

Ian Jardine
Chief Executive
Scottish Natural Heritage
Great Glen House
Leachkin Road
INVERNESS
IV3 8NW
Scotland
United Kingdom
Ian.Jardine@snh.gov.uk

September 2012

Dear Ian,

Increasing Use of Toxic Chemicals on ‘Scottish’ Salmon Farms

What is SNH doing to prevent the increasing discharge of toxic chemicals by salmon farms into Scotland’s Special Areas of Conservation and other lochs across Scotland?

Not very much, it seems, judged by the fact that there has been a 12-fold increase in the use of toxic chemicals by salmon farms in Scotland since 2005 – including discharge into SACs.

Please note a formal complaint filed with the [OSPAR Commission](#) against the United Kingdom and Norway for failure to adhere to [PARCOM Recommendation 94/6](#) on Best Environmental Practice for the Reduction of Inputs of Potentially Toxic Chemicals from Aquaculture Use (available [online here](#)) – including:

“The Global Alliance Against Industrial Aquaculture (GAAIA) wishes to bring to your attention the increasing use of toxic chemicals by the salmon farming industry – including a potential breach of the [EU Habitats Directive](#) by Scotland which is permitting salmon farming companies to discharge toxic chemicals into [Special Areas of Conservation](#). This information has been made available online via ‘[FishyLeaks](#)’ and is available in full via ‘[Dossier of Chemical Use on Scottish Salmon Farms 2008-2011](#)’.”

Does SNH have data on the increasing use of chemicals discharged into SACs in particular?

Thankfully, it appears that SNH does have some concerns at the use of toxic chemicals within or near SACs. In August 2012, the Scottish Wildlife Trust reported that Scottish Natural Heritage has [expressed concern](#) that chemical use could spread to the nearby [Firth of Lorn Special Area of Conservation](#), protected under EU law because of the rarity of its reefs.

Read more via “[Will wildlife have to pay the price for salmon farming?](#)”

A 2007 report – ‘[Scottish Farmed Salmon Exposed](#)’ - from the Pure Salmon Campaign (sourced from data supplied by SEPA) detailed the use of chemicals in Scotland’s Special Areas of Conservation:

Sea Lice Chemical Use in Selected Lochs and Special Areas of Conservation in 2005

Annual total Cypermethrin (g)	Year				
	2002	2003	2004	2005	2006
Receiving water					
Firth of Lorn	20	212	70	68	-
Loch Alsh	178	-	180	-	-
Loch Duich	958	290	328	12	-
Loch Fyne	608	1,184	24	637	-
Loch Laxford	-	40	8	-	116
Loch Roag	618	264	166	412	471
Loch Sunart	1,131	606	1,704	72	1,080

4,411 g of Cypermethrin was discharged into Special Areas of Conservation between 2002 -2006

Annual total Emamectin Benzoate (g)	Year				
	2002	2003	2004	2005	2006
Receiving water					
Firth of Lorn	297	910	205	490	55
Loch Alsh	662	341	2,504	-	78
Loch Duich	440	-	1,724	-	57
Loch Fyne	-	-	864	1,766	2,768
Loch Laxford	-	934	-	142	-
Loch Roag	1,418	349	310	1,382	23
Loch Sunart	1,753	155	8,030	1,600	134

12,321 g of Emamectin Benzoate was discharged into Special Areas of Conservation between 2002 -2006

Discharges of copper in SAC's also included:

Copper Discharges into Selected Lochs and Special Areas of Conservation, 2002 - 2005

Annual total Copper Oxide (g) Receiving water	Year			
	2002	2003	2004	2005
Firth of Lorn	283,500	201,630	164,760	115,380
Loch Alsh	237,600	-	-	-
Loch Duich	-	-	-	-
Loch Fyne	1,743,680	530,670	2,520,000	9,347,200
Loch Laxford	-	-	-	-
Loch Roag	6,336,640	2,482,560	3,122,720	1,190,400
Loch Sunart	228,800	-	-	-

**Scottish salmon farming companies discharged
over 14 tonnes of copper into Special Areas of
Conservation, 2002 - 2005**

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

It is clear that chemical and waste discharges into SAC's by Scottish salmon farms are not insignificant. The report also stated:

- Waste Discharges into Special Areas of Conservation and Protected Areas:

Open net cage salmon farms are even permitted to discharge untreated waste effluents into some of Scotland's most pristine water bodies. The Firth of Lorn, Loch Alsh, Loch Duich, Loch Laxford and Loch Roag, for example, are all classified as Special Areas of Conservation and were protected under the European Commission's Habitats Directive in 2004 (formally designated by the Scottish Government in 2005)¹. During 2005, however, discharges of total organic carbon into Loch Roag exceeded 1 million kg. Salmon farms

¹ "Special Areas of Conservation" (Scottish Natural Heritage): <http://www.snh.org.uk/about/directives/ab-dir07.asp>

² "Marine SACs" (Scottish Natural Heritage): <http://www.snh.org.uk/about/directives/ab-dir14.asp>

alone in Loch Fyne (operated by Pan Fish) discharged 31,096 kg of phosphorus and 225,178 kg of nitrogen.

Annual total Total Organic Carbon (kg)	Year
Receiving Water	2005
Firth of Lorn	181,488
Loch Alsh	133,591
Loch Duich	174,415
Loch Fyne	722,446
Loch Laxford	158,125
Loch Roag	1,046,484
Loch Sunart	525,839

Loch Roag lagoons is a Special Area of Conservation designated due to the presence of beds of eelgrass *Zostera* spp. and tasselweed *Ruppia* spp., turfs of marine algae and stands of large brown algae, kelp *Laminaria* spp., anemones and sponges³. However, Loch Roag is the second most heavily farmed loch in Scotland with 7,775 tonnes of biomass in 2002⁴ (it has a capacity for in excess of 12,000 tonnes of production)⁵.

Loch Fyne – home of the internationally renowned Loch Fyne Oysters (as well as up to 10 salmon farm sites owned by Pan Fish) – is Scotland’s most heavily farmed loch with 9,240 tonnes of biomass in 2002 (Loch Sunart was 4th with 6,020 tonnes)⁶.

Annual total Phosphorus (kg)	Year
Receiving Water	2005
Firth of Lorn	7,812
Loch Alsh	5,750
Loch Duich	7,507
Loch Fyne	31,096
Loch Laxford	6,806
Loch Roag	45,043
Loch Sunart	22,634

Loch Laxford (home to Loch Duart’s ‘Sustainable Salmon Company’) contains particularly dense beds of the anemone *Sagartiogeton laceratus*, and the snake blenny *Lumpenus lumpretaeformis* (which usually occurs in burrows in deeper water). Sea cucumbers, hydroids, heart-urchins, bivalves and beds of maerl *Phymatolithon calcareum*, with their

³ Loch Roag lagoons Special Area of Conservation (JNCC): <http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCODE=UK0017074>

⁴ “The Interaction between Fish Farming and Algal Communities of the Scottish Waters - a Review” (Scottish Executive: 2003): <http://www.scotland.gov.uk/Publications/2003/07/17787/23581>

⁵ Information obtained under FOI in July 2006 from SEPA – available as Excel spreadsheets from the Pure Salmon Campaign

⁶ “The Interaction between Fish Farming and Algal Communities of the Scottish Waters - a Review” (Scottish Executive: 2003): <http://www.scotland.gov.uk/Publications/2003/07/17787/23581>

associated species-rich communities, also occur in Loch Laxford Special Area of Conservation⁷ (see Section 11 for more information). A scientific paper published in 2006 demonstrated major impacts of salmon farm wastes on maerl beds (red algal coralline gravels of high conservation importance)⁸ – see Section 10 for more details.

Annual total Nitrogen (kg)	Year
Receiving Water	2005
Firth of Lorn	56,568
Loch Alsh	41,639
Loch Duich	54,363
Loch Fyne	225,178
Loch Laxford	49,286
Loch Roag	330,019
Loch Sunart	163,978

Loch Alsh and Loch Duich (home to salmon farms operated by Marine Harvest) are both part of the Lochs Duich, Long and Alsh Reefs Special Area of Conservation. Characteristic species include the sea anemone *Protanthea simplex*, the fan-worm *Sabella pavonina*, the brachiopods *Neocrania anomala* and *Terebratulina retusa*, the hydroids *Tubularia indivisa* and *Sertularia argentea*, the barnacle *Balanus crenatus*, anemones, sponges and ascidians and unusually dense beds of the brittlestar *Ophiopholis aculeata*, an extremely rare feature in the UK⁹.

The Firth of Lorn Special Area of Conservation includes species which are normally characteristic of deeper water (the sponges *Mycale lingua* and *Clathria barleii*, and the featherstar *Leptometra celtica*), and others which are considered scarce (including the brown alga *Desmarestia dresnayi*). Many species occurring here have either a northern or southern-influenced distribution and reach their geographic limits in this area, for example, the southern cup-coral *Caryophyllia inornata*, the nationally scarce brittlestar *Ophiopsila annulosa*, and the northern bryozoans *Bugula purpurotincta* and *Caberea ellisii*¹⁰. In 2002, a video taken by diver David Ainsley showed significant benthic impacts from a salmon farm in the Firth of Lorn¹¹.

Moreover, the reported also detailed chemical use in SACs including:

Emamectin Use in Special Areas of Conservation

The use of Emamectin benzoate, like Cypermethrin, occurs in Scotland's most pristine and most protected areas. Information obtained from SEPA under FOI by the Pure Salmon

⁷ Loch Laxford Special Area of Conservation (JNCC):

<http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCODE=UK0030192>

⁸ "Impact of fish farms on maerl beds in strongly tidal areas" (Marine Ecology Progress Series, Vol 326 pp1-9):

<http://www.int-res.com/abstracts/meps/v326/p1-9/>

⁹ Lochs Duich, Long and Alsh Reefs Special Area of Conservation (JNCC):

<http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCODE=UK0017077>

¹⁰ Firth of Lorn Special Area of Conservation (JNCC):

<http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCODE=UK0030041>

¹¹ "Pollution fear over fish farms" (BBC, 31st January 2002): <http://news.bbc.co.uk/1/hi/scotland/1793266.stm>

Campaign in December 2006, reveals significant use of Emamectin benzoate in the Firth of Lorn, Loch Alsh, Loch Duich, Loch Fyne, Loch Roag and Loch Sunart since 2002. The use of Emamectin benzoate (at farms operated by Pan Fish) in Loch Fyne, for example, has increased dramatically since 2004 with at least 2,768 grams used during 2006¹².

Annual total Emamectin Benzoate (g)	Year				
Receiving water	2002	2003	2004	2005	2006
Firth of Lorn	297	910	205	490	55
Loch Alsh	662	341	2,504	0	78
Loch Duich	440	0	1,724	0	57
Loch Fyne	0	0	864	1,766	2,768
Loch Roag	1,418	349	310	1,382	23
Loch Sunart	1,753	155	8,030	1,600	134

Cypermethrin Use in Special Areas of Conservation

According to information obtained from SEPA under FOI by the Pure Salmon Campaign in December 2006, the use of Cypermethrin even occurs in Scotland's most pristine and most protected areas including Loch Roag, Loch Alsh and Loch Duich – all Special Areas of Conservation protected under the EU Habitats Directive. Cypermethrin has been used in Loch Fyne – the home of Loch Fyne Oysters – since 2002¹³. The use of Cypermethrin in Loch Sunart during 2006 was over 1,000 g (The Pure Salmon Campaign wrote to SEPA in December 2006 asking for clarification on these figures – Cypermethrin use is usually given in litres).

Annual total Cypermethrin (g)	Year				
Receiving water	2002	2003	2004	2005	2006
Firth of Lorn	20	212	70	68	0
Loch Alsh	178	0	180	0	0
Loch Duich	958	290	328	12	0
Loch Fyne	608	1,184	24	637	0
Loch Roag	618	264	166	412	471
Loch Sunart	1,131	606	1,704	72	1,080

Does SNH have an update on current chemical use in SACs? If chemical use in Scottish salmon farming in general has increased 12-fold since 2005 then what has been the increase in Loch Roag SAC for example? What has been the increase in chemical use into the Firth of Lorne and Loch Laxford for example?

Read all the data online via '[FishyLeaks](#)' including: '[Dossier of Chemical Use on Scottish Salmon Farms 2008-2011](#)'

¹² Data provided by SEPA to the Pure Salmon Campaign on 13th December 2006 – Excel spreadsheet available.

¹³ Data provided by SEPA to the Pure Salmon Campaign on 13th December 2006 – Excel spreadsheet available.

Please pass this letter onto the SNH board and the SNH salmon farming management team.

Please also read a letter to SEPA's chairman - [online here](#)

Yours sincerely,

Don Staniford

[Global Alliance Against Industrial Aquaculture](#)

Cc:

Andrew Thin (Chairman): melissa.wall@snh.gov.uk

Susan Davies (Director of Policy & Advice): susan.davies@snh.gov.uk

John Baxter (Coastal & Marine Ecosystems): john.baxter@snh.gov.uk