

**Wester Ross Area Salmon Fishery Board**  
**The Harbour Centre**  
**Gairloch**  
**Wester Ross**  
**IV21 2BQ**

Dr Shona Turnbull  
Planning and Development Department  
The Highland Council  
Glenurquhart Road  
Inverness  
IV3 5NX

19 August 2017

Dear Dr Turnbull,

**17/02976/FUL | Marine Fish Farm - Atlantic Salmon: alteration from 12 x 100m circular pens to 12 x 120m circular pens | Fish Farm Site In Loch Duich North Of Leachachan Letterfearn**

<http://wam.highland.gov.uk/wam/applicationDetails.do?activeTab=summary&keyVal=ORYFDYIH0FN00>

**1. Wild salmon and sea trout populations near the Loch Duich farm**

This farm is located in the Loch Alsh/Loch Duich farm salmon production area (Loch Long/Croe SSPO fish health management area). There are two other salmon farms within this production area, located at Sron and Ardintoul, and the applicant operates all three.

To understand potential impacts to wild salmon and sea trout populations within the area, the contribution of the Loch Duich salmon farm to the cumulative impact, from all salmon farms operating within the area, to wild fish populations needs to be assessed.

The Loch Alsh/Loch Duich farm salmon production area is a particularly sensitive one for wild sea trout and wild salmon migrating to sea from rivers within a large part of the west of Scotland.

The nearest wild salmon rivers to the Loch Duich salmon farm are the rivers Croe and Shiel, both located within 5km of the salmon farm.

The mouth of Loch Long, into which the rivers Ling and Elchaig enter, is located within 6km of the Loch Duich salmon farm.

Salmon smolts from rivers to the south of this area, including smolts from the rivers Glen More, Glen Beag and Arnisdale, are also likely to migrate through this farm salmon production area.

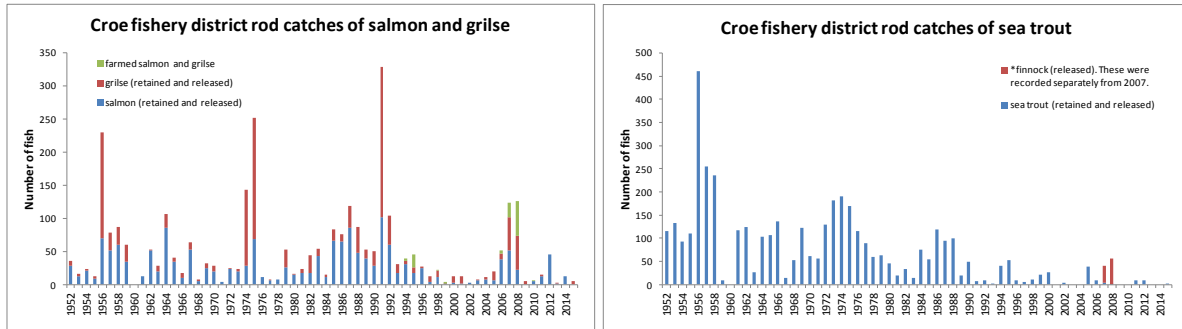
Depending on weather and tidal conditions, salmon smolts from some of the rivers further south, including those in Lochaber, may also be funnelled through the Sound of Sleat and through Loch Alsh as they migrate towards the northern feeding grounds.

The Loch Alsh/Loch Duich farm salmon production area is also close (within 6km) to the mouth of the Loch Kishorn/Carron production area to the north, through which wild salmon smolts from the River Carron must pass as they migrate to the northern feeding grounds.

## 2. Rod catches of salmon and sea trout from nearby rivers.

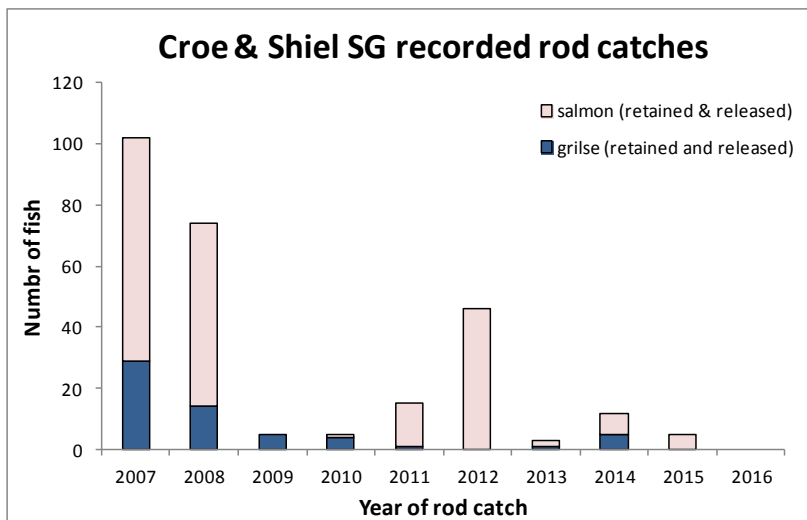
Reported rod catches of salmon and sea trout for the rivers Croe and Shiel fluctuated considerably during the period 1952 to 1990 (see **Figure 1**).

**Figure 1.** Reported rod catches of salmon and sea trout for Croe fishery district (Scottish Government figures from <http://www.gov.scot/Topics/marine/Publications/stats/SalmonSeaTroutCatches> ).



Fisheries for sea trout at the head of Loch Duich (Croe and Shiel rivers) have never recovered since the 1990s. Over the past 10 years, reported catches of salmon have been very low; perhaps partly due to reduced fishing effort. In effect, the rod fisheries for salmon have also virtually collapsed (see **Figure 2**).

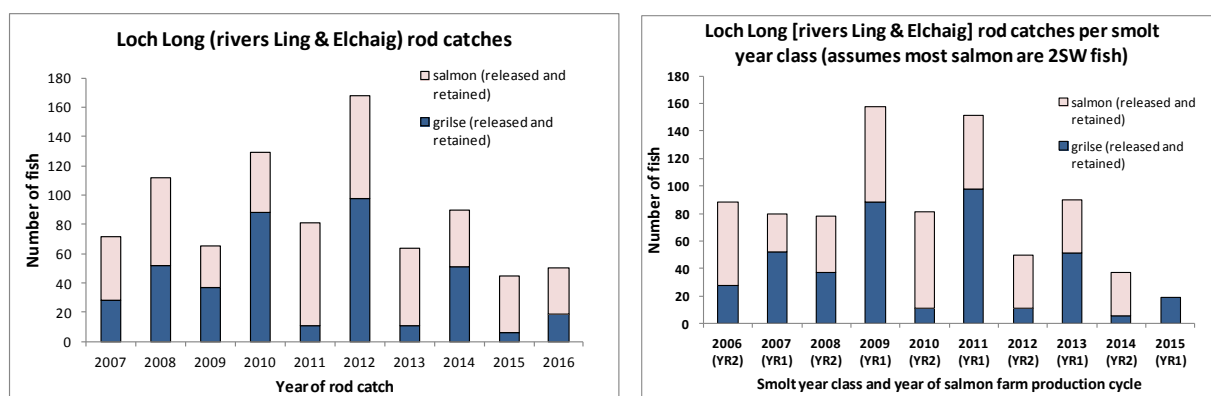
**Figure 2.** Reported rod catches of salmon and grilse for Croe fishery district (Scottish Government figures from <http://www.gov.scot/Topics/marine/Publications/stats/SalmonSeaTroutCatches> ).



The next nearest rivers to the Loch Duich farm are the Rivers Ling and Elchaig. Over the past ten years, the numbers of rod caught grilse reported for this area have been much higher every second year than in intervening years. This is shown in **Figure 3a**.

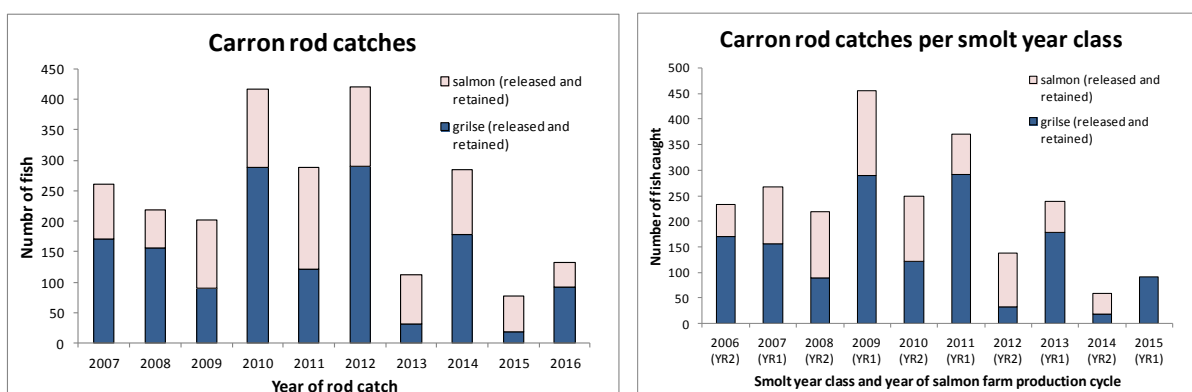
**Figure 3b** shows how the reported catch of wild salmon in rivers entering Loch Long from smolts which migrated through the Loch Alsh/Loch Duich production area in 2009, 2011 and 2013 was much higher than from smolts which migrated through this farm salmon production area in 2010, 2012 and 2014.

**Figure 3a (left)** Reported rod catches of adult salmon and grilse from the Loch Long fishery district (river Ling and Elchaig). **Figure 3b (right)** rod catches of adult salmon and grilse per smolt year class, vs. salmon farm production cycle (Scottish Government figures from <http://www.gov.scot/Topics/marine/Publications/stats/SalmonSeaTroutCatches> ).



A similar pattern has been observed for rod catches of salmon in the River Carron (**Figures 4a and 4b**).

**Figure 4a** Reported rod catches of adult salmon and grilse from the River Carron fishery district. **Figure 4b** rod catches of adult salmon and grilse per smolt year class, vs. salmon farm production cycle (Scottish Government figures from <http://www.gov.scot/Topics/marine/Publications/stats/SalmonSeaTroutCatches> ).

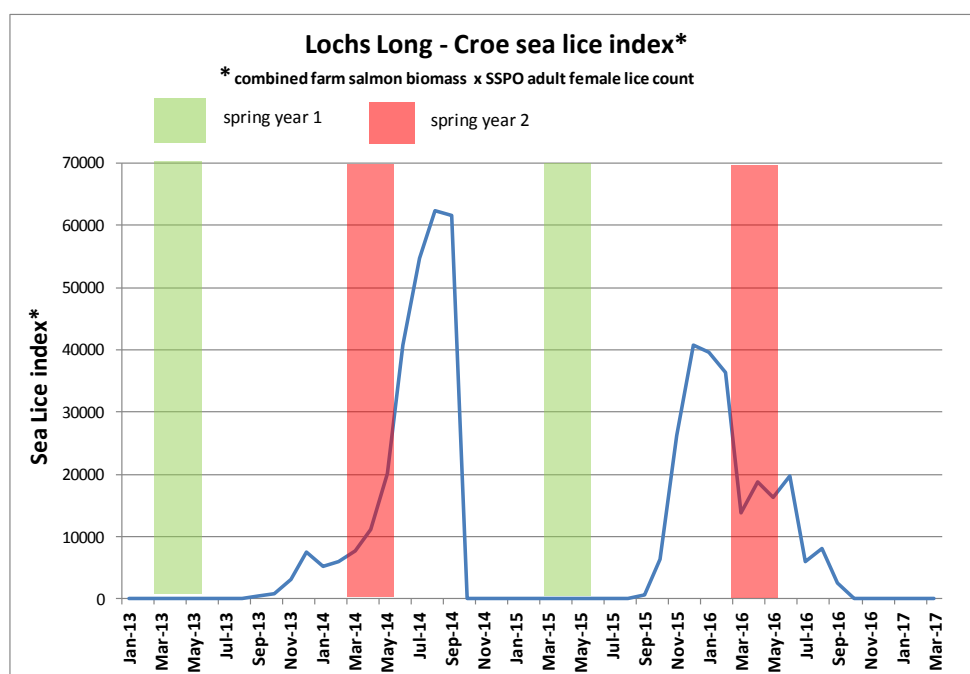


### 3. Associations with sea lice emissions from salmon farms within the Loch Alsh/Loch Duich production area

One interpretation is that wild salmon smolts migrating to sea from rivers within and around this area have experienced much higher mortality during the second year of the farm salmon production cycle than during the first year of the farm salmon production cycle.

**Figure 5**, based on published figures, shows how wild salmon smolts would have experienced much higher sea lice infection pressures associated with salmon farming within this area during spring of 2014 and 2016 (shaded red) than in spring of 2013 and 2015 (shaded green), due to high emissions of larval sea lice from salmon farms within the Loch Alsh/Duich production area. The sea lice population index is the farm salmon biomass x adult female sea lice average. Conservative estimates of actual adult female sea lice populations for respective areas & months can be obtained by multiplying the sea lice population index by 200 (assumes average weight of salmon is 5kg). Appendix 1 presents the data from which this figure has been prepared.

**Figure 5.** Projected sea lice indices associated with farm salmon production in the Loch Alsh/Duich area during the period January 2013 – March 2017. This figure has been produced from figures presented in **Appendix 1**. These figures also show that salmon farms within the area reported on-farm sea lice levels far in excess of SSPO Code of Good Practice [CoGP] threshold levels of 0.5 adult female lice per fish (January to June) and 1.0 adult female lice per fish (July – December). Figures for biomass are from Scotland’s Aquaculture website <http://aquaculture.scotland.gov.uk/>. Figures for adult female sea lice averages are from SSPO Fish Health reports <http://scottishsalmon.co.uk/tag/fish-health-management/>.



Note that the total population of adult female lice on farmed salmon within an area will increase according to the total number of salmon on farms (and hence the biomass) within the area and not just the average number of adult female lice per fish as reported in SSPO fish health reports.

Given the high biomass of farmed salmon already held within this area and hence the large number of fish held in cages within the production area, even at close to GoGP levels, the emissions of larval

sea lice from these salmon farms are likely to be too high to safeguard migrating juvenile salmon and sea trout within the area. In the absence of a DSFB in this area, the duties and responsibilities of a DSFB to protect and enhance wild salmon fall to Scottish Ministers acting on advice from Marine Scotland. While Marine Scotland had a policy that neither objected nor supported planning applications for marine fish farms, we believe in this case they are obliged to do so on behalf of Scottish Ministers carrying out their duties of a DSFB.

The submission from Marine Science Scotland in response to this planning application which is published on the Highland Council planning application website<sup>1</sup>, states that “satisfactory measures are in place to control sea lice as far as can reasonably be foreseen”. But they also clearly document failures to control sea lice at the Loch Duich salmon farm in 2014, 2015 and 2016 despite the use of the full suite of sea lice treatments, including a hydrolicer, that are available. Moreover, it was clear that in each case an “early harvest ” was needed because of the sea lice problem.

It therefore follows that unless an applicant can fully demonstrate that not only do they have sufficient measures in place to control sea lice, but also that they can demonstrate that these measures have been effective, it would be premature to grant any consents that might allow an increase of biomass on further promises and aspirations. The evidence from the official sources strongly suggests that despite the promises and guarantees made during the 2011 application (11/02114/FUL), the applicant has been unsuccessful in their ability to control sea lice at this site since then.

In June 2016, The Wester Ross Fisheries Trust sampling team recorded heavily lice infested sea trout in the Balmacara burn and reports from Loch Long in June and July 2016, have provided further evidence of high numbers of sea lice in this area. **Appendix 2** shows some of the fish sampled. Although the number of fish in the WRFT sample was small, the very high numbers of small chalimus lice on individual fish were far above those reported with the range of intensity on sea trout sampled within the Celtic Seas area as part of the Celtic Seas project (an example background sea lice infection levels away from farm salmon production areas <http://celticseatrout.com/downloads/technical-report/>).

## 5. Conclusion

Emissions of parasitic sea lice from salmon farms within the Loch Alsh/Duich farm salmon production area have been much too high during the past two salmon farm production cycles (2013 – 2014 and 2015 – 2016) to safeguard wild salmon and sea trout smolts migrating to sea though this area.

To enable recovery of wild salmon and sea trout fisheries and to protect wild salmon and sea trout, at a population level, emissions of sea lice from salmon farms within this area need to be greatly reduced in future years. It should be noted here that due to the fact that it is only the numbers of

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<sup>1</sup> Marine Scotland Science response to this planning application:  
[http://wam.highland.gov.uk/wam/files/1FBAAE33C087E6B7E5A83F4B1A0D91BF/pdf/17\\_02976\\_FUL-MARINE\\_SCOTLAND-1275744.pdf](http://wam.highland.gov.uk/wam/files/1FBAAE33C087E6B7E5A83F4B1A0D91BF/pdf/17_02976_FUL-MARINE_SCOTLAND-1275744.pdf).

<sup>2</sup> For example, the numbers of lice on these Balmacara sea trout were far above numbers reported on any of the fish in a sample of 843 sea trout within the Celtic Seas area as reported in Celtic Sea Trout Project (2016) Milner et al edits. <http://celticseatrout.com/downloads/technical-report/>. In the Celtic Sea Study 843 sea

adult female sea lice on the fish farms that are published, if the sea trout in **Appendix 2** were farmed salmon, the report would read “0 adult females” which would imply to the uninformed that they were “lice free” which, clearly, they are not.

Therefore, as any further expansion of open cage salmon farming within the Loch Alsh/Loch Duich will clearly increase the pressure on wild salmon and sea trout within the area, causing further significant damage to their populations and fisheries within the surrounding area, The Wester Ross Area Salmon Fisheries Board objects to this proposed development.

While collating and reviewing these data sets from previously published material from Marine Scotland, Marine Scotland Science, Fish Health Inspectorate, SEPA and SSPO, we note that there is a striking similarity with the recent papers out of Ireland (<http://www.fisheriesireland.ie/Press-releases/new-study-finds-that-sea-lice-from-salmon-farms-can-cause-a-50-reduction-in-runs-of-wild-atlantic-salmon.html>).

This strongly suggests that a wider investigation needs to take place over the whole West Coast fishery areas to see if these observations are replicated elsewhere. The biodiversity duties of all the statutory consultees, along with the general precautionary principle, should dictate that until a full investigation takes place and the results are published. Any further expansion of the farmed salmon industry at this time would be inappropriate, premature and potentially catastrophic for wild salmon on the West Coast of Scotland.

While it is generally accepted that many things can, and do, affect wild salmon smolt survival at sea, there is not enough time during the consultation stage of a planning application to determine if Global Warming, Rising Sea Temperatures, Reduced Levels Of Food At Sea, Predation At Sea or Fisheries By-Catch are the most significant factors. Since it is highly unlikely that these factors only occur on a biannual basis they are unlikely to contribute significantly to the correlation we have found between returning grilse numbers and the higher number of sea lice found on salmon farms in the second year of a production cycle.

Yours sincerely,



Bill Whyte  
WRASFB Chairman

**Appendix 1: Total biomass of salmon farms in Loch Alsh – Duich area and reported on farm sea lice levels within the area.**

Figures for biomass are from Scotland’s Aquaculture website <http://aquaculture.scotland.gov.uk/>. Figures for adult female sea lice averages are from SSPO Fish Health reports <http://scottishsalmon.co.uk/tag/fish-health-management/>. The sea lice population index is the farm salmon biomass x adult female sea lice average. Conservative estimates of actual adult female sea lice populations for respective areas & months can be obtained by multiplying the sea lice population index by 200 (assumes average weight of salmon is 5kg).

	Salmon farm			Farm salmon biomass (tonnes)	Adult female sea lice average	Louse population index (= biomass x sea lice average)
	Sron [MH]	Ardintoul [MH]	Loch Duich [MH]			
<i>consented biomass (tonnes)</i>	2000	2500	2125	6625		
Jan-13	0	0	0	0	F	0
Feb-13	47	0	0	47	F	0
Mar-13	66	9	0	75	0.00	0
Apr-13	117	63	40	220	0.00	0
May-13	192	93	62	347	0.00	0
Jun-13	280	149	101	530	0.00	0
Jul-13	435	271	183	889	0.01	9
Aug-13	696	469	342	1507	0.01	15
Sep-13	1075	750	557	2382	0.16	381
Oct-13	1285	1045	823	3153	0.25	788
Nov-13	1563	1374	1081	4018	0.78	3134
Dec-13	1780	1704	1271	4755	1.58	7513
Jan-14	1947	2015	1466	5428	0.96	5211
Feb-14	1995	2178	1683	5856	1.03	6032
Mar-14	1986	2444	1947	6377	1.21	7716
Apr-14	1996	2457	1982	6435	1.74	11197
May-14	1578	2495	1861	5934	3.39	20116
Jun-14	1435	2468	1841	5744	7.10	40782
Jul-14	0	2488	2088	4576	11.94	54637
Aug-14	0	1790	1678	3468	17.99	62389
Sep-14	0	50	1426	1476	41.70	61549
Oct-14	0	0	0	0	F	0
Nov-14	0	0	0	0	F	0
Dec-14	0	0	0	0	F	0
Jan-15	0	0	0	0	F	0
Feb-15	105	78	95	278	F	0
Mar-15	155	132	139	426	0	0
Apr-15	239	210	216	665	0	0
May-15	355	306	338	999	0	0
Jun-15	485	421	457	1363	0.01	14
Jul-15	687	601	650	1938	0	0
Aug-15	1010	888	973	2871	0.06	172
Sep-15	1399	1297	1421	4117	0.16	659
Oct-15	1656	1671	1779	5106	1.24	6331
Nov-15	1942	2004	1918	5864	4.48	26271
Dec-15	1932	2176	1910	6018	6.78	40802
Jan-16	1998	2422	1830	6250	6.33	39563
Feb-16	1993	2472	1885	6350	5.73	36386
Mar-16	1833	2446	1909	6188	2.22	13737
Apr-16	1611	1932	1492	5035	3.72	18730
May-16	1035	1544	1155	3734	4.37	16318
Jun-16	866	1470	930	3266	6.07	19825
Jul-16	0	1340	782	2122	2.82	5984
Aug-16	0	865	450	1315	6.22	8179
Sep-16	0	691	0	691	3.75	2591
Oct-16	0	0	0	0	F	0
Nov-16	141	0	0	141	0	0
Dec-16	264	0	0	264	0	0
Jan-17	441	0	35	476	0.05	24
Feb-17	644	124	114	882	0.04	35
Mar-17	917	196	174	1287	0.04	51

**Appendix 2: Examples of sea trout carrying very high numbers of sea lice from Loch Alsh – Ducih area in June 2016.** Early returned post-smolt sea trout sampled in the Balmacara burn by Loch Alsh on 10th June 2016. Although the number of fish in this sample was small, the very high numbers of small chalimus lice on individual fish was very high, and indicative of lice infection pressures in nearby waters far above conceivable natural background levels<sup>2</sup>.

Fish 1. 150mm, 200 lice



Underside of fish 1, showing sea lice around pelvic and ventral fins.



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<sup>2</sup> For example, the numbers of lice on these Balmacara sea trout were far above numbers reported on any of the fish in a sample of 843 sea trout within the Celtic Seas area as reported in Celtic Sea Trout Project (2016) Milner et al edits. <http://celticseatrout.com/downloads/technical-report/>. In the Celtic Sea Study 843 sea trout were sampled through a variety of means in and around the Irish Sea. These fish carried a mean abundance of 3.7 *Lepeophtheirus salmonis* lice per fish (Intensity range 1 – 53 lice per fish), of which less than 10% were chalimus lice. Contrast with photos presented here.



Fish 2. 206mm, 250+ lice



Underside of fish 2, showing lice attached to fins.



Fish 3. 218mm, estimated 150 lice. Note damaged dorsal fin.

