

18th July, 2010.

The Chairman,
Petitions Committee,
Scottish Parliament,
Holyrood,
Edinburgh.
EH99 1SP.

Dear Sir,

Petition PE1336

1. I have read through the above Petition and would like to make various comments and observations. The inference of the Petition is two fold. Farmed Salmon in salt water growing cages infect wild Salmon with sea lice which in turn cause mass mortalities in wild Salmon/Sea Trout populations. Salmon Smolt production units in fresh water locations cause mass release of “hybrid” salmon thus altering local genetic strains.
2. The commercial farming of salmon and on growing in salt water did not start in the UK until the late 1970’s yet statistics show that stocks of wild Salmon have been falling since the late 1950’s early 1960’s. There were high mortalities in wild Salmon in the late 1950’s early 1960’s caused by a major ulcer disease. There is a published paper showing that in circa 1940/41 there was high mortalities in wild Salmon in the St George area of New Brunswick, Canada, caused by massive infections with sea lice. This was some 30 years before rearing of Salmon in salt water was even considered, never mind practiced. The sign of freshness of a wild rod caught Salmon in Scotland has always been the number of fresh sea lice on the fish!
3. There may have been justification in the theory that farmed Salmon are a breeding ground for sea lice that decimate Salmon stocks but for one major point. The commercial farming of Salmon in salt water and fresh water is confined to the West Coast of Scotland and in particular between the Kintyre Peninsular and Cape Wrath. Statistics show that the

demise of wild Salmon numbers is affecting all Scottish rivers and in particular East Coast rivers i.e. those rivers nowhere near Salmon farming operations.

4. There are two species of sea lice that attack Salmon and Sea Trout. *Lepeophtheirus salmonis* is specific to Salmon. *Caligus* is a smaller sea lice and is commonly found on Herring, Mackerel and other fish species that Salmon feed on in the wild or encounter, especially in coastal waters. Lice go through various growth stages including a period of free swimming in the water column. It is believed that adult *Caligus* will “jump” from fish to fish, *Lepeophtheirus salmonis* tend not to. The amount of activity and the frequency of breeding by sea lice is tied specifically to water temperature. The warmer the water temperature the faster the life cycle. It could well be that with Global Warming and rising sea temperatures, sea lice are breeding faster in sea areas to the north than they have in the past. Whether it be fish or animals, it is well known that undernourished animals etc are more prone to parasite infections than health ones. The nutrition and diet of wild fish will be discussed later in this document.
5. Farmed Salmon are free of sea lice when they are transferred to salt water growing cages. Farmed Salmon are infected with sea lice that have come from wild fish in the sea environment. Under various accords and local management agreements salmon farmers regularly sample their stock, carry out a count of sea lice and their growth stages. From such data co-ordinated sea lice treatments are carried out to reduce the sea lice population on the farmed salmon. Various products are used to treat Salmon infected with sea lice. A popular product is added to the feed. This reduces the volume of chemical released in to the environment. Another chemical is hydrogen peroxide. When discharged in to the environment it breaks down to water and oxygen, increasing the oxygen content of the water to the advantage of all fish. Sea lice “knocked off” treated salmon are eaten by other fish species and crustaceans. Sea lice killed during hydrogen peroxide treatments do not have any chemical residues.
6. Over the centuries two legislative controls have controlled the taking of wild Salmon. Net sizes are controlled and the season for taking wild salmon is controlled. In the use of salmon nets, whether they be sweep nets, coastal bag nets or illegal gill nets, the biggest,

fastest growing largest most prolific egg laying fish are constantly taken while smaller lower egg producing fish are released. The upshot is that for centuries man has been manipulating the salmon gene pool by selective culling. Fish lay egg numbers in proportion to their body size i.e. a fish will produce approximately 1000 eggs per kilogram of body weight. One thousand 10 kilogram fish will produce similar amount of eggs to approximately 2000 fish weighing 5 kilogram. Therefore studies into the decreasing numbers of wild Salmon numbers should look at the average weight of wild Salmon to ascertain if the decrease in numbers is due to average salmon weight rather than external reasons such as fish farming.

7. The Petition makes concerns about the practice of rearing juvenile Salmon in open fresh water systems. This is nothing new as many large estates boasted their own hatcheries from the turn of the 19th Century for restocking their own rivers. The Salmon and Trout Association encourages the restocking of Rivers with Brown Trout, a cousin of the Sea Trout. To facilitate restocking of rivers, Trout are moved from one river system to another without any apparent consideration to the loss of local gene pool fish nor the transfer of disease and parasites. The Salmon and Trout Association also encourage the stocking of Rainbow Trout, a non native species in fisheries in Scotland. Not all restocking of Rainbow Trout is done in contained water systems. In investigating the demise of Salmon and Sea Trout numbers in Scottish waters and the perceived transfer of diseases within fisheries/river catchment areas, the impact of restocking with non “local” trout species should be investigated.
8. Salmon and Sea Trout have many parts to their life cycle. Egg laying, incubation, hatching and early development in fresh water before running to sea to feed and grow before returning to the rivers of their birth to spawn and repeat the cycle. The percentage of adult fish making repeat spawnings is unknown. Obviously the more times they can do it, the better chance of increasing stock numbers. Modern tracking technology could and should be used to gain insight in to this part of the life span of Salmon and Sea Trout.
9. The Petition makes mention of the use of chemicals to control sea lice on farmed Salmon. What has not been discussed is the fact that the same chemicals that are used for controlling

sea lice on salmon are used to control external parasites on sheep. Formulations for controlling sea lice are designed to break down quickly in the environment whereas formulations for sheep are more persistent in order to give a longer period of cover. A fish farmed is restricted as to the total quantity of such chemicals it can use per day and per year on a site. No controls exist for sheep farmers. There is a documented case of sheep dip being washed off sheep during rain showers and subsequently entering river courses, killing vertebrae and thus reducing fish numbers. Certain anthelmintics used to control internal parasites of sheep and cattle are known to be persistent in the environment when excreted from the animal in faeces. What studies have been done to ascertain the impact of general agricultural pollution on the stocks of Salmon, Sea and Brown Trout? It has been noticed in some water courses, "improvement" in water quality have been coincidental to demise in fish stock levels. By "improving" water quality has Government Regulations actually sterilised water systems?

10. Spawning and survival in fresh water is part of the key to survival and intensity of Salmon and Sea Trout stocks. Most spawning grounds are in the upper head waters of major rivers and their tributaries. Maintenance of these waters is ignored. Over grazing by sheep and deer have had a major impact on fauna, especially deciduous trees at the waters edge that provided both shelter and food. Major drainage schemes in the uplands have caused quick run off of water during periods of precipitation leaving many streams and rivers dry at some and long periods of the year. Fish cannot survive without water. Changes in weather patterns have also added to this problem. Water flow levels are not apparently maintained or monitored by land owners/managers. This coupled with some older forestation schemes have decimated fish stocks in some areas. The legal protection of some predator bird species has had a part to play in the demise of over all fish stocks. Land management, or lack of it, has had a major impact on the sustainability of Salmon, Sea Trout and Brown stocks.
11. The sea phase of the Salmon and Sea Trout life cycle is the period where they eat and grow in order to produce the eggs and spawn before returning to the rivers. Recent decades have seen the massive drop in stocks of all sea fish species. Some of these form the staple diet of Salmon and Sea Trout while they are at sea. I have experienced catching "Finnock"

(small Sea Trout) at the mouth of the River Spey. These fish had big heads but very small bodies, a sign of starvation. If there is a demise in species of fish that Salmon and Sea Trout utilise as their main diet, then their will be starvation, malnutrition which will lead to mortalities at sea, lower numbers of fish returning and those that do in poor condition spawning fewer eggs and milt.

12. It is well documented that sea temperatures have risen in recent years along with Global Warming. It is known that fish follow water temperatures rather than the calendar when moving around the shore. Suggestions are that sea fish species that make up the staple diet of Salmon and Sea Trout have moved further off shore at the time that juvenile Salmon and Sea Trout enter the sea. If that is the case then starvation could be a major problem for these migratory fish. However, it may be that because of Global Warming, Salmon and Sea Trout are maturing earlier in the fresh water environment and this heading to sea earlier than traditionally done, thus entering the sea before the species that form their staple diet do. Studies need to be commissioned to ascertain what is happening with the food chain when Salmon and Sea Trout do enter the marine environment.

13. Fishing methods at sea have a major impact on the environment and the sustainability of fish stocks, irrespective of the species. Some inshore fishing methods use what can only be described as agricultural harrows to dig up the sea bed in order to flush the target species out in to the dragged nets. This does irreparable damage to the sea bed, fauna and the food chain. An example of this was shown up a few years ago when scallop fishing was banned on the West Coast and around the outer islands due to a toxic algal bloom. Commercial fishing with nets for scallops was banned for a period of about 9 months in some places. The following two years saw massive Salmon and Sea Trout runs to West Coast Rivers in the area of the ban. This is a fact that has been ignored by environmentalists when condemning fish farming methods. Sea fishing happens all around the coast of Scotland, therefore will have a far greater adverse impact on wild fish numbers than fish farming sites. Sea Trout feed close to the mouth of the rivers where they were spawned. Thus heavy inshore bottom net/drag fisheries will have a major impact on their environment and sustainability.

14. It was well known that there was an illegal drift net fishery off the West Coast of Scotland operated by Irish fishing boats. Is that industry still in operation and if so what impact does it have on stocks of Salmon? What impact does the Danish Sand Eel fishery have on stocks of Salmon from Scottish waters? As the Sand Eel and Capelin populations wane and rise, a similar situation is seen in sea bird numbers around the Coast. Has any studies been done to correlate the figures between certain fish species, sea bird colony numbers and Salmon and Sea Trout stocks?

15. One contentious subject to do with Salmon and Sea Trout numbers is Seals. A Seal does not eat a whole fish, it only takes a bite out of one. Therefore a Seal will kill up to 10 times the weight of fish it actually eats. Seal numbers do cause concern in certain areas. The Cromarty Firth is calculated to have approximately 650 Seals while Findhorn Bay on the Moray Firth has a population of over 350. These high numbers are bound to have a major impact of fish numbers and sustainability. Such is the dearth of sea fish species, it is now common on some rivers to see Seals some 4 to 5 miles inland. One never hears the wild Salmon lobby complaining about Seal numbers where their rivers are near to fish farms!

16. I was born in Buckie and spent my childhood at the mouth of the River Spey. I have been an angler for some 50 years. I was a Founder Member and Trustee of the Forth Fishery Conservation Trust. I was a member of the Scottish Office Working Party on Construction Materials of Salmon Nets. I have submitted various Petitions to the Scottish Parliament on matters relating to fisheries, river erosion and costal erosion. I own a business that develops and markets non chemical products for improving the health and nutrition of farmed and ornamental fish. In the early 1990's I developed the technique for using hydrogen peroxide as a bath treatment for farmed Salmon and Trout in Salt water. The technique and products were subsequently approved for use in fish farming by the authorities in the UK, Ireland, Canada and the USA. I am a member of a Canadian Federal Government Working Party looking at a Sea Lice Management Strategy.

17. Should the Petition Committee decide that an investigation in to the link between sea lice, farmed Salmon and Wild Salmon is necessary, I would suggest that the Scottish Parliament make contact with the Government of British Columbia in Canada who have researched this

subject in great depth. It should be noted that many who claim to be environmentalists with an interest in protecting wild Salmon and Sea Trout, actually have a commercial interest in their sustainability. The leasing of Salmon and Sea Trout rod fisheries in Scotland stimulates a large tourist industry.

Yours faithfully,

James A Mackie