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Judge Cohen  
BC Supreme Court  
800 Smith Street  
Vancouver BC

Dear Sir,

Re; salmon farming in BC waters

After reading and researching the “missing salmon “, story there are a few points of interest that have stuck in my mind and just wont go away, Sir I am just a regular Canadian and haven't put pen to paper for any cause in the last 30 years, but after doing some research I feel compelled to write to you with regards to the fish farming industry.

The sealice infestation of juvenile salmon and its subsequent effect (mass mortality) has been documented since the early 1990s a study in Loch sheildeg Scotland showed that upwards of 86% of Juvenile seatrout succumbed to sealice infestation as they attempted to migrate passed the fishfarms located there, in another article from the University of Bergin 86% of juvenile salmon suffered the same fate when farms were placed in fiords with wild salmon stocks, Sir if I can find out this information from home, I ask the question, did our own DFO even look into this problem prior to, or during the siting of cages and the continued expansion of the industry, and why do the fish farm companies continually deny they are the root of the problem in light of the mass of evidence to the contrary.

According to articles I have read the fish farm industry was given the go ahead to site their cages away from identified “wild salmon hot spots” they did the opposite, placing their cages on the hot spots, with apparently no protest or intervention from either the Provincial or Federal authorities, Sir some of these companies have been around for forty years so know full well the impact of placing cages on migration routes, their excuses just don't cut it. Wild salmon is now all but impossible to buy in Norway and to a lesser Degree in Scotland ( they still have relatively healthy stocks on their east coast rivers, no salmon farms there), effectively the fishfarm companies have cornered the market for salmon sales, no wild salmon = no commercial fishery = no competition, the only fish available to the consumer are farmed fish, Sir I cannot say that the fish farm companies intentions on the BC coast were to decimate the wild stocks, but decimate them they have, there has been no commercial fishery for the last three years.

The same scenario has all ready played out in the Bay of Fundy

In light of the depth of evidence dating back to the 1990s that shows that open cage salmon farming, for what ever reason, decimates the local indigenous salmonoid populations, I am at a loss to wonder why these companies were ever allowed to operate in Canadian waters, knowing the effect their operations have had in Norway, Scotland and Ireland, they in my opinion have shown blatant disregard for our environment and to our indigenous salmon populations on both the East and West coasts.

Judge Cohen, I don't presume to tell you how to do your job, but I do urge you to use the full power of your office to rectify this situation on behalf of our nation and for our future generations, not forgetting of course the salmon and dependent wild life who unfortunately now depend on our actions for their very survival, if I may make a suggestion, we should send these companies back to Norway to clean up their own house which is in disarray , with total wild salmon stocks for the whole of Norway estimated to be somewhere between 400,000 and 600,000 , a decline of over 80% since the onset of salmon farming.

A group of eminent biologists headed by Alexandra Morton have asked the DFO to take immediate action and remove farms off the migration routes, this request has fell on deaf ears, I would ask Sir, that in light of the next generation of salmon due to migrate this spring coming from an already depleted stock, if it is within your powers, that you consider enforcing this action as a precautionary measure until you have done your investigation, which I presume will take some considerable time.

lastly Sir, when I go to BC fishing we pay our licence and follow the regulations for the particular body of water we are on, were I to get caught by a fisheries officer introducing an Atlantic salmon to any river or lake I am quite sure my truck, boat and equipment would be confiscated pending my trial, in which I am quite sure I would receive a substantial fine and a ban from fishing, there have been numerous introductions of Atlantic salmon to the west coast fishery albeit by accident through neglect or incompetence by various farms, in 2009 Marine harvest introduced 40,000 Atlantic salmon to the west coast fishery, to date as far as I am aware no charges have ever been laid for this offence, I trust this is one area of the law you will visit and correct. I realise Sir that the tone of my letter assumes that you will find the root cause of the problem to be sealice, so would ask you to revisit the points I have raised if indeed this is the case.

I have enclosed six articles that may be of interest to you.

I put my trust and faith in you to uphold our Canadian standards and thank you for your time.

Respectfully yours



William J S Ritchie.

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# Resistant lice threaten salmon

Threaten wild fish and aquaculture

*you should see this in colour!*



LUS ON SALMON: Lusespist farmed salmon. Photo: Alf Arne Light

During 2008, there have appeared resistant deposits of sea lice in several farms along the coast. Salmon lice threaten wild fish and aquaculture. Norwegian Hunting and Fishing Association, Norwegian Salmon Rivers and the Norwegian Farmers' Union now requires that coastal and fisheries minister Helga Pedersen take immediate measures to stop the lice problem.

Salmon farming as it is run today is not sustainable, according to organizations that require the government to set stricter environmental standards for aquaculture industry.

Lice in a natural state of a harmless parasite on salmon and sea trout. In a breeding cage, however, is lice a constant problem because the density of fish creates enormous amounts of lice on a small area. In these concentrations, a salmon lice quickly became a threat to both wild fish in nearby areas and farmed fish, when the stock grazing damage to the fish in the worst case is fatal. Salmon smolt are particularly vulnerable when it is to the sea in the spring, and an attack of 10 sea lice is NOK to provide smolt fatal injuries. Escaped farmed salmon are also an important factor in the spread of sea lice, says the organizations behind the petition.

Earlier this fall, it was reported that sea lice in a plant by Austevoll in Hordaland had developed resistance to the chemical treatment agent Slice. In the past there has also been detected resistance or decreased sensitivity to lice agent Slice of three new facilities in Hordaland and Sogn og Fjordane. This should be confirmed by the FSA.

Medical situation

We now have a situation where resistant lice spread upward along the coast. This can lead to an epidemic-like blooms of lice. This will be a disaster for wild salmon and sjørreiten, which at worst would

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destroy many of our stocks. In River Drive have the catch of sea trout in a few years fell from 10 tons to 1 ton. In the Hardangerfjord has the problem of lice led to critically small populations of salmon and sea trout, and with stops in river fish that consistency. Here is the big growth Vosso salmon about to die out, "says organiasjonene that require action.

They believe the risk of resistance also represents an economic threat to the farming industry because large luseskader of the fish causes a reduced selling price.

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By: peter green

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# 1000 lice on one escaped farmed salmon

DN.no

A three-pound fish farming of salmon on the run should have been more than a thousand lice on them, when it was captured near Namsen in Nord-Trøndelag in July, the newspaper Dagens Næringsliv.

- This is extreme. I've never seen such a big fish that is so infected with lice, says a researcher at the National Veterinary Institute, Peter-Andreas Heuch, to DN - after studying the images of luselaksen.

## - It is tragic

The salmon was taken in a kilenot fish farmer and tourist host Svann Kaldahl and salmon Kåre Nicolaysen. The duo thought hardly their eyes when they got the salmon over the gunwale.

- We were great in the eyes both of them. Think about how the salmon had set out in a few weeks, when the lice had been grown. It is tragic what is happening, and everything suggests that it is the fish farming industry's fault. Previously, we had to tourists who were about 100 maritime in one week. In May, got the same two maritime tourists in a week, "said Kaldahl, who has been kilenot fish Namsenfjord fjord more than 30 years.

- I have biology and zoology in the curriculum, but is not an expert on fish. Something like that, I have never seen before. That situation must be dramatic for wild salmon, there is little doubt, says Nicolaysen to DN.

## Urgent

Torstein Moland, chairman of Norway's hunter-fiskerforbund (NJFF), reacts strongly.

- Conditions in the aquaculture industry is that the industry 40 years ago. The industry is not sustainable as it is run today, "says Moland told the newspaper.

Asked by DN on the urgent measures, responding Moland:

- Yes, spring smolt is an acute challenge. But the problems are much more fundamental and long-term than that. I hope the industry can do to solve the acute situation, but I have very little faith in that it addresses the farming industry's fundamental problems. There are too many aspects of the industry that is not sustainable. And we must be prepared to environmentally conscious consumers begin to react to this, both in Norway and in other countries. Perhaps this is what it takes to make farming the players to react.

**Read also:** - Disaster can strike Norwegian farmed

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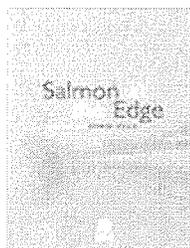
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### Salmon at the Edge

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## Assessing and Managing the Impacts of Marine Salmon Farms on Wild Atlantic Salmon in Western Scotland: Identifying Priority Rivers for Conservation

Chapter Authors: J.R.A. Butler, J. Watt

### Summary

#### Abstract:

This chapter contains sections titled:

- The Scottish salmon farming industry became established in the early 1980s. However, impacts of farm salmon on wild Atlantic salmon (*Salmo salar*) were not predicted and many farms were located near the mouths of rivers. This paper assesses 38 salmon rivers in the centre of the west coast salmon farming zone, and compares the status of stocks in those with and without salmon farms in their sea lochs. Juvenile surveys carried out at 230 sites in 35 rivers in 1997, 1999 and 2001 revealed that rivers with farms had 62-82% and 44-62% lower mean abundances of salmon fry and parr, respectively, and the differences were statistically significant. Calibration of juvenile abundance indices against smolt counts at two rivers with fish traps demonstrated that 86% of predicted smolt runs were depleted in rivers with farms, versus 26% in rivers without farms. Severe stock collapses were evident in 14 (50%) of rivers with farms, where only remnant populations remain. Applying the NASCO Rivers Database classifications, nine of these are considered 'threatened with loss', and five may be 'lost'. In 1990-2001 escaped farm salmon were significantly more prevalent for rod catches in rivers with farms (mean 9%) than in those without (mean 2%), resulting in a greater threat of genetic introgression. Epidemics of sea lice (*Lepeophtheirus salmonis*) found on sea trout (*Salmo trutta*) suggest that salmon smolts emigrating from sea lochs with farms are also suffering lethal infestations. It is proposed that in sea lochs with farms the combined effects of genetic introgression and lice infestation have suppressed smolt survival rates to < 8% during the 1990s, resulting in stock collapse. Invoking the requirements of the Habitats and Birds Directives, and NASCO's 'precautionary principle', the 15 largest and potentially most genetically diverse salmon rivers on the west coast are identified. Measures are proposed to avoid further deleterious effects of marine salmon farms on these rivers, including the establishment of exclusion zones in their sea lochs.

### KEYWORDS

marine salmon farms; wild atlantic salmon; western scotland; sea lochs; interb reeding

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### AUTHOR DETAILS

J.R.A. Butler<sup>1</sup>, J. Watt<sup>2</sup>

<sup>1</sup> Spey Fishery Board Research Office, 1 Nether Borlum Cottage, Knockando, Morayshire, AB38 7SD, Scotland, UK

<sup>2</sup> Lochaber and District Fisheries Trust, Arieniskill Cottage, Lochailort, Iny ernes shire, PH38 4LZ, Scotland, UK

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## Has salmon farming outgrown itself?

By Michael Wigan

Published: 1:30PM BST 31 Mar 2008

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Salmon farming seems always in the news, disadvantageously.

[Offshore salmon farm: Has the industry outgrown itself?](#)

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This is embarrassing for Scotland where in the 1970's it was identified as the successor in remote regions to North Sea oil, and steadily subsidised by Government.

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The first global study on the environmental effects of salmon aquaculture shows that the 1m tonne industry has serious side-effects on captive salmon's cousins in the wild.

Parasitic sea-lice, multiplying in millions around cage salmon, are shown to decimate wild runs across the study's range stretching from British Columbia on the Pacific to Nova Scotia and Newfoundland on the Atlantic and across to Ireland and Scotland.

The only country not studied was Norway because no areas were sufficiently free of salmon farming to act as comparisons.

Nova Scotia researchers the late Ransom Myers and Jennifer Ford found that wild runs near salmon farms suffered population losses of at least 50 per cent each year. Sea-trout, or anadromous brown trout, were particularly vulnerable.

The authors claim this scale of loss is unsustainable and say that diseases from aquaculture operations spread into the wild and that interbreeding with wild fish weakens the ability of future generations to survive.

The effect of this research on Scotland cannot be taken in isolation. Negative publicity for salmon farming has been unremitting. Last August John Fredriksen, the major shareholder in salmon producer giant Marine Harvest said whilst on an angling holiday that salmon farms should be in places without wild fish, in other words that the bulk of the industry was wrongly-sited.

In the last month or so farm salmon products have been recalled by supermarkets following news that they had been tainted with diesel during processing. Panicky supermarkets even waived the need for shoppers to produce receipts on order to get refunds.

Farm salmon is on the way to becoming permanently dodgy.

Since 2000 when salmon farming's polluting effect on sea-lochs was shown to have eradicated wild stocks in 14 west Highlands rivers the industry has reacted to criticism by moving production to easier locations.

On the wild coast of Chile there are neither roads, people, nor wild salmon. Production there, using cages 10 times Scotland's largest, has overtaken that of Norway, formerly the leading producer.

The original employment justification for Scottish salmon farming has shrunk as farms have consolidated, mechanised, and shed labour. Now a few very large companies dominate the industry.

Whilst output per employee has climbed, the number of Scottish salmon farms has dwindled from 325 in 2003 to 277 in 2005, the last official figure.

Output too has declined, from a peak of 170,000 tonnes to 132,000 tonnes for 2006.

Critically, the industry's food supply is shrinking. The last FAO world aquaculture report said the increases in farm-reared fish worldwide were unsustainable.

Farm fish are fed meal composed of trimmings from fish processing plants, by-catch not thrown back to sea, and so-called 'industrial' fish not normally eaten by humans. The Chilean coast where the bulk of industrial fish is sourced in the form of vast shoals of anchovies is itself now where the fish-feed is needed.

These anchovy stocks are notoriously volatile, with catches ranging from 14m tonnes in 1994 to 100,000 tonnes in 1982.

Increasingly salmon farms have been substituting vegetable feeds. But when does a vegetarian salmon cease to be a salmon?

The sea can only yield so much. It is not a miracle of biomass production, it is a mechanism of biomass production. Salmon farming seems to have outgrown itself.

- [Michael Wigan is a farmer and environmental writer](#)

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Effects of the Use of Tributyltin Antifoulants in Mariculture

Davies, I. Drinkwater, J. McKie, J. Balls, P. Department of Agriculture and Fisheries for Scotland, Aberdeen, Scotland;

This paper appears in: OCEANS 1984 Publication Date: Sep 1987 Volume: 19, On page(s): 1477- 1481 Current Version Published: 2003-01-29

Abstract

Tributyltin antifoulants have been used on cages at marine fish farms in fjordic sea lochs in Scotland. It has been demonstrated from field observations that the release of TBT from these paints can adversely effect the growth of Pacific oysters, cause enhanced TBT concentrations in sea water, and contribute to the development of imposex by dogwhelks. Imposex development has been found to be a particularly sensitive indicator of TBT contamination.

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## WASTE CONTAMINATION FROM SALMON FARMS

Tens of thousands of farmed salmon confined to net pens produce a huge amount of waste: chemical, biological, organic, and inorganic. For more than 25 years, researchers around the world have recognized the harm from salmon farm waste and its long-term impacts on water quality, fisheries resources, and sea-bed ecology.<sup>1</sup>

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### THE WASTE PROBLEM

Salmon net pens discharge untreated sewage, including contaminated feed laced with chemicals, toxic residues, nitrogen, phosphorus, and copper and zinc—not to mention diseases and parasites—directly into coastal waters throughout the world. In addition, tons of contaminated salmon, together with processing wastes—bones, entrails, and even the carcasses of seals, sea lions, and other predators—are dumped in landfills or processed for fertilizer or animal feed.

### Sewer Systems in the Sea

Experts have calculated that factory salmon farms, each extending over several acres of coastal waters, discharge extremely high concentrations of untreated sewage.

- According to Scotland's World Wildlife Fund, salmon farms there produce nitrogen wastes equal to a human population of more than nine million people.<sup>2</sup>

Even industry insiders concede that a typical 200,000-fish salmon farm releases:

- nitrogen equal to 20,000 humans,
- phosphorus equal to 25,000 humans, and
- fecal matter roughly equivalent to a city of 65,000 people.<sup>3</sup>

In 2000 and 2001, nutrient discharges from aquaculture in the Northeast Atlantic, including Scotland, Denmark, Norway, and Ireland, were estimated at almost 40,000 tons of nitrogen and 6,600 tons of phosphorus.<sup>4</sup>

### Pollution from Nutrients

Sewage and other wastes from salmon farming causes far-reaching environmental harm by:

- contaminating the sea-bed and its shellfish species,
- contributing to the antibiotic resistance of shellfish and wild fish, and
- causing eutrophication that triggers toxic algal blooms.

The accumulation of sewage on the seafloor under and around salmon farms directly harms marine biodiversity. Scientists in Scotland, Norway, Ireland, and Canada have all shown that some

of these effects may last several years and extend for several hundred meters away from salmon farm.<sup>5</sup> Divers have also found biological “dead zones” under salmon farms—areas on the sea-bed devoid of marine life. This problem is so prevalent that every few years salmon farmers relocate their net pens to prevent the sea-bed from completely dying. As a result, salmon farms are gradually moving further offshore and contaminating a larger area of once healthy water.

### Pollution from Chemicals

Salmon farm sewage often contains chemicals and contaminants<sup>6</sup> that easily enter the food chain and accumulate as they move up it, ultimately reaching humans. Among these chemicals are:

- copper
- zinc
- tributyltin, a fungicide
- oxytetracycline and oxolinic acid, both antibiotics
- ivermectin, an anti-parasite compound
- emamectin benzoate, cypermethrin, azame-thiphos teflubenzuron, and dichlorvos—all insecticides.
- polychlorinated biphenyls (PCBs).<sup>7</sup>

The abuse of antibiotics by large salmon farming operations has not only led to chemical resistance in wild fish species but also raised health concerns for humans whose diets already include milk, eggs, and meat products containing unknown amounts of similar drugs.<sup>8</sup>

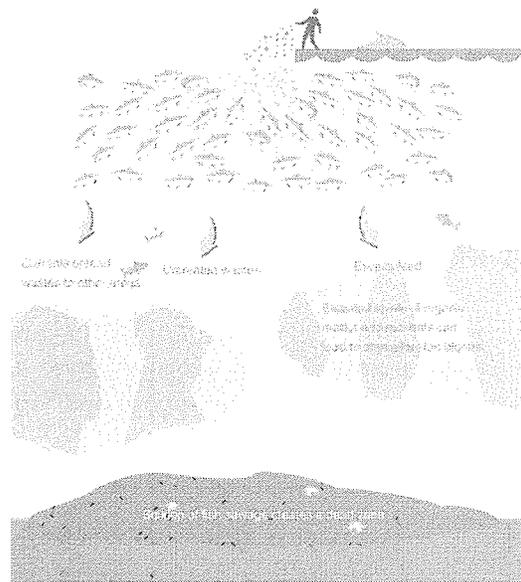
### Pollution from Mass Mortalities

Massive farmed salmon deaths (euphemistically referred to as “morts” in the industry) add to the burden of pollution from commercial salmon farms. Industry-wide, mortality rates in factory salmon operations range from 10 percent to 40 percent. Outbreaks of infectious diseases, such as Infectious Salmon Anaemia, may necessitate the slaughter of 100 percent of a farm’s stock, as it did in Scotland in 1998-99 when eight million fish had to be killed to stem the spread of disease.

The sheer volume of dead fish can only be measured in tons. In British Columbia, for example, where factory farms produce 70,000 tons of salmon annually, an estimated 20,000 tons of dead fish have to be discarded each year. Globally, production of almost 1.9 million tons of salmon produces a disposal problem for several thousand tons of dead and dying salmon.

In many parts of the world, thousands of tons of dead farmed salmon are dumped every year in landfills. Because most salmon farms are in remote locations, dead fish are often expediently dumped in isolated areas rather than farmers paying to ship the waste to legitimate treatment sites. In Scotland, for example, one company was caught dumping thousands of disease-suspected farmed salmon on an environmentally sensitive beach.<sup>9</sup>

Waste Stream Pollution From Farming Fish In Net Pens



Graphic: Rick Shiers

Alternative disposal methods involve depositing fish in large silos and applying chemicals to hasten decomposition. Dead salmon, some diseased and others contaminated with chemicals, may also be used by farmers for fertilizer or converted to compost and applied to farms and gardens. Still other salmon "morts" end up in pet food or as feed on mink farms.

### CLOSING THE NET ON WASTE

Alternatives to irresponsible dumping and waste discharge have been tried for several years. Scotland's Environmental Protection Agency experimented with various systems until the late 1990s when it yielded to industry pressure and concluded that the cost of requiring new technologies was "not viable for commercial salmon production under present economic conditions." Similar studies in Canada, with treatments for waste water from salmon farms, were also declared "uneco-nomic" and discontinued.<sup>10</sup>

Although dead salmon and their wastes can be safely disposed of with various filtration and treatment systems to protect marine ecosystems, the salmon farming industry has resisted all such proposals in the interest of keeping costs low to offer the cheapest product possible. The savings to consumers, however, means a far heavier price must be paid by wild salmon, the shellfish industry, and traditional commercial fishing livelihoods. More to the point, no one yet knows the true cost of cheap farmed salmon to human health.

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