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The Highland Council  
Glenurquhart Road  
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IV3 5NX**

**WESTER ROSS AREA SALMON FISHERY BOARD**  
c/o Wester Ross Fisheries Trust Office  
Harbour Centre  
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IV21 2BQ  
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22<sup>nd</sup> December 2018

Dear Sir/Madam,

**Response to SSC West Strome new salmon farm application ref 18/04819/FUL**

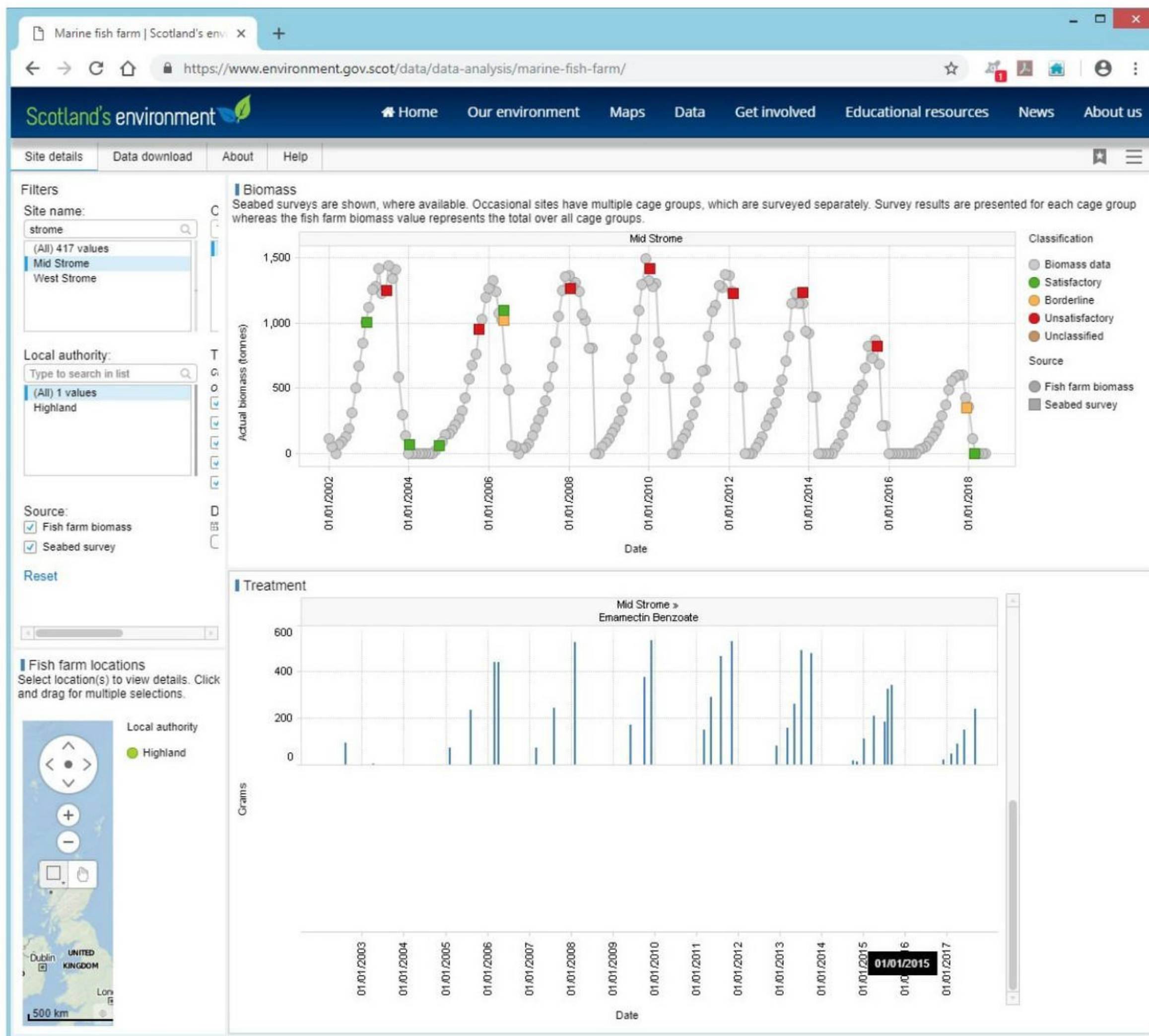
Our concerns regarding the proposed new 2k tonne open cage salmon farm at West Strome in Loch Carron focus on the impact to wild salmon and sea trout populations within the surrounding area. We disagree with the assessment in the Non-Technical summary that 'no significant impacts will result from the proposed development' for the following reasons.

**1. Past record of sea lice control at adjacent salmon farm in relation to rod catches of wild fish in the River Carron**

The proposed farm is to be located next to a smaller existing salmon farm at Mid Strome and control of parasitic sea lice has been problematic at the existing farm. The management of sea lice there has required use of several pesticides including the in-feed 'medicine' Emamectin Benzoate. Figure 1 shows the recorded biomass at this farm over recent production cycles in relation to use of Emamectin Benzoate at the adjacent Mid Strome salmon farm.

Figure 1. Biomass and use of Emamectin benzoate at mid Strome salmon farm.

<https://www.environment.gov.scot/data/data-analysis/marine-fish-farm/>

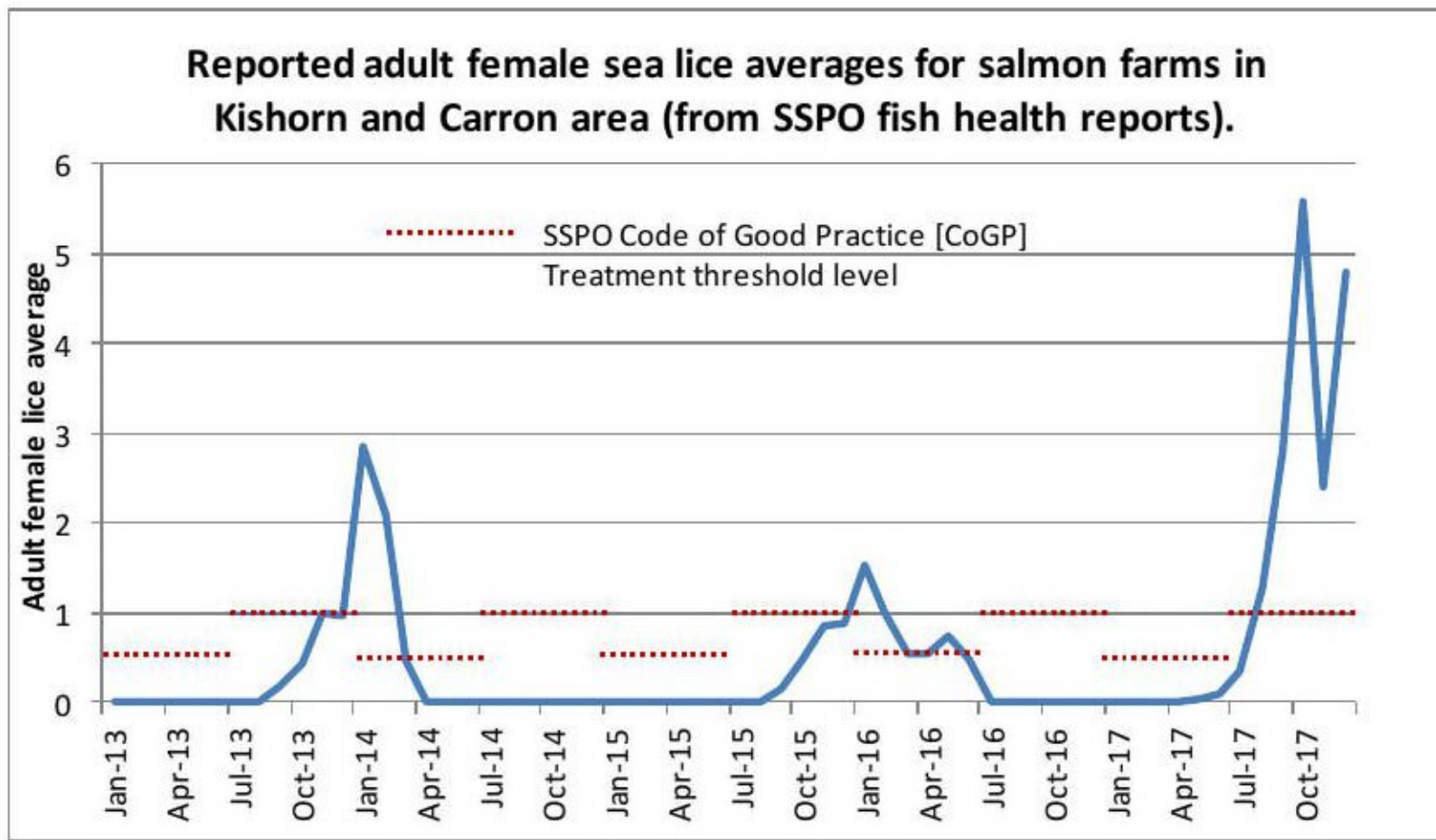


During the years 2008 to 2012 sea trout were sampled on wild fish at the mouth of the River Carron by the Wester Ross Fisheries Trust sweep netting team. In 2012, sea trout carrying very high numbers of small, early stage chalimus lice were recorded at the mouth of the River Carron (see Appendix 2).

Subsequently SSPO published regional average sea lice figures for salmon farm production areas in Scotland. Average sea lice levels at salmon farms within the Loch Kishorn – Carron area exceeded the SSPO CoGP Treatment thresholds every second year during the period 2013 – 2017 (see Figure 2). In 2018, the SSPO published individual salmon farm lice figures: the figure of 4.76 adult female lice per farmed fish was given for the existing Mid Strome salmon farm for January 2018.

<http://scottishsalmon.co.uk/wp-content/uploads/2018/04/Lice-averages-Jan-2018.pdf>

Figure 2. Reported adult female sea lice averages for salmon farms in the Loch Kishorn – Loch Carron area (based on figures presented in SSPO fish health reports).



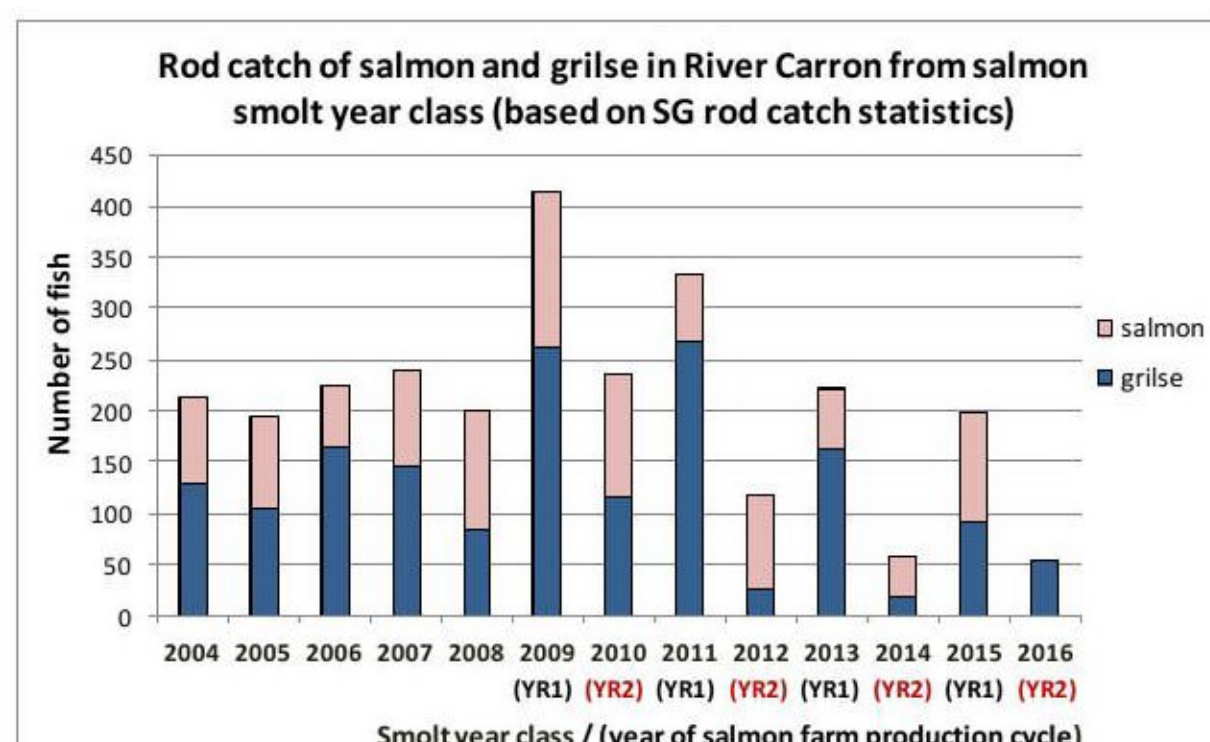
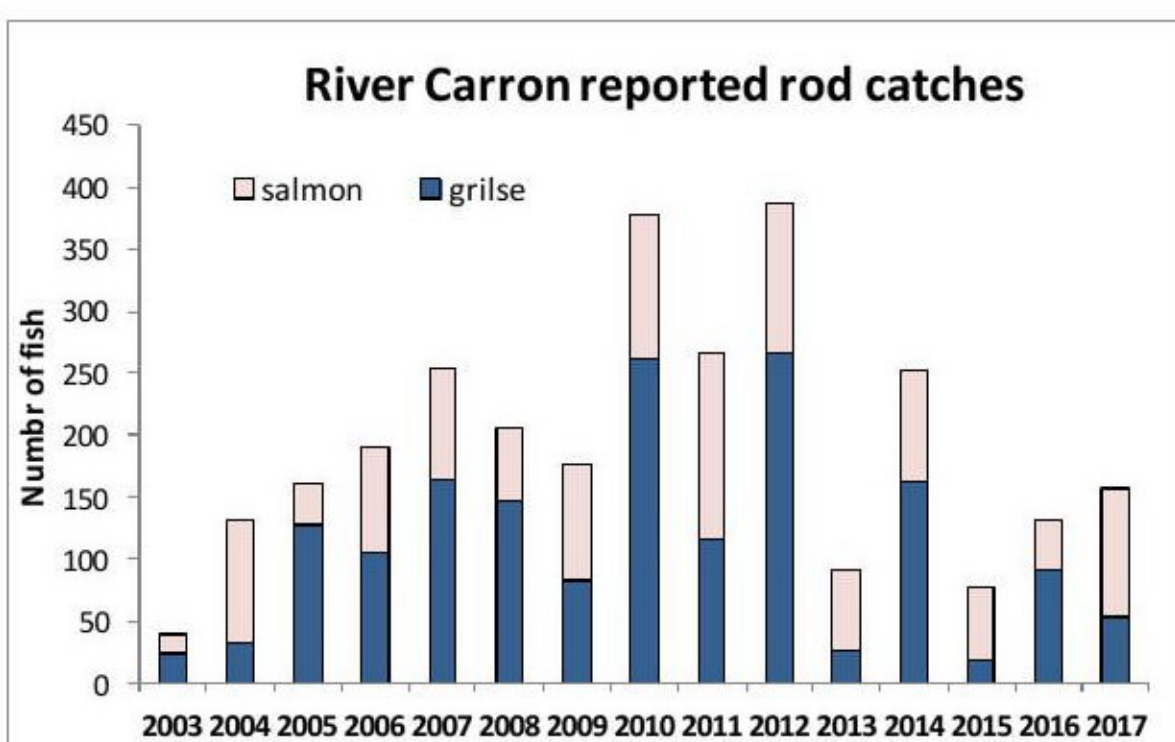
Higher levels of sea lice were also recorded on salmon farms in the adjacent Loch Long and Croe region during this period (reviewed in the SWRFT Review February 2018 – see link below). There is thus no evidence that the control of sea lice on existing salmon farms within the Loch Carron – Loch Kishorn region has improved in recent years, following objections by the Wester Ross Fisheries Trust to an earlier application for a new salmon farm at West Strome in 2012 (see Appendix 2).

The Scottish Government’s published reported rod catches of salmon and grilse, and sea trout in the River Carron recovered notably in the first 12 years of the 21<sup>st</sup> century, peaking in 2012. However, in more recent years reported catches of salmon and grilse have fallen (Figure 3). Reported rod catches of salmon and grilse for the years 2008 to 2017 show clear two-year periodicity for grilse catches for the Carron district and also for the rivers of the adjacent ‘Loch Long district’ (the rivers Ling and Elchaig) but not for the other fishery districts in NW Scotland (e.g. Gruinards, Ewe, Snizort districts). For both the Carron and the Loch Long districts, significantly fewer grilse were reported in rod catches during even years than during odd years (Student’s T- test,  $p < 0.01$ ).

The ‘low’ grilse years follow the 2<sup>nd</sup> years of the production cycle at salmon farms within the area. The most obvious explanation for the relatively poor grilse years is that sea lice from farms within the region infected wild smolts on their migration through coastal water and subsequently reduced the numbers of grilse returning to these rivers by 50% or more in some years. This is further discussed in the Skye and Wester Ross Fisheries Trust review February 2018, where graphs for the Loch Long fisheries district rod catches are also presented.

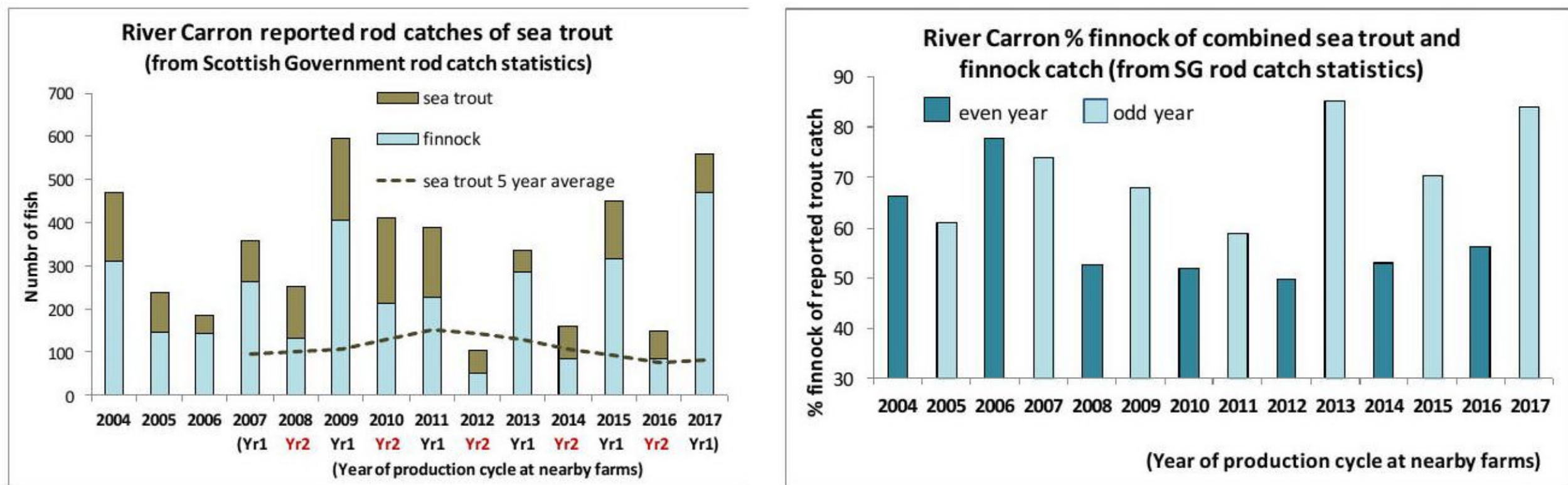
<http://www.wrft.org.uk/files/SWRFT%20Review%20February%202018%20Final%20for%20web%20V2.pdf>

Figure 3a (left) Rod catches of salmon and grilse in the River Carron ; Figure 3b (right) rod catches of salmon and grilse expressed as estimated numbers of fish per smolt year class in relation to salmon farm production cycle within the area. The graphs assume that most MSW fish were 2 sea winter salmon, some of these may have been 3SW fish.



A similar even year and odd year pattern of catches can be seen for reported rod catches of finnock and sea trout for the River Carron (Figure 4). Catches of finnock were lower every second year, correlating again with the second year of production in nearby waters. The pattern of reduced numbers of finnock during 2<sup>nd</sup> year of salmon farm production cycle is consistent with results of sea trout monitoring in relation to fish farm production cycles by Marine Scotland Science in Loch Torridon (see Appendix 3).

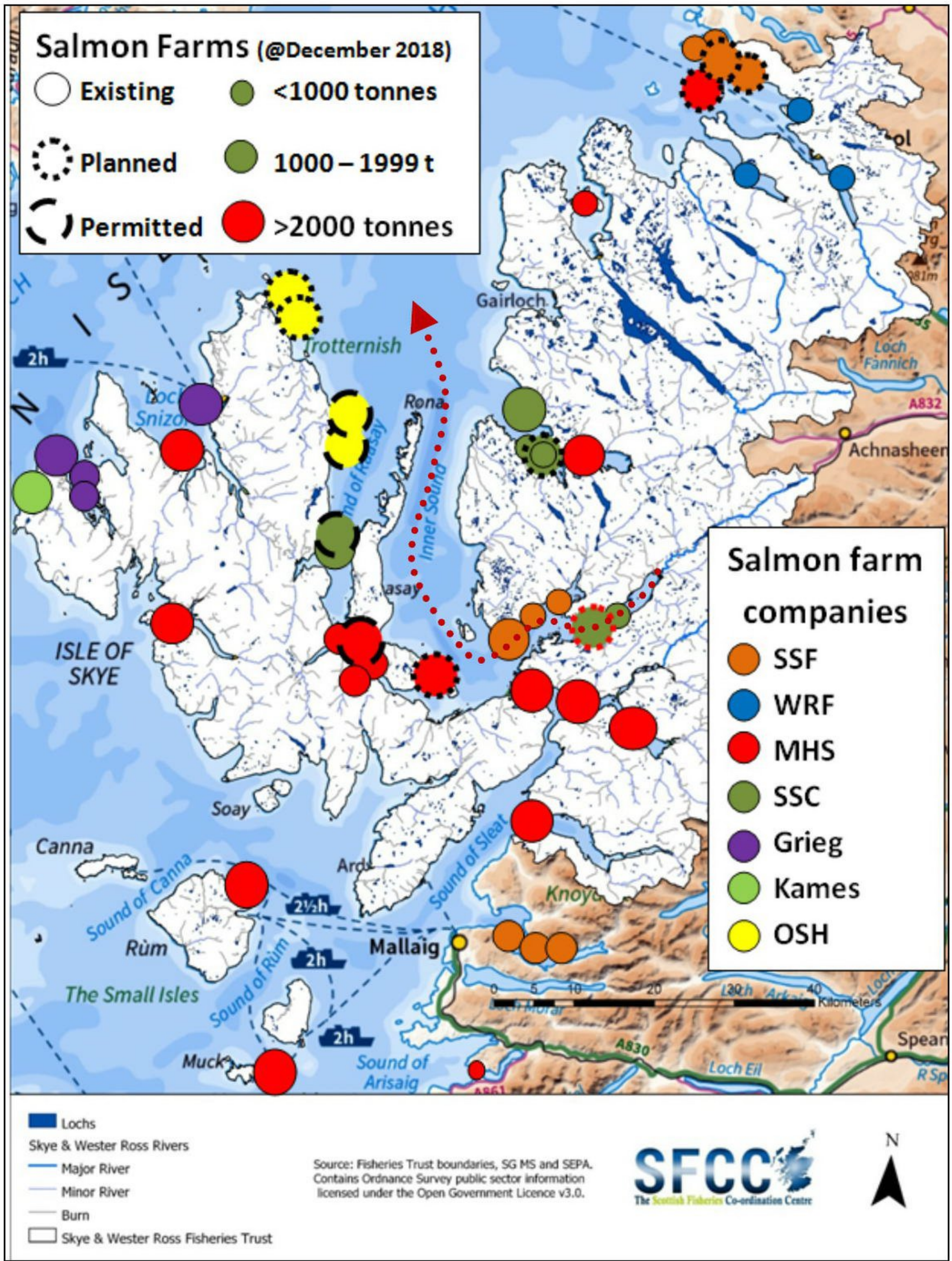
Figure 4 River Carron reported catches of sea trout and finnock (SG figures) in relation to the production cycle at nearby salmon farms.



In conclusion, there is a strong correlation between rod catches in the nearby River Carron and reported sea lice levels on salmon farms within nearby production areas including Loch Carron for the period 2008 to 2017.

## 2. Cumulative impact of sea lice from fish farms in the area to migrating salmon smolts

The map presented below (Figure 5) is based on information from Scotland's Aquaculture website <http://aquaculture.scotland.gov.uk/map/map.aspx> and The Highland Council e-planning website: <https://wam.highland.gov.uk/wam/>. We've shown the approximate location of the new farm with a **red dashed-line circle**. The red arrow (dotted line) is a projected migration route for salmon smolts from the River Carron. Note that permissions have recently been granted for the development of 4 new 2000+ tonne farms by the east coast of Skye, within 15km of the migration path.



Based on the foregoing, there is a high likelihood that the proposed new salmon farm in Loch Carron, in combination with existing salmon farms and other new salmon farms that may be developed in the East Coast of Skye, will greatly exacerbate problems associated with sea lice management within the area.

Where new farms are being consented before existing farms have been able to demonstrate adequate control of sea lice; then there is a very high likelihood that populations of sea lice within the area will reach new and even less easily manageable highs, with potentially devastating consequences for wild salmon population within the area (i.e. even fewer wild salmon returning to spawn in nearby rivers). Appendix 4 provides a link to Norwegian licedispersal model.

SEPA have recently announced much tighter controls for the use of the in feed 'medicine' Emamectin Benzoate EmBz

[https://consultation.sepa.org.uk/sector-plan/finfishaquaculture/supporting\\_documents/SEPA\\_position\\_statement\\_implementation%20of%20CAR.pdf](https://consultation.sepa.org.uk/sector-plan/finfishaquaculture/supporting_documents/SEPA_position_statement_implementation%20of%20CAR.pdf)


We assume this will require further input from SEPA of how sea lice can be managed at the proposed new farm.

The Mid-Strome salmon farm has used Emamectin benzoate as a principle means of managing sea lice in previous production cycles (see Figure 1). Until this farm and other farms within the region are able to demonstrate adequate control of sea lice without being able to use EmBz; the granting of planning permission for any further increase in open-cage farm salmon production within the area would be irresponsible from the point of view of protecting wild fish populations within the area.

Additionally we cannot help but notice the SNH response to this application which states that whilst they recognize that there will be an adverse impact, on a national scale any such impact will be insignificant. We would remind the planning committee that the Loch Carron MPA was not designated as a protected area on the national scale, it was designated on a very site specific scale and so needs to be considered on a site specific scale for this planning application. It is our opinion that the SNH response does not do this and in our opinion, carries some major flaws which would leave the planning authority open to challenge by those NGO`s who seek to protect MPA`s.

Therefore the WRASFB objects to this application.

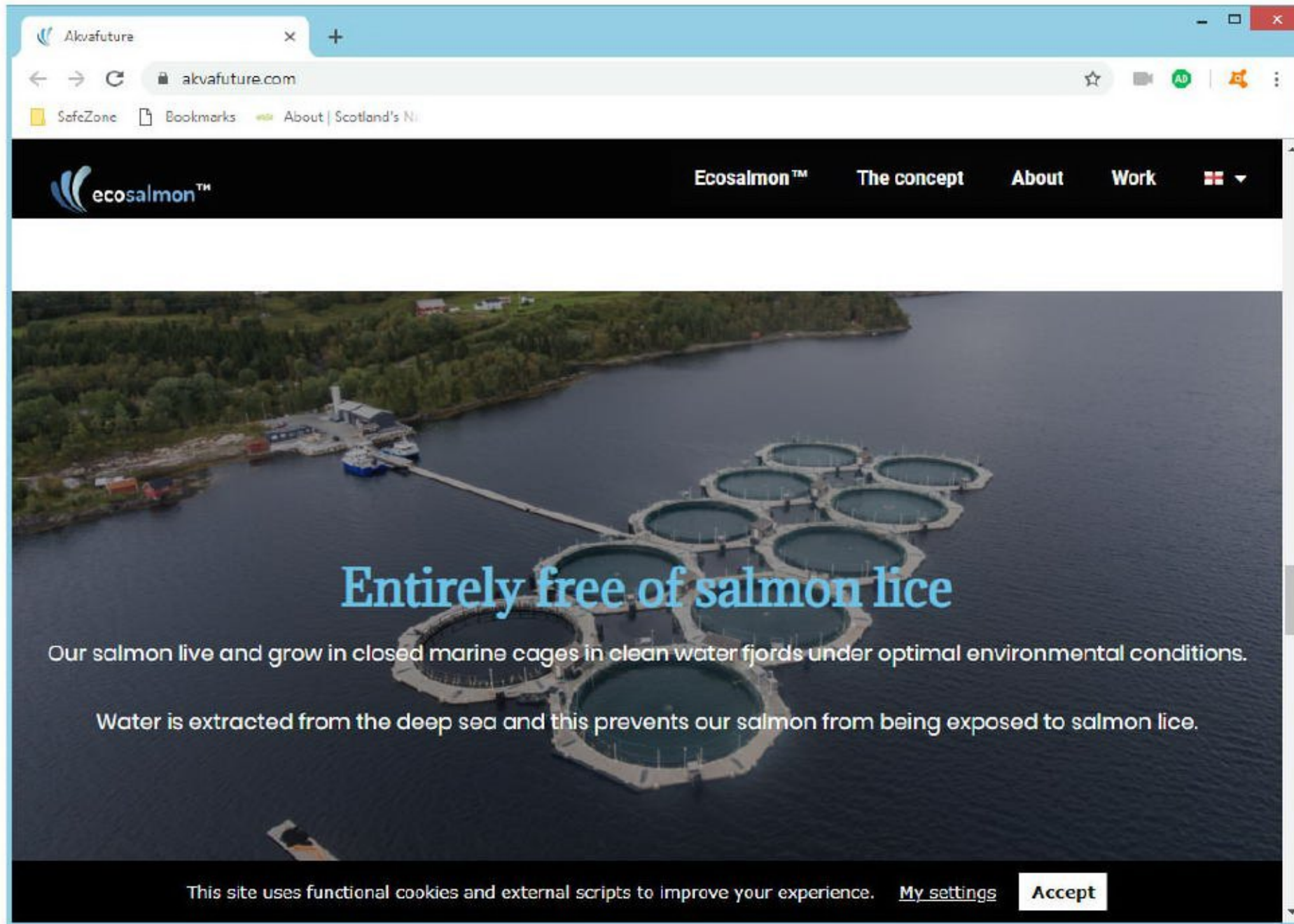
Yours faithfully,

A solid black rectangular box used to redact the signature of the WRASFB Convener.

WRASFB Convener

**Appendix 1:**

We support the recommendations expressed in the SEPA Finfish Aquaculture sector Plan for Scottish salmon farmers to change to closed containment systems; for example this one in Norway <https://www.akvafuture.com/> in order to reduce emission of sea lice and other adverse environment impacts.



## Appendix 2: Sea lice levels on wild sea trout sampled at mouth of River Carron in May 2012

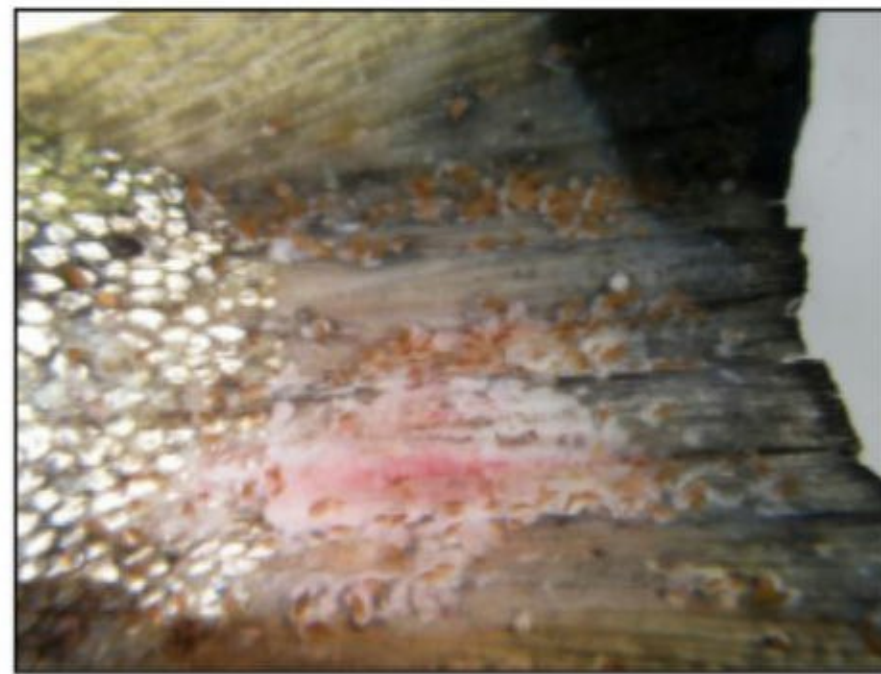
### 4.2.6 River Carron estuary

On 9<sup>th</sup> May 2012, five sea trout were caught, and on 5<sup>th</sup> June 2 sea trout were caught with the sweep net in the sea pool of the River Carron. Although numbers of fish were small, the fish sampled were more heavily infected with sea lice than those at any other sites sampled in 2012 (see Table 4.1). The most heavily infected fish is shown below. The high lice numbers on these fish are indicative of high sea lice infection pressures in nearby waters in April and early May 2012.

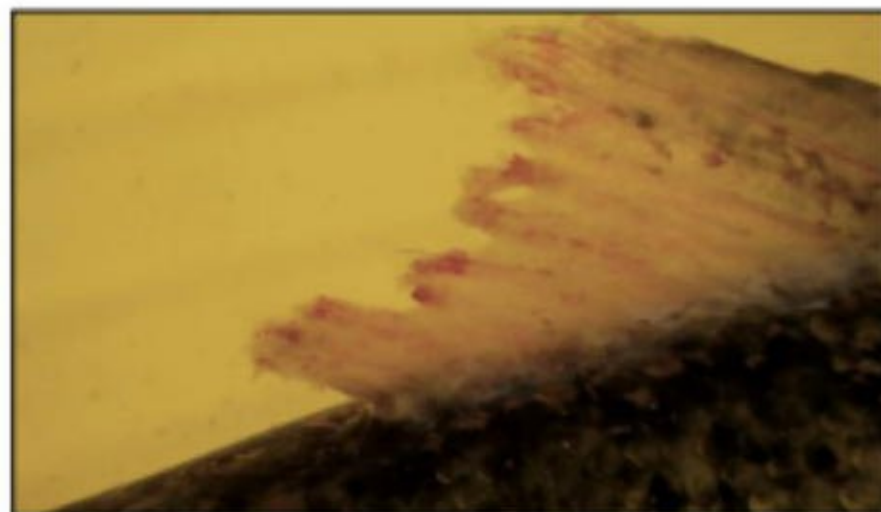
*Carron sea trout 395mm 5<sup>th</sup> June 2012 (pictures by J. Tosney). The field data sheet recorded 200+ chalimus lice and 40+ adult and pre-adult lice.*



*Picture 1 (zoom to view): part of the underside of this fish (including around the ventral fin). I can count over 100 chalimus & copepodid (attached stage) lice and 10 pre-adult lice in this picture.*



*Picture 2: one side of the tail. ~200 attached lice (chalimi or copepodids) can be seen.*



*Picture 3: part of the dorsal fin. There are at least 40 small chalimus lice in the picture . . .*

*Conservative total lice estimate for whole fish based on these photographs: 700+ copepodid and chalimus lice; 30+ pre-adult and adult lice. Therefore, 730+ lice in total, the most heavily louse-infected sea trout recorded by WRFT to date.*

On 12<sup>th</sup> July, 9 sea trout were caught in the Carron sweep, ranging in size from 209mm to 425mm. Lice numbers varied from 2 lice (on the largest fish) to 85 lice per fish. Both of the two largest fish (of 310mm and 425mm) had a dorsal fin damage score of 3, indicating that over 2/3 of the dorsal fin was louse damaged.

From:

<http://www.wrft.org.uk/files/wrft%20sea%20trout%20monitoing%20report%20April%202013%20v5.pdf>



### Appendix 3: WRFT responses to earlier application at Strome

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Wester Ross Fisheries Trust  
Harbour Centre  
Gairloch  
Wester Ross  
IV21 2BQ

Re: 12/00674/FUL, Proposed Fish Farm at Strome, Loch Carron

Dear Mr Bromham,

Wester Ross Fisheries Trust objects to the development of the proposed salmon farm in Loch Carron due to the adverse impact that the resulting increase in sea lice in the loch is likely to have upon wild salmon and sea trout populations.

Loch Carron currently supports a 1300 tonne salmon farm adjacent to the proposed 2000 tonne site and the increase in farmed biomass in the loch will result in a proportional increase in the number of sea lice on farmed fish in the loch unless the efficacy of currently available treatments improves further.

The Trust recognises that the River Carron currently has a highly successful fishery, and also that the existing site at Strome appears to be very well managed. However, the Carron fishery benefits from an intensive stocking program, and although the wild fishery has improved dramatically in recent years it has been greatly assisted. The Trust has sampled sea trout in the loch at intervals since 2008. The sampling site is 8 km from the existing farm and has produced both clean and heavily infested fish (Cunningham 2008, 2011). An overview of the results appears in Appendix 1.

No data on the performance of sea lice control on the existing site has been provided with the application, and although the Trust has seen lice count data in confidence periodically in the past, without current, continuous data it is not possible to judge the applicant's ability to meet the stringent lice count targets set out in the application.

The Trust feels that in order to justify this application the applicant should provide recent data from their existing site, and if possible from two comparable adjacent sites of similar biomass, to show that the stated lice targets can be achieved and sustained. Given the recent improvements in the efficacy of treatments, data pre-dating current treatment methods need not be considered. The Trust also believes that a management plan should be provided to manage the situation in the event that treatments are not as effective as desired. In the absence of both recent lice data and details of a contingency plan should lice numbers become excessive, the Trust considers that the precautionary principle must prevail.

Yours faithfully,

Wester Ross Fisheries Trust

#### References:

Cunningham 2008, The occurrence of the parasitic sea louse (*Lepeophtheirus salmonis*, Krøyer) on sea trout (*Salmo trutta*) in the Wester Ross Fisheries Trust area in 2007 and 2008 with recommendations for monitoring and management.

<http://www.wrft.org.uk/files/WRFT%20Sea%20lice%20monitoring%20report%202007-2008%20for%20web.pdf>

Cunningham 2011, Sea Trout Monitoring Report for 2009 – 2010.

<http://www.wrft.org.uk/files/WRFTSeaTroutintheSeaReport2009-spring2011.pdf>

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5<sup>th</sup> June, 2012

Re: 12/00674/FUL, Proposed Fish Farm at Strome, Loch Carron

Dear Mr Bromham,

*Wester Ross Fisheries Trust is now aware that Marine Scotland Science has reviewed the lice data from the existing Strome salmon farm and found that the applicant is "able to control sea lice on the existing site to a level exceeding that required in the CoGP" and that proposed sea lice treatments "should be efficacious". As stated in our original objection, WRFT believes that the applicant manages the existing site to a very high standard, and the Carron fishery is currently very successful.*

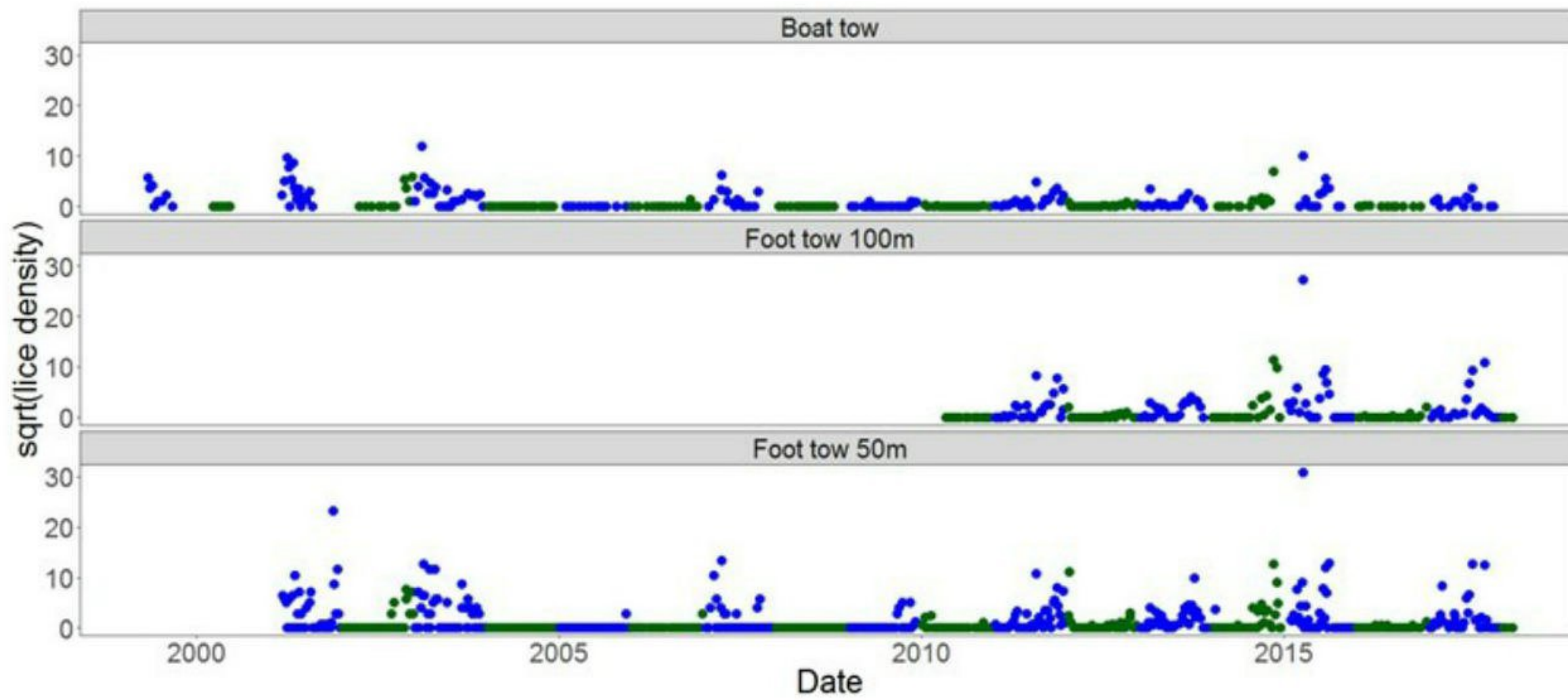
*However, the current application represents a very substantial increase in biomass and thus increases the potential threat to wild fish from increased lice numbers. The Trust believes that data from the existing site must be supplied as part of a transparent planning process to allow other concerned parties as well as Highland Council to make an informed decision. The Marine Scotland statement above would allow for anywhere between zero and several hundred thousand ovigerous lice to be present on site, whilst still remaining within CoGP limits. Furthermore, although Marine Scotland states that the proposed treatment regime should be efficacious there is no indication of what this means for wild salmonid populations.*

*Consequently, WRFT is not currently in a position to withdraw our objection. It might be able to do so if lice data from the existing site was made available to be reviewed as part of the planning process, if that data is considered to be satisfactory, and if the applicant is able to commit to making data from the existing and proposed sites available on a continuing basis. The Trust recognises the sensitivity of this data but none-the-less believes that full transparency must be a pre-requisite for further development.*

#### Appendix 4: relationship between sea lice and sea trout in and around the Loch Torridon area

There is a long record of monitoring sea lice in Loch Torridon, and summary data is published on the Marine Scotland Shieldaig Project website. Elevated concentrations of infective sea lice have been recorded every second year of the production cycle, most recently in 2015 and 2017. Loch Shieldaig sea lice monitoring site is located within 5km of the Aird salmon farm. The graphs below are from the Marine Scotland website: Source: <https://www2.gov.scot/Topics/marine/Salmon-Trout-Coarse/Freshwater/Research/Aqint/Shieldaig/LiceLevels>

Figure 1: Density of sea lice (square root transformed) measuring by plankton tows in Loch Shieldaig 1999-2017. Green points are those in the first year of production, blue are in the second year.



The high sea lice levels recorded in the plankton in Loch Shildaig correlate with higher lice infestation levels of wild sea trout at the Shildaig Field station 5km from the Aird salmon farm. The graphs below are from: <https://www2.gov.scot/Topics/marine/Salmon-Trout-Coarse/Freshwater/Research/Aqint/Shildaig/LiceBurdens>

Figure 2a: The proportion of trout sampled in the lower Shildaig with lice in relation to fish farm production cycle. Green bars are those in the first year of production, blue are in the second year.

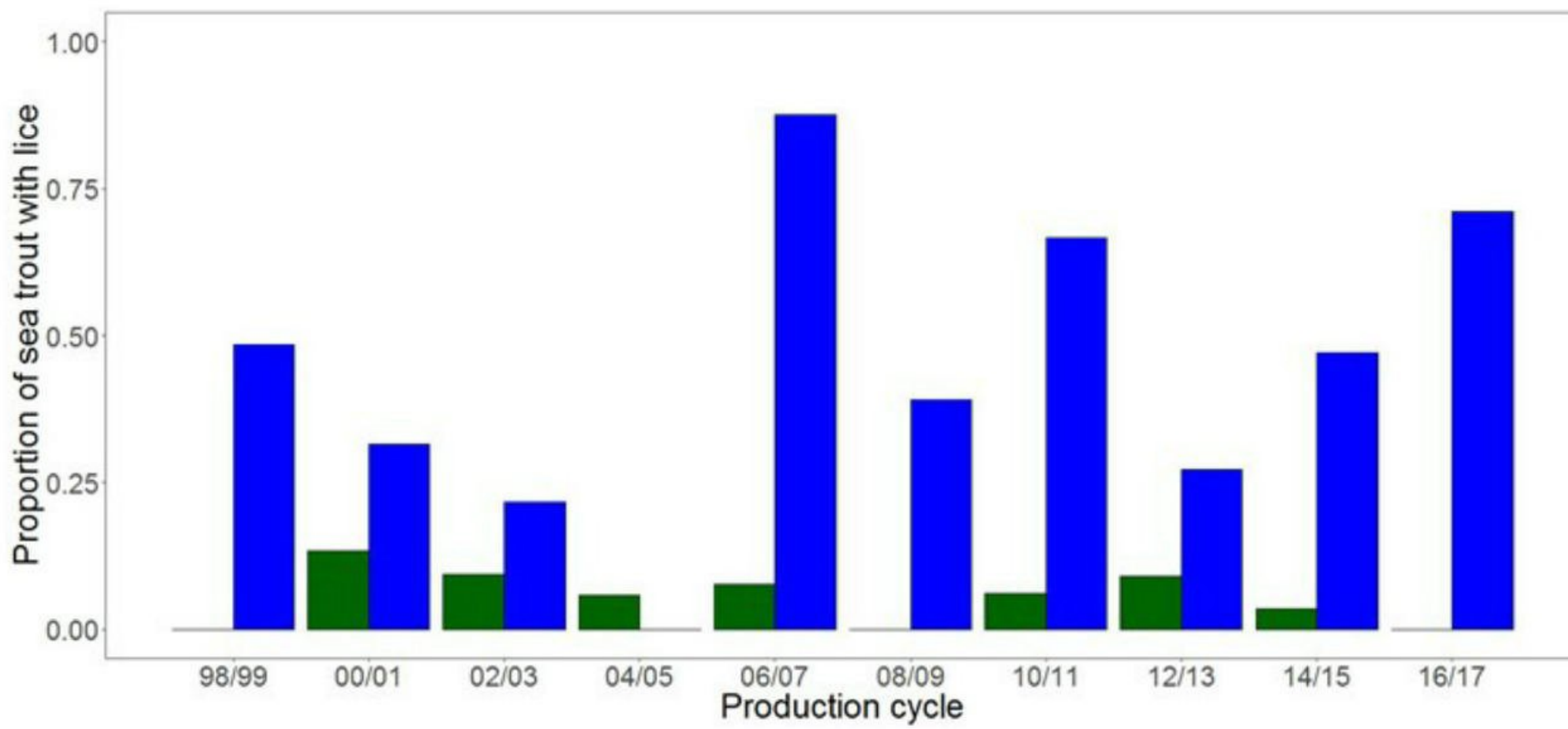
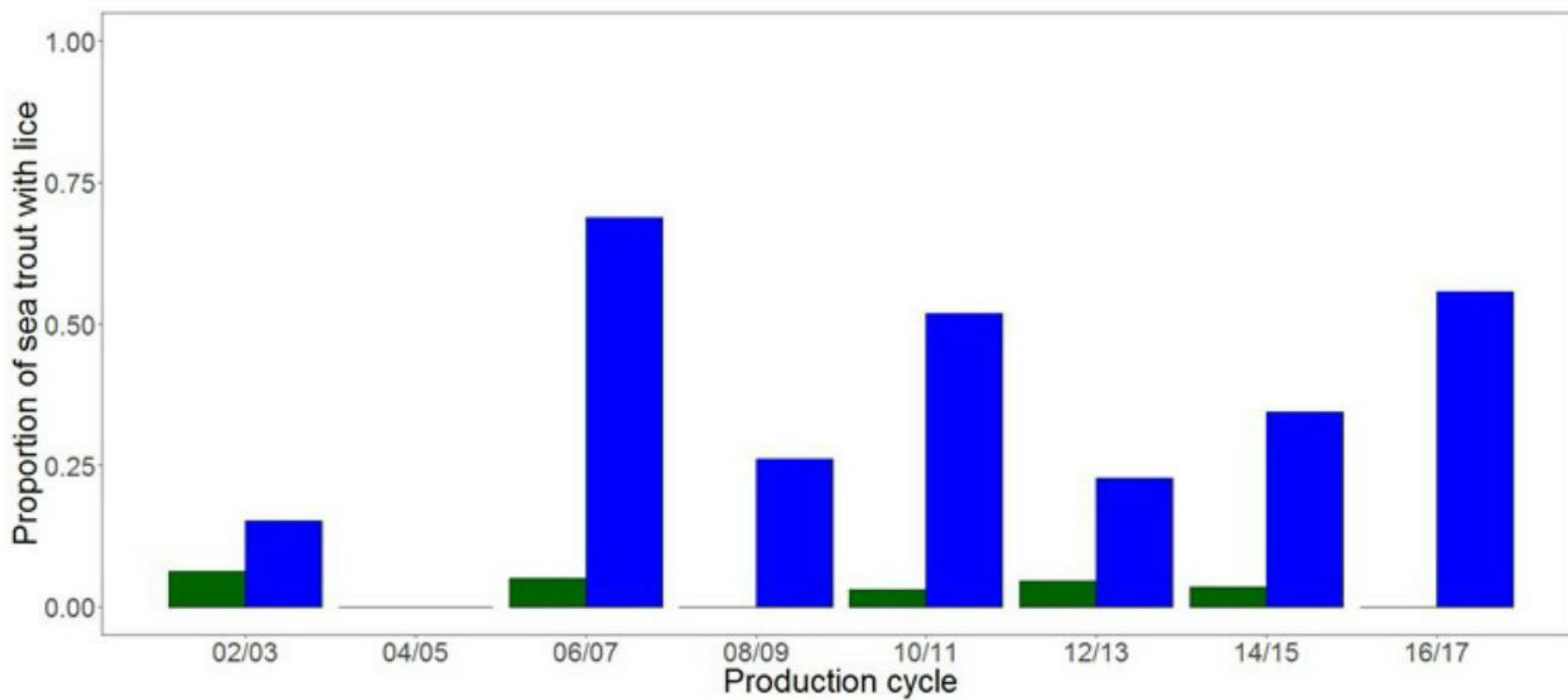
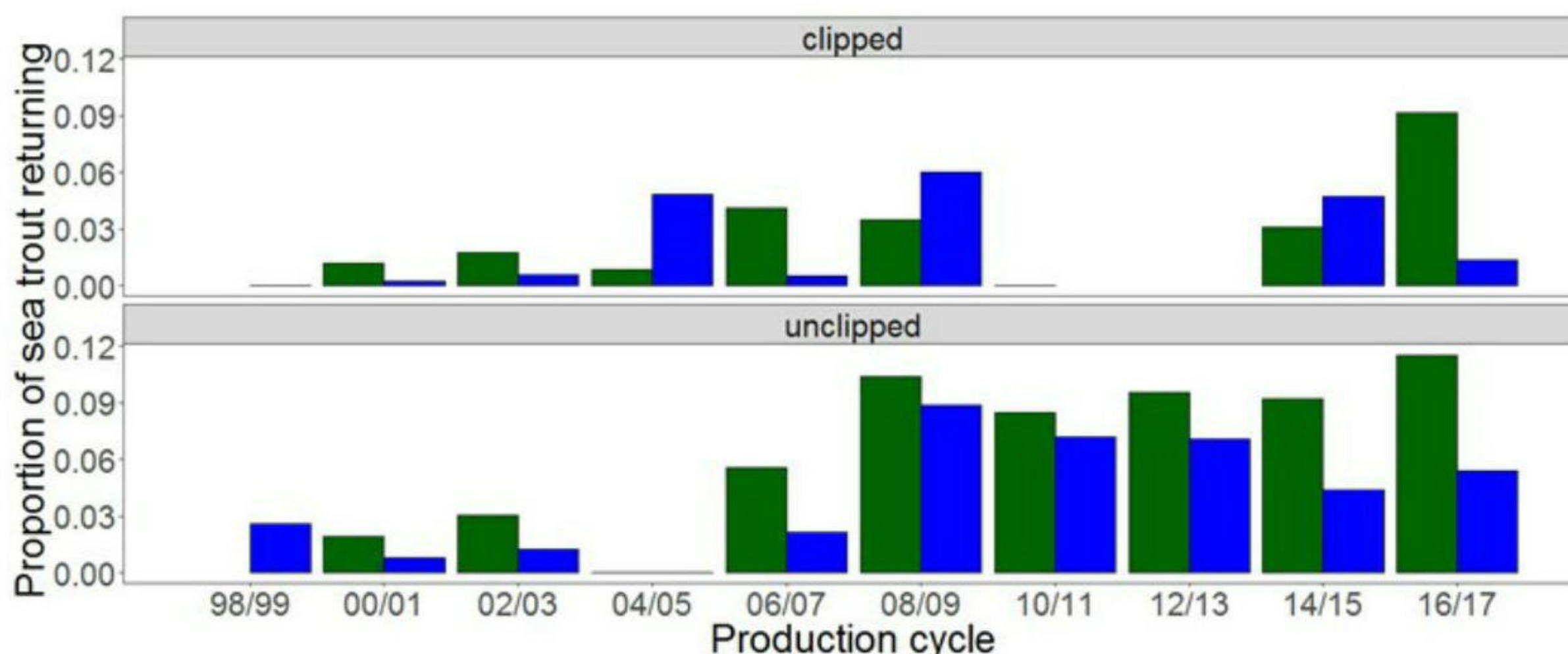


Figure 2b: The proportion of trout sampled in the lower Shildaig exhibiting lice burdens above the threshold level with respect to fish farm production cycle. Green bars are those in the first year of production, blue are in the second year.



The return rates of sea trout to the Shieldaig trap were significantly lower following the second year of the salmon farm production cycle at the nearby SSC Aird salmon farm, most recently in the 2016-2017 production cycle. Source: <https://www2.gov.scot/Topics/marine/Salmon-Trout-Coarse/Freshwater/Research/Aqint/Shieldaig/ReturnRates>

Figure 4: The proportion of marked sea trout of different origins returning to the River Shieldaig in relation to fish farm production cycles. Green bars are those in the first year of production, blue are in the second year. Data for clipped fish span 1999-2009 and 2017, unclipped 1999-2017.



Marine Scotland Science have therefore demonstrated a strong and consistent impact to wild sea trout from the Shieldaig River system from sea lice associated with salmon farming in Loch Torridon. The evidence base of an impact from sea lice to wild fish is as strong as for around any other salmon farm in Scotland.

Further afield from Loch Torridon, there is strong evidence that larval sea lice from salmon farms in Loch Torridon have affected sea trout as far away as Loch Gairloch in 2015 and 2017. The following examples are from the Wester Ross Fisheries Trust and Skye and Wester Ross Fisheries Trust reviews. Sea trout carrying very high numbers of sea lice were recorded in Loch Gairloch in both 2015 and 2017 but not intervening years. The high lice levels correlate with salmon farm production cycles in Loch Torridon. The salmon farms in Loch Torridon are the nearest source of lice from farmed salmon to wild fish in Loch Gairloch.

From the WRFT Review <http://www.wrft.org.uk/files/WRFT%20Review%20May%202016%20Final.pdf>

*'Occurrence of heavily lice infested sea trout in May – July 2015*

*Sea trout carrying high or very high sea lice burdens (100 lice to 400+ lice per fish) were sampled by WRFT from the Flowerdale River estuary [Loch Gairloch], River Balgy sea pool, Inverbain river estuary, and Sand (by Gairloch) river estuary; and by Marine Scotland Science in the Shieldaig river estuary (Marine Scotland, pers comm.). The most heavily infested fish were between 250mm and 350mm in length and were caught between late May and early July. The majority of lice on heavily infested fish were small 'chalimus' (juvenile) stage lice; indicative of nearby infestation.*

*Some samples included thin post-smolt sea trout carrying no lice or very few lice. Some of these samples may have included trout that had remained in brackish water and not been exposed to the high lice infestation pressures experienced by other trout in respective samples. They may have also included sea trout which by returning 'early' to freshwater shortly after becoming infested, had been able to rid themselves of lice before significant external physiological damage associated with lice infestation had occurred.*

Figure 5: Flowerdale, 19<sup>th</sup> May 2015. (Main picture) Pulling the sweep net in. (Inset) Our catch included this sea trout of 281mm taken in the sweep net; this fish carried an estimated 500 mostly chalimus stag lice. Note the descaled area below the dorsal fin associated with a bird attack (photos by James Merryweather).



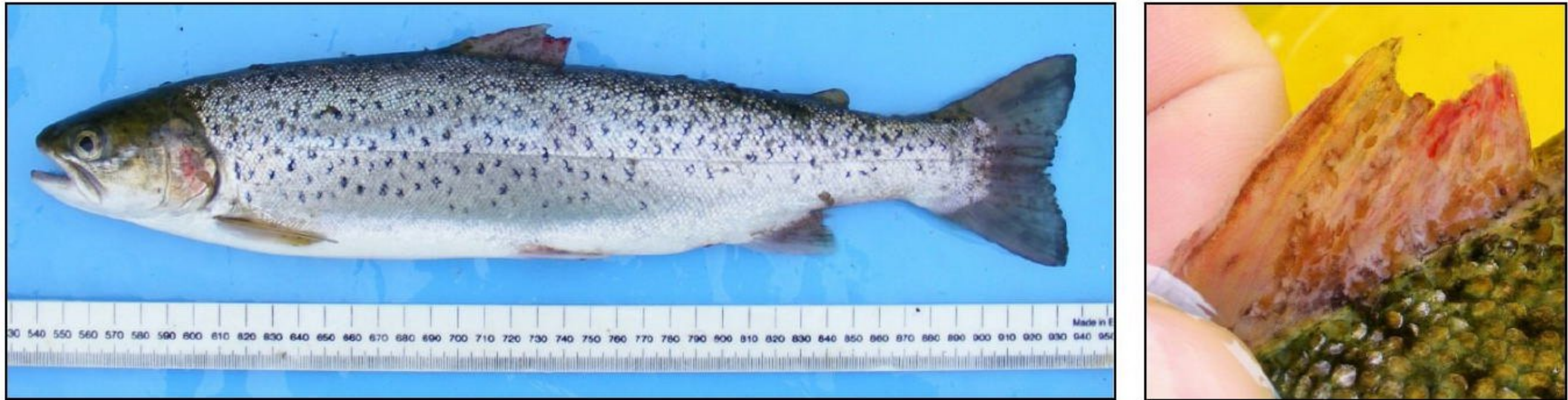
Levels of lice infestation on some of the sea trout in some samples were far in excess of potentially lethal threshold levels described in published literature<sup>1</sup>. The marine survival rate, especially of smaller trout in systems such as the River Balgy, may have been reduced by 50% or more as a result of sea lice infestation.'

<sup>1</sup> For example, Taranger et al, 2015 <http://brage.bibsys.no/xmlui/bitstream/id/332219/997.full.pdf>

Sea trout carrying very high numbers of sea lice were also recorded in Loch Gairloch in June 2017:

*Figure 6: Sea trout 395mm, 645g (c.f. 1.05) Flowerdale, Loch Gairloch, 26<sup>th</sup> June 2017 with 500 copepodid & chalimus lice, 11 preadult and adult lice, 9 ovigerous females (0.806 lice per gram). Dorsal fin damage 2. The salmon farms in Loch Torridon were the nearest sources of larval sea lice to Loch Gairloch; our assumption is that the lice originated from these farms. Source:*

<http://www.wrft.org.uk/files/SWRFT%20Review%20February%202018%20Final%20for%20web%20V2.pdf>



Thus there is very strong evidence that salmon farms in Loch Torridon have harmed wild sea trout in surrounding waters, up to at least 25km away.

We do not have data describing sea lice levels on wild salmon smolts migrating through sea areas around Loch Torridon. However where sea lice levels are as high as they have been on wild sea trout, it is reasonable to assume that wild salmon smolts would also be adversely affected.

Therefore we conclude that cumulative biomass levels on salmon farms in Loch Torridon have been too high for parasitic sea lice to be controlled to levels where wild fish populations were able to remain healthy in surrounding waters.

Source: <https://www.environment.gov.scot/data/data-analysis/marine-fish-farm/>

## **Appendix 5: Larval sea lice dispersal model**

Larval infective sea lice larvae may travel 50km or more according to wind and tidal currents to infect wild salmon, wild sea trout and farmed salmonids 10s of km away from their source. This has been investigated and modelled more thoroughly in Norway than in Scotland to date; the following website provides further information:

<http://www.imr.no/lakseluskart/html/lakseluskart.html>

The proposed West Strome salmon farm is located within the Loch Carron – Loch Kishorn fish health management region, which is adjacent to the Loch Alsh – Duich Horn management region, and North Skye (east of Skye) farm salmon production area (see Figure 5) from where sea lice may cross-infect farmed salmon on farms. There is already over 25,000 tonnes of consented farm salmon biomass within these three production areas; a further 8,000+ tonnes has recently been granted planning permission.