



**THE CONTROL OF SEA LICE
ON FISH FARMS IN SCOTLAND**

AN UPDATE

SALMON AND TROUT CONSERVATION SCOTLAND

JANUARY 2017

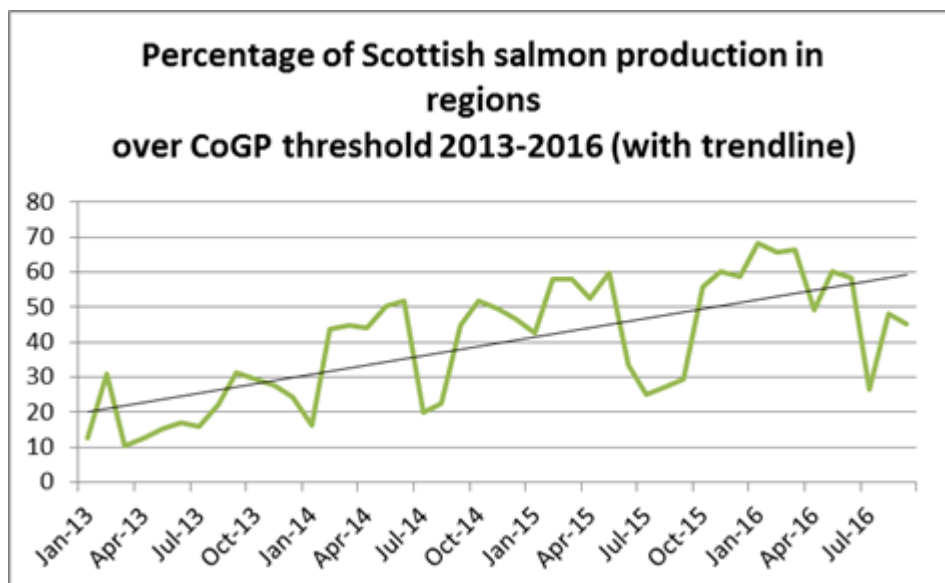
Recent fisheries research

Since the publication in December 2015 of Salmon and Trout Conservation Scotland's report, *The Control Of Sea Lice On Fish Farms In Scotland 2013-2015* further peer-reviewed research has been published by fisheries scientists that shows that sea lice produced on fish-farms harm wild salmonids, making the proper control of sea-lice on fish-farms essential to protect wild fish. All fisheries scientists increasingly support the view of wild fish conservation groups that sea lice production on farmed fish in open marine cages harms wild salmonids (Atlantic salmon and sea trout) both at an individual and at a population level.

Importantly, despite the Scottish Government's official position that research into the effect of farm-derived sea lice is lacking in Scotland, Shephard et al (2016) concluded very recently that "*research carried out in Ireland and Scotland has shown that infestation of sea trout *Salmo trutta* L by salmon lice *Lepeophtheirus salmonis* is associated with increased mortality risk and possible sub-lethal effects. Sea trout captured closer to salmon farms had significantly higher levels of lice infestation, and that this effect was exacerbated in warmer years. Sea trout sampled closer to salmon farms also had significantly reduced weight at length (impaired condition), with the strongest impact in dry years. Results imply a rather general impact of salmon farming on lice infestation and body condition of sea trout*".¹

On-farm sea lice numbers in Scotland

Although analysis of control of sea lice on Scottish fish-farms is still severely hampered by the lack of farm-specific sea lice data, publicly available aggregated data for October 2015 to September 2016 continues to show that the number of Scottish fish-farming regions failing to keep adult female sea lice numbers below the Code of Good Practice (CoGP) criteria is on an upward trend. The industry-wide problem with sea lice is increasing and is certainly not under control.



¹ Shephard S, MacIntyre C and Gargan P (2016) Aquaculture and environmental drivers of salmon lice infestation and body condition in sea trout *Aquaculture Environment Interactions* Vol. 8: 597–610, 2016

Over the year to September 2016, regions representing a staggering 80.1% of the Scottish production of farmed salmon have been over industry criteria for at least one month.

Over the last year to September 2016, data published by SEPA, the Fish Health Inspectorate and on the Scotland's Aquaculture database provides further strong evidence that sea lice numbers on fish farms rise during the second year of production and, in much of Scotland, average adult female sea lice numbers per farmed fish appear to be strongly linked to the cumulative biomass of farmed fish held on the farms.

In a number of regions, there is still evidence of a failure to treat for sea lice on farmed fish despite adult female sea lice numbers per fish being over CoGP thresholds, contrary to CoGP requirements. Additionally, there is evidence of the failure by fish-farmers to treat sea lice as the farm nears the end of a production cycle, contemplates or begins harvesting.

This suggests that insufficient consideration is still being given by fish-farmers to the potential for very large juvenile sea lice production during the last few months of a production cycle, and the consequent negative effects on wild salmonids up to 30km away from the farms concerned.

A review of CoGP sea lice obligations, to be led by Scottish Government, but in consultation with all interested parties including wild fish interests and conservation bodies, is urgently required. Inter alia, the review must ensure that it is no longer possible for fish-farmers, where sea lice numbers have effectively gone out of control on their farms, to assert, as they currently can do, that they remain in compliance with the CoGP. This currently gives a false impression that the sea lice issue is under control.

Sea lice treatment

There is further evidence of the failure in some regions of available chemical sea lice treatments to limit sea lice numbers on farmed fish to below CoGP thresholds, strongly suggesting that resistance and tolerance to these treatments is becoming widespread.

This is perhaps hardly surprising given reports that the use of chemical treatments by the industry, based on data obtained from the Scottish Environment Protection Agency (SEPA), is now ten times higher than a decade ago. Indeed, the genetic mechanism behind the apparent resistance in sea lice to the more widely used sea lice treatment, the organophosphate azamethiphos, has now been described².

In addition it is worth noting that a number of regions appear to have experienced sea lice numbers persistently above CoGP criteria in 2016, despite the use of wrasse as cleaner fish and other novel sea lice treatments, such as the Thermolicer³, on some farms.

The presence of Amoebic Gill Disease on many farms in 2016 has also often made the treatment for sea lice problematic or impossible, as fish with AGD do not tolerate

² Kiranpreet Kaur, Kari Olli Helgesen, Marit Jørgensen Bakke and Tor Einar Horsberg (2015) Mechanism behind Resistance against the Organophosphate Azamethiphos in Salmon Lice (*Lepeophtheirus salmonis*) <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0124220>

³ See <http://www.telegraph.co.uk/news/2016/11/18/thousands-of-fish-poached-alive-in-lice-treatment-bungle-that-co/>

the sea lice treatment chemicals, meaning chemical treatments can lead to much higher than normal treatment mortalities.

New policy

Patently, the North Atlantic Salmon Conservation Organisation (NASCO) Best Management Practice Guidance requirement, to which Scotland has signed up, that “100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms” is not being met.

Indeed, the Scottish Government announced a new sea lice policy at the Annual Meeting of the North Atlantic Salmon Conservation Organisation (NASCO) in June 2016⁴:

*“Government and Industry Commitment to Improved Management
The Aquaculture and Fisheries (Scotland) Act 2007 (AFSA) requires that satisfactory measures are in place for the prevention, control and reduction of sea lice. Scottish Government committed to review the interpretation of ‘satisfactory measures’ under AFSA 2007 and, in cooperation with the industry, has created a new sea lice management policy. This will work alongside the recommended treatment criteria in the CoGP with farms now being required to report to Marine Scotland’s Fish Health Inspectorate when set sea lice levels are reached.*

All farms are now required to produce a site specific escalation action plan, to be triggered at levels above 3.0 average female lice. This reporting system will allow increased monitoring during any escalation in sea lice numbers and intervention where it is demonstrated that satisfactory measures to control sea lice are not in place. Exceeding a level of 8.0 average female adult lice will result in enforcement action, including the potential to require reduction in biomass”.

The Scottish Government has been unable to provide any scientific justification for the new trigger levels, but they are patently way short of the NASCO requirement. They are also far laxer than the trigger levels in all other European salmon-farming countries (Norway, Faroes and Ireland).

Over the last year to September 2016, regions representing 66.4% have been over three adult female lice per fish for at least one month, the level at which the Scottish Government now requires individual farms to produce a “site specific escalation action plan”. Also over the year to September 2016, regions representing 18.2% have been over 8 adult female lice per fish for at least one month, the level at which the Scottish Government announced at NASCO would result in enforcement action, including the potential to require reduction in biomass.

⁴ NASCO paper CNL(16)47 Supporting sustainable aquaculture growth alongside a thriving recreational fisheries sector Reducing the impacts from sea lice and escapes on wild fish in Scotland in parallel with NASCO’s international goals - EU – UK (Scotland)

The Table below shows which Scottish fish-farming regions went above the 3 (orange) and 8 (pink) levels in the year to September 2016.

	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16
Hope and Grudie	0	0	0	0	0	0	0	0	0	0	0	0.06
Inchard to Kirkaig North	2.15	2.12	0.57	1.09	2.4	3.6	4.11	1.32	3.77	1.08	2.26	0.7
Inchard to Kirkaig South	0	0	0	0	0	0	0	0	0	0	0	0
Kennart to Gruinard	0	0	0	0.01	0.05	0.04	0.05	0.04	0.1	0.11	0.07	0.08
Ewe	0	0	0	0	0.01	0.01	0.02	0.02	0.01	0.03	0.02	0.07
Badachro to Applecross	0	0	0	0	0	0	0	0.01	0	0.02	0	0.02
Kishorn and Carron	0.47	0.85	0.89	1.53	0.99	0.55	0.55	0.74	0.48	0	0	0
Loch Long and Croe	1.24	4.48	6.78	6.33	5.73	2.22	3.72	4.37	6.07	2.82	6.22	3.75
Glenelg and Kilchoan	0.55	0.69	1.22	2.06	1.22	0.74	0	0	0	0.01	0.04	0.03
Morar to Shiel	0	0	0	0	0	0.05	0.01	0.07	0.05	0.34	0	0
Skye and Small Isles North	0.67	2.24	3.98	2.42	0	0	0	0.01	0.05	0.03	0.05	1.31
Skye and Small Isle South	0.55	0.71	1.51	1.31	0.95	0.9	0.82	1.07	2.96	1.82	3.7	1.26
Sunart and Aline	1.57	1.24	0.8	1.81	0.76	1.1	1.2	0.66	1.18	0.64	0.31	0.34
Sanda to Creran North	0	0	0	0	0	0	0.01	0.01	0.04	0.04	0.13	0.09
Sanda to Creran South	0	0	0	0.01	0.03	0.07	0.16	0.11	0.23	0.43	0.73	0.58
Awe and Nell	6.97	6.71	13.97	11.06	9.4	8.45	5.87	5.33	4.62	3.97	1.68	0.34
Add and Ormsary	2.18	5.18	8.92	9.76	7.71	10.81	5.21	5.19	7.23	4.68	0.08	0
Island of Mull	3.78	4.48	6.96	9.23	7.69	4.49	0.39	0.42	0.2	0.06	0.02	0.02
Islay and Jura	0.02	0.09	0.11	0.58	0.49	0.88	1.84	1.16	2.28	0.41	0.44	0.31
Carradale and Iorsa	0	0	0	0	0.04	0.06	0.06	0.09	0.12	0.19	0.3	0.34
Fyne	0	0	0	0.02	0.08	0.11	0.13	0.62	1.54	1.59	1.95	2.78
Ruel and Drummachloy	0.39	1.47	1.63	2.48	9.42	8.43	6.64	6.17	4.81	3.86	3.76	4.22
Isle of Lewis East	7.43	4.82	3.44	8.01	4.83	5.77	3.56	4.28	1.85	0.35	1.08	3.04
Isle of Lewis West	0.07	0.02	0.02	0.1	0.08	0.17	0.2	0.63	2.02	4.74	6.71	8.46
Harris	0.02	0.02	0.02	0.1	0.23	0.28	0.48	0.82	0.9	1.12	2.21	3.9
The Uists North	1.95	3.49	2.84	1.48	1.4	1.72	1.71	0.62	0.93	0.36	0.34	0.32
The Uists South	0.45	0.32	0.12	0.11	0.07	0.07	0.05	0.11	0.32	0.24	0.3	0.82
Orkney	0	0	0	0	0	0	0.01	0	0	0	0	0
East Shetland	1	1.6	1.75	2.51	2.08	1.53	1.51	1.69	1.77	0.96	1.88	3.02
West Shetland	4.48	4.89	3.62	2.9	3.07	3.1	0.47	0.27	0.08	0.07	0.15	0.35

Despite what was announced at NASCO as to the policy's immediate effect, S&TCS has recently been informed by Marine Scotland that the new 8 level will not now be brought into effect until April 2017 and further, in response to a request made by S&TCS in October 2016, Marine Scotland has refused to disclose any site-specific escalation plans that it might already have received.

Even under the new policy, Marine Scotland has confirmed that early harvest or culling out of farmed fish can only be ordered if this is associated with unacceptable damage being caused to the farmed fish, causing either commercial losses or animal welfare issues for the farmed fish. No early harvest or culling out can be ordered at any site solely to protect wild fish from unacceptable levels of juvenile lice leaving the farms.

Next steps – plugging the gap in Scottish law

Therefore, the new policy still completely fails to plug the gap in the law that prevents action by the Fish Health Inspectorate, or any other regulator, solely to protect wild fish. The only action that can be taken under this new policy still only relates to the health and welfare of the farmed fish, as governed by the Aquaculture and Fisheries (Scotland) Act 2007.

S&TCS has put forward proposals via its Petition to the Scottish Parliament⁵ and has drafted amendments to Aquaculture and Fisheries (Scotland) Act 2007, for incorporation into the forthcoming Wild Fisheries Bill, that S&TCS believes will plug

⁵ <http://www.parliament.scot/GettingInvolved/Petitions/PE01598>

the gap in the law that leaves wild fish insufficiently protected from harm caused by fish-farms.

Specific action by Scottish Government is required urgently to address the sea lice issue as it affects wild fish:

- 1) Analysis by third parties of the sea lice issue continues to be hampered by the lack of farm-specific sea lice data, which is currently published only as data aggregated into regions, rather than being provided on a farm-specific basis as previously recommended by all wild fish bodies, SEPA, SNH and all relevant local authorities. This major barrier to proper scrutiny of the fish farms needs to be removed. The Scottish Government should amend the Record Keeping Order 2008 to require the records - that must already be kept by fish farmers under that Order- to be published promptly online, for example, on the Scotland's Aquaculture database. Further information concerning newer control methods for sea lice should also be recorded and published to ensure that a complete picture is obtained of the sea lice control methods being used.
- 2) The voluntary CoGP should be made a statutory code, as provided for in the 2007 Act, and an upper tier sea lice threshold should be introduced, above which an immediate cull or harvest of farmed fish is mandated. It should not be possible for fish-farmers, where sea lice numbers have effectively gone out of control on their farms, to assert that they remain in compliance with the CoGP merely because they have instigated treatment, regardless of its efficacy in reducing lice numbers.
- 3) The Scottish Government should amend legislation with the express purpose of protecting wild fish from potential damage caused by fish-farms, with inspectors given a legal duty to control sea lice on fish-farms expressly in order to protect wild fish populations.
- 4) The Scottish Government should consult on a precautionary trigger level beyond which immediate harvest or cull is mandated to protect wild fish.
- 5) The FHI should be given stronger guidance requiring it to enforce proper sea lice control on fish farms more robustly and to protect wild fish. This requires an amendment to the 2007 Act to require those inspectors to examine farms with respect to the threat from fish farms to wild fish, as well as the current requirements to examine the welfare of the farmed animal.
- 6) Those farms consistently failing to control sea lice should be identified for closure. Marine Scotland needs to routinely examine all the data available to it under the Record Keeping Order and that information collected by SEPA, local authorities, FHI and others in order to identify those farms that are consistently failing to control sea lice. Such farms should then be examined closely with a view to closure.
- 7) In parallel, Scottish Government should focus on alternative more sustainable production methods with the ultimate objective of moving to full closed containment (either in tanks in the sea or on land) of farmed salmon production in Scotland, eliminating the biological interaction between farmed and wild fish.

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