

Scottish Salmon Farming

101



"You asked me once, what was in Room 101. I told you that you knew the answer already. Everyone knows it. The thing that is in Room 101 is the worst thing in the world" (George Orwell's Nineteen Eighty-Four)

Media Backgrounder (January 2018)

by Don Staniford

Global Alliance Against Industrial Aquaculture

As a prelude to the Scottish Parliament's inquiry into salmon farming (scheduled to start "[in early 2018](#)"), please find enclosed a basic overview of Scottish salmon farming in 101 bullet points.



Read more background via:

[25 Years of Scottish Salmon Shame](#)

[25 Reasons to Boycott Scottish Salmon](#)

[The Scotsman: "Call for curb in fish farms as study shows pest risk to wild fish";](#)

["New scientific study underlines damage to wild salmon and sea trout populations from salmon farm parasites – in Scotland, Norway and Ireland](#)

["Fish farm lice are killing wild salmon"](#)

["First Minister questioned on leaking wastes from morts - call for a moratorium from Greens"](#)

["BBC's 'Dead Salmon Run' Opens Can of Worms"](#)

["Scottish salmon farming's 'liciest' farms named and shamed"](#)

["Millions of Scottish Salmon Going Up in Smoke"](#)

["Campaigners say 'no more salmon farms' after disease on Lewis kills 125,000 fish"](#)

["Red Alert for Label Rouge - Lousy Label Goes Rogue"](#)

["Media Backgrounder: Scotland's Silent Spring of the Sea"](#)

["Scottish Salmon's Lethal Legacy"](#)

["Scottish Salmon's Great Escape"](#)

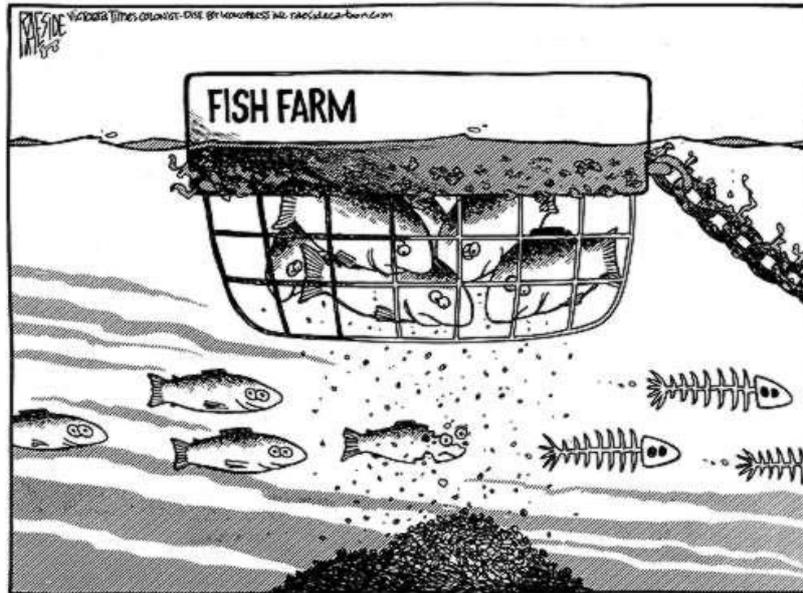
["Gill Diseases: Scottish Salmon's Dirty Big Secret"](#)

["Media Backgrounder: Chemical Culture in Scotland"](#)

["Fish Farmageddon: The Infectious Salmon Aquacalypse"](#)

1) Salmon farms kill wild fish:

Over two decades of peer-reviewed scientific research has proved beyond reasonable doubt that lice-infested salmon farms kill wild fish.



Read more via "[The Weight of Scientific Evidence: Sea Lice & Salmon Farms](#)"; "[Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout](#)" and "[Fish farm lice are killing wild salmon](#)"

2) Salmon farms spread infectious diseases:

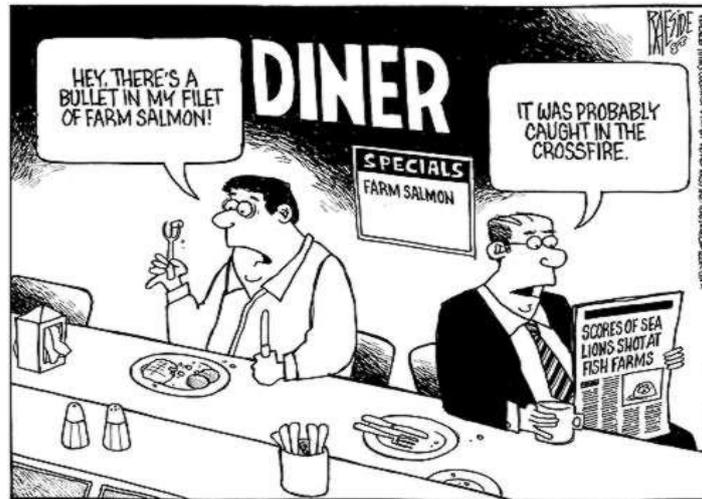
Salmon farms are reservoirs and incubators for a raft of infectious diseases such as sea lice, Amoebic Gill Disease, Infectious Pancreatic Necrosis and Infectious Salmon Anaemia.



Read more via "[Fish Farmageddon: The Infectious Salmon Aquacalypse](#)" and "[Scottish salmon farming's 'liciest' farms named and shamed](#)"

3) Salmon farms kill seals:

Scottish salmon farms have killed over 800 seals since 2011 - with over 110 seals killed by Marine Harvest (a company certified via RSPCA Assured).



Read more via ["Carry on killing says RSPCA"](#); ["RSPCA in firing line over Marine Harvest's seal-killing spree in Scotland - 118 seals killed by Marine Harvest's RSPCA Assured farms since 2011"](#); ["The Killing Farms"](#) and ["RSPCA Assured Seals Killers!"](#)

4) Salmon farms kill shellfish:

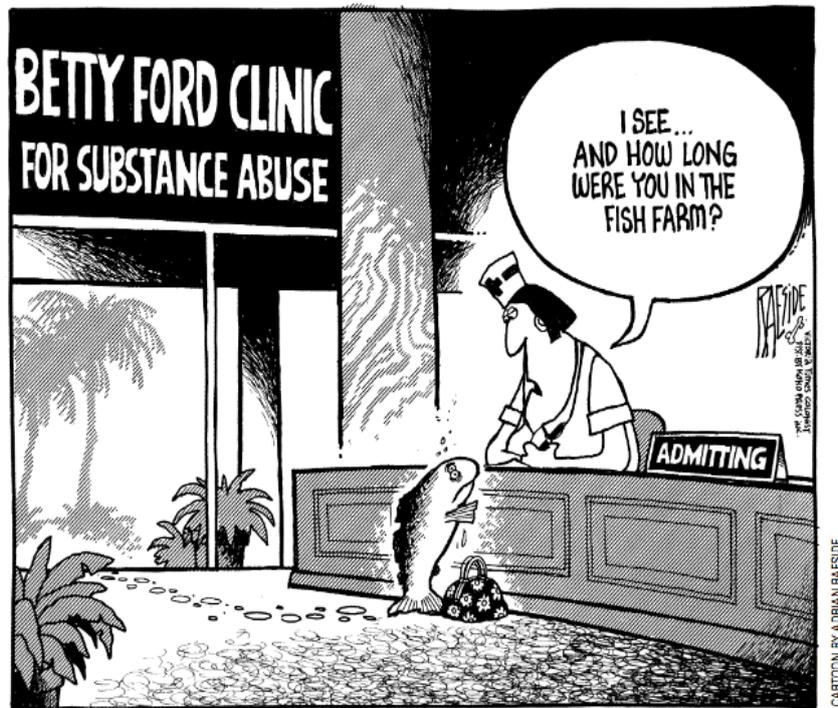
The toxic chemicals used on salmon farms have been shown by peer-reviewed scientific studies to kill shellfish including lobsters.



Read more via ["Scientific Backgrounder: Ecotoxicity & Chemical Resistance"](#); ["Damning Report on Toxic Salmon Farms Buried - SEPA finally acts on lobster-killing chemical"](#); ["Towards Understanding of the Environmental Impact of a Sea Lice Medicine - the PAMP Suite"](#) and ["Silent Spring of the Sea"](#)

5) Farmed salmon are addicted to a cocktail of drugs:

Scottish salmon farms use a cocktail of pesticides, anti-parasitics, therapeutants, antibiotics, medicines and other drugs.



Read more via "[Media Backgrounder: Scotland's Silent Spring of the Sea](#)" and "[Media Backgrounder: Chemical Culture in Scotland](#)"

6) Scottish farmed salmon is contaminated with cancer-causing chemicals:

Science magazine reported in 2004 that Scottish farmed salmon was so contaminated with cancer-causing chemicals that it was safe to eat only three times per year.



Read more via "[Scottish farmed salmon 'is full of cancer toxins'](#)"; "[Farm salmon linked to cancer chemicals](#)" and "[Global Assessment of Organic Contaminants in Farmed Salmon](#)"

7) Nearly 4 million farmed salmon have escaped in over 200 incidents since 1998 leading to genetic pollution of wild salmon:



The image shows a screenshot of a BBC News article. At the top, the BBC logo is on the left, and navigation links for 'Your account', 'News', 'Sport', 'Weather', 'iPlayer', 'TV', and 'Radio' are on the right. Below this is a red banner with the word 'NEWS' in white. Underneath the banner is a horizontal menu with categories: 'Home', 'UK', 'World', 'Business', 'Politics', 'Tech', 'Science', 'Health', 'Family & Education', and 'Environment'. Below the menu is a sub-menu for 'Scotland' with links for 'Scotland Politics', 'Scotland Business', 'Edinburgh, Fife & East', and 'Glasgow & West'. The main headline of the article is 'Over 300,000 salmon escaped fish farms in 2016'. Below the headline, the date '19 September 2017' is shown on the left, and social media sharing icons for Facebook, Twitter, LinkedIn, Email, and a general 'Share' button are on the right.



Read more via "[Scottish Salmon's Great Escape](#)" and "[Scotland's Aquaculture: Fish Escapes](#)"

8) Mass mortalities leapt to over 20,000 tonnes (an estimated 20 million fish) in 2017:



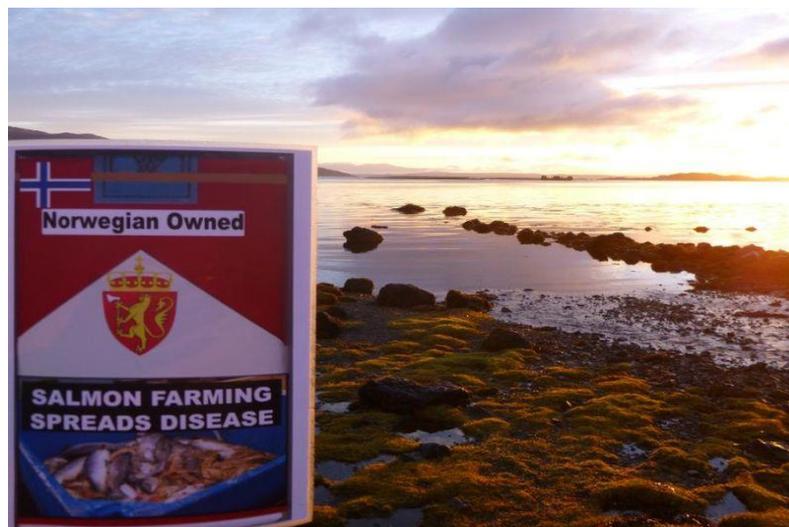
Read more via "[Millions of Scottish Salmon Going Up in Smoke](#)" and "[Scottish Salmon's Lethal Legacy](#)"

9) Amoebic Gill Disease, Infectious Pancreatic Necrosis, Furunculosis, Infectious Salmon Anaemia, Pancreas Disease and other deadly diseases have ravaged Scottish salmon farms killing millions of fish:



Read more via "[Gill Diseases: Scottish Salmon's Dirty Big Secret](#)"; "[Infectious pancreatic necrosis virus in Scottish Atlantic salmon farms, 1996–2001](#)"; "[An outbreak of disease resembling heart and skeletal muscle inflammation in Scottish farmed salmon, *Salmo salar* L., with observations on myocardial regeneration](#)"; "[Surveillance for infectious salmon anaemia virus HPR0 in marine Atlantic salmon farms across Scotland](#)"; "[Analysis of a company's production data to describe the epidemiology and persistence of pancreas disease in Atlantic salmon \(*Salmo salar* L.\) farms off Western Scotland](#)" and "[Cardiomyopathy syndrome in farmed Scottish salmon](#)"

Pasteurella skyensis killed 125,000 farmed salmon in Loch Erisort in 2017:



Read more via "[125,000 salmon die in disease outbreak at Lewis fish farms](#)"; "[Disease kills 125,000 salmon on Lewis fish farm](#)"; "[Campaigners say 'no more salmon farms' after disease on Lewis kills 125,000 fish](#)"; "[Pasteurella skyensis sp. nov., isolated from Atlantic salmon \(*Salmo salar* L.\)](#)" and "[Characterization of two groups of *Pasteurella skyensis* isolates from Atlantic salmon, *Salmo salar* L., based on serotype and 16S rRNA and rpoB gene partial sequences](#)"

10) Extracting information has been an onerous task due to the secrecy of the Scottish Government and Scottish salmon farming industry - but there have been notable victories via Freedom of Information forcing disclosure of damning documents and data on diseases, lice infestation, toxic chemicals, escapes, mass mortalities and seals killed:

Guy Linley-Adams, Solicitor for S&TC Scotland said:

"The right to environmental information is enshrined not just in Scottish law, but in European law and in an international convention, the Aarhus Convention, to which the UK is signatory.

Scottish Ministers and SEPA cannot keep ignoring the law, just because the information S&TC Scotland requests from them might be embarrassing or show that they lean too far towards protecting the fish-farmers from proper public scrutiny.

It must never be forgotten that the impact of fish-farms outside the cages - on wild fish, on benthic species and on the wider sea loch environment - is of very real, substantial and legitimate public interest."



FREEDOM FOR FISH

SEALS • PORPOISES • WHALES

Read more via "[FOI Number Five – getting you the information they don't want you to see!](#)"; "[Scottish salmon farming's 'liciest' farms named and shamed](#)"; "[Scotland's worst sea lice offenders: Full Farm List](#)"; "[Revealed: Scandal of 45 Scottish lochs trashed by pollution](#)"; "[Campaigners welcome ruling on seal shooting disclosure](#)"; "[Victory: Disclosure of Seal-Killing Salmon Farm Data Ordered by 21 August](#)"; "[FishyLeaks: Scottish Salmon Infested With Parasites - Sea Lice Data Reveals 1001 Reasons to Boycott Farmed Salmon](#)"; "[FishyLeaks: Scottish Salmon's Toxic Toilets Named & Shamed](#)"; [Scottish Information Commissioner Decision 182/2006 Mr Bruce Sandison and the Fisheries Research Services - Request for information relating to the escape of salmon from an Orkney fish farm](#); "[Gaining Transparency: using the FOIA process to track down data on the impacts of fish farming](#)"

11) Salmon farms have polluted 45 lochs around Scotland:

 **sunday herald**
@newsundayherald

 Follow

Our front page
Revealed: scandal of 45 Scottish lochs
trashed by pollution
[#scotpapers](#) [#buyapaper](#)

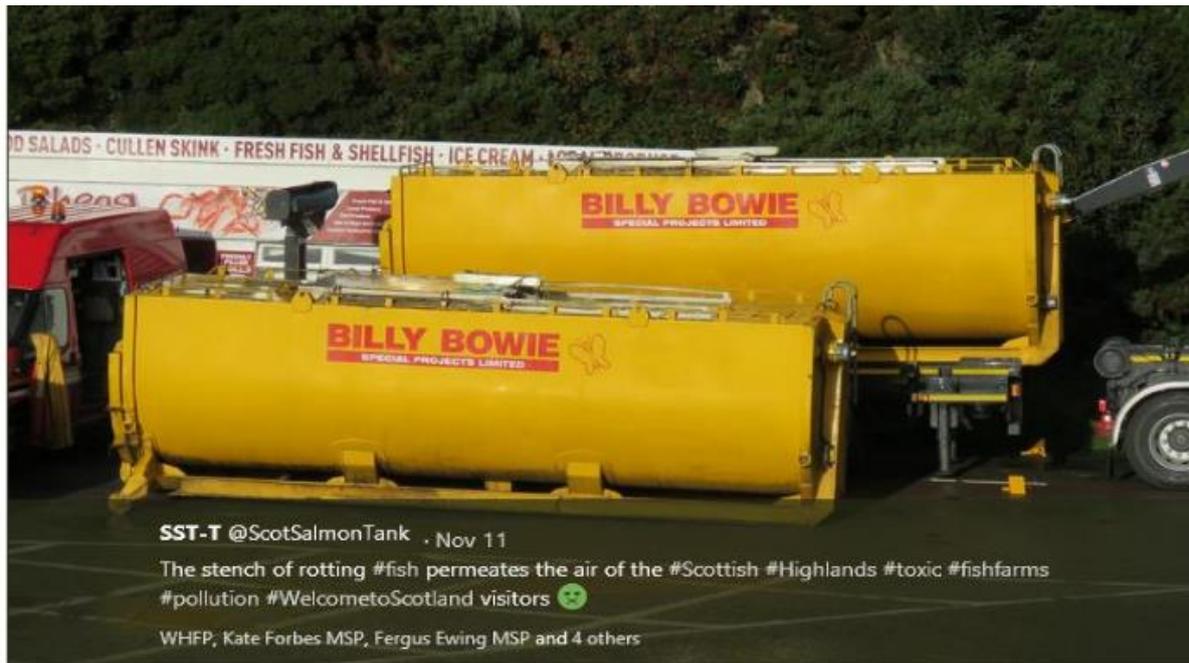


THE 45 CONTAMINATED LOCHS		
Inner Sound, Highland	Kilbrannan Sound, Argyll and Bute	Lax Firth, Shetland
Loch a Chairn Bhain, Highland	Loch Craignish, Argyll and Bute	Off Lunnaness, Shetland
Loch Alsh, Highland	Loch Creran, Argyll and Bute	Olnafirth, Shetland
Loch Bracadale, Highland	Loch Fyne, Argyll and Bute	Ronas Voe, Shetland
Loch Broom, Highland	Loch Spelve, Argyll and Bute	Swarbacks Minn, Shetland
Loch Duich, Highland	Loch Tuath, Argyll and Bute	The Deeps, Shetland
Loch Ewe, Highland	Shuna Sound, Argyll and Bute	East Loch Tarbert, Eilean Siar
Loch Kishorn, Highland	Sound of Gigha, Argyll and Bute	Loch Boisdale, Eilean Siar
Loch Laxford, Highland	Sound of Jura, Argyll and Bute	Loch Erisort, Eilean Siar
Loch Linnhe, Highland	Sound of Mull, Argyll and Bute	Loch Roag, Eilean Siar
Loch Nevis, Highland	Cat Firth, Shetland	Loch Seaforth, Eilean Siar
Loch Sunart, Highland	Clift Sound, Shetland	Loch Shell, Eilean Siar
Loch Torridon, Highland	Clousta Voe, Shetland	Loch Skipport, Eilean Siar
Sound of Raasay, Highland	Colla Firth, Shetland	Lamlash Bay, North Ayrshire
Firth of Lorn, Argyll and Bute	Dury Voe, Shetland	

Source: Scottish Environment Protection Agency

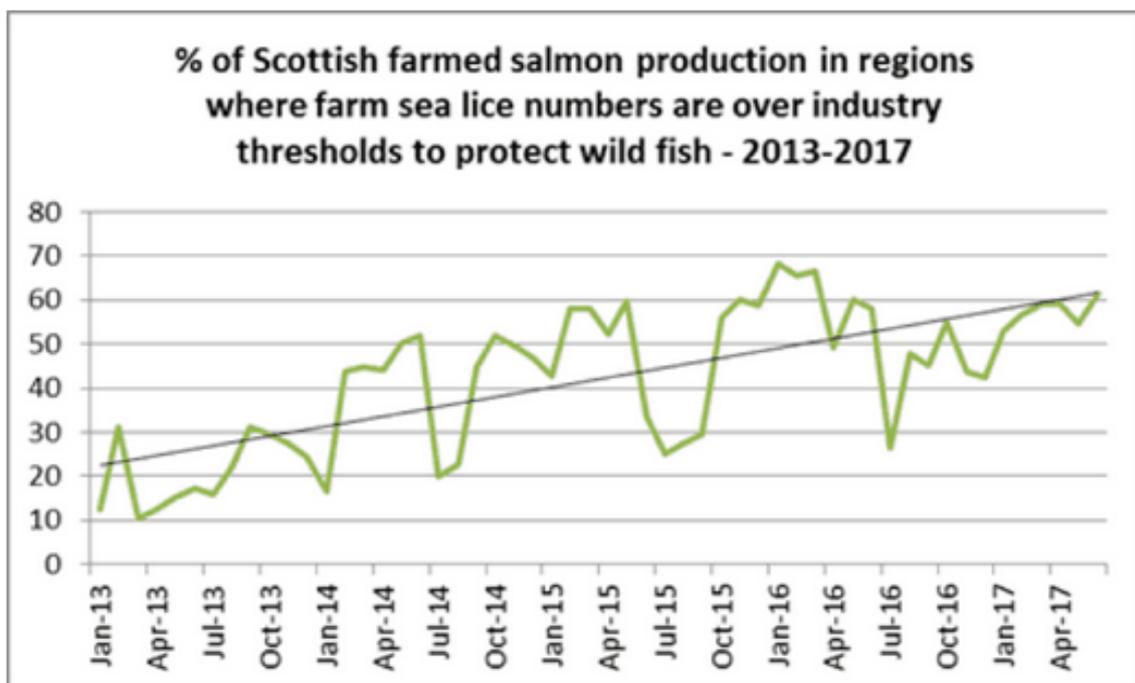
Read more via "[Revealed: Scandal of 45 Scottish lochs trashed by pollution](#)"

12) Wastes are leaking from haulage trucks transporting dead farmed salmon:



Read more via "[First Minister questioned on leaking wastes from morts - call for a moratorium from Greens](#)" and "[BBC's 'Dead Salmon Run' Opens Can of Worms](#)"

13) Lice-infestation on Scottish salmon farms is running out of control:



Read more via "[Scottish salmon farming's 'liciest' farms named and shamed](#)" and "[Scottish salmon sold by a range of supermarkets in the UK has sea lice up to 20 times acceptable limit](#)"

14) Seven companies accounted for 99% of Scottish salmon farming production in 2016 - with 82% of production coming from salmon farms producing over 1,000 tonnes:

3. ATLANTIC SALMON – PRODUCTION

Production

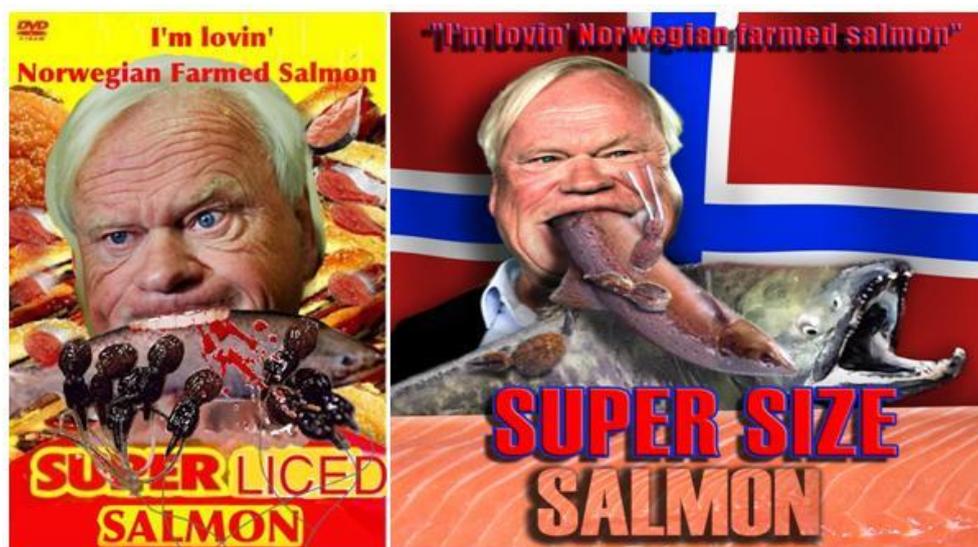
Production survey information was collected from all 15 companies actively involved in Atlantic salmon production, farming 253 active sites. This figure represents the entire industry operating in Scotland.

Table 24: Annual production of salmon (tonnes) during 1996-2016 and projected production in 2017

Year	Tonnes	Percentage difference	Year	Tonnes	Percentage difference
1996	83,121	19	2007	129,930	-1.4
1997	99,197	19	2008	128,606	-1
1998	110,897	12	2009	144,247	12
1999	126,686	14	2010	154,164	6.9
2000	128,959	2	2011	158,018	2.5
2001	138,519	7	2012	162,223	2.7
2002	144,589	4	2013	163,234	0.6
2003	169,736	17	2014	179,022	9.7
2004	158,099	-7	2015	171,722	-4.1
2005	129,588	-18	2016	162,817	-5.2
2006	131,847	2	2017	177,202*	

*Industry estimate of projected tonnage based on stocks currently being on-grown.

Production is increasingly concentrated in the hands of a small number of multinationals (mostly Norwegian-owned, headed by Marine Harvest) - with 15 companies (but only 10 actually produced farmed salmon) in 2016 compared to 106 in 1996.



Read more via "[Scottish Fish Farm Production Survey 2016](#)" and "[Scottish Fish Farms Annual Production Survey 1996](#)"

15) Salmon farms are getting bigger and bigger with super-sized salmon farms producing up to 8,000 tonnes coming to Scotland soon:

The Herald

sundayherald

Outrage over secret plans to base world's biggest salmon farm in Scotland



Scale of Production by Site

Table 33: Number of sites shown in relation to their production grouping and percentage share of production 2006-2016

Production grouping (tonnes)	0	1-50	51-100	101-200	201-500	501-1,000	>1,000	Total	
								Sites*	Tonnes
2006	95	10	10	16	29	30	62	252	131,847
2007	89	9	8	19	33	34	55	247	129,930
2008	118	7	9	15	22	29	57	257	128,606
2009	104	12	12	10	33	25	58	254	144,247
2010	109	5	6	10	33	22	64	249	154,164
2011	106	9	7	9	28	29	66	254	158,018
2012	115	3	5	9	25	33	67	257	162,223
2013	112	9	3	12	18	36	67	257	163,234
2014	117	8	1	9	26	29	70	260	179,022
2015	115	2	1	9	26	26	75	254	171,722
2016	117	3	3	9	22	26	73	253	162,817
2006	0	0.2	0.6	1.8	7.9	15.9	73.6	-	-
2007	0	0.2	0.4	2.3	8.3	19.0	69.8	-	-
2008	0	0.1	0.5	1.6	5.8	15.9	76	-	-
2009	0	0.2	0.6	1.0	7.7	13.0	77.5	-	-
2010	0	0.1	0.3	0.9	7.3	10.8	80.6	-	-
2011	0	0.2	0.3	0.8	6.4	13.4	78.9	-	-
2012	0	<0.1	0.2	0.9	5.0	15.0	78.8	-	-
2013	0	0.1	0.1	1.1	4.0	16.7	78.0	-	-
2014	0	0.1	<0.1	0.8	5.0	12.0	82.0	-	-
2015	0	<0.1	<0.1	0.9	5.0	11.6	82.4	-	-
2016	0	<0.1	0.1	0.8	4.6	11.7	82.8	-	-

*Includes farms stocked but having no production.

Read more via "[Outrage over secret plans to base world's biggest salmon farm in Scotland](#)"; "[Super-sized Scottish Salmon - 8,000 tonnes of trouble on the horizon!](#)" and "[Trends during development of Scottish salmon farming: An example of sustainable intensification?](#)"

16) Foreign-owned companies control over 90% of Scottish salmon farming production:

Scottish salmon farming production in 2016 was 162,817 tonnes in 2016 - with ca. 150,000 tonnes coming from foreign-owned companies (Marine Harvest, Grieg Seafood, Scottish Sea Farms, Scottish Salmon Company and Cooke Aquaculture).



Norwegian-owned Marine Harvest produced more than 50,000 tonnes of Scottish farmed salmon in 2015 - that represents around 30% of Scottish salmon farming production. Other Norwegian-owned companies include Scottish Sea Farms (28,000 tonnes in 2016) and Grieg Seafood (22,000 tonnes production capacity).

The Scottish Salmon Company - registered in Jersey with the largest shareholder listed as a Swiss financial institution (linked to "Ukrainian banker" Yuri Lopatinsky) - exceeds 25,000 tonnes in production. Canadian-owned Cooke Aquaculture produced 22,500 tonnes of Scottish farmed salmon in 2016.

Loch Duart (5,200 tonnes in 2016) and Wester Ross Fisheries (2,000 tonnes in 2016) are both believed to be Scottish owned along with Kames (ca. 2,000 tonnes).

Read more via "[Marine Harvest Scotland](#)"; "[Grieg Seafood Shetland](#)"; "[Scottish Sea Farms see profits rise](#)"; "[The Scottish Salmon Company: Largest Shareholders](#)"; "[Interview: Stewart McLelland, chief executive of the Scottish Salmon Company](#)"; "[Scottish Salmon Company: Environmental Policy](#)"; "[Cooke Aquaculture of Canada buys Shetland salmon producer](#)"; "[Loch Duart lands fifth vessel](#)"; "[Wester Ross Fisheries increases profit to £1.4m](#)"; "[Scottish Fish Farm Production Survey 2016](#)"; "[Exposed: the madness of the great international salmon swap](#)" and "[The Great International Salmon Swap](#)"

17) 90% of 'Scottish' salmon is imported as eggs with Norway accounting for 86% of egg imports:

THE SUNDAY TIMES

'Tartan imposters' charge as fish egg imports hit 90%

Nine out of 10 Scottish farmed salmon are reared from eggs produced overseas, according to government data that reveals a record level of imports.

Mark Macaskill

April 16 2017, 12:01am,
The Sunday Times



Fisherman holding a salmon at a farm in Oban

Nine out of 10 Scottish farmed salmon are reared from eggs produced overseas, according to government data that reveals a record level of imports.

Just over 90% of eggs used to farm Scottish salmon came from other countries in 2015, up from 13% in 2005. The vast majority (86%) were brought from Norway.

The disclosure has led to fresh claims that Scottish salmon, the country's largest food export, are "Viking fish with a kilt thrown on" and that UK stores that sell farmed salmon as "Scottish" are misleading consumers.

THE TRUE COST OF SCOTTISH SALMON



Norwegian owned farms operating in Scottish waters for export to China.

Read more via "[Viking Invasion Taints 'Scottish' Salmon](#)"; "[Invasion of the Viking Salmon Hits Scotland!](#)"; "[Supermarkets sell Norwegian fish as 'Scots' salmon](#)" and "[UK retailers accused of selling Norway salmon as Scottish](#)"

18) A genetic study found one in four 'wild' Scottish salmon contain DNA from Norwegian fish (due to interbreeding via mass escapes from salmon farms):



Read more via "[Fish farms are 'wiping out Scotland's wild salmon'](#)" and "[Report on Genetic Tool Development for Distinguishing Farmed vs Wild Fish in Scotland](#)"

19) The Royal Society of London reported in 2003 that repeated escapes of farmed salmon could cause an "extinction vortex" in wild fish":

PROCEEDINGS OF THE ROYAL SOCIETY B

BIOLOGICAL SCIENCES

[Home](#) [Content](#) [Information for](#) [About us](#) [Sign up](#) [Submit](#)

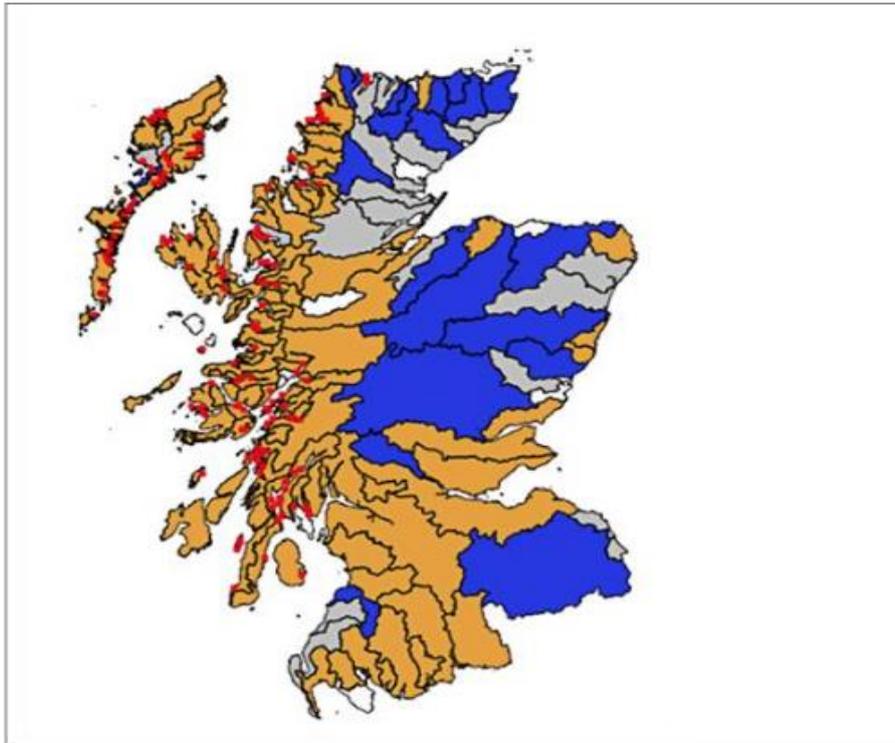
◦ **Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon**

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

Published 7 December 2003. DOI: 10.1098/rspb.2003.2520

Read more via "[Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon](#)"; "[Wild salmon put at risk as a million farmed fish escape](#)" and "[The salmon scandal they tried to ignore](#)"

20) There is an East-West divide with wild salmon already extinct in many rivers on the West Coast of Scotland (where there are dozens of salmon farms compared to a ban on the East Coast):



The contrast between western Scotland and the rest of the country is stark, with the major or substantive distinction between east and west coast being the presence of salmon farming in the west. The map at Figure 2 shows that the extent of west Highland rivers where wild salmon populations are in very poor health (category 3 are shown in brown) closely matches the extent of the salmon farming industry (the current active marine salmon farming sites are marked in red).

“The contrast between western Scotland and the rest of the country is clear to see, and the only major or substantive distinction between the east and west coasts is, of course, the presence of salmon farming in the west.”

Andrew Graham-Stewart



Sea lice infestation on salmon fry

WARNING: Salmon farming can be fatal to wild salmon.

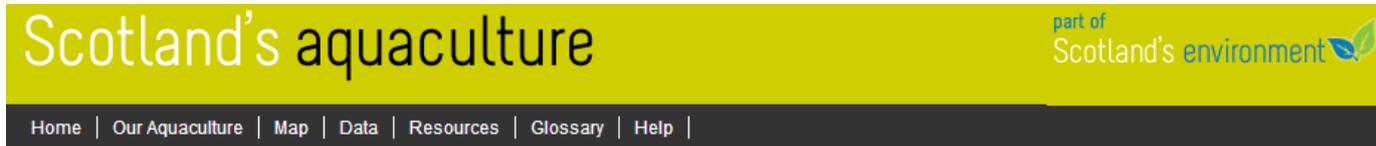


Flesh-eating lice spread by fish farms kill 39 per cent of wild salmon



Read more via: ["Salmon 'extinct' in 14 Highland rivers"](#); ["Fish farms are destroying wild Scottish salmon, says leading environmentalist"](#); ["Save Scottish Salmon: Stop Norwegian Salmon Farms Killing Wild Fish!"](#); ["Cull of the Wild"](#); ["The Control of Sea Lice in Fish Farms in Scotland, 2013-2015"](#); ["Mounting evidence of need to modernise salmon farming – collapse of salmon run in South-West Highlands"](#) and ["Map: Wild salmon dangerously scarce in Highland rivers"](#)

21) The 'Scotland's Aquaculture' database provides a useful resource of information on mortalities; toxic chemicals; feed use; discharges of copper, zinc, nitrogen and phosphorus; biomass exceedances and escapes (although data on sea lice and infectious diseases is less accessible and data on the killing of seals is published elsewhere by the Scottish Government):



Home > Data Search

Data Search

Help ?

Please choose a category you wish to search on. The next screen will allow you to further filter your search.

You can [find out what each dataset contains from our Dataset Descriptions](#).

Please read the terms and conditions of use on our [Legal](#) page.

Site Details	Operator Transfers	Site Facilities
Movement Restrictions	Fish Escapes	Lease Details
Licence Conditions	Fish Farm Annual Emissions	Sealice In-Feed Treatment Residues
Environmental Monitoring Surveys	Shellfish Harvesting Areas	Shellfish Species Area Classifications
Biotoxin Monitoring	Microhygiene Monitoring	Fish Farm Monthly Biomass and Treatments
Phytoplankton Monitoring	Temporary Shellfish Area Closures	

Fish Farm Monthly Biomass and Treatments Details		Annual Emissions Details	
Year	2017	Licence Site Name	Achintraid (Kishorn Site 1)
Month	September	Year	2016
Submitted By	Scottish Sea Farms Ltd	Submitted By	Scottish Sea Farms Ltd
Licence Number	CAR/L/1004062/C1/V3	Licence active at time of report	CAR/L/1015867
Licence active at time of report	CAR/L/1004062	Total copper from feed and nets (kg)	0.11018040
Report for Site	AAC3 Allt a Chois (Kishorn North Shore)	Zinc from feed (kg)	2.30568690
Max licensed biomass on site (tonnes)	1900	Nitrogen (kg)	816.6312
Actual biomass on site (tonnes)	1508	Phosphorus (kg)	112.772880
Biomass Exceedance (tonnes)	0	Total organic carbon (kg)	2620.0251
Feed (kg)	169666	Data supplied by SEPA on 10/11/2017	
Mortalities (kg)	123054		
Sealice Treatments Used			
Sealice Treatment Product	Quantity Used (grams)		
Azamethiphos	900		

Access more data via "[Scotland's Aquaculture database](#)"; [Scottish Fish Farm Production Survey 2016](#) (and [annual surveys since 1979](#)); [Seal Licensing & Returns](#); [Fish Health Management Reports](#); [FishyLeaks](#); "[Mapped: the 45 lochs polluted by fish farm pesticides](#)"; "[Mapped: every Scottish salmon farm that shot seals](#)"; "[Scottish salmon farming's 'liciest' farms named and shamed](#)" and "[Trends during development of Scottish salmon farming: An example of sustainable intensification?](#)"

22) 'Organic' salmon is "making a mockery of organic standards":



Read more via "[Why organic salmon is causing a nasty smell](#)"; "[Concern over organic salmon farms](#)" and "[Organic salmon: the greenwashing of toxic farmed salmon](#)"

Organic salmon production in Scotland is less than 4,000 tonnes (representing 2% of Scottish salmon farming production) with only 5 salmon farms registered as 'organic':

Organic Production

Table 39: Organic production of Atlantic salmon during 2011-2016

Year	Number of active cage sites	Number of cage sites certified as organic	Production (tonnes)
2011	252	10	3,104
2012	255	7	4,597
2013	253	8	5,207
2014	257	8	3,588
2015	250	5	2,382
2016	248	5	3,903

Of the 248 active Atlantic salmon seawater cage sites in 2016, five were certified as organic, producing 3,903 tonnes.

Read more via "[Scottish Fish Farm Production Survey 2016](#)"

23) Scotland's 'Yes Ministers' are rubber-stamping salmon farming expansion:

The Herald

sundayherald

1st December 2013

The yes ministers: Scottish Government 'is in bed with the fish-farming industry' Scottish ministers accused of being 'in bed' with the fish-farming industry

THE Scottish Government has been accused of being "in cahoots" with the fish-farming industry after public agencies disclosed more than 750 fish farms have been approved in recent years - and only six have been refused.

Critics say plans for the farms are being rubber-stamped to help meet the Government's target of a 50% increase in production by 2020, and that ministers are failing to protect the environment.

They also point out that ministers have had more than 30 meetings with leaders of the fish-farming industry in the last three years.

GIVING FISH FARMS THE GO-AHEAD		
PUBLIC BODY	APPROVED	REJECTED
Scottish Environment Protection Agency	585 since 2006	1
Highland Council	66 since 2003	2
Comhairle nan Eilean Siar	73 since 2008	1
Argyll & Bute Council	32 since 2003	2

Read more via "[The yes ministers: Scottish Government 'is in bed with the fish-farming industry' Scottish ministers accused of being 'in bed' with the fish-farming industry](#)"; "[Scottish ministers accused of being 'in bed' with the fish farming industry](#)" and "[Continued salmon farm expansion in Arran's MPA](#)"

24) Loch Duart - the so-called 'Sustainable Salmon Company' - uses a cocktail of toxic chemicals and operates some of Scotland's "liciest" salmon farms:



Read more via "[Loch Duart - the Toxic Salmon Company](#)"; "[Scottish salmon farming's 'liciest' farms named and shamed](#)" and "[Scotland's Aquaculture](#)" (search 'Loch Duart')

25) Listeria contamination has plagued Scottish salmon (including Loch Duart):



Listeria alert at top salmon firm

Consumers may be at risk of eating toxic fish from the award-winning Loch Duart

Mark Macaskill

September 29 2013, 1:01am,
The Sunday Times



Loch Duart salmon, batches of which have had to be recalled after the potentially lethal listeria bug was detected in some packets (Robert Paterson)

Read more via "[Listeria Contamination in Farmed Salmon](#)"; "[Listeria found in smoked salmon](#)"; "[Listeria alert at top salmon firm](#)"; "[America in new Scots salmon health scare](#)"; "[Waitrose pulls salmon in listeria alarm](#)"; "[Smoked salmon industry practices and their association with *Listeria monocytogenes*](#)"; "[Hong Kong Listeria Warning for Scottish Salmon](#)"; "[Deadly bug discovered in salmon](#)"

26) Supermarkets are looking to feed farmed salmon on chicken parts:

By Dawn Thompson

SUPERMARKET salmon could be fed a 'revolting' mix of abattoir waste under plans that have renewed the debate over food standards in fish farming.

The proposals would see farmed salmon fed 'avian protein' - made up of poultry by-products including offal and blood, as well as ground up bone and feathers.

Supermarket giant Morrisons is taking part in a £68,000 project - involving scientists and feed companies - to discuss the idea and test the possible reaction of consumers.

The move would save fish farmers a fortune by turning a readily available waste product into a cheap food source. Researchers also say it will be more environmentally friendly and provide cheaper salmon.

Guidelines already permit the use of avian protein in feed but although it is widely used in other parts of the world, fears that consumers would find it unacceptable have always prevented its use in the UK.

That could change if the six-month study - part-funded by the Scottish Aquaculture Innovation Centre, which has contributed £41,000 - finds public opinion has altered.

But critics condemned the idea. Don Staniford, director of the Global Alliance Against Industrial Aquaculture, said: 'Feeding chicken parts to farmed salmon is revolting. It's completely unnatural, a nutritional nightmare and compromises salmon welfare.'

'Consumers will be appalled to learn that Scottish salmon could be fed on chicken waste. If I wanted to eat chicken, I'd go to KFC.'

The project is led by feed company BioMar, in partnership with Morrisons, the Institute of Aquaculture at Stirling University and raw material producer SARIA.

An institute press release said: 'Adopting avian protein could significantly reduce feed costs and, in doing so, overall production costs.'

'If consumer perception around avian proteins is found to be positive, later phases of the project could comprise nutritional and fish quality analysis.'

The Institute admitted that, while Chilean and Australian salmon farmers have used poultry by-products for more than a decade, there are still some challenges around consumer acceptance of introducing these products into the UK.

Avian proteins are also used throughout Europe in feeds for other farmed fish species, including sea bream, sea bass and trout.

Brett Glencross, Professor of Aquaculture Nutrition at Stirling University, said: 'Australian salmon feeds are a lot cheaper than in the UK. Most of it is made of avian protein and it works really well.'

'Salmon's a carnivore; it's designed to eat meat, therefore that's what

Coming soon to a fish counter near you, the salmon that's truly fowl...



Backlash over plan to feed farmed favourite on 'avian protein' to save money

'It's about having a grown-up conversation. We don't want to force consumers to do anything.'

'The British people, Europeans in general, have been some of the most prolific offal eaters through history - black pudding, haggis.'

He said avian protein would only come from birds destined for human

birds not wanted for human consumption - including bones, feathers, blood and the guts - could be ground down and dried before further processing. The protein could then be incorporated into the pellets used to feed farmed salmon.

Farmed salmon is Scotland's biggest food export, with an annual retail value of £1 billion. Scottish Government estimates suggest 5,000 jobs rely on the industry.

Morrisons said: 'Our role on this project is to advise on research with consumers. All of our salmon is fed on soya protein and fish meal and we have no plans to change that.'

NET VALUE: Farmed salmon is worth £1bn a year to Scotland

expert Professor Hugh Pennington said: 'We eat enormous amounts of chicken. There's a fair amount of waste from that and it's a good idea if it was used for something else.'

But Phil Brooke of Compassion in World Farming said: 'Salmon farming is problematic. The problem

such as chicken, but salmon wouldn't naturally eat chicken as they are in the sea. I think we should be asking whether we should be farming salmon at all.'

Writer Bruce Sandison, founder of the Salmon Farm Protest Group said: 'Salmon farming is an abomination. It's quite simple. For the

'I wouldn't feed it to my cat'



Read more via [Mail On Sunday](#): "[Coming soon to a fish counter near you, the salmon that's truly fowl....](#)" and "[Will it Fly: Avian proteins could help reduce costs and help the industry grow but only if the market is ready](#)"

27) The supermarket chain Morrisons is working with the University of Stirling to encourage the use of chicken parts in Scottish salmon:

'Little consumer resistance to the idea of using avian protein in salmon feed'

By Jane Byrne

15-May-2017 - Last updated on 17-May-2017 at 10:21 GMT



An academia and industry run project, aiming to encourage the use of avian protein in Scottish salmon feed, found consumers are, in general, open to the use of such protein sources, particularly if it means cost effective salmon production.

Read more via "[Little consumer resistance to the idea of using avian protein in salmon feed](#)"

Others are convinced that feeding salmon on chicken parts is a recipe for ruin:



Read more via "[Backlash against chicken and pork in farmed fish](#)"

28) Scottish salmon is infested with lice:

Supermarket salmon riddled with sea lice

Ministers tried to bury figures showing a pest that can spread to and kill fish in the wild is rife in Scottish farms

Mark Macaskill

October 29 2017, 12:01am,
The Sunday Times



Read more via "[Supermarket salmon riddled with sea lice](#)"

29) **Scottish salmon's "liciest" farms include sites operated by the Scottish Salmon Company, Loch Duart, Marine Harvest, Cooke Aquaculture and Scottish Sea Farms (all members of the Scottish Salmon Producers Organisation):**

Sea Lice Breaching Farm List

#SalmonFarmReform

Scottish Government has trigger levels of 3 adult female sea lice per farmed salmon (at which point a "site-specific escalation plan" to reduce lice numbers is required) and 8 adult female lice per farmed salmon (at which point, enforcement action may be ordered to harvest early, reduce biomass or cull-out a farm).

Here is the full list of open net salmon farms that breached the 3 and/or 8 sea lice trigger levels, for differing periods, between November 2016 and August 2017



Ardcastle Bay	The Scottish Salmon Company	Loura Voe	Scottish Sea Farms Ltd
Badcall Bay	Loch Duart Ltd	Maol Ban	Marine Harvest (Scotland) Ltd
Bagh Chlann Neill	The Scottish Salmon Company	Maragay Mor	The Scottish Salmon Company
Bastaness	Cooke Aquaculture Scotland Ltd	Meall Mhor Loch Fyne	The Scottish Salmon Company
Cairidh	Marine Harvest (Scotland) Ltd	Nevis B	Scottish Sea Farms Ltd
Clashnessie Bay	Loch Duart Ltd	North Havra	Grieg Seafood Shetland Ltd
Cloudin	Cooke Aquaculture Scotland Ltd	North Papa	Grieg Seafood Shetland Ltd
Corlarach	Grieg Seafood Shetland Ltd	North Shore	Marine Harvest (Scotland) Ltd
Djubawick	Cooke Aquaculture Scotland Ltd	North Uiskevagh	The Scottish Salmon Company
Dury Voe	Scottish Sea Farms Ltd	Ornish Island	Marine Harvest (Scotland) Ltd
Eilean Grianain	Marine Harvest (Scotland) Ltd	Plocrapol	The Scottish Salmon Company
Etive 4	Dawnfresh Farming Ltd	Quarry Point	The Scottish Salmon Company
Foreholm	Scottish Sea Farms Ltd	Reibinish	The Scottish Salmon Company
Furnace Quarry	The Scottish Salmon Company	Scadabay	The Scottish Salmon Company
Geasgill	The Scottish Salmon Company	Score Holms	Grieg Seafood Shetland Ltd
Gob a Bharra Loch Fyne	The Scottish Salmon Company	Sgeir Dughall	The Scottish Salmon Company
Gob na Hoe	Grieg Seafood Shetland Ltd	Shuna SW (Rubh'an Trilleachain)	Kames Fish Farming Ltd
Greanamul	The Scottish Salmon Company	Sian Bay	Scottish Sea Farms Ltd
Groatay	Marine Harvest (Scotland) Ltd	Snaranness	Scottish Sea Farms Ltd
Hellisay	Marine Harvest (Scotland) Ltd	Soay	Marine Harvest (Scotland) Ltd
Holms Geo	Scottish Sea Farms Ltd	South Sound	Scottish Sea Farms Ltd
Kempie Bay	Scottish Sea Farms Ltd	Spoose Holm	Grieg Seafood Shetland Ltd
Kenmore Loch Torridon	The Scottish Salmon Company	Strome	The Scottish Salmon Company
Kilerivagh / Petersport	The Scottish Salmon Company	Strondoir Bay	The Scottish Salmon Company
Kingairloch	Marine Harvest (Scotland) Ltd	Stulaigh	Marine Harvest (Scotland) Ltd
Langa Isle (East)	Grieg Seafood Shetland Ltd	Teisti Geo	Scottish Sea Farms Ltd
Leinish	Grieg Seafood Shetland Ltd	Turness	Cooke Aquaculture Scotland Ltd
Linnhe	Marine Harvest (Scotland) Ltd	Uyea Isle	Cooke Aquaculture Scotland Ltd
Loch Carnan	Loch Duart Ltd	Vee Taing	Cooke Aquaculture Scotland Ltd
Loch Laxford	Loch Duart Ltd	West of Burwick	Grieg Seafood Shetland Ltd
Loch Odhaim	The Scottish Salmon Company	Wick of Belmont	Cooke Aquaculture Scotland Ltd

Read more via "[Scottish salmon farming's 'liciest' farms named and shamed](#)"

30) Scottish Salmon's 'Label Rouge' scheme - promoted by the Scottish Salmon Producers Organisation - should be renamed 'Label Louse':



Read more via "[Red Alert for Label Rouge - Lousy Label Goes Rogue](#)"

31) Levels of beneficial omega-3 oils in farmed salmon have halved in five years.....



The screenshot shows the top portion of a BBC News article. At the top left is the BBC logo, followed by a search bar and navigation links for 'Your account', 'News', 'Sport', 'Weather', 'iPlayer', 'TV', and 'Radio'. Below this is a red banner with the word 'NEWS' in white. Underneath the banner is a horizontal menu with categories: 'Home', 'UK', 'World', 'Business', 'Politics', 'Tech', 'Science', 'Health', and 'Family & Education'. The article title 'Omega-3 oils in farmed salmon 'halve in five years'' is prominently displayed in black text. Below the title, it says 'By Pallab Ghosh, Science correspondent, BBC News' and '6 October 2016'. There are also social media sharing icons for Facebook, Twitter, LinkedIn, Email, and a general 'Share' button.



Read more via [Omega-3 oils in farmed salmon 'halve in five years'](#)

.....with scientists at the University of Stirling feeding genetically modified plants which produce Omega-3 to farmed salmon:

The Telegraph



The screenshot shows the top portion of a The Telegraph article. The navigation bar includes 'Home', 'Video', 'News', 'World', 'Sport', 'Business', 'Money', 'Comment', 'Culture', 'Travel', 'Life', and 'W'. Below this is a secondary navigation bar with categories: 'Politics', 'Investigations', 'Obits', 'Education', 'Science', 'Earth', 'Weather', 'Health', 'Royal', and 'Celebr'. The article title 'Genetically modified crop successfully fed to salmon, say scientists' is displayed in black text. Below the title, it says 'Genetically modified plants which produce Omega-3 have been successfully fed to salmon'.

HOME » NEWS » SCIENCE » SCIENCE NEWS

Genetically modified crop successfully fed to salmon, say scientists

Genetically modified plants which produce Omega-3 have been successfully fed to salmon



Read more via "[Genetically modified crop successfully fed to salmon, say scientists](#)"

32) Farmed salmon contains toxins including DDT, PCBs, flame retardants and insecticides:

What's in farmed salmon?

FACT: THESE TOXINS ACCUMULATE IN OUR BODIES AND MOTHERS RELEASE UP TO 94% OF THESE TOXINS THROUGH PREGNANCY AND BREASTFEEDING

Fat

Compared to wild salmon, farmed salmon has over twice the fat, where toxins accumulate

DDT

Linked to breast cancer, passed to babies during breastfeeding

Viruses

Such as salmon influenza-type virus and a novel reovirus

Insecticides

Such as endosulfan, banned due to high toxicity; Norway lobbied to increase levels in farmed salmon feed 10x higher

GMO corn and animal by-products

Used in salmon feed

Artificial Colouring

Farmed salmon flesh is coloured to make it look real

Flame retardants

Linked to low IQ, hyperactivity

PCBs

Dangerous chemicals that can cause cancer, immune dysfunction and nervous system damage

"One should avoid farmed salmon like the plague."

- DAVID CARPENTER, AUTHOR OF PAPER ON FARMED SALMON TOXINS IN SCIENCE

What's in Farm Salmon?*

Toxins in farmed salmon



DDT: A banned pesticide.
Risk: Carcinogenic.

Emamectin: A sea louse repellent.
Risk: Low toxicity to humans

Pentachlorobenzene: In the chlorine family.
Risk: Nervous system damage. Banned in Europe.

Gamma-HCH: Insecticide.
Risk: Nervous system damage. Now banned in Europe.

Trans-nonachlor: Insecticide.
Risk: Nervous system damage. Banned in Europe.

Toxaphene-62: Insecticide.
Risk: Negative effect on nervous system and carcinogenic. Banned in most of the world.

PCB: One of the most dangerous pollutants.
Risk: Damages immune function, nervous system damage, liver cancer, reduced fertility of the fetus.

Alfa-HCH: Insecticide.
Risk: Nervous system damage. Banned in Europe.

Cis-nonachlor: Insecticide.
Risk: Nervous system damage. Banned substance.

Mirex: Insecticide.
Risk: Nervous system damage, carcinogenic. Banned due to environmental impact.

Dioxins.
Risk: Carcinogenic. Can also harm the fetus.

Alfa Endosulfan: Insecticide.
Risk: Nervous system damage, carcinogenic.

Toxaphene 40-41: Insecticide.
Risk: Nervous system damage, carcinogenic. Banned substance.

Mercury.
Risk: Weakens the immune system, fetal abnormalities, impaired learning in children.

Isodrin: Insecticide.
Risk: Nervous system damage. Banned substance.

Trans-Chlordane: Insecticide.
Risk: Nervous system damage. Banned substance.

Toxaphene 42: Pesticide.
Risk: Nervous system damage, carcinogenic. Organic pesticides that are now banned.

Isodrin: Insecticide.
No set upper limit. Risk: negative effect on nervous system. Banned substance.

Dieldrin: Insecticide.
Risk: Nervous system damage. Banned substance.

Beta-Endosulfan: Insecticide.
Risk: Nervous system damage, carcinogenic.

Ory-chlordane: Chlorinated pollutants.
Risk: Nervous system damage. Banned substance.

Endosulfan sulfate: Chlorinated pollutants.
Risk: Nervous system damage, carcinogenic.

Toxaphene 26: Insecticide
Risk: Nervous system damage, carcinogenic. Banned substance.

Cis-Chlordane: Pesticide.
Risk: Nervous system damage. Banned substance.

Toxaphene 50: Pesticide.
Risk: Nervous system damage, carcinogenic. Banned substance.

Brominated flame retardants (PBDE7).
Used in products to reduce flammability. Risk: liver damage, reduced and impaired fertility hormone system.

Cadmium.
Russian authorities took action against Norwegian salmon when cadmium was found in farm salmon in the 2006. Risk: Damage to brain, kidney, testes, placenta, bones, lungs, a Group 1 carcinogen

HCB: Seed fungicide.
Risk: Nervous system damage. Banned substance.

*Information adapted from VG, Norway's second largest newspaper

Read more via "[What's in Farmed Salmon](#)"; "[A Threat to Your Child's Health](#)" and "[Are You Trading Your Omega-3s for PCBs with Your Choice of Salmon?](#)"

33) Farmed salmon is the most contaminated food on the supermarket shelf:



Read more via: "[Farmed & Dangerous Salmon - the most contaminated food on the supermarket shelf](#)"; "[Supermarket Scamon: Pesticide Contamination of Farmed Salmon](#)"; "[Farmed Salmon — One of the Most Toxic Foods in the World?](#)" and "[Farm salmon is now most contaminated food on shelf](#)"

34) Diesel contamination of Scottish farmed salmon led to a supermarket recall in 2008:

Supermarkets recall salmon over contamination

- Fish products may be tainted with diesel
- No health risk, but taste may be affected, says FSA



Salmon fillets and other fish on ice at a counter. Photograph: Goncalo D'Almeida/Alamy

Supermarkets were forced to withdraw about 50 salmon products from their shelves yesterday, after it emerged they may have been contaminated with diesel.

Ten supermarkets, including Tesco, Asda, Sainsbury's and Morrisons, have had to withdraw products ranging from Tesco's salmon en croute to Co-op's salmon fillets. The Food Standards Agency (FSA) said salmon supplied by Marine Harvest to Morrisons and to a second firm, Young's Seafood, who make their own brand as well as those for other retailers, is believed to be the source of the contamination.

Read more via "[Supermarkets recall salmon over contamination](#)" and "[Salmon products recalled from supermarkets](#)"

35) Contamination with polychlorinated biphenyls (PCBs) has been found under salmon farms in Scotland (as well as in the flesh of Scottish farmed salmon):

Fisheries Research Services Internal Report No 01/04

A REVIEW OF HAZARDOUS SUBSTANCES IN THE SCOTTISH MARINE ENVIRONMENT

In January 2001, there was considerable controversy regarding the presence of polychlorinated biphenyls (CBs) and dioxins (polychlorinated dibenzo-*p*-dioxins and dibenzofurans) in farmed salmon. A television programme highlighted that farmed fish may be a major dietary source of CBs and dioxins. It was suggested that fish feed used in the

fish farming industry contained significant quantities of dioxins and CBs, which could potentially bioaccumulate in the fish. Easton *et al.* reported a study on contaminants (CBs, PAHs, PBDEs and OCPs) in farmed and wild salmon and commercial salmon feed from Canada³³. Wild fish were found to contain higher concentrations of CBs, PBDEs and OCPs than wild salmon and it was suggested that this was due to the high levels of these contaminants in commercial salmon feed. Farmed salmon were found to contain total CB concentrations (sum of 112 congeners) as high as 72.4 µg kg⁻¹ wet weight. Jacobs *et al.* reported concentrations of dioxins, non-ortho and mono-ortho CBs (CB77, 105, 118, 126, 156, 157, 169) in farmed and wild Scottish Atlantic salmon³⁴. CBs were found to be the dominant contaminant. Again it was suggested that contaminated feed was the most likely source. More recently Hites *et al.* reported concentrations of organic contaminants (dioxins, CBs, OCPs and toxaphene) in farmed and wild salmon from Northern Europe, America and Chile³⁵. Concentrations were found to be higher in farmed salmon compared to wild, with the highest total CB concentrations being found in farmed salmon produced in Scotland and the Faroe Islands (~50 µg kg⁻¹ wet weight).

In 2001 SEPA undertook a study of CBs in sediments collected in the vicinity of fish farms on the west coast of Scotland in 1999 and 2000³⁶. Thirteen sediments collected in the vicinity of cages were analysed for CBs and concentrations for the sum of the ICES 7 CBs ranged from 1.3–16.2 µg kg⁻¹ dry weight with the highest concentrations being found closest to the cages. Two sediments had concentrations above the upper EAC value, the remaining were within the EAC range (1–10 µg kg⁻¹ dry weight). Possible sources of CBs (and dioxins) into the Scottish marine environment could, therefore, come from faecal waste and non-ingested food pellets on the seabed around fish cages lochs which support aquaculture.

33. Easton, M.D.L., Lusziniak, D. and Von der Geest, E. 2002. Preliminary examination of contaminant loadings in farmed salmon, wild salmon and commercial salmon feed. *Chemosphere*, **46**, 1053–1074.
34. Jacobs, M., Ferrario, J. and Byrne, C. 2002. Investigation of polychlorinated dibenzo-*p*-dioxins and dibenzo-*p*-furans and selected coplanar biphenyls in Scottish farmed Atlantic salmon (*Salmo salar*). *Chemosphere*, **47**, 183–191.
35. Hites, R., Foran, J.A., Carpenter, D.O., Hamilton, M.C., Knuth, B.A. and Schwager, S.J. 2004. *Science*, **303**, 226–229.
36. Pirie, D. 2001. Report on the occurrence and significance of polychlorinated biphenyls (PCBs) in marine sediments from Scottish fish farm locations. SEPA internal report (*unpublished*).

Read more via "[A review of hazardous substances in the Scottish marine environment](#)"; "[Unintentional use of organic contaminants in aquaculture and impact on sediments](#)"

36) In 2017 the Expert Committee on Pesticide Residues in Food detected the banned carcinogen DDT in Scottish farmed salmon on sale in supermarkets across the UK (including Aldi, ASDA, Budgens, Marks & Spencers and Morrisons):

Expert Committee on Pesticide Residues in Food Sample Details Quarter 2 2017 Fish (oily)								
Sample ID	Date of Sampling	Description	Country of Origin	Retail Outlet	Address	Brand Name	Packer / Manufacturer	Pesticide residues found in mg/kg (MRL)
Salmon								
2032/2017	19/06/2017	Specially selected Scottish	UK	Aldi	7 Shiltern Lane Coventry CV4 7AN	Aldi	Aldi PO Box 26 Atherstone CV9 2SA	DDT (sum) 0.002 (No MRL)
5092/2017	22/05/2017	Salmon fillet	UK	Asda	St Pauls Road Bournemouth BH8	Asda	Asda Leeds LS11 5AD	DDT (sum) 0.003 (No MRL)
4736/2017	05/06/2017	Salmon fillets	UK	Budgens	Valley Park Centre Peterborough PE2 9QB	Bleikers	Bleikers Smokhouse LTD Unit 2 Food	DDT (sum) 0.003 (No MRL)
1575/2017	22/05/2017	Salmon fillets	UK	Marks & Spencers	Culverhouse Cross Cardiff CF5 6YZ	Marks & Spencers	Marks & Spencer PO	DDT (sum) 0.003 (No MRL)
3900/2017	19/06/2017	Fresh atlantic salmon fillets	UK	Morrisons	Kettering Road Northampton NN3	Morrisons	Morrisons Gain Lane Bradford	DDT (sum) 0.003 (No MRL)

Read more via "[Pesticide residues in food: quarterly monitoring results for 20170](#)"; "[Pesticide Residues in Food: Q2 2017](#)"; "[DDT may quadruple breast cancer risk](#)"; "[Farmed salmon linked to cancer risk](#)"; "[Cancer warning over Scottish farmed salmon](#)"; "[Health fear over farmed salmon](#)"; "[Salmon poison alert](#)"; "[Scottish farmed salmon is 'full of cancer toxins'](#)"; "[The salmon scandal they tried to ignore](#)"; "[Consumption advisories for salmon based on risk of cancer and noncancer health effects](#)" and "[DDT found in salmon: Pesticide discovered in farmed fish on sale in five major British supermarkets](#)"



37) Emamectin contamination of Scottish farmed salmon has now occurred at least eight times (including Scottish Salmon Company in 2016 and 2012, Lakeland Marine in 2010, Skelda Salmon in 2009, Scottish Sea Farms in 2006 and Marine Harvest in 2005):



Read more via "[Scottish Salmon Overdoses on Toxic Chemical](#)"; [Daily Mail: "The toxic chemicals in farmed salmon straight from the loch"](#) and "[Emamectin residues in farmed salmon](#)"

Malachite green - a banned carcinogen - has also contaminated Scottish farmed salmon:

BBC NEWS **E LIVE** **BBC NEWS CHANNEL**

Last Updated: Wednesday, 29 September, 2004, 17:54 GMT 18:54 UK

[E-mail this to a friend](#) [Printable version](#)

Banned chemical found in salmon

Official tests found a banned chemical in farmed salmon bought on Tyneside.

The Veterinary Medicines Directorate (VMD) discovered traces of malachite green in Scottish farmed salmon bought at a branch of Morrisons in Newcastle.

The chemical, normally used to dye fabric, was also used to kill fish parasites. It was banned in 2002 amid fears it may damage human cells.

The Food Standards Agency described the find of the chemical in fish for human consumption as "unacceptable".

Scottish fish farms were criticised in a US study

Read more via "[Contaminated salmon on sale to public](#)"; "[Banned chemical found in salmon](#)" and "['Toxic' salmon faces EU-wide sales ban](#)"

38) Whales, dolphins and porpoises on the West Coast of Scotland are being put at risk by noise alarms used by salmon farms to scare off seals:



Underwater alarms putting health of whales, dolphins and porpoises at risk



Monday 1 May 2017

Large-scale underwater noise pollution from Acoustic Deterrent Devices (ADDs) on the west coast of Scotland

Denise Risch³, Charlotte Rose Findlay^{1,2}, Hayden Ripple², Steven Benjamins³, Ben Wilson³, Frazer Coomber⁴

(1) Joint Nature Conservation Committee, Aberdeen, AB, United Kingdom.

(2) University of St Andrews; Scottish Association for Marine Science.

(3) Scottish Association for Marine Science.

(4) Hebridean Whale and Dolphin Trust.

Expansion of the aquaculture industry off Scotland has led to conflicts with marine predators such as seals, which predate species bred in aquaculture facilities and cause damage to equipment. To mitigate this, non-lethal management tools have been developed, the most popular of which are Acoustic Deterrent Devices (ADDs) or 'seal scarers'. ADDs broadcast loud, aversive sounds within the hearing range of the target species (i.e. seals). However their success in addressing the issue has been variable. In addition their unregulated use in Scotland could pose unintended ecological impacts to non-target species such as the harbour porpoise (*Phocoena phocoena*). This study aimed to address the gap in knowledge on the extent of ADD use in the Scottish aquaculture industry, and to quantify the scale of their acoustic presence in Scottish waters. Acoustic data collected during cetacean line-transect surveys carried out by the Hebridean Whale and Dolphin Trust (HWDT) were used to map the acoustic presence of ADDs across the west coast between 2006 and 2015. Results found a significant spatial and temporal increase in ADD presence across the west coast study regions (detections per unit effort; 2006 = 0.5%; 2015 = 15.3%). This study highlights the large-scale extent of noise from ADDs use at fish farms across Scotland and illustrates its gradual increase over the study period. The increasing ensonification of the Scottish coastline which includes multiple protected areas for marine mammals, due to these devices may pose a risk to both target and non-target species (e.g. odontocete cetaceans) that use these areas either seasonally or year round. This study is one of the first to highlight the large-scale extent of ADD noise pollution and its overlap with marine mammal habitat. This information is crucial in order to effectively address European legislation related to underwater noise and marine species protection.

Read more via [Sunday Herald: "Health of whales, dolphins and porpoises put at risk by underwater alarms"](#) ; ["Cetaceans Sound Alarm On Salmon Farms - new research sparks EC complaint & call to ban Acoustic Deterrent Devices"](#) and ["Large-scale underwater noise pollution from Acoustic Deterrent Devices \(ADDs\) on the west coast of Scotland"](#)

39) Scottish salmon farmers risk losing £200 million per year in exports to the United States if the industry continues killing seals:

heraldscotland

The Herald **sundayherald**

Scotland's 'trigger-happy' salmon farmers risk losing £200m US export market

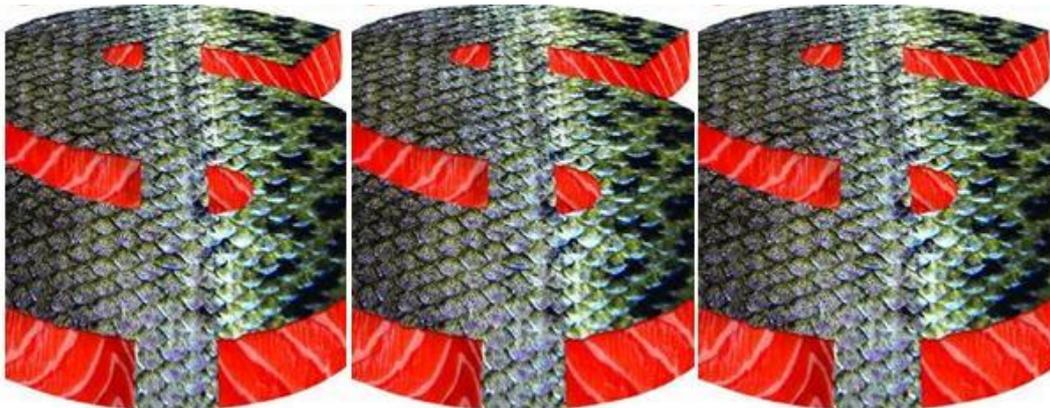
1 hr ago / Rob Edwards



Scotland's salmon farming industry will lose its £200 million export market to the US if it persists in shooting seals, according to the US government.

A senior US fisheries official has told the Sunday Herald that countries that want to keep exporting fish to the US have to show that their products "are not associated with a fishery in which intentional killing or serious injury of a marine mammal is allowed."

The warning comes as new official figures reveal that fish farms in Scotland have been shooting seven or eight seals a month this year, despite the industry's promise to cut the killing to zero.



Read more via [Sunday Herald: "Scotland's 'trigger-happy' salmon farmers risk losing £200m US export market"](#); ["US warning over continued killing of seals by Scots fish farms"](#); ["The \\$2 Billion Dollar Salmon Ban"](#); ["Salmon chiefs seek clarity on possible US ban"](#); ["Import ban on Scottish fisheries set to cost £200m a year"](#); ["Seal of Approval for U.S. Ban on Salmon"](#); ["Five-Year stay of execution for Scottish salmon's serial killers - US outlaws killing of marine mammals by 2022"](#); ["US ban on lethal Scottish salmon - £200 million in exports killed off by seal slaughter"](#)

40) Over 250 salmon farms litter the West Coast and the Highlands & Islands of Scotland - with the North-West accounting for 30% of salmon farming production in 2016 followed by Shetland (22%), South West (21%), Western Isles (18%) and Orkney (8%):



Read more via [Scottish Fish Farm Production Survey 2016](#)

41) Waste pollution from salmon farms is killing off the sea bed:



More via "[David Ainsley shows us the waste impacts of salmon farms](#)"; "[Shame Below the Waves](#)"; "[Pollution fears over fish farms](#)"; "[Factors Affecting Benthic Impacts at Scottish Fish Farms](#)" and "[Benthic Recovery Project](#)"

42) Scientific research has shown that salmon farms impact on maerl beds:

Impact of fish farms on maerl beds in strongly tidal areas

Jason Hall-Spencer^{1,*}, Nicola White², Ewan Gillespie³, Katie Gillham⁴, Andy Foggo¹

¹Plymouth Marine Institute, University of Plymouth, Drake Circus, Plymouth PL4 8AA, UK

²Haskoning UL Ltd, Elizabeth House, Emperor Way, Exeter EX1 3QS, UK

³Scottish Environment Protection Agency, Dingwall IV7 9XB, UK

⁴Scottish Natural Heritage, Westercaigs, Inverness IV3 8NW, UK



This first study on the effects of offshore salmon farms on strongly tidal maerl beds (above) reveals that strong currents do not prevent major degradation of benthic habitats (inset). Changes in management policy are therefore required to prevent detrimental effects to seabed ecology, and rotation of farmed sites (fallowing) is inadvisable where slow-growing biogenic habitats are concerned.

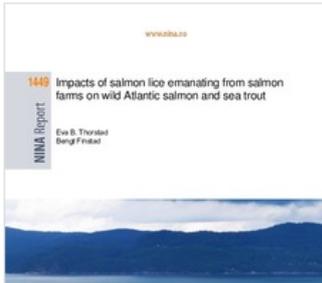
Read more via "[Impact of fish farms on maerl beds in strongly tidal areas](#)"; "[Investigation into the impact of marine fish farm deposition on maerl beds](#)"; "[A Big Fish In A Small Pond](#)"; "[Fish farm threatens rare marine life](#)"

43) Scientific research published in 2018 details "considerable evidence" of a link between salmon farms and the spread of lice to wild Atlantic salmon and sea trout:

Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout

Thorstad, Eva B.; Finstad, Bengt

Research report



Abstract

Thorstad, E.B. & Finstad, B. 2018. Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout. NINA Report 1449: 1-22.

Results from scientific studies on the impacts of salmon lice on Atlantic salmon and sea trout are summarized here. Considerable evidence exists that there is a link between farm-intensive areas and the spread of salmon lice to wild Atlantic salmon and sea trout. Several studies have shown that the effects of salmon lice from fish farms on wild salmon and sea trout populations can be severe; ultimately reducing the number of adult fish due to salmon lice induced mortality, resulting in reduced stocks and reduced opportunities for fisheries. Depending on the population size, elevated salmon lice levels can also result in too few spawners to reach conservation limits.

Read more via: "[Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout](#)"; "[Report backs negative sea louse claims](#)"; [The Scotsman: "Call for curb in fish farms as study shows pest risk to wild fish"](#); "[New scientific study underlines damage to wild salmon and sea trout populations from salmon farm parasites – in Scotland, Norway and Ireland](#)"; [Daily Mail: "Up to third of wild salmon 'eaten alive by fish farm lice'"](#); "[Fish farm lice are killing wild salmon](#)" and "[EC Complaint concerning the failure of the UK to draw up and take appropriate measures pursuant to the Marine Strategy Framework Directive in relation to the impact of sea lice emanating from Scottish marine salmon farms on wild Atlantic salmon and sea trout](#)"

44) Antibiotic use on Scottish salmon farms represents a public health risk:



Read more via "[Antibiotic-ridden Scottish Salmon: FOI reveals of Oxytetracycline, Florfenicol, Amoxicillin and Fenbendazole](#)" and "[Fish 'hooked on chemicals'](#)"

45) Consumption of farmed salmon has been linked to obesity and diabetes:



OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

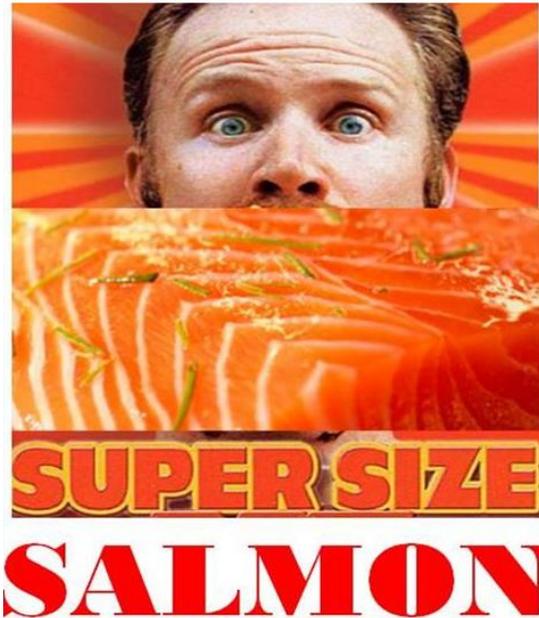
Chronic Consumption of Farmed Salmon Containing Persistent Organic Pollutants Causes Insulin Resistance and Obesity in Mice

Mohammad Madani Ibrahim, Even Fjære, Erik-Jan Lock, Danielle Naville, Heidi Amlund, Emmanuelle Meugnier, Brigitte Le Magueresse Battistoni, Livar Frøyland, Lise Madsen, Niels Jessen, Sten Lund, Hubert Vidal, Jérôme Ruzzin

Published: September 23, 2011 • <https://doi.org/10.1371/journal.pone.0025170>

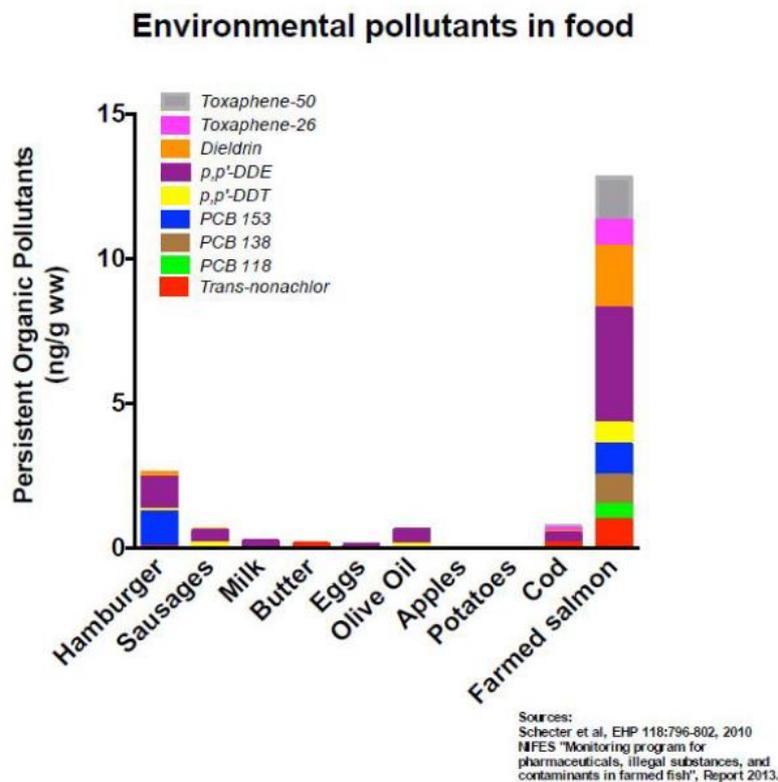
Conclusions/Significance

Our data indicate that intake of farmed salmon fillet contributes to several metabolic disorders linked to type 2 diabetes and obesity, and suggest a role of POPs in these deleterious effects. Overall, these findings may participate to improve nutritional strategies for the prevention and therapy of insulin resistance.



Read more via [Chronic Consumption of Farmed Salmon Containing Persistent Organic Pollutants Causes Insulin Resistance and Obesity in Mice](#)

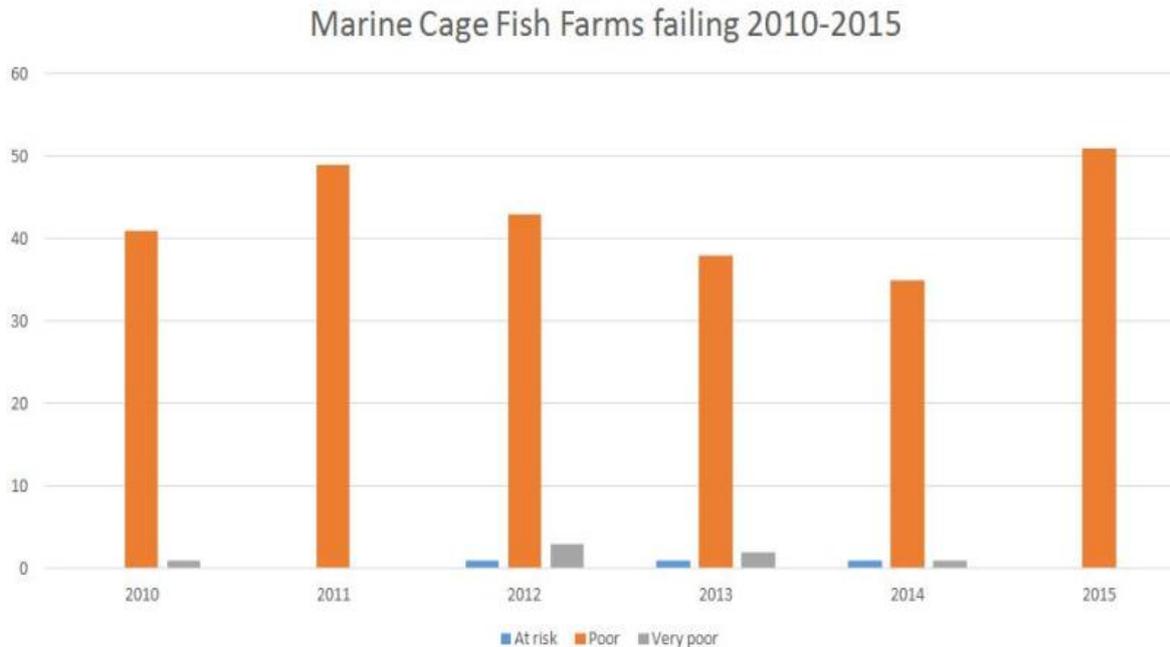
46) "Never eat farmed salmon!" warned Dr. Jerome Ruzzin of the University of Bergen following scientific research showing farmed salmon was the most contaminated:



More details via "[Fillet Oh Fish](#)" and "[Farmed & Dangerous Salmon - the most contaminated food on the supermarket shelf](#)"

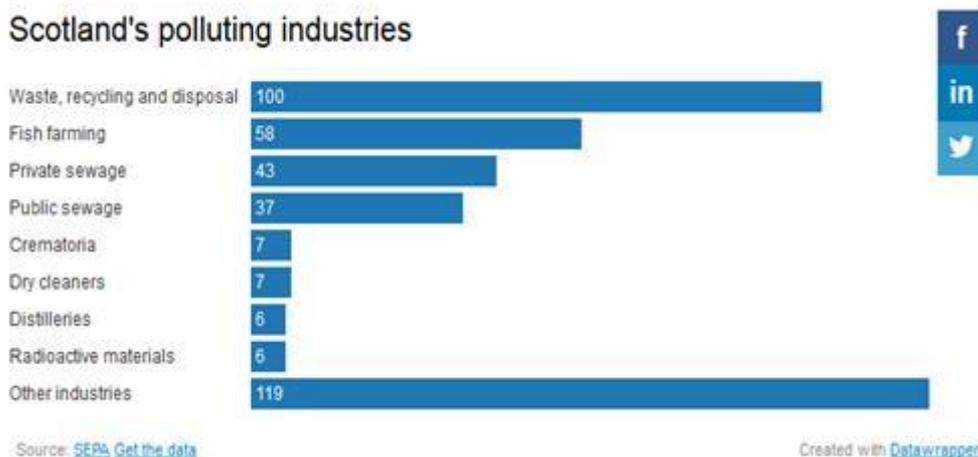
47) Almost a fifth (18%) of Scottish fish farms were classified by the Scottish Environment Protection Agency as failing and responsible for "at least one significant breach" in 2015:

Norwegian-owned Marine Harvest, Scotland's largest salmon farming company, is the worst operator with 13 "failing" salmon farms in 2015 (that's 27% of the 49 marine salmon farms operated by Marine Harvest).



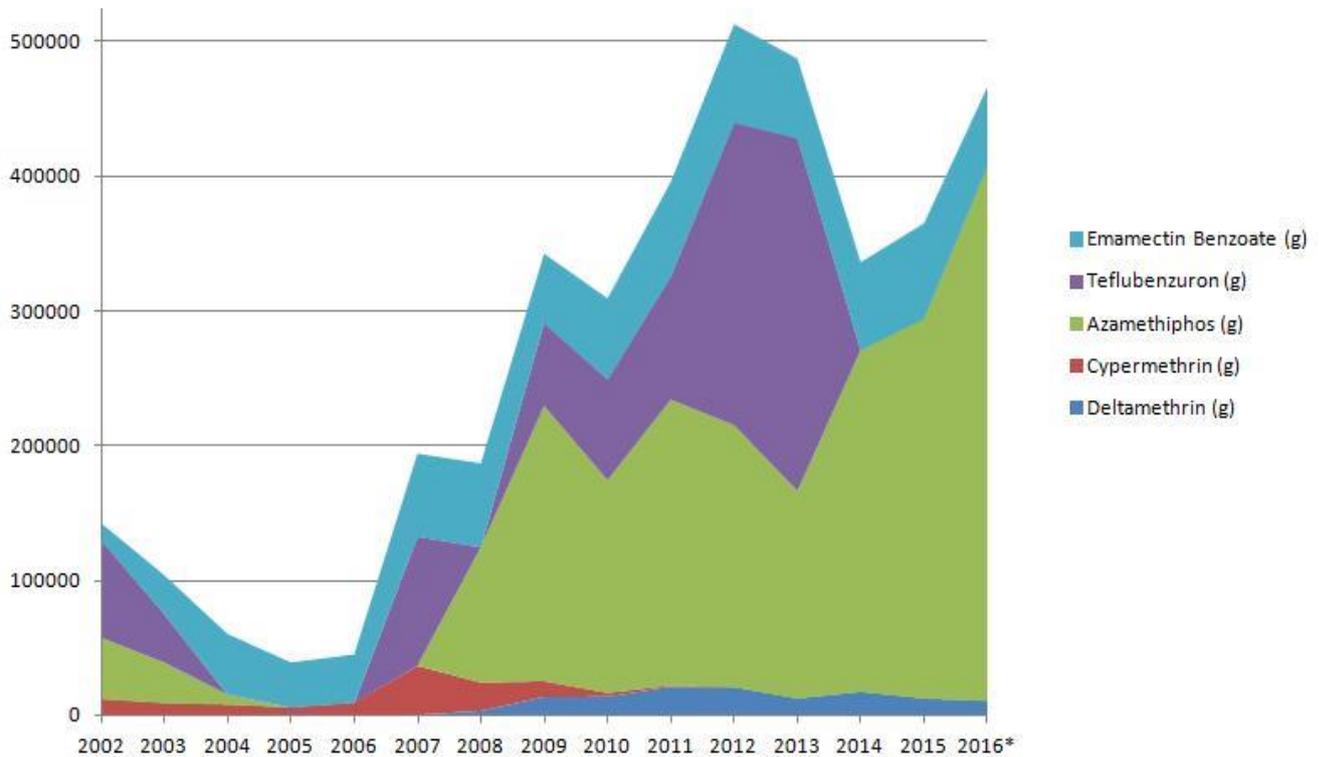
Read more via ["Failing Fish Farms - 18% rated "poor" by SEPA in 2015"](#)

48) Data from SEPA ranked fish farms as 2nd worst out of "Scotland's polluting industries":



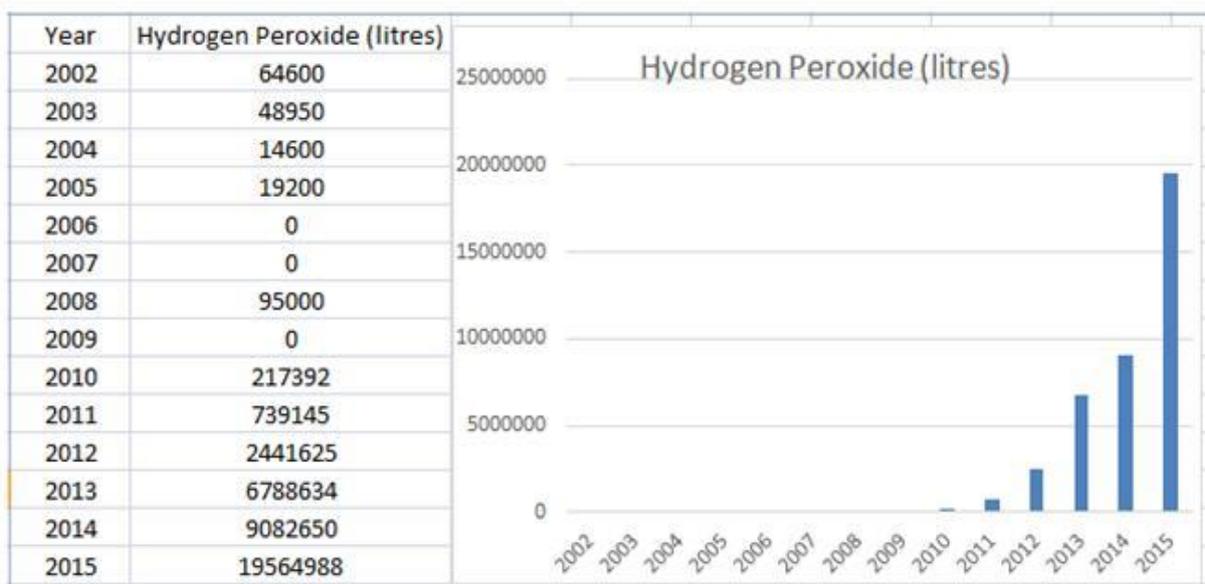
Read more via ["Exposed: the 383 plants that pollute Scotland"](#) and ["Mapped: the hundreds of firms condemned for 'poor' pollution performance"](#)

49) Toxic chemical use on Scottish salmon leapt 1000% over the last decade:



Read more via [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"](#); [Press & Journal: "Scottish salmon farming 'fighting a losing battle' against sea lice"](#); ["Scottish fish farmers use record amounts of parasite pesticides"](#) and ["Sharp rise reported in Scots fish lice chemical"](#)

The use of Hydrogen peroxide on Scottish salmon farms has also sky-rocketed:



Read more via [The Sunday Times: "Record chemical use 'of concern' to salmon giant"](#) and ["Sky-Rocketing Chemical Use on Scottish Salmon Farms"](#)

50) Toxic chemicals used by "junkie" salmon farms include the cancer-causing Dichlorvos, the poisonous paint TBT and lobster-killing Teflubenzuron (all now banned).....



Gerald Warner: All talk and no action as fish farms kill off our wild salmon

Published: 19:53

Updated: 23:52

Saturday 08 August 2009

In its early, buccaneering days, the salmon farming industry rewrote the definition of "cavalier". Its response to health problems among farmed salmon was bigger and better chemical warfare. An article in *The Ecologist* claimed that, prior to the banning in 1999 of Dichlorvos (DDVP), a pesticide linked to cancer, Scottish salmon farms used up to nine million tonnes of the stuff. Such was the reputation of salmon farming that the World Wildlife Fund labelled it a "junkie industry".

Read more via ["Insecticide ban amid cancer fears"](#); ["Fly Spray Ban Urged as Cancer Fears Rise"](#); ["Nuvan use in salmon farming—the antithesis of the Precautionary Principle"](#); ["Tin from paint is found in salmon flesh"](#); ["Accumulation of butyltins in muscle tissue of chinook salmon reared in sea pens treated with tri-n-butyltin"](#); ["Sea louse control in Scotland, past and present"](#); ["All talk and no action as fish farms kill off our wild salmon"](#); ["Toxic pesticide again in use on salmon farms"](#); ["Critics question safety of Calicide use at Scottish salmon farms"](#); ["Effects of teflubenzuron on sediment processing by members of the *Capitella* species-complex"](#); ["The drug that's meant to save Salmon but is killing the creatures on the Ocean floor"](#); ["Mortality and deformities in European lobster \(*Homarus gammarus*\) juveniles exposed to the anti-parasitic drug teflubenzuron"](#); ["Media backgrounder: Chemical Culture in Scotland"](#) and ["Fish Farmageddon: Scottish Salmon's Lethal Legacy"](#)

.....with new chemicals now in the pipeline:

Read more via ["New lice bath '100% effective' and pollution-free"](#); ["Patent sought for neonicotinoid-based sea louse treatment"](#); ["New sea louse treatment nears commercial launch"](#) and ["A new generation of biocides for control of crustacea in fish farms"](#)

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

Environmental news 06.11.16 29

Revealed: how Scottish fish farm cooked thousands of salmon alive

EXCLUSIVE
BY ROB EDWARDS

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

Blunders by Norwegian multinational Marine Harvest have cost millions of pounds and led to more than 600 tonnes of salmon having to be incinerated. The losses have contributed to a 10 per cent drop in the company's Scottish salmon production.

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

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

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

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

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

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

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

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

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

On October 28, the fish farming industry launched a plan to double its business from £1.8 billion this year to £3.6bn by 2020. The plan was backed by Ewing, who promised to set up an "industry leadership group".

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

It was Stansfield who obtained the Government memo revealing the accidental deaths. "The Marine Harvest is desperate enough to resort to a decidedly dodgy thermolicer device that deep-freezes the industry's disease problems are," he said.

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

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

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

Marine Harvest pointed out that the salmon killed in the "unfortunate" thermolicer incident had been weak and had gill disease. "We regret any loss of fish and are always mindful of the welfare of the fish and aim to continuously improve our methods to

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

Photograph: PA/David Chewkin

address changing environmental circumstances," said the company's manager Steve Brocken.

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

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

"Any growth will be achieved in a speedy and sustainable way," said chief executive Scott Landsburgh.

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

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



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

MARINE HARVEST

turns up the heat with



THE THERMOLICER

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

THE PRESS AND JOURNAL
Tuesday, January 17, 2017

Thermal treatment for lice blamed for salmon deaths

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

BY KEITH FINDLAY

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

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

But instead of just

"We had some unexpected mortality during the procedure"

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

Read more via "[Thermal treatment for lice blamed for salmon deaths](#)" and "[Treatment leads to morts in Shetland](#)"

53) Scottish salmon farms represent a welfare nightmare with mass mortalities, high stocking densities, so-called 'death crowns' due to lice infestation and other problems:



Read more via [Compassion In World Farming: Why fish farming needs urgent welfare reform](#); "[Welfare fears after claim deaths of farmed salmon have doubled](#)"; "[Closed Waters: the welfare of farmed Atlantic salmon](#)"; "[Salmon farming welfare raised at industry event](#)" and "[Farmageddon](#)"

54) The mortality rate at Scottish salmon farms is a staggering 26.7% (five times higher than the 5% mortality tolerated on intensive chicken farms):

SCOTTISH PARLIAMENT

WRITTEN ANSWER

9 January 2018

Index Heading: Economy

Mark Ruskell (Mid Scotland and Fife) (Scottish Green Party): To ask the Scottish Government how many farmed salmon have died in each year since 2012.

S5W-13432

Fergus Ewing: Scottish Government does not record farmed salmon mortalities by year but does maintain and publish the percentage of fish harvested from each year class in the Scottish Fish Farm Production Survey; <http://www.gov.scot/Topics/marine/Fish-Shellfish/FH/surveys>. Mortality is included in the number of fish not harvested for human consumption, which also consists of fish which have escaped, have been culled for production reasons, have been removed for sampling purposes, statutory culls or have been selected for broodstock production.

A year class represents all smolts put to sea in any one year. The production cycle of any year class is complete within two years. The following table details the data from the 2010 year class onwards, as these fish will have contributed to mortality in 2012. The latest fin fish production survey was published in September 2017 and the most up to date information available is for the 2014 year class.

Year Class	Percentage of Fish Not Harvested	Number of Fish Not Harvested (millions)
2014	26.7%	12.85
2013	23.7%	9.7
2012	14.6%	6.0
2011	23.0%	9.83
2010	17.2%	6.62
Average	21.04%	9

Read more via ["Parliamentary Question: to ask the Scottish Government how many farmed salmon have died in each year since 2012"](#) and ["Death rate at salmon farms doubles to 20m fish a year"](#)

55) In December 2016, the Scottish Green Party called for a moratorium on Scottish salmon farming:

#FMQs

First Minister's Questions
 Mark Ruskell
 Mid Scotland and Fife
 Dec 14
 Green

Mark Ruskell MSP - Scottish Greens
 9 hrs · 🌐

Today at FMQs Mark raised the recent BBC1 investigation into Scotland's salmon farms and asked how a farming system with a mortality rate of 25% could be allowed to continue. We're backing calls for a moratorium on industry expansion until a full parliamentary inquiry has been completed.

Read more via [First Minister questioned on leaking wastes from morts - call for a moratorium from Greens](#)

Instead of expanding salmon farming yet further, the Scottish Government should be curbing production and that means immediately closing down disease-ridden salmon farms.



Read more via "[Aquaculture Growth to 2030: a strategic plan for farming Scotland's seas](#)"; "[New innovation roadmap outlines pathway for Scottish aquaculture growth](#)"; "[Scottish Aquaculture: a view towards 2030](#)"; "[New strategy launched to 'double' size of aquaculture](#)"; "[New Strategy to Double Size of Scotland's £1.8 billion Aquaculture Sector](#)"; "[Call for curb in fish farms as study shows pest risk to wild fish](#)"; "[Salmon Farming Moratorium: Letter to the First Minister of Scotland](#)"; "[Scotland's salmon farms face strict curbs](#)"



55) "Scotland's farmed salmon industry stinks" reported The Grocer in 2017 in an article by award-winning food writer Joanna Blythman:



The Grocer

Yes! I want to read more Claim trial >>

HOME ▾ BUYING & SUPPLYING ▾ STORES ▾ CHANNELS ▾ FINANCE ▾ PEOPLE ▾ F

Home > Opinion > Columns > Second opinion >

Scotland's farmed salmon industry stinks

23 Feb 2017 | Joanna Blythman

Print | Email | Share | Comment | Save

Scotland's salmon farming industry is being eaten away by sea lice, the parasite that stalks large concentrations of farmed fish. Latest figures from Marine Harvest, the Norwegian multinational that owns most of the Scottish 'farms', show that despite its self-styled reputation as a clean, green country, Scotland has by far the worst sea lice problem of any producer nation. In 2014, 28% of sites were affected; by 2015 that figure had jumped to 49%. Equivalent levels on Norwegian and Irish farms were 5% and 18% respectively.

"The gloss is off the Scottish salmon brand"
Joanna Blythman, journalist and author of *Swallow This*

Read more via [The Grocer: 'Scotland's Farmed Salmon Industry Stinks'](#) and "[Salmon farming morts](#)"



Read more via "[Ground Zero in Scotland's Salmon Wars](#)"

56) Hjaltland Sea Farms (owned by the Norwegian multinational Grieg Seafood) was kicked out of the Scottish Salmon Producers Organisation for importing smolts without quarantine:

The screenshot shows a BBC News article from 30 April 2014. The article title is "Industry body expels Shetland salmon producer Hjaltland". The sub-headline reads: "Shetland's largest salmon producer has been expelled from the Scottish Salmon Producers Organisation (SSPO).". The main text states: "The industry body said it had taken the decision to expel Hjaltland Sea Farms because it had been importing smolts from Norway without putting them in quarantine." To the right of the text is a photograph of a salmon with its mouth open. A caption below the photo says: "Hjaltland processes more than 60% of Shetland's total salmon production".

Read more via "[Industry body expels Shetland salmon producer Hjaltland](#)" and "[Salmon firm defiant after SSPO expulsion](#)"

57) Ardessie Salmon were kicked out of Scottish Quality Salmon for illegal chemical use:

The screenshot shows a BBC News article from Wednesday, 19 July 2000, at 17:12 GMT. The article title is "Salmon producer kicked out". The sub-headline reads: "The farm has been investigated before". The main text states: "A Scottish farmed salmon producer has been expelled from an industry body following an inquiry into allegations of malpractice." Another paragraph says: "Scottish Quality Salmon said it took the decision after an independent investigation into Ardessie Salmon, in Wester Ross, revealed a breach of quality standards." A final paragraph states: "The ruling means that Ardessie Salmon cannot sell its products under the quality assurance schemes Tartan Quality Mark and French Label Rouge." To the right of the text is a photograph of a person's hands holding a salmon.

Read more via "['Illegal poison' used on salmon](#)"; "[Illegal chemical 'used on salmon'](#)" and "[Salmon producer kicked out](#)"

58) Scottish Sea Farms was guilty of "serious violations" of food safety rules on pesticides in salmon:

"Your firm's aquaculture farmed salmon appear to be adulterated," the US Food & Drug Administration said, "in that the products have been prepared, packed, or held under conditions whereby they may have been rendered injurious to health."



SATURDAY 27 OCTOBER 2012

Fish farm at centre of mystery illness was warned over safety by US agency

exclusive By Rob Edwards Environment Editor

A Scottish fish farming plant, whose workers complained of a mystery illness, had been reprimanded by the US Food and Drug Administration (FDA) for "serious violations" of food safety rules on pesticides in salmon.

Read more via [FDA Health Warning for Scottish Farmed Salmon](#) and [Salmon Farming is Sickening: FDA warning for "adulterated" Scottish farmed salmon "injurious to health"](#)

59) Scottish Salmon Company was caught out calling a local community a "vipers nest" in leaked documents:

Local community labelled 'vipers nest' by salmon company

from [Sunday Herald](#), 13 January 2013



Scotland's £1 billion salmon farming industry is facing growing difficulties winning public support for massive expansion plans after a concerned local community was labelled a "vipers nest" in a leaked company email.

Private emails from within the foreign-owned [Scottish Salmon Company](#), which produces a fifth of Scotland's farmed salmon, also reveal its public relations tactics for avoiding the "angst, time, delay, hoo-haa" caused by objections.

The company planned to locate small salmon cages on a loch and then "let the locals get used to it", before applying to introduce larger ones in two or three years time. The aim was to avoid "lengthy, tiring, negative PR battles".

The revelations have sparked fury amongst fish farm opponents, who accuse the company of betraying "cynical contempt" for local people by hiding their plans for future expansion. The company has hit back, however, alleging that campaigners have distorted the facts in an attempt to discredit the fish farming industry.

Read more via "[Local community labelled 'vipers nest' by salmon company](#)"

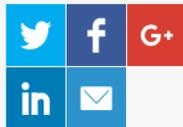
60) Wester Ross Fisheries were dropped by ASDA due to concerns over its environmental impact - including benthic pollution and sea lice infestation:

Asda Drops Wester Ross Salmon Over Environmental Concerns



Lucy Towers
22 April 2014, at 1:00am

UK - Asda has dropped the Scottish salmon supplier Wester Ross Fisheries (WRF) due to concerns over its environmental impact.



The company had previously been praised by Asda for its environmental credentials and the quality of its farmed salmon, reports [TheSundayTimes](#).

The announcement from Asda coincides with mounting pressure on the Highland council to force WRF to reapply for permission to farm fish at its Ardesie sites in Ross and Cromarty.

A Scottish government audit recently found that an assessment of the firm's environmental impact, carried out in 2002, was "inadequate".



Fish-farm parasites eating Wester Ross trout alive

By
FRANK URQUHART

Published: 09:56
Wednesday 03 July 2013

Share this article



A LEADING Scottish anglers organisation today claimed that wild sea trout are being "eaten alive" by fish-farm parasites in a sea loch in Wester Ross.

The Salmon and Trout Association Scotland (STAS) has revealed that samples of trout recovered from Little Loch Broom, near Ullapool, show that some fish are infested with "huge and probably lethal" numbers of the parasitic sea lice *Lepeophtheirus salmonis*.

0
comments



HAVE
YOUR SAY

Read more via "[Asda axes salmon from 'problem' WRF](#)"; "['Unsatisfactory' Wester Ross Salmon: Over a decade of non-compliance](#)"; "[Prizes for polluting fish farm under fire](#)"; "[Wester Ross fish farms under fire over sea lice outbreaks](#)" and "[Fish-farm parasites eating Wester Ross trout alive](#)"

61) Marine Harvest's slaughter of seals in Loch Alsh - a Special Area of Conservation - attracted widespread condemnation:



marine harmfulfest

More details via "[Scottish Fish Farmers Slaughter Seals](#)"; "[Marine Harvest's Slaughter of Seals in Loch Alsh, Scotland](#)"; "[Seal killing concern at fish farm](#)"; "[Marine Harvest: Scotland's #1 Seal Killer](#)" and "[RSPCA in firing line over Marine Harvest's seal-killing spree in Scotland](#)"

62) Marine Harvest was fined £4,000 for polluting the River Lochy with fish viscera, blood and congealed fats deposits, scum and grease:



Marine Harvest pollution in the River Lochy for which it was fined £ 4,000.

Marine Harvest Scotland (27th July 2005) - cause or knowingly permit poisonous, noxious or polluting matter or any solid waste matter namely fish viscera, blood and congealed fat deposits, scum & grease to the River Lochy contra s30F(1) CoPA 1974. Fined £4,000.

Read more via "[Scottish Farmed Salmon Exposed](#)"

63) Marine Harvest polluted Loch Shell with the toxic pesticide Teflubenzuron (subsequently banned by SEPA) up to 450 times higher than recommended levels:

Fishing

Fish company investigated after salmon farm pollutes Scottish loch

Marine Harvest, one of the largest fish-farming companies, is under investigation after polluting loch with pesticide

Severin Carrell, Scotland correspondent

Fri 10 May '13 12.08 BST



This article is 4 years old

<
52



Caged Scottish Salmon. Photograph: Alamy

Marine Harvest, one of the world's largest fish-farming companies, is under investigation after its salmon farms polluted a Scottish loch with toxic pesticide residues hundreds of times above environmental limits.

Sampling tests around salmon cages on Loch Shell in the Outer Hebrides by the Scottish Environment Protection Agency (Sepa) found that levels of Teflubenzuron, used to kill sea lice parasites which affect hundreds of thousands of caged fish each year, were up to 450 times higher than recommended levels.



Read more via "[Fish company investigated after salmon farm pollutes Scottish loch](#)"; "[Revealed: the dirty dozen salmon farms that contaminate lochs with pesticides](#)" and "[Revealed: the toxic pesticides that pollute our lochs](#)" and "[The drug that's meant to save Salmon but is killing the creatures on the Ocean floor](#)"

64) Deaths at salmon farms have cost the industry dearly:

BBC News [reported](#) in 2012 that Scottish Sea Farms had been fined £333,335 following the deaths of two workers - that's around £166,700 each for the lives of Scottish Sea Farms worker Campbell Files and engineer Arthur Raikes.



The image is a screenshot of a BBC News article. At the top, there is a red navigation bar with the BBC logo and links for News, Sport, Weather, Travel, and Future. Below this is a white banner with the text 'NEWS GLASGOW & WEST SCOTLAND'. A secondary navigation bar includes links for Home, UK, Africa, Asia, Europe, Latin America, Mid-East, US & Canada, Business, Health, and Sci/Environment. A third bar lists regional categories: England, Northern Ireland, Scotland (highlighted), Wales, UK Politics, and Education. The article's date and time are '26 January 2012 Last updated at 14:05 GMT'. The main headline is 'Loch Creran barge death firms have £640,000 fines cut'. A sub-headline reads: 'Two companies who were fined a total of £640,000 over the deaths of two men on a fish farm barge in Argyll have had their penalties cut by appeal judges.' The text continues: 'Maarten Pieter Den Heijer, 30, and 45-year-old Robert MacDonald died on Loch Creran, near Oban, in May 2009.' It then states: 'Scottish Sea Farms was fined £600,000 and Logan Inglis was fined £40,000 over health and safety breaches.' A photo shows two men, Maarten Den Heijer and Robert MacDonald, with a caption: 'Maarten Den Heijer and Robert MacDonald died on the barge'. Further text says: 'Appeal court judges agreed the fines were too harsh and reduced them to £333,335 and £20,000 respectively.' The final paragraph: 'The original fines were imposed by Sheriff Douglas Small last year after the case was heard at Oban Sheriff Court.' On the right side, there is a 'Related Stories' section with a link: 'Companies fined over barge deaths'.

"Following the incident on 11 May 2009, inspectors from the Health and Safety Executive (HSE) discovered Scottish Sea Farms had failed to suitably prepare staff for working in the small, sealed chambers on the Loch Creran barge," reported the BBC.

Speaking after the conclusion of the case, HSE principal inspector Barry Baker said: "These two men were trying to help save their colleague's life when they tragically lost their own. Aquaculture is an important industry in Scotland and one that we can be very proud of, however, we must not forget that the marine environment is dangerous and unforgiving. The deaths in this case should have been avoided - the risks should have been identified and a clear and safe system of work prepared."

Read more via "[Firms fined £640,000 over Loch Creran barge deaths](#)"; "[Loch Creran barge death firms have £640,000 fines cut](#)" and "[Barge pair 'died in two minutes'](#)"

65) "Filthy" and "Insanitary" Scottish farmed salmon "unfit for human consumption" was rejected by the US Food & Drug Administration in 2003:

An analysis by the Sunday Herald of all the UK food rejected reveals that Scottish salmon is one of the most frequently refused. Since January, 15 shipments of smoked salmon have been turned away because they were contaminated with listeria.

A further nine salmon shipments from Scotland were classified as "insanitary". According to the FDA, they "may have become contaminated with filth" and "may have been rendered injurious to health".

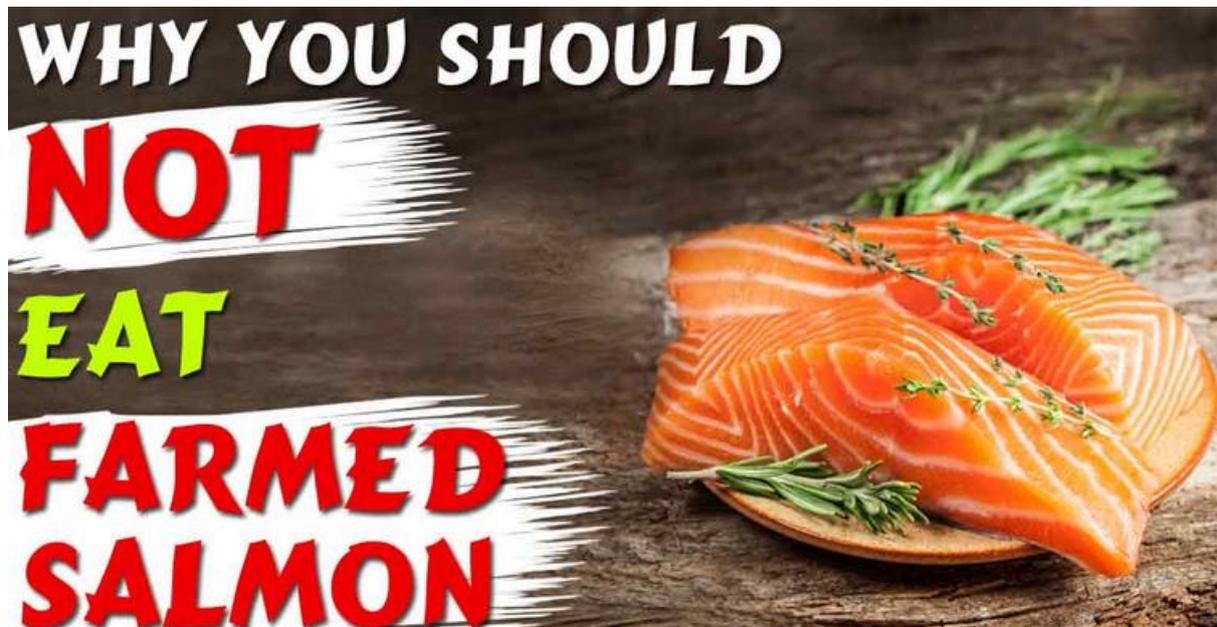
Three more salmon shipments were officially defined as "filthy".

DEFINITIONS USED BY THE US FOOD AND DRUG ADMINISTRATION

FILTHY: "The article appears to consist in whole or in part of a filthy, putrid, or decomposed substance or be otherwise unfit for food.

INSANITARY: "The article appears to have been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health."

LISTERIA: "The article appears to contain Listeria, a poisonous and deleterious substance which may render it injurious to health."



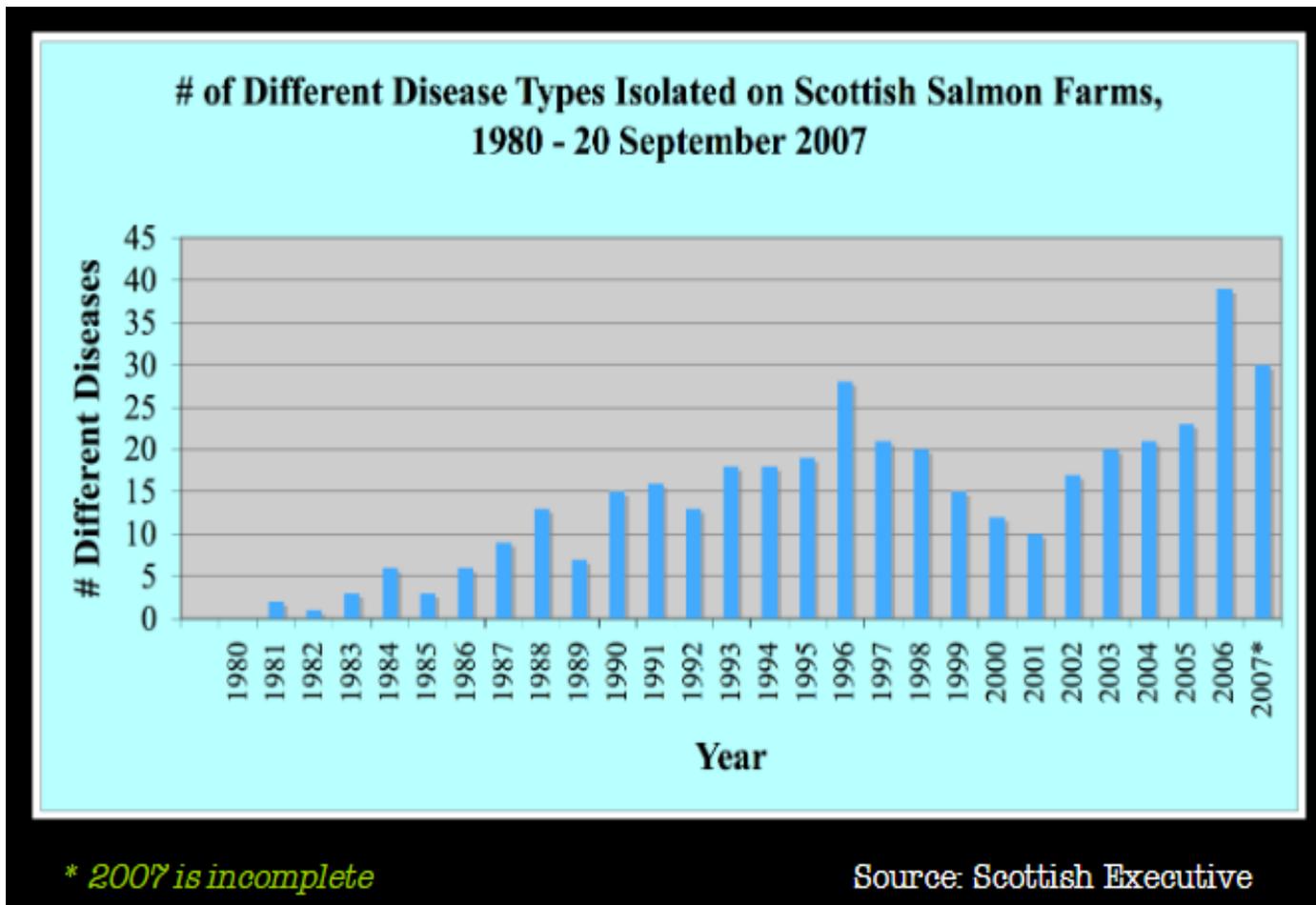
Read more via ["US rejects 'filthy' Scottish salmon"](#) and [""Insanitary" and "Filthy" Farmed Salmon: United States refuses imports of Irish and Scottish salmon"](#)

66) RSPCA Assured (formerly Freedom Food) certify 70% of Scottish farmed salmon yet still have problems with infectious diseases, mortalities, benthic pollution as well as killing seals:



Read more via "[RSPCA Assured Seal Killers!](#)"; "[Marine Harvest: Scotland's #1 Seal Killer](#)"; "[RSPCA in firing line over Marine Harvest's seal-killing spree in Scotland](#)"; "[Freedom Foods 'failing to crack down' on poor salmon farming standards](#)" and "[RSPCA Assured Certification of Scottish Farmed Salmon](#)"

67) Up-to-date data on diseases on Scottish salmon farms is not readily accessible - but we know from previous data accessed via FOI that diseases increased significantly between 1980 and 2007:

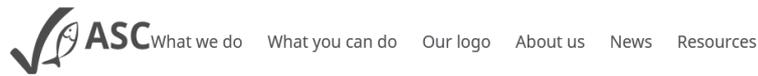


Scottish salmon farms have been riddled with infectious diseases since the 1980s when Furunculosis became a particular problem and continued throughout the 1990s when ISA was first reported. Diseases reported on Scottish salmon farms during 2006 and 2007 (data obtained from the Scottish Government via Freedom of Information), for example, included: Adhesions, Gill Pathology, Vibrio species, Bacterial Kidney Disease, Infectious Pancreatic Necrosis, Capriniana, Dermocystidium species, Yersinia ruckeri (ERM), Pseudomonas species, Nephrocalcinosis, Haemorrhagic smolt syndrome, Moritella viscosa, Aeromonas hydrophila, Epitheliocystis, Myxosporean species, Salmon pancreas disease, Cardiomyopathy syndrome, Cataract, Exophiala, Gyrodactylus derjavini, Eubothrium species, Ichthyobodo species, Proliferative kidney disease, Aeromonas salmonicida (furunculosis), Flavobacterium psychrophila (RTFS), Bacterial gill disease and Piscirickettsia salmonis (SRS).

A review of disease data for Scotland between 1980 and 2006 (the latest data set available) shows an inexorable increase in the number of different diseases reported – with a peak of nearly 40 in 2006 (increasing from 20 in 1998 and less than 10 in 1989).

Read more via "[Gaining Transparency: using the FOIA process to track down data on the impacts of fish farming](#)"; "[Fish Farmageddon: The Infectious Salmon Aquacalypse](#)" and "[The Infectious Salmon Aquacalypse](#)"

68) Only two of Scotland's salmon farms are currently certified via the Aquaculture Stewardship Council with one more "in assessment" - despite claims by Marine Harvest in 2013 that all of their farms (49 in total) would be certified by 2020:



Company Name	Farm	Country	Species	Status	Certified Until
Marine Harvest Scotland	Loch Leven Farm	United Kingdom	Atlantic Salmon (<i>Salmo salar</i>)	Certified	18 Feb 2018
Marine Harvest Scotland	Linnhe Farm	United Kingdom	Atlantic Salmon (<i>Salmo salar</i>)	Certified	24 Nov 2018
Marine Harvest Scotland	Muck Farm	United Kingdom	Atlantic Salmon (<i>Salmo salar</i>)	In Assessment	
Cooke Aquaculture Scotland	Cava Farm	United Kingdom	Atlantic Salmon (<i>Salmo salar</i>)	Withdrawn	29 May 2017



Read more via "[Abominable Salmon Council - buyer beware!](#)"; "[Aquaculture Stewardship Council](#)" "[Scottish salmon farm first in UK to get ASC certification](#)"; "[Salmon farming: Scotland's largest company commits to reducing its environmental impacts](#)"; "[Salmon firm Marine Harvest faces call to move fish farms](#)"; "[Updated Salmon Standard starts to take shape](#)" and "[WWF Greenwashes Marine Harvest](#)"

69) Label Rouge is not an environmental or welfare standard (and permits the use of artificial colourings, toxic chemicals, lice infestation, killing of seals etc):



Read more via [SSPO admit Label Rouge "is not a standard designed to assess environmental or animal welfare criteria"](#); "[Concerns Over Label Rouge Salmon Certification](#)" and "[Red Alert for Label Rouge - Lousy Label Goes Rogue](#)"

70) Scottish salmon was ranked the worst in the world by Seafood Watch in 2017:

Farmed salmon from Scotland is ranked as the world's worst - according to assessments by Seafood Watch in 2017 which recommended avoiding farmed salmon from Scotland, Norway, Chile and Atlantic Canada. The red ranking for Scottish farmed salmon - which scored a woeful 2.65 out of 10 - was attributed to poor performance in terms of chemicals, disease and escapes.



SST-T

@ScotSalmonTank

Following

Damning report on #Scottish #salmon by @SeafoodWatch. Scores 2.65 out of 10: disease, escapes, chemicals.

@FergusEwingMSP @JoannaBlythman

Islands regions of Scotland and a second for the Orkney Islands region of Scotland.

Scotland: Mainland, Shetland and Western Islands

Criterion	Score	Rank	Critical?
C1 Data	7.27	GREEN	NO
C2 Effluent	5.00	YELLOW	NO
C3 Habitat	6.27	YELLOW	NO
C4 Chemicals	1.00	RED	NO
C5 Feed	3.58	YELLOW	NO
C6 Escapes	2.00	RED	NO
C7 Disease	1.00	RED	NO
Total			
	18.52		
Final score (0-10)			
	2.65		

OVERALL RANKING	
Final Score	2.65
Initial rank	RED
Red criteria	3
Interim rank	RED
Critical Criteria?	NO

FINAL RANK

RED

Scoring note – scores range from 0 to 10, where 0 indicates very poor performance and 10 indicates the aquaculture operations have no significant impact. Criteria 8X, 9X, and 10X are exceptional criteria, where 0 indicates no impact and a deduction of -10 reflects a very significant impact. Two or more Red criteria result in a Red final result.

Scoring Summary – Scotland: Mainland, Shetland and Western Islands
 Salmon farmed in net pens in the Mainland and Shetland and Western Islands regions of

7:46 AM - 2 Nov 2017

Read more via "[Red Light for Scottish salmon: Scotland is ranked worst in the world](#)"; [The Sunday Times: "US report approves only Orkney salmon farms"](#) and "[Seafood Watch: Atlantic salmon - Scotland](#)"

71) The use of antibiotics in salmon farming is increasing the risk of antibiotic resistance:

THE LANCET
Infectious Diseases

Online First Current Issue All Issues Multimedia About the Journal

All Content Search Advanced Search

< Previous Article Volume 16, No. 7, e127–e133, July 2016 Next Article >

Personal View

Aquaculture as yet another environmental gateway to the development and globalisation of antimicrobial resistance

Prof Felipe C Cabello, MD, Prof Henry P Godfrey, MD, Prof Alejandro H Buschmann, PhD, Prof Humberto J Dölz, PhD

Published: 12 April 2016

PlumX Metrics

DOI: [http://dx.doi.org/10.1016/S1473-3099\(16\)00100-6](http://dx.doi.org/10.1016/S1473-3099(16)00100-6) | CrossMark

Article Info

Summary	Full Text	Tables and Figures	References
---------	-----------	--------------------	------------

Summary

Aquaculture uses hundreds of tonnes of antimicrobials annually to prevent and treat bacterial infection. The passage of these antimicrobials into the aquatic environment selects for resistant bacteria and resistance genes and stimulates bacterial mutation, recombination, and horizontal gene transfer. The potential bridging of aquatic and human pathogen resistomes leads to emergence of new antimicrobial-resistant bacteria and global dissemination of them and their antimicrobial resistance genes into animal and human populations. Efforts to prevent antimicrobial overuse in aquaculture must include education of all stakeholders about its detrimental effects on the health of fish, human beings, and the aquatic ecosystem (the notion of One Health), and encouragement of environmentally friendly measures of disease prevention, including vaccines, probiotics, and bacteriophages. Adoption of these measures is a crucial supplement to efforts dealing with antimicrobial resistance by developing new therapeutic agents, if headway is to be made against the increasing problem of antimicrobial resistance in human and veterinary medicine.

Read more via "[Aquaculture as yet another environmental gateway to the development and globalisation of antimicrobial resistance](#)"; "[The Rising Tide of Antimicrobial Resistance in Aquaculture: Sources, Sinks and Solutions](#)"; "[Antibiotic resistance could spread through feed at fish farms](#)"; "[Salmon Aquaculture and Antimicrobial Resistance in the Marine Environment](#)"; "[Heavy use of prophylactic antibiotics in aquaculture: a growing problem for human and animal health and for the environment](#)"; "[How do third party certifications control the use of antibiotics in global salmon aquaculture?](#)" and [Antibiotic use in aquaculture: development of antibiotic resistance–potential for consumer health risks](#)



72) SEPA ditched plans in 2016 to ban a toxic pesticide following lobbying from the Scottish Government and the salmon farming industry:



Toxic pesticide ban scrapped after fish farm industry pressure

Rob Edwards

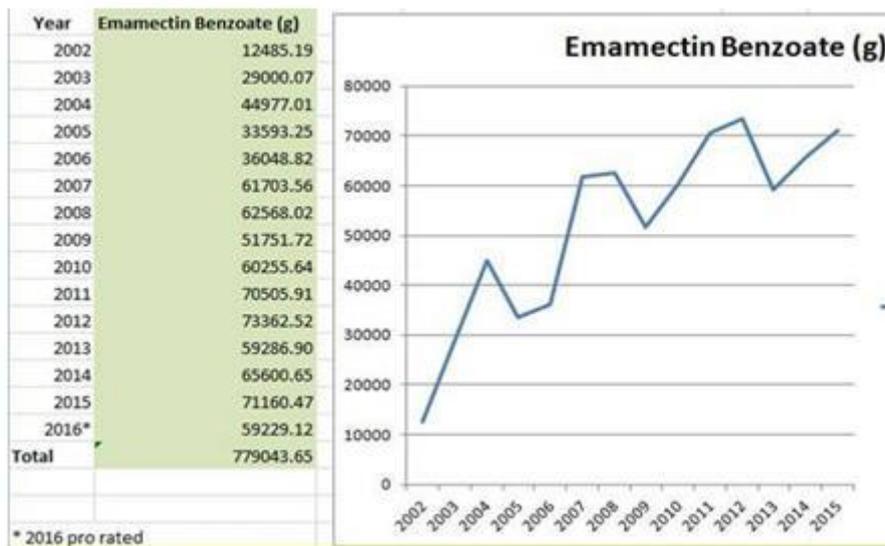
The Scottish Environment Protection Agency secretly ditched a plan to ban a toxic pesticide contaminating sea lochs and killing wildlife after pressure from the fish farming industry.

Sepra had been intending to prevent salmon farmers from using emamectin to kill sea lice in 2018, but dropped the idea when the Scottish Salmon Producers' Organisation (SSPO) warned that it would "undermine commercial confidence in the industry".

The Sunday Herald revealed last month that emamectin and another fish farm pesticide had polluted 45 lochs around [Scotland](#) in breach of environmental safety limits. We reported earlier this month that Sepra was planning a "tightening" of the rules for using the pesticide.

Read more via ["Pesticide report suppressed after freedom of information warning"](#); ["How the Scottish Government 'nuanced' away fish farm pesticide ban"](#); [The Ferret: "Revealed: secret role of US drug company in fish farm pesticide row"](#); ["Slicegate: Anatomy & Chronology of an Environmental Lobotomy"](#)

73) The use of the toxic chemical Emamectin benzoate (SLICE) increased six-fold between 2002 and 2015:



Read more via ["Damning Report on Toxic Salmon Farms Buried - SEPA finally acts on lobster-killing chemical"](#); ["Crackdown on fish farm pesticides after Sunday Herald investigation"](#) and ["Toxic Toilets: Salmon Farms Pollute Scotland's Lochs"](#)

74) Salmon farming is engaged in a 'chemicals arms race' with shellfish considered collateral damage in the industry's 'war on sea lice':



Read more via "[Salmon farming in crisis: 'We are seeing a chemical arms race in the seas'](#)"; "[Salmon farming has done 'enormous harm' to fish and the environment warns Jeremy Paxman](#)"; "[The terrible cost of Scotland's salmon farms](#)"; "[Salmon industry toxins soar by 1000 per cent](#)"; "[Scottish salmon farms pour chemicals on parasites](#)" and "[Scottish salmon farming revolution that has left the seas awash with toxic chemicals](#)"

Lice are now becoming resistant to the toxic chemicals used on salmon farms leading to calls for immediate action.



Read more via "[Scientific Backgrounder: Ecotoxicity & Chemical Resistance](#)" and [The Courier: "Salmon farming protest at industry headquarters"](#)

75) A scientific paper published by Nature in December 2017 "provides evidence for the first time that sea lice can override the protective effects of vaccination against a bacterial pathogen in Atlantic salmon, reducing the survival and growth of vaccinated fish and concomitantly increasing bacterial load and clinical signs of disease when compared to fish with a single infection":

nature.com > scientific reports > articles > article

SCIENTIFIC REPORTS

Altmetric: 18 [More detail >>](#)

Article | [OPEN](#)

Coinfection takes its toll: Sea lice override the protective effects of vaccination against a bacterial pathogen in Atlantic salmon

Carolina Figueroa, Paulina Bustos, Débora Torrealba, Brian Dixon, Carlos Soto, Pablo Conejeros & José A. Gallardo 

<i>Scientific Reports</i> 7, Article number: 17817 (2017) doi:10.1038/s41598-017-18180-6	Received: 30 May 2017 Accepted: 07 December 2017 Published online: 19 December 2017
---	---

Read more via "[Coinfection takes its toll: Sea lice override the protective effects of vaccination against a bacterial pathogen in Atlantic salmon](#)"

76) In simple terms, sea lice infestation on salmon farms sucks life away:



Read more via "[Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout](#)" and "[Plagues of parasitic sea lice depleting world's salmon stocks](#)"

77) Salmon farming drains our global oceans of wild fish for feed - leading to a net loss of marine protein:



More details via "[Farming Salmon is Stealing Food from Poor People & Our Oceans](#)"; "[Letter to Kofi Annan](#)"; "[The Greed of Feed – the hidden cost of your cheap farmed salmon](#)"; "[Greed of Feed: what's feeding our cheap farmed salmon?](#)" and "[Hugh Fearnley-Whittingstall tackles farmed salmon feed controversy](#)"

According to Dr. Daniel Pauly of the University of British Columbia, salmon farming "robs Peter to pay Paul" stealing precious protein away from hungry people in Latin America and Africa:

Aquacalypse Now

BY DANIEL PAULY | September 28, 2009

The End of Fish

Some Pollyannas believe that aquaculture, or fish farming, can ensure the health of stocks without government action--a notion supposedly buttressed by FAO statistics showing such rapid growth in aquaculture that more than 40 percent of all "seafood" consumed now comes from farms. The problem with this argument is that China reports about 68 percent of the world's aquaculture production, and the FAO, which has been burned by inflated Chinese statistics before, expresses doubt about its stated production and growth rates. Outside of China--where most farmed fish are freshwater vegetarians, such as carp--aquaculture produces predominately carnivorous marine fish, like salmon, which are fed not only vegetal ingredients, but also fishmeal and fish oil, which are obtained by grinding up herring, mackerel, and sardines caught by "reduction fisheries." Carnivore farming, which requires three to four pounds of smaller fish to produce one pound of a larger one, thus robs Peter to pay Paul. Aquaculture in the West produces a luxury product in global terms. To expect aquaculture to ensure that fish remain available--or, at least, to expect carnivore farming to solve the problem posed by diminishing catches from fisheries--would be akin to expecting that Enzo Ferrari's cars can solve gridlock in Los Angeles.

Read more via "[Aquacalypse Now](#)"; "[Fish As Food: A Love Affair, Issues Included](#)"; "[Feed Matters: Satisfying the Feed Demand of Aquaculture](#)"; "[Fishing for Aquaculture: Non-Food Use of Small Pelagic Forage Fish - A Global Perspective](#)" and "[Fish Matters: Importance of Aquatic Foods in Human Nutrition and Global Food Supply](#)"

78) SEPA stopped collecting data on the numbers of dead farmed salmon following lobbying from the SSPO in 2013 who claimed publication would be "commercially damaging":

The Herald sundayherald

20th October 2013

Public denied info on full scale of salmon deaths



In February, the Sunday Herald revealed that there has been a huge leap over the past three years in the number of salmon dying in Scottish fish farms. Photograph: PAS

Scotland's environment watchdog has bowed to pressure from the salmon industry to keep secret the number of farmed fish killed by disease, according to internal correspondence seen by the Sunday Herald.

The Scottish Environment Protection Agency (Sepa) agreed to delete information on millions of dead fish from a public database on fish farming launched this month because the Scottish Salmon Producers' Association (SSPO) argued it would be commercially damaging.

Now campaigners against fish farms have accused Sepa of acting like an industry "lapdog". The database, which also omits crucial information on sea lice, is no more than "spin", one claimed.

Read more via "[Scottish watchdog labelled 'lapdog' after agreeing to keep fish farm deaths secret](#)"; "[Public denied info on full scale of salmon deaths](#)"; "[Environment watchdog 'gave in to industry' over dead salmon](#)"; "[Farmed salmon killed by disease leaps to 8.5 million](#)"; "[Fish farmers 'blocked' vital safety study](#)"; "[Salmon firms 'hiding damning reports'](#)" and "[Keeping salmon farming problems secret](#)"



79) Salmon farmers in Shetland were charged with animal cruelty after poisoning more than 6,000 farmed salmon with toxic chemicals (the same farm subsequently faced legal action for trapping and killing seals):



The two managers are said to have poisoned over 6,000 farmed salmon. (Photo: FIS)

Salmon farm managers charged with animal cruelty over salmon deaths

 **UNITED KINGDOM**
Friday, January 28, 2011, 15:00 (GMT + 9)

Two managers of a Shetland salmon farm have been charged with animal cruelty after poisoning more than 6,000 farmed salmon that then died on 15 August 2010.

The men - regional manager Graham McNally and site manager Ross Morrison - were reported to the procurator fiscal following a five-month inquiry into the chemical poisoning of fish at Burrastow in western Shetland. Both culprits are employed by Hoga Ness Salmon.

Salmon farm boss fined £800 for setting nets to kill seals



hungry: Seals were said to have attacked the salmon cages.

Read more via "[Cruelty charges over Shetland salmon farm deaths](#)"; "[Salmon farm managers charged with animal cruelty over salmon deaths](#)"; "[Hoga Ness Salmon managers face new charges](#)"; "[Salmon farm managers suspended](#)"; "[Salmon farm boss had seal-trap nets - manager fined after Scottish SPCA raid](#)"; "[Ex salmon manager fined over seal nets](#)" and "[Salmon farm boss fined £800 for setting nets to kill seals](#)"

80) The Scottish Salmon Think Tank asks you to take a moment to think about the problems of salmon farming in Scotland:



QUICK ACCESS TO INFORMATION IN SUMMARY FORM

IS THIS POLLUTION? YOU DECIDE

One modern salmon farm: 1,000 tonnes of fish excrement per year into the sea (data: [Marine Harvest](#))
 250-plus salmon farms active around the Scottish coast (data: [The Scottish Government](#))
 $1,000 \times 250 = 250,000$ tonnes tonnes of fish excrement per year (data: [simple arithmetic](#))
 Salmon production, 2015: 179,022 tonnes (data: [Scottish Salmon Producers' Organisation](#))

Yes, **250,000 tonnes** of untreated salmon sewage every year dumped in Scottish seas by the aquaculture industry, SEPA approved and completely free of cost or responsibility to polluter. Weight for weight, fish farm waste greatly exceeds end product: 250,000 vs 179,000 tonnes. Waste includes toxic pesticide residues (data: [Scottish Environment Protection Agency - SEPA](#))

PDF document: [NET-CAGE SALMON FARMS: Q&A with reasons & References](#)

PDF document: [THE THREE MAIN PROBLEMS WITH NET-CAGE SALMON FARMS](#)

PDF document: [WHO SHOULD BE RESPONSIBLE FOR FARMING SALMON SAFELY?](#)

PDF document: [SEA LICE - INTERACTIONS WITH WILD SALMONIDS](#) with references

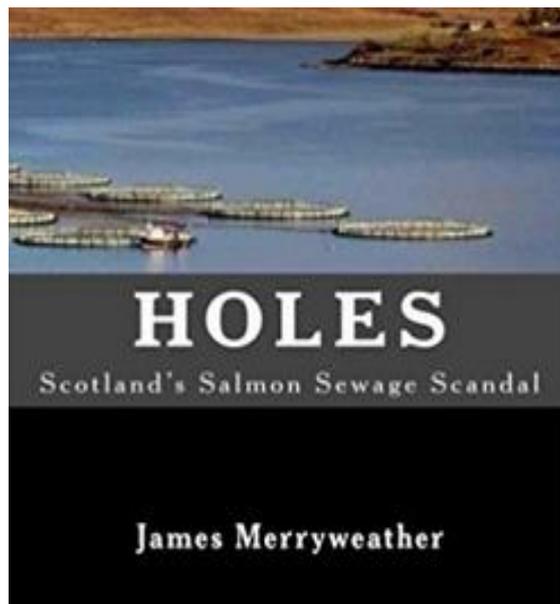
PDF document: **NEW - Jan 2018** [Impacts of salmon lice emanating from salmon farms on wild Atlantic Salmon and sea trout.](#)

PDF document: [Full list of References!](#)

PDF document: [IMPACTS OF FISH FARM WASTE ON RARE MAERL BEDS & SEA GRASS](#) with references

PDF table: [CLOSED CONTAINMENT ELIMINATES ALL OF THE PROBLEMS ASSOCIATED WITH NET-CAGE SALMON FARMING](#) Two more problems to eliminate (not a fault of the nets) are: 1. the [fish component of salmon feed](#) and 2. the incredible hijacking by the industry of the 'Scottish Salmon' [brand](#). Champagne wouldn't allow that, neither would Melton Mowbray (pork pies), Parma (ham/cheese) or Jersey (Royals).

BOOK: [HOLES: Scotland's Salmon Sewage Scandal](#) (buy the book)



Read more via "[Scottish Salmon Think Tank](#)"

81) Farmed salmon is fatter than pizza.....

Farmed Salmon



Thick stripes of white (fat)

Wild Salmon



Deep red and less fatty

The Telegraph

Home Video News World Sport Business Money Comment Culture Travel Life W
Politics Investigations Obits Education Science Earth Weather Health Royal Celebr

HOME » NEWS » HEALTH » HEALTH NEWS

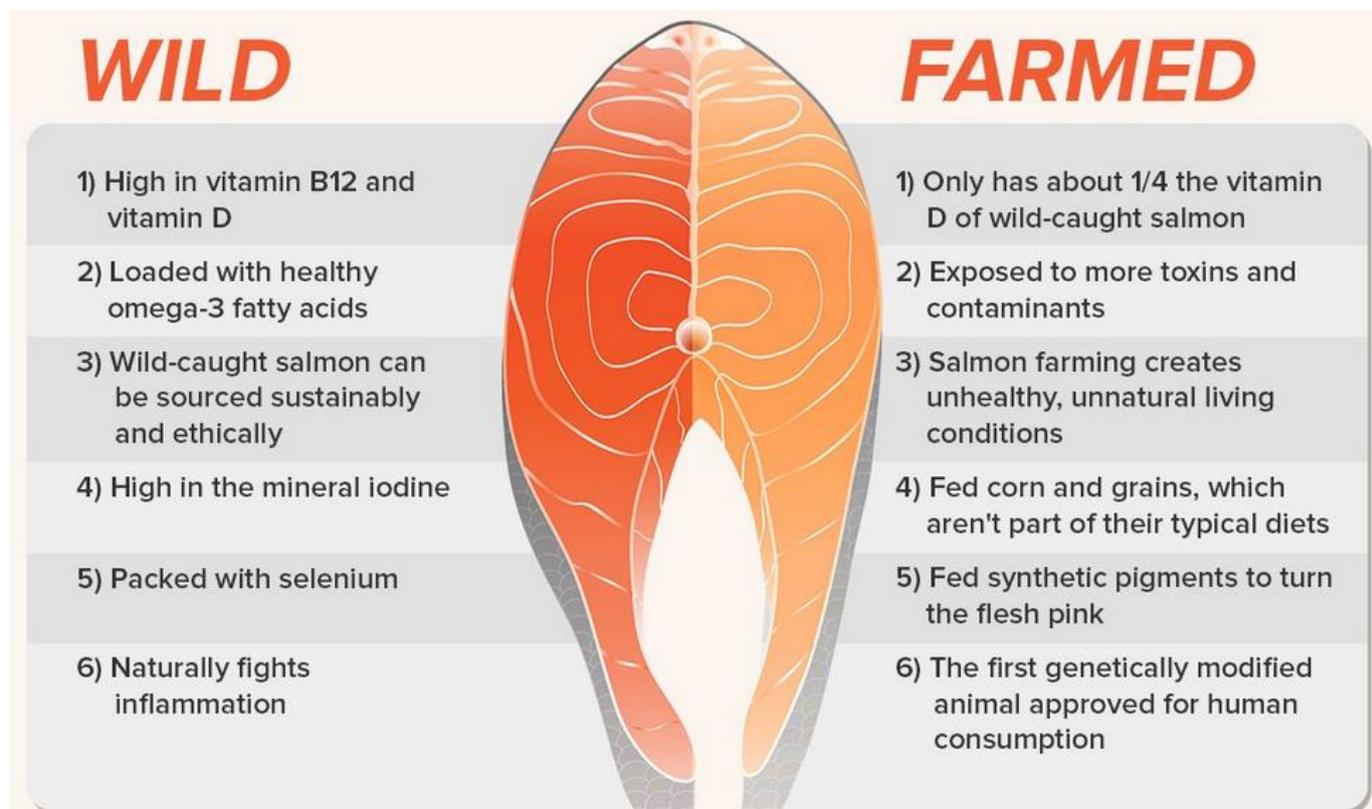
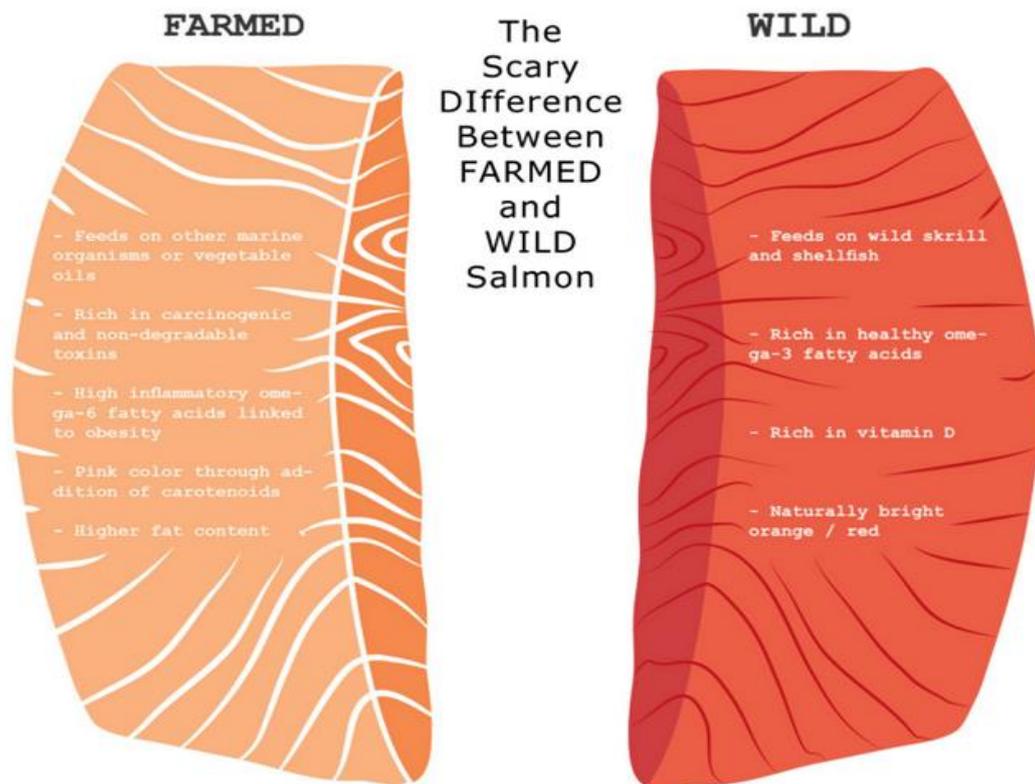
Farmed salmon has 'more fat than pizza'

Farmed smoked salmon has three times as much fat as wild fish and is fatter than pizza, research shows



Read more via [Farmed salmon has 'more fat than pizza'](#); "[Smoked salmon could be worse for you than a margherita pizza because of high fat content](#)" and [Picture of what farmed salmon vs wild salmon sashimi looks like. Know which you're eating!](#)

.....and a world removed from natural wild salmon:



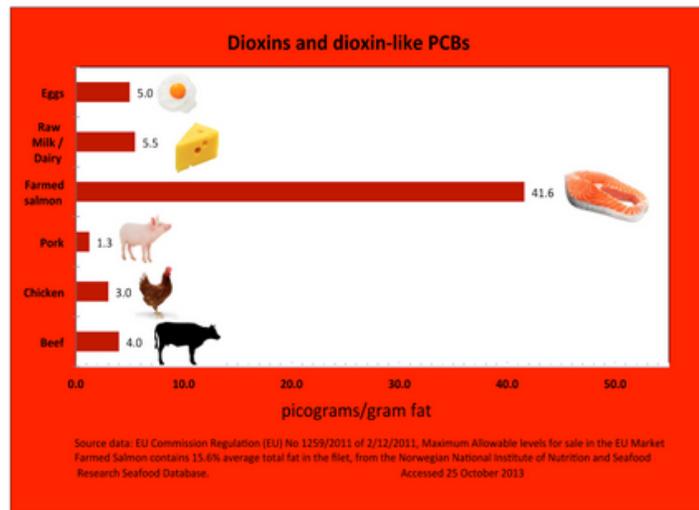
Read more via "[Farmed Vs Wild Salmon](#)"; "[The Scottish Salmon Scam: complaints filed with Trading Standards and the Competition & Markets Authority](#)"; "[Appendix 1: The Scottish Salmon Scam](#)"; "[Supermarkets sell Norwegian fish as 'Scots' salmon](#)"

82) Farmed salmon contains higher levels of cancer-causing dioxins and dioxin-like PCBs than other foods:

Maximum allowable dioxin and dioxin-like PCB levels for sale in EU market

The European Union permits high levels of toxins in farmed salmon: 41.6 picograms of toxins *per gram of fat* is allowed in farmed salmon. It is 7 to 32 times more than allowed in other comparable foods. Graphs like this illustrate the importance of educating ourselves about the foods we buy in restaurants and markets, so we can make informed decisions on the risks we are willing to take.

The graph below reveals the extent of the problem with toxins in farmed salmon.



Please note the source data for salmon is provided in pg/g wet weight, while the other values were provided in pg/g fat. [NIFES reports](#) farmed salmon is 15.6% fat and so the conversion to pg/g fat = 41.6

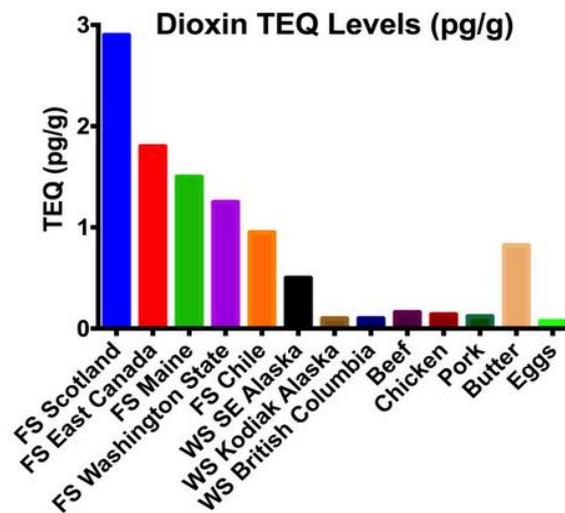
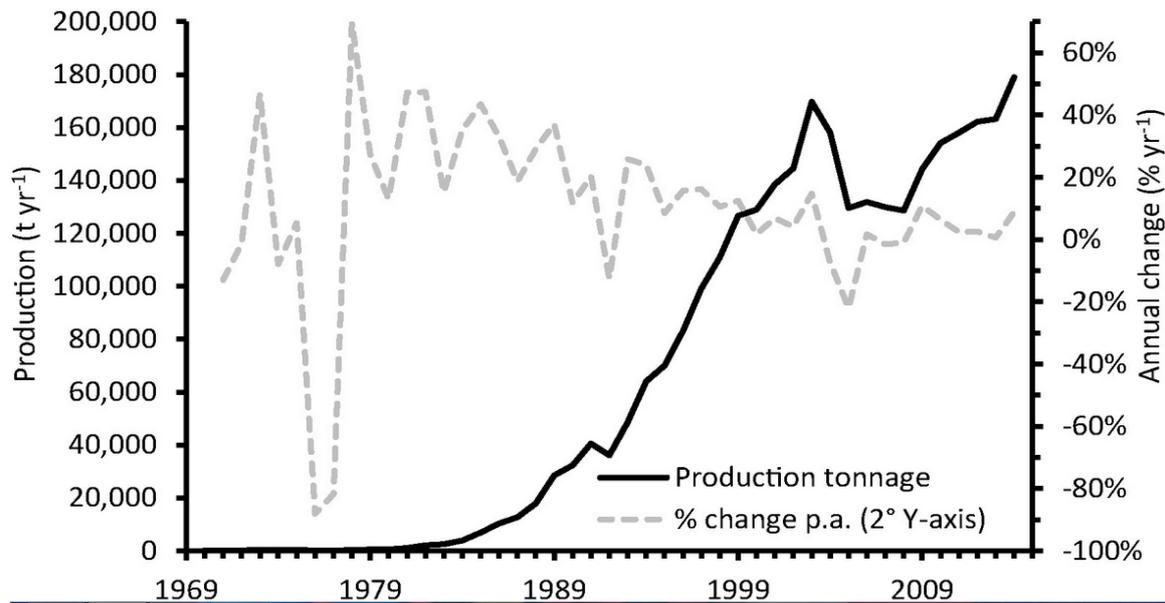


Figure 1. Dioxin Concentration of Salmon and Other Foods. WS= Wild Salmon; FS=Farmed Salmon. Levels of dioxin were much higher in farmed than wild salmon. Wild salmon dioxin concentrations varied depending on type of salmon. The wild salmon from SE Alaska (Chinook) had the highest levels of dioxin, while others (Coho, Pink, Chum) from the same area had similar levels as Kodiak and BC wild salmon. Butter has a high level of dioxin per gram but dioxin intake from butter would be lower when accounting for serving size. Sources: (1,2).

Read more via "[What's in farmed salmon](#)"; "[A Threat to Your Child's Health](#)"; "[Dioxin in Salmon Presents Serious Health Concerns](#)" and "[Global Assessment of Organic Contaminants in Farmed Salmon](#)"

83) Salmon farming has impacted Scotland's marine environment and wild fisheries since the rapid expansion of salmon farms in the 1980s:



Read more via: "[Self-pollution by Scottish salmon farms?](#)" (1989); "[Nuvan use in salmon farming The antithesis of the precautionary principle](#)" (1989); "[Marine Salmon Farming In Scotland: A Review](#)" (1990); "[Leaping in the Dark – A Review of the Environmental Impacts of Marine Salmon Farming in Scotland and Proposals for Change](#)" (1997); "[Scotland’s Secret – Aquaculture, Nutrient Pollution, Eutrophication and Toxic Blooms](#)" (2000); "[The One That Got Away – Marine Salmon Farming In Scotland](#)" (2001); "[Bitter Harvest: a call for reform in Scottish aquaculture](#)" (2001); "[Sea cage fish farming: an evaluation of environmental and public health aspects \(the five fundamental flaws of sea cage fish farming\)](#)" (2002); "[Assessing and managing the impacts of marine salmon farms on wild Atlantic salmon in western Scotland: identifying priority rivers for conservation](#)" (2003); "[Scottish Farmed Salmon Exposed](#)" (2007); "[Scottish salmon farming under attack in new film](#)"; "[Aquaculture Information Pack](#)" (2013); "[25 Years of Scottish Salmon Shame](#)" (2017) and "[Media Backgrounder: Scotland's Silent Spring of the Sea](#)" (2017)



84) Farmed salmon are deaf due to accelerated growth:

Science News

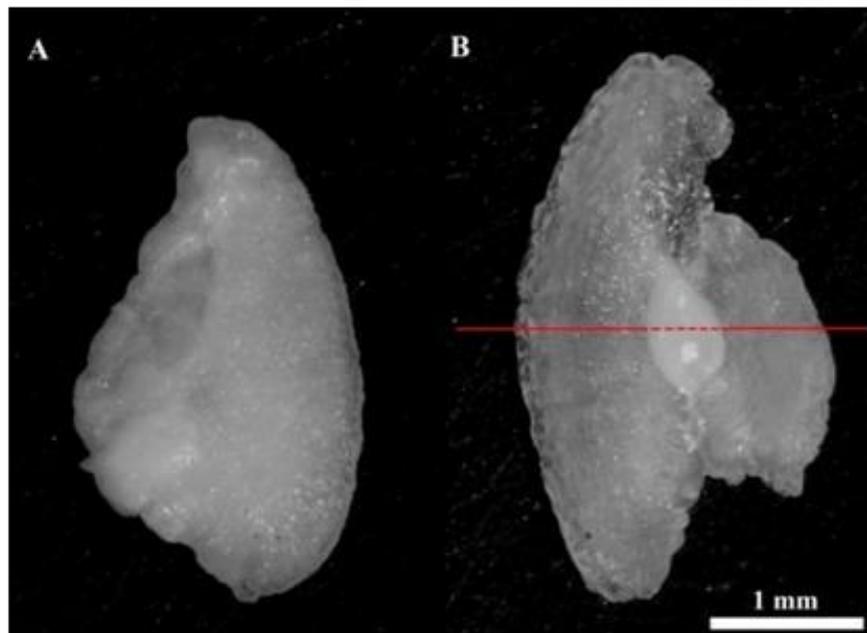
from research organizations

Deafness in farmed salmon linked to accelerated growth

Date: August 16, 2017

Source: University of Melbourne

Summary: Half of the world's farmed salmon are part deaf due to accelerated growth rates in aquaculture, new research has found. The results now offer a better understanding of the effects of a common inner ear deformity, and some specific actions to tackle this welfare issue.



Sagittal otoliths from a juvenile Atlantic salmon, with scale bar = 1 mm (bottom right). The left otolith is entirely aragonite, while the right otolith is approximately 90% vaterite by planar area.

Credit: Image courtesy of University of Melbourne

Half of the world's farmed salmon are part deaf due to accelerated growth rates in aquaculture, new research has found.

Read more via "[Deafness in farmed salmon linked to accelerated growth](#)"; "[More than 95 per cent of adult farmed fish are deformed](#)" and "[We're Farming Our Salmon to Deaf](#)"

85) Insect-fed Scottish salmon is set to make your flesh creep:

In the desperate search for alternative feed supplies the industry is looking towards insect feeds - but will farmed salmon fed on cockroaches or maggots fly with UK consumers?



Read more via: "[The feasibility of using insects in salmon feed in Scotland](#)"; "[Insect meal in salmon feeds](#)"; "[Start-up receives funds for salmon insect feed](#)"; "[Aquafeed fly farmer creates a buzz in business](#)" and "[Attitudes towards the use of insect-derived materials in Scottish salmon feeds](#)"

86) The increasing use of vegetable protein in salmon feed is compromising fish health and flesh quality:

Fishmeal replacement 'damaging health and quality'

The substitution of fish-derived ingredients with vegetables in salmon feed is reaching its practical limit, and is compromising fish health and quality, according to Eduardo Goycoolea, president-elect of fishmeal and fish oil industry body IFFO.

Author:  Jonathan Garcés

Goycoolea, who takes up his new role on January 1, told fishfarmingexpert's sister site, salmonexpert.cl, that although supplies of fish oil were limited, enough fishmeal was available to triple current use in feed.

The Chilean, who is also executive director of New World Currents, the brand under which Chilean salmon farmers sell to China, said one of his priorities was "to continue demonstrating that fishmeal is the best existing protein, not only for human beings, but also for the culture fish, that grow more and better if they have more ingredients of marine origin in their diet".

Global demand

Goycoolea said: "The salmon feed industry 20 years ago used between 40 per cent and 50 per cent fishmeal in the diet and today the figure is in the range 10 per cent-15 per cent. There has been excessive substitution with vegetables, because producers need to meet the highest global demand and also be competitive in prices. It's a global trend and it would be reaching the limit."

He argued that "the balance that salmon producers have to find is between the cost of the food they buy and the quality of it, and the latter is reflected in the speed with which the fish grow, the weight they reach and the level of health they have during the specific cycle".

'Fish become sicker'

"It has been seen that when food has very little protein from marine foods, the fish become sicker, they have to be given more antibiotics, they have to undergo more treatments, obtaining lower results than expected," he added.



The percentage of forage fish used to produce salmon feed has dropped significantly.

Read more via: "[Fishmeal replacement 'damaging health and quality'](#)"; "[Fisheries challenged by rising cost of fish oil in feed](#)"; "[Scottish Salmon to get sustainable wheat feed](#)" and "[Impact of sustainable feeds on omega-3 long-chain fatty acid levels in farmed Atlantic salmon, 2006–2015](#)"

87) Despite trials of genetically engineered salmon in Loch Fyne in the 1990s the industry claims to oppose genetic engineering and thus far "there is no GM food used to farm Scottish salmon" - but the switch to GM feed "is seen as most likely happening by 2020" according to a report by scientists at the University of Stirling:



8.2.3 Conclusions and implications for GM feed ingredients

Unless non-GM protein supply becomes less competitive in terms of supply and price, there is little incentive to change today due to the risk to salmon export markets. But given the market importance of omega-3 LC-PUFA content, the commercial availability of cost-effective GM oil from recombinant oilseed crops could herald a relaxation of non-GM policy, possibly as a special case linked to consumer health, but perhaps leading to wider use of GM feed ingredients. In view of the brand focus on Scottish salmon as a healthy product, a switch to using GM oil might well be seen as a price worth paying to avoid the risk of fish oil supply interruptions, if and when transgenic material becomes commercially available. It is likely that consumer attitudes will continue to soften and that current negative attitudes by NGOs, trade associations and some Scottish politicians may reverse in the next five years, allowing penetration of salmon fed GM ingredients even to markets traditionally most hostile to GM-fed products (e.g. France). In this connection the lack of any genetic material in GM oil removes at a stroke a principal objection to its use and European consumers might be less concerned about theoretical risks of environmental effects in the case of oil imported from GM crops grown outside Europe. In any event UK retailers, other than Waitrose, emphasised that they would follow, but would be unwilling to lead, a change to GM-fed salmon. The overall conclusion is that a switch to GM feed ingredients is seen as most likely happening by 2020, possibly linked to GM oil, and that it would be likely to take place before any change in LAPs/PAP policy became commercially feasible.

Read more via "[Fish farmers told 'reject GM salmon'](#)"; "[Giant GM salmon on the way](#)"; "[GM salmon prompts safety pledge](#)"; "[Monster scare for fish farmers](#)"; "[GM fish fail to hook Scottish salmon farmers](#)"; "[Q&A on Omega 3 levels in Farmed Salmon](#)"; "[GM crop ban: how Scottish salmon – and public health – could have benefited from this technology](#)"; "[Genetically engineered salmon goes on sale for the first time](#)" and "[SARF: Production of high quality healthy farmed salmon from a changing raw material base with special reference to a sustainable Scottish industry](#)"

88) Salmon feed contains Ethoxyquin - a flame retardant manufactured by Monsanto which is "very toxic to aquatic life" and has been linked to cancer of the stomach, kidneys, bladder and colon:

SSPO briefing on Ethoxyquin use

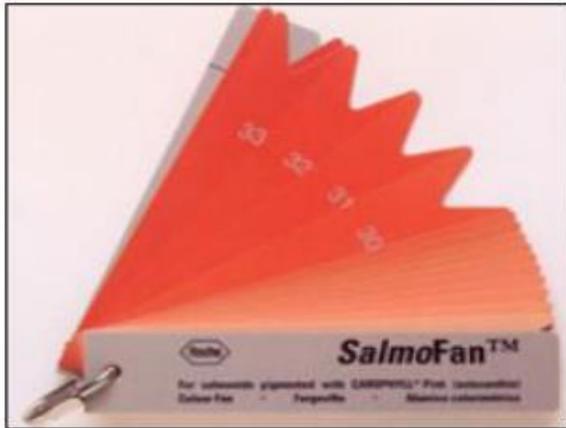
Published on 12th May 2017

- Scottish farmed salmon is safe to eat and provides many health benefits.
- The fish meal and fish oil contained within the fish feed used by Scottish salmon farmers originates from the Southern Pacific and Northern Atlantic regions.
- Ethoxyquin (EQ) is an EU approved additive used to preserve fish meal during transportation and storage.
- It is a legal requirement of the [International Maritime Organisation](#) (IMO) to add the anti-oxidant to fish feed prior to shipping for safety.
- The [World Health Organisation](#) (WHO) along with many other independent experts have evaluated the use of EQ several times and have approved its use in fish feed.
- The amount of EQ consumed by eating fish is negligible.
- The [European Food Safety Authority](#) regularly monitors the use of all feed additives to ensure the safety of consumers.

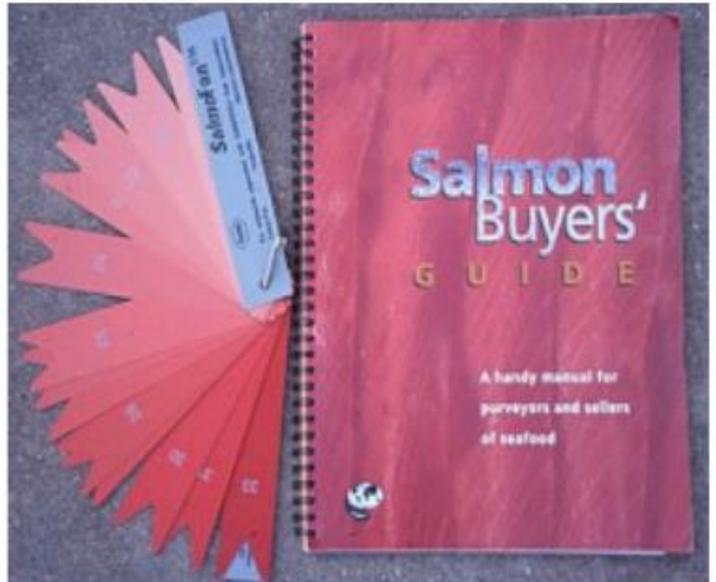


Read more via "[SSPO briefing on Ethoxyquin use](#)"; "[Ethoxyquin as anti-oxidant in fishmeal and fish feeds - Facts](#)"; "[How healthy is farmed salmon and what is ethoxyquin?](#)"; "[Levels of synthetic antioxidants \(ethoxyquin, butylated hydroxytoluene and butylated hydroxyanisole\) in fish feed and commercially farmed fish](#)"; "[European Parliament: Health risk from Norwegian farmed salmon](#)"; "[Ethoxyquin in fish feed](#)"; "[Ethoxyquin in Salmon](#)"; "[IFFO on Ethoxyquin](#)"; "[Ethoxyquin — toxicity, side effects, diseases and environmental impacts](#)"; "[DNA damage induced by ethoxyquin in human peripheral lymphocytes](#)"; "[Ethoxyquin, The Silent Killer Hiding In Your Fish Food](#)"; "[Green Warriors of Norway: Ethoxyquin](#)" and "[Hepatic metabolism, phase I and II biotransformation enzymes in Atlantic salmon \(Salmo Salar, L\) during a 12 week feeding period with graded levels of the synthetic antioxidant, ethoxyquin](#)"

89) Farmed salmon feed contains artificial colourings such as Canthaxanthin (E161g) which has been linked to eye defects:



Salmon farmers can choose the colour they want for their salmon, using the 'SalmoFan'



A little E161g with your fish, madam?

The EU's ban on the colouring that makes farmed salmon pink makes Nick Thorpe wonder what else might be lurking under the gills

February 2 2003, 12:00am,
The Sunday Times

Share    Save 

So there were some perhaps inevitable jibes this week when similar health fears prompted European Union commissioners to cut permitted levels of the same chemical in fish feed – where it currently acts as pink dye in the otherwise greyish flesh of farmed salmon.

“A farmed salmon without canthaxanthin is like a Page 3 girl stripped of her fake tan and red lipstick,” said Don Staniford, a prominent campaigner linked with Friends of the Earth. “Shoppers should give cosmetically challenged salmon a wide berth.”

It's not the first time that Scotland's farm-bred salmon have found themselves in need of some remedial PR. Compared to the popular image of the migratory king of fish, leaping up waterfalls in its epic struggle to reach the spawning ground, it can be disappointing to realise that most of the salmon on supermarket shelves has lived a chemically altered life.

Read more via "[Ugly In Pink: Cosmetically Challenged Farmed Salmon](#)"; "[Pink Poison](#)"; "[Salmon pink becomes a grey area for EU](#)"; "[Silent Spring of the Sea](#)"; "[A little E161g with your fish, madam?](#)"

90) Salmon farming is an environmental and public health disaster and should carry a Government health warning like cigarettes - rather than promoted by the Government as a healthy and nutritious product:



Read more via ["Salmon farming kills"](#); ["Silent Spring of the Sea"](#); ["A Big Fish in a Small Pond"](#); ["The Five Fundamental Flaws of Sea Cage Fish Farming"](#); ["Scottish Farmed Salmon Exposed"](#); ["Everything You Should Know About Salmon Farming"](#); ["Sea Cage Fish Farming: an evaluation of environmental and public health aspects"](#)

91) Tesco was caught out selling Norwegian farmed salmon as '100% Scottish'


THE SUNDAY TIMES

Tesco in U-turn over 'red herring' of Scots salmon promotion

Mark Macaskill Published: 6 April 2014



Hundreds of stores across the country had been promoting the Norwegian salmon as '100% Scottish' (PhotoAlto/Laurence Mouton)

TESCO has been forced into a U-turn over a Scotland-wide farmed salmon campaign after conceding products branded as "100% Scottish" were imported from Norway.

Hundreds of stores across the country have been promoting Scottish farmed salmon with Saltires, flags and "I'm Scottish" flyers.



Read more via ["Tesco's 'Scottish' Salmon Scam Exposed!"](#); ["Tesco in U-turn over 'red herring' of Scots salmon promotion"](#); ["Tesco blames wrong signage for salmon marketed as Scottish"](#) and ["Tesco forced to axe marketing campaign after it emerged salmon labelled '100% Scottish' was imported from Norway"](#)

If only retailers were honest when marketing farmed salmon.....



Findus FLYING FISH FILLETS

Now with added pig, chicken, beef, horse AND crystal violet!

100% "ORGANIC"
100% "SUSTAINABLE"
100% PURE
BULLSHIT
HORSESHIT
CHICKENSHIT

Ingredients:
Farmed Atlantic Salmon with added artificial colourings, toxic chemicals, chicken feathers, blood meal, pigs' blood, GM soya

"FLYING OFF THE SHELVES FASTER THAN PEGASUS"
(SUPERMARKET NEWS)

The advertisement features a central image of a fish with a pig's head and a chicken's body. Below this, there are illustrations of pink, spiky fish and chickens. The background is a mix of red, purple, and green.

92) Norway is a sharing, generous and giving nation - infectious diseases such as Infectious Salmon Anaemia have been introduced to Scotland by Norwegian companies:

The first outbreak of Infectious Salmon Anaemia (ISA) was traced to Norwegian-owned Hydro Seafoods (now Scottish Sea Farms) in Loch Nevis in 1998 and spread to a total of 11 salmon farms with a further 34 salmon farms suspected on the Scottish west coast mainland, Skye, Orkney, Shetland and the Western Isles. The first ISA outbreak cost £100 million and led to the loss of 200 jobs.



A suspected outbreak of ISA was reported at a farm operated by Norwegian-owned Marine Harvest in Loch Sheilavaig, South Uist, in 2004. A second confirmed outbreak of ISA in Scotland occurred in Shetland in 2009 at Norwegian-owned Grieg Seafood wiping out £20 million in value.

Read more via "[Engulfed by a deadly tide](#)"; "[Report details disease links](#)"; "[Lethal fish infection spreads](#)"; "[Suspected ISA outbreak in Scotland](#)"; "[Report into the epidemiology and control of an outbreak of infectious salmon anaemia in the Shetland Islands, Scotland](#)"; "[Fish virus detected at third farm](#)"; "[Disease costs Grieg dearly](#)"; "[Fourth ISA case](#)"; "[Deadly salmon infection detected](#)"; "[ISA back to haunt fish farmers](#)"; "[Norwegians concede a role in Chilean salmon virus](#)"; "[ISA - Diary of Disease Disaster](#)" and "[Fish Farmageddon: The Infectious Salmon Aquacalypse](#)"

93) Waste pollution from salmon farms has been linked to eutrophication, hypereutrophication and toxic algal blooms - with Scottish salmon farms discharging more sewage wastes than Scotland's population of 5.4 million:

The Telegraph

Home Video News World Sport Business Money Comment
Politics Investigations Obits Education Science Earth Weather

HOME » NEWS » UK NEWS

Pollution from fish farms 'as bad as sewage'

By Charles Clover, Environment Editor

12:00AM BST 19 Sep 2000

FISH farms discharge more nutrient pollution than Scotland's human population, according to a report published yesterday.

The nitrogen and phosphorus discharged from Scotland's 350 marine salmon farms, whose salmon are fed on fish meal pellets, pose a risk to fish, mammals, shellfish and other wildlife in what were until recently pristine waters, says the report commissioned by the World Wide Fund for Nature.

The report by Malcolm MacGarvin, an independent ecologist, uses new criteria used by Ospar, the intergovernmental body for the North East Atlantic, to calculate the extent of pollution. This year, salmon farms will produce 7,500 tons of nitrogen, equivalent to the annual sewage from 3.2 million people, and 1,240 tons of phosphorus, comparable to sewage from 9.4 million people. The ecological result is effectively greater than the sewage produced by Scotland's 5.1 million humans.



Read more via "[The Interactions Between Fish Farming and the Algal Communities of Scottish Waters: A Review](#)"; "[Harmful Algal Bloom Communities in Scottish Coastal Waters: Relationship to Fish Farming and Regional Comparisons – A Review](#)"; "[Impact of salmonid pen aquaculture on hard substrates](#)"; "[Pollution from fish farms 'as bad as sewage'](#)"; "[Poison blamed on fish farms; Expert critical of officials](#)" and "[Scotland's Secret: Aquaculture, Nutrient Pollution, Eutrophication and Toxic Blooms](#)"

94) Mass mortalities from salmon farms are piling up so high that their carcasses are used to generate electricity:

Vegans in shock at fish electricity

Energy firm SSE admitted generating power from dead salmon earlier this year

Mark Macaskill

December 10 2017, 12:01am,
The Sunday Times



Salmon at a fish farm in Oban
GETTY IMAGES

Share Save

Dead salmon from Scottish fish farms are being "recycled" to generate energy for peoples' homes, prompting outrage from animal welfare campaigners.



Read more via "[Vegans in shock at fish electricity](#)"; "[Energy from dead salmon horrifies vegan activists](#)" and "[Millions of Scottish Salmon Going Up in Smoke](#)"

95) Sea trout (as well as wild salmon) have been devastated by Scottish salmon farms:



Sea trout near salmon farms more infested with sea lice

Sea trout swimming close to salmon farms in Ireland and in Scotland have been found to be carrying significantly higher levels of sea lice infestation than those swimming further away from such farms.

Research carried out by scientists at Inland Fisheries Ireland and Argyll Fisheries Trust in Scotland also found sea trout swimming close to salmon farms had reduced weight.

The study saw the team of researchers examine sea lice levels of more than 20,000 sea trout from 94 rivers and lakes here and in Scotland over a period of 25 years.



Read more via "[Sea trout near salmon farms more infested with sea lice](#)"; "[New research finds salmon farming contributes to sea lice infestation on sea trout as valuable stocks decline](#)"; "[New study finds that sea lice from salmon farms can cause a 50% reduction in runs of wild Atlantic salmon](#)"; "[Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation](#)"; "[Summary of information relating to impacts of salmon lice from fish farms on wild Scottish sea trout and salmon](#)"; "[Aquaculture and environmental drivers of salmon lice infestation and body condition in sea trout](#)" and "[Effects of salmon lice *Lepeophtheirus salmonis* on wild sea trout *Salmo trutta* - a literature review](#)"

96) A humpback whale died in a salmon farm operated by Scottish Sea Farms in the Sound of Mull:

Humpback Whale Post Mortem Suggests Entanglement in Salmon Farm

Published Wednesday, 9th July 2014 in **SAC Consulting news**

SRUC vets believe that a young humpback whale found drowned off the coast of Mull died after swimming into a fish farm.

The post mortem results suggest the animal became trapped under a salmon pen and subsequently drowned.

Aided by staff from the Hebridean Whale and Dolphin Trust and Aberdeen University's Lighthouse Field Station, the post mortem was carried out by Dr Andrew Brownlow from Scotland's Rural College, which coordinates the **Scottish Marine Animal Stranding Scheme**. Every year over 400 marine mammals are stranded around the coast of Scotland and any cases suitable for post mortem are examined by the project.

The animal was found dead beneath the nets of a salmon pen. Due to the logistics involved in recovery it was around 36 hours after discovery before the animal could be post mortemed, however it was still in relatively fresh condition and therefore a reasonably confident diagnosis could be reached. The post mortem findings are consistent with a peri-weaning, maternally-attached animal which underwent an acute death. The observed pathology and stranding history would be consistent with the whale becoming trapped beneath a salmon pen and subsequently drowning.



Read more via "[Salmon Farming Kills Whales!](#)"; "[Humpback Whale Post Mortem Suggests Entanglement in Salmon Farm](#)"; "[Humpback Whale died after swimming into fish farm](#)" and "[Whale drowned after being trapped under salmon pen](#)"

97) The King of Fish is being "farmed to death":



How the King of Fish is being farmed to death

Fish farming has delivered cheap salmon to the consumer - but at a high environmental price. In this in-depth investigation, Stuart Millar talks to farmers, ecologists and scientists about the growing crisis

Special report: global fishing in crisis

A glistening cold winter's day in the Highlands, and Frank Durdle is reminiscing about salmon. For more than 40 years, he has spent a fair amount of his time below the sweeping stone arch of Lovat Bridge in Beauly, near Inverness, pitting his wits against the salmon which battle their way through the pools of the town's eponymous river to their spawning grounds.

Aquaculture - fish farming as it is better known - has heralded an age in which corner shops, let alone the major supermarket chains, are able to have their shelves groaning under the weight of fresh salmon 365 days a year. Good season, bad season, it matters not. But the prospect of year-round salmon fills Durdle with little joy. 'I can't remember the last time I bought farmed salmon and I wouldn't buy it,' he says. 'It is an inferior product and tastes nothing like the real thing. It's all flab and fat, no flavour.' This is not merely the pride of a veteran angler talking.

'Farmed salmon is produced in a completely unnatural way and the industry is causing God knows what damage,' he continues. 'It's high time people realised that being able to buy cheap salmon all year round carries a heavy price in other ways.' For the 21st century consumer, salmon is available in every possible formulation - from whole fish and smoked slices to fillets, steaks, pies and even something called crunchy bites.

Better still, it is cheap yet looks like it came from the same place as its wild relation, with that rich, pink hue. Even the packaging is rustic. Nothing, apart from the bargain-basement price tag, to give away the reality of intensive salmon production, which has turned the King of Fish into the battery chicken of the seas.

'Salmon are farmed in cages at higher densities than battery hens,' says Don Staniford, researcher for Friends of the Earth Scotland. 'They are fed a diet marinated in chemicals and artificial colourings, injected with vaccines and growth promoters, then starved for 10 days before being slaughtered.'

The resulting mix nutrifies the surrounding waters, destroying delicate marine habitats. More disturbingly, it is also being blamed for spawning the toxic algae blooms which in recent years have closed down 9,000 square miles of west coast shellfish fisheries because the toxins cause amnesiac shellfish poisoning, an irreversible disease that can cause brain damage in humans. 'The siting of salmon farms at the heads of sea lochs is a major problem,' says Adams. 'You need tidal flush to remove the nutrients, diluting them and sweeping them out to sea. But in the deep, glacial lochs around the farm the flushing rate is so poor that it is akin to flushing your toilet once every two weeks.' In some lochs, that figure may be as bad as once every two years.

Read more via "[How the King of Fish is being farmed to death](#)"

98) The use of 'cleaner-fish' is impacting on wild fish populations and increasing disease risks:

Fishing
The Observer

Salmon farmers 'put wild fish at risk' in fight to kill off sea lice

Use of wrasse to combat parasite threatens natural stocks, say experts

Robin McKie, science editor

Sat 10 Jun '17 22:11 BST



This article is 7 months old

1,215 102



A ballan wrasse devours a crab. Concern is growing over their falling numbers in the wild. Photograph: Marevision/Getty Images/age fotostock RM

Salmon farmers have been accused of playing dirty by using fish caught in the wild to clean lice from Scottish fish farms. Marine conservation experts say that shipping tonnes of English-caught wrasse a year - to tackle lice infestations in salmon pens north of the border - is endangering natural stocks. English anglers have also warned wrasse is becoming harder and harder to find in local waters.

THE SUNDAY TIMES

Today's sections

Past six days

My articles

Times+

Scotland

'Clean fish' bring danger of disease to salmon farms

Julia Horton

December 31 2017, 12:01am,
The Sunday Times



Read more via "[Salmon farmers 'put wild fish at risk' in fight to kill off sea lice](#)"; "[Cleaner fish that keep farmed salmon healthy at risk of wipe-out](#)" and [Sunday Times: "Clean fish' bring danger of disease to salmon farms"](#)

99) The only truly 'green' thing about Scottish salmon is radioactive contamination:



The screenshot shows a BBC News article from July 11, 2003. The page features the BBC News logo, a 'LIVE' indicator, and the 'BBC NEWS CHANNEL' branding. A navigation menu on the left lists various news categories, with 'Scotland' highlighted. The main headline reads 'Low level radiation in salmon', with a sub-headline stating 'Official government tests have found traces of radioactive waste in salmon bred in farms near the Sellafield nuclear plant.' The article text discusses the findings of Greenpeace, noting that tests confirmed the presence of Technetium-99 (Tc-99) in farmed salmon sold in supermarkets. An image of farmed salmon is included, with a caption stating 'Tests were carried out on farmed salmon'. The article also mentions that the environmental group found very low levels of Tc-99 in fresh and smoked salmon from major retailers like Sainsbury's, Tesco, Asda, Safeway, Waitrose, and Marks & Spencer.

Read more via "[Low level radiation in salmon](#)"; "[Tests reveal radioactive waste in Scottish salmon](#)"; "[Radioactive waste found in supermarket salmon](#)"; "[Radioactive waste 'found in salmon'](#)"; "[Anger over fish radiation find](#)" and "[Sellafield waste in salmon is 'no risk to consumers'](#)"



100) The scandal of Scottish salmon farming warrants front-page news coverage:



Farms turning pristine waters 'to toxic toilets'

Farmed salmon 'contaminated'

Scottish farmed salmon 'is full of cancer toxins'

Scottish salmon farming revolution that has left the seas awash with toxic chemicals

Contamination alert over salmon **Disease on-going**

Wild Atlantic salmon 'under threat' from escaped farmed fish and sea lice

Scottish salmon farms 'disregard' environment

DAMNED LICE

Daily Scottish Mail
NEWSPAPER OF THE YEAR 40p



Oops: fish farm firm kills 175,000 of its salmon by accident

Salmon industry under fire for shooting seals

"The most toxic product in the food industry"

Marine Harvest has 'serious AGD issues'

Fish company investigated after salmon farm pollutes Scottish loch

Wild trout 'eaten alive by sea lice from fish farms'

'Illegal poison' used on salmon

Lethal fish infection spreads

Fish farms fined over unlicensed chemical use

Salmon farms turn sea bed into graveyard

Scottish fish farmers use record amounts of parasite pesticides **Salmon boycott**

Flesh-eating lice spread by fish farms kill 39 per cent of wild salmon

Record chemical use 'of concern' to salmon giant

Infested waters

Read more via "[25 Years of Scottish Salmon Shame](#)"; "[Spinning Scottish Salmon: We Live in Shameless Times](#)" and "[Spinning Farmed Salmon](#)"

101) "Sustainable" and "responsible" do not even belong in the same sentence as Scottish salmon:



Read more via "[Sustainable Scottish Salmon](#)"; "[Scottish Salmon Farming: A Sustainable Industry](#)"; "[Scottish Salmon's Sustainability Scam](#)"; "[Unbridled expansion of fish farms is not sustainable](#)" and "[25 Reasons to Boycott Scottish Salmon](#)"



LABEL ROGUE

CALL THE LICE POLICE

