PE1598/A

Callender McDowell Letter of 27 May 2016

This is a response to the Petition submitted by Guy Linley Adams, Solicitor to Salmon & Trout Conservation Scotland, an organization that represents the interests of salmon and trout anglers in Scotland. Following the collapse of the sea trout fishery in Loch Maree in 1989, the angling sector has repeatedly blamed the salmon farming industry for declines in wild fish numbers along Scotland's west coast. However, as the evidence presented in the Petition demonstrates, the link between sea lice from salmon farms and declining wild fish numbers is circumstantial.

The author of this response has worked in the aquaculture industry for over 40 years, of which the last twenty years have been focused on the market for farmed produce. The involvement in the debate about the impact on wild fisheries began in 2010 following an invitation by the Fishmongers Company to speak at an event entitled 'The Aquaculture Debate' which intended to consider the issues involved in salmon farming that might affect wild salmonid fisheries. The audience consisted mainly of anglers, who were both aggressive and discourteous. Although the author stands by any views expressed that day, the audience response sparked an interest to look much deeper into these issues. This has been an undertaking that has been ongoing for the last five years. The author has worked independently of the salmon industry and the views are his own. He has attempted to discuss the issues with representatives of Salmon & Trout Conservation Scotland without any response. S&TC have also blocked all areas of social media in order to prevent contact.

The fundamental question at the heart of the Petition is whether wild salmonid fish numbers have declined along Scotland's west coast and if they have whether the rate of decline is any different to wild salmonid numbers in other parts of Scotland and the rest of the UK and if they are declining at a different rate to the rest of the country, whether that is decline is due to the presence of salmon farms.

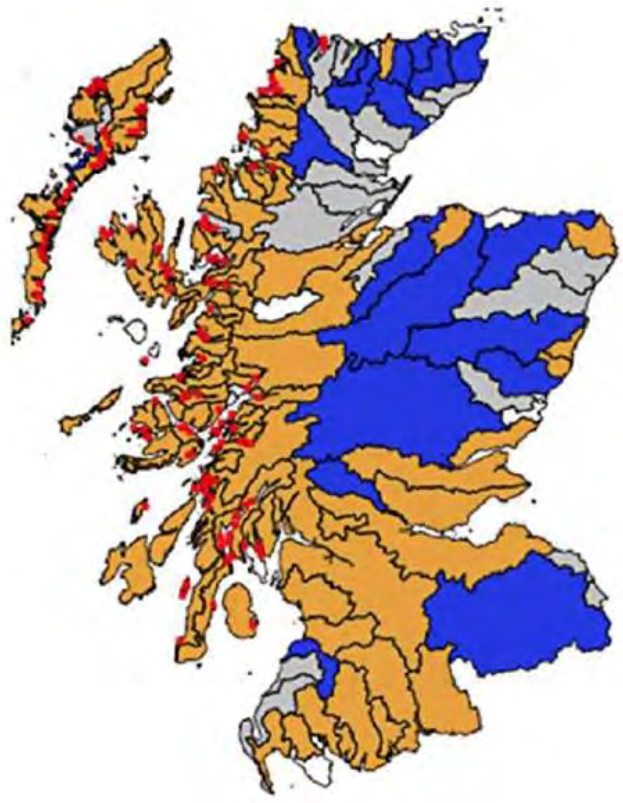
Salmon & Trout Conservation state in their petition that wild salmonids in the 'aquaculture zone' on the west coast are in trouble. What they fail to say is that wild salmonids are in trouble across the whole North Atlantic. This is why the North Atlantic Salmon Conservation Organisation (NASCO) was established in 1984 and why their latest annual meeting took place at the beginning of June in Germany. This was before any association was made between declines in wild salmon and the presence of salmon farms.

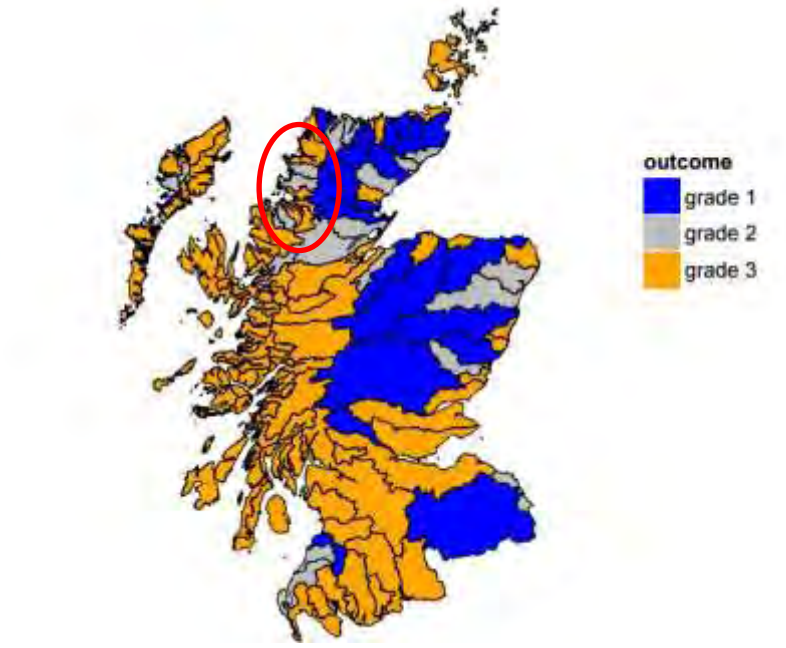
No-one disputes that sea lice have become a major issue for the salmon farming industry and much of the S&TC petition is based on data that has actually been supplied by the salmon farming industry. Whether there is an impact on wild fish is another matter. In addition, the S&TC have provided two pieces of evidence to support their claim that wild fish numbers are declining faster along the west coast and that this decline is due to the impact of salmon farming.

The first of these relates to the classification of all rivers in Scotland as to their conservation status by the Scottish Government at the end of 2015. According to the S&TC, all rivers along the west coast were placed in the worst performing category because wild salmon failed to reach their conservation limits. The S&TC say that in the Scottish Government's estimation, no river in salmon farming's heartland has a sufficient stock of wild salmon to support exploitation.

Actually, S&TC are factually incorrect. The categorisation of Scottish rivers was never intended to be set in stone. Conservation Limits can change as more information becomes available. Such changes have been apparent in England where Conservation Limits have been established for a longer time. Even though the Scottish Government has only recently classified Scottish rivers, a couple of west coast rivers have already been reclassified as category 2 rather than 3. These changes can be seen in the map of Scotland used to illustrate the spread of the various categories.

The first map is the one that S&TC use and appears in their latest complaint to Europe which was published in May 2016. The second is the same map taken from the Scottish Government website and dated January 2016 which shows the most recent changes. The petition was lodged after these changes were announced.





Whilst the Petitioner uses the recent Scottish Government initiative to introduce Conservation Limits as proof that salmon farms are damaging wild stocks, the wider angling sector are not so convinced by the new regulations. The BBC Scotland TV programme 'Landward' reported from the River Earn, part of the River Tay system last November. Anglers on the Earn have expressed concern that their river has also been classified as a category 3 river. They say that the Scottish Government has got their classification wrong. Dr David Summers of the Tay District Salmon Fishery Board told the programme that 'the benchmark which the Earn is compared with – the Conservation Limit – is partly derived from the River North Esk, which is a productive Highland river that is a much better river inherently for producing young salmon than the River Earn ever will be or ever was.' 'It is a benchmark that is actually unattainable for this river and inappropriate for it' he said.

The Fishing website FishPal describes the North Esk as 'one of the most prolific salmon rivers in the Northern hemisphere' let alone Scotland, which suggests that it sets a level of production which simply cannot be attained by the small spate rivers along the west coast. Certainly, if Dr Summers believes that the River Earn is not being compared like for like, then neither are the rivers in the west coast aquaculture zone. Thus if the classification of many Scottish rivers is wrong, then the assertion that the classification of all west coast rivers in the aquaculture zone is evidence that the salmon farming industry is damaging wild stocks must also be judged to be incorrect.

As mentioned above, Salmon & Trout Conservation have also complained to the European Commission about the Scottish Government's alleged failure to protect wild salmon on the west coast. News of the complaint was released on the 11th May 2016. On the 10th May, Salmon & Trout Conservation issued another press release about the state of wild salmon stocks in England. Salmon & Trout Conservation had joined with a number of agencies and NGO's including the Environment Agency and DEFRA to consider the state of wild

salmon stocks in England and Wales and have subsequently published a report. The first section is a review of the status of stocks in England. The report states:

‘The 2014 assessment of salmon stocks showed a further decline of salmon populations to the lowest level on record. In 2014, 38 of England’s 42 principal rivers were assessed as being ‘At Risk’ or ‘Probably at Risk’. None were catagorised as ‘Not at Risk’. The poor state of Atlantic salmon is not unique to England and is reflected across the UK and throughout much of its range.’

The second piece of supporting evidence provided by the Petitioner is a review of over 300 scientific publications that looks at the damaging effects of sea lice stocks on salmon farming areas. Although the review paper focuses on sea trout, there is reference to salmon because it was salmon that were used to try to experimentally determine a definitive mortality level due to sea lice. Two groups of salmon smolts were released into the sea. One had been fed with an anti-lice treatment and the other was a control. The number of returning fish were counted and the impact of sea lice measured.

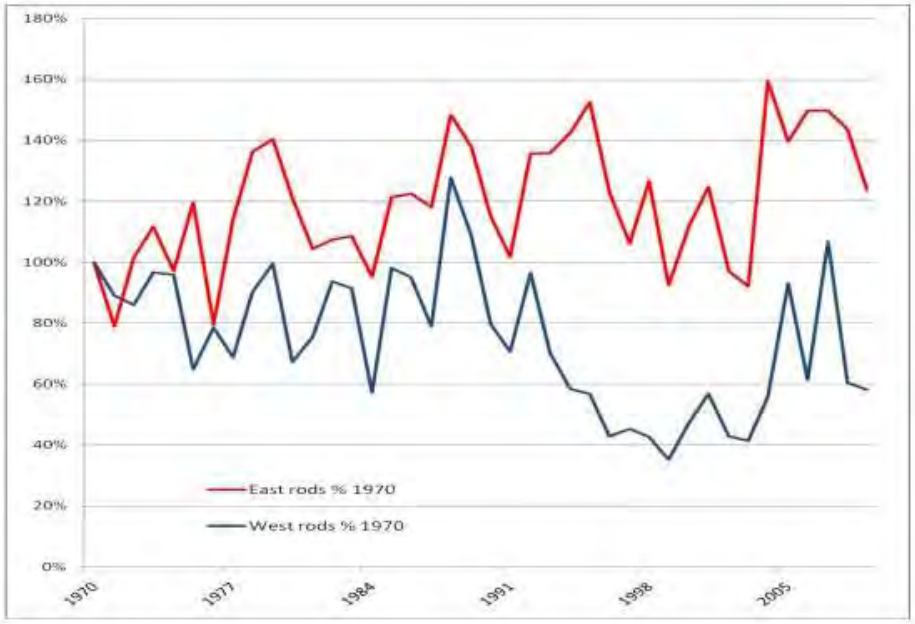
These studies have been the subject of a major debate between fisheries scientists. This is because the mortality rate of between 12-29% quoted by the Petitioner relates the measured mortality as a percentage of the total number of all fish returning from each group. However, these figures are misleading because the measurement should really relate to the total number of fish initially released. This is because salmon die at sea from other reasons than sea lice. In fact, it is well-accepted that 95% of wild salmon migrating as smolts die at sea and do not return to their home rivers. This applies to all salmon, not just those from salmon farming areas. The 12-29% mortality quoted by the Petitioner actually equates to between 1-2% mortality. This means that out of the 95 fish that die at sea, one or two die as a result of sea lice. Thus sea lice are a minor component of the fish mortality at sea. The Irish Salmon Growers Association has posted an eight-minute video explanation of these experiments at https://vimeo.com/83845976 to help clarify any confusion caused by the counter claims. The Scottish Government is currently undertaking a similar experimental trial in Scotland to ascertain whether mortality rates are the same as found in Norway and Ireland. The results are not expected for at least another year.

What the S&TC Petition fails to show is whether fish numbers are in decline and whether salmon farms are implicated in the decline. Instead, they assume that high lice levels on some farms translate into high mortality of wild fish. The reason why the S&TC have not shown whether this connection exists is because no-one has analysed any data that is available to determine whether any links exist. The only work undertaken until now has been a comparison of the rod catch data for rivers from within the west coast Aquaculture Zone and the east coast by the Rivers and Fisheries Trusts of Scotland (RAFTS). This was published in 2011.

According to Marine Scotland Science, ‘rod catches have traditionally been used to assess the status of salmon in Scotland. An underlying assumption in the use of these data is that there is no consistent change in the percentage of available salmon captured by the fisheries (exploitation rate) over time or among rivers. Exploitation rate may be influenced

by a number of factors including river flow, fishing effort and fishing efficiency. This limitation should be considered when interpreting rod catch data. However, rod catches are the most comprehensive potential indicator of stock status in terms of temporal and geographical coverage, and in many areas may be the only information available'.

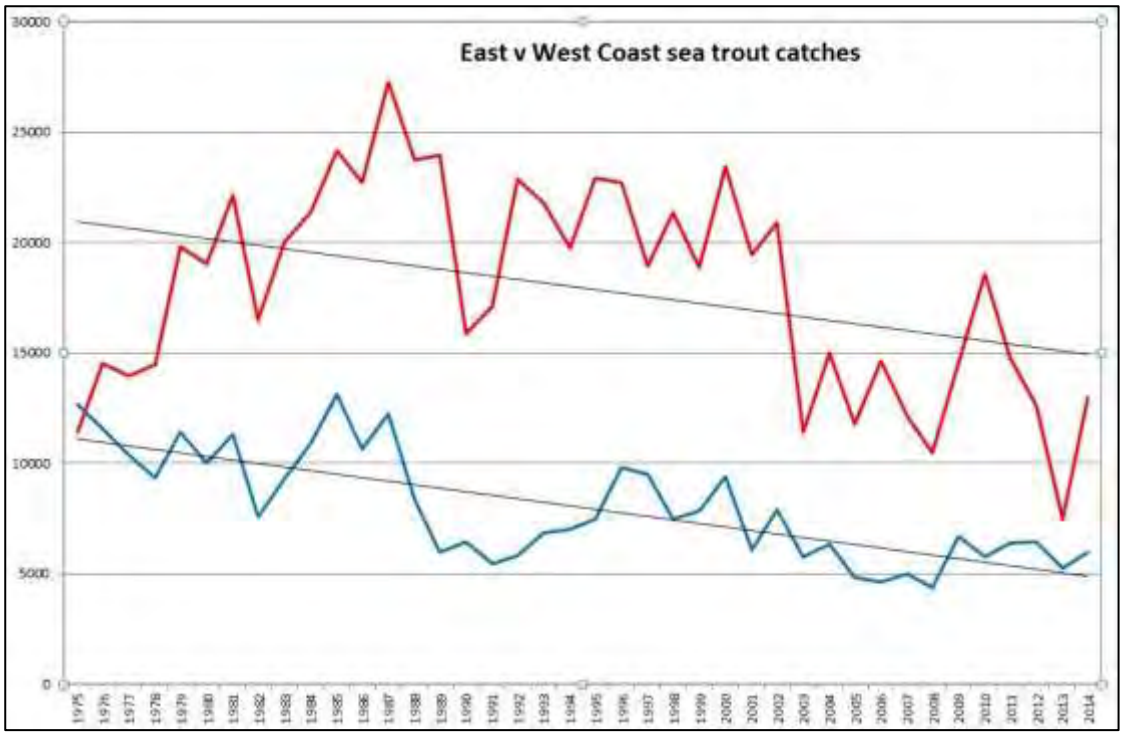
The graph produced by RAFTS is shown below. The red line shows the catches from the east coast rivers whilst the blue line represents catches from rivers along the west coast from 1970 onwards. RAFTS say that the graph clearly shows that catches on the east coast have increased over the period shown, whilst those on the west coast have decreased. Unfortunately, the graph is flawed as a way of presenting this information. This is because RAFTS have taken 1970 as a fixed point and called it 100% and then calculated each subsequent year as a percentage change. The reason this s flawed is that east coast rivers tend to be much bigger than those on the west coast, which are typically short spate rivers. Even when the fishing is at its best, east coast rivers will land significantly more fish than those on the west and this can influence the rate of change.



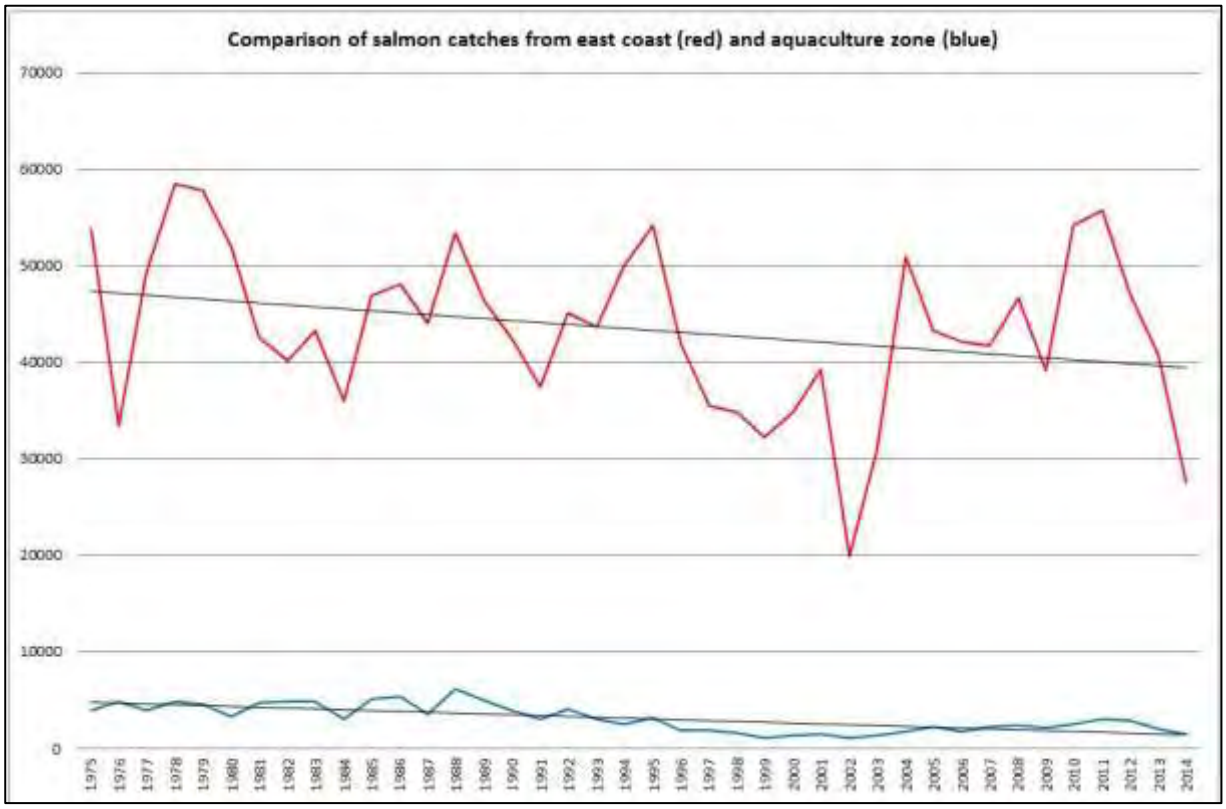
Decline in Scottish wild salmon catches by rod (1970 = 100%) for east coast and west coast (Cape Wrath to the Mull of Kintyre including the Hebrides). Data taken from the Marine Scotland annual catch statistics.

The author has repeated the information shown in this graph but using the exact numbers of fish caught for each coast. The Scottish Government data is presented as catches of salmon (large multi-sea winter fish) grilse (smaller one sea winter fish) and sea trout and thus a graph has been produced for each of these data sets.

The first is sea trout, the second, salmon and the third grilse.

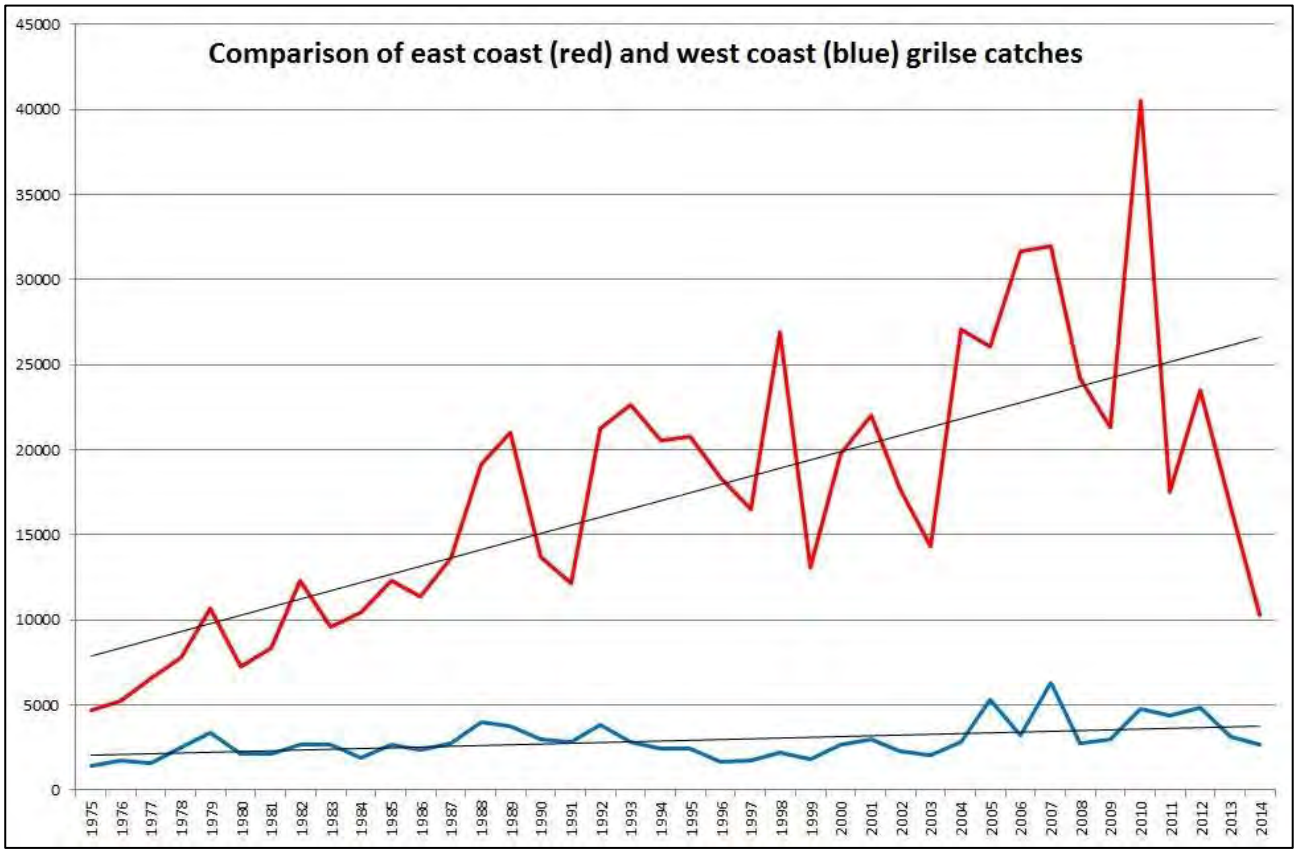


The graph comparing sea trout catches from east and west coast shows that sea trout catches are in decline on the west coast but also on the east. More significantly, the rate of decline for both coasts is almost identical suggesting that the decline on both coasts may be due to the same factor. Clearly, as salmon farming is only present on the west coast, the decline on the east is hard to explain if salmon farms are to blame.



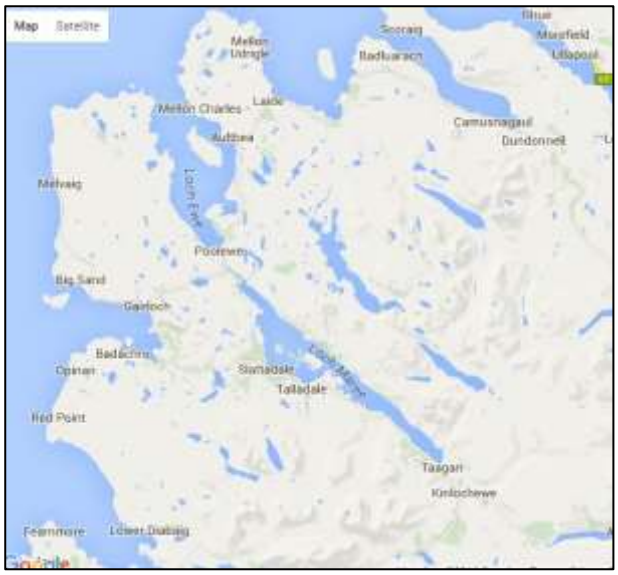
The comparison of large salmon also shows that catches are declining on both coasts. In fact, the rate of decline is actually greater on the east coast.

Finally, the comparison of east and west coast for grilse shows that the catches of these early maturing salmon have increased, most notably along the east coast. However, despite claims from the S&TC that wild fish are in trouble, catches of grilse have also increased. As with larger salmon, the rate of change between east and west coast will be linked to the huge differences in the sizes of river on each coast.



These graphs would suggest that the east and west coast may not be so different and that what is happening on one coast is also happening on the other. However, combining the catch data from all the coast may mask the situation in individual rivers. Therefore, it is worth considering the data from just one fishery district. The review paper that the S&TC have referred to in the Petition specifically highlights the collapse of the River Ewe rod-caught sea trout fishery beginning in 1988 so the author has investigated this fishery in more detail.

Loch Maree is part of the Loch Ewe System. It is a large freshwater loch about 12 miles long. It is connected to the sea in Loch Ewe via the short River Ewe which is just over two and half miles long.



According to the former head of the Freshwater Fisheries Laboratory at Pitlochry, who wrote in his memoir – The Longshoreman - that the world famous sea trout fishery in Loch Maree collapsed in 1989. The blame for the collapse was laid against a salmon farm that was established in 1987 in Loch Ewe. One of Dr Shelton's colleagues, Dr Andy Walker, who is also mentioned in Dr Shelton's memoir subsequently undertook a study of the collapse. His paper, published in 2006, includes the following graph:

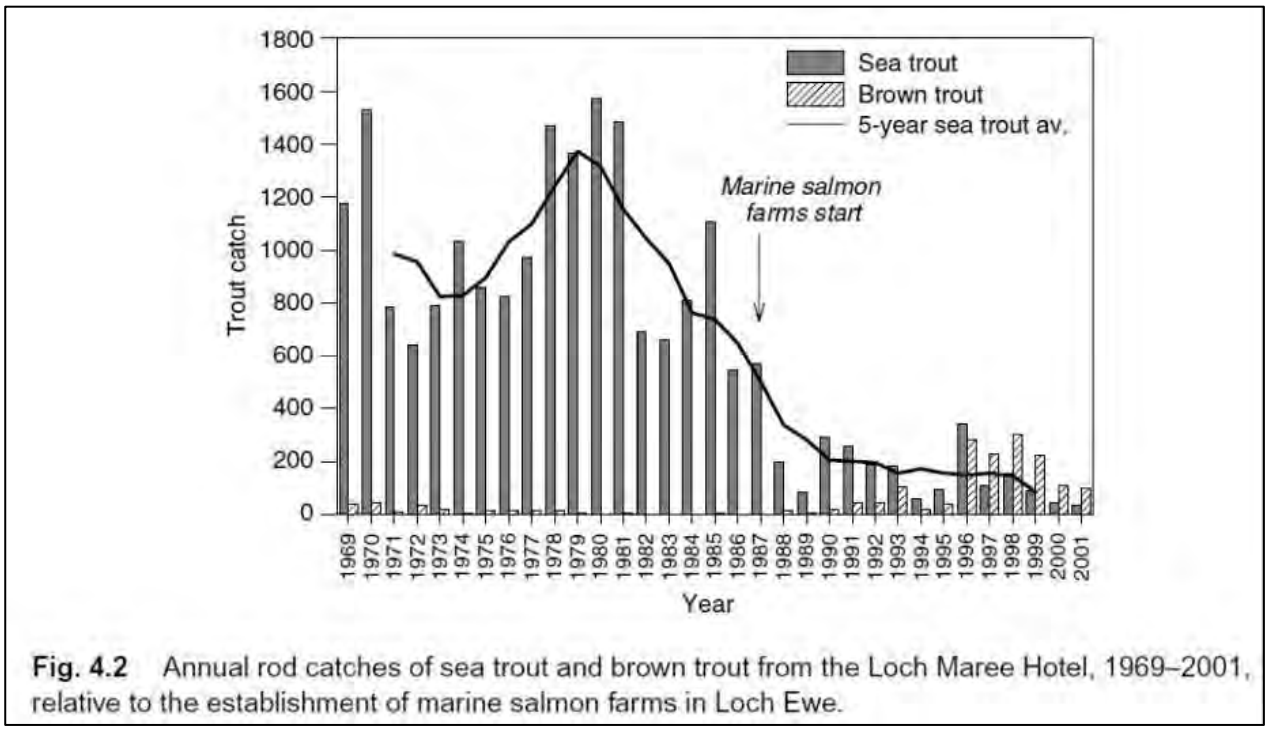
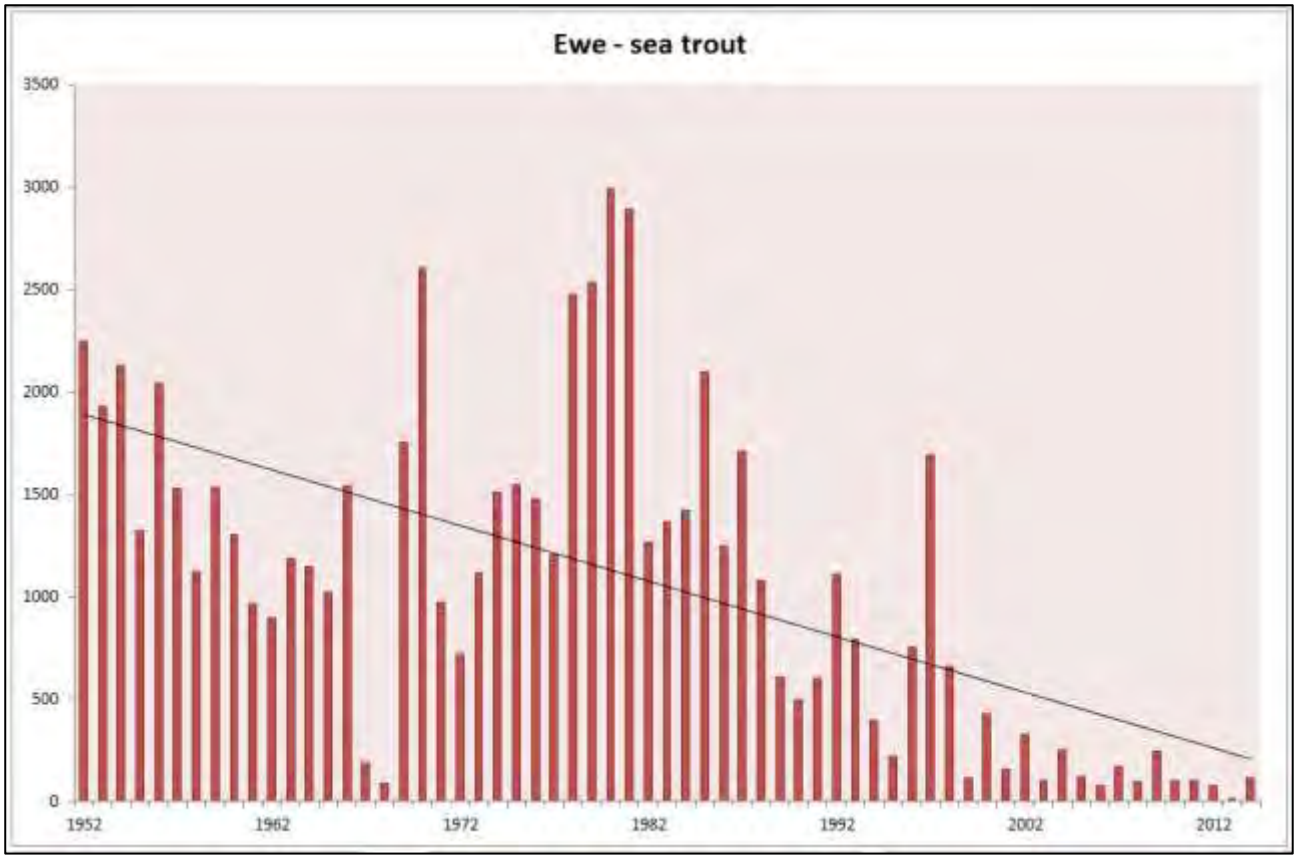


Fig. 4.2 Annual rod catches of sea trout and brown trout from the Loch Maree Hotel, 1969–2001, relative to the establishment of marine salmon farms in Loch Ewe.

The graph from Dr Walker's paper actually includes a marker showing the arrival of salmon farming in Loch Ewe in 1987 yet the graph does not seem to provide definitive proof that salmon farming was responsible for the collapse of the Loch Maree sea trout fishery. Firstly, the line showing the five-year average is already in steep decline by 1987 having peaked in 1979. This suggests that the fishery was already in decline by 1987. In his memoir Dr Shelton implies that by 1989, two years after the arrival of the salmon, that

the fishery had vanished. The graph shows that in 1987, the fishery produced about 600 fish whilst in 1989, it had fallen to less than 100 fish. Yet, in 1996, it had increased to over 300 fish despite the presence of the salmon farm.

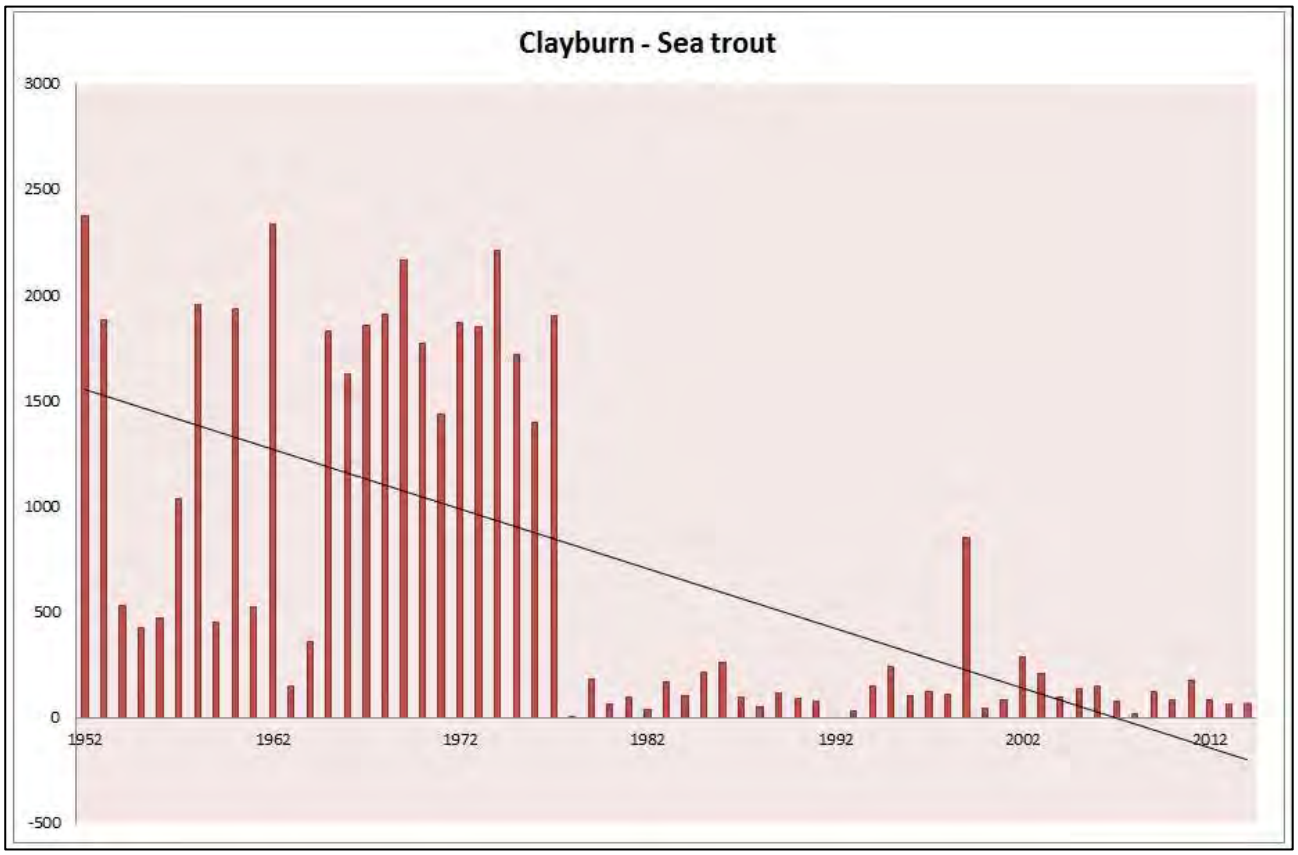
Given that Dr Walker, worked for the Government laboratory and had access to the annual statistics, it is surprising that the data he used was the catch data from the Loch Maree Hotel. The author has reproduced the same graph using the catch data from the whole of the Ewe system for the whole data set.



What is apparent is that whilst the overall picture of the fishery is one that is in decline, the collapse in 1989 highlighted by Dr Shelton was not one that was total. The fishery continued for another ten years peaking at nearly 2000 fish in 1997. Although there has been some peaks and troughs, the fishery has been in decline over many years, even before fish farming arrived in Loch Ewe. In recent years, Loch Maree has only been lightly fished, in part because the Hotel closed for some time. It is possible that the low catches are simply a reflection of the fishing effort although this has not been measured.

The angling sector continues to highlight the collapse of Loch Maree sea trout fishery as prime example of the damage caused by local fish farms. The June 2016 issue of the angling magazine ‘Fly Fishing and Fly Tying’ states on page 95 “For Scotland’s iconic wild salmon and sea trout it (fish farming) has been a disaster, once famous fisheries are now but poor shadows of their former glory. Highland hotels that specialized in caring for anglers such as the Loch Maree Hotel in Wester Ross have closed their doors” except that the Loch Maree Hotel has reopened and welcomes anglers to come and fish the loch.

The sea trout catch data for the Loch Ewe system shows all the signs of a long-term decline. This could be for a variety of reasons. By comparison, the sea trout fishery in the Clayburn Fishery District in the Outer Hebrides, exhibits an almost sudden collapse. A similar response might have been expected from the collapse of Loch Maree sea trout fishery given all the hype about it.



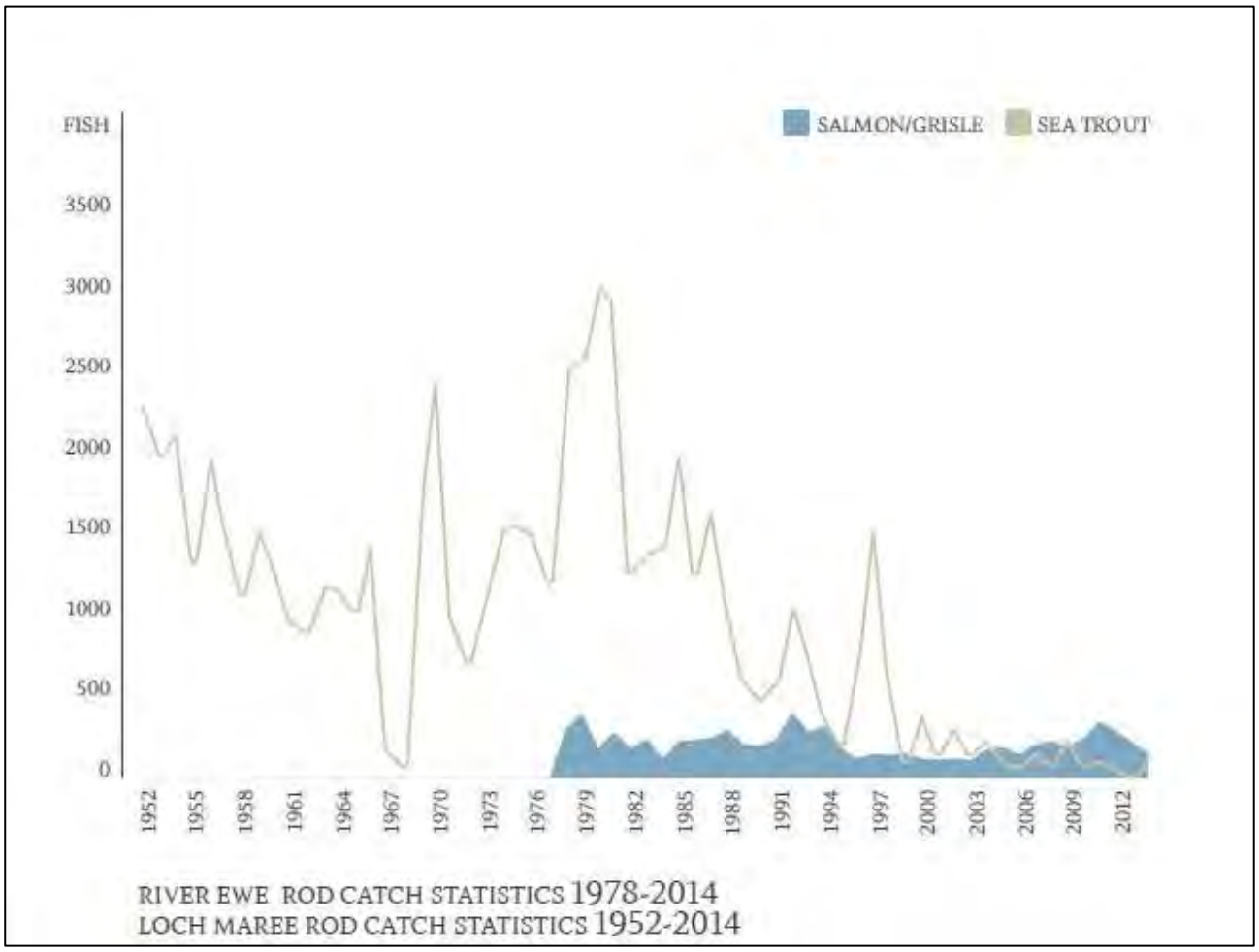
The angling sector would be right to be concerned about such a collapse yet, the Clayburn sea trout fishery has never been discussed within the sector. In fact, most people consulted had never heard of the Clayburn Fishery District. It might be thought that fishery managers would be keen to understand why the fishery has collapsed in this way. Given that salmon farming is often blamed for the decline of wild salmonid fish along the west coast, it may be rather surprising that Clayburn has not been highlighted as yet another example of a fishery damaged by salmon farming. The reason why may be because Clayburn collapsed four years prior to the arrival of any salmon farm in the vicinity. This might pose the question that whatever caused the collapse of the Clayburn sea trout fishery may be equally responsible for the collapse of other fisheries in the region. The collapse of the Clayburn sea trout fishery remains a mystery. The only reference that the author has found relating to this fishery is in a report published by the local fishery trust in 2014.

They state that “catches for the Clayburn area declined by around 2,000 fish per annum in the 1980’s (sic) it is not clear if this reflects fish abundance or is an artefact of the way fisheries are managed or data was collected or partitioned. Until this can be determined

trends in catches for the fishery should be interpreted with particular caution." In other words, they have no idea but clearly if they didn't know by 2014, then it is unlikely that they will ever know what really happened to the Clayburn fishery in the late 1970s.

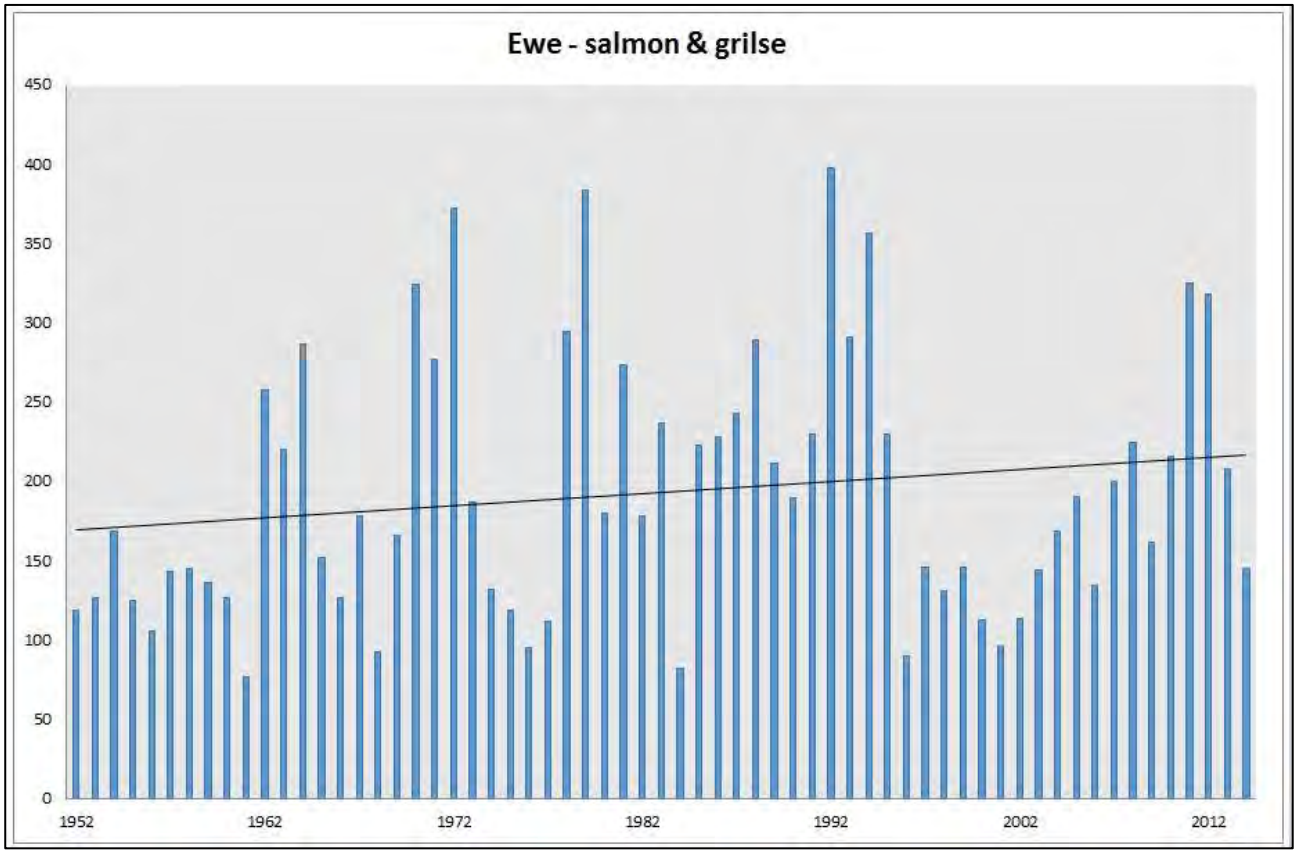
The collapse of the Clayburn sea trout fishery is very different to the decline of that in Loch Maree and is indicative that every fishery district may not be the same in terms of the state of its fishery. Those who object to the presence of the salmon farming industry, such as the Petitioner, often focus on the collapse of the Loch Maree sea trout fishery because it was so well-known within the angling sector. However, this narrow focus draws attention to just one part of the wild fish stock in the Loch Ewe System. The River Ewe has had a reputation for producing big salmon but the FishPal fishing website says that the river has taken a downturn in recent years.

The 2015 Annual Review of the Association of Salmon Fishery Boards includes a review of the catch data from the River Ewe. Their graph shows the salmon catch compared to that of sea trout. It is however unclear why the salmon data only begins in 1978 and not 1952 when the data was first compiled. The short length of the river is probably why the catch is relatively low compared to sea trout.



The author has accessed the Scottish Government catch data and produced a graph of the salmon catch for the Loch Ewe System from 1952.

The graph is surprising as it shows a clear upward trend. There are peaks and troughs but these occur repeatedly over the whole time series including during the years when there was no salmon farming in the loch.



The Petitioner states that wild salmonids along Scotland's west coast are in trouble yet the catch data for what was one of Scotland's most famous fisheries seems to suggest otherwise.

The Petitioner implies that young salmonid fish, migrating out to sea swim past salmon farms and pick up so many sea lice that the fish eventually succumbs leading to a decline in the number of fish eventually returning to the river. The two graphs, which are simply the number of fish caught by rod and line as reported to the Scottish Government, appear to question that premise.

(For clarification, the author is not suggesting that young salmonid fish swimming past a salmon farm might not pick up sea lice. Sea lice are after all a natural parasite that pass normally between salmonid fish. The question posed by this petition is whether there is a negative impact on wild salmonid stocks).

Since 1989, the angling sector has said that young sea trout swim down the River Ewe into Loch Ewe and pass by the salmon farm picking up sea lice. However, salmon also swim down the River Ewe into the loch and out to sea passing the salmon farm on the way.

The question posed here is if the salmon farm is having a negative impact on sea trout numbers, why are salmon not suffering in the same way. The catch data suggests completely the opposite and that over the years, the number of salmon has been increasing.

If sea trout are succumbing to sea lice infestation, why are not the salmon?

So far, no-one from the angling sector to who the author has spoken to has been able to answer that question. The only other hypothesis is that whilst some individual fish are affected by sea lice, the decline of wild fish numbers on the west coast may not be the due to the presence of salmon farms.

The author has subsequently analysed the catch data from all 109 fishery districts in Scotland in relation to large salmon, grilse, salmon & grilse together and sea trout. The result is over 500 trend graphs (which can be supplied to the Petitions Committee if required). It is clear that the situation is different in every fishery district.

However, the overall patterns of trend that are apparent are that sea trout are in decline on the west coast but that they are in decline all over Scotland and were in decline long before salmon farming arrived in Scotland.

Large salmon have also in decline for many years but grilse numbers have increased,

On the west coast 59% of rivers have at least one stock that has increased. By comparison, 62% of east coast rivers, where there is no salmon farming, has one stock that is in decline.

It is a possibility that on some rivers, the presence of a salmon farm may have contributed to a decline that was already well advanced although there is no evidence to either confirm or reject this view. The analysis of catch data from all Scottish rivers does not support the claim made by the Petitioner that salmon farms are responsible for any observed decline in wild fish numbers.

Dr Martin Jaffa
Callander McDowell

Additional references:

Rural Affairs, Climate Change and Environment Committee 09 March 2016

Subordinate Legislation- Conservation of Salmon (Scotland) Regulations 2016 (SSI 2016/115)

Marine Scotland Science Report 03/14 - Status of Scottish Salmon and Sea Trout Stocks 2013

http://www.salmon-trout.org/files/pdf/Salmon-Five-Point-Approach-Restoring-Salmon-in-England.pdf