REPORT OF THE TWENTY-FIRST ANNUAL MEETING OF THE COUNCIL

REYKJAVIK, ICELAND

7-11 JUNE 2004

President:	Mr Jacque Robichaud (Canada)
Vice-President:	Mr Ole Tougaard (European Union)
Secretary:	Dr Malcolm Windsor

CNL(04)50

NASCO, 11 Rutland Square, Edinburgh EH1 2AS, Scotland, UK
Tel: (Int+44) 131 228 2551, Fax: (Int+44) 131 228 4384, e-mail: hq@nasco.int

CONTENTS

CNL(04)50

Report of the Twenty-First Annual Meeting of the Council
The Saga Hotel, Reykjavik, Iceland
7-11 June, 2004

1. Opening Session

1.1 The President, Mr Jacque Robichaud, opened the meeting. Mr Gudmundur Helgason, Permanent Secretary in the Ministry of Agriculture in Iceland, welcomed delegates to Reykjavik, and congratulated the Organization on its achievements in salmon conservation over the twenty years of its existence and made an opening statement for Iceland (Annex 1).

1.2 The President thanked Mr Helgason for hosting the meeting. He then made an opening statement on the work of the Organization (Annex 2).

1.3 The representatives of Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, the Russian Federation and the United States of America made opening statements (Annex 3).

1.4 An opening statement was made by the observer from France (in respect of St Pierre and Miquelon) (Annex 4).

1.5 An opening statement was made by the International Baltic Sea Fishery Commission (IBSFC) (Annex 5). A statement was distributed by the North Atlantic Marine Mammal Commission (NAMMCO).

1.6 An opening statement was made jointly on behalf of all the 12 Non-Government Organizations (NGOs) attending the Annual Meeting (Annex 6).

1.7 The President expressed appreciation to the Parties, to France (in respect of St Pierre and Miquelon) and to the observer organizations for their statements, and closed the Opening Session.

1.8 A list of participants is given in Annex 7.

2. Adoption of Agenda

2.1 The Council adopted its agenda, CNL(04)51 (Annex 8), after having added two new agenda items: Item 6.2(b), Special Session on the Management of Homewater Fisheries; and Item 9, Next Steps for NASCO.

3. Election of Officers

3.1 The Council unanimously elected Dr Ken Whelan (European Union) as President and Mr Arni Isaksson (Iceland) as Vice-President.

4. Administrative Issues

4.1 Secretary's Report

The Secretary made a report to the Council, CNL(04)6, on: NASCO at 20 years; the status of ratifications of, and accessions to, the Convention; membership of the regional Commissions; observers at NASCO's meetings; a joint meeting of North Atlantic Regional Fisheries Management Organizations; relations with ICES; the proposed joint meeting with ICES, to be held in 2005, on 'Interactions between aquaculture and wild stocks of Atlantic salmon and other diadromous fish species: Science and Management, Challenges and Solutions'; initiatives within FAO of relevance to NASCO; fishing for salmon in international waters; the Tag Return Incentive Scheme; a review of international salmon-related literature published in 2003; the Organization's financial affairs and the Headquarters Property.

In accordance with Financial Rule 5.5, the Secretary reported on the receipt of contributions for 2004. The USA contribution had not been received but it is anticipated that this will be made in the next two months.

Since the last Annual Meeting, two organizations, Coalition Clean Baltic, based in Sweden, and WWF (France), had been granted observer status. Both organizations have objectives that are compatible with those of NASCO and they had both been advised of, and had accepted, the conditions governing NGO attendance.

4.2 Report of the Finance and Administration Committee

The Chairman of the Finance and Administration Committee, Mr Steinar Hermansen (Norway), presented the report of the Committee, CNL(04)7. On the recommendation of the Committee the Council took the following decisions:

(i) to accept the audited 2003 annual financial statement, FAC(04)2;

(ii) to adopt a budget for 2005 and to note a forecast budget for 2006, CNL(04)56 (Annex 9);

(iii) to appoint PricewaterhouseCoopers (PWC) of Edinburgh as auditors for the 2004 accounts, or such other company as may be agreed by the Secretary following consultation with the Chairman of the Finance and Administration Committee;

(iv) to adopt the report of the Finance and Administration Committee, including changes to the Staff Rules and the Staff Fund Rules, CNL(04)52 (Annex 10).

With regard to relations with ICES, the EU asked that the Secretary continue to liaise with the other fishery Commissions so as to ensure consistency in the MoUs.

The President thanked Mr Hermansen for his valuable work and for that of the Committee.

4.3 **Report on the Activities of the Organization**

In accordance with Article 5, paragraph 6 of the Convention, the Council adopted a report to the Parties on the Activities of the Organization in 2003, CNL(04)8.

4.4 **Announcement of the Tag Return Incentive Scheme Grand Prize**

The President announced that the winner of the $2,500 Grand Prize was Mildrid Børseth, Hovin, Norway. The Council offered its congratulations to the winner.

5. Scientific, Technical, Legal and Other Information

5.1 **Scientific Advice from ICES**

The representative of ICES presented the report of the Advisory Committee on Fishery Management (ACFM) to the Council, CNL(04)9 (Annex 11).

5.2 **Catch Statistics and their Analysis**

The Secretary tabled a statistical paper presenting the official catch returns by the Parties for 2003, CNL(04)10 (Annex 12), and historical data for the period 1960-2003, CNL(04)11. The statistics for 2003 are provisional and will be updated by the Parties.

5.3 **Scientific Research Fishing in the Convention Area**

Reports on scientific research fishing conducted since the last Annual Meeting were made by Denmark (in respect of the Faroe Islands and Greenland), CNL(04)44, and Norway, CNL(04)45.

5.4 **Report of the International Atlantic Salmon Research Board**

The International Atlantic Salmon Research Board was established by the Council in 2001 to direct and coordinate a programme of research to identify and explain the causes of marine mortality of Atlantic salmon and the possibilities to counteract this mortality.

The report of the Third Meeting of the Board, CNL(04)12 (Annex 13), was presented by the Chairman of the Board, Mr Jacque Robichaud. The Board had updated its inventory of research related to salmon mortality in the sea and had received advice from its Scientific Advisory Group. In addition to expenditure on the 43 projects in the inventory, which amounted to £4.3 million, NASCO's Parties had contributed or pledged an additional £180,000 to the fund. These contributions should assist in seeking funds from the private sector. Details of a pilot fund-raising initiative were presented. The Board had noted that fund-raising is a very specialised activity and is likely to be a slow process as there are many competing interests for the funds available. The Board had agreed that it would be helpful to have some professional assistance in developing a fund-raising strategy and agreed that an action plan to guide future fund-raising should be commissioned. The Board had decided to organise and sponsor a workshop to further develop a major proposal for a programme of research on salmon at sea drawing on the SALSEA project but including scientists from North America and more widely in Europe.

5.5 **Report of the Standing Scientific Committee**

The Chairman of the Standing Scientific Committee presented a draft request to ICES for scientific advice. Upon the recommendation of the Committee, the Council adopted a request for scientific advice from ICES, CNL(04)13 (Annex 14).

6. Conservation, Restoration, Enhancement and Rational Management of Salmon Stocks

6.1 **Measures Taken in Accordance with Articles 14 and 15 of the Convention**

The Secretary presented a report on the returns made under Articles 14 and 15 of the Convention, CNL(04)14 (Annex 15). An additional return was made by the European Union (Spain), CNL(04)29 (Annex 16). This return also included information in relation to the development and implementation of habitat protection and restoration plans and on unreported catches.

6.2 **Application of the Decision Structure for Management of North Atlantic Salmon Fisheries**

(a) Returns by the Parties

A report prepared by the Secretariat on the returns made by the Parties on progress in applying the Decision Structure for Management of North Atlantic Salmon Fisheries, CNL(04)15 (Annex 17) had been circulated. An additional report on application of the Decision Structure was tabled by the Russian Federation, CNL(04)33. The European Union tabled a document giving examples of application of the Decision Structure in the UK and Finland, CNL(04)36.

The President raised a number of questions with the Parties relating to implementation of the Decision Structure, including a question about what proportion of salmon rivers in the North Atlantic have had conservation limits established. The Parties responded individually and it was agreed that future reporting should be sufficiently comprehensive, and illustrated with examples, such that progress, or lack of it, could be recognised.

The Council welcomed the progress made in the two years since the Decision Structure was adopted.

(b) Special Session on the Management of Homewater Fisheries

The Council held a Special Session on the Management of Homewater Fisheries, in which there were presentations by two EU Member States (Ireland and the UK) and by Norway. The NGOs raised a number of questions in relation to the presentations, CNL(04)72. A separate report of this Special Session has been prepared, CNL(04)53.

6.3 **Development and Implementation of Habitat Protection and Restoration Plans**

(a) Returns by the Parties

A report prepared by the Secretariat on the returns made by the Parties on the development and implementation of habitat protection and restoration plans, CNL(04)16 (Annex 18), had been circulated. The European Union tabled a document detailing progress with the development and implementation of habitat protection and restoration plans in a number of Member States (Germany, Ireland and the UK), CNL(04)42.

The President raised a number of questions relating to the development and implementation of habitat protection and restoration plans and the establishment of inventories of salmon rivers. The Parties agreed that, in future, reporting could be more comprehensive and that examples of measures taken to protect habitat and to restore damaged habitat should be provided. The President asked the Parties if access to, and the quality of, Atlantic salmon habitat was continuing to increase as had been reported at the Special Session on Habitat held in 2002. The Parties felt that there had been gains, and some examples were provided.

(b) Database of Salmon Rivers

In order to measure and improve progress in meeting the objective of the NASCO Plan of Action for Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat, NASCO, its Contracting Parties and their relevant jurisdictions agreed to establish inventories of salmon rivers. Last year the Council established a Working Group to work by correspondence to further develop a database started by the US. The Chairman of this Group, Mr Ed Baum (USA), presented a progress report to the Council, CNL(04)17. An expanded database based on the detailed inventory structure outlined in the Plan of Action has been developed by US scientists and made available through a website, www. WildAtlanticSalmon.com. The Council agreed on the potential uses of the salmon rivers database and adopted the recommended next steps, CNL(04)38 (Annex 19). The Council also agreed that NASCO should now assume responsibility for maintaining and further developing the database. The Council thanked the US for developing the database.

6.4 **Aquaculture, Introductions and Transfers, and Transgenics**

(a) The Williamsburg Resolution

At its last Annual Meeting the Council adopted 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, CNL(03)57. In adopting the Williamsburg Resolution the Council had recognized that it was a “living document” that could evolve in future in the light of experience with its implementation, consultations, improved scientific understanding of the impacts of aquaculture, introductions and transfers and transgenics on the wild stocks and developments in measures to minimise them.

The Council had recognized that further work was required in relation to the definition of 'transgenic' and consequently to the Guidelines for Action on Transgenic Salmon and to further refine the Preliminary Guidelines for Stocking Atlantic Salmon. This work was undertaken by two inter-sessional Working Groups which had worked by correspondence under the Chairmanship of Mr David Dunkley (definition of transgenics) and Dr Malcolm Beveridge (stocking guidelines). The recommendations from these groups were presented, CNL(04)18.

The Council adopted the following definition of transgenic: "an organism that has been modified by genetic engineering to contain DNA from an external source," and agreed to amend the Guidelines for Action on Transgenic Salmon in accordance with the Working Group's recommendations after adding text to clarify that not all NASCO Parties are signatories to the Cartagena Protocol of the Convention on Biological Diversity. The Council also adopted Guidelines for Stocking Atlantic Salmon. The Williamsburg Resolution, amended to reflect these changes, is contained in document CNL(04)54 (Annex 20).

The representative of Canada indicated that Canada's National Code on Introductions and Transfers of Aquatic Organisms, adopted in 2001, is the document governing introductions and transfers in Canada. Domestic consultations have been held with respect to the Williamsburg Resolution and from these, Canada will be discussing with the USA how to integrate the National Code into the North American context and ultimately Canada's final position on implementing the Williamsburg Resolution.

The Council accepted an invitation from the European Union (Scottish Executive) to host a Workshop in Edinburgh in late 2004 to assess the current and developing methods for marking farmed Atlantic salmon, CNL(04)37 (Annex 21).

(b) Returns made in accordance with the Williamsburg Resolution

The Parties made reports on their returns made in accordance with the Williamsburg Resolution, CNL(04)19 (Annex 22). Iceland tabled a paper, CNL(04)32, describing a new regulation for the protection of wild Atlantic salmon, which prohibits the rearing of salmonids of reared origin in sea cages in fjords and bays close to major salmon rivers.

(c) Liaison with the Salmon Farming Industry

The Secretary reported on a meeting with the International Salmon Farmers Association that had been held in Boston, USA in February, CNL(04)20 (Annex 23). The meeting in Boston had not been a full Liaison Group meeting but was intended to explore how the liaison process could be put back on a firmer footing with a higher level of commitment. The overall view of the NASCO representatives present was that the meeting had been useful and there had been a frank exchange of views. The failures in communication and in mutual understanding of processes had been explored. In order to avoid the risk of these failures happening in future, a Statement of Commitment had been drafted at the meeting.

The Council reviewed the report of this meeting as presented in CNL(04)20. It viewed the discussions that occurred as productive and expressed its support for continuation of the Liaison Group. The Council agreed that the actions outlined in Annex 4 of CNL(04)20 serve as a good basis for further cooperation with the salmon farming industry. In addition, the Council acknowledged that it had outlined actions applicable to the salmon farming industry in the Williamsburg Resolution. This document, therefore, serves as a basis for the NASCO Parties' future involvement in the Liaison Group and for identification of other areas of cooperation.

6.5 **Unreported Catches**

The Secretary introduced document CNL(04)21 (Annex 24) summarising the returns by the Parties. These returns indicate that in 2003 unreported catches were estimated to be between 675 and 1,007 tonnes. The Council welcomed the information contained in this document which presented data on unreported catches in a transparent manner.

6.6 **By-Catch of Atlantic Salmon**

Concern had previously been raised within the Council about the possible by-catch of salmon post-smolts in fisheries for pelagic species of fish, particularly mackerel, in the North-East Atlantic. Last year, the Council had decided that, consistent with the Precautionary Approach, it would encourage and seek appropriate funding for research on the distribution of salmon at sea, and the overlap between salmon at sea and pelagic fisheries; encourage pilot studies on technical adjustments to the deployment of gear in pelagic fisheries so as to minimise by-catch of salmon; review the results of this research at its 2005 Annual Meeting or at a Special Session; in the light of the findings of this research, request that the Parties, non-Parties and other Fisheries Commissions make adjustments (if appropriate) to fishing methods so as to minimise the by-catch of salmon; continue to ask ICES to provide information on by-catch.

In the ACFM report, CNL(04)9, ICES had advised that, given the wide range in catch rate estimates and limited observer coverage of pelagic fleets, it has not been possible to provide sound estimates of by-catch for any pelagic fishery and that this situation will prevail until there is sufficient monitoring of, and information derived from, commercial fisheries. ICES have advised that observer-based programmes are the preferred methodology and should be expanded and further refined.

A report on recent studies of the distribution and by-catch of Atlantic salmon post-smolts in the Norwegian Sea in 2003 was presented by the Russian Federation, CNL(04)34 (Annex 25).

6.7 **Development of Guidelines on Stock Rebuilding Programmes**

A stock rebuilding programme has been defined by the Council as an array of management measures, including habitat improvement, exploitation control and stocking, designed to restore a stock to above its conservation limit. These management measures are being addressed by the Council in application of the Precautionary Approach. However, at its Twentieth Annual Meeting the Council had agreed that it would be useful to develop some guidance to the Parties, and had adopted preliminary guidelines on the use of stock rebuilding programmes. These preliminary guidelines had been further developed by a Working Group which had worked inter-sessionally by correspondence under the Chairmanship of Mr Ted Potter, who reported to the Council on progress, CNL(04)22.

The Council adopted the Guidelines on the Use of Stock Rebuilding Programmes in the context of the Precautionary Management of Salmon Stocks, as contained in document CNL(04)55 (Annex 26). In order that the Parties can gain from each other's experience, and to facilitate the dissemination of best practice, the Council agreed that each year the Parties should be requested to provide the following information:

- a summary or list of current stock rebuilding programmes (or similar documents) indicating how copies may be obtained;

- suggestions for how the guidelines might be improved.

6.8 **Report of the Technical Workshop on Development of a Decision Structure for Incorporating Social and Economic Values in Application of the Precautionary Approach**

The wild Atlantic salmon has many aspects to its value, including those associated with recreational, commercial and subsistence fisheries. In addition, however, there are values associated with the existence of the salmon itself which, although difficult to assess, are so widespread that they may greatly exceed the values associated with the fisheries. All these values had been explored at a Technical Workshop in 2003 which had developed a framework which could be used to assess the social and economic values of the wild stocks.

The Council had asked that a further Technical Workshop be held to develop a decision structure or guidelines for incorporating social and economic factors into management decisions under a Precautionary Approach. This Workshop was held in New Orleans, USA, during 23-26 March 2004 under the Chairmanship of the Secretary, who presented the report of the meeting, CNL(04)23 (Annex 27). The Workshop developed Guidelines, which provide a logical framework to support and inform decision-making. They are intended to be used by those with responsibility for managing the wild Atlantic salmon and its environments and for communicating concerns to other sectors whose proposals could impact on the wild salmon and its environments. The Workshop had also considered the development of a bio-economic modelling approach that would allow social and economic factors to be integrated into a management model for Atlantic salmon.

The Council adopted the Guidelines without change, CNL(04)57, and agreed that the Parties should use them on a trial basis. The President asked that the Parties select one area of the application of the Precautionary Approach (management of fisheries; habitat protection and restoration; aquaculture, introductions and transfers and transgenics; by-catch and stock rebuilding programmes), and report to the Council next year on an example of the use of the guidelines in relation to the area chosen. The Council also decided to set up a small Working Group, led by the USA, to develop a bio-economic modelling approach that would allow social and economic factors to be integrated into a management model for Atlantic salmon, CNL(04)43 (Annex 28). The Council also asked the Secretariat to combine the output from the two Technical Workshops into one handbook.

6.9 Future Actions in Relation to Application of the Precautionary Approach

The Council considered possible future actions in relation to application of the Precautionary Approach, CNL(04)24. After a period of sustained activity in developing agreements on application of the Precautionary Approach, the emphasis should now be on implementation of the agreements by the Contracting Parties with detailed and transparent reporting and amendment of the agreements as necessary in the light of experience gained with their implementation. The Council agreed that the future actions in relation to the application of the Precautionary Approach should be considered by the Working Group referred to in Section 9 below.

7. Predator-related Mortality

Last year the Council had agreed that it would seek to gather together all available information on predator-related mortality of Atlantic salmon so that a compendium of information could be prepared. Each Party had been requested to appoint a coordinator for this work and the coordinators had been requested by the Secretary to provide the following:

- information on the impact on salmon populations of predation by piscivorous birds, fish and mammals;

- details of measures implemented in relation to management of these predators of salmon and any assessment of the effectiveness of these measures;

- details of on-going research in relation to predator-related mortality.

The Secretary indicated that information had been provided by Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway and the Russian Federation, CNL(04)25 (Annex 29), and the USA, CNL(04)31 (Annex 30).

The President suggested that the Secretary be asked to review the information submitted, so as to summarise available knowledge on impacts. The issue of predator-related mortality of salmon at sea is an area that will be considered by the International Atlantic Salmon Research Board. The Council recognised that predation is an important issue that will need to be considered further in the light of increased understanding of its impacts.

8. St Pierre and Miquelon Salmon Fishery

At its Nineteenth Annual Meeting, the Council had recognised the need for additional scientific information concerning the mixed stocks exploited at St Pierre and Miquelon. Prior to the Twentieth Annual Meeting, a letter had been received from France (in respect of St Pierre and Miquelon) which indicated France's intention to implement a sampling programme in 2003. The Council had welcomed this development and the President and Secretary had responded, welcoming the sampling programme and, building on France's spirit of cooperation, offering to cooperate fully with the support of NASCO scientific representatives. A report on consultations with the Ministère de l'Agriculture, de l'Alimentation, de la Pêche et des Affaires rurales was presented, CNL(04)26.

Mr Yann Becouarn, an observer at the meeting from the Ministère de l'Agriculture, de l'Alimentation, de la Pêche et des Affaires rurales, made a presentation to the Council on a sampling programme for salmon at St Pierre and Miquelon undertaken by IFREMER scientists in 2003. Details of the sampling programme are provided in CNL(04)26. He indicated that France (in respect of St Pierre and Miquelon) will continue the biometric sampling in 2004 and start the genetic sampling (provided that Canadian scientists are able to cooperate in the programme). France (in respect of St Pierre and Miquelon) wishes to increase its cooperation with NASCO and to initiate an exchange of information with the Parties which manage traditional fisheries. The Council welcomed the cooperation from France (in respect of St Pierre and Miquelon). Canada indicated that it was willing to cooperate with IFREMER scientists on the genetic study and sought clarification that sampling would be undertaken during the 2004 fishery. Mr Becouarn confirmed that, provided Canada was able to provide technical expertise, the genetic sampling would be undertaken in 2004.

9. Next Steps for NASCO

9.1 Last year, in order to mark NASCO's Twentieth Anniversary, the Heads of Delegations had asked the Secretary to produce a review with ideas on NASCO's Working Methods and Structures. He summarised this review, which covered: the frequency of Council and Commission meetings; the organization of sessions at meetings; the effective use of delegates' time at meetings; inter-sessional meetings; reporting procedures; scientific advice; membership structure; the Presidency and Secretariat; transparency; and the spirit of the Organization. The review had concluded that there were many issues to consider, and it would be useful to further examine these issues in some depth.

9.2 The United States tabled a report entitled NASCO – the Past, Present and Future, CNL(04)35 (Annex 31). The President then referred to a Vision Statement for NASCO which had been written by four authors, including the Chairman of NASCO's accredited NGOs. This contribution was welcomed.

9.3 In the light of the useful suggestions made, the Council decided to establish a Working Group on the Next Steps for NASCO, and agreed Terms of Reference, CNL(04)47 (Annex 32). The aim would be to develop and strengthen the Organization to ensure that it continues to be a world-class regional fisheries organization over the next twenty years.

9.4 The Council stressed that NASCO is undertaking this review to identify and develop new objectives and strategies for its work. The Parties recognise that one goal is to ensure that NASCO's work reflects contemporary developments in science, management practice and international cooperation. Another goal is to ensure that

NASCO business is conducted in a cost-effective, efficient and transparent manner. This review should be responsive to the needs of the species and to the interests of stakeholders. The Council wishes to encourage the Working Group to involve a representative of NASCO's NGOs in the planning of the consultative process.

9.5 A first meeting of the Working Group will be held in Edinburgh before the end of 2004 and the Working Group is asked to complete its consultative process in time to report to the Council at its next Annual Meeting.

10. Reports on Conservation Measures Taken by the Three Regional Commissions

10.1 The Chairman of each of the three regional Commissions reported to the Council on the activities of their Commission.

11. Other Business

11.1 There was no other business.

12. Date and Place of Next Meeting

12.1 The Council accepted an invitation from the European Union on behalf of France to hold its Twenty-Second Annual Meeting in Vichy, France, during 6-10 June 2005.

12.2 The Council decided to hold its Twenty-Third Annual Meeting during 5-9 June 2006 in Edinburgh or elsewhere at the invitation of a Party.

13. Report of the Meeting

13.1 The Council agreed the report of the meeting, CNL(04)50.

14. Press Release

14.1 The Council adopted a press release, CNL(04)49 (Annex 33).

<u>Note</u>

Following adoption of the report of the meeting, the Vice-President, Mr Ole Tougaard, proposed that in recognition of his excellent service to the Organization, the retiring President, Mr Jacque Robichaud, be retained as a Special Adviser to NASCO and that an appropriate adjustment be made to the budget. The Council unanimously agreed to this proposal.

Note: A list of all Council papers is contained in Annex 34. The annexes mentioned above begin on page 27, following the French translation of the report of the meeting.

CNL(04)50

Compte rendu de la Vingt-et-unième réunion annuelle du Conseil
Hôtel Saga, Reykjavik, Islande
7-11 juin, 2004

1. Séance d'ouverture

1.1 Le Président, M. Jacque Robichaud, a ouvert la conférence. M. Gudmundur Helgason, Secrétaire permanent du Ministère de l'Agriculture d'Islande, a souhaité aux délégués la bienvenue à Reykjavik. M. Gudmundur Helgason a ensuite félicité l'Organisation pour ce qu'elle avait accompli dans le domaine de la conservation du saumon au cours des 20 années de son existence et a prononcé une déclaration d'ouverture au nom de l'Islande (annexe 1).

1.2 Le Président a remercié M. Helgason pour avoir bien voulu être l'hôte de cette réunion. Il a ensuite prononcé une déclaration d'ouverture portant sur le travail de l'Organisation (annexe 2).

1.3 Les représentants du Canada, du Danemark (pour les Iles Féroé et le Groenland), de l'Union européenne, de la Norvège, de la Fédération de Russie et des États-Unis d'Amérique ont chacun prononcé leur déclaration d'ouverture (annexe 3).

1.4 Une déclaration d'ouverture a été prononcée par le représentant de la France, présent en tant qu'observateur (pour St Pierre et Miquelon) (annexe 4).

1.5 La Commission Internationale des Pêches de la Mer Baltique (CIPMB) a prononcé une déclaration d'ouverture (annexe 5). Un document contenant la déclaration de la Commission des Mammifères Marins de l'Atlantique Nord (NAMMCO) a été distribué.

1.6 Une déclaration d'ouverture commune a été prononcée au nom des douze organisations non gouvernementales (ONG), présentes à la Réunion annuelle (annexe 6).

1.7 Le Président a exprimé sa reconnaissance aux Parties, à la France (pour St. Pierre et Miquelon) et aux organisations, présentes à titre d'observateurs, pour leurs déclarations et a clos la séance d'ouverture.

1.8 Une liste des participants figure à l'annexe 7.

2. Adoption de l'ordre du jour

2.1 Le Conseil a adopté l'ordre du jour, CNL(04)51 (annexe 8), après y avoir ajouté deux nouveaux points : Point 6.2(b), Séance spéciale concernant la Gestion des pêcheries en eaux territoriales et Point 9, Mesures à prendre à l'avenir par l'OCSAN.

3. Election des membres du comité directeur

3.1 Le Conseil a élu Président, à l'unanimité, Dr Ken Whelan (Union européenne) et Vice-président, M. Arni Isaksson (Islande).

4. Questions administratives

4.1 **Rapport du Secrétaire**

Le Secrétaire a rendu compte au Conseil, de par son rapport CNL(04)6, des questions suivantes : les vingt ans de l'OCSAN ; état d'avancement des ratifications et des adhésions à la Convention ; nombre d'adhérents aux Commissions régionales ; observateurs aux réunions de l'OCSAN ; réunion commune avec les Commissions des Pêcheries de l'Atlantique Nord ; rapports avec le CIEM ; proposition de réunion commune avec le CIEM, en 2005, portant sur les « Interactions entre les stocks de saumons atlantiques sauvages et d'aquaculture et d'autres espèces de poissons diadromes : Science et Gestion, Défis et Solutions » ; mesures prises au sein de la FAO (OAA) pertinentes à l'OCSAN ; pêche au saumon dans les eaux internationales ; programme d'encouragement au renvoi des marques ; examen des publications internationales portant sur le saumon parues en 2003 ; affaires financières de l'Organisation et propriété du siège social.

Conformément au règlement financier 5.5, le Secrétaire a dressé un rapport sur les contributions reçues pour 2004. Les Etats-Unis n'avaient pas encore envoyé leur contribution, mais on s'attendait à ce qu'elle soit versée dans les deux mois prochains.

Depuis la dernière Réunion annuelle, deux organismes : Coalition pour une Baltique propre, implanté en Suède, et le WWF (France), avaient obtenu le statut d'observateur. Les objectifs de ces organismes sont, dans chacun des cas, compatibles avec ceux de l'OCSAN. De plus, l'un comme l'autre avait accepté les conditions auxquelles était assujettie la présence des ONG et dont on leur avait fait part.

4.2 **Rapport de la Commission financière et administrative**

Le Président de la Commission financière et administrative, M. Steinar Hermansen (Norvège), a présenté le rapport de la Commission, CNL(04)7. Suite aux recommandations de celle-ci, le Conseil a pris les décisions suivantes :

(i) accepter la déclaration financière révisée de 2003, FAC(04)2 ;

(ii) adopter un budget pour 2005 et prendre acte du budget prévisionnel pour 2006, CNL(04)56 (annexe 9) ;

(iii) nommer soit PricewaterhouseCoopers (PWC) d'Edimbourg, vérificateurs des comptes pour l'an 2004, ou toute autre société recevant l'approbation du Secrétaire après consultation avec le Président de la Commission financière et administrative ;

(iv) adopter le rapport de la Commission financière et administrative, y compris les modifications apportées au Règlement relatif au personnel et au Règlement régissant le fond destiné au personnel, CNL(04)52 (annexe 10).

En ce qui concernait les rapports avec le CIEM, l'UE a demandé au Secrétaire de rester en contact avec les autres Commissions de pêche afin de garantir l'homogénéité des Protocoles d'accord.

Le Président a remercié M. Hermansen et la Commission pour leur précieux travail.

4.3 Rapport sur les activités de l'Organisation

Le Conseil a adopté le rapport sur les activités de 2003 de l'Organisation, CNL(04)8, adressé aux Parties, conformément à l'article 5, paragraphe 6 de la Convention.

4.4 Annonce du gagnant du Grand Prix du Programme d'encouragement au renvoi des marques

Le Président a annoncé que la gagnante du Grand Prix de 2 500 $ est Mildrid Børseth, de Hovin, Norvège. Le Conseil a offert ses félicitations à la gagnante.

5. Questions scientifiques, techniques, juridiques et autres

5.1 Recommandations scientifiques du CIEM

Le représentant du CIEM a présenté au Conseil le rapport du Comité Consultatif sur la Gestion des pêcheries (CCGP), CNL(04)9 (annexe 11).

5.2 Statistiques de capture et analyse

Le Secrétaire a présenté un document statistique portant sur les déclarations de captures officielles effectuées par les Parties en 2003, CNL(04)10 (annexe 12), et sur les données historiques pour la période 1960-2003, CNL(04)11. Les statistiques de 2003 sont provisoires et seront mises à jour par les Parties.

5.3 Pêche menée à des fins de recherche scientifique dans la zone de la Convention

Le Danemark (pour les Iles Féroé et le Groenland) et la Norvège ont rendu compte, de par leurs rapports (CNL(04)44 et CNL(04)45 respectivement), des activités de pêche menées à des fins de recherche scientifique depuis la dernière Réunion annuelle.

5.4 Rapport de la Commission internationale de recherche sur le saumon atlantique

La Commission internationale chargée de la recherche sur le Saumon atlantique a été créée en 2001 par le Conseil avec pour but de diriger et de coordonner un programme de recherche visant à identifier et expliquer les causes de la mortalité marine du saumon atlantique et de déterminer les possibilités de contrer cette mortalité.

M. Jacque Robichaud, Président de la Commission a présenté le rapport de la troisième réunion de la Commission, CNL(04)12 (annexe 13). La Commission avait mis à jour l'inventaire des recherches portant sur la mortalité du saumon en mer et avait obtenu des conseils auprès du Groupe chargé de fournir des recommandations scientifiques. Outre les 4,3 millions de livres sterling attribués aux 43 projets figurant dans l'inventaire, les Parties de l'OCSAN avait contribué, ou s'étaient engagées à contribuer, au fond la somme supplémentaire de 180 000 livres sterling. On envisageait que ces contributions faciliteraient la recherche de fonds auprès du secteur privé. Aussi une initiative de collecte de fonds pilote a-t-elle été présentée en détail. La Commission avait toutefois reconnu que le processus de collecte de fonds représentait une activité très spécialisée et que celui-ci serait probablement long étant donné la compétition qui existait entre les multiples requêtes pour les fonds disponibles. La Commission avait donc convenu qu'il serait utile d'avoir recours à une aide professionnelle pour mettre au point une stratégie de collecte de fonds. Elle a également accepté qu'il serait nécessaire de commander l'élaboration d'un plan d'action qui servirait de cadre à toute activité de collecte de fonds future. La Commission avait, par ailleurs, décidé d'organiser et de sponsoriser un atelier pour affiner la proposition d'un programme de recherche de grande envergure concernant le saumon en mer. Ce programme, qui s'inspirerait du projet SALSEA, ferait intervenir outre des scientifiques d'Amérique du Nord un plus grand nombre de scientifiques européens que précédemment.

5.5 Compte rendu du Comité scientifique permanent

Le Président du Comité scientifique permanent a présenté une demande provisoire de recommandations scientifiques au CIEM. Fort de l'avis de ce dernier, le Conseil a adopté une demande de recommandations scientifiques au CIEM, CNL(04)13 (annexe 14).

6. Conservation, restauration, mise en valeur et gestion rationnelle des stocks de saumons

6.1 Mesures prises au titre des articles 14 et 15 de la Convention

Le Secrétaire a présenté un compte rendu sur les renvois effectués au terme des articles 14 et 15 de la Convention, CNL(04)14 (annexe 15). L'Union européenne (Espagne) avait effectué un renvoi d'informations supplémentaire, CNL(04)29 (annexe 16). Ces informations comprenaient également des renseignements sur l'avancement et la mise en oeuvre de programmes de protection et de restauration de l'habitat. Des renseignements sur les captures non déclarées étaient également inclus.

6.2 Application du cahier des charges dans le cadre de la gestion des pêcheries de saumon nord atlantique

(a) Renvois effectués par les Parties

Un rapport sur les progrès réalisés dans l'application du cahier des charges, dans le cadre de la gestion des pêcheries de saumon nord atlantique, a été rédigé par le Secrétariat à partir des renvois d'information effectués par les Parties, CNL(04)15 (annexe 17). Ce document avait été circulé au préalable. La Fédération de Russie a par ailleurs présenté un rapport supplémentaire sur ce sujet, CNL(04)33. L'Union européenne a également soumis un document qui fournissait des exemples d'application du Cahier des charges au Royaume-Uni et en Finlande, CNL(04)36.

Le Président a soulevé un certain nombre de questions concernant l'exécution du Cahier des charges, dont notamment la question de la proportion des rivières à saumons dans l'Atlantique Nord assujetties à des limites de conservation. Les Parties ont répondu chacune séparément. Il fut par ailleurs convenu de faire en sorte que les comptes rendus soient, à l'avenir, suffisamment complets, et comprennent des exemples, de façon à ce que l'on puisse plus facilement identifier la présence ou l'absence de progrès.

Le Conseil a accueilli favorablement les progrès réalisés au cours des deux années qui s'étaient écoulées depuis l'adoption du Cahier des charges.

(b) Séance spéciale sur la Gestion des pêcheries en eaux territoriales

Le Conseil a organisé une séance spéciale sur le sujet de la gestion des pêcheries en eaux territoriales, au cours de laquelle deux Etats membres de l'Union européenne ainsi que la Norvège (l'Irlande et le Royaume-Uni) ont présenté des informations. Les ONG ont soulevé un certain nombre de questions concernant ces présentations, CNL(04)72. Un rapport de cette séance spéciale avait été compilé séparément, CNL(04)53.

6.3 Elaboration et mise en oeuvre de programmes de protection et de restauration de l'habitat

(a) Renvois effectués par les Parties

Le Secrétariat avait compilé un rapport sur l'élaboration et l'exécution des programmes de protection et de restauration, à partir des renvois effectués par les Parties, CNL(04)16 (annexe 18). Ce rapport avait été circulé au préalable. L'Union européenne a présenté, en plus, un document qui passait en revue les progrès réalisés dans ce domaine dans plusieurs Etats membres (Allemagne, Irlande et Royaume-Uni), CNL(04)42.

Le Président a soulevé plusieurs questions sur l'élaboration et la mise en oeuvre des programmes de protection et de restauration de l'habitat et sur la création d'inventaires de rivières à saumons. Les Parties ont convenu, qu'à l'avenir, les rapports pourraient être plus complets et devraient inclure des exemples d'initiatives prises pour protéger le milieu et restaurer les habitats endommagés. Le Président a demandé aux Parties si l'accès à l'habitat du saumon et la qualité de cet habitat avaient continué à s'améliorer comme il en avait été fait état à la séance spéciale sur l'habitat tenue en 2002. Les Parties étaient d'avis qu'il y avait eu des améliorations et en ont fournis quelques exemples.

(b) Base de données des rivières à saumons

Afin de mesurer et d'accélérer les progrès réalisés pour atteindre l'objectif du plan d'actions de l'OCSAN, visant à appliquer l'approche préventive à la protection et restauration de l'habitat du saumon atlantique, l'OCSAN ainsi que ses Parties signataires et leurs juridictions avaient convenu de créer des inventaires de rivières à saumons. L'année dernière, le Conseil avait établi un Groupe de travail chargé de développer, par correspondance, une base de données initiée par les Etats-Unis. Le Président de ce groupe, M. Ed Baum (Etats-Unis), a présenté, au Conseil, un rapport sur l'état des travaux, CNL(04)17. Une base de données amplifiée, reposant sur la structure d'inventaire telle qu'elle est ébauchée, dans tous ses détails, dans le Plan d'actions a été élaborée par des scientifiques américains et diffusée sur Internet (site web : www. WildAtlanticSalmon.com). Le Conseil a convenu des utilisations potentielles de la base de données portant sur les rivières à saumons et a adopté les étapes suivantes recommandées, CNL(04)38 (annexe 19). Le Conseil a également convenu que l'OCSAN devrait désormais avoir la responsabilité de la mise à jour et de l'extension de la base de données en question. Le Conseil a remercié les Etats-Unis pour leur travail de mise au point.

6.4 Aquaculture, introductions et transferts, et transgéniques

(a) La Résolution de Williamsburg

Lors de sa dernière Réunion annuelle, le Conseil avait adopté la Résolution prise par les Parties, dans le cadre de la Convention pour la conservation du saumon de l'Atlantique nord, pour minimiser les effets nuisibles de l'aquaculture, des introductions et transferts et des transgéniques sur les stocks de saumons sauvages, à savoir la Résolution de Williamsburg, CNL(03)57. En adoptant cette Résolution, le Conseil avait reconnu qu'il s'agissait d' « un document vivant ». En effet, celui-ci aurait sans doute à évoluer de manière à tenir compte des expériences rencontrées lors de son exécution, des différentes consultations, de l'amélioration des connaissances scientifiques concernant les répercussions de l'aquaculture, des introductions et transferts et des transgéniques sur les stocks sauvages et de l'évolution des mesures prises pour les minimiser.

Le Conseil avait reconnu qu'il était nécessaire d'affiner la définition de 'transgénique' et par conséquent de perfectionner les Orientations recommandant l'application de mesures concernant ce type de saumon. Il importait également de perfectionner encore plus les Orientations préliminaires concernant le repeuplement du saumon atlantique. Ce travail avait été entrepris par deux Groupes de travail d'intersession qui avait rempli leur tâche par correspondance sous la Présidence de M. David Dunkley (définition des transgéniques) et Dr Malcolm Beveridge (orientations sur le repeuplement). Une présentation a été faite des recommandations provenant de ces deux groupes, CNL(04)18.

Le Conseil a adopté la définition du terme transgénique suivante : « un organisme qui a été modifié par génie génétique afin de contenir des molécules d'ADN provenant d'une source externe ». Le Conseil a convenu également de modifier les Orientations, recommandant l'application de mesures concernant le saumon transgénique, conformément aux recommandations du Groupe de travail, et ce, après avoir ajouté une note qui clarifiait que les Parties de l'OCSAN n'étaient pas toutes signataires du Protocole de Carthagène de la Convention sur la diversité biologique. Le Conseil a également adopté des Orientations pour le repeuplement du saumon atlantique. La Résolution de Williamsburg, modifiée pour refléter ces changements, fait partie du document CNL(04)54 (annexe 20).

Le représentant du Canada a indiqué que le Code National du Canada portant sur les introductions et transferts d'organismes aquatiques, adopté en 2001, était le document qui régissait les introductions et transferts au Canada. Des consultations nationales avaient eu lieu à propos de la Résolution de Williamsburg. Fort des conclusions de ces consultations, le Canada examinera avec les Etats-Unis comment intégrer le Code National dans le contexte de l'Amérique du Nord. Ils étudieront également la position finale du Canada quant à l'exécution de la Résolution de Williamsburg.

Le Conseil a accepté l'invitation de l'Union européenne (Pouvoir exécutif d'Ecosse) d'accueillir un atelier qui évaluerait les méthodes actuelles, et en cours de développement, employées pour marquer le saumon atlantique d'élevage, CNL(04)37 (annexe 21). Cet atelier aurait lieu à la fin de 2004.

(b) Renvois effectués conformément à la Résolution de Williamsburg

Les Parties ont présenté leurs renvois effectués conformément à la Résolution de Williamsburg, CNL(04)19 (annexe 22). L'Islande a dévoilé un nouveau règlement concernant la protection du saumon atlantique sauvage, CNL(04)32. Ce règlement interdit l'élevage de salmonidés provenant d'élevage ayant recours aux cages marines installées dans les fjords et baies proches des plus importantes rivières à saumons.

(c) Liaison avec l'industrie salmonicole

Le Secrétaire a fait un rapport sur une réunion avec l'Association internationale d'éleveurs de saumons. Cette délibération eut lieu à Boston, aux Etats-Unis, en février, CNL(04)20 (annexe 23). La réunion n'avait pas complètement été une réunion du groupe de liaison. L'intention avait, toutefois, été d'explorer comment il était possible d'améliorer le processus de liaison et d'encourager un niveau d'engagement plus important. L'impression générale des représentants de l'OCSAN présents était que la réunion avait été utile et qu'il y avait eu un échange franc d'opinions. On avait ainsi examiné les manques de communication et de compréhension réciproque des processus. Afin d'éviter le risque que ces échecs ne se reproduisent à l'avenir, une Déclaration d'engagement avait été ébauchée lors de la réunion.

Le Conseil a étudié le rapport de cette réunion tel qu'il est présenté dans CNL(04)20. Le Conseil considérait les débats, qui eurent lieu, comme productifs et a approuvé la continuation du Groupe de liaison. Le Conseil a par ailleurs convenu que les mesures, esquissées dans l'annexe 4, constituaient une base solide à d'autres formes de coopération avec l'industrie salmonicole. De plus, le Conseil a reconnu qu'il avait, lui-même, ébauché des mesures s'adressant à l'industrie salmonicole dans la Résolution de Williamsburg. Ce document servirait par conséquent de point de départ aux engagements futurs des Parties de l'OCSAN au sein du groupe de liaison, et servirait également à identifier d'autres aires de coopération.

6.5 Captures non déclarées

Le Secrétaire a présenté le document CNL(04)21 (annexe 24) résumant les renvois effectués par les Parties. Ces renvois indiquaient qu'en 2003, l'estimation des captures non déclarées était de l'ordre de 675 à 1 007 tonnes. Le Conseil a accueilli favorablement les informations contenues dans ce document qui présentait les données avec transparence.

6.6 Captures accidentelles de saumons atlantiques

La possibilité de prises accidentelles de post-smolts de saumons dans les pêcheries de poissons pélagiques, tel que le maquereau, dans l'Atlantique du Nord-est avait déjà suscité des inquiétudes au sein du Conseil. L'année dernière, le Conseil avait décidé que, conformément à l'approche préventive, il encouragerait et chercherait à obtenir les fonds appropriés et nécessaires à la recherche portant sur les sujets suivants : distribution du saumon en mer et chevauchement spatio-temporel entre le saumon en mer et les pêcheries pélagiques ; études pilotes sur les ajustements techniques à apporter au déploiement des engins employés dans les pêcheries pélagiques afin de minimiser les prises accidentelles de saumons. L'intention était de passer en revue les résultats de cette recherche lors de la Réunion annuelle de 2005 ou d'une séance spéciale. Le Conseil demanderait, à la lumière des résultats de cette recherche, aux Parties, non-Parties et autres Commissions de Pêcheries d'ajuster (si besoin est) leurs méthodes de pêche afin de minimiser les prises accidentelles de saumons. Il continuerait également de demander au CIEM de fournir des renseignements sur les prises accidentelles.

Le CIEM avait indiqué, dans le rapport du CCGP, CNL(04)9, qu'étant donné le large éventail des estimations du taux de captures et la restriction de la couverture d'observation des flottes pélagiques, il n'avait pas été possible de fournir des estimations sures des prises accidentelles dans aucune des pêcheries pélagiques. Le CIEM avait ajouté que cette situation prévaudrait jusqu'à ce que la surveillance des pêcheries commerciales et l'information que l'on en tirerait soient suffisantes. Le CIEM a indiqué que les programmes basés sur l'observation étaient la méthode préférée et qu'il importait que ceux-ci soit étendus et améliorés.

La Fédération de Russie a présenté un rapport portant sur des études récentes de la distribution et des prises accidentelles des post-smolts de saumons atlantiques dans la mer de Norvège en 2003, CNL(04)34 (annexe 25).

6.7 Elaboration d'Orientations sur les programmes de repeuplement

Un programme de repeuplement des stocks, consistait, selon la définition du Conseil, en un ensemble de mesures de gestion, dont une amélioration de l'habitat, un contrôle de l'exploitation et un exercice de repeuplement, mesures conçues pour restaurer les stocks au-dessus de leur limite de conservation. C'est au Conseil qu'incombe de prendre ces mesures de gestion dans le cadre de l'application de l'approche préventive. Cependant, lors de sa Vingtième réunion annuelle, le Conseil avait convenu qu'il serait utile de préparer des directives pour les Parties et avait adopté des orientations préliminaires sur l'utilisation des programmes de repeuplement de stocks. Ces orientations préliminaires avaient été perfectionnées par un Groupe de travail d'intersession qui avait œuvré par correspondance, sous la direction de M. Ted Potter. Ce dernier a présenté les progrès réalisés au Conseil, CNL(04)22.

Le Conseil a adopté les Orientations sur l'utilisation des programmes de repeuplement de stocks, définies dans le contexte de la gestion préventive des stocks de saumons, et telles qu'elles sont présentées dans le document CNL(04)55 (annexe 26). De façon à ce que les Parties puissent tirer profit de leur expérience réciproque, et afin de faciliter la diffusion de meilleure pratique, le Conseil a convenu de demander aux Parties de fournir chaque année les informations suivantes :

- un résumé ou une liste des programmes de repeuplement de stocks courants (ou tout autre document similaire), indiquant la manière dont on peut en obtenir des copies ;

- des suggestions sur la façon d'améliorer les orientations.

6.8 **Rapport de l'atelier technique portant sur la mise au point d'un cahier des charges qui tiendrait compte des valeurs socio-économiques du saumon dans l'application de l'approche préventive**

Le saumon atlantique sauvage représente une valeur à multiples facettes. Certaines ont trait à la pêche commerciale, de loisir ou de subsistance. D'autres, cependant, sont liées à l'existence même du saumon. Et bien que difficiles à évaluer, ces dernières sont étendues au point de probablement surpasser de beaucoup les valeurs liées à la pêche. Chacune de ces facettes de la valeur du saumon a été l'objet d'un examen lors d'un atelier technique, qui eut lieu en 2003 et qui mit au point un cadre permettant d'évaluer les valeurs socio-économiques des stocks sauvages.

Le Conseil avait demandé qu'un autre atelier technique soit organisé en vue d'élaborer un cahier des charges ou des orientations qui faciliteraient, dans le cadre de l'approche préventive, l'incorporation des facteurs socio-économiques dans les décisions de gestion. Cet atelier eut lieu à New Orléans, aux Etats-Unis, du 23 au 26 mars 2004, sous la direction du Secrétaire. Ce dernier en a présenté le rapport, CNL(04)23 (annexe 27). L'atelier a élaboré des Orientations qui soutiennent et informent les prises de décision pour lesquelles elles forment également un cadre logique. L'intention est que ces orientations soient employées par ceux sur lesquels repose la responsabilité de gérer le saumon sauvage atlantique et son milieu. Elles pourraient également être employées pour communiquer toutes inquiétudes aux autres secteurs dont les propositions pourraient avoir un effet nuisible sur le saumon sauvage et son milieu. L'atelier avait également envisagé la mise au point d'une approche de modélisation bioéconomique qui permettrait d'intégrer les facteurs socio-économiques dans un modèle de gestion du saumon atlantique.

Le Conseil a adopté les Orientations sans aucune modifications, CNL(04)57, et a convenu qu'elles devraient être utilisées par les Parties à titre d'essai. Le Président a demandé aux Parties de choisir un domaine de l'application de l'approche préventive (gestion des pêcheries ; protection et restauration de l'habitat ; aquaculture, introductions et transferts et transgéniques ; captures accidentelles et programmes de repeuplement des stocks), et de présenter au Conseil, l'année prochaine, un exemple d'emploi des Orientations dans le domaine d'application sélectionné. Le Conseil a aussi décidé de créer un petit groupe de travail, qui opèrerait sous la direction des Etats-Unis, afin de mettre au point une approche de modélisation bioéconomique qui permettrait l'intégration des facteurs socio-économiques dans le modèle de gestion du saumon atlantique, CNL(04)43 (annexe 28). Le Conseil a également demandé au Secrétariat de compiler le résultat du travail de ces deux ateliers techniques en un manuel.

6.9 **Mesures à prendre à l'avenir dans le cadre de l'application de l'approche préventive**

Le Conseil a étudié les mesures à prendre à l'avenir dans le cadre de l'application de l'approche préventive, CNL(04)24. Après une période d'efforts soutenus à mettre au point des accords sur l'application de l'approche préventive, l'accent devait désormais être porté sur la mise en application de ces accords par les Parties signataires. Ceci exigeait de la part des Parties de rendre compte, d'une façon détaillée et avec transparence, de leurs progrès ou, le cas échéant, de l'amendement des accords, selon l'expérience tirée de leur mise en pratique. Le Conseil a convenu que les mesures futures prises dans le cadre de l'approche préventive seraient examinées par le Groupe de travail, tel qu'il est mentionné plus bas, à la section 9.

7. Mortalité liée à la prédation

L'année dernière, le Conseil avait convenu qu'il chercherait à rassembler toutes les informations disponibles concernant la mortalité du saumon atlantique causée par la prédation, et ce, afin de préparer un compendium d'information. On avait invité chaque Partie à nommer un coordinateur pour cette tâche et le Secrétaire avait prié les coordinateurs de fournir les informations suivantes :

- information sur l'effet nuisible de la prédation effectuée par les oiseaux, poissons et mammifères piscivores sur les populations de saumons;

- détails des mesures mises en place pour gérer les prédateurs de saumons et évaluation de l'efficacité de ces mesures ;

- détails de toute recherche courante ayant trait à la mortalité du saumon causée par les prédateurs.

Le Secrétaire a indiqué que le Canada, le Danemark (pour les Iles Féroé et le Groenland), l'Union européenne, l'Islande, la Norvège et la Fédération de Russie avaient contribué des informations, CNL(04)25 (annexe 29). Les Etats-Unis avaient également fourni des données, CNL(04)31 (annexe 30).

Le Président a émis la suggestion de demander au Secrétaire de passer en revue l'information soumise et de résumer les connaissances disponibles sur les effets de la prédation. La question de la mortalité du saumon en mer, liée aux prédateurs, est un sujet qui sera examiné par la Commission internationale de recherche sur le saumon atlantique. Le Conseil a reconnu que la prédation était une question importante qui nécessitait un examen plus approfondi, à la lumière de la connaissance élargie de ses effets.

8. Pêcherie de saumon à St Pierre et Miquelon

Lors de sa Dix-neuvième réunion annuelle, le Conseil avait reconnu la nécessité d'obtenir des informations scientifiques supplémentaires sur les stocks mixtes exploités à St Pierre et Miquelon. Avant la Vingtième réunion annuelle, une lettre avait été reçue de France (pour St Pierre et Miquelon) qui indiquait l'intention de la France d'effectuer un programme d'échantillonnage en 2003. Le Conseil avait accueilli favorablement ce développement. Le Président et le Secrétaire avaient ainsi répondu au courrier, indiquant qu'ils accueillaient favorablement le programme d'échantillonnage et, pour donner suite à l'esprit de coopération de la France, qu'ils offraient leur entière coopération par le biais du soutien que les représentants scientifiques de l'OCSAN pouvaient apporter. Un rapport des consultations avec le Ministère de l'Agriculture, de l'Alimentation, de la Pêche et des Affaires rurales a été présenté, CNL(04)26.

M. Yann Becouarn, représentant le Ministère de l'Agriculture, de l'Alimentation, de la Pêche et des Affaires rurales, et observateur à la réunion, a rendu compte, au Conseil, d'un programme d'échantillonnage des saumons à St Pierre et Miquelon (voir document détaillé CNL(04)26). Ce programme avait été entrepris par les scientifiques d'IFREMER en 2003. M. Becouarn a indiqué que la France (pour St Pierre et Miquelon) continuera l'échantillonnage biométrique en 2004 et commencera un échantillonnage génétique (à la condition que les scientifiques canadiens soient en mesure d'offrir leur coopération au programme). La France (pour St Pierre et Miquelon) désire accroître sa coopération avec l'OCSAN et initier un échange d'informations avec les Parties qui gèrent des pêcheries traditionnelles. Le Conseil a accueilli favorablement la coopération de la France (pour St Pierre et Miquelon). Le Canada a indiqué qu'il était prêt à collaborer avec les scientifiques d'IFREMER lors de l'étude génétique. Il a par ailleurs cherché à savoir si l'échantillonnage aurait lieu pendant la pêcherie de 2004. M. Becouarn a confirmé que, dans la mesure où le Canada serait en mesure d'offrir leur expertise technique, cet échantillonnage serait en effet entrepris en 2004.

9. Décisions à prendre à l'avenir par l'OCSAN

9.1 L'année dernière, les Chefs de délégation avaient demandé au Secrétaire de produire, pour marquer les vingt ans de l'OCSAN, une analyse des méthodes et structures de travail de l'Organisation, accompagnée de suggestions d'amélioration. Celui-ci résuma cette analyse qui portait sur les points suivants : la fréquence des réunions du Conseil et des Commissions ; l'organisation des séances lors des réunions ; le degré d'efficacité de l'utilisation du temps des délégués lors des réunions ; l'organisation de réunions d'intersession ; les procédures de comptes-rendus ; les recommandations scientifiques ; la structure d'adhésion ; la Présidence et le Secrétariat ; la transparence et l'esprit de l'Organisation. L'analyse avait indiqué que plusieurs questions pourraient bénéficier d'un nouvel examen approfondi.

9.2 Les Etats-Unis ont présenté un rapport, intitulé « L'OCSAN – passé, présent et avenir », CNL(04)35 (annexe 31). Le Président a ensuite fait allusion à une déclaration de Vision rédigée pour l'OCSAN par quatre auteurs, dont le Président des ONG accréditées de l'OCSAN. Cette contribution a été accueillie favorablement.

9.3 A la lumière des suggestions faites – qui se sont avérées fort utiles – le Conseil a décidé d'établir un Groupe de travail qui serait chargé des décisions à prendre à l'avenir par l'OCSAN, et a convenu du mandat de ce groupe, CNL(04)47 (annexe 32). Le but était de développer et de renforcer l'Organisation afin d'assurer qu'elle continue à être un organisme de pêcheries régionales de premier ordre au cours des vingt prochaines années.

9.4 Le Conseil a souligné que l'OCSAN entreprenait cette étude pour identifier et mettre au point de nouveaux objectifs et de nouvelles stratégies. Les Parties ont reconnu qu'un des buts était de garantir que le travail de l'OCSAN reflète les développements courants qui avaient lieu dans les domaines de la science, de la pratique de gestion et de la coopération au niveau international. Un autre objectif était d'assurer que l'activité de l'OCSAN soit menée le plus économiquement possible, avec efficacité et transparence. Cette analyse devait aussi adresser les besoins de l'espèce et les intérêts des détenteurs d'enjeux. Le Conseil souhaitait encourager le Groupe de travail à faire participer un représentant des ONG à la planification du processus de consultation.

9.5 La première réunion du Groupe de travail aura lieu à Edimbourg avant la fin de 2004. Il fut demandé au Groupe de travail de terminer son processus de consultation d'ici la prochaine réunion annuelle du Conseil au cours de laquelle il devra rendre compte de ses activités.

10. Compte rendus sur les mesures de conservation prises par les trois Commissions régionales

10.1 Le Président de chacune des trois Commissions régionales a soumis au Conseil un compte rendu des activités des Commissions respectives.

11. Divers

11.1 Aucune autre question n'a été abordée.

12. Date et lieu de la prochaine réunion

12.1 Le Conseil a accepté l'invitation offerte par l'Union européenne au nom de la France de tenir sa Vingt-deuxième réunion annuelle à Vichy, en France, du 6 au 10 juin 2005.

12.2 Le Conseil a décidé d'organiser sa Vingt-troisième réunion annuelle du 5 au 9 juin 2006, soit dans un lieu suggéré par invitation, soit à Edimbourg.

13. Compte rendu de la réunion

13.1 Le Conseil a adopté le compte rendu de la réunion, CNL(04)50.

14. Communiqué de presse

14.1 Le Conseil a approuvé un communiqué de presse, CNL(04)49 (annexe 33).

Note

A la suite de l'adoption du compte rendu de la réunion, le Vice-président, M. Ole Tougaard, a proposé, qu'en reconnaissance de l'excellent service qu'il avait rendu à l'Organisation, le Président sortant, M. Jacque Robichaud, soit engagé comme Conseiller particulier à l'OCSAN et qu'un ajustement approprié soit effectué au budget. Le Conseil a accepté cette proposition à l'unanimité.

Note : La liste intégrale des documents du Conseil figure à l'annexe 34.

ANNEX 1

Welcoming Address and Opening Statement made by Iceland

Mr. President, Distinguished Delegates, Ladies and Gentlemen.

On behalf of the Minister of Agriculture, Mr. Gudni Agustsson, it gives me great pleasure to welcome you all to Iceland for this 20th Anniversary meeting of the North Atlantic Salmon Conservation Organization. It is only fitting that we should find ourselves here at this important milestone in the life of the organization for it was indeed in the city of Reykjavik that the foundation of NASCO was laid at a Diplomatic Conference in January 1982. The Secretariat was subsequently established in Edinburgh in February 1984, just over 20 years ago.

Leading the NASCO negotiations for our part at the time was Mr. Gudmundur Eiríksson, then Legal Adviser to the Minister for Foreign Affairs. In 1984, he became the very first President of NASCO. He currently resides in Ottawa as the Icelandic Ambassador to Canada and I am extremely pleased to welcome him here as our guest of honour as we celebrate this memorable occasion.

Iceland is an appropriate meeting place for an event of this nature for another reason as well. As a nation historically dependent on fisheries for our very survival, we have long since recognized the need to manage our marine and freshwater resources in a responsible and sustainable fashion so that future generations may also enjoy their benefit. This is no less true for the salmon than the marine species at our economic base. Our rivers are also our lifeblood, whether in social, economic or cultural terms. As a favourite child of our unspoiled nature, the salmon touches a delicate chord in every Icelandic heart.

Since 1984, NASCO has provided the only inter-governmental forum for discussion, communication and decision with respect to conservation, restoration, enhancement and rational management of Atlantic salmon. The scope of the Organization's activities in this period has progressively broadened to cover the multitude of factors that affect the complex life-cycle of the truly remarkable species the salmon represents. Conservation challenges extend far beyond national borders, making international cooperation essential if the task at hand is to be successfully carried out. As evidenced by the Secretariat's compilation in the meeting documents before us, the last 20 years are a testament as to what can be achieved through inter-governmental cooperation in the area of salmon management and conservation. I believe we can look back on that period with considerable pride and take inspiration from our achievements.

We must, however, also recognize that we still have a long way to go. In spite of NASCO's successes, the fact remains that the past 20 years have witnessed a decline in the abundance of salmon. The same holds true here as for any momentous challenge in the context of history: we have climbed a mountain only to find ourselves at the foot of another. Changes in our environment, particularly at sea, seem to have played at large role, but we need more effort and in particular more research to develop our understanding of the complex issues concerned and their interaction. I am sure we will prove up to the task but this occasion provides us with an excellent opportunity to take stock of where we stand and map the road ahead.

Turning now to Icelandic issues, our records indicate that the 2003 angling catch was similar to the one in 2002 and still well below the average of the previous 30 years. The grilse stocks seem to be in satisfactory condition, but there appears to be a continued decline in the two-sea-winter component, which used to dominate the catches in northern Iceland. This has resulted in a more pronounced angling decline in north-coast salmon rivers. This decline in the multi-sea-winter component would seem to be a shared problem among NASCO members, without satisfactory explanation.

In order to reverse the decline in the multi-sea-winter component of the Icelandic salmon populations, the Federation of Icelandic River Owners has launched a campaign which encourages anglers to release large salmon. Salmon management authorities have recently issued regulations which prohibit char-netting operations along the west and north coasts during the peak of salmon migration in June and July. Coupled with increased enforcement, the aim is to decrease by-catches of salmon in legal char nets. By-catch of salmon in other types of gear used in marine fisheries is still a pending issue.

In light of this situation, Iceland urges that caution be applied in the harvest of salmon, especially in mixed stock fisheries. This would seem to be in line with the ICES scientific advice and our acceptance of the “Precautionary Approach”.

Net-pen farming of salmon has been increasing on Iceland’s east coast, where one salmon farm dominates production. Containment of salmon in marine cages has been a high priority issue and in December 2003 a regulatory measure regarding equipment and internal inspection on Icelandic fish farms took effect. The regulation expects all Icelandic salmonid fish farms to be in compliance with its requirements as of the first of this month. It should be highlighted that the work done by NASCO in this area proved extremely useful in the elaboration of our regulation.

In 2001, the Minister of Agriculture issued a regulation banning the pen-rearing of fertile salmon in bays and fjords in proximity to productive salmon rivers. In late May of this year the regulation was amended so as to exclude all salmonids bred for farming from those same areas. Salmonids can thus only be farmed in marine cages in restricted areas far from salmon-producing areas. We see this approach to aquaculture as being a model application of the Precautionary Approach championed by NASCO.

By way of closing, and before yielding to a little local music to set the tone for our coming agenda, I wish to congratulate NASCO and its members on this memorable occasion. I am confident that the Organization’s future is as bright as the Icelandic summer that has welcomed you. May you all have an enjoyable stay here in Reykjavík and a productive and fruitful meeting in the coming days.

Thank you, Mr. President.

ANNEX 2

Opening Statement made by the President of NASCO

Ladies and Gentlemen, It is a pleasure to welcome you all to the 21st Annual Meeting of the Council of NASCO, consequently joining us on our 20th Anniversary.

First, I would like to give this opportunity to our host, Mr. Gudmundur Helgason, Head of the Iceland delegation, to make some opening remarks and also his remarks on behalf of his delegation.

First, I want to thank Mr Gudmundur Helgason for his warm welcome to Iceland, as well as the excellent performance of the choir, 8 men led by a lady. At the same time, we are honoured to have Mr Gudmundur Eiriksson here today. We are aware of the central role you played in developing the Convention and getting it implemented. Now you are the Ambassador to my country, Canada, and based in my home city, Ottawa. Two NASCO Presidents in Ottawa! Ambassador Eiriksson, you won't know this, but in the late 60s as member of the Canadian Air Force I used to fly sorties in the North Atlantic that would bring me into Keflavik quite regularly. So I know what a wonderful country this is, and what nice people you are. (And since I used to land here in the winter, I can assure you it is even nicer during the long daylight hours). It is a real thrill for us in NASCO to be back here and it was so very nice of Iceland to invite us here for our 20th Birthday. This is really the place where we were born! The NASCO Convention was, in fact, opened for signature in Reykjavik and Gudmundur played a vital role in this.

After the Convention was signed here, our Secretary was appointed and he moved to Scotland and started up the new Organization from scratch. He has lost some hair, but he is still with us and even if he was honoured recently with the Order of the British Empire, he decided to stay with us. As it is our 20th Birthday, I hope you will allow me to summarise what has happened in those years.

- NASCO's Convention immediately prohibited fishing for salmon beyond areas of fisheries jurisdiction and in most parts of the North Atlantic beyond 12 nautical miles, and thereby created a large protected zone free of fisheries in the North Atlantic; we then successfully addressed the problem of fishing for salmon in international waters by non-Contracting Parties;

- We have greatly reduced the interception by a Party of salmon originating in the rivers of other Parties. These fisheries accounted for 30% of the total harvest at their peak prior to 1984, but account for less than 0.5% of the harvest in 2003; their sacrifices in turn stimulated management measures in "home water" fisheries which have also greatly reduced harvests;

- NASCO has considerably broadened its base from an organization which focused only on the fisheries to one which is now addressing a very wide range of threats to the resource and has stimulated scientific research and advice so as to provide a basis for its actions; it has introduced a minimum standard for catch statistics, and encouraged measures to reduce unreported catches;

- NASCO has introduced the concepts of the Precautionary Approach to all of its work so as to give priority to conserving the productive capacity of the resource and avoid irreversible change. In this regard NASCO has developed precautionary guidelines in relation to:

  - management of North Atlantic salmon fisheries;
  - habitat protection and restoration;
  - by-catch;
  - stock rebuilding programmes;
  - aquaculture;
  - introductions and transfers;
  - and transgenics.

Procedures are in place for annual reporting by the Parties on management of salmon fisheries and habitat protection and restoration. After only two years it is clear that progress is being made in applying the Decision Structure for management of fisheries and in developing habitat protection and restoration plans and inventories of rivers. At this meeting, we will receive the first returns under the new Williamsburg Resolution on aquaculture, introductions and transfers and transgenics.

All this has been done in the last four years or so.

- NASCO has identified all the social and economic values of the wild Atlantic salmon and is now developing guidelines on how to incorporate socio-economic factors in application of the Precautionary Approach without undermining its effectiveness;

- NASCO has taken steps to prevent the further spread of the parasite *Gyrodactylus salaris*;

- has developed guidelines for catch and release fishing;

- has stimulated an exchange of statistics and information among the Parties and has established a number of databases related to the salmon and its conservation;

- has established an International Atlantic Salmon Research Board in order to stimulate research and develop links with the private sector, and further developed these with our NGOs, on this issue; it has also established a Liaison Group with the international salmon farming industry with a view to developing agreements on how to minimise impacts of this industry on the wild stocks;

- NASCO has developed its transparency and has admitted almost 30 observer organizations and more are joining, a very much larger number than most fishery organizations, to its meetings. The contributions they make have been welcomed.

- We have over 100 delegates, all with differing experience and backgrounds in wild salmon, gathering annually in a cooperative spirit to do their best to conserve the wild stocks.

Now apart from all this, we have an Organization in good financial shape that bought its own Headquarters property and even makes a profit for us on it!

The Precautionary Approach has been a major effort for us and it is far more complex for salmon than for other species. I believe that we are well in the forefront on the Precautionary Approach; I do not believe any other Organization could have claimed to have done more. Even the 'Ecosystem Approach' now underlies our work. We have not just looked at salmon management in isolation. We have looked at habitat, aquaculture, re-stocking, transgenics, by-catch, and have agreements on all of these. We are also looking at the thorny issue of predator-related mortality. There is no doubt that in this forum we have negotiated some excellent and wide-reaching guidelines. We have started to implement and report, and I am urging you all to now to put all this into implementation and monitoring as quickly as you can so as to be able to report in a transparent way.

We do all of this, however, against a backdrop of a wild salmon stock that has not responded yet to all the sacrifices made. This lack of response may be due to factors such as climate change that are beyond our control. So we must keep up the strong pressure to conserve the wild stocks. To this end, we started a process last year where I invited the delegations to consider how we could further improve the effectiveness of the work of our Organization. We thought that was an appropriate thing to do in our 20th year. We also asked our Secretary to produce a paper, initially for the Heads of Delegations, on our working methods and structure. Our NGOs have also given this some thought and I see that they have come up with some ideas. So I intend to carry this process forward during this week and report towards the end of the week on how we see this moving. It is not as if we have run out of ideas. We have just launched a completely new idea, the International Atlantic Salmon Research Board, and you will also hear from them over the next days.

You all know that international work is difficult and not usually the fastest of operations. So I am very happy that not only have we made amazing progress over our first twenty years, but we have ideas for the coming years. I congratulate every one of you and your predecessors for what you have done, and I know that there have been sacrifices. This was not easy for you and your clients, and is very much appreciated by the international community.

I have always felt, and I'm sure many of you agree, that we have a very special atmosphere in NASCO where we have built up trust and friendship to the extent that we can move forward strongly, and this is a precious asset that will stand us in good stead for the next twenty years.

I now pass the floor to Norway in the middle, clockwise, as a change from previous years.

ANNEX 3

Opening Statements made by the Parties

Opening Statement made by Canada

Thank you. Mr. President, Ambassador Eiriksson, Distinguished Delegates, Observers, Ladies and Gentlemen:

The Canadian delegation is very happy to be in Reykjavik for NASCO's Twenty-First Annual Meeting.

I have had the pleasure to be in Reykjavik and Stykkisholmur for the last 5 or 6 days for another meeting and have had the opportunity to appreciate the breathtaking scenery Iceland has to offer as well as the warmth of its people. It is a very beautiful country certainly for us to enjoy, but also for salmon to prosper.

Our agenda for the week includes very important and challenging issues for us to discuss and I am looking forward to our deliberations. Mr. President, NASCO has faced major challenges over the last 20 years and like you, I'd like to highlight some of the main accomplishments of our Organization.

NASCO has been successful in achieving significant reductions of interceptions of salmon by NASCO Parties. In addition through our collective efforts, catches of Atlantic salmon by non-member countries have been reduced. Our Organization has moved beyond just achieving reductions in catch in the last few years. NASCO Parties have been looking at means to achieve conservation of precious Atlantic salmon stocks. We have implemented the Precautionary Approach, which helps us deal with a wide array of factors which affect Atlantic salmon abundance. We have established the International Atlantic Salmon Research Board which promotes collaboration and cooperation on research on marine mortality through strategic support from the private sector as well as the public. This and other achievements have helped focus energies towards protecting and conserving Atlantic salmon.

But I think we all recognize that more effort is needed on an urgent basis to reverse the most disturbing continuing decline in Atlantic salmon abundance and to ensure that salmon can come back to proper habitat. It is better to protect habitat than to have to restore it. But to succeed we need the help and stewardship of all interested Parties.

Mr. President, we can be proud of what we have accomplished. But we cannot rest on our laurels. NASCO needs to continue to build on past successes and to move forward in a confident and flexible manner. While we continue to work on understanding various phenomenona such as mortality at sea and the impacts of climate changes, we need to engage a broader base of people and organizations in the protection and sound management of wild stocks.

As you know, a Vision Statement has been recently released in Halifax, Canada by a panel of four authors at the invitation of the Atlantic Salmon Federation and the World Wildlife Fund. The panel makes several suggestions on a broad range of issues and proposes a programme of action for what they call "a reinvigorated NASCO". Canada welcomes this and other initiatives on how to deal with the issues we face.

Around this table we all agree NASCO has had, and continues to have influence on the protection and conservation of wild salmon stocks. We all have views on new directions to engage in and we look forward to discussions as to how to move forward.

The International Atlantic Salmon Research Board has the potential to provide us with the means to understand the factors which influence survival in the sea. Improved knowledge is required to work effectively to stop the decline in stocks and hopefully reverse it. Canada will be providing a contribution to the Board this year, albeit small. I would suggest that we can also learn from our colleagues on the Pacific coast and in particular those with the North Pacific Anadromous Fish Commission. The NPAFC has been successful in collecting and co-coordinating scientific information and assessments concerning marine mortality of the seven species of Pacific salmon. This is one of many areas of common linkages to the problems facing us in the North Atlantic. As a Commissioner for the NPAFC I encourage NASCO to quickly engage in closer exchanges with our Pacific counterparts and suggest that a symposium of NASCO and NPAFC cannot come soon enough.

In closing, I thank you the Icelandic Government and the NASCO Secretariat for the organization of this meeting and look forward to working with you this week.

Opening Statement made by Denmark (in respect of the Faroe Islands and Greenland)

Mr. President, Mr Ambassador, Distinguished Delegates, Observers, Ladies and Gentlemen:

It is a great pleasure to be here in Reykjavík for the 21st Annual Meeting of NASCO. It is always a pleasure to be here in Iceland where we have an interest in fishing and historically have been fishing for a very long time. To the people of the Faroe Islands and Greenland, the ocean and its resources play a major role in our existence. Thus the socio-economic impact from management decisions on fisheries is considerable. The salmon fisheries in the Faroe Islands and Greenland were also important to the people in our countries. Even this fishery has been reduced very heavily to almost zero.

This 21st Annual Meeting of NASCO is again a further step forward in our discussions between the Parties and the possibilities of NASCO to strengthen regional co-operation in the North-East Atlantic and West Greenland and to study the management of salmon. The question is, for how long shall we proceed this way?

From our point of view the most important issue for NASCO to deal with now is its future, that is, how to define its role in the management of salmon. Since NASCO was established, it has been said, and now I am referring to the Vision Statement, that NASCO has achieved notable success and has been able to ban fishing for Atlantic salmon beyond areas of national jurisdiction, and to reduce salmon catches dramatically off Greenland and the Faroe Islands. What is the result and who has suffered and who has taken the share of burden? The status of the stocks in some rivers, especially in Southern Europe, is very poor. What is the reason for this and what can NASCO do to improve the situation?

In our view NASCO needs to expand the scope of its formal authority so it covers the real threats to the wild salmon, such as continued harvesting of salmon in home waters with poor stocks, habitat degradation/destruction, pollution, interaction between farmed and wild salmon, by-catches in pelagic fisheries, predation and depleted food supplies.

NASCO has made adjustments to the threats by adopting the Precautionary Approach to fisheries management. However, this is not enough. NASCO needs to have a new mandate which should not only focus on the high seas but also include the sea jurisdictions within the Member States.

An ecosystem-based management approach must be the new vision of NASCO and the Council must be able to take decisions concerning not only the fisheries in the Faroe Islands and Greenland but in the entire area in the North Atlantic.

Many factors are affecting the salmon stocks as listed above, and all these factors reduce the spawning opportunities and the survival of wild salmon. The effects of this damage are more severe than the effects of the fisheries at the Faroe Island and Greenland. Among the factors which have not changed during the last 20 years is the continued high dependency of the Faroe Islands and Greenland upon fisheries in general. Salmon farming is an important industry in the Faroe Islands.

For many years our quotas have been significantly reduced to the present level. The fishery has only been very precautionary in the last decade. However, we would like to stress our right to fish and maintain a sustainable utilisation of the stocks based upon the best scientific advice presented to NASCO, bearing in mind the precautionary approach principles.

A research fishery in the North-East Atlantic has been recognised as being of major importance to the scientific programme, and such a programme has been duly recommended by ICES. The International Atlantic Salmon Research Board could improve the possibilities for Parties like the Faroe Islands and Greenland to participate in large-scale research into the causes of salmon mortality at sea. With a large herring stock, together with mackerel and blue whiting, the role of salmon in the ecosystem in the North-East Atlantic needs to be further investigated.

When it comes to management of marine resources, we have had good experience. In the Faroe Islands and Greenland it goes without saying that responsible and effective fisheries management is not only a basic political goal - it is a necessity for countries as dependent on the sea as we are for our economic and social well-being. Making and keeping fisheries sustainable – both in ecological and economic terms, is the biggest challenge facing all fisheries nations today, with increasing fishing efficiency and expanding global markets for food. No fisheries management system is carved in stone, nor should it be seen as such. The key for the future will, therefore, be our ability both to adapt effectively in the short term and at the same time for the long-term.

Last year a report was issued on the Sea Around Us Project, and as regards the North Atlantic, the paper described a scaling method employed to aggregate three independent rankings of sustainability of fisheries from 11 countries in the North Atlantic. These fisheries were first scored and ranked using three measures, (a) Rapfish assessment of sustainability, (b) compliance of fisheries with the FAO Code of Conduct, and (c) compliance of nations with the international fisheries agreements. The result of this aggregated ranking of the sustainability of the fisheries of 11 countries gave the Faroe Islands and Greenland the highest score.

Mr. President, we are looking forward to hearing and sharing views which may give inspiration to solutions to the rational utilisation of the Atlantic salmon resources in the North Atlantic, where NASCO in the future has an expanded mandate to reach such goals.

Opening Statement made by the European Union

Mr. President, Distinguished Delegates and Observers:

I am delighted to be here in Reykjavik at this the Twenty-First Annual Meeting of the North Atlantic Salmon Conservation Organization. On behalf of the European Union, I would like to express my personal delight at being here in the capital of Iceland in the North Atlantic at the very heart of NASCO and of the wild salmon community. I understand that we are on the edge of two tectonic plates, which will hopefully remain sufficiently close for us to complete our work. I hope we are not on two different plates when it comes to salmon management.

All Member States of the European Union (and there are 25 of them now) recognise the need for NASCO to continue with its work throughout the North Atlantic Ocean. Through this exemplary cooperation between sovereign States, we can hopefully see the wild salmon safeguarded for future generations.

The current state of the wild Atlantic salmon stocks is nothing of which we can be proud. Catches in 2003 were even lower than in previous years although I am glad to see that coastal fisheries now account for a smaller portion of the catches in the North-East Atlantic after the increases of recent years. However, sustainable management of these mixed fisheries in coastal waters continues to concern my delegation. It is clear to us all that this issue is one, which is directly linked to that of the fisheries in distant waters. We all remember what transpired at last year's Annual Meeting, as well as in previous years, when we agreed not to decide upon a measure for the fishery at the Faroe Islands. The Faroe Islands have on each occasion made a clear commitment to managing their own fishery (if there was one) in a precautionary manner and to taking management decisions with due consideration for the ICES advice. So to complete the picture, it is up to the relevant Parties such as the Community to take further and appropriate management measures for the home waters. We recognise this obligation and so we intend to address this issue in more detail at this meeting. I hope that the authorities of the distant water nations can also commit themselves to take action in a similar complementary manner during this week's talks.

For West Greenland, the advice from ICES for 2004 seems to be as pessimistic as ever. They suggest that there should be no fishery at West Greenland and they have indicated that even without a harvest at West Greenland, we have only a 5% probability of attaining conservation limits in the four northern regions of North America. I am very concerned by this situation as I am sure are my colleagues from both Canada and the United States.

It seems that the ACFM report will never give us any really good news, at least that is my experience from the last few years. The Community and its Member States are always fully committed to taking appropriate measures in home waters. All Parties in the West Greenland Commission, particularly Denmark (with respect to the Faroe Islands and Greenland), must help to support the stock rebuilding process and ensure that there is a future for the wild salmon wherever it occurs. The management must therefore be decided on the basis of the precautionary approach.

My delegation would like to endorse the results of the workshop on socio-economic implications for the Precautionary Approach held in New Orleans in March under the auspices of the Standing Committee on the Precautionary Approach. I would particularly like to see the adoption of some form of guidelines for incorporating social and economic factors into decisions under the Precautionary Approach. There is still much work to be done on the Precautionary Approach but we can see some light at the end of the tunnel. This week, after five years of sustained activity we need to see what are the missing elements and on completion (if that is ever possible), we should look at some form of consolidation and review.

Following the adoption by NASCO of the Williamsburg Resolution at last year's Annual Meeting, a resolution which basically consolidated previous texts on aquaculture, introductions and transfers, and transgenics, I had anticipated that the salmon farming industry would follow suit. I am therefore very disappointed that we were unable to hold a full Salmon Liaison Meeting this year although there was some limited success in Boston. However, I feel that the farming industry should not have any problems with the NASCO approach on the Williamsburg Resolution. It is in the common interests of the wild salmon sector as well as of the salmon farming industry that we work together on this matter.

The International Atlantic Salmon Research Board has been in existence since December 2002 and, despite its best efforts, has still to find any rich widows to give it a vital injection of funds. I am very pleased to confirm that the Community will be transferring €50,000 very shortly into the IASRB coffers.

As in previous years, we will be in the presence of a number of non-government organisation observers. I look forward to working with these organisations. They continue to provide an important input into the work of NASCO. We recognise that it was through their initial urgings some twenty-five years ago that NASCO itself came into being. They continue to be there to watch over us in our endeavours and this year, in recognition of the twenty years of existence of NASCO, they have produced a paper entitled "NASCO's Future – A Vision Statement". Mr. President, I have read this paper with great interest and I feel pleased that NASCO has addressed most of the comments made therein. I must also commend the authors of the paper for the efforts they have made in producing this paper. I feel that a dialogue with the NGOs and other interested parties is very useful. At this stage in the history of NASCO, it may be time for us to have a stock-taking to see where we are, where we have come from and where we are going.

Mr. President, I am, as ever, delighted to see you here presiding over our proceedings. With the help of the NASCO Secretariat, you have no doubt prepared this meeting in such a manner that we will have substantial and genuinely worthwhile results at the end of the week. I would like to thank you and Malcolm Windsor and all the members of the NASCO team for all the work done to prepare this meeting. I would also like to personally thank the Icelandic authorities for all their efforts to ensure a smooth meeting this week in Reykjavik. In order to thank everyone and in appreciation of their efforts, the Irish Presidency of the European Union would like to invite delegates to a reception tomorrow night in this hotel.

Mr. President, Distinguished Representatives and Observers, on behalf of the European Community, I must express my delegation's genuine desire to work with you over the next four days in order to achieve real and substantial results for NASCO at this 21st Annual Meeting. I look forward to a very successful outcome.

Opening Statement made by Norway

Mr President, distinguished Delegates, Observers, Ladies and Gentlemen,

Norway is very pleased to participate at this Twenty-First Annual Meeting of NASCO here in Reykjavik.

During its twenty years, NASCO has created a solid international platform for the conservation of Atlantic salmon. This important work has taken place in a period where stocks of Atlantic salmon have declined – in some areas to dramatically low levels. In the last few years, however, the stocks in Northern Europe have shown increasing strength. We must hope that this trend will continue and that a similar development will take place in all regions.

For the last few years we have been engaged in informal discussions both on implementation and on NASCO's working methods and structures more generally. The discussions have been motivated by a common wish to strengthen NASCO and develop this successful Organization even further.

In this respect, Mr President, Norway very much welcomes your initiative for an open-minded discussion on our working methods. We also welcome contributions from, and participation by, the NGOs in this field. I will assure you, Mr President, that my delegation really looks forward to discussions on these issues.

Finally, I would like to express my thanks to you, Mr President, to our Icelandic hosts and to the Secretariat for the excellent preparations for this meeting.

Opening Statement made by the Russian Federation

Mr. President, Distinguished Delegates, Observers, Ladies and Gentlemen:

On behalf of the Russian delegation I am pleased to greet all participants at the 21st Annual Meeting of NASCO in Reykjavik.

Atlantic salmon is a national treasure in our country. And we realize that without international cooperation in conserving this resource, without combined efforts in developing a strategy for future actions one could hardly expect to be successful. Therefore, we do not have doubts that the work that will be accomplished in the course of this Annual Meeting will contribute to the preservation of this valuable species for the future generations.

At the last Annual Meeting I told you that the status of Atlantic salmon stocks in many rivers in Russia was observed to have become healthier for the first time over a long period of time. In 2003 this tendency continued, and we link this to the fact that the Precautionary Approach has been applied by us in management of salmon fisheries in recent years. A variety of management measures to regulate the salmon fisheries were implemented in Russia in the past. In the last century, however, the Russian stocks of Atlantic salmon underwent three very serious declines caused by overfishing. Application of the Decision Structure for management of salmon fisheries has allowed, in the first place, optimization of the existing schemes of managing these fisheries, moving the focus to the development of a recreational fishery.

We have also taken actions to protect the habitat of Atlantic salmon. Special Protection Zones have been established on all salmon rivers in Russia, where any economic activity is forbidden unless it has been permitted by the Fish Protection Authorities. On the two largest salmon rivers of the Kola Peninsula - Ponoi and Varzuga - following a decision of the Murmansk Region Government, game reserves were established. In addition, we have developed an action plan for protection and restoration of salmon habitat on the Kola River. Work is being carried out to rehabilitate spawning and nursery areas in the river, which were destroyed by log rafting. The Governments of three regions are cooperating with non-government organizations in raising funds for protection and restoration of salmon habitat and recruiting volunteers to do the work to this end. For instance, over the past few years school children and students have participated in the project aimed at cleaning the rivers of sunken logs and wastes. As a result of these efforts juvenile salmon re-emerged on rehabilitated sites after having been absent there for a long time.

In 2003 we continued our studies of by-catch of salmon in pelagic fisheries. However, as last year, we did not find any evidence suggesting any relationship between the level of by-catch of post-smolts and the intensity of pelagic fisheries, in particular the mackerel fishery. We have already expressed our point of view earlier on possible adverse impacts of climatic factors on survival of salmon in the sea. We would now like once again to draw your attention to this. In addition, we have quite representative data available on the deleterious impact of hatchery-reared salmon on the genetic structure of wild populations. According to ICES, millions of artificially reared fish are released into the wild every year. Escapes of farmed salmon from cages are also quite significant. All this undoubtedly could impact on the genetic structure of wild populations, and the viability of their progeny.

I would also like to touch on the issue of transgenic salmon. Lately, an extensive campaign was initiated in Russia against sales of genetically modified organisms and products containing their components. This discussion attracted politicians, scientists, businessmen and public organizations. As many scientists suggest, the health of nation is at issue. In this connection I would like to stress once again that the official Russian authorities, whom we represent here, are not supportive of developments with transgenic salmon, despite potential economic benefits from its production.

NASCO was created with the purpose of combining the efforts of all countries in conserving the North Atlantic salmon. Over the past 20 years, NASCO has accomplished much for conservation, enhancement and rational exploitation of Atlantic salmon. Many important decisions and agreements have been adopted. Some of them have already been implemented, others are being taken through this process. Of particular note is the work done in Williamsburg last year which resulted in a new Williamsburg Resolution that consolidated all previously adopted NASCO agreements on aquaculture, introductions and transfers, and transgenic salmon. In general, application of the Precautionary Approach to various aspects of management of Atlantic salmon stocks has become a cornerstone of NASCO's work in the past years, and, in our view, furthering efforts along this line will give good perspectives for the future.

I cannot help noting an important role the hosts of this Annual Meeting play in NASCO. It is not merely a compliment to the host. Representatives of Iceland were elected to the office of the President of this Organization and chaired its Commissions and Committees. The land of Iceland is of volcanic origin and to us it always appears as a mixture of two elements, fire and ice. Such are also the people of this country, severe and cheerful, having preserved their ancient original folklore. And I should also mention that the ancestors of modern Icelanders, the Vikings, left their mark in Russian history. It was also the Vikings, who were the founders of the first settlement exactly at the place where we are now and which is called Reykjavik.

Opening Statement made by the United States of America

Mr. President, Distinguished Delegates, Observers, Ladies and Gentlemen:

It gives me great pleasure to participate on behalf of the United States in this Twentieth Anniversary meeting of NASCO. I would like to call attention to the cooperation among the Parties that has led to the development of state of the art agreements and to the significant sacrifices that have been made in commercial harvests with the goal of improving the status of the stocks. We as an Organization should be proud of our accomplishments, and of the fact that we are now moving forward to focus our energy on implementation of the agreements we have all reached.

During the past 20 years we have built a strong foundation that will serve us well as the Organization enters its next phase of growth and faces new challenges. The Precautionary Approach is no longer one focus area of NASCO, but it is a continuous thread throughout all of our work. Our continued and future success depends on our ability to critically evaluate and improve the work of the Contracting Parties and of the Organization. We must broadly consider the ecosystems upon which salmon depend and to engage our partners and stakeholders in our work.

As noted by ICES in its advice this year, clearly there are factors other than fisheries influencing marine survival of Atlantic salmon. Targeted research, collaboration and information exchange among the Parties will be necessary before the identity and impact of these factors can be understood and evaluated. Recognizing the importance of gaining insights into marine survival, NASCO created the International Atlantic Salmon Research Board. We are hopeful that the Board will be able to support one or more projects in the coming year to help us obtain some of this critical information.

The situation in the US is severe – our wild Atlantic salmon stocks are listed as endangered which has led to the development of a comprehensive recovery plan that identifies actions needed to address threats to the species and its habitat. ICES has advised that even in the absence of fisheries on the non-maturing 1SW salmon at West Greenland in 2004, the probability of realizing increases in returns to the Southern North American stocks is close to zero. Looking further into the future, ICES has advised that for the US there is a zero chance of meeting conservation limits in the short or medium term. Clearly the road to recovery is a long one that requires great sacrifices, investments and commitments..

As NASCO enters its second 20 years, we look forward to working with our NASCO partners and stakeholders to continue to strengthen the functioning of the Organization so that we can better achieve our goals..

I would like to thank you, Mr. President, our hosts, Iceland, and the NASCO Secretariat for the outstanding efforts made in preparation for this meeting and I look forward to productive discussions. Also, Mr. President, I would like to compliment you on the energy and enthusiasm you have brought to the Organization.

In this city we have to take many important decisions over the week ahead and I wish us all success in our endeavours.

Thank you.

ANNEX 4

Opening Statement made by the Observer from France (in respect of St Pierre and Miquelon)

Mr President, Mr Ambassador, Distinguished Delegates, Observers, Ladies and Gentlemen,

On behalf of France (in respect of St Pierre and Miquelon), I would like to express our gratitude to the Council of NASCO and its President for their invitation to France (in respect of St Pierre and Miquelon) to attend the 21st Annual Meeting of NASCO in an observer capacity.

We also want to say that we are very happy to be here in Reykjavik and we thank very much the Icelandic authorities.

As this is my very first meeting in NASCO, I feel that a few introductory remarks are in order. My name is Mr Yann Becouarn; I work in the Department of Fisheries and Aquaculture in the Ministry of Agriculture, Food, Fisheries and Rural Affairs in Paris. As you know, St Pierre and Miquelon is an overseas territory with a special status. I have the mandate to represent St Pierre and Miquelon in this forum.

As you know it is the first time that France (in respect of St Pierre and Miquelon), has attended the NASCO meeting. This is important because we consider that it is a very good way to improve our collaboration and mutual exchange with NASCO and its Parties in the interests of wild salmon and for a better knowledge and understanding of the St Pierre and Miquelon context.

It is essential, first of all, not to forget that salmon fishing is a traditional activity in St Pierre and Miquelon, that it forms part of the culture of the inhabitants and that the quantities harvested are very low. This practice must also be examined in the broader context of the general maritime fishing situation in St Pierre and Miquelon and the strong concern felt by a community highly dependent on fishing.

Despite the symbolical and traditional importance that salmon fishing represents for the local inhabitants, and the low level of capture, St Pierre and Miquelon fully participates in its management thanks to a very strict regulatory framework.

You will find in your documents, as every year, the salmon catch statistical data for St Pierre and Miquelon gathered in the context of the cooperation existing between NASCO and the French territory. Despite these elements, we know that NASCO and especially some of its Parties have concerns about salmon caught at St Pierre and Miquelon.

Be sure that France (in respect of St Pierre and Miquelon) shares the same view as the Parties of NASCO about the necessity to have better knowledge of salmon and to manage it as well as possible for us and for future generations.

This is why, as announced last year, France (in respect of St Pierre and Miquelon) wishes to increase its cooperation with NASCO so as to better participate in the process of understanding, conservation and management of this particular species. This cooperation should also increase the links which exist naturally between St Pierre and Miquelon and some

Parties of NASCO, encouraging therefore, an exchange of information with those Parties who have to manage traditional fisheries.

In this context, and thanks to the implementation of a scientific programme by IFREMER, it had been decided to find out more about the salmon harvested at St Pierre and Miquelon. This programme, inspired by a project developed by NASCO, was launched in 2003.

A biometric study was thus undertaken during the 2003 campaign so as to better determine the characteristics of the salmon population. This study and statistical data are presented in your documents. It is still too early to draw conclusions and so this assessment will be continued in 2004.

The second constituent of the scientific programme will be a genetic analysis to commence in 2004, aimed at improving the knowledge of the origin of the salmon caught. It is also hoped that this analysis will take place in cooperation with Canada.

Finally, a pathological study will be considered at a later date.

Mr President, France (in respect of St Pierre and Miquelon) trusts that these elements will contribute positively to the effort made towards a better understanding of the Atlantic salmon and a good and efficient collaboration with NASCO in the interests of wild salmon and in respect of traditional activities.

ANNEX 5

Opening Statement made by the International Baltic Sea Fishery Commission

Thank you, Mr President, Mr Ambassador, Distinguished Delegates, Ladies and Gentlemen. It is a pleasure for the IBSFC to participate in this, your Twenty-First Annual Meeting.

During the mid-1990s, wild salmon stocks in the Baltic Sea were close to extinction as a result of damming of rivers, increased pollution and the high levels of mortality associated with M74 syndrome. However, the focus of criticism for this situation was the offshore fishery which accounted for 80% of the harvest. In response to this situation and in accordance with the UN Law of the Sea Convention, the IBSFC had to act to protect the stocks while minimising economic dislocation to fisheries. In 1997 the Commission developed the IBSFC Salmon Action Plan 1997-2010. The management objective of this 15-year plan is to increase the natural production of wild Baltic salmon to 50% of the natural productive capacity by 2010 while maintaining the catch as high as possible. We are now in the middle of this 15-year period and a mid-term analysis from ICES indicates that the status of wild salmon stocks in the Main Basin and Gulf of Bothnia is making good progress. The status of the less productive stocks is poor but the stocks in large rivers have shown a dramatic improvement and in general these rivers reached the target level of 50% natural production capacity. However, there is no room for complacency since in the Gulf of Finland, a small corner of the Baltic bordered by Finland, Russia and Estonia, wild stocks are still in extremely poor condition.

There appear to have been changes to the ecosystem in the Gulf of Finland and predation by seals and cormorants is of concern. The next meeting of the Salmon Action Plan Surveillance Group will be focusing on the situation in the Gulf of Finland.

There are three further points I would like to draw to your attention. In February this year, I attended NASCO's *Gyrodactylus salaris* workshop in Oslo. This was a very positive meeting and the information presented indicated that Baltic salmon are resistant to the parasite. This is encouraging since Baltic salmon have just recovered from M74 syndrome which caused high levels of mortality. Secondly, the bad news is that dioxin levels in the Baltic and Baltic salmon are high and this is likely to cause problems in the future. Thirdly, under a United Nations Environment Programme analysis conducted in 2002, IBSFC, ICES and CCAMLR were identified as pioneers in applying the ecosystem approach to fisheries management. We are happy to share our experiences on this approach with NASCO.

Thank you, Mr President.

ANNEX 6

Joint Opening Statement made by Non-Government Organizations

Mr President, Mr Ambassador, Distinguished Delegates, I am pleased to present the joint opening statement on behalf of all participating NGOs.

We meet against the background of continued international concern at the status of wild Atlantic salmon stocks. This year the ICES advice is uncompromising; if I may paraphrase it as follows; the status of stocks should not allow any fishery to take place either at West Greenland or the Faroes, and harvesting of both 1SW and MSW salmon in both northern and southern Europe and North America should be confined to rivers where stocks exceed their conservation limit.

Mr President, we have heard this kind of advice before, but while the fishing communities of Greenland and the Faroes have made great sacrifices in reducing their harvest to subsistence levels, or not fishing at all, progress in the home waters of some parties has been slower and somewhat mixed, like some of the fisheries which remain.

As NGOs we attend NASCO because of our shared concern about the future of wild Atlantic salmon, and we are full of admiration for what NASCO has achieved so far. Mr President, as you pointed out in your opening statement, salmon stocks have not yet responded; in fact, despite NASCO's best efforts, they have continued to decline. One of the roles of NGOs is to stimulate governments to respond to such challenges; this is a significant anniversary for NASCO and we feel the time has come for a step change in the Organization. NASCO was formed 20 years ago as a result of an NGO initiative, and we think it highly appropriate that NGOs should now promote a review of the way the Organization operates, with a view to strengthen NASCO and improve its ability to meet the serious challenges we already know exist, and those that lie ahead.

The NGOs welcome the initiative taken by WWF and ASF to sponsor a vision for the future of the Organization. As you know, I am one of the authors of that document and I must stress that the views expressed are those of the authors. However, I am pleased to say that the NGO group unanimously endorses the aim of this document.

The vision contains some ideas about ways in which we believe NASCO can strengthen its role, which I do not propose to re-iterate here. However, its central recommendation is for the creation of a working party to examine those ideas, a working party which includes the full and active participation of NGOs.

Mr President, the NGOs urge the Council of NASCO to embrace our suggestion and set up such a group to report back, in detail, to the 2005 meeting.

There are, of course, many issues which are of immediate and ongoing concern to the NGOs present today. Issues such as:

- The continued presence of mixed stock fisheries in home waters.
- The parasite *Gyrodactyus salaris.*
- The continuing impact of aquaculture on wild fish, despite the Oslo (1994) and Williamsburg Resolutions.

- The possible impact of pelagic by-catches.
- Predation by fish-eating birds and seals.

I draw you attention to the short supplementary written statement on these topics and the statement on seal predation by the Scottish Net Fishing Association, which we all support.

Can I also draw your attention to a statement from our colleagues in the Baltic about their concerns for the future management of the closely related Baltic salmon.

These statements will be circulated to you later today. The fact that these issues will be strikingly familiar to you all, in my view, emphasises the merit of the vision statement and need for a review of the way NASCO operates.

NGO participation and media

The NGOs present here represent millions of ordinary voters who share concerns about the future of wild Atlantic salmon. We also represent a pool of expertise, particularly on practical fishery management, and are anxious to maximise our contribution to the NASCO process. NGOs also have special skills in dealing with the media and one particular way of improving NASCO's public image, as well as solving an ongoing internal problem, would be to agree a joint media plan with NGOs. We suggest this would be a positive step forward for all concerned, and particularly the salmon.

Mr President, Delegates, thank you for your attention. Can I conclude by emphasizing the contribution that NGOs have to make to this Organization, and on behalf of all my colleagues, I commend our statement to you, and very much hope that this Council will agree to set up a working party, as we have suggested, to report back with detailed recommendations in 2005.

ANNEX 7

List of Participants

* Denotes Head of Delegation

CANADA

*Mr Guy Beaupré	Representative Department of Fisheries and Oceans, Ottawa, Ontario
Mr Pierre Tremblay	Representative Sainte-Foy, Quebec
Mr Jacque Robichaud	President of NASCO Ottawa, Ontario
Mrs Julia Barrow	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Peter Cronin	New Brunswick Department of Natural Resources and Energy, Fredericton, New Brunswick
Mr Murray Hill	Department of Fisheries, Pictou, Nova Scotia
Mr Maurice Levesque	Department of Fisheries and Oceans, New Brunswick
Mr Brian Meaney	Department of Fisheries and Aquaculture, St John’s, Newfoundland
Mr David Meerburg	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Rex Porter	Department of Fisheries and Oceans, St John’s, Newfoundland
Ms Sue Scott	Atlantic Salmon Federation, New Brunswick
Mr Berkley Slade	Department of Fisheries and Oceans, St John's, Newfoundland
Mr William Taylor	Atlantic Salmon Federation, St Andrews, New Brunswick
Mr Serge Tremblay	Societe de la Faune et des parcs du Quebec, Quebec
Mr Tim Young	Department of Fisheries and Oceans, Ottawa, Ontario

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*Mr Kaj P Mortensen	Representative Ministry of Foreign Affairs, Faroe Islands
Mr Emanuel Rosing	Representative Greenland Home Rule, Nuuk, Greenland
Ms Ulla Wang	Representative Ministry of Fisheries and Maritime Affairs, Faroe Islands
Dr Jan Arge Jacobsen	Faroese Fisheries Laboratory, Torshavn, Faroe Islands
Mr Per Kanneworff	Greenland Institute of Natural Resources, Nuuk, Greenland
Ms Ane Skak	Department of Fisheries and Hunting, Nuuk, Greenland

EUROPEAN UNION

*Mr Ole Tougaard	Representative European Commission, Brussels, Belgium
Mr Andrew Thomson	Representative European Commission, Brussels, Belgium
Mr Bo Bengtsson	National Board of Fisheries, Gothenburg, Sweden
Ms Carmen Beraldi	Secretaria General de Pesca, Madrid, Spain
Dr Malcolm Beveridge	Fisheries Research Services, Pitlochry, UK
Ms Hazel Campbell	Department of Culture, Arts and Leisure, Belfast, UK
Mr Richard Cowan	DEFRA, London, UK
Mr David Dunkley	SEERAD, Edinburgh, UK
Dr Jaakko Erkinaro	Finnish Game and Fisheries Research Institute, Oulu, Finland
Mr Lal Faherty	Western Regional Fisheries Board, Galway, Ireland
Dr Ulrich Fassbender	Federal Ministry of Consumer Protection, Food & Agriculture, Bonn, Germany
Dr Paddy Gargan	Central Fisheries Board, Dublin, Ireland
Mr Jose Luis Gonzalez Serrano	Secretaria General de Pesca Maritima, Madrid, Spain

Mr Michael Guilfoyle	Department of Communications, Marine and Natural Resources, Dublin, Ireland
Ms Eija Kirjavainen	Ministry of Agriculture and Forestry, Department of Fisheries and Game, Helsinki, Finland
Dr Guy Mawle	Environment Agency, Bristol, UK
Mr Pentti Munne	Ministry of Agriculture and Forestry, Department of Fisheries and Game, Helsinki, Finland
Mr John O'Connor	Central Fisheries Board, Dublin, Ireland
Mr George O'Doherty	Department of Communications, Marine and Natural Resources, Dublin, Ireland
Dr Niall Ó Maoileidigh	Marine Institute, Dublin, Ireland
Mr Ted Potter	Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, UK
Mr Frank Sheridan	Department of Communications, Marine and Natural Resources, Dublin, Ireland
Mr Tico Söderlindh	Ministry of Agriculture, Food and Consumer Affairs, Stockholm, Sweden
Mr Andrew Wallace	Association of Salmon Fishery Boards, Edinburgh, UK
Dr Ken Whelan	Marine Institute, Newport, Ireland

ICELAND

*Mr Guðmundur B Helgason	Representative Ministry of Agriculture, Reykjavik
Mr Arni Isaksson	Representative Directorate of Freshwater Fisheries, Reykjavik
Mr Gudmundur Eiriksson	Icelandic Ambassador to Canada, Ottawa
Mr Gudni Gudbergsson	Institute of Freshwater Fisheries, Reykjavik
Dr Sigurdur Gudjonsson	Institute of Freshwater Fisheries, Reykjavik
Mr Ingimar Johannsson	Ministry of Agriculture, Reykjavik

NORWAY

*Mr Steinar Hermansen	Representative The Royal Ministry of Environment, Oslo
Mr Arne Eggereide	Representative Directorate for Nature Management, Trondheim
Ms Eva Espeland	Representative The Royal Ministry of Environment, Oslo
Mr Raoul Bierach	Directorate for Nature Management, Trondheim
Ms Maren Esmark	WWF Norway, Oslo
Dr Lars Petter Hansen	Norwegian Institute for Nature Research, Oslo

RUSSIAN FEDERATION

*Dr Boris Prischepa	Representative Murmanrybvod, Murmansk
Dr Svetlana Krylova	Representative Murmanrybvod, Murmansk
Mr Alexej Grushko	State Committee for Fisheries, Moscow
Ms Elena Samoylova	PINRO, Murmansk
Dr Igor Studenov	SevPINRO, Archangel
Dr Alexander Zubchenko	PINRO, Murmansk

USA

*Ms Patricia Kurkul	Representative NOAA Fisheries, Gloucester, Massachusetts
Mr Stephen Gephard	Representative Department of Environmental Protection, Inland Fisheries Division, Old Lyme, Connecticut
Mr George Lapointe	Representative Maine Department of Marine Resources, Augusta, Maine
Mr Edward Baum	Atlantic Salmon Unlimited, Hermon, Maine
Ms Kimberly Blankenbeker	National Marine Fisheries Service, Silver Spring, Maryland

Mr Scott Burns	World Wildlife Fund (USA), Washington DC
Mr Stephen Chase	Atlantic Salmon Federation, St Andrews, New Brunswick
Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts
Ms Kim Davis	World Wildlife Fund (USA), Washington DC
Mr Patrick Keliher	Maine Atlantic Salmon Commission, Maine
Mr Pasquale Scida	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Timothy Sheehan	NOAA Fisheries, Woods Hole, Massachusetts
Mr Stetson Tinkham	US Department of State, Washington DC
Mr John Ward	National Marine Fisheries Service, Silver Spring, Maryland

STATES NOT PARTIES TO THE CONVENTION

Mr Yann Becouarn	France (in respect of St Pierre and Miquelon)

INTER-GOVERNMENT ORGANIZATIONS

Dr Walter Crozier	Chairman, ICES Working Group on North Atlantic Salmon, Bushmills, Northern Ireland
Dr Walter Ranke	International Baltic Sea Fishery Commission, Warsaw, Poland
Ms Ulla Wang	North Atlantic Marine Mammal Commission, Tromsø, Norway

NON-GOVERNMENT ORGANIZATIONS

Major General Seymour Monro Dr Richard Shelton	Atlantic Salmon Trust, UK
Dr Frederic Mazeaud	AIDSA
Mr Gunnar Noren	Coalition Clean Baltic, Sweden
Mr Chris Poupard	European Anglers Alliance

Mr Noel Carr	Federation of Irish Salmon and Sea-Trout Anglers, Ireland
Mr Patrick Martin	Fondation Saumon, France
Mr John Gregory	Institute of Fisheries Management, UK
Mr Patrick Byrne	National Anglers Representative Association, Ireland
Mr Bjornulf Kristiansen	Norges Bondelag (Norwegian Farmers Union), Norway
Mr Aage Wold	Norskelakseelver (Norwegian Salmon Rivers), Norway
Mr Paul Knight	Salmon and Trout Association, UK
Mr Ian Calcott	Scottish Anglers National Association, UK

SECRETARIAT

Dr Malcolm Windsor	Secretary
Dr Peter Hutchinson	Assistant Secretary
Miss Margaret Nicolson	PA to the Secretary
Mrs Sophie Ross	PA

Support Staff

Mr Eirikur Beck	Directorate of Freshwater Fisheries, Reykjavik
Ms Gudlaug Jónasdóttir	Ministry of Agriculture, Reykjavik
Ms Sigridur Jónsdóttir	Ministry of Agriculture, Reykjavik
Mr Sumarlidi Oskarsson	Directorate of Freshwater Fisheries, Reykjavik

ANNEX 8

CNL(04)51

Twenty-First Annual Meeting of the Council
Radisson SAS Saga Hotel, Reykjavik, Iceland
7-11 June, 2004

Agenda

1. **Opening Session**

2. **Adoption of Agenda**

3. **Election of Officers**

4. **Administrative Issues**

    4.1 Secretary's Report

    4.2 Report of the Finance and Administration Committee

    4.3 Report on the Activities of the Organization

    4.4 Announcement of the Tag Return Incentive Scheme Grand Prize

5. **Scientific, Technical, Legal and Other Information**

    5.1 Scientific Advice from ICES

    5.2 Catch Statistics and their Analysis

    5.3 Scientific Research Fishing in the Convention Area

    5.4 Report of the International Atlantic Salmon Research Board

    5.5 Report of the Standing Scientific Committee

6. **Conservation, Restoration, Enhancement and Rational Management of Atlantic Salmon under the Precautionary Approach**

    6.1 Measures Taken in Accordance with Articles 14 and 15 of the Convention

    6.2 Application of the Decision Structure for Management of North Atlantic Salmon Fisheries

        (a) Returns by the Parties
        (b) Special Session on the Management of Homewater Fisheries

6.3 Development and Implementation of Habitat Protection and Restoration Plans

(a) Returns by the Parties
(b) Database of Salmon Rivers

6.4 Aquaculture, Introductions and Transfers, and Transgenics

(a) The Williamsburg Resolution
(b) Returns made in accordance with the Williamsburg Resolution
(c) Liaison with the Salmon Farming Industry

6.5 Unreported Catches

6.6 By-catch of Atlantic Salmon

6.7 Development of Guidelines on Stock Rebuilding Programmes

6.8 Report of the Technical Workshop on Development of a Decision Structure for Incorporating Social and Economic Values in Application of the Precautionary Approach

6.9 Future Actions in relation to Application of the Precautionary Approach

7. Predator-related Mortality

8. St Pierre and Miquelon Salmon Fishery

9. Next Steps for NASCO

10. Reports on the Work of the Three Regional Commissions

11. Other Business

12. Date and Place of Next Meeting

13. Report of the Meeting

14. Press Release

ANNEX 9

Council

CNL(04)56

2005 Budget, 2006 Forecast Budget and Schedule of Contributions

North Atlantic Salmon Conservation Organization
2005 Budget and 2006 Forecast Budget (Pounds Sterling)

Section	Description	Expenditure	
		Budget 2005	Forecast 2006
1	Staff-related costs	308,710	317,960
2	Travel and subsistence	39,950	40,760
3	Research and advice	47,710	38,840
4	Contribution to Working Capital Fund	0	0
5	Meetings	12,500	12,870
6	Office supplies, printing and translation	27,500	25,050
7	Communications	15,250	15,690
8	Headquarters Property	-24,760	-23,760
9	Office furniture and equipment	9,750	7,280
10	Audit and other expenses	9,000	9,250
11	Tag Return Incentive Scheme	4,500	5,000
12	International Atlantic Salmon Research Fund	0	0
	Total	450,110	448,940

		Revenue	
		Budget 2005	Forecast 2006
13	Contributions - Contracting Parties	472,110	471,940
14	Miscellaneous Income - Interest	4,000	4,000
15	Stabilisation	-26,000	-27,000
16	Surplus or Deficit (-) from 2003	0	0
	Total	450,110	448,940

Adjustments to 2004 contributions (Pounds Sterling)
to take into account confirmed 2002 Catch Statistics

Party	2002 Provisional catch	2002 Confirmed catch	2004 Contribution based on provisional catch	2004 Contribution based on confirmed catch	Adjustment to 2004 contribution
Canada	148	148	37,219	37,117	-102
Denmark (Faroe Islands and Greenland)	9	9	20,447	20,441	-6
European Union	1,235	1,245	168,372	168,723	+352
Iceland	92	97	30,462	30,999	+537
Norway	1,019	1,019	142,310	141,610	-700
Russian Federation	118	118	33,599	33,518	-81
USA	0	0	19,362	19,362	0
TOTAL	2,621	2,636	451,770	451,770	0

Note: A positive adjustment represents an underpayment in 2004.

NASCO Budget Contributions for 2005 and Forecast
Budget Contributions for 2006 (Pounds Sterling)

Party	2003 Provisional catch (tonnes)	Contribution for 2005	Adjustment from 2004	Adjusted contribution for 2005	Forecast contribution for 2006
Canada	137	38,556	-102	38,454	38,542
Denmark (Faroe Islands and Greenland)	9	21,437	-6	21,431	21,429
European Union	1,039	159,191	+352	159,543	159,134
Iceland	108	34,677	+537	35,214	34,665
Norway	1,071	163,471	-700	162,772	163,412
Russian Federation	107	34,544	-81	34,463	34,531
USA	0	20,233	0	20,233	20,226
TOTAL	2,471	472,110	0	472,110	471,940

Contributions are based on the Official Catch Returns supplied by the Parties. Column totals can be in error by a few pounds due to rounding.

ANNEX 10

CNL(04)52

Decisions in Relation to the Staff Rules and to the Staff Fund Rules

On the recommendation of the Finance and Administration Committee, the Council agreed a new Staff Rule, as follows:

"A Secretariat Member aged over 55 years may request the Secretary to transfer to the Staff Fund up to 20% per annum of the estimated value of his or her lump sum entitlement so as to enable investment planning. Such transfers will be deducted from the final payment".

The Council also decided to add the following text to Rule 2.1 of the Staff Fund Rules:

"However, the Council has decided that Members of the Scheme, as at 11 June 2004, shall retain Secretariat Member status while in receipt of benefits from the Scheme".

ANNEX 11

Council

CNL(04)9

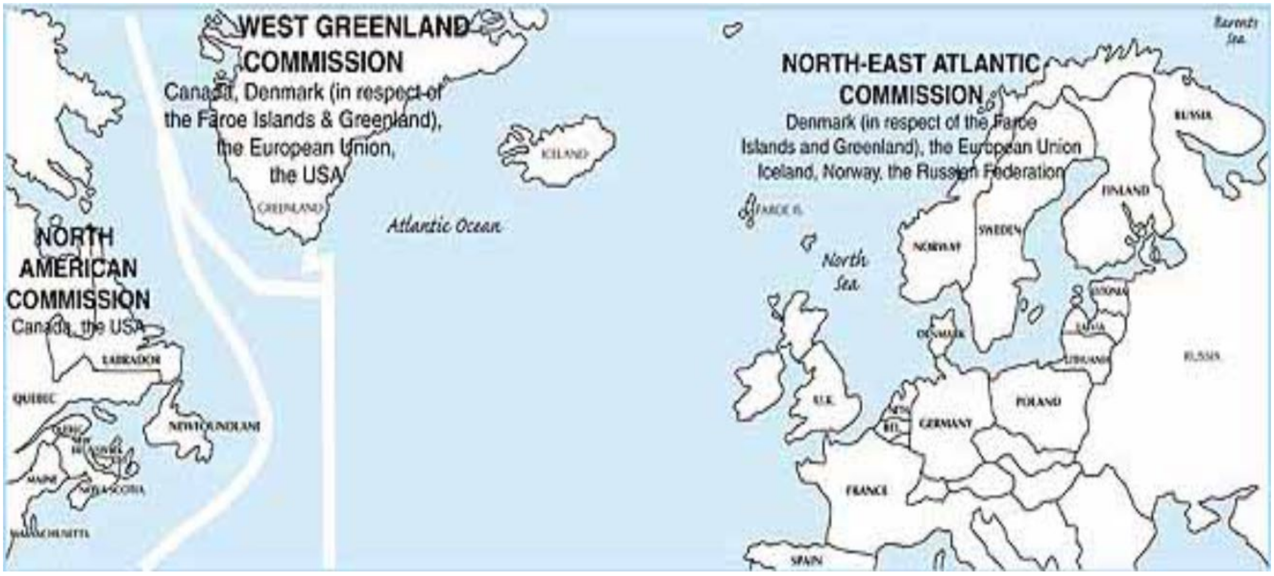
Report of the ICES Advisory Committee on Fishery Management (Sections 1, 2 and 6 only)

Only the advice concerning general issues of relevance to the North Atlantic is given in this report. The detailed advice on a Commission area basis is annexed to the report of the Commissions.

1.2 Management framework for salmon in the North Atlantic

The advice generated by ICES is in response to terms of reference posed by the North Atlantic Salmon Conservation Organisation (NASCO), pursuant to its role in international management of salmon. NASCO was set up in 1984 by an international convention (the Convention for the Conservation of Salmon in the North Atlantic Ocean), with a responsibility for the conservation, restoration, enhancement and rational management of wild salmon in the North Atlantic. While sovereign states retain their role in the regulation of salmon fisheries for salmon originating from their own rivers, distant water salmon fisheries, such as those at Greenland and Faroes, which take salmon originating from rivers of another Party are regulated by NASCO under the terms of the Convention. NASCO now has seven Parties that are signatories to the Convention, including the EU which represents its Member States.

NASCO discharges these responsibilities via three Commission areas shown below:



1.3 Management objectives

NASCO (NASCO CNL31.210) has identified the primary management objective of that organisation as:

“To contribute through consultation and co-operation to the conservation, restoration, enhancement and rational management of salmon stocks taking into account the best scientific advice available”.

NASCO further stated that “the Agreement on the Adoption of a Precautionary Approach states that an objective for the management of salmon fisheries is to provide the diversity and abundance of salmon stocks”, and NASCOs Standing Committee on the Precautionary Approach interpreted this as being “to maintain both the productive capacity and diversity of salmon stocks”.

NASCO’s Action Plan for Application of the Precautionary Approach (NASCO CNL(99)48) provides interpretation of how this is to be achieved, as follows:

- “Management measures should be aimed at maintaining all stocks above their conservation limits…………by the use of management targets”;

- “Socio-economic factors could be taken into account in applying the Precautionary Approach to fisheries management issues”;

- “The precautionary approach is an integrated approach that requires, inter alia, that stock rebuilding programmes (including as appropriate, habitat improvements, stock enhancement, and fishery management actions) be developed for stocks that are below conservation limits”.

NASCO (1998) has adopted the conservation limits as defined by ICES. However, management targets have not yet been defined for North Atlantic salmon stocks. ICES has interpreted stocks to be within safe biological limits only if the lower bound of the confidence interval of the most recent spawner estimate is above the CL. This parallels the use of precautionary reference points used for the provision of catch advice for other stocks. It should be noted that target reference points once developed, should be larger than the precautionary reference points.

1.4 Reference points and application of precaution

Conservation limits (CLs) for North Atlantic salmon stock complexes have been defined by ICES as the level of stock that will achieve long-term average maximum sustainable yield (MSY), as derived from the adult to adult stock and recruitment relationship (Ricker, 1975; ICES, 1993). NASCO has adopted this definition of CLs (NASCO, 1998). The CL is a limit reference point (S_{lim}) which should be avoided with high probability. Management advice is referenced to the S_{lim} conservation limit. This parallels the use of precautionary reference points used for the provision of catch advice for other fish stocks in the ICES area.

For catch advice on fish exploited at West Greenland (non-maturing 1SW fish from North America and non-maturing 1SW fish from Southern NEAC), NASCO has adopted a risk level of 75%. ICES applies the same level of risk aversion for catch advice for homewater fisheries on the North American stock complex.

For the assessment of the status of stocks and advice on management in homewater fisheries in the NEAC area, ICES requires that the lower bound of the 95% confidence interval of the current estimate of spawners is above the CL. This is more risk averse than the NASCO criterion for advice on West Greenland.

For national components and geographical groupings of the stock complexes and individual stocks, the conservation limits have the same biological basis. Because it is not possible to estimate confidence intervals for returns to many rivers, ICES can only compare the point estimates (average or mean) of returns to the CL. Therefore these comparisons cannot be interpreted as an evaluation of the status of stocks relative to precautionary reference points.

Management targets have not yet been defined for North Atlantic salmon stocks. When these have been defined they will play an important role in ICES advice. It should be noted that target reference points once developed, should be higher than the precautionary reference points.

2 ATLANTIC SALMON IN THE NORTH ATLANTIC AREA

2.1 Catches of North Atlantic Salmon

2.1.1 Nominal catches of salmon

Nominal catches of salmon reported for each salmon-producing country in the North Atlantic are given in Table 2.1.1.1 for the years 1960 to 2003. These catches (in tonnes) are illustrated in Figure 2.1.1.1 for four North Atlantic regions. Catch statistics in the North Atlantic also include fish farm escapees and, in some northeast Atlantic countries, also ranched fish. Reported catches for the three NASCO Commission Areas for 1995-2003 are provided below.

Area	1995	1996	1997	1998	1999	2000	2001	2002	2003
NEAC	3282	2751	2074	2226	2073	2736	2876	2479	2315
NAC	261	294	231	159	154	155	150	152	137
WGC	85	92	59	11	19	21	43	9	9
Total	3628	3136	2364	2397	2246	2913	3069	2640	2461

The catch data for 2003 are provisional, but the total nominal catch of 2461 t is amongst the lowest on record. Catches for most countries were below the recent 5- and 10-year averages, and in three countries were the lowest in the time-series. The short-term data should be taken in the context of the overall time-series of catch data shown in Table 2.1.1.1.

The nominal catch (in tonnes) of wild fish in 2003 was partitioned according to whether the catch was taken in coastal, estuarine, or riverine fisheries. These are shown below for the NEAC and NAC Commission Areas. It was not possible to apportion the small French or Danish catches in 2003 and these have been excluded from the calculation. The percentages accounted for by each fishery varied considerably between countries. In total, however, coastal fisheries accounted for 53% of catches in North East Atlantic countries compared to 12% in North America, whereas in-river fisheries took 39% of catches in North East Atlantic countries compared to 70% in North America. The percentage of the catch taken in coastal fisheries in the Southern part of the NEAC area has increased over recent years, despite reductions in catches and fishing effort. This is believed to reflect the large increase in catch-and-release in rod fisheries.

Area	Coast		Estuary		River		Total
	Weight	%	Weight	%	Weight	%	Weight
NEAC	1214	53	171	8	887	39	2272
NAC	17	12	24	18	96	70	137

2.1.2 Catch and release

Catch and release data have been provided since the early 1990s by 6 countries. In 2003, the percentage of the total rod catch that was released ranged from 16% in Iceland to 81% in Russia. Catch and release rates generally indicate an increasing trend over the last decade and the values reported in 2003 are among the highest in each time-series. Overall, about 127 000 salmon were reported to have been released in 2003.

2.1.3 Unreported catches of salmon

The estimated unreported catch within the NASCO Commission Areas in 2003 was 847 t (Table 2.1.1.1), or 26 % of the total catch (reported and unreported). Unreported catch has comprised a reasonably consistent percentage of the total catch since 1987, but has declined over the past five years. The introduction of carcass tagging programmes in Ireland and UK (N. Ireland) in the last two years is expected to lead to reductions in unreported catches in these countries. After 1994 there are no available data on the extent of possible salmon catches in international waters. Limited surveillance flights, which were the basis of past estimates of catches in international waters, have not reported any such salmon fishing in recent years. Estimates (in tonnes) of unreported catches for the three Commission Areas for the period 1995–2003 are given below:

Area	1995	1996	1997	1998	1999	2000	2001	2002	2003
NEAC	942	947	732	1108	887	1135	1089	946	719
NAC	98	156	90	91	133	124	81	83	118
WGC	20	20	5	11	13	10	10	10	10
Int'l. waters	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Expressed as a percentage of the total North Atlantic catch, national unreported catch estimates range from 0% to 13%. However, it should be noted that methods of estimating unreported catch vary both within and among countries. The non-reporting rates range from 1% to 54% of the total national catch in individual countries. An allowance for unreported catch is included in the assessments and catch advice for each Commission area.

2.2 Production of farmed and ranched salmon

The production of farmed Atlantic salmon in the North Atlantic area was 761 752 t in 2003, a 5% increase over 2002 (726 210 t), but 16% above the average of the past five years. Most of the production in the North Atlantic took place in Norway (61%) and Scotland (23%). Production increased over previous years in most countries; in relation to the average of the past five years reported increases ranged from 9% in Norway to 46% in Canada. However, in relation to 2002 production fell a little in the USA and by around a quarter in Ireland.

In 2002, world-wide production of farmed Atlantic salmon topped one million tonnes for the first time. Total production increased further in 2003 and is provisionally estimated at over 1.1 million tonnes, an increase of 2% compared with 2002 (Figure 2.2.1). Production outside the North Atlantic area rose sharply in 2002, but fell a little in 2003 to 350 000 t; Chile was the biggest producer, accounting for 261 000 t. Overall, world-wide production of farmed Atlantic salmon in 2003 exceeded the reported nominal catch of Atlantic salmon in the North Atlantic by over 450 times. As a result, farmed salmon dominate world markets.

Catches of ranched salmon have declined substantially from a high of over 500 t in 1993 to around 12 t in 2003 (Figure 2.2.2). This is due mainly to the cessation of salmon ranching in Iceland from 1999.

2.3 Significant developments towards the management of North Atlantic salmon

2.3.1 Update on the estimation of natural mortality at sea of Atlantic salmon

In 2002 and 2003, ICES reviewed theoretical and empirical methods for estimating natural mortality M for Atlantic salmon. The "inverse weight" method considers that mortality at sea is primarily determined by weight (or size) and the integral over time can be calculated if the growth function over time can be defined. An alternative maturity "schedule method" does not describe any time function for mortality other than at the end points defined by 1SW and 2SW life stages and hence can be applied to stocks which mature at sea at two or more different ages. The analysis of the river-specific growth data concluded that a linear function effectively characterized the observed weights-at-age in the marine phase. This lead to the conclusion that monthly mortality in the second year at sea was greater than 1% and distributed around 3%, at least for the wild fish. There were important differences among stocks and even regions which were not accounted for in the generalization over the entire NEAC and NAC areas. After reviews of natural mortality estimates by ICES in 2002, the value of M used in run-reconstruction was changed from 0.01 to 0.03 per month in the second year at sea.

In 2004, ICES showed that there were large differences in the mortality rates estimated using the inverse-weight method and the maturity schedule method, in some cases by as much as seven times (R. Scorff, France, Figure 2.3.1.1). The maturity schedule method estimates were always greater than those from the inverse-weight method although the latter estimates were less variable when estimated for comparable stocks and time periods (Figure 2.3.1.1). In one river, (de la Trinite, Canada), the inverse weight method failed to characterize the apparent average decrease in mortality associated with the closure of coastal interceptory fisheries in the 1990s (Figure 2.3.1.2). It was noted, however that in several situations, the maturity schedule estimates were biologically unfeasible with survival values greater than one. This was considered to be the result of violations of the assumptions of the model.

These further analyses of datasets from European and N. American rivers using maturity schedule and inverse weight methods, supported the previous change in M from 0.01 to 0.03 M per month.

2.3.2 Alternative approach to setting Conservation Limits in Ireland

The analysis of stock and recruitment (SR) data is the most widely used approach for deriving Biological Reference Points (BRPs) for salmon populations. In order to provide catch advice based on BRPs for the 17 individual fishery districts in Ireland, it is necessary to calculate both the Pre-fishery abundance (PFA) and CLs for each district. The models used to estimate the PFA of salmon from countries in the NEAC area employ a run-reconstruction approach. The main inputs required for these models are the catch of salmon, the unreported catch, and the exploitation rate. Estimates of spawning stocks in each district are derived as model outputs. The lagged egg (i.e. total egg production of a spawning cohort) estimates derived from these spawners provide a measure of the relative spawning level which gave rise to the recruitment estimates expressed above as the PFA. These data can then be plotted to provide a "pseudo" stock recruitment (PSR) relationship and a number of BRPs can be derived.

While the conservation limits generated from such PSR models are derived from the stock and recruitment data for each district, they are "pseudo" because they relate to geographic entities (i.e. the number of fish returning to that district) rather than true biological stocks. They are further complicated by the mixed stock nature of the fisheries in these districts. More recently, therefore, Bayesian hierarchical modeling of stock-recruitment (SR) relationships has been applied to estimate BRPs for European Atlantic salmon stocks. The Bayesian analysis of this hierarchical model has been developed using a set of 13 stock and recruitment data series from monitored salmon rivers located in the Northeast Atlantic (Crozier *et al.,* 2003). The parameters of the Ricker function are assumed to be different between rivers, but drawn from a common probability distribution depending on two primary covariates, river size and river latitude. SR parameters and their associated BRPs can thus be derived for rivers with no SR data provided information is available on wetted area and latitude.

Despite the two different approaches used, estimates of a national CL based on the PFA/PSR approach (209 000 1SW salmon) would not differ greatly from the equivalent value using the BHSRA/Wetted Area approach (198 000 1SW salmon). This tends to support the contention that the PSR models are robust for National CL estimation as all spawning stocks are included.

Catch advice and Total Allowable Catch (TAC) for Irish salmon fisheries are expressed in terms of numbers of adult 1SW salmon. Multi-sea winter (MSW) salmon are not included in the catch advice, principally because they are not exposed to a significant commercial fishery, angling pressure has been reduced and these fish represent less than 10% of the total population. The status of the 1SW district stocks in 2003, relative to their attainment of BHSRA/Wetted Area CLs, indicated that 6 of the 17 fisheries districts in Ireland were meeting their conservation limits, 6 were over 50% of CL, while the remaining districts fall as low as 15% of CL. The national 1SW stock was slightly above CL in 2003 despite being below for 4 of the previous 7 years.

The derivation of CL probability distributions by the BHSRA/Wetted Area approach is an improvement on the point estimates of district CLs obtained from the PFA/PSR catch-based models, as it accounts for the uncertainty associated with the mixed stock nature of the district fisheries. It also allows for a more in-depth appraisal of the underlying biology of the individual stocks in relation to the productive capacity of the rivers producing them. These results highlight that some stocks in a complex can be well below their CL even when the complex as a whole appears to be at or above CL.

2.3.3 Examining the effects of reductions in fisheries on repeat spawning in Atlantic salmon stocks and implication for management advice

In 2003, ICES considered repeat spawning in the Mirimichi River in Canada, subsequent to and in apparent response to reductions in marine fisheries. In 2004, ICES examined further datasets in order to establish if this was a widespread phenomenon. The implications of increases in repeat spawners were examined in the context of attainment of CL and provision of catch advice. ICES examined the age structure and characteristics of salmon returning to ten rivers in the North American Commission (NAC) area, and two rivers in the North East Atlantic Commission (NEAC) area, and rivers in France. In many cases, closures of commercial and recreational fisheries and mandatory release of large salmon in recreational fisheries had been instigated. In a number of instances, the relative proportion and the absolute abundance of repeat spawning salmon in the returns of large salmon have increased (Figure 2.3.3.1). The status of populations in monitored rivers in the USA and Canada is assessed by comparing the egg deposition from the estimated spawning escapement with the conservation limits (required number of eggs) established for each river. Repeat spawners are included when calculating the annual egg deposition, and as a result, changes in the number of repeat spawners are included in the assessment of whether conservation limits are being met in these rivers. These observations suggest that higher proportions of repeat spawning fish should increase the probability that conservation limits will be met. ICES notes that there is an apparent increase in repeat spawners consistent with reduced fishing mortality and it will be important to look for their contribution to recruitment in juvenile monitoring programmes. Currently, the catch advice for this stock complex is referenced to the attainment of the 2SW egg requirement as it is only the non-maturing 1SW salmon which is exploited at West Greenland. If increases in repeat spawners translate into increased recruitment production then it will be necessary to evaluate the implications for catch advice.

2.3.4 Long-term projections for stock rebuilding

In 2003, ICES provided information on long-term trajectories for stock rebuilding for specific stocks with different productive capacities and under different conditions of exploitation and starting stock size (relative to CL). The data and analysis indicated that there is an increased probability of not achieving S_{lim} in low productivity rivers when exploitation was increased. Under these conditions recovery was unobtainable in fifty-year projections in a low productivity river, and possibly unobtainable in a moderate productivity river. The analysis suggested that increased caution needs to be taken when allocating catch opportunities to low productivity stocks. It also suggested that current management strategies for mixed stock fisheries are likely to fail to protect "the weakest link", i.e. those stocks that are of low productivity and far below their S_{lim}. Similarly, expected contributions to rebuilding from restocking programmes may also be confounded by prevailing low levels of marine survival, high or variable exploitation rates and even negative interactions between hatchery-reared fish and their wild counterparts.

ICES cautions that the prognosis for the stocks should reflect the evidence of recent declines, that the probability of rebuilding in the short term is low in most areas and that the main result of recent management measures may have been to reduce the rate of decline rather than lead to any significant stock rebuilding.

2.3.4.1 Impact of mixed stock fisheries on stocks with different productivities

The recovery trajectory analyses reported last year were extended, with the river-specific exploitation rates replaced by a total catch applied to three rivers in a mixed stock fishery. The simulations examined the ability to catch fish from high productivity stocks while still rebuilding low productivity stocks in a mixed stock fishery. The potential for extirpation when catch levels were set too high was also investigated.

The additional analyses indicated that the number of years below the conservation limit was always greatest for the low productivity stock, meaning the low productivity stock had the lowest probability of rebuilding at any catch level (Table 2.3.4.1). Conversely, the high productivity stock always had the highest probability of rebuilding, as measured by the lowest number of years below the conservation limit, although high total catches could overfish even this stock. The medium productivity stock showed the greatest change in number of years below the conservation limit as catch was increased when the initial population sizes were set to half of S_{opt}. This occurred even though the medium productivity river contained approximately 60% of the total riverine habitat of the three rivers combined. The medium productivity stock also had the largest confidence intervals generally (Table 2.3.4.1), demonstrating the sensitivity of medium productivity stocks to relatively small changes in total catch when the stocks occur in a mixed stock fishery. Increasing the total catch not only increased the number of years below the conservation limit, but could drive the stocks to extirpation (i.e., remaining below CL for the entire 50-year simulation period was taken here to indicate high risk of extirpation), especially when the initial populations were low.

Stock productivity was the most important factor in determining the ability of a stock to rebuild in a mixed stock fishery. Changing the riverine wetted area so that each river was equal size did not produce a large change in results. Similarly, using three rivers with the same stock productivity but different riverine wetted area also demonstrated the dependence of the results on stock productivity instead of river size.

ICES is satisfied that these approaches are useful in describing theoretical outcomes from general simulation. However, the problems faced in managing mixed stock fisheries currently are more complex than the simple three stock scenario explored with current models, i.e. there are many more stocks and starting conditions (productivity, status with respect to CL and exploitation rates) are poorly known. In order for these approaches to be incorporated into stock-specific catch advice, the theoretical models must include increased complexity and specific applications will require adequate data on stocks and well-defined management objectives. However, ICES considers that these theoretical models are sufficiently well developed to demonstrate the sensitivity of low and medium productivity stock types to over-exploitation in mixed stock fisheries.

2.3.4.2 A Population Viability Analysis of North American and Northeast Atlantic Commission Groups

Population Viability Analysis (PVA) is an established analytical tool for estimating the risk of extinction to threatened or endangered species. This approach is widely applied in North America to estimate the viability of Pacific salmon with regard to the Endangered Species Listings. ICES applied a PVA (Dennis et al., 1991) to abundance estimates for the North American (NA) and Northeast Atlantic Commission (NEAC) stock complexes. This PVA utilizes past observations of changes in population size to predict future trends. The approach is life history based, and does not include density dependence. For these analyses, the pre-fishery abundance, returns, and spawners were examined and results compared in an attempt to detect the changes due to reductions in fishing in the past.

The methods produce distributions of abundance in the future such that populations with negative growth rates (i.e. are in decline) have a chance of increasing and populations with positive growth rates (i.e. are increasing) may actually decrease. These projected distributions can be used to estimate the probability of population persistence over a given time period. The main assumption with these projections is that the rate of change in the population observed in the past will continue into the future, i.e. that non-stationarity is not an issue.

The time-series examined from both the NAC and NEAC areas showed both positive and negative growth rates, with large variances in general (Table 2.3.4.2). The pre-fishery abundance growth rates were negative for all five groups examined, with the largest declines seen in North America and the NEAC Southern multi-sea-winter series. The spawner growth rates were only negative for the two Southern NEAC groups and positive for the other groups examined. The returns for North America had a negative growth rate as a whole as well as for five of the six regions within North America. Growth rates for returns to the NEAC area were all negative and followed the same patterns as seen in the PFA and spawners.

Projections were conducted using these mean growth rates, associated variances, and initial population sizes (Table 2.3.4.2). The projected median population sizes for 12 years (approximately 3 generation) and 25 years (approximately 6 generations) suggests a significant decline in PFA in North America, which has the largest negative growth rates and smallest current population sizes. Although the relative decline is smaller, there is also a decline in the PFA for Northern NEAC 1SW and MSW stocks, but an increase in the spawners. Declines in both PFA and spawners are indicated for Southern NEAC stocks. Examination of the projected returns to individual areas in North America suggests declines in each stock complex, although the relative size of these declines varies. Reductions in catches to achieve conservation limits appear to have offset reductions in productivity as there is virtually no trend in the spawner time-series. Despite the large variances observed in all stock complexes and the large amount of heterogeneity among rivers within each group, longer-term forecasts suggest that some stocks, particularly individual river stocks, could face extirpation within 50 years.

In order to progress this application, the assumptions of the PVA need to be critically examined and there is a need to understand how the projections are affected by the uncertainty in the parameters. Although this method has not yet been used to provide specific management advice, the potential for extirpations within these time frames is judged to be real.

2.4 Compilation of tag releases and finclip data by ICES Member Countries in 2003

Data on releases of tagged, fin-clipped, and marked salmon in 2003 were provided by the Working Group and are compiled as a separate report. A summary of Atlantic salmon marked in 2003 is given in Table 2.4.1. About 3.9 million salmon were marked in 2003, a decrease from the 4.1 million fish marked in 2002. The Working Group has begun reporting information on the use of data storage tags (DSTs) and acoustic tags. In 2003, 116 DSTs were applied to salmon in the Faroes and more than 500 acoustic tags were used in studies in North America and elsewhere.

ICES noted that a number of commercial fish farms are applying tags to fish placed in sea cages. Two jurisdictions, USA-Maine and Iceland, require that some or all of the sea-cage farmed fish reared in their area be marked. In Maine some producers have opted for a genetic 'marking' procedure. In Iceland, coded wire tags are being applied to about 10% of sea-cage farm produced fish, and are included in the tag compilation.

2.5 Other developments in progress

2.5.1 DNA-based analysis of the composition of the Foyle fishery in Northeast Ireland

Within a mixed stock fishery, the identification of the origin and composition of the exploited salmon is important for responsible management of the shared resource. In the Northern part of Ireland, a significant mixed stock fishery exploits Atlantic salmon populations in the cross-border Foyle and Carlingford catchments, with recent declared catches fluctuating around 25 000–40 000 fish. The fish stocks are believed to mainly originate from rivers in the Foyle catchment, but may include some fish from stocks in neighbouring rivers and districts. A study was therefore carried out in 2003 to analyse the composition of the mixed stock fishery in the Foyle area using genetic techniques.

This investigation was based on analysis of the variability at six micro satellite loci, and two alternative assessment procedures were applied, conditional maximum likelihood estimates (CMLE) and a pseudo-Bayesian analytical procedure.

In order to provide a baseline of potentially contributing stocks, sampling of putative river populations was carried out between 1999 and 2001 at 19 sites throughout the Foyle catchment and in two neighbouring coastal rivers to the East of the Foyle area. During the summer of 2003, 840 samples of commercially-caught adult salmon were taken at Greencastle, the major landing point for commercially-caught salmon in the Foyle area, comprising fish mainly from drift nets in the estuary and near-sea coastal areas. In addition to these samples, 185 wild smolts were sampled from the River Finn in the Foyle system during May 2002.

The pseudo-Bayesian approach produced the most accurate estimate of a known origin sample of River Finn fish (84±8%), compared to CMLE (58±2%). Results of the analysis of the 2003 mixed stock fishery are shown in Figure 2.5.1. It appears that the 2003 fishery comprised mainly Finn fish from the western part of the Foyle system, while the Cappagh Burn was the strongest contributor from the eastern Foyle rivers. Several other rivers in the eastern Foyle contributed at relativity high levels. However, two of the larger rivers appeared not to be contributing significantly to the 2003 fishery. It was further evident that salmon from certain Finn tributaries were virtually absent from the fishery. It was noted that one of these has significant multi-sea-winter spring salmon stocks, and thus would not be expected in the summer grilse fishery. In both analyses, the two rivers from outside the Foyle management area that were included in the baseline (Grillagh and Bush, combined here as North Coast group) were also detected in the fishery, though at a relatively low level (<5%).

Both analyses indicated strong temporal variation in the stock composition in the 2003 fishery. Based on the Bayesian method, it was evident that Finn salmon were present in the fishery at the start of the season, but tailed off significantly towards the end. In contrast, Cappagh Burn fish were more strongly represented at the end of the season, as were Cashel Bridge and River Roe fish, whereas the Owenreagh and Quiggery salmon appeared to be present at higher levels during the middle two weeks of the season. The genetic analysis indicated the presence at low level (<5%) of fish from the two north coast rivers outside the Foyle area (Figure 2.5.1). This was corroborated by tagging, which indicated that R. Bush fish comprised 1.9% of the 2003 Foyle catch.

The contribution of the Foyle rivers and tributaries to the fishery probably reflects the non-homogenous structure of suitable Atlantic salmon habitat within the Foyle area. The patchy distribution leads to certain areas providing the majority of yield to this fishery, while other areas are under-producing salmon relative to their available habitat areas. The significant differences among river stocks in the composition of this fishery could also partly reflect stock differences in timing of spawning runs, which results in uneven representation of the contributing freshwater stocks. Although the sampling carried out here was stratified to cover the whole period of the fishery, differences within the season were very clear and could conceivably arise if certain stocks or stock components were passing through the fishery at different times, or being caught at different locations.

Results of this type of analysis may enable managers to regulate a fishery to achieve conservation in stocks, to ensure fishery sustainability, and to identify where specific action is needed to restore production in vulnerable or under-producing stocks.

2.5.2 Developing models for forecasting salmon pre-fishery abundance at the single-stock/river level

Where catch levels are to be set annually in order to maintain escapement above a pre-determined threshold, a forecast of abundance is needed prior to fishery opening. ICES is investigating two approaches for forecasting PFA before a fishery opens using measures of abundance of the stock available at the time the catch advice is elaborated (e.g. smolt counts) and combined with knowledge about survival to derive an estimate of PFA. This can be addressed through a time invariant model (i.e. the parameters associated to predictors are assumed fixed over time) or alternatively a more flexible dynamic modelling approach which allows parameters to vary over time. For example, smolt counts from several periods together with PFA (calculated from run-reconstruction treatment of catch and exploitation data) could be used to "condition" the models, resulting in forecasts of PFA.

In tests on data from the River Bush (UK, N. Ireland), neither model was able to predict a severe drop in marine survival that occurred between 1996 and 1997. However, the static model did not perform as well as the dynamic one in forecasting PFA for 1998, and produced a particularly poor forecast for 2000, when marine survival dropped further. The dynamic model captured a further drop in 2002 satisfactorily, indicating that it was better able to adapt to the non-stationary time trend in marine survival in this stock, though at a price in terms of precision of the forecast.

Dynamic modelling appears as a valuable option for salmon PFA forecasting, which should be considered more systematically, especially at single-river level, where reliable measures of cohort abundance may be available. This application is being developed to produce pre-season catch forecasts, perhaps leading to catch quotas, which could then be modified in-season, in the light of real-time information on performance of the stock.

2.5.3 Distribution, behavior, and migration of salmon

ICES noted information on research projects designed to provide further information on the distribution and behaviour of salmon. These included sonic tracking of escaped farmed salmon in Maine, USA, and smolt migration / emigration studies in two rivers in Canada and the USA. ICES endorses these types of studies for partitioning marine survival into distinct phases, and also to provide information on behaviour of salmon at sea. ICES also endorsed a recent DST tagging programme in the Norwegian Sea, noting that data generated from recovered DSTs will provide new information on the marine phase of Atlantic salmon and will help with the development of predictive models.

Table 2.1.1.1 **Nominal catch of SALMON by country (in tonnes round fresh weight), 1960-2003. (2003 figures include provisional data).**

	NAC Area			NEAC (N. Area)							NEAC (S. Area)						Faroes & Greenland				Total	Unreported catches	
								Sweden				UK	UK	UK				East	West		Reported		
Year	Canada	USA	St. P&M	Norway	Russia	Iceland		(West)	Den.	Finland	Ireland	(E & W)	(N.Irl.)	(Scotl.)	France	Spain	Faroes	Grld.	Grld.	Other	Nominal	NASCO	International
	(1)		(12)	(2)	(3)	Wild	Ranch				(4,5)		(5,6)			(7)	(8)		(9)	(10)	Catch	Areas	waters (11)
1960	1636	1	-	1659	1100	100		40	-	-	743	283	139	1443	-	33	-	-	60	-	7237	-	-
1961	1583	1	-	1533	790	127		27	-	-	707	232	132	1185	-	20	-	-	127	-	6464	-	-
1962	1719	1	-	1935	710	125		45	-	-	1459	318	356	1738	-	23	-	-	244	-	8673	-	-
1963	1861	1	-	1786	480	145		23	-	-	1458	325	306	1725	-	28	-	-	466	-	8604	-	-
1964	2069	1	-	2147	590	135		36	-	-	1617	307	377	1907	-	34	-	-	1539	-	10759	-	-
1965	2116	1	-	2000	590	133		40	-	-	1457	320	281	1593	-	42	-	-	861	-	9434	-	-
1966	2369	1	-	1791	570	104	2	36	-	-	1238	387	287	1595	-	42	-	-	1370	-	9792	-	-
1967	2863	1	-	1980	883	144	2	25	-	-	1463	420	449	2117	-	43	-	-	1601	-	11991	-	-
1968	2111	1	-	1514	827	161	1	20	-	-	1413	282	312	1578	-	38	5	-	1127	403	9793	-	-
1969	2202	1	-	1383	360	131	2	22	-	-	1730	377	267	1955	-	54	7	-	2210	893	11594	-	-
1970	2323	1	-	1171	448	182	13	20	-	-	1787	527	297	1392	-	45	12	-	2146	922	11286	-	-
1971	1992	1	-	1207	417	196	8	18	-	-	1639	426	234	1421	-	16	-	-	2689	471	10735	-	-
1972	1759	1	-	1578	462	245	5	18	-	32	1804	442	210	1727	34	40	9	-	2113	486	10965	-	-
1973	2434	2.7	-	1726	772	148	8	23	-	50	1930	450	182	2006	12	24	28	-	2341	533	12670	-	-
1974	2539	0.9	-	1633	709	215	10	32	-	76	2128	383	184	1628	13	16	20	-	1917	373	11877	-	-
1975	2485	1.7	-	1537	811	145	21	26	-	76	2216	447	164	1621	25	27	28	-	2030	475	12136	-	-
1976	2506	0.8	2.5	1530	542	216	9	20	-	66	1561	208	113	1019	9	21	40	<1	1175	289	9327	-	-
1977	2545	2.4	-	1488	497	123	7	10	-	59	1372	345	110	1160	19	19	40	6	1420	192	9414	-	-
1978	1545	4.1	-	1050	476	285	6	10	-	37	1230	349	148	1323	20	32	37	8	984	138	7682	-	-
1979	1287	2.5	-	1831	455	219	6	12	-	26	1097	261	99	1076	10	29	119	<0,5	1395	193	8118	-	-
1980	2680	5.5	-	1830	664	241	8	17	-	34	947	360	122	1134	30	47	536	<0,5	1194	277	10127	-	-
1981	2437	6	-	1656	463	147	16	26	-	44	685	493	101	1233	20	25	1025	<0,5	1264	313	9954	-	-
1982	1798	6.4	-	1348	364	130	17	25	-	54	993	286	132	1092	20	10	606	<0,5	1077	437	8395	-	-
1983	1424	1.3	3	1550	507	166	32	28	-	58	1656	429	187	1221	16	23	678	<0,5	310	466	8755	-	-
1984	1112	2.2	3	1623	593	139	20	40	-	46	829	345	78	1013	25	18	628	<0,5	297	101	6912	-	-
1985	1133	2.1	3	1561	659	162	55	45	-	49	1595	361	98	913	22	13	566	7	864	-	8108	-	-
1986	1559	1.9	2.5	1598	608	232	59	54	-	37	1730	430	109	1271	28	27	530	19	960	-	9255	315	-
1987	1784	1.2	2	1385	564	181	40	47	-	49	1239	302	56	922	27	18	576	<0,5	966	-	8159	2788	-
1988	1310	0.9	2	1076	420	217	180	40	-	36	1874	395	114	882	32	18	243	4	893	-	7737	3248	-
1989	1139	1.7	2	905	364	141	136	29	-	52	1079	296	142	895	14	7	364	-	337	-	5904	2277	-
1990	911	2.4	1.9	930	313	146	280	33	13	60	567	338	94	624	15	7	315	-	274	-	4924	1890	180-350

Table 2.1.1.1 continued

Year	NAC Area			NEAC (N. Area)							NEAC (S. Area)						Faroes & Greenland				Total	Unreported catches	
	Canada (1)	USA	St. P&M (12)	Norway (2)	Russia (3)	Iceland Wild	Iceland Ranch	Sweden (West)	Den.	Finland	Ireland (4,5)	UK (E & W)	UK (N.Irl.) (5,6)	UK (Scotl.)	France	Spain (7)	Faroes (8)	East Grld.	West Grld. (9)	Other (10)	Reported Nominal Catch	NASCO Areas	International waters (11)
1991	711	0.8	1.2	876	215	130	345	38	3.3	70	404	200	55	462	13	11	95	4	472	-	4106	1682	25-100
1992	522	0.7	2.3	867	167	175	461	49	10	77	630	171	91	600	20	11	23	5	237	-	4119	1962	25-100
1993	373	0.6	2.9	923	139	160	496	56	9	70	541	248	83	547	16	8	23	-	-	-	3696	1644	25-100
1994	355	0	3.4	996	141	141	308	44	6	49	804	324	91	649	18	10	6	-	-	-	3945	1276	25-100
1995	260	0	0.8	839	128	150	298	37	3.1	48	790	295	83	588	9	9	5	2	83	-	3628	1060	-
1996	292	0	1.6	787	131	122	239	33	1.7	44	685	183	77	427	14	7	-	0.1	92	-	3136	1123	-
1997	229	0	1.5	630	111	106	50	19	1.3	45	570	142	93	296	8	3	-	1	58	-	2364	827	-
1998	157	0	2.3	740	131	130	34	15	1.3	48	624	123	78	283	9	4	6	0	11	-	2397	1210	-
1999	152	0	2.3	811	103	120	26	16	0.5	62	515	150	53	199	11	6	0	0.4	19	-	2246	1032	-
2000	153	0	2.3	1176	124	83	2	33	5.2	95	621	219	78	274	11	7	8	0	21	-	2913	1269	-
2001	148	0	2.2	1267	114	88	0	33	6.4	126	730	184	53	251	11	13	0	0	43	-	3069	1180	-
2002	148	0	3.6	1019	118	97	0	28	5.3	93	682	161	64	191	12	9	0	0	9	-	2640	1039	-
2003	137	0	-	1071	107	108	0	18	3.6	76	575	88	48	201	14	6	0	0	9	-	2461	847	-
Average																							
1998-2002	152	0	3	1003	118	104	12	25	4	85	634	167	65	240	11	8	2	0	21	-	2653	1146	-
1993-2002	227	0	2	919	124	120	145	31	4	68	656	203	75	371	12	8	6	0	42	-	3003	1166	-

Key:

1. Includes estimates of some local sales, and, prior to 1984, by-catch.
2. Before 1966, sea trout and sea charr included (5% of total).
3. Figures from 1991 to 2000 do not include catches taken in the recently developed recreational (rod) fishery.
4. From 1994, includes increased reporting of rod catches.
5. Catch on River Foyle allocated 50% Ireland and 50% N. Ireland.
6. Not including angling catch (mainly 1SW).
7. Weights estimated from mean weight of fish caught in Asturias (80-90% of Spanish catch).
8. Between 1991 & 1999, there was only a research fishery at Faroes. In 1997 & 1999 no fishery took place, the commercial fishery resumed in 2000, but has not operated in 2001, 2002 or 2003.
9. Includes catches made in the West Greenland area by Norway, Faroes, Sweden and Denmark in 1965-1975.
10. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.
11. Estimates refer to season ending in given year.
12. No data available for 2003.

Figure 2.3.4.1 Median number of years below the conservation limit for three rivers with low, medium, and high productivity and two levels of initial population abundance.

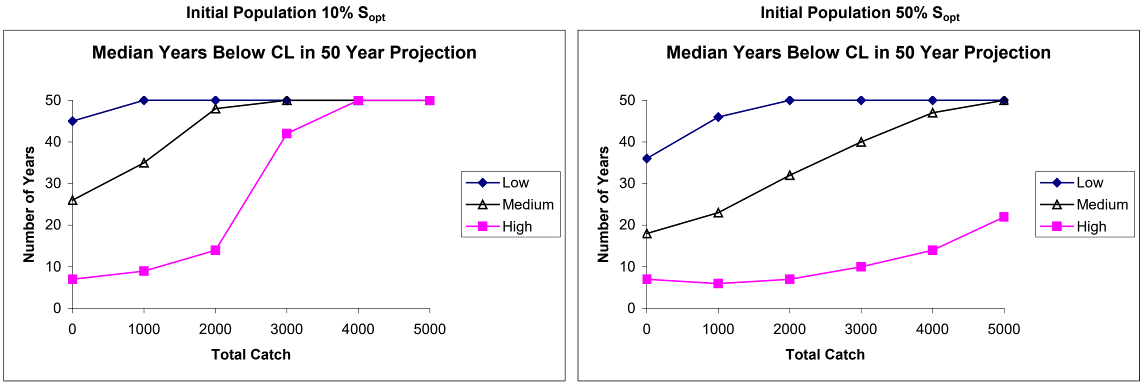


Table 2.3.4.2.. Mean and variance of population growth rates for three life stages examined for North America and Northeast Atlantic Commission groups. Also shown are the range of initial population sizes used in projections (minimum, maximum, and midpoint) and the median number of fish projected 12 and 25 years into the future for each group.

		Population	**Growth Rates**	**Initial Population Sizes**[1]			**Median No. Fish**	
Life Stage	Stock Complex	Mean	Variance	Min	Max	Midpoint	Year 12	Year 25
PFA	North America	-8.7%	0.090	54,615	111,372	82,994	28,631	9,351
PFA	NEAC North 1SW	-1.2%	0.038	643,937	810,018	726,977	626,602	541,306
PFA	NEAC North MSW	-1.0%	0.029	837,210	1,043,488	940,349	828,117	729,083
PFA	NEAC South 1SW	-2.8%	0.069	944,469	1,343,715	1,144,092	810,557	557,967
PFA	NEAC South MSW	-5.1%	0.047	466,833	627,045	546,939	295,088	152,749
Spawners	North America	1.3%	0.144	46,895	91,483	69,189	79,656	91,452
Spawners	NEAC North 1SW	1.4%	0.036	211,255	326,869	269,062	315,918	374,660
Spawners	NEAC North MSW	3.4%	0.037	174,033	273,577	223,805	334,064	527,200
Spawners	NEAC South 1SW	-1.3%	0.090	398,093	693,480	545,786	463,621	397,852
Spawners	NEAC South MSW	-2.0%	0.058	206,253	309,195	257,724	201,276	156,987
Returns	Labrador	-2.0%	0.204	8,133	9,691	8,912	6,884	5,397
Returns	Newfoundland	0.2%	0.218	2,054	10,078	6,066	5,841	6,044
Returns	Quebec	-2.1%	0.060	18,700	26,108	22,404	17,395	12,907
Returns	Gulf	-3.7%	0.295	6,950	17,042	11,996	7,323	4,573
Returns	Scotia-Fundy	-6.6%	0.198	1,399	2,141	1,770	809	335
Returns	USA	-0.8%	0.265	511	511	511	464	423
Returns	Whole NA	-2.7%	0.096	37,747	65,571	51,659	36,980	25,955

[1] Projections begin in 2001 for PFA and Spawners and begin in 2002 for Returns

Table 2.4.1. Summary of Atlantic salmon tagged and marked in 2003. 'Hatchery' and 'Wild' refer to smolts or parr; 'Adult' refers to wild and hatchery fish. Data from France were not available. Fish were not tagged in Finland or Denmark. PIT tags were not included.

		Primary Tag or Mark			
Country	Origin	Microtag	External mark	Adipose clip	Total
Canada	Hatchery	0	31,048	2,014,223	2,045,271
	Wild	651	29,167	0	29,818
	Adult	0	6,388	0	6,388
	Total	651	66,603	2,014,223	2,081,477
	NB: Wild/Microtag fish had secondary adipose clip				
Iceland	Hatchery	239,879	290	0	240,169
	Wild	4,364	0	0	4,364
	Adult	0	608	0	608
	Total	244,243	898	0	245,141
Ireland	Hatchery	310,323	0	0	310,323
	Wild	8,063	0	0	8,063
	Adult	0	0	0	0
	Total	318,386	0	0	318,386
Norway	Hatchery	0	47,934	0	47,934
	Wild	0	2,887	0	2,887
	Adult	0	680	0	680
	Total	0	51,501	0	51,501
Russia	Hatchery	0	0	287,200	287,200
	Wild	0	0	0	0
	Adult	0	2,218	0	2,218
	Total	0	2,218	287,200	289,418
Spain	Hatchery	10,676	0	231,703	242,379
	Wild	0	0	0	0
	Adult	0	0	0	0
	Total	10,676	0	231,703	242,379
Sweden	Hatchery	0	4,000	20,580	24,580
	Wild	0	447	0	447
	Adult	0	0	0	0
	Total	0	4,447	20,580	25,027
UK (England & Wales)	Hatchery	59,840	17,920	50,750	128,510
	Wild	6,239	0	1,595	7,834
	Adult	0	2,185	0	2,185
	Total	66,079	20,105	52,345	138,529
UK (N. Ireland)	Hatchery	17,526	0	3,472	20,998
	Wild	2,507	0	0	2,507
	Adult	0	0	0	0
	Total	20,033	0	3,472	23,505
UK (Scotland)	Hatchery	7,500	0	0	7,500
	Wild	5,013	3,296	2,184	10,493
	Adult	0	737	0	737
	Total	12,513	4,033	2,184	18,730
USA	Hatchery	0	356,737	138,329	495,066
	Wild	0	2,301	410	2,711
	Adult	0	1,466	3,623	5,089
	Total	0	360,504	142,362	502,866
All Countries	Hatchery	645,744	457,929	2,746,257	3,849,930
	Wild	26,837	38,098	4,189	69,124
	Adult	0	14,282	3,623	17,905
	Total	672,581	510,309	2,754,069	3,936,959

Figure 2.1.1.1 Nominal catches of salmon in four North Atlantic regions, 1960-2003

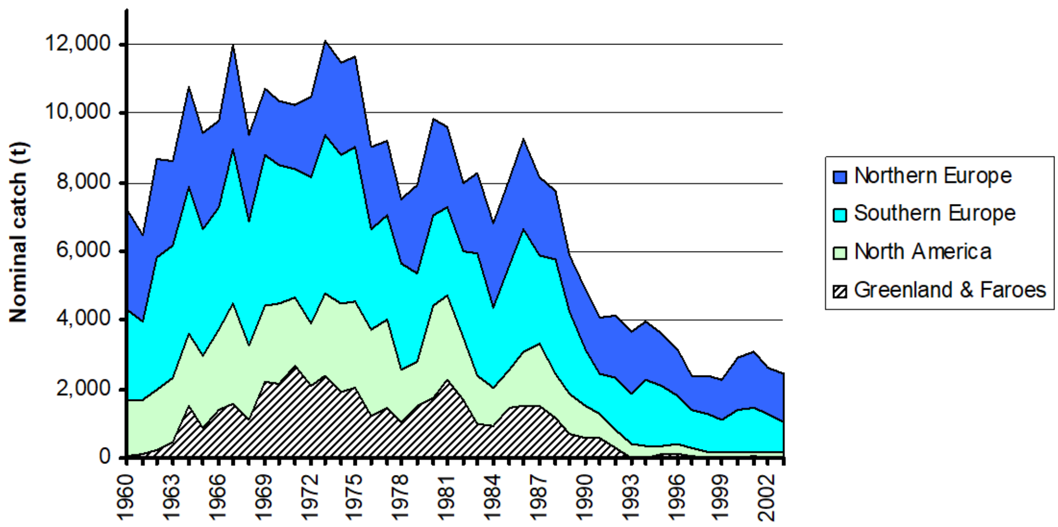


Figure 2.2.1. World-wide farmed Atlantic salmon production, 1980-2003.

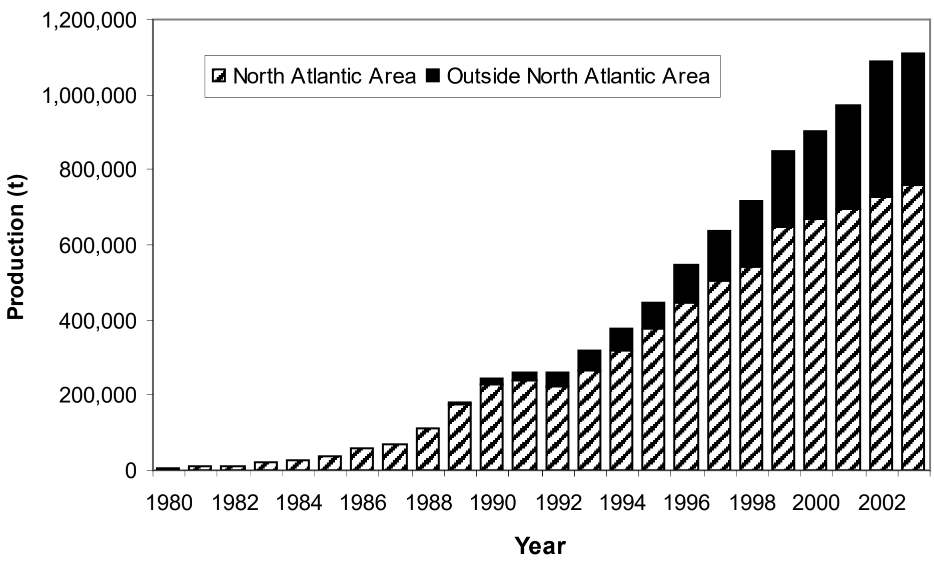


Figure 2.2.2. Production of ranched salmon (tonnes round fresh weight) as harvested at ranching facilities in the North Atlantic, 1980-2003.

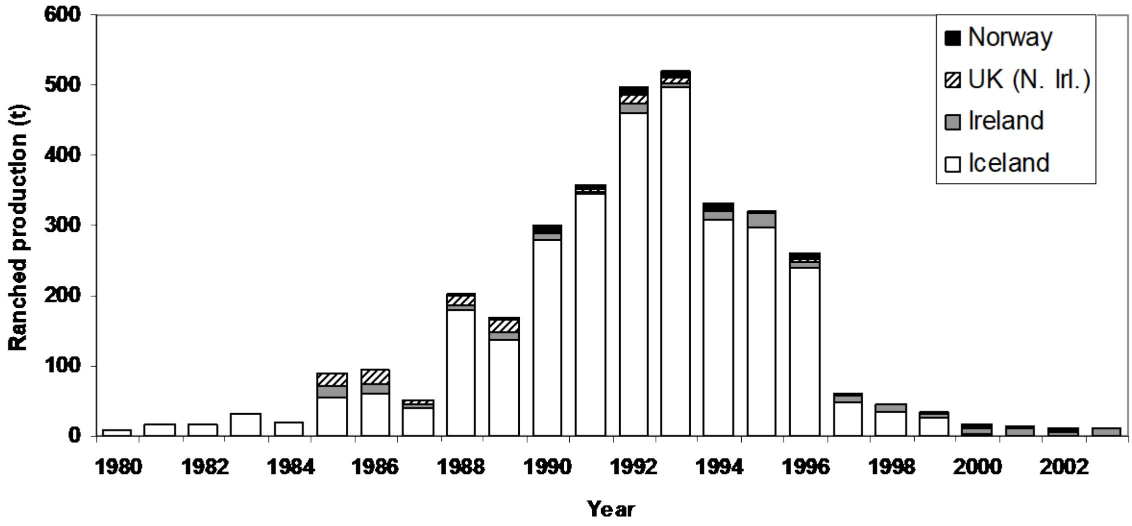


Figure 2.3.1.1 A comparison of the estimates of the mortality by month in the second year at sea for five rivers from the NEAC and NAC areas using the inverse weight and the maturity schedule methods. The symbols represent the median and the vertical bar the minimum and maximum values for at least five annual estimates.

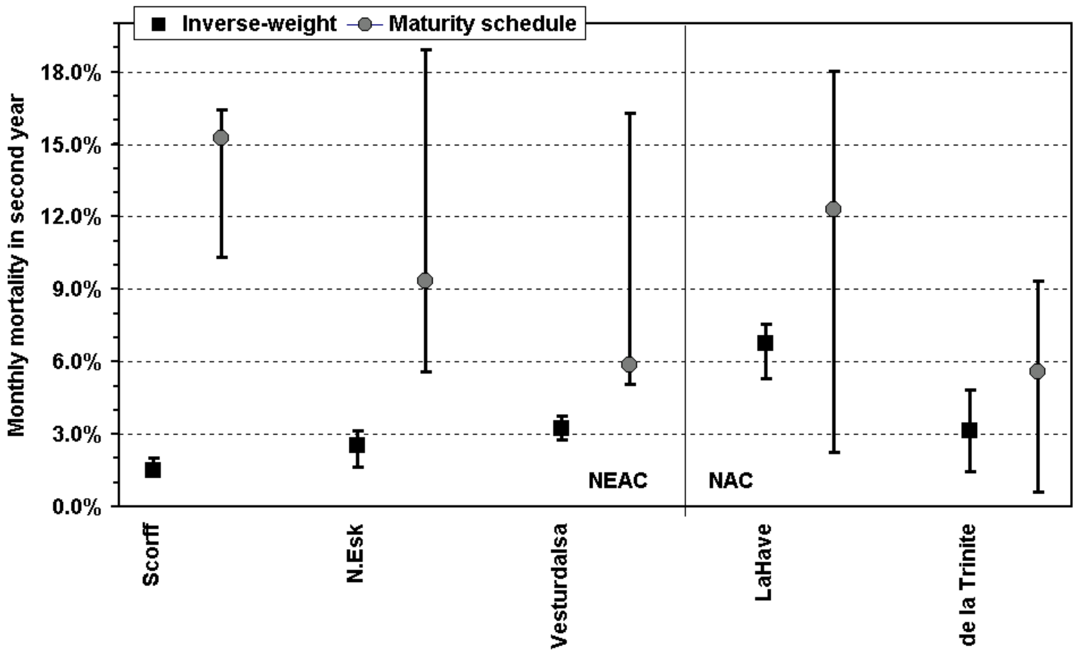


Figure 2.3.1.2. Monthly mortality rate in the second year at sea for salmon from de la Trinite River stock as estimated from the maturity schedule method and the inverse weight method (assuming linear growth function).

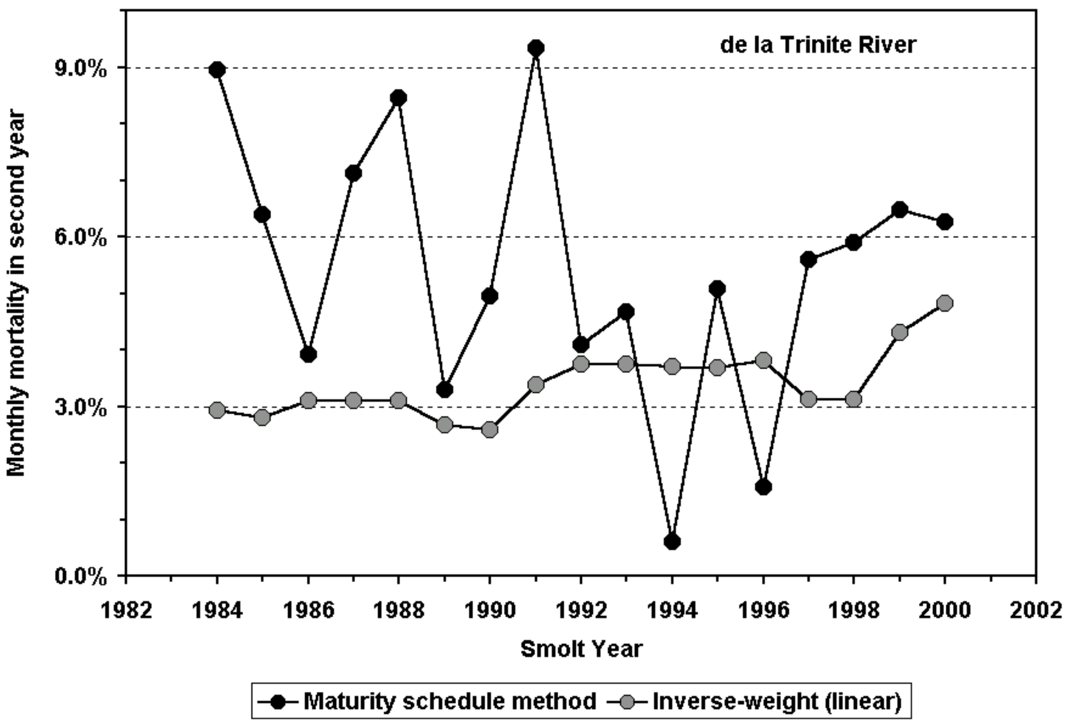


Figure 2.3.3.1. Proportions of repeat spawning salmon in the returns to two rivers in the NEAC area (top), five rivers in the mid (middle), and five rivers in the Southern (bottom) NAC area.

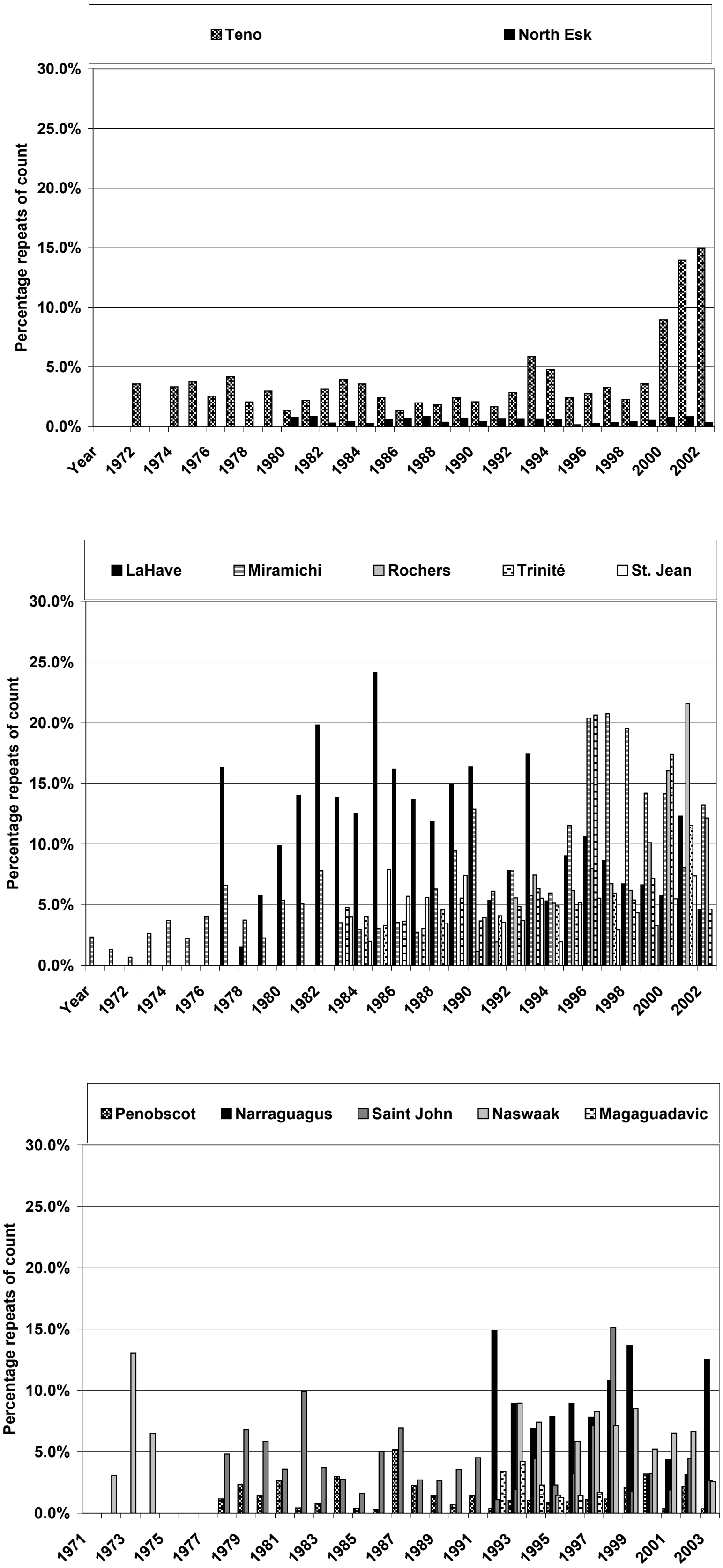


Figure 2.3.4.1. Changes in equilibrium population size in a hypothetical salmon population (similar to the LaHave River, Nova Scotia) in the absence of fishing (2) and fished at MSY (1) under two repeat spawning scenarios. The left plot assumes post-spawning mortality of 50% annually up to 6 spawnings. The right plot shows the equilibrium points in the absence of any repeat spawning. The SR data are from the LaHave River, but the remaining dynamics are hypothetical.

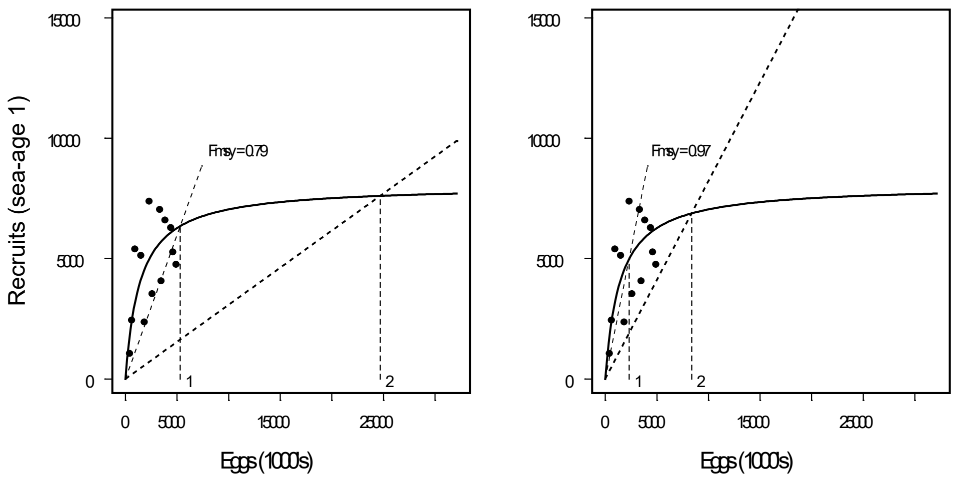
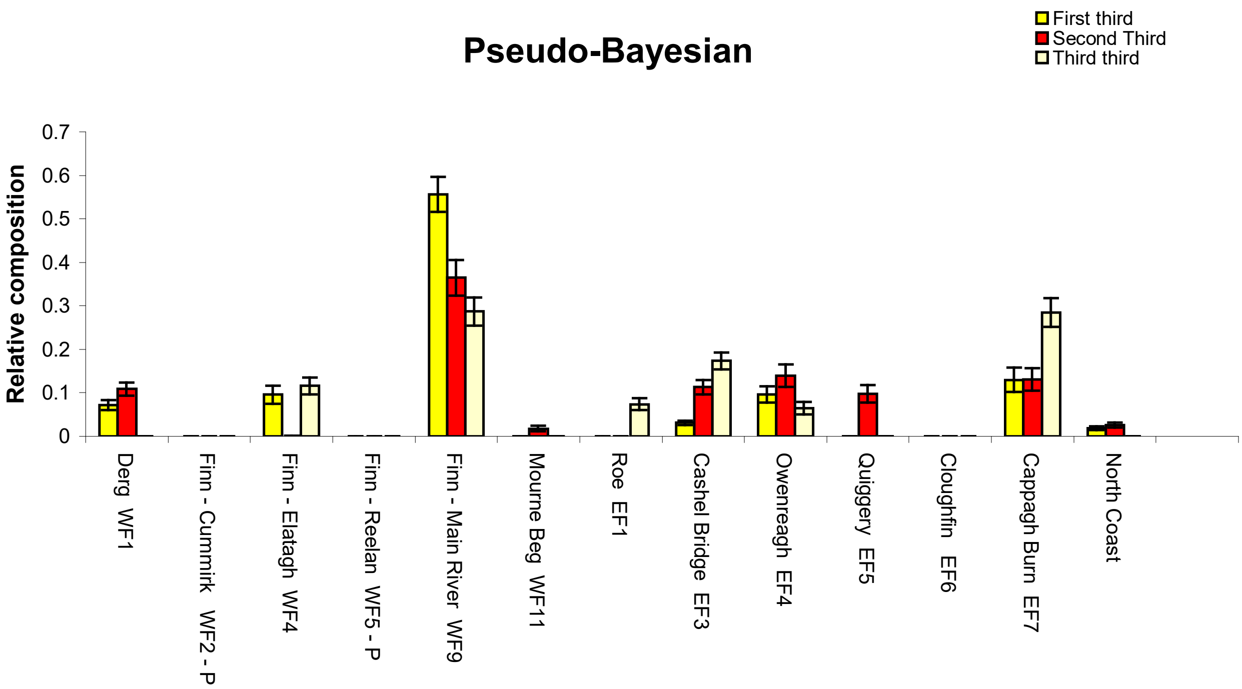
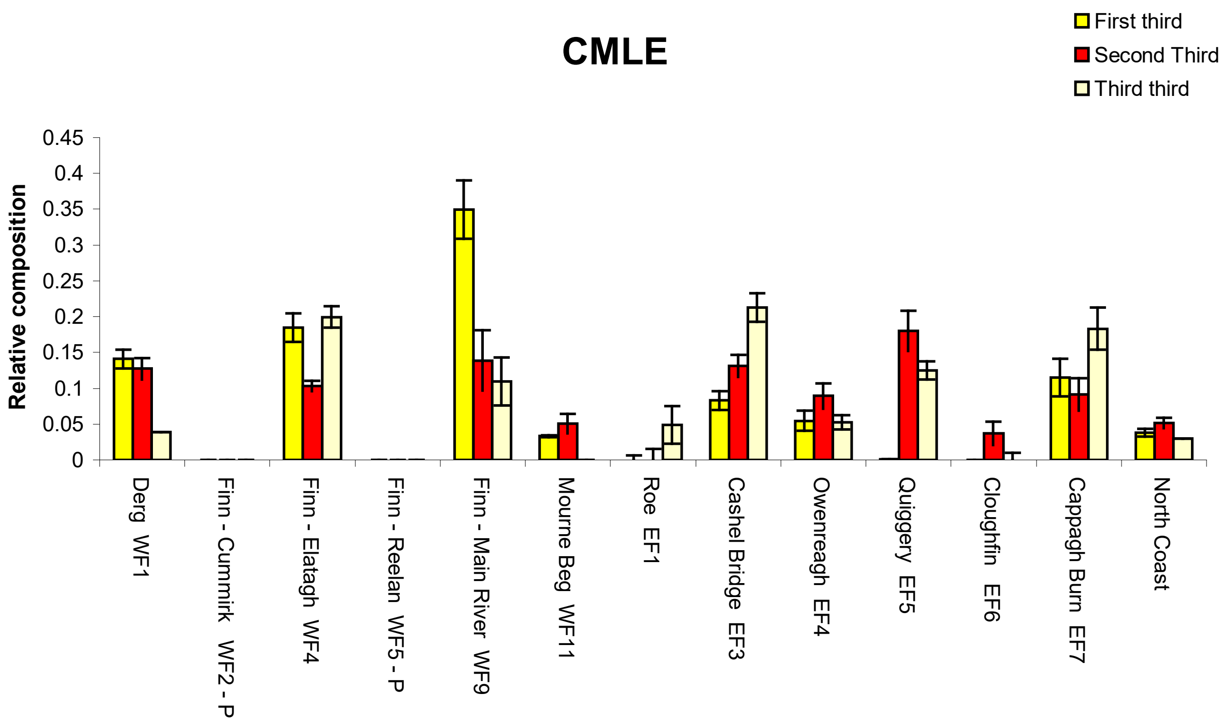


Figure 2.5.1. Estimated composition of the Foyle mixed stock salmon fishery in 2003, based on two mixture analysis techniques.





6. NASCO has requested ICES to identify relevent data deficiencies, monitoring needs and research requirements, taking into account NASCO's international atlantic salmon research board's inventory of on-going research relating to salmon mortality in the sea

6.1 Data deficiencies and research needs

Recommendations from Section 2 – Atlantic salmon in the North Atlantic Area:

1. Given the importance of M in the provision of catch advice and in the understanding of the dynamics of Atlantic salmon in the ocean, and in order to refine the assessment of M with the maturity schedule method, hatchery stocking programs should attempt to confirm the sex ratio of the released smolts.

2. ICES recommends that in regions where fishery closures have not resulted in stock rebuilding, that urgent research work be undertaken to forecast population viability, to determine the cause or causes of declines, and that activities be implemented to reverse declining population trends.

3. A coordinated tagging study should be designed and carried out to give information on migration, distribution, survival, and growth of escaped farmed salmon from the NEAC countries.

4. Further basic research is needed on the spatial and temporal distribution of salmon and their predators at sea to assist in explaining variability in survival rates.

ANNEX 12

Council

CNL(04)10

Catch Statistics - Returns by the Parties

CNL(04)10

Catch Statistics - Returns by the Parties

1. The Official Catch Statistics, as submitted by the Parties, are tabulated overleaf (Table 1). The figures for 2003 are provisional. These catch statistics, which have been rounded to the nearest tonne, will be used to calculate the contributions to NASCO for 2005 and the adjustment to the 2004 contributions (in the light of the confirmed 2002 catches) unless the Secretary is advised otherwise.

2. Under Article 12 of the Convention, the Secretary shall compile and disseminate statistics and reports concerning the salmon stocks subject to the Convention. Table 2 presents catch statistics for the period 1960-2003 by Party to the NASCO Convention.

3. Tables 1 and 2 are set out in the format for the presentation of catch statistics which was agreed by the Council at its Fifth Annual Meeting. A further, more detailed, record of catch statistics during the period 1960-2003 is provided, for information only, in paper CNL(04)11.

4. For the 2003 catch data, the discrepancy in the combined statistics for the North Atlantic region provided to NASCO by the Contracting Parties (2,471 tonnes) and those provided by ICES (2,462 tonnes) is 9 tonnes, and is due to the inclusion of the catch by rod and line in the information for Northern Ireland provided to NASCO. This information was not available at the time of the ICES Working Group on North Atlantic Salmon meeting.

5. The total provisional declared catch in 2003 by NASCO Parties is approximately 6% lower than the confirmed catch in 2002, is the fourth-lowest catch in the period of record, being higher than the catches in each of the three years 1996-1998. There have been major reductions in fishing effort all around the North Atlantic. In addition, catch and release of wild salmon is becoming increasingly significant but these "catches" are not included in these statistics (see CNL(04)21). Catches do not necessarily, therefore, reflect abundance. A report on the status of the stocks in 2003 is contained in the ACFM report from ICES (document CNL(04)9).

Secretary
Edinburgh
11 May, 2004

Table 1: Official Catch Statistics

	Provisional 2003 Catch (Tonnes)	Provisional 2003 Catch according to Sea Age						Confirmed 2002 Catch (Tonnes)
		1SW		MSW		Total		
		No	Wt	No	Wt	No	Wt	
Canada *	137	44,426	77	11,171	60	55,597	137	148
Denmark (in respect of Faroe Islands and Greenland)	9	-	-	-	-	-	-	9
Faroe Islands	0	-	-	-	-	-	-	0
Greenland	9	-	-	-	-	-	-	9
European Union**	1,039	-	-	-	-	-	-	1,245
Iceland	108	-	-	-	-	-	-	97
Norway	1,071	185,574	363.2	119,092	707.9	304,666	1,071.1	1,019
Russian Federation	107	22,014	49.8	10,765	57.4	32,779	107.2	118
United States of America	0	-	-	-	-	-	-	0

* The breakdown of the Canadian catch is into the categories small (shown under 1SW) and large (shown under MSW) salmon.
** Breakdown of the catch by number and weight according to sea age is available for some EU Member States.

Table 2: Catches of Atlantic Salmon by the Parties to the NASCO Convention

	Canada	Denmark (Faroe Islands and Greenland)	European Union	Finland	Iceland	Norway	Russian Federation	Sweden	USA
1960	1636	60	2641		100	1576	1100	40	1
1961	1583	127	2276		127	1456	790	27	1
1962	1719	244	3894		125	1838	710	45	1
1963	1861	466	3842		145	1697	480	23	1
1964	2069	1539	4242		135	2040	590	36	1
1965	2116	861	3693		133	1900	590	40	1
1966	2369	1338	3549		106	1823	570	36	1
1967	2863	1600	4492		146	2058	883	25	1
1968	2111	1167	3623		162	1752	827	150	1
1969	2202	2350	4407		133	2083	360	76	1
1970	2323	2354	4069		195	1861	448	52	1
1971	1992	2511	3745		204	1847	417	35	1
1972	1759	2146	4261	32	250	1986	462	38	1
1973	2434	2402	4604	50	156	2126	772	73	3
1974	2539	1945	4432	76	225	1973	709	57	1
1975	2485	2086	4500	76	166	1754	811	56	2
1976	2506	1479	2931	66	225	1530	542	45	1
1977	2545	1652	3025	59	130	1488	497	10	2
1978	1545	1159	3102	37	291	1050	476	10	4
1979	1287	1694	2572	26	225	1831	455	12	3
1980	2680	2052	2640	34	249	1830	664	17	6
1981	2437	2602	2557	44	163	1656	463	26	6
1982	1798	2350	2533	83	147	1348	364	25	6
1983	1424	1433	3532	79	198	1550	507	28	1
1984	1112	997	2308	75	159	1623	593	40	2
1985	1133	1430	3002	49	217	1561	659	45	2
1986	1559	1490	3524	38	330	1597	608	53	2
1987	1784	1539	2593	49	250	1385	559	47	1
1988	1311	1136	2833	34	412	1076	419	40	1
1989	1139	701	2450	52	277	905	359	29	2
1990	912	542	1645	59	426	930	316	33	2
1991	711	533	1139	69	505	877	215	38	1
1992	520	260	1506	77	636	867	166	49	1
1993	373	35	1483	70	656	923	140	56	1
1994	355	18	1919	48	448	996	141	44	0
1995	259	86	1852	-	439	839	130	-	0
1996	290	92	1474	-	358	787	131	-	0
1997	229	59	1179	-	154	630	111	-	0
1998	157	17	1183	-	164	740	130	-	0
1999	152	19	1016	-	147	811	102	-	0
2000	153	29	1336	-	85	1176	124	-	0
2001	148	42	1407	-	88	1267	114	-	0
2002	148	9	1245	-	97	1019	118	-	0
2003	137	9	1039	-	108	1071	107	-	0

NOTES: 1. The European Union catch from 1995 includes the catches by Finland and Sweden.

2. The catch for Denmark (in respect of the Faroe Islands and Greenland) includes the catch for Greenland when it was a member of the European Union and the catches up to 1983 by Denmark.

3. Figures from 1986 are the official catch returns to NASCO. Figures to 1986 are based on data contained in the ICES Working Group Reports.

4. The Faroese fishery was subject to compensation arrangements in the period 1991-1998. The West Greenland fishery was subject to compensation arrangements in 1993, 1994, 2002 and 2003.

ANNEX 13

Council

CNL(04)12

Report of the Third Meeting of the International Atlantic Salmon Research Board

CNL(04)12

Report of the Third Meeting of the International Atlantic Salmon Research Board

7 June 2004, Radisson SAS Saga Hotel, Reykjavik, Iceland

1. Opening of the meeting

1.1 The Chairman, Mr Jacque Robichaud, opened the meeting and welcomed Members of the Board, their scientific advisers and the representative of the accredited NGOs, Mr Chris Poupard, to Reykjavik.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the agenda

2.1 The Board adopted its agenda, ICR(04)5 (Annex 2).

3. Inventory of Research

3.1 At its inaugural meeting the Board had developed an inventory of research related to salmon mortality at sea, CNL(01)21, which had been updated in 2003, ICR(03)3, and again in 2004, ICR(04)3. A summary of the most recently updated inventory had been made available to the ICES Working Group on North Atlantic Salmon for information purposes so as to assist it in identifying data deficiencies and research needs. This inventory had also been made available to the Board's Scientific Advisory Group (SAG) to assist it in identifying gaps in research and research priorities and to develop recommendations for enhanced coordination of existing research (see section 4 below).

3.2 The updated inventory includes a total of 43 projects with six projects having been completed since the last update and six new projects included. The new projects included research being undertaken in two EU Member States (France and Denmark) which had not previously provided information to the Board. The representative of the European Union advised the Board that he intended to check at the EU coordination meeting if other Member States (Finland, Germany, Spain, Sweden and Portugal) have relevant research that should also be included in the inventory. The total annual expenditure on the projects included in the inventory amounts to about £4.3 million but no costings were available for 7 of the projects. As requested, the Secretary had asked Members of the Board to provide details of research on salmon at sea being undertaken at universities and other non-governmental institutions for inclusion in the updated inventory. Of the new projects included, one is a collaborative venture between the Canadian government and a non-government organization while the remaining five projects appear to be exclusively government-funded. The SAG had indicated that any major projects in relation to mortality of salmon at sea undertaken by non-government institutions would probably involve collaboration with government scientists, and that Board Members would be aware of these projects.

3.3 The Board recognized that it needed to be able to demonstrate the progress that is being made in relation to advancing understanding of the causes of mortality of salmon at sea. The Board felt that it would be useful if the results of projects that had been completed could be collated so as to provide a status report of current understanding of the causes of mortality of salmon at sea. The Board agreed that completed projects currently annexed to the inventory should be included in the summary table of projects so as to better promote the achievements in research concerning mortality of salmon at sea. Not all of the completed projects presently contained a summary of the main research findings, partly because these may not have been published, but it was agreed that it would be useful if each completed project could contain some outline of the results obtained. A list of publications arising from the study could also be included. Consideration might also be given to developing a brochure about the research that had been undertaken by the Parties and previously included in the inventory and the results obtained. The SAG would be asked to advise the Board on those research projects which it considered have contributed significantly to understanding of the causes of mortality of salmon at sea.

4. Report of the Scientific Advisory Group

4.1 The report of the second meeting of the Board's Scientific Advisory Group (SAG) was presented by its Chairman, Mr David Meerburg (Canada), SAG(04)5 (Annex 3). The Group had reviewed the updated inventory of research and developed recommendations for enhanced coordination of research, reviewed research priorities, considered a progress report on the SALSEA project, considered further the call for research proposals, and made two proposals for workshops.

4.2 The Chairman of the SAG indicated that it would be beneficial to the group's work if each Party could nominate a representative(s) to the SAG. The Board recognized that it was important to have some continuity in the membership of the group and a point of contact for the Chairman. It was agreed that each Member of the Board and the NGO representative should advise the Secretariat of their representative(s). The Board agreed that meetings of the SAG should, wherever possible, be held in conjunction with the Board meetings.

4.3 The SAG had recommended that costing information should be included in Table 2 of the inventory and that a summary table showing costs by research topic area for each Party should be developed. The SAG had also proposed that before the inventory is made available on the Organization's website, the Members of the Board should be given the opportunity to update the information.

4.4 The SAG had previously recommended that the Board could play an important role in enhancing coordination and collaboration among scientists by, for example, facilitating an exchange of scientists or by organizing relevant workshops and symposia. The SAG recommended that a workshop on the development and application of data storage tags and other electronic tags in investigating the distribution and migration of salmon at sea be supported by the Board.

4.5 The SAG noted that to understand the causes of increased marine mortality of salmon at sea, the Board's first research priority should be to investigate the migration and distribution of salmon at sea in relation to feeding opportunities and predation. Studies on by-catch should also be afforded a high priority. The SAG had received a report on the SALSEA project proposal which outlined a major multi-disciplinary programme of research into the mortality of salmon at sea. The SAG recommended that the Board consider supporting the further development of the SALSEA project so as to involve scientists from North America and more widely in Europe. This work might be achieved through a workshop over a period of 5 days, supported by the Board, the costs of which might be in the region of £15,000 - £20,000 if no more than two representatives from each NASCO Party and one representative from the NGOs were funded.

4.6 The Board discussed the possibility of holding both of the workshops proposed by the SAG in the same year. It was recognized that it was important to ensure that the research tools required, such as DSTs, were available for use when funds became available. However, further development of the SALSEA project would be of assistance in fund-raising activities and would provide a menu from which individual research projects could be selected as funds become available. The Board agreed that its first priority would be to hold a workshop to further develop the SALSEA project.

4.7 In the light of the recommendations of the SAG, the Board agreed that:

- Members of the Board should be given the opportunity to update the inventory before 30 June and prior to it being made available on the Board's website;

- details of project costs should be included in Table 2 of the inventory and a table showing project costs by topic area and Party should be developed by the Secretariat;

- e-mail addresses of coordinating scientists should be included in the inventory;

- guidance notes on the information sought from the Parties in updating the inventory should be provided by the Secretariat at the time information to update the inventory is requested;

- it would organize and sponsor a workshop to further develop a major proposal for a programme of research on salmon at sea, drawing on the SALSEA project but involving scientists from North America and more widely in Europe. Dr Ken Whelan and Mr David Meerburg were asked to develop a Plan of Action for the workshop and report back to Members of the Board, if possible within a period of 4-6 weeks. The Board recognized that the DST workshop proposed by the SAG was also important. Technology development could take some time and could delay the implementation of a research programme. The Board agreed that it might be appropriate to invite representatives of electronic tag manufacturers to participate in the workshop to further develop the SALSEA project. This workshop should be held within the next 12 months and preferably this autumn if the funds are available.

5. The search for new funds

5.1 The Secretary advised the Board that at the end of the 2003 financial year the fund amounted to £30,000 following receipt of a contribution from Norway of £10,000 and a contribution from NASCO of £30,000. Approximately £10,000 had been spent. In 2004 a further contribution by NASCO of £18,000 had been made to the fund, which currently stands at about £48,000. The EU indicated that a contribution from the Commission to the fund of Euros 50,000 (about £35,000) had been approved and would be made in the current financial year. The US indicated that there had been some administrative delay in processing the grant of US$150,000 (about £90,000) but that the funds had been approved and reserved but not transferred. Contributions to the fund would also be made by Iceland ($5,000, about £3,000), Canada (Can$5,000, about £2,500) and the Russian Federation ($5,000-$10,000, about £3,000-£6,000). The Chairman noted that in addition to expenditure on the projects in the inventory, some of which had been stimulated as a result of the establishment of the Board, which amount to at least £4.3 million, the Parties had now contributed or pledged an additional £180,000 to the fund. These contributions would assist in seeking funding from private sources. He noted, however, that there are competing demands on available funds and that raising the substantial sums required would be a long-term process.

5.2 The Chairman and Secretary reported on the pilot fund-raising project which had been initiated in the autumn of 2003. Following consultations with the Board's PR advisor, a three-stage approach had been adopted. Firstly, in Norway a patron (Georg Rieber-Mohn) had been appointed and, following consultations with the Head of the Norwegian delegation to NASCO and one of the Norwegian NGOs (Norsk Lakseelver), seven companies (including oil, shipping and hydro-electric companies) had been approached. Only one company had replied, indicating that the Board's request for funding did not fit its current corporate strategy. No response had been received from the other six companies although the Norwegian NGO had been advised that these companies would not be able to contribute funds to the Board. The second approach had been to a major international company which had also indicated that the Board's request for funding did not fit its current corporate strategy. Thirdly, four companies had been selected in Canada and while three had indicated that they would not be able to contribute funds, there were signs from one company which were encouraging and follow-up action was planned. The Secretary indicated that he had also approached the actor Robert Redford to see if he would be willing to serve as Patron to the Board but, while he had expressed interest in the work of the Board, his existing commitments meant that he would be unable to accept.

5.3 The Board welcomed these initial efforts by the Chairman and Secretary. It was noted that fund-raising is a very specialized activity, and is likely to be a slow process and that there are many competing interests for the funds available. Furthermore, companies are unlikely to change their corporate strategy quickly and many would regard salmon research as a low priority, and the responsibility of governments. A further difficulty is that the work of NASCO in international conservation and management of Atlantic salmon may not be well known to the companies being targeted. The Board agreed that it would be helpful to have some professional assistance in developing a fund-raising strategy and that a sum of £10,000 to £20,000 should be allocated to developing an action plan to guide future fund-raising activities. The Board agreed that the action plan should be developed by the end of October and distributed by e-mail to all Members of the Board for their approval. Following approval of the action plan, the fund-raising activities described in the plan should commence without delay.

5.4 The representative of the NGOs indicated that NASCO's accredited NGOs may be able to assist in identifying potential target companies and in fund-raising since they have considerable experience in this area. For example, £2 million had been raised recently in order to buy out net-fishing licences in England.

6. Finance and administrative issues

6.1 The Secretary reported that the Board's financial statements for the year to 31 December 2003 had been sent to all Members of the Board. These had not been audited because there had been very few transactions in the year (approximately 20) and the price quoted by the auditors had been very high. The Board recognized that it would be important to have an external audit in future and the representative of the NGOs indicated that the NGOs might be able to assist by arranging an honorary auditor to the Board. The Secretary indicated that in addition to the cost of developing a fund-raising strategy (£10,000 - £20,000) and the workshop to further develop the SALSEA project (£15,000 - £20,000) there could be other expenditure in 2004 in further developing the website and on travel and subsistence in relation to fund-raising activities.

7. Other business

7.1 There was no other business.

8. Report of the meeting

8.1 The Board agreed the report of its meeting.

9. Date and place of next meeting

9.1 The Board will agree the date and place of its next meeting by correspondence.

9.2 The Chairman thanked participants for their contributions and closed the meeting.

List of Participants

Canada

Mr Guy Beaupré
Mr David Meerburg
Mr Jacque Robichaud (Chairman)

Denmark (in respect of the Faroe Islands and Greenland)

Dr Jan Arge Jacobsen
Ms Ulla Wang

European Union

Mr Ted Potter
Dr Ken Whelan

Iceland

Mr Arni Isaksson

Norway

Mr Raoul Bierach
Mr Arne Eggereide
Dr Lars Petter Hansen

Russian Federation

Dr Svetlana Krylova
Dr Boris Prischepa
Ms Elena Samoylova

USA

Mr Pasquale Scida
Mr Timothy Sheehan

Non-Government Observers

Mr Chris Poupard

Secretariat

Dr Malcolm Windsor
Dr Peter Hutchinson

Annex 2 of CNL(04)12

ICR(04)5

Third Meeting of the International Atlantic Salmon Research Board

Radisson SAS Saga Hotel, Reykjavik, Iceland, 7 June, 2004

Agenda

1. Opening of the meeting
2. Adoption of the agenda
3. Inventory of Research
4. Report of the Scientific Advisory Group
5. The search for new funds
6. Finance and administrative issues
7. Other business
8. Report of the meeting
9. Date and place of next meeting

SAG(04)5

Report of the Second Meeting of the Scientific Advisory Group of the International Atlantic Salmon Research Board

6 June 2004, Radisson SAS Saga Hotel, Reykjavik, Iceland

1. Opening of the Meeting

1.1 The Chairman of the Scientific Advisory Group (SAG), Mr David Meerburg (Canada), opened the meeting and welcomed members of the group to Reykjavik. He indicated that the NGO representative to the group, Dr Dick Shelton, had been invited to participate in the meeting but was unable to attend. Dr Shelton had, however, indicated to the Chairman that he fully supported the research priorities identified by the group and he had made some suggestions for research on migration and distribution of salmon at sea which the Chairman conveyed to the group.

1.2 Dr Malcolm Windsor, Secretary of NASCO, referred to the importance of the work of the SAG in developing recommendations for improved coordination of research so that existing resources are used as effectively as possible. He indicated that it would be very helpful to the Chairman of the Board and the Secretary in their fund-raising activities if the SAG could develop some costed research proposals so that potential sponsors could see how their contributions might be spent.

1.3 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The SAG adopted its agenda, SAG(04)4 (Annex 2).

3. Review of the updated inventory of research and recommendations for enhanced coordination of research

3.1 The SAG reviewed the inventory of research relating to salmon mortality in the sea, ICR(04)3. Each member of the SAG provided a brief overview of the projects included in the inventory for their Party. At its first meeting the SAG had welcomed the development of the inventory and had noted the many on-going projects on topics related to research on mortality of salmon at sea. However, the SAG had been advised that there may be research at universities and other non-government institutions that was not included in the inventory. Members of the Board had, therefore, been requested to seek details of any such research projects for inclusion in the updated inventory. The SAG noted that of the six new projects included in the inventory since last year, one was a collaborative project between the Canadian government and a non-government organization but the other five projects were entirely government-funded. Members of the Board and their scientific advisors would be aware of any major research initiatives being undertaken by non-governmental institutions so it was felt unlikely that many significant projects had been omitted. Also, seeking further information from universities and other institutions this year would be a major undertaking and much of the focus of their research would, in any case, be in fresh water. However, the attention of the group was drawn to one project undertaken by the Sir Alister Hardy Foundation which was relevant to the inventory and which should have been included.

3.2 The SAG agreed that it would be useful if costing information was included in Table 2 of the inventory and if a summary table showing costs by research topic area for each Party was developed. The SAG noted that for a number of projects no summary of progress or costings had been provided, that a number of projects had not been updated since last year and that a number of changes of an editorial nature were required. The SAG therefore recommends that before the inventory is made available on the Board's website, the Members of the Board be given the opportunity to update the information which should be provided to the Secretariat no later than 30 June. After that date the inventory should be made available on the web. The SAG also recommends that e-mail addresses of the coordinating scientists be included for each project.

3.3 The SAG recommends that, when the Members of the Board are requested to update the inventory in 2005, the Secretariat provide some guidance notes making it clear that the information sought is details of any changes to on-going projects, a brief summary of progress for each of these projects, details of any projects completed since the last notification and details of any new projects for which funding has been confirmed. For all projects full economic costs (including staff costs, equipment costs and overheads) are sought.

3.4 The SAG had previously recommended to the Board that it could play an important role in enhancing coordination and collaboration among scientists by, for example, facilitating an exchange of scientists or by organizing relevant workshops and symposia. The SAG discussed the role of the Board in improving coordination of research and agreed that there is a need for enhanced coordination so as to ensure that new research on a particular topic is undertaken at the most appropriate facilities and drawing on the best available scientific expertise. It was noted that data storage tags (DSTs) are very expensive and that the recovery rate is generally low so the objective should be to select a facility with the highest chance of recovering the tags. For example, in the Pacific, DSTs are being applied principally to Japanese chum salmon since there is a higher chance of recovering the tags and the valuable information they contain because all fish returning to homewaters are either caught in fisheries or used in hatchery programmes. The SAG reiterated that the Board could stimulate enhanced coordination through organizing workshops which should be small and clearly focused. One possibility would be for the Board to facilitate relevant workshops by hosting them and offering travel and subsistence costs to participants. It was noted that there are no projects in the inventory concerned with electronic tag technology and the development of such technology and its application would benefit from international cooperation. The SAG recommends that a workshop, focused on development and application of DSTs and other electronic tags in investigating the distribution and migration of salmon at sea, be supported by the Board. Such a workshop should be held at or close to a laboratory where there are on-going studies utilising these tag technologies. Consideration might be given to inviting one or two scientists from the Pacific area to participate in the workshop. The SAG anticipated that the cost of a five-day workshop might be in the region of £15,000 - £20,000 if no more than two representatives from each NASCO Party and one representative of the NGOs were funded. This would not preclude additional representation at national expense.

4. Development of research priorities

4.1 To understand the causes of increased mortality of salmon at sea, the Board's first research priority should be to investigate the migration and distribution of salmon at sea in relation to feeding opportunities and predation. The Board has also agreed that studies on by-catch of salmon in pelagic fisheries should also be afforded a high priority. The SAG confirmed that it continued to endorse these research priorities identified by the Board.

5. Progress report on the SALSEA project

5.1 A report on the SALSEA project proposal was made available to the group, SAG(04)2. This project proposal, which had been a direct result of the Board's initiatives to improve coordination of research, had been developed at a workshop held in Bergen, Norway in October 2003 and outlined a major multi-disciplinary programme of research into the mortality of salmon at sea. It includes three major work packages dealing with the theoretical and technical framework for a survey of salmon at sea, investigating the distribution and migration of salmon at sea (including overlap with commercial fisheries) and dissemination of information from the project. This project was the first attempt to develop a highly coordinated international research proposal in relation to mortality of salmon at sea in the North-East Atlantic. The project had been presented to the Directors of Fisheries Research Institutes in Europe by the EU Board Member, Dr Ken Whelan, and it had been positively received. The project has not so far been formally presented for funding but it was anticipated that funds might be sought from the EU or alternatively from the Board if its pilot fund-raising initiative is successful.

5.2 The SAG welcomed the development of the SALSEA project which provided a comprehensive proposal for research which, if undertaken, should greatly improve understanding of the migration and distribution of salmon at sea. The proposal should also be useful in describing to potential sponsors the nature of the research the Board wishes to fund. The SAG noted that there had been no North American scientists involved in the development of the SALSEA project. Furthermore, some European countries had not contributed to its development. The SAG therefore recommended that the Board consider supporting the further development of a major proposal for a programme of research on salmon at sea drawing on the SALSEA project but involving scientists from North America and more widely in Europe. This work might best be achieved through a workshop supported by the Board, with anticipated costs similar to those identified for the tagging workshop.

6. Further development of a Call for Research Proposals

6.1 The SAG had previously developed a call for proposals which sought applications for practical studies of the distribution and migration of salmon in the sea and studies of biological processes relating to the marine phase of the life-cycle. This call for proposals had been developed for use in competitive bids for research funds from the Board but the SAG felt that such an approach might not foster collaboration between researchers. An alternative approach would be to expand on the SALSEA project so that it covers the entire North Atlantic and involves all Parties. The SAG recommends that the Board considers which approach it wishes to use in the future. If further development of the SALSEA project is considered desirable by the Board then it may wish to proceed with the workshop envisaged in paragraph 5.2 above.

7. Proposals for Workshops/Symposia

7.1 As indicated in paragraphs 4 and 5 above, the SAG recommends that the Board considers supporting two workshops if its resources permit. The need for a workshop in relation to further development of the SALSEA proposal would, of course, depend on the Board's decision in relation to its future direction.

8. Other business

8.1 The representative of the EU referred to a meeting between Keith Stoodley of Lotek Wireless Inc. and the NASCO Secretary in which he had also participated. CEFAS and Lotek have been cooperating on the development (CEFAS) and marketing (Lotek) of tags and it would be useful to Lotek and other tag manufacturers in planning their product development if there could be a coordinated view from scientists working on Atlantic salmon with regard to their requirements for the future development of electronic tags. The SAG felt that it would be useful to involve representatives of tag manufacturers (such as Lotek, Starr-Oddi, and Vemco) in the workshop referred to in paragraphs 4 and 7 above although such participation would be at the companies' expense.

9. Report of the meeting

9.1 The SAG agreed a report of its meeting.

10. Date and place of next meeting

10.1 The SAG decided not to set a date and place for its next meeting. The Chairman would liaise with members of the SAG on the arrangements for the next meeting in the light of any decisions of the Board concerning the work of the group.

Annex 1 to SAG(04)5

List of Participants

Canada

Mr David Meerburg (Chairman)

Denmark (in respect of the Faroe Islands and Greenland)

Dr Jan Arge Jacobsen

European Union

Mr Ted Potter

Iceland

Mr Gudni Gudbergsson

Norway

Dr Lars Petter Hansen

USA

Mr Tim Sheehan

Secretariat

Dr Malcolm Windsor
Dr Peter Hutchinson

Annex 2 to SAG(04)5

SAG(04)4

Second Meeting of the Scientific Advisory Group of the International Atlantic Salmon Research Board

Radisson SAS Saga Hotel, Reykjavik, Iceland, 6 June, 2004

Agenda

1. Opening of the meeting
2. Adoption of the agenda
3. Review of the updated inventory of research and recommendations for enhanced coordination of research
4. Development of research priorities
5. Progress report on the SALSEA project
6. Further development of a Call for Research Proposals
7. Proposals for Workshops/Symposia
8. Other business
9. Report of the meeting
10. Date and place of next meeting

ANNEX 14

CNL(04)13

Request for Scientific Advice from ICES

1. With respect to Atlantic salmon in the North Atlantic area:

   1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and worldwide production of farmed and ranched Atlantic salmon in 2004;
   1.2 report on significant developments which might assist NASCO with the management of salmon stocks;
   1.3 provide a compilation of tag releases by country in 2004;
   1.4 identify relevant data deficiencies, monitoring needs and research requirements[1].

2. With respect to Atlantic salmon in the North-East Atlantic Commission area:

   2.1 describe the key events of the 2004 fisheries and the status of the stocks; [2]
   2.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
   2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;
   2.4 provide catch options or alternative management advice, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding; [3]
   2.5 provide an estimate of by-catch of salmon in pelagic fisheries.

3. With respect to Atlantic salmon in the North American Commission area:

   3.1 describe the key events of the 2004 fisheries and the status of the stocks; [2]
   3.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
   3.3 update age-specific stock conservation limits based on new information as available;
   3.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding; [3]
   3.5 provide an analysis of any new biological and/or tag return data to identify the origin and biological characteristics of Atlantic salmon caught at St Pierre and Miquelon.

4. With respect to Atlantic salmon in the West Greenland Commission area:

   4.1 describe the events of the 2004 fisheries and the status of the stocks; [2, 4]

4.2 provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;

4.3 provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes);

4.4 provide catch options or alternative management advice with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding. [3]

Notes:

1. *NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea will be provided to ICES to assist it in this task.*

2. *In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the by-catch of other species in salmon gear, and of salmon in any existing and new fisheries for other species is also requested.*

3. *In response to questions 2.4, 3.4 and 4.4 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*

4. *In response to question 4.1, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.1 and 3.1.*

ANNEX 15

Council

CNL(04)14

Returns under Articles 14 and 15 of the Convention

CNL(04)14

Returns under Articles 14 and 15 of the Convention

Summary

1. Under the Convention, the Parties shall report on actions taken in accordance with Articles 14 and 15 of the Convention. Details of the new actions taken are attached. At the time of preparation of this paper, some EU Member States which have Atlantic salmon stocks (France, Portugal and Spain) have not sent returns.

2. Under Article 14 of the Convention, the USA has reported on their efforts to encourage France (in respect of St Pierre and Miquelon) to initiate a sampling programme for the St Pierre and Miquelon salmon fishery in 2003. A report from the Secretariat on the St Pierre and Miquelon salmon fishery is contained in document CNL(04)26. Norway has reported on its surveillance activities which (together with the surveillance activities of the Icelandic coastguard) are very valuable in identifying fishing for salmon in international waters in the North-East Atlantic Commission area by non-Contracting Parties.

3. Under Article 15, a number of new laws, regulations and programmes and other new commitments have been reported. In summary these include:

   In Canada, the Species at Risk Act was promulgated in 2003. The Inner Bay of Fundy Atlantic salmon population is listed as 'endangered' under this Act, which prohibits any person from killing, harming, harassing, capturing or taking an individual of a listed species, and also provides protection for its habitat.

   In Greenland, a sampling programme for the fishery was conducted in 2003.

   European Union:

   In Ireland, a number of statutory instruments and by-laws were updated and/or maintained in 2003. The carcass-tagging and logbook scheme introduced in 2001 was continued in 2003. The TAC applied to the commercial fishery in 2003 (182,000 salmon) represented a reduction on the TAC in 2002 (219,000 salmon) so as to limit the catch in this sector. A further reduction in TAC has been agreed for 2004 (162,000 salmon). A limit of one salmon per day up to 1 June was maintained for the rod fishery in 2003 to protect spring salmon and a season limit of 20 salmon per angler applied. The ban on the sale of rod-caught fish introduced in 2001 was continued in 2003. A system of on-the-spot fines for inland fishery violations was introduced. Enforcement activities have been described.

   In Sweden, new regulations were introduced concerning stocking of rivers in order to reduce the risk of spreading *Gyrodactylus salaris*. Rivers free of the parasite are monitored on a yearly basis together with fish farms in these areas.

   In Denmark, closed areas have been extended in the Wadden Sea area and adjoining rivers. Bacterial Kidney Disease has been found in salmon in some Danish rivers.

In the United Kingdom, a number of net limitation orders have been introduced in England and Wales. In Scotland, regulations have been introduced prohibiting the keeping or release of specified species of fish or their eggs except under licence; prohibiting the use of certain types of baits and lures in certain rivers; and designating a new salmon fishery district which amalgamates several previous districts. A new Act which consolidates salmon and freshwater fisheries enactments received Royal Assent. In England and Wales, a number of mixed stock fisheries continue to be phased out. There have been compensation arrangements for commercial fisheries in England and Wales and in Northern Ireland. Funding has been secured for habitat work in Northern Ireland. In Scotland, voluntary catch and release fishing has continued to increase and there has been a continuation of the voluntary deferment of the start of the netting season by six weeks to protect early-running MSW salmon. Programmes of stock and habitat enhancement have continued.

In Iceland, a new regulatory measure regulating the equipment used on, and requiring internal inspections at, fish farms entered into force. There has been a delay in the opening date of the char netting season in areas close to salmon rivers on the north coast of Iceland.

In Norway, a new five-year regulatory regime for the management of salmon fisheries was introduced, which takes into account a survey of stock status and the NASCO Decision Structure. The use of bend nets has been prohibited throughout Norway except in Finnmark county. The liming programme has continued, with 21 rivers limed in 2003 at a cost of approximately £4 million. The programme has led to marked increases in catches of salmon in limed rivers. The parasite *Gyrodactylus salaris* spread to one new river in 2003, taking the total number of infected watercourses to 45. The parasite has been eradicated from 21 of these infected watercourses through rotenone treatment. A large project to treat 6 rivers in the same fjord system with rotenone was initiated in 2003 although the main treatment will be conducted in 2004. The wild salmon gene bank is being maintained although no new stocks were added in 2003. Cooperative research programmes with Russia continued in 2003.

In the USA, a draft recovery plan has been developed for the populations of Atlantic salmon listed as endangered and is expected to be finalised in the summer of 2004. All projects carried out in salmon watersheds are subject to review in order to avoid or minimise impacts to Atlantic salmon and their habitat. Consultations on the permitting process for discharge from aquaculture facilities, dredging projects and bridge and road repairs have been conducted. Special mandatory conditions have been developed for inclusion in the permits to conduct aquaculture so as to reduce threats to wild Atlantic salmon. Non-lethal methods which have been developed to displace foraging cormorant populations from the Narraguagus River estuary will be implemented and their effectiveness assessed. In order to combat the effects of acid rain, a pilot liming project is being implemented on the Dennys River.

Secretary
Edinburgh
11 May 2004

Returns under Article 14 of the Convention

1. Actions Taken To Make Effective The Provisions Of The Convention *(Article 14, Paragraph 1)*

1.1 The prohibition of fishing for salmon beyond 12* nautical miles from the baselines from which the breadth of the territorial sea is measured. *(Article 2, paragraph 2)*

* 40 nautical miles at West Greenland
* Area of fisheries jurisdiction of the Faroe Islands

Norway

Information on sightings is reported directly to NASCO by the Norwegian Coast Guard Squadron North.

Other Parties

No actions reported by the other Parties.

1.2 Inviting the attention of States not party to the Convention to any matter relating to the activities of the vessels of that State which appears to affect adversely the salmon stocks subject to the Convention. *(Article 2, paragraph 3)*

USA

The US did not receive any response to inquiries regarding what, if any, sampling had been conducted this year in the St Pierre and Miquelon fishery. The US will continue to engage in efforts to encourage France to conduct sampling in this fishery.

Other Parties

No actions reported by the other Parties.

1.3 Measures to minimise the by-catches of salmon originating in the rivers of the other member. *(Article 7, paragraph 2)* [North American Commission members only]

No actions reported by either Party.

1.4 Alteration in fishing patterns in a manner which results in the initiation of fishing or increase in catches of salmon originating in the rivers of another Party, except with the consent of the latter. *(Article 7, paragraph 3)* [North American Commission members only]

No actions reported by either Party.

2. Actions Taken To Implement Regulatory Measures Under Article 13 *(Article 14, Paragraph 1)*

No actions reported by any Party.

Returns under Article 15 of the Convention

1. Laws, Regulations And Programmes Adopted Or Repealed Since The Last Notification *(Article 15, Paragraph 5(a))*

Canada

Canada's *Species at Risk Act* was promulgated in June 2003. The Act prohibits any person from killing, harming, harassing, capturing or taking an individual of a listed species, and also provides protection for its habitat.

The inner Bay of Fundy Atlantic salmon population is listed as "endangered" under this Act. Further information on the Act and its implementation can be found at www.sararegistry.gc.ca.

European Union

Ireland

Statutory Instrument (SI No. 256 of 2000) was updated and amended for the 2003 fishing season (SI No. 174 of 2003) for the continuation of the Carcass Tagging and Logbook Scheme for 2003. Under this instrument all salmon fishermen (commercial and recreational) must apply a coded carcass tag to each salmon caught and provide details of these landings and subsequent disposal (sale, storage, etc.) in official logbooks. The amendment required the return of all logbooks and unused tags within 7 days after the end of the season rather than 21 days as in previous years.

By-law 781 (of 2001) was maintained for 2003 allowing a limit of one salmon per day up to 1st June to protect spring (MSW) fish. Subject to this limit, by-law 786 (of 2002) was maintained for 2003 allowing a limit of 20 salmon per angler per season.

Statutory Instrument (SI No. 353 of 2001) was maintained for 2003 which prohibits the sale of salmon caught by rod and line.

A national aggregated TAC of 182,000 salmon was included in the regulations in 2003, and applied to the commercial salmon fishery in 2003 to limit the catch in this sector.

Fisheries (Miscellaneous Commercial Licences) (Alteration of Duties) Order 2003, S.I. No. 703 of 2003. This Order increased the licence fees payable in respect of salmon, eel and molluscan shellfish dealers' licences issued or renewed for a period commencing on or after 1 January 2004.

Inland Fisheries Payment in Lieu of Prosecution Regulations 2003 (updated in 2004) provide for a system of on-the-spot fines in the area of inland fisheries.

United Kingdom

In England and Wales: River Leven (NW Region) – A new Net Limitation Order (NLO) was introduced reducing the number of lave nets from 6 to 4 (as fishermen leave the fishery). The netting season on the Leven estuary was also reduced to July and August only (previously June to August).

River Dart (SW Region) – A new NLO was introduced (reduction in the number of nets to 13 from 15).
River Teign (SW Region) – A new NLO was introduced (reduction in the number of nets to 6 from 9).

In Scotland: The Kyle of Sutherland Salmon Fishery District (Baits and Lures) Regulations 2003 – came into force on 1 May 2003. Prohibits the use of organic bait and certain lures when fishing for salmon in the Rivers Carron, Oykel, Cassley, Shin and Evelix in the Kyle of Sutherland Salmon Fishery District.

The Prohibition of Keeping of Live Fish (Specified Species) (Scotland) Order 2003 – came into force on 10 December 2003. Prohibits the keeping or release in Scotland of any species of fish or the live eggs of fish specified in Schedules 1 and 2 to the Order, except under authority of a licence granted by the Scottish Ministers.

The Wester Ross Salmon Fishery District Designation Order 2003 – came into force on 24 December 2003. Designates the area described in Schedule 1 to the Order as the Wester Ross Salmon Fishery District, and abolishes the former Applecross, Badachro and Kerry, Balgay, Broom, Ewe, Gruinard and Little Gruinard, Kannaird, Little Loch Broom, Torridon and Ullapool districts.

The River Ewe Salmon Fishery District (Baits and Lures) Revocation Regulations 2003 – came into force 24 December 2003. Revokes the River Ewe Salmon Fishery District (Baits and Lures) Regulations 1998, in line with abolition of the River Ewe Salmon Fishery District.

The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 – received Royal Assent on 1 May 2003. To be brought into force by Commencement Order. Consolidates, with amendments recommended by the Scottish Law Commission, the enactments relating to salmon and freshwater fisheries in Scotland.

Iceland

On 29 December 2003 a "Regulatory measure regarding equipment and internal inspection on Icelandic Fish Farms" entered into force. An English abstract of the regulatory measure has been made available to the Secretariat. According to a preliminary provision it is assumed that all Icelandic salmonid fish farms will have adjusted to the regulation by 1 June 2004. Verification of compliance with the provisions of the regulatory measure is the responsibility of inspectors from the Directorate of Freshwater Fisheries.

Escapes from Icelandic sea-cage farms, which are mostly located on Iceland's east coast, have been limited in scope as most of the production takes place in one salmon farm. No accidental releases from the fish farms have been observed or reported, but in late August 2003 an accidental release of 3,000 farmed salmon from a holding cage at a slaughtering facility in Neskaupstaður on the east coast occurred. The cause of the accident was a minor collision with a boat. Subsequently 9 fish farm escapees, 8 of which were males, were reported from angling in 3 salmon rivers on the east coast. Three retrieved microtags indicate that these were probably from the previously mentioned accident. No escapees were reported from rivers in other areas.

Since the regulatory measure is very recent, its effectiveness has not been evaluated but there is every indication that it should be very effective in reducing escapes.

The opening date of the season for net fishing for char has been delayed by two months from 10 June to 10 August in certain areas close to salmon rivers on Iceland's north coast.

Norway

A 5-year regulatory regime was introduced as a means of rationalizing regulatory procedures, and in order to bring in new and revised guidelines for the management of salmon fisheries. In preparation for the 5-year regulatory regime the Norwegian Authorities undertook a comprehensive survey of the status of the stocks. The new category-system (reported in 2003) was employed in the survey. The new category-system covers many of the questions raised in the NASCO Decision Structure for Management of North Atlantic Salmon Fisheries. The Decision Structure was then widely used in determining the regulatory regime.

The new regulatory regime does not imply any great changes in the regulation of salmon fisheries. Some adjustment was necessary in order to make the regulations consistent with the results of the new stock survey and the revised guidelines. The greatest change in the regulations was the implementation of a ban on bend-nets on the Skagerrak coast, which had been announced three years earlier. From now on, bend nets are allowed only in Finnmark county where the stock status is good.

The regulations will be reviewed every year during the 5-year period and adjustments made only for river stocks that have changed category.

Other Parties

No changes reported by the other Parties or the other EU Member States.

2. Other New Commitments Relating To The Conservation, Restoration, Enhancement And Rational Management Of Salmon Stocks Subject To The Convention *(Article 15, paragraph 5(b))*

Denmark (Faroe Islands and Greenland)

Greenland

At its Annual Meeting in June 2003 the West Greenland Commission agreed a West Greenland Fishery Sampling Agreement for 2003 (WGC(03)8), which describes the cooperative contributions of the Parties of the West Greenland Commission to the process of collecting biological data on Atlantic salmon harvested at West Greenland in 2003.

European Union

Denmark

In the Danish part of the Wadden Sea, closed areas have been extended in the sea and adjoining rivers.

Ireland

The Fisheries Boards' protection staff are responsible for the enforcement of the Fisheries Acts, Bye-Laws and Orders. The Boards' responsibilities cover inland waterways and coastal waters out to twelve miles. Out of a total staff compliment of 490, some 200 staff are solely dedicated to fishery protection. The Fisheries Boards use a multi-faceted approach to deter illegal fishing and protect those species defined under the legislation. The methods used to protect the fisheries resource include:

- Inshore rigid inflatable boat (RIBs) patrols.
- Vehicle patrols by day and night for illegal fishing.
- Foot patrols by day and night for illegal fishing.
- Inspections at fisheries.
- On-the-spot fines.
- Sea patrols in all regions using the Boards' Large Patrol Vessels (LPVs).
- Spot checks at fish dealers, restaurants, hotels and guesthouses.

A summary of fishery protection activities over the 2000-2003 period is given below.

Year	No. of Incidents Prosecuted	Fisheries Board Sea and Inland Boats Patrols (man hours)	Central Board Large Patrol Vessel Days	Naval Service Patrol Days	Air Corp Maritime Patrol Days	Metres of Illegal Net Seized
2000	116	16,682	307	56	12	44,969
2001	147	11,775	315	48	14	37,112
2002	109	13,550	306	56	17	40,066
2003	94	16,450	295	56	13	45,953

In protecting the fisheries resource, the Fisheries Boards work closely with the Naval Service, the Air Corps and the Garda Siochana.

Sweden

New regulations concerning the salmon parasite *Gyrodactylus salaris* were adopted in 2003 stating that stocking of salmonids in salmon rivers on the west coast which are free from the parasite is only allowed above the second migration barrier. Above the second barrier stocked fish must come from a farm declared free from the parasite (FIFS 2003:34). Treating fish (formaline, salt) before stocking is no longer an option for stocking salmonids in rivers where the parasite has not been found. Rivers that are free from the parasite are monitored on a yearly basis together with fish farms in these areas. Stocked salmon in the area must have their adipose fin removed before being stocked (SFS 2003:253, FIFS 2003:34). New regulations to separate wild and stocked salmon in the fishery will be considered in the future.

United Kingdom

In England and Wales: Netsmen have received compensation payments (from various sources) not to fish for all or part of the season (or to release fish alive) in the following salmon fisheries: Tavy, Tamar, Lynher, Fowey, Camel, Lyn, Usk, Severn, Hampshire Avon and Stour, and Cumbrian coastal fisheries. The rights to operate a fish trap on the River Lyn (a fixed engine which dates back to the 1600s) were purchased by the Environment Agency, in perpetuity. The trap will be maintained to preserve its heritage value.

A number of mixed stock fisheries continue to be phased out. In the largest of these, the North East coast fishery, a major compensation scheme was agreed in 2003, based on funding of £3.4 million (£1.25 million from Government and the rest from private sources). This resulted in 52 drift net licensees giving up their licences. As a result of this accelerated phase-out, the number of drift net licences has now fallen to 16, an 89% reduction since the phase-out began in 1993.

In Northern Ireland: The Commercial Salmon Netsmen Buy-out Scheme, operating in the Fisheries Conservancy Board (FCB) area, closed for applications in March 2004. At the close of the Scheme, 49 of the 56 fishing engines were bought out. The 10-year average catch of these nets was 9,800 salmon.

A successful bid was made to the European Economic Area Financial Instrument for funding for salmon habitat restoration works on two river catchments in Northern Ireland. The works will commence in 2004.

In Scotland: The voluntary practice of catch and release in the rod fishery continued to increase, rising from 42% in 2002 to an estimated 55% in 2003.

Members of the Salmon Net Fishing Association of Scotland repeated their voluntary deferment of the start of the netting season by six weeks to conserve early-running MSW salmon.

District Salmon Fishery Boards and Fisheries Trusts throughout Scotland have maintained programmes of stock and habitat enhancement.

Norway

Liming

In 2003, 21 Atlantic salmon rivers were limed in Norway at a cost of NOK45 million (approximately £4 million). For 2004 the Government of Norway has reduced the funding for the liming programme by NOK12 million (approximately £1 million). The liming of salmon rivers has high priority, and the consequences of the reduced funding will be small.

Most liming projects commenced during the period 1991 to 1997. It will take some years before these salmon stocks are re-established. In 14 rivers in the southern-most part of Norway the total catch of Atlantic salmon was 2 tonnes per year in the 1980s. After about 10 years of liming the catches have increased to about 35 tonnes per year. The Norwegian Institute for Nature Research (NINA) has estimated that the salmon stocks in these 14 rivers will be fully re-established in about 8 years, and has suggested that the total catch may be about 75 tonnes in 2011.

The largest liming projects are in three large watercourses in southern-most Norway: Tovdalselva, Mandalselva and Bjerkreimselva. In Tovdalselva and Mandalselva, the natural Atlantic salmon stocks became extinct due to acidification. Before acidification, during the late 1800s, yearly catches of salmon in the rivers Mandalselva and Tovdalselva were as high as 30 and 20 tonnes respectively. In both rivers, a restocking programme is being carried out in connection with the liming programme. The catches are increasing in the river Mandalselva with an average catch of about 9 tonnes in the last four years. In the River Tovdalselva a high density of young fish was recorded in 2002 - 2003 and the catches are expected to increase from 2004 onwards. Bjerkreimselva had a small population of its natural salmon stock before liming, and catches increased significantly in the first few years after liming started. The average catch in the river Bjerkreimselva for the last four years has been about 14 tonnes.

Gyrodactylus salaris

The salmon parasite *Gyrodactylus salaris* spread to one new river in 2003. The infected river, River Sandeelva, is situated not far from the River Drammenselva, which is the largest infected river in Norway. The total number of infected rivers has thus increased to 45. Eradication measures have, however, reduced the occurrence of the parasite.

In accordance with the action plan, two infected rivers (River Hestdalselva and River Halsanelva) were treated with rotenone in 2003. The treated rivers are situated in the northern part of Norway. Through treatment with rotenone the parasite has been eradicated from a total of 21 of the 45 infected watercourses in Norway. A big rotenone treatment project, consisting of 6 rivers in the same fjord system in the northern part of Norway, started in 2003. The first phase of this project took place in the autumn with a limited rotenone treatment concentrated on the two biggest rivers (River Ranaelva and River Røssåga). The main rotenone treatment of all 6 rivers will be accomplished in 2004.

In addition to the remedial measures, the monitoring programme and preventive measures are being given high priority.

Gene-bank and milt-bank

By the end of 2003, milt from a total of 6,500 wild salmon from 173 stocks had been included in the Norwegian Gene Bank to provide an opportunity to protect stocks from extinction. No new milt samples were included in the gene bank in 2003. Norway currently operates 3 living gene banks; one in northern Norway, one in mid-Norway and one in south-western Norway. 27 characteristic and valuable stocks have been included in the "living gene banks". Four stocks have been removed from the programme after these stocks were re-introduced to their rivers.

International research programmes

Cooperation between Norway and Russia on environmental issues, and on research and management of Atlantic salmon, has continued, especially concerning Atlantic salmon in the Pechora River and in relation to *Gyrodactylus salaris*.

USA

As reported last year, following the listing of Atlantic salmon under the Endangered Species Act, NOAA Fisheries and the US Fish and Wildlife Service have been consulting with other federal agencies to review all projects carried out in the salmon watersheds in order to avoid or minimize impacts to Atlantic salmon and their habitat. Consultations have been conducted on the permitting process for discharge from aquaculture facilities, dredging projects, and bridge and road repair.

The US Fish and Wildlife Service and NOAA Fisheries have worked with the Maine Atlantic Salmon Commission to develop a draft recovery plan for the populations of Atlantic salmon that have been listed as endangered. The draft has undergone formal review by technical staff at both state and federal agencies and is currently being revised to address the comments received during the review process. Once the draft is finalized it will be released for public review. A final draft is expected in the summer of 2004.

NOAA Fisheries, in conjunction with the US Fish and Wildlife Service, completed a Biological Opinion on November 19, 2003, for the Army Corps of Engineers (which issues permits for aquaculture sites) on the adverse effect that existing aquaculture sites have on endangered wild Atlantic salmon. This Opinion includes special conditions that the Army Corps of Engineers will incorporate as mandatory conditions in the permits that they issue to the aquaculture industry authorizing the operation of these facilities. The special conditions are mandatory and address issues that will improve the operation of aquaculture facilities and reduce threats to wild Atlantic salmon.

The National Marine Fisheries Service, Maine Atlantic Salmon Commission, and US Department of Agriculture - Wildlife Services have developed a study to determine the effectiveness of non-lethal methods to remove or displace foraging double-crested cormorant populations from the Narraguagus River estuary. This project was developed in response to the need to alleviate the threat of predators that feed on Atlantic salmon smolts in the estuary as they migrate. The non-lethal methods used include pyrotechnics and boat activity. This project will be monitored by implanting ultrasonic devices (pingers) in migrating smolts which will allow scientists to determine how many smolts successfully migrate out of the bay into the ocean. The number of smolts that successfully make it out into the ocean will be compared with mortality rates in previous years from the same areas.

The National Marine Fisheries Service in conjunction with other federal and state agencies, universities, and non-governmental organizations, has created the Water Chemistry Committee to implement a pilot liming project on a portion of the Dennys River, Maine. This pilot liming study will use a liming doser to deliver calcium product to buffer against episodic acidification events that are thought to be affecting salmon survival in downeast Maine. Extensive pre-assessment work is being completed in order to detect changes that occur as a result of the project.

Other Parties

No new commitments reported by the other Parties, the other EU Member States or the Faroe Islands.

3. Other Factors Which May Significantly Affect The Abundance Of Salmon Stocks Subject To The Convention *(Article 15, Paragraph 5(c))*

European Union

Denmark

BKD (Bacterial kidney disease) has now been found in salmon in some Danish salmon rivers.

Ireland

The commercial quota in 2004 has been set at 162,000 salmon. This is a reduction on the previous year’s quota of 182,000 salmon (11%) and on the 2002 quota of 219,000 salmon (26%). The reduction is expected to lead to increased escapement to spawn.

Other Parties

No factors reported by the other Parties or the other EU Member States.

ANNEX 16

Council

CNL(04)29

Return of Information by EU (Spain)

CNL(04)29

Return of Information by EU (Spain)

1. At the time of preparation of the following Council papers:

   Returns under Articles 14 and 15 of the Convention, CNL(04)14;
   Unreported Catches – Returns by the Parties, CNL(04)21;
   Report on Progress with Development and Implementation of Habitat Protection and Restoration Plans, CNL(04)16.

   which are based on returns by the Parties, no information had been provided by some EU Member States.

2. We have now received a return from Spain and the information is attached. However, information in relation to the Williamsburg Resolution has been incorporated into paper CNL(04)19 since this had not been completed at the time we received the information from Spain. No information has been provided by Spain on application of the Decision Structure for Management of North Atlantic Salmon Fisheries (paper CNL(04)15).

Secretary
Edinburgh
2 June, 2004

Returns under Article 15 of the Convention

1. Laws, Regulations And Programmes Adopted Or Repealed Since The Last Notification *(Article 15, Paragraph 5(a))*

TAC adoption in some salmon rivers of Galicia: Masma, Ulla, Lérez and Miño (Spanish reach). River Eo has no TAC established. Salmon fishing forbidden in rivers Ouro, Landro, Mandeo, Tambre, Umia and Verdugo.

2. Other New Commitments Relating To The Conservation, Restoration, Enhancement And Rational Management Of Salmon Stocks Subject To The Convention *(Article 15, paragraph 5(b))*

Most accessible reaches of salmon rivers of Galicia have been included in the proposed zones for Natura 2000.

3. Other Factors Which May Significantly Affect The Abundance Of Salmon Stocks Subject To The Convention *(Article 15, Paragraph 5(c))*

Effects of "Prestige" oil spill (November 2002) are unknown.

Section 3: Unreported Catches

Annual return of information in relation to unreported catches for the calendar year 2003. Please provide the following information:

1. A description of management control and reporting systems by country

All rod and line catches are screened. Other salmon fisheries (nets,…) are illegal.

2. An estimate of unreported catch by country, broken down by category and indicating whether the unreported catch is the result of legal or illegal activities

Unknown.

3. An explanation of how the figure for unreported catch is arrived at, according to the following breakdown:

No explanation provided.

4. The extent of catch and release fishing

Seems not to be a common practice.

5. Any measures taken to further minimise the level of unreported catches

No new measures.

Reports on Progress with Development and Implementation of Habitat Protection and Restoration Plans

1.	Has an inventory of rivers, as envisaged in Annex 2 of the NASCO Plan of Action, been established or updated since the last notification? If "yes" please provide a brief description of the inventory or of any changes to an existing inventory.

Under development.

2.	Has a comprehensive salmon habitat protection and restoration plan been developed in accordance with the aims of the NASCO Plan of Action, or an existing plan updated, since the last notification? If "yes" please provide brief details of the plan and the extent of its implementation or of any changes to an existing plan since the last notification.

Under development. In Cantabria the salmon restoration programme, initiated in 1996, is based on increasing the stream length accessible to salmon through demolishing illegal weirs and constructing new passes, enhancing the wild populations, based on the rearing and release of tagged juveniles, and the protection and restoration of salmon.

3.	If a Plan has been developed or updated since the last notification have evaluation and monitoring systems been introduced or updated to assess the effectiveness of the plan in protecting and restoring salmon habitat? If the response to question 2 was "yes" please provide details of these systems or of changes to existing systems since the last notification.

In Galicia: 5 operating adult traps, 2 operating smolt traps, 4 operating counters and 1 being installed, Stocking programmes monitoring (tagging), Juvenile abundance monitoring.

In Cantabria, assessment of the success of restoration programme is carried out through micro-tagging and recaptures of stocked adults both in home rivers and at sea. Recapture rates varied from 0% to 0.35% and stocked adults represented 10-20% of all the adults screened.

ANNEX 17

Council

CNL(04)15

Report on Progress with Application of the Decision Structure for Management of North Atlantic Salmon Fisheries

CNL(04)15

Report on Progress with Application of the Decision Structure for Management of North Atlantic Salmon Fisheries

Summary

1. To assist NASCO and the relevant authorities in applying the Precautionary Approach to the management of North Atlantic salmon fisheries, a Decision Structure was adopted on a provisional basis in 2000. After further development and evaluation, a revised Decision Structure was adopted by the Council in 2002 in order to provide a basis for more consistent approaches to the management of exploitation of salmon throughout the North Atlantic region. Application of this Decision Structure by the Parties is intended to assist in safeguarding the abundance and diversity of the resource. It is the Council's request that the Decision Structure be widely applied, without delay, by managers in cooperation with stakeholders on salmon rivers.

2. In order to facilitate annual reporting by the Parties on the extent of implementation of the Decision Structure and their experiences with its application, a simple format for reporting was developed and was used on a trial basis for last year's returns. It was recognized that the Decision Structure is being used both to provide a record of decisions taken and to provide guidance to managers on how to reach management decisions. Last year, a revised reporting format was agreed and used for the first time for this year's returns. The information provided by the Parties is attached. At the time of preparation of this report, no return of information was available for some EU Member States (France, Portugal and Spain) with salmon stocks.

Use of the Decision Structure

3. The Decision Structure appears to have been widely used as a guide to management of salmon fisheries in Canada, the EU (Ireland, England and Wales and Northern Ireland), Norway and the Russian Federation. In Iceland, the Decision Structure has been used as a record of management decisions on two rivers. In the EU (Scotland), discussions are ongoing to develop the Decision Structure as a management tool. There are no Atlantic salmon fisheries in the EU (Germany) or the US. In the EU (Sweden), the Decision Structure has not been applied to the management of salmon fisheries but work to develop an index river has continued. The Decision Structure was not applied to the subsistence-only fishery at West Greenland in 2003.

Compilation of Decision Structure forms and examples of its application

4. Information has been provided by Canada, the EU (Ireland, England and Wales and Northern Ireland) on how the Decision Structure forms are being compiled and retained. In Canada, the Decision Structure forms are not being used regularly but management plans are held at DFO regional offices and by the Province of Quebec. In the EU (Ireland), the forms are being compiled by the Marine Institute prior to formal application. In the EU (England and Wales), Salmon Action Plans which cover all aspects of the Decision Structure are held by the Environment Agency. In the EU (Northern Ireland), the Decision Structure form has been completed for the Foyle and will be completed for other catchments in 2004. In Norway, the existing

reporting system under the river categorization system is being developed to incorporate the elements included in the Decision Structure. Examples of the use of the Decision Structure have been provided by the EU (Ireland), Iceland and the Russian Federation.

Comments on the usefulness of the Decision Structure and on how it might be improved

5. Feedback from the EU (Ireland, England and Wales and Northern Ireland), Norway and the Russian Federation indicates that managers have found the Decision Structure to be a useful guide to management of salmon fisheries. In Iceland, it is felt that as the salmon fisheries are managed on the basis of limited entry, there are no options for in-season measures except in emergency situations so the use of the Decision Structure is likely to be descriptive. In the EU (Scotland), work is ongoing to develop the basic structure to reflect salmon fishery management requirements in that country. No suggestions for improvements to the Decision Structure have been made by any Party.

Additional guidance on the use of the Decision Structure

6. In Norway, general guidelines have been developed on the regulation of salmon fisheries and specific guidelines for each river category. Elements from the Decision Structure have been incorporated in these guidelines. No additional guidance on the use of the Decision Structure itself has been developed by any Party.

7. **In short**, it is only two years since the Decision Structure was adopted. The first returns under the new reporting format agreed last year indicate that real progress has been made by a number of Parties and EU Member States in using the Decision Structure as a guide to management decisions. In Iceland, the Decision Structure has been used as a record of management decisions in two rivers. Some examples of its use have been provided. The general feedback is that it is a useful aid to managers. No proposals for improvements to the Decision Structure have been made and no additional guidance on its use has been developed by any Party.

Secretary
Edinburgh
11 May, 2004

1. Provide a summary of the fisheries for which the Decision Structure has been applied, indicating whether it has been used as a guide to, or a record of, management decisions.

Canada

For Atlantic salmon management, Canada uses a river classification system. River classifications establish certain management measures (e.g. retention limits, closures, catch and release only) for each river, based on factors such as: are conservation spawning requirements being met, level of angling effort, proximity to densely populated areas, and overall size of the river and of the salmon population in it.

Conservation limits are set where enough information exists, management targets are established, and in-season monitoring indicates whether conservation limits will be met. When the limits are not met, the management process provides for pre-agreed management actions to be implemented, such as catch and release fishing only, or complete closure of the river.

The NASCO Decision Structure is used as a guide to management decisions.

Denmark (in respect of the Faroe Island and Greenland)

Greenland

The Decision Structure has not been applied. Sections 2-4 of this document are not therefore applicable.

European Union

Ireland

The Decision Structure has been applied to the national fishery and all fishing methods.

United Kingdom

England and Wales

Conservation Limits and Management Targets have been set for all principal salmon rivers in accordance with the Decision Structure. Salmon Action Plans are used to address other issues defined within the Decision Structure, including: the status of the stock; other diversity criteria; selectivity of fisheries; factors threatening the stock; and proposed management actions.

Germany

The Decision Structure has not yet been applied in Northrhine-Westfalia, since there are no fisheries as salmon populations have first to be re-established. Sections 2-4 of this document are, therefore, not applicable.

Northern Ireland

The Decision Structure has been used as a guide to the implementation of a Salmon Management Plan in the Fisheries Conservancy Board (FCB) area of Northern Ireland which mirrors that developed in the Foyle area.

In 2003 habitat, juvenile populations and adult escapement data were complied for the Rivers Bush, Glendun, Maine and Blackwater in the FCB area and the Foyle system. Conservation limits were updated as more information is assembled.

Scotland

Discussions have continued with Fisheries Research Services (FRS), the Association of Salmon Fishery Boards (ASFB), and District Salmon Fishery Boards (DSFBs) to develop the Decision Structure as a tool for use in management operations.

Sweden

Work to establish an index river on the Swedish West Coast has continued in 2003.

Iceland

The Decision Structure has been used as a record of management decisions in the salmon river Vesturdalsá in eastern Iceland (see CNL(03)36), and in the River Hvítá in Borgarfjörður.

Norway

The Decision Structure has been used as a guide to management decisions in all salmon fisheries. The Decision Structure for sea-fisheries requires identification of the river stocks being exploited by the fishery. To approach this problem the coast has been divided into 19 regions, each constituting a fishery that mainly exploits river stocks within the region's boundaries. The sea-fishery is regulated according to the status of the stocks within the region.

Russian Federation

The Decision Structure has been applied to the management of fisheries on 38 White Sea rivers and 37 Barents Sea rivers on the Kola Peninsula. For each river the Polar Research Institute (PINRO) provides advice on the abundance of the spawning stocks, conservation limits and the catch options. On the basis of this advice the Science and Fisheries Council makes management decisions concerning catch limits in each fishery (commercial, catch-and-retain, catch-and-release) on a river-by-river basis. Murmanrybvod details the fishing regime for each river including time of fishing, fishing gears, sites and catch limit for each site. This information is notified to the users of the resource on a given river. Control and enforcement is the responsibility of Murmanrybvod.

USA

There are no salmon fisheries within US jurisdiction. Sections 2-4 of this document are therefore not applicable.

Other Parties

No information on the use of the Decision Structure has been provided by the Faroe Islands or the other EU Member States.

2.	Indicate where and how completed Decision Structure forms are being compiled and retained, and provide an example of its application.

Canada

The Decision Structure forms are not being regularly used by those making decisions on Atlantic salmon fisheries. Atlantic salmon fishing is regulated under management plans that are developed for each area, with conservation limits, and pre-agreed rules for actions to be taken if conservation limits are not being met. These management plans are held in each regional office of the Department of Fisheries and Oceans and by the Province of Québec.

European Union

Ireland

Forms are being compiled on behalf of the Department of Communications, Marine and Natural Resources by the Marine Institute for general discussion before formal application. An example is attached in Annex 1.

United Kingdom

England and Wales

Completed Salmon Action Plans, which cover all aspects of the Decision Structure, are available from the Environment Agency, UK.

Northern Ireland

The form has already been completed and retained for the Foyle system and will be completed for the other catchments in 2004. Failure to achieve conservation limits in the Bush in recent years has prompted management action to restrict exploitation for both commercial fisheries and angling throughout the FCB area.

Scotland

The Decision Structure is still being developed for use by managers.

Iceland

The Decision Structure is still in an evaluation stage in the Icelandic management system. An example of its application in a mixed stock situation, the River Hvítá in Borgarfjörður, is contained in Annex 2.

Norway

The Decision Structure form has not been used to keep a record of management decisions. This information is still being stored in existing databases and archives. A reporting system for the Decision Structure will be developed and included in the existing reporting under the river categorization system. Many of the elements in the Decision Structure are being addressed through the Norwegian river categorization system. There is a form to be filled in for each fishery. The forms are stored digitally in a central database called the Salmon Register, which is administered by the Directorate for Nature Management. The forms contain information on: Category, threatening factors (including overfishing) and stock restoration. This reporting system and the Salmon Register is being developed to cover all the questions raised by the Decision Structure.

Russian Federation

An example of the application of the Decision Structure is the Kola river. In 2003 the spawning stock was 7,410 salmon. The conservation limit is 1,560 salmon. 300 salmon were allocated for fishing to monitor the biological structure of the population. 200 salmon were allocated for use by the hatchery for enhancement purposes, 20 salmon were allocated for scientific studies. The allocated catch in the catch-and retain fishery was 1,200 salmon and in the catch-and-release fishery 1,300 salmon. The fishing was conducted in accordance with established fishing regimes. Catch-and-retain fishing was conducted at two sites, time of fishing per licence was 6 hours, permitted catch per licence was 1 salmon. Catch-and-release was conducted at three sites in the main stem of the river and on three tributaries. A licence was issued to an angler for one-day fishing on one of the allocated sites. When fishing, anglers are obliged to follow the fishing regime and comply with the Regulations for the recreational fisheries. Each fisherman is responsible for recording the catch and reporting it to Murmanrybvod.

Other Parties

No information on the compilation and retention of Decision Structure forms or examples of its application have been provided by the other Parties or the other EU Member States.

3. Provide comments on how useful managers have found the Decision Structure and suggestions for how it might be improved.

European Union

Ireland

The Decision Structure is useful for focusing on the main issues which need to be considered when managing fisheries. The national example is used to provide a comparative platform for application at a river, district or regional level. The Decision Structure represents guidelines, which may be modified in their application in particular circumstances.

United Kingdom

England and Wales

The Decision Structure has been used as an aide-memoire.

Northern Ireland

Information consistent with the Decision Structure is fundamental to management decisions.

Scotland

A Working Group (FRS/ASFB/DSFBs) has been supportive of the general proposal and are collaborating in the development of the basic structure to reflect more closely the Scottish salmon fishery management requirements.

Iceland

Icelandic salmon fisheries are based on a terminal fishery with severely limited entry. There are thus no options for in-season measures except in an emergency situation. The use of the Decision Structure in Icelandic rivers is thus likely to be of a descriptive nature. It might, for example, be useful to document other Icelandic salmon angling rivers in a similar manner as was done for River Vesturdalsá (see CNL(03)36).

Norway

Both central and regional managers have found the Decision Structure useful as an aid in determining the regulatory regime. However, in many cases the data requirements cannot be met and must be substituted by sound judgement based on whatever information is available. The Decision Structure has inspired authorities, managers and researchers to fill the information gap. Among several initiatives that have been taken are:

- a research project on the stock-recruitment relationship and methods for determining conservation limits;
- research and other activities aimed at increasing knowledge on the productive capacity of salmon rivers.

We see no immediate need to make changes to the Decision Structure.

Russian Federation

The Decision Structure has been effectively applied in setting catch limits for salmon fisheries in rivers on the Kola Peninsula to ensure rational exploitation of the resource.

Other Parties

No comments on the usefulness of the Decision Structure or suggestions for its improvement have been provided by the other Parties or the other EU Member States.

4.	Provide a copy of any additional guidance which has been developed on the use of the Decision Structure.

Norway

Elements from the Decision Structure are incorporated into the general guidelines for regulation of salmon fisheries, and the specific guidelines for each category in the river categorization system. These guidelines (in Norwegian only) are issued by the Directorate for Nature Management and distributed to all parties taking part in the regulation process.

Other Parties

No information on additional guidance which has developed on the use of the Decision Structure has been provided by the other Parties or the other EU Member States.

Annex 1 of CNL(04)15

Example provided by the EU (Ireland)

A. Brief Description of the Fishery(ies):

Date of review:	21/4/04
Fishery location:	Ireland
Gear types:	The principal gears used to catch salmon in Irish waters are 1) drift nets, 2) draft nets, 3) snap nets, 4) various traps and trapping nets (loop. Pole, bag) and 5) fishing rods.
Magnitude of fishery (e.g. catch or effort):	***Estimates include all Irish Salmon Fishing districts and half of the Foyle area catch.*** Drift net catch Mean (previous 10 yrs) = **456 t** (approx. **168,000 salmon**) Catch in **2002** = **514 t** (**194,177 salmon**) 76% of total catch Inshore net catch Mean (previous 10 yrs) = **127 t** (approx. **47,000 salmon**) Catch in 2002 = **89 t** (**33,222 salmon**) 13% of total catch Rod catch Mean (previous 10 yrs = **79 t** (approx. **29,000 salmon**) Catch in 2001 = **70 t** (**26,074 salmon**) 11% of total catch 2002 Commercial TAC = 219,619 salmon (catch = 207,339, excluding Foyle). 2003 Commercial TAC = 182,000 salmon (catch = 166,874, excluding Foyle).
Current management restrictions:	New management and conservation legislation was brought into force in 1997 which was aimed at reducing effort in the fishery and to facilitate enforcement. These regulations have been enforced since that time. • Cap on public commercial fishing licences for draft nets and drift nets • Area of fishing at sea reduced from 12 to 6 nautical miles • Drift net season constrained to 1st June to 31st July • Draft net fishery deferred to the 12th of May • Restriction on night-time fishing (0400 to 2100 hrs only) • Reduction to 4 days fishing per week • Mono-filament netting legalised for drift net fishing.

	Subsequent measures in place since 1997: • Introduction of mandatory carcass tagging and logbook scheme in 2001 for all sectors of the salmon fishery • Ban on the sale of rod-caught fish • Angling bag limit of 1 per day up to 1st June with 3 fish per day subsequently up to a season limit 20 fish • TAC of 219,619 salmon imposed for commercial fisheries in 2002 • TAC of 182,000 imposed for commercial salmon fishery in 2003 • TAC of 162,000 imposed for commercial salmon fishery in 2004
Outline pre-agreed procedures (or provide references):	The principal aim of the stock assessment programme is to evaluate the total return of salmon relative to a biological reference point which indicates the required number of spawning fish for all rivers. The data used for this assessment and for the establishment of a Conservation Limit are the catch (including the unreported catch of each stock) and the exploitation rates by the fisheries, derived from the results of the National Micro-tagging and Tag Recovery Programme each year. These values provide an estimate of the total spawning numbers and by adding the total spawners to the total catch this provides the total stock which returned. The Conservation Limit for Ireland had been estimated from a stock and recruitment curve derived from catch data and exploitation rate data over 30 years (ICES 2003). A significant investment was made in acquiring new information on wetted areas of all Irish rivers and transporting stock and recruitment parameters from European index rivers of known wetted area to rivers without specific S/R data. These new CLs were applied in 2003 for the 2004 fishery.
Principal river stock(s) exploited:	Approximately 256 rivers where spawning salmonids exist comprising 169 salmon rivers with a further 87 designated as sea trout rivers. 20 main rivers provide over 80% of the returns of salmon.
Other fisheries exploiting stock(s):	Greenland (1SW salmon destined to return to Ireland as 2SW salmon), Faroes, UK (Northern Ireland). Tagged Irish salmon have also been recovered in Iceland, UK (England and Wales, and Scotland) but exploitation rates are not known.

Other information:	The responsibility for management of the salmon fishery lies with the Department of Communications, Marine and Natural Resources and is administered through the seven Regional Fisheries Boards (East, South, South West, Shannon, West, North West and North). The Boards enforce fisheries legislation and carry out inspection at sea and on inland waters. This surveillance is further enhanced by dedicated naval surveillance co-ordinated through the Central Fisheries Board. Each region is further sub-divided into districts for administrative and management purposes. There are 17 salmon fishing districts in Ireland. The administration of the Lough Foyle area, a significant salmon fishery, is jointly administered by a north-south agency, the Loughs Agency.

If fishery primarily exploits salmon from only one river answer all questions in Section B; If fishery exploits salmon from more than one river answer all questions in section C.

C. Mixed River Stock Fishery

C1. Specify the reference points (Conservation Limits and/or Management Targets) or alternative measures used to define adequate abundance of the exploited stocks.

National CL = 197,000 1SW salmon, based on wetted areas of individual rivers and transported stock and recruitment parameters from European index rivers.

C2. Describe the status of all stocks relative to the abundance criteria in C1.

- Include trends and forecasts of abundance.

Average spawners since 1997 (ICES 2003) = 209,000. Therefore, the national stock is above the CL although it has been below this in a number of years within the period.

Separate Conservation Limits have been derived for combined stock complexes in each of the 17 Salmon Fishing Districts. These indicate that relative to the previous 7-year mean the CL has only been met consistently in 5 of the 17 districts.

C3. Are all the stocks meeting other diversity criteria (e.g. age structure, run-timing, fecundity)?

- Describe criteria assessed;
- Identify possible reasons for any failures.

Age composition - The adult age composition is assessed from catch (based on average size) and in some instances from traps or counters. A failure in the age structure is not thought to be the case as up to 95% of the Irish salmon stock is comprised of grilse. This appears to have been the case for the last two decades at least. Concerns have been expressed at the low abundance of MSW salmon stocks in the last two decades or more where these stocks are known to predominate in the population. However, it is not known if the reduction in MSW fish has been accompanied by an increase in 1SW salmon. Therefore it is difficult to assess if there has been a change or failure in the age structure of the adult population.

Run timing - Assessed from catch data, trap or counter data. The majority of the grilse enter Irish rivers between late May and the end of July. A smaller autumn run has been noted in several rivers. This appears to be a consistent feature of the stock.

The principal run of larger MSW salmon occurs in spring (i.e. Spring salmon). A smaller summer salmon run also occurs. Again, this appears to be a consistent feature of the Irish salmon stock for at least the last two decades.

Fecundity - There is little information available other than from records of hatcheries, etc. These data may not reflect the situation in the wild population.

C4. Is the fishery selective for certain stock components (e.g. age groups, size, populations, river stocks)?

- If yes, describe reasons.

The principal exploitation by the commercial fisheries is now on the 1SW component. It is believed that the drift nets exploit the larger grilse although no systematic study has been carried out. The fishery is also selective on the run between mid-May and the end of July when the commercial fisheries operate.

Exploitation on multi-sea-winter salmon stocks is principally by rod and line.

C5. Are any of the stocks threatened by factors other than fisheries (e.g. habitat degradation, disease/parasites, predators?

- If yes, describe threat and management action that will be taken (e.g. establish gene bank; habitat mitigation).

Local problems are known to occur and are believed to be a significant threat to some populations. The main problems are agricultural organic enrichment, arterial drainage, riparian zone damage (gravel extraction, urban development, etc), overgrazing and dams. There is little information available on the impact of either predators or diseases/parasites on wild salmon populations although the potential threats are well described.

The principal management measures taken include legal actions taken by Fisheries Boards and other environmental agencies against polluters and those causing damage to habitats. Up to 1999, the Central and Regional Fisheries Boards have surveyed over 2,000 km of river channel and carried out habitat restoration on over 400 km of compromised waters.

C6. Describe management actions that will be employed to control harvest, including measures that will be used to address any failure or trend in abundance or diversity, taking account of pre-agreed procedures.

- Decisions should take account of: uncertainty in the assessments; abundance of the stock (q. C2); diversity of the stock (q. C3); selectivity of the fishery (q. C4); any non-fishery factors affecting the stock (q. C5); and socio-economic factors; and other fisheries exploiting the stock;
- Describe the expected extent and timescale of effects.

In 2001 a Carcass Tagging and Logbook Scheme was introduced for all sectors of the salmon fishery aimed at reducing the illegal catch of salmon and providing a more accurate record of the legal catch.

In 2003 the TAC was reduced from 219,619 salmon to 182,000 salmon as a means of restricting the salmon catch.

Reductions in catch were applied to all districts to acknowledge the nature of the mixed stock fishery on stocks from neighbouring districts and regions.

It should be noted that all districts will have a reduced TAC over 2002, even if they were not specifically below their Conservation Limit. This is to acknowledge the mixed stock nature of the fishery where stocks from neighbouring districts and regions which are below Conservation Limits may be taken in catches. However, the highest reductions were imposed in districts which had been shown to be below their Conservation Limit consistently since 1997. Despite the fact that a number of districts should have been allocated a zero quota based on the scientific advice, the cuts have been introduced as sympathetically as possible considering prevailing socio-economic factors and the impact on local communities.
The stock status will be monitored scientifically each year to ascertain if further reductions are required to bring the fishery into line with scientific advice with the principal aim of attaining conservation limits in all Salmon Fishing Districts.

C7. Outline programmes (including in-season programmes) that will be used to monitor the effects of the management measures, and identify information deficiencies and the timeframe for their resolution.

National Carcass Tagging and Logbook Scheme - mandatory carcass tagging and recording of catch details. Information is entered into a National Database operated by the Central Fisheries Board. Provides more accurate catch statistics and information on effort, distribution of catch by method, etc. Carcass tags are also the principal method of controlling the allocation of the TAC within each district and by fishing method as tags are colour-coded by fishing method and number coded by district, tag number and year.

National Micro-tagging and Recovery Programme - Between 200,000 and 300,000 salmon smolts are tagged annually from nine locations around Ireland. Examination of over 100,000 salmon annually in commercial and recreational catches (between 30 and 50% of the national catch) provides recoveries of between 3,000 and 10,000 tags for analyses. This generates specific information on exploitation rates, marine survival and freshwater survival of Irish salmon stocks.

Wetted area analysis - The previous method of estimating district Conservation Limits was updated in 2003. Conservation Limits for each Irish river will continue to be developed to ascertain the actual productive capacity of the individual rivers.

Attainment of Conservation Limits - The attainment of Conservation Limits will be assessed from the returns in the fisheries and the exploitation rates. Supplementary information will be available from 22 electronic fish counters distributed throughout the country. Currently, information is available for 2002 and 2003 for 18 fish counters to compare actual run size with predicted Conservation Limits. These will demonstrate whether key indicator stocks are meeting Conservation Limits and will allow any improvements in spawning stocks to be monitored.

Example provided by Iceland

A. Brief Description of the Fishery(ies):

Date of review:	21.04.2004
Fishery location:	River Hvítá, and tributaries, West Iceland.
Gear types:	Rod and line Gillnets
Magnitude of fishery (e.g. catch or effort):	Rod fishery: 1974-2003 is 6,044 (s.d. 717) fish. Rod fishery: 1994-2003 is 6,008 (s.d. 711) fish. Net fishery: 1974-2003 is 3,181 (s.d. 2847) Net fishery: 1994-2003 is 325 (s.d. 135) Effort: Rod fishery: 56 rods for 90 days, in total 5,040 rod/days. Effort: Net fishery: 68 nets (1974-1991) lease from May 20 to August 20 since 1991. Effort: Nets used: 6 nets during fishing season. 37 nets from August 20 to October 10. Weekly net fishing period is 5 days. Tuesday 10 am to Friday 10 pm.
Current management restrictions:	Rod and line fishery in tributaries only. From 1 June to September 25 with 105 days as the maximum fishing period in each tributary. 12 fishing hours/day. Net fishery: Weekly net fishing period is 5 days. Tuesday 10 am to Friday 10 pm.
Outline pre-agreed procedures (or provide references):	Historic reference point in rod fishery 1fish/rod/day.
Principal river stock(s) exploited:	The net fishery exploits at least 10 different salmon stocks. The number of stocks is based on the principle of one stock per tributary.
Other fisheries exploiting stock(s):	None
Other information:	River Hvita is mixture of direct runoff, spring-fed and glacial water. Tributaries are clear water. Drainage area is 3,880 km^2 including glacier that covers 9% of the catchment basin. The mean annual discharge is 190 m^3/s. Salmon is the dominant fish species in the river system with smaller populations of sea-trout and sea-charr.

If fishery primarily exploits salmon from only one river answer all questions in Section B;
If fishery exploits salmon from more than one river answer all questions in section C.

B. Single River Stock Fishery(ies)

B1. Specify the reference points (Conservation Limit and/or Management Target) or alternative measures used to define adequate abundance of the stock.

In recent years the proportion of the salmon run caught in mixed stock fishery is low (see section A) and not significant for the salmon stock in the River Hvita and its tributaries. In this Decision Structure, salmon stocks in River Hvita mainstem and its tributaries are listed combined.

The only reference point used is based on the average of 1fish/rod/day in River Hvita mainstem. Net fishery is limited to the weekly net fishing period of 5 days. Tuesday 10 am to Friday 10 pm.

The net fishery in River Hvita has been leased since 1991 by the landowners of the tributaries. The salmon catch in the mixed stock fishery since 1991 decreased and is 325 fish on average.

The only reference point used is based on the average of 1 fish/rod/day in each of the tributaries to the River Hvita. The tributaries are: Andakilsa (2 rods), Grimsa (10 rods), Flokadalsa (3 rods), Reykjadalsa (2 rods), Thvera (14 rods), Nordura (14 rods) and Gljufura (3 rods). The number of rods in the mainstem is 8.

B2. Describe the status of the stock relative to the abundance criteria in B1.

- Include trends and forecasts of abundance.

Information is not available other than the catch records that are expected to reflect the status of stocks. The catch records include sea-age composition of the salmon catch.

B3. Is the stock meeting other diversity criteria (e.g. age structure, run-timing, fecundity)?

- Describe criteria assessed;
- Identify possible reasons for any failure.

No, the number of 2SW salmon is declining, probably due to increased ocean mortality.

B4. Is the fishery(ies) selective for certain stock components (e.g. age groups, size groups, populations)?

- If yes, describe reasons.

Yes: Based on information from rod catch in other rivers with fish counters, the exploitation rate of 2SW fish is higher than for 1SW fish due to earlier runtime for 2SW salmon.

The size selectivity of gillnets is not available.

B5. Is the stock threatened by factors other than fisheries (e.g. habitat degradation, disease/parasites, predators)?

- If yes, describe threat and management action that will be taken (e.g. establish gene bank; habitat mitigation).

No.

B6. Describe management actions that will be employed to control harvest, including measures that will be used to address any failure or trend in abundance or diversity, taking account of pre-agreed procedures.

- Decisions should take account of: uncertainty in the assessments; abundance of the stock (q. B2); diversity of the stock (q. B3); selectivity of the fishery (q. B4); any non-fishery factors affecting the stock (q. B5); and socio-economic factors; and other fisheries exploiting the stock;
- Describe the expected extent and timescale of effects.

Catch and release is the most likely measure in tributaries. This is recommended for 2SW salmon on a voluntary basis. The percentage released in 2003 was 12.3% in the tributaries to the River Hvita.

Prior to the net lease in the River Hvita, the average number of 5049 ± 1460 were caught annually.

The majority of the nets in the River Hvita have been leased since 1991 by the landowners of the tributaries. The net lease increases the rod catch in tributaries by 28-35% per year. The rods are taking 39-52% of the previous net catch.

The net lease agreement is based on the high value of the rod fishery compared to net-caught salmon. The sum paid for the net lease is €135,000 annually.

B7. Outline programmes (including in-season programmes) that will be used to monitor the effect of the management measures and identify information deficiencies and timeframe for resolution.

With stable effort the catch statistics in tributaries can be used as an indicator of stock size. Most of the tributaries are monitored through yearly electrofishing surveys.

ANNEX 18

Council

CNL(04)16

Reports on Progress with Development and Implementation of Habitat Protection and Restoration Plans

CNL(04)16

Reports on Progress with Development and Implementation of Habitat Protection and Restoration Plans

Summary

1. At its 2001 Annual Meeting the Council adopted a NASCO Plan of Action for Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat, CNL(01)51. The overall objective of this Plan of Action is to maintain and, where possible, increase the current productive capacity of Atlantic salmon habitat through the establishment and implementation, by the Contracting Parties and their relevant jurisdictions, of comprehensive salmon habitat protection and restoration plans. These plans aim to:

   - protect current productive capacity of existing habitat and restore habitat that has already been adversely impacted;
   - identify potential risks to productive capacity and develop procedures for implementation of corrective measures;
   - place the burden of proof on proponents of an activity which may impact on habitat;
   - maintain biodiversity;
   - take into account other biological factors affecting productive capacity, e.g. predator-prey interactions;
   - balance risks and benefits to salmon stocks with the socio-economic implications of a project.

   In order to measure and improve progress in meeting the objective, the Plan of Action proposes the establishment of inventories of rivers by the Contracting Parties and their relevant jurisdictions. The Parties agreed to report to NASCO on progress towards implementation of the plan(s) and on development of inventories.

2. A reporting format for this information was used on a trial basis for the first returns last year, and the Council agreed to use this format for subsequent returns. The information provided by the Parties according to this format is attached. At the time of preparation of this report, no return had been received from some EU Member States (France, Portugal and Spain) with salmon interests. A summary of the measures taken in the two years since reporting began is contained in tabular form in Annex 1 in order to allow progress since the Plan's adoption to be reviewed.

3. Progress in developing or updating inventories of salmon rivers since the last notification has been reported by the EU (Ireland, and the United Kingdom (Northern Ireland)) and the USA. In Ireland, wetted areas and river-specific conservation limits have been included in the inventory and each river classified according to reach and sub-reach and gradient. In the United Kingdom (Northern Ireland), the inventory described in 2003 is being extended through the compilation of information for additional river catchments. In the US, a web-based database has been established to hold inventory data. No progress in establishing or updating inventories of salmon rivers has been reported by the other Parties or the other EU Member States.

4. There has also been progress in establishing or updating habitat protection and restoration plans in the EU (United Kingdom (England and Wales, and Northern Ireland)), and the USA. In England and Wales, Salmon Action Plans have been completed for all the principal salmon rivers. These plans include an agreed list of actions to be addressed within five years. In Northern Ireland, funding has been secured to implement a habitat restoration plan in two catchments. In the US, a report by the National Research Council is being used as a guide to restoration activities. In Iceland, while no overall plan has been developed, habitat protection is the responsibility of each river association and as most rivers do not have habitat problems, no restoration plan is required. No progress in developing or updating habitat protection and restoration plans has been reported by the other Parties or the other EU Member States.

5. With regard to evaluation and monitoring, in the United Kingdom (England and Wales), stock status and fishery performance are monitored in all rivers where the catch is >50 salmon. The evaluation and monitoring programmes are reviewed annually. No changes to evaluation and monitoring programmes were reported by the other Parties or the other EU Member States.

Secretary
Edinburgh
11 May, 2004

1.	Has an inventory of rivers, as envisaged in Annex 2 of the NASCO Plan of Action, been established or updated since the last notification? If "yes" please provide a brief description of the inventory or of any changes to an existing inventory.

Canada

Organizations and agencies such as the Atlantic Salmon Federation, Fisheries and Oceans Canada and Environment Canada maintain and update various databases on Atlantic salmon rivers and associated environments.

European Union

Ireland

The inventory has been significantly improved in 2003 with the addition of wetted areas accessible to salmon produced by the Central Fisheries Board (Quantification of the Freshwater Salmon Habitat Asset in Ireland - 2004) and the establishment of river-specific Conservation Limits based on these areas and known stock and recruitment parameters from European index rivers. Each river has been classified according to reach and sub-reach classified according to gradient classes (Amiro, Rosgen classification schemes).

Sweden

An inventory of all salmon rivers has existed for several years. It describes the physical characteristics of each salmon river, obstacles to migration, and size and quality of the rearing habitat for salmonids. The salmon population in each river is described with regard to its present status, the need for protection, to what extent it is dependent on continued liming operations and other factors such as releases and the fishery. A short summary of actions to be taken for each river has been developed. This list of actions, as well as the inventory, needs to be revised to be more in line with Annex 2 in the NASCO Plan of Action.

United Kingdom

England and Wales

Various inventories are employed for the management of salmon rivers in England and Wales, for example for the establishment and review of conservation limits in 64 principal salmon rivers. A Geographical Information System (GIS) based method for estimating the extent and quality of salmon habitat is in development, to be completed during 2004.

Northern Ireland

An inventory of rivers in Northern Ireland supporting or capable of supporting salmonids has been compiled on a GIS. Data on habitat quantity and quality, juvenile fish abundance and adult escapement were updated for rivers in the Foyle and Carlingford area and in the Bush, Glendun, Maine and Blackwater rivers in the Fisheries Conservancy Board area. Similar information is also being compiled for other catchments, for example the Erne system.

Scotland

Salmon fishery management in Scotland is devolved to District Salmon Fishery Boards. A number of Fishery Trusts and Foundations has also been established. Trust biologists and biologists employed by Boards have established a series of inventories listing either rivers or habitat problems relevant to their areas of jurisdiction.

USA

As reported in CNL(04)17, at last year's Annual Meeting the U.S. agreed to chair a Working Group to develop a Habitat Database inter-sessionally. A database has been developed and made available through a website and data was entered by the U.S. and Canada.

Other Parties

No progress in establishing or updating inventories of salmon rivers has been reported by the other Parties or the other EU Member States.

2. Has a comprehensive salmon habitat protection and restoration plan been developed in accordance with the aims of the NASCO Plan of Action, or an existing plan updated, since the last notification? If "yes" please provide brief details of the plan and the extent of its implementation or of any changes to an existing plan since the last notification.

Canada

Canada has a no-net-loss policy that we continue to apply to ensure conservation of salmon and other fishery resources. An example is the latest hydro-electric facility being proposed on a salmon river in Quebec: DFO is reviewing the project and will only recommend approval if no-net-loss is assured. It is also Canada's policy to encourage and support habitat stewardship to involve government agencies, public interest groups and the private sector to conserve, restore and develop fish habitat.

European Union

Ireland

The objectives of National Programmes run by state agencies (Central and Regional Fisheries Boards, Marine Institute, the Environmental Protection Agency, etc.) are in accordance with the NASCO Plan of Action.

Sweden

The present status of the habitat plan is provided in section 1 above. The present protection and restoration plan needs to be revised and expanded to be in line with the NASCO Plan of Action.

United Kingdom

England and Wales

Salmon Action Plans (SAPs) have now been completed for all principal salmon rivers in England and Wales. Each SAP comprises two documents. The Consultation document reviews stock and fishery status, identifies factors limiting performance and lists a series of costed options to address these. Following consultation on this document, a Final Plan is prepared containing an agreed list of actions to be addressed within five years. Progress on each of these actions is reviewed annually.

Northern Ireland

A Habitat Restoration Plan has been prepared and funding secured to implement this in two catchments – the Maine (FCB area) and Clanrye (Carlingford area). Procedures are now in place to inform all proposals with a potential to impact on habitat or which involve the improvement of land and water use.

Scotland

Salmon fishery management in Scotland is devolved to District Salmon Fishery Boards. A number of Fishery Trusts and Foundations has also been established. Trust biologists and biologists employed by Boards have established a series of inventories listing either rivers or habitat problems relevant to their areas of jurisdiction

Iceland

Each river association is responsible for salmon habitat protection on its river. Additionally any gravel mining or in-river structures, such as fish ladders, need to be approved by the Directorate of Freshwater Fisheries. Most Icelandic salmon rivers do not need a habitat restoration plan as the habitat is in fairly good condition.

USA

A great deal of time and effort over the past year has been focused on the development of a recovery plan for endangered populations of Atlantic salmon. This plan includes provisions for the protection and restoration of Atlantic salmon habitat. Atlantic salmon restoration programmes on other rivers, such as the Connecticut and Merrimack, are conducted under management plans that include provisions for salmon management and habitat protection.

There are a number of programmes within the U.S. to support and facilitate Atlantic salmon protection and restoration. These include the Atlantic Salmon Collaborative grants operated by the National Fish and Wildlife Foundation
(http://www.nfwf.org/programs/atlantic_salmon.htm)
and the NOAA Community Based Restoration programme
(http://www.nmfs.noaa.gov/habitat/restoration/funding_opportunities/funding.html).

In 2000, the National Research Council of the National Academies was asked to describe what is known about the genetic make-up of Atlantic salmon in Maine and this was done in a report issued in January 2002. In addition, they were asked to assess the causes of decline and to suggest strategies for the rehabilitation of salmon in Maine. That report was issued on 20 January 2004 and is being used as a guide for restoration and recovery activities.

Other Parties

No progress in developing or updating comprehensive salmon habitat protection and restoration plans has been reported by the other Parties or the other EU Member States.

3.	If a Plan has been developed or updated since the last notification have evaluation and monitoring systems been introduced or updated to assess the effectiveness of the plan in protecting and restoring salmon habitat? If the response to question 2 was "yes" please provide details of these systems or of changes to existing systems since the last notification.

European Union

United Kingdom

England and Wales

Stocks and fishery performance are monitored in all those rivers where the annual catch is >50 salmon. The juvenile programme started in 2002, and aims to identify spatial differences and temporal trends in the juvenile salmon population. It samples 380 sites quantitatively each year to identify temporal trends in abundance, and 3,030 sites are sampled semi-quantitatively once every five years to identify spatial variation in the juvenile population. Evaluation and monitoring programmes are reviewed annually as part of the development and implementation of Salmon Action Plans. A review has been completed of salmon stocks in recovering rivers

Northern Ireland

Baseline data (adult escapement, juvenile populations, habitat quantity and quality) to inform habitat restoration plans has been collated on specified catchments.

USA

Monitoring provisions will be included as part of the recovery plan for endangered Atlantic salmon populations. The process of identifying appropriate systems and evaluation criteria is on-going.

Other Parties

No progress in developing or updating evaluation and monitoring systems has been reported by the other Parties or the other EU Member States.

1. Summary of progress reports on the establishment or updating of inventories of salmon rivers.

Party	2003 Return	2004 Return
Canada	A number of inventories have existed for years, but one common database as outlined in the NASCO Plan of Action does not yet exist. A number of inventories were carried out over the past year by the various jurisdictions. DFO has developed a Geographic Information System to access all habitat-related information for the province of Quebec. A similar system has recently been developed in Newfoundland and Labrador. Further inventory development is expected in 2003/2004.	Organizations and agencies such as the Atlantic Salmon Federation, Fisheries and Oceans Canada and Environment Canada maintain and update various databases on Atlantic salmon rivers and associated environments.
Denmark (in respect of the Faroe Islands and Greenland)		
Faroe Islands	No return received.	
Greenland		
European Union		
Denmark	No return received.	
Finland		
France	No return received.	No return received.
Germany	No return received.	
Ireland	The current Irish inventory is being modified in line with NASCO's suggested inventory. The current inventory contains: River number (OS index); Region; River name; Location (latitude and longitude); Brief description; NASCO category; Catchment area; Total length; Axial length; Maximum altitude; Hydrographic characteristics; Presence of trap or counter; Conservation limit (provisional).	The inventory has been significantly improved in 2003 with the addition of wetted areas and the establishment of river-specific Conservation Limits. Each river has been classified according to reach and sub-reach classified according to gradient classes.
Portugal	No return received.	No return received.
Spain	No return received.	No return received.
Sweden	An inventory of all salmon rivers has existed for several years and describes the physical characteristics of the rivers, obstacles to migration and the quantity and quality of rearing habitat. A list briefly summarizing the actions to be taken for each river has been developed. This list, as well as the inventory, needs to be revised so as to be more consistent with the NASCO Plan of Action.	No change from 2003 return.

Party	2003 Return	2004 Return
UK – England and Wales	Various inventories are employed for the management of salmon rivers, e.g. for the establishment and review of conservation limits. A Geographic Information System (GIS)-based method for estimating the extent and quality of salmon habitat is in development, to be completed during 2004.	No change from 2003 return.
UK – Northern Ireland	GIS inventories were updated for rivers in the Foyle and Carlingford area, and in the Bush, Glendun, Maine and Blackwater rivers in the FCB area. These record data on habitat quantity and quality, juvenile fish abundance and adult escapement.	An inventory of rivers has been compiled on a Geographical Information System (GIS). Data on habitat quantity and quality, juvenile fish abundance and adult escapement were updated for rivers in the Foyle and Carlingford area and in the Bush, Glendun, Maine and Blackwater rivers in the Fisheries Conservancy Board area. Similar information is also being compiled for other catchments, for example the Erne system.
UK – Scotland	Trust biologists and biologists employed by Boards have established a series of inventories listing either rivers or habitat problems relevant to their areas of jurisdiction.	No change from 2003 return.
Iceland		
Norway	A new categorization system for rivers with salmon has been developed and applied in a nationwide survey of salmon rivers. The system is compatible with, but more detailed than, the NASCO rivers database. During the survey, information on human impact factors, restoration and mitigation actions was collected. Information on the status of stocks will be updated every year.	
Russian Federation	Compilation of an inventory has been initiated. It now includes the complete information required for 2 rivers and partial information for another 76 rivers.	
USA	The US is in the process of developing a salmon river habitat database, using the structure contained in the NASCO Plan of Action. It will include river data, salmon production data, habitat improvement data and river classification.	The U.S. agreed to chair a Working Group to develop a Habitat Database inter-sessionally. A database has been developed and made available through a website and data was entered by the U.S. and Canada.

2. Summary of progress in the development or updating of comprehensive salmon habitat protection restoration plans.

Party	2003 Return	2004 Return
Canada	All fish habitat in Canada is managed according to the national Policy for the Management of Fish Habitat. A net gain in the productive capacity of fish habitat is the overall objective. There is currently a significant amount of restoration work underway. DFO's contribution is focused on improving access. Although an overall conservation and restoration plan already exists, it is being further refined and developed at the watershed level. A number of new watershed management plans are being implemented and more are being developed.	Canada has a no-net-loss policy that continues to be applied to ensure conservation of salmon and other fishery resources. It is also Canada's policy to encourage and support habitat stewardship to involve government agencies, public interest groups and the private sector to conserve, restore and develop fish habitat.
Denmark (in respect of the Faroe Islands and Greenland)		
Faroe Islands	No return received.	
Greenland		
European Union		
Denmark	No return received.	
Finland		
France	No return received.	No return received.
Germany	No return received.	
Ireland	No specific plan has been developed. However, the objectives of National Programmes run by state agencies are in accordance with the NASCO Plan of Action. These include: establish an inventory; quantify existing habitat; estimate productive capacity; estimate current production; identify shortfalls and recovery potential; enhance damaged habitat; monitor outcome.	No change from 2003 return.
Portugal	No return received.	No return received.
Spain	No return received.	No return received.
Sweden	The present protection and restoration plan needs to be revised and expanded to be consistent with the NASCO Plan of Action.	No change from 2003 return.
UK – England and Wales	Salmon Action Plans (SAPs) are being developed for all principal salmon rivers. Plans contain an agreed list of actions to be addressed within five years. SAPs are expected to be completed for all principal salmon rivers by the end of 2003.	Salmon Action Plans (SAPs) have now been completed for all principal salmon rivers. Plans contain agreed list of actions to be addressed within five years. Progress on each of these actions is reviewed annually.

Party	2003 Return	2004 Return
UK – Northern Ireland	A Habitat Restoration Plan has been prepared and funding for implementation is being sought.	A Habitat Restoration Plan has been prepared and funding secured to implement this in two catchments – the Maine (FCB area) and Clanrye (Carlingford area).
UK – Scotland	Fishery Boards and Fishery Trusts have been developing plans relevant to their areas of jurisdiction. A number of habitat enhancement programmes are in place, including bank stabilization, removal/easing of obstructions, riparian buffer strips. Forest and Water Guidelines have been introduced.	Trust biologists and biologists employed by Boards have established a series of inventories listing either rivers or habitat problems relevant to their areas of jurisdiction.
Iceland		Each river association is responsible for salmon habitat protection on its river. Gravel mining and in-river structures need approval from the Directorate of Freshwater Fisheries. Most Icelandic salmon rivers do not need a habitat restoration plan as the habitat is in fairly good condition.
Norway		
Russian Federation	Salmon habitat protection and restoration plans have been developed for two rivers.	
USA	A great deal of time and effort over the past year has been focused on the development of a recovery plan for endangered populations of Atlantic salmon. This plan includes provisions for the protection and restoration of Atlantic salmon habitat. Restoration programmes on other salmon rivers include provision for habitat protection.	A great deal of time and effort over the past year has been focused on the development of a recovery plan for endangered populations of Atlantic salmon. This plan includes provisions for the protection and restoration of Atlantic salmon habitat. Restoration programmes on other salmon rivers include provisions for habitat protection. There are a number of programmes within the U.S. to support and facilitate Atlantic salmon protection and restoration. A report by the National Research Council of the National Academies is being used as a guide for restoration and recovery activities.

3. Summary of progress in introducing or updating evaluation and monitoring systems.

Party	2003 Return	2004 Return
Canada	Some monitoring to measure the efficacy of conservation and restoration initiatives has and continues to occur; however, it is recognized that further monitoring would be beneficial. The Habitat Management program is moving towards a more results-based approach.	
Denmark (in respect of the Faroe Islands and Greenland)		
Faroe Islands	No return received.	
Greenland		
European Union		
Denmark	No return received.	
Finland		
France	No return received.	No return received.
Germany	No return received.	
Ireland	Monitoring of EU-funded physical enhancement works continued.	
Portugal	No return received.	No return received.
Spain	No return received.	No return received.
Sweden		
UK – England and Wales	Evaluation and monitoring programmes are reviewed annually as part of the development and implementation of Salmon Action Plans. The national fisheries monitoring programme was revised in 2000. 2002 was the first full year of the new programme (comprising electrofishing, trapping, counters and catch recording). A review has been completed of salmon stocks in recovering rivers.	Stocks and fishery performance are monitored in all those rivers where the annual catch is >50 salmon. Evaluation and monitoring programmes are reviewed annually as part of the development and implementation of Salmon Action Plans.
UK – Northern Ireland	Monitoring data (on adult escapement, juvenile populations, habitat quantity and quality) on specified catchments.	No change from 2003 return.
UK – Scotland	Trust and Board biologists undertake regular sampling to assess fish population and habitat status.	

Party	2003 Return	2004
Iceland		
Norway		
Russian Federation	Federal nature conservation authorities assess the effectiveness of plans for protection of salmon habitat.	
USA	Monitoring provisions will be included as part of the recovery plan for endangered Atlantic salmon populations. The process of identifying appropriate systems and evaluation criteria is ongoing.	No change from 2003 return.

ANNEX 19

Council

CNL(04)38

NASCO Atlantic Salmon Rivers Database Project: Clarification of Potential Uses and Recommendations for Next Steps

CNL(04)38

NASCO Atlantic Salmon Rivers Database Project: Clarification of Potential Uses and Recommendations for Next Steps

Following discussion of CNL(04)17, the Council requested a clarification of the potential uses of, and recommended next steps in, the development of the NASCO salmon rivers database.

Potential uses of the database include:

1. The main purpose would be to describe and summarize the status of Atlantic salmon habitat in all countries on a regular schedule.

2. It would be an effective way to describe and monitor the level of impact(s) on salmon habitat.

3. It would be a useful tool for Contracting Parties, and others, to monitor and evaluate habitat conservation and restoration plans over time.

Recommendations for next steps in development of the NASCO salmon rivers database:

1. The Parties should agree to annually update the original NASCO salmon rivers database (the Rivers Table in the expanded database) to correct errors and inconsistencies and conform to the new format. These data include river name, location information, and NASCO salmon stock category. This should *not* require a significant amount of time and effort.

2. The Parties should consider using the database to report basic salmon habitat and habitat impacts information to meet the following objectives agreed to in the NASCO Plan of Action for Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat: a) to establish the baseline level of salmon production *potential* against which changes may be assessed and to monitor changes over time, and b) to identify appropriate restoration activities and assist policy makers in prioritizing restoration programmes (CNL(04)17). The Parties should endeavour to avoid any duplication with regard to databases required for other purposes.

3. If data are available, and countries have the resources to enter generalized juvenile and adult salmon production data, this would be an added benefit to the database (i.e., salmon production data entry would be optional). Countries are encouraged to evaluate the potential uses of the NASCO database for this purpose.

4. Given the above, the most appropriate location for the database is with existing NASCO information on the current NASCO website. NASCO should make sure that the countries that provide data input have access to their own data at all times.

5. Parties should provide an annual progress report on the status of salmon habitat as currently required under the development and implementation of habitat protection and restoration plans.

6. The NASCO salmon rivers database should contain links to relevant national databases which may contain more information of special interest to the countries concerned.

It is recognized that within each Contracting Party there are individual legal and governance frameworks for dealing with habitat management and therefore coordination should take place in the provision of habitat information.

ANNEX 20

Council

CNL(04)54

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

(Adopted at the Twentieth Annual Meeting of NASCO in June 2003 and amended at the Twenty-First Annual Meeting of NASCO in June 2004)

CNL(04)54

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

(Adopted at the Twentieth Annual Meeting of NASCO in June 2003 and amended at the Twenty-First Annual Meeting of NASCO in June 2004)

The Parties,

NOTING the provisions of the Convention for the Conservation of Salmon in the North Atlantic Ocean of 2 March 1982 (the "Convention"), which seeks to promote the conservation, restoration, enhancement and rational management of salmon stocks;

WELCOMING the achievements in salmon conservation by the Parties to the Convention, within the framework of the Convention, and the role of the North Atlantic Salmon Conservation Organization (the "Organization") therein;

NOTING that NASCO and its Contracting Parties have agreed to apply the Precautionary Approach to the conservation of salmon and acknowledging the need for measures taken in accordance with this Resolution to be consistent with the Precautionary Approach;

AWARE of the need for cooperation between the Parties in order to maintain and to restore the wild salmon stocks, and promote sustainable conservation and management of such stocks;

RECOGNISING the benefits, including the socio-economic benefits, which have resulted from the development of salmon aquaculture;

CONSCIOUS of the threats to the wild stocks of salmon from different human activities, including possible adverse effects from aquaculture, introductions and transfers and transgenics;

RECOGNISING that in order to protect wild salmon stocks from adverse impacts that can be caused by aquaculture, introductions and transfers, and transgenics, there is a need to take into account local conditions in determining appropriate management measures;

DESIRING to minimise the possible adverse impacts of aquaculture, introductions and transfers and transgenics on the wild stocks and noting the earlier initiatives taken by the Organization in this respect;

RESOLVE as follows:

ARTICLE 1

Cooperation between the Parties

The Parties shall cooperate in order to minimise adverse effects to the wild salmon stocks from aquaculture, introductions and transfers and transgenics.

ARTICLE 2

Definitions

For the purposes of this Resolution definitions are as given in Annex 1.

ARTICLE 3

Burden of Proof

Each Party, in accordance with the Precautionary Approach, should require the proponent of an activity covered by this Resolution to provide all information necessary to demonstrate that the proposed activity will not have an adverse impact on wild salmon stocks or lead to irreversible change.

ARTICLE 4

Risk Assessment

Risk assessment is integral to the implementation of the Precautionary Approach and serves to promote transparency in the decision-making process. Risk assessment should include identification of options and consideration of mitigation measures. The Parties should develop and apply appropriate risk assessment methodologies in considering the measures to be taken in accordance with this Resolution.

ARTICLE 5

Measures to Minimise Impacts of Aquaculture and Introductions and Transfers

Each Party shall take measures, in accordance with Annexes 2, 3 and 4 to this Resolution, to:

- Minimise escapes of farmed salmon to a level that is a close as practicable to zero through the development and implementation of action plans as envisaged under the Guidelines on Containment of Farm Salmon (CNL(01)53);
- Minimise impacts of ranched salmon by utilizing local stocks and developing and applying appropriate release and harvest strategies;
- Minimise the adverse genetic and other biological interactions from salmon enhancement activities, including introductions and transfers;
- Minimise the risk of transmission to wild salmon stocks of diseases and parasites from all aquaculture activities and from introductions and transfers.

Movements into a Commission area of reproductively viable Atlantic salmon or their gametes that have originated from outside that Commission area should not be permitted.

ARTICLE 6

Non-Indigenous Fish

No non-indigenous fish should be introduced into a river containing Atlantic salmon without a thorough evaluation of the potential adverse impacts on the Atlantic salmon population(s) which indicates that there is no unacceptable risk of adverse ecological interactions.

Introductions into any Commission area of reproductively viable non-indigenous anadromous salmonids or their gametes should not be permitted.

ARTICLE 7

Transgenic Salmonids

The Parties should apply the Guidelines for Action on Transgenic Salmon, CNL(97)48 (Annex 5), to protect against potential impacts from transgenic salmonids on wild salmon stocks. In view of the current lack of scientific knowledge on the impact of transgenic salmonids on wild salmon stocks, the use of transgenic salmonids should be considered a high-risk activity. There should be a strong presumption against any such use.

ARTICLE 8

River Classification and Zoning

For the purposes of developing management measures concerning aquaculture and introductions and transfers, Parties should, as appropriate, develop and apply river classification and zoning systems. Details of such systems should be established in accordance with the guidance in Annex 6.

ARTICLE 9

Mitigation and Corrective Measures

Where adverse impacts on wild salmon stocks are identified, the Parties should initiate corrective measures without delay and these should be designed to achieve their purpose promptly.

Mitigation measures can include activities to safeguard against potential future impacts (e.g. contingency planning, gene banks).

ARTICLE 10

Implementation

In order to have confidence that the wild stocks are protected from irreversible genetic change, from ecological impacts and from impacts of diseases and parasites, full implementation of the measures in this Resolution and its Annexes is essential. Local conditions may warrant consideration of stronger measures.

Where detailed agreements are developed by a regional Commission of NASCO in support of this Resolution, they will be appended. Appendix 1 indicates the current situation within the North American Commission. Any further guidelines to assist in implementing this Resolution will be annexed.

Each Party shall report annually to the Organization on the measures adopted and actions taken under Articles 5, 6, 7 and 9.

ARTICLE 11

Research and Development

Each Party should encourage research and data collection in support of this Resolution (as detailed in Annex 7) and should take steps to improve the effectiveness of the measures contained in this Resolution.

Each Party shall report annually to the Organization on the research and development carried out.

ARTICLE 12

Dissemination of Information

Educational materials should be developed and distributed to increase awareness of the risks that introductions and transfers of aquatic species may pose to wild salmon stocks and the need for the measures that control these activities.

Annex 1

Definitions relating to Salmon Aquaculture, Introductions and Transfers and Transgenics

Term	**Definition**
Containment	Physical containment: Prevention of escapes of farmed salmon into the freshwater and marine environments. Containment of diseases and parasites: Implementation of measures to prevent the spread of diseases and parasites from aquaculture facilities.
Epidemiological zones	Zones defined by lack or presence of specific pathogens.
Introduction	The intentional or accidental release of a species into an environment outside its native or natural range.
Mitigation stocking	Stocking conducted as a voluntary action or statutory requirement to mitigate lost production due to an activity that cannot be removed.
Non-indigenous	Not originating or occurring naturally in a particular environment; introduced outside its native or natural range.
Population	A group of organisms of a species occupying a specific geographical area.
Rehabilitation	The rebuilding of a diminished population of a finfish species, using a remnant-reproducing nucleus, toward the level that its environment is now capable of supporting.
Restoration	The re-establishment of a finfish species in waters occupied in historical times.
Risk assessment	The process of identifying and describing the risks of activities having an impact on fisheries resources, habitat or aquaculture before such activities take place; the process of identifying a hazard and estimating the risk presented by the hazard, in either qualitative or quantitative terms.
River classification	Designation of a river or watershed according to the degree of human impact.
Salmon aquaculture*	The culture or husbandry of Atlantic salmon and includes salmon farming, salmon ranching and salmon enhancement activities.
Salmon enhancement	The augmentation of wild stocks in individual river systems by the release of Atlantic salmon at different stages in their life-cycles.
Salmon farming	Production system which involves the rearing of Atlantic salmon in captivity for the duration of their life-cycle until harvested.
Salmon ranching*	The release of reared Atlantic salmon smolts with the intention of harvesting all that return.
Salmonid*	All species and hybrids of the family salmonidae.

Stock* (Management unit)	A management unit comprising one or more salmon populations.
Stock (local)	A stock from a river or tributary in close proximity to the river to be stocked. This may refer to rivers with a common bay of entry or closely related catchment areas.
Stocking	The deliberate release of Atlantic salmon into the wild at any stage of their life-cycle for enhancement, mitigation, restoration, rehabilitation or ranching purposes.
Transfer*	The deliberate or accidental transport of Atlantic salmon within their native or natural range.
Transgenic	An organism that has been modified by genetic engineering to contain DNA from an external source.
Wild salmon	Fish that have spent their entire life-cycle in the wild and originate from parents which were also spawned and continuously lived in the wild.
Zone	Geographic area reflective of the degree of degradation or manipulation of wild Atlantic salmon populations.

* for the purposes of the NAC Protocols, a different definition is used, see NAC(94)14

Annex 2

General Measures To Minimise Impacts

1. Siting and Operation of Aquaculture Activities

1.1 Salmon aquaculture facilities should only be located where hydrographical, epidemiological, biological and ecological standards can be met. Factors which may be taken into consideration include: availability of water supply and receiving waters for discharge; water quality and exchange; water depth; site protection; separation distances between aquaculture facilities; and distance from salmon rivers. Further guidance on containment is provided in Annex 3.

1.2 Consideration should be given to the establishment of "wild salmon protection areas" where salmon aquaculture is restricted or prohibited. Such protection areas may minimise genetic, disease, parasite and environmental impacts.

1.3 The designation of "aquaculture regions", where all the steps in the production process are carried out and which are separated from similar regions by areas without aquaculture, should also be considered. Such regions could provide a framework for management of the aquaculture industry and could assist in controlling the spread of fish diseases and parasites.

1.4 The separation distance between aquaculture facilities at marine sites should be based on a general assessment of local conditions. Wherever possible, different generations of salmon should be reared in separate locations. As local conditions permit, a fallowing regime should be practised as a means of minimising outbreaks of disease and parasites. Aquaculture production should be adapted to the holding capacity of an individual site and should not exceed density levels based on good husbandry practices.

1.5 Dead and dying fish should be removed immediately from aquaculture production facilities and disposed of, along with waste materials, in an approved manner. Procedures should be established to address the effective removal and disposal of infectious material. Contingency plans should be established for the disposal of mortalities from emergency situations.

1.6 Tagging or marking could be used in order to facilitate the identification of farmed salmon in the wild and their separation from wild fish, to determine the source of escapes and to assess the interactions of escaped farmed salmon with the wild stocks.

2. Diseases and Parasites

2.1 All steps in the aquaculture production process from hatchery to processing plant, including transportation of live fish materials, should be conducted in accordance with appropriate fish health protection practices. This includes attention to the application of appropriate husbandry techniques to minimise the risk of disease in the reared stock. These might include vaccination, use of optimal stocking densities, careful handling, frequent inspection of fish, proper diet and feeding regimes, avoidance of unnecessary disturbance of the fish, detailed health inspections, disinfection of transportation equipment and the use of foot baths at production facilities.

Specified diseases and parasites

2.2 Mapping of the presence of serious diseases and parasites should be used to establish epidemiological zones (either with or without specific pathogens). Management measures within these zones should include monitoring to confirm the disease status of a zone and eradication. These zones should be established for at least the following diseases: Viral Haemorrhagic Septicaemia (VHS), Infectious Haematopoietic Necrosis (IHN), Infectious Salmon Anaemia (ISA) and the parasite *Gyrodactylus salaris*.

2.3 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 should not be permitted. However, movements of salmonid eggs may be permitted where there is minimal risk of transmission of the specified diseases or parasite.

2.4 A list of the prevailing infectious diseases and parasites, and the methods in practice for their control, should be maintained by the appropriate authorities.

Unknown diseases and parasites

2.5 Procedures should be established for the early identification and detection of, and rapid response to, an outbreak of any new disease or parasitic infection likely to affect Atlantic salmon. These procedures should include the establishment of official surveillance services responsible for the monitoring of the health of both wild and farmed fish. The procedures should also demand the rapid introduction of restrictions on the movement of salmonids in the case of an outbreak of a disease or parasitic infection until the status of the disease or parasitic infection is known.

2.6 Even with such procedures, it may not be possible to respond in time to prevent the spread of such a disease or parasitic infection. It is recommended that the Contracting Parties, when establishing or reviewing rules on transfers of fish, consider additional protective measures such as:

- **the establishment of zones:** the intention of such zones, between which the movement of live salmonid fish and their gametes should be restricted and which might be defined using geographical, climatic or biological criteria, is to limit the spread of parasites and diseases to wild stocks;

- **the movement of salmonids:** for disease prevention purposes, the trade in eggs is safer than the trade in live fish. It must, however, be recognised that some serious diseases, such as IPN, BKD and IHN, may be transferred with eggs and ovarian fluid;

- **diseases of wild fish:** there is a need to strengthen and amend disease controls to ensure adequate protection of wild fish.

Health inspections of donor facilities

2.7 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, should only take place from facilities where regular inspections have not detected significant diseases and parasites.

Use of medicines and disinfectants

2.8 Medicines and disinfectants to control diseases and parasites must be used with care and in accordance with the manufacturer's instructions and any Codes of Practice, and in compliance with regulatory authorities.

3. Gene Banks

3.1 Various activities may result in serious adverse impacts on salmon stocks and strains such that the potential exists that a portion of the salmon genome is lost. In order to protect against this possibility, Parties should consider the establishment of gene banks for stocks that are in danger of extirpation. This could provide a source of genetic material for future restoration programmes.

Annex 3

CNL(01)53

Guidelines on Containment of Farm Salmon

Section 1: Introduction

1.1 The North Atlantic salmon farming industry and the North Atlantic Salmon Conservation Organization (NASCO) have established a Liaison Group. This Liaison Group recognised the importance of conserving and enhancing wild salmon stocks and of supporting a sustainable salmon farming industry and is seeking to establish mutually beneficial working arrangements in order to make recommendations on wild salmon conservation and sustainable farming practices. To this end the Liaison Group has developed guidelines on containment to apply throughout the NASCO Convention area.

1.2 Both Parties recognise that a number of guidelines and measures, outlined below, should apply to all salmon aquaculture activities. The Liaison Group should be updated annually on progress on the development of parallel measures in relation to these activities.

Section 2: Objectives

2.1 these guidelines are intended to result in the prevention of escapes of farmed salmon in the freshwater and marine environments.

Section 3: Site Selection

3.1 sites shall be selected having regard to the capability of the equipment to withstand the weather and other environmental conditions likely to be experienced at that site;

3.2 in the interest of avoiding collision damage, equipment shall comply with the relevant national and international regulations regarding navigation and marking;

3.3 careful consideration shall be given to the siting of land-based facilities, so as to minimise the risk of escapes from these facilities.

Section 4: Equipment and Structures

4.1 nets, cages and moorings systems shall be designed, constructed and deployed to prevent escapes, having proper regard to the prevailing conditions at the site. Moorings systems should have a significant in-built safety margin;

4.2 nets and cages should be marked with an identification number; adequate records of each net and cage in use should be maintained in order to assess its fitness for purpose;

4.3 nets shall be: compatible with the cages with which they will be used; secured to the cage collar so that the collar alone bears the strain; and adequately UV-protected. Net weights shall be installed in such a way as to prevent damage to the nets;

4.4 tank systems shall be designed to contain fish effectively and to minimise the chances of fish escaping. Where the outflow from tanks passes into a settling pond, the outflow from the settling pond should incorporate a screen of suitable size and construction to minimise the chances of fish escaping;

4.5 effective predator deterrence methods shall be implemented as appropriate; these should be up-graded as improved, site-appropriate and cost-effective systems of proven efficacy become available; records of predator attacks that may have caused escapes should be maintained for audit;

4.6 salmon farming systems should be upgraded as improved, site-appropriate and cost-effective systems of proven efficacy become available.

Section 5: Management System Operations

5.1 farm management procedures shall ensure supervision by appropriately trained, qualified or experienced personnel. There is a need for constant vigilance during operations that could result in escapes;

5.2 procedures shall be adopted to ensure that escapes are prevented during movement and handling of stocks (e.g. during stocking, counting, grading, transport, transfers, treatment and harvesting of fish), and during net changes and cleaning;

5.3 regular preventative maintenance, inspection and repair procedures shall be adopted in order to prevent escapes;

5.4 stress testing of all nets in use shall be conducted on a regular basis and testing protocols, minimum breaking strengths and thresholds for net replacement should be specified in action plans. Records of the results of the tests shall be retained throughout the period the net is in use;

5.5 when it is necessary to tow cages, great care shall be taken to avoid damage to the nets;

5.6 storm preparation procedures shall be developed to minimise the risk of damage from storms detailing the actions to be taken to ensure that the site is made ready; after each storm all nets, cages and mooring systems shall be inspected for damage;

5.7 vessels shall be operated so as to minimise the risk of accidental damage to the equipment;

5.8 where practicable, security systems should be installed so as to deter acts of vandalism and malicious damage.

Section 6: Verification

6.1 management systems should include as a minimum all details of introductions, grading, transfers, treatments, handling or any other incident or occurrence that may have led to an escape. These details shall be recorded and retained for audit. Detailed records should allow estimates of escapes to be made. It is recognised that not all discrepancies will be the result of escapes;

6.2 when an event occurs which leads to an escape defined as significant under the action plan, the operator shall advise the appropriate authorities immediately;

6.3 a site-specific contingency plan shall be developed for use when an event occurs which may have led to an escape defined as significant under the action plan. The contingency plan shall include details of the method of recapture to be used and the area and timeframe over which a recapture programme would apply. Efforts shall be made to recapture farmed salmon immediately provided that this is practicable and does not adversely affect wild Atlantic salmon populations;

6.4 action plans should require appropriate authorities to take all reasonable efforts to issue permits for facilitating the contingency plans developed for each farm.

Section 7: Development of Action Plans

7.1 each jurisdiction should draw up a national action plan, or regional plans, at the earliest opportunity, based on these guidelines. The action plan is the process through which internationally agreed guidelines on containment would be implemented at national or regional level through existing or new voluntary codes of practice, regulations, or a combination of both;

7.2 each action plan should:

7.2.1 create a systematic basis for minimising escapes so as to achieve a level of escapes that is as close to zero as is practicable;

7.2.2 include a mechanism for reporting information on the level and causes of escapes;

7.2.3 include a mechanism for reporting and monitoring in order to assess compliance and to verify the plan’s efficacy;

7.2.4 identify areas for research and development.

7.3 the action plan should be based on co-operation between industry and the relevant authorities and should include the allocation of responsibilities under the plan(s) and a timetable for implementation.

Section 8: Reporting to the Liaison Group

8.1 each jurisdiction should advise the Liaison Group annually on progress in implementing its action plan(s).

Section 9: Revision

9.1 these guidelines shall be subject to revision, with the agreement of the Liaison Group, to take account of new scientific, technical and other relevant information.

Annex 4

Guidelines for Stocking Atlantic Salmon

I. Introduction

The term "stocking" is defined as "the deliberate release of Atlantic salmon into the wild at any stage of their life-cycle for enhancement, mitigation, restoration, rehabilitation or ranching purposes," as defined in Annex 1 of this Resolution.

Stocking is widely carried out by many government and private entities for the reasons listed above. While these programmes are sometimes successful, it is now known that stocking can also have negative impacts on wild salmon populations and other species and that poor hatchery practices may negatively impact the characteristics of the wild salmon population that we wish to conserve. Potential consequences include: depression of the survival and abundance of indigenous populations and straying of stocked fish into nearby rivers. There is thus a need to consider fully the risks as well as the benefits arising from stocking.

Codes of Practice for stocking are widely available as are very detailed stocking manuals. These codes and manuals are designed to address issues of local or national relevance.

The present document is designed to provide guidance to NASCO's Parties on applying the Precautionary Approach to the authorisation and conduct of any stocking of Atlantic salmon into the wild. The guidelines will be regularly reviewed and updated as appropriate in the light of new scientific information.

II. Rationale for Stocking

There are many possible causes for decline of Atlantic salmon populations and stocking may not be an appropriate solution. Where a river is at or close to carrying capacity there may be little or no benefit from stocking. In addition, stocking is carried out for ranching purposes.

NASCO's Guidelines on the Use of Stock Rebuilding Programmes, CNL(04)55, provide guidance on compliance assessment, evaluation of the problem, development of a management plan and monitoring and evaluation of progress. In addition, to assist its Parties in applying the Precautionary Approach, NASCO has developed a Decision Structure for Management of North Atlantic Salmon Fisheries, CNL31.332, and a Plan of Action for the Protection and Restoration of Atlantic Salmon Habitat, CNL(01)51. It is recommended that these documents be consulted in determining if stocking is an appropriate management response to a perceived problem.

In accordance with the Precautionary Approach appropriate risk assessment methodology should be developed and applied by the Parties to proposals for stocking. Proponents must provide all information necessary to demonstrate that a proposed stocking activity will not have a significant adverse impact on wild salmon populations or have an unacceptable impact on the ecosystem.

III. Guidelines for Conducting Stocking

A. Definition of river classes

For the purposes of these guidelines, three types of river are defined on the basis of the extent to which salmon and their habitats have been affected by human activities: Class I, Class II and Class III.

Rivers are classified as Class I when they are pristine. Class I rivers have no significant human-induced habitat alterations, and neither any history of introductions or transfers of fish into the watersheds nor any fish-rearing operations in the watersheds, and no aquaculture has been conducted in marine cage culture within a specified distance of the river.

Rivers are classified as Class II if one or more of the following conditions occur: the habitat has been altered; non-indigenous wild or hatchery-reared Atlantic salmon populations have been released; or aquaculture has been conducted in marine cage culture within a specified distance of the river. Non-indigenous species may be present in land-based facilities. Introduced species such as rainbow trout would be treated as indigenous if a population has been established for 10 or more years. Many rivers around the North Atlantic will belong to this class.

Rivers are classified as Class III if habitats have been altered or if fish communities are destabilised, such as the loss of component populations, or non-indigenous species are present.

B. Guidelines applicable to all rivers

1. Atlantic salmon of European origin, including Icelandic origin, should not be released in the North American Commission area and Atlantic salmon of North American origin should not be released in the North-East Atlantic Commission area.

2. Prior to any transfer of eggs, juveniles or broodstock, health inspections of the donor facility will be undertaken. No fish will be transferred from the facility to other facilities or released into waters within the NASCO Convention area if emergency diseases, as defined by national, state, or provincial authorities, are detected at the donor facility.

3. Fish with restricted diseases, as defined by national, state, or provincial authorities, may be transferred between facilities or released into waters within the NASCO Convention area, provided that this does not result in changing the disease status of the receiving facility or waters. These transfers must also comply with national, state or provincial regulations.

4. Where hatchery rearing programmes are used in support of stocking programmes specialist advice should be sought in order to minimise genetic impacts in resultant generations. Hatchery rearing programmes should comply with the following measures:

   (a) Wherever possible, use eggs or progeny of wild fish;

(b) Ensure that wild fish removal will not significantly adversely impact on donor population(s);

(c) Derive broodstock from all phenotype age groups and components of a donor population[1];

(d) Careful consideration must be given to the size of the effective breeding population and its management. Geneticists have generally recommended that a minimum of a random group of 50 pairs be used for each cohort. However, that advice may not always be appropriate. For rehabilitation projects, where wild populations may be severely limited (i.e. remnant populations and live gene bank situations), it is essential that specialist advice be sought in order to minimise genetic impacts in resultant generations;

(e) Ideally, for genetic reasons, each male should be mated separately with a female so that the contribution of all males is equal (i.e. do not mix milt of males prior to fertilization, which can promote sperm competition);

(f) Where a river, or tributary, has completely lost its salmon population(s), several populations might be used for stocking to provide wide genetic variability for natural selection. However, genetic advice should be sought;

(g) Where there are suitable areas of unoccupied habitat, stocking with eggs or fry is recommended as stocked populations will benefit from natural selection during the juvenile phase.

5. Stocking and management programmes should take account of the fact that most Atlantic salmon in rivers are structured into a number of populations.

C. <u>Guidelines applicable to Class I rivers</u>

1. *General*

(a) No Atlantic salmon reared in a fish culture facility are to be released into a Class I river, another river which has its estuary within an appropriate, specified distance of a Class I river, or a marine site that is within an appropriate, specified distance of a Class I river;

(b) In general, no non-indigenous[2] Atlantic salmon are to be released into a Class I river.

2. *Rehabilitation*

(a) Generally, rehabilitation is not necessary in Class I rivers. However, where human-induced or natural events impact on a Class I river the preferred

[1] The term ‘population’ here is used to denote a genetic population, i.e. populations are groups of animals within which mating is more or less random and among which interbreeding is more or less constrained.
[2] Not belonging to the local genetic population.

methods are to improve degraded habitat and to ensure escapement of sufficient spawners through fisheries management.

3. ***Restoration (or establishment) of Atlantic salmon in a river or part of a watershed where there are no salmon***

(a) Expert advice should be sought to identify the best option, based on the genetic and ecological characteristics of the donor population or the habitat characteristics of the donor stream;

(b) Consideration should be given to the impacts on the existing fish community and fisheries.

4. ***Ranching***

(a) Atlantic salmon ranching should only take place at release sites located greater than an appropriate, specified distance from the estuary of a Class I river and if it is demonstrated that the activity will not significantly affect wild Atlantic salmon populations.

D. Guidelines applicable to Class II rivers

1. ***General***

(a) Atlantic salmon, with the exception noted in III-B-1 of these guidelines, may be considered for stocking, if fish health and genetic protocols are followed and risk assessments show, on the basis of careful ecological impact evaluation, that negative impacts on local populations of Atlantic salmon will be minimal. Use of non-indigenous fish should only be used as a last resort.

2. ***Rehabilitation***

(a) The preferred methods are to improve degraded habitat and to ensure escapement of sufficient spawners through fisheries management;

(b) If further measures are required, residual population(s) of wild fish should be used. If the residual populations are too small, thorough genetic and ecological assessments should be carried out to identify the best option for rehabilitation purposes.

3. ***Restoration (or establishment) of Atlantic salmon in a river or part of a watershed where there are no salmon***

(a) For restoration, use a population(s) from a tributary within the same watershed or from a nearby river(s) that has similar genetic and ecological characteristics to the original population(s);

(b) For establishment, use a population(s) from a tributary within the same watershed or from a nearby river(s) that has similar habitat characteristics;

(c) Consideration should be given to the impacts on the existing fish community and fisheries.

4. ***Ranching***

(a) Atlantic salmon ranching should only take place at release sites located greater than an appropriate, specified distance from the estuary of a Class II river and if it is demonstrated that the activity will not significantly affect wild Atlantic salmon populations.

E. Guidelines applicable to Class III rivers

1. ***General***

(a) Atlantic salmon, with the exception noted in item III-B-1 of these Guidelines, may be considered for stocking, if fish health and genetic protocols are followed and risk assessments show, on the basis of careful ecological impact evaluation, that negative impacts on local populations of Atlantic salmon will be minimal.

2. ***Rehabilitation***

(a) The preferred methods are to improve degraded habitat and to ensure escapement of sufficient spawners through fisheries management;

(b) Rehabilitation may be achieved by stocking cultured fish.

3. ***Establishment or restoration of Atlantic salmon in a river or part of a watershed where there are no salmon***

(a) For restoration, use a population(s) from a tributary within the same watershed or from a nearby river(s) that has similar genetic and ecological characteristics to the original population(s);

(b) For establishment, use a population(s) from a tributary within the same watershed or from a nearby river(s) that has similar habitat characteristics;

(c) Consideration should be given to the impacts on the existing fish community and fisheries.

4. ***Ranching***

Ranching of Atlantic salmon should only be permitted if it is demonstrated that the activity will not significantly affect wild Atlantic salmon populations.

IV. Guidelines for Authorising Stocking

A. Introduction

Both proponents and agencies responsible for managing Atlantic salmon must ensure that the risk of adverse effects on wild Atlantic salmon populations from stocking is minimised.

B. Responsibility of proponent of stocking

1. Proponents must submit an application for stocking of Atlantic salmon to the permit-issuing agency (see Box 1).

2. The application should provide a full justification for stocking and sufficient documentary evidence to allow for an evaluation of the impacts of the proposed stocking activities on the wild Atlantic salmon and its habitats.

3. The lead-time required for notice and justification of stocking will be determined by the permit-issuing agency.

4. Proponents must report all stockings that are conducted.

C. Responsibility of those with the authority to issue permits

1. Enact laws to protect wild populations of Atlantic salmon and prevent the release of Atlantic salmon that will significantly affect the productivity of existing wild Atlantic salmon populations.

2. Draw the Guidelines to the attention of all proponents of stocking at the application stage.

3. Establish, maintain, and operate a permit system and inventory for all stockings of Atlantic salmon.

4. Enact regulations to control the stocking of Atlantic salmon.

5. Establish a formal scientific evaluation process to review all applications (private and government agencies) for the stocking of Atlantic salmon and recommend conditional acceptance or rejection of the proposed stocking(s) based on the potential impact on the ecosystem.

6. Establish an evaluation process to determine the effectiveness of stocking activities and their impacts on wild Atlantic salmon populations.

7. Within a class of rivers, each agency may be more restrictive in setting salmon stocking requirements.

8. Submit to NASCO, as requested, information of a scope to be determined by the Council in relation to the application of these Guidelines.

Box 1. Guidance for proponents in the preparation of stocking proposals

The following information should be provided to the permit-issuing agency with all applications to stock Atlantic salmon so as to enable the risk of adverse effects from the proposed activities on wild Atlantic salmon populations to be evaluated.

(1) Name the population and/or strain and, where available, its genetic characteristics, and include:

  (a) Time and quantity of stocking;

  (b) A list of anticipated future stockings;

  (c) A list of previous stockings.

(2) Area, place, river or hatchery from which the fish will be obtained.

(3) Proposed place of release and any interim rearing sites.

(4) Disease status of donor hatchery, river or other location from which fish are obtained.

(5) Disease status of recipient facility or stream (where available).

(6) Objectives of the stocking and the rationale for not using a local population (if such use is not proposed).

(7) Details of the available biological characteristics of the donor population. This would include such characteristics as run timing, time of spawning, age-at-maturity, size-at-age, etc. and potential for competition with local populations of Atlantic salmon in the recipient waters or nearby waters.

(8) Information on similar stockings.

(9) Proposed procedure for transportation from donor to recipient site.

(10) Measures to be taken to prevent transmission of disease agents and to reduce the risk of escape of fish.

(11) Species composition at proposed site of introduction and adjacent rivers.

(12) Climatic regime and water chemistry, including pH of waters at the site of proposed introduction and of adjacent rivers.

(13) Potential of stocked fish to disperse to nearby streams.

(14) A bibliography of pertinent literature.

(15) A plan for monitoring, in order to assess how successful stocking has been.

Annex 5

CNL(04)41

NASCO Guidelines for Action on Transgenic Salmonids

THE PARTIES to NASCO are aware of the development of transgenic salmonids. While there may be benefits from the introduction of such salmonids if, for example, they could not interbreed with wild stocks the Council recognises that there are also risks which may lead to irreversible genetic changes and ecological interactions.

The Council considers that there is an urgent need to take steps to ensure the protection of the wild stocks and has therefore agreed to cooperate to develop means such that transgenic salmonids cannot impact upon wild salmon stocks. The following specific steps are agreed.

The Parties will:

a) advise the NASCO Council of any proposal to permit the rearing of transgenic salmonids and provide details of the proposed method of containment and other measures to safeguard the wild salmon stocks;

b) take all possible actions to ensure that the use of transgenic salmonids, in any part of the NASCO Convention Area, is confined to secure, self-contained, land-based facilities;

c) inform their salmon producers of the potentially serious risks to wild stocks of this development and consult with the salmon farming industry on this matter through the Liaison Group established between NASCO and the international salmon farming industry;

d) take steps, as appropriate, to improve knowledge on the potential impacts of transgenic salmonids on the wild salmon stocks and their habitat;

e) examine the trade implications associated with transgenic salmonids in accordance with World Trade Organization Agreements and other instruments of international law.

Furthermore, those Parties to NASCO that are also Parties to the Cartagena Protocol on Biosafety to the Convention on Biological Diversity should take into account the provisions of that Protocol.

Annex 6

River Classification and Zoning

For the purpose of developing management measures concerning aquaculture, introductions and transfers, Contracting Parties should classify their Atlantic salmon rivers. Where appropriate, consideration should be given to grouping neighbouring or biologically (or otherwise) similar river systems into complementary management zones. River classification and zonation systems are useful to identify specific rivers and/or areas that need special protection. For example, rivers and/or areas that have been subject to significant enhancement efforts may need to be differentiated from rivers and/or areas that have not. This could allow managers to easily identify the rivers and/or areas where future enhancement efforts may or may not be appropriate.

The NAC Protocols and the NASCO Salmon Rivers Database provide examples of river classification systems. Contracting Parties should consider these examples in developing classification systems that are appropriate to their needs. Parties are further encouraged to work co-operatively in developing such systems (e.g. NEAC Parties could develop a classification system that complements the Water Framework Directive).

In conducting a risk assessment for a proposed aquaculture, or introductions and transfers, activity, the classification of the river(s) and/or zone(s) should be taken into account and class/zone-specific factors should be considered. Furthermore, in developing measures appropriate to each class of river or management zone, it is recognised that local conditions are a very significant factor and should also be considered.

Annex 7

Research and Development and Data Collection

Research and data collection should be carried out, as appropriate, in support of this Resolution. Recognising that research requirements are continually developing, a list of current research areas is identified in this Annex. Where appropriate, successful research results should be taken forward to pilot testing

Areas for research and pilot testing include:

Sterile fish

Methodology and techniques for sterilization are now well developed; research should now focus on developing strains of sterile fish which could perform at a level similar to current strains of fish used in farm production. Trials should be encouraged to evaluate the performance of strains of sterile fish under production conditions.

Tagging and marking

Tagging and marking is being used on a small scale in order to facilitate the identification of farmed salmon in the wild and their separation from wild fish, to determine the source of escapes and to assess the interactions of escaped farmed salmon with the wild stocks. Full evaluation of those trials should be conducted in order to assess effectiveness, the feasibility of large-scale marking, and associated costs.

Alternative production methods

There should be an ongoing evaluation of current and new production methods and technology including land-based production facilities, closed or contained floating facilities, water recirculation and other containment technologies to evaluate their potential to reduce the risk of disease and parasite transmission and escapes.

Aquaculture broodstock

Research is recommended on broodstock selection methodology to minimise impacts on wild salmon stocks.

Genetics

Great advances have been made in genetic research in the past decade. These methods should be applied in investigating, in greater detail, interactions between wild salmon and salmon of aquaculture origin, including the extent of hybridization, composition of stocks, and identification of disease strains and appropriate treatment.

Diseases and parasites

The transmission of diseases and parasites from salmon reared in aquaculture to the wild stocks is an area of considerable concern. Research on vectors for transmission, and methods to prevent and control disease and parasite outbreaks in aquaculture, should be encouraged.

Interactions

Information should be collected and analyzed on the extent of intermingling in rivers and at sea between wild salmon and salmon of aquaculture origin.

Risk assessment frameworks

There has been considerable activity in the development of risk assessment frameworks. There remains a need to identify the appropriate factors to be included in a risk assessment in order to evaluate the potential impacts of aquaculture, introductions and transfers, and transgenics on wild salmon stocks.

Biological impacts

Further work is recommended on biological interactions between wild salmon and salmon of aquaculture origin including competition and behavioural interactions that may affect the viability and success of the wild populations.

Appendix 1

North American Commission Protocols for the Introduction and Transfer of Salmonids
Summary of Protocols by Zone, NAC(94)14

Note:

This document contains only summary Protocols and should be read in conjunction with document NAC(92)24.

1 ZONING OF RIVER SYSTEMS

The NAC has adopted the concept of Zoning for application of these protocols to the NAC Area. Three zones have been designated based on the degree of degradation or manipulation of the wild Atlantic salmon populations (Figure 1). The NAC recognizes that Atlantic salmon populations have been variously affected by human activities. These activities include over-harvesting, selective fishing, habitat degradation, mixing of stocks, introduction of non-indigenous fish species, and spreading fish diseases. Atlantic salmon stocks in northern areas (Zone I) have generally been least affected, and those stocks in the southern area (Zone III) have been most affected, by humans.

In order to allow operational flexibility within a Zone, river systems have been classified as Class I, II, or III rivers. Generally, rivers will have the same classification as the Zone in which they occur. For example, in Zone II, river systems will be mainly categorized as Class II. However, a river system may be assigned a higher classification than the Zone in which it is located (e.g. Class I river in Zone II) to allow additional protection for valuable Atlantic salmon stocks. In extenuating circumstances and if a river is sufficiently isolated from other rivers, it is acceptable to have a river with a lower classification than the Zone in which it is located (e.g. Class III rivers within Zone II or Class II rivers in Zone I).

All rivers are generally classified at the same level as the Zone designation. Member countries wishing to change the location of Zone boundaries or to have rivers of a lower classification within a Zone should submit their recommendations, with scientific justifications, to NAC.

2 DESCRIPTION OF ZONES

Zone I: Geographic Area: Northern Quebec, Labrador, Anticosti Island and the major salmon-producing rivers in Newfoundland north of Cape Ray and west of Cape Saint John; namely: all rivers from Cape Ray to Cape Anguille and in Bay of Islands, Lomond River, Portland Creek, River of Ponds, Torrent River, Castors River, St. Genevieve River, Western Arm Brook, Salmon River (Hare Bay), Northeast River (Canada Bay), and Main River (Sop's Arm).

Rivers are classified primarily as Class I. They are pristine rivers with no significant man-made habitat alterations, no history of transfers of fish into the watersheds, and no fish-rearing operations in the watersheds.

Zone II: Geographic Area: Quebec rivers flowing into Gulf of St. Lawrence south of Pte. des Monts, Gaspé region of Quebec, Magdalen Islands, Prince Edward Island, New Brunswick, Nova Scotia, Newfoundland (except rivers designated as Class I rivers, referenced above in description of Zone I) and State of Maine east of Rockland.

Rivers are classified primarily as Class II watersheds in which one or more of the following conditions occur: the habitat has been altered; non-indigenous wild or hatchery-reared Atlantic salmon stocks have been released; or aquaculture has been conducted in marine cage culture. Non-indigenous species may be present in land-based facilities. Introduced species such as rainbow trout would be treated as indigenous if a population has been established for ten or more years.

Zone III: Geographic Area: Lake Ontario, southern Quebec draining to St. Lawrence River, State of Maine west of Rockland, New Hampshire, New York, Connecticut, Massachusetts, New Jersey, Rhode Island, and Vermont.

Rivers are classified primarily as Class III watersheds in which habitats have been altered, or where fish communities are destabilized, or exotic species are present.

3 PROTOCOLS

3.1 Protocols applicable to all three Zones

(1) Reproductively viable strains of Atlantic salmon of European origin, including Icelandic origin, are not to be released or used in Aquaculture in the North American Commission Area. This ban on importation or use of European-origin Atlantic salmon will remain in place until scientific information confirms that the risk of adverse genetic effects on wild Atlantic salmon stocks is minimal.

(2) No live salmonid fishes, fertilized eggs, gametes, or fish products are to be imported from IHN enzootic areas, unless sources have an acceptable history of disease testing demonstrating the absence of IHN (e.g. Great Lakes Fish Health Disease Committee protocol requirements). IHN infected areas currently include State of Washington, Oregon, Idaho, California, Alaska, British Columbia, Japan, and parts of Taiwan and France.

(3) Prior to any transfer of eggs, juveniles or brood stock a minimum of three health inspections of the donor facility will be undertaken during the two-year period immediately preceding the transfer; and

- No fish will be transferred from the facility to other facilities or released in waters within the NAC Area if emergency diseases are detected at a rearing facility (see Annex III, Part II of NAC(92)24);

- Fish with restricted diseases may be transferred or released in the NAC Area provided that this does not result in changing the disease status of the receiving facility or waters. These transfers must also comply with national, state or provincial regulations (see Annex III, Part II of NAC(92)24).

(4) Prior to any movement of non-native fishes into a river system or rearing site inhabited by Atlantic salmon the agency with jurisdiction shall review and evaluate fully the potential for interspecific competition which would adversely impact on the productivity of wild Atlantic salmon populations. Such evaluations should be undertaken, to the extent possible, with information on the river in which the introduction is to occur and from similar situations.

(5) Hatchery rearing programmes to support the introduction, re-establishment, rehabilitation and enhancement of Atlantic salmon should try to comply with the following measures:

(a) Use only F1 progeny from wild stocks;

(b) Derive broodstock from all phenotype age-groups and the entire run of a donor population;

(c) Avoid selection of the "best" fish during the hatchery rearing period; and

(d) During spawning, make only single paired matings from a broodstock population of no less than 100 parents. Should the number of one sex be fewer than 50, the number of spawners of the other sex should be increased to achieve a minimum effective population size (N_e) of 100.

$$N_e = \frac{4N♂N♀}{N♂+N♀}$$

3.2 Protocols applicable to Zone I

Zone I consists of Class I watersheds where every effort must be made to maintain the existing genetic integrity of Atlantic salmon stocks. The following summary protocols apply.

3.2.1 General within Zone I

- No Atlantic salmon reared in a fish culture facility are to be released into a Class I river, another river which has its estuary less than 30 km from a Class I river, or a marine site less than 30 km from a Class I river (distances would be measured in a straight line(s) headland to headland).

- No non-indigenous fish species, other than Arctic charr and brook trout, or non-indigenous Atlantic salmon stock is to be introduced into a Class I watershed.

3.2.2 Rehabilitation

- Fisheries management techniques will be used to ensure sufficient spawners such that spawning escapement exceeds a minimum target level to maintain an effective breeding population.

- Habitat that becomes degraded will be restored to the greatest extent possible.

3.2.3 Establishment or re-establishment of Atlantic salmon in a river or part of a watershed where there are no salmon

- Use transfers of adults or juvenile salmon from the residual population in other parts of the watershed.

- A nearby salmon stock which has similar phenotypic characteristics to the lost stock could be transferred if there is no residual stock in the recipient watershed and provided an effective breeding population is maintained in the donor watershed (See Section 3.1 (5)).

- If the biological characteristics of the original stock are not known or there was no previous stock in the recipient watershed, then transfer broodstock or early life stages from a nearby river having similar habitat characteristics.

3.2.4 Aquaculture

(i) Rearing in marine or freshwater cages, or land-based facilities:

  - Reproductively viable Arctic charr and brook trout may be reared in marine and freshwater cages and in land-based facilities;

  - Rearing of other salmonids or non-indigenous fishes is not permitted in the marine environment within 30 km of a Class I river, in a Class I river, or in a watershed with its estuary less than 30 km from the estuary of a Class I river. (30 km is measured in a straight line(s) headland to headland);

  - Rearing of reproductively viable indigenous species and reproductively sterile non-indigenous species is permitted in land-based facilities;

  - Reproductively sterile salmonids may be reared in the marine environment, and/or in a watershed with its estuary greater than 30 km from a Class I river, provided that the risk of adverse effects on wild salmon stocks is minimal;

  - Natural or man-made ponds which have adequate screening of the outlet and inlet streams, such that the risk of fish escaping is low, can also be treated as land-based facilities.

(ii) Commercial ranching:

- No commercial ranching of salmonids is permitted within 30 km of the estuary of a Class I river (measured in a straight line(s) headland to headland);

- At locations greater than 30 km from the estuary of a Class I river, reproductively sterile Atlantic salmon, reproductively viable brook trout or Arctic charr, and reproductively sterile non-indigenous species may be ranched provided that the risk of adverse effects on wild Atlantic salmon stocks are minimal.

3.3 Protocols applicable to Zone II

3.3.1 General within Zone II

- Reproductively viable non-indigenous species, other than Arctic charr and brook trout, and reproductively viable Atlantic salmon stocks, non-indigenous to the NAC area, are not to be introduced into watersheds or into the marine environment of Zone II.

- Restoration, enhancement and aquaculture activities are permitted in the freshwater and marine environments.

3.3.2 Rehabilitation

- The preferred methods are to improve degraded habitat and ensure escapement of sufficient spawners through fisheries management.

- If further measures are required, use residual stocks for rehabilitation and enhancement. If the residual stock is too small, select a donor stock having similar life-history and biochemical characteristics from a tributary or nearby river.

- Stocking of hatchery-reared smolts is preferred, to reduce competition with juveniles of the natural stocks.

3.3.3 Establishment or re-establishment of Atlantic salmon in a river or part of a watershed where there are no salmon

- To establish an Atlantic salmon stock, use a stock from a nearby river having similar stream habitat characteristics.

- If re-establishing a stock, use a stock from a nearby river which has similar biological characteristics to the original stock.

- It is preferable to stock rivers with broodstock or early life-history stages (eggs and fry); this would allow selection and imprinting by juveniles to occur.

- If eggs are spawned artificially, use single pair matings and optimize the effective number of parents (See Section 3.1(5)).

3.3.4 Aquaculture

(i) Rearing in marine or freshwater cages, and land-based facilities:

- It is important to apply methods which minimize escapes;

- Reproductively viable Arctic charr and brook trout may be reared in marine and freshwater cages and in land-based facilities;

- Develop domesticated salmon broodstock using local stocks; or, if local stocks are limited, use nearby stocks;

- Reproductively viable non-indigenous species may only be introduced into land-based facilities where risk of escapement is minimal;

- Non-indigenous salmonid stocks may be introduced into the wild or used in cage rearing operations if the fish are reproductively sterile and the risk of adverse ecological interactions is minimal.

(ii) Commercial ranching:

- Commercial Atlantic salmon ranching will only be permitted at release sites located greater than 20 km from the estuary of a Class II river (measured in a straight line(s) headland to headland) and it is demonstrated that the activity will not negatively affect wild Atlantic salmon stocks;

- Non-indigenous species or distant national Atlantic salmon stocks may be used if the fish are reproductively sterile and the risk of adverse ecological interactions is minimal.

3.4 Protocols applicable to Zone III

3.4.1 General within Zone III

- Indigenous and non-indigenous salmonid and non-salmonid [except reproductively viable Atlantic salmon stocks non-indigenous to the NAC Area] fishes may be considered for introduction or transfer if fish health and genetic protocols are followed and negative impacts on Atlantic salmon can be shown to be minimal using careful ecological impact evaluation.

3.4.2 Rehabilitation

- Habitat quality should be upgraded wherever possible.

- Rebuilding stocks can be achieved by controlling exploitation and by stocking cultured fish.

3.4.3 Establishment or re-establishment of Atlantic salmon in a river or part of a watershed where there are no salmon

- Transfer source stocks from nearest rivers having similar habitat characteristics.
- Stock with juvenile stages (eggs, fry and/or parr). If eggs are spawned artificially, use single pair matings and optimize the effective number of parents (Section 3.1(5)).

3.4.4 Aquaculture

(i) Rearing in marine or freshwater cages, or land-based facilities:

- Use of local stocks is preferred but non-indigenous stocks may be cultured;
- Marine cage culture can be widely practised; but preferred locations are at least 20 km from watersheds managed for salmon production (measurements are by straight lines from headland to headland);
- Culture of non-indigenous species in land-based facilities on Class III watersheds is permitted in adequately controlled facilities where risk of escapement is minimal.

(ii) Commercial ranching:

- Commercial ranching of salmonids is permitted if it is demonstrated that the activity will not negatively affect Atlantic salmon rehabilitation or enhancement programmes or the development of wild Atlantic salmon stocks.

4 GUIDELINES FOR APPROVAL OF INTRODUCTIONS AND TRANSFERS

Both proponents and agencies responsible for managing salmonids have a responsibility for ensuring that risk of adverse effects on Atlantic salmon stocks from introductions and transfers of salmonids and other fishes is low. Reasonable laws to protect wild stocks should be enacted by each agency, as necessary. Resource management agencies will determine protection for habitats with Atlantic salmon potential.

4.1 Responsibility of proponent

The proponent must submit an application for introduction or transfer of fishes to the permit-issuing agency. This request must provide a full justification for the introduction or transfer such that a complete evaluation will be possible prior to issuance of a permit. The list of information to be included in the justification for introductions and transfers is in Section 4.4 below. The lead time required for notice and justification of introductions and transfers will be determined by the permit-issuing agency. Proponents should be aware of the protocols established for introductions and transfers.

4.2 Responsibility of government agencies having the authority to issue permits

These agencies shall be those entities having the responsibility for fishery management within the receiving area. The responsibilities of the agencies shall include:

(1) Establish, maintain, and operate a permit system and inventory for all introductions and transfers of fishes;

(2) Enact regulations required to control the introductions and transfers of fishes as per established protocols;

(3) Establish a formal scientific evaluation process to review all applications (private and government agencies) for the introduction and transfer of all species and recommend conditional acceptance or rejection of the proposed introductions and transfers based on the potential impact on the productivity of Atlantic salmon;

(4) Within the Zones each agency may be more restrictive in classifying individual watersheds. Rarely, a less restrictive classification may be applied to an individual watershed if its estuary is at least 30 km in Zone I, or 20 km in Zone II (measured in straight lines headland to headland) from a watershed with a higher classification;

(5) Annually, submit to the NAC Scientific Working Group the results of the permit submission/review process, and a list of introductions and/or international transfers proposed for their jurisdiction;

(6) Prevent the release of fishes which will adversely affect the productivity of wild Atlantic salmon stocks.

4.3 Responsibilities of the NAC Scientific Working Group on Salmonid Introductions and Transfers

(1) Maintain an inventory of all introductions of salmonids, transfers of salmonids from IHN-infected areas, and importation of salmonids across national boundaries into the Commission Area.

(2) Review and evaluate all introductions and transfers referenced in Section 4.3(1) above in relation to the NAC protocols and report the results to the North American Commission.

4.4 Preparation of proposals

The following information is required, by the permit-issuing agency, with applications involving introductions and transfers of salmonids, except for restocking into source river. This information will be used to evaluate the risk of adverse effects on Atlantic salmon stocks.

(1) Name the species, strain and quantity to be introduced or transferred, and include:

   (a) Time of introduction or transfer;

   (b) List anticipated future introductions or transfers;

   (c) List previous introductions and/or transfers.

(2) Area, place, river or hatchery from which the fish will be obtained.

(3) Proposed place of release and any interim rearing sites.

(4) Disease status of donor hatchery, river or other location from which fish are obtained.

(5) Disease status of recipient facility or stream (where available).

(6) Objectives of the introduction or transfer and the rationale for not using local stock or species.

(7) For non-indigenous species, provide the available information on the proposed species' life-history, preferred habitat, potential parasites and disease agents, and potential for competition with Atlantic salmon in the recipient waters or nearby waters.

(8) Information on similar transfers or introductions.

(9) Proposed procedure for transportation from donor to recipient site.

(10) List measures to be taken to prevent transmission of disease agents and to reduce the risk of escape of fish.

(11) Species composition at proposed site of introduction and adjacent rivers.

(12) Climatic regime and water chemistry, including pH of waters at the site of proposed introduction and of adjacent rivers.

(13) For indigenous species determine the life-history and biological characteristics of donor stock. This would include such characteristics as run timing, time of spawning, age-at-maturity, size-at-age etc.

(14) Potential of introduced or transferred fish to disperse to nearby streams.

(15) A bibliography of pertinent literature should be appended to the proposal.

4.5 Evaluation of proposals

The evaluation of proposals will be the responsibility of the permitting agency and will focus on the risk to Atlantic salmon production and potential production associated with the proposed introductions and/or transfers. The evaluation will be based on the classification of the recipient watershed. All requests for introductions or transfers must provide sufficient detail (Section 4.4 above) such that the potential risk of adverse effects to Atlantic salmon stocks can be evaluated.

The evaluation of potential adverse effects on fish health will consider the disease history of the donor and recipient facility and/or watershed with specific reference to the potential for transferring emergency diseases. The risk of detrimental genetic effects of introducing a non-indigenous stock into a river will be evaluated taking into consideration the phenotypic and life-history characteristics of the donor stock, the biochemical information (mitochondrial/nuclear DNA and enzyme frequencies, if available), and geographic distance between donor and recipient locations. The evaluation of the risk of ecological effects on Atlantic salmon populations is more involved. Introduction of non-indigenous Atlantic salmon stocks and/or non-indigenous species will be evaluated by considering the life-history and habitat requirements of the transferred fish.

The introduction of non-indigenous species poses a significant risk to the productivity of the Atlantic salmon stocks. Evaluation will be by comparison of the habitat requirement and behaviour of both the proposed introduced species and the indigenous Atlantic salmon stock at all life stages. The habitat requirements and areas of possible interactions with Atlantic salmon have been described for 13 fish species (see Part IV, Ecological Subgroup report). These can be used to provide a cursory evaluation of the life-history stage at which interactions would occur. However, more detailed information on stocks and habitats in both donor and recipient locations would be required in the form of an envirogram (example is provided in Part IV). Where insufficient data are available, research will be required prior to permitting the introduction or transfer.

An outline example of the type of information which is available in the species summaries (Part IV) is presented below for rainbow trout:

(1) Conditions under which interactions may occur:

- spawning rainbow trout may overcut Atlantic salmon redds and displace developing eggs;

- competitive interaction of juveniles: (i) exploitative competition for food; and (ii) interference competition;

- rainbow trout juveniles are more aggressive than juvenile Atlantic salmon, and may displace salmon from pools; and

- large rainbow trout are piscivorous and could prey on all stages of young salmon including emigrating smolts.

(2) Low interaction:

- in streams which Atlantic salmon do not utilize;

- in streams in which salmon are well established; and

- aquaculture using sterile fish or land-based facility.

(3) Conditions under which no interaction would occur. It would be permissible to use reproductively viable rainbow trout:

- in habitats with pH less than 5.5;

- if rainbow trout are already present in recipient stream; and

- in disturbed ecosystems where Atlantic salmon are absent and sport fishing would be improved.

5 GLOSSARY

Applicant: See proponent.

Aquaculture: The culture or husbandry of aquatic fauna other than in research, in hobby aquaria, or in governmental enhancement activities.

Commercial ranching: The release of a fish species from a culture facility to range freely in the ocean for harvest and for profit.

Competition: Demand by two or more organisms or kinds of organism at the same time for some environmental resource in excess of the available supply.

Containment: Characteristic of a facility which has an approved design which minimizes operator error to cause escape of fish, or unauthorized persons to release contained fish.

Diversity: All of the variations in an individual population or species.

Enhancement: The enlargement or increase in number of individuals in a population by providing access to more or improved habitats or by using fish culture facility production capability.

Exotic: See introduced species.

Fish: A live finfish.

Fish culture facility: Any fish culture station, hatchery, rearing pond, net pen, or container holding, rearing, or releasing salmonids.

Gamete: Mature germ cell (sperm or egg) possessing a haploid chromosome set and capable of formation of a new individual by fusion with another gamete.

Genetics: A branch of biology that deals with the heredity and variation of organisms and with the mechanisms by which these are effected.

Indigenous: Existing and having originated naturally in a particular region or environment.

Introduced species: Any finfish species intentionally or accidentally transported or released by Man into an environment outside its native or natural range.

Introduction: The intentional or accidental release of a species into an environment outside its native or natural range.

Isolation: Means restricted movement of fish and fish pathogens within a facility by means of physical barriers, on-site sanitary procedures and separate water supply and drain systems and cultural equipment.

Mariculture: Aquaculture in sea water.

Native: See indigenous.

N_e: Effective population size $= \dfrac{4N♂N♀}{N♂+N♀}$

Niche: A site or habitat supplying the sum of the physical and biotic life-controlling factors necessary for the successful existence of a finfish in a given habitat.

Non-indigenous: Not originating or occurring naturally in a particular environment; introduced outside its native or natural range.

Population: A group of organisms of a species occupying a specific geographic area.

Predator: An individual that preys upon and eats live fish, usually of another species.

Proponent: A private or public group which requests permission to introduce or transfer any finfish within or between countries and lobbies for the proposal.

Quarantine: The holding or rearing of fish under conditions which prevent the escape or movement of fish and fish disease agents. (For a detailed description of a quarantine facility see Annex IX of Part II).

Rehabilitation: The rebuilding of a diminished population of a finfish species, using a remnant reproducing nucleus, toward the level that its environment is now capable of supporting.

Restoration: The re-establishment of a finfish species in waters occupied in historical times.

Salmonid: All species and hybrids of the Family Salmonidae covered by the AFS checklist special publication No. 12, “A list of Common and Scientific Names of Fishes from the United States and Canada (1980)”.

Species: A group of interbreeding natural populations that are reproductively isolated from other groups.

Stock: Population of organisms sharing a common gene pool which is sufficiently discrete to warrant consideration as a self-perpetuating system which can be managed.

Strain: A group of individuals with a common ancestry that exhibits genetic, physiological, or morphological differences from other groups as a result of husbandry practices.

Transfer: The deliberate or accidental movement of a species between waters within its native or natural geographic range, usually with the result that a viable population results in the new locations.

Transferred species: Any finfish intentionally or accidentally transported and released within its native or natural geographic range.

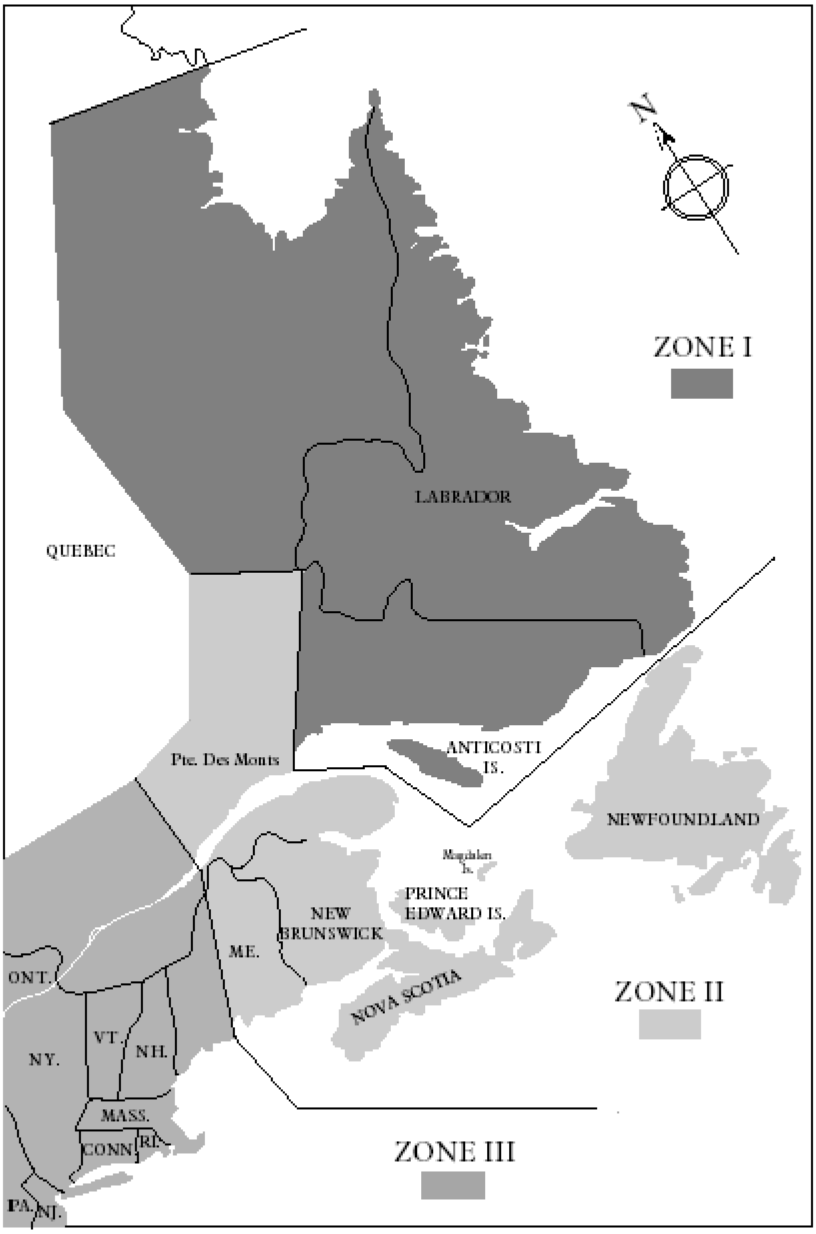


Figure 1.

Map of eastern Canada and northeastern USA showing the three zones designated for implementation of the Protocols. Certain rivers on the west coast of Newfoundland are designated as Zone I, even though Newfoundland is shown as being in Zone II.

ANNEX 21

Council

CNL(04)37

Proposal for a Workshop to Assess Current and Developing Methods for Marking Farmed Atlantic Salmon

(tabled by the European Union)

CNL(04)37

Proposal for a Workshop to Assess Current and Developing Methods for Marking Farmed Atlantic Salmon

(tabled by the European Union)

Despite the best efforts of the operators and managers of fish farms, it is inevitable that escapes will occur. Even where husbandry practices are as good as they can be, the possibility of equipment failure or catastrophic events remains. Currently, it is not always possible for fish which have escaped to be identified to the farm of origin. The escape of farmed salmon can have consequences not only for the wild salmon populations in the area to which the fish migrate, but also for the farmers, who lose stock, and may not always be aware of the extent of the loss, especially if there is an ongoing low-level escape process.

In the Strategic Framework for Scottish Aquaculture, published in 2003 by the Scottish Executive and developed by a Working Group comprising representatives of the Scottish fish farming industry, wild salmon interests and the Scottish Executive, a recommendation was made that an international assessment be undertaken of current and developing methods for the marking of farmed salmon. This approach to the problem was recommended because of the international nature of the industry, the need to ensure a "level playing field" across the industry throughout its range, and the magnitude of the problems associated with the logistics of marking the large numbers of fish involved.

A number of techniques are currently available for marking large numbers of juvenile Atlantic salmon, including some which combine marking techniques with fin-clipping and vaccination procedures. However, it is not clear that any systematic evaluation of the available techniques has been undertaken to allow fish farmers throughout the North Atlantic area to adopt a standardised method.

The European Union suggests that a Workshop be convened to address these issues. The Workshop should be held at an agreed date in late 2004 in Edinburgh, Scotland.

Draft Terms of Reference

1. To evaluate the current and developing techniques available for marking large numbers (many millions each year) of juvenile salmon destined for sea cage operations.

2. To develop protocols to ensure that smolts destined for different sea cage locations may be separately identified. (Each smolt-rearing station may supply smolts to a number of different fish farms, and each fish farm may receive smolts from a number of different smolt farms.)

3. To develop recommendations for screening techniques that may have to be used (often in remote fisheries) to identify marked fish farm escapees.

4. To examine the compatibility of marking techniques with food safety requirements, and their consistency with the requirement not to devalue the fish farm product.

ANNEX 22

Council

CNL(04)19

Returns Made in Accordance with the Williamsburg Resolution

CNL(04)19

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 Preliminary 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. The returns are attached.

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 relation to the Oslo Resolution and the new reporting format referred to this. In previous years, the Secretariat had checked the returns to ensure that only new measures were presented in the report to the Council.

As this is the first year of reporting under a new Resolution with a new reporting format, 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. It is clear from the information provided that some clarification of the information requested is required in the reporting format. For example, the information sought is for the 2003 calendar year and some of the information provided refers to initiatives in earlier years or that are to be introduced in the future. Furthermore, some Parties have provided a simple 'yes' answer, but have not provided details of the measures taken, and in some cases where new elements have been included in the reporting format (e.g. Mitigation and Corrective Measures) some returns indicate that previously reported measures still apply.

4. It is, of course, to be anticipated that there will be some initial difficulties with a new reporting format. On the basis that the format used on a trial basis this year will be used in future, it is proposed that this be further developed by the Secretariat prior to the next returns so as to assist the Parties in completing subsequent returns and to address the initial difficulties identified. The return seeks information on more than 40 elements included in the Resolution. This is a substantial reporting burden and some proposals for alternative reporting arrangements are made in document CNL(04)24.

5. 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). Furthermore, Canada has indicated that while it agrees with the Williamsburg Resolution in principle, it has not implemented the specific measures. Domestic consultations on the Resolution were only completed recently so Canada has not submitted a return for the Williamsburg Resolution, although a report on measures taken in accordance with the Oslo Resolution has been provided. Details of the measures reported by Canada are contained in Annex 1.

6. 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. General Measures to Minimise Impacts (Annex 2 of Williamsburg Resolution)

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

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)

Yes, this was investigated at the initial stages of the application. Northern Ireland has only 1 salmon aquaculture business, operating from 2 licensed marine sites off the east Antrim coast.

UK (Scotland)

A Location/Relocation Working Group has been established as a result of proposals in the Scottish Executive publication "A Strategic Framework for Scottish Aquaculture" to address these issues. In addition, Highland Council has produced a number of Aquaculture Plans in relation to location of aquaculture sites.

USA

No zones have been established that prohibit the location of aquaculture operations in different areas. This is due in large part to two factors: 1) the US has not identified any coastal areas that are particularly ecologically sensitive or unique as compared with other areas; and 2) the Maine Department of Marine Resources (MDMR) in conjunction with the Maine Department of Environmental Protection (MDEP) administer the Finfish Aquaculture Monitoring Programme (FAMP), which is a monitoring programme for all finfish farms in Maine. The purpose of the FAMP is to collect data from all of the operating finfish farms in order to ensure that they are not adversely affecting the environment. The FAMP includes the following: video survey of all active farms collected in the spring and fall that provides clear and timely information on the condition of the benthic habitat; dissolved oxygen readings collected in late summer to ensure there are not violations of water quality standards; and every other year, a benthic survey of organisms is conducted under farms to determine the abundance and diversity of animals within acceptable limits. The FAMP also supports and conducts research on the impacts of aquaculture. Recent research ventures have included: assessments of fallowing; organic enrichment; nutrient modeling of embayments; antibiotic residues; and nutrient enrichment.

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

European Union

UK (Scotland)

A Location/Relocation Working Group has been established as a result of proposals in the Scottish Executive publication "A Strategic Framework for Scottish Aquaculture" to address these issues. In addition, Highland Council has produced a number of Aquaculture Plans in relation to location of aquaculture sites.

Iceland

Wild salmon protection areas were established in 2001 (Regulation Nr. 226/2001).

Norway

Joint resolution of the Parliament (Stortinget) establishing national salmon rivers and fjords.

USA

The US does not think that wild salmon protection areas are necessarily appropriate for the US industry given the implementation of the FAMP by MDMR and MDEP and given that no particularly ecologically unique areas have been identified. Potential impacts posed by aquaculture operations are also assessed and limited by the National Marine Fisheries Service and US Fish and Wildlife Service.

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?

European Union

UK (Scotland)

A Location/Relocation Working Group has been established as a result of proposals in the Scottish Executive publication "A Strategic Framework for Scottish Aquaculture" to address these issues. In addition, Highland Council has produced a number of Aquaculture Plans in relation to location of aquaculture sites. The presumption against salmon farming on the north and east coasts of Scotland remains in place.

Iceland

Such areas were indirectly established in 2001 (Regulation Nr. 226/2001).

Norway

Protected salmon fjords.

USA

No, because once again the US feels that aquaculture is being addressed through other programmes.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Minimum distance of 1km is required.

UK (Northern Ireland)

Yes, again this was carried out at the initial assessment.

UK (Scotland)

A Location/Relocation Working Group has been established as a result of proposals in the Scottish Executive publication "A Strategic Framework for Scottish Aquaculture" to address these issues. In addition, Highland Council has produced a number of Aquaculture Plans in relation to location of aquaculture sites.

USA

There is no required minimum distance between facilities based upon the habitat conditions. The industry must apply for a permit from the State resource agencies (MDEP and MDMR) and federal agency (ACOE) for approval prior to establishing a new site. The application shall include information necessary for the Departments to evaluate the expected impact of the new facility on existing water quality.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Yes.

UK (England and Wales)

Freshwater hatchery sites in England and Wales now largely avoid holding more than one generation of fish.

UK (Northern Ireland)

There is a separation of age classes at the two sea sites but not at the hatchery.

UK (Scotland)

A Location/Relocation Working Group has been established as a result of proposals in the Scottish Executive publication "A Strategic Framework for Scottish Aquaculture" to address these issues. In addition, Highland Council has produced a number of Aquaculture Plans in relation to location of aquaculture sites.

Iceland

Adequate fallowing is carried out on rearing sites.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Yes.

UK (England and Wales)

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

UK (Northern Ireland)

Yes. There is a minimum six-week fallow period in place being implemented as part of the IPN Infected Waters Order.

UK (Scotland)

The Scottish Executive continues to encourage fallowing and its inclusion in Area Management Agreements (AMAs). We can report that in 2002 AMAs covering Loch Eriboll and the east side of the islands of Lewis and Harris were signed by all stakeholders.

Iceland

Adequate fallowing is carried out on rearing sites.

USA

Fallowing the site between production cycles is required to minimise the harbouring or spread of disease from one year-class to the next.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Benthic conditions are monitored and audited regulatory stocking densities are controlled under the terms of each Aquaculture Licence.

UK (England and Wales)

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)

Yes. The Salmon Company is an organic farm with required stocking density.

UK (Scotland)

An expert Working Group has been established to examine carrying capacity issues; the Group's Report is pending.

USA

State discharge permits (MEPDES) have feed discharge and fish monitoring requirements that include: the age, weight and number of fish in each pen; and the total amount of feed added to each pen. Optimal stocking densities based on good fish husbandry practices are encouraged. Information on the State of Maine Department of Environmental Protection Maine Pollution Discharge Elimination System (MEPDES) permit can be found at:
http://www.maine.gov/dep/blwq/docstand/wastepage.htm

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

This is required under the terms of the licence.

UK (Northern Ireland)

Yes.

USA

State discharge permits (MEPDES) require removal of mortalities at least once per week, all carcasses removed are to be collected in a leak-proof container and transported to a land-based disposal facility. The discharge of solid wastes is prohibited.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

In preparation - (National Animal By-Products Working Group).

UK (Northern Ireland)

Yes. Again under the Infected Waters Order conditions.

UK (Scotland)

The Scottish Executive is working with industry to facilitate the development of indigenous rendering capacity for high-risk fish waste.

USA

The US Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS) ISA programme standards requires all removal and disposal of infectious materials be conducted in a manner so as to minimise the exposure of all other fish at the site and in bay waters. Guidelines are provided for cleaning and disinfection based on the sites fish health status.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Yes.

UK (Northern Ireland)

No. This will be addressed by the end of the year.

USA

The USDA APHIS ISA programme standards have contingency plans for the immediate depopulation/eradication of infected fish based on the sites fish health status.

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

Sweden

A new regulation was introduced in 2003 stating that stocked salmon should have their adipose fin removed.

UK (Northern Ireland)

No. However, there is scientific work carried out on the genetics of local rivers.

UK (Scotland)

The Strategic Framework for Scottish Aquaculture recommends an international assessment of current and prospective techniques for tracing or marking farmed fish. In addition, a simulated escapes experiment involving the release of marked farmed salmon is scheduled for 2005.

Iceland

Marine cage farms must microtag 10% of smolts planted into cages according to provisions in the operational licence.

Norway

A decision in principle of the parliament, a committee will consider this question.

USA

The US is currently phasing in a marking programme that has, and will, facilitate the identification of escapees in the wild. The National Marine Fisheries Service completed a Biological Opinion on November 19, 2003, for the Army Corps of Engineers (permit aquaculture sites) on the adverse effect that existing aquaculture sites have on endangered wild Atlantic salmon. This Opinion includes special conditions that the Army Corps of Engineers will incorporate as mandatory conditions in the permits that they issue to the aquaculture industry authorizing the operation of these facilities. These conditions are also included in the Maine Department

Environmental Protection Maine Pollution Discharge Elimination System (MEPDES) permit. The special conditions in the Biological Opinion and MEPDES permit can be found at either of the following websites:

Biological Opinion:
http://www.nmfs.noaa.gov/prot_res/readingrm/ESAsec7/7se_maine_aquaculture_2003.pdf

MPDES Permit:
http://www.maine.gov/dep/blwq/docstand/wastepage.htm

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Yes.

UK (Northern Ireland)

Yes.

Iceland

Carried out according to EEA standards.

USA

The Department of Marine Resources transfer permit requires compliance with all the department's fish health guidelines, USDA APHIS ISA programme standards and all special conditions attached to the permit.

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

Yes. 2003: 9 seafarms with outbreak of ISA. IHN, VHS and *Gyrodactylus salaris* have never been diagnosed on Faroe Islands.

European Union

Ireland

Yes.

Sweden

VHS-zone established since 1998 at the mouth of River Gota alv. The disease was not detected in the infected fish farm 2003. No other zones for listed diseases have been established. The parasite *Gyrodactylus salaris* is considered to be affecting wild Atlantic salmon stocks in Sweden to a certain degree but not as much as in other Atlantic areas. In the Baltic and inland zones, the salmon stocks are considered to have an immune response.

UK (England and Wales, and Scotland)

Great Britain is a zone with recognised freedom from these diseases under Directive 91/67 EEC (as amended).

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

Both Bay Management Zones and Fish Health Zones are specified in the State of Maine DMR fish transfer permit. The DMR rules used the advice and findings of the Fish Health Technical Committee to refer to Cobscook Bay as a High Risk Zone (for ISA) and salmon aquaculture areas to the west as low or lower risk zones by epidemiological risk based on disease. Cobscook Bay sites have been included in the USDA APHIS ISA Programme.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Ireland

Yes.

Sweden

An eradication programme for VHS has been implemented at an infected fish farm on the River Gota alv.

UK (England and Wales, and Scotland)

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.

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

Cobscook Bay management area sites are participating in the USDA APHIS ISA programme which requires biosecurity audits and surveillance for diseases of concern. Information about the USDA APHIS ISA programme can be found at the following website: www.aphis.usda.gov/programmes/aquaculture

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?

There have been no 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.

The US has reported that biosecurity guidelines for fish and egg movement minimise the risk of the introduction and spread of infectious diseases. Movement of fish between ISA suspect and ISA positive marine sites into sites that are free of diseased cages is prohibited; two weeks prior to transfer fish must be tested for ISA. No disease of regulatory concern or other clinical level infectious disease can have been detected at the respective sites 4 weeks prior to fish transfer or movement.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Germany

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

Ireland

Yes.

UK (England and Wales, and Scotland)

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

UK (Northern Ireland)

Yes.

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

USDA APHIS ISA standards including Best Management Practices (BMP's) that will reduce the risk of the introduction and spread of infectious diseases has been adopted by all marine sites in Maine. Integrated Pest Management guidelines are established for all Bay Management Groups including BMP's that will reduce the need for use of chemicals or medications. Participation in both programmes is required in accordance with the DMR transfer permit.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Germany

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

Ireland

Yes.

Sweden

An unidentified virus was detected in a quarantine of glass eels in 2003. Stocking was only allowed in coastal zones.

UK (England and Wales, and Scotland)

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)

Yes.

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

USDA APHIS ISA standards include aggressive surveillance for the early detection and response to any outbreaks of diseases of concern. DMR rules allow the State to require immediate depopulation of infected fish. The depopulation is required to be supervised by the USDA APHIS programme area veterinarian in charge.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Sweden

An unidentified virus was detected in a quarantine of glass eels in 2003. Stocking was only allowed in coastal zones.

UK (England and Wales, and Scotland)

Controls are consistent with the requirements for maintenance of approved status.

UK (Northern Ireland)

Yes. The Disease of Fish Act allows for the imposition of the Infected Waters Order which will help protect the wild stocks.

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

Restrictions on movement of vessels between epidemiological zones have been established, including disinfection protocols. Transportation of live or processed fish products are required to carry a valid transfer permit issued by DMR or USDA.

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

Germany

Imported salmon ova for stocking programmes are inspected regarding diseases of virological origin.

Iceland

Carried out according to EEA standards.

USA

Broodstock used for egg production are required to be screened for diseases of concern. Eggs are disinfected prior to arrival at hatcheries and are kept in separate units until the results from the disease screening are received.

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?

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

Yes.

European Union

Finland

Yes.

Germany

Yes.

Ireland

Yes.

UK (England and Wales, and Scotland)

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)

Yes.

Iceland

Carried out according to EEA standards.

Norway

Yes.

USA

Integrated Pest Management guidelines are established for all Bay Management Groups including BMP's that will reduce the need for use of chemicals or medications. State discharge permits (MEPDES) regulate the use of drugs approved by the FDA for Atlantic salmon aquaculture that may be used in accordance with manufacturers' instructions.

1.3 Gene Banks

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

European Union

Finland

Yes.

Spain

Yes. Sperm cryopreservation.

Norway

Yes.

USA

The USFWS has implemented a captive broodstock programme for recovery of listed endangered Atlantic salmon in the U.S. They are in the process of establishing gene preservation measures to maintain current genetic variability within these populations.

2. Guidelines on Containment of Farm Salmon (Annex 3 of the Williamsburg Resolution)

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.

Sweden

There is no salmon farming in Sweden other than for stocking purposes.

UK (Northern Ireland)

This is in draft form and will be circulated for comment by the end of May 2004.

UK (Scotland)

Fish farming company specific contingency plans are required as part of the site licensing process. In addition, a Containment Working Group has been established under the Strategic Framework for Scottish Aquaculture to examine this issue further.

Iceland

On December 29th 2003 a "Regulatory measure regarding equipment and internal inspection on Icelandic Fish Farms" took effect. According to a preliminary provision it is assumed that all Icelandic salmonid fish farms will have conformed with the regulation by 1st of June 2004. An English abstract of the regulatory measure has been provided to the Secretariat.

Norway

NS 9415, Marine fish farms - Requirements for design, dimensioning, production, installation and operation, adopted August 2003.

NYTEK-regulations issued by the Ministries of Fisheries on 11 December 2003. Requirement according to the regulations:
Classification of sites. Type certificate for new main components, proof of capability for existing plants.

Russian Federation

There is an Action Plan available (see CNL(03)23).

USA

Preventive System Management for the containment of aquaculture salmon was initiated in May, 2001 through a collaborative of representatives from Maine aquaculture industry, Environmental groups (NGO's) and State and Federal Agencies. The framework for Containment Management System (CMS) plans were developed for both marine sites and freshwater hatcheries. State MEPDES permits require a CMS plan in place prior to placement of fish. Site-specific CMS plans for all active aquaculture sites in Maine are currently being implemented. Each facility is required to develop and utilise a CMS consisting of management and auditing methods to include: inventory control procedures, predator control procedures, escape response procedures, unusual event management, severe weather procedures, and training. The CMS will be audited at least once per year. Containment Management System audits were completed for all active sites in 2003.

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 carried out annually to identify any escapees, as part of National Coded Wire tagging and Tag Recovery Programme. Occurrence of fish farm escapees is generally less than 1%.

UK (Northern Ireland)

Information is available in respect of any major escape. The new Contingency Plan will formalise a requirement to produce this information.

UK (Scotland)

Yes.

Iceland

Escapes from Icelandic sea-cage farms, which are mostly located on Iceland's east coast, have been limited in scope as most of the production takes place in one salmon farm. No accidental releases from the fish farms have been observed or reported, but in late August 2003 an accidental release of 3,000 farmed salmon from a holding cage at a slaughtering facility in Neskaupstaður on the east coast occurred. The cause of the accident was a minor collision with a boat. Subsequently 9 fish farm escapees, 8 of which were males, were reported by anglers in 3 salmon rivers on the east coast. Three retrieved microtags indicate that these were probably from the previously mentioned accident. No escapees were reported from rivers in other areas.

Norway

Yes: www.fiskeridir.no/sider/aktuelt/romning/index.html

Russian Federation

There have been no escapes.

USA

Escape events have historically resulted from both marine facilities and freshwater hatcheries. Aquaculture escapees have been detected throughout the Gulf of Maine DPS. There are 3 causes of escape events that have been identified as accounting for the majority of escape events; these include: 1) trickle (small losses of fish during activities such as feeding); 2) systematic (specific losses during activities such as stocking smolts into cages, or grading and harvesting fish); 3) catastrophic (significant losses due to predators, storms, structural damage). State MEPDES permits require reporting escapes of 50 fish 2kg or greater and for smaller fish a loss of more than 20% from a single cage within 24 hours. The permit requires all losses to be reported monthly and to follow inventory tracking guidelines established.

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.

UK (Scotland)

Instances of escapes, and the numbers of fish involved, have been recorded before and after the introduction of the Scottish escapes legislation, the Registration of Fish Farming and Shellfish Farming Businesses Amendment (Scotland) Order 2002, which came into force on 10 May 2002.

Iceland

Verification of compliance with the provisions of the regulatory measure is carried out by the inspectors of the Directorate of Freshwater Fisheries.

Norway

Yes – this process is delegated to the Fish Farmers Association.

Russian Federation

Yes, all sites follow the Plan.

USA

The National Marine Fisheries Service has been working in conjunction with the Army Corps of Engineers to provide guidance on implementing these special conditions. The compliance rate is expected to be high given that existing sites are required to implement all of the conditions in the Army Corps of Engineers Permit.

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 low.

Iceland

Since the regulatory measure is very recent, its effectiveness has not be evaluated but there is every indication that it should be very effective in reducing escapes.

Norway

Not yet.

Russian Federation

It is difficult so far to assess the effectiveness of the Action Plan as there have been no escapes from aquaculture facilities.

USA

The special conditions are in the process of being implemented this year and there is no data available yet to determine the positive impact that these conditions have had on reducing the number and magnitude of escape events.

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

Norway

Yes.

USA

Research and development in support of Containment systems is currently ongoing; 1) "Engineering Design and Analysis for More Secure Salmon Net Pen Systems" 2) "The Use of Acoustic Conditioning to Reduce the Impact of Escapement in Atlantic Salmon Net Pen Aquaculture" and, 3) an "Evaluation of LiftUp System in the Mitigation of Environmental and Fish Disease Impacts in Net Pen Aquaculture". This research is being funded by the Saltonstall/Kennedy grant programme administered through NOAA Fisheries.

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

No, but historically the pike-perch (*Stizestedion lucioperca*) has been introduced into the River Rhine before the extinction of the former salmon stock of the River Rhine.

Sweden

Rainbow trout are stocked in several head waters of salmon rivers on the Swedish west coast each year. A sterlet sturgeon, *Acipenser ruthenus* was found at Rönne å on the Swedish west coast in 2003. The species is not native to Sweden. No introductions have been reported.

UK (England and Wales)

Rainbow trout are released into some rivers containing salmon on a put-and-take basis.

USA

Non-indigenous fish have been intentionally introduced into rivers containing wild Atlantic salmon. The State of Maine Inland Fish and Wildlife and Atlantic Salmon Commission signed an MOA (June 2002) to guide the management and stocking practices within listed DPS rivers in order to minimise potential impacts to wild salmon. Non-North American aquaculture escapees that are currently being phased out of existing operations have the potential to migrate up in a river containing wild Atlantic salmon. Some DPS salmon rivers have weirs in place that allow screening of returning salmon.

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

European Union

Sweden

Rainbow trout eggs were imported from Denmark to Sweden in 2003.

UK (England and Wales)

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

USA

Non-North American Atlantic salmon were used commercially within the U.S. aquaculture industry through 2003. Recently, a court order and injunction pursuant to US Clean Water Act violations, issued in May, 2003, to two large aquaculture companies operating in Maine requires stocking only North American Atlantic salmon in Maine waters. State MEPDES permits require 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. Guidelines for Action on Transgenic Salmon (Annex 5 of the Williamsburg Resolution)

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?

European Union

Sweden

At the University of Gothenburg research is undertaken on ecological effects of transgenic fish. No field-work has, however, been done in the area.

No research is being undertaken by the other Parties or other EU Member States to improve knowledge of the potential impacts of transgenic fish on the wild stocks and their habitat. EU (UK – Scotland) has indicated that a Scottish Aquaculture Research Forum (SARF), comprising both aquaculture and wild fish interests, was established in April 2004 to address this and other issues.

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)?

European Union

Sweden

Very low interest regarding transgenic fish shown from farming industry. Information on risks available on website.

Norway

In general; Norwegian authorities and Norwegian Fish Farmers Association are against transgenic salmon.

But there are some industry-related projects of interest:

1) Projects on gene-therapy is going on (plasmid – naked DNA – in order to increase growth)
2) Projects on development of transgenic vaccines is going on

USA

The use of transgenic salmon is prohibited in the State MEPDES permit. Special Conditions in the Biological Opinion that prohibit transgenic salmon will be incorporated as permit conditions in order for the Army Corps of Engineers to authorize their operation.

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

Ireland

Yes.

UK (Northern Ireland)

Yes. Where there are possible escapes there is prompt netting of the sea and river areas to prevent impacts on wild stocks.

Norway

Yes.

USA

Yes. As noted in response to other questions, due to concerns over adverse impacts to wild stocks, transgenic and non-North American stocks have been prohibited, containment management systems are required including annual audits, reporting of escapes is mandatory, and marking of commercially reared fish at increasing levels of specificity is required.

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?

European Union

Ireland

Yes.

Spain

Yes.

UK (Scotland)

The Scottish Aquaculture Research Forum will be established in April 2004 to address this and other issues. SARF will comprise both aquaculture and wild fish interests.

USA

The USDA Agricultural Research Service Cold Water Marine Aquaculture Center Aquatic Research programme is currently working with sterile triploid fish to evaluate their performance under production conditions.

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 (<0.5%) suggests low overall abundance.

UK (Scotland)

The Strategic Framework for Scottish Aquaculture recommends an international assessment of current and prospective techniques for tracing or marking farmed fish. In addition, a simulated escapes experiment involving the release of marked farmed salmon is scheduled for 2005.

Iceland

Marine cage farms must microtag 10% of smolts planted into cages according to provisions in the operational licence.

Norway

A decision in principle of the parliament, a committee is considering the question.

USA

There is a marking group that is comprised of various industry, state, and federal representatives that have evaluated the current marking technology and ranked various marks using specific criteria. Trials for coded wire tags and otolith marking is ongoing to evaluate their use in commercial production, e.g., effectiveness, feasibility of large-scale marking, and associated costs.

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?

European Union

Ireland

Yes.

UK (Scotland)

Yes. Risk assessment is the basis for fish movement decisions.

Norway

Yes.

USA

Integrated Pest Management guidelines are established for all Bay Management Groups including BMP's that will reduce the need for use of chemicals or medications. State discharge permits (MEPDES) regulate the use of drugs approved by the FDA for Atlantic salmon aquaculture. Investigations for New Animal Drugs (INAD) are currently ongoing for external parasites.

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

Iceland

Broodstocks continue to be selected for improved farming traits.

USA

The USDA Agricultural Research Service Cold Water Marine Aquaculture Center Aquatic Research programme is currently involved in a selective breeding programme utilizing North American stocks to evaluate performance of different genetic strains for use in commercial production.

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

Finland

New research focusing on the genetic differences between wild and escaped farmed salmon in the River Teno and the possible genetic impact of escapees on wild salmon reproduction was started in 2003.

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 (Northern Ireland)

Genetic studies on the impact of escaped farm salmon on wild salmon have been studied in the Glenarm River and the results published. Interbreeding and some genetic mixing has been demonstrated.

Norway

Yes.

Russian Federation

A study was conducted by the Moscow University on the subject: "Genetic monitoring of wild populations of Atlantic salmon in areas of salmon farming". Differences were identified in all characteristics, biological and genetic, between wild salmon juveniles from the Pechenga river and artificially reared salmon in the Pechenga fjord. It was proved that in the event of escapes, foreign material, differing in its characteristics, could potentially be introduced to the population of wild Atlantic salmon of the Pechenga river.

USA

There is ongoing research on the potential impacts of genetic interactions between wild and aquaculture-origin fish.

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

Ireland

Yes.

Sweden

Research on new diagnostic methods for Bacterial Kidney Disease (BKD).

UK (England and Wales)

An import risk assessment has been conducted for *Gyrodactylus salaris*, which considered potential vectors of the parasite into England and Wales, their relative risk and measures to manage that risk.

Iceland

Various research projects are being carried out by the Pathological Laboratory at Keldur.

Norway

Yes.

USA

Yes, the USDA APHIS is currently studying ISA vectors to minimise and control transmission between farm sites.

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

European Union

Finland

New research focusing on the genetic differences between wild and escaped farmed salmon in the River Teno and the possible genetic impact of escapees on wild salmon reproduction was started in 2003.

UK (England and Wales)

A pilot study was carried out to assess the incidence of fish farm escapees in catches taken by net and rod fisheries in England and Wales in 2003. Very few "suspect" fish were reported, and only 1 was confirmed as likely to have originated from a fish farm. This, and routine monitoring at traps and counters, suggests very few farmed salmon currently enter rivers in England and Wales.

UK (Northern Ireland)

Yes. The recent report on interbreeding between wild and farmed salmon by Ferguson, Queens University Belfast. DARD continues its monitoring programme for the occurrence of escaped farm salmon in coastal salmon fisheries and in fresh water.

Iceland

The marine cage rearing area in eastern Iceland is kept under surveillance.

Norway

Yes.

USA

Yes, juvenile Atlantic salmon collected from the DPS rivers to be used as broodstock for the USFWS conservation hatchery programme are screened for genetic composition of stocks. The genetic information collected is used to determine appropriate broodstock to be used during spawning each year. All non-North American fish are removed from the captive populations.

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?

USA

The Biological Opinion mentioned earlier contains identification and evaluation of risk and a more formal risk assessment is currently being conducted.

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

New research focusing on the genetic differences between wild and escaped farmed salmon in the River Teno and the possible genetic impact of escapees on wild salmon reproduction was started in 2003.

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

Sweden

On-going research on interactions between environment and salmon of stocked origin, in order to enhance current stocking programmes.

UK (Northern Ireland)

Yes. A hybridisation experiment was carried out in the River Bush, involving crosses between escaped farm salmon entering the river and wild salmon. Data on survival and growth of the progeny of these crosses are currently being evaluated and results will be published when available.

Norway

Yes.

USA

Yes.

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.

ANNEX 23

Council

CNL(04)20

Liaison with the Salmon Farming Industry

CNL(04)20

Liaison with the Salmon Farming Industry

1. The Council will recall that there was to have been a meeting of the Liaison Group with the North Atlantic salmon farming industry in Boston, USA on 17 March 2004. However, several delegations expressed concern about proceeding with this meeting because of:

   - the failure of the industry to fulfil the commitment to hold a joint Workshop in conjunction with the Liaison Group meeting;
   - the industry's response on the Williamsburg Resolution which had been seen as unhelpful and opaque;
   - the industry's responses on reporting in relation to the containment guidelines which were, in some cases, absent or inadequate.

   In short, a number of delegations felt that there was a lack of commitment by the industry to their obligations under the liaison process.

2. For these reasons a small delegation was asked to meet with industry, not for a full Liaison Group meeting but to see if the liaison process could be put back on a firmer footing with a higher level of commitment. We held that meeting in Boston on 17 March and the report of the meeting is attached. The overall view of the NASCO representatives present is that this was a frank and useful meeting. The failures in communication and in mutual understanding of processes were explored. It is clear from the statements made by the industry that it felt it was not an equal partner with NASCO in the liaison process, and that it wishes all issues concerning salmon farming being considered by NASCO to be brought to the Liaison Group, where practicable, prior to decision. In order to avoid the risk of these failures in communication and understanding from happening again, a Statement of Commitment was agreed by both sides. This statement is contained in Annex 4 of the report. We suggest that the Council considers adopting the commitments in that statement. These include NASCO continuing to provide administrative support for the Liaison Group meetings which it is proposed NASCO will, in future, host. We do, however, see this as a step-by-step process. If the commitments are not fulfilled, we believe that there would be no point in continuing with the liaison process.

3. It should be noted that although the intention had been to hold the next Liaison Group meeting in conjunction with the Workshop, the industry's view was that it wanted to hold the Liaison Group meeting prior to NASCO's 2005 Annual Meeting so that it will have an input to that meeting. The proposal is to hold this Liaison Group meeting in conjunction with the ISFA meeting in Brussels in May 2005. However, the industry felt that the Workshop was best held at a time and place where there would be good attendance and availability of speakers from industry. For this reason the proposal is to hold the Workshop at the same time as the AquaNor Exhibition in Trondheim in August 2005.

4. The Council is asked to consider the report of the meeting and in particular the Statement of Commitment and decide how it wishes to proceed.

Secretary
Edinburgh
8 April, 2004

Report of ISFA/NASCO Meeting
Radisson Hotel, Boston
Wednesday 17 March, 2004

1. Introduction

1.1 Mr James Ryan opened the meeting and welcomed participants to Boston. He indicated that at a meeting on 16 March he had been appointed President of ISFA. Dr Malcolm Windsor thanked ISFA for making the arrangements for the meeting, congratulated Mr Ryan on his appointment as President of ISFA and indicated that the NASCO representatives looked forward to a productive meeting though it would be different in scope from that originally intended.

1.2 The meeting adopted its agenda.

1.3 A list of participants is contained in Annex 1.

2. Future of the Liaison Group

2.1 A statement was made on behalf of ISFA by Mr James Ryan (Annex 2).

2.2 A statement was made on behalf of NASCO by Dr Malcolm Windsor (Annex 3).

2.3 The Group first discussed the perceptions that there had been a failure in the liaison process.

2.4 The industry felt that due process had not been followed in developing the Williamsburg Resolution which, although based on NASCO's existing agreements, contained new elements such as the burden of proof which could have serious implications for the industry. The industry indicated that it had only been involved in the development of the Guidelines on Containment of Farm Salmon not the other agreements incorporated in the Resolution. Furthermore, the industry felt that the Williamsburg Resolution had been rushed through and the comments developed by ISFA on the Resolution had not been taken into account by the Council of NASCO before adoption of the Resolution. The Liaison Group's Guiding Principles state that the Parties will work cooperatively when consideration is given to the application of the Precautionary Approach to salmon aquaculture. The industry assumed that the Williamsburg Resolution would be handled in the same way as the Guidelines on Containment of Farm Salmon but this had not been the case and the industry did not, therefore, feel like an equal partner in the liaison process which had consequently lost credibility. The industry representatives wanted the liaison process to continue but on the basis of being equal partners in the future. They would like to have the opportunity for a detailed discussion on the Williamsburg Resolution at the next Liaison Group meeting. If that group felt that valid concerns were being raised these should be referred to the Council of NASCO with the Group's backing. The industry representatives also indicated that they were surprised that NASCO had expressed concern about the standard of reporting on escapes. The industry believes that considerable progress had been made in Williamsburg and that, while not perfect, this had been the first year of the reporting process which should improve with time.

2.5 The NASCO representatives indicated that, in their view, due process had been followed in handling the Williamsburg Resolution. First, the Terms of Reference for the meeting of the Standing Committee on the Precautionary Approach (SCPA) in relation to application of the Precautionary Approach to aquaculture, introductions and transfers and transgenics had been made available for comment by the industry through the Liaison Group at its 2002 meeting. Then, the draft Williamsburg Resolution had also been made available to the industry at the 2003 Liaison Group meeting, the day after it had been developed by the SCPA and before it had even been considered by the Council of NASCO. No other stakeholder was afforded this opportunity and NASCO believed the industry had had ample opportunity between March and June to further review the document since not one word of the Liaison Group's containment guidelines had been changed. The comments from ISFA were then tabled at NASCO's Twentieth Annual Meeting but the Council did not delay because there were no specific proposals for changes to the Resolution. NASCO was also very concerned at the unilateral decision by ISFA not to proceed with the joint Workshop in accordance with the commitment made at the last Liaison Group meeting. This was important to NASCO not only because of the subject matter but because NGO participation had been agreed. A further problem had been difficulties in communications with ISFA. NASCO representatives then indicated that one of the problems could be that there are differences in perceptions as to the role of the Liaison Group. The Liaison Group cannot veto NASCO's decisions just as NASCO's accredited NGOs could not. The containment guidelines were developed at the request of the Liaison Group so the process was different to that followed in the work of the SCPA which had also been dealing with issues other than salmon farming, e.g. the development of guidelines on stocking. Nonetheless, the Williamsburg Resolution is a living document that will evolve in future in the light of experience with its implementation, consultations, improved scientific understanding of impacts and developments in measures to minimise them. NASCO representatives also indicated that they believed that the liaison process would be strengthened through NGO participation.

2.6 The Group agreed that the Liaison Group forum offered the opportunity for international cooperation on many issues affecting the two sectors. There would be many instances where countries could learn from each other on issues such as containment, area management and control of sea lice. The Group recognised that there had been some different expectations of the role of the Liaison Group but understood that it could not veto NASCO's decisions although it could provide a very useful forum for consultations on issues of mutual concern and for developing recommendations for action. The industry representatives agreed to provide specific comments on the Williamsburg Resolution well in advance of the next Liaison Group meeting.

2.7 The Group stressed that it wished to see the Liaison Group continue and developed a Statement of Commitment (Annex 4). It was recognised that if these commitments were not fulfilled the future of the liaison process would be placed in jeopardy.

3. The Williamsburg Resolution

3.1 The Group's discussions in relation to the Williamsburg Resolution are reflected in paragraph 2 above.

4. Proposed Joint Workshop to take forward SALCOOP proposals

4.1 There was support for proceeding with a one-day joint Workshop to be held in conjunction with the AquaNor Exhibition in Trondheim, Norway in August 2005. The Liaison Group had agreed that the Steering Group for the Workshop should consist of two representatives from NASCO and two representatives from the North Atlantic salmon farming industry. Dr Ken Whelan and Dr Peter Hutchinson were appointed as the NASCO representatives and Mr James Ryan and a representative to be nominated by Norway were appointed as the salmon farming industry representatives. The Steering Group was asked to develop a programme for the Workshop and to consider the financial implications. They should report back to the Liaison Group by correspondence so that the Workshop could be held in August 2005.

5. Any Other Business

5.1 A brief update on plans for a major international symposium on interactions between aquaculture and wild Atlantic salmon and other diadromous fish species was presented. The symposium is being co-convened by NASCO and ICES and is planned for 2005. In the light of the decision to hold a Workshop in August 2005, it might be proposed to ICES that the symposium be delayed until 2006.

5.2 The industry representatives provided a brief overview of the challenges presently facing the industry.

5.3 NASCO again raised the question of a representative of its accredited NGOs being able to observe the Liaison Group's meetings. This would be a step forward in improving the relations between the two sectors. The industry representatives indicated that they would wish to see the liaison process put back on a firm footing before considering admitting a representative of NASCO's accredited NGOs to the Liaison Group's meetings.

6. Report of the Meeting

6.1 A report of the meeting was agreed. NASCO representatives indicated that they would have to take the report of the meeting back to the Council meeting in June to obtain a mandate to proceed.

7. Date and Place of next Liaison Group Meeting and Workshop

7.1 The Group agreed that it would plan to hold the next Liaison Group meeting in May 2005, in conjunction with the ISFA meeting in Brussels, and prior to the Annual Meeting of NASCO so that the industry's comments on the Williamsburg Resolution could be made available to the Council.

7.2 The Chairman thanked the participants for their contributions and closed the meeting.

List of Participants

Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts, USA e-mail: mary.a.colligan@noaa.gov
Mr William Crowe	Scottish Quality Salmon, Perth, UK e-mail: wcrowe@scottishsalmon.co.uk
Mr Phil Gilmour	Scottish Executive Rural Affairs Department, Edinburgh, UK e-mail: phil.gilmour@scotland.gsi.gov.uk
Ms Nell Halse	New Brunswick Salmon Growers' Association, New Brunswick, Canada e-mail: nbsganh@nb.aibn.com
Mr Knut Hjelt	FHL Aquaculture, Trondheim, Norway e-mail: knut.a.hjelt@fhl.no
Dr Peter Hutchinson	NASCO Secretariat, Edinburgh, UK e-mail: hq@nasco.int
Mr James Ryan (Chairman)	Ireland e-mail: jryan@anu.ie
Dr Ken Whelan	The Marine Institute, Newport, Co. Mayo, Ireland e-mail: ken.whelan@marine.ie
Dr Malcolm Windsor	NASCO Secretariat, Edinburgh, UK e-mail: hq@nasco.int

Statement on behalf of ISFA

First I would like to stress that the salmon farming industry is here today because we want to see the liaison process with NASCO continue. That process has made progress in moving from a situation characterised by lack of trust to one in which there is improved communication and understanding of each sector's position. The development of containment guidelines and a reporting procedure represented real progress and the Liaison Group had also identified other areas for cooperation. So the Group had achieved considerable success in a period of four to five years at considerable cost and effort to all participants.

Then NASCO developed the Williamsburg Resolution which was like a hand grenade being thrown into the liaison process. The industry's main concern is not with the content of that Resolution as such but that NASCO did not follow due process in its development. The SCPA had been working in parallel with the Liaison Group which should have been more directly involved in the process. The salmon farming industry had anticipated that the draft Williamsburg Resolution would be made available to the Liaison Group and that a similar process would be followed to that used to develop the containment guidelines. That was not the case and it is the industry's view that the Williamsburg Resolution was rushed through and past the industry to the extent that the impression gained was that a 'fast one' was being pulled. This led to a feeling in the industry of betrayal of the trust that had been carefully built up over the previous years.

The industry was of the opinion that all issues concerning NASCO's work on salmon farming would be passed through the filter of the Liaison Group but NASCO now appears to be taking a different view and is being selective in what it makes available to the Group with the effect that the industry no longer considers that it is an equal partner in the liaison process. The Liaison Group's Constitution states that the Group will work by consensus but that did not happen with regard to the Williamsburg Resolution. Furthermore, under the Liaison Group's Guiding Principles, it is stated that the parties will work cooperatively when consideration is given to the application of the Precautionary Approach to aquaculture. This was not the case and dealing with an important Resolution by correspondence was not a satisfactory way to proceed. Furthermore, the comments on the Williamsburg Resolution provided to NASCO by ISFA were not taken into account by the Council of NASCO before adopting the Resolution.

The industry representatives have committed much time, effort and resources to the Liaison Group but this process has lost credibility with ISFA members who, at a time of economic difficulties, are seeing no return on their investment. The liaison process is no longer a successful partnership and while the industry wants to see the process continue it must be on the basis of an equal partnership approach.

Statement on behalf of NASCO

The Council of NASCO, and its Contracting Parties, very much value the links which have been established with the international salmon farming industry. Clearly there are interactions between wild and farmed salmon and, in our view, these need to be assessed and managed in a collaborative way. It is efficient to do this internationally and offers the industry some guarantee of a level playing-field.

We welcome the new willingness in the industry to look at and seek out areas for active cooperation. We believe that the SALCOOP project has put together very useful ideas for ways in which our two sectors can work together rather than the hostility which has sometimes characterised past relations. We think the time is now right to look closely, in cooperation with the industry, at area management agreements, restoration initiatives and the pros and cons of using sterile salmon in farming.

NASCO is committed to a liaison process with the international salmon farming industry, although this has often been marked by delay. We wish to discuss commitments which would assure the Liaison Group of a solid future.

Last year in Williamsburg there was a clear commitment to hold the 2004 Liaison Group meeting at the same time as a Joint Workshop. It seems that the industry has decided unilaterally to drop this commitment and only wishes to discuss the Workshop again. This Workshop is important to us, not only in exploring and cooperating on issues such as area management and the use of sterile fish, but also as an opportunity for NASCO's NGOs to participate, thereby enhancing the transparency of the process. You will appreciate that separating the Workshop and Liaison Group Meeting can add significantly to costs. We also believe that NGO participation in the Liaison Group as observers is important in making the process transparent.

We are also concerned by the industry's statements made in Edinburgh in June 2003 about the Williamsburg Resolution in which it was suggested that due process had not been followed and that the Williamsburg Resolution threatens the liaison process. Indeed, we saw the correspondence from ISFA on this issue as unhelpful and not based on facts. The Council has recognised that the Williamsburg Resolution will evolve in future in the light of experience with its implementation, consultations, improved scientific understanding of the impacts of aquaculture, introductions and transfers and transgenics on the wild stocks and developments in measures to minimise them.

Therefore, the President, in consultation with the Parties, has asked this small delegation to meet with you today in Boston in order to see if the Liaison Group can be put back on a firmer footing.

This meeting today, while not a Liaison Group Meeting proper, might be seen as planning for a more productive relationship in future. To this end, we are, of course, eager and willing to listen to the industry today on your perceptions of the Liaison Group. We are also willing to hear views on any aspects of this work of concern to you. More concretely, today we are ready to set up a Steering Group for the Joint Workshop, and to nominate our participants for that Steering Group. We would also like to agree, conditional on full commitment by all parties, on a date and place for the next Liaison Group Meeting to be held in conjunction with this Workshop. The Council of NASCO will consider the feedback from the industry before committing itself to any future meeting of the Liaison Group.

Annex 4 of SLG(04)6

Statement of Commitment

The North Atlantic Salmon Conservation Organization (NASCO), its Contracting Parties and the North Atlantic salmon farming industry, reaffirm their commitment to the liaison process and, recognising the importance of conserving and restoring wild salmon stocks and of supporting a sustainable salmon farming industry, agree to make the following commitments in order to strengthen and improve the future of the Liaison Group:

- to hold a Liaison Group meeting on an annual basis, or at more or less frequent intervals if they so decide, in order to explore issues of mutual interest and to make recommendations for action. These meetings will be organised by NASCO in consultation with the salmon farming industry and hosted by NASCO;

- in order to facilitate improved communication between NASCO and the North Atlantic salmon farming industry the President of ISFA will serve as the point of contact for his members and the NASCO Secretariat on all matters concerning the Liaison Group as they arise. NASCO will liaise directly with the non-ISFA salmon farming industries in the North Atlantic. The President of ISFA shall serve as the Liaison Group Chairman or Rapporteur depending on which of these posts is held by the industry;

- in accordance with the Liaison Group's Guidelines on Containment of Farm Salmon, to exchange information annually on:

    - progress in developing Action Plans on Containment;
    - the level and causes of escapes;
    - progress on implementation of, and compliance with, the Action Plan;
    - the effectiveness of the Action Plan in minimizing escapes;
    - identification of areas for research and development in support of the Action Plan.

    The responsibility for this reporting will be agreed between the industry in each country and the relevant authorities and confirmed to NASCO. Such reports should be made available to the NASCO Secretariat by each country not less than one month before the Liaison Group meeting so that they can be distributed to all participants well in advance of the meeting;

- to exchange information annually on the status of wild stocks of Atlantic salmon and their management;

- to hold the next meeting of the Liaison Group in conjunction with the 2005 meeting of ISFA in Brussels in May. In addition to reports in relation to the Guidelines on Containment of Farm Salmon, the meeting will allow for a full discussion of the Williamsburg Resolution. The industry agrees to make their comments on this Resolution available to the NASCO Secretariat no later than the end of February 2005;

- to hold a Workshop in conjunction with the AquaNor Exhibition in Trondheim, Norway in August 2005. The focus of this Workshop will be on area management initiatives, restoration programmes and the pros and cons of using sterile salmon in farming and possible opportunities for cooperative trials, as identified by the SALCOOP project. This Workshop will be open to all interested parties, including NGOs. NASCO and the salmon farming industry will each nominate two representatives to serve on a Steering Committee for the Workshop. NASCO's representatives will be Drs Ken Whelan and Peter Hutchinson. The industry representatives will be Mr James Ryan and a representative from Norway to be confirmed. The Steering Group will develop a programme for the Workshop and consider the financial implications and report back to the Liaison Group by correspondence;

- to bring relevant issues concerning salmon farming being considered by NASCO to the Liaison Group for full discussion in a timely manner, where practicable prior to decision-making by NASCO;

- to explore other areas for cooperation, including those identified in the SALCOOP report.

ANNEX 24

Council

CNL(04)21

Unreported Catches – Returns by the Parties

CNL(04)21

Unreported Catches – Returns by the Parties

1. The Council has previously agreed that the Parties should be requested to provide, on an annual basis, information in relation to unreported catches, and has welcomed the progress made in transparent presentation of this information. For 2003, new information on the management control and reporting systems for the EU (Germany and Ireland) has been provided. No changes have been reported by the other Parties. In 2003, between 675-1,007 tonnes were estimated to be unreported compared to a provisional declared catch of 2,471 tonnes, i.e. the estimate of unreported catch is between 27-41% of the reported catch. The estimated unreported catch over the five years for which information is available is as follows:

Year	1999	2000	2001	2002	2003
Estimate of unreported catch	917-1,160	1,065-1,445	962-1,374	838-1,158	675-1,007
% of reported catch	41-52%	37-51%	37-51%	32-44%	27-41%

2. More than 126,000 salmon were released following capture in recreational fisheries in 2003. This is an increase on the number caught and released in 2002 (118,000) and 2001 (112,000). Catch and release angling is not practised in all countries and in some countries no statistics are available on the extent of its use.

3. A number of new measures to minimise the level of unreported catch have been reported, including: efforts to improve the distribution of catch reporting forms in Greenland; more thorough targeting of fishery owners with catch return questionnaires in Finland; the introduction of incentives to provide catch reports and efforts to increase awareness of the importance of catch reporting in Norway; the re-opening of a commercial fishery on the Pechora River in Russia so as to reduce the illegal fishery; and the closure to all fishing of a section of the Narraguagus River in the US in response to reports of illegal fishing for salmon. A number of measures introduced in recent years have also been maintained in 2003. These include: the carcass tagging and logbook scheme and the use of on-the-spot fines for non-return of logbooks in Ireland; the carcass tagging and logbook scheme in Northern Ireland; the nationwide second-reminder system for catch returns in England and Wales; improved control of fisheries in river mouths in Sweden; and education efforts to improve identification of Atlantic salmon in US.

4. Last year the Council noted the continuing progress being made by the Parties in reducing the level of unreported catches and emphasised the need to take stronger measures to minimise the level of such catches. It appears that this progress in reducing the level of unreported catch is being maintained, and new measures to address this problem continue to be introduced. The Council is asked to consider what, if any, additional actions it wishes to take in relation to unreported catches. The Secretary will continue to request information on unreported catches from the Parties on an annual basis.

5. At the time of preparation of this paper, information had not been received from some EU Member States (France, Portugal and Spain) which have salmon stocks.

Secretary
Edinburgh
11 May, 2004

1. Description of management control and reporting systems by country

European Union

Germany

There has been a legal obligation since 1993 for all fishermen to report catches of salmon to the authorities but no management control system has been established.

Ireland

A national database of catch information has been established. The carcass tagging and logbook scheme introduced in 2001 has resulted in an increase in the reported catch for the period 2001-2003 over the previous 5 years and therefore a corresponding decrease in unreported catch. Prior to 2001 catch statistics had been derived primarily from recorded sales in licensed salmon dealers' registers, with estimates of private sales of legally caught salmon included in unreported catches. Preliminary analyses suggest that approximately 30% of salmon caught in 2002 and 2003 were not sold through licensed dealers but were either kept for domestic consumption or sold through retail outlets, hotels, etc. While there is still an element of illegal catch this is thought to be low at present.

Other Parties

No changes to the management control and reporting systems were reported by the other Parties or the other EU Member States. Descriptions of these systems were presented in documents CNL(00)19, CNL(02)19 and CNL(03)20.

2. *Estimate of unreported catch by country, broken down by category and indicating whether the unreported catch is the result of legal or illegal activities*		
Party	**Estimate (tonnes)**	**Breakdown**
Canada	118	Illegal activities. Estimated by enforcement, management and biological staff. Labrador – 2.16 tonnes; Newfoundland – 41.92 tonnes; Quebec – 34.16 tonnes; New Brunswick – 38.85 tonnes; Nova Scotia – 1.21 tonnes (no report from 3 fishing areas); Prince Edward Island < 1 tonne.
Denmark (in respect of the Faroe Islands and Greenland)		
Faroe Islands	<1	The unreported catch is the result of legal activities. This estimate is based only on information from the Sports Fishermen's Association.
Greenland	Approx. 10	In 2003 Wildlife and Fisheries Officers reported one incident of illegal fishing for salmon (use of a trout net instead of a salmon net). A total of 146 licences were issued to professional fishermen in 2003, but reports indicated that only 20 of these were utilised. Some of the catches may be legal but have been reported after the close of the fishery. Some fishermen are said not to have received reporting forms from the local authorities. Due to the scattered nature of the fishery, effective control by the authorities is impossible within any reasonable level of effort. Presently there is no way of estimating the magnitude of the unreported fishery. However, as any change in the pattern of consumption is unlikely to have taken place in recent years, the unreported fishery is estimated to be at the same level as in the proceeding years.
European Union		
Denmark	-	There are no estimates of unreported catches but DIFRES considers the number to be insignificant.
Finland	17	Negligible illegal catch.
Germany	-	No estimate available. A significant part of the salmon run may be taken by anglers. The Atlantic salmon is protected in Northrhine-Westfalia.
Ireland	57	Mainly illegal catch.
Sweden	1.8	Approximately 10% of catch. Largely the result of legal activities in fisheries with no obligation to report catches (see CNL(01)19 for further details) but poaching probably contributes to a minor extent. It is believed that new fishery regulations in recent years have reduced the proportion of the catch that is not reported.
UK – England and Wales	24	Estimates are not made for separate categories of unreported catch. The total is calculated using the percentages in Table 3.
UK – Northern Ireland	0.3	Figure for commercial net fisheries in Northern Ireland. This figure has dropped significantly from earlier years largely as a result of the introduction of carcass tagging of salmon in both FCB and FCILC areas in 2001/2002.
UK – Scotland	25	Legal and illegal components.
Iceland	2.2	
Norway	460 (uncertainty ± 140 tonnes)	Illegal catch in the sea: 124 tonnes By-catch in commercial sea fishing: 18 tonnes Legal catch in sea by bag-net and bend net: 110 tonnes Legal catch in sea by angling: 97 tonnes Illegal catch in rivers: 14 tonnes Legal catch in rivers, mainly by angling: 97 tonnes
Russian Federation	99-152	Legal coastal fishery: 1-5 tonnes Illegal coastal fishery: 3-7 tonnes Legal in-river fishery: 15-20 tonnes Illegal in-river fishery: 80-120 tonnes
USA	0	There were no reports in the mandatory logbooks of fishermen of by-catch of Atlantic salmon, and no observers documented by-catch of Atlantic salmon in any fishery in 2003.
TOTAL	**675-1,007**	

3. Explanation of how the figure for unreported catch is arrived at

New information on how the figure for unreported catch is derived has been provided by EU (Finland and Ireland).

In Finland, there are licensed fisheries which are not required to report their catch, but the total catch is estimated by extrapolation from the reported catch. There is negligible illegal catch but suppression of information thought to be unfavourable might also lead to unreported catches. In Ireland, local sale or consumption was thought to have been a source of unreported catches in the past but since 2001, with the introduction of logbooks, it is obligatory to provide details of all disposals of salmon landed in Ireland.

No changes to the way the figure for unreported catch is derived have been reported by the other Parties or other EU Member States. For details of an explanation of how the figure for unreported catch is derived see documents CNL(01)19 and CNL(03)20.

4. The extent of catch and release fishing

Party	Estimated Number Released	Comment
Canada	51,442	Preliminary numbers: 28,503 small salmon; 22,939 large salmon.
Denmark (in respect of the Faroe Islands and Greenland)		
Faroe Islands	0	
Greenland	0	
European Union		
Denmark	No statistics available.	Catch and release is carried out in some rivers but the number of salmon involved is not known.
Finland	Negligible.	
Germany	No statistics available.	
Ireland	No statistics available.	Under current legislation if an angler catches his quota of salmon he may continue to fish but only on a catch and release basis. Catch and release is becoming more common in Ireland particularly during the latter part of the season and in some fisheries (Burrishoole and Delphi) anglers return well over 95% of all wild salmon caught.
Sweden	No statistics available.	Catch and release fishing is practised in a few rivers in order to improve the protection of females before and during the spawning period. The practice of catch and release fishing is likely to increase.
UK - England and Wales	5,981	Provisional estimate for 2003 is 55% of rod-caught fish released (including voluntary and compulsory catch and release). Agreements (both formal and voluntary) have been reached for some rivers in southern England for the release of all fish caught by anglers.
UK - Northern Ireland	No statistics available.	Current regulations in the FCB area require catch and release of spring fish (from start of season to 31 May). Many anglers practice voluntary catch and release thereafter.
UK - Scotland	30,156	55% of all salmon and grilse caught by rod and line were subsequently released.
Iceland	5,357	15.8% of all rod-caught salmon.
Norway	0	The extent of catch and release fishing is sporadic and accidental.
Russian Federation	33,862	81% of the total recreational catch. This information is based on catch reports sent to the relevant authorities.
USA	0	There is no directed catch and release fishing for sea-run Atlantic salmon in the US.
TOTAL	**126,798**	

5. *Any measures taken to further minimise the level of unreported catches*

Party	Measures taken
Canada	No new measures.
Denmark (in respect of the Faroe Islands and Greenland)	
Faroe Islands	No new measures.
Greenland	In 2003, the Wildlife and Fisheries Officers have put a lot of effort into handing out reporting forms to all fishermen whom they have observed fishing for salmon and advising them that all catches must be reported to the Greenland Fishery Licence Control.
European Union	
Denmark	No new measures.
Finland	Different groups of owners of fishing rights, especially some new ones, are now being contacted more effectively than previously with targeted questionnaires.
Germany	No new measures.
Ireland	No new measures. The return rate of anglers' logbooks to the Regional and Central Fisheries Boards was 43% in 2001, 52% in 2002 and is expected to be over 60% in 2003 but returns are not yet finalised. Regional authorities have issued on-the-spot fines for non-return of 2003 angling log-books.
Sweden	No new measures. As previously reported, recent fishery regulations have improved the possibilities to control fisheries in river mouths. Furthermore, investigations are underway of traditional traps and net fisheries in three rivers where there is no obligation to report catches.
UK - England and Wales	No new measures. In 2001, for the first time, a nation-wide second reminder was issued by the Environment Agency to anglers in England and Wales in an effort to reduce the level of unreported catch in the rod fishery. This resulted in a substantial improvement in the catch return rate in 2001 and 2002 (83% and 94% respectively for annual licence holders, compared with an average of 75% for the period 1998-2000). Provisional data for 2003 (86% return for annual licence holders to date) indicates that reporting improvements continue.
UK - Northern Ireland	No new measures. The salmon tagging and logbook scheme introduced in 2001 should provide accurate catch statistics of angling and commercial fishery exploitation.
UK - Scotland	No new measures.
Iceland	No new measures.
Norway	In recent years systems and routines for reporting catches have gradually improved in many salmon rivers, including many of the major sport-fishing rivers. The measures taken include introducing deposits in relation to catch reports, employing data technology to support the collection and compilation of catch reports and increasing general awareness of the importance of more accurate catch reporting among fishermen. These improvements have led to a considerable reduction in unreported catches from angling.

Party	Measures taken
Russian Federation	A commercial in-river fishery was re-opened on the Pechora River after a ban was implemented in 1989. This was done with the aim of reducing the pressure on the stock from illegal fishing.
USA*	Angling for Atlantic salmon is prohibited in Maine, but in 2003 illegal angling for salmon occurred on the Narraguagus River under the guise of shad angling. An emergency rule was adopted by the Maine Inland Fisheries and Wildlife Agency which closed to all fishing the section of the Narraguagus River in which these activities were observed. Educational efforts are continuing to ensure that recreational anglers can identify Atlantic salmon and are aware of the fishing restrictions. Particular emphasis has been placed on distinguishing between trout and juvenile Atlantic salmon to reduce bycatch at the early life stages.

* Unreported catch estimated to be zero.

ANNEX 25

Council

CNL(04)34

Russian Studies of Distribution and By-Catch of Atlantic Salmon Post-Smolts in the Norwegian Sea in 2003

CNL(04)34

Russian Studies of Distribution and By-Catch of Atlantic Salmon Post-Smolts in the Norwegian Sea in 2003

In 2003 Russia continued a comprehensive programme to study the by-catch of post-smolts in pelagic fisheries. As in the previous year it included collection of information during the pelagic fish survey by a research vessel and the screening of commercial catches by shipboard observers.

Studies to assess the by-catch of post-smolts were undertaken in the trawl-acoustic survey of mackerel, blue whiting and herring by the research vessel "Smolensk" from 8 - 17 July 2003. The survey covered the area from 64°45N to 68°30N between 03°E and 06°W in the international waters of the Norwegian Sea. A total of 31 hauls were taken in the surface layer (0 - 10 m) by mid-water trawl at a speed of 4 - 4.8 knots. Hauls at deeper depth (to 150 - 300 m) were also taken regularly to sample blue whiting. The whole catch was screened.

Mackerel was registered by the research vessel over the entire area covered by the survey. This species was always found in the hauls when the trawl was towed in the upper sea layer. Mackerel catches varied from 5 kg to 5,395 kg, the average was 429 kg and contained mainly fish 32-38 cm in length and 370-670 g in weight. The total catch of mackerel was 13,293 kg. When towing was conducted with a headline at 30-340 m depth the catch consisted of blue whiting. Neither Atlantic salmon adults nor post-smolts were caught.

In commercial fisheries, information on by-catch of adult salmon and post-smolts was collected on five fishing vessels, which operated in the international waters of the Norwegian Sea in the period from 17 April - 26 September 2003. The hauls were taken at depths from 0 to 400 m according to the vertical distribution of fish.

There were 6 observers and 3 fish inspectors, who worked onboard the fishing vessels which operated in the pelagic fisheries in the Norwegian Sea. Scientific observers reported no adult Atlantic salmon or post-smolts: however, one post-smolt and 15 adult salmon were recorded in July - August by fish inspectors. Two of the adults were caught when the target species was blue whiting. In addition, one fish caught in late July was described as a sea trout. The total catch of four vessels inspected by fish inspectors was 3,800 t of mackerel and 3,400 t of blue whiting. 416 hauls were screened fully or partially.

So, the findings in 2003 confirmed the results obtained in 2002, which showed that the by-catch of post-smolts in the trawl fishery for mackerel in the international waters of the Norwegian Sea was composed only of single individuals. The mid-water trawl used by the commercial mackerel fishery, which cannot capture post-smolts migrating close to the sea surface during towing, may, however, capture individual post-smolts in the course of hauling the trawl onboard. Such by-catch may occur even in the fishery of demersal fish. It should also be noted that, given that only single salmon and post-smolts occur in catches of pelagic fish, it is not correct methodologically to compare by-catch data obtained in research surveys to the catch data from the commercial mackerel fishery, because despite overlapping areas, the time when the two species gather in concentrations is different and their migration takes place at different depths.

ANNEX 26

Council

CNL(04)55

NASCO Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks

CNL(04)55

NASCO Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks

1. Background

In 1998, NASCO and its Contracting Parties agreed to apply a Precautionary Approach to the conservation, management and exploitation of Atlantic salmon. The NASCO Agreement states that the application of a Precautionary Approach requires:

- *"all salmon stocks in the NASCO Convention Area to be maintained above their conservation limits (CLs) by use of management targets"; and*

- ***"stock rebuilding programmes** to be developed for stocks that are below their CLs".*

The inclusion of 'stock rebuilding programmes' within the NASCO Agreement reflects similar clauses in other agreements on the Precautionary Approach (e.g. UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks).

This document provides guidance on the process of establishing a Stock Rebuilding Programme (SRP) for a salmon stock and what such a plan might contain. It also provides a link between several other guidance documents developed by NASCO in relation to the application of the Precautionary Approach, including the Decision Structure for the Management of Salmon Fisheries, and the Plan of Action for the Protection and Restoration of Atlantic Salmon Habitats.

2. What is an SRP?

An SRP is an array of management measures, possibly including habitat restoration/improvement, exploitation control and stocking, which is designed to restore a salmon stock above its conservation limit. The nature and extent of the programme will depend upon the status of the stock and the pressures that it is facing.

While the short-term response to a stock failing to exceed its conservation limit may be to reduce or eliminate exploitation, there will generally be a need to develop a programme to evaluate and address the causes of the stock decline. In more serious situations, there may be a need for a comprehensive programme of research and management, involving a wide range of management actions undertaken by a number of user groups.

3. Evaluate status of stock

NASCO has recommended that SRPs be developed for all stocks[1] that are failing to exceed their Conservation Limits (CLs). NASCO Parties are developing CLs for all their salmon stocks, based at a national, regional, river or population level according to their management requirements. However, assessing the status of the stock requires more than simply determining whether the escapement has fallen below the CL, and a range of other factors will influence management decisions on the nature and extent of the SRP.

Uncertainty in assessments: Information on the stock may be limited, so there may be uncertainties about both the CL and the current stock abundance. In addition, the numbers of salmon returning to spawn can be highly variable, and so the stock will sometimes fall below the CL simply as a result of natural variation. These uncertainties must be taken into account in the decision-making process.

Nature of CL failure: Both the duration and degree of the CL failure (e.g. failure by more than X% for more than Y years) are relevant to the assessment. Clearly, the further that a stock falls below its CL and the more years for which it does this, the greater the probable need for management action. The nature of the stock decline (e.g. timing and severity of decline) may also be informative in determining the main causes. Ideally, managers and stakeholders should agree in advance upon the failure criteria that will trigger certain management actions.

Recent stock status history: Where the stock has fallen below the CL for only a single year (or a short period) consideration might be given to the margin by which the CL was exceeded in earlier years. If the stock has been well above the CL in recent years, this may suggest that the current management practices are appropriate under most normal circumstances and there may be less reason to consider extensive management changes.

Stock diversity: Consideration must also be given to other stock criteria, such as age structure, run timing and fecundity. A minor overall shortfall in egg deposition, for example, may mask a much greater problem with one stock component.

4. Evaluate causes of stock decline and threats to stock

Proposals for remedial measures should be developed on the basis of a full assessment of the pressures faced by the stock. Stocks may fall below their CLs as a result of reduced production and/or increased mortality, and these can result from either natural or anthropogeneic factors (including fishing). The exact reasons for the stock decline may be unknown, but possible causes and potential threats should be described and evaluated. The following categories of factors may be considered:

[1] NASCO defines a 'stock' as "a management unit comprising one or more salmon populations. This would be established by managers, in part, for the purpose of regulating fisheries." (SCPA(00)11)

Natural environmental change: *(including rainfall and river flow patterns, river temperatures, sea surface temperatures, marine currents)*
Any remedial actions will need to take account of best predictions of the likely duration and extent of natural environmental change, and whether this is likely to progress further. If continuing deterioration of natural environmental conditions is predicted, this will need to be taken into account in determining the most appropriate management actions.

Habitat degradation: *(including water quality (including sub-lethal effects), water chemistry (e.g. pH), water quantity caused by man-made structures or extractions, spawning and juvenile habitat (e.g. sediments and reduced carrying capacity), factors affecting food production, obstructions to smolt or adult migration (and entrainment), fish farming)*
It is important to try to identify where habitat degradation is causing production 'bottlenecks', and to determine whether the problems are natural or man-made, and whether the impact is reversible.

Species interactions: *(including fish/bird/mammal predators in sea/fresh water, diseases and parasites (e.g. sea lice), competition with native species, competition with introduced species (e.g. releasing of non-indigenous stocks); wild/farmed fish (e.g. fish farms))*
The potential impact of predators should be assessed taking into account known characteristics of salmon and predator biology and population dynamics; possible sources of disease from wild and reared stocks should be evaluated, and the effects of any stocking programme, with salmonids or other species, and any changes in stocks of other native species considered.

Exploitation: *(including by-catches of post smolts, marine salmon fisheries, by-catches in homewater fisheries, directed homewater net and rod fisheries, non-catch fishing mortality, exploitation of prey species)*
The need for exploitation control should be determined based upon an assessment of how fisheries are contributing to the stock decline and its longer-term sustainability.

Differential effects on stock components: *(including sea-age groups, size classes, tributary populations, etc.)*
Different stock components may be affected in different ways by different factors, and it is important to identify those components in greatest need of protection or restoration. For example, age groups may be differentially affected by fisheries which are size-selective, and tributary populations may be differentially affected by water quality problems.

5. Identify and involve stakeholders

Stakeholder groups need to be consulted when restoration programmes are being considered and kept informed when action is planned. Wherever possible, they should be involved from the earliest stages in the development of an SRP. Benefit may be gained from their general experience of salmon management and their specific knowledge of the stock(s) in question.

Consideration also needs to be given to the potential incidental effects of an SRP on other users or those with interests in other parts of the ecosystem that may be affected.

Early involvement may also help to secure the buy-in of groups that may be affected by proposed measures.

The responsibilities of different groups and organisations in the SRP must be clearly defined.

Consideration should be given to the development of education material for dissemination to interested groups and the wider public.

6. Plan and prioritise management actions

A programme of management actions should be developed to address the problems and threats that have been identified. Efforts should be made to ensure all activities are consistent with the Precautionary Approach.

Prioritising actions: Where a number of problems/threats have been identified, proposed actions will need to be prioritised to assist in planning the funding of the conservation and restoration programme.

Research needs: Where there is insufficient information of the nature of the problems, the management plan may need to include a provision for further research.

Environmental management: Decisions on habitat restoration should be based on identification of whether the cause of a production bottleneck is natural or man-made. It may not be appropriate to try to reverse natural changes, and where effects are irreversible it may be necessary to reassess the CL. Further guidance is provided by the NASCO Action Plan[2] which provides a framework for use by jurisdictions that have responsibility for activities involving salmon habitat.

Fishery management: Reducing the impact of salmon fisheries is often the first response to a decline in stocks since it is likely to have the most immediate effect on the spawning escapement. However, exploitation control should be seen in the context of other measures that may be taken, including reductions on unreported catches and by-catches, and may only be required while other problems/threats are remedied; ideally such responses should be based upon pre-agreed plans. However, if long-term changes in production are expected, there may be a need for a readjustment of the harvest strategy. The NASCO Decision Structure[3] provides further guidance on the decision-making process for determining appropriate management measures in targeted fisheries.

Gene banks: Consideration may be given to the need for establishing a gene bank in case the stock declines to critically low levels.

---

[2] CNL(01)51 - NASCO Plan of Action for the Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat

[3] SCPA(02)16 – NASCO Decision Structure to Aid the Council and Commissions of NASCO and the Relevant Authorities in Implementing the Precautionary Approach to Management of Atlantic Salmon Fisheries

7. Identify interim measures

Where stocks are seriously depleted, and full recovery is likely to take several generations, there may be a need to develop a staged approach to the recovery programme and to adopt certain interim measures.

Interim reference points: Where a stock has fallen well below its CL, or has been below the CL for an extended period, it may be appropriate to consider an intermediate 'recovery' reference point or to set a goal of an annual average percentage increase. This may assist in tracking stock recovery over a longer period.

Stocking: Consideration should be given to the need for stocking, but this should generally only be used as an interim stock protection measure. Stocking may be used to circumvent particular bottlenecks in production while other actions are taken to address the cause of the stock decline. Further guidance is provided in the NASCO Stocking Guidelines[4].

8. Assess social and economic factors

Managers will need to consider the social and economic consequences of different management options including the possible impacts on other users and other activities that may constrain success. NASCO guidelines[5] are being developed to provide a framework for incorporating social and economic factors into decisions which may affect wild salmon and the environments in which it lives.

Fisheries managers may have to consider whether:

- there is a need to permit a residual fishery to continue (e.g. subsistence fishing);
- the fishery itself has an intrinsic value (e.g. heritage values of specific methods); or
- certain fishing activities (e.g. catch and release angling) may be allowed to continue because it will have a minimal effect on the stock.

9. Monitor and evaluate progress

SRPs should include a forecast of the expected effects of the proposed measures against which the stock recovery can be assessed. This will facilitate an assessment of the effectiveness of the measures. Project timescales should be developed with interim targets and expected outcomes.

Monitoring programmes should be maintained or enhanced to permit appropriate evaluation of the progress of the SRP.

Progress should be assessed against the forecasts of the expected benefits of the different management measures, including where possible trajectories for stock recovery. Objectives should be reviewed at regular intervals during the recovery process.

---

[4] CNL(04)18 Annex 2 NASCO Preliminary Guidelines for Stocking Atlantic Salmon

[5] WSEV(04)12 Annex 5 – Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach

ANNEX 27

Council

CNL(04)23

Report of the Technical Workshop on Development of a Decision Structure for Incorporating Social and Economic Factors into Management Decisions under a Precautionary Approach

CNL(04)23

Report of the Technical Workshop on Development of a Decision Structure for Incorporating Social and Economic Factors into Management Decisions under a Precautionary Approach

1. At its Twentieth Annual Meeting the Council considered the report of a Technical Workshop on the development of a framework for assessing social and economic values related to the wild Atlantic salmon. This Workshop had recognised that the wild Atlantic salmon has many aspects to its value. In addition to those associated with the fisheries, the salmon is a highly prized species and an indicator of environmental quality. The 'existence value' of the wild Atlantic salmon may greatly exceed the values associated with the commercial and recreational fisheries. A framework developed at the Workshop identifies all the elements of value and provides some guidance on assessment methodologies. The Workshop had recommended that administrators and decision-makers should ensure that the difficult-to-measure but long-lasting and widespread values associated with the Atlantic salmon are fully incorporated and given due weight in decisions in relation to management of wild Atlantic salmon and its habitats.

2. The Council welcomed the progress made at that meeting and asked that a second Technical Workshop be held to develop a decision structure for incorporating social and economic factors into management decisions under a Precautionary Approach. At the invitation of the US, that Workshop was held in New Orleans during 23 – 26 March 2004 and the report of the meeting is attached.

3. After reviewing a number of case studies provided by the Parties on how social and economic factors are currently incorporated into decisions concerning the conservation and management of Atlantic salmon, the Workshop discussed the implications of incorporating socio-economic factors in decision-making under the Precautionary Approach. It had been suggested that incorporating social and economic factors could undermine the effectiveness of the Precautionary Approach and that there was, therefore, a need to give due weight to biological factors. However, the Workshop concluded that if proper assessments are undertaken, cost benefit analysis should be supportive of salmon conservation because of the large existence value of the resource to society.

4. The Workshop developed Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach, which provide a framework to support and inform decision-making and which are intended to be used by those with responsibility for managing the wild Atlantic salmon and its environments and for communicating concerns to other sectors whose proposals could impact on the wild salmon and its environments. These Guidelines are contained in Annex 5 of the attached report. A number of hypothetical but realistic case studies were developed in order to test the guidelines and illustrate their use. The Workshop also recommended that the output from the two socio-economic workshops be developed into a handbook for use by NASCO and the Parties. The Workshop welcomed, as a valuable initiative for the future, a bio-economic modelling approach that would allow social and

economic factors to be integrated into a management model for Atlantic salmon. It recommends that the Council considers how such work might be encouraged.

5. The Council is asked to consider the recommendations from the Workshop and decide if it wishes to:

- adopt the Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach;

- ask the Parties to evaluate the Guidelines on a trial basis over a period of two years and report back on their experiences and on any suggestions for amendments to the Guidelines;

- ask the Secretariat to combine the output from the two Technical Workshops into one handbook so as to assist NASCO and its Parties in incorporating social and economic factors in applying the Precautionary Approach;

- encourage the development of a bio-economic model for integrating social and economic factors into management of Atlantic salmon under the Precautionary Approach.

Secretary
Edinburgh
8 April, 2004

WSEV(04)16

Report of the Technical Workshop to Develop a Decision Structure for Incorporating Social and Economic Factors into Management Decisions under a Precautionary Approach

Doubletree Hotel, New Orleans, USA
23-26 March, 2004

1. Opening of the Meeting

1.1 The Chairman, Dr Malcolm Windsor (Secretary of NASCO), opened the meeting and welcomed participants to New Orleans. He thanked the US delegation for hosting the meeting and for the arrangements made. He referred to the progress that had been made at the first Technical Workshop meeting, held in Edinburgh in January 2003, in reviewing the social and economic values of the Atlantic salmon and in developing an internationally agreed framework for assessing these values. This progress had been welcomed by the Council of NASCO which now sought guidance on incorporating social and economic values in decisions relating to the conservation and management of salmon under the Precautionary Approach.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Workshop adopted its agenda, WSEV(04)14 (Annex 2).

3. Overview of NASCO's work in applying the Precautionary Approach

3.1 The Assistant Secretary presented an overview of NASCO's actions in relation to application of the Precautionary Approach. Since adoption, in 1998, by NASCO and its Contracting Parties of the Precautionary Approach, considerable progress has been made in developing agreements in relation to: management of fisheries; habitat protection and restoration; aquaculture, introductions and transfers and transgenics; stock rebuilding programmes and by-catch. These agreements provide guidance to managers in ensuring that decisions relating to salmon conservation and management are consistent with the Precautionary Approach. Most of the agreements make reference to the need to take account of social and economic factors in such decisions although they provide no guidance as to how this is to be achieved.

3.2 The Secretary then presented a summary of the main conclusions from the first Technical Workshop meeting. The wild Atlantic salmon has many aspects to its value. In addition to those associated with the fisheries, the salmon is a highly prized species and an indicator of environmental quality. The 'existence value' of the wild Atlantic salmon may greatly exceed the values associated with the commercial and recreational fisheries. A framework developed at the Workshop identifies all the elements of value and provides some guidance on assessment methodologies. He noted that the Workshop had recommended that administrators and decision-makers should ensure that the difficult-to-measure but long-lasting and widespread values associated with the Atlantic salmon are fully incorporated and given due weight in decisions in relation to management of wild Atlantic salmon and its habitats. He suggested that the challenge now before the Workshop was to develop a decision structure or guidelines which could assist managers in incorporating social and economic factors in decisions relating to conservation of wild Atlantic salmon stocks, in a way that is supportive of the Precautionary Approach. In this regard, the relevant Precautionary Approach agreements are those developed by the Council of NASCO on management of: salmon fisheries; habitat protection and restoration; aquaculture, introductions and transfers and transgenics; stock rebuilding programmes; and by-catch.

4. Consideration of the Terms of Reference

4.1 The Council of NASCO had asked that the Contracting Parties first update the table of information and bibliography of the social and economic values of wild Atlantic salmon contained in the report of the first Technical Workshop meeting. Then the Contracting Parties were asked to provide case studies on how social and economic factors have been incorporated into decisions relating to management of: fisheries; habitat; aquaculture, introductions and transfers and transgenics; and by-catch. The Council had asked that these case studies form the basis of a desk study to develop a standard methodology. The specific task assigned to the Workshop is to review the methodology and to develop a decision structure for incorporating social and economic factors into management decisions under a Precautionary Approach.

4.2 The Workshop discussed these Terms of Reference. A document was tabled by Norway, WSEV(04)7, with some suggestions on how the Workshop might address the tasks assigned to it. Norway proposed that existing approaches might be adapted for use by NASCO and its Contracting Parties and that Impact Assessment might be considered as a useful approach for incorporating social and economic factors in decisions under a Precautionary Approach. This approach is flexible and could be applied in the different legislative frameworks of NASCO's Contracting Parties and to the range of issues being addressed under the Precautionary Approach. The need for an integrated approach, applicable to all aspects of application of the Precautionary Approach, and for the output from the meeting to be clear, concise and comprehensible to administrators and stakeholders, was recognized.

4.3 The Workshop agreed that impact assessment provided a useful framework for incorporating social and economic factors in decisions concerning the conservation and management of Atlantic salmon and that other approaches, such as bio-economic modeling, might also be appropriate. However, the objective during the Workshop would be to develop guiding principles or guidelines to support and inform decision-making and which incorporated consideration of social and economic factors, rather than to provide a mechanism for making the decision.

5. Updating of table of existing data/studies on social and economic values of wild Atlantic salmon

5.1 A table providing an overview of existing information on the social and economic values of Atlantic salmon developed at the first Workshop was updated and a bibliography appended to it on the basis of information provided by the Parties. The Secretariat was asked to incorporate into the bibliography relevant references provided in the background papers for the first Workshop. The updated information and bibliography is contained in Annex 3.

6. Review of case studies on how social and economic factors have been incorporated into decisions concerning management of fisheries; habitat; aquaculture, introductions and transfers and transgenics; and by-catch

6.1 Case studies illustrating how social and economic factors have been incorporated into management decisions were provided by the European Union (UK - Scotland) Iceland, Norway, and the Russian Federation. These case studies are contained in Annex 4. In addition, a brief report was presented of a recent economic and socio-economic evaluation of the wild salmon in Ireland (the Indecon Report). This report presents an independent socio-economic evaluation of wild salmon in Ireland. The evaluation addresses the requirements for the long-term sustainable management of wild salmon stocks within an economic and socio-economic context, to ensure the viability of this important resource. The current status of the report is that following its presentation to the Minister, he requested the Central Fisheries Board to undertake a wide-ranging consultation process with interested stakeholders and the public. This process is now complete and the responses have been independently assessed. The outcome of this assessment will shortly be presented to the Minister for his consideration. A recently completed report, prepared for the Scottish Executive, entitled 'The economic impact of game and coarse angling in Scotland', was made available to the Workshop and introduced by one of its authors. The principal objective of the study was to analyse the impact of angler expenditure on output income and employment.

6.2 A representative of the EU (UK - England and Wales) presented a framework which had been developed, in conjunction with economists, for assessing the impacts of changes in policy on *inter alia* the environment, businesses, consumers, public health and safety, and crime. He noted that the scope of the assessment was necessarily broad since relatively minor changes in policy could have widespread impacts. He indicated that the framework might form a useful starting point for the Workshop in developing guiding principles for incorporating social and economic factors into decisions concerning the conservation and management of salmon. The work of the Environment Agency in England and Wales was also briefly described. The Agency's role is to contribute to sustainable development by improving and enhancing the environment. The guidance to the Agency from the Government is that, in exercising its functions, it should take into account the costs and benefits and the impacts of its decisions on rural communities. The Agency is developing some guidance to assist the decision-making process. In protecting the environment there will be different options, each with different costs and benefits. Reference was made to the EU Habitats Directive under which rivers may be designated as Special Areas of Conservation (SACs) for salmon. In designated rivers there is a requirement to maintain good conservation status, and every proposal for a development that could affect that status is thoroughly reviewed. It is still possible for certain developments to be approved that could affect that status but only with Ministerial approval and where there is overwhelming public interest. There are, therefore, still situations where conservation does not have primacy. More detailed information is contained in document WSEV(04)15.

6.3 A representative of the US referred to the requirement under the National Environmental Policy Act to evaluate alternative options and their impacts for all Federal actions. In the case of the Atlantic salmon, which has been listed under the Endangered Species Act, preventing extinction of the species is given priority in all decisions concerning proposals that could impact the species or its habitats and he noted that a challenge for the workshop would be to develop a framework for incorporating social and economic factors in decision-making that would be applicable in situations both where salmon stock status is relatively good and in the US where the stocks are threatened with extinction.

6.4 A representative of the US reported on the outcome of a group discussion conducted during the Workshop. Economic and socio-cultural factors can be incorporated into the Precautionary Approach if the maximization of net benefits is used as a criterion to determine if a regulatory change will improve stock conservation. Firstly, socio-cultural factors can be incorporated into the management process through public hearings and meetings with stakeholders identified using sociological and anthropological scientific techniques. Legislatures can also establish social criteria by passing laws that create standards or criteria with which managers must comply. Secondly, the Precautionary Approach uses maximum sustainable yield as a limit instead of a target for fishery managers to ensure that over-fishing does not occur at any point in the future. This implies a precautionary stock size greater than the stock size that exists at maximum sustainable yield. This larger stock size at a lower fishing effort level means that catch rates per unit of effort will be greater and that the costs of harvesting fish per unit of fishing effort is lower, whether the harvest is by commercial or recreational fishermen. Thirdly, the higher catch rates also imply that the values of recreational fishing and the revenue from commercial fishing have increased as well as the values associated with non-consumptive uses of the salmon resource. The reductions in cost of harvesting and increases in values due to the larger stock size cause net benefits to increase as the precautionary target stock size is achieved. That is, maximum economic yield from the fishery can comply with the Precautionary Approach to management but may be constrained by the limits placed on it by legislative mandates or socio-cultural issues important to communities or regions.

6.5 The representative of Canada indicated that there are approximately 500 rivers in eastern Canada with populations of Atlantic salmon, 40% of which are in remote areas. Under the Canadian Constitution, the primary obligation is to conservation but after these requirements have been met, the aboriginal rights have priority followed by the recreational fishery. There is no commercial salmon fishery in Canada. The Federal Government is responsible for management of the fisheries except in the province of Quebec. He indicated that socio-economic factors influence all decisions concerning management and conservation of the resource but that under a Precautionary Approach the priority should be to protect and enhance the wild salmon and that if there is uncertainty about the impact of a proposed development on the resource it should not be permitted.

7. Development of a decision structure for incorporating social and economic factors into decisions under a Precautionary Approach

7.1 The Workshop discussed the implications of incorporating socio-economic factors in decision-making under the Precautionary Approach. It had been suggested that incorporating social and economic factors could undermine the effectiveness of the Precautionary Approach and that there was, therefore, a need to give due weight to biological factors. However, it was noted that if proper assessments are undertaken (see paragraph 6.4) cost benefit analysis should be supportive of salmon conservation because of the large existence value of the resource to society. For example, a study indicated that Londoners have a willingness-to-pay to restore salmon to the River Thames, England of £12 million annually. Decisions had been taken in the past in which all the elements of value of the salmon had probably not been understood and incorporated. Consequently, developments had been approved which had had adverse consequences for the salmon. There are many examples of hydro-electric developments impacting adversely on the wild salmon stocks. Cost benefit analysis would, however, have taken into account in the decision-making process all the values of the salmon. In the US the full environmental cost of dams on salmon rivers is now being recognized and some dams have been removed. Consideration of socio-economic issues should assist resource managers in developing advice to politicians concerning salmon conservation and management. It was, however, recognized that there may be a need for expert economic advice to assist resource managers in this task.

7.2 The Workshop developed Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach, WSEV(04)12, Annex 5. These guidelines provide a framework to support and inform decision-making rather than a mechanism for making decisions. They are intended to be used by those with responsibility for managing the wild Atlantic salmon and its environments and for communicating concerns to other sectors whose proposals could impact on the wild salmon and its environments. In order to test the application of the guidelines, a number of case studies were developed in relation to management of salmon fisheries, habitat, aquaculture and by-catch. These are contained in Annex 6. Although all of the scenarios are realistic they were developed in order to test the guidelines and illustrate their use. In the light of this exercise the Workshop believed that the guidelines provide a clear and rational process for the task they were designed for. The Workshop felt that combining the output from the first and second Technical Workshop meetings into a handbook covering all NASCO's work on social and economic aspects of the Precautionary Approach would be most valuable.

7.3 A bio-economic modeling approach that would allow socio-economic factors to be integrated into a management model for Atlantic salmon was outlined by the US, WSEV(04)13, Annex 7. The Workshop welcomed this approach as a valuable initiative for the future and recommends that the Council considers how such work might be encouraged, possibly through a further Technical Workshop to develop a framework for the model.

8. Any other business

8.1 There was no other business.

9. Consideration of the report of the meeting

9.1 The Workshop agreed a report of its meeting.

10. Close of the meeting

10.1 The Chairman thanked the participants for their contribution to the Workshop and closed the meeting.

Annex 1 of WSEV(04)16

List of Participants

Canada

Mr Pierre Tremblay	NASCO Commissioner, Saint-foy, Quebec

European Union

Ms Carmen Beraldi	Secretaria General de Pesca, Madrid, Spain
Ms Paloma Carballo	Ministerio de Agricultura y Pesca, Madrid, Spain
Mr Richard Cowan	Department for Agriculture, Food and Rural Affairs, London, UK
Mr David Dunkley	Scottish Executive Environment and Rural Affairs Department, Edinburgh, UK
Dr Guy Mawle	Environment Agency, Bristol, UK
Dr John O'Connor	Central Fisheries Board, Dublin, Ireland
Dr Alan Radford	Glasgow Caledonian University, Glasgow, UK
Mr Andrew Thomson	European Commission, Brussels, Belgium

Iceland

Mr Arni Isaksson	Directorate of Freshwater Fisheries, Reykjavik

Norway

Dr Øystein Aas	Norwegian Institute for Nature Research, Lillehammer
Mr Raoul Bierach	Directorate for Nature Management, Trondheim

Russia

Dr Boris Prischepa	Murmanrybvod, Murmansk
Dr Svetlana Krylova	Murmanrybvod, Murmansk
Ms Elena Samoylova	PINRO, Murmansk
Dr Alexander Zubchenko	PINRO, Murmansk

USA

Dr Walter Keithly	Louisiana State University, Baton Rouge, Louisiana
Mr Pasquale Scida	National Marine Fisheries Service, Gloucester, Massachusetts
Mr John Ward	National Marine Fisheries Service, Silver Spring, Maryland

Secretariat

Dr Malcolm Windsor (Chairman)	Secretary
Dr Peter Hutchinson	Assistant Secretary

Annex 2 of WSEV(04)16

WSEV(04)14

Agenda

1. Opening of the Meeting

2. Adoption of the Agenda

3. Overview of NASCO's work in applying the Precautionary Approach

4. Consideration of the Terms of Reference

5. Updating of table of existing data/studies on social and economic values of wild Atlantic salmon

6. Review of case studies on how social and economic factors have been incorporated into decisions concerning management of fisheries; habitat; aquaculture, introductions and transfers and transgenics; and by-catch

7. Development of a decision structure for incorporating social and economic factors into decisions under a Precautionary Approach

8. Any other business

9. Consideration of the report of the meeting

10. Close of the meeting

Technical Workshop to Develop a Decision Structure for Incorporating Social and Economic Factors into Management Decisions under a Precautionary Approach

WSEV(04)19

Overview of Existing Information on the Social and Economic Values of Wild Atlantic Salmon – updating by the Parties

Overview of existing knowledge/data/studies of the social and economic values of wild Atlantic Salmon*

Values / Country	USA	Canada	Greenland	Iceland	Faroe Isl.	Norway	Russia	UK (Scot)	UK (E & W)
Economic value									
Use	r	r		R		Cr		RC	RC
Non-use	x	x		X		X			X
Economic impacts									
Direct		RC	C	R	c	Rc	r	R	rc
Indirect		r		r		R		R	r
Cost/benefit		rc		r		R			
Social and cultural benefits									
Psychological	r					R			
Social	r			r		Rc			
Cultural/indigenous peoples		s?				S			C?

Values / Country	UK (NI)	Ireland	Finland	Sweden	Denmark	Germany	France	Spain
Economic value								
Use		RC	R	r	r			r
Non-use								
Economic impacts								
Direct		RC						
Indirect		RC						r
Cost/benefit		RC						
Social and cultural benefits								
Psychological		RC						
Social		RC						r
Cultural/indigenous peoples		RC						r

* This table focuses on studies of Atlantic salmon, but it is recognised that studies of other fish resources or other environmental issues provide useful information for enhancing knowledge of the social and economic values of Atlantic salmon. The table is incomplete and may be added to by each of the countries listed.

Legend: Relevance of study   Significant R/C/S   Minor r/c/s

R C S indicate recreational, commercial or subsistence

X indicates non-use value   ? indicates uncertainty

Bibliography

Note: *This is not a comprehensive bibliography of studies concerning the social and economic value of Atlantic salmon. It is a selection of studies provided by the Parties as background information for the two Technical Workshop meetings.*

Amiro, P.G. and Jansen, H. (2000): Impact of low-head hydropower generation at Morgans Falls, LaHave River on migrating Atlantic Salmon (*Salmo salar*); Dartmouth, N.S.: Department of Fisheries and Oceans. [University of Ottawa Library].

Anon (1982) A Study of the Economic Value of Sporting Salmon Fishing in Three Areas of Scotland. Report prepared for the Department of Agriculture and Fisheries for Scotland. Tourism and Recreation Research Unit, Edinburgh University. 21 pp.

Anon (1983) Countryside Sports and their Economic Significance. Report prepared for The Standing Conference on Countryside Sports. Cobham Resource Consultants, Oxford, England. 322pp.

Anon (1989) Economic Importance of Salmon Fishing and Netting in Scotland. Report prepared for the Scottish Tourist Board and the Highlands and Islands Development Board. Mackay Consultants, Inverness. 129 pp.

Anon (2000) Economic value of recreational fisheries in the Nordic Counties, Nordic Council, Copenhagen, Denmark. 70 pp.

Anon (2003) An economic/socio-economic evaluation of wild salmon in Ireland. Report prepared for the Central Fisheries Board, Dublin, Ireland, by Indecon International Economic Consultants. 132pp.

Anon (2004) The Economic Impact of Game and Coarse Angling in Scotland. Report prepared for the Scottish Executive by Alan Radford, Geoff Riddington, John Anderson, Glasgow Caledonian University, and Hervey Gibson, Cogentsi Research International Ltd. 66 pp.

Curtis, J.A. (2002) Estimating the Demand for Salmon Angling in Ireland. Economic and Social Review. 33(3), pp. 319-332.

Davis, J. and O'Neill C.O. (1992) Discrete Choice Valuation of Recreational Angling in Northern Ireland. Journal of Agricultural Economics. 3: 452-457.

Environment Agency (1996) Salmon Action Plan Guidelines. Section 4. Economic & social evaluation of salmon fisheries. Environment Agency internal working document, Bristol, UK.

Fisheries and Oceans Canada - Statistical Services (2002): 2000 Survey of Recreational Fishing in Canada.

Gee A.S. and Edwards R.W. (1982) Recreational Exploitation of the Atlantic Salmon in the River Wye. In: Allocation of Fishery Resources. Proceedings of the Technical Consultation, Vichy, France, 1980, (ed. by J.H. Grover), pp 129-137. FAO/AFS.

Heitman, K. 1998. The importance of the river Alta and salmon fishing for the local community. In: Nesje, T (ed.) Alta salmon. Culture, hydropower development and environment. Alta kommune.

Lund P.J. (1981) The Economic and Social Value of Salmon Fishing to the UK Economy in 1978. Presented at the Symposium on the Economic Evaluation of Salmon Fisheries, Fishmongers Hall, London, 1981. Atlantic Salmon Trust, Pitlochry, Scotland. 11 pp.

MAFF (1998) Economic value of salmon net and rod fisheries in England and Wales in 1996. Internal report. 7 pp.

Maharaj, V. (1995) Valuation of Atlantic Salmon Sport Fishing in New England and an Economic Analysis of Farming Adult Atlantic Salmon for a Sport Fishery. Ph.D. Dissertation, Department of Natural Resource Economics, University of Rhode Island, Kingston, Rhode Island.

Mawle G.W. and Randerson P.F. (1983) Economic aspects of recreational fishing in South Wales. In: Proceedings of the 3rd British Freshwater Fisheries Conference, 1983. pp 142-154.

Mørkved, O.J. and Krokan, P.S. (1997) Levels of incomes and costs in the Norwegian salmon sea fishing by pound net and bend net (in Norwegian). Report to Directorate for Nature Management, Trondheim.

Mørkved, O.J. and Krokan, P.S. (1999) An analysis of Norwegian salmon sea fishermen (in Norwegian). Report to Directorate for Nature Management, Trondheim.

Mørkved, O.J. and Krokan, P.S. (2000) Cost benefit analysis of rotenone treatment of the Steinkjer watercourses (in Norwegian). Report to Directorate for Nature Management, Trondheim.

Mørkved, O.J. and Krokan, P.S. (2001) Economic analysis of the value of the wild salmon resources in national salmon watercourses proposed by the Rieber-Mohn Committee (in Norwegian). Report to Directorate for Nature Management, Trondheim.

Nautilus (2001) A study to assess the economic development potential of sea and inland fisheries in Wales. Report by Nautilus Consultants Ltd in association with EKOS Economic Consultants Lit for the National Assembly for Wales Agriculture Department.

O'Connor R. and Whelan B.J (1973) An Economic Evaluation of Irish Salmon Fishing. Part I: The Visiting Anglers. Publication series paper no. 68. The Economic and Social Research Institute, Dublin.

O'Connor R., Whelan B.J. and McCashin A. (1974) An Economic Evaluation of Irish Salmon Fishing. Part II: The Irish Anglers. Publication series paper no. 75. The Economic and Social Research Institute, Dublin.

O'Connor R. (1983) An Economic Evaluation of Salmon Fishing in Ireland in 1982. Presented to the South Western Regional Fisheries Board Seminar, Kenmore, Eire. 12 pp.

Okstad, A. and Gustavsen, T. (1989) Economic effects of salmon angling in the river Namsen. Report from Nord Trondelag Research 1989:13.

O'Neill, C.E. and Davis (1991) Alternative Definitions of the Demand for Recreational Angling in Northern Ireland. Journal of Agricultural Economics 42, 174-179.

Radford A.F. (1980) Economic Survey of the River Wye Recreational Salmon Fishery. Centre for the Economics and Management of Aquatic Resources. Research Paper No 10, University of Portsmouth.

Radford A.F. (1982) Estimating the Net Economic Yield of a Recreational Salmon Fishery: A Case Study of the River Wye. Centre for the Economics and Management of Aquatic Resources. Research Paper No 16 , University of Portsmouth.

Radford A.F. (1984) The economics and value of recreational salmon fisheries in England & Wales: an analysis of the rivers Wye, Mawddach, Tamar and Lune. Report for the Atlantic Salmon Trust. Marine Resources Unit, Portsmouth Polytechnic.

Radford A.F., Hatcher, A.C. and Whitmarsh D.J. (1991) An economic evaluation of salmon fisheries in Great Britain. Report for MAFF. Marine Resources Unit, Portsmouth Polytechnic.

Radford, A.F., Riddington, G., Tingley, D. (2001) Economic evaluation of inland fisheries. Environment Agency R&D Project W2-039/PR/1 (Module A). 166 pp

Spurgeon, J., Colarullo, G., Radford, A.F., and Tingley, D. (2001) Economic evaluation of inland fisheries. Environment Agency R&D Project W2-039/PR/2 (Module B). 162 pp

Whelan B.J., O'Connor, R. and McCashin, A. (1974) An Economic Evaluation of Irish Angling III: The Commercial Fishermen, General Research Series Paper No. 78. The Economic and Social Research Institute, Dublin.

Whelan B.J. and Whelan, K. F. (1986) The Economics of Salmon Fishing in the Republic of Ireland: Present and Potential. The Institute of Fisheries Management, University of Ulster, Coleraine.

Whelan B.J. and Marsh G. (1988) An Economic Evaluation of Irish Angling. Report prepared for the Central Fisheries Board. The Economic and Social Research Institute, Dublin. 84 pp.

The following background papers, available from the Secretariat, were submitted to the first Technical Workshop meeting held in Edinburgh, and contain information on the social and economic value of Atlantic salmon:

WSEV(03)3	Social and Economic Values of Atlantic Salmon – Information provided by the Parties (Canada, Denmark (in respect of the Faroe Islands and Greenland), European Union, Norway, Russia, USA)

WSEV(03)5	Economic Value of Icelandic Salmon (*Salmo salar* L.) in Angling and Net Fisheries
WSEV(03)6	Freshwater Fisheries in Iceland
WSEV(03)7	The Value of the Atlantic Salmon and its Fisheries in England and Wales
WSEV(03)9	Social and Economic Values of Atlantic Salmon - Information provided by the Parties - European Union – Finland
WSEV(03)10	Social and Economic Values of Atlantic Salmon – Canada

WSEV(04)18

Case Studies of how social and economic factors have been incorporated into decisions in relation to management of fisheries; habitat; aquaculture; introductions, transfers and transgenics; and by-catch

EU (UK – SCOTLAND)

Introduction

As a general rule, social and economic factors are taken into account throughout the management of wild salmon fisheries and aquaculture. Where new legislation is proposed, wide, public consultation is a necessary prerequisite. When subordinate legislation is being prepared, Regulatory Impact Assessments are required to determine the impacts the measures will have on stakeholders.

Management of fisheries

Salmon fishing is of significant social and economic importance to Scotland, especially in the more remote and rural areas. Many hotels and guest-houses rely upon angling to extend their season of operation, with salmon angling being available in Scotland between mid-January and the end of November. Employment of service industry staff, as well as the more direct employment of ghillies, fishing crews and bailiffs, is therefore often highly dependent upon salmon and salmon fishing. However, the objective is to ensure sustainable fisheries, and so management, while conscious of the social and economic demands, must often place the emphasis on limiting exploitation. In Scotland, salmon fisheries management is undertaken at the local level. Scotland is divided into 66 salmon fishery districts, for which 48 district salmon fishery boards have been established. The district salmon fishery boards have powers to do such acts, execute such works and incur such expenses as may appear to them expedient for the protection or improvement of the fisheries within their district; the increase of salmon; or the stocking of the waters of the district with salmon. To this end, a number of boards have undertaken significant work in developing local fishery management plans, such as encouraging the practice of catch and release; buying out and closing fisheries; operation of hatcheries; employment of bailiff staff to enforce the salmon and freshwater fisheries legislation. Fisheries are also managed to a very large extent by the proprietors and tenants, who may impose more stringent rules than the legislation does – for example the voluntary deferment of netting for six weeks at the start of the fishing season by members of the Salmon Net Fishing Association of Scotland; use of fly only on some angling beats either throughout the season or under certain river conditions.

Habitat

Habitat modification may be undertaken to provide improved facilities for fishing, to improve spawning and nursery areas, or to create new areas where salmon may be produced. However, habitat modifications may also be undertaken for reasons quite unrelated to fisheries, and the effects may be detrimental to salmon. For example, activities such as forestry, agriculture, electricity generation, and road and rail works have all had impacts, often adverse, in the past. Social and economic factors are usually of great significance when assessing the effects of these activities. We all need electricity, industry may need forestry products, society needs agricultural produce, and the road and rail networks are essential to the running of the country. It is inconceivable that such activities could be stopped for the sole reason that they might impact on salmon. However, it is possible, and indeed necessary nowadays, to ensure that proper assessments are undertaken to estimate the likely impact on rivers and the salmon they support. For example, all those who propose a hydro-electricity scheme with an installed capacity of greater than 1MW must consult the Fisheries Committee, established under the Electricity Acts to advise developers and Ministers on the implications of such developments for migratory fish. Where installations have a capacity of 1MW or less, they are subject to the provisions of the Salmon (Fish Passes and Screens) (Scotland) Regulations 1994. In practice, many of these proposals are also sent to the Fisheries Committee for advice. Reference to such publications as "Forests and Water Guidelines" produced by the Forestry Commission[1] have been invaluable to woodland developers, while the series of publications on pollution control urban waste water and river engineering produced by the Scottish Environment Protection Agency[2] have provided developers with expert guidance on habitat modification and its effects. "River Crossings and Migratory Fish: Design Guidance[3]", published by the Scottish Executive, provides engineers designing bridges and culverts with detailed advice on the requirements of migratory fish, and is now accepted as a standard reference work.

Aquaculture

The Scottish fish farming industry is of great importance to the economy of Scotland, especially in remote and rural areas. The document, "A Strategic Framework for Scottish Aquaculture[4]", published by the Scottish Executive in March 2003, addresses the issue of developing a sustainable, diverse, competitive and economically viable aquaculture industry which balances economic progress with social justice and environmental responsibility. The document sets out four guiding principles:

The Economic Principle: Aquaculture should be enabled to make a positive contribution to the Scottish economy through being internationally competitive in the marketplace and economically viable at a national level.

The Environmental Principle: The industry should work in harmony with nature, managing and minimising transient environmental impacts, and avoiding significant, cumulative, long-term or irreversible changes to ecological systems, to cultural remains or to valued landscape and scenery.

The Social Principle: Aquaculture should foster strong community links, recognising and supporting the needs of local communities and working with community initiatives to manage local environments for mutual benefit. It must be integrated within its community, liaising locally and nationally on all appropriate matters.

---

[1] http://www.forestry.gov.uk/website/publications.nsf/$$search
[2] http://www.sepa.org.uk
[3] http://www.scotland.gov.uk/consultations/transport/rcmf-00.asp
[4] http://www.scotland.gov.uk/library5/environment/sfsa-00.asp

The Principle of Stewardship: While the first three principles relate to outcomes, the principle of stewardship relates to the ways in which these principles will be observed. It is about delivering outcomes sustainably. It embraces the precepts of transparency, integration, co-ordinated government and fit-for-purpose regulation, partnership and stakeholder participation, accountability, ethics and regard for animal welfare, and a culture of best practice and continuous improvement. This both reflects and develops the concept of stewardship set out in the Government's first Marine Stewardship Report[5].

Social and economic factors feature importantly in the work of the Tripartite Working Group, which comprises representatives of wild salmon fishery interests, the salmon farming industry and officials from the Scottish Executive. The development of Area Management Agreements is inevitably conditioned by social and economic factors as well as operational and biological considerations.

Introductions, transfers and transgenics

Introductions and transfers – salmon ova are imported into Scotland for the purposes of maintaining genetic diversity and continuity of production in the aquaculture industry. Such movements are subject to stringent fish health regulations, but socio-economic factors dictate that, subject to necessary regulation, these activities must be allowed to continue. Currently, the application of transgenic technology plays no part in Scottish commercial aquaculture production, nor are there plans for it to be introduced. Any proposals to use transgenic fish would require the consent of the Scottish Ministers.

By-catch

Salmon fishing rights in Scotland are private, heritable titles, and only those with the right to fish for salmon, or with written permission from a person having such right, may legally fish for salmon. There are few records of salmon being taken as a by-catch in other Scottish fisheries. Since the 1960s, regulations have been introduced to prohibit activities such as drift-netting, gill-netting, trolling for salmon. Thus, many of the gears that may have taken salmon as a by-catch may not be used. Regulations have also been introduced to prohibit the landing of salmon by unauthorised fishermen. Of course, salmon may be taken on occasion as a by-catch, but where this occurs, they must be released or an offence is committed.

ICELAND

Introduction

This report will describe how socio-economic factors have affected Icelandic decisions on management of salmon fisheries, riverine habitat, aquaculture, introductions of salmon stocks and control of by-catch.

It is very clear that the Icelandic Salmonid Fisheries Act and related regulatory measures are much affected by social and economic factors. This is most obvious in the structure of the law, where river owners are awarded the stewardship of the salmon populations in the rivers

[5] http://www.defra.gov.uk/environment/marine/stewardship/default.htm

and must form an association to carry out local management and share costs as well as benefits. This is also quite pronounced in many other aspects of salmon management.

It is well known that socio-economic factors have considerable bearing on political decisions in the conduct of government. Fisheries management agencies, on the other hand, are mostly basing their decisions on scientific and biological factors. Closer scrutiny, however, reveals that there are complex relationships between these realms of science and politics.

In the first part of this paper I will discuss these aspects in relation to the management of salmon fisheries followed by an overview of these issues in relation to the management of river habitat, aquaculture, introductions, transfers and by-catch.

Management of salmon fisheries

Salmon fisheries play an integral part in Icelandic culture and the economy. It has been estimated that each angled salmon is directly worth at least US$ 600 to the Icelandic river owners. This generates significant income to these landowners, most of whom are farmers.

Net fisheries have been conducted in Icelandic glacial rivers for decades. These are now mostly in the Ölfusá-Hvítá system and the number of nets has been declining due to a reduction in the price of net-caught salmon as a result of the increased supply from aquaculture.

The fact that private individuals are entrusted with the stewardship of salmon rivers and reap the benefits of salmon angling brings in entirely different sets of socio-economic factors than those occurring in an economy where the resource is in public custody. The former system, e.g., requires comprehensive legislation, which ensures that there is fair sharing of the resource among its owners.

According to the Icelandic Salmonid Fisheries Act fishing rights can not be separated from the ownership of the land adjacent to the river or lake. The landowners are thus obliged to form a river association composed of all registered farms surrounding the river. Owners of small lots on rivers can have fishing rights but do not have a vote at an association meeting. The river association is obliged to make a register of dividends showing the shares of all landowners on the river. This is most often done by external commissioners appointed by a district judge.

Despite the private ownership, the Directorate of Freshwater Fisheries sets the total number of permissible rods for angling on each river. A permitted rod should on the average catch one salmon per day during a 100 day fishing season. This limited entry system ensures some stability in the exploitation from year to year but does not, for socio-economic reasons, allow any in-season measures or limitations, as the rods are sold up to a year in advance of the salmon season.

Catch and release is growing in Icelandic angling and has in recent years been about 18 percent of the nominal catch. This practice may not be needed for stock conservation in many rivers and can easily confuse the angling statistics both with respect to numbers and size of the fish. This practice originally started in Iceland through the influence on, and pressure from, foreign anglers, who had been required through regulations to release a large proportion of angled salmon in their home country. Since only fly-caught salmon can be released successfully this has led to fishing exclusively by fly in many rivers and many anglers now frown on other types of bait.

Since these changes are primarily angler-initiated and depend to a large extent on angling fashion they must be considered socio-economic in nature. Many anglers will now pay more for a fly-only "catch and release" fishery despite the fact that total and recorded catches will probably go down.

Management of river habitat

The riverine habitat is managed according to Chapter VII of the Salmonid Fisheries Act. Most of the activity centres around the following issues: construction of fishways, gravel mining, creation of fishing holes and prevention of bank erosion. All these projects are subject to the approval and supervision of the Directorate of Freshwater Fisheries.

Fishways

Numerous fishways have been constructed in Iceland, mostly past waterfalls blocking salmon migration. These have been constructed and financed by river associations with a 30 % grant from the Fisheries Enhancement Fund. The Directorate of Freshwater Fisheries must approve the construction of the fishway as well as its design and such a decision is at least partially socio-economic in nature as the project frequently increases the income of the river association in question in the long run. For that to happen it must, of course, also be biologically sound.

Gravel mining

Icelandic rivers carry great quantities of gravel into the lowland areas annually. Most of the bedrock is basaltic and very fragile. The freeze and thaw conditions as well as intense rain in the winter favour a great deal of weathering and fragmentation of the bedrock.

Icelandic houses are traditionally made out of concrete, which requires a great deal of gravel. Gravel is also extensively used for road building. There is thus a great deal of demand for this resource. Gravel has traditionally been taken from dry river beds or gravel pits on land. With increased environmental awareness as well as an increase in demand for gravel there has been an increasing trend to refrain from gravel mining in hills and mountains and rather go to the flat river beds in the lowland areas, which are a more renewable resource.

Since 1994 the Directorate of Freshwater Fisheries must grant a permit for any gravel mining which might affect biological conditions and/or fishing conditions in rivers. The permit is always based on a biological survey or a statement from freshwater fisheries experts as well as a positive statement from the landowners and the river association in question. The permit is also subject to various conditions regarding quantity, mining time and methods as well as execution and finish.

Management decisions on gravel mining must be considered socio-economic as well as biological.

Creation of fishing holes

One part of river improvement is the creation of new fishing holes on a stretch of river, where there are few suitable fishing places. This can clearly affect the biological conditions in the river as well as the register of dividends, which is partly based on the salmon catch in the respective areas. Approval of the river association in question is thus a prerequisite for such a project, making it a highly socio-economic decision.

Prevention of bank erosion

Rivers are frequently eroding their banks and sometimes degrading fields as well as cultured land. If left undisturbed this could, in the long run, lead to financial losses for the farmer in question. This erosion can in many cases be stopped by stacking large rocks and boulders in the eroded area. As this project can also be beneficial for the fish populations by creating shelter in the rocks the biological and socio-economic factors are in harmony here.

Management of aquaculture

Aquaculture of salmon in sea-cages has recently started up again in Iceland. Such a culture was previously attempted in the late 1980s on an experimental scale and was not successful. The main reasons for these failures were the following:

- The areas selected were shallow and poorly sheltered.
- The Icelandic salmon stocks in use were slow-growing, with early maturation.
- Companies were small and frequently had cash flow problems.
- Farming equipment could not tolerate adverse climatic and oceanographic conditions and escapes were frequent.

After 1990 only one salmon cage-farm was in operation in a lagoon in northern Iceland, which had been permitted to import and use a selectively bred Norwegian aquaculture stock. This stock, which was imported to Iceland three times between 1985 and 1987, was also used in a number of land-based salmon farms in Iceland.

In 1991 the selective breeding company “Stofnfiskur” was established with government support and soon started to breed the imported Norwegian salmon stock for the purpose of using it for aquaculture. Since that time it has been the only salmon stock used for aquaculture in Iceland. Since it is one of a few virus-free aquaculture salmon stocks in Europe it has also been in demand for export.

In the year 2000 three companies applied for permits to start rearing Atlantic salmon in sea-cages in eastern Iceland using the selectively bred stock. Since the eastern fjords are relatively cold they intended to use land-based operations to produce 500 gram post-smolt, which then would be reared for only a year in sea-cages prior to slaughtering.

Although managers were concerned about the fact that these companies would be using the selectively bred stock of Norwegian origin, there were certain aspects which were considered to work in favour of the project:

- The cages should be limited to eastern and north-western Iceland, where there were few salmon rivers.

- There was considerable lack of employment in certain communities in the area, which would benefit from such a project.
- The salmon would only be 12-15 months in the cages, which should reduce the probability of escapes.
- The selectively bred salmon stock had a history of late maturation (2+ sea years), which was much later than any Icelandic stock, which should reduce returns from escapes.
- The selective breeding of this stock had been prioritized by the Icelandic parliament through public support of the "Stofnfiskur" breeding programme.
- No selectively bred Icelandic aquaculture stocks were thus available.

In 2001 the Minister of Agriculture established aquaculture zones, prohibiting aquaculture of salmon in bays and inlets close to the major salmon-producing areas in Iceland (Reg. no. 226/2001). The aquaculture chapter in the Salmonid Fisheries Act was furthermore strengthened in 2001 to cope with this new scenario.

From the foregoing it can be concluded that socio-economic factors have played a large part in the decision process regarding Icelandic aquaculture for decades. For example, the decision to allow importation of Norwegian salmon eggs in 1984 set the stage for the commercial development that followed in the land-based operations and subsequently the establishment of a commercial selective breeding company in 1991, which started to breed the imported stock. In fact, the same or similar stocks of Norwegian origin are now being used for aquaculture in all countries bordering the north-east Atlantic.

Introductions and transfers

Introductions of live salmonids into Iceland have been forbidden by law for decades but import of fertilized salmonid eggs has been open to an exemption after careful scrutiny of the donor stock. After the creation of the European Economic Area, Iceland was temporarily exempted from the provisions of Council Directive 91/67 EEC, but in November 2003 the Icelandic parliament passed some amendments to the Icelandic "Salmonid Fisheries Act", the "Laws on Importation of Animals" and the "Laws on Fish Diseases" to adapt Icelandic legislation to this directive.

In the execution of these laws the Icelandic authorities will be emphasizing the need to protect the unique health status of Icelandic farmed and wild salmonids, thereby safeguarding the interest of the owners and users of the valuable salmonid angling resources.

Transgenic salmonids have not been promoted or used in Icelandic aquaculture and their use is prohibited in line with EU regulations.

By-catch

Salmon fishing in the sea has been forbidden in Iceland since the 1930s. A handful of farms with heritable coastal netting rights were exempted. These fisheries have now been eliminated so the only salmon fisheries in the sea would be by-catches in sea-trout nets, which are still legal in some areas; also, incidental by-catches in the fisheries for marine species.

It is known that some salmon are caught in char-nets, especially on Iceland's north coast, and regulatory measures have been set in some areas, which prohibit net fishing for char during the peak of the salmon migration between June 10th and August 10th. Any compensation to owners of the netting rights must be paid by the stakeholders asking for such limitations, but seem unlikely as most of the char-netting parties do not provide catch statistics although they are required to do so by law. The setting of these regulatory measures serves the double purpose of preventing illegal by-catch and providing greater numbers of salmon in the rivers.

In recent years there has been a great increase in the use of large pelagic trawls in the fisheries for various pelagic species such as blue whiting, herring, capelin and mackerel. There have been confirmed catches of salmon in pelagic trawls by Icelandic multi-gear vessels fishing for herring. The extent of the problem is, however, not documented.

Assuming that pelagic trawling could be a considerable source of marine mortality of salmon, the solution would be a high level socio-economic decision, which would probably be a difficult one to resolve in favour of the wild salmon, considering the importance and high value of commercial marine fisheries.

NORWAY

A number of studies have been undertaken to estimate social, cultural and economic values of the wild Atlantic salmon, its use, or related resources/uses, see document WSEV(03)3. These studies include studies of the economic value, economic impacts, and social and cultural benefits. While some of these studies have been important in decision-making in Norway, they all, for the most part, follow the "estimation" tradition, and just recently there have been some efforts on applying bioeconomic models on the issue of salmon fishing and the allocation of catches between the sea and river (see Skonhoft & Logstein 2003 in Norwegian).

In most of the studies there are limitations that reduce their direct application in this context:

- a study might focus the benefits of all angling in Norway, not only salmon angling;
- a study might have methodological weaknesses.

A majority of the studies are published as reports, and not too many in international refereed journals. Consequently, few studies are easy accessible for readers not familiar with Nordic languages.

However, one study should be carefully considered as a relevant case study for estimating important aspects of the value of Atlantic salmon, and that is the Study of the Economic Value of Recreational Fisheries in the Nordic Countries (Toivonen 2000).

The study has a relevant method (CVM) for our task; covers a very relevant/related topic; and covers several countries (Iceland, Sweden, Finland, Norway, Denmark). This report was specifically mentioned and discussed during the meeting in Edinburgh; however, it is worth having a closer look at the methods section of the report, as the team had some of the same challenges as the NASCO group have now in developing a study applicable in several countries.

RUSSIAN FEDERATION

Introduction

Salmon fisheries in northern Russia undoubtedly have a long history, as indicated by rock carvings of salmon and salmon fishing gear found near the Lake of Onega and dating back to the III-II millennium BC. The Atlantic salmon has always been one of the most important species exploited by the fisheries in terms of value of the catch, the extent of the fisheries and the employment generated and the income created for a large number of people. Nowadays the commercial and recreational fisheries for Atlantic salmon continue to be an important source of income for whole regions and are often the sole source of income for the majority of families in the Pomor communities. Therefore, incorporation of social and economic considerations into management of Atlantic salmon stocks in northern Russia is vitally important. Of no lesser importance are social and economic aspects in relation to the development of aquaculture. On the one hand, this development can be very important for the economy of remote coastal areas, providing new possibilities for employment of people there and generating additional income for local communities. On the other hand, farmed salmon represent a potential threat to wild salmon stocks (disease, modification of genetic make-up) and may be one of the reasons behind the current decline in abundance of wild Atlantic salmon. This industry can, therefore, reduce the possibilities offered to the same local communities by commercial and recreational fisheries. It is also important to incorporate social and economic considerations into decisions relating, for instance, to the rights of First Nations in northern Russia.

Management of salmon fisheries

Before the 20th century all salmon fishing grounds in rivers and at sea were allocated for use by local individuals. Monasteries exploited the particularly lucrative fishing grounds (at river mouths). As early as the 15th century a part of the total harvest was traded to merchants from England and Norway. Indigenous people on the Kola Peninsula, Saamy, applied a principle of equal sharing of the catch, and there was a rotation of fishing grounds among them every third year, in accordance with a formal written agreement.

In the 20th century the system of management of salmon fisheries changed. Priority was given to the commercial fishery prosecuted by state-run companies. All fishermen engaged in this fishery had social and economic guarantees given by the government, which included high wages and certain benefits.

In the 1990s, with the development of the recreational fishery, priorities changed and the commercial fishery lost its importance. Now it is maintained in the coastal areas of the White Sea only as a traditional fishery conducted by local people. This fishery is clearly of a social nature, intended to resolve economic difficulties in local communities. However, it does so only to a limited extent, as it is strictly restricted by quotas. As this fishery exploits mixed stocks, the commercial quotas are established on the basis of risk analysis. Quotas are allocated by Fisheries Councils of the Regional Administrations in accordance with TACs allocated by the Government of the Russian Federation through issuance of a relevant Executive Order. This fishery provides employment to about 500-600 fishermen, indigenous people in these regions. Until recently there was no legislative basis to justify allocation of quotas for this fishery as a social measure. This was provided as a result of adoption of the

Federal Law of 7 May 2001 “On territories of traditional use of natural resources by small indigenous nations of the North, Siberia and Far East of the Russian Federation”.

The recreational fishery has a more prominent social and economic importance and is expanding continuously. The recreational fishery allows a much larger number of people to use the resource. For instance, in 2003 more than 11,000 anglers took part in this fishery. This type of fishery also contributes to the development of infrastructure for fishing tourism, provides additional possibilities for employment, and is economically more profitable. For instance, on the Kola Peninsula the recreational fishery generates about US$ 6,000,000 to 7,000,000 to the region’s budget annually and creates more than 450 jobs.

Management of river habitat

Incorporation of social and economic considerations into the Precautionary Approach when it is applied to management of habitat in salmon rivers in Russia is important in taking decisions on river development, road and rail works, construction of industrial installations, extraction of minerals, agricultural development and other human activities, which can lead to modification of salmon habitat. Development of the economy is undoubtedly a priority; however, today there is a system developed at a federal level for control of activities impacting on aquatic biological resources and habitat, which is based on federal laws such as the Laws “On Animal World”,“Protection of Environment”, and “Aquatic Code of the Russian Federation”. The Government of the Russian Federation approved “Regulations on water protection zones”. These laws enable the authorities to stop projects which may cause considerable damage to salmon habitat, or ensure compensation for the damage caused. In accordance with the “Regulations on water protection zones”, protection zones in which any economic activity is forbidden, unless there is a special permit for it, may be established on all salmon rivers.

Management of aquaculture

Farming of aquatic animals is a potential area of economic development and this development is of great social and economic importance: employment for local people, development of the processing industry, etc. Currently there is only one farm for salmon, which is located in the coastal zone in the Barents Sea, and there are a few rainbow trout farms in the coastal zone of the White Sea. There is potential for the culture of aquatic animals such as red king crab, sea urchin and mussels. These developments are important for resolving social and economic issues and regulations have already been adopted at the regional level, which stipulate the principal conditions for operation of aquaculture units, compliance with which should help minimize potential adverse impacts.

Introductions and transfers

To minimize the risk to wild salmon stocks from introductions and transfers, import of live fish from other countries to the Russian Federation is prohibited. Movements of eggs to aquaculture facilities are conducted in accordance with established veterinary regulations. Stocking of hatchery-reared salmon juveniles is allowed only after they have been inspected and an appropriate permit issued.

Introductions of pink salmon to the White and Barents Sea basins, undertaken with the aim of resolving social and economic problems in the coastal regions, have been suspended to allow the risks to the stocks of wild Atlantic salmon to be assessed. Currently under consideration is the need for additional studies on pink salmon biology and its interactions with indigenous species.

By-catch

In order to conserve Atlantic salmon stocks in the White Sea rivers, the drift-net fishery for White Sea herring was closed as this fishery harvested large numbers of salmon post-smolts as by-catch. However, the problem of by-catch of adult salmon in the fishery for White Sea herring and pink salmon by set nets remains unresolved. More than 50 fishermen are engaged in this fishery and any decision to limit or close this fishery will definitely have social and economic implications.

WSEV(04)12

Guidelines for incorporating social and economic factors in decisions under the Precautionary Approach

The principal objective of NASCO and its Contracting Parties in applying the Precautionary Approach to the conservation and management of Atlantic salmon is to protect the resource and preserve the environments in which it lives. Under the Precautionary Approach priority should be given to conserving the productive capacity of the resource.

These Guidelines form a framework for incorporating social and economic factors into decisions which may affect the wild Atlantic salmon and the environments in which it lives. The guidelines have been developed on the basis that all decisions in relation to:

- management of salmon fisheries;
- habitat protection and restoration;
- aquaculture, introductions and transfers and transgenics;
- stock rebuilding programmes;
- by-catch

will be taken in the context of the Precautionary Approach as adopted by NASCO and its Contracting Parties. In applying these Guidelines there may be a need for expert social and economic advice.

These Guidelines are intended for use by those who have responsibility for managing the wild Atlantic salmon and its environments. However, they are also intended to be used for communicating concerns to other sectors whose proposals could impact on the wild salmon and its environments.

The means by which social and economic factors may be incorporated in decisions under the Precautionary Approach is through socio-economic impact assessments. In these guidelines, the purpose of socio-economic impact assessments is to support and inform decision-making, rather than to provide a mechanism for making the decision.

The impacts from a particular proposal may affect not only the salmon. For example, schemes to improve salmon habitat are likely to benefit wildlife in general. On the other hand, actions designed to benefit the Atlantic salmon (e.g. predator control) may have other environmental costs.

The following steps should be followed in carrying out a socio-economic impact assessment of a proposal that could affect the wild Atlantic salmon and its environment:

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The proposal should first be considered in the light of the appropriate NASCO agreement on application of the Precautionary Approach. The objective of the proposal should be identified together with an appropriate range of options, within the relevant legislative framework, for achieving that objective. It should be borne in mind that rejecting the proposal is always an option. The options should then be subject to the socio-economic evaluation that follows.

(a) What is the proposal, its objective and how would it affect the wild Atlantic salmon and the environment in which it lives?
(b) How does the proposal conform with the appropriate NASCO agreement on application of the Precautionary Approach?
(c) What is the range of options available, within the relevant legislative framework, that would achieve the objectives of the proposal?

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

Under the Precautionary Approach, it is the responsibility of the proponent of a proposal to provide all necessary information to allow a thorough assessment of the risks associated with that proposal. There is a need to avoid deleterious impacts that are serious or irreversible. Deleterious impacts that are neither serious nor irreversible should not, however, be ignored and should be subject to evaluation albeit that this may be less rigorous. The impacts of these options on the salmon and its environments should be clearly stated.

(a) What information has been provided by the proponent of the proposal which will allow for a thorough assessment of the risks to the salmon and its environments?
(b) What is the impact of each option on the salmon and its environments?
(c) Do any of the options involve the risk of serious or irreversible damage to the salmon and its environment and what are these risks?

3. Identify the stakeholders and how their behaviour might be affected by each option.

In principle the potential stakeholder constituency should be as wide as possible but subsequent analysis should focus on those stakeholders who will be directly or indirectly affected.

(a) Who are the stakeholders who will be directly or indirectly affected by each option?
(b) What is the likely impact of each option on the behaviour of those stakeholders?

4. **Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.**

The economic and social values associated with salmon and the different groups of stakeholders associated with these are listed in NASCO Council document CNL(03)18. It is appropriate to consider whether and to what extent these values and each stakeholder group will be affected. It may also be appropriate to consider the economic impacts for local, regional or national economies.

While it may be theoretically possible, though difficult, to put an economic value on all costs and benefits, in practice this may not be feasible. The assessment may therefore include a number of different units of value, monetary and non-monetary. The non-monetary elements of value may be difficult to assess but may be highly significant.

The level of assessment should be proportionate to the scale of change proposed and its likely impact. For major changes, detailed quantitative analysis would be appropriate whereas for smaller changes the analysis would be semi-quantitative or even qualitative.

The time period over which the benefits and costs are being considered should be explicit. The assessment should also indicate how costs and benefits will change over that period. For example, stricter fishing regulations may impose short-term costs but generate economic benefits in the long term.

(a) What are the key elements of value, monetary and non-monetary, which should be incorporated into the assessments?
(b) To what extent is the scale of the assessment being conducted proportionate to the scale of the change proposed and the potential impact of the proposal?
(c) What are the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option for each group of stakeholders?
(d) What are the impacts of those changes for each option and for each group of stakeholders?

5. **Rank options and consult with stakeholders as appropriate.**

The options should be ranked on the basis of costs and benefits and presented to the stakeholders who would be affected by each of the options.

(a) What is the ranking of all the options on the basis of costs and benefits?
(b) What was the outcome of the consultations with stakeholders who will be affected by these ranked options?

6. **Review the options, including mitigation measures or compensation where appropriate**.

Where these options may have social, economic or environmental costs the possibilities for mitigation or compensation should be explored.

(a) Where there are social, economic or environmental costs what are the possibilities for mitigation or compensation?

7. **Choose option and implement.**

On the basis of steps 1-6 above, the option with the highest social, economic and environmental benefits would normally be chosen and implemented, but the decision maker will have the responsibility for assigning weightings to the various costs and benefits.

(a) Which option has been chosen and was it selected on the basis of it having the highest social, economic and environmental benefits or on some other basis? If the selection was not on the basis of the highest social, economic and environmental benefits, on what basis was it made?
(b) What is the timescale for implementation?

8. **Monitor impacts and consider need for further mitigation.**

After implementation of the chosen option its social, economic and environmental impacts should be monitored, proportionate to the scale of the change and its potential impact, to ensure conformity with the Precautionary Approach and the need for mitigation measures considered. Under the Precautionary Approach, where there is a risk of a serious or irreversible deleterious impact, corrective measures should be implemented without delay and should be designed to achieve their purpose promptly.

(a) What steps have been taken to monitor the social, economic and environmental impacts of the chosen option following its implementation to ensure consistency with the Precautionary Approach?
(b) What procedures have been developed for introducing corrective measures, in the event that monitoring reveals unanticipated, undesirable impacts?

Annex 6 of WSEV(04)16

Case Studies to test the application of the Guidelines for incorporating social and economic factors into decisions under a Precautionary Approach

1. Scenarios concerning management of North Atlantic salmon fisheries

Scenario A: The advice from the international scientific community is that abundance of salmon in the North Atlantic has increased. A mixed stock fishery in the sea exploiting stocks from a wide range of rivers over a large geographical area and whose communities are highly dependent on fisheries for their existence wishes, therefore, to increase its catch.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The proposal is to increase the catch of the mixed stock fishery. Its objective is to take advantage of the improved abundance of salmon and thereby increase their profit from the fishery and improve the quality of life of the dependent communities.

It is assumed that the relevant legislative framework includes:

- the mixed stock fishery operating within one Party's waters.
- the salmon taken in the fishery are derived from other Parties' rivers; and that
- quotas for the fishery are set by agreement at NASCO between the relevant parties.

Options:

(i) do nothing and seek alternative sources of profit;
(ii) set the quota to reflect the increased abundance of salmon and take the quota;
(iii) set the quota but other Parties to compensate the fishing community for not taking either part or all of the quota.

A final list of options for detailed consideration would be decided following appropriate expert consultation and consultation between the NASCO Parties.

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

Although the overall abundance of salmon has increased there may still be some contributing stocks in a seriously depleted condition. Any increase in catch, such as under the second option, could, therefore, increase the risk of losing these stocks.

The risk of taking no action to increase the quota would be that the Party concerned might stop participating in the NASCO process, which would imply a loss of overall control of the fishery and potentially greater damage to the stocks.

3. **Identify the stakeholders and how their behaviour might be affected by each option.**

Country with sea fishery

Fishermen
Fishery-related businesses
Vessel owners
General public (especially in fishing communities)
Government
NGOs

Homewater countries

Fishermen (anglers and netsmen)
Fisheries-related businesses (including tourism)
Fishery owners
General public (especially in communities in salmon areas)
Government
NGOs

4. **Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.**

On the basis of the economic and social analysis identified in the SCPA Technical Workshop, CNL(03)18, the costs and benefits of the options would be evaluated. The key values relevant in this scenario are likely to be:

Country with sea fishery

- Fishermen: enhanced profits
- Fisheries-related businesses: changes in income and employment
- Fishing communities: economic impact; reduced social costs of full employment

Homewater countries

- Anglers: change in net willingness-to-pay
- Netsmen: enhanced profits
- Fisheries-related businesses: changes in income and employment
- Fishing communities: economic impact; reduced social costs of full employment
- General public (especially in communities in salmon areas): existence and cultural values

Under **Option 1** net benefits would increase for homewater countries, reflecting increased abundance of salmon returning to homewater rivers. Net benefits might also increase for distant water fisheries in the long term if spawning escapement increases, but also in the short term if catch per unit effort increases.

Under **Option 2** net benefits would increase more immediately, and probably more significantly, than under Option 1 for the country with the sea fishery. For homewater countries, increases in net benefits would be lower overall than under Option 1 and in some locations might actually decline.

Under **Option 3** everybody is a potential winner provided that the compensation accepted by the country with the sea fishery does not exceed the increase in net benefits in the homewater countries (their willingness to pay). Monetary compensation alone might not improve the quality of life due to social costs through reduced employment. Alternative employment opportunities would be needed.

5. Rank options and consult with stakeholders as appropriate.

In this case the ranking is inherent in the assessment process. In consultation with stakeholders we would explain the rationale behind each option and the associated uncertainties to explain the proposed ranking.

6. Review the options, including mitigation measures or compensation where appropriate.

Final ranking subsequent to feedback to consultation. Consultation may reduce uncertainty about the viability of particular options.

7. Choose option and implement.

Implement on the basis of steps 1-6, subject to agreement by relevant parties.

8. Monitor impacts and consider need for further mitigation.

Compliance with the agreed option will be monitored under agreed procedures. Quotas and/or compensation will be subject to annual review.

Scenario B: A new government regulation is proposed to delay the start of the salmon angling season by two months.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The proposal is to delay the start of the salmon angling season by two months. The objective is to increase spawning escapement of early-run salmon to conserve the genetic diversity of the salmon stock and enhance the future value of the fishery. A delay in the start of the angling season is one way of achieving this. A number of other potential options could be identified, including:

- Closure of the early season rod fishery;
- Imposition of voluntary catch and release for the entire season;
- Imposition of mandatory catch and release for two months, followed by voluntary catch and release;

- Imposition of close times;
- Restriction of fishing methods;
- Restriction of estuary netting;
- Do nothing and hope for improvement.

The final list of options for detailed consideration would be decided following appropriate expert consultation. For practical purposes the final list should not be too large.

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

Apart from "do nothing" all of the options seek to reduce risk to this genetic component of the stock.

3. Identify the stakeholders and how their behaviour might be affected by each option.

Netsmen
Anglers
Fishing-related business
Fishery Owners
General Public
Conservation Agencies
Government
NGO's

The impact of each of the final options on the behaviour of stakeholders would be assessed through surveys, consultation and analysis as appropriate. For example, discussion with anglers to determine the likely compliance with catch and release.

4. Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.

On the basis of the economic and social values identified in the SCPA Technical Workshop report, CNL(03)18, the costs and benefits of the option list would be evaluated. For example, closure of the early-season fishery will have greater economic costs than other options but a greater certainty of a reduction in angling mortality. On the other hand, in the absence of anglers on the bank, mortality through illegal fishing might increase. For the catch and release option, economic costs will be less but there is greater uncertainty about achieving the desired increase in spawning escapement. The analysis will highlight the trade-offs and ensure more informed decision-making. The benefits and costs need to be evaluated in the short and long term and in the case of spring salmon this would require at least two generations.

On the basis of preliminary discussion we would rank mandatory catch and release higher than the other options.

5. Rank options and consult with stakeholders as appropriate.

In consultation with stakeholders we would explain the rationale behind each option and the uncertainties associated with each to explain the proposed ranking.

6. Review the options, including mitigation measures or compensation where appropriate.

Final ranking subsequent to feedback to consultation. Consultation may reduce uncertainty about the viability of particular options.

7. Choose option and implement.

Implementation.

8. Monitor impacts and consider need for further mitigation.

There will be on-going monitoring of compliance and a regular performance review to see if objectives have been achieved or whether further initiatives are required.

2. A scenario concerning habitat protection and restoration

A small hydro-electric company wishes to dam a salmon river so as to provide cheaper electricity to local communities, but this will cause loss of salmon production upstream of the dam.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The proposal is to dam a salmon river so as to provide cheaper electricity to local communities. The policy objective is to seek to conserve salmon stocks by persuading the relevant authorities to ensure that the conditions attaching to the permission to develop the hydro plant address the concerns of fishery managers relating to the salmon stock and its habitat.

Biological, social and economic arguments will be developed to best present the case for the long-term sustainable rational management of the stock and its environment. The presumption is that the proposers have not fully evaluated the long-term biological, economic and social impacts resulting from the reduction of salmon stocks associated with their proposal.

The most relevant available options are:

- Do nothing.
- Oppose the project.
- Negotiate mitigating terms and conditions to minimise the risk to salmon migration and its habitat.

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

In assessing the risk of serious or irreversible environmental impacts, the importance of the stock in question should first be considered. If it is a large genetically distinct stock and if the proposed hydro installation is considered to greatly or totally impede migrating salmon or seriously damage their spawning habitat, then the risk could be serious or irreversible. The 'do nothing' option has the highest risk of irreversible consequences. The other two options carry less risk for salmon stocks.

3. Identify the stakeholders and how their behaviour might be affected by each option.

The principal stakeholders that may be impacted under the above options are:

Riparian owners: Lose their salmon angling income. The capital value of the fishery will fall. The heritable value will also be adversely affected.

Anglers: Lose the opportunity to fish. They may have to travel further to get fishing and it may not be as good.

Guest houses/ghillies/tackle shops/local shops and restaurants, etc.: They will lose the income from the anglers.

NGO's such as angler representative bodies: Particularly in recent years, NGO's have been recognised as legitimate stakeholders in salmon management and any intervention that results in a negative impact on their policies and remits needs to be addressed.

Project proposers: Lose the opportunity to make money (the conditions applied could impact on profit margins and even the viability of the project.)

State agencies: Planning, environmental management, flooding, power generation, etc. A poorly researched and managed project could have serious cost, nuisance and other implications for State agencies and even politicians/Government.

Local community: May lose opportunity to get cheaper power or alternatively may forego all the pleasures associated with having a healthy stock of wild fish in their local river.

4. Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.

To assess the social, economic and environmental costs and benefits it will be necessary to engage the services of appropriate specialists in these areas. The EIS-type model might be appropriate here. The availability of hard data and meaningful consultation with appropriate stakeholders is critical. Also critical is measurement of the non-monetary elements such as quality-of-life values.

With respect to the "Do Nothing" option, the relative biological, economic and social values of the two competing interests may leave few real and defendable choices. Indeed, the importance of that particular salmon stock *per se*, may not be great. Again if the project does not go ahead on this river, it may get approval to proceed on a neighbouring but more important salmon river.

It may be possible to persuade the appropriate authorities that, on balance, the benefits that might derive from the development of this project could not be justified when compared to the biological, economic and social consequences.

On the other hand, it may be possible to negotiate mitigating terms and conditions to minimise the risk to salmon migration and its habitat. This might be enhancement of feeder systems below the hydro site or enhancement of an entirely separate river system or salmon stock which is under threat. These enhancements would be funded by the project promoters.

5. Rank options and consult with stakeholders as appropriate.

The ranking of the available options is a central element of the assessment and decision-making process in a case of this nature. Due process and transparency are essential to retain the support and engagement of all stakeholders. Great care must be taken from the outset to ensure this is delivered effectively.

6. Review the options, including mitigation measures or compensation where appropriate.

As a result of consultation further mitigating measures or compensation funded by the proposer may be appropriate.

7. Choose option and implement.

In this scenario, where the decision is made by a third party, it is hoped that steps 1-6 result in an outcome that provides for the long-term sustainability of salmon stocks.

8. Monitor impacts and consider need for further mitigation.

On-going monitoring of impacts, particularly if option three is implemented, must be undertaken and should be included in the conditions attaching to the approval to construct and operate the hydro installation. Again, quantitative and qualitative baseline data are essential. In line with the Precautionary Approach, the cost of ongoing monitoring should be borne by the hydro owner and there must be a mechanism to ensure corrective action is taken in a timely manner when warranted. On-going monitoring would include, *inter alia*, fish migration, water flow/abstraction, efficacy of fish passes, impacts of screens in headraces and tailraces, water quality, water temperature, changes to spawning areas and food supply, etc.

3. Scenarios concerning aquaculture

Scenario A: The international company Fishygrowth Inc. has applied to establish a new fish farm near the treasured Goldmine salmon river, located in the remote fjord area of the northern country Midgaard. The farm would likely have the potential to affect this river as well as three neighbouring rivers. The situation is further confounded by the fact that the farm will be located not far from the international border of Highgaard, the neighbouring country which has very little aquaculture but many salmon rivers.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The issue of locating a new fish farm in a fjord is, in most cases, the responsibility of authorities which do not deal with salmon management. Most salmon management authorities, however, are consulted and thus have impacts on the assessment and licensing processes. They can thus have considerable influence on the acceptance or rejection of fish farms, which might pose threats to salmon and wild salmon interests. Both the Williamsburg Resolution and the Guidelines for Social and Economic Impact Assessment serve as important "templates" to applicants and other authorities as to what the wild salmon sector expect to be addressed in the Environmental Impact Assessment. Since the location of fish farms is a highly important issue in the management context it should be considered here.

The following should be considered:

- Have all relevant options for location and management of the business been considered?
- Is the application reasonable and have environmental, social and economic values been taken into account in a justifiable way?
- If so, should the proposal be accepted, rejected or accepted with certain conditions?

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

In this example/task, Environmental Impact Assessments are demanded in most countries, assessing many interests and conditions, regarding environmental effects, possible effects on wildlife and landscape, pollution, effects for transportation, economic and social effects in general. However, these overall assessments are controlled by other authorities, and the interests of wild salmon, and the benefits to society of the wild salmon are just two of many interests. Also, several countries are making changes in their legislation and decision-making regarding aquaculture. Different authorities and different levels handle such proposals, depending on the size of the business, the status of the wild salmon stock, etc. For instance, often local authorities decide on smaller farms. In situations where the wild salmon is threatened, national/federal authorities are usually involved, with the wild salmon authority more influential in the decision.

The input from fisheries managers would need to consider the relevance of the Precautionary Approach and the implementation of social and economic values into the Precautionary Approach and the following question might be asked:

Does the proposed farm comply with the general guidelines to minimise impacts from aquaculture on the wild salmon stocks?

The Williamsburg Resolution should be used as a checklist to assess to what extent the new farm is a "state-of the-art" business that has taken this Resolution into account. If the proposed farm does not comply with the Resolution, the proposal could be sent back with specific questions and suggestions in line with these guidelines.

3. Identify the stakeholders and how their behaviour might be affected by each option.

Have all stakeholders related to wild salmon interests been identified and their interests described in a justifiable way? All relevant stakeholders should be identified, including anglers, netsmen, fishing businesses, and NGOs from the local communities that are affected. Stakeholders will vary from country to country. Fisheries Associations and Fishery Boards need to be consulted where salmon fisheries are privately owned but in other cases the resource is public and relevant governments responsible. In this case, stakeholders in the neighbouring country should also be consulted, possibly through diplomatic channels.

4. Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impact of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.

It is likely that many socio-economic factors have already been considered in an Environmental Impact Assessment. This needs to be scrutinized by the Salmon Management Agency prior to final licensing of the fish farm. Two issues are paramount for them: Are the benefits and costs of the farm operation justifiable and correct? Are the benefits and costs to the wild salmon and related interests justifiable and correct? Have both short- and long-term benefits and costs been considered?

5. Rank options and consult with stakeholders as appropriate.

There could be number of options open for changing the impact of the fish farm. The quantity produced could be reduced, the location shifted away from the rivers or split into several units. This, of course, needs to be done through consultation with the proponent of the aquaculture activity.

6. Review the options, including mitigation measures or compensation where appropriate.

The operation of the fish farm could be approved with stringent conditions regarding gear, quantity produced, partial or total tagging of salmon as well as monitoring measures, c.f. the Williamsburg Resolution. Are the benefits of the mitigating actions greater than their cost?

7. Chose options and implement.

The fish farm would be approved or alternatively rejected due to excessive environmental effects especially in the long term.

8. **Monitor impacts and consider need for further mitigation.**

If licensed, the impacts of the farm would be monitored and mitigated if possible.

Scenario B: An angling association in Scotland concerned about declining catches of salmon wishes to augment the stock through a hatchery rearing programme using salmon from a river fifty miles away.

1. **Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.**

   An angling association concerned about declining catches of salmon wishes to augment the stock through a hatchery rearing programme using salmon from a river fifty miles away.

   Background information on management regime: In Scotland, salmon fishing rights in fresh water and in the sea are private, heritable titles which may be held separately from any land. Scotland is divided into 66 salmon fishery districts. Salmon fishery management in Scotland has been devolved to District Salmon Fishery Boards (DSFBs). Membership of these DSFBs comprises elected representatives of salmon fishery proprietors and, where appropriate, co-opted representatives of tenant netsmen and anglers. Representatives of Local Authorities and Government Agencies such as Scottish Natural Heritage and the Scottish Environment Protection Agency are, in many cases, invited to participate. Currently, 48 DSFBs have been established. All of the major salmon rivers have DSFBs in place.

   Relevant legislation currently in force: Section 24 of the Salmon Act 1986 makes it an offence for any person to introduce salmon or the eggs of salmon into waters in a salmon fishery district where a DSFB has been established without the prior approval of the Board.

2. **Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.**

   The DSFB should take account of the recommendations in the Williamsburg Resolution, particularly the guidelines for stocking;

   Has the proponent undertaken an appropriate environmental impact assessment (EIA) to determine that stocking is necessary? Is there some physical factor or factors that limit salmon production; has the proponent considered options other than stocking? The assessment need not always be a full-scale EIA, which may attract great cost, but the proponent must demonstrate that full consideration has been given to possible impacts;

   If the result of the EIA submitted by the proponent is that stocking is deemed to be necessary, has it determined whether the source of the stock to be used is appropriate?

Does an appropriate hatchery exist? Has the hatchery been registered with Fisheries Research Services to include it in the monitoring undertaken by Fisheries Health Inspectorate?

If there is no hatchery, has planning permission from the relevant Local Authority been sought in order to build one?

Is there evidence that there will be adverse genetic interactions, given that these may be as bad or almost as bad if salmon from a neighbouring river are used?

The DSFB should establish whether there is a shortage of salmon. Do declining catches reflect decreased stock abundance, or is there some other cause, such as changes in run-timing, changes in flow regime, or some other non-stock-related factor?

The DSFB should examine whether other options are available and not merely rely on the assessment provided by the proponent. Expert advice should be sought from appropriate sources, such as Fishery Research Services, Fishery Trusts, and retained biologists. The options might include habitat restoration or improvement; re-negotiation of compensation flow agreements; stocking with local stocks; kelt reconditioning; apply to Scottish Ministers for appropriate Orders or Regulations to address management or conservation issues (e.g. alteration of close times, baits and lures, mandatory catch and release); education that decreased catch rates are likely to provide a better long-term solution; or do nothing;

Risk analyses should be performed on each option to assess whether any action taken would have a serious or irreversible impact on local stocks.

3. **Identify the stakeholders and how their behaviour might be affected by each option.**

The DSFB should identify the stakeholders likely to be affected. These would include other fishery owners and angling groups operating elsewhere in the river; the DSFBs, owners and operators in neighbouring rivers that might be affected by straying; owners and operators in the source river; downstream interests in the area such as service industries (hotels, tackle dealers, etc.).

4. **Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.**

The DSFB should estimate the potential environmental cost of each option. In the case of the proposed stocking programme, in addition to the environmental costs, the potential social and economic costs should be assessed. The assessment should address the long-term costs of affecting adversely the local stocks, and balance this against the potential short-term gains and long-term costs to local stocks of introducing non-native fish.

The assessment need not always be a full-scale EIA, which may attract great cost, but the DSFB should give full consideration to possible impacts.

5. Rank options and consult with stakeholders as appropriate.

The DSFB should rank the possible options on the basis of costs and benefits, taking into account the effect on local jobs (ghillies, water bailiffs, hotels, etc.) of the recorded decline in salmon catches, and the long-term implications for these sectors of each of the options.

The DSFB should present the list of options to appropriate stakeholders for their comment. The stakeholders might include other salmon fishery owners within the catchment; other local angling interests; Local Authorities; NGOs; appropriate Government Departments and Agencies.

6. Review the options, including mitigation measures or compensation where appropriate.

In the light of the comments received, the DSFB should decide on the appropriate course of action to follow.

7. Choose an option and implement.

The appropriate option, based on the analysis above, should be implemented for a fixed period.

8. Monitor impacts and consider need for further mitigation.

Stock status and catches should be monitored before and after implementation of the chosen option, and the programme kept under review. If necessary the measure may be allowed to fall when the prescribed time limit is reached, or it may be renewed as it is or modified in the light of experience gained during the appraisal period.

Scenario C: An angling society in the US wishes to augment the stock in a river through a hatchery rearing programme using salmon from a separate, nearby river. The association wants to stock fish from the Penobscot River (currently not listed as endangered under the U.S. Endangered Species Act) in a river adjacent to those with populations which are endangered, but which currently does not have an extant wild population[1]. Currently Atlantic salmon fishing is prohibited in Maine, thus this project would be attempting to restore a population to this river for a purpose other than angling – although part of the motive could be for angling at some point in the future.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The U.S. Federal government controls the hatchery brood stock, and would have to agree to provide the angling association with the eggs, fry, or smolt to be stocked or reared. This also has to be approved by a technical advisory committee in Maine, as well as a Maine State agency charged with Atlantic salmon management. The federal action (the federal government giving the eggs to the association) would trigger the National Environmental Policy Act (NEPA), which requires an environmental review (including a socio-economic review) of the action. The U.S. government would be responsible for this review, which would require a description of the action and its purpose and need. If the project were determined to be of more than "minor" significance, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) would be conducted. Both an EA and an EIS require the identification and analysis of several alternatives, including the "no action" alternative. Consistency with the appropriate NASCO agreement on application of the Precautionary Approach, specifically the Williamsburg Resolution, would be noted here.

2. Assess for each option whether there is risk of serious or irreversible deleterious impact on the salmon and its environments.

The review under NEPA would require an assessment of the environmental impacts of the action, including a conclusion (if applicable) of no "significant" impact.

3. Identify the stakeholders and how their behaviour might be affected by each option.

Depending on the significance of the project, NEPA requires public review for anything which would be of more than "minor" impact. Stakeholders here would be the salmon

[1] A hypothetical example could also be explored in which fish from one of the endangered U.S. populations were to be stocked in a river with no population or no endangered population. This would complicate matters in that an endangered species carries its protection wherever it goes and this example would be expanding the endangered species beyond its current range. Such use would have to be of benefit to the endangered population, and would also introduce additional socio-economic impacts that are associated with the protection of endangered species. While this would complicate the analysis, and the legal framework under which this action would be taken is more complex, the steps involved in evaluating the socio-economic and environmental impacts, costs, and benefits would be similar.

association, landowners along the river, NGO's, anglers of other species, perhaps the aquaculture industry, and other state and federal agencies.

4. Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of the impact of the change.

If the project were determined to be of more than "minor" significance, an EA or an EIS would be conducted. Both an EA and an EIS require socio-economic analysis of alternatives. In this case an EA may be written, and the Federal agency authorizing the action would be responsible for the analyses, although the agency may pass that responsibility on to the proponent (in this case the salmon association). Of particular importance will be the impacts on the endangered wild Atlantic salmon population, including the benefits and costs associated with those impacts.

5. Rank options and consult with stakeholders as appropriate.

A "preferred" alternative would be identified, and a draft EA would be made available for public review and comment.

6. Review the options, including mitigation measures or compensation where appropriate.

The EA process requires the identification of mitigation measures.

7. Choose option and implement.

After review of the public input, the Federal agency would decide if it will provide the eggs (as requested, or perhaps in a modified fashion (e.g., more, less, fry instead of eggs, etc.).

8. Monitor impacts and consider need for further mitigation.

The Maine State agency, in its permit to the association, would likely require monitoring of the results of the stocking. This would be of interest to the association as well since they are interested in seeing fish return. The United States, in general, is trying to implement salmon recovery and restoration projects using an experimental design, with monitoring required before, during, and after project implementation to better assess the impact of the project.

4. A scenario concerning by-catch

Nascovia , a country from outside the North Atlantic area, obtains a quota from another international fisheries organization to fish for pelagic species in international waters on the migration routes of wild salmon post-smolts. There is evidence that such fisheries can take significant amounts of salmon post-smolts.

1. Describe the proposal, its objective and the options within the relevant legislative framework for achieving the objective.

The change consists of a new fishery for pelagic species to provide economic benefits to country Nascovia. The change is lawful, within the rules of the other international fisheries organization. The quota has been fixed so the only options are to consider changes in fishing methods or timing. There is a risk of serious deleterious effects on abundance and diversity of wild Atlantic salmon so it is unacceptable to take no action. As a bare minimum, scientific studies or an observer programme should be initiated to better understand the scale of the problem.

2. Assess for each option whether there is a risk of serious or irreversible deleterious impact on the salmon and its environments.

Scientific evidence suggests that a very small proportion of the catch may consist of salmon post-smolts. Nevertheless, this level may constitute a large proportion of salmon post-smolts in the area at the time of the fishery. However, there is considerable uncertainty in the scientific estimates of the level of by-catch of salmon.

3. Identify the stakeholders and how their behaviour might be affected by each option.

Nascovian fishermen, vessel owners and fish processors;
Owners of salmon fisheries on rivers to which the stocks would have returned had they not been harvested as by-catch;
Salmon anglers on rivers to which the stocks would have returned had they not been harvested as by-catch;
Commercial and subsistence fishermen who would have exploited the salmon that would have returned had they not been harvested as by-catch (including distant water fisheries on the salmon's migration routes);
Those inhabitants in the states of origin of the fish harvested as by-catch and which will not, therefore, return to the rivers resulting in loss of existence value, etc.

4. Assess the changes in social, economic and environmental costs and benefits, both short- and long-term, associated with each option, and determine the economic impacts of those changes. This should be done for each group of stakeholders. The scale of the assessment should be proportionate to the scale of change.

Option 1 is to lower the height of the head rope of the pelagic trawl by 5m. This measure might eliminate the by-catch or more likely reduce it substantially but it will reduce the catch-per-unit-effort of the pelagic trawls by 15%.

Option 2 is to stop the pelagic fishery during daylight hours, in which case the by-catch might be eliminated or, more likely, substantially reduced but the catch-per-unit-effort of the target pelagic species would fall by 50%.

At this point there may be a need to obtain professional economic advice on the losses to Nascovian stakeholders versus the gains to state of origin stakeholders of each option. The existence values of the salmon must be fully incorporated and not just the value of a tonne of salmon. The long-term impacts on the salmon must be considered.

5. Rank options and consult with stakeholders as appropriate.

The option with maximum benefit to the salmon and the stakeholders who benefit from it is to stop the new fishery. The option with the least benefit to the salmon and the stakeholders who benefit from it is to allow the fishery to proceed in its present or an expanded form. The option of modifying the operation of the fishery would have an intermediate effect.

6. Review the options, including mitigation measures or compensation where appropriate.

Option 1: NASCO and its Contracting Parties attempt to persuade the international organisation concerned that they should issue new regulations concerning fishing methods and patterns because they are undermining NASCO's conservation efforts.

Option 2: NASCO and its Contracting Parties and/or the private sector could offer compensation to Nascovian fishermen to change fishing patterns

7. Choose option and implement.

Option 1 is chosen and representations are made to the international organization to change fishing methods.

8. Monitor impacts and consider need for further mitigation.

Research is undertaken to evaluate the impacts of the change in fishing methods on the level of by-catch, with a view to considering the need for further representations should the level of by-catch not fall as anticipated.

WSEV(04)13

A Modeling Approach for Integrating Socio-economic Factors into Atlantic Salmon Management

The North Atlantic salmon fishery is a complex organization of many different stakeholders representing direct users of the resource and those that benefit indirectly from its existence. Within the salmon fishery, commercial, recreational, and First Nations have a direct, consumptive demand for the resource. Non-consumptive demands for the resource also exist with tourists visiting spawning sites and observing wildlife that has congregated around spawning streams. Interactions also occur with other industries or activities that compete with salmon for the resources upon which they are dependent. Hydro-electric power and flood control, aquaculture, agriculture, forestry, industrial development and pollution, and the construction of roads and bridges, can temporarily or permanently change the environment and habitat of salmon. In addition, salmon is managed differently by different jurisdictions; some maintain an open access fishery while others employ property rights in the management of their stocks. Given these many different interactions, it is often difficult to determine how a particular management action will affect different components of the North Atlantic salmon fishery. More importantly, research into the biology, economics, and social components of the salmon fishery are not compatible and are not easily compared within an integrated, management framework. A conceptual or empirical North Atlantic salmon model could be developed that would allow information about the management of salmon to be developed that would account for these interactions.

Such a model would have four basic components for each stakeholder. The first is an assessment of the market for products or services that are produced or provided by, or based on, the resource. This assessment would include the demand for recreational fishing trips based on their travel costs, supply and demand for salmon products commercially produced, impacts from other substitute products on salmon prices and availability, and demand for services related to salmon viewing or existence value. This assessment allows the determination of the values of salmon and quantities needed by the different consumptive and non-consumptive users of the resource. It also allows the determination of how these values change over time and with changes in the management environment.

A second component is a measure of the values, profits, or costs associated with providing these products and services by individuals or firms. Leasing of salmon fishing sites to recreational fishermen is a source of income to landowners. Guide and charter services are businesses that generate value to the nation. Commercial sales of aquaculture-produced salmon reduce market prices for wild-caught salmon and could cause a reallocation to recreational users of wild salmon. Satisfaction from recreational fishing also generates a value for wild salmon. This assessment allows the impacts on individuals' or firms' provision of services or products to be analysed. That is, how much will be produced, what is the resulting demand for labor, how much income is produced, etc.

The third component is to determine the level of participation in the salmon-related industries. The numbers of recreational and commercial fishermen, environmental tourists, and other users need to be determined for each stakeholder group. The decision to enter or exit an activity can change under different management institutions, levels of abundance, or costs of participating relative to other activities. Based on the individual levels of production, total production of a good or service by the entire group of stakeholders can be determined.

Once identified for each stakeholder group these three components can be combined with the final component, which is the biology of the stock or related stocks. Changes in fishing effort will impact the size of the stock. This includes an understanding of growth rates, recruitment, etc. of the fish species. This change in stock size over time will impact the values of salmon used by consumptive and non-consumptive stakeholders. Once developed for each stakeholder group, the discounted net benefits generated by each group can be summed to determine the change in total net benefits for each proposed change in the management environment.

This approach to understanding how net benefits change in a group of salmon dependent or related industries need not be time-consuming or expensive. Existing studies of salmon values can be incorporated into the management framework, expert opinion can be used to determine parameter values to explain behaviour, and case studies can be used. Simple analyses can be developed initially that can be replaced by more comprehensive analyses conducted in the future if needed. Statistical programmes to develop the necessary data for these model components could be simplified if combined with existing stock assessment data collection survey programmes. Alternatively, qualitative assessments can be used to rank the alternatives without explicit empirical values being generated for each alternative. In this approach, the framework can be assembled and agreed to by stakeholders and then alternatives evaluated and discussed to ensure agreement with the outcome.

The result of this modeling approach is a better understanding of the interactions between components of the salmon-related industries and stocks of fish. Research can be conducted that provides information to improve the model over time. Interactions between the stock dynamics and the economic and socio-cultural aspects of salmon can be better understood. Information that assists managers in making decisions can be provided and improved over time. Manager decisions about the use of the salmon resource can be improved and biological, economic, and social research can be made more responsive to the needs of the managers.

<u>ANNEX 28</u>

Council

CNL(04)43

The Role of NASCO in Developing a Bioeconomic Model and a Proposal for a Pilot Project

(tabled by the United States)

CNL(04)43

The Role of NASCO in Developing a Bioeconomic Model and a Proposal for a Pilot Project

(tabled by the United States)

Bioeconomic models are an approach to developing an assessment of a fishery, which includes both the stocks and the participants. To understand the role NASCO should play in developing a socio-economic impact assessment, first it is important to clarify what a bioeconomic model is and how social factors are incorporated into such models.

The best use of a bioeconomic model is to assess the status of a fishery; not only the stock but the participants as well. It is not an expert system that makes decisions, but provides information to managers on which decisions can be based. This modeling approach provides a framework in which information from different scientific disciplines can be integrated into a single assessment. As such, this framework can be viewed as a set of components or modules. The first component is the stock assessment that sets the biological limits on the other components of the model since it determines the availability of the salmon stock. The second component is a market assessment that determines the demand for the salmon resource by different users, e.g., commercial fishers, recreational anglers, non-consumptive users, and those who are indirectly dependent on the resource. The third component is an assessment of how participants in the fishery and those who are indirectly dependent upon the fishery change in number and characteristics over time. The fourth component is an assessment of the costs of and revenues generated by fishing-related activities.

Once developed using empirical analysis and expert opinion, this bioeconomic framework is flexible enough to allow the determination of the effects of regulatory change, the potential future value of a recovered sustainable stock that is presently being foregone, and the ability to compare activities to determine the resource's best use, e.g., hydroelectric development versus habitat preservation.

This approach need not be time-consuming or expensive. Existing studies of salmon values can be incorporated into the management framework, expert opinion can be used to determine parameter values to explain behaviour, and case studies can be used. Simple analyses can be developed initially that can be replaced by more comprehensive analyses conducted in the future if needed. Statistical programmes to develop the necessary data for these model components could be simplified if combined with existing stock assessment data collection survey programmes. Alternatively, qualitative assessments can be used to rank the alternatives without explicit empirical values generated for each alternative.

A small NASCO workgroup could be tasked to develop a fishery assessment for the NASCO Contracting Parties. This workgroup would indicate the types of data that would be needed in the development of a bioeconomic salmon model and ensure that future salmon bioeconomic models developed by Contracting Parties are compatible. Specifically, this would include an overview of the accessible data and information used in this pilot project, including data collection methodology. In addition, a comprehensive report on management issues related to wild salmon would be developed for use in describing the scope of this bioeconomic model. This process would result in recommendations on the types of data needed and how it would be obtained. It is expected that the value of bioeconomic models will become evident as NASCO Parties implement the guidelines for incorporation of social and economic factors into decisions under the Precautionary Approach. To illustrate this, this workgroup could apply the available information to a pilot project. The results of this project could be presented at the next NASCO meeting to illustrate how a salmon model could be developed and what types of information it would provide fishery managers.

ANNEX 29

Council

CNL(04)25

Predator-Related Mortality

CNL(04)25

Predator-Related Mortality

Introduction

1. Many predators of Atlantic salmon have been identified but their impact is hard to quantify, particularly in the marine environment. Salmon abundance is presently low while at the same time some populations of predators of the Atlantic salmon are increasing, and in some cases the species concerned are protected. This has led to calls to restore the balance to ecosystems through the introduction of measures, both lethal and non-lethal, to reduce the impact of some species of predators. There are likely to be strong reactions to such measures.

NASCO's Actions to Date

2. At the Council's Annual Meeting in 1996, a Special Session was held entitled 'The Atlantic Salmon as Predator and Prey'. The issue remained on the Council's agenda in 1997 when a summary of the session was presented and the need for additional research on this topic was noted by several Parties. At the Seventeenth Annual Meeting in 2000, Canada made a presentation and tabled a paper, CNL(00)48, on the effects of predators on Atlantic salmon. In 2001, the representative of the European Union tabled a paper, CNL(01)61, on control of seals as predators of salmon in the European Union and verbal reports on the management of seal populations were given by the other Parties. In 2002, a further paper, CNL(02)46, was presented by the EU in relation to predation of salmon by seals and birds, summarizing ongoing research initiatives and outlining management options. The Council was advised that some EU Member States have management programmes in place and others are considering them for the future. Iceland had indicated that increased predation by cod on salmon smolts in Icelandic waters was a concern. Denmark (in respect of the Faroe Islands and Greenland) referred to the importance of predator-related mortality for wild salmon conservation and for salmon aquaculture, and noted that the issue should be considered in relation to application of the Precautionary Approach. At the Council's 2003 Annual Meeting, information on research and management activities in relation to predator-related mortality was provided by the EU (Denmark, Finland, Sweden and UK (Scotland)), CNL(03)24. A paper entitled 'The Effects of Marine Predation on US Stocks of Atlantic Salmon' was tabled by the US, CNL(03)39. Written statements on predator-related mortality have also been distributed to delegates by one of NASCO's NGOs at a number of recent Annual Meetings (CNL(97)72, CNL(98)71, CNL(01)70, CNL(02)44) and the issue has been referred to in a number of joint NGO Opening Statements.

Returns

3. Last year the Council agreed to gather together all available information on this subject and each Party was asked to appoint a coordinator for this work. These coordinators were asked by the Secretary to provide the following:

- information on the impact on salmon populations of predation by piscivorous birds, fish and mammals;
- details of measures implemented in relation to management of these predators of salmon and any assessment of the effectiveness of these measures;
- details of on-going research in relation to predator-related mortality.

4. The returns are presented in Annex 1. At the time of preparation of this document, no information had been provided by Greenland, a number of EU Member States with salmon stocks (France, Portugal and Spain) and the USA.

Canada has provided information on a three-year management plan introduced in 2003. This plan established a harp seal quota of 975,000 over the three-year period 2003-2005. For the same period, the TAC for hooded seals is 10,000 animals per annum and a small harvest of grey seals is permitted. The seals hunted must be independent, self-reliant animals. Actual harvest levels are highly variable and dependent on environmental and market conditions. 289,000 harp seals were harvested in 2003. Less than 200 hooded seals and a small number of grey seals are hunted annually. An active seal research programme has been maintained for many years and in April 2003 a two-year Atlantic Seal Research Programme with funding of CAN$ 6 million was announced to expand research activities in relation to abundance and distribution of seals and their impact on fish stocks. The programme will also evaluate seal management tools to aid recovery of cod stocks including exclusion zones and reproduction control. The results of this scientific programme will inform future management. A recent study suggests that seal predation of smolts leaving the Miramichi River is unlikely to be significant and no evidence was found of consumption of adult salmon, although this may be because the heads of salmon were not consumed or the head parts used for identification had been digested. Information on a river observation programme in Newfoundland rivers is also presented. Recent warm winters have altered coastal ice coverage and allowed seals access to estuaries and rivers.

Denmark (in respect of the Faroe Islands and Greenland) has indicated that there is no ongoing research on predator-related mortality of salmon in the Faroe Islands.

The European Union has reported that the Atlantic salmon is preyed upon by a number of species of fish, birds and mammals throughout the European Union and there has been much conjecture about the impact of this predation on salmon stocks and fisheries. Many of the species that predate on salmon are themselves subject to protection although for some species this protection has been relaxed in response to concerns from fishery interests. Pike, brown trout, burbot and a number of gadoid species are among the fish species listed as predators of salmon. Red-breasted merganser, goosander and great cormorant are considered by managers to be particularly serious predators, with predation by grey heron significant in some areas. Of the mammalian predators, seals have received the greatest attention by managers and scientists. Details of potential interactions between predators and salmon and of the measures taken to reduce damage to salmon stocks and fisheries, are provided for a number of EU Member States.

In Finland, research suggests that the main prey of medium and large burbot in the river Teno in winter months is juvenile salmon but the impact of this predation has not been quantified.

In Germany, studies of the impact of hydro-electric schemes on migrating salmon smolts indicated that smolts weakened by their passage through turbines were easy prey for predatory fish gathered downstream. Harvesting of these predators has been recommended during the migration period of smolts. Both cormorant and grey heron populations have increased substantially since the 1970s. Increasing awareness that continuing high levels of protection for cormorants could jeopardize the salmon restoration programme in the Rhine may lead to the authorities allowing scaring-off or shooting of cormorants.

In Denmark, in response to an increase in the cormorant population and the number of complaints from fishermen a variety of control measures, both lethal and non-lethal, have been introduced. They include changes to fishing gear and the mode of fishing, scaring of birds (e.g. from release sites used for stocking salmon), removal of nests, shooting, spraying of eggs with paraffin oil and the illegal release of predators such as mink, a practice that can lead to predation on other species of birds. The mink may also prey on Atlantic salmon.

For Great Britain, information has been provided on the number of licences issued and the numbers of cormorants, herons, mergansers and goosanders shot under these licences. In England and Wales, the general view is that predation on salmon by seals is probably limited to a small number of seals that target fish in nets and in river mouths and estuaries. In Scotland, there are increasing reports of seals moving upstream into rivers and lochs and it is assumed that they are feeding on salmon. Although some seals are known to eat salmon, evidence of salmon in the diet of seals is limited. Details of the number of licences issued to shoot seals and the numbers shot under these licences is provided. Collaborative research projects are on-going in Scotland to assess the diet of seals and the use of scaring devices and to identify interactions and damage "hotspots".

In Sweden, damage to salmon stocks and fisheries from seals has been recorded.

In Ireland, salmon smolts are frequently recorded in the stomachs of pike in large lakes and some large rivers, although many large rivers lack suitable pike habitat, so predation in these rivers is low. Ferox trout may also prey on salmon smolts. The cormorant population in Ireland has increased following reduction in persecution by humans and stocking of game and coarse fish of a size suitable for consumption by cormorants. Disturbance of cormorants and, in exceptional circumstances, shooting are used to protect migrating smolts. Although salmon fishermen have reported that seals are major predators of salmon, studies on the diet of seals have failed to produce evidence to substantiate this. A report on a meeting held in Londonderry, Northern Ireland, entitled "Seals/Atlantic Salmon Interaction Workshop – a recent Irish review of the evidence" is referred to. One recommendation from the Workshop was that further seal control measures should be tested in Ireland with a view to replacing the lethal control methods currently available.

Iceland has provided a list of potential predators of Atlantic salmon in both fresh and marine waters. Information from an ocean ranching site suggests predation losses in the first 24 hours following release to be in the range of 0.2 – 1.1% of smolts released. It includes 15 species of birds, 8 species of fish and 3 species of mammal (including mink, a species introduced to Iceland), although no information is available on the impact on salmon of a particular predator. The urgent need for an extensive study on the impact of predation on salmon stocks in Iceland is noted. Details of predator control programmes are provided. For most potential predators these are implemented during short periods of time considered to be critical for the salmon. They include activities to control seal populations and to keep them away from river estuaries during the peak salmon migration period.

Norway has also indicated that information on the impact of predation on salmon stocks is limited, but has listed those fish, birds and mammals which are potential or confirmed predators of salmon at the different stages of its life-cycle. A study of the diet of goosanders and red-breasted mergansers showed that salmon was the dominant prey species but it was concluded that this predation did not significantly affect smolt production. Salmonids made up to 70-80% of the diet of otters but only 10% of the fish eaten were juvenile salmon. Predation is presumed to be the most important cause of natural mortality of salmon at sea and mortality is highest in the first few months at sea. Cormorants, grey seals and harbour seals are thought to be capable of exerting heavy predation pressure during the post-smolt migration period. Avian predation probably declines as the salmon grow while seal predation can occur throughout the marine phase. Elevated sea lice levels on migrating post-smolts may lead to increased predation. No specific management measures to control predators of salmon have been implemented. It is noted that a review of the literature suggests that predation pressure at certain stages in the salmon's life-cycle may be high although there is no empirical evidence that the total predation pressure or any individual predator is having a significant negative impact on salmon stock level. In several Norwegian rivers catches and pre-fishery abundance of salmon have increased significantly since 1997 despite the presence of stable or slightly increasing populations of predators. It is believed, therefore, that the decline in abundance in other areas is the result of environmental pressures other than predation.

The **Russian Federation** has provided information from observations at in-river barrier fences on a number of rivers with regard to seal damage and from studies on piscivorous fish. The percentage of salmon examined which showed signs of seal damage ranged from <1% to 5.3%. Analysis of the diet of pike in the Umba River during the smolt migration period indicated that 19% of the fish examined contained juvenile salmon. Management of predatory fish populations is undertaken in rivers in the Murmansk region. Pike, perch and burbot are harvested.

Further actions

4. NASCO has agreed guidelines and agreements on a wide range of threats to wild Atlantic salmon stocks but has not yet done so in relation to predator-related mortality although the Habitat Plan of Action states that habitat protection and restoration plans should take into account biological factors affecting the productive capacity of Atlantic salmon populations including predator-prey interactions. This is undoubtedly a complicated area. There are difficulties in assessing the impact of predation because

of the complexity of predator-prey interactions, and there are certain political overtones. Nevertheless, it would be difficult to argue that it should not be undertaken because of the political complexities. One approach which a Party has proposed is that the SCPA be asked to make recommendations on this issue consistent with the Precautionary Approach. Alternatively, a workshop might be held to assemble more detailed data on predator-related mortality, and to list options for future actions. When this has been done, another Special Session might be held, perhaps in 2005. It is, of course, also an issue of concern to the salmon farming industry so it may be useful to discuss it in the Liaison Group The Council is asked to consider the information provided by the Parties and decide what further action it wishes to take in relation to predator-related mortality of wild Atlantic salmon.

Secretary
Edinburgh
2 June, 2004

CANADA

Summary of 2004 - 2005 Seal Management Measures

The Canadian seal hunt is a sustainable, economically viable fishery based on sound conservation principles. Fisheries and Oceans Canada (DFO), the federal department responsible for managing the seal hunt, introduced a three-year management plan in 2003.

DFO sets the total allowable catch at levels that ensure the health and abundance of seal herds. Many factors are considered in establishing quotas. The full Atlantic seal hunt management plan is available at: http://www.dfo-mpo.gc.ca/seal-phoque/reports-rapports/mgtplan-plangest2003/mgtplan-plangest2003_e.htm

Key Management Measures:

- The seals that are hunted must be independent, self-reliant animals. The hunting of harp seal pups (whitecoats) and hooded seals (bluebacks) is prohibited.
- Persons may not hunt adult seals in breeding or whelping patches.

Harp Seals:

- The Northwest Atlantic harp seal is the most abundant of all seal species in Atlantic Canada and accounts for most of the commercial harvest. The harp seal herd is healthy and abundant, nearly triple what it was in the 1970s.
- The harp seal quota is set at 975,000 over a three-year period, from 2003-2005 inclusive.
- Although this size of harvest will reduce the population if the full quota is achieved, the population will remain above a level where there are any conservation concerns.

Hooded and Grey Seals:

- For the 2003-2005 sealing seasons, the annual total allowable catch (TAC) for hooded seals remains at 10,000 animals. As in previous years, there will be no hunt of hooded seals in the Gulf of St. Lawrence.
- A small harvest of grey seals is permitted in areas other than Sable Island, Nova Scotia (NS).

Recent Canadian Harvest Levels

Harvest levels are highly variable, dependent on environmental and market conditions.

Harp Seals:

- The harp seal quota was set at 275,000 from 1997 to 2002. Given the low harvest in 2000 (92,000), and because there were no conservation concerns, sealers were permitted to exceed the pre-season quota and harvested 312,000 seals in 2002. By comparison, 289,500 harp seals were harvested during the 2003 season.

Hooded Seals:

- Less than 200 hooded seals have been harvested annually in Canada since 1998.

Grey Seals:

- Only small numbers of grey seals are hunted each year and a TAC has not been established. At present, they are harvested in Atlantic Canada, mostly in the Magdalen Islands and Cape Breton. No commercial hunting is permitted on Sable Island, NS.

Scientific Initiatives

- The multi-year management plan is based on sound conservation principles and a commitment to strong, peer-reviewed scientific advice.

- Fisheries and Oceans Canada has maintained an active seal research program for many years. This programme is aimed at understanding population dynamics, trends in reproductive performance and survival, migration, diving behaviour and diet analysis. These studies provide a better understanding of predation on fish stocks by seals and how seals interact within the marine ecosystem.

- In April 2003, the Government of Canada announced a two-year, $6 million Atlantic Seal Research Programme (ASRP) to expand on current research activities for the purposes of understanding of abundance, distribution and potential impact of seals on fish stocks.

- The ASRP is divided into three key components: 1) population assessments on harp, hooded and grey seals; 2) seal impact on cod (seal distribution and diet analysis); and 3) evaluation and implementation of seal management tools to aid in the recovery of Atlantic cod stocks (seal exclusion zones and reproductive control).

- Population surveys on grey seals and harp seals are scheduled for January and March 2004 respectively. A hooded seal population study is scheduled for March 2005.

- When results of population assessments and other research become available, DFO will rely on this scientific advice during the development of the next multi-year seal management plan, beginning in 2006.

- Satellite tagging is also being conducted to assist scientists determine migratory habits. The results of this work will give the department a better understanding of seal-fish interaction within the marine ecosystem. Approximately 65 seals will be tagged in this study.

- Part of the funding will also focus on seal exclusion zone research and how they may contribute to the recovery of cod stocks. A pilot seal exclusion zone (SEZ) will assist in the collection of scientific information pertaining to the evaluation and effectiveness of establishing these zones for the protection of cod. A pilot SEZ began in Smith Sound, Newfoundland in January 2004.

Seal Predation on Cod

- Studies of predation by seals on fish in Atlantic Canada have focused on harp seals and grey seals. Predation by harbour and hooded seals has also been estimated. Harp seals accounted for the largest amount of consumption, followed by hooded and grey seals. However, recent data on diets of hooded seals suggest that they may also be important fish predators.

- The commercial seal quota is established based on sound conservation principles, not an attempt to assist in the recovery of groundfish stocks.

- Seals eat cod, but seals also eat other fish that prey on cod. There are several factors contributing to the lack of recovery of Atlantic cod stocks such as fishing effort, the poor physical condition of the fish, poor growth, unfavourable ocean conditions and low stock productivity at current levels.

- It is widely accepted in the scientific community that there are many uncertainties in the estimates of the amount of fish consumed by seals. Seals and cod exist in a complex ecosystem, which mitigates against easy analysis or simple solutions to problems such as the lack of recovery of cod stocks.

- Canada also provided copies of two recent working papers on seals and salmon which are available from the Secretariat. A summary of each of these papers is presented below:

***Halichoerus grypus* and *Salmo salar*: Is the Grey Seal predating on Atlantic salmon in Miramichi Bay?** Claire Williams - Biology Intern 2002 Miramichi Salmon Association Inc. With funding assistance from Fisheries and Oceans Canada – Youth Internship Programme.

The purpose of this study was to determine if the grey seals of Miramichi Bay were eating outgoing salmon smolts and incoming adult salmon. This was accomplished by collecting a sample of forty seals from early June to late August 2002, removing, rinsing, sieving, and sorting their digestive tract contents by organ. Once this was completed, fish otoliths were removed and identified. There were very few seals in the bay before late June, so they could not be eating many of the salmon smolts as they went out to sea. Also, there was no evidence of salmon otoliths in any of the samples, meaning none of the seals collected for this study were eating salmon, or more particularly, salmon heads.

Seals and Salmon: Comments on the Results of a River Observation Programme in Newfoundland and Labrador. B Sjare and D Reddin, Science and Oceans Environment, Northwest Atlantic Fisheries Center, St John's, Newfoundland. Working Paper – Marine Mammal Peer Review Committee, February 2003.

There are six species of seals present in Newfoundland and Labrador waters including harp, hooded, harbour, grey, ringed and bearded seals. All are known to opportunistically feed on salmon; however, only two incidences of salmon have been documented in the stomachs of harp seals and nothing for any other species (n=7,000 stomachs). Presently there is growing concern from resource users and the general public that seals may be responsible for the declining returns of salmon in many Newfoundland and Labrador rivers. To address this issue a River Observation Programme was implemented in 1999 to identify which rivers have seal/salmon interactions and to document the frequency of occurrence and nature of the interactions. Also a questionnaire dealing with a wide range of seal/salmon concerns related to the commercial fishery in Labrador was conducted in 1997 (n=89 participants). The occurrence of schooling bait fish (i.e. capelin, smelt or juvenile herring) in a river estuary during the smolt or adult salmon run appears to be an important factor in determining when and where seal/salmon interactions will occur (particularly in the case of harp seals). Whether the seal predator is a migratory or a more resident species also appears to influence the nature and frequency of occurrence of a predation incident. There is also evidence that recent warm winter temperatures have altered coastal ice coverage enough to allow seals access to river and estuarine habitats that were traditionally protected by ice during the early winter and spring. These findings emphasize the importance of having a good understanding of the ecological factors influencing the distribution, seasonal migration patterns and feeding behavior of the seal predator in question and its preferred prey.

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

Faroe Islands

There is no ongoing research conducted in relation to predator-related mortality of Atlantic salmon.

EUROPEAN UNION

Introduction

Throughout the European Union - from Finland in the north to Portugal in the south - the Atlantic salmon is preyed upon by a number of species of fish, birds and mammals. There has been much conjecture over the impact of such predation on stocks and fisheries, and NASCO has returned to this issue several times in recent years.

Many of the species that predate on salmon are native to the European Union, and are subject to protection themselves. The EC Birds Directive and Habitats and Species Directive have been introduced in domestic legislation in member states throughout the EU. As well as the designation of Special Areas of Conservation and Special Protection Areas under Natura 2000, the legislation has led to the effective protection of species, including piscivorous birds, otters and seals, and habitat types throughout Europe. Currently, there are almost 19,000 Natura 2000 sites within the EU, covering some 230,000 km^2 , approximately 14% of the EU landmass. Many of the sites have been designated for plants and animals that have little or no effect on salmon.

NASCO Council Paper CNL(03)24 provided information from Finland, Denmark, Sweden and UK(Scotland). This paper updates the material presented in 2003, and describes further information on predation on salmon from a number of countries throughout the European Union.

Predators

A number of species that predate on salmon throughout the EU have been described.

Among the fish listed are pike (*Esox lucius*), brown trout (*Salmo trutta*), burbot (*Lota lota*), and a number of gadoid species which prey on smolts as they emigrate into coastal waters.

A number of piscivorous birds are known to predate on juvenile salmon. However, those considered by managers to be potentially serious predators are the Red-breasted Merganser (*Mergus serrator*), Goosander (*Mergus merganser*), and the Great Cormorant (*Phalacrocorax carbo*). The Grey Heron (*Ardea cinerea*) is considered to be a potentially significant predator in some areas.

Salmon are also preyed upon by a number of mammals, including otters (*Lutra lutra*), mink (*Mustela vison*) and seals (common seal, *Phoca vitulina* and grey seal, *Halichoerus grypus*). These two species receive the greatest attention by managers and scientists in the EU, as they can be observed along most shorelines. However, several other seal species may interact with European Atlantic salmon during their long oceanic migration to Greenland, including the harp seal (*Phoca groenlandica*) and the hooded seal (*Cystopha cristata*).

Predation by fish species

Finland: Information has been gathered on predation on juvenile Atlantic salmon in the River Teno during the winter by burbot. Stomach samples of burbot have been collected over some winter periods in the 1980s and 1990s, and information on winter activity and diel movements have been collected using under-ice video monitoring in 2003. These data suggest that the main prey of large- and medium-size burbot during winter in the River Teno system is juvenile salmon. However, the impact of this predation is not yet quantified as no information on the size of the burbot population is available, nor information on consumption rates of burbot during winter. There are plans to intensify the burbot predation studies, probably in cooperation with the Norwegian counterparts. Detailed analyses of the recently collected video material are underway.

Germany: *Nordrhein-Westfalen* In 1996, an experiment to study the impact of turbine plants on migrating smolts was conducted at the Unkelmühle weir. For this purpose, two-year-old salmon, marked with VI-tags and telemetric transmitters, were released above a dam with a turbine plant. Suitable measures were taken to control the downward movement of the fish.

Observers noted that salmon were being predated by large fish in the tailrace of the power plant. One pike (98 cm long) had two marked salmon in its stomach. Another young salmon which had been fitted with a telemetric transmitter was eaten by a pike-perch (*Stizostedion lucioperca*) of approx. 70 cm in length, also in the tailrace of the power plant.

It was noted that an injury-free passage through the turbines was possible, but that fish in the tailrace, which might have been weakened during their passage through the turbine, constitute easy prey for predatory fish gathering downstream. It must also be assumed that dams and weirs form structures in the river that present excellent settlement and feeding places for large predatory fish. These are slack water areas upstream of the weir crests, and on the edge of the turbulence zones downstream of the turbines. After the experiment, repeated harvesting of predatory fish was recommended during the main migrating period of smolts. The predatory fish were removed alive to other locations.

Ireland: Pike (*Esox lucius* L.) are known to prey on salmon smolts during the spring period. Salmon smolts passing through large lakes on their downward migration are frequently recorded in pike stomachs in Lough Corrib on the Corrib system and Lough Conn and Cullin on the Moy system. Pike have been recorded accumulating in significant numbers where inflowing streams enter lakes in spring. Predation on salmon smolts also takes place on large rivers like the Boyne and Barrow, where salmon smolts have been recorded in significant numbers in pike stomachs in spring. Pike population size is low on many large salmon rivers, such as the Nore, Suir, Slaney and Blackwater, most likely due to lack of spawning areas, and thus predation on smolts is low.

There have been rare incidences of large pike preying on adult salmon in both Lough Corrib and Lough Conn, and two grilse of 4lb and 5lb were recorded in one large pike on one occasion. Little is known of the significance of trout predation on salmon smolts in rivers or lakes but it is believed to be less than that of pike. Salmon smolts have been recorded in the stomachs of ferox trout in Lough Corrib.

United Kingdom: During the late 1950s and early 1960s, it was estimated that 10% of the smolt run on the River Bran, a tributary of the River Conon in Ross-shire in Scotland, was eaten by pike (Mills, 1964). Research is currently underway by Fisheries Research Services in Scotland, using PIT and radio tags, to estimate the impact of predation by pike on juvenile salmon.

Predation by birds

Finland: In the lower reaches of the River Teno, some data on predation of mergansers on seaward-migrating salmon smolts have been collected in recent years. This collection and the analyses have been carried out by Norwegian research agencies.

Denmark: Cormorants have been protected since 1979, and no killing, disturbance or harassment has been allowed. Figure 1 below shows the increase in the number of colonies recorded since 1979.

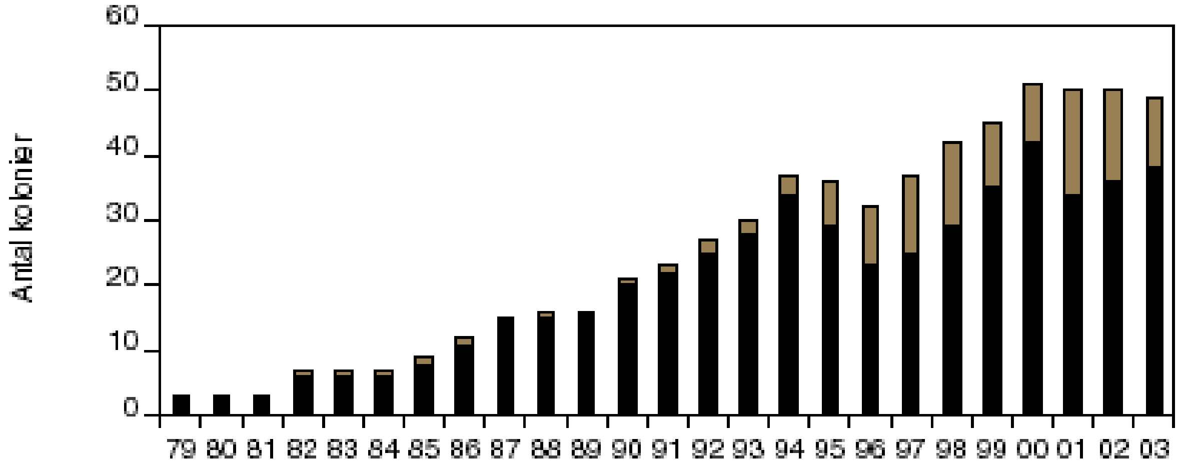


Figure 1. Number of Danish cormorant colonies 1979 – 2003.
Lighter shading shows the regulated proportion.

In 1992, the high number of birds in combination with increasing number of complaints from fishermen, led to the creation of a National Cormorant Management Plan. This plan made it possible to shoot at cormorants, foraging at or in fishing nets and at fish farms. The revised plan also allows for shooting at cormorants not only in the vicinity of nets, but within a distance of 1,000 metres of fishing gear. To assess the effect of shooting as a management tool, permits were issued to hunters in the Ringkøbing Fjord area to shoot cormorants in the hunting season. The management plan includes extensive monitoring of the birds through the first 4 years, to evaluate the effects of the new measures.

The continuing growth in population and number of conflicts led to a revision of the plan in the spring of 2002. This new plan allowed for a more intensive use of a new type of management measure, the spraying of eggs. This method aims to reduce significantly the breeding success of cormorants at selected (ground-based) colonies by preventing the eggs from hatching. This method has also been used to prevent establishment of new colonies on publicly owned land.

Conflicts that arise are generally between recreational and commercial fishermen and cormorants. The issues raised in relation to fish farms are different, but here effective protection against most birds is achieved by using cover-nets, combined with shooting intruding birds.

No economic compensation has been given to fish-farmers, fishers or forest owners for damage caused by cormorants.

Control Measures

Non lethal measures:

Cover-nets combined with "otter guards" to keep birds from hunting in pound-nets: When Danish pound net fishermen began to report severe losses to catches as a result of cormorant foraging in their nets during the late 1980s, attempts were made to try to keep the cormorants away from the nets. Initial attempts to reduce damage to catches involved the fishermen trying to empty their nets as early in the day as possible, because it was known that cormorants left their colonies around sunrise. There was some initial success, but then the birds changed behaviour and began to arrive at the nets even earlier. Thus, unless a fisherman could empty all his nets before daybreak, significant losses were recorded. Fishermen operating only a few nets in a restricted area could avoid severe loss by fishing early in the day, but for most fishermen, who have many nets in a large area and whose times of fishing are dependent on the right tide conditions (slack-tide), this approach was not successful. Fishermen tried various modifications of their gear to prevent cormorants getting access. One method was to hammer spikes in the top of each of the poles to prevent cormorants from landing and roosting. Another was to hang dead (drowned in nets) birds on the nets to scare others away. Neither of these measures had any significant effect.

In 1994, a more focused research programme was started to evaluate the value of cover-nets. The proposed method was to exclude the birds from the nets. Field experiments, including thousand hours of video surveillance, were carried out in 1994, 1995 and 1997. Initial results showed that cover nets alone had little or no effect, because cormorants simply dived through the trap entrance into the nets and were able to find their way out again. Additionally, cover nets are difficult to mount and include extra cost and labour. Another approach assessed involved installing cormorant barriers in the pound nets, so called barrel-nets, that allow fish to pass, but not the birds. Experiments with barrel-nets showed a positive effect because it was much more difficult for the cormorants to hunt in the nets, but the results were not really conclusive. Finally, experiments were carried out with a combination of cover-nets and barrel-nets covering the entrance. This method effectively keeps the birds out, but it is rather costly, labour-demanding and some fish species are much harder to catch in these net types than in regular nets. The information about these tests was disseminated to all fishermen, and today a few regularly use these methods, but most do not.

In the new management plan initiated in 2002, it is stated that: "It is planned to conduct new experiments with covered pound nets in the plan-period. This will be initiated in cooperation with DIFRES and University of Copenhagen and will aim at testing if it is possible to construct a net-type that will solve the problems caused by cormorants in a practical and economical way".

Commercial trout farmers traditionally use cover-nets to prevent predation from fish-eating birds. However, several birds walk or fly into the farms under the nets (mounted 3-4 metres above the ground). The most common birds are grey heron, cormorant and mergansers. Most fish farmers simply shoot intruding birds. It is likely that a rather high number of birds are killed annually this way, but this has not been quantified.

Scaring of birds: Generally, scaring away birds that are believed to be causing damage is the first and most obvious action to take and thus, cormorants are being harassed in a number of ways all the time. However, in Denmark no co-ordinated research or monitoring of efforts of scaring cormorants away from sensitive areas has been carried out. The only exception is that a growing number of angling associations are attempting to scare away cormorants from release sites at the time just after fish have been stocked. In the special cases where large number of juvenile (trout, salmon, eel, pike) are released it may be very efficient to keep the birds away for just a few days until the stocked fish disperse or migrate. However, no evaluation of this method has been done.

Prevention of establishment of new colonies by removing nests: When cormorants attempt to establish a new colony, the owner or the authorities can decide to simply remove or destroy the nests. This is easily done when the birds attempt to nest on the ground, but more difficult where they nest in trees. In some places, trees with nests have been cut down, both legally and illegally. The method is very effective, but requires good access and usually takes several removals to prohibit the establishment of a new colony. When cormorants nest on private land, the nests can only be removed if the owner gives permission. Several large colonies in Denmark are situated on privately owned land, where the owners accept the presence of many cormorants.

Lethal measures:

Shooting: Shooting (and killing) of cormorants is generally forbidden, but some exceptions exist. It is legal for owners of fixed nets to shoot cormorants at the nets from 1 August until 31 March. In 1992 this was in effect for birds within 100m of nets. In 1995 the distance allowed was increased to 500m from a net, and since 2002 it has been legal to shoot birds within 1,000m of fixed nets. An owner of nets can also issue permission to another person(s) to shoot birds, and one pound-net fisherman claims to have up to 1,000 birds shot every year in the area where his nets are located. There are no estimates of the total number of birds shot in the proximity of nets, but it could be up to 10,000 annually. During the last two years, hunters have been given permission to shoot cormorants in Ringkøbing and Nissum Fjords from 1 September to 31 January. A total of 410 permits were issued, but only a few birds were actually shot (300 – 400). The conclusion from the first two years of testing the effect of opening a hunting season for cormorants is that this approach has had little effect.

Spraying of eggs: The management plan gives recommendations for each existing colony, regarding whether it may be regulated or not. Some colonies are protected and cannot be touched at all, others can be regulated only in special circumstances, and the remaining are open for regulation if the management authorities judge it to be necessary. The regulation method employed is to spray all or a proportion of the eggs with paraffin oil, which seals the eggs so that they do not hatch. The birds stay with the eggs and do not lay new eggs, so the method effectively reduces the reproductive success (to zero) of the birds. The method has been used since 1995 (before that a few colonies were physically removed) and the experience from 7 years of regulation is that the establishment of new large colonies has been prevented. However, it cannot be concluded that the regulatory methods introduced have diminished the conflicts with fisheries.

Illegal releases of predators: This illegal measure seems to be a rather common response of local people (fishers?) to the growing number of cormorants. The annual report of the status of all colonies, give several examples of such releases every year. In particular, mink are easy to obtain (from fur farms) and they can do significant damage in ground-nesting colonies. However, a major problem is that other nesting birds (terns, swans, gulls) also suffer from such illegal releases.

Germany: Juvenile stocking to reintroduce salmon in Baden-Württemberg is currently conducted in the Rhine tributaries (Alb, Murg, Rench and Kinzig) coming from the Black Forest, as well as in the remaining Rhine area at Breisach (from the French and Swiss sides). The programme is to be extended to other Rhine tributaries.

Until about 1970, only very few cormorants had lived in the entire region and only as over-wintering birds. From the early 1970s onwards, the number of winter visitors increased steeply (currently >1,000 specimen). Over-summering birds and breeding birds have also been increasing visibly for some years now. In Baden-Württemberg alone, there are currently 200 pairs. Other breeding colonies, very large in some cases, can be found in the adjoining Bundesländer of Rheinland-Pfalz, and Hessen.

The grey heron population in the region has also increased substantially since it had been placed under full protection in 1974. Today, numerous colonies consisting of 50 or 100 breeding pairs respectively live in the Upper Rhine area.

Other fish-eating bird species have not been important in this context to date.

Areas of conflict
The lower courses of the Rhine tributaries and the main Rhine area are heavily populated with cormorants. There is also likely to be heavy predation pressure by the large number of grey herons in some parts. While cormorants are rarer in the smaller tributaries than in the main water bodies, grey herons occur frequently everywhere.

Impact on the salmon stocks
Many good nursery areas for salmon smolts are located in the middle and lower courses of the waters included in the re-introduction schemes, and in the remaining Rhine. These nursery areas are frequently visited by cormorants. Salmon parr and smolts fit excellently into the prey spectrum of these birds, and a considerable predation pressure can therefore be assumed. However, quantitative data are not available on this issue.

Fishery experts consider the impact of fish-eating birds on the juvenile salmon population as potentially heavy enough to jeopardize the salmon and sea trout restoration project to a great extent. This assessment is, *inter alia*, based on studies on salmonid rivers where a large influx of cormorants reduced stocks by over 90%.

Protective measures
Birds are protected under both Federal law (*Bundesnaturschutzgesetz*) and at the *Bundesläder* level (*Landesnaturschutzgesetze*). Under these provisions, regulations can be made addressing when measures may be taken, what those measures may be, and whether financial compensation could be granted. The regulations made may be quite different in different *Länder*. However, most of them will allow measures to be taken only under specific conditions.

Until recently, protective measures could only be taken to a very limited degree in the reintroduction waters. Bird protection has been a frequent reason for non-approval of proposed measures. However, the state of Baden-Württemberg has issued a regulation in relation to control of cormorant populations. An increasing awareness that a continuing high level of protection for cormorants could jeopardize all efforts to reintroduce salmon may lead to an increased willingness of the authorities concerned to allow the scaring-off or shooting of cormorants.

Impact of cormorants on migrating fish stocks (salmon, sea trout)

The river catchment formed by the Sieg, Agger, and Bröl comes within the scope of application of the so-called Cormorant Decree of Nordrhein-Westfalen. Parts of the rivers Wupper and Rur have also been included in this programme. An application has been filed to enlarge the scope by the Rur. This is adequate proof of the fact that rivers where salmon is being reintroduced by the Land in cooperation with the fishing associations, serve as feeding territory for cormorants. Even though the data evaluation only concerns grayling stocks, it can be assumed that cormorants feed on all other fishes of a suitable size that migrate in shoals. However, precise data and assessments on this are not currently available.

Literature shows that sawbill ducks, cormorants and other birds feed, to some extent, on migrating young salmon. Comparable studies have not yet been carried out in Germany. Hence, no statements on the transferability of the statements made in the literature can be made.

Ireland: Cormorants (*Phalacrocorax carbo carbo)* in Ireland breed primarily in coastal regions although some breeding also occurs inland. As in other European countries cormorants are considered by some to have an adverse effect on fish stocks. During the 1900s some fishery managers offered rewards for the killing of cormorants in their fisheries. This was later followed by a National bounty system introduced by the Department of Fisheries and between 1973 and 1976, 3,527 cormorants were reported killed under the scheme. With the implementation of the Wildlife Act 1976 cormorants were given full protection and can now only be disturbed or shot by licence in exceptional circumstances under Section 42 of the Act. Licences are issued by the National Parks and Wildlife Division of Duchas who are responsible for natural heritage conservation in Ireland.

The protection of cormorants led to concern among fishery interests that any population increase or change in distribution would have an adverse effect on fish stocks, particularly due to the apparent increase in use of inland waters for feeding. During the mid 1980s the Forest and Wildlife Service carried out a cormorant breeding census to monitor changes in population size since the previous census in 1969/70. The results of this census showed the population had increased from 1,865 pairs in 1969-70 (Operation Seafarer) to 4,455 pairs in 1986-87 (Macdonald 1987). The reasons given for the increase in population size were reduction in human persecution and the increased availability of winter food in inland waters as a result of pike predation control and a stocking programme run by the Central Fisheries Board. Examination of cormorant diet during the non-breeding season showed a high incidence of coarse fish, particularly roach and perch, with roach providing over 80% of the diet in late winter (Mcdonald 1987). Mcdonald 1987 also showed that systems with high populations of roach coincided with the highest concentrations of wintering cormorants. Sellers (1991) estimated that roughly half the wintering population of cormorants is found inland. Doherty and McCarthy (1997) found that cormorants in the lower reaches of the Shannon fed predominantly on perch in winter and eels in summer and concluded that the 'greatest potential for impact on economically important fish stocks seems to involve eels'.

A study carried out on the Erne to assess the impact of cormorants on salmonid stocks suggest that cormorants did not pose a serious threat to salmon smolts,)Crowley, Mathers and O' Teangana 2001). This was similar to the findings of Doherty and McCarthy (1997) who suggested that it was unlikely that salmon smolts were extensively predated by cormorants in the lower river Shannon system.

To gauge the present level of conflict in Ireland between cormorants and fisheries, information was gathered from stakeholders in the aquaculture sector (freshwater and marine), salmonid game fisheries, coarse fisheries and conservation groups. In the case of the aquaculture industry, damage control activities, primarily predator netting, were shown to be effective on most sites and resulted in minimal losses due to direct consumption of fish. Some sites did report indirect damage by cormorants stabbing fish but in general cormorants were not considered a major problem to the aquaculture industry.

The continued stocking of inland waters with coarse and game fish, which are a suitable size for cormorants, continues to act as an attractant to the cormorants as they are opportunistic feeders. The presence of cormorants at these fisheries is considered by many anglers to have a significant impact. However, due to the limited resources of the Fisheries Boards it is not possible to assess the actual impact of cormorants on these stocked fisheries. Resources are also limited in relation to providing damage control activities.

In relation to salmonid fisheries the main periods of potential conflict with cormorants occurs during smolt migration and stocking. Damage control activities, when used, are generally human disturbance and, in exceptional circumstances, shooting. However, the number of licences applied for nationally to shoot cormorants in recent years was low and the majority of these were required during smolt migration.

Overall, in comparison to other European countries the interaction between cormorants and fisheries in Ireland does not appear as great. In most cases there is a lack of scientific data on the actual impact of cormorants on fish stocks and what their impact is in relation to other mortality factors. However, whereas the cormorant is not seen as a major problem to the aquaculture industry it is still perceived as a problem to the angling sector, particularly on larger water bodies. Despite the perceived problem the number of applications to shoot cormorants under Section 42 of the Wildlife Act 1976 has been low. In the last three years the number of cormorants permitted to be shot has not exceeded 150 birds in any one year.

United Kingdom: In England and Wales, and in Scotland, birds are protected under the provisions of the Wildlife and Countryside Act 1981. Special provision is made, however, to allow for the killing of birds *inter alia* "for the purposes of preventing serious damage to livestock, foodstuffs for livestock, crops, vegetable, fruit, growing timber and fisheries". In Northern Ireland, similar provisions are available under the Wildlife (NI) Order 1985.

England and Wales

Cormorants

Overview and level of potential interaction with salmon

The population of cormorants wintering in Britain has increased around four-fold over the last 25 years. Cormorants in England and Wales have extended their range from coastal areas and now over-winter and feed in many inland areas, taking advantage of new wetland habitats, many created as a result of mineral extraction and water-supply reservoirs. In addition, over the last 18 years cormorants have started to develop inland breeding colonies. The increase in inland colonies has meant that some birds are present at inland sites throughout the year, although peak numbers occur over winter with many birds returning to coastal breeding sites in the spring. The range extension and increase in numbers of birds has increasingly brought cormorants into conflict with inland fisheries.

There is marked variation in the diversity of fish species in river systems in England and Wales, with the number of species increasing with decreasing latitude and decreasing altitude. Fish communities are dominated by relatively small numbers of species (primarily salmonids) in many of the rivers in northern England and in those draining more upland areas on the west coast and in Wales. In contrast, more diverse fish communities (predominantly cyprinids) are present in most of the rivers towards the south and east of England and in the lower reaches of some rivers elsewhere.

Cormorants are perceived to be a fairly widespread 'problem' on river systems throughout England and Wales, particularly in central and southern England. However, relatively few licences to shoot cormorants have been issued over recent years for river systems, and these have mostly been in southern England. The relatively small number of licences on rivers may, in part, reflect the difficulties of demonstrating serious impact at such sites. The limited data available from cormorant stomach analysis for birds shot on these river systems are consistent with the variable distribution of fish species and the fact that cormorants are opportunist predators which consume locally abundant species. Very few salmon have been recorded in these birds, shot mostly in the lower reaches of rivers over the winter months. The limited available data suggest that the proportion of salmon in the diet would be greater in more northerly and upland catchments (consistent with the latitudinal trends reported in Scotland – Marquiss *et al*., 1998). A brief summary of the diet differences between different river 'types' in England and Wales is included in Russell *et al* (2003).

There have been a number of reports in England and Wales of birds aggregating on estuaries and the lower reaches of rivers in spring and thus concerns about predation on smolts. These reports have not been quantified and there are no published estimates of losses of salmon to cormorants for river systems in England and Wales. However, this remains a potential concern given that the majority of salmon stocks in England and Wales remain in a depleted state.

R&D and other reports

As a result of growing concerns about the problem of fish-eating birds at inland fisheries in England and Wales, a programme of research was commissioned in 1995. Much of this work focussed on cormorants. The R&D investigations (5 separate projects) reported in the late 1990s (see references). The overall aim of the research was to improve the level of information on the behaviour of fish-eating birds, the populations of these birds, the extent of the problem they cause to fisheries and to develop effective management strategies. However, as noted above, this did not include estimating cormorant impact on salmon stocks, since this was not perceived as the main 'conflict issue' in England and Wales. The Department for Environment, Food and Rural Affairs (Defra) is continuing to fund research that might reduce cormorant impact, but this work is directed at the potential benefits of fish refuges and is mainly applicable to stillwater coarse fisheries. This work is being undertaken by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS).

Apart from the scientific advances resulting from the R&D programme, there has also been recent emphasis on consensus building and conflict resolution. This has done much to break down the polarised and entrenched views that have tended to characterise the issue in the past. Different groups have been set up to bring together stakeholders (i.e. fisheries and conservation organisations, ornithologists, fishery scientists) and other interest groups. An EU Concerted Action programme ('REDCAFE' – Reducing the conflict between cormorants and fisheries on a pan-European scale) was recently completed (final report available at http://banchory.ceh.ac.uk/REDCAFE/REDCAFEdocs.htm). Within the UK, a group was set up as part of the Moran Committee to address the concerns about cormorants. The Moran Committee (Chairman Lord Moran) represents 13 of the major fisheries and angling organisations in England and Wales; the Committee's Joint Bird Group also comprises representatives from RSPB, Environment Agency and English Nature. The group has recently produced a leaflet 'Cormorants – The Facts' and an advisory booklet 'Protecting your fishery from cormorants'. Details are available on a dedicated website (www.cormorants.info).

Legal status

As stated above, in England and Wales, cormorants are protected under the Wildlife and Countryside Act (WCA) 1981, which implements the 1979 European Community Directive on the Conservation of Wild Birds (EEC/79/409). In its capacity as a licensing authority under the 1981 Act, Defra issues licences (Welsh Assembly Government (WAG) in Wales) to shoot cormorants at specific sites. Licences only allow limited numbers of birds to be killed to reinforce the effects of other scaring measures, and are only issued where Defra is satisfied that:

- birds are causing sufficiently serious damage to justify shooting;
- other methods of non-lethal scaring have been shown to be ineffective or impracticable;
- shooting will be successful in reducing the damage; and
- there is no other satisfactory solution.

There are no powers to undertake a general cull. The numbers of birds for which licences to shoot have been issued in England over recent years and the numbers of birds shot are provided in the Table 1 below.

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02
Cormorants						
Licensed	366	443	517	485	506	545
Shot	180	139	167	205	199	225
Herons						
Licensed	22	32	45	67	62	68
Shot	5	10	15	31	33	28
Goosanders						
Licensed	5	11	11	9	5	5
Shot	3	6	3	0	0	1

Table 1. Numbers of birds for which licences were issued, and the numbers reported shot in 1996-2002

Sawbill Ducks

Overview and level of potential interaction with salmon

Goosanders and red-breasted mergansers breed on rivers and lakes in northern and western Britain. Goosanders have extended their range into many parts of England and Wales over recent decades and are much more widespread in winter than at other seasons. In view of their favoured foraging habitat on upland rivers, these birds are seen as a problem for salmon fisheries in many parts of the country. In contrast, there are relatively few red-breasted mergansers in England and Wales and this species is not generally perceived to be a problem.

R&D and other reports

The recent Government-funded R&D programme (noted above) includes case studies of goosander impact on the Rivers Wye and Ribble. The goosander case study on the Wye estimated that the diet of goosander broods comprised between 16 and 97% salmon (by weight). However, the level of impact remained unclear (the study found that estimates of annual depredation exceeded the estimated standing crop of salmon by between 1 and 7 times). The difficulties were believed to lie in providing reliable estimates of the standing crop biomass of juvenile salmon. Notwithstanding the uncertainties, the results are seen as a cause for ongoing concern (particularly given the current depleted status of salmon on the Wye). Estimates for the Ribble/Hodder system found that salmon comprised a much smaller part of the diet (7 to 14% by weight), but with estimated annual standing crop reduction still ranging from 6 to 60%, although these again are likely to be over-estimates. Full details of these studies are provided in Feltham *et al*. (1999) and Wilson *et al*. (2003).

Only small numbers of goosanders have been shot under licence in England and Wales in recent years (e.g. see Table 1 above for England). The limited available data from these birds have confirmed the presence of some salmon in the diet, but have been insufficient to provide reliable estimates of percentage composition of diet for these birds.

Recent R&D (McKay *et al*., 1999) indicated that shooting may increase the sensitivity of goosanders to human disturbance, and that disturbance by anglers reduced goosander numbers on rivers. Gas cannons were found to be ineffective.

The Moran Committee have recently completed an advisory leaflet ‘Goosanders and Mergansers – The Facts’, this is available on the Moran Committee website (see above).

Legal status

As with cormorants, goosanders and red-breasted mergansers are protected under the Wildlife and Countryside Act (WCA) 1981. The same provisions also apply for killing or taking birds under licence for the purpose of preventing serious damage to fisheries. However, relatively few licences have been issued in England and Wales for goosanders (e.g. see table above for England) and no licences have been issued over recent years to shoot red-breasted mergansers.

Scotland

Atlantic salmon may be preyed upon by a number of bird species, but those of principal interest in Scotland are the sawbill ducks (goosander, and red-breasted merganser), and the great cormorant.

Marquiss *et al* (1998) reported that the most recent estimates indicated that there were 2,600 pairs of breeding goosanders and 800 breeding pairs of red-breasted mergansers on Scottish rivers. The most recent estimate of cormorant numbers is 11,700 pairs in Britain and Ireland.

Fishery managers may apply for a licence to shoot piscivorous birds under the provisions of section 16 of the WCA to prevent serious damage to fisheries.

The Scottish Executive Environment and Rural Affairs Department (SEERAD) may issue licences where appropriate application has been made.

Licences are issued as an aid to scaring and to provide point protection to salmon, not as an exercise to reduce bird populations. No licences are issued during the periods of mating, nesting and fledging. Licences to protect salmon fisheries are issued generally only to District Salmon Fishery Boards, or to proprietors of salmon fisheries where there are no Boards in place. Each applicant has to provide estimates of the amount of damage sustained, counts of the numbers of birds involved, and details of any non-lethal methods of control that have been tried. Bird counts must be made in accordance with specified techniques. Before a decision on whether to issue a licence is made, SEERAD consults Fisheries Research Services Freshwater Laboratory (FRSFL), Scottish Natural Heritage (SNH), and the Wildlife Management section at the Scottish Agricultural Science Agency (SASA).

If a licence is issued, it stipulates where, when, how and how many birds may be shot. It makes clear that shooting must be used as an aid to scaring.

Table 2 shows the numbers of cormorants and sawbill ducks for which licences were issued, and the numbers reported as being shot for the period 1997-2003.

	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
Cormorants						
Licensed	308	191	204	165	118	125
Shot	193	138	154	95	106	108
Mergansers						
Licensed	210	136	105	85	68	64
Shot	148	89	88	48	68	64
Goosanders						
Licensed	529	417	417	400	357	320
Shot	410	345	352	285	357	312

Table 2. Numbers of cormorants and sawbill ducks for which licences were issued, and the numbers reported shot in 1997-2003

Concern has been expressed by some about the shooting of piscivorous birds. It has been argued that there is no evidence that shooting sawbill ducks and cormorants has resulted in any increase in salmon numbers. The advice from fishery scientists is that as predation is being controlled at a stage in the life-cycle of the fish when density-dependent mortality has ceased to have an effect, then the avoidance of losses can be expected to provide a real gain, even if subsequent density-independent mortality acts on the fish populations. Research continues at FRSFL into the population dynamics of Atlantic salmon and other species of freshwater fish in relation to predation and other impacts.

Northern Ireland

There has been little work undertaken to assess the impacts of predation on salmon by birds in recent years. Kennedy and Greer reported in 1988 on predation by cormorants on the salmonid populations of the River Bush, Northern Ireland. They concluded that birds feeding in the upper reaches of the river fed on wild smolts and brown trout, whereas those feeding downstream of the salmon hatchery at Bushmills fed exclusively on hatchery-reared smolts.

Predation by mammals

Ireland: The most recent information available is presented at a workshop convened by the Loughs Agency of the Foyle, Carlingford and the Irish Lights Commission (a joint Ireland/UK N. Ireland agency) at the request of the North-South Ministerial Council. The ensuing report is entitled "Seals/Atlantic Salmon Interaction Workshop. A Recent Irish Review of the Evidence" (Boylan, Crozier, McGinnity and Ó Maoiléidigh, 2003).

The most recent estimates of seal abundance indicate a minimum population of 1,000 common seals and 4,000 grey seals. Although salmon fishermen have reported that seals are major predators of salmon, studies on the diet of grey seals failed to produce evidence of salmon in either faecal or stomach content analyses. However, salmon were noted to be relatively scarce in the areas where samples for dietary analysis were taken, and the difficulties with identifying salmonid remains reported from studies in Scotland apply equally to the Irish investigations.

The Workshop also noted that there was a distinct lack of information relating to the behaviour of seals encountering free-swimming salmon and particularly on the diet of seals in the high seas.

Recommendations from the Workshop included:

- seal census should be co-ordinated on an all island basis with appropriate standardisation to avoid conflict of observations from fishermen and official observers.
- studies should target specific areas (e.g. the Foyle estuary and river) to examine the impact on salmon at the population level.
- modelling techniques should be developed to allow extrapolation of survey results to wider geographic areas and populations.
- further seal control measures should be tested in Ireland with a view to replacing the lethal control methods which are currently available.
- information of seal census and scientific research should be more widely and routinely available.

Sweden: Damage to salmon and salmon fisheries by seals has been recorded in Sweden. Until recently, Sweden used the same method to estimate the level of damage as that used in Finland, UK, and Ireland. However, this method takes account only of the visible remains of fish, whereas whole fish are known to be taken from fishing gear without leaving a trace. In 2003 (CNL(03)24), Sweden presented a document describing methods to estimate hidden losses to salmon fisheries as a result of seal activity.

United Kingdom:

Otters

The Otter is given full protection under the Wildlife and Countryside Act 1981 and is listed on both Schedules 5 and 6 of the Act. Among other things, it is an offence for any person to intentionally kill, injure or take an otter, or damage, destroy, or obstruct access to, any structure or place which it uses for shelter or protection. Otters are also protected by the EC Habitats Directive 1992, being listed on Annexes II and IV, which is implemented in the UK through the Conservation (Natural Habitats, &c.) Regulations 1994. The Directive makes it illegal to intentionally kill, capture, injure or disturb otters, or to damage or destroy breeding or resting site. In England and Wales, under the Countryside And Rights of Way Act 2000, it is also an offence to recklessly disturb an otter or to damage, destroy or obstruct their place of shelter. The Wild Mammals (Protection) Act 1996, also protects, in England and Wales, wild mammals from cruel acts. The Protection of Wild Mammals (Scotland) Act 2002 prohibits, with certain exceptions, the hunting of wild mammals, including otters, with dogs.

Derogation from the protection afforded to otters under the 1994 Regulations (e.g. to provide fencing that restricts or excludes otters from their habitat) requires a licence from Defra in England, WAG in Wales, and SEERAD in Scotland. Before a licence can be granted, three tests specified in regulation 44 of the 1994 Regulations, must be satisfied:

- That the project or plan will prevent 'serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber or any other form of property or to fisheries';
- That there is 'no satisfactory alternative';
- That the derogation is 'not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range'.

Otters were seriously affected by organic pesticide residues in the 1960s and 1970s and were lost from many rivers. Nevertheless, Scotland is regarded as having one of the best otter populations in Europe. Numbers throughout the UK have increased considerably in recent years, but populations have still not reached previous sizes in many areas. Throughout the UK, various agencies, including the Environment Agency and the Wildlife Trusts, have taken the lead in producing a Biodiversity Action Plan for otters and have been involved in the Otters and Rivers Project designed to encourage the return of otters to river systems where otters used to live, mainly by improving habitats. The return of the otter has generally proved popular, since it is a charismatic species. Some 80 local biodiversity action plans across the UK include specific proposals to benefit otters.

The main current concerns in England and Wales relating to otter impacts on fisheries are among coarse-fishery owners and anglers, who claim that otters are killing large, highly-prized carp. There do not appear to any major current concerns about the impact of otters on salmon fisheries in the UK.

The review of Salmon & Freshwater Fisheries in England and Wales, completed in 2000, recommended that: *Research is required to investigate the potential effects of reintroduced populations of otters in areas where the native fish populations are under particular pressure. Any programme designed to encourage the re-establishment of otters should take account of the impact of the resulting predation on vulnerable fish stocks.*

Seals

Two species of seals predate on salmon in UK waters, the grey seal (*Halichoerus grypus*), and the common or harbour seal (*Phoca vitulina*). The most recent estimates of seal population sizes in UK (2002) were 109,500 grey seals (99,100 in Scotland) and 35,000 common seals (minimum estimate), of which 29,700 are in Scottish waters (Report of the Special Committee on Seals - http://smub.st-and.ac.uk/pdfs/SCOS%2003_v7.pdf). The estimated population of grey seals is lower than in 2001, not because of a decrease in seal numbers but because of the introduction of a new and more robust population estimation model. The new model reflects strong indications that the rate of increase in pup production is slowing due to limits on the carrying capacity of the main breeding sites. In the late 1980s, pup production increased at over 6% per annum, whereas in the past 5 years, it has been less than 2% per annum. If conditions persist as they are, the total population size is predicted to increase by no more than about 1% over the next ten years.

Seals are protected in Scotland and in England and Wales under the provisions of the Conservation of Seals Act 1970. The 1970 Act provides a close season for grey seals during the period 1 September to 31 December, and for common seals in the period 1 June to 31 August. During the remainder of the year, seals may be shot providing an appropriate, licensed firearm is used. This firearm must be a rifle using ammunition with a muzzle velocity of not less than 600 footpounds (813.5 joules) and a bullet of not less than 45 grains (15.4 g). Under the provisions of section 10 of the 1970 Act, fishermen may shoot seals during the annual close times only if serious damage is being caused to catches or gear, and if the seal in question is in the vicinity of the fishing gear. Seals may also be shot under licence during the close times if there is evidence that they are causing serious damage to fisheries or gear. In practice, fishermen apply for licences to shoot seals, rather than depending on the defence section of the 1970 Act. In Northern Ireland, seals are protected under provisions in the Wildlife (NI) Order 1985, which allows for the issue of licences where fishermen can demonstrate damage to catches and fishing gear.

Under the Habitats Directive, both common and grey seals are identified as protected species for which SACs must be designated, and for which UK has special responsibility. The UK has about 40% of the world population of grey seals, and about 45% of the EU population of common seals. Of the UK population of both species, around 90% are found in Scottish waters.

Designation of sites as SACs does not preclude control of seals within the sites, but it does place restrictions on the scale of control, including taking appropriate steps to avoid "significant disturbance". More generally, the EC Habitats Directive imposes a requirement to maintain the "favourable conservation status" of grey and common seals. This would certainly prevent any significant cull being undertaken within an SAC, and may even restrict shooting on sites or in the wider environment.

In 1988, an outbreak of Phocine Distemper Virus (PDV) was recorded in the UK, and an Order effectively making a year-round close time for seals was introduced under provisions in the 1970 Act. This Order remains in force in England and Wales. In Scotland, where the PDV outbreak affected fewer animals, the Order lapsed in 1990, except for around the Shetland Islands where it remained in force until 1998. Another outbreak of PDV occurred in 2002, and a Conservation Order was made under the 1970 Act to prevent shooting of common seals anywhere in Scottish waters, except under licence, and grey seals in the Moray Firth. That Order is due to lapse in September 2004.

England and Wales Salmon are known to feature in the diet of seals, but are not considered to form a major part of the diet (although there are well-publicised concerns about how representative the available diet data are). The general view is that predation on salmon is probably limited to a small number of seals that target fish in nets and in river mouths and estuaries. However, it is recognised that this could be significant for salmon populations in local areas.

There are no recent data available on the extent of seal predation on salmon stocks in England and Wales. However, 'seal problems' are often reported by salmon netsmen; Potter and Swain (1979) estimated seals removed about 5% of the fish caught by netsmen in the north east coast fishery in 1977. Seals are also often seen taking fish in rivers and estuaries, and around barrages.

Scotland There is considerable debate about the level of impact on salmon of predation by seals. There are increasing numbers of reports of seals moving upstream into rivers and lochs, and the assumption is that they are likely to be predating on salmon in these areas. Investigations are underway to determine whether a small number of seals specialise in this activity, or whether seals in general will enter freshwater if the opportunity presents itself.

A Seals Forum has been established, chaired by the Scottish Executive and comprising representatives of Sea Mammal Research Unit, Scottish Natural Heritage, Fisheries Research Services, Joint Nature Conservation Committee, University Marine Biological Station Millport, University of Aberdeen, Highlands & Islands Fishermen's Association, Scottish White Fish Producers Association, Spey Fishery Board (on behalf of ASFB and the Atlantic Salmon Trust), Salmon Net Fishing Association of Scotland, Tourism and Environment Forum, the Scottish SPCA, and Countryside Council for Wales. This Forum provides an opportunity for sectors with interests in seals and their potential impacts to disseminate information, and consider current and proposed research.

Licences to shoot seals may be issued by SEERAD under provisions in the 1970 Act. Each applicant must provide evidence of damage to catches and/or gear, provide details of the location where shooting would take place, and provide counts of the numbers of seals present. Before any licence is issued, advice is sought from FRSFL, SNH, and the Sea Mammals Research Unit (SMRU). Table 3 shows the numbers of seals for which licences were issued and the numbers reported shot during the period 1997-2003.

Year	Scientific Issued	Seals Shot	DSFB Issued	Seals Shot
1997	0 Common	0	25 Common	20
	0 Grey	0	25 Grey	14
1998	14 Common		25 Common	25
	77 Grey		20 Grey	10
1999	0 Common	0	30 Common	25
	0 Grey	0	30 Grey	30
2000	0 Common	0	53 Common	22
	0 Grey	0	53 Grey	33
2001	0 Common	0	50 Common	40
	0 Grey	0	52 Grey	25
2002	Common	0	50 Common	0
	Grey	0	61 Grey	8
2003	Common	0	26 Common	17
	Grey	0	52 Grey	42

Table 3. Numbers of licences issued to shoot seals in 1997-2003, and the numbers of seals shot.

Although some seals are known to eat salmon, evidence of salmon in the diet of seals, except where the seals have been taken from salmon nets, or shot in the immediate vicinity of salmon fisheries, is lacking. It is not clear whether this indicates that salmon form a small proportion of the diet of seals, or whether salmonid hard parts, such as bones, scales and otoliths, are less robust and thus more likely to be destroyed during digestion. Collaborative research projects involving SMRU, FRS and DSFBs are currently underway. These programmes include assessments of diets of seals, seal/salmon interactions, the use of scaring devices, and identification of seal damage "hotspots".

Northern Ireland The most recent information available is presented in the report "Seals/Atlantic Salmon Interaction Workshop. A Recent Irish Review of the Evidence". The Workshop was convened by the Loughs Agency of the Foyle, Carlingford and the Irish Lights Commission, at the request of the North-South Ministerial Council.

Mean counts of seals indicate that around 194 adult grey seals and 551 adult common seals frequent the Northern Ireland coast. Distribution is not uniform, with seals being concentrated in a small number of well populated sites. No data are available on the level of damage to catches.

References

Aarestrup, K., Jepsen, N., Koed, A. & Pedersen, S. (in prep). Causes of mortality of stocked Brown Trout (*Salmo Trutta* L.) in a Danish stream.

Boylan, P., Crozier, W.W, McGinnity, P. and Ó Maoiléidigh, N. (2003) Seals/Atlantic Salmon Interaction Workshop – A recent Irish review of the evidence. The Loughs Agency, Foyle Carlingford and Irish Lights Commission, 22 Victory Road, Londonderry, BT47 2AB

Crowley, Mathers and O' Teangana 2000. An assessment of the impact of predation on migrating salmon smolts in the Erne Catchment 1999/2000.

Doherty D. and Mc Carthy K., 1997. The population dynamics, foraging activities and diet of great cormorants (*Phalacrocorax carbo carbo* L.) in the vicinity of an Irish hydroelectricity generating station.

Feltham, J.M., Davies, J.M., Wilson, B.R., Holden, T., Cowx, I.G., Harvey, J.P. and Britton, Hughes, B., Bevan, R.M., Bowler, J.M., Still, L., Carss, D.N., Marquiss, M., Hearn, R.D. & Bruce, J.H., 1999. Feeding behaviour of fish-eating birds in Great Britain. Report to the Department of the Environment, Transport & Regions, 249 pp.

Jepsen, N., 1999. Behaviour of lake piscivores and their predation on migrating smolts. Ph.D.-dissertation. Environmental Engineering Laboratory, Aalborg University. 159pp.

Jepsen, N., Aarestrup, K., Økland, F. & Rasmussen, G., 1998. Survival of radiotagged Atlantic salmon (*Salmo salar* L.) and trout (*Salmo trutta* L.) smolts passing a reservoir during seaward migration. *Hydrobiologia* **371/372**, 347-353.

Jepsen, N., Pedersen, S. & Thorstad, E., 2000. Behavioural interactions between prey (trout smolts) and predators (pike and pikeperch) in an impounded river. *Regulated Rivers: Research & Management* **16**, 189-198.

Koed, A (in prep). Mortality causes of Atlantic salmon and sea trout smolts in a restored river and its estuary.

Koed, A, Jepsen, N., Aarestrup, K. & Nielsen, C., 2002. Initial mortality of radio-tagged Atlantic salmon (*Salmo salar* L.) smolts following release downstream of a hydropower station. *Hydrobiologia* **483**, 31-37.

J.R. 1999. Case studies of the impact of fish-eating birds on inland fisheries in England and Wales. Report to MAFF (Project VC1006), 406pp.

M^c^Kay, H., Furness, R., Russell, I., Parrott, D., Rehfisch, M., Watola, G., Packer, J., Armitage, M., Gill, E. & Robertson, P., 1999. The assessment of the effectiveness of management measures to control damage by fish-eating birds to inland fisheries in England and Wales. Report to the Ministry of Agriculture, Fisheries and Food (MAFF Project VC0107), 254pp.

Mcdonald R.A., 1987. The breeding population and distribution of the cormorant in Ireland. Irish Birds, 3: 405 – 416.

Marquiss, M., Carss, D.N., Armstrong, J.D., and Gardiner, R. 1998. Fish-eating birds and salmonids in Scotland. Report on fish-eating birds research (1990-1997), to the Scottish Office Agriculture, Environment and Fisheries Department. 16 pp.

Moran Committee (2001) – Cormorants - the Facts, Moran Committee, London, 4pp.

Moran Committee (2002) – Protecting your fishery from cormorants, Moran Committee, London, 23pp.

Moran Committee (2004) – Goosanders & Mergansers - the Facts, Moran Committee, London, 4pp.

Potter, E.C.E. and Swain, A., 1979. Seal predation in the north-east England coastal salmon fishery. ICES CM 1979/N:9.

Rasmussen, G., Aarestrup, K. & Jepsen, N., 1996. Mortality of sea trout (*Salmo trutta* L.) and Atlantic salmon (*Salmo salar* L.) smolts during seaward migration through rivers and lakes in Denmark. ICES C.M. T:9.

Russell, I.C., Dare, P.J., Eaton, D.R. & Armstrong, D.A., 1996. Assessment of the problem of fish-eating birds in inland fisheries in England and Wales. Report to the Ministry of Agriculture, Fisheries and Food (MAFF Project VC0104), 130pp.

Russell, I.C., Cook, A., Kinsman, D.A., Ives, M.J., Lower, N., and Ives, S.J., 2003. Stomach contents analysis of cormorants at some different fishery types in England and Wales. Vogelwelt 124, Suppl.: 255-259.

Sellers, R.M. 1991. Breeding and wintering distribution of the cormorant in the British Isles. Proc. Workshop 1989 on Cormorants *Phalacrocorax carbo*. Rijkswaterstaat Directorate Flevoland, Lelystad: 30-35.

Wernham, C.V., Armitage, M., Holloway, S.J., Hughes, B., Hughes, R., Kershaw, M., Madden, J.R., Marchant, J.H., Peach, W.J., and Rehfisch, M.M., 1999. Population, distribution, movements and survival of fish-eating birds in Great Britain. Report to the Department of the Environment, Transport & Regions, 360 pp.

Wilson, B.R., Feltham, M.J., Davies, J.M., Holden, T., Cowx, I.G., Harvey, J.P. and Britton, J.R., 2003. A quantitative assessment of the impact of goosander, *Mergus merganser*, on salmonid populations in two upland rivers in England and Wales. In: I.G. Cowx (ed.) *Interactions between Fish and Birds – Implications for Management*. Fishing News Books, Oxford, 119-135.

ICELAND

Predator overview

The anadromous life-cycle of the Atlantic salmon is divided into the freshwater phase, during the juvenile stage, and the marine phase, which lasts from smolt to adult stage. The freshwater phase in Icelandic rivers is 2-6 years (Antonsson and Gudjonsson 2002). The survival from fry to smolt is commonly close to 1% (Mills 1989). The mortality is also high in the ocean and sea survival in Icelandic rivers has been estimated to be 4.4-12% in rivers in southwestern Iceland and 1-4.9% in northeastern Iceland (Antonsson and Gudjonsson 2002).

Predation is one of the factors causing mortality of salmon both as a primary and secondary cause. The predators and competitors of hatchery smolts of Atlantic salmon after their release from an ocean ranching site have been studied by Thorisson and Sturlaugsson (1995). The estimated total predation in the first 24 hours after release was 0.2-1.1%.

The potential predators of Atlantic salmon in Iceland are listed in Table 1. The list includes 15 species of birds, 8 species of fish, 2 mammalian species in the sea and 1 in fresh water. All of the species in Table 1 are native to Iceland with the exception of mink (*Mustela vision*), which originates from North America and was imported to Iceland in 1931 for culture on mink farms (Skírnisson 1993). The first mink escaped in 1932 and subsequently naturalised mink were caught in 1937. By 1975 mink were distributed throughout Iceland. Mink usually live close to rivers and lakes and are known predators on Atlantic salmon, mainly of the parr to smolt stages, although there have been no investigations into the effects of this predation on population size in rivers. Predation activity by mink at fish farms is, however, well known and this predator's effects on the Icelandic bird fauna in general have been extensive.

Table 1 includes species observed as predators on hatchery smolts as reported by Thorisson and Sturlaugsson (1995). No information is available to quantify predation or to rank the risk from potential predators.

It is generally believed that the salmon is especially vulnerable to predation during the smolt run. The migrating salmon smolts are the index of the salmon production of the rivers. During their migration down rivers and through estuaries, which are often shallow, especially at low tide, the smolts tend to be highly vulnerable to avian predation.

It can be concluded that there is an urgent need for an extensive study of predators and their impacts on Atlantic salmon in Iceland.

Predator control

The population size of many of the species that are regarded as potential predators of Atlantic salmon is shown in Table 2. The source of the information is the Icelandic Environment and Food Agency (www.ust.is). The table includes both species that are hunted for game as well as those targeted for extermination. The extermination activity is, in most cases, supported both by the government as well as relevant communities where the extermination is either conducted by official employees or facilitated by paying a bounty for each animal killed.

The annual catch for some of the species, e.g. the mink, is much higher than the population size in spring. That means that the catch is not likely to influence the population size of the predator and the populations is likely to be determined by other factors. However, it is possible that the population size of predators, especially in the case of the mink, could be higher or have different distribution patterns if control measures were not in place.

It can be concluded that for most potential predators of Atlantic salmon in Iceland, predator control can only be used in management during short periods determined as critical for salmon. The period when salmon are regarded as being most vulnerable is during the smolt run in spring when smolts are travelling downstream and through shallow waters in estuaries. It is during this period that some river associations try to control avian predators in the estuaries.

Although not shown in Table 2, there is some ongoing activity to control seal populations and to keep seals away from river estuaries during the peak period of salmon migration.

Table 1. Potential predators of Atlantic salmon in Iceland

Freshwater phase

	Species		Life stages
Mammals	Mink	*Mustela vision*	juveniles - smolts, adults
Birds	Goosander	*Mergus merganser*	juveniles - smolts
	Red-breasted merganser	*Mergus serrator*	juveniles - smolts
	Cormorant	*Phalacrocorax carbo*	juveniles - smolts
	Red-throated Diver	*Gavia stellata*	juveniles - smolts
	Arctic Tern	*Sterna paradisaea*	juveniles - smolts
	Black-headed Gull	*Larus ridibundus*	juveniles - smolts
	Lesser Black-backed Gull	*Larus fuscus*	juveniles - smolts
	Great Black-backed Gull	*Larus marinus*	juveniles - smolts
Fish	Brown trout	*Salmo trutta*	juveniles - smolts

3. Marine phase

	Species		Life stages
Mammals	[1] Common seal	*Phoca vitulina*	smolt post-smolt, adults
	[1] Grey seal	*Halichoerus grypus*	smolt post-smolt, adults
Birds			
	[1] Cormorant	*Phalacrocorax carbo*	smolt post-smolt
	[1] Fulmar	*Fulmarus glacialis*	smolt post-smolt
	[1] Gannets	*Sula bassana*	smolt post-smolt
	[1] Puffin	*Fratercula arctica*	smolt post-smolt
	[1] Kittiwake	*Rissa tridactyla*	smolt post-smolt
	[1] Black guillemot	*Cepphus grylle*	smolt post-smolt
	[1] Glaucous gull	*Larus hyperboreus*	smolt post-smolt
	[1] Black-headed Gull	*Larus ridibundus*	juveniles - smolts
	[1] Arctic Tern	*Sterna paradisaea*	juveniles - smolts
	[1] Arctic skua	*Stercorarius parasiticus*	smolt post-smolt
	[1] Lesser Black-backed Gull	*Larus fuscus*	juveniles - smolts
	[1] Great Black-backed Gull	*Larus marinus*	juveniles - smolts
Fish			
	[1] Salmon	*Salmo salar*	smolt post-smolt
	[1] Cod	*Gadus morrhua*	smolt post-smolt
	[1] Sea scorpion	*Myoxochephalus scorpius*	smolt post-smolt
	[1] Pollock	*Pollachius virens*	smolt, post-smolt
	Eel	*Anguilla anguilla*	smolt
	Spiny dogfish	*Squalusn acanthias*	smolt, post-smolt, adult
	Greenland shark	*Somniosus microcephalus*	post-smolt, adult

[1] From Thorisson and Sturlaugsson 1995

Table 2. Estimated population size* and average catch in game shooting or extermination operations 1995-2001.
*The population size is the number of animals in spring or the number of nesting birds.

Freshwater

	Species		Population size [1]	Yearly catch 1995-2001 [1]	Control activity	STDEV of mean
Mammals	Mink	*Mustela vision*	3,500	7,627	Extermination	853
Birds						
	Goosander	*Mergus merganser*	2,000-4,000	630	Game shooting	100
	Cormorant	*Phalacrocorax carbo*	2,000-3,000	2,459	Game shooting	510
	Black-headed Gull	*Larus ridibundus*	25,000-30,000	2,374	Extermination	393
	Lesser Black-backed Gull	*Larus fuscus*	25,000	24,314	Extermination	5,075
	Great Black-backed Gull	*Larus marinus*	50,000	27,646	Extermination	5,752
	Gannets	*Sula bassana*	23,000	827	Game shooting	129
	Puffin	*Fratercula arctica*	2-3 million	169,202	Shot, netted	44,248
	Kittiwake	*Rissa tridactyla*	900,000	1,717	Shot	353
	Black guillemot	*Cepphus grylle*	20,000-30,000	4,227	Shot	552
	Glaucous gull	*Larus hyperboreus*	8,000	4,041	Extermination	785
	Arctic skua	*Stercorarius parasiticus*	5,000-10,000	1,773	Extermination	533

[1] The Environment and Food Agency

References

Antonsson, Th., and Gudjonsson, S. 2002. Variability in timing and characteristics of Atlantic salmon smolt in Icelandic rivers. Transactions of the American Fisheries Society 131:643-655.

Mills, D. 1989. Ecology and management of Atlantic salmon. Chapman and Hall, London. 351pp.

Thorisson, K., and Sturlaugsson. J. 1995. Postsmolts of ranched Atlantic salmon (*Salmo salar* L.) in Iceland. IV Competitors and predators. International Council for the Exploration of the Sea. ANACAT Committee. CM 1995/M:12

Skírnisson, K., 1993. Minkur. pp 79-103. In: Vilt íslensk spendýr. P. Hersteinsson and G. Sigurbjarnarsson (eds.) Landvernd, Reykjavík

NORWAY

The issue of predator-related mortality in fresh- and saltwater was reviewed in connection with the work of the Wild Salmon Committee, that was appointed by Royal Decree of 18th of July 1997. The background for the Committee's work was the marked decline in the stocks of wild Atlantic salmon (henceforth: salmon) in Norway since the 1970s. NOU 1999:9[1] was received by the Ministry of the Environment (MD) on the 12th of March 1999.

The report is based on NOU 1999:9, but we have also considered recent changes in the status of the salmon stocks in Norway in relation to the predator populations.

The salmon catches in Norway declined markedly during the 1980s and the first half of the 1990s. The decline continued despite extensive measures and restrictions in the fisheries. Catches in the period 1997-2002 have increased significantly compared with the situation in the early 1990s, but it is far too early to conclude that the declining trend in Norwegian salmon stocks that occurred in the 1990s has been reversed (Hansen *et al* 2003[2]).

Predators on salmon

The knowledge base concerning the significance of predation on salmon stocks is limited, but a number of species of fresh- and saltwater marine fish, birds and mammals are potential and/or documented predators on salmon at different stages of their life-cycle.

Freshwater

The most significant/important predators in fresh water in Norway are probably: pike *(Esox lucius),* goosander *(Mergus merganser),* red-breasted merganser *(Mergus serrator),* dipper *(Cinclus cinclus),* mink *(Mustela vison)* and otter *(Lutra lutra).* The harbour seal *(Phoca vitulina)* is occasionally observed in estuaries and rivers, where it probably forages on salmonids.

Estuaries and coastal waters

Potential predators in the estuaries and along the coast are: coastal populations of cod *(Gadhus morhua),* saithe *(Pollachius virens)* and pollack *(Pollachius pollachius),* cormorant *(Phalacrocorax carbo),* shag *(Phalacrocorax aristotelis),* common tern *(Sterna hirundo),* arctic tern *(Sterna paradisaea),* gulls *(Larus spp),* mink *(Mustelo vison),* otter *(Lutra lutra),* grey seal *(Halichoerus grypus)* and harbour seal *(Phoca vitulina).* Killer whale *(Orcinus orca)* has been observed foraging on salmon in the outlet of the Trondheimsfjord in Central Norway (Røv *et al* 1999[3]). The harp seal *(Phoca groenlandica)* is observed regularly in estuaries and in coastal waters in Finnmark, but was also observed in coastal waters in Middle/Southern Norway on several occasions during the "seal-invasion-years" in the latter half of the l980s.

[1] NOU 1999:9 Til laks åt alle kan ingen gjera?
[2] Hansen, L.P, Fiske, P., Holm, M., Jensen, A.J., og Sægrov, H. 2003. Bestandsstatus for laks i Norge 2002. Rapport fra arbeidsgruppe. Utredning for DN 2003-2, 1-56.
[3] Røv, N., Folkow, L., Øien, N., og Hvidsten, N.A. 1999. Predasjon på atlantisk laks med hovedvekt på sel. I: NOU 1999:9 Til laks åt alle kan ingen gjera?

Open ocean

The number and "density" of potential predators in the Norwegian Sea and the Barents Sea is considerably lower than the number of potential predators in coastal waters. Harp seal *(Phoca groenlandica)* is distributed within parts of the salmon's feeding areas in the southern parts of the Barents sea. The distribution of the hooded seal *(Cystophora cristata)* overlaps the distribution of salmon, both in the feeding and wintering areas in the Norwegian Sea and in the feeding areas in the Barents Sea. The gannet *(Sula bassana)* is a possible predator on post-smolt salmon in the open sea (Holm *et al* 1999[4]).

Table 1. List of some of the species identified as potential predators on Atlantic salmon *(Salmo salar)* in the Norwegian Sea, the Barents Sea and in Norwegian rivers.

Species	**Scientific name**	**Population size**	**Pop. trend**	**Exploitation/ protection**	**Predation documented**	**Comments**
Cod	*Gadhus morhua*		-	commercial fishing	Hvidsten & Møkkelgjerd 1987[5], Hvidsten & Lund 1988[6]	Coastal populations
Northeast Atlantic cod	*Gadus morhua*		-	commercial fishing		
Saithe	*Pollachius virens*		0	commercial *fishing*	Hvidsten & Møkkelgjerd 1987, Holm *et al* 1999	
Haddock	*Pollachius pollachius*		-	commercial fishing	Skilbrei *et al* 1998[7]	
Gannet	*Sula basana*	4,000 pairs	+	protected		
Cormorant	*Phalocrocorax carbo*	24,000 pairs		open season		Responsibility species
Shag	*Phalacrocorax aristotelis*	15,000 pairs		open season		Responsibility species
Grey heron	*Ardea cinerea*	5,000-10,000 pairs	0/?	protected		
Red-breasted merganser	*Mergus serrator*	25 – 30,000 ind	0/?	protected		Responsibility species
Goosander	*Mergus merganser*	2,000 pairs	0/+	protected		
Dipper	*Cinclus cinclus*	5 – 25,000 pairs	0/?	protected		
Mink	*Mustela vison*	?		open season		
European otter	*Lutra lutra*	10 – 20,000 ind	+	protected		Responsibility species

[4] Holm, M., Hansen, L.P. & Holst, J.C. 1999. Laks i havet — kunnskapsstatus, forskningsbehov og flaskehalser. I: NOU 1999:9 Til laks åt alle kan ingen gjera?
[5] Hvidsten. N.A., & Møkkelgjerd, P.I. 1987. Predation on salmon smolts, *Salmo salar,* in the estuary of the river Surna, Norway. J. Fish. Biol. 30:273-280.
[6] Hvidsten N.A., & Lund, R.A. 1988. Predation on hatchery-reared and wild smolts of Atlantic salmon, *Salmo salar,* in the estuary of the river Orkla, Norway. J. Fish. Biol. 33:121-126.
[7] Skilbrei, O.T., Johnsen, B.O., Heggberget, T.G., Krokan, P.S., Aarset, B., Sagen, T., & Holm, M. 1998. Havbeite med laks - artsrapport. Norges forskningsråd.

Species	Scientific name	Population size	Pop. trend	Exploitation/ protection	Predation documented	Comments
Harbour seal	*Phoca vitulina*	6,700 ind	0/ (+)	open season/quotas	Røv *et al* 1999	Data from Scotland
Harp seal	*Phoca groenlandica*	2 mill +	+	quotas		Responsibility species. Breeding grounds (Jan Mayen/White Sea (1.7 mill ind.)
Grey seal	*Halichoerus grypus*	4,400 ind	0	open season/ quotas	Røv *et al* 1999	Data from Scotland
Hooded seal	*Cystophora cristata*	100-150,000 ind	0	quotas	Røv *et al* 1999	Data from 1907. Responsibility species
Killer whale	*Orcinus orca*	3,000 ind	0	protected	Røv *et al* 1999	
Harbour porpoise	*Phocena phocena*	95,000 ind	+	protected		Responsibility species

*Population size and trend data on birds are collected from Norsk Fugleatlas (Gjershaug *et al* 1994[8]). **Similar data on marine fish are from Michalsen (2003[9]). ***Status related to the national red list and international responsibility are from the Norwegian Red List 1998 (DN 1999[10]).

Predation pressure in relation to the life-cycle of salmon

Juvenile salmon

The importance/effect of predation on juvenile salmon in fresh-water is unknown. Predation pressure is dependent upon, and varies with, factors like distribution/density of predators, water clarity, season, “river size”, availability of alternative prey, etc.

The pike is probably among the most effective predators on juvenile salmonids in general, but the species has a rather limited distribution in Norway (south-eastern parts of the country and in Finnmark). The number of salmon rivers in the south-eastern parts of Norway is limited. Pike predation on juvenile salmon has not been investigated.

The dipper is widely distributed in Norway. The dipper has been observed eating salmon fry.

The heron is widely distributed along the coast between Vest-Agder and Helgeland, and more sparsely distributed along the coast in the south-east. The species is rare in Troms and Finnmark. Heron predation on salmon fry/parr is documented, but the predation pressure from heron is probably relatively low because of the species’ preference for sub-optimal habitats for juvenile salmon.

The red-breasted merganser is widely distributed along the coast, while the goosander is more common in inland areas. The influence of predation from red-breasted merganser and

[8] Gjershaug, J.O., Thingstad, P.G., Eldøy, S. & Byrkjeland, S. (red.). 1994. Norsk fugleatlas. Norsk Ornitologisk Forening. Klæbu. *552* s.
[9] Michalsen, K. (red) 2003. Havets ressurser 2003. Fisken og havet, særnr. 1-2003.
[10] Direktoratet for naturforvaltning. 1999. Nasjonal rødliste for truete arter i Norge 1998. Norwegian Red List 1998. DN-rapport 3:1-161.

goosander on smolt production in the Alta River in Finnmark was investigated by Moen (1983[11]), who examined the stomach contents of 160 goosanders and 40 red-breasted mergansers. He concluded that although salmon was the dominant prey species, predation did not significantly influence smolt production.

The mink is widely distributed along the coast. The otter is widely distributed and common from Sogn og Fjordane to Finnmark. The otter population is expanding southwards. The diet composition of mink and otter in Gråelva was investigated by Heggberget *et al* (2001[12]). Gråelva is a small tributary to Stjørdalselva. The proportion of salmonids in the otter diet was 70-80%. 10% of the fish were juvenile salmon. The diet composition of mink was more varied. The magnitude of mink and otter predation on juvenile salmon in general is unknown, but the results from Gråelva indicate that mink and otter can be effective predators on juvenile salmon.

Smolt/post-smolt and mature salmon

Smolt age in Norwegian rivers varies between 1-5 years. Age at smoltification increases with latitude and in glacier-fed rivers, i.e. the youngest smolts are produced mainly in the rivers in Southern Norway. Smolt migration from Norwegian salmon rivers takes place between the end of April in the rivers in southern Norway and the beginning of September in the rivers in the north. Smolt migration is dependent on the temperature in the rivers and in the sea.

Migrating post-smolt actively utilise the outward bound currents in the fjords and the north-bound current along the Norwegian coastline. The feeding area covers the northern parts of the Norwegian Sea and parts of the Barents Sea. The wintering areas lie north of the Faroe Islands in the Norwegian sea (Holm *et al* 1999).

Predation is presumed to be the most important cause of natural mortality from the marine environment (Wheeler & Gardner 1974[13]). It is generally accepted that mortality is highest at the post-smolt stage, i.e. in the first few months in the marine environment.

According to Holm *et al* (1999), the presence and concentration of migrating post-smolts in the estuaries attracts predators. The predation pressure will depend upon factors such as turbidity, the depth of the freshwater layer and the speed of the outward bound currents in the fjords. Seaward migration at night (Hansen & Jonsson 1986[14]) and the timing of the smolt migration from individual rivers (Greenstreet *et al* 1993[15]) are strategies to reduce predation. Smolt/post-smolts are most vulnerable to predation during the fresh-water to sea-water transition period.

---

[11] Moen, K. 1983. Fiskeenders *(Mergus merganser* L. og *M. serrator* L.*)* beskatning av laksunger (*Salmo salar* L.) i Altaelva. Cand. Scient thesis. 38 s.
[12] Heggberget, T.M., Berger, H.M., Kvaløy, K. & Lamberg, A. 2001. Oter og mink i en steinsatt sjøørret-elv. I: Heggberget, T.M. og Jonsson, B. (red.) Virkninger av fysiske naturinngrep — systemøkologisk innrettning. NINA Temahefte 16:32-38.
[13] Wheeler, A. & Gardner, D. 1974. Survey of the literature of marine fish predators on salmon in the North-east Atlantic. J. Inst. Fish. Mgmt. 5 (3):63-66.
[14] Hansen, L.P. & Jonsson, B. 1986. Salmon ranching experiments in the River Imsa: effects of day and night release and of seawater adaptation on recapture-rates of adults. Report of the Institute of Freshwater Research, Drottningholm, 63:47-51.
[15] Greenstreet, S.P.R., Morgan, R.I.G., Barnett. S. & Redhead, P. 1993. Variation in the number of shags *(Phalacrocorax aristotelis)* and common seals *(Phoca vitulina)* near the mouth of an Atlantic salmon *(Salmo salar)* river at the time of the smolt run. Journal of Animal Ecology, 62 (3):565-576.

The predation pressure from marine fish and avian predators decreases with increasing distance to the coastline (Holm *et al* 1999). Coastal cod are described as predators on post-smolts in estuaries and in the fjords (Hvidsten & Møkkelgjerd 1987, Hvidsten & Lund 1988). Saithe (Hvidsten & Møkkelgjerd 1987) and haddock (Skilbrei et at 1998) are also documented predators on post-smolts. Northeast Arctic cod is a potential predator on post-smolts, but the salmon was not found in the stomach contents of 80,000 stomach samples from Northeast Arctic cod (Holm *et al* 1999).

The abundance of coastal cod, saithe and haddock in most areas along the Norwegian coastline is lower than in the 1980s. Haddock has a limited distribution along the coast, but can be abundant locally. The stock of Northeast Arctic saithe is considered to be within safe biological limits. The spawning stock biomass of coastal cod north of 62°N is presently at its lowest observed level. The recruitment has been well below average since 1995. The spawning stock biomass of coastal cod south of 62°N has been below safe biological limits since 1984 (Michalsen 2003). It is, therefore, unlikely that the general decline in the salmon stocks during the 1990s can be attributed to predation by coastal cod, saithe or haddock.

Predation pressure from mink and otter in salt water is probably negligible, compared to fresh water. Predation from terns and gulls is also negligible, due to the species' limited ability to catch the smolt/post-smolts. The importance of cormorant and coastal seal predation on post-smolts is unresolved. Several authors (Holm *et al* 1999, Røv *et al* 1999) have concluded that cormorant, grey seal and harbour seal are probably capable of exerting a heavy predation pressure during the post-smolt migration period. Coastal seal predation on mature salmon has been documented from Scotland (Røv *et al* 1999).

Man-induced threats, for example an elevated infection level of salmon lice *(Lepeophtheirus salmonis)* on migrating post-smolts in areas with high fish-farming intensity, may also increase marine mortality through behavioural changes that expose the post-smolts to an elevated risk of predation.

The knowledge base concerning predation in the open sea is restricted, but the potential for predation can be estimated by considering the overlap between the distribution of salmon and their potential predators. Avian predation decreases during the first sea-winter as the size of salmon increases (Holm *et al* 1999). Hooded seal and harp seal clearly have the greatest potential for predation at sea, both in the feeding/overwintering areas and again on the return to spawn.

Management regimes

Freshwater fish, including anadromous salmonids, and birds are managed by the environmental authorities with the Directorate for Nature Management as the central advisory and executive agency. The County Governor has regional responsibility. Marine fish and marine mammals are managed by the fisheries authorities, with the Directorate for Fisheries as the central advisory and executive agency. Specific management measures to control the populations of potential salmon predators have not been implemented.

Conclusion

Review of the available literature on predation of salmon indicates that there might be a relatively high predation pressure at certain stages in the life-cycle of the salmon. Only a small number of the potential predators of salmon have been documented as such, through stomach content samples and/or direct observation. Juveniles and smolt/post-smolts, during the freshwater to seawater transition period and in coastal waters, seem to be more vulnerable to predation than adult salmon.

In Norway, there is at present no empirical evidence that either the total predation pressure or any individual predator species have a significant negative impact on the stock level.

Catches and pre-fishery abundance in several rivers in, e.g., Central Norway have increased significantly since 1997, despite the presence of stable/slightly increasing populations of otter, grey seal, harbour seal and cormorants within the same area. The continued negative development in several other regions of Norway must, therefore, most probably be attributed to environmental pressures other than predation.

RUSSIAN FEDERATION

No targeted research was conducted in Russia to assess the predator-related mortality of Atlantic salmon. There is only evidence available from observations at in-river barrier fences where adult counts are derived and biological sampling is done, as well as evidence relating to the impact of predatory fish in juvenile salmon habitat and on their migration routes.

1. The impact of marine mammals on salmon populations

We have evidence available on damage caused to salmon by seals, which was derived on rivers where biological sampling and counts of returning adult salmon were conducted.

For instance, for the Severnaya Dvina (White Sea basin) damaged fish accounted, on the average, for 1.7% of all salmon examined in the period from 1994 to 2002 (variation range was 0.7 to 2.6%).

In the Pechora river (Barents Sea basin) no records of damage to salmon by seals were available after the closure of the commercial fishery in 1989. However, there are data available for the period 1975-1980 when salmon damaged by seals accounted for 3.6%, on average, of all salmon examined (variation range 2.8-5.3).

For rivers on the Kola Peninsula the following records of damage by seals were made during biological sampling of salmon at in-river barrier fences in 2003:

B.Z.Litsa river (Barents Sea basin): 205 salmon sampled, 6 of which had damage caused by seals (2.9%);
Ura river (Barents Sea basin): 278 salmon sampled – 2 of which had damage (0.7%);
Tuloma river (Barents Sea basin): 422 salmon sampled – 5 of which had damage (1.2%);
Varzuga river (White Sea basin): 1,784 salmon sampled, – 5 of which had damage (0.3%);
Kitsa river (White Sea basin): 232 salmon sampled: 4 of which had damage (1.7%).

2. The impact of piscivorous fish on juvenile salmon populations

In its freshwater period of life the survival of salmon is affected by predation by piscivorous fish found in the habitat of juvenile salmon and on their migration routes (during smolt migration). For instance, 19% of the stomachs of pike caught in the Umba river at the end of July 2003 contained juvenile salmon.

A complex of measures designed to enhance the production of salmon helps reduce the pressure from predatory fish. In the Murmansk region, fishing for management purposes (regulation of the species composition) is carried out on all salmon rivers and non-stagnant lakes. In the winter season, ice fishing by rods and nets in non-stagnant lakes. In spring, during the pike and perch spawning season, directed net fishery in flooded areas and pools in salmon rivers. For instance, in 2003 a total of 2.98 t of pike, 7.43 t of perch and 6.41 t of burbot were harvested.

ANNEX 30

Council

CNL(04)31

Predator-related Mortality
(tabled by the United States)

CNL(04)31

Predator-related Mortality
(tabled by the United States)

Introduction

Predation has long been recognized as a potential factor that limits the abundance of Atlantic salmon (*Salmo salar*) populations throughout their range. In freshwater environments, predation has been relatively well studied and in some cases these studies have led to a more quantitative understanding of the salmon's role in aquatic food webs (e.g., Larsson 1985, van den Ende 1993). However in marine environments, this level of understanding has not been achieved. This understanding is lacking because of the varying spatial scales at which populations can be studied in the open ocean, the myriad of potential predators that salmon encounter, and the relatively small role that salmon play in marine food webs (Cairns 2001a). A recent review of the potential causes for declines in salmon abundance (Cairns 2001b) underscores the importance of considering marine predation with five of the leading 12 hypotheses being related to predation. The problems of understanding the role of predation in structuring US salmon stocks are exacerbated by critically low abundance levels. Abundance of remnant US stocks are presently so low that the National Marine Fisheries Service and the US Fish and Wildlife Service recently determined that the Gulf of Maine Distinct Population Segment (DPS) is in danger of extinction throughout its range (65 Fed Reg 69459). The purposes of this paper are to (1) summarize recent information regarding the impact of marine predators on US Atlantic salmon stocks and (2) to describe management measures and on-going research in relation to predator-related mortality.

The Impact of Marine Predators on US Stocks of Atlantic Salmon

Recent research has advanced our understanding of the impacts of marine predation on US stocks of Atlantic salmon. These advances include both species-specific investigations as well as investigations that clarify the mechanisms for particularly high predation at various life stages, especially as smolts and post-smolts transition to life at sea. We will first consider the recent literature pertaining to species-specific interactions.

Seabirds

Northern gannets (*Morus bassanus*) are the largest seabirds in the north Atlantic that can prey on post-smolts throughout their first year at sea (Cairns 2001a). Montevecchi et al. (2002) examined the diets of northern gannets on Funk Island, Newfoundland for 24 years. Atlantic salmon post-smolts comprised between 0 and 6.37% of the northern gannets' diet. Atlantic salmon consumption by northern gannets varied greatly across years but consumption was highest during the 1990s. Overall, northern gannets consumed an estimated 0.22% of North American post-smolt biomass in August from 1977 to 1989 and 2.70% of North American post-smolt biomass in August from 1990 to 2000. The highest consumption of Atlantic salmon occurred in 1993 when northern gannets consumed an estimated 43.4 tons of salmon in August alone. The higher post-smolt predation rates in the 1990s appear to be associated with colder surface water, though many other factors may have affected this shift (e.g., the collapse of ground fish stocks). Tags of salmon from US stocks (Penobscot River, Maine) were found in this colony. The extent of predation by northern gannets specific to US stocks remains unclear though it is likely to be roughly equal to the overall proportion of the US stock in the Northwest Atlantic mixed stock complex.

Unlike northern gannets, double-crested cormorants (*Phalacrocorax auritus*) have long been recognized as important predators of smolts and post-smolts (Meister and Gramlich 1967). Breeding pairs of cormorants in Maine have increased by 87% between 1977 and 1985 to around 29,000 pairs and this population been stable since the early 1990's (Baum 1997, Anthony 1994). Blackwell et al. (1997) demonstrated that smolts were among the most frequent prey items of double-crested cormorants in the Penobscot River, Maine during the smolt emigration period. Observations by Blackwell et al. (1997) and Blackwell and Krohn (1997) suggest that cormorants prefer to forage near dams where smolts are delayed above the dam and smolts that have gone through the dam are disoriented. These mechanisms may lead to the high levels of predation observed by Moring et al. (1999). Recent studies in eastern Canada also underscore the importance of predation by cormorants on emigrating smolts. Smolts comprised 3.3% of cormorants' diet in the Maritime Provinces during the smolt run (Cairns 1998). This study was not targeted at the major salmon rivers and instead represents an overall assessment of cormorant diet throughout the study area. Thus, overall predation intensity by cormorants is still unknown (Cairns 2001a).

Vulnerability windows have recently been established for most of the major seabird predators of salmon (Cairns and Reddin 2000). Smolts and post-smolts are vulnerable to seabird predation as soon as they leave the river until they attain a critical size at which they are no longer vulnerable to a specific predator. Post-smolts out-grow northern fulmars (*Fulmarus glacialis*), black-legged kittiwakes (*Rissa tridactyla*), and common murres (*Uria aalge*) by early July; shearwaters (*Puffinus* spp.) by late July; and gulls (*Larus* spp.) by early September (Cairns and Reddin 2000). This review did not include great cormorants (*Phalacrocorax carbo*) or double-crested cormorants because they are inshore predators and salmon are only available as prey as they migrate through estuaries and near-shore areas. Northern gannets were also not included in this review. However, the vulnerability window to northern gannet predation is known to be considerably wider than other seabirds because of specialized feeding adaptations that allow them to feed on medium-size fish (Cairns and Reddin 2000).

Marine Mammals

Direct evidence of salmon predation by seals in the northwest Atlantic remains sparse. One harbor seal (*Phoca vitrulina*), two grey seals (*Halichoerus grypus*), and two harp seals (*Phoca groenlandica*) have been documented with wild salmon remains or tags in their stomachs (Cairns 2001a). Seal predation is better known in the northeastern Atlantic, especially the UK, where seals affect commercial fisheries (Harwood 1984, Gulland 1987). Predation on free-swimming salmon is not as well documented. Most records of seal predation occur near salmon nets (Pierce et al. 1991).

Harbor seals are of particular concern in Maine, USA where seal bites on returning wild salmon have increased during the last decade (Baum 1997). Harbor seal populations in Maine have increased sharply over the last two decades (Gilbert 2003, pers. comm.). This increase clearly coincides with more bite marks on salmon, however actual consumption of wild Maine salmon by harbor seals has never been recorded.

Harbor seals also pose an indirect threat to endangered salmon by damaging aquaculture net pens. Not only are seal attacks on the pens a significant cause of predation, they also damage nets. These attacks can lead to large escapes of domesticated salmon which may lead to disruption of wild salmon redds, competition for food and habitat, interbreeding with wild salmon, disease transmission, and benthic habitat degradation (Windsor and Hutchinson 1990, Saunders 1991, Webb et al. 1993, Youngson et al. 1993, Clifford et al. 1998).

Another potential salmon predator is the grey seal which ranges across the north Atlantic to the southern Gulf of Maine, inhabiting both coastal and offshore waters. Predation on salmon in the Gulf of Maine by grey seals has not been documented. However, predation by grey seals has been documented in the northwest Atlantic on two occasions (Cairns and Reddin 2000). Salmon remains have been found in the stomachs of grey seals from the Gulf of St. Lawrence, although no salmon remains were found in the stomachs of grey seals from the Scotian Shelf (Anthony 1994). All other accounts of grey seals feeding on salmon are from the northeastern Atlantic. Salmon predation by seals has been documented in many studies conducted in the UK though many incidences of predation are likely net-caught fish (Boyle et al. 1990).

Harp seals are abundant in the north Atlantic and usually inhabit pack ice (Lawson et al. 1998). Harp seal populations in the north Atlantic have increased during the last decade, with breeding populations in Newfoundland, the Gulf of St. Lawrence, and Greenland (Hammill and Stenson 2000). Harp seals feed selectively on capelin (*Mallotus villosus*) and arctic cod (*Boreogadus saida*) but will prey on other available fishes (Lawson et al. 1998). Hammill and Stenson (2000) estimated that harp seals consumed 82% (3.3 million t) of all food eaten by seals in eastern Canadian waters in 1996. Thus if salmon predation is proportional to overall consumption, harp seals may be important salmon predators even though predation on wild salmon in the northwest Atlantic has only been recorded twice (Cairns and Reddin 2000). Further, the abundance of harp seals appears to be inversely correlated with salmon recruitment in the north Atlantic (Amiro 1998). However, harp seals may simply be a surrogate for some other predator or environmental condition that reduces salmon recruitment.

Overall, seal predation is likely to have risen substantially over the last decade concurrent with increases in overall seal abundance in the northwest Atlantic. Hammill and Stenson (2000) estimated that overall consumption of salmon by harp, hooded (*Cystophora cristata*), grey, and harbor seals steadily increased from 2,467 t in 1990 to 3,229 t in 1996. However, the vast majority (93% in 1996) of all salmon predation by seals is thought to occur in NAFO areas 4R and 4S (i.e., the western side of Newfoundland). US salmon stocks are thought to migrate through and over-winter on the eastern side of Newfoundland (Meister 1984, Baum 1997). Though this migration pattern is not known with certainty, Hammill and Stenson's (2000) results suggest that post-smolts migrating through and over-wintering on the eastern side of Newfoundland may have considerably lower predation risks than those on the western side of Newfoundland. Thus, US salmon stocks may be subject to substantially lower seal predation risks than many Canadian stocks. However, these consumption estimates, and subsequent predation rates, are based on the few records of salmon predation available.

As with seabirds, vulnerability windows were recently established for the major seal predators of salmon (Cairns and Reddin 2000). Vulnerability windows for hooded, harbor, and grey seals are quite variable and depend largely on spatial co-occurrence. Vulnerability for harp seals is more straight-forward with both post-smolts and 1SW salmon being vulnerable throughout the year.

The extent of predation by other marine mammals is still poorly understood. The only indication that cetaceans may prey on salmon is from a single salmonid otolith found in a harbor porpoise (*Phocoena phocoena*) stomach (Cairns 2001b), though Thompson and Mackay (1999) suggest that many of the marks attributed to seals may have been inflicted by odontocete cetaceans instead. Without meaningful consumption estimates, it is currently impossible to assess the impacts of cetacean predation. However, the distribution of several odontocete cetaceans clearly overlaps the distribution of Atlantic salmon. Furthermore, Pacific salmon (*Oncorhynchus* spp.) have been reported from the stomachs of nine species of cetaceans (Fiscus 1980). Thus, cetaceans may harvest a substantial portion of Atlantic salmon biomass even if salmon are a small portion of their diet (Cairns 2001b).

Fish

Striped bass (*Morone saxatilis*) are presumed to be important predators of smolts and post-smolts as they migrate through nearshore waters. This presumption has recently gained credibility by two studies that documented the intensity (Blackwell and Juanes 1998) and the spatial variability (Beland et al. 2001) of striped bass predation on Atlantic salmon. Blackwell and Juanes (1998) documented striped bass preying on salmon smolts in the tailrace of the Essex Dam on the Merrimack River, Massachusetts, USA. Smolts represented approximately 80% of prey recovered. This was during the peak smolts emigration period (May 6 to May 28) and most smolts were hatchery-origin fish either stocked as fry or smolts. In addition, Schulze (1996) demonstrated that the spatial and temporal distributions of striped bass and emigrating smolts in the Connecticut River estuary overlap substantially and further concluded that only early-migrating smolts would not be subject to striped bass predation. Striped bass predation has also been documented in the Narraguagas River (Beland et al. 2001) which is one of the rivers containing an endangered population of Atlantic salmon in eastern Maine, USA (65 Fed Reg 69459). Though the extent of striped bass predation on endangered salmon is still unclear, the risk of population effects upon salmon is presently high given low smolt production (Beland et al. 2001) and high striped bass abundance (Field 1997).

Underlying Mechanisms

Several of the underlying mechanisms for the apparently high marine predation observed by many researchers are becoming clear. Some of these mechanisms include water quality perturbations and decreased abundance of other anadromous fish. Although some mechanisms are becoming clear, many critical uncertainties remain.

Emigrating smolts are subject to intense predation as they enter estuaries (Järvi 1990, Dieperink et al. 2002) and predation rates may approach 25% (Hvidsten and Møkkelgjerd 1987, Hvidsten and Lund 1987). Thus many researchers consider smolt predation important in structuring salmon populations (Mather 1998). Smolts are especially vulnerable to predation upon entering saltwater because they encounter new habitats and predators while simultaneously being subject to osmotic stress while adapting to the saltwater environment (Järvi 1989). Stress levels alone may elevate predation risk to emigrating smolts by reducing the amount of energy available for normal activities (Barton and Schreck 1987) such as proper anti-predator behavior (Handeland et al. 1996). Thus the mechanism responsible for the observed high predation rates may be osmotic stress (Staurnes et al. 1996). This problem is likely exacerbated in many Maine rivers where the smoltification process appears to be especially difficult given the low pH experienced by emigrating smolts (Magee et al. 2001).

As more energy is required to simply maintain homeostatic balance, less energy is available for normal activities and predator avoidance behaviors appear to be compromised resulting in higher predation rates (Handeland et al. 1996). In addition, episodic acidification, such as those experienced during spring freshets (Whiting 2003), leads to disrupted osmoregulation as smolts transition to seawater (Magee et al. 2003) with mortality often occurring via predation in the wild (Kocik 2003 pers. comm.).

In addition to water quality perturbations, the decreased abundance of other anadromous stocks may also play a role in the perceived elevated predation risks as smolts and post-smolts transition to saltwater. Prior to European settlement, many anadromous species were more abundant than they are today. Many US and southern Canadian rivers historically supported large and diverse anadromous fish populations including alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), and rainbow smelt (*Osmerus mordax*) in addition to Atlantic salmon. For some stocks, declines have been as dramatic as Atlantic salmon declines. For example, US landings of American shad exceeded 22,000 mt in 1896. Today, landings rarely exceed 2,000 mt and have averaged less than 1,350 mt since 1980 (Kocik 1998). These populations likely served as an important predation buffer allowing predators to focus on more abundant and energy-rich prey species (Schulze 1996, Brown et al. 2002). However, some of the same anthropogenic perturbations (e.g., dams, pollution, etc.) that lead to salmon declines have also diminished other anadromous populations (Collette and Klein-MacPhee 2002). The extent to which declines in other anadromous populations have led to higher smolt predation is yet to be assessed quantitatively.

Critical Uncertainties

Sea surface temperature (SST) is another factor that may mediate Atlantic salmon predator-prey dynamics. Accumulating evidence suggests that changes in the SST regime in the northwest Atlantic can fundamentally change predator prey dynamics. For example, Montevecchi et al. (2002) recorded a substantial increase in Atlantic salmon post-smolts in the diet of northern gannets beginning in 1990. This increase coincided with a shift from warm-water to cold-water pelagic prey (Montevecchi and Myers 1997). This shift was likely influenced by colder SSTs in the 1990s which likely inhibited highly migratory, warm-water mackerel (*Scomber scombrus*) and short-finned squid (*Ilex illecebrosus*) from moving into the Newfoundland region (Templeman and Fleming 1953 cited in Montevecchi and Myers 1997). The extent to which changes in the SST regime are impacting other predator-prey relationships in the northwest Atlantic is largely unknown. The observations by Montevecchi and Meyers (1997) and Montevecchi et al. (2002) were made possible by long-term data sets that span the decadal changes in SST regimes. Thus similar patterns with other species may be occurring without our knowing because such comprehensive data sets are relatively rare.

Further uncertainty stems from the cumulative, perhaps synergistic (Järvi 1989), nature of the impacts of many anthropogenic perturbations to Atlantic salmon ecosystems. Järvi (1989) described the effects of osmotic stress and stress due to the presence of a predator as synergistic (i.e., greater than the sum of the two effects alone). Similarly, the impacts of dams, elevated predator abundance, and water quality perturbations may be leading to the very high mortality experienced by emigrating smolts in US rivers. For example, the presence of dams alone would likely have minimal impacts to emigrating smolts if the dams only delayed migration and killed a small portion of the total smolt biomass. However, when you consider the habitat preference of double-crested cormorants (Blackwell et al. 1997), the migration delay due to dams (Blackwell et al. 1998), physical striking caused by turbines (Raymond 1988), decreased predator avoidance behaviors due to acid rain (Handeland et al. 1996), and the lack of emigrating Alosids as a predation buffer for emigrating smolts (Brown et al. 2002), a different picture emerges. Many anthropogenic impacts to Atlantic salmon ecosystems appear to cause system-wide destabilizations that are perceived as predator-prey dynamics issues.

Regardless of ultimate causes, many predation issues must be addressed as stocks of Atlantic salmon have been listed as endangered in the US and Canada. There are several approaches to consider as we move forward with Atlantic salmon research and management. Further research is clearly warranted as long as the problems with quantifying marine predation, clearly outlined by Cairns (2001a), are considered. The results of further studies may be problematic for US managers as critically low abundance further exacerbates the problem of even documenting predation in the open ocean. However, Cairns' (2001a) proposed assessments of life history, ocean temperatures, and schooling behavior would clearly provide important insights into the tradeoffs between predation risk and high growth potential. Further examination of novel approaches (e.g., fatty acid signature analysis, genetic analysis of seal scat) to detection and measurement of predation may also produce useful information for identifying localized predation issues.

Management Measures and On-going Research

Several management measures aimed at reducing early marine predation have recently been initiated in the US. First, an experimental liming project has been initiated. The objective of the project is to ease the transition from freshwater to saltwater for emigrating smolts in the Dennys River in eastern Maine. This approach might ameliorate the impacts of episodic low pH events (including low calcium and high aluminum concentrations) on the smoltification process, hopefully leading to higher early marine survival. If successful, this technique may be expanded to other salmon rivers that experience episodic low pH events. Second, an experimental double-crested cormorant control project has been initiated. This project is using non-lethal methods displace foraging double-crested cormorants from the lower Narraguagus River and estuary during the smolt migration. The goal is to see if displacement alone can have a measurable effect upon smolt survival as they enter the ocean. If successful, this programme may be expanded in the near future. If unsuccessful, the project may also use lethal removals in subsequent years. These are both adaptive management experiments that allow managers to evaluate the effects of their actions and adjust strategies accordingly. No results are yet available from either study.

In addition, on-going research at the University of Maine is attempting to document the frequency, pattern, and extent of seal depredations at salmon aquaculture farms. This research should assist the aquaculture industry by identifying the most successful mitigation measures available in US waters. This research could also assist wild salmon recovery efforts by minimizing domesticated salmon escapement.

Several other management options that are yet to be tested in the US are also available. Non-lethal seal exclusion from a particular estuary could be examined. This approach has recently been shown to deter harbor seal predation on Pacific salmon in British Columbia, Canada (Yurk and Trites 2000) and these techniques may be transferable. Second, open sea releases of hatchery smolts could be used to minimize predation as smolts transition to seawater. This approach increased return rates by as much as 111% in Norway (Gunnerød et al. 1988).

These additional management options may seem somewhat drastic but may be worth pursuing given the endangered status of some US stocks. Each technique would also require an adaptive management approach.

References

Amiro, P. G. 1998. The abundance of Harp seals in the North Atlantic and recruitment of the North American stock of Atlantic salmon (*Salmo salar*). Canadian Stock Assessment Secretariat Research Document 98/84.

Anthony, V. C. 1994. The Significance of Predation on Atlantic Salmon. *In*. A Hard Look at Some Tough Issues: Proceedings of the New England Atlantic Salmon Management conference. *Edited by* S. Calabi and A. Stout. New England Salmon Association. Newburyport, Massachusetts. pp 240-284.

Anthony, V.C. 1996. The predators of Atlantic salmon and their impact on salmon stocks. Pages 5-65 in "The Atlantic salmon as predator and prey". North Atlantic Salmon Conservation Organization. Edinburgh, Scotland.

Barton, B. A. and C.B. Schreck. 1987. Influence of acclimation temperature on interrenal and carbohydrate stress responses in juvenile chinook salmon (*Oncorhynchus tshawytscha*). Aquaculture 62: 299-310.

Baum, E. 1997. Maine Atlantic Salmon: a national treasure. Atlantic Salmon Unlimited. Hermon, Maine.

Beland, K.F., J.F. Kocik, J. vandeSande, and T.F. Sheehan. 2001. Striped bass predation upon Atlantic salmon smolts in Maine. Northeastern Naturalist 8(3): 267-274.

Blackwell, B.F. and F. Juanes. 1998. Predation on Atlantic salmon smolts by striped bass after dam passage. North American Journal of Fisheries Management 18: 936-939.

Blackwell, B.F., W.B. Krohn, N.R. Dube, and A.J. Godin. 1997. Spring prey use by double-crested cormorants on the Penobscot River, Maine, USA. Colonial Waterbirds 20(1): 77-86.

Blackwell, B.F., and W.B. Krohn. 1997. Spring foraging distribution and habitat selection by Double-crested Cormorants on the Penobscot River, Maine. Colonial Waterbirds 20:66-76

Blackwell, B.F., G. Gries, F. Jauanes, K.D. Friedland, L.W. Stolte and J.F. McKeon. 1998. Simulating migration mortality of Atlantic salmon smolts in the Merrimack River. North American Journal of Fisheries Management 18:31-45.

Boyle, P.R., G.J. Pierce, and J.S.W. Diack. 1990. Sources of evidence for salmon in the diet of seals. Fisheries Research 10: 137-150.

Brown, R.W., F. Juanes, and G. Shepard. 2002. Approaches to evaluating the role of marine fish predation on juvenile Atlantic salmon. Sixth International Atlantic Salmon Symposium. Edinburgh, Scotland.

Cairns, D.K. 1998. Diet of cormorants, mergansers, and kingfishers in northeastern North America. Canadian Technical Report of Fisheries and Aquatic Sciences No. 2225.

Cairns, D.K. 2001a. Approaches and methods for the scientific evaluation of bird and mammal predation on salmon in the Northwest Atlantic. Canadian Stock Assessment Secretariat Research Document 2001/011.

Cairns, D. K. 2001b. An evaluation of possible causes of the decline in pre-fishery abundance of North American Atlantic salmon. Canadian Technical Report of Fisheries and Aquatic Sciences No. 2358.

Cairns, D. K. and D.G. Reddin. 2000. The potential impact of seal and seabird predation on North American Atlantic salmon. Canadian Stock Assessment Secretariat Research Document 2000/12.

Clifford, S. L., P. McGinnity, and A. Ferguson. 1998. Genetic changes in Atlantic salmon (*Salmo salar*) populations of northwest Irish rivers resulting from escapes of adult farm salmon. Canadian Journal of Fisheries and Aquatic Sciences 55: 358-363.

Collette, B. B. and G. Klein-MacPhee. 2002. Fishes of the Gulf of Maine, Third Edition. Smithsonian Institution Press. Washington. D.C.

Diepernink, C., B.D. Bak, L.F. Pedersen, M.I. Pedersen, and S. Pedersen. 2002. Predation on Atlantic salmon and sea trout during their first days as postsmolts. Journal of Fish Biology 61: 848-852.

Field, J.D. 1997. Atlantic striped bass management: Where did we go right? Fisheries 22(7):6-8.

Fiscus, C.H. 1980. Marine mammal-salmonid interactions: a review. *In* Salmonid Ecosystems of the North Pacific. *Edited by* W.J. McNeil and D.C. Himsworth Oregon State University, Corvallis. pp. 121-132.

Gilbert, J.R. 2003. University of Maine, Professor of Wildlife Ecology. Personal Communication.

Gulland, J.A. 1987. Seals and fisheries: A case for predator control? Trends in Ecology and Evolution 2(4): 102-104.

Gunnerød, T. B., N.A. Hvidsten, and T.G. Heggberget. 1988. Open sea releases of Atlantic salmon smolts, *Salmo salar*, in central Norway, 1973-83. Canadian Journal of Fisheries and Aquatic Sciences 45: 1340-1345.

Hammill, M.O., and G.B. Stenson. 2000. Estimated prey consumption by harp seal (*Phoca groenlandica*), hooded seals (*Cystophora cristata*), grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*) in Atlantic Canada. Journal of Northwest Atlantic Fishery Science 26: 1-23.

Handelhand, S.O., T. Järvi, A. Fernö, and S.O. Stefansson. 1996. Osmotic stress, antipredator behavior, and mortality of Atlantic salmon (*Salmo salar*) smolts. Canadian Journal of Fisheries and Aquatic Sciences 53: 2673-2680.

Harwood, J. 1984. Seals and Fisheries. Marine Pollution Bulletin 15(12): 426-429.

Hvidsten, N. A. and R.A. Lund. 1988. Predation on hatchery-reared and wild smolts of Atlantic salmon, *Salmo salar* L., in the estuary of River Orkla, Norway. Journal of Fish Biology 33: 121-126.

Hvidsten, N.A. and P.I. Møkkelgjerd. 1987. Predation on salmon smolts, *Salmon salar* L., in the estuary of the River Surna, Norway. Journal of Fish Biology 30: 273- 280.

Järvi, T. 1989. Synergistic effect on mortality in Atlantic salmon, *Salmo salar*, smolt caused by osmotic stress and presence of predators. Environmental Biology of Fishes 26: 149-152.

Järvi, T. 1990. Cumulative acute physiological stress in Atlantic salmon smolts: the effect of osmotic imbalance and the presence of predators. Aquaculture 89:337-350.

Kocik J.F. 1998. American shad. *In* Status of fishery resources off the Northeastern United States for 1998. *Edited by* S.H. Clark. NOAA Technical Memo NMFS-NE-115. pp. 136-137.

Kocik, J.F. 2003. Research Fishery Biologist, National Marine Fisheries Service. Personal Communication.

Larsson, P.O. 1985. Predation on migrating smolt as a regulating factor in Baltic salmon, *Salmo salar* L., populations. Journal of Fish Biology 26: 391-397.

Lawson, J.W., J.T. Anderson, E.L. Dalley, and G.B. Stenson. 1998. Selective foraging by harp seals *Phoca groenlandica* in nearshore and offshore waters of Newfoundland, 1993 and 1994. Marine Ecology Press Series 163: 1-10.

Magee, J.A., T.A. Haines, J.F. Kocik, K.F. Beland, and S.D. McCormick. 2001. Effects of acidity and aluminum on the physiology and migratory behavior of Atlantic salmon smolts in Maine, USA. Water, Air, and Soil Pollution 130: 881-886.

Magee, J.A., M. Obedzinski, S.D. McCormick, and J.F. Kocik. 2003. Effects of episodic acidification on Atlantic salmon (*Salmo salar*) smolts. Canadian Journal of Fisheries and Aquatic Sciences 60: 214-221.

Mather, M.E. 1998. The role of context-specific predation in understanding patterns exhibited by anadromous salmon. Canadian Journal of Fisheries and Aquatic Sciences 55(Suppl. 1): 232-246.

Meister, A. L. 1984. The marine migrations of tagged Atlantic salmon (*Salmo salar* L.) of USA origin. Anadromous and Catadromous Fish Committee, International Council for the Exploration of the Sea. Copenhagen, Denmark.

Meister, A. L. and F.J. Gramlich. 1967. Cormorant predation on tagged Atlantic salmon smolts. Final report of the 1966-67 Cormorant - Salmon Smolt Study. Atlantic Sea Run Salmon Commission. Orono, Maine.

Montevecchi, W.A., D.K. Cairns, and R.A. Myers. 2002. Predation on marine-phase Atlantic salmon (*Salmo salar*) by gannets (*Morus bassanus*) in the Northwest Atlantic. Canadian Journal of Fisheries and Aquatic Sciences 59: 602-612.

Montevecchi, W.A. and R. A. Myers. 1997. Centurial and decadal oceanographic influences on changes in northern gannet populations and diets in the north-west Atlantic: implications for climate change. ICES Journal of Marine Science 54: 608-614.

Moring, J.R., O. van den Ende, and K.S. Hockett. 1999. Predation on Atlantic salmon smolts in New England rivers. *In* Smolt, physiology, ecology and behaviour. *Edited by* S. McCormick and D. MacKinlay. Department of Fisheries and Oceans, Vancouver, British Columbia, Canada. pp. 127-139.

Pierce, G. J., P.M. Thompson, A. Miller, J.S.W. Diack, D. Miller, and P.R. Boyle. 1991. Seasonal variation in the diet of common seals (Phoca vitulina) in the Moray Firth area of Scotland. Journal of Zoology 223: 641-652.

Raymond, H.L. 1988. Effects of Hydroelectric Development and Fisheries Enhancement on Spring and Summer Chinook Salmon and Steelhead in the Columbia River Basin. North American Journal of Fisheries and Aquatic Sciences 8: 1-24.

Saunders, R. L. 1991. Potential interactions between cultured and wild Atlantic salmon. Aquaculture 98: 51-60.

Schulze, M.B. 1996. Using a field survey to assess potential temporal and spatial overlap between piscivores and their prey, and a bioenergetics model to examine potential consumption of prey, especially juvenile anadromous fish in the Connecticut River estuary. M.Sc. Thesis. University of Massachusetts, Amherst. 133 pp.

Staurnes, M., L.P. Hansen, K. Fugelli, and O. Haraldstad. 1996. Short-term exposure to acid water impairs osmoregulation, seawater tolerance, and subsequent marine survival of smolts of Atlantic salmon (*Salmo salar* L.). Canadian Journal of Fisheries and Aquatic Sciences 53: 1695-1704.

Thompson, P. M. and F. Mackay. 1999. Pattern and prevalence of predator damage on adult Atlantic salmon, *Salmo salar* L., returning to a river system in north-east Scotland. Fisheries Management and Ecology 6: 335-343.

Templeman, W. and A.M. Fleming. 1953. Long-term changes in hydrographic conditions and corresponding changes in the abundance of marine animals. Canadian Journal of Fisheries and Aquatic Sciences 42: 976–981.

Van den Ende, O. 1993. Predation on Atlantic salmon smolts (*Salmo salar*) by smallmouth bass (*Micropterus dolomeiu*) and chain pickerel (*Esox niger*) in the Penobscot River, Maine. M.Sc. Thesis. University of Maine, Orono. 95 pp.

Webb, J. H., A.F. Youngson, C.E. Thompson, D.W. Hay, M.J. Donagy, and I.S. McLaren. 1983. Spawning of escaped farmed Atlantic salmon, *Salmo salar* L., in western and northern Scottish rivers: egg deposition by females. Aquaculture and Fisheries Management 24: 663-670.

Whiting, M. 2003. Maine salmon rivers water quality monitoring progress report for the 2002 field season. Maine Department of Environmental Protection, Bangor, Maine, 04401.

Windsor, M. L. and P. Hutchinson. 1990. The potential interactions between salmon aquaculture and the wild stocks - a review. Fisheries Research 10: 163-176.

Youngson, A. F., J.H. Webb, C.E. Thompson, and D. Knox. 1993. Spawning of escaped farmed Atlantic salmon (*Salmo salar*): hybridization of females with brown trout (*Salmo trutta*). Canadian Journal of Fisheries and Aquatic Sciences 50: 1986-1990.

Yurk H., and A.W. Trites. 2000. Experimental Attempts to Reduce Predation by Harbor Seals on Out-Migrating Juvenile Salmonids. Transactions of the American Fisheries Society 129: 1360-1366.

ANNEX 31

Council

CNL(04)35

NASCO – The Past, Present, and Future

(tabled by the United States)

CNL(04)35

NASCO – The Past, Present, and Future
(tabled by the United States)

The Formation of NASCO

The North Atlantic Salmon Conservation Organization (NASCO) was established under the Convention for the Conservation of Salmon in the North Atlantic Ocean which entered into force on 1 October 1983. A driving force behind the creation of NASCO was the existence of distant water commercial fisheries targeting mixed stocks of Atlantic salmon and the need for international cooperation to properly manage those fisheries. However, recognizing that there are a wide range of threats impacting Atlantic salmon throughout their migratory range, the objective of the Organization was more broadly defined to include the conservation, restoration, enhancement and rational management of salmon stocks and the acquisition, analysis and dissemination of scientific information.

Structure and Function

NASCO is composed of a Council, three regional Commissions and a Secretariat. In addition, 27 non-governmental organizations have observer status to NASCO and inter-governmental organizations and media representatives may also attend NASCO meetings. One of the primary functions of the Council is to provide a forum for the study, analysis, and exchange of information and for consultation and cooperation on matters concerning salmon stocks. The Rules of Procedure for the Council state that the President will convene regular annual meetings of the Council and Commissions. One of the functions of the regional Commissions is to provide a forum for consultation and cooperation on salmon stocks including the establishment of regulatory measures, including quotas. The regional Commissions are chaired by a member of one of the participating delegations whereas the Council is chaired by the President. In the initial years of NASCO, the primary focus of activities was in the Commissions where regulatory measures were debated and developed. In addition to this function, they provide a forum for exchange of information that is more regional in nature. As less time has been spent in the Commissions on regulatory measures, there has been more focus and activity within the Council. For example, Council activity in recent years has included all of the activity related to the Precautionary Approach, the International Atlantic Salmon Research Board, and the Aquaculture Liaison Group.

The Evolution of NASCO

In recent years, NASCO's scientific advisors at ICES have consistently delivered the message that there should be no commercial fishery for Atlantic salmon in international waters. The challenge has been to see how closely the Parties could agree to adhere to this advice in light of the status of the stocks while still recognizing the dependence of some Parties on salmon fishing. The NASCO Parties have, in some cases, not strictly adhered to the scientific advice provided by ICES. The extent to which the decisions and factors affecting the management decisions has been explicitly stated has varied among Commissions and years. In the case of the fishery at West Greenland, in some years the West Greenland Commission has adhered to the scientific advice and warnings by not agreeing to any commercial harvest quota, but has attempted to account for the needs of local communities by allowing an internal-use-only fishery to continue. The members of the West Greenland Commission have also cooperated in a scientific evaluation of this fishery to gain as much information as possible on the composition of the stocks in the mixed stock fishery and also to screen for any diseases.

Of significant disappointment has been the narrow range and scope of a response from the stocks to drastic management measures undertaken, especially in recent years. It was reasonably expected that with commercial fisheries greatly restricted, the stocks would respond and recovery would begin. It is clear at this time that the recovery will take much longer than initially anticipated and will require aggressive action on a number of threats to the species and its habitat. Under NASCO's broad objective, NASCO has sought to identify factors, other than fisheries, that could be adversely affecting Atlantic salmon stocks. In fact, at its 10-year review in 1995, the NASCO Parties identified the following new issues requiring further consideration: increased cooperation on freshwater issues such as pollution and habitat damage; how to adopt the Precautionary Approach; the Organization's working methods including its relations with non-government and inter-government organizations; global warming and its potential impact on salmon distribution; and the role NASCO could play in educating the young on salmon conservation and management issues. In venturing into these other areas, it is important to recognize that NASCO as a body does not have any regulatory authority within homewaters, and therefore the actions of NASCO must come in the form of guidelines which serve only as recommendations to the Parties.

Perhaps the most visible example of the evolution of NASCO's approach to stock management, is the focus on the adoption and implementation of the Precautionary Approach. In 1998, NASCO agreed to adopt and apply the Precautionary Approach to its work and in 1999 adopted an Action Plan for the Application of the Precautionary Approach. The action plan included the following components: management of North Atlantic salmon fisheries; socio-economic issues; unreported catch; scientific advice and research requirements; stock rebuilding programmes; introductions, transfers, aquaculture and transgenics; habitat issues; and by-catch. As this list illustrates, in agreeing to this action plan, NASCO has responded to the lack of recovery of salmon stocks by broadening its management approach to more holistically encompass the variety of threats salmon encounter throughout their migration. From 1999 – 2003, NASCO has tackled the difficult task of taking the commitments made in the action plan and developing specific implementation plans.

On the surface, the adoption of the Precautionary Approach by NASCO may not appear to have tangible benefits for Atlantic salmon protection and recovery. The concepts embodied in the Precautionary Approach are not new to management or conservation. The most important step NASCO Parties took, however, was to attempt to operationalize the Precautionary Approach. Rather than simply adopting the approach and making a broad and general commitment to it, the Parties went one step further and applied it to the work of the Organization. Specifically, the Parties developed, and are implementing, a decision structure for fishery management decisions that incorporates the Precautionary Approach. The Parties then identified the need for the development of a database on habitat to facilitate information exchange and monitoring on habitat conditions for Atlantic salmon. The Williamsburg Resolution was adopted as an effort to bring together all of the NASCO actions related to identifying and minimizing potential adverse risks to wild Atlantic salmon stocks from introductions and transfers of fish. Finally, the Parties are continuing to work on a structure that incorporates and considers socio-economic factors when making management decisions.

As the Parties gain and exchange more experience in implementing these plans and structures, it is expected that suggestions for improvement will be brought forward. These documents should be viewed as dynamic and continuously revisited and revised. It might also be appropriate to reexamine the action plan at this point to see if the products produced achieve the intended goal and if there are any other remaining issues to be addressed.

NASCO was able to make so much progress in adopting and implementing the Precautionary Approach because the extremely depressed status of the stocks demanded that managers analyze the threats to the species more holistically. The fact that saving salmon requires more than reducing or eliminating commercial fisheries provides a strong incentive to adopt a more broad-based approach to management. Parties had moved beyond the point of debating the science and reached agreement that the predictions of low abundance at sea and the low numbers of fish returning to home rivers to spawn demanded a conservative approach. NASCO and its Contracting Parties seized this opportunity to agree to key principles that would guide its decisions on allocations of harvestable surplus in the future when the stock status improved. In adopting the Precautionary Approach and applying it to its work, NASCO and its Contracting Parties have formally recognized that the foundation of any good decision-making is the articulation and understanding of the consequences (risks) of alternative choices. NASCO has asked its scientific advisors at ICES to present the status of the stocks and the management advice in a way that these consequences are transparent and has agreed to make decisions in a more risk-averse manner. For example, on the advice of ICES, NASCO has moved away from adopting management measures that provide only a 50% or less probability of achieving conservation goals. The Precautionary Approach encourages the collection of data necessary to fill in gaps in knowledge and this was a major driving force behind the significant improvement made by the EU in collecting data on salmon rivers with the goal of using this information to refine and improve the model used to calculate pre-fishery abundance at West Greenland. At NASCO's request, ICES also provided the consequences of various management options on the rate and success of rebuilding depleted stocks. While one could argue that these steps should have been implemented earlier by NASCO, the fact that an international fishery organization is asking these questions and is seriously considering the answers in making management decisions is a very significant accomplishment and tangible evidence of NASCO's commitment to the Precautionary Approach.

In recent years, NASCO has been increasingly looking beyond regulatory control of fishing to focus on improving the Parties collective understanding of threats that may be impacting salmon stocks and of measures that could be taken to avoid or minimize those threats. In 1994, NASCO expressed concern over potential impacts from commercial aquaculture on wild stocks of Atlantic salmon with the adoption of the *Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimize Impacts from Salmon Aquaculture on the Wild Salmon Stocks* (called the Oslo Resolution). Closely related interests between NASCO and the aquaculture industry also led to the formation of a Liaison Group between NASCO and the international salmon farming industry in 2000. Another threat NASCO identified as an area of concern was predators and prey. NASCO held a Special Session on this topic and has periodically requested updates from Contracting Parties on the state of knowledge and management actions to minimize adverse effects on predation on Atlantic salmon stocks and to increase prey. NASCO Parties have always shared a common desire to better understand the factors affecting the survival of salmon at sea and, in 2002, jointly sponsored a symposium with the International Baltic Sea Fishery Commission, International Council for the Exploration of the Sea, North Pacific Anadromous

Fish Commission and North Pacific Marine Science Organization to look for common factors affecting salmon stocks at sea. Work is currently underway to schedule a follow-up workshop in 2006. The limited response of stocks to drastic reductions in commercial fisheries again elevated the importance of understanding what other factors may be affecting salmon at sea. NASCO recognized the complexities involved in conducting research at sea and the resource demands of such studies. This recognition led to the creation of the International Atlantic Salmon Research Board to first create an inventory of ongoing and completed research on salmon at sea and then to attempt to solicit funds so that large-scale cooperative studies could be undertaken in an attempt to unlock the many mysteries of salmon at sea. Finally, under the Habitat Action Plan, NASCO Parties have agreed to populate a database with information on physical, biological and chemical factors that may be adversely affecting salmon stocks.

The Challenge and the Opportunity

As noted above, NASCO has taken bold steps forward in broadening its concern to encompass a wide range of factors that could affect salmon and their habitat. Ultimately the effectiveness of the guidance provided by NASCO on habitat, aquaculture, stock rebuilding and stocking issues depends on the strength of the commitment made by NASCO Parties in fulfilling the actions identified and in reporting these back to NASCO. Implementing these action plans and items is no small undertaking and requires a firm commitment of resources by the NASCO Parties. Reporting on actions undertaken to protect and restore habitat is more complicated than reporting back on a fishery. It has and will take some trial and error for the NASCO Parties to determine the best way to provide information back in a concise but meaningful manner. Part of the difficulty arises from the dual purposes of reporting. On the one hand, Parties report on actions they have taken to demonstrate a commitment to the resource and a real contribution in terms of sharing the burden of recovery. The other equally valuable component of reporting back is to share information and expertise with the other Parties that might be experiencing similar challenges. For example, all of the Parties face the problem of passing fish around barriers such as dams and a great deal could be learned by hearing of obstacles faced and solutions implemented. Generally speaking, current reporting procedures do not lend themselves to the type of technology and expertise transfer that would have great benefit to the Parties, and ultimately to salmon. Perhaps a Special Session or workshop format would be an appropriate format to achieve meaningful information transfer.

NASCO has demonstrated its utility as a forum to promote the conservation, restoration, enhancement and rational management of salmon stocks. It has facilitated international cooperation, including the acquisition, analysis and dissemination of scientific information. It is perhaps easiest to gauge NASCO's effectiveness in this area where it has the most influence – in setting regulatory measures. NASCO has succeeded in providing a forum for these discussions and debates within the Commissions where Parties have agreed management measures. In areas other than fishery regulation, the Council and Commissions have provided a forum for the exchange of information and for consultation and cooperation on matters affecting salmon stocks. New relationships and structures have been created to explore those areas further such as the use of Special Sessions, creation of the Standing Committee on the Precautionary Approach, the Aquaculture Liaison Group and the International Atlantic Salmon Research Board. When evaluating the effectiveness of NASCO in these areas, it is important to recall that the Council and Commissions can only make recommendations and not require actions on these issues.

NASCO – THE NEXT 20 YEARS

As noted above, in recent years, due to the extremely depleted status of Atlantic salmon stocks range wide, there has been little if any harvestable surplus to debate and allocate at NASCO. The importance of international cooperation is never greater than when the stocks are in such poor condition. Many of the Contracting Parties are experiencing very low returns despite extreme measures to protect and restore habitat and increase runs through stocking programmes. In some countries, salmon stocks have been designated as endangered or otherwise deserving of added protection. As individual countries attempt to rebuild and recover salmon populations, the more we can pool our knowledge and collaborate on efforts to identify threats and effective mitigation measures, the greater our chances of successful salmon recovery. NASCO was created to serve this exact need. It has and can play a vital role in facilitating the effort to unravel the mystery of salmon survival and mortality.

In order to increase the efficiency and effectiveness of NASCO in achieving its objectives, the Contracting Parties need to be flexible and adaptive. Given the depleted status of wild Atlantic salmon stocks across their range, the importance of international cooperation to identify causes of salmon decline and effective strategies to improve stock status cannot be overstated. For the next few years, projections indicate that the stock status is unlikely to dramatically improve and therefore the attention on multiple threats needs to continue and intensify. It follows then that the major focus of NASCO actions over the coming years should be the development of ecosystem-based strategies to improve Atlantic salmon stocks and their habitats. In 1998, NASCO and its Contracting Parties agreed to adopt and apply a Precautionary Approach to the conservation, management and exploitation of salmon in order to protect the resource and preserve the environments in which it lives. Additional work is needed on stock rebuilding guidelines and monitoring implementation of other guidelines and resolutions. Given the change in emphasis, it may be appropriate to reexamine the way in which NASCO carries out its work so that the potential to achieve this goal is maximized.

Although in recent years NASCO has spent a greater amount of time on these non-regulatory measures, often they have been dealt with on the margins of the Annual Meeting, during intersessional meetings and/or through separate committees and working groups. Many of these groups meet intersessionally requiring greater resources to travel and participate in additional meetings. Also, there are a number of ad-hoc working groups that are created during the Annual Meeting and during intercessional meetings to tackle specific tasks. Perhaps thought should be given to restructuring the annual meeting so that more time can be spent on development of broader-based strategies. The traditional manner in which the Council and Commission meetings have been run has been more formal and less conducive to detailed information exchange and technology transfer.

Recommendations

In light of the observations noted above, the U.S. offers the following recommendations:

- Restructure the format of the Annual Meeting to improve the efficiency and effectiveness of the Organization.

- Improve the interaction between scientists and managers and between the Parties and non-governmental organizations. NASCO Parties are accustomed to asking ICES for advice on fishery management measures, but asking for scientific information on factors other than fisheries and then taking action on the basis of that data is relatively new to the NASCO Parties.

- Create a Working Group to plan an experimental new approach for the structure and content of an Annual Meeting designed around the further implementation of an ecosystem-based strategy. The group could consider an alternate meeting structure where every other year the meeting agenda would be similar to the historical format and in alternate years could focus on non-regulatory measures and be arranged in a workshop format. The working group could solicit ideas on the structure and content for the alternate meeting from the Parties, non-governmental organizations and other interested parties and work over the course of the next year to make a proposal for consideration at the 2005 Annual NASCO Meeting.

ANNEX 32

CNL(04)47

Terms of Reference - Working Group on Next Steps for NASCO

A Working Group will be established on the Next Steps for NASCO; the objectives are to:

- Identify the challenges facing NASCO in the management and conservation of the wild Atlantic salmon, with particular reference to Article 3 of the Convention;
- Identify ways to address these challenges, specifically highlighting areas which would benefit from international cooperation and collaboration;
- Conduct a review of the management and organizational structure of NASCO, specifically focusing on its ability to meet current salmon management challenges and flexibility to address future issues; and
- Discuss the current procedural aspects of NASCO and the relationship between the Organization, its Parties and stakeholders.

The Working Group will consist of designated representatives from each of the Contracting Parties and will be Chaired by Mr Steinar Hermansen (Norway). It will seek advice, as appropriate, from its accredited NGOs and other stakeholders.

The Working Group will organize and convene a consultative meeting with stakeholders. Following this consultative process, the Group will summarise the input it has received. This summary will be made available to the stakeholders.

The Working Group will develop options and recommendations on the Next Steps for NASCO to be considered by the Organization at its Twenty-Second Annual Meeting.

ANNEX 33

CNL(04)49

Press Release

Twenty-First Annual Meeting
Reykjavik, Iceland
June 7 - 11, 2004

At 20 Years
Leading Wild Atlantic Salmon Conservation Organization
Looks To The Challenges Of Its Future

> "To conserve the King of Fish, NASCO is taking a key step to remain at the forefront of fisheries management, reflecting contemporary developments in the best science, management practices and international cooperation."
>
> **- Jacque Robichaud, President of NASCO**

The North Atlantic Salmon Conservation Organization (NASCO), an intergovernmental organization formed to promote the conservation, restoration, enhancement, and rational management of salmon stocks in the North Atlantic Ocean, met from 7 to 11 June 2004, in Reykjavik, Iceland. Its members are Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, the Russian Federation, and the United States of America.

On the occasion of the 20th Anniversary of the Organization, NASCO committed itself to the development of a dynamic and new vision. Building on its successes to-date and recognizing the urgent need to take action, NASCO will review its capability of addressing the major challenges facing the Organization in the future management and conservation of the wild Atlantic salmon. NASCO's work must reflect contemporary developments in science, management practices and international cooperation. This fundamental review will include wide consultation with accredited NGOs and other stakeholders. To ensure a comprehensive and inclusive process, a major consultative meeting is planned for early 2005. The review will ensure that NASCO remains at the forefront of international fisheries management and is fully responsive to the needs of the wild salmon and to the interests of all stakeholders.

Despite significant and constructive international cooperation and improvements in salmon fisheries management, the abundance of stocks of salmon in the last two decades has declined markedly, to critical levels in some areas. Wild Atlantic salmon face a wide range of threats in the course of their epic migrations from the rivers to the seas and back again. There is a clear need to ensure that NASCO, as an organization, is fully equipped to address the many challenges these threats pose to the future of wild salmon.

In the area of fisheries management, NASCO remains a leader among international fisheries organizations in its commitment to the Precautionary Approach, a responsible risk-averse strategy for resource management. NASCO Parties have now completed the process of drafting all the implementing guidelines for the Precautionary Approach in respect to the management of wild Atlantic salmon. To this end, they have initiated the process of reporting on the progress on the implementation of the key guidelines. As part of the completion of this process, in 2004, NASCO examined the application of the Precautionary Approach in relation to socio-economic factors in salmon management.

The International Atlantic Salmon Research Board (IASRB) had been established to direct and coordinate a programme of research to identify and explain the causes of marine mortality. The Board has updated its inventory of research; it has estimated the cost of ongoing essential research at some £4.3 million. NASCO Parties have contributed or pledged an additional £180,000. The IASRB continues to seek additional contributions from private companies, governments, organizations and individuals with an interest in wild Atlantic salmon conservation.

NASCO Parties recognized the continuing sacrifices made by Greenland fishermen in agreeing to halt commercial fisheries at West Greenland for 2004. There is an ongoing requirement to meet subsistence needs and this is also recognised. With respect to the Faroe Islands fishery, NASCO acknowledged the restraint demonstrated by the Faroe Islands in not having had a commercial salmon fishery for a number of years. However, it was not possible to agree on specific management measures as per the Convention to control the fishery in 2005. Nevertheless, in the event of a fishery, the Faroe Islands have agreed to take internal management decisions on the basis of current ICES advice. France (in respect of St. Pierre and Miquelon), the only party catching Atlantic salmon although not a member of NASCO, has recently committed to enhancing its cooperation with the Organization by continuing its research programme on the St. Pierre and Miquelon fishery.

There were representatives from 12 non-governmental organizations (NGOs) attending the meeting. Two new NGOs were accredited to the Organization in 2004. The NGOs continued to participate in the work of the NASCO in a positive and active manner.

Dr Ken Whelan from the European Union was elected as President of NASCO for a period of two years. Mr Arni Isaksson from Iceland was elected as Vice-President. Mr Jacque Robichaud from Canada stood down as President after four years but has been asked to remain with the Organization as a Special Advisor to NASCO and Chairman of the IASRB. The Council unanimously expressed its great gratitude to Mr Robichaud for his outstanding work for the Organization.

The next Annual Meeting of NASCO will be held from 6 to 10 June 2005 in Vichy, France.

The report of the NASCO Annual Meeting, including the annexed documents, as well as other essential information on the Organization, can be accessed at the NASCO website: www.nasco.int.

For more information on NASCO, contact:

Dr Malcolm Windsor
Secretary
11 Rutland Square
Edinburgh, Scotland
EH1 2AS

Tel. (+44-131) 228-2551
Fax (+44-131) 228-4384
e-mail hq@nasco.int

For more information on the IASRB, contact:

Dr Malcolm Windsor
Secretary of NASCO
11 Rutland Square
Edinburgh, Scotland
EH1 2AS

www.salmonatsea.com

Tel. (+44-131) 228-2551
Fax (+44-131) 228-4384
e-mail hq@nasco.int

ANNEX 34

CNL(04)0

List of Council Papers

Paper No.	Title
CNL(04)0	List of Council Papers
CNL(04)1	Provisional Agenda
CNL(04)2	Explanatory Memorandum on the Agenda
CNL(04)3	Draft Agenda
CNL(04)4	Draft Schedule of Meetings
CNL(04)5	Not issued
CNL(04)6	Secretary's Report
CNL(04)7	Report of the Finance and Administration Committee
CNL(04)8	Report on the Activities of the North Atlantic Salmon Conservation Organization in 2003
CNL(04)9	Report of the ICES Advisory Committee on Fishery Management
CNL(04)10	Catch Statistics - Returns by the Parties
CNL(04)11	Historical Catch Record 1960-2003
CNL(04)12	Report of the Third Meeting of the International Atlantic Salmon Research Board
CNL(04)13	Request for Scientific Advice from ICES
CNL(04)14	Returns under Articles 14 and 15 of the Convention
CNL(04)15	Report on Progress with Application of the Decision Structure for Management of North Atlantic Salmon Fisheries
CNL(04)16	Reports on Progress with Development and Implementation of Habitat Protection and Restoration Plans
CNL(04)17	Report on Progress with the Development of a Database of Salmon Rivers
CNL(04)18	The Williamsburg Resolution

CNL(04)19	Returns Made in Accordance with the Williamsburg Resolution
CNL(04)20	Liaison with the Salmon Farming Industry
CNL(04)21	Unreported Catches - Returns by the Parties
CNL(04)22	Report of the Working Group on Stock Rebuilding Programmes
CNL(04)23	Report of the Technical Workshop on Development of a Decision Structure for Incorporating Social and Economic Factors into Management Decisions under a Precautionary Approach
CNL(04)24	Future Actions in Relation to Application of the Precautionary Approach
CNL(04)25	Predator-Related Mortality
CNL(04)26	St Pierre and Miquelon Salmon Fishery
CNL(04)27	Summary of Council Decisions (Revised Version)
CNL(04)28	Draft Report
CNL(04)29	Return of Information by EU (Spain)
CNL(04)30	Application for NGO Status to NASCO by WWF (France)
CNL(04)31	Predator-Related Mortality (tabled by the United States)
CNL(04)32	A New Regulation for the Protection of Wild Atlantic Salmon (a paper presented by Iceland)
CNL(04)33	Report of the Russian Federation on Application of the Decision Structure for Management of Salmon Fisheries
CNL(04)34	Russian Studies of Distribution and By-Catch of Atlantic Salmon Post-Smolts in the Norwegian Sea in 2003
CNL(04)35	NASCO - The Past, Present and Future (tabled by the United States)
CNL(04)36	Decision Structure to Aid the Council and Commissions of NASCO and the Relevant Authorities in Implementing the Precautionary Approach to Management of North Atlantic Salmon Fisheries – UK (England and Wales)
CNL(04)37	Conservation, Restoration and Rational Management of Atlantic Salmon under the Precautionary Approach – Aquaculture, Introductions and Transgenics – Proposal for a Workshop to Assess Current and Developing Methods for Marking Farmed Atlantic Salmon (tabled by the European Union)
CNL(04)38	NASCO Atlantic Salmon Rivers Database Project: Clarification of Potential Uses and Recommendations for Next Steps

CNL(04)39	Template for Bioeconomic Modelling and Pilot Project (tabled by the United States)
CNL(04)40	Presentation by ICES to NASCO
CNL(04)41	NASCO Guidelines for Action on Transgenic Salmonids
CNL(04)42	Progress with the Development and Implementation of Habitat Protection and Restoration Plans (tabled by the European Union)
CNL(04)43	The Role of NASCO in Developing a Bioeconomic Model and a Proposal for a Pilot Project (tabled by the United States)
CNL(04)44	Tagging of Post-smolts North of the Faroes in 2003 (tabled by Denmark (in respect of the Faroe Islands and Greenland))
CNL(04)45	Sampling of Post-smolts and Pre-adults of Atlantic Salmon in 2003. Report from Norway (tabled by Norway)
CNL(04)46	Draft Press Release
CNL(04)47	Terms of Reference - Working Group on Next Steps for NASCO
CNL(04)48	Council Agenda Item 9: The Future of NASCO - NGO Comments on Proposal from the Parties
CNL(04)49	Press Release
CNL(04)50	Report of the Twenty-First Annual Meeting of the Council
CNL(04)51	Agenda
CNL(04)52	Decisions in Relation to the Staff Rules and to the Staff Fund Rules
CNL(04)53	Report of the Special Session on the Management of Homewater Fisheries
CNL(04)54	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 (Adopted at the Twentieth Annual Meeting of NASCO in June 2003 and amended at the Twenty-First Annual Meeting in June 2004)
CNL(04)55	NASCO Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks
CNL(04)56	2005 Budget, 2005 Forecast Budget and Schedule of Contributions

CNL(04)57	Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach
CNL(04)70	Joint Supplementary Statement on behalf of the NASCO NGOs
CNL(04)71	Statement by the Salmon Net Fishing Association of Scotland
CNL(04)72	NGO Questions at the Special Session on Homewater Fisheries

Note: This is a listing of all the Council papers. Some, but not all, of these papers are included in this report as annexes.