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***Report of the 2000 Special Liaison Meeting to Review Measures Taken by the European Union and its Member States to Minimise Impacts of Aquaculture on the Wild Stocks***

# **BACKGROUND TO THE EUROPEAN UNION AND OVERVIEW OF EUROPEAN UNION MEASURES TO MINIMISE IMPACTS OF AQUACULTURE ON THE WILD STOCKS**

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This presentation outlines the measures taken by the European Union to minimise the impacts of aquaculture on the wild stocks. At the 16<sup>th</sup> Annual Meeting in Westport, Ireland in 1999, Canada and Norway had a similar opportunity to show what they had done in those countries.

## **I. GENERAL INTRODUCTION**

The European Union is an international organisation which has its origins in the 1950s although some would say they went back earlier. The European community of nations now consists of more than 375 million people in 15 Member States stretching from the very edges of the Arctic Ocean right down to the Mediterranean Sea. The European Union countries range in size from Luxemburg with 350,000 people to Germany with more than 80 million. There is an ever-expanding list of countries wishing to join the European Union, but that is for the future.

With a production of over 8 million tonnes of fish both from fisheries and aquaculture, the European Union is the world's third largest fishing power after China and Peru. In 1995, a total of 1.6 million tonnes of fish were exported from the European Union, whilst imports totalled some 4.3 million tonnes. This resulted in an imbalance in the European Union of 6.5 billion euros.

The European Union fleet comprises more than 97,000 vessels of varying size and capacity, although there has been a decline over the last few years.

Jobs provided by fishing vary from region to region but, between the regions, some 260,000 fishermen are directly employed in actually catching fish, either in a full-time or part-time capacity.

Out of the total 8 million tonnes mentioned above, European Union aquaculture production is over 1 million tonnes. It provides some 35,000 full-time and 50,000 part-time jobs and has a value of nearly 2 billion euros. For the European Union, fisheries in general and aquaculture are both important economic activities.

This presentation gives a short overview of what the European Union (or the European Community) is all about. How does the Common Fisheries Policy fit in to the general framework of the European Union? What do we actually do at level of the European Union to minimise the potentially harmful effects on the wild salmon stocks?

The European Union has policies on aquaculture as well as on fish health. The remaining policies in the European Union are carried out at Member State level. This is because under the European Union Treaty, the Common Fisheries Policy covers the exploitation and processing activities of all maritime and freshwater fishery resources on the territory of a Member State, or in Community fishing waters or by Community vessels. At this stage, the Council of Ministers has not decided upon any specifying regulation to cover inland waters.

Presentations on the national measures taken in the United Kingdom (in particular Scotland), as well as in Ireland, to minimise the effects of aquaculture are given separately.

In 1999, estimates of total reported and unreported catches of wild salmon in the North Atlantic barely exceeded 3,200 tonnes. This comes out to about 650,000 fish!

If we compare that to the output of farmed salmon in the North Atlantic, where we are talking of 620,000 tonnes, this represents about one tonne of farmed salmon produced for every wild fish caught. It quickly becomes clear that we have a strong interest in all Contracting Parties of NASCO in being able to minimise potential negative effects of farmed salmon on the few remaining wild salmon. It goes without saying that in the European Union, as in other Contracting Parties to NASCO, a great number of jobs depend upon both the continuation of the wild salmon stocks as well as the success of the farmed salmon industry.

There now follows a brief introduction to the European Union's Common Fisheries Policy.

At the beginning of the 21<sup>st</sup> century (some might say at the end of the 20<sup>th</sup> century), we are increasingly aware of the dependence we have on our natural resources. Fishing and aquaculture are amongst the most important uses of our marine resources. It is easy to acknowledge that they provide a healthy and enjoyable food source; at the same time they create jobs in the coastal areas, whilst promoting the social and economic wellbeing of those areas.

The European Community's Common Fisheries Policy was set up for very specific reasons. It is the instrument used by the European Union for the management of both fisheries and aquaculture. It was created in order to manage a common resource and to meet the obligations set out in the original European Communities Treaties. These are the treaties, which initially established the European Community.

Fish are a natural and mobile resource and, as such, are considered to be common property. Our Treaties obliged us to set up a common policy in this area and this has resulted in common rules for us all.

It was in 1983 that the Common Fisheries Policy finally came into full being. This had followed a long process within the European Community through the 1960s and 1970s with the establishment of various policies in respect of fisheries. The Common Fisheries Policy is a policy which takes account of the biological, economic and social dimension of fishing.

There are four main areas into which the Common Fisheries Policy can be divided. These are dealt with briefly in turn. They are the conservation of fish stocks, structures (such as vessels, port facilities and fish processing plants), the common organisation of the market and an external fisheries policy, including non-Community member agreements and international organisations.

The conservation of fish stocks allows for fish to renew their stocks and reproduce. The Common Fisheries Policy sets maximum quantities of fish that can be safely caught each year. It involves the execution of a number of scientific studies on the main stocks (including salmon). With the help of the European Commission, the Council of Ministers, which represents the 15 Member States, decides on how much fish can be caught by the European Union fishermen. These catch quotas are then divided amongst the Member States. In

conjunction with this, in order to protect smaller fish, a number of technical rules are established. There is no allocation of salmon between the Member States. Salmon fisheries are restricted to taking place within 6 miles from the base lines and in inland waters. The scheme in the European Union is therefore more restrictive than the provisions set out in the NASCO Convention.

The European Union has also established a structural policy. This structural policy is designed to help the fishing sector adapt to today's needs. It covers vessels, port facilities and fish-processing plants. Fleet restructuring is planned for each Member State within Multi-Annual Guidance Programmes setting out objectives and the means to achieve them.

As part of the first set of common measures, the Community established the common organisation of the market. The objective of the common organisation of the market was to create a common market inside the Community and to match production to demand. Furthermore, it has helped to ensure stability, not only for the consumer, but also for the fishermen.

Finally, at bilateral and multi-lateral levels, it became necessary for the Community to have an external fisheries policy. This external fisheries policy establishes fisheries agreements with non-Community countries since, with the advent of extended fisheries zones, distant-water fishing vessels had lost access to their traditional fishing grounds. The Community also became involved in negotiations with international organisations and regional fisheries organisations, such as NASCO, in order to ensure rational fishing.

To recap, there are four main areas in the Common Fisheries Policy:

- Conservation of fish stocks;
- Structures;
- Common organisation of the market; and
- External fisheries policy.

In 1992, the Common Fisheries Policy was reviewed. From 2002, a further review will take place not only internally, but also at an international level.

The next part of the presentation deals with the European Union's structural policy as well as aquaculture and the environment.

## **II. STRUCTURES**

According to the most recently available figures, in 1997 the European Union's aquaculture production amounted to some 1.1 million tonnes in volume and to 1.9 billion euros in value, and provided approximately 60,000 jobs in terms of full-time equivalent, including upstream and downstream activities.

The major species groups concerned were fin-fish (446,000 tonnes) and molluscs (662,000 tonnes), with only a very limited production of aquatic plants and crustaceans. Fin-fish are the most valuable group.

The European aquaculture industry as a whole has slowly but steadily increased its production over recent years. Apart from short-term imbalances, the market as a whole has

nevertheless been able to absorb its output. Fin-fish production has increased by 100% every ten years in the last three decades.

European Union aquaculture is essentially focused on high value species, such as salmon, sea bass, sea bream, trout, mussels and oysters. For many of the species farmed within the European Union, the European Union is a world leader. However, on a global level, it represents only 3% of world-wide aquaculture production.

This does not really show the importance of the aquaculture industry for certain coastal regions of the European Union, where aquaculture businesses and associated activities make up a considerable part of the local economy and where alternative employment opportunities are limited.

Aquaculture is the only segment of the fisheries industry that has seen a slow but steady increase of employment over the last years. Moreover, plausible scenarios for the medium-term future suggest that the number of jobs in the European aquaculture industry could increase even further.

The European Commission considers that aquaculture can contribute further towards helping improve the supply of fish in the European Union and reduce the current substantial deficit. Furthermore, it can create employment in areas where alternatives to fish-based enterprises are rare.

It is possible for the aquaculture sector to further develop in the European Union, provided that there is recognition of the many obstacles that must be addressed and overcome. The key issues facing aquaculture development in the European Union are:

- Risk of over-production and saturation of markets within Europe with a consequent decrease in fish prices and profitability;
- Coping with increasing regulatory requirements and administration in general, particularly for small producers;
- Technical problems and risks and the need for technical innovation. There are particular requirements to stimulate species diversification, to reduce production cost and to reduce the current total dependence of intensive farming systems upon capture fisheries for feed;
- Need for quality market information and organisation in order to generate further market opportunities and diversification from high-value niche markets;
- Health and disease issues arising from natural phenomena and intensive culture; and
- Increasing competition with other users for available resources, including water and sites, coupled with growing public concern about environmental issues and increasing pressure for “clean and green” aquatic food products.

In recent years, the aquaculture industry has been required to make significant investments. These investments are still continuing. They are mainly due to the increasing constraints from environmental concerns and from competition for space and aquatic resources; and on the other side the rapidly changing conditions (threats as well as opportunities) of the market.

Public financial assistance to the aquaculture industry has to be seen in this context. It is a legitimate instrument in the European Union’s regional cohesion policy, as aquaculture businesses are, in fact, mainly present in areas whose economies are structurally lagging behind.

The Community supports aquaculture enterprises basically in two ways:

- Firstly, support is given by funding **research and development** through the Community Research and Technological Development (RTD) Framework programmes.

This started in 1989 with the Fisheries and Aquaculture Research Programme (FAR) which ran for five years and provided some 13.3 million euros for aquaculture research. It was followed by the AIR programme (Agriculture and the Agro-industry, including Fisheries, 1991 - 1994) which funded 34 aquaculture projects with grants totalling 18.5 million euros, and by the Agriculture and Fisheries Programme (FAIR) 1994 - 1998. The Fifth Framework Programme (1998 - 2002) will continue to give support in strategic areas. However, the bulk of the investment in aquaculture research is provided by European Union Member States' own national research programmes as well as by the industry itself.

- Secondly, support comes in the framework of Structural Funds, as **capital grant contributions** to the investment of production projects.

In this case, a financial participation from the private investor is always requested. This can differ according to area. The European Union has supported aquaculture enterprises through a variety of programmes. From 1983 to 1993, a total of 1,822 projects for the construction, modernisation or extension of fish farming units were funded with a total European Union subsidy of 304 million euros. Support continues today through the Financial Instrument for Fisheries Guidance (FIFG) programmes. In the programming period from 1994 to 1999, aquaculture has been given support of almost 300 million euros. Under the FIFG, the private investor's financial participation to the project can vary between 30% and more than 60% of the total investment.

In December 1999, the European Union adopted Regulation 2792/99, which renewed FIFG aid to aquaculture. In this framework we are currently negotiating with the Member States structural development programmes for fisheries (including aquaculture) which will last from 2000 to 2006.

In general, FIFG continues to finance private projects, although the European Union grant rate is lower than it has been in the past.

The emphasis for grant aid in the future will be to avoid adverse effects, such as a build-up of excess capacity, and concentrate on investments which aim to improve the environment, as well as collective actions involving professional fish farmers.

The influence of aquaculture on the environment is of paramount importance. This is reflected in the new regulation, which requires all grant-aided aquaculture projects using intensive technology to conform to the provisions of Directive 85/337/EEC. In this context the costs relating to environmental impact studies will be eligible for aid.

In order to encourage clean operations, aquaculture investments using technology which will substantially reduce the negative effects on the environment may benefit from additional financial aid of up to 10%.

Another innovation, which is linked to environmental protection, is the possibility of financing the incorporation of data collection into an integrated coastal zone management plan, or the creation of models for environmental management. These initiatives are granted only if they involve the participation of professional fish farmers, who should be encouraged to participate in the management of the coastal zone where they work.

Equally important for the European Union is the development of so-called “collective actions”. A collective action is one where the action exceeds the size of a normal private project, for example, the improvements of infrastructures in a shellfish culture area, involving the financial participation of a group of producers together with public aid. The purchase of equipment and machinery used collectively is also eligible for aid.

Disease eradication will continue to be eligible, as it was under the previous FIGG regulation. However, there is now a specific implementation regulation, which we hope will contribute towards making this measure more effectively utilised by the national authorities.

Pilot projects are still eligible and the level of public aid has been increased. These projects aim at establishing and distributing technical and economic knowledge. Scientific monitoring and a scientific report to the management authority are now requested.

In the framework of the **European Union Structural Funds**, there is also another fund, the **European Regional Development Fund (ERDF)**, which can indirectly contribute to the protection of wild salmon. This fund can finance investment in both the environmental and tourism sectors. In this context, during the period 1994 to 1999, it has supported the restoration and the improvement of rivers with the objective of increasing the wild fish resource. Important investment has been provided by the ERDF for this purpose, mainly in Ireland in the framework of the Interreg PEACE programme.

### **III. ENVIRONMENTAL LEGISLATION**

The protection of the environment is pivotal in the objectives of the European Union. There is a particular commitment to integrating environmental concerns into all policy areas covered by the European Union Treaty. Having said that, environmental provisions contained in and adopted within the framework of the European Union Treaty do not make up a complete environmental code. A wide range of national laws supplements these provisions.

However, certain provisions of European Union environmental law are intended to prevent possible negative environmental impacts from aquaculture. I will attempt to go into more detail on these issues.

#### **1. Nature Conservation Requirements**

Nature conservation requirements in the European Union are principally found in two directives. The first one is from 1979 (Directive 79/409/EEC) on the conservation of wild birds<sup>1</sup>, which came into effect in 1981, the other from 1992 (Directive 92/43/EEC) on the conservation of natural habitats and of wild fauna and flora<sup>2</sup>, which came into effect in mid-1994.

These directives establish a European network of protected habitats for vulnerable species of flora and fauna (known as Natura 2000). Any activity which is capable of affecting such habitats is subject to various controls. A considerable number of areas have already been recognised.

## **2. Water Quality Standards**

In the 1970s, a number of directives were adopted with a view to ensuring that, for various water bodies, water quality standards would be sufficient to guarantee certain beneficial uses of water. These instruments fix a number of standards:

- For popular bathing waters (Directive 76/160/EEC concerning the quality of bathing water<sup>3</sup>);
- For freshwater used for the abstraction of drinking water (Directive 75/440/EEC, concerning the quality required of surface water intended for the abstraction of drinking water in the Member States<sup>4</sup>);
- For freshwater designed for the support of fish life (Directive 78/659/EEC on the quality of fresh waters needing protection or improvement in order to support fish life<sup>5</sup>); and
- For marine waters designated for shellfish cultivation (Directive 79/923/EEC on the quality required of shellfish waters<sup>6</sup>).

These directives may be relevant for the protection of wild fish. European Union Member States must establish programmes in order to reduce pollution and ensure that waters are brought into conformity with the binding quality values fixed by these directives.

Other than what has just been mentioned, the possible significance of certain international wildlife conventions should also be considered. For example, the European Union is a Party to the Convention on the Conservation of European Wildlife and Natural Habitats<sup>7</sup> and the Convention of Biological Diversity<sup>8</sup>. These Conventions commit parties to avoiding or minimising damage to wildlife sites, to protecting flora and fauna, to safeguarding bio-diversity and to integrating the principle of sustainable use into development policies.

## **3. Procedural Formalities and Authorisation Requirements**

The relevance of European Union environmental legislation goes beyond setting standards and fixing requirements for the ambient environment. In some cases, it also fixes procedural formalities which apply, for instance, when aquaculture activities are first established.

One directive (85/337/EEC on the assessment of the effects of certain public and private projects on the environment<sup>9</sup>, as amended by Directive 97/11/EC) embodies the “preventive approach” to environmental protection. It requires that, before any development consent is given, certain projects likely to have significant effects on the environment by virtue of their nature, size or location are subjected to an assessment of possible environmental impacts. Projects covered by this directive include “intensive fish farming”. An impact assessment must be carried out for a project falling in this class where a Member State considers that the project’s characteristics so require. In this regard, practice varies between the Member States as to when an assessment is deemed necessary. The impact assessment involves a number of stages: the developer must submit certain information, and the public concerned is then given an opportunity to express an opinion; all the information thus obtained must be taken into consideration in the development consent procedure.



This directive is supplemented by a provision under another directive (92/43/EEC), whereby plans or projects likely to have a significant effect on sites protected under that directive (and Directive 79/409/EEC) are the subject of an assessment as to their implications for the sites concerned. This provision is at once broader and narrower than the provisions of Directive 85/337/EEC: plans and projects other than those covered by this latter directive are within the scope of the provision. However, the objective of the assessment is more limited.

A directive from 1976 (76/464/EEC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community<sup>10</sup>) creates a framework for controlling the introduction of certain dangerous substances into the aquatic environment. This includes biocides and organic substances associated with aquaculture activities. This framework requires Member States to adopt pollution reduction programmes involving water quality objectives and discharge authorisations with emission standards based on the quality objectives.

#### **4. Operational Controls**

Once an industrial activity, including aquaculture, has been established, European Union environmental rules remain relevant. For example, it will be necessary through monitoring, in some cases possibly through enforcement action, to ensure that enterprises respect the emission standards established under Directive 76/464/EEC and that they do not compromise the standards, which apply to the ambient environment under water quality and nature conservation instruments.

There may also be restrictions on the sorts of chemicals that can be employed in human activities. For example, under Directive 76/769/EEC (approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations<sup>11</sup>, as amended by Directive 89/677/EEC<sup>12</sup>), compounds such as Tributyltin (TBT) may not be used as substances and constituents of anti-fouling preparations for cages or other equipment used for fish or shellfish farming. This is an instance of the European Union acting to ensure that one form of aquaculture activity does not suffer from harmful interaction with another. Even if TBT has been used extensively in the past as an anti-foulant (mostly on the hulls of boats but also on salmon cages), its use is now banned or so severely restricted in many countries, that it has now been virtually eliminated.

Where solid wastes, for example sludge, require disposal, there are a number of potentially relevant Community instruments.

#### **5. Protecting the Resource Base**

The general scheme for pollution discharges established under Directive 76/464/EEC and subsidiary directives is an example of protecting the resource base. This Directive provides a basis for controlling discharges of dangerous substances from industrial installations and other sources, and to the extent that such substances may be harmful to aquatic life (e.g. heavy metals), the Directive contributes to securing safe conditions.

Another important instrument is the Directive concerning urban wastewater treatment (91/271/EEC)<sup>13</sup>. This directive establishes ambitious targets for sewage treatment in the

Community, to be met over a staggered timetable extending through to 2005. By requiring improved treatment, the Directive should contribute to achieving better environmental conditions.

As far as the resource base is concerned, Directive 78/659/EEC, on the quality of fresh water needing protection or improvement in order to support fish, has already been mentioned.

Finally, attention should be drawn to a provision of the European Union's "Habitat Directive" (Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) and in particular its Article 22, which states:

"Member States shall ... ensure that the deliberate introduction into the wild of any species, which is not native to their territory is regulated so as not to prejudice natural habitats within their natural range or the wild native fauna and flora and, if they consider it necessary, prohibit such introduction."

This means that national authorities are obliged to intervene in order to stop the stocking of non-indigenous fish, when it is demonstrated that these fish represent a threat to wildlife.

So to summarise the above, it can be said that the European Union legislation provides for a range of control measures over the aquaculture impact on the environment, including the following:

- The use of environmental impact assessment procedures for watershed management, cage/pond siting, design and operation;
- Limited access rights for water and seed, as well as limits upon the introduction of exotic species;
- Effluent control techniques involving feed control ratios, limited use of drugs, antibiotics and other chemicals;
- Development of user groups agreements, to avoid user conflicts and to allow for effective area management.

Additionally, the following practices are encouraged

- The implementation of land-use zoning techniques, buffer zones and authorisations involving the costing of land or wetland;
- Development of best management practices through codes of conduct and practice; and
- The use of trade-related techniques such as product certification schemes.

#### **DIRECTIVE ESTABLISHING A FRAMEWORK FOR EUROPEAN UNION ACTION RELATING TO WATER POLICY**

In June 1995, the Council of Ministers and the Sub-Committee for the Environment of the European Parliament called for a detailed review of the European Union's water policy. In response to this, in February 1996, the European Commission adopted a communication on European Union water policy. The principal recommendation of this communication concerned the development of a framework directive in the field of water.

The consultations undertaken on the basis of this communication confirmed the importance of local measures aimed at evaluating and improving the situation. It is for the Member States and the relevant local authorities to set up the mechanisms and the measures intended to protect the local environment. Nonetheless, it is true that a European framework could allow them to achieve their objectives more effectively.

The Commission's proposal for a Directive is aimed at establishing the framework for the protection of the surface and of the subsoil waters in the European Union. The Council of Ministers reached a Common Position on October 22, 1999 with a view to adopting this Directive.

The purpose of the Directive is to establish a framework for the protection of inland surface water, transitional waters, coastal waters and groundwater which:

- prevents further deterioration and protects and enhances the status of aquatic ecosystems;
- promotes sustainable water use based on a long-term protection of available water resources;
- contributes to mitigating the effects of floods and droughts and thereby contributes to:
  - The provision of the sufficient supply of good quality surface water and groundwater as needed for sustainable, balanced and equitable water use;
  - The protection of territorial and marine waters;
  - Achieving the objectives of relevant international agreements including those which aim to prevent and eliminate pollution of the marine environment; and
  - The progressive reduction of emissions of hazardous substances.

This framework will be based on the natural unit of the management of water, in other words the catchment area.

The directive is designed to prevent any additional deterioration, to protect the aquatic ecosystems at a level that is both qualitative and quantitative, as well as the land ecosystems with regard to their needs in water. By doing this, it also contributes to ensuring a sufficient water supply, both in quantity and in quality, to ensure sustainable development. With regard to the reduction of pollution, it confirms and formalises the principle of "the combined approach".

The directive comprises four principal elements: co-ordination, measures, the gathering of the data and transparency, each of which shall be dealt with separately.

## **1. Co-ordination**

The directive is based on the hydrographic districts, and requires co-operation between regions and between Member States sharing the same water, as well as the development of common measure programmes registered in the basin management plans. Member States have to ensure that a river basin management plan is produced for each river basin district.

The framework directive does not involve all the legislative texts concerning water. However, it does guarantee their co-ordination by instituting a framework in which each text finds its place. In particular, it allows the co-ordination of both elements of "the combined

approach” as regards reduction of pollution. The “combined approach” as regards water protection should be better specified.

The framework directive envisages various rules aiming to establish objectives and environmental quality standards on a uniform basis for the Community. It also aims to ensure the co-ordination of the standards and objectives with the various limit emission values applicable under the terms of other Community texts such as the directive on integrated prevention and reduction of pollution (96/61/EC)<sup>14</sup> These two types of measure will be strengthened reciprocally and, in each individual case, the most rigorous approach will prevail.

The principal tool of co-ordination is the measure programme, which constitutes a central element of the management plans of catchment area required by the directive. One of the core measures prescribed in the programme is the implementation of all the relevant Community legislative texts.

The directive will allow co-ordination between national and local legislation within the same “measure programme”, which simplifies the application of the Community legislation in the field of water. It also institutes an information mechanism by which the local authorities can point out to the national and Community authorities the problems which require a solution at the higher level or a trans-sectoral action.

## **2. Measures**

The draft directive lays down the co-ordination of the measures required under various legislative Community, national or local texts, and their grouping in the same “measure programme”. The directive also fixes certain requirements, which are also co-ordinated within the measure programme. In particular, they cover the control of abstractions of surface and subsoil waters, as well as the pricing of all uses of water on a level, which will ensure the total recovery of the costs.

## **3. Gathering of the Data**

The directive lays down the gathering of complete data concerning the state of the aquatic environment and the constraints which hang over it. That will require the adoption of monitoring programmes. One will thus have the essential information upon which the authorities will be able to rely for establishing policies ensuring ecological viability.

## **4. Transparency – Public Consultation and Dissemination of Information**

Finally, the framework directive lays down participation and consultation in all the stages of the development of water policies. Furthermore, it requires the publication of various information on the basin management plans, in order to allow for consultation with full knowledge of the facts.

Once approved, the framework directive will gradually over the next thirteen years repeal the provisions of many previous Directives. Amongst these directives are some of those quoted before, such as the directive on drinking water (75/440/EEC), the directive on the quality of freshwater needing protection or improvement in order to support fish life (78/659/EEC), the

directive on the quality required of shellfish waters (79/923/EEC) and the directive on pollution caused by certain dangerous substances (76/464/EEC).

<sup>1</sup> Official Journal L 103 of 25 April 1979, p. 1

<sup>2</sup> Official Journal L 206 of 22 July 1992, p. 7

<sup>3</sup> Official Journal L 31 of 5 February 1976, p. 1

<sup>4</sup> Official Journal L 194 of 25 July 1975, p. 26

<sup>5</sup> Official Journal L 222 of 14 August 1978, p. 1

<sup>6</sup> Official Journal L 20 of 26 January 1980, p. 43

<sup>7</sup> Official Journal L 38 of 10 February 1982, p. 1

<sup>8</sup> Official Journal L 309 of 13 December 1993, p. 1

<sup>9</sup> Official Journal L 175 of 5 July 1985, p. 40

<sup>10</sup> Official Journal L 129 of 18 May 1976, p. 23

<sup>11</sup> Official Journal L 262 of 27 September 1976, p. 201

<sup>12</sup> Official Journal L 398 of 30 December 1989, p. 19

<sup>13</sup> Official Journal L 135 of 30 May 1991, p. 40

<sup>14</sup> Council Directive 96/61/EC of 24 September 1996, concerning integrated pollution prevention and control - Official Journal L 19 of 24/01/1998 p. 83.

# EU FISH HEALTH REGIME

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## Introduction

1. The basic rules on fish health are common throughout the EU, although Member States have some discretion on how they are applied.
2. The EU's Fish Health Regime dates from 1992; it was one of a suite of animal health measures designed to adapt EU and national rules to the introduction of the EU single market. Under the single market routine customs controls and other checks at the frontier were abolished between Member States: this meant that the arrangements then in place in many EU countries, whereby fish health controls were imposed at frontiers to prevent the import which posed a potential health threat to the importing country, were no longer workable.

## EU Fish Health Regime

3. The key features of the regime are:
  - fish health controls on fish movements within the EU are based on certification at the farm or site of origin;
  - to protect areas with a high fish health status, zones can be established where it can be shown that an area is free of a particular disease;
  - movements into approved disease free zones can only be from zones of equal status.
4. The regime places fish diseases into categories. It should be emphasised that these do not reflect the relative seriousness of the different diseases.
5. *List I contains serious diseases which are exotic to the Community.*

Community policy is to eradicate any List I disease which is found in the Community.
6. Currently the only disease on List I is **ISA**.
7. *List II diseases are serious diseases which are controlled at Community level.*

There are two List II diseases **VHS and IHN**.
8. **List III diseases are diseases which are controlled at the national and regional level.** Member States may, with the approval of the European Commission, introduce national measures to eradicate or control the spread of these diseases; these can involve restrictions on imports. Current List III diseases include **BKD, IPN and Gyrodactylus salaris**.
9. Areas which are shown to be free of either or both of the List II diseases can be designated **approved zones**. Live fish, eggs and gametes of susceptible species can only be introduced into an approved zone from another approved zone. There are also

restrictions on the movement of non-species from non-approved zones into approved zones; they must come from sites which do not contain susceptible species and are not connected to a watercourse. In addition, dead fish of a susceptible species coming from a non-approved zone must be eviscerated before they can be brought into an approved zone.

10. All movements of live fish into an approved zone must be accompanied by a movement document signed by someone authorized by the official body responsible in that Member State for fish health. The authorities in the “importing” approved zone must be informed in advance of any movements by the authorities in the “exporting” approved zone; a proportion of “imports” can be inspected at their destination.
11. To ensure that approved zones remain free of List II diseases, all fish farms holding susceptible species are inspected at least once a year, with samples taken and tested once every two years. Wild fish are also tested.
12. If there is an outbreak of a List II disease in an approved zone, approved status is revoked. To regain approved zone status, all fish on infected farms must be slaughtered and the zone must remain disease-free for two years.
13. The current list of approved zones in the EU is:

IHN	VHS
Great Britain	Great Britain (excluding the island of Gigha)
Northern Ireland	Northern Ireland
Ireland	Ireland (excluding Cape Clear Island)
Guernsey	Guernsey
Isle of Man	Isle of Man
Denmark	Parts of Denmark
Parts of France	Parts of France
Parts of Italy	Parts of Italy
Parts of Spain	Parts of Spain

14. Special arrangements apply for *Gyrodactylus salaris*. Because of the potential seriousness of this disease, the European Commission has introduced a safeguard measure prohibiting the introduction of all live salmonids into the UK, Ireland and part of Finland, all of which have been shown to be free from the parasite. This is a temporary measure, pending the approval by the Commission of new List III controls.
15. The EU has not yet established detailed rules for the import into the EU of fish and fish products from third countries. Until this has been done, Member States continue to apply their own rules but these must ensure that imports are subject to conditions at least equivalent to those applying to imports from elsewhere in the EU. For the UK, for example, this means that there is an absolute prohibition on the import of live salmonids from third countries, and other fish susceptible to VHS and IHN must come from areas recognized to be free from these diseases, with the same rules applying to non-susceptible fish species as apply to fish introduced into Great Britain or Northern Ireland from non-approved zones elsewhere in the EU.

# MANAGEMENT OF AQUACULTURE IN IRELAND

**Maurice Mullen, Department of the Marine and Natural Resources, Dublin, Ireland**

**Dr Ken Whelan, Marine Institute, Co Mayo, Ireland**

## Introduction

The Department of the Marine and Natural Resources regulates aquaculture in Ireland. The main functions of the Department in this regard are:

- **Corporate governance of Fisheries Boards, Marine Institute and BIM**
- **Setting policy objectives and frameworks for fisheries, including inland fisheries and aquaculture**
- **Licensing and monitoring aquaculture operations**
- **Overseeing implementation of EU health regime**

The Department of the Marine is supported in its work by a range of State agencies: the Marine Institute, Bórd Iascaigh Mhara (Irish Sea Fisheries Board), Údarás na Gaeltachta (The Irish Language and Culture Authority) and the Central and Regional Fisheries Board.

The Marine Institute is the principal scientific and research body in marine area. Its responsibilities include:

- **Monitoring, assessment and policy advice on salmon and sea trout stocks**
- **Fish health and environmental monitoring**
- **Monitoring of aquaculture operations**

The aquaculture industry in Ireland currently produces: Salmon - 18,000t; marine trout - 1,000; freshwater trout - 2,000t; rope mussels - 8,000t; bottom mussels - 11,000t and Gigas oysters - 4,500t.

The industry currently directly employs 3,500 people and it is estimated that a further 20,000 are dependent on the industry for employment. Over 70% of the salmon and 90% of the shellfish production is exported. The principal export markets are: France (55%), UK (19%) and Spain (9%).

## Application Process

To apply for an aquaculture licence a standard application procedure is followed. This includes: standard forms/maps/copy of planning permission/copy of water discharge licence/full Environmental Impact Statement/full drawings of structures etc. The applicant is obliged to publish details in local newspapers and the EIS for the project is made available to the public. The application is passed on to the Aquaculture Licence Advisory Committee and 12 bodies are notified of the details of the application (e.g. fisheries, tourism, heritage and



environmental bodies). In the case of a successful applicant and following completion of the process, the Minister publishes his intention to issue a licence.

### **Aquaculture Licence Appeals Board**

If the public or the applicant is unhappy with the above process, they have the right to appeal the outcome of the application process to the Aquaculture Licence Appeals Board. This Board is chaired by a Senior Council and members include representatives from the aquaculture, wild fisheries, physical planning/development and environmental sectors. The Board reviews applications “de novo”. The rights and procedures of the Board are set out in the governing act.

### **Environmental Controls**

#### **EIS**

The formulation of an EIS is a rigorous process incorporating the following:

- Location, dimensions, site characteristics, marine environment – water, biota
- Full details of production process, any potential impacts
- Detailed description of proposed monitoring activities
- Baseline monitoring carried out in support of the application
- List of individuals, organisations consulted and issues raised
- Any difficulties in the completion of the EIS must be reported.

### **Aquaculture Protocols**

A series of aquaculture protocols were developed in the past year, which cover: water quality, the benthos, sea lice, fallowing and visual amenity.

#### **Water Quality**

This process began in the early 1980’s but to date has shown no long-term effects from marine salmon farming. The programme currently includes: Winter nutrient monitoring (4-month period) at all marine salmon farms. The parameters measured include: Ammonia, Nitrate, Nitrite, Phosphate, Silicate Temperature and Salinity.

#### **Benthos**

This programme was initiated in 2000. Its purpose included: environmental protection, and an assessment of the environmental impact of the farm. The parameters measured include: visual observation, oxygen measurement in the sediment and an estimate of invertebrate species abundance and distribution. The system includes an annual verification on each site by the Marine Institute and a tri-annual review of data trends.

#### **Sea Lice Monitoring**

The purpose of sea lice monitoring is: to provide an objective measurement of lice levels on farms, to investigate the nature of the infestations and to provide management information. Further development of the strategy involves such aspects as separation of generations,

annual fallowing of sites, early harvest of two-sea-winter fish, targeted treatment regimes and agreed husbandry practices. The following protocols are followed:

### **Sampling strategy**

- **All farms obliged to Monitor**
- **Each year class, at all farm assessed 14 times each year by Marine Institute**
- **Sample Size: X2 samples 30 fish**
- **Standard and random cages sampled**

### **Autumn/Winter Treatments**

- **Target of zero ovigerous lice at this period**

### **Treatment Triggers**

- **Critical period (February to May) 0.3 - 0.5 ovigerous**
- **Remainder of year 2.0 ovigerous**

If sea lice levels are above the agreed levels the Marine Institute carries out inspections and a report is submitted to the Department of the Marine and Natural Resources. The Department may apply sanctions if lice levels remain high and their treatment is not effectively addressed. Other measures, which may be applied, include: peer review at Single Bay Management meetings, conditional fish movement permissions or accelerated harvests.

### **Fallowing**

The concept was imported from agriculture. The initial purpose was the recovery of bottom sediments. The current use is to break the cycle of disease and parasite infestation. The concept involves the separation between generations and an appropriate fallowing period. The current recommendation is for a minimum fallowing of one month. A key to success is the synchronous fallowing of sites and the incorporation of all decisions into a Single Bay Management process or agreement. This system is very effective in breaking the cycle of infection and implementation is well advanced. One of the key benefits is that no extra production sites are required.

### **Fisheries-Related Issues**

In contrast with other salmon producing countries Ireland has had little serious problems with the level and intensity of fish farm escapes. A major sampling programme of the wild catch has consistently shown less than a 1% occurrence of fish farm escapes. This is equivalent to an occurrence of some 2t to 2.5t per annum. Research in fresh water has also shown a low level of intrusion of reared stocks.

Over the past decade serious issues have arisen in relation to the overall survival of sea trout in the vicinity of intensive salmon farming areas. A major review of the status of sea trout stocks has now been completed. It is planned to agree management protocols and recovery targets for the sea trout stocks and to engage in a clearly focused research and monitoring programme. It is further planned to engage in a CLAMS type community initiative, which will have as a basic tenet a commitment to the conservation and rehabilitation of wild salmonid stocks.

## **Coordinated Local Aquaculture**

The CLAMS process has proven very successful in co-ordinating all aquaculture activities in selected areas or bays. The key to its success is that the process is nationally driven and locally implemented. CLAMS developed from the original Single Bay Management process and it is hoped to integrate it with new Coastal Zone Management arrangements and eventually a new system of Inshore Fisheries Management.

## **Cross-Body Representation**

The key to partnership and co-operation between the various fisheries sectors is cross-body representation on the various fisheries bodies and open accountability. Currently both wild fish and aquaculture interest groups are represented on:

**National Salmon Commission**

**Fisheries Boards**

**Aquaculture Licence Advisory Committee**

**Aquaculture Licence Appeals Board**

## **Aquaculture in Ireland**

**Mr Maurice Mullen, Department  
of the Marine and Natural  
Resources**

**Dr Ken Whelan, Marine Institute**

### **PRESENTATION FORMAT**

- **1. FRAMEWORK**
- **2. TECHNICAL ASSESSMENT**
- **3. POTENTIAL IMPACTS**
- **4. FUTURE STRATEGY**

### **DEPARTMENT OF THE MARINE AND NATURAL RESOURCES**

- **Corporate governance of Fisheries Boards,  
Marine Institute and BIM**
- **Setting policy objectives and frameworks for  
fisheries, including inland fisheries and  
aquaculture**
- **Licensing and monitoring aquaculture  
operations**
- **Overseeing implementation of EU health  
regime**

## **STRUCTURES**

- **Department of the Marine and Natural Resources**
- **Fisheries Boards**
- **Marine Institute**
- **Bord Iascaigh Mhara (BIM) and Údarás na Gaeltachta**

## **FISHERIES BOARDS**

- **7 Regional Fisheries Boards (RFBs) responsible for management and development of fisheries. Boards mainly public funded**
- **Central Board provides specialist services and co-ordinates RFBs**
- **New RFB Board structures in place - includes fisheries, tourism environmental, local development and aquaculture interests**

## **IRISH SEA FISHERIES BOARD**

### ***BOARD IASCAIGH MHARA (BIM)***

- **Development of sea fisheries and aquaculture**
- **Provides technical advice to aquaculture industry**
- **Implements “Aquaculture Measure” for development of industry**

## **AQUACULTURE PRODUCTION**

- **Industry produces:**
  - Salmon - 18,000t
  - Marine trout - 1,000t
  - Freshwater trout - 2,000t
  - Rope mussels - 8,000t
  - Bottom mussels - 11,000t
  - Gigas oysters - 4,500t
- **Number of people employed in aquaculture** 3,500 (f&p)
- **Number of people dependent on aquaculture** 20,000
- **70% of salmon and 90% of shellfish production exported**
- **Main export markets: France (55%), UK (19%) and Spain (9%)**

## **AQUACULTURE LEGISLATION**

- **Governing legislation: Fisheries (Amendment) Act, 1997**
- **Main features:**
  - Minister is deciding authority
  - Standard application process (EIS/consultation)
  - Independent appeals process
  - Rights / obligations specified for all parties
  - Ministerial Regulations specifies details

## **MARINE INSTITUTE**

- **Main scientific and research body in marine area. Its responsibilities include:**
  - **Monitoring, assessment and policy advice on salmon and sea trout stocks**
  - **Fish health and environmental monitoring**
  - **Monitoring of aquaculture operations**

## **AQUACULTURE APPLICATION**

- **Application (standard form / maps / planning permission / water discharge licence / EIS / drawings of structures)**
- **Applicant publishes details in local newspaper**
- **Public right to make submissions / EIS available to public**
- **Minister informs 12 bodies (e.g fisheries, tourism, heritage and environmental)**
- **Aquaculture Licence Advisory Committee (State agencies)**
- **Notice of Minister's intention to issue licence published**

## **ENVIRONMENTAL IMPACT STATEMENT**

- **EIS is required:**

**For finfish farms**

**Any other circumstances the Minister decides**

- **EU Council Directive 85/337/EEC governs form of EIS**
- **EIS prepared by independent Consultants**
- **Minister reserves right to determine adequacy of the EIS**

## **AQUACULTURE LICENCE APPEALS BOARD**

- **Aquaculture Licence Appeals Board (ALAB):**
- **Independent / Chaired by a Senior Counsel**
- **Members appointed from nominating bodies, including:**
  - Aquaculture**
  - Wild fisheries**
  - Physical planning / development**
  - Environment and amenities**
  - Community**
- **Reviews applications "de novo"**
- **Rights and procedures set out in Act**

## Aquaculture Monitoring in Ireland

Programme	Agency / Institution	Personnel	Annual Cost (Year 2000)
Sea-lice Monitoring	Marine Institute	5	£200,000
Benthic Monitoring	Marine Institute	1	£ 40,000
Engineering Surveys	Department of Marine	6	£ 12,000
Fish Health Monitoring	Marine Institute	5	£250,000
Residue Testing	Marine Institute	6	£210,000
Wild Salmon/ Escapees	Marine Institute	12	£180,000
<b>Total</b>			<b>£892,000</b>

## EIS

- **EIS all operations over 100 tonnes**
  - **Address issues of: location, dimensions, site characteristics, marine environment – water, biota etc**
  - **Full details of production process, any potential impacts**
  - **Detailed description of proposed monitoring activities**
  - **Baseline monitoring carried out in support of the application**
  - **List of individuals, organisations consulted and issues raised**
  - **Any difficulties in the completion of the EIS must be reported.**

## MONITORING PROTOCOLS

- 1. Benthic
- 2. Water Quality
- 3. Sea Lice
- 4. Fallowing
- 5. Visual Amenity



## Marine Institute Water Quality Monitoring

- **Programme initiated** Early '80s
- **Purpose:** Farm Management, Early warning System
- **Parameters:** Monthly Nutrients (Nitrate, Phosphate)  
Oxygen, Ammonium, Chlorophyll
- **Results:** Analysed - Regular Reviews - Public

### Water Quality Trends Findings 1980 - 1998

Dr Richard Gowan, of the Dunstaffnage Marine Lab in Scotland was asked to review available nutrient data collected at Salmon farm sites for the period 1984 - 1990. His report concluded:

**Gowan 1990:** *“To date, evidence for fishfarming having brought about changes in the nutrient status and eutrophication of coastal waters is limited  
No indication that Fish farming in Irish Coastal Waters has caused any change in summer levels of dissolved oxygen, summer levels of phytoplankton and winter levels of dissolved inorganic nutrients”*

### Water Quality Trends Findings 1980 - 1998

In 1999 the Marine Institute commissioned Aquafact International to collate and assess the water quality for Kilkieran Bay, an area which contains 12 licenced salmon farm operators for the period 1984 -1998 .  
Their report concluded:

**Aquafact 1999:** *“Data from the present report show that there were no significant increases in inorganic nutrients that can be attributed to anything other than normal cycles”*

## **Water Quality Monitoring**

- **Winter nutrient monitoring** (4 month period) at all Marine Salmon Farms
- **Parameters:** Ammonia, Nitrate, Nitrite, Phosphate, Silicate  
Temperature and Salinity
- **Reporting:** Department of Marine and Natural Resources
- **Analysis / Advice:** Marine Institute

## **Benthic Monitoring**

- Programme initiated in 2000
- **Purpose:**
  - Environmental Protection
  - Assess environmental impact of Farm
  - Farm management input
- **Audit / Annual Verification** by Marine Institute
- **Tri annual review** of data trends
- **Parameters**
  - Visual Observation
  - Oxygen measurements in sediments
  - Numbers/species of invertebrates

## **Sea Lice Control and Fallowing**

**Current practice in the Irish  
aquaculture industry**

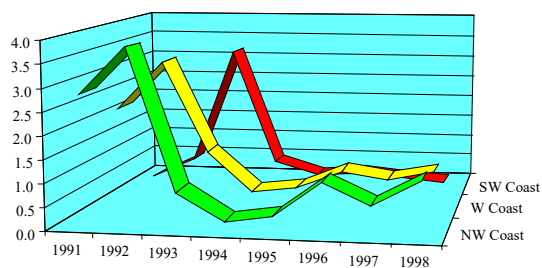
## The Purpose of Monitoring

- To provide an objective measurement of lice levels on farms.
- To investigate the nature of the infestations.
- To provide management information.
- Further development of management strategies

## Management Strategy

- Separation of Generations
- Annual fallowing of sites
- Early harvest of two sea-winter fish
- Targeted treatment regimes
- Agreed husbandry practices

## Mean Ovigerous Lice Levels



## **Sea lice monitoring**

### **Sampling strategy**

- | **All farms obliged to Monitor**
- | **Each year class, at all farms X 14**
- | **Sample Size: X2 samples 30 fish**
- | **Standard and random cages**

## **Targeted Treatment Regimes**

- **Autumn/Winter Treatments**
- **Target of zero ovigerous lice**
- **Treatment Triggers**
  - **critical period 0.3 - 0.5 ovigerous**
  - **remainder of year 2.0 ovigerous**
- **Follow up Inspections**
- **Sanctions**
  - **peer review at SBM meetings**
  - **conditional fish movement permissions**
  - **accelerated harvests**

## **Fallowing**

- **Concept imported from agriculture**
- **Initial purpose - recovery of bottom sediments**
- **Current use- break cycle of disease and parasite infestation**

## **Effective Fallowing**

- **Separation between generations**
- **Appropriate fallow period**
  - 1 Month
- **Synchronous fallowing of sites**
  - adjacent sites fallow at same time
  - SBM agreement

## **Strengths of Approach**

- **Very effective in breaking cycle of infection**
- **Implementation is well advanced**
- **No extra production sites required**
  - fallowing or smolt sites only required

## **ESCAPEES**

- **Ireland - large number of small salmon**
- **Moy - 120,000 coast, 40,000 to 50,000 spawners**
- **Salmon tag recovery programme - 48% catch**
- **Overall 1% or less of catch - 2t - 2.5t**
- **Strong cages, function of location - exposed west coast**

## **SEA TROUT**

- Decline 1980's - habitat & poaching
- Collapse 1989 mid-west
- Broad range of research areas: environment, predation, disease, physiology and sea lice
- Intensive research: disease, physiology, environment, sea lice
- Most interest has centred on sea lice research - difficult
- Now evidence Norway, Scotland, Ireland, high or low juvenile lice numbers near farms, high chalimus levels always recorded near farms. Contribution from farms complex and variable
- Some fisheries stocks very low, others some evidence of recovery
- Sea Trout Task Force (1995) - all parties involved
- Farms adjacent to wild salmonid fisheries, managed on a precautionary basis

## **SEA TROUT (Cont.)**

- Major sea trout review completed
- Management protocols, recovery targets
- Focused research & monitoring programme
- CLAMS type initiative - commit to conservation and rehabilitation of wild salmonid stocks

## **FUTURE DIRECTIONS**

- Strategic study to be published - 8th June
- Need to expand the industry:
  - achieve critical mass
  - support coastal jobs
  - sustainable / quality / innovation
  - priority - wild salmonids
  - develop real cooperative processes

## **INTEGRATED RESOURCE MANAGEMENT**

- **Co-ordinated Local Aquaculture Management Systems (CLAMS)**
- **Nationally driven / locally implemented**
- **CLAMS developed from SBM - half way house**
- **Integration with new CZM arrangements:**

### **CLAMS**

#### **Inshore Fisheries Management**

## **CROSS BODY REPRESENTATION**

- **National Salmon Commission**
- **Fisheries Boards**
- **Aquaculture Licence Advisory Committee**
- **Aquaculture Licence Appeals Board**

**IMPLEMENTATION OF THE OSLO RESOLUTION ON MEASURES TO  
MINIMISE IMPACTS OF AQUACULTURE ON THE WILD STOCKS THE  
POSITION IN SCOTLAND – GEORGE THOMSON AND DAVID DUNKLEY,  
SCOTTISH EXECUTIVE RURAL AFFAIRS DEPARTMENT**

1. This presentation is divided into two parts. Part I describes the context and offers an over-view of wild salmon and aquaculture in Scotland within which the Oslo Resolution is being implemented. Part II elaborates on the detailed responses to the Oslo Resolution provided in the Annex to this Paper.

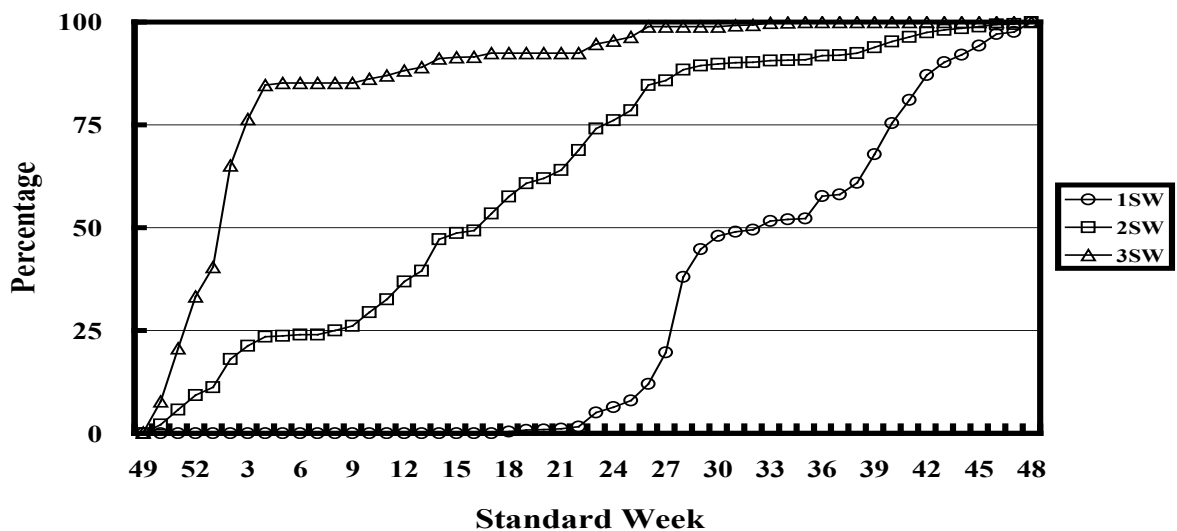
**PART I**

**Wild salmon in Scotland**

General

2. Salmon and Scotland are synonymous. With approximately 400 salmon rivers, one does not have to travel very far – certainly in the context of the great American continent – before stumbling into one. The rivers are located in the north, south, east and west of Scotland but it is on the east coast that the major salmon-carrying rivers occur. These include the Tweed, the Spey and the Tay.
3. Indeed it was on the Tay that history was made on 7 October 1922 when 32-year-old Georgina Ballantyne landed the largest recorded salmon. It weighed 64lb (29 kg): a catch that current followers of the sport must envy.
4. It is worth pointing out that whilst grilse are dominant in Scotland’s west coast rivers, rivers on the east receive both grilse and multi-sea-winter fish: and fish are returning virtually every day of the year (see Figure 4.1 below).

**Figure 4.1. Cumulative Percentage Counts of Salmon  
Ascending North Esk**





5. This feature of east coast rivers, and the fact also that within individual rivers there are many different populations of salmon, contribute to the complexity of managing the rivers and of determining appropriate conservation, stocking and exploitation regimes.

### Ownership/Management

6. The right to fish in Scotland for salmon, whether by rod and line or net, is a private heritable one. It is quite distinct from the right of landowners to fish other species in rivers adjoining their land (riparian rights). In some cases the two rights may be enjoyed by the same individual: and others not. The salmon fishery right is held to be pre-eminent.
7. A recognition that multiple ownership of salmon fishery rights within a river is not perhaps conducive to whole river management led to the UK Parliament passing legislation in 1828 (a mere 10 years after Canada/USA resolved minor issue of the 49<sup>th</sup> Parallel!) allowing proprietors to raise levies for bailiff, etc., activities. This was taken further in 1862 and 1868 when legislation first divided Scotland into districts for salmon purposes and in the later year created the concept of District Salmon Fishery Boards (DSFBs).
8. DSFBs embody the concept of subsidiarity and local management – long before the relatively recent acceptance and enunciation of such concepts. There are currently 53 Boards. The main players are the angling proprietors but there is also a legal requirement to include a representative of netting interests, where these exist, and anglers. In recent times, a number of Boards have opened their doors, on a non-voting basis, to bodies such as Scottish Natural Heritage and the Scottish Environment Protection Agency – offering Boards the opportunity to take a more holistic approach.
9. Funding of Salmon Boards is by means of levies on proprietors (angling and nets). There is no direct central funding but, in 1989, central Government abolished rates payable to local Government bodies on sporting activities such as angling where there was a DSFB in place, and this was extended to all owners of salmon fishings in 1995.

### Legislative framework

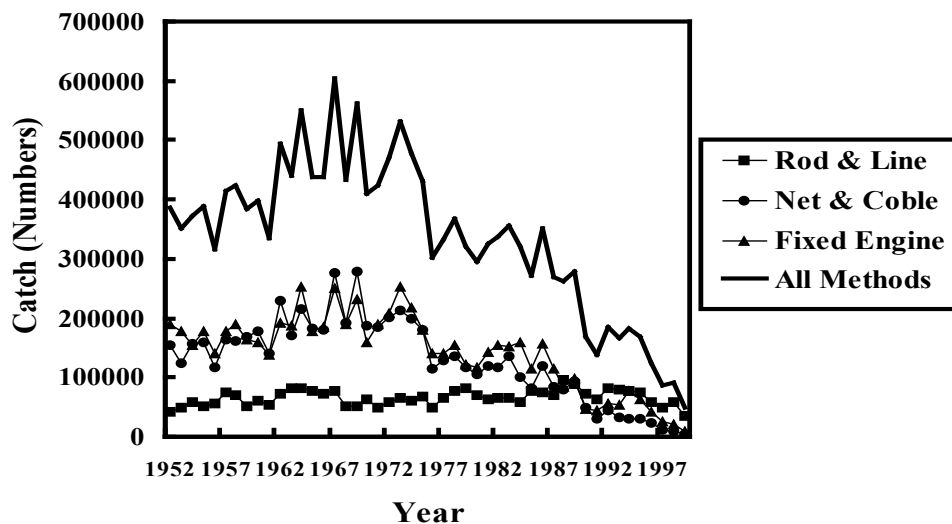
10. The law in Scotland governing salmon and its exploitation is ancient. Specific legislation can be traced back to 1424 but other references confirm earlier statutory interest. This includes the requirement of the 12/13<sup>th</sup> century which in respect of weekly close times required cruive traps to be opened to such an extent that a three-year-old pig could circulate in the freed passage so that neither its tail nor nose touched the sides.
11. It is worth emphasising that succeeding legislation has always tended to be restrictive in terms of its effect, providing proof, if proof were needed, that concepts of sustainability and of the precautionary principle/approach were recognised and applied long before current management jargon took ownership.

12. As indicated earlier, the main feature of legislation is the responsibility which it places on Boards for day to day management of salmon in their areas, for example appointing bailiffs, determining fishing times, undertaking riverine works, devising stocking programmes. However, this is within a national framework which:
- imposes close times (including a prohibition on fishing on Sundays);
  - defines fishing methods including design and construction;
  - prohibits the taking of unclean and unseasonable fish;
  - prohibits the killing of juvenile fish;
  - makes regulations on fish passes and screens.

Current state of stocks

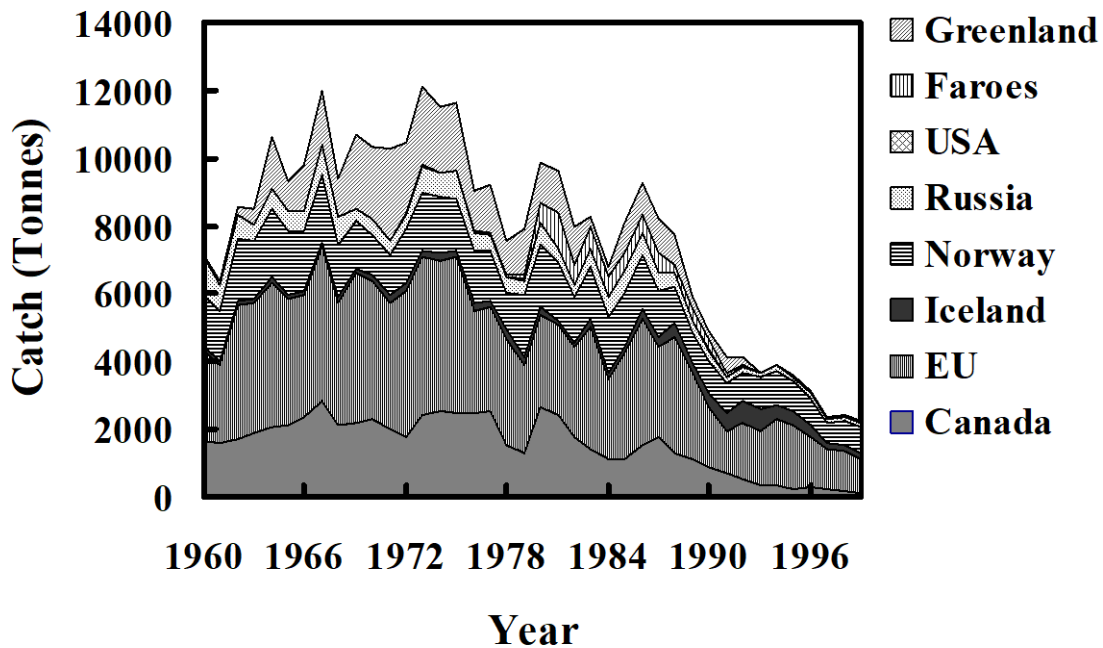
13. Catches of salmon in Scotland are revealed in Figure 13.1. These make depressing reading, the 1999 catch being 35% below the all-time low of the previous year.

**Figure 13.1. Scottish Salmon and Grilse Catches**



14. Whilst the declines can be attributed in part to a major reduction in netting effort, the constancy of the rod and line catches suggest a major decline in stock abundance. That the pattern is reflected throughout the range of the Atlantic salmon (see Figure 14.1) supports the contention that the problem occurs during the marine phase of the fish's life.

**Figure 14.1 Nominal Catches of Salmon**



Action in hand

15. The use of offshore gill nets has been banned in Scotland since 1962. Under the terms of netting regulations introduced in 1992, no net may be designed or constructed to catch salmon by enmeshing them, and the use of monofilament twine in any part of a net is prohibited. Coastal and estuary nets which, as mentioned earlier, are fished under private, heritable rights have been substantially reduced, both in number and effort. Fixed engine effort, for example, in 1998 was 15% of that in 1966. Total catch by nets in 1999 was 15% of that in 1995. This year Scottish netsmen voluntarily postponed the opening of their season by six weeks – a welcome gesture.
16. Eighteen Salmon Boards now have baits and lures regulations in place. By prohibiting the use of worms, shrimps, multiple hooks, etc., catching fish becomes more difficult and self-evidently more have a greater chance of surviving to spawn.
17. More Boards are now operating catch and release policies – admittedly on a voluntary basis. Nevertheless the contribution which this makes to salmon conservation should not be understated. In 1999, 29% of total rod and line catch and 22% of overall catch was returned. In weight terms this amounts to about 53 tonnes – greater than the total West Greenland catch (reported and unreported).
18. A significant feature of the response to declining stocks has been the activity of Boards in the area of restocking. Figures for 1999 point to one and a quarter million eyed ova, 3 million unfed fry, nearly 2 million fed fry, and 300,000 parr.

19. In this area of ongoing action the activity of the Scottish Executive's Freshwater Fisheries Laboratory (FFL) is worth mentioning. FFL is extensively involved in salmonid activities. It has major monitoring programmes on the Rivers North Esk, Shieldaig, and two tributaries of the River Dee, the Girnock and Baddoch. A number of innovative projects, including one currently which will seek to plot seal activity in the Loch Shieldaig area, are also being undertaken. The Laboratory is also working closely with a number of Boards on a major programme for reconditioning of kelts.

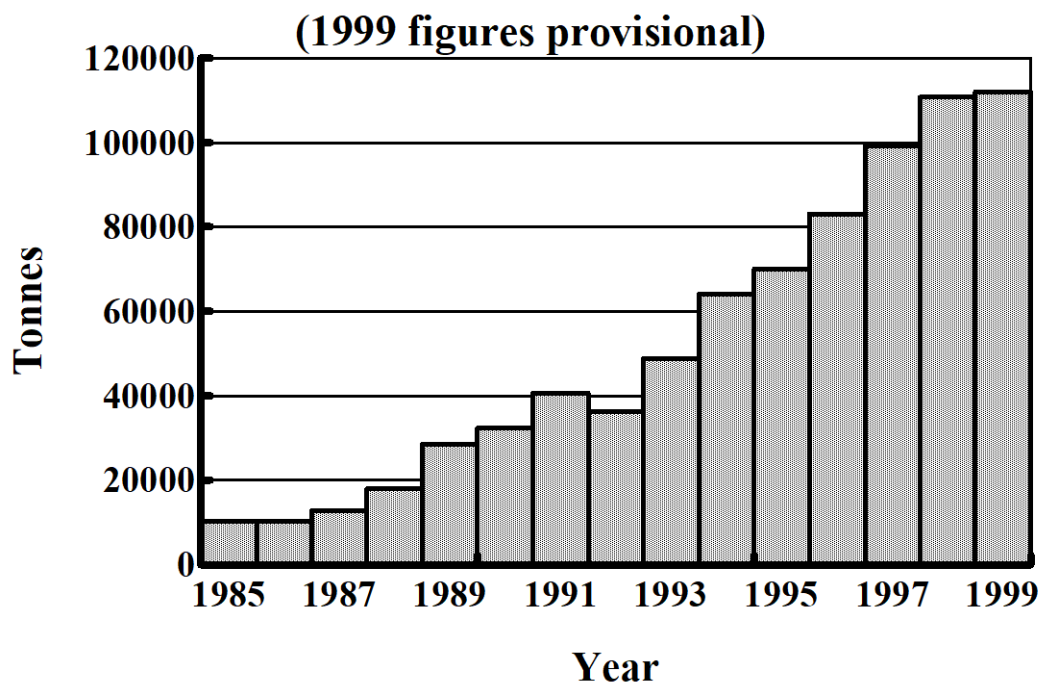
### **Aquaculture**

20. It is inevitable that at a conference of the North Atlantic Salmon Conservation Organization and dealing with the Oslo Resolution that the main focus of aquaculture should be on Atlantic salmon. However, it is worth bearing in mind that farming of other species is also undertaken in Scotland. These species include trout, turbot, halibut, cod and shellfish.
21. Compared with salmon the scale of production of these species is very small – production, for example, of cod this year will be a pilot 50 tonnes – but longer-term they could ease the pressure on salmon (wild and farmed) and there is a need to bear in mind the lessons, sometimes painfully learned, from salmon aquaculture.

### Scale of salmon farming in Scotland

22. The salmon farming industry in Scotland is essentially concentrated on the west coast, the Western Isles and Orkney and Shetland. The bald facts are that there are approximately 340 farms which produced roughly 110,000 tonnes in 1999 worth circa £500 million (initial production and processing). Some 6,300 jobs, direct and indirect, are involved.
23. These facts tend to mask the substantial growth the industry has made in a relatively short time (see 23.1). Also the significance of the jobs provided lies as much in their location as in their number. Seventy-five per cent of the jobs are in the Highlands and Islands: areas where alternative employment opportunities are scarce. For that same reason the socio-economic contribution of wild salmon and sea trout and the angling opportunities which they offer need to be borne in mind.

**Figure 23.1 Scottish Salmon Farming Production**



#### Regulation of the industry

24. There is a perception, even in Scotland, that the aquaculture industry is under-regulated. The facts are somewhat different. This regulation comes in a variety of forms including:

24.1 Leases from Crown Estates. Most of the foreshore around Great Britain is owned by the Crown. It is administered on the Crown's behalf by the Crown Estate Commissioners (but incidentally the income is payable to the National Treasury) who act as landlord and quasi-planning authority (local authority planning responsibility runs only to the high watermark). In exercising the latter role, the Crown Estate Commissioners consult a number of relevant bodies on fish farm applications including the Scottish Executive (for its broader fishery interests), local authorities, Scottish Natural Heritage and the Scottish Environment Protection Agency.

24.2 Registration with Scottish Executive. Under the terms of the Diseases of Fish Acts 1937 and 1993, fish farms are required to be registered with the Scottish Executive. Under EU/domestic legislation farms are inspected annually.

24.3 Navigational aspects. Fish farms are controlled under the Coastal Protection Act 1949.

24.4 Discharge consents. The impact of fish, feedstuff, medication, natural discharges have to be within limits authorised by the Scottish Environment Protection Agency under the Control of Pollution Act 1976.

24.5 Safety of Personnel. Fish farms are subject to the full panoply of Health and Safety legislation.

24.6 Use of medications. Medicines and veterinary medicinal products are licensed by the Veterinary Medicines Directorate under legislation set down by the EU.

#### Pressures facing the industry

25. The graph at 23.1 reveals a Scottish industry which has made remarkable growth in a short period but it faces a number of pressures. The sector remains highly competitive. The dominant player (nearly four times the size of the Scottish industry) is Norway. But this year Chile is expected to overtake Scotland as the second largest producer of farmed Atlantic salmon and substantial growth is also being made by the Faroese industry. The strength of sterling has also served to disadvantage the Scottish industry.
26. Pressures are also evident on the environment front. The industry continues to receive criticism from angling bodies and well-known environmental organisations. These criticisms focus on concerns about possible impact on the seabed, on the possible interaction on wild salmon through escapes, and on the problems of sea lice, particularly on sea trout in the north west of Scotland.
27. The industry has also had to contend with the problems of infectious salmon anaemia. First identified in Norwegian waters in 1984, then in Canada in 1996, the first outbreak of the disease in Scotland occurred in May 1998. In total there have been 11 confirmed outbreaks and 25 suspect cases. The last confirmed case was in May 1999. Seen by some in the industry as draconian, the response to confirmed cases was to require immediate clearance of the site, disinfection of all facilities and extensive fallowing – all of this with no compensation provided.

#### Action being taken

28. Regulation of the aquaculture industry is not static. Changes are being made to reflect increased knowledge, in acknowledgement of concerns, and in accordance with EU and domestic legislation.
29. One of the changes proposed concerns the role of the Crown Estate Commissioners. It is recognised that the dual role of landowner and quasi-planning authority is not appropriate - notwithstanding the manner in which the latter is actually conducted (para 24.1). The Scottish Executive will be introducing legislation to assign planning responsibility to local authorities. The broad intention is that this will operate in a similar open, accountable way to that of terrestrial planning. This process will be underpinned by the Location Guidelines issued by the Scottish Executive in November 1999 which identified the suitability, or otherwise, of areas for further development and announced a presumption against any development on the north and east coasts.
30. In March 1999 new tougher environmental assessment regulations were introduced throughout the EU. These will apply to aquaculture developments – existing and

new; in the case of the former when current development controls come up for renewal.

31. As mentioned at paragraph 27 a major challenge faced by the industry has been ISA. In response to that a Joint Government/Industry Working Party was established to review all relevant practices. A report containing some 74 recommendations covering matters such as fallowing, husbandry, movement of stock, disinfection regimes, etc, has been produced and Scottish Executive Ministers have given a commitment to seeing these carried forward. The discovery of ISA in wild fish – some well removed from fish farms – has raised the possibility that the virus exists at a low level in the natural environment. In the light of this an increase surveillance programme in Scotland and England is being mounted.
32. The development of new treatments for sea lice, which is a major economic problem for the industry and which is seen by some as contributing to sea trout declines, continues – driven, understandably, by the industry. The major players in the industry in Scotland have also committed themselves to the development of an adherence to independently auditable Environment Management Systems.
33. A potentially major contribution to the development of improved relations between wild and farmed salmon interests has been the creation of a Tripartite Working Group, chaired by the Scottish Executive and comprising representatives of the two interests, to look at problems of mutual interest in the north west of Scotland. From this it is planned that Area Management Agreements will be drawn up at a local level to address issues such as sea lice, fallowing and general siting. It is early days yet. Mutual suspicion remains and success will be dependent on the development of trust. However, all concerned see this as holding out considerable promise for the future.

## **PART II**

### **Implementation of the Oslo Resolution in Scotland**

34. As part of the UK, which is a Member State of the European Union, Scotland is committed to the implementation of the Oslo Resolution to minimise the impacts of aquaculture on wild stocks of Atlantic salmon.
35. Returns to NASCO giving details of the implementation of Oslo Resolution are divided into four categories:
  1. General Measures
  2. Measures to minimise genetic and other biological interactions
  3. Measures to minimise disease and parasite interactions
  4. Research and Development
36. The attached Annex provides details of the returns made to NASCO by Scotland.

37. A number of initiatives require special mention, and these are detailed in paragraphs 38-42 below.
38. Following the outbreak of Infectious Salmon Anaemia in Scotland in May 1998, a Joint Government/Industry Working Group was established to identify the measures required to prevent/minimise the occurrence and impact of further outbreaks. The Group made a number of recommendations that have been accepted by the Scottish Executive, including:
- Gametes from ISA-infected salmon must not be used;
  - Hatchery operations must include disinfection of equipment and ova;
  - Seawater must not be used at any stage in the freshwater production phase;
  - Strict hygiene must be observed at all times, including the use of helicopters, road tankers and wellboats;
  - There should be a cessation of bus-stop deliveries by wellboats, except to empty sites;
  - Stress on smolts should be minimised by reducing handling and minimising transport;
  - Broodstock and juveniles should be kept separate at all times;
  - Mortalities must be dealt with correctly: mortalities and waste must be ensiled in accordance with the requirements for dealing with ISA-infected material;
  - Adequate protection against predators that might damage gear should be ensured;
  - Risk assessments should be made before any smolt transfer operations;
  - There shall be a presumption against sea water/sea water transfer between sites;
  - Marine trout farms must be treated in the same way as salmon farms.
39. A Working Group on Farmed Fish Escapes, comprising members from the salmon farming industry, freshwater fish farming industry, Association of Salmon Fishery Boards and the Scottish Executive was established to investigate measures to improve containment of fish in aquaculture facilities and to develop plans for the recapture of escapes. The Group made a number of recommendations including:
- The Crown Estate Commissioners should consider whether adoption of the Environment Management Strategy developed by the largest industry group should be a condition of the lease for all farmers;
  - An environmental impact assessment should include an assessment of the possible risks to wild stocks from escapes;
  - There should be an accelerated replacement of old equipment;
  - There should be rapid notification of escapes and this should be made a statutory requirement;
  - There should be a full audit trail of all farming operations and equipment;
  - Nets that could be used to effect recapture of escapes should be kept at strategic locations;
  - A Code of Containment based on proposals from the joint NASFI/NASCO Liaison Group should be developed in Scotland.



40. A Tripartite Working Group has been established comprising representatives of the salmon farming industry, wild fish interests and chaired by the Scottish Executive to develop and promote the implementation of measures for the restoration and maintenance of healthy stocks of wild and farmed fish, to develop and promote the initiation of measures for the regeneration of wild salmon and sea trout stocks, and to propose arrangements at a local and national level for taking forward the foregoing and to ensure that the results of this work are reflected in the development of Local Authority fish farm planning guidelines and Framework Plans.
41. In addition, representatives of the Scottish salmon farming industry and the Scottish Executive have participated in the NASFI/NASCO Liaison Group and the Working Group established to develop internationally agreed codes of containment.
42. A consultation exercise to consider the management of Scotland's freshwater fish and fisheries was launched in April 2000. A document "Protecting and Promoting Scotland's Freshwater Fish and Fisheries: A Review" forms the background to this exercise.

### **Conclusion**

43. The Scottish Executive shares the widespread concern about the state of salmonid stocks and to that end has issued a consultation paper outlining possible proposals for increasing the statutory powers of District Salmon Fishery Boards and Scottish Ministers.
44. The Scottish Executive also recognises the important parts that both salmon fishing and aquaculture play in many remote parts of Scotland where alternative sources of economic activity are limited. The Executive believes that the farming industry has the potential for further development but accepts that this must be achieved in a way that has full regard to the environment and the wild stocks. The Executive sees the close involvement of both wild fish and farming interests as being crucial to a successful future and believes that the mechanisms being put in place as a result of the efforts of the Tripartite Working Group show the way forward.

# OSLO RESOLUTION

Notes on implementation of the Oslo resolution in Scotland.

1. General Measures	Details of Action Taken
<b>1.1 Sites:</b>	
1.1.1 Sites only to be assigned for aquaculture where hydrographical, epidemiological, biological and ecological standards can be met	Locational guidelines issued by Scottish Executive Rural Affairs Department in 1999. Leases for fish farm sites issued by Crown Estate Commissioners. Consultation with Local Authorities. Advice on hydrographical, biological, fisheries and ecological issues obtained from Fisheries Research Services, Scottish Natural Heritage, Salmon and Freshwater Fisheries Inspectorate, wild fishery interests. Consent to discharge required from Scottish Environment Protection Agency.
1.1.2 Siting of units to avoid risk of damage by collision	Siting must meet with approval of the Scottish Executive Development Department, Transport Division to ensure that the farm does not constitute a navigational hazard. Must comply with Coast Protection Act 1949.
1.1.3 Adequate marking of aquaculture units	Fish farms must be marked with appropriate navigational markers and lights.
<b>1.2 Operations:</b>	
1.2.1 Management of aquaculture units to prevent and control diseases and parasites	All aquaculture facilities are subject to inspection and disease testing under EU and national fish health legislation. GB is an approved zone for VHS and IHN, and has additional guarantees under EU legislation against the introduction of <i>Gyrodactylus salaris</i> .
1.2.2 Management of aquaculture units to prevent escape of fish	The establishment of freshwater fish farms is subject to Local Authority planning regulations. The Planning Authority consults widely and, if planning permission is granted, attaches conditions such as requirements for the prevention of escapes. Tripartite Working Group (Scottish Executive/fish farming industry/wild fish interests) has initiated development of Area Management Agreements, one aspect of which requires the implementation of measures to minimise escapes. Prevention of escapes has been considered by a joint government/industry/wild fish interest Working Group.

<b>1.3 Transfers:</b>	
1.3.1 Transfers conducted so as to minimise potential for disease/parasite transmission and for genetic and other biological interactions	Salmon or salmon eggs may not be introduced into a salmon fishery district for which there is a district salmon fishery board without permission from the board, except where the waters constitute or are part of a fish farm as defined in the Diseases of Fish Act 1937.
1.3.2 Introduction of mechanisms to control transfers where necessary	This issue has been addressed in the recent document “Protecting and Promoting Scotland’s Freshwater Fish and Fisheries: a review”.

<b>2. Measures To Minimise Genetic And Other Biological Interactions</b>	
<b>2.1 Design standards for Aquaculture Units:</b>	
2.1.1 Establishment of standards and technical specifications for the design and deployment of aquaculture units (marine and freshwater)	Joint government/fish farming/wild fish interests Working Group on Farmed Fish Escapes produced report addressing escapes. Recommendations include replacement of wooden cages with more modern, robust cages.
2.1.2 Optimisation of containment of fish through use of appropriate technology for prevailing conditions	NASFI/NASCO Liaison Group considering these issues. Working Group established to examine technical issues. Equipment deployed should be suitable for the site and for conditions likely to be experienced.
2.1.3 Regular routine inspection and maintenance of aquaculture systems and upgrading of equipment as new technological improvements become available	Working Group on Farmed Fish Escapes highlighted need for regular maintenance and inspection. NASFI/NASCO Liaison Group considering these issues. Working Group established to examine technical issues.
2.1.4 Regular monitoring and use of efficient security systems	NASFI/NASCO Liaison Group considering these issues. Working Group established to examine technical issues. Working Group highlighted need for research into the development of suitable security systems.
<b>2.2 Salmon Enhancement:</b>	
2.2.1 Use of local stocks wherever possible	Enhancement undertaken by district salmon fishery boards, or proprietors where there are no boards. Salmon or salmon eggs may not be introduced into a salmon fishery district for which there is a district salmon fishery board without permission from the board, except where the waters constitute or are part of a fish farm as defined in the Diseases of Fish Act 1937. Local stocks invariably used nowadays.
2.2.2 Implementation of criteria for broodstock selection and management	District salmon fishery boards and Fishery Trusts may, and do, seek advice from Fisheries Research Services to augment the advice provided by their own biologists.
<b>2.3 Salmon ranching:</b>	
2.3.1 Use of local stocks or alternatively local ranching stocks	No ranching in Scotland.
2.3.2 Harvesting of ranched fish at or close to release site or in fisheries managed in a way that prevents over-harvesting of wild stocks	No ranching in Scotland.

<b>2.4 Salmon farming:</b>	
2.4.1 Use of local broodstocks where practicable	Many farms relied on local fish to establish initial broodstocks. However, selection for traits such as low grilising and disease resistance have led to the use of mixes of different stocks where the desirable characteristics of different strains are combined.
2.4.2 Efforts to recapture escaped farmed salmon	Working Group on Farmed Fish Escapes recommended site-specific plans be developed to contain fish and contingency plans to deal with escapes. Full audit trails should be available in relation to the equipment used, the fish introduced, husbandry and harvesting. NASFI/NASCO Liaison Group considering these issues. Working Group established to examine technical issues.
2.4.3 Establishment of site specific contingency plan in the event of large escapes	Working Group on Farmed Fish Escapes recommended site-specific plans be developed to contain fish and contingency plans to deal with escapes. Full audit trails should be available in relation to the equipment used, the fish introduced, husbandry and harvesting. NASFI/NASCO Liaison Group considering these issues. Working Group established to examine technical issues.

<b>3. Measures To Minimise Disease And Parasite Interactions</b>	
<b>3.1 Control and prevention of diseases and parasites:</b>	
3.1.1 Aquaculture production process conducted in accordance with appropriate fish health protection and veterinary controls, including the application of appropriate husbandry techniques to minimise risk of diseases (vaccination, use of optimum stocking densities, careful handling, frequent inspection of fish, proper diet and feeding regimes, avoidance of unnecessary disturbance, detailed health inspections, disinfection of transportation equipment and use of disinfection baths at production facilities)	<p>EU and national fish health legislation in place. All registered fish farms must be inspected. Additional guarantees in GB and Ireland to prevent introduction of <i>Gyrodactylus salaris</i>. Following to restrict disease and parasites and to allow seabed recovery is standard practice nowadays.</p> <p>ISA has been confirmed at 11 Scottish farms and suspected of being present on a further 25 farms. All fish at sites where ISA confirmed were subject to immediate slaughter. Movement controls were introduced at all confirmed and suspect sites. Following is mandatory for infected (6 months) and suspect sites (3 months at sites where risk of disease is judged to be minimal). Increased levels of sampling and testing are in place. ISA virus detected in wild fish (trout, eel) in a number of locations around Scotland.</p>
3.1.2 Treatment or removal of diseased stock and measures to ensure diseased fish are not released to the wild	<p>Where ISA was confirmed, all fish subject to immediate slaughter. At suspect sites, movement restrictions introduced immediately. All slaughtering to be done in contained conditions, including containment of blood, offal and water used in the process. All affected material must be ensiled by blending to a liquid state, then mixing with formic acid, the material being held for at least 24 hours at a pH of less than 3.9. Full audit trails of all actions must be maintained for inspection by Fish Health Inspectorate.</p>
<b>3.2 Stocking density:</b>	
3.2.1 Aquaculture production adapted to the site's holding capacity and stocking density should not exceed levels based on good husbandry practices	<p>Veterinary controls on animal welfare apply, as do voluntary controls through industry codes of practice. Pressure from consumers to comply with such codes. Increasing interest within EU in development of welfare protocols.</p>
<b>3.3 Removal of dead or dying fish:</b>	
3.3.1 Removal of dead/dying fish and disposal along with waste materials in an approved manner	<p>Controlled by a combination of statutory and voluntary codes. A variety of methods exist for the removal of dead fish, depending upon the design of the facility, e.g. dead sock method. There are regulations (EC Directive 90/667) to control fallen animals, which includes fish from aquaculture.</p>

3.3.2	Establishment of procedures for effective removal and disposal of infectious material	Approved methods include incineration and burial at an approved site and are usually regulated by the local authorities. Where ISA identified, fish must be disposed of by means of ensilement as described above.
3.3.3	Establishment of contingency plans for disposal of mortalities from emergency situations	Contingency plans for the disposal of mortalities under emergency situations are covered under the Fish Health regulations. Encouragement by government to private companies to develop disposal facilities.
<b>3.4</b>	<b>Adequate Separation:</b>	
3.4.1	Separation of aquaculture facilities on the basis of a general assessment of local conditions	Fisheries Research Services, Scottish Environment Protection Agency, Salmon and Freshwater Fisheries Inspectorate, Scottish Natural Heritage, wild fish interests are consulted by Crown Estates and Local Authorities when applications or leases are to be renewed.
<b>3.5</b>	<b>Year Class Separation:</b>	
3.5.1	Rearing of different generations in separate locations where possible	Single year class stocking widely practised and actively encouraged.
<b>3.6</b>	<b>Fallowing of Sites:</b>	
3.6.1	Use of a fallowing regime wherever possible	Formal controls where ISA confirmed or suspected. SERAD strongly advise adoption of a fallowing strategy and the fallowing period should be as long as possible. Industry are developing Regional management plans and Tripartite Working Group has stimulated the development of Area Management Agreements.
<b>3.7</b>	<b>Use of Medicines and Disinfectants:</b>	
3.7.1	Careful use of medicines and disinfectants in accordance with manufacturers' instructions, Codes of Practice and in compliance with regulatory authorities	All medicinal products require authorisation by the Veterinary Products Committee and the assessment of each product covers a wide range of factors including pharmaceutical quality, efficacy and safety to the operator, the fish and the environment. In most cases, use of a product on a farm is also regulated through veterinary prescription and by the need for a consent to discharge from the Scottish Environment Protection Agency. Directive 96/23/EC on monitoring veterinary residues in farmed salmon is in force.
<b>3.8</b>	<b>Lists of Diseases:</b>	
3.8.1	Lists of prevailing infectious diseases and parasites and methods for control to be maintained by appropriate authorities	Covered by EC List I, II and III diseases, and UK legislation in place to implement the relevant Directives. Most effort is related to maintaining the UK as a zone free of VHS, IHN and <i>Gyrodactylus salaris</i> , and to regulate movements of fish with IPNV and BKD, and to eradicate ISA.

<b>4. Research And Development</b>	
<b>4.1 Research, small-scale testing and full-scale implementation of:</b>	
4.1.1 Wild salmon protection areas	Locational guidelines issued by SERAD in 1999. Presumption against further development of fish farming on the north and east coasts of Scotland.
4.1.2 Sterile salmon	The Scottish Executive is contributing to an EU funded collaborative study involving centres in Scotland (Fisheries Research Services (Marine Laboratory, Aberdeen); Gatty Marine Laboratory, St Andrews University), Ireland (University College, Galway) and Norway (Institute of Marine Research, Matre Aquaculture Research Station).
4.1.3 Tagging and Marking	Fish are not marked or tagged. Each smolt-rearing unit may supply a number of cage-rearing sites and each cage-rearing site may receive fish from a number of smolt-rearing units. Given sufficient information on the frequencies of a number of genetic markers in both source (i.e. fish farm) and sink (i.e. local salmonid populations), it is theoretically possible to identify the origin of individuals or parentage of progeny on a probabilistic basis, although this may identify the smolt-rearing unit rather than the farm from which fish escaped.
4.1.4 Designation of aquaculture regions	Locational guidelines introduced by SERAD propose 3 categories of areas: Category 1 where development acceptable only in exceptional circumstances, Category 2 where prospects for further development are limited but there may be potential for modifications of existing operations or limited expansion of existing sites, particularly where proposals will result in an overall reduction in environmental effect, Category 3 where there may be better prospects of satisfying environmental requirements. Detailed examination of each application always required.
4.1.5 Alternative production methods (land-based, closed or contained floating facilities and other containment technologies)	Land-based salmon grower sites have not proved to be economically viable in Scotland. Most of those that have been established have become specialised in broodstock production or have turned to other species, such as halibut.
4.1.6 Use of local broodstocks	Stocks from multiple sources are currently used in Scotland.
4.1.7 Understanding of genetic interactions	Subsumed within on-going work on genetics and population structuring.
4.1.8 Prevention and control of disease and parasites	Work undertaken on development of vaccines, better methods of disease



	<p>detection, control of disease and aetiology of diseases in the wild. Specific programmes include: improvements in control of <i>Furunculosis</i>; better methods for detection of <i>Gyrodactylus salaris</i>; detection and control of Bacterial Kidney Disease, Pancreas Disease and IPN Virus. Work underway in relation to salmon lice, ERM and Pasteurella. Research on understanding of fish immune systems. Interaction of disease in wild and farmed fish is being investigated. Occurrence of Rhabdoviruses in wild marine fish in European coastal waters being investigated.</p>
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## DISCUSSION

*Chris Poupard (Salmon and Trout Association)*: referred on behalf of all NASCO's NGOs present to a statement by George Thomson (Scottish Executive) in which he alleged that some NGOs are anti-salmon farming. He stated that he wished to make it absolutely clear that NASCO's NGOs recognize the importance of the salmon farming industry but he stressed that the industry must be conducted in a sustainable manner in accordance with NASCO's Oslo Resolution. He indicated that the NGOs were more than willing to cooperate with the salmon farming industry and with NASCO towards this aim.

*Fiona Willis (Salmon and Trout Association)*: noted that the scientific advice indicated that sea trout declines are attributable to sea lice and that this had been acknowledged by Mr Thomson in his presentation. She asked what proposals the Scottish Executive had to introduce statutory regulatory measures to address the problem.

*George Thomson (EU - Scotland)*: indicated that he was reluctant to concede that he had acknowledged that sea lice were the cause of sea trout declines since, as the presentations had indicated, the situation is complex. There is, however, the potential for damage. He referred to a Court Action in relation to the issue of which organization in Scotland is responsible for monitoring sea lice and that as the issue was sub-judice he would not be able to comment further.

*Mr Einar Lemche (President of NASCO)*: in response to a question asking if NASCO had considered stronger measures to minimize escapes than those in the Oslo Resolution, referred to the draft guidelines on containment of farm salmon, developed by the NASCO/North Atlantic Salmon Farming Industry Liaison Group, to be considered by the Council later in the week.

*Stephen Chase (Atlantic Salmon Federation)*: referred to his interest in the regulatory process and noted that monitoring was an important component of this process. He asked the panel for their views on how important the active involvement of Government is in regulation and monitoring the salmon farming industry.

*Ken Whelan (EU - Ireland)*: responded that, in Ireland, government involvement is fundamental to the two 'industries' of wild and farm salmon moving forward 'hand in hand'. However, he stressed that Ireland is a small country and that what works in Ireland might not be appropriate elsewhere.

*Paddy Byrne (National Anglers Representative Association)*: congratulated the speakers and referred to the good progress being made in Ireland where the industry is closely monitored and escapes are not a serious problem. He noted that while the impact of sea lice on wild salmon stocks is not yet clearly established it is for sea trout and that where monitoring shows that target lice levels are being exceeded there must be immediate action not delays of some months as at present.

*Maurice Mullen (EU - Ireland)*: indicated that there was a need for immediate follow-up action in the lice monitoring programme and that this would involve obligations for salmon farm owners and for the controlling authority. He referred to the concerns of

industry and lack of adequate information but noted that the system needed to be transparent so that all involved groups were kept well informed.

*Ray Owen (USA)*: noted that in Ireland approximately \$1.8 million was being spent on research and development in relation to salmon farming and asked for clarification as to whether this was being funded by the tax payer or the industry.

*Maurice Mullen (EU - Ireland)*: indicated that as the Irish State owns the foreshore, salmon farming companies are charged an annual rental. The extent of investment in the industry reflects its importance to the country.

*Jean-Pierre Plé (USA)*: referred to the EU Habitats Directive which contains annexes listing 'species of concern' and 'species for which specific conservation measures are required.' He asked why Atlantic salmon are only listed for freshwater habitats and not also for marine habitats.

*Henning Roed (World Wildlife Fund - Norway)*: noted that the presentations had given a good indication of the economic value of farm salmon and of job creation by the industry but as the session was devoted to interactions he questioned why equivalent information had not been presented for the value of wild fish. He referred to discussions in North America in relation to genetically modified (GM) salmon and asked if the use of GM salmon in aquaculture in Europe would be acceptable. Finally he referred to the damage caused by sea lice and to aquarium studies in Norway that had shown that where wild salmon smolts had been treated against the parasite subsequent mortality was negligible compared to more than 75% mortality in untreated groups. He stressed that while lice levels on individual farm fish had declined in Ireland the important figure was the total production of sea lice in a particular area.

*Maurice Mullen (EU - Ireland)*: responded that while the focus of the session was on aquaculture, in Ireland the wild fishery is also highly valued. In some areas there is no competition between aquaculture activities and wild fishery interests.

*Ken Whelan (EU - Ireland)*: referred to a study that had been commissioned in Ireland on GM salmon but at present no interest is being shown in GM salmon by the aquaculture industry. With regard to sea lice, it has been possible to reduce the number of lice per fish but the number of fish being produced in aquaculture is increasing rapidly. However, the growth of the industry in Ireland is only a fraction of the rate of growth in Norway. The management process must link obligations with the perceived risks and involve all interested parties. He stressed that salmon farmers want to see low lice levels.

*Ole Tougaard (EU)*: indicated that he agreed with the importance of assessing the economic value of the wild salmon resource and that the available information within EU Member States should be compiled. With regard to GM salmon and the broader aspects of GM foods there has been a heated debate recently and he stressed the importance of taking appropriate measures before these technologies are introduced.

*Jeremy Read (Atlantic Salmon Trust)*: stated that in the North and West of Scotland there has been a considerable decline in wild populations of salmon and sea trout with juvenile

salmon populations in many rivers now at very low levels or zero. The cause of this decline is complex but in some areas it is now generally accepted that the decline of sea trout is attributed to salmon farming.

*George Thomson (EU - Scotland)*: referring to the earlier question from Fiona Willis stated that there is a view that sea lice are a contributing factor in the decline of wild salmon and sea trout in parts of Scotland and indicated that the Scottish Executive had never disputed that fact. However, sea lice are not the only cause of problems facing these wild stocks and it is difficult to quantify the extent of their impact.

*Fred Whoriskey (Atlantic Salmon Federation)*: referred to the need for transparency in monitoring regimes so that it is possible to identify farms that are in compliance and those that are not. He asked for clarification as to whether individual farms could be identified.

*George Thomson (EU - Scotland)*: referred to recent initiatives in Scotland involving salmon farming industry and wild salmon interests (e.g. tripartite working group and area management agreements). Fundamental to these initiatives is greater openness, greater trust and a willingness to seek mutually beneficial solutions to problems.

*Mary Colligan (USA)*: asked what procedures are in place in Ireland and Scotland for reporting escapes and to recapture escapees from salmon farms.

*George Thomson (EU - Scotland)*: responded that the current regime in Scotland is inadequate as there is no statutory requirement to report escapes. However, he indicated that he was confident that such a requirement would be introduced.

*Ken Whelan (EU- Ireland)*: indicated that in Ireland it is a requirement of salmon farming licences to report escapes. Fishery Boards can take measures to protect against escaped farm salmon.

*Andy Rosenberg (USA)*: noted that the estimated level of escapes in Ireland was about 2 tonnes – an insignificant level relative to production. He indicated that he found it puzzling that the level of escapes was apparently so low and asked if any studies to monitor escaped farm salmon had been conducted in rivers.

*Ken Whelan (EU - Ireland)*: responded that a small proportion of the fish which escape subsequently appear in Irish rivers. Extensive genetic studies on the prevalence of salmon/trout hybrids had found little evidence of impacts of escaped farm salmon and on the river Moy, fishery staff had found no evidence of any large influx of escaped farm salmon.

*Nell Halse (New Brunswick Salmon Growers Association)*: referred to the on-going debate about transgenic salmon and indicated that her Association, the Canadian Aquaculture Industry Alliance and the International Salmon Farmers Association have all stated that they do not support the commercial production of transgenic salmon until it has been shown that such use is safe and desirable to consumers.

*Richard Behal (Federation of Irish Salmon & Sea-Trout Anglers)*: referred to the history of regulation in the Irish salmon farming industry and stressed that much had been

learned from the sea lice - sea trout issue. In zones free of aquaculture on the west coast of Ireland there was no noticeable sea trout collapse and salmon runs had been maintained thereby pin-pointing the casual effect between salmon farms and damage to wild stocks. He indicated that setting a level of 0.3 egg-bearing lice per farm salmon still leads to too high a lice level and that in future the emphasis must be on the total number of lice in a particular bay or loch. This could perhaps best be achieved through peer pressure under single bay management agreements but if the Government fails to enforce its laws there will continue to be problems in future.

*Ken Whelan (EU - Ireland)*: referred to on-going research in Ireland on sea trout at sea which had shown that a suite of factors lead to mortality and which had confirmed that sea lice impacts are important. The situation is complex, however, because in some years, in some bays, elevated lice levels on farm salmon may not result in problems for wild fish but there can be problems for wild fish when lice levels are low. In future, it is hoped to use aquaculture-free zones as controls and to look at a number of bays in greater detail with the aim of obtaining a clearer understanding of the various factors influencing marine mortality. In the meantime, he stressed that the Precautionary Approach should be adopted and it should be assumed that lice from salmon farms impose an additional pressure on the wild stocks. The ultimate target should, therefore, be zero lice on farms.

*Bill Taylor (Atlantic Salmon Federation)*: stated that it would be ridiculous to assume that salmon farms had no impact on wild stocks. He asked for clarification as to whether wild salmon protection areas had been established in Scotland and, if so, what criteria had been used in their selection.

*David Dunkley (EU - Scotland)*: referred to locational guidelines, used in relation to siting of salmon farms, under which a central element is a presumption against development of salmon farms on the north and east coasts of Scotland. For the west and north-west of Scotland further development will be carefully managed in accordance with the guidelines.

*Nell Halse (New Brunswick Salmon Growers Association)*: in response to an earlier intervention that the New Brunswick salmon farming industry monitors itself and there is no public access to these results, indicated that a Committee involving the industry and provincial government monitors the environment programme. The salmon farming industry in Canada, and around the North Atlantic, is developing codes of practice and there is a need to ensure that these codes are consistent on an international level and this is being undertaken through the International Salmon Farmers Association. The industry in Canada is also developing its research and development function and has developed a database in relation to fish health which will be available for Third Party audit.

*Dan Kimball (USA)*: asked if there is an on-going programme in relation to the use of local broodstocks in aquaculture in Scotland.

*David Dunkley (Scottish Executive Rural Affairs Department)*: responded that when the industry started in Scotland local broodstocks were used but strains reared specifically for farming rapidly became the preference. He indicated that fish farmers understand

the difficulties they could face in the future if the industry resulted in genetic damage to the wild salmon stocks.

*Andrew Goode (Atlantic Salmon Federation)*: asked if public funding was available to the industry for development of broodstocks and for clarification of the recommended separation distance between salmon farms and rivers.

*David Dunkley (EU - Scotland)*: responded that the development of broodstocks was a matter for the industry and that in Scotland there is no specific distance required. He noted that there had been calls for a separation distance of at least 20 km between farms and salmon rivers but if this was applied in Scotland then there wouldn't be a salmon farming industry. Licence applications involve a consultation process with interested parties and each case is examined on its merits, including consideration of separation distance. Not every application results in a licence being issued.

*Ivor Llewelyn (EU - England and Wales)*: referred to the aquaculture link research programme in Great Britain which is jointly funded 50%:50% by industry and Government. Projects in this programme involve research on broodstock development, flesh quality, welfare issues and fish health issues.

*Jim Gourlay (Atlantic Salmon Federation)*: stated that in North America, in relation to the oil industry, the assumption is made that there will be accidents and a pollution fund has been established. Furthermore, fines levied against constructors of highways are held in a fund to mitigate damage to the wild stocks. He asked if such a fund had been established within the EU to mitigate for aquaculture damage.

*Ole Tougaard (EU)*: responded that he didn't believe that such a fund existed. He added that in the past the EU's reporting under the Oslo Resolution had not been adequate but he hoped that the presentations made gave a clearer overview of the measures being taken to minimize the impacts of aquaculture on the wild stocks by the Commission and the EU Member States.

*Einar Lemche (President of NASCO)*: in closing the Special Liaison Meeting thanked the contributors for their presentations and all who had contributed to the debate.