peroxide – Researchers for a study published in the Annals of Emergency Medicine in 2016 looked at 294 cases of peroxide ingestion over a 10-year period. They found that a large number of cases where patients swallowed high-concentration peroxide resulted in critical illness, some with continued disability or death.

After consuming high-concentration peroxide, patients in the study experienced conditions including seizures, altered mental status, respiratory distress, stroke and pulmonary embolism and heart attacks.

Even a mouthful or two of concentrated hydrogen peroxide led to critical illness caused by a suspected embolism, a vessel blockage, in 13.9% of cases studied, the study said.

Severe long-term outcomes, including continued disability or death, were found in 20 (6.8%) of the 294 cases reported to US poison centers.

"It is not an edible substance. It is very dangerous when you take a high concentration of hydrogen peroxide," said Dr. Cathleen Clancy, associate medical director at the National Capital Poison Center, who was not involved in the new study.

"To put it in perspective, when you consume 1 milliliter of 3% hydrogen peroxide, it can release 10 milliliters of oxygen," she said. "When you put a high concentration of hydrogen peroxide into the blood vessels, it can cause an embolism, which is a collection of air in the blood vessels that can cause a stroke."

Fish Farming Expert [reported in 2016]():

H2O2 treatment concerns

Researchers from Quantidoc AS in Norway presented new results in Edinburgh this week which showed that delousing treatments with hydrogen peroxide (H2O2) may compromise the health of fish for up to 2 weeks.

By Laura Braden, PhD

A healthy mucosa means a healthy fish, and a new technology developed University of Bergen Professor Karin Pittman is allowing researchers to investigate the mucosa-damaging effects of many common aquaculture-associated stressors.

One example is the effects of delousing treatments with hydrogen peroxide on the skin, gill and gut health of salmon.

Deemed an important tool in the integrated pest management control strategies of the parasitic salmon louse, hydrogen peroxide offers farmers a method to remove lice from their fish without chemotherapeutants (eg SLICE). And because it degrades rapidly in the environment, treatment with hydrogen peroxide is seen as a much more environmentally friendly way to treat fish.

However, exposure to an oxidizing agent can be harmful to the fish, especially the mucosal barriers of the gills, skin and gut.

Using mucosal mapping tools, researchers have determined that harmful effects caused by hydrogen peroxide include damage to the delicate gill tissue and associated mucosal layers. Moreover the research reveals that the fish need at least 2 weeks to recover to a normal state - during this time, the animals might be more susceptible to aquatic pathogens as their primary immune defence (the mucosa) is compromised.

A factsheet published by Salmon Scotland claims that Hydrogen Peroxide is "is of low environmental concern" and "has no wider adverse environmental impact":

Why is hydrogen peroxide used in salmon farming?

Hydrogen Peroxide is used in aquaculture as a bath treatment to protect fish from a number of potentially harmful organisms including sea-lice. It's not only effective but has no wider adverse environmental impact as it rapidly breaks down to form pure water and oxygen. Those properties mean that Hydrogen Peroxide is also used by environmental agencies during pollution incidents to raise oxygen levels for fish and stop them suffocating.

How does hydrogen peroxide work?

Mode of action: the subtance dissociates into oxygen and water which causes disruption to internal structures, resulting in the detachment and mortality of the sea lice.

How does hydrogen peroxide affect the environment?

Hydrogen Peroxide is of low environmental concern and is not classed as hazardous by regulators. It quickly breaks down into water and oxygen leaving no harmful by-products in the environment. Once a treatment is completed the product disperses quickly and is further diluted by the surrounding seawater to trace levels which quickly decompose to water and oxygen.

Are salmon treated with hydrogen peroxide safe to eat?

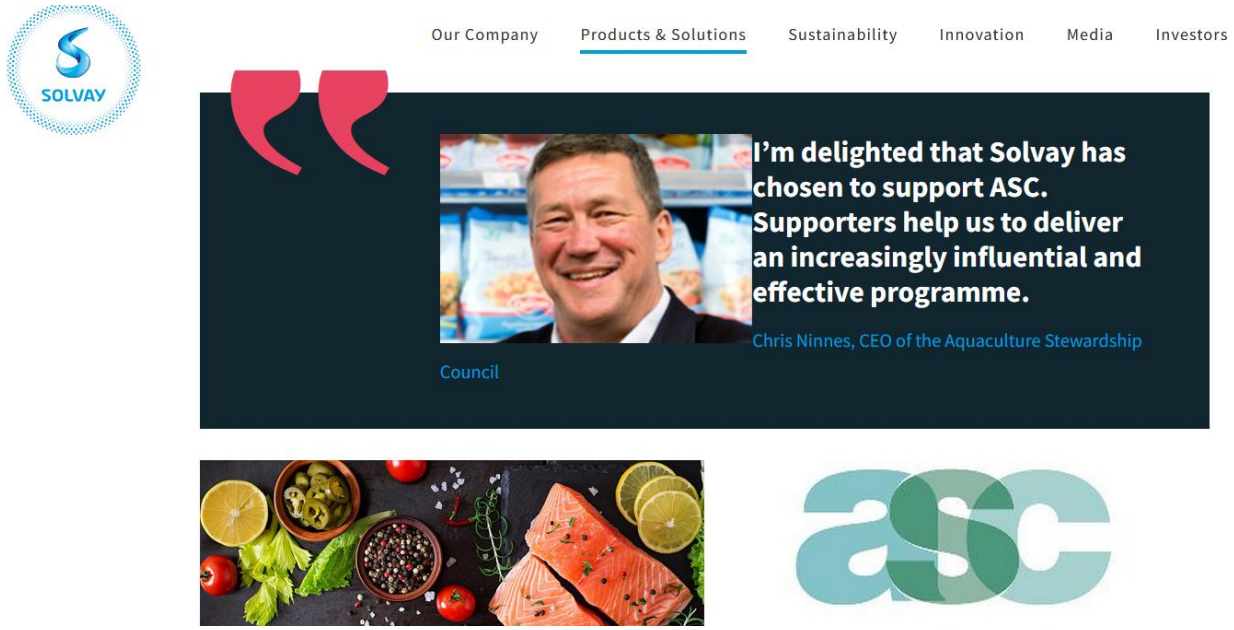
Hydrogen peroxide leaves no residue or trace on the fish and therefore is completely safe to consumers.

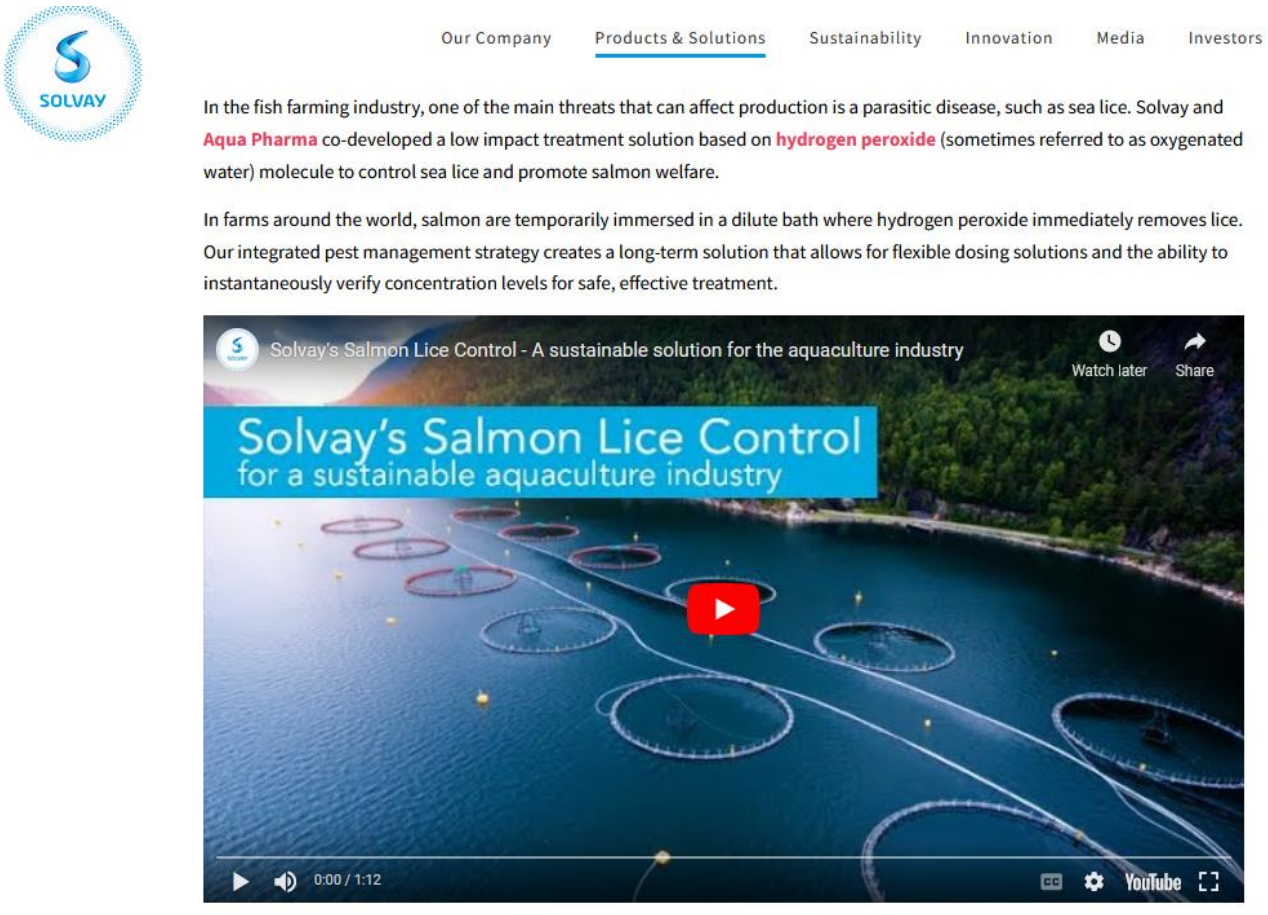
How is the use of hydrogen peroxide controlled?

Products are produced and distributed through a safe and fully traceable supply chain. All treatments are recorded.

Medicine use is a condition on environmental licences (CAR) granted and regulated by SEPA (Scottish Environmental Protection Agency), extensive modelling and monitoring is conducted on sites regularly before and during their operation to ensure the use of medicine will not have any detrimental impact on the environment.

Hydrogen Peroxide is endorsed by the Aquaculture Stewardship Council, [according to Solvay's website] (Solvay manufacturers the Hydrogen Peroxide formulation Paramove 50):





The ASC's latest version of their salmon standard (July 2019) endorses the use of Hydrogen Peroxide:

Additional considerations:

1. Hydrogen peroxide (H_2O_2) must be considered as medicinal parasiticide treatment and thus be included in the WNMT-count;
2. If a *single* bath-treatment is prescribed to be applied as "coupled-treatment" (i.e. one treatment at t_1 and a follow-up treatment at t_2), then each treatment (t_1 and t_2) must be included in the WNMT-count.

Some more examples are given on how to count the WNMT, e.g.

- treating 1 cage, out of 10, once with hydrogen peroxide (H_2O_2), will count as WNMT = 0.1;
- treating 1 cage, out of 10, once with hydrogen peroxide (H_2O_2) as a coupled-treatment, will count as WNMT = 0.2;

[182] Medicinal parasiticide includes hydrogen peroxide.

Scottish Salmon Watch wrote to the Soil Association in March 2021 asking why Hydrogen Peroxide was endorsed under 'organic' salmon farming:

From: **Don Staniford** <salmonfarmingkills@gmail.com>
Date: Mon, Mar 22, 2021 at 7:49 AM
Subject: Addendum: Is the carcinogenic chemical Formalin & toxic Hydrogen peroxide permitted by the Soil Association?
To: <contact@soilassociation.org>, <cert@soilassociation.org>, <lbowles@soilassociation.org>, Helen Browning <hbrowning@soilassociation.org>, <mdawson@soilassociation.org>, <jcashmore@soilassociation.org>, <JLewis@soilassociation.org>, <lpharoah@soilassociation.org>, <abehan@soilassociation.org>, <jdingwall@soilassociation.org>, <acartwright@soilassociation.org>

In addition, does the Soil Association's aquaculture standards permit the use of the toxic chemical Hydrogen peroxide?

A scientific paper - "Gill damage and delayed mortality of Northern shrimp *(Pandalus borealis)* after short time exposure to anti-parasitic veterinary medicine containing hydrogen peroxide" - published in Ecotoxicology & Environmental Safety in September 2019 reported that:

"Results from dispersion modelling (literature data) together with the current experiments indicate that treatment water with toxic concentrations of H_2O_2 (1.5 mg/L) could reach *P. borealis* living more than 1 km from a treated salmon farm"

Another scientific paper - "Acute toxic effects of hydrogen peroxide, used for salmon lice treatment, on the survival of polychaetes *Capitella* sp. and *Ophryotrocha* spp" - published in Aquaculture Environmental Interactions in August 2018 detailed further toxic impacts.

Are Mowi and Organic Sea Harvest - certified by the Soil Association as 'organic' - using Hydrogen Peroxide?

The RSPCA's salmon standards (February 2021) – supervised by a Who's Who of salmon farming representatives including Mowi, Scottish Sea Farms, Loch Duart and Cooke - sanction the use of Hydrogen Peroxide and other toxic chemicals on RSPCA Assured salmon farms:

RSPCA welfare standards for farmed Atlantic salmon

Our detailed RSPCA welfare standards have been developed to represent good practice in the care and welfare of commercially farmed Atlantic salmon at all stages of their lives.

Download the **RSPCA welfare standards for farmed Atlantic salmon (PDF)**.

RSPCA farmed salmon standards technical advisory groups

LEGAL Any veterinary medicines used must be licensed in the UK for use in Atlantic salmon or authorised under an Animal Test Certificate or an Animal Test Exemption Certificate issue.

> **The RSPCA recognises that the welfare of farmed fish may be adversely affected by the limited availability of vaccines or therapeutic medicines approved for the treatment of fish. In exceptional circumstances, on the advice of the designated veterinary surgeon, specific products licensed in the UK for use in other food producing species can be administered (following the requirements of the cascade principle) as detailed in the Veterinary Health and Welfare Plan (see H 1.1), providing that a valid discharge consent is held from the appropriate Government body. All proven medications should be made available to aid disease treatment as advised by the designated veterinary surgeon.**

Gill Disease

Gill Disease in Atlantic salmon during the marine phase of their lifecycle is caused by a range of pathogens and includes conditions such as Amoebic Gill Disease (AGD) and Proliferative Gill Disease (PGD). Recently, AGD has become more prevalent, and whilst the reasons for the proliferation of the organisms causing the condition are not fully understood, certain factors such as water temperature, salinity, smolt size and quality are key determinants contributing to the prevalence of the disease. Treatments include bathing in hydrogen peroxide or freshwater. The timing and administration of these treatments are key factors in terms of influencing the success of these procedures, as is the requirement to make them as stress free as possible for the fish involved.

Here's a specimen prescription signed by Dr Ronnie Soutar (head vet with Scottish Sea Farms and current chair of the SSPCA – until May 2022 when he is replaced):

Scottish Sea Farms | SEA LICE MANAGEMENT

3.3 Specimen Prescription

Aqualife FISH CARE PROFESSIONALS

Veterinary prescription for
Scottish Sea Farms Ltd, Blackness Pier, Scalloway, Shetland. ZE1 0TQ

Prescription reference	RS SSF H2O2 2014011
Prescription date	8th October 2014
Site(s)	Slocka
Manager / Responsible person	Michael Ruddick
Stock	13gS0
Units to be treated	12*80m circles
Condition to be treated	AGD & sea lice
Method	Bath (Tarpaulin enclosure)
Medicine	Paramove vm 31011/4000
Supplier	Aqua Pharma
Active ingredient	Hydrogen Peroxide 49.5%
Supplied from	Aqua Pharma stock
Batch number	1228, 1235, 1251 & 1253
Expiry date	5th, 7th, 12th & 12th July'15
Medicine dose	1500 ppm
Treatment dose per unit	Approx. 5,300 litres, but determined by titration
Treatment duration (Minutes)	20 minutes
Total medicine	63.7 m^3
Veterinary instruction	Peroxide concentration must be titrated during treatment. If <1000ppm, add additional peroxide. If >1500ppm, reduce treatment time.
Withdrawal period which must be completed after treatment before fish can be harvested for human consumption.	Zero

Instructions

- Medicines are only to be administered by trained, competent staff.
- Supplier's product information and safety data sheets must be available on site.
- Follow the supplier's safety recommendations and all relevant Health & Safety protocols.
- A standard operating protocol must be in place and followed for all bath treatments.
- Oxygen concentration should be maintained between 90 & 120% saturation and above 7 mg/litre.
- Wear appropriate protective clothing when handling and administering the product.
- Do not eat, drink or smoke when handling the product.
- Wash contaminated skin and clothing thoroughly after handling the product.
- Medicine usage must comply with SEPA discharge consent for the site.
- Any adverse reactions must be notified to the prescribing veterinarian as soon as possible.
- Any adverse reactions in staff must also be notified in accordance with company H&S protocols.
- Medicine usage must be recorded in sufficient detail to allow traceability of treated stock.
- Medicines records must be kept for a minimum of 5 years.

For animal treatment only. For use in animals under my care.

Signed Ronnie Soutar, BVM&S, MSc, MRCVS

Aqualife Services Ltd, Wallace House, 5 Whitehouse Road, Stirling. FK7 7TA
Tel: 01786 849 141 Mob: 07809 466 758
email: ronnie.soutar@aqualifeservices.co.uk

According to the Veterinary Medicines Directorate:

Revised: November 2017
AN: 01958/2016

SUMMARY OF PRODUCTS CHARACTERISTICS

1. NAME OF THE VETERINARY MEDICINAL PRODUCT

Paramove, 49.5% w/w Hydrogen Peroxide concentrate for solution for fish treatment.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Active Substance	Excipients
49.5% w/w Hydrogen Peroxide	Disodium dihydrogen diphosphate Nitric Acid Demineralised Water

3. PHARMACEUTICAL FORM

Concentrate for solution for fish treatment.
The product is a clear, colourless liquid.

4. CLINICAL PARTICULARS

4.1 Target species

Atlantic Salmon

4.2 Indications for use, specifying the target species

For the treatment of salmon suffering from infestation with motile (pre-adult to adult) sea lice, *Lepeophtheirus salmonis* or *Caligus spp*, prior to the stage where serious tissue damage occurs.

4.3 Contraindications

Do not exceed the recommended concentration of hydrogen peroxide.

Do not use at high water temperatures. Extreme care should be taken if using hydrogen peroxide at water temperatures above 14°C. If treatment is unavoidable, hydrogen peroxide concentration and contact time should be reduced. If signs of atypical behaviour, e.g. fish losing equilibrium or hyperactivity are observed, treatment should be stopped immediately.

And:

6.6 Special precautions for the disposal of unused veterinary medicinal product or waste materials derived from the use of such products, if appropriate

Harmful to aquatic life. Do not contaminate water courses or confined inlets with concentrated product as high concentrations may be deleterious to some marine species.
Any unused veterinary medicinal product or waste materials derived from such veterinary medicinal products should be disposed of in accordance with local requirements.
Dispose of contents/ container to an approved waste disposal plant.

Another [VMD document for a different Hydrogen Peroxide brand] includes:

United Kingdom
Veterinary Medicines Directorate
Woodham Lane
New Haw
Addlestone
Surrey KT15 3LS

DECENTRALISED PROCEDURE

PUBLICLY AVAILABLE ASSESSMENT REPORT FOR A VETERINARY MEDICINAL PRODUCT

Asperix Vet, 49.5 % w/w Hydrogen Peroxide Concentrate for Solution for Fish Treatment

Date Created: 20th March 2018

User Safety

A user risk assessment was provided in compliance with the relevant guideline. The posology and indications are the same as those of the reference product and the same user warnings that feature on the SPC of the reference product are proposed. Warnings and precautions as listed on the product literature are adequate to ensure safety to users of the product. Therefore the following applicant's user recommendations are appropriate:

Harmful

Corrosive

Oxidising Agent

Do not attempt to administer the product unless you have been fully trained to handle and use the product, and are fully aware of operational and safety procedures. Hydrogen peroxide is corrosive.

This product is harmful if swallowed or if inhaled and may cause respiratory irritation. Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

Avoid contact with skin and eyes. This product may cause skin irritation and serious eye damage.

And:

> For the assessment of the risk from hydrogen peroxide, following the intended use of the product, the timeframe and the critical concentration are required inputs for the model. SEPA has not set an EQS or timeframe/area where the EQS can be exceeded (AZE) as it is considered that hydrogen peroxide will rapidly degrade both during and after the treatment due to the presence of high concentrations of organic matter (treated fish, fish food, fouling on pen nets, other organic matter near cages). In terms of the AZE, the same parameters as agreed for azamethiphos, which are the lesser value of 0.5 km² or 2% of the loch area. This approach is considered to be conservative and therefore acceptable.
>
> The findings from the above modelling indicate that there may be a potential risk to some marine organisms, directly after use of the product. However, this risk can be mitigated with dilution and degradation which are increased by water movements. The product is not expected to pose a risk for the environment when used as recommended, and providing the following environmental safety information is adhered to.
>
> SPC Section 4.5.iii 'Other precautions'
>
> - The most important mechanisms for removal of hydrogen peroxide in coastal waters are dilution and degradation which are increased by water movements, including the flushing effects in sea lochs. Do not use at times of slack water as poor dilution and dissociation of residuals may occur.
>
> - After treatment, care should be taken to provide sufficient water through the net to dilute residual hydrogen peroxide. The water from a boat's propeller may be used to increase water exchange in cases where low water exchange rates cannot be avoided. These measures will help to prevent possible adverse effects on aquatic life.

A factsheet published by MSD Animal Health advocates the use of Hydrogen Peroxide together with SLICE (Emamectin benzoate):

The SLICE® Sustainability Project
(parasiticide)

Sequential treatment of salmon with SLICE®
(emamectin benzoate)
and hydrogen peroxide for the control of sea lice.

A press release published by The Global Alliance Against Industrial Aquaculture in February 2017 included:

> "The Scottish salmon farming industry's use of toxic chemicals is exploding due to sea lice resistance," said Don Staniford, Director of the Global Alliance Against Industrial Aquaculture. "Put simply, the drugs don't work. There's more than enough rocket propellant being pumped into Scottish waters to propel this corrosive industry back to Norway. Consumers can blow this toxic industry out of the water by boycotting Scottish salmon".

Tankers carrying hundreds of litres of the toxic chemical - marked "corrosive" - are now a regular sight across Scotland. Here's a tanker marked "corrosive" Hydrogen Peroxide parked in Ullapool, Wester Ross:

And here's Hydrogen Peroxide trucks at a transport depot in North Uist, Outer Hebrides:

Here's vats of Hydrogen Peroxide in North Uist, Outer Hebrides:

Mass mortalities due to Hydrogen Peroxide are piling up at salmon farming's door - the deaths include:

126,225 farmed salmon in Norway in 2016 "likely due to the fish being overexposed to hydrogen peroxide" (reported by Norway Today)

80,000 farmed salmon in Norway in 2016 "after delousing them with hydrogen peroxide" (reported by Intrafish)

60,000 farmed salmon "killed by hydrogen peroxide being used to treat them for amoebic gill disease at Marine Harvest's fish farm in Soay Sound, off the Isle of Harris" in 2016 (reported by Daily Telegraph, The Ferret and GAAIA).

17,000 farmed salmon (70 metric tons) died "while using hydrogen peroxide" in Norway in 2015 (reported by Intrafish)

Marine Harvest loses 70 tons of salmon during sealice treatment

Norwegian Food Safety Authority talks of 'very serious incident,' local media report suggests.

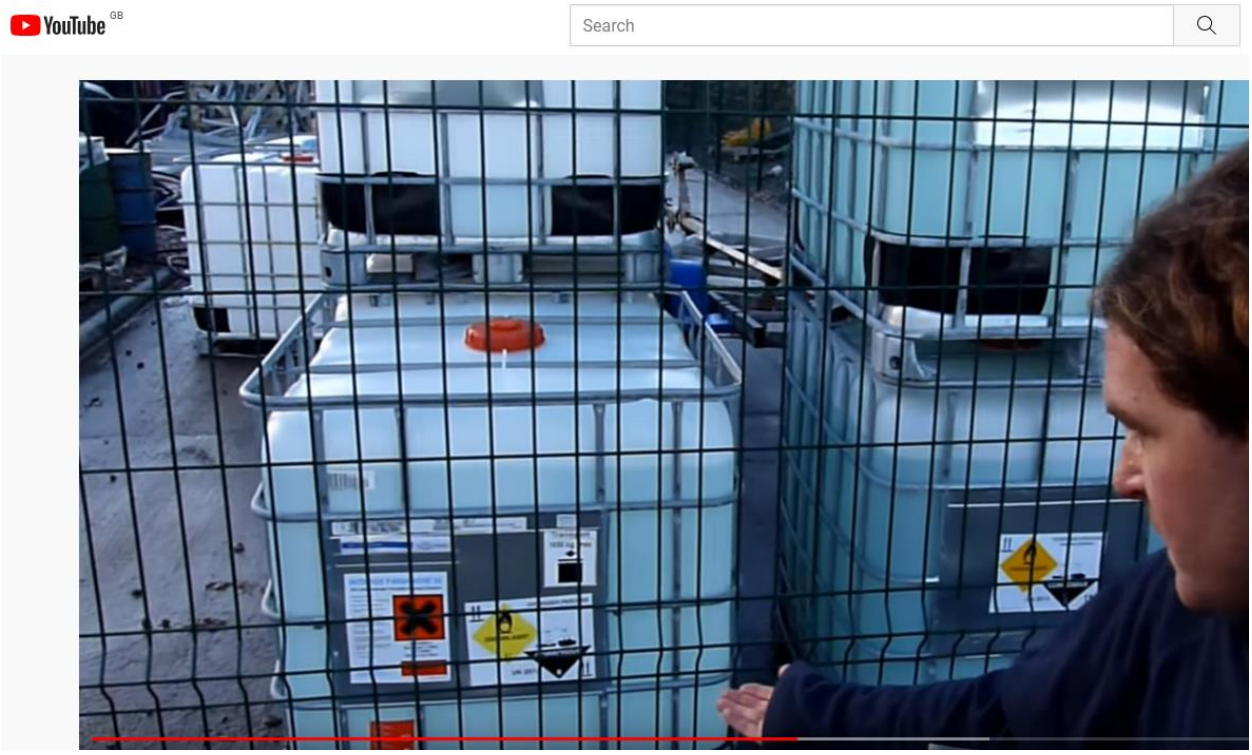
by IntraFish Media
October 14th, 2015 13:09 GMT Updated May 9th, 2018 19:24 GMT

The Sunday Times reported in February 2017:

In 2001, Compassion In World Farming (CIWF) warned that hydrogen peroxide posed "serious animal welfare drawbacks". Philip Lymbery, the chief executive of CIWF, said: "We have long condemned the use of this chemical because it is known to cause suffering to farmed fish."

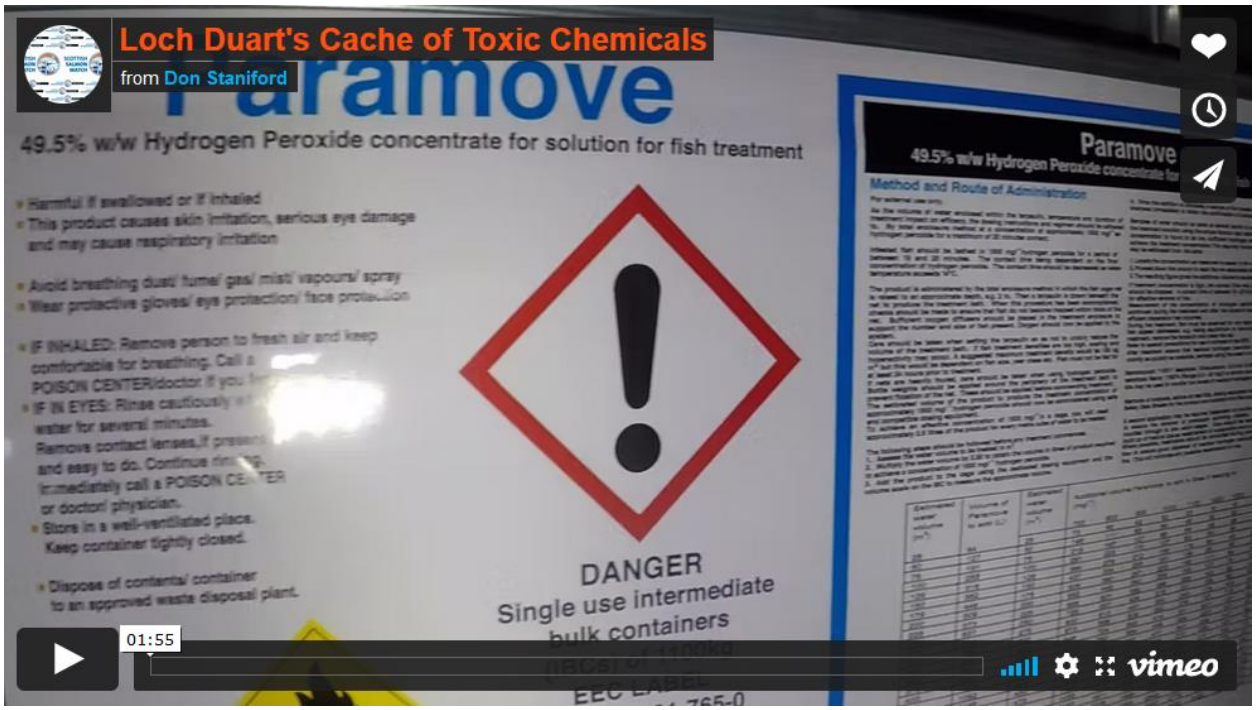
Watch [video footage of Paramove 50 at Marine Harvest (Mowi)]:

Watch [video footage from Loch Duart in North Uist]:



Watch [video footage at Wester Ross Salmon]:

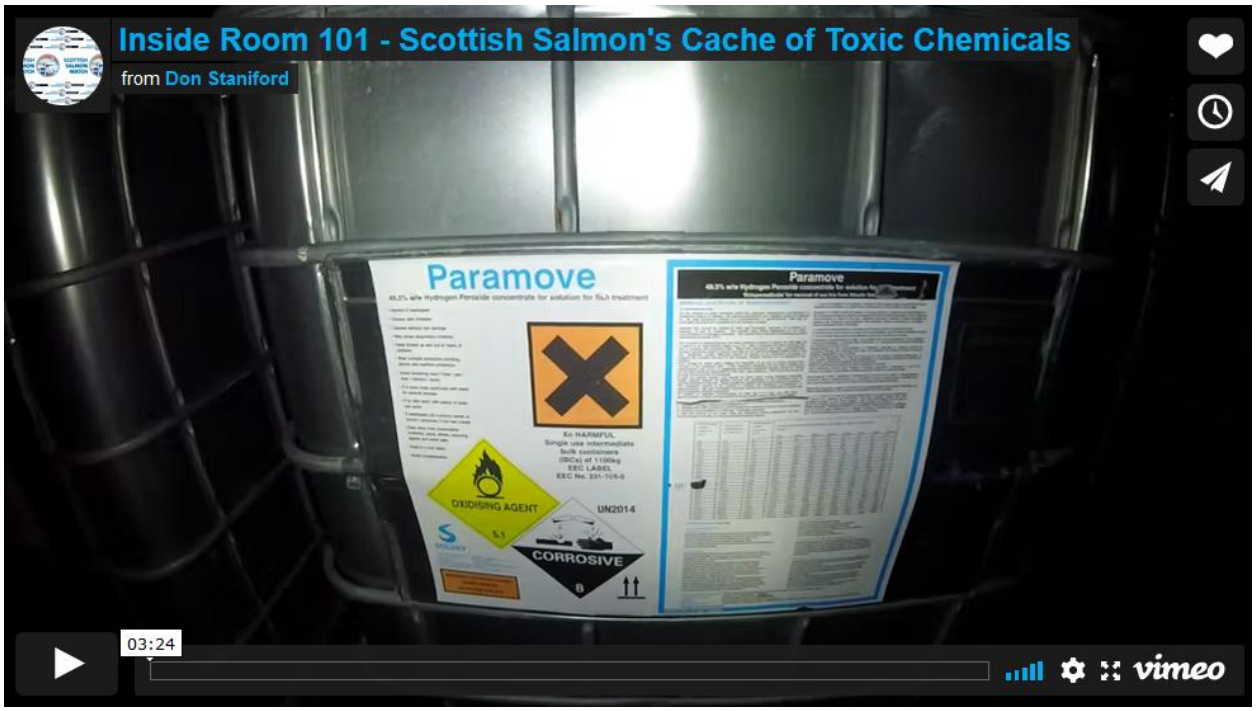
Watch [video footage at Loch Duart in Badcall Bay]:



Watch [video footage at Mowi in Argyll]:

Watch [video footage at Kames in Argyll]:

Watch [video footage of tankers and containers of Hydrogen Peroxide at Ferguson Transport near Fort William]:



Notes to Editors:

[1]

From: **Access to Information Enquiries** <foi@sepa.org.uk>
Date: Tue, Mar 1, 2022 at 9:29 AM
Subject: Request for Information Response - F0192861
To: Don Staniford <salmonfarmingkills@gmail.com>
Cc: Access to Information Enquiries foi@sepa.org.uk

OFFICIAL

REQUEST FOR INFORMATION – RESPONSE

We apologise for the delay in providing this response.

SEPA Access to Information Team began working remotely on 17 March 2020 due to COVID-19. In addition, there was continued disruption due to a sophisticated criminal cyber-attack on Christmas Eve 2020 which have significantly affected SEPA's ability to respond to Access to Information enquiries. More information about SEPA's response and service status can be found here: https://www.sepa.org.uk/about-us/cyber-attack

Please see the enclosed response.

If you are not satisfied with the response provided and wish to request a formal review. You have 40 working days from the date of this email to request a formal review from SEPA at: foi@sepa.org.uk

If you are still not satisfied, following the completion of a formal review, you can appeal to the Scottish Information Commissioner. www.itspublicknowledge.info/appeal

Your unique reference number is F0192861. Please quote this in any future contact with us about your request.

Carol Ann Morland

Access to Information Team

5 Attachments

SEPA FOI reply letter 1 March 2022 Hydrogen Peroxide Use on Salmon Farms EIR Response F0192861

PUBLIC

Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

RESPONSE TO F0192861

Request Timeline

Date	Status
09/12/2020	EIR Request received [statutory deadline 11/01/2021]
10/12/2020	Email from requestor clarifying request.
11/12/2020	Acknowledgement sent to requestor
01/12/2020	Apology email for delay sent to requestor
24/12/2020	Cyber-attack
01/03/2022	Response issued

Requested Information

1. **Please provide information on the use of Hydrogen Peroxide in salmon farming - via both wellboats, tarpaulins and any other methods - since 1 January 2016 (effectively an update on the data published by GAAIA in February 2017). Where is the data for use of Hydrogen Peroxide via tarpaulins and any other methods of application?**

A. **Please include Excel spreadsheets, data, emails, letters, reports and any other information related to the use of Hydrogen Peroxide in salmon farming in Scotland.**
B. **Please also include any information including emails, discussions with the Scottish Government, SSPO and any other parties relating to the non-reporting and non-recording of Hydrogen Peroxide use.**
C. **Provide information pertaining to why the use of Hydrogen Peroxide has remained unreported, unrecorded and/or unpublished including any discussions with the Scottish Government, the SSPO, Mowi and other salmon farming companies.**

2. **Please explain why the use of Hydrogen Peroxide is not included via the 'Scotland's Aquaculture' database: http://aquaculture.scotland.gov.uk/data/fish_farms_monthly_biomass_and_treatment_reports.aspx**

As context, the information provided on 30 September 2020 via FOI/202000084741 - online via https://www.gov.scot/publications/foi-202000084741/ - included data on the use of Hydrogen Peroxide (Paramove) in 2019 via wellboats; namely:Scottish Salmon Watch finds it difficult to believe that this was the only use of Hydrogen Peroxide in 2019.

Another FOI replied to by the Scottish Government on 30 September 2020 (FOI-202000084355) detailed an Excel spreadsheet of data of chemical use via wellboats for 2018: https://www.gov.scot/publications/foi-202000084355/ - including data on the use of Hydrogen Peroxide: Again, Scottish Salmon Watch struggles to believe that Grieg Seafood was the only user of Hydrogen Peroxide in 2018.

In April 2018, a FOI disclosure by the Scottish Government provided data on Hydrogen Peroxide use via wellboats (although it appears the data returns were not complete): https://www.gov.scot/publications/foi-18-00985/ - including: Please note that GAAIA published data on Hydrogen Peroxide use in February 2017 obtained from SEPA via FOI for period 2005 to 2015.

Read more via "Sky-Rocketing Chemical Use on Scottish Salmon Farms - Hydrogen Peroxide use leaps from 19,000 litres in 2005 to 19m litres in 2015".

A FOI reply from the Scottish Government in April 2019 provided some details on Hydrogen Peroxide use on salmon farms but no site specific data: https://www.gov.scot/publications/foi-19-00723/

Another FOI reply from the Scottish Government in December 2017 provided information on mortalities associated with the use of Hydrogen Peroxide in salmon farming: https://www.gov.scot/publications/foi-17-02755/

Another FOI reply from the Scottish Government in December 2018 refused to provide information on Hydrogen Peroxide: https://www.gov.scot/publications/foi-18-03273/

Response

We can confirm that we have handled your request under the terms of the Environmental Information (Scotland) Regulations 2004 (EIRs).

We apologise for the delay in providing this response.

SEPA Access to Information Team began working remotely on 17 March 2020 due to COVID-19. In addition, there was continued disruption due to a sophisticated criminal cyber-attack on Christmas Eve 2020 which have significantly affected SEPA's ability to respond to Access to Information enquiries. More information about SEPA's response and service status can be found here: https://www.sepa.org.uk/about-us/cyber-attack

1. Please find attached two spreadsheets with the figures for Hydrogen Peroxide use reported by operators in their quarterly returns for the calendar years 2020 & 2021.
   - *HydrogenPeroxide15-19 FINAL.xls (do not include treatments carried out on wellboats)*
   - *HydrogenPeroxide-20.xls (do not include treatments carried out on wellboats)*
   - *HydrogenPeroxide-21.xls (include treatments carried out on wellboats)*

We can confirm that we do not hold any correspondence between the Scottish Government, SSPO or any other parties relating to the non-reporting and non-recording of Hydrogen Peroxide.

2. SEPA are working towards ensuring all data is made easily accessible by publication. We are currently exploring how we could make information hydrogen peroxide available via Scotland's Aquaculture Website. This requires development of the website and we are exploring with partners how we best achieve this as we prioritise improvements to our Information systems post the serious cyberattack SEPA experienced at the end of 2020.

Advice and Assistance

We can advise that treatments at fish farms can either be carried out directly in the pens or onboard wellboats adjacent to the pens. Authorisation and regulation of discharge treatment solutions from wellboats passed from Marine Scotland to SEPA on 9 November 2020.

Further information regarding the regulations/ exceptions applied to this information can be found below.

Application of Regulations/Exceptions

Section 39(2)

We have applied the exemption under Section 39(2) of the Freedom of Information (Scotland) Act 2002 as we have determined that the information sought in your request is environmental information. We are therefore handling your request under the terms of the Environmental Information (Scotland) Regulations 2004 (EIRs). In this case the public interest in maintaining this exemption and in dealing with the request in line with the requirements of the EIRs outweighs any public interest in disclosing the information under FOISA.

Regulation 9 – Advice and assistance

Where we have issued additional information or advice this is provided in line with SEPA's duty to advise and assist under Regulation 9 of The Environmental Information (Scotland) Regulations 2004.

Regulation 10(4)(a) – Information not held

Where we have advised above that SEPA does not hold this information it is excepted under Regulation 10(4)(a) of the Environmental Information Regulations 2004. The text of which is reproduced below;

(4) A Scottish public authority may refuse to make environmental information available to the extent that;- (a) it does not hold that information when an applicant's request is received.

The exception in regulation 10(4)(a) is subject to the public interest test in regulation 10(1)(b) of the EIRs. As SEPA does not hold the information in question there is no conceivable public interest in requiring that the information be made available.

Regulation 14(1)(b) – Other authority

As confirmed above SEPA does not hold this information. In accordance with the terms of the EIRs regulation 14(1)(b), The text of which is reproduced below.

14(1) Where a Scottish public authority has received a request to make environmental information available and does not hold that information but believes that another public authority holds the information requested then it shall (b) supply the applicant with the name and address of that other authority

We advise that you contact:
Marine Scotland, 1A South, Victoria Quay, Edinburgh, EH6 6QQ
Telephone: +44 (0)300 244 4000
email: marinescotland@gov.scot

Excel #1: Hydrogen Peroxide use in 2021: 2,224,225 litres (76 sites)

Excel #1 Hydrogen Peroxide 2021

Note from SEPA:

HydrogenPeroxide-21.xls (include treatments carried out on wellboats)

Yea	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres
2021	Allt a Chois (Kishorn North	Scottish Sea Farms Ltd	133523
2021	Balta Island	Cooke Aquaculture Scotland	83995
2021	Westerbister	Scottish Sea Farms Ltd	80471
2021	Spelve B (Dalnaha)	Scottish Sea Farms Ltd	75364
2021	Reibinish	The Scottish Salmon Company	73555
2021	Ardintoul	Mowi Scotland Ltd	66775
2021	Wick of Belmont North	Cooke Aquaculture Scotland	65304.5
2021	Camus Glas	Mowi Scotland Ltd	64640.75
2021	Setterness North	Grieg Seafood Shetland Ltd	63100
2021	Ness of Copister	Cooke Aquaculture Scotland	60879
2021	Veantrow Bay	Scottish Sea Farms Ltd	53336
2021	Linga (South of Linga)	Grieg Seafood Shetland Ltd	52400
2021	Oldany	Loch Duart Ltd	49401
2021	Point of Burkwell (Site 5)	Cooke Aquaculture Scotland	48308.5
2021	Setterness South	Grieg Seafood Shetland Ltd	46800
2021	Bight of Foraness	Grieg Seafood Shetland Ltd	45600
2021	MacLeans Nose	Mowi Scotland Ltd	42120.25
2021	Sound of Harris (Groay-Lingay)	Loch Duart Ltd	40518.8
2021	Groatay	Mowi Scotland Ltd	39962.5
2021	Bloody Bay	Scottish Sea Farms Ltd	39293
2021	Scallastle Bay	Scottish Sea Farms Ltd	39187
2021	Scadabay	The Scottish Salmon Company	37376
2021	Invasion Bay	Mowi Scotland Ltd	36651
2021	Grey Horse Channel	Mowi Scotland Ltd	34850
2021	Cole Deep	Grieg Seafood Shetland Ltd	34500

2021	Dury Voe (Swarta Skerry)	Scottish Sea Farms Ltd	34224
2021	Winna Ness	Cooke Aquaculture Scotland	33583
2021	Uyea Isle	Cooke Aquaculture Scotland	33342.5
2021	Vee Taing	Cooke Aquaculture Scotland	32775
2021	Collafirth Delting Site 3	Grieg Seafood Shetland Ltd	32100
2021	Sron	Mowi Scotland Ltd	29983
2021	Grey Horse Channel Outer	Mowi Scotland Ltd	29286.75
2021	Fiunary	Scottish Sea Farms Ltd	28199
2021	Colonsay	Mowi Scotland Ltd	26862
2021	Bellister	Scottish Sea Farms Ltd	26381
2021	Slocka (Site C)	Scottish Sea Farms Ltd	25953
2021	Fishnish A	Scottish Sea Farms Ltd	25668
2021	Eilean Fada Mor	Scottish Sea Farms Ltd	23985
2021	Hunda North	Scottish Sea Farms Ltd	23272
2021	Charlotte Bay	Scottish Sea Farms Ltd	23130
2021	Dunstaffnage	Scottish Sea Farms Ltd	21682
2021	Vidlin Outer Site	Scottish Sea Farms Ltd	21504
2021	Greshornish	Mowi Scotland Ltd	20949
2021	Skipport Outer (Ornish)	Mowi Scotland Ltd	20030.25
2021	Caolas Loch Portain	Loch Duart Ltd	18630.165
2021	Kirk Noust	Cooke Aquaculture Scotland	17526
2021	South Sound, Mangaster Voe	Scottish Sea Farms Ltd	17469
2021	Vidlin North	Scottish Sea Farms Ltd	17426
2021	Fishnish B	Scottish Sea Farms Ltd	16043
2021	East of Papa Little	Grieg Seafood Shetland Ltd	15500
2021	Tabhaigh	Mowi Scotland Ltd	15400
2021	Caolas a Deas West	Mowi Scotland Ltd	15047.5
2021	Portnalong	Mowi Scotland Ltd	14599.5
2021	Bagh Dail nan Ceann	Mowi Scotland Ltd	12675

2021	Ferramus	Loch Duart Ltd	11809.833
2021	Tanera 2	Scottish Sea Farms Ltd	10880
2021	Bring Head, Hoy	Scottish Sea Farms Ltd	10481
2021	Tanera 1	Scottish Sea Farms Ltd	9832
2021	Duich	Mowi Scotland Ltd	9750
2021	Noster	Mowi Scotland Ltd	9502.5
2021	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	8982
2021	Stulaigh Island	Mowi Scotland Ltd	8950
2021	Isle Martin, Ardmair Bay	Wester Ross Fisheries Ltd	8098.2
2021	Sconser, Balmeanach Bay	Mowi Scotland Ltd	7979
2021	South Ford East (Gashernish	Loch Duart Ltd	6986
2021	Puldrite Bay	Scottish Sea Farms Ltd	6488
2021	Gravir West	The Scottish Salmon Company	5528
2021	Toy Ness	Scottish Sea Farms Ltd	4412
2021	Badcall Site 10 (North Eilean na	Loch Duart Ltd	4241.5
2021	East of Langa	Grieg Seafood Shetland Ltd	4200
2021	Eday Sound (Noust Geo)	Scottish Sea Farms Ltd	3743
2021	Ardessie A	Wester Ross Fisheries Ltd	3048.89
2021	Ardessie B	Wester Ross Fisheries Ltd	2879.23
2021	Caolas a Deas East	Mowi Scotland Ltd	2227.5
2021	Sian Bay	Scottish Sea Farms Ltd	1569
2021	Isle of Rum	Mowi Scotland Ltd	1500

Excel #2: Hydrogen Peroxide use in 2020: 5,181,717 litres (78 sites)

Excel #2 Hydrogen Peroxide 2020

Note from SEPA:

HydrogenPeroxide-20.xls (do not include treatments carried out on wellboats)

Year	Site Name	Operator (at date of submission)	Hydrogen Peroxide (litres)
2020	Marulaig Bay	Mowi Scotland Ltd	271459
2020	Scadabay	The Scottish Salmon Company Ltd	233752
2020	Reibinish	The Scottish Salmon Company Ltd	197335
2020	Bagh Dail nan Ceann	Mowi Scotland Ltd	184153
2020	Creag an Sagairt West	Mowi Scotland Ltd	176760
2020	Maragay Mor	The Scottish Salmon Company Ltd	172656
2020	Skipport Outer (Ornish)	Mowi Scotland Ltd	170124
2020	East of Loch Uiskevagh	The Scottish Salmon Company Ltd	169030
2020	Greanamul	The Scottish Salmon Company Ltd	163588
2020	Rubh an Trilleachain	Kames Fish Farming Ltd	141786
2020	Poll na Gille	Mowi Scotland Ltd	133600
2020	Grey Horse Channel	Mowi Scotland Ltd	124574
2020	Flaeshins	Cooke Aquaculture Scotland	118014
2020	Portnalong	Mowi Scotland Ltd	109408
2020	Plocrapol	The Scottish Salmon Company Ltd	107099
2020	Uig Bay	Grieg Seafood Shetland Ltd	97300
2020	Sconser, Balmeanach Bay	Mowi Scotland Ltd	91318
2020	Stulaigh Island	Mowi Scotland Ltd	91000
2020	Eport Outer (Sgeir n Lolla)	The Scottish Salmon Company Ltd	90762
2020	South Ford East (Gashernish Eas	Loch Duart Ltd	88700
2020	Sconser Quarry	Mowi Scotland Ltd	83900
2020	Aird Ardheslaig	The Scottish Salmon Company Ltd	82485
2020	An Camus	Mowi Scotland Ltd	82304
2020	Taranaish	The Scottish Salmon Company Ltd	73344
2020	Hogan (Site 1)	Cooke Aquaculture Scotland	72116

2020	Ness of Copister	Cooke Aquaculture Scotland	70233.5
2020	Balta Island	Cooke Aquaculture Scotland	70043
2020	Scalpay	Mowi Scotland Ltd	70000
2020	Kishorn Outer	Scottish Sea Farms Ltd	68500
2020	Cloudin	Cooke Aquaculture Scotland	68207.5
2020	Leinish Bay	Grieg Seafood Shetland Ltd	68090
2020	Hellisay	Mowi Scotland Ltd	66000
2020	Ru Chorachan	Grieg Seafood Shetland Ltd	66000
2020	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	65600
2020	North Voe	Grieg Seafood Shetland Ltd	63900
2020	Camas an Leim (Torridon)	Mowi Scotland Ltd	60800
2020	Sandavaig (South Ford)	Loch Duart Ltd	56500
2020	Easter Score Holm	Grieg Seafood Shetland Ltd	56000
2020	West of Burwick	Grieg Seafood Shetland Ltd	55800
2020	East of Langa	Grieg Seafood Shetland Ltd	53820
2020	Bay of Meil	Cooke Aquaculture Scotland	53404
2020	Sound of Harris (Groay-Lingay)	Loch Duart Ltd	52100
2020	Greshornish	Mowi Scotland Ltd	51817
2020	Camas Doun Point (Kishorn Site	Scottish Sea Farms Ltd	48730
2020	Maol Ban	Mowi Scotland Ltd	46500
2020	Sgeir Dughall	The Scottish Salmon Company Ltd	40695
2020	Grey Horse Channel Outer	Mowi Scotland Ltd	39844
2020	Earnsaig (Nevis A)	Scottish Sea Farms Ltd	36795.5
2020	Kingairloch (Loch a Choire)	Mowi Scotland Ltd	36073
2020	Setter Voe	Grieg Seafood Shetland Ltd	32200
2020	Vest Ness	Cooke Aquaculture Scotland	30616
2020	Dury Voe (Swarta Skerry)	Scottish Sea Farms Ltd	28908.5
2020	Ardintigh (Nevis C)	Scottish Sea Farms Ltd	27945
2020	Cairidh	Mowi Scotland Ltd	25410

2020	Cole Deep	Grieg Seafood Shetland Ltd	24600
2020	Strone Point	The Scottish Salmon Company Ltd	24400
2020	St Molios	The Scottish Salmon Company Ltd	23551
2020	Port na Cro	Mowi Scotland Ltd	23140
2020	Bellister	Scottish Sea Farms Ltd	22500
2020	Kirk Noust	Cooke Aquaculture Scotland	21538.5
2020	Shuna, Sound of Shuna	Scottish Sea Farms Ltd	18800
2020	Stoull (Nevis B)	Scottish Sea Farms Ltd	18747.5
2020	Linga (South of Linga)	Grieg Seafood Shetland Ltd	17800
2020	Gob na Hoe	Grieg Seafood Shetland Ltd	17760
2020	St Margarets Hope	Scottish Sea Farms Ltd	15112.5
2020	Charlotte Bay	Scottish Sea Farms Ltd	14551
2020	Port nan Ledaig (Lismore B)	Scottish Sea Farms Ltd	13500
2020	South Voe of Gletness	Grieg Seafood Shetland Ltd	13400
2020	Eilean Grianain (Carradale) Nor	Mowi Scotland Ltd	13300
2020	Toy Ness	Scottish Sea Farms Ltd	10991
2020	Sian Bay	Scottish Sea Farms Ltd	9705.5
2020	NW Winnaness	Cooke Aquaculture Scotland	8503
2020	Isle Martin, Ardmair Bay	Wester Ross Fisheries Ltd	8140
2020	Eilean Grianain (Carradale) Sou	Mowi Scotland Ltd	6500
2020	Corlarach	Grieg Seafood Shetland Ltd	5700
2020	Spelve B (Dalnaha)	Scottish Sea Farms Ltd	5065
2020	Ardessie B	Wester Ross Fisheries Ltd	3967.5
2020	Ardessie A	Wester Ross Fisheries Ltd	3345

Excel #3: Hydrogen Peroxide use from 2016 to 2019 (199 salmon farms reported use of Hydrogen Peroxide – total use was 33.3 million litres):

Excel #3 Hydrogen Peroxide 2016 to 2019

Note from SEPA:

HydrogenPeroxide15-19 FINAL.xls (do not include treatments carried out on wellboats)

- 2019: 6,671,591 litres (100 sites)
- 2018: 5,272,756 litres (104 sites)
- 2017: 9,504,379 litres (133 sites)
- 2016: 11,873,925 litres (130 sites)

Mowi (Marine Harvest): 14.7 million litres

The Scottish Salmon Company: 5.7 million litres
Grieg Seafood: 4.6 million litres
Cooke Aquaculture: 3.8 million litres
Scottish Sea Farms: 2.9 million litres
Loch Duart: 1.1 million litres
Kames: 0.4 million litres
Wester Ross: 0.05 million litres

2019 (Top 25 largest using sites only listed):

Year	Site Name	Operator	Hydrogen Peroxide (litres)
2019	Taranaish	The Scottish Salmon Company	411732
2019	Bagh Dail nan Ceann	Mowi Scotland Ltd	267551
2019	Kyles Vuia East	The Scottish Salmon Company	247350
2019	Erisort, North Shore East	Mowi Scotland Ltd	246396
2019	Ardintoul	Mowi Scotland Ltd	226500
2019	MacLeans Nose	Mowi Scotland Ltd	220600
2019	Loch Portree (Torvaig)	The Scottish Salmon Company	194740
2019	Tabhaigh	Mowi Scotland Ltd	187000
2019	Erisort, North Shore West	Mowi Scotland Ltd	166600
2019	Rubh an Trilleachain	Kames Fish Farming Ltd	165143
2019	Stulaigh Island	Mowi Scotland Ltd	165143
2019	Caolas a Deas West	Mowi Scotland Ltd	144022
2019	Seaforth	Mowi Scotland Ltd	137100
2019	Caolas a Deas East	Mowi Scotland Ltd	131851
2019	Noster	Mowi Scotland Ltd	131600
2019	Greshornish	Mowi Scotland Ltd	119200
2019	Poll na Gille	Mowi Scotland Ltd	118000
2019	Eughlam	The Scottish Salmon Company	116955
2019	Uyea Isle	Cooke Aquaculture Scotland	105467
2019	Bay of Cleat North	Cooke Aquaculture Scotland	96621.5
2019	Portree Outer	The Scottish Salmon Company	94972
2019	Eughlam South	The Scottish Salmon Company	91838
2019	Fiunary	Scottish Sea Farms Ltd	80110
2019	Sgian Dubh	The Scottish Salmon Company	79947
2019	Allt a Chois (Kishorn North	Scottish Sea Farms Ltd	79886

2018 (Top 25 largest using sites only listed):

Year	Site Name	Operator (at date of	Hydrogen Peroxide (litres)
2018	Marulaig Bay	Marine Harvest (Scotland) Ltd	613000
2018	Groatay	Marine Harvest (Scotland) Ltd	175410
2018	Grey Horse Channel	Marine Harvest (Scotland) Ltd	151050
2018	Uiskevagh North	The Scottish Salmon Company	137974
2018	Stulaigh Island	Marine Harvest (Scotland) Ltd	132250
2018	Skipport Outer (Ornish)	Marine Harvest (Scotland) Ltd	114368
2018	West of Burwick	Grieg Seafood Shetland Ltd	111600
2018	Taranaish	The Scottish Salmon Company	106176
2018	Maragay Mor	The Scottish Salmon Company	105234
2018	Hellisay	Marine Harvest (Scotland) Ltd	104815
2018	Flaeshins	Cooke Aquaculture Scotland	91789
2018	Aird Ardheslaig	The Scottish Salmon Company	91000
2018	Camas an Leim (Torridon)	Marine Harvest (Scotland) Ltd	85777.5
2018	Petersport North	The Scottish Salmon Company	85673
2018	Maol Ban	Marine Harvest (Scotland) Ltd	81948.5
2018	Cairidh	Marine Harvest (Scotland) Ltd	81885
2018	Vuia Mor	The Scottish Salmon Company	79800
2018	East of Langa	Grieg Seafood Shetland Ltd	78912
2018	Setterness North	Grieg Seafood Shetland Ltd	78360
2018	Bagh Dail nan Ceann	Marine Harvest (Scotland) Ltd	75830
2018	Petersport South (Kilerivagh)	The Scottish Salmon Company	74981
2018	Vuia Beag	The Scottish Salmon Company	74872
2018	Strondoir Bay	The Scottish Salmon Company	74399
2018	Vest Ness	Cooke Aquaculture Scotland	67752
2018	Ardcastle	The Scottish Salmon Company	67585

2017 (Top 25 largest using sites only listed):

Year	Site Name	Operator (at date of	Hydrogen Peroxide (litres)
2017	Easter Score Holm	Grieg Seafood Shetland Ltd	365000
2017	Wick of Belmont North	Cooke Aquaculture Scotland	341961.5
2017	Gravir Outer	The Scottish Salmon	333139
2017	Sron	Marine Harvest (Scotland)	306557
2017	Bagh Dail nan Ceann	Marine Harvest (Scotland)	238099
2017	Erisort, North Shore West	Marine Harvest (Scotland)	228185
2017	MacLeans Nose	Marine Harvest (Scotland)	224661
2017	Tabhaigh	Marine Harvest (Scotland)	216394
2017	Loch Portree (Torvaig)	The Scottish Salmon	197867
2017	Greshornish	Marine Harvest (Scotland)	189065
2017	Creag an Sagairt West	Marine Harvest (Scotland)	185000
2017	North Havra	Grieg Seafood Shetland Ltd	174601
2017	Cole Deep	Grieg Seafood Shetland Ltd	163698
2017	Poll na Gille	Marine Harvest (Scotland)	159000
2017	Point of Burkwell (Site 5)	Cooke Aquaculture Scotland	157619
2017	Camus Glas	Marine Harvest (Scotland)	155164
2017	Grey Horse Channel	Marine Harvest (Scotland)	154965
2017	Groatay	Marine Harvest (Scotland)	152503
2017	Erisort, North Shore East	Marine Harvest (Scotland)	145524
2017	East of Papa Little	Grieg Seafood Shetland Ltd	143707
2017	Greanamul	The Scottish Salmon	139589
2017	Ardintoul	Marine Harvest (Scotland)	137336
2017	Swining Voe Site 3 (Collafirth Ness)	Grieg Seafood Shetland Ltd	135700
2017	Calbha Site 6 (East Rubh a	Loch Duart Ltd	134000
2017	Calbha Site 5 (Calbha Beag)	Loch Duart Ltd	132000

2016 (Top 25 largest using sites only listed):

Year	Site Name	Operator (at date of	Hydrogen Peroxide (litres)
2016	Ardintoul	Marine Harvest (Scotland) Ltd	535496
2016	Tabhaigh	Marine Harvest (Scotland) Ltd	490944
2016	Sron	Marine Harvest (Scotland) Ltd	467000
2016	Swining Voe Site 3 (Collafirth Ness)	Grieg Seafood Shetland Ltd	419200
2016	Eilean Raineach	Marine Harvest (Scotland) Ltd	351540
2016	Linga (South of Linga)	Grieg Seafood Shetland Ltd	336500
2016	Grey Horse Channel	Marine Harvest (Scotland) Ltd	329666
2016	Greshornish	Marine Harvest (Scotland) Ltd	325793
2016	Scotasay	Marine Harvest (Scotland) Ltd	303635
2016	Soay Sound	Marine Harvest (Scotland) Ltd	287786
2016	Setterness South	Grieg Seafood Shetland Ltd	253400
2016	Skipport Outer (Ornish)	Marine Harvest (Scotland) Ltd	252100
2016	Winna Ness	Cooke Aquaculture Scotland	236830
2016	Duich	Marine Harvest (Scotland) Ltd	212500
2016	Noster	Marine Harvest (Scotland) Ltd	209000
2016	Carradale (South)	Marine Harvest (Scotland) Ltd	195559
2016	Slocka (Site C)	Scottish Sea Farms Ltd	186400
2016	Maol Ban	Marine Harvest (Scotland) Ltd	181500
2016	Stulaigh Island	Marine Harvest (Scotland) Ltd	173468
2016	Erisort, North Shore East	Marine Harvest (Scotland) Ltd	172545
2016	Seaforth	Marine Harvest (Scotland) Ltd	170300
2016	Rubh an Trilleachain	Kames Fish Farming Ltd	157818
2016	Colonsay	Marine Harvest (Scotland) Ltd	153815
2016	Taing of Railsborough	Grieg Seafood Shetland Ltd	153200
2016	Camas an Leim (Torridon)	Marine Harvest (Scotland) Ltd	136000

Excel #4: Marine Scotland wellboats treatments 2020 (only one company – Scottish Sea Farms – reported the use of Hydrogen Peroxide):

Excel #4 Marine Scotland Wellboats Treatments 2020

2020			Scottish Sea Farms	
Site	Date	Product	Amount	Comments
Bellister	11/08/2020	Paramove	0.65m3 per well, 2 Wells 0.65m3 per well, 2 Wells	1350L Paramove = 962.55 kg hydrogen peroxide 1350L Paramove = 962.55 kg hydrogen peroxide
Bellister	13/08/2020	Paramove	0.65m3 per well, 2 Wells 0.65m3 per well, 2 Wells	1350L Paramove = 962.55 kg hydrogen peroxide 1350L Paramove = 962.55 kg hydrogen peroxide
Bellister	14/08/2020	Paramove	0.65m3 per well, 2 Wells 0.65m3 per well, 2 Wells	1350L Paramove = 962.55 kg hydrogen peroxide 1350L Paramove = 962.55 kg hydrogen peroxide
Bellister	15/08/2020	Paramove	0.65m3 per well, 2 Wells 0.65m3 per well, 2 Wells	1350L Paramove = 962.55 kg hydrogen peroxide 1350L Paramove = 962.55 kg hydrogen peroxide
				Total = 10800L Paramove = 7700.4 kg hydrogen peroxide.
Eday	13/10/2020	Paramove	1000 litres (only 800L used)	570.4 kg active
				Total = 800L Paramove = 570.4 kg hydrogen peroxide.
Eriboll Sian	27/10/2020	Paramove	455 litres per well, 2 wells 455 litres per well, 2 wells	910L Paramove = 648.83 kg hydrogen peroxide 910L Paramove = 648.83 kg hydrogen peroxide
Eriboll Sian	28/10/2020	Paramove	455 litres per well, 2 wells	910L Paramove = 648.83 kg hydrogen peroxide
				Total = 1830L Paramove = 1946.49 kg hydrogen peroxide
Eriboll Kempie	25/10/2020	Paramove	455 litres per well, 2 wells 455 litres per well, 2 wells	910L Paramove = 648.83 kg hydrogen peroxide 910L Paramove = 648.83 kg hydrogen peroxide
Eriboll Kempie	26/10/2020	Paramove	455 litres per well, 2 wells 455 litres per well, 2 wells 455 litres per well, 2 wells	910L Paramove = 648.83 kg hydrogen peroxide 910L Paramove = 648.83 kg hydrogen peroxide 910L Paramove = 648.83 kg hydrogen peroxide
Eriboll Kempie	27/10/2020	Paramove	455 litres per well, 2 wells	910L Paramove = 648.83 kg hydrogen peroxide
				Total = 5460L Paramove = 3892.98 kg hydrogen peroxide

The Excel spreadsheet also cited:

Covid-19 variation 04/20 example - useful for understanding the variation data collection:
http://marine.gov.scot/sites/default/files/scottish_sea_farms_ltd_-_16_april_2020_0.pdf

marinescotland

E: ms.marinelicensing@gov.scot

Scottish Government
Riaghaltas na h-Alba
gov.scot

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING

NOTIFICATION CONCERNING TEMPORARY VARIATION OF LICENCES TO DEPOSIT ANY SUBSTANCE OR OBJECT WITHIN THE SCOTTISH MARINE AREA IN RELATION TO CHEMICALS OR AGENTS FROM WELLBOATS

The Scottish Ministers hereby notify:

Scottish Sea Farms Ltd
South Shian
Connel
Argyll
PA37 1SB

of the variation in accordance with section 30(3)(a) of the Marine (Scotland) Act 2010 ("The Act") of the relevant licences ("The Licences"): See Annex 1.

The Scottish Ministers recognise that, as a consequence of the COVID-19 outbreak, the holders of The Licences ("Licensees") may face challenges in resourcing activities performed under The Licences. There is the potential for licensed activities to be compromised by a lack of available staff or due to the need to protect staff through social distancing measures in response to COVID-19. This in turn could have implications for fish health and welfare.

The Licensees must remain in compliance with the terms of The Licences and all relevant legislation, including environmental laws. The Licensees should also prepare for the challenges of the COVID-19 outbreak to ensure that impacts on the environment, human health and legitimate use of the sea are minimised.

Mindful of the challenges posed by the COVID-19 outbreak, the Scottish Ministers propose to vary The Licences, on a temporary basis, in accordance with section 30(3)(a) of The Act because of a change in circumstances relating to human health.

The Scottish Ministers consider that there is an urgent need to vary The Licences. Therefore, in accordance with section 31(6) of The Act, they are varying The Licences without providing for a period during which representations can be made.

In making this variation, the Scottish Ministers have taken account the position statement issued by the Scottish Environment Protection Agency ("SEPA") entitled 'Temporary Regulatory Position – Response to Covid-19' on 7 April 2020, and this variation is consistent with that position as it refers to bath treatments of fish.

This variation is valid from 16 April 2020 until either 30 June 2020 or such other date as the Scottish Ministers specify in any subsequent notification of variation (whichever is the shortest) and supersedes the previous marine licence variation, issued on 08 April 2020.

The particulars and conditions of the variation are described in Part 1 of the attached Schedule.

Signed:	
	Michael Bland
For and on behalf of the Scottish Ministers	
Date:	16 April 2020

Marine Laboratory, 375 Victoria Road, Aberdeen, AB11 9DB
http://www.gov.scot/Topics/marine/Licensing/marine

SCHEDULE TO NOTIFICATION OF VARIATION DATED: 16 April 2020

Part 1 – Particulars and Conditions

The Licences specify certain chemical(s) or agent(s) which can be deposited in the Scottish marine area in accordance with the terms of The Licences. The Licences contain time limitations upon the quantity of the specified chemical(s) or agent(s) that can be discharged in 3-hour periods and 24-hour periods.

For the purposes of this variation, a "Treatment Cycle" means a single cycle of treatment of fish, using chemical(s) or agent(s) as specified within The Licences, during which all fish from each stocked pen on a fish farm site are treated once with the relevant chemical(s) or agent(s).

The time limitations contained in The Licences concerning the quantity of the chemical or agent, azamethiphos[1] that can be discharged in 24-hour periods are varied as follows, subject to the following conditions, for the duration of this variation:

(a) Licensees must ensure that the total quantity of azamethiphos released during a Treatment Cycle does not exceed the amount specified in the most recent version of the Bath Auto modelling spreadsheet for the relevant site approved by SEPA[2];

(b) Licensees must ensure that the total quantity of azamethiphos released in any 24-hour period does not exceed a quantity which is three times the individual amount listed in The Licences as being permitted for discharge within a 24-hour period[3];

(c) Licensees must ensure that the cumulative quantity of azamethiphos released during a Treatment Cycle at the site, from both wellboats and from net pens, remains within the limits set in the conditions specified in (a) and (b) above;

(d) This variation does not apply to licences for wellboat discharge at fish farm sites within 2.5 km of sites where there is growing for production taking place in shellfish harvesting areas[4];

(e) Licensees must ensure that there is a minimum period of 8 days[5] between the end of a Treatment Cycle on a fish farm site and the start of a further Treatment Cycle on that fish farm site;

(f) Licensees must ensure that action to control sea lice must be coordinated across suitable areas of sea, such as the relevant disease management area, insofar as possible, and keep a record of such actions;

(g) Licensees must give consideration to how efficacious the treatment with azamethiphos is likely to be and must keep records of these considerations; and

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[1] The licensed discharge limits for the bath treatment medicine, deltamethrin, are all in the form of 3-hour limits.

[2] This information is part of the information that was submitted by Licensees to SEPA when they applied for the authorisation to discharge azamethiphos.

[3] Condition (b) allows the peak concentrations of chemical or agent residues in the environment around the fish farm site to be temporarily higher than normal in the hours immediately following the discharge. Under condition (a), by 96 hours after discharge, environmental concentrations are expected to be at, or approaching, the concentrations expected under compliance with the conditions of the licence.

[4] This condition is designed to ensure that the waters immediately around active shellfish harvesting areas are not exposed to elevated concentrations of chemical or agent residues as a result of this variation. The distance of 2.5 km is the average tidal excursion radius from a range of existing Scottish fish farms plus 500 m.

[5] 8 days is half-life of azamethiphos in the environment used by SEPA in modelling bath treatments.

(h) Licensees must:

(i) Notify the Marine Scotland - Licensing Operations Team ("MS-LOT") 2 working days in advance of each instance in which the 24-hour quantity limit as originally provided in the licence is going to be exceeded;

(ii) Provide an explanation, specifically related to the effects of the COVID-19 outbreak, as to why it was necessary to exceed the 24-hour time limitation; and

(iii) Provide confirmation that there is no growing of shellfish for production taking place within 2.5 km of the site at any shellfish harvesting areas.

Provided condition (c) above is met, conditions relating to restriction on simultaneous discharges of azamethiphos at the fish farm site are removed for duration of this variation.

Notifications are to be submitted to: ms.marinelicensing@gov.scot.

The information referred to in condition h (ii) and (iii) should be reported to MS-LOT at the above email address at the time of the notification referred to in h (i).

SCHEDULE TO NOTIFICATION OF VARIATION DATED: 16 April 2020

Annex 1. The Licences to which this variation applies.

06203/17/0
06267/17/0
06377/17/0
06378/17/0
06379/17/0
06380/17/0
06381/17/0
06382/17/0
06383/17/0
06384/17/1
06385/17/0
06386/17/0
06613/19/0
06614/19/1
06615/19/1
06616/19/2
06617/19/0
06618/19/1
06620/19/0
06621/19/0
06622/19/0
06623/19/1
06624/19/0
06696/19/0
06697/19/0
06698/19/0
06699/19/1

06715/19/0
06716/19/0
06717/19/2
06726/20/0
06727/19/0
06728/19/0
06729/19/0
06734/19/0
06735/19/0
06736/19/0
06741/19/1
06816/19/1
06918/19/0
06919/19/1
06925/19/1
07034/19/0
07038/19/0
07137/19/0
07192/20/0
07229/20/0

From: **Don Staniford** <salmonfarmingkills@gmail.com>
Date: Wed, Dec 9, 2020 at 10:46 PM
Subject: FOI re. Hydrogen Peroxide use on salmon farms in Scotland since 1 January 2016
To: AccesstoInformation <foi@sepa.org.uk>;

Please provide information on the use of Hydrogen Peroxide in salmon farming - via both wellboats, tarpaulins and any other methods - since 1 January 2016.

Please include Excel spreadsheets, data, emails, letters, reports and any other information related to the use of Hydrogen Peroxide in salmon farming in Scotland.

Please also include any information including emails, discussions with the Scottish Government, SSPO and any other parties relating to the non-reporting and non-recording of Hydrogen Peroxide use.

For example, please explain why the use of Hydrogen Peroxide is not included via the 'Scotland's Aquaculture' database:
http://aquaculture.scotland.gov.uk/data/fish_farms_monthly_biomass_and_treatment_reports.aspx

As context, the information provided on 30 September 2020 via FOI/202000084741 - online via https://www.gov.scot/publications/foi-202000084741/ - included data on the use of Hydrogen Peroxide (Paramove) in 2019 via wellboats; namely:

2019	Scottish Sea Farms			
Site	MCMS No.	Date	Product	Amount
Puldrite	05415	08/08/2019 - 10/08/2019	Paramove	9000L
Fishnish A	06614	23/08/2019 - 24/08/2019	Paramove	8000L
Fishnish B	06615	21/08/2019 - 22/08/2019	Paramove	7000L

2019	Grieg Seafood Ltd				
Site	MCMS No.	Date	Duration	Product	Amount
Setterness North	06122	14/12/2019	20 Minutes	Paramove	4400L
Setterness North	06122	15/12/2019	20 Minutes	Paramove	9600L
Setterness North	06122	16/12/2019	20 Minutes	Paramove	9600L
Setterness North	06122	17/12/2019	20 Minutes	Paramove	4800L
Setterness North	06122	18/12/2019	20 Minutes	Paramove	9600L
Setterness North	06122	19/12/2019	20 Minutes	Paramove	3450L
Setterness North	06122	21/12/2019	20 Minutes	Paramove	2300L
Setterness North	06122	22/12/2019	20 Minutes	Paramove	2300L
South of Linga	06714	06/12/2019	20 Minutes	Paramove	4000L
South of Linga	06714	07/12/2019	20 Minutes	Paramove	6000L
South of Linga	06714	12/12/2019	20 Minutes	Paramove	2000L
South of Linga	06714	13/12/2019	20 Minutes	Paramove	4000L

Scottish Salmon Watch finds it difficult to believe that this was the only use of Hydrogen Peroxide in 2019 - where is the data for use of Hydrogen Peroxide via tarpaulins and any other methods of application?

Another FOI replied to by the Scottish Government on 30 September 2020 (FOI-202000084355) detailed an Excel spreadsheet of data of chemical use via wellboats for 2018: https://www.gov.scot/publications/foi-202000084355/ - including data on the use of Hydrogen Peroxide:

2018	Grieg Seafood Ltd					
Site	MCMS No.	Date	Time	Duration	Product	Amount
Swinning 3	06131	15/01/2018	09:30	20 Mins	Peroxide and AMX	9940L and 720ml
Swinning 3	06131	15/01/2018	15:00	20 Mins	Peroxide and AMX	9940L and 720ml
Swinning 3	06131	16/01/2018	09:20	20 Mins	Peroxide and AMX	9790L and 720ml
Swinning 3	06131	16/01/2018	15:40	20 Mins	Peroxide and AMX	9790L and 720ml
Swinning 3	06131	16/01/2018	17:30	20 Mins	Peroxide and AMX	9790L and 720ml
Swinning 3	06131	18/01/2018	08:40	20 Mins	Peroxide and AMX	9640L and 720ml
Swinning 3	06131	18/01/2018	13:25	20 Mins	Peroxide and AMX	9640L and 720ml
Swinning 3	06131	19/01/2018	08:45	20 Mins	Peroxide and AMX	9640L and 720ml
Swinning 3	06131	19/01/2018	14:00	20 Mins	Peroxide and AMX	9640L and 720ml
Swinning 3	06131	14/05/2018	15:30	20 Mins	Peroxide and AMX	2921L and 200ml
Swinning 3	06131	15/05/2018	10:00	20 Mins	Peroxide and AMX	5374L and 400ml
Swinning 3	06131	15/05/2018	13:00	20 Mins	Peroxide and AMX	5374L and 400ml
Swinning 3	06131	15/05/2018	16:00	20 Mins	Peroxide and AMX	5374L and 400ml
Swinning 3	06131	16/05/2018	12:00	20 Mins	Peroxide and AMX	5072L and 400ml
Swinning 3	06131	16/05/2018	16:00	20 Mins	Peroxide and AMX	5072L and 400ml
Swinning 3	06131	17/05/2018	10:00	20 Mins	Peroxide and AMX	4417L and 400ml
Swinning 3	06131	17/05/2018	15:30	20 Mins	Peroxide and AMX	4417L and 400ml
Setterness North	06122	18/05/2018	10:05	20 Mins	Peroxide and Salmosan	5400L and 360g
Setterness North	06122	19/05/2018	09:25	20 Mins	Peroxide and Salmosan	10800L and 720g
Setterness North	06122	19/05/2018	15:40	20 Mins	Peroxide and Salmosan	10800L and 720g
Setterness North	06122	20/05/2018	10:00	20 Mins	Peroxide and Salmosan	8100L and 540g
Setterness North	06122	20/05/2018	15:30	20 Mins	Peroxide and Salmosan	8100L and 540g
Setterness North	06122	21/05/2018	19:00	20 Mins	Peroxide and Salmosan	5400L and 360g
Setterness North	06122	22/05/2018	11:00	20 Mins	Peroxide and Salmosan	8800L and 720g
Setterness North	06122	22/05/2018	18:00	20 Mins	Peroxide and Salmosan	8800L and 720g
Setterness North	06122	23/05/2018	18:00	20 Mins	Peroxide and Salmosan	5400L and 360g
Setterness North	06122	24/05/2018	19:05	20 Mins	Peroxide and Salmosan	5400L and 360g
Setterness North	06122	25/05/2018	19:00	20 Mins	Peroxide and Salmosan	5400L and 360g
Setterness North	06122	26/05/2018	19:50	20 Mins	Peroxide and Salmosan	5400L and 360g

Again, Scottish Salmon Watch struggles to believe that Grieg Seafood was the only user of Hydrogen Peroxide in 2018.

In April 2018, a FOI disclosure by the Scottish Government provided data on Hydrogen Peroxide use via wellboats (although it appears the data returns were not complete): https://www.gov.scot/publications/foi-18-00985/ - including:

2017	The Scottish Salmon Company	Returns as of 27/03/2018 detailed below - Awaiting final returns for 2017.				
Site	MCMS No.	Date	Time	Duration	Product	Amount
Gob a Bharra	05211	08/06/2017	09:00	60 mins	Hydrogen Peroxide	8000L

2017	Scottish Sea Farms	Returns as of 27/03/2018 detailed below - Awaiting final returns for 2017.				
Site	MCMS No.	Date	Time	Duration	Product	Amount
Holms Geo	05246	28/04/2017	19:10	40 mins	Hydrogen Peroxide	3800L
Holms Geo	05246	29/04/2017	10:08	34 mins	Hydrogen Peroxide	3800L
Holms Geo	05246	29/04/2017	15:00	40 mins	Hydrogen Peroxide	3800L
Holms Geo	05246	29/04/2017	18:55	40 mins	Hydrogen Peroxide	3800L
Holms Geo	05246	29/04/2017	22:50	40 mins	Hydrogen Peroxide	3800L
Holms Geo	05246	30/04/2017	02:20	40 mins	Hydrogen Peroxide	3800L
Teitsi Geo	05240	30/04/2017	12:30	40 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	30/04/2017	16:25	45 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	30/04/2017	20:25	45 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	01/05/2017	01:10	62 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	01/05/2017	13:00	48 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	01/05/2017	17:25	45 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	01/05/2017	21:35	40 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	02/05/2017	01:20	40 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	02/05/2017	12:40	45 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	02/05/2017	16:40	55 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	02/05/2017	20:30	35 mins	Hydrogen Peroxide	4300L
Teitsi Geo	05240	03/05/2017	01:00	50 mins	Hydrogen Peroxide	4300L

Please note that GAAIA published data on Hydrogen Peroxide use in February 2017 obtained from SEPA via FOI for period 2005 to 2015 - online here

Read more via "Sky-Rocketing Chemical Use on Scottish Salmon Farms - Hydrogen Peroxide use leaps from 19,000 litres in 2005 to 19m litres in 2015"

A FOI reply from the Scottish Government in April 2019 provided some details on Hydrogen Peroxide use on salmon farms but no site specific data: https://www.gov.scot/publications/foi-19-00723/

Another FOI reply from the Scottish Government in December 2017 provided information on mortalities associated with the use of Hydrogen Peroxide in salmon farming: https://www.gov.scot/publications/foi-17-02755/

Another FOI reply from the Scottish Government in December 2018 refused to provide information on Hydrogen Peroxide: https://www.gov.scot/publications/foi-18-03273/

Please therefore provide data on the use of Hydrogen Peroxide since 1 January 2016 (effectively an update on the data published by GAAIA in February 2017) and provide information pertaining to why the use of Hydrogen Peroxide has remained unreported, unrecorded and/or unpublished including any discussions with the Scottish Government, the SSPO, Mowi and other salmon farming companies.

Please consider this a formal FOI request under the relevant FOI and Environmental Information regulations.

Please provide the information electronically.

Please provide a receipt for this FOI request.

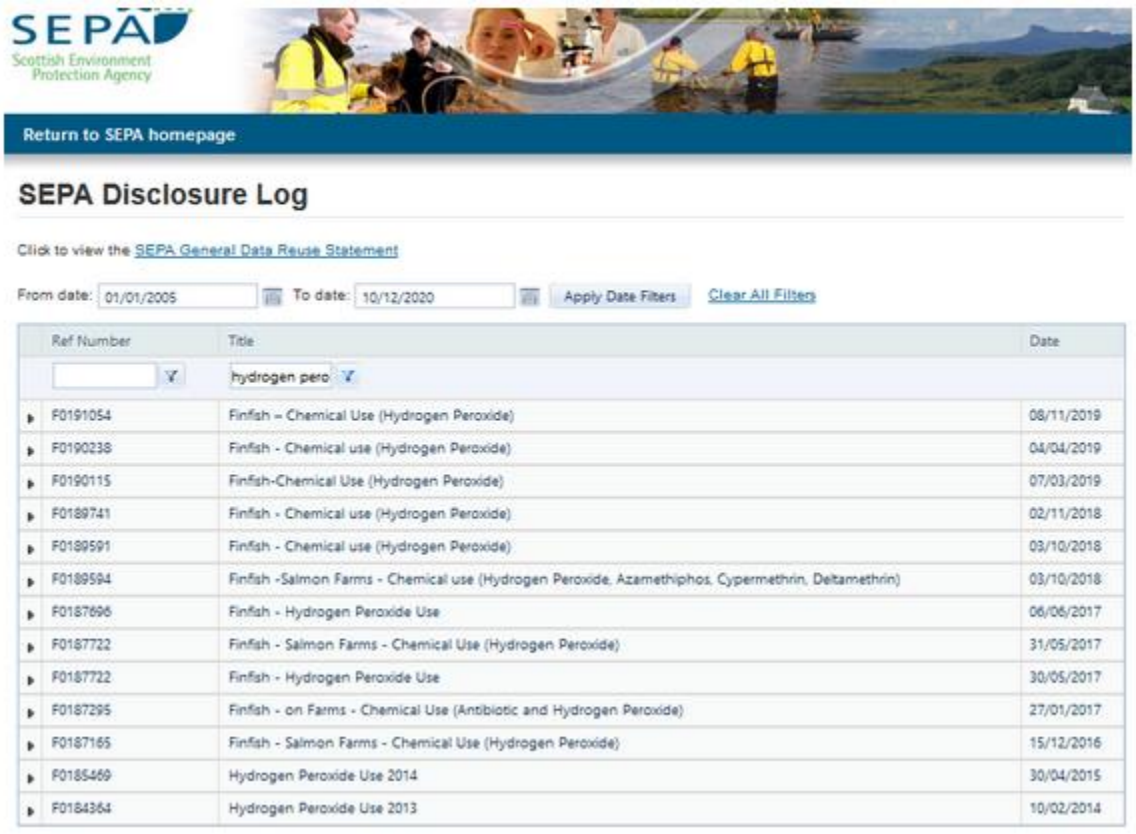
Thanks,

Don Staniford

Director, Scottish Salmon Watch

From: **Don Staniford** <salmonfarmingkills@gmail.com>
Date: Thu, Dec 10, 2020 at 9:58 AM
Subject: Addendum: FOI re. Hydrogen Peroxide use on salmon farms in Scotland since 1 January 2016
To: AccesstoInformation <foi@sepa.org.uk>

In addition to the FOI filed last night (9 December 2020), Scottish Salmon Watch fully appreciates that SEPA has disclosed various data on Hydrogen Peroxide via FOI previously - including via https://www2.sepa.org.uk/disclosurelog/#



SEPA
Scottish Environment Protection Agency

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From date: 01/01/2005 To date: 10/12/2020 Apply Date Filters Clear All Filters

Ref Number	Title	Date
	hydrogen pero	
F0191054	Finfish – Chemical Use (Hydrogen Peroxide)	08/11/2019
F0190238	Finfish - Chemical use (Hydrogen Peroxide)	04/04/2019
F0190115	Finfish-Chemical Use (Hydrogen Peroxide)	07/03/2019
F0189741	Finfish - Chemical use (Hydrogen Peroxide)	02/11/2018
F0189591	Finfish - Chemical use (Hydrogen Peroxide)	03/10/2018
F0189594	Finfish -Salmon Farms - Chemical use (Hydrogen Peroxide, Azamethiphos, Cypermethrin, Deltamethrin)	03/10/2018
F0187696	Finfish - Hydrogen Peroxide Use	06/06/2017
F0187722	Finfish - Salmon Farms - Chemical Use (Hydrogen Peroxide)	31/05/2017
F0187722	Finfish - Hydrogen Peroxide Use	30/05/2017
F0187295	Finfish - on Farms - Chemical Use (Antibiotic and Hydrogen Peroxide)	27/01/2017
F0187165	Finfish - Salmon Farms - Chemical Use (Hydrogen Peroxide)	15/12/2016
F0185469	Hydrogen Peroxide Use 2014	30/04/2015
F0184364	Hydrogen Peroxide Use 2013	10/02/2014

Scottish Salmon Watch does not seek to duplicate previous FOI disclosures but merely is seeking a comprehensive database for Hydrogen Peroxide use in the same way as use of Azamethiphos, Deltamethrin and Emamectin benzoate is recorded and published via Scotland's Aquaculture (this sadly does not currently include use via wellboats) and via SEPA's SPRI (this is sadly not current and does not distinguish between use via wellboats and tarpaulins).

We understand via a FOI disclosure in November 2019:

- F0191054 Response r
- 191018-HydrogenPeroxide-18

That Hydrogen Peroxide use by salmon farms was disclosed with the Top Ten uses out of 104 reports detailed as:

Site ID	Year	Site Name	Licence	Operator (at date of submission)	Local Authority	Hydrogen Peroxide (litres)
MBM1	2018	Marulaig Bay	CAR/L/1028518	Marine Harvest (Scotland) Ltd	Eilean Siar	613000
GRT1	2018	Groatay	CAR/L/1011922	Marine Harvest (Scotland) Ltd	Eilean Siar	175410
GHC1	2018	Grey Horse Channel	CAR/L/1025571	Marine Harvest (Scotland) Ltd	Eilean Siar	151050
UIS2	2018	Uiskevagh North	CAR/L/1010065	The Scottish Salmon Company Ltd	Eilean Siar	137974
STI1	2018	Stulaigh Island	CAR/L/1096609	Marine Harvest (Scotland) Ltd	Eilean Siar	132250
SKIO1	2018	Skipport Outer (Ornish)	CAR/L/1001968	Marine Harvest (Scotland) Ltd	Eilean Siar	114368
BUR1	2018	West of Burwick	CAR/L/1003059	Grieg Seafood Shetland Ltd	Shetland Islands	111600
TARA1	2018	Taranaish	CAR/L/1017374	The Scottish Salmon Company Ltd	Eilean Siar	106176
MRGY1	2018	Maragay Mor	CAR/L/1124848	The Scottish Salmon Company Ltd	Eilean Siar	105234
HEL1	2018	Hellisay	CAR/L/1095612	Marine Harvest (Scotland) Ltd	Eilean Siar	104815

SEPA's letter dated 8 November 2019 included:

Response
Please refer to attached spreadsheet for figures for hydrogen peroxide use reported in 2018 for marine pen fish farms.

Please note that SEPA will not receive figures for 2019 until the end of January 2020. This information is therefore excepted under Regulation 10(4)(a) of the EIRs. The text of which is reproduced below;

(4) A Scottish public authority may refuse to make environmental information available to the extent that;-

(a) it does not hold that information when an applicant's request is received.

The exception in regulation 10(4)(a) is subject to the public interest test in regulation 10(1)(b) of the EIRs. As SEPA does not hold the information in question there is no conceivable public interest in requiring that the information be made available.

We are therefore requesting 2019 data in full which should now be available as well as 2020 data (at least for Q1, Q2 and Q3).

Via F0190238 EIR Response r in April 2019, SEPA also stated:

Response
We confirm that the total annual volume of hydrogen peroxide (H2O2) used in UK for fish farming;
2017: 9504378.5 litres
2018: 5277756 litres

Please note that these figures relate to treatments carried out in cages and do not include hydrogen peroxide treatments carried out on wellboats.

For the sake of clarification, Scottish Salmon Watch is therefore requesting data for ALL use of hydrogen peroxide on salmon farms since 1 January 2016. Where this does NOT include wellboat use please indicate as such (the previous data disclosed in January 2017 via F0187295 AntibioticHydrogenPeroxideData released for 2002 to 2015 is understood to NOT have included Hydrogen Peroxide use via wellboats).

I hope this clarifies yesterday's FOI request.

Thanks,

Don

Here's the Scottish Government's reply in January 2021:

marinescotland

Scottish Government
Riaghaltas na h-Alba
gov.scot

T : 0131 244 4377
E : kate.webb@gov.scot

Don Staniford
salmonfarmingkills@gmail.com

Your ref: 202000122166
Our ref: FOI re. Hydrogen Peroxide use on salmon farms in Scotland since 1 January 2016
29 January 2021

Dear Don Staniford,

REQUEST UNDER THE ENVIRONMENTAL INFORMATION (SCOTLAND) REGULATIONS 2004 (EIRs)

Thank you for your request made by email dated 9 December 2020.

Your request

You asked:

"Please provide information on the use of Hydrogen Peroxide in salmon farming - via both wellboats, tarpaulins and any other methods - since 1 January 2016.

Please include Excel spreadsheets, data, emails, letters, reports and any other information related to the use of Hydrogen Peroxide in salmon farming in Scotland.

Please also include any information including emails, Cabinet Briefings and other details relating to the non-reporting and non-recording of Hydrogen Peroxide use.

For example, please explain why the use of Hydrogen Peroxide is not included via the 'Scotland's Aquaculture' database:

Marine Laboratory, 375 Victoria Road,
Aberdeen AB11 9DB
www.gov.scot/marinescotland

http://aquaculture.scotland.gov.uk/data/fish_farms_monthly_biomass_and_treatment_reports.aspx

Scottish Salmon Watch finds it difficult to believe that this was the only use of Hydrogen Peroxide in 2019 - where is the data for use of Hydrogen Peroxide via tarpaulins and any other methods of application?

Another FOI replied to by the Scottish Government on 30 September 2020 (FOI-202000084355) detailed an Excel spreadsheet of data of chemical use via wellboats for 2018: https://www.gov.scot/publications/foi-202000084355/ - including data on the use of Hydrogen Peroxide. Again, Scottish Salmon Watch struggles to believe that Grieg Seafood was the only user of Hydrogen Peroxide in 2018.

Please therefore provide data on the use of Hydrogen Peroxide since 1 January 2016 (effectively an update on the data published by GAAIA in February 2017) and provide information pertaining to why the use of Hydrogen Peroxide has remained unreported, unrecorded and/or unpublished including any discussions with SEPA, the SSPO, Mowi and other salmon farming companies.

Please consider this a formal FOI request under the relevant FOI and Environmental Information regulations.

Please provide the information electronically."

Response to your request

As the information you have requested is 'environmental information' for the purposes of the Environmental Information (Scotland) Regulations 2004 (EIRs), we are required to deal with your request under those Regulations. We are applying the exemption at section 39 (2) of the Freedom of Information (Scotland) Act 2002 (FOISA), so that we do not also have to deal with your request under FOISA.

This exemption is subject to the 'public interest test'. Therefore, taking account of all the circumstances of this case, we have considered if the public interest in disclosing the information outweighs the public interest in applying the exemption. We have found that, on balance, the public interest lies in favour of upholding the exemption, because there is no public interest in dealing with the same request under two different regimes. This is essentially a technical point and has no material effect on the outcome of your request.

1. While our aim is to provide information whenever possible, in this instance we are unable to provide some of the information you have requested. Therefore we are refusing part of your request under the exception at regulation 10(4)(a) of the EIRs. The reason why that exception applies is explained in the Annex to this letter.

2. While our aim is to provide information whenever possible, in this instance we are unable to provide some of the information you have requested because an exception under regulation 10(5) (d) (confidentiality of proceedings) of the EIRs applies to that information. The reason why this exception applies is explained in the Annex to this letter.

3. Under Regulation 9 of the EIRs (duty to provide advice and assistance), I am advising you that we considered whether to refuse the penultimate part of this request (Please therefore provide data on the use of Hydrogen Peroxide since 1 January 2016) as 'manifestly unreasonable'. Essentially,

regulation 10(4)(b) is concerned with the effect of a request, or series of requests, on the authority and its staff.

The following factors will be relevant to determining whether a request is manifestly unreasonable:

(i) It would impose a significant burden on the public authority.
(ii) It does not have a serious purpose or value.
(iii) It is designed to cause disruption or annoyance to the public authority.
(iv) It has the effect of harassing the public authority.
(v) It would otherwise, in the opinion of a reasonable person, be considered to be manifestly unreasonable or disproportionate.

The request may also be manifestly unreasonable if:

(i) there is no additional information that can be provided because all relevant information has already been disclosed.

The decision to reject a request on manifestly unreasonable grounds is one the Scottish Government does not take lightly and very rarely exercises. We recognise and encourage disclosing information as part of an open, transparent and accountable government, and to inform public debate.

However, we considered if the servicing of your request, a repetition of previous requests, would impose a significant burden on MS-LOT. We considered if complying with it would require a disproportionate amount of time, and the diversion of an unreasonable proportion of our resources away from other statutory and regulatory functions.

Data on the use of Hydrogen Peroxide since 1 January 2016 is included in the completed Discharge Returns we have already released to you under previous information requests, however, on this occasion we will answer your request. Below are the links and the dates of the responses we have previously provided to you on this topic.

Some of the information you have requested is available from on the Scottish Government Publications website at the following web link: Publications - gov.scot (www.gov.scot)

Under regulation 6(1)(b) of the EIRs, we do not have to give you information which is already publicly available and easily accessible to you in another form or format.

- The completed 2015 (finalised in 2016), 2016 & 2017 Discharge Returns have already been provided to you under the EIRs request case number FoI/18/01265, which you made on 1 May 2018 and which we responded to on 28 June 2018. Our response to this request was published on the Scottish Government website on 2 July 2018: Wellboats chemical licensing and related database information: EIR release - gov.scot (www.gov.scot)

- The completed 2018 Discharge Returns have already been provided to you under the EIRs request case number FoI/19/02442, which you made on 23 October 2019 and we responded to on 18 November 2019. Our response to this request was published on the Scottish Government website on 19 November 2019: https://www.gov.scot/publications/foi-19-02442/

Further to this, on 30 September 2020, under our response to a review request of your EIRs request case number 202000058631 (review case number 202000084355), we released the same

information to you in a more accessible format (an excel spreadsheet) in order to be as helpful as possible. Our response to this review request was published on the Scottish Government website on 10 November 2020: https://www.gov.scot/publications/foi-202000084355/

- The completed 2019 Discharge Returns were provided to you as an excel spreadsheet under your EIRs request case number 202000084741, made on 2 September 2020 and released on 30 September 2020. Our response to this request was published on the Scottish Government website on 9 November 2020:
https://www.gov.scot/publications/foi-202000084741/

4. The answers to your questions posed are provided below:

(i) Please explain why the use of Hydrogen Peroxide is not included via the 'Scotland's Aquaculture' database:
http://aquaculture.scotland.gov.uk/data/fish_farms_monthly_biomass_and_treatment_reports.aspx

Our response: This is not a question that the Scottish Government can provide an answer for. MS-LOT provide completed Discharge returns to SEPA each year for publishing, which includes data on the use of hydrogen peroxide. The full annual SPRI data returns inclusive of wellboat information can be found here.

(ii) Scottish Salmon Watch finds it difficult to believe that this was the only use of Hydrogen Peroxide in 2019.

Our response: MS-LOT can confirm we have reported all data we hold on the use of Hydrogen Peroxide in salmon farming in 2019 to SEPA.

(iii) Another FOI replied to by the Scottish Government on 30 September 2020 (FOI-202000084355) detailed an Excel spreadsheet of data of chemical use via wellboats for 2018:
https://www.gov.scot/publications/foi-202000084355/ - including data on the use of Hydrogen Peroxide. Again, Scottish Salmon Watch struggles to believe that Grieg Seafood was the only user of Hydrogen Peroxide in 2018.

Our response: MS-LOT can confirm we have reported all data we hold on the use of Hydrogen Peroxide in salmon farming in 2018 to SEPA.

Your right to request a review

If you are unhappy with this response to your EIRs request, you may ask us to carry out an internal review of the response, by writing to The Director of Marine Scotland, Area 1B South, Victoria Quay, The Shore, Edinburgh, EH6 6QQ or by emailing: Directormarinescotland@gov.scot.

Your review request should explain why you are dissatisfied with this response, and should be made within 40 working days from the date when you received this letter. We will complete the review and tell you the result, within 20 working days from the date when we receive your review request.

If you are not satisfied with the result of the review, you then have the right to appeal to the Scottish Information Commissioner. More detailed information on your appeal rights is available on the Commissioner's website at:
http://www.itspublicknowledge.info/YourRights/Unhappywiththeresponse/AppealingtoCommissioner.asp

Marine Laboratory, 375 Victoria Road,
Aberdeen AB11 9DB
www.gov.scot/marinescotland

ANNEX

REASONS FOR NOT PROVIDING INFORMATION

The Scottish Government does not have the information:

An exception under regulation 10(4)(a) (information not held) of the EIRs applies to some of the information you have requested.

Under the terms of the exception at regulation 10(4)(a) of the EIRs (information not held), the Scottish Government is not required to provide information which it does not have. The Scottish Government does not hold the following information you have requested:

- We do not yet hold completed Discharge Returns for 2021.

- We do not hold any letters or reports related to the use of Hydrogen Peroxide in salmon farming in Scotland.

- We do not hold information including emails, Cabinet Briefings and other details relating to the non-reporting and non-recording of Hydrogen Peroxide use.

- We do not hold information pertaining to why the use of Hydrogen Peroxide has remained unreported, unrecorded and/or unpublished including any discussions with SEPA, the SSPO, Mowi and other salmon farming companies.

- We do not hold information on the use of Hydrogen Peroxide in salmon farming via tarpaulins. The Scottish Government only hold information on the use of Hydrogen Peroxide in salmon farming via wellboats (see above our response under point 3).

However, you may wish to contact the Scottish Environment Protection Agency (SEPA) at Contact | Scottish Environment Protection Agency (SEPA) who may be able to provide you with information on the use of Hydrogen Peroxide in salmon farming via tarpaulins.

This exception is subject to the 'public interest test'. Therefore, taking account of all the circumstances of this case, we have considered if the public interest in disclosing the information outweighs the public interest in applying the exception. We have found that, on balance, the public interest lies in favour of upholding the exception. While we recognise that there may be some public interest in the information you have requested, as detailed above, clearly we cannot provide information which we do not hold.

An Exception applies:

An exception under regulation 10(5)(d) (Confidentiality of proceedings) of the EIRs applies to some of the information you have requested

An exception under regulation 10(5)(d) of the EIRs (Confidentiality of proceedings) applies to some of the information you have requested because it is internal legal advice and disclosure would breach legal professional privilege.

This exception is subject to the 'public interest test'. Therefore, taking account of all the circumstances of this case, we have considered if the public interest in disclosing the information outweighs the public interest in applying the exception. We have found that, on balance, the public interest lies in favour of upholding the exception. We recognise that there is a public interest in disclosing information as part of open, transparent and accountable government, and to inform public debate. However, this is outweighed by the strong public interest in maintaining the right to confidentiality of communications between legal advisers and clients, to ensure that Ministers and officials are able to receive legal advice in confidence, like any other public or private organisation.

Yours sincerely

Kate Webb
Business Casework Officer - Licensing Operations Team - Marine Planning & Policy