

Agenda item 6.4(c)
For information

Council

CNL(05)20

Returns Made in Accordance with the Williamsburg Resolution

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Returns Made in Accordance with the Williamsburg Resolution

1. The Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Aquaculture, Introductions and Transfers and Transgenics on the Wild Salmon Stocks, the Williamsburg Resolution, was adopted by the Council at its Twentieth Annual Meeting. It restructured five of NASCO's existing agreements into one new 'umbrella' Resolution. These agreements are:
 - Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the Oslo Resolution);
 - Guidelines on Containment of Farm Salmon (developed by the Liaison Group with the salmon farming industry);
 - Guidelines for Action on Transgenic Salmon;
 - North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers;
 - North American Commission Protocols for the Introduction and Transfer of Salmonids.

New elements on burden of proof, risk assessment, mitigation and corrective measures, implementation and reporting and Guidelines on Stocking were also included.

2. Under Article 10 (Implementation) of the Williamsburg Resolution the Parties are required to report annually to NASCO on the measures adopted and actions taken under Article 5 (Measures to Minimise Impacts of Aquaculture and Introductions and Transfers in accordance with Annexes 2, 3 and 4 of the Resolution), Article 6 (Non-Indigenous Fish), Article 7 (Transgenic Salmonids) and Article 9 (Mitigation and Corrective Measures). Reporting formats had previously been agreed for the Oslo Resolution, the Guidelines on Containment of Farm Salmon (developed by the Liaison Group) and the NEAC Resolution. The Standing Committee on the Precautionary Approach (SCPA) had proposed a format for reporting on the Guidelines for Action on Transgenic Salmon. While the NAC Protocols are appended to the Williamsburg Resolution, there is no requirement for reporting under the Resolution, and they are currently under review. These existing reporting formats were combined and used on a trial basis for the first returns under the Williamsburg Resolution last year. The same format has been used again this year and the returns are attached. It should be noted that with regard to Section 2, Guidelines on Containment of Farm Salmon, more comprehensive reports were made to the Liaison Group and are contained in Annex 6 of document CNL(05)21.
3. The absence of information under any section of the attached returns does not mean that there are no measures in place. The Council had previously agreed that it wished

only to be advised of new measures. In previous years, the Secretariat had checked the returns to ensure that only new measures were presented in the report to the Council. We have not done so in this report but merely presented the returns as received from the Parties except that we have not included returns of 'No' or 'Not applicable' unless an explanation has been given.

4. It should be noted that not all forms of aquaculture are practised by all Parties. For example, Greenland has no salmon aquaculture at all. Within the EU, there are no marine cage salmon farming sites in Sweden, Spain, Finland, Germany or the UK (England and Wales). At the time of preparation of this paper, no return of information was available for some EU Member States with salmon interests (France and Portugal). Canada has provided a return under the Oslo Resolution rather than using the return format for the Williamsburg Resolution and this is attached as Annex 1.
5. Some of the returns were received quite late and we have, therefore, been unable to carry out any analysis of them or draw conclusions.

Secretary
Edinburgh
2 June, 2004

1. <i>General Measures to Minimise Impacts (Annex 2 of Williamsburg Resolution)</i>
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1.1 Siting and Operation of Aquaculture Activities**1.1.1 Have salmon aquaculture facilities only been located where hydrographical, epidemiological, biological and ecological standards can be met?****European Union***Spain*

In Spain, all the fish farms that cultivate salmons are for restocking, none of them are for commercialising. In all Spanish salmon fish farms, the sanitary controls are very strict. In Galicia two fish farms of salmon exist and belong to the Xunta of Galicia. In Asturias there are three fish farms that cultivate salmon belonging to the Principality of Asturias. There is also a salmon fish farm property of a fishermen association. In the Autonomous Region of Cantabria there is only a fish farm of salmon and it belongs to the Government of Cantabria. There is only a fish farm of salmon in Guipúzcoa that is controlled by the Local Delegation of Guipúzcoa. This fish farm is located in the race of Ibarla (Irún). The salmon fish farm of Navarre is located in the Bidasoa basin where permanent sanitary controls are carried out by microbiological standards and it is isolated of the rest of salmonid fish farms (trout production). This means that "San Francisco de Asis salmon fish farm" is an independent area for salmon. The Environmental Ministry of Regional Government of Navarre is responsible of all the processes. No transformation of salmon products exists in the area. The fish farm-produced, parr and smolts salmons, are used in the enhancement programs of wild population of the Bidasoa River.

UK (England and Wales)

Not applicable for marine cage sites (none in England and Wales). Freshwater hatchery sites are typically sited where disease and ecological risks are in accord with good practice.

UK (Northern Ireland)

These standards were investigated at the initial application stage.

Russian Federation

These standards are taken into account when site-specific requirements to an aquaculture facility are developed.

1.1.2 Have “wild salmon protection areas”, where salmon aquaculture is restricted or prohibited, been established?

Iceland

Regulation # 460/2004 banning the rearing of salmonids in salmon producing areas (see CNL(04)32).

Norway

No new measures, but a proposal for additional number of salmon fjords will be put forward to the Parliament in 2005.

1.1.3 Have any “aquaculture regions”, where all steps in the production process are carried out and which are separated from similar regions by areas without aquaculture, been designated?

Iceland

Regulation # 460/2004 banning the rearing of salmonids in salmon producing areas (see CNL(04)32).

1.1.4(a) Has the separation distance between aquaculture facilities at marine sites been based on a general assessment of local conditions?

European Union

Ireland

Minimum distance of 1km is required.

UK (Northern Ireland)

This was investigated at the initial application stage.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the approval of establishment and expansion of aquaculture farms, and the registration of ponds”, 16. Jan. 2004 (“Etableringsforskriften”).

Russian Federation

According to veterinary and sanitary requirements to sea cage farms the following separation distances are applied: aquaculture facilities belonging to different owners are to be located at a distance of at least 5 km from each other.

1.1.4(b) Have different generations of salmon been reared in separate locations?

European Union

Germany (Brandenburg)

See report on stock rebuilding programmes in CNL(05)23.

Ireland

Farms divided into “smolt sites” and “grower sites” which are geographically separate.

UK (England and Wales)

Not applicable. Freshwater hatchery sites now largely avoid holding more than one generation of fish.

UK (Northern Ireland)

This would be the case at the sea sites but not in the hatchery operation of the company.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the management of aquaculture farms” 22. Dec. 2004 (“Akvakulturdriftsforskriften”).

USA

There is a requirement in the State discharge permit (MEPDES) to rear a single year class of fish through harvest at a particular site.

1.1.4(c) Has fallowing been used as a means of minimising outbreaks of diseases and parasites?

European Union

Ireland

Minimum 1 month fallow required on most sites.

Spain

In the fish farm of Ibarla (Gipúzcoa) preventive measures are taken to avoid sanitary problems. In Navarre, when the restocking program has been concluded, the tanks are emptied and all the working areas are fallowed. At the same time cleaning and disinfecting are carried out.

UK (England and Wales)

There would be a compulsory fallowing period following any outbreak of a serious notifiable disease.

UK (Northern Ireland)

There is a requirement to fallow under the IPN Infected Waters Order currently in operation.

UK (Scotland)

A routine fallow between successive stockings of a site is considered to be good husbandry practice. Our Area Management Agreements seek to introduce synchronous fallowing. In 2004 an AMA was signed for West Mull.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the management of aquaculture farms” 22. Dec. 2004 (“Akvakulturdriftsforskriften”).

Russian Federation

The area of a site allocated to an aquaculture facility should be enough to allow to use a part of it for fallowing.

1.1.4(d) Has aquaculture production been adapted to the holding capacity of individual sites, with density levels based on good husbandry practices?

European Union

Ireland

Benthic conditions are monitored. Stocking levels are controlled under the terms of each Aquaculture Licence.

Spain

In the Autonomous Region of Cantabria, salmon aquaculture is only carried out for stocking enhancement programmes. The fish farm of Ibarla (Guipúzcoa) has a low density of salmon in relation to its capacity to avoid handling and sanitary problems. In Navarre, the number of animals that will be reintroduced in the river and that will be needed to produce in the farm, is decided every year according to the possibilities of the fish farm in order to get a correct density and animal husbandry and to reduce stress.

UK (England and Wales)

Not applicable in terms of marine sites. Production in freshwater is governed by water availability and waste discharge consents, which typically ensure good practice in terms of fish density.

UK (Northern Ireland)

The company have a recognised organic status which specifies the stocking density for the holding of fish.

Norway

The holding capacity was earlier based on volume of the nets on the location, but is now, on the basis of the new regulation of 16. Jan 2004, based on total biomass.

Russian Federation

Stocking densities are applied according to established standards.

- 1.1.5(a) Have dead and dying fish been removed immediately from aquaculture production facilities and disposed of, along with waste materials, in an approved manner?**

European Union

Ireland

This is required under the terms of the licence.

Spain

In Navarre, like in the rest of the Autonomous Regions, when an infectious disease is confirmed or suspected to happen, animals are destroyed and tanks and work material are disinfected. In the case of viral infections (not present to date) an eradication program has been designed in order to get a fast eradication of the disease.

UK (Northern Ireland)

The company regularly uses divers to collect the mortalities from the sea cages. All mortalities have to be disposed of in an appropriate manner as a condition of the Infected Waters Order.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the management of aquaculture farms” 22. Dec. 2004 (“Akvakulturdriftsforskriften”).

Russian Federation

According to veterinary and sanitary regulations and requirements to aquaculture facilities.

1.1.5(b) Have procedures been established to address the effective removal and disposal of infectious materials?

European Union

Germany (Brandenburg)

Only fishes certified free of diseases and parasites used.

Ireland

Animal By-Products Regulations, 2002.

Spain

For example, in the farm of Navarre there is a permanent control of deaths in tanks. Dead animals are removed of the tanks immediately and incinerated if there is any suspect of infectious diseases.

UK (Northern Ireland)

Again this is a requirement of the Infected Waters order.

Russian Federation

According to veterinary and sanitary regulations and requirements to aquaculture facilities.

1.1.5(c) Have contingency plans been established for the disposal of mortalities from emergency situations?

European Union

Germany (Baden-Wuerttemberg)

For ISA: EC Decision 2003/466/EC.

Germany (Brandenburg)

See report on stock rebuilding programmes in CNL(05)23.

Germany (Lower Saxony)

No new measures. Previously reported measures still apply - for ISA: EC Decision 2003/466/EC

Ireland

Contracts established with certified Rendering Plants.

Spain

In the Autonomous Regions of Galicia and Cantabria a contingency plan has not been established for the disposal of mortalities from emergency situations. In Navarre a permanent epidemiological surveillance program is carried out in order to detect diseases in the farm and also in the river, not only clinical cases but also asymptomatic carriers. If bacterial or parasitic diseases are detected, control programs (usually treatments) are applied. If it is a viral disease (never detected) the eradication program will be applied. In all that cases cleaning and disinfecting programs are routines in the farm.

UK (Northern Ireland)

This procedure is in place for the existing and future situations. A rendering company can collect or will take delivery of infected materials at short notice.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the management of aquaculture farms” 22. Dec. 2004 (“Akvakulturdriftsforskriften”).

1.1.6 Has tagging or marking of farmed fish been used, e.g. to facilitate their identification in the wild and to determine the source of escapes?

European Union

Germany (Brandenburg)

See report on stock rebuilding programmes in CNL(05)23.

Spain

All animals, parr and smolts, that will be introduced in the river are tagged by micro-tag (CWT) and/or adipose fin clipping (ADC).

Iceland

10 % of smolts put into sea-cages must be tagged.

USA

In 2003, an MEPDES general permit for Atlantic salmon aquaculture was finalised and includes special conditions for protection of endangered Atlantic salmon. These conditions focused on finfish aquaculture operations in four primary areas: (1) fish husbandry and culture; (2) loss prevention through audited containment practices; (3) marking cultured fish to identify the origin of escapes; and (4) use of only North American strains of Atlantic salmon. Effective April 1, 2004 all new fish placed into marine net pens must be identifiable through external means as commercially reared and identifiable through other means as stocked within State of Maine waters. In 2004, mostly all fish stocked for aquaculture purposes received a fin clip.

1.2 Diseases and Parasites

1.2.1 Have all steps in the aquaculture production process, from hatchery to processing plant, including transportation of live fish materials, been conducted in accordance with appropriate fish health protection practices?

European Union

Spain

In Navarre the program for health of salmon is carried out in the fish farm and the rivers where salmon live (also trout rivers). It is based on the epidemiological surveillance program that means a permanent evaluation of the health status of the animals by microbiological diagnosis (bacterial, parasitological, virological and fungal diagnosis). Every three months random samples are taken in the fish farm and at 5 different points of the rivers where salmon live. On these animals the microbiological analyses are carried out using the OIE standards for diagnosis. Also the number of selected animals in every point is determined according to the OIE standards for zones qualification. European Directive 91/67 and Spanish legislation Royal Decree 1882/94.

Ireland

Most farms operate to an Approved Fish Health Management Plan.

UK (Northern Ireland)

The Fish Health unit monitors and approves all fish movements into and out of the sites in accordance with EU legislation

Russian Federation

Compliance with veterinary requirements at all stages of aquaculture production process. Regular inspections of aquaculture facilities for diseases and parasites.

Specified diseases and parasites

1.2.2(a) Have epidemiological zones (either with or without specific pathogens) been established for at least the following diseases: VHS, IHN, ISA and the parasite *Gyrodactylus salaris*?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

In 2004, 12 seafarms have experienced outbreak of ISA. IHN, VHS and *Gyrodactylus salaris* have never been diagnosed

European Union

Finland

Ministry of Agriculture and Forestry has revised decrees concerning the prevention of the spread of *Gyrodactylus salaris* to the rivers flowing into the Arctic Ocean:

The new Statute of the Ministry of Agriculture and Forestry for the protection of the water systems of the Rivers Tenojoki (Tana), Nääämöjoki (Neiden), Paatsjoki, Uutuanjoki and Tuulomanjoki from the spread of *Gyrodactylus salaris* was stipulated on the basis of Fisheries Act and Act on Animal Diseases and came into force 10.1.2005.

Restrictions on movement of live fish and eggs: Transfer of live farmed and wild fish as well as undisinfected eggs from other parts of Finland to the water systems of the Rivers Tenojoki, Nääämöjoki, Paatsjoki, Uutuanjoki and Tuulomanjoki is forbidden.

Transfer of live farmed and wild fish as well as undisinfected eggs from the water systems of the Rivers Paatsjoki, Uutuanjoki and Tuulomanjoki to the Rivers Tenojoki and Nääämöjoki is forbidden. The Tenojoki – agreement between Finland and Norway applies as well.

Baitfish etc.: It is forbidden to transfer baitfish from other parts of Finland to the water systems of the Rivers Tenojoki, Nääämöjoki, Paatsjoki, Uutuanjoki and Tuulomanjoki, as well as to transfer them between these water systems. The Use of baitfish is forbidden in angling, ice-fishing and lurefishing.

Gutting of fish originating from other water systems is forbidden, if gutting waste can end up in natural waters of the water systems of the Rivers Tenojoki, Nääämöjoki, Paatsjoki, Uutuanjoki and Tuulomanjoki.

Fishing equipment, boats, etc.: Boats, canoes, fishing equipment like reels, rods, lures, nets, boots, wading trousers transferred from other parts of Finland must be completely dried or disinfected before their use in these water systems.

Germany (Baden-Wuerttemberg)

Trout farming: Yes, one new VHS-/IHN-free zone was established according to EC Decision 2004/373/EC.

Ireland

At the moment, the entire country is a single zone, since we are free of the diseases listed. Should an outbreak /outbreaks occur, appropriate local epidemiological zones would be established.

Spain

In Cantabria epidemiological zones for VHS, IHN and ISA have been established. In Navarre, all the area is free of these diseases according to the Spanish and European legislation for free areas. (EU 91/67 and RD 1882/94).

Sweden

Sweden was given additional guarantees for three fish diseases: SVC (spring viremia of carp), IPN-V (infectious pancreatic necrosis) on coast and inland and BKD (bacterial kidney disease) on inland (Commission Decision 2004/453/EG). The decision concerns all species intended for aquaculture, implying that the fish only can be brought from countries having the same health status.

UK (Northern Ireland)

Established in relation to 91/67 and as amended.

UK (Scotland)

Evidence to suspect the presence of ISA virus was obtained during a routine investigation into increasing fish mortalities at a farm in South Uist, off the west coast of Scotland, in November 2004. Clinical signs of disease were not consistent with ISA as described in the current OIE Aquatic animal health code. Great Britain is a zone with recognised freedom from these diseases under Directive 91/67/EEC (as amended).

Norway

ISA: Report of outbreaks and epidemiological evaluation for 2004 has been produced by the National Veterinary Institute. Epidemiological zones have been established for all. *G. salaris*: Application for free status (EU) in process. BKD: Application for free status (EU) is under evaluation. VHS and IHN: No new measures. Bufferzone along the border to Russia and the free zone in the rest of the country still apply.

Russian Federation

No. However, in 2004 the Veterinary Service for the Murmansk Region carried out targeted investigations in the wild to identify the presence and spreading of parasites

of particular threat to juvenile Atlantic salmon, *G.salaris* in the first place. This was done on the river system, Tuloma river, in the border area between Russia and Finland. *G.salaris* was not found.

1.2.2(b) If epidemiological zones have been established, have management measures (including monitoring to confirm disease status and eradication) been introduced within these zones?

European Union

Germany (Baden-Wuerttemberg)

Trout farming: In the epidemiological zones monitoring plans are established and the monitoring itself is conducted by the National Fish Health Service based on Council Directive 91/67/EEC.

Ireland

The FHU carries out an annual monitoring programme for all the diseases listed.

Sweden

The additional guarantees imply that detections of above mentioned fish diseases must be eradicated.

Spain

In Cantabria, all aquaculture facilities are screened twice every year. In Navarre, all the measures included in the epidemiological surveillance program (diagnostic, programs for control of bacterial diseases and eradication of viral diseases) were described in previous points.

UK

Temporary Control and Surveillance Zones were established as laid down in Commission Decision 2003/466/EC. Controls were implemented according to Council Directive 93/53/EEC. An epizootic investigation is being conducted. The affected fish were culled on a voluntary basis within 16 days of the declaration of suspicion of ISA under the supervision of the Official Service.

UK (England and Wales)

Monitoring is in accord with EU legislation under Directive 91/67 EEC (as amended), and related Decisions, notably Decision 2001/183 EC on sampling and testing.

UK (Northern Ireland)

Wild fish sampling programme, farmed fish sampling programme and appropriate contingency planning in progress.

Norway

ISA: The contingency plan (Contingency Plan for control of Infectious Salmon Anaemia (ISA) in Norway) has been revised and is now under scrutiny by ESA.

- 1.2.3 Have there been any known movements of live salmonids and their eggs from a zone where any of the specified diseases is present to a zone free of these diseases?**

European Union

Spain

All the areas of the Autonomous Regions where salmon live are free of diseases.

- 1.2.4 Has a list of prevailing infectious diseases and parasites, including methods used for their control, been established and maintained by the appropriate authorities?**

European Union

Germany (Baden-Wuerttemberg)

A list of such diseases and parasites exists and is maintained by the National Fish Health Service.

Germany (Northrhine-Westfalia)

Such a list is maintained by Bundesforschungsanstalt für Viruskrankheiten der Tiere in Riems.

Ireland

Available from Marine Institute/Dept. Communications, Marine & Natural Resources.

Spain

In Galicia, Asturias and Basque Country, a list of prevailing infectious diseases and parasites has not been established or maintained by the appropriate authorities. In Navarre they have two lists: List I and II of aquatic diseases for the UE and standards of the OIE for sampling and diagnostic in aquaculture

Sweden

Complementary directions from the Swedish National Board of Agriculture (SJVFS 1994:94).

UK (England and Wales)

ISA, VHS, IHN, BKD, IPN are notifiable diseases controlled under EU and national legislation. The first four are subject to eradication programmes if found on farms in

GB. IPN is notifiable in salmon in GB, and is managed by movement controls on farms and a broodstock management programme on marine sites.

UK (Northern Ireland)

This is a living document and updated as necessary.

Russian Federation

There is a list of diseases and parasites which may occur at aquaculture facilities established by the Veterinary Service.

Unknown diseases and parasites

1.2.5 Have procedures been established for the early identification and detection of, and rapid response to, an outbreak of any new disease or parasite infection likely to affect Atlantic salmon?

European Union

Germany (Baden-Wuerttemberg)

The National Fish Health Service regularly controls commercial trout (fish) hatcheries and production units as well as non-commercial trout (fish) farms in programme and applied epidemiological zones by sampling fish and controlling their health status. New diseases or parasites would be detected during this programme.

Germany (Northrhine-Westfalia)

Control of health status of imported salmon ova for stocking programmes is performed in collaboration with Bundesforschungsanstalt für Viruskrankheiten der Tiere

Ireland

Generic Contingency Plans available.

Spain

Since 1995 the epidemiological surveillance program to detect the referred viral diseases. Authorised reference laboratories carry out diagnostics for Fish Diseases in Spain (Madrid, Zaragoza).

UK (England and Wales)

The official services are legally obliged to investigate mortalities suspected to be caused by notifiable or emerging diseases. Appropriate movement controls would be placed on suspect sites.

UK (Northern Ireland)

There are wild fish and farmed fish sampling programmes in place.

Norway

No new measures. Previously reported measures still apply, but the regulation is put into the new “Regulation concerning the management of aquaculture farms” 22. Dec. 2004 (“Akvakulturdriftsforskriften”).

Russian Federation

The Veterinary Service undertook investigations to identify: the presence and spreading of parasites of particular threat to juvenile salmon; the presence of diseases in fish and how they are spread in the wild populations.

1.2.6 Have any additional protective measures been introduced, e.g. establishment of zones, restrictions on trade in live fish, or strengthening and amendment of disease controls to ensure adequate protection of wild fish?

European Union

Germany (Brandenburg)

Only fishes certified free of diseases and parasites used.

Germany (Baden-Wuerttemberg)

The introduction and release of fish into programme and applied epidemiological zones is restricted due to Commission Decision 916/67/EEC and 93/53/EEC.

Spain

The Classification of free of Diseases (viral and parasitic *Gyrodactylus salaris*) is made according to Spanish and EU regulation and according to the OIE standards (EU 91/67 and RD 1882/94).

UK (England and Wales)

Additional guarantees for the control of diseases on List II of Annex 1 of Directive 91/67/EEC were given to certain EU Member States under Commission Decision 2004/453/EC in May 2004. For Great Britain, this included formal controls for Bacterial Kidney Disease (BKD), and increased controls for *Gyrodactylus salaris*

UK (Northern Ireland)

The Disease of Fish Act 1967 allows for the imposition of restrictions to protect the wild fish stocks. None have been introduced in this reporting period.

UK (Scotland)

Commission Decision 2004/453/EC of 29 April 2004 granted the UK additional guarantees (control of imports) and approved the control programmes for *Gyrodactylus salaris*, Bacterial Kidney Disease (BKD) and Spring Viraemia of Carp (SVC).

Health inspection of donor facilities

1.2.7 Have there been any known movements of live salmonids and their eggs from hatcheries to areas containing Atlantic salmon stocks, or to facilities where there is a risk of transmission of infection to such areas, other than those from facilities where regular inspections have not detected significant diseases and parasites?

European Union

Spain

Only movements from the farm to the river (free of the referred diseases) where restocking releases are made (also free of diseases) are according to the epidemiological surveillance program.

Use of medicines and disinfectants

1.2.8 Have medicines and disinfectants been used with care and in accordance with manufacturers' instructions and any Codes of Practice, and in compliance with regulatory authorities?

European Union

Germany (Lower Saxony)

Medicines are prescribed by the Fish Health Service of Lower Saxony on the basis of the *Verordnung über Standardzulassungen von Arzneimitteln* (Regulation for standard license of medicines) BGBl I v. 15.12.2004, S. 3334. Disinfectants are used on the basis of the *Fischseuchen-Verordnung* (Fish Epidemic Regulation) BGBl I v. 9.11.2004, S. 2754.

Germany (Baden-Wuerttemberg)

Medicines are prescribed by the National Fish Health Service on the basis of the *Verordnung über Standardzulassungen von Arzneimitteln* (Regulation for standard license of medicines) BGBl I v. 15.12.2004, S. 3334. Disinfectants are used on the basis of the *Fischseuchen-Verordnung* (Fish Epidemic Regulation) BGBl I v. 9.11.2004, S. 2754.

Ireland

Monitored by private veterinarians, Dept of Agriculture and Marine Institute.

Spain

The treatment of bacterial, fungal and parasitic diseases is made with accepted medications in the UE regulation (especially those referred to antibiotics and disinfectants) and application is made according to the manufacturer instructions.

In Navarre, the efficacy of the treatments is evaluated also by the epidemiological surveillance program and studies of resistance are carried out periodically.

UK (England and Wales)

Veterinary medicine use on farms is monitored by the official services, and residue testing is carried out to look at illegal and legal use of medicines. There is no official monitoring of farm disinfectant use, other than for confirmation of egg disinfection following import to the GB approved zone

UK (Northern Ireland)

All codes of practice are adhered to.

1.3 Gene Banks

1.3.1 Have gene banks been established for stocks that are in danger of extirpation?

European Union

Denmark

A gene bank has been established at the Danish Center for Wild Salmon.

Germany (Brandenburg)

The gene data banks are at Leibnitz-Institute of Freshwater Ecology and Inland Fisheries Berlin (Germany); Dr. Klaus Kohlmann (Department of Inland Fisheries).

Germany (Northrhine-Westfalia)

No, because of extinction of Rhine salmon stock 50 years ago.

Spain

In Cantabria there is sperm criopreservation.

In Galicia a living gene bank has been created with females from the Eo, Ulla, Lézor and Miño rivers. Also sperm freezing is under development in these rivers.

Norway

By the end of 2004, milt from a total of 6,511 wild salmon from 169 stocks had been included in the Norwegian Gene Bank (cryopreservation) 11 new milt samples were included in the gene bank in 2004. Norway currently operates 3 living gene banks; one in northern Norway, one in middle Norway and one in south-western Norway. The threats to the stocks that are kept in these stations are hydropower development, acidification, high proportion of escaped farmed salmon and the freshwater parasite *Gyrodactylus salaris*. Of the 29 salmon stocks that are, or have been, taken care of in the gene banks, nine have been reintroduced to their rivers and seven of them are taken out from the gene banks. Two is kept for safety reasons. Ten stocks are under restoration, while nine stocks waiting to be restored after eradication of *G. salaris* from the rivers.

2. <i>Guidelines on Containment of Farm Salmon (Annex 3 of the Williamsburg Resolution)</i>
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2.1 Is there currently an Action Plan for containment of farm salmon so as to achieve a level of escapes that is as close to zero as practicable? If yes, please attach a copy. If no, what is the anticipated timetable for development of an Action Plan?

European Union

Ireland

Industry has developed a code of practice and reported escape levels are exceptionally low. Copy previously supplied to NASCO.

UK (Northern Ireland)

This is currently in draft form and will be introduced by May 2005.

Iceland

Regulation # 1011/2003 on sea-cage integrity and internal inspection on fish farms was set in December 2003. An abstract of the regulation is attached. The original in Icelandic can be obtained on the Directorate's web page: www.veidimalastjori.is

*** Regulatory measure regarding equipment and internal inspection on Icelandic Fish Farms**

Abstract

Prepared by

Árni Ísaksson

Directorate of Freshwater Fisheries

Provisions

- The regulatory measure is composed of 9 chapters and 8 annexes.
- Chapter 1 (articles 1-2) defines the scope of the measure and technical words.
- Chapter 2 (article 3) contains provisions regarding a production log and its accessibility by inspectors.
- Chapter 3 (article 4) contains provisions regarding accidental releases from fish farms and how these should be dealt with through emergency measures.
- Chapter 4 (articles 5-9) defines the integrity of equipment used on fish farms as well as maintenance.
- Chapter 5 (articles 10-12) defines the inner inspection and risk analysis, which shall be performed on fish farms and approved by the Directorate of Freshwater Fisheries.
- Chapter 6 (article 13) contains provisions for the runoff from landbased farms, which shall be fish proof.
- Chapter 7 (article 14-15) specifies methods used for the transport of life salmonids between fish farms, especially if well boats are used. Towing of cages outside jurisdiction of the fish farms is prohibited as well as the containment of salmonids in cages, which are not part of a licensed unit.
- Chapter 8 (article 16) contains provisions regarding official inspection of the fish farms by the Directorate of Freshwater Fisheries.
- Chapter 9 (article 17-18) specifies penalties and validation of the regulatory measure.

Annexes

- Annex 1 specifies the contents and the processing of the log book kept on the fish farm, which shall be available for inspection at any time.
- Annex 2 specifies procedures regarding accidental releases both with respect to reporting and emergency procedures.
- Annex 3 specifies how a fish farm shall be designed and constructed. It defines environmental variables that shall be withstood by different classes of sea-cages. Necessary anchors for each class are also specified.
- Annex 4 contains provisions regarding the inspection of netting used on sea-cages both above and below the sea-surface.
- Annex 5 specifies monitoring of the vicinity of the fish farm through netting series.
- Annex 6 outlines procedures to be devised by the fish farm management in order to minimize accidental releases from sea-cages.
- Annex 7 specifies necessary training of personnel working in fish farms.
- Annex 8 contains provisions on official verification of the effectiveness of the internal inspection performed by the fish farm management at least once a year.

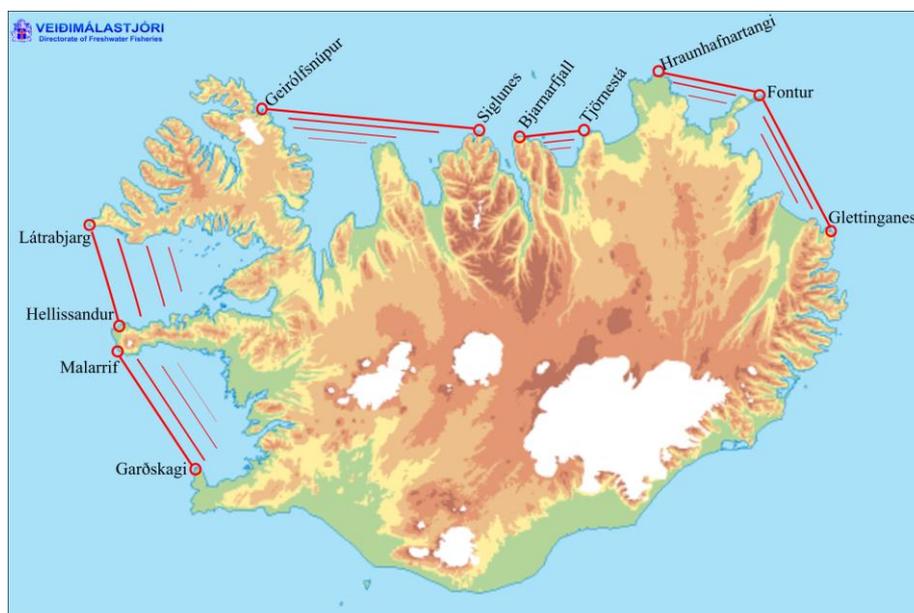
****A new regulation for the protection of wild Atlantic salmon**

In May of 2004 the Ministry of Agriculture in Reykjavík issued a regulatory measure (nr. 460/2004) prohibiting the rearing of salmonids of reared origin in sea-cages in fjords and bays close to major salmon rivers. This ban, which is set in the light of the Precautionary Approach, replaces a regulation set in 2001 (nr. 226/2001), which prohibited rearing of fertile salmon in these same areas.

The map below designates the protection areas and an English translation of the regulations is attached in Annex 1.

With this regulation in force no farming of salmonids (fam. Salmonidae), i.e. salmon, brown trout, char or rainbow trout or related species can be carried out in sea-cages in the designated areas.

The setting of this regulation limits farming of salmonids in sea-cages in Iceland to limited north coast areas in addition to the Western and Eastern fjords.



Coastal protection areas where farming of salmonids (fam. Salmonidae) in sea-cages is prohibited.

Annex 1

Nr. 460

27th of May 2004

Notification

on protection areas, where rearing of salmonids
(fam. salmonidae) in sea-cages is prohibited

Article 1

In order to protect wild salmon stocks it is prohibited to rear salmonid species of reared origin in sea-cages in the following areas along the Icelandic coast:

1. In Faxaflói inside a line drawn from Garðskagi to Malarrif on Snæfellsnes.
2. In Breiðafjörður inside a line drawn from Hellissandur to Látrabjarg.
3. In Húnaflói and Skagafjörður inside a line drawn from Geirólfsgnúpur to Siglunes.
4. In Skjálfandaflói inside a line drawn from Bjarnarfjall to Tjörnestá.
5. In northeastern Iceland inside a line drawn from Hraunhafnartangi to Fontur on Langanes and from Fontur to Glettinganes.

Article 2

This notification, which enters immediately into force, is set according to an authorization in article 77 in the Salmonid Fisheries Act nr. 76/1970 with subsequent amendments. It replaces notification nr. 226/2001 on protection areas where the rearing of fertile salmon (*Salmo salar*) in sea-cages is prohibited.

Ministry of Agriculture 27th of May 2004

Guðni Ágústsson
(Minister of Agriculture)

Guðmundur B. Helgason

Norway

The two measures of highest priority in the Action Plan of March 2000 were introduced in 2004.

- Quality management systems on production and operation are mandatory; called Internal Control
NYTEK, a scheme of approval of floating fish farm. Requirements based on NS 9415, Marine fish farms: Requirement for design, dimensioning, production, installation and operation

Russian Federation

There is presently only one commercial marine cage rearing facility for Atlantic salmon in Russia – “Gigante-Pechenga” salmon farm (Kola Peninsula). The Plan of Action for this farm was developed in 2001. It is being followed and continuously developed further. In 2004 and 2005 new legislation was adopted to regulate aquaculture and protect wild Atlantic salmon stocks (see references below).

USA

In 2003, an MEPDES general permit for Atlantic salmon aquaculture was finalised and includes special conditions for protection of endangered Atlantic salmon. Some of these conditions focused on operations and loss prevention through audited containment practices. Each facility shall employ a fully functional marine Containment Management System (CMS) designed, constructed, and operated so as to prevent the accidental or consequential escape of fish to open water. The CMS will be audited at least once per year and within 30 days of a reportable escape i.e., more than 50 fish 2 Kg or larger. Containment audits for all active facilities were completed for 2004.

2.2 Is information available on the level and causes of escapes?

European Union

Ireland

Yes - must be reported under terms of the Aquaculture Licence.

Scanning of 30-60% of Irish commercial wild salmon is carried out annually, in June and July, as part of National Coded Wire tagging and Tag Recovery Programme. Occurrence of fish farm escapees in this summer survey is generally less than 1%. Other indices such data from index systems, rod catches and video linked fish counting facilities indicate that levels of farmed fish entering freshwater are low. No escapes were reported from fish farms in 2004.

UK (Northern Ireland)

This will be included as a result of the contingency plan.

UK (Scotland)

Information on escapes is available in the Scottish Executive annual fish farm production survey. See: <http://www.marlab.ac.uk>

Iceland

There are only 2 marine cage farms operating in Iceland, both on the east coast. Escapes as judged by occurrence of escapees in rivers seem to have been minimal.

Russian Federation

For the whole period of operations at the rearing facility “Gigante Pechenga” there was only one small-scale leakage of salmon juveniles from cages at on-growing site at Trifonojarvi lake in April 2004. As a follow-up of this case a requisition was issued by relevant authorities and measures were taken by the farm to prevent escapes.

USA

In 2004, mandatory escape reporting protocols were in place for all MEPDES permitted facilities. The facility shall report any known or suspected escapes of more than 50 fish with an average weight of 2 Kg each or more within 24 hrs to the Maine Department Marine Resources (MEDMR). In 2004, one escape event was voluntarily reported; damage to a cage during a storm caused a small hole in the primary containment net, which held fish approximately 800 grams in size. Information on the number of fish escaped is not available. There were 4 aquaculture origin fish documented captured within the St. Croix River in 2004 (USASAC draft report 2004).

2.3 Is information available on implementation of, and compliance with, the Action Plan?

European Union

Ireland

Yes – details of escapes must be reported under terms of the Aquaculture Licence.

Iceland

The fish farms are responsible for the preparation of a contingency plan related to escapes and other emergency events. The inspectors of the Directorate of Freshwater Fisheries have enforced that this is prepared.

Russian Federation

The implementation of and compliance with the Action Plan by “Gigante- Pechenga” are monitored by relevant government organisations (Murmanrybvod - Directorate for Fisheries Control and Enforcement and Fish Protection and State Veterinary Services). There is good cooperation between them and the company which ensures that the best practices are used and the Plan of Action is further refined in the light of new legislation adopted.

USA

In 2004, all active marine sites acquiring MEPDES permits were required to develop, implement and adhere to appropriate CMS plans. These facilities were audited for compliance through a collaborative of State and federal agencies.

2.4 Is information available on the effectiveness of the Action Plan in minimising escapes?

European Union

Ireland

Levels of escapes before and after introduction of plan were already low.

Iceland

Another regulation # 460/2004 has been set, which bans salmon and salmonid farming from areas close to salmon rivers. An English translation is attached **. This further ensures that reared salmon do not enter salmon rivers.

Norway

Difficult to say due to the fluctuations. Since April 2003 there has been, with exception of two collision incidents, a significant reduction of *reported* escapees. However we still have considerable uncertainty with *unreported* escapees.

Russian Federation

The effectiveness of the Action Plan can be assessed as rather good as there were no escapes of fish from sea cages over the years of operation of the farm. The cooperation with government organisations improved and new legislation was adopted, which will further enhance the effectiveness.

USA

All salmon aquaculture facilities are required to develop and maintain an inventory tracking system that allows clear, accurate inventory tracking of all size classes (i.e. average weight and age) of Atlantic salmon, including documentation of mortality events and any escapes. All inventories are reported monthly to MEDMR in accordance with MEPDES permit requirements.

2.5 Have areas for research and development in support of the Action Plan been identified?

European Union

Ireland

Joint simulated control release and subsequent recovery of farmed salmon has been designed but not yet implemented due to concerns in some home water countries. This plan will be considered again in due course.

Iceland

Iceland will follow the international development on the standards of sea-cages, which is being developed e.g. in Norway.

Norway

Proposal for National Monitoring Program reg. National Salmon Fjords also includes focus on escaped farmed salmon and salmon lice.

3. Non-indigenous Fish (Article 6 of the Williamsburg Resolution)

3.1 Have there been any known introductions of non-indigenous fish into a river containing Atlantic salmon, other than where a thorough evaluation of potential adverse impacts has indicated that there is no unacceptable risk of adverse ecological interactions?

European Union

Germany (Brandenburg)

The indigenous stock of salmon in river-system Elbe is extinct. The restocking program uses closely related gene stocks.

UK (England and Wales)

Rainbow trout are released into some rivers containing salmon on a put-and-take basis but this is subject to consenting requirements accounting for risks to the fishery and environment.

USA

As reported last year, non-indigenous fish have been intentionally introduced into rivers containing wild Atlantic salmon. Some of these introductions have been discontinued, however, as a result of discussions between NMFS, MEASC, and MEIFW. NMFS is continuing to work with state agencies in ME to evaluate the risks of the introductions that are continuing.

3.2 Have there been any known introductions into a Commission area of reproductively viable non-indigenous anadromous salmonids or their gametes?

European Union

UK (England and Wales)

Rainbow trout eggs from health certified sites in South Africa and USA.

USA

In 2004, all fish placed in Maine waters within the US were of North American origin, due in part to a court order and injunction pursuant to US Clean Water Act violations, issued in May 2003. The court ordered two major companies operating in Maine to rear only North American Atlantic salmon in Maine waters. The other major company settled out of court and agreed to use only North American stocks in the US. State MEPDES permits require that after July 31, 2004 all reproductively viable Atlantic salmon stocked into Maine waters for the purpose of aquaculture must be of

North American origin. All reproductively viable non North American Atlantic salmon must be removed from net pens prior to March 1, 2006.

4. <i>Guidelines for Action on Transgenic Salmon (Annex 5 of the Williamsburg Resolution)</i>
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4.1 Have there been any proposals to permit the commercial rearing of transgenic salmonids? If ‘yes’, please provide details of the proposed method of containment and other measures to safeguard the wild stocks.

No proposals to rear transgenic salmonids have been reported by any Party.

4.2 Has any research been undertaken to improve knowledge on the potential impacts of transgenic fish on the wild stocks and their habitat?

USA

A small biotech company AquaBounty (based out of Waltham, Massachusetts) is currently working with the US Food and Drug Administration on specific research needs to market transgenic salmon in the US. As part of the application process, there is a requirement to conduct an assessment of the potential impacts of selling and/or raising transgenic salmon on humans, fish and the overall environment.

4.3 Have any other relevant actions been taken (e.g. to advise the salmon farming industry of the potential risks to wild stocks from transgenic salmon; to examine the trade implications associated with transgenic salmon; to implement the Protocol on Biosafety)?

USA

NOAA Fisheries and USFWS have advised the US Food and Drug Administration of the need to consult under the Endangered Species Act on the potential impacts of this application on endangered Atlantic salmon. Holding of transgenic salmon is currently prohibited under the MEDEP permit.

5. Mitigation and Corrective Measures (Article 9 of the Williamsburg Resolution)

5.1 Where adverse impacts on wild salmon stocks have been identified, have corrective measures, designed to achieve their purpose promptly, been initiated without delay?

European Union

Denmark

Genetic research is going on in rivers Ribe and Varde going to the Wadden Sea.

Germany (Brandenburg)

See article 15; no. 3.

The cooperation between authorities of fishery, water engineering and nature protection is difficult, because of different laws, regulations or aims.

UK (Northern Ireland)

These corrective measures, netting at sea of escapes etc, have been highlighted and will be incorporated into the contingency planning.

Norway

By reported escapes and sudden accidents - mandatory recapture of escaped fish is activated.

Reg. gene banks see 1.3.1.

6. Research and Development and Data Collection (Annex 7 of the Williamsburg Resolution)

6.1 Have any trials been undertaken to evaluate the performance of strains of sterile fish under production conditions?

USA

The United States Department of Agriculture (USDA) has initiated a breeding program to assist in the development of suitable North American strains of Atlantic salmon for use in aquaculture. Researchers at the USDA facility are working with sterile triploid salmon of the "Cascade" strain, believed to be of Gaspé Peninsula origin.

6.2 Have the effectiveness, feasibility and cost of tagging or marking of farmed fish been assessed?

European Union

Ireland

Undertaken by Irish Salmon Growers Association and thought not to be feasible at present. Current low level of escapees present in Irish commercial catch (<1%) suggests low overall abundance.

Spain

Salmon of the fish farm of Ibarla (Irún) that are released in the rivers of Guipúzcoa are marked. It carries out a monitoring of the tagging salmons that enter in the rivers through programs established by the Local Delegation of Guipúzcoa that is the Organisation that assessed all the costs.

Both the effectiveness and the feasibility have been assessed and the Regional Government of Navarre assumes the cost.

UK (Scotland)

The Scottish Executive was part of the EU delegation in the NASCO workshop on the marking of farmed fish held in Edinburgh in December 2004, and chaired the workshop.

Norway

Different tagging/marking methods evaluated by an interdepartmental group of administrators and researchers. DNA viewed as being effective in distinguishing between farm strains, but having logistic problems as the same group of smolts may end up in several farms. (Same problem applies to some physical tags). However a smaller study in Hardangerfjord will be initiated with the aim of using chemical and biochemical tracing techniques. The first step will be DNA based methods.

6.3 Have current and new production methods and technology been evaluated with regard to their potential to reduce the risk of disease and parasite transmission and escapes?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Vaccination against ISA has been approved by the EU Commission and will be initiated in spring 2005 under surveillance by the veterinary authorities.

Norway

Evaluated in review articles (BioScience, May 2005 vol 55 No 5, by R Naylor, K Hindar, IA Fleming et al., and another one in Aquaculture, Review of the Norwegian “National Action Plan Against Salmon Lice on Salmonids”: The effect on wild salmonids. Heuch et al. Aquaculture 246, 2005.).

6.4 Has any research been undertaken on broodstock selection methodology to minimise impacts on wild salmon stocks?

European Union

Denmark

Genetic research is going on in rivers Ribe and Varde going to the Wadden Sea.

UK (Northern Ireland)

The purchase of eggs from an IPN free source has been implemented due to the present situation at the sea sites. This is in place of holding their own broodstock.

Spain

In Navarre spawners are captured in the river every year, preferably not tagged.

The rest of the Autonomous Regions have not undertaken any research on broodstock selection methodology to minimise impacts on wild salmon stocks

Norway

Two studies on variation in susceptibility and resistance to lice infections:
Glover et al. 2005. Variation of Atlantic salmon families (*Salmo salar* L.) in susceptibility to the sea lice *L. salm.* and *C. elong.* Aquaculture 245: 19-30
Kolstad et al. Genetic variation in resistance of Atlantic salmon to the salmon louse. Aquaculture, In press.

6.5 Has any genetic research been conducted to investigate interactions between wild salmon and salmon of aquaculture origin, e.g. extent of hybridization, composition of stocks and identification of disease strains and appropriate treatment?

European Union

Germany (Brandenburg)

Genetic research for identification of best suitable origin.

Ireland

P McGinnity, P. Prodohl, A. Ferguson, R. Hynes, N. O'Maoileidigh, N. Baker, D. Cotter, B. O'Hea, D. Cooke, G. Rogan, J. Taggart & T. Cross, 2003.

Fitness reduction and potential extinction of wild populations of Atlantic salmon as a result of interactions with escaped farm salmon. *Proc. R. Soc. Lond. B*

Spain

The study of the genetic structure of the populations of the Bidasoa River and Guipúzcoa's rivers are under development.

UK (Northern Ireland)

Genetic studies on the impact of escaped farmed salmon on wild salmon have been carried out on the Glenarm River and the River Bush in County Antrim.

Norway

Research projects being carried out at the Institute of Marine Research (IMR) and the Norwegian Institute for Nature Research (NINA). An EU project (Salimpact) co-ordinated from the Netherlands has studied impacts of aquaculture on immune response genes of wild salmon and trout (to be concluded 2005). Reviews in Naylor *et al.* (2005) and in book chapter for EU-Salgen (Ferguson, A. *et al.*) to appear soon.

A study has been conducted to assess the genetic variability in the five major Norwegian strains of farmed salmon, and to compare this with genetic variability in wild salmon populations. The study is based on both DNA microsatellite loci and allozyme loci. The microsatellite data are published, while the allozyme data are in press.

Skaala, Ø., J. B. Taggart, K. Gunnes. 2005. Genetic differences between five major domesticated strains of Atlantic salmon (*Salmo salar*) and wild salmon. *Journal of Fish Biology*. In press.

Skaala, Ø., Høyheim, B., Glover, K.A., Dahle, G. 2004. Microsatellite analysis in domesticated and wild Atlantic salmon (*Salmo salar* L.): allelic diversity and identification of individuals. *Aquaculture* 240: 131–143.

Russian Federation

In 2004 the Moscow University continued studies on the topic: "Genetic monitoring of wild populations of Atlantic salmon in areas of salmon farming". Information was gathered on the genetic make-up of wild salmon populations in rivers B.Z.Litsa, Ura located in the vicinity of Atlantic salmon farm in the Pechenga inlet.

6.6 Has any research been conducted on vectors for transmission of diseases and parasites and on methods to prevent and control disease and parasite outbreaks in aquaculture?

European Union

Germany (Baden-Wuerttemberg)

Salmon farming: Not applicable. Trout farming: Yes. Research concerning the occurrence of VHS in Lake Constance as well as of IPN, Red-Mouth-Disease, VHS and IHN in rivers was conducted.

UK (Scotland)

In 2004 the following FRS projects were completed:

FC1186 Disease susceptibility and immunology of cultured marine fish.

FC1188 Limiting the disease impact from new species.

FC 1190 IPN Epidemiology.

FC 1192 IPN Testing and Transmission.

Norway

Focus on salmon lice and on *Gyrodactylus salaris*, especially in fjords with varying degrees of salinity and farm concentration. One aim is to model acquisition of lice on salmon smolts (e.g. Wagner, G.N., et al. 2004. J. Fish Biol. 64: 1593-1604, Otterå et al., 2004. Fisken & Havet, ISSN 0071-5638; IMR).

A considerable research effort is carried out in order to improve prophylaxis in aquaculture. In particular, all salmon and trout is routinely vaccinated against common bacterial diseases, and in some cases viral diseases. Research is carried out on:

- Improved vaccines and immunostimulants
- Improved vaccination protocols
- Improvement of environmental and nutritional conditions

Other prophylactic strategies

*Research on development of vaccine against salmon lice is continued. (MR).

(Promising results so far – not published).

*Review of the Norwegian “National Action Plan Against Salmon Lice on Salmonids”: The effect on wild salmonids. (Heuch et al. Aquaculture 246, 2005.).

*One study on population dynamics of salmon lice. (Stien et al. 2005, Mar.Ecol.Prog.Ser. vol 190.)

Reg lice; research on population dynamics, epidemiology and interactions are going on in several fjords in Norway.

USA

Yes, the USDA APHIS is currently studying ISA vectors to minimise and control transmission between farm sites. NOAA Fisheries is currently researching other fish species (non-salmonid) harbouring the ISA virus.

6.7 Has any information been collected and analysed on the extent of intermingling between wild salmon and salmon of aquaculture origin?

European Union

Denmark

Genetic research is going on in rivers Ribe and Varde going to the Wadden Sea.

Finland

Research focusing on the genetic differences between wild and escaped farmed salmon in the River Tenojoki and the possible genetic impact of escapees on wild salmon reproduction was started in 2003 and continued in 2004.

UK (England and Wales)

In 2003, a sampling programme, initiated by CEFAS and the Agency, to identify any salmon suspected of being of farmed origin in the England and Wales catch was expanded in 2004 to include commercial fisheries in the NW Region. There was only one report in 2004 of a salmon suspected to be of farmed origin, from the NE Region, though this fish was confirmed as unlikely to have originated in a fish farm.

UK (Northern Ireland)

A hybridisation experiment was carried out on the River Bush to test the consequences in production terms, of interbreeding between escaped farmed salmon and wild salmon. Results are currently being evaluated. Also DARD carries out an annual monitoring programme to quantify the occurrence of escaped farmed salmon in coastal salmon fisheries and in the River Bush.

Norway

*Surveillance being carried out along the coast and in several rivers (NINA). New project to be initiated summer 2005 based on experimental release of farm fish from sea cages (IMR).

*Historical and recent samples of five salmon populations have been collected and genotyped at 11 DNA microsatellite loci to assess genetic temporal stability. Not published (IMR).

6.8 Have any appropriate factors been identified for inclusion in a risk assessment in order to evaluate the potential impacts of aquaculture, introductions and transfers and transgenics on wild salmon stocks?

Norway

Parts of risk assessment being carried out in review paper (Naylor *et al.*, BioScience vol.55 no5, May 2005).

Project at NINA aimed at quantifying risks posed by aquaculture of genetically modified fish, using a physiological model of comparing fast-growing fish with wild fish.

6.9 Has any research been undertaken on biological interactions between wild salmon and salmon of aquaculture origin, including competitive and behavioural interactions, that may affect the viability and success of the wild populations?

European Union

Finland

Research focusing on the genetic differences between wild and escaped farmed salmon in the River Tenjoki and the possible genetic impact of escapees on wild salmon reproduction was started in 2003 and continued in 2004.

Ireland

P. McGinnity, P. Prodohl, A. Ferguson, R. Hynes, N. O'Maoileidigh, N. Baker, D. Cotter, B. O'Hea, D. Cooke, G. Rogan, J. Taggart & T. Cross, 2003. Fitness reduction and potential extinction of wild populations of Atlantic salmon as a result of interactions with escaped farm salmon. Proc. R. Soc. Lond. B.

UK Scotland

In 2004 the following FRS research project was completed:
AE 1158 Impacts of salmon farming on wild fish populations.

Norway

Parts of ongoing research at IMR and NINA (but probably less activity in 2004 than in previous years). Reviews in Ferguson *et al.* (Salgen book chapter) and Hindar & Fleming (book chapter from Aqua 2000, to appear soon).

A study (Survival, growth and disease resistance in offspring of domesticated and wild Atlantic salmon and their hybrids) has been initiated to investigate biological interactions between offspring of wild and farmed salmon. Altogether about 60 families and 200,000 eggs of known parentage were planted in a natural river habitat with downstream traps. The study is not finished. (IMR).

USA

The Atlantic Salmon Federation is engaged in an ongoing study that began in 2004 with funding from NOAA Fisheries. The proposed research consists of tracking experimentally released farmed salmon in the Bay of Fundy region to obtain information that can be used to determine recapture feasibility and potential interactions with wild Atlantic salmon. The study is a tracking study to learn about the behavior of fish when they leave a cage site. If the released fish stay in the proximity of the cage site for a period of time then that will indicate that there may be

opportunities to attempt to recapture escaped fish. If fish disperse more rapidly then recapture attempts may not be feasible as a measure to reduce the potential for escapees to interact with wild Atlantic salmon. The study has not yet been completed and results are not available.

Return by Canada under the Oslo Resolution

1. General Measures

1.1 Sites

1.1.1 Sites only to be assigned for aquaculture where hydrographical, epidemiological, biological and ecological standards can be met

New Brunswick is currently reviewing site separation distances to take into consideration epidemiology and hydrographics. The Province of New Brunswick continues to use a multi-level government review for site evaluation and a comprehensive Environmental Assessment must be carried out under the Canadian Environmental Assessment Act.

1.1.3 Adequate marking of aquaculture units

In Newfoundland, an annual site inspection programme was initiated to ensure compliance with *Navigable Waters Protection Act* authorization on site configuration and marking.

1.2 Operations

1.2.1 Management of aquaculture units to prevent and control diseases and parasites

Newfoundland industry initiated revision of industry Code of Practice. New Brunswick has developed wharf usage and aquaculture vessel traffic corridors to limit the movement of aquaculture vessels from one bay area to another. New Brunswick continues to run a Fish Health Surveillance Programme by both government and industry. Private veterinarians as well as the Provincial Aquaculture Veterinarian are active in surveying and managing any disease issues. The focus of the programme is on early detection and removal of ISA infected fish as soon as possible.

1.2.2 Management of aquaculture units to prevent escape of fish

Newfoundland industry initiated revision of industry Code of Practice which meets or exceeds ISFA/NASCO requirements. In New Brunswick a draft Containment Code is being incorporated into the industry Code of Practice. Previously reported measures still apply.

1.3 Transfers

1.3.1 Transfers conducted so as to minimise potential for disease/parasite transmission and for genetic and other biological interactions

New Brunswick, Nova Scotia, Newfoundland, PEI and Fisheries and Oceans Canada are developing new requirements for movement of alternate species such as cod, halibut and haddock. The National Code for Introductions and Transfers is being implemented for all transfers.

1.3.2 Introduction of mechanisms to control transfers where necessary

In addition to disease diagnostics required under Fish Health Protection Regulations (FHPR) in Newfoundland, veterinary inspections of all imported lots conducted both pre- and post-transfer. Measure not new but previously unreported. The National Code for Introductions and Transfers is fully implemented by all provinces, territorial and federal governments.

2. Measures To Minimise Genetic And Other Biological Interactions

2.1 Design standards for aquaculture units

2.1.2 Optimisation of containment of fish through use of appropriate technology for prevailing conditions

The New Brunswick industry continues to invest in the best technology for the Bay of Fundy region.

2.1.3 Regular routine inspection and maintenance of aquaculture systems and upgrading of equipment as new technological improvements become available

In Newfoundland, an annual reporting process was initiated to report on compliance with Code of Containment.

3. Measures To Minimise Disease And Parasite Interactions

3.1 Control and prevention of diseases and parasites

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

Newfoundland completed a Comprehensive Draft Fish Health Management Plan, which involves additional site licencing to facilitate large area fallowing as fish health precautionary measure. In New Brunswick previously reported measures such as Fish Health Surveillance Programme and use of private and government veterinarians still apply.

3.1.2 Treatment or removal of diseased stock and measures to ensure diseased fish are not released to the wild

Procedures on containment of stocks during harvesting and removal of diseased stocks are implemented and audit by the Province of New Brunswick. Harvest vessels undergo a rigorous authorization process. Previously reported measures still apply.

3.4 Adequate separation

3.4.1 Separation of aquaculture facilities on the basis of a general assessment of local conditions

New Brunswick is re-assessing distances between new sites and using epidemiological, biological and hydrographic information as part of this process.

3.6 Fallowing of sites

3.6.1 Use of a fallowing regime wherever possible

In Newfoundland, a Farm Fallowing Monitoring programme was implemented to complement mandatory fallowing period to confirm that farm sites are capable of assimilating organic inputs and to avoid causing a harmful alteration, disruption or destruction of fish habitat. Fallowing is required (6-8 weeks) in New Brunswick for ISA-infected areas. All other sites have a minimum 2-week fallow; however, longer periods are generally implemented. Farms are run as single-year-class sites. Previously reported measures still apply.

4. Research And Development

4.1 Research, small-scale testing and full-scale implementation of:

4.1.4 Designation of aquaculture regions

Barry Hargrave of Fisheries and Oceans Canada published 'Far-field Environmental Effects of Marine Finfish Aquaculture' in Canadian Technical Report of Fisheries and Aquatic Sciences 2450.

4.1.8 Prevention and control of disease and parasites

In Newfoundland laboratory trials of novel vaccines and immunostimulants for atypical furunculosis of Atlantic salmon (*Aeromonas salmonicida* subspecies *nova*), the most relevant pathogen to Newfoundland salmonid aquaculture, completed. Field trials planned for 2004. In New Brunswick, increasing biosecurity by controlling wharf usage and aquaculture vessel traffic routes. Further collaboration with US Department of Agriculture on coordinating ISA and fish health management strategies across the border between New Brunswick and Maine.