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5th February 2011.

For the attention of: Tim Porter, Cragg Ross Dawson, 18 Carlisle Street, London W1D 3BX.

Dear Mr. Porter, Marine Scotland Public Consultation on Aquaculture in Scotland.

Thank you for your email of 14th January 2011 and the invitation to comment on the aquaculture (fish farming) public consultation being organised by Marine Scotland with respect to this industry in Scotland. MARINET represents Friends of the Earth England Wales and Northern Ireland (FOE EWNI) on marine issues, and we are pleased to participate.

We note your advice of 14th January that all communications will be treated as strictly confidential and anonymous. However, we advise that we wish you to attribute these comments to MARINET and when we speak to you on the telephone, as part of the agreed follow-up, we would be grateful for a written transcript from yourself of this conversation so that we may verify and sign it for you as being an accurate record.

We offer here our written comments in accord with the subject headings specified in your email of 14th January.

Food Production generally, and fish and shellfish as food sources specifically.

MARINET will not comment specifically on food production generally as our field is marine as opposed to terrestrial, other than to say that FOE EWNI believes that all food production must be undertaken on a clearly demonstrable sustainable basis where respect for the integrity of the environment and its ecology is paramount. Food production on this basis is fundamental to the development of a world society capable of living within and with respect for planetary limits.

With regard to food production derived from fish and shellfish sources, MARINET believes that the harvesting of wild populations must be undertaken on a sustainable basis. In this context sustainable means where stocks are harvested at levels which do not lead to their decline (e.g. being overfished so that their natural regeneration is compromised), and at levels that do not lead to wider ecological damage (e.g. use of fishing methods such as intensive trawling or indiscriminate netting which affects non-target species and damages marine ecology in a wider context).

MARINET believes that if the harvesting of wild populations were undertaken on a sustainable basis, then there would be little need for fish farming (other than in a specialised context i.e. seeding of shellfish beds with wild stock, and the use of freshwater fisheries in conjunction with other farming methods i.e. herbivorous species – such as carp – reared in rice paddies in Asia or in conjunction with water conservation in the UK). Therefore, the **primary emphasis** of fisheries management policy must be on action to protect and rebuild **wild fish stock populations**, rather than the development of alternative methods of aquaculture which are, at best, a substitute for wild populations and, at worst, contributing to the damage and further decline of wild populations. For example, MARINET would like to see the rebuilding of wild salmon populations to historic levels, rather than accept the collapse of these wild populations and the introduction of the farming of salmon as a substitute. If this policy were to be so, the ecological benefits would be immense, and the quality of fish in terms of nutritional quality would be far greater.

With respect to shellfish, MARINET would like to see the **primary emphasis** of management placed on action to restore water quality and fisheries management practices so that **wild populations** of all types of shellfish may be harvested in all marine areas. At present, this is not practical due to fishing practices (intensive trawling) and due to pollution and the consequential contamination of stocks.

This approach, described above, is essential if we are to restore ecological equilibrium to our marine environment. This equilibrium is currently under severe stress, and requires immediate action in terms of the management of human activities, particularly the fishing of wild populations (the primary cause of this stress). Aquaculture is, within this context, largely an admission of defeat and consequently it is, generally speaking, not a solution nor an intelligent, viable response in terms of the restoration of ecological equilibrium.

Where fish farming does occur, it must be undertaken on an **organic basis** (as defined by an accepted accreditation agency, such as The Soil Association). If aquaculture (carnivorous and herbivorous species) can be undertaken in such a manner, it has a place alongside the primary purpose of fisheries management, namely the sustainable harvesting of wild populations.

Farmed fish versus wild fish as food sources.

As we have already stated, the primary emphasis of fisheries management must be on the protection and regeneration of wild fish populations. This is a planetary, ecological necessity; and, is the **only way** we can ensure that fish remain a primary, sustainable food source for the human population long term.

It is to be noted that the farming of carnivorous species (e.g. salmon, cod) requires three times the body weight of the farmed fish to be obtained in the form of wild fish protein in order to feed the farmed fish.

If wild fish stocks were abundant, this might be acceptable. However, EU wild fish stocks are not abundant and 80% are overfished, with 30% of these beyond their safe biological limit (ref. EU Green Paper on the Common Fisheries Policy 2009). Therefore, in order to feed carnivorous farmed species, additional pressure is being placed on wild populations. Further, if non-commercial fish species are targeted as fish protein for farmed fish (e.g. sand eels), this impacts on seabirds and other marine animals which are dependent on these non-commercial species as their primary food source.

It can be argued that wild salmon also eat three times their body weight in fish prey. However, there is an essential difference. Wild salmon, like cod, take their food from a naturally

functioning ecosystem where they exist as a key predator near the top of the food chain, and their behaviour and selection of prey is part of a naturally functioning ecological balance. In the case of fish farming the collection by humans of fish protein as feedstock is indiscriminate and takes no heed of the needs of the balance in a naturally functioning ecosystem. It is supplying fish protein to carnivorous farmed fish that is not necessarily their preference; and, it is not allowing any natural system of predation to function. Sourcing fish protein as feed in this manner is, therefore, negative in its ecological impact.

If the fish quota system for wild harvesting were to work differently, and were to require all fish which are caught to be landed (instead of permitting a substantial percentage to be discarded), then the non-marketable component of the catch could be converted to fish protein for aquaculture. The benefit of this sourcing of fish feed protein would be a reduced pressure on wild populations, but it must still be observed that the natural manner in which wild salmon and cod predate and bring balance to the natural functioning of the marine ecosystem would still be absent.

In short, the fish protein required to feed carnivorous farmed fish will still be placing increased stress on a marine ecosystem already under substantial duress due to over fishing and, at worst, it will still be making a significant additional contribution to that stress.

Fish farming is **not** the solution to the collapse of wild fish populations. The solution to the collapse of wild fish populations is proper management of those wild populations which, in many instances, means a cessation of harvesting until those fish populations are rebuilt, and the ecological structure on which those wild populations depend is restored. Fish farming of carnivorous species is definitely not contributing to such a management approach and, indeed, is in most instances inimical and injurious to the success of that approach.

It is also to be noted that intensive, non-organic fish farming places other forms of stress on wild populations. For example, lice on farmed salmon (present largely due to the intensive nature of fish farms) are transferred and readily affect wild salmon passing in the vicinity of those farms, and the pharmaceuticals and pesticides used to control such parasites and other diseases in the farmed stock are dispersed into the surrounding marine environment, contaminating the marine species which live there. In short, fish farms contribute to ecological disturbance. Fish farms also produce considerable quantities of faeces which, in turn, alter and disturb the natural ecological balance.

Non-organically managed fish farms, and particularly intensively stocked fish farms, are therefore **not** a benign force on the marine environment. In order to explore this proposition further it is **our recommendation** that scientific research is urgently required which studies the impact of fish farming on the ecology of nearby river systems *compared* to the ecology of river systems where there is no fish farming in the vicinity.

In terrestrial agriculture, there are standards which govern the use and administration of chemicals and pharmaceuticals, particularly with respect to the target livestock. Have such standards (and the rigorous long-term testing which supports those standards) been established for aquaculture and, if so, who and how are they being enforced? At present, MARINET is not aware of any clear yardsticks in this area.

Also, in terrestrial agriculture, intensive farming practices (which have to be sustained artificially by pharmaceuticals) are now, in theory, rigorously controlled and assessed in terms of their immediate and wider environmental impact (e.g. pharmaceutical residues and the presence of pathogens in chickens – albeit often unsuccessfully regulated, it might be added). MARINET is not aware of any clear regulatory regime in this regard for intensive fish farming and, indeed, whether there is any limit on the intensity of fish farming (population density) other than the physical limits of space itself.

In respect of adequate containment (netting and prevention of farmed fish escaping into the wild), MARINET notes the repeated reporting of failures in containment, and is not aware that adequate regulatory standards are in force.

In respect of the regulatory regime itself, MARINET notes that the Salmon and Trout Association reported in November 2010:

"In March Marine Scotland informed the industry that it would be publishing details online of certain inspection reports on salmon farms relating in particular to sea lice infestations and fish escapes, carried out under the terms of the Aquaculture and Fisheries (Scotland) Act, given a ruling by the Scottish Information Commissioner that such information should be in the public domain.

"The industry's trade body, the Scottish Salmon Producers Organisation (SSPO), responded threatening Marine Scotland with legal action if any company's business was "compromised" as a consequence. Marine Scotland then announced that it was suspending the publication plan and reviewing the situation in light of the issues raised by SSPO. In October Environment Minister Roseanna Cunningham confirmed that no audits or inspections of fish farms had taken place since March 2010." (Ref. <http://www.marinet.org.uk/latestnews.html#ctss>).

MARINET is greatly concerned by this report. It seriously undermines confidence. We further ask whether proper Environmental Impact Assessments are being conducted at the time of licence applications, and whether these EIAs are being undertaken on the basis of freely available, objective evidence if the above reported suppression of evidence is taking place ? Further, are these licence applications being sufficiently advertised at the time of their submission, thus enabling the public to comment freely ?

Looking to the future, a matter of fundamental importance is whether aquaculture embraces genetic modification (GM). The principal proposal at the present time is the genetic modification of salmon. Ref. <http://www.marinet.org.uk/latestnews.html#uccs> and <http://www.marinet.org.uk/latestnews.html#fggs> and <http://www.marinet.org.uk/latestnews.html#itgh>

MARINET believes that the genetic modification of farmed fish is unacceptable.

In the case of the salmon proposal (references above), where salmon is being crossed with Norway pout resulting in a GM fish that grows at twice the rate of natural salmon, there is a substantial risk that wild salmon will be eliminated from our seas. This is because GM salmon will escape from the fish farms (over 100,000 escaped in March 2010 from a UK fish farm, ref : <http://www.marinet.org.uk/latestnews.html#uccs>) and only 98% will be infertile. Thus, given the growth advantage introduced by the genetic modification it is very likely that, over time, the entire salmon genetic pool will be affected and only stocks carrying the GM genes will survive because of the competitive growth advantage. This means the natural salmon will become extinct. In turn, its replacement by the GM variant will likely have serious ecological impact as the GM variant's feeding behaviour (appetite and prey selection) will be different from natural salmon.

This corruption of the natural ecology of our seas is unacceptable, both in terms of moral principle and in terms of its practical consequences.

Under no circumstances must GM be introduced to aquaculture unless the ecological consequences can be shown to be benign or, at worst, entirely neutral.

Overall impressions of the aquaculture industry.

In the main, the aquaculture industry and its development in the UK is a response born of our society's refusal to acknowledge and to remedy the adverse impact of human activity (over fishing and pollution) on wild stocks. This is particularly true in the case of carnivorous species.

Fish farming is seen as a remedy and a solution to collapsing wild populations. It is not, and this is a wholly mistaken response. The only way to solve the collapse in wild populations is the adoption of management policies which will restore wild population stock sizes e.g. the ecosystem approach to marine management supported by a suite of management tools, using marine reserves in particular.

The aquaculture industry, and particularly the marine and carnivorous species side of the industry, is operating on an unsustainable basis (it needs to employ organic principles in order to be sustainable) and it is leading to further intensification of the ecological stress being experienced by our marine, coastal and estuarine waters.

The aquaculture industry is being driven by commercial costs, rather than environmental and ecological responsibility. Whenever there is a choice between the "supermarket price" of the product and the best environmental management approach, it is the commercial consideration that holds the trump card.

There is a strong feeling among MARINET members that the commercial companies in the industry should be employing best environmental practice and that *this* would be their best marketing strategy, not price.

There is a strong perception amongst MARINET members that this public consultation itself by Marine Scotland is about improving the *image* of fish farming, rather than improving the reality.

There is also a strong suspicion amongst MARINET members that the commercial companies do not really care about their environmental impact, and that best practice based on environmental principles is an irksome encumbrance which they could do without - ref. the alleged suppression of the recent Marine Scotland report on the environmental impact of the industry <http://www.marinet.org.uk/latestnews.html#ctss>

Perceptions of the benefits and problems associated with fish farming.

Answers to this question have, largely, already been supplied above. However, it is important to stress that fish farming is **not a solution** to declining wild populations and, in many respects, the development of the industry is frustrating the adoption of the urgent policies required to restore and rebuild wild populations. This is partly because the supporters of the industry are purveying a myth that aquaculture can replace wild populations and meet the market's demand – a myth which is wholly unfounded and extremely damaging because it is distorting and concealing reality from the decision-makers in the political arena; and, also, because the supply of fish protein to feed the fish farms and the particular management policies within the fish farms (use of chemicals and pharmaceuticals) is intensifying the collapse of ecological structure in our seas, coastal and estuarine waters.

Herbivorous fish farming and the judicious practice of shell fish farming has a better case to argue, but it is essential that development in this area is supported fully by objective environmental impact data. As earlier, we express serious doubts whether the environmental

impact assessment process (EIAs) is operating properly. EIAs need to be undertaken independently of the commercial companies, and it is **our recommendation** that Marine Scotland commission a **Strategic Environmental Impact Assessment** of the aquaculture industry.

Views on public perceptions of fish farming – what people know and feel about it.

MARINET believes that the general public is not being properly informed by both government and the industry about the management policies which need to be adopted and pursued in order to rebuild wild fish populations, nor is the public being informed properly about the environmental impact of aquaculture, particularly the carnivorous-based side of the industry.

For example, in England, the Food Standards Agency recommends that only one portion of farmed salmon be eaten by a person per week because of the range of toxins present in the farmed fish. This reality is largely unknown.

Also, much farmed salmon is marketed in English supermarkets as being “responsibly sourced” when no definition of this phrase is available. Foregoing remarks by us make this assertion appear highly suspect.

People generally believe, in their ignorance, that fish farming is being undertaken responsibly and that the industry can solve the serious problems in supply of fish created by the collapse in wild populations. Neither government, Marine Scotland nor the industry itself is behaving responsibly in this regard and explaining the true situation to the public.

Information about the fish farming industry: whether there should be more and, if so, what might encourage people to eat more farmed fish ?

Information, in an accurate and objective form, is the bedrock of sound decision-making. It is what enables a democracy and a market to function properly.

Clearly, there should be more information. Information at the present time is largely conspicuous by its absence.

Will information encourage more people to eat farmed fish ? This largely depends on the story which this information purveys.

It is the strong suspicion of MARINET that the industry, and government, is concealing information at the present time because this information portrays an industry that is not functioning on a sound environmental basis and, further, is contributing to the severe ecological stress being experienced by our seas.

If the aquaculture industry is to prosper, and equally if not more importantly is to develop and function in an ecologically responsible manner, then it has to assess itself objectively and fully publish such assessments, and develop policies with public approval which will place the industry on a sustainable basis.

Our society urgently needs this industry to behave in this manner. We need the industry to behave in this way because it is imperative for us to achieve marine “food security” on a sustainable basis (our society is rapidly losing marine “food security” at the present time), and because food security, if it is to be achieved, requires the marine environment and the ecological structure of our seas to be in a sound condition as a **prerequisite**.

Communications about fish farming, whether it is needed and, if so, what should it say ?

Yes, such communication is a **fundamental** necessity.

It should cover all the issues addressed above, without exception, and should do so in a wholly open manner.

What should it say ? It should talk about the truth, and where this is not known it should commission research so that the truth can be known.

It is on this basis that sound economic markets and democracies function.

These, therefore, are the comments of MARINET. As earlier advised, we will be making these comments available publicly and we look forward to receiving your telecommunications in order to clarify and amplify and matters contained in this submission.

We thank you for the opportunity to comment.

Yours sincerely

S. D. Eades.
On behalf of MARINET,
Friends of the Earth Marine Network.

Scottish fish farming additional questions and reply 14 February 2011.

Questions supplied by Marine Scotland and their consultant : Cragg Ross Dawson, 18 Carlisle Street, London W1D 3BX.

MARINET replies in blue.

Aquaculture and salmon farming

- Aquaculture accounts for nearly 50 percent of the world's food fish. In 1980 only 9% of the fish consumed by people came from aquaculture.
- At present, the UN Food and Agricultural Organisation places the figure at 45%, with 50% projected for 2015. Also, the overwhelming proportion of the world aquaculture figure arises in the Far East, with China supplying 67% and Asia 22% (Source: FAO). Further, most of the Chinese production is of freshwater species, principally cyprinids (carp species) which are largely herbivorous, and the Asian production is principally penaids (prawns) and oysters. The latter are marine species, but place little load additional load on the harvesting of wild marine populations for fishfarm food protein.

The reality relating to the 50% figure is therefore very different from the reality that would be brought about by an expansion of the Scottish marine fish farming industry, and the statement that 50% of the world's fish food is accounted for by aquaculture is misleading with reference to Scottish fish farming because the nature of the industry elsewhere globally (China, Asia) is substantially different.

- The UN FAO reports that aquaculture is the only way to meet the surging demand for seafood.
- We are not aware of this statement or its reference. However, if the FAO has made it, it is incorrect. Most marine fish farming in the NE Atlantic involves carnivorous species (e.g. salmon, cod), and feeding these farmed fish requires 2 and a half units of wild fish protein to yield 1 unit of farmed fish (Source: Prof. Daniel Pauly, Professor of Fisheries, University of British Columbia <http://www.latimes.com/news/nationworld/nation/la-me-salmon9dec09,0.2475812.story>)

Further, as wild populations of commercial fish decline and are fished out (ref. Newfoundland, Canada and EU seas) the availability of wild commercial fish populations to feed fish farms becomes virtually non-existent. Pressure therefore moves onto wild non-commercial fish populations, and if fish farms expand as predicted (see FAO figures), then these wild non-commercial fish populations will also decline and become fished out. Therefore, under this scenario (marine aquaculture replacing harvesting of wild marine populations), there will be an extensive collapse in the existing marine ecological structure. The planetary consequences of this are uncharted and unknown, but most likely to be benign to human society.

As we have said elsewhere, the only way to achieve “food security” in respect of fish is to **rebuild wild populations** and to pursue management policies which will bring this about. Aquaculture is **not and cannot** be a substitute for this. Examine the logic. There is no other conclusion.

- The Food Standards Agency recommends that people should eat 2 portions of fish a week, with one portion an oily fish.
- This is sound nutritional advice. Only it should be remembered that the FSA also recommends that **only one** of these weekly portions should be of fish from fish farms because of the levels of toxins present in farmed fish.
- Fish and seafood from cold water are the major source of omega-3 oils; these help combat coronary heart disease, high blood pressure, kidney disorders and mental health problems.
- This is correct.
- Salmon farming in Scotland employs over 1,500 people directly
 - We do not have any information enabling us to comment on the accuracy of this statement. However, consider too the number of people who were employed in the fish and fish processing industry when wild fish populations were once abundant in UK seas. This level of employment was very many times greater than the current salmon fish farming figure, and sustained it coastal communities all around the UK.
 - It supports a further 4,700 jobs in associated businesses
 - The same comments from above reply apply in respect of this figure.
- Salmon is Scotland’s largest food export; the Scottish salmon farming industry exported more than 13 million fish in 2009
 - The Scottish Government reports “Scottish seafood exports are estimated to be worth around £500 million, representing more than 62 per cent by value of total Scottish food exports (£805 million). Scottish vessels account for approximately 66 per cent of the UK fleet, land roughly 70 per cent of the UK catch, and capture the bulk of the world’s langoustine supplies. Scotland is the world’s second biggest producer of farmed salmon, exporting to more than 60 international markets.” (Source: Scottish Government, 2011 <http://www.scotland.gov.uk/News/Releases/2010/04/26102053>)

It should be noted that, if properly managed, Scotland’s wild commercial fish populations would far exceed the value of aquaculture. This assertion is verified historically, with reference to the Scottish herring and cod fisheries which are now a pale shadow of their former selves (ref. *The Unnatural History of the Sea*, Prof. Callum Roberts, Professor of Marine Conservation, The University of York).

- Exports in the industry have increased by over 500% in the last twenty years
- Probably true, but of dubious statistical worth (i.e. 500% of what figure ?).
- The worldwide retail value of Scottish farmed salmon is over £1billion
- The total export value of Scottish seafood is currently £575 million annually (Source: Scottish Enterprise <http://www.scotland.gov.uk/News/Releases/2010/04/26102053>)

The figure of a retail value of £1billion for Scottish farmed salmon therefore looks like a bit of propaganda of dubious calculation. It is not direct revenue to the industry, or Scotland.

- 55 countries imported fresh Scottish farmed salmon in 2009
- We believe this to be correct. How many countries imported Scottish whisky ? How many countries imported Scottish marmalade ? How many countries imported Scottish porridge oats ?

This is a propaganda statement of dubious worth.

- Scottish farmed salmon has held the French Government's top quality award, Label Rouge, for the past 18 years. It was the first non-French food to receive this award.
- We believe this to be true, and our congratulations to the producers. However, did the marketing companies of Scottish wild salmon, which is of superior quality, seek this award. Often such awards are marketing tools and only given to those who seek them for marketing purposes, rather than reflecting the full nature of reality relating to the character and background of that food.
- Scottish farmed salmon has been awarded Protected Geographical Indication (PGI) status by the European Commission, setting it alongside Champagne and Parma Ham.
- Probably true. A useful marketing tool.
- The salmon farming industry is regulated at European, UK and local levels by a range of statutory bodies.
- In theory, true. However we draw your attention to the fact that such regulation is allegedly being manipulated by both the salmon farming producers and Marine Scotland, and that environmental reports on the impact of the Scottish industry being suppressed and unavailable to the public, see below:

“In March Marine Scotland informed the industry that it would be publishing details online of certain inspection reports on salmon farms relating in particular to sea lice infestations and

fish escapes, carried out under the terms of the Aquaculture and Fisheries (Scotland) Act, given a ruling by the Scottish Information Commissioner that such information should be in the public domain.

"The industry's trade body, the Scottish Salmon Producers Organisation (SSPO), responded threatening Marine Scotland with legal action if any company's business was "compromised" as a consequence. Marine Scotland then announced that it was suspending the publication plan and reviewing the situation in light of the issues raised by SSPO. In October Environment Minister Roseanna Cunningham confirmed that no audits or inspections of fish farms had taken place since March 2010." (Ref. <http://www.marinet.org.uk/latestnews.html#ctss>).

- Members of the Scottish Salmon Producers Organisation go beyond regulatory standards and adhere to the *Code of Good Practice for Scottish Fin Fish Aquaculture*
The Code covers...
traceability of salmon
fish health, welfare and husbandry
environmental measures
feeding guidance
- Maybe true in some instances, but if this is true of the whole industry why was the Marine Scotland report of March 2010 suppressed (see above) ?