

[Sustainable Seas Inquiry by the Environmental Audit Committee](#) (May 2018)

Written submission from [Scottish Salmon Watch](#) and the [Global Alliance Against Industrial Aquaculture](#)

Introduction

[Scottish Salmon Watch](#) is a campaign group set up in February 2018 to raise public awareness of the environmental impacts of salmon farming in Scotland. Scottish Salmon Watch [submitted written evidence](#) in March 2018 to the [ongoing inquiry into salmon farming by the Scottish Parliament](#).

The [Global Alliance Against Industrial Aquaculture](#) (GAAIA) has campaigned against the environmental impacts of industrial aquaculture - predominantly salmon farming - since 2011. GAAIA [submitted written evidence](#) in February 2018 to the [inquiry into the environmental impact of salmon farming in Scotland conducted by the Scottish Parliament's Environment, Climate Change and Land Reform Committee](#).

Our written submission focuses solely on the two questions asked by the Environmental Audit Committee in relation to aquaculture; namely:

Does aquaculture cause less harm to marine biodiversity than fishing?

Is aquaculture in the UK adequately regulated to protect biodiversity?

The simple and resounding reply is no. Please read more details below. Given the volume of information on the environmental impacts of salmon farming it is extremely challenging limiting the word count to 3,000 (hence the references and web-links for further reading).

Summary

- 1) Since the [House of Commons Agriculture Committee report on 'Fish Farming in the UK](#) in 1990, salmon farming production in Scotland has [increased five-fold from 32,351 tonnes](#). Proposed increased from current levels of salmon farming production ([177,202 tonnes projected for 2017](#)) to [400,000 tonnes in 2030](#) represents a recipe for ecological ruin. Salmon farming in Scotland represents a significant threat to biodiversity - with predictions of a [doubling or even trebling of production by 2030](#) jeopardising biodiversity even further.
- 2) A [Review of the Environmental Impacts of Salmon Farming in Scotland](#) published in January 2018 by the Scottish Association of Marine Science collated evidence in relation to toxic chemicals, untreated wastes, infectious diseases (including lice infestations), wild fish (including wrasse) and marine mammals.
- 3) A [report published in March 2018 by the Scottish Parliament's Environment, Climate Change and Land Reform Committee](#) warned of 'irrecoverable damage' from salmon farming

with BBC News reporting [MSPs warning over salmon farming impact on environment](#). The report was particularly damning in relation to the regulation of salmon farming (read excerpts via [Key Points: Scottish Parliament's report on the environmental impact of salmon farming](#)).

4) In April 2018, 27 wild fisheries and environmental NGOs [called for an immediate moratorium on the expansion of salmon farming in Scotland](#). "Until the current failings in the regulation of the salmon farming industry and the environmental problems the industry causes, as identified by the Scottish Parliament's Environment Climate Change and Land Reform (ECCLR) Committee, are resolved, there must be an immediate moratorium on any new marine open cage fish farms or any expansion of existing fish farm sites, including any increases in farmed fish biomass at existing sites, as any expansion of the industry now will be unsustainable and may cause irrecoverable damage to the environment," [wrote Salmon & Trout Conservation Scotland](#).

5) "The all-party ECCLR Committee of the Scottish Parliament unanimously agreed their report in March and concluded that the current consenting and regulatory framework for the salmon farming industry is inadequate to address the environmental issues. They were not convinced the sector is being regulated sufficiently, or regulated sufficiently effectively, and made it clear that this needs to be addressed urgently because further expansion must be on an environmentally sustainable basis. They also said that if the current issues are not addressed this expansion will be unsustainable and may cause irrecoverable damage to the environment, concluding '*the status quo is not an option*'," said Andrew Graham-Stewart, Director of Salmon & Trout Conservation Scotland in a [press release](#).

6) A review of the environmental and public health impacts of Scottish salmon farming was published in January 2018 via [Scottish Salmon Farming 101](#). Reviews of the companies involved in salmon farming production in Scotland are available via [Media Backgrounder: Marine Harmfest Scotland](#); [Loch Duart: The Not Really Very Sustainable Salmon Company](#) and [The Scottish Salmon Polluters Organisation](#). A review of the poorly regulation salmon farming industry in Scotland is available via [SEPA's Shame on Salmon Farming](#).

Huge Ecological Footprint Beyond Scotland

7) The ecological footprint of Scottish salmon farming is huge with impacts as far away as Antarctica via [exploitation of krill](#) and South America [via use of anchovies](#) in fish feed. Not to mention the 'food miles' racked up in exporting farmed salmon to the United States and markets in Europe and Asia and other ecological costs (read more via [Not All Salmon Are Created Equal: Life Cycle Assessment \(LCA\) of Global Salmon Farming Systems](#) and [Life Cycle Analyses of Salmon Fishing and Aquaculture](#)).

8) UK-wide impacts have been recently reported via the [overexploitation of wild wrasse](#) (cleaner fish) in England for use in Scottish salmon farms with the threat of legal action ("[Legal action looms over reef wrasse removals](#)"). The genetic impacts of escapees from salmon farms and impacts of lice infestations can also be detected way beyond the boundary of Scottish salmon farms ([for example, escaped Scottish salmon caught in Welsh rivers](#)). Research [published by the Royal Society](#) in March 2018 also reported that wild corksiding wrasse which are transported long distances to be used as cleaner fish in salmon farms, escape and hybridize with local populations (read more via [Cleaner fish escape salmon farms and hybridize with local wrasse populations](#)).

Specific Concerns

Feed

9) Salmon farming drains our global oceans of wild fish for feed - leading to a net loss of marine protein. 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. Read more [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?](#); [Hugh Fearnley-Whittingstall tackles farmed salmon feed controversy](#); [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](#).

10) In the desperate search for alternative feed supplies, supermarkets are even looking to feed farmed salmon on chicken parts. The supermarket chain Morrisons is working with the University of Stirling to encourage the use of chicken parts in Scottish salmon. Others are convinced that feeding salmon on chicken parts is a recipe for ruin. Read more via [Mail On Sunday: "Coming soon to a fish counter near you, the salmon that's truly fowl...."](#); [Will it Fly: Avian proteins could help reduce costs and help the industry grow but only if the market is ready](#); [Little consumer resistance to the idea of using avian protein in salmon feed](#) and [Backlash against chicken and pork in farmed fish](#).

11) Scientists at the University of Stirling are feeding genetically modified plants which produce Omega-3 to farmed salmon. Read more via [Omega-3 oils in farmed salmon 'halve in five years'](#); [Genetically modified crop successfully fed to salmon, say scientists](#); [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](#).

12) The industry is now looking towards insect feeds - but will farmed salmon fed on cockroaches or maggots fly with UK consumers and what are the environmental impacts of using insects, chicken parts, GM soya etc in farmed salmon feed? 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](#).

Genetic Pollution

13) Nearly 4 million farmed salmon have escaped in over 200 incidents from Scottish salmon farms since 1998 leading to genetic pollution of wild salmon. Read more via [Scottish Salmon's Great Escape](#) and [Scotland's Aquaculture: Fish Escapes](#).

14) 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](#).

15) The Royal Society of London reported in 2003 that repeated escapes of farmed salmon could cause an "extinction vortex" in wild fish". 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](#) and [Wild salmon put at risk as a million farmed fish escape](#).

Marine Mammals

16) Salmon farms in Scotland have reported the killing of over 800 seals since 2011 (despite 70% of salmon farming production being certified via the RSPCA).

Seal Killing Salmon Farms (2011-2017)								
Operator	2017	2016	2015	2014	2013	2012	2011	Total
Scottish Sea Farms	12	14	15	33	33	45	37	189
The Scottish Salmon Company	7	2	11	14	14	38	54	140
Hjaltsland Seafarms (Grieg Seafood)	1			7	32	50	50	140
Marine Harvest	13	26	20	7	5	16	34	121
Loch Duart	15	12	9	13	11	20	10	90
Northern Isles Salmon						16	21	37
Balta Island Seafare		1	7	6	4	2	6	26
Dawnfresh			3	4	4	7	6	24
Meridian				1	8	12		21
Lakeland							18	18
Bound Skerries Salmon				3	4	5	4	16
Wester Ross Fisheries		2	2	4	3	1	1	13
Cooke Aquaculture	1	8	3					12
Kames Fish Farming			2		1			3
Thompson Brothers			1					1
Total	49	65	73	92	119	212	241	851

Read more via Sunday Herald: [Revealed: Scottish Government bid to exempt salmon farming from US seal-killing ban](#); [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!](#).

17) In 2014, a humpback whale died in a salmon farm in the Sound of Mull. 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](#).

18) Whales, dolphins and porpoises are being put at risk by noise alarms (Acoustic Deterrent Devices) used by salmon farms to scare off seals. Read more via [Warning salmon farm devices could hit wildlife tourism](#); [Deafening Impact of Salmon Farms on Cetaceans](#); [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](#).

Wastes

19) In May 2018, campaigners called for untreated wastes from salmon farming operations to be tested for infectious diseases, viruses and pathogens. Read more via [Herald: "Salmon farms are turning Scotland's seas into an open sewer, claim campaigners"](#); [The National: "42,000 sign petition for tougher Scottish salmon farm testing"](#) and [SumOfUs: "Campaigners at Scottish Parliament call for wastewater testing at salmon farming operations to save wild fish"](#).

20) In March 2018, the Scottish Parliament heard evidence that one salmon farm produces the same amount of waste as all of [Scotland](#)'s west coast towns put together. Read more via [One fish farm produces waste equivalent to 'all of Scotland's west coast towns'](#) and [Fish Faeces: Scotland's booming fish farming market will lead to coastlines being swamped by salmon poo, experts warn](#).

21) 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. Read more via [Scotland's Secret: Aquaculture, Nutrient Pollution, Eutrophication and Toxic Blooms](#); [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'](#).

22) Waste pollution from salmon farms is killing off the sea bed. Scientific research has shown that salmon farms impact on maerl beds. 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](#); [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](#); [Benthic Recovery Project](#); [A Big Fish In A Small Pond](#) and [Fish farm threatens rare marine life](#).

23) Wastes are even leaking from haulage trucks transporting dead Scottish farmed salmon including to disposal facilities in England. Read more via [First Minister questioned on leaking wastes from morts - call for a moratorium from Greens](#); [BBC's 'Dead Salmon Run' Opens Can of Worms](#) and [Sunday Times: "Scots councils 'failing to enforce EC laws on leaky salmon trucks'"](#).

Infectious Diseases

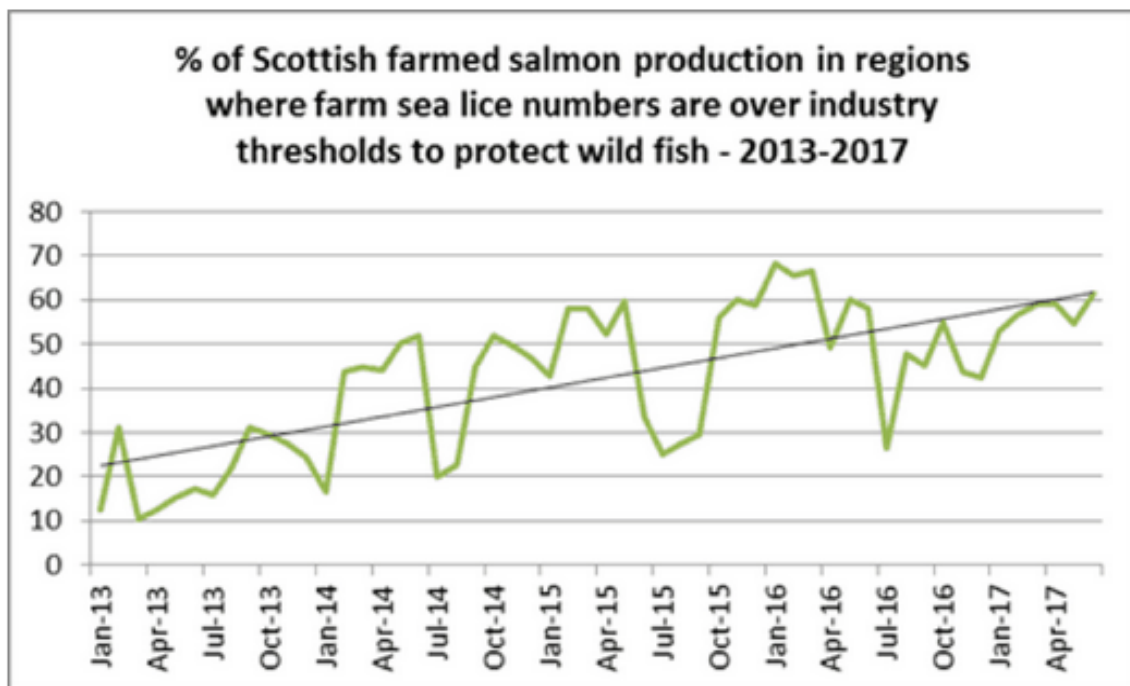
24) Amoebic Gill Disease, Infectious Pancreatic Necrosis, Furunculosis, Infectious Salmon Anaemia, Pancreas Disease and other deadly diseases have ravaged Scottish salmon farms killing millions of fish. Read more via [Hard Evidence: Dossier of Data on Lice Diseases & Mortalities at Scottish Salmon Farms](#); [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](#);

[Cardiomyopathy syndrome in farmed Scottish salmon](#) and [Fish Farmageddon: The Infectious Salmon Aquacalypse](#).

25) Emerging diseases ravaging Scottish salmon farms threaten wild fisheries and the marine environment. *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](#); [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](#).

Lice Infestation

26) Lice-infestation on Scottish salmon farms is running out of control. 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).



Read more via [Scottish salmon farming's 'liciest' farms named and shamed](#); [Scotland's worst sea lice offenders: Full Farm List](#); [Scottish salmon sold by a range of supermarkets in the UK has sea lice up to 20 times acceptable limit](#); [Hard Evidence: Dossier of Data on Lice Diseases & Mortalities at Scottish Salmon Farms](#) and [FishyLeaks: Scottish Salmon Infested With Parasites - Sea Lice Data Reveals 1001 Reasons to Boycott Farmed Salmon](#).

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

Mass Mortalities

28) Mass mortalities leapt to over 23,000 tonnes (an estimated 15-20 million dead farmed salmon) in 2017 with a mortality rate of 26.7%. Read more via [Hard Evidence: Dossier of Data on Lice Diseases & Mortalities at Scottish Salmon Farms](#); [Scottish Salmon's Mort Mountain Leaps Over 10 Million - FOI reveals 2.3 million dead salmon at Marine Harvest farms in 2017](#); [Millions of Scottish Salmon Going Up in Smoke](#); [Scottish Salmon's Lethal Legacy](#); [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.](#)

Wild Fish

29) Scientific research published in January 2018 by the Norwegian Institute of Nature Research (NINA) - "[Impacts of salmon lice emanating from salmon farms on wild Atlantic salmon and sea trout](#)" - detailed "considerable evidence" of a link between salmon farms and the spread of lice to wild Atlantic salmon and sea trout. Read more via [The Weight of Scientific Evidence: Sea Lice & Salmon Farms](#); [Fish farm lice are killing wild salmon](#); [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.](#)

30) Sea trout (as well as wild salmon) have been devastated by Scottish salmon farms. 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.](#)

31) "This is a complete vindication of what we have been arguing for many years now, often in the face of denials and opposition from within Scottish Government and Scottish public authorities, that open cage salmon farming in sea lochs is way out of balance with the environment, particularly with the conservation of wild salmon and sea trout," [wrote Salmon & Trout Conservation in March 2018](#) following the Scottish Parliament's [report on the environmental impacts of salmon farming.](#)

32) 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). 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](#).

Benthic Contamination

33) Documents disclosed by SEPA in 2017 [revealed that salmon farms have polluted 45 lochs around Scotland](#).

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](#) and [SEPA's Shame on Salmon Farming](#).

34) Marine Harvest polluted Loch Shell with the toxic pesticide Teflubenzuron (subsequently banned by SEPA) 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](#).

Toxic Chemicals

35) Salmon farming is engaged in a 'chemicals arms race' with shellfish considered collateral damage in the industry's 'war on sea lice'. Toxic chemical use on Scottish salmon leapt 1000% over the last decade (2006-2016). 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](#); [Sharp rise reported in Scots fish lice chemical](#); [Media Backgrounder: Scotland's Silent Spring of the Sea](#); [Media Backgrounder: Chemical Culture in Scotland](#); [FishyLeaks: Scottish Salmon's Toxic Toilets Named & Shamed](#); [Salmon farming in crisis: 'We are seeing a chemical arms race in the seas'](#) and [Scottish salmon farms pour chemicals on parasites](#).

36) 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](#).

37) 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](#).

Poor Environmental Performance

38) 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 with 51 fish farms assessed as "Very Poor", "Poor" or "At Risk" in 2016. Data from SEPA in ranked fish farms as 2nd worst out of "Scotland's polluting industries" in 2015.

Read more via [SEPA's Shame on Salmon Farming](#); [Failing Fish Farms - 18% rated "poor" by SEPA in 2015](#); [Exposed: the 383 plants that pollute Scotland](#) and [Mapped: the hundreds of firms condemned for 'poor' pollution performance](#).

39) Farmed salmon from Scotland is ranked as the world's worst - according to assessments by Seafood Watch in 2017. 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. 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](#).

Poor Environmental Regulation

40) There has not been a single successful prosecution of a salmon farm since November 2008 (between 1998 and 2008 there were at least 23 prosecutions with fines totalling at least £106,500). 91% of site inspections by SEPA to salmon farms are announced (i.e. only 9% are unannounced). Read more via [SEPA's Shame on Salmon Farming](#).

41) SEPA ditched plans in 2016 to ban a toxic pesticide (Emamectin benzoate) following lobbying from the Scottish Government and the salmon farming industry. 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"](#) and [Slicegate: Anatomy & Chronology of an Environmental Lobotomy](#).

42) SEPA permitted the use of the toxic chemical Emamectin benzoate (trade name SLICE) to increase six-fold between 2002 and 2015 despite a damning scientific report detailing lethal impacts on lobsters. 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](#).

43) 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". 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](#).

44) In April 2018, SEPA and Scottish Natural Heritage admitted to the Scottish Parliament that they did not know if their policies were helping to prevent environmental damage from the expansion of salmon farming. Read more via [Daily Mail: "We've no idea if we're curbing damage of fish farms, admit watchdogs"](#).

Supersize Salmon Farming

45) Salmon farms are getting bigger and bigger with supersized salmon farms producing up to 8,000 tonnes coming to Scotland soon (2,500 tonnes is currently Scotland's biggest salmon farm).

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!](#); [Supersized McSalmon - I'm Lovin' It Sings Fergus!](#); [Big McSalmon, Large Lice & Toxic Chemicals - Supersized Salmon Goes Global!](#); [Sunday Times: "Supersizing salmon farms in Scotland 'will be a disaster'"](#); [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](#).

Cleaner Fish

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

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"](#); [Sunday Times: "'Clean fish' bring danger of disease to salmon farms"](#); [Cleaner fish escape salmon farms and hybridize with local wrasse populations](#) and [Ilona Amos: Fish farms are catching other fish to clean their salmon](#).

Decades of Environmental Pollution

47) Salmon farming has increasingly impacted Scotland's marine environment and wild fisheries since the rapid expansion of salmon farms in the 1980s and the [House of Commons Agriculture Committee report on 'Fish Farming in the UK'](#) in 1990.

Read more via [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); [Aquaculture Information Pack](#) (2013); [25 Years of Scottish Salmon Shame](#) (2017) and [Media Backgrounder: Scotland's Silent Spring of the Sea](#) (2017) and [Time for Change in Scottish Salmon Farming](#) (2018).

Microplastic Pollution from Salmon Farms

48) Salmon farms around Scotland are generating unknown quantities of microplastics. In March 2018, the Scottish Government [admitted via a Parliamentary Reply from the Cabinet Secretary for the Environment, Climate Change and Land Reform](#) that SEPA "does not currently monitor for microplastics but is engaged with academic researchers looking into improving understanding of this problem" and that "Marine Scotland monitors microplastics in the water column, in sub-tidal marine sediment and also on the sea surface which can wash onto beaches".

49) In Norway, Naturvernforbundet (Friends of the Earth Norway) estimate a potential of 325 tonnes of microplastic from Norwegian fish farms a year leading to calls for a ban on plastic pipes on salmon farms. Read more via [Feed pipe wear 'putting tonnes of plastic into sea'](#); [Stop using plastic feed pipe, Greens urge](#); [What's known about microplastics and fish](#) and [Research in the pipeline to measure microplastic](#).

50) Scientific research has shown that microplastics can spread salmon farming diseases such as Furunculosis and fillets of farmed salmon have been shown to be contaminated with microplastics. Read more via [Microplastics as a vector for the transport of the bacterial fish pathogen species *Aeromonas salmonicida*](#); [Mail probe finds airborne plastic particles in EVERY sample of shop-bought fish tested](#); [Are microplastics in your salmon fillet?](#); [From sea to plate: how plastic got into our fish](#) and [Fish for dinner? Your seafood might come with a side of plastic](#).

Recommendations:

51) The [House of Commons Agriculture Committee report on 'Fish Farming in the UK'](#) (1990) must be followed up with another House of Commons inquiry. A timely starting point would be the [Scottish Parliament's ongoing salmon farming inquiry](#) with a report from the Rural Economy & Connectivity Committee published "[possibly before the parliament's summer recess](#)" and a [report published in March 2018 by the Environment, Climate Change and Land Reform Committee](#).

52) Written evidence [submitted in February 2018 to the Scottish Parliament's Environment, Climate Change and Land Reform Committee](#) and [submitted in April 2018 to the Scottish Parliament's Rural Economy & Connectivity Committee](#) should be reviewed - including submissions from [Salmon & Trout Conservation Scotland](#); [Friends of the Sound of Jura](#); [Scottish Salmon Think Tank](#); [Scottish Creel Fishermen's Federation](#); [Angling Trust & Fish Legal](#); [Marine Conservation Society](#); [National Trust for Scotland](#); [Orkney Trout Fishing Association](#); [Scottish Gamekeepers Association](#); [Scottish Salmon Watch](#) and [Global Alliance Against Industrial Aquaculture](#).

53) A comprehensive monitoring program testing wastes from salmon farming operations for infectious diseases, pathogens, viruses and bacteria should be set up - perhaps [coordinated by](#)

[scientists at DEFRA and CEFAS who have expertise in this area](#) - to plug the gaps [currently permitted by the Scottish Government and SEPA](#).

54) A strategic environmental assessment of the impacts salmon farming in Scotland should be carried out by the Environmental Audit Committee - with specific reference to impacts on benthic ecosystems, water quality, wild fisheries (including cleaner fish and shellfish such as lobsters), cetaceans and seals.

55) Further research is required into the amount of microplastic pollution generated by salmon farms in Scotland and the role of salmon farms in the spread of infectious diseases via microplastics.

Don Staniford, Director of [Scottish Salmon Watch](#) and the [Global Alliance Against Industrial Aquaculture](#), 14 May 2018