1999

SIXTEENTH
ANNUAL MEETING

WESTPORT, IRELAND

7-11 JUNE 1999

President:	Mr Einar Lemche (Denmark (in respect of the Faroe Islands and Greenland))
Vice-President:	Mr Ole Tougaard (European Union)
Secretary:	Dr Malcolm Windsor

CNL(99)47

CONTENTS

PAGE

CNL(99)47

Report of the Sixteenth Annual Meeting of the Council 7-11 June 1999, Westport, Ireland

1. Opening Session

1.1 The President, Mr Einar Lemche, opened the meeting, welcomed delegates to Westport and made an opening statement on the work of the Organization (Annex 1).

1.2 Mr Maurice Mullen, on behalf of the Department of the Marine, welcomed delegates to Ireland and wished them an enjoyable and productive meeting.

1.3 The representatives of Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, the Russian Federation and the United States of America made opening statements (Annex 2).

1.4 An opening statement was made jointly on behalf of all Non-Government Organizations (NGOs) attending the Annual Meeting. In addition, opening statements were made by the Atlantic Salmon Federation, the Atlantic Salmon Trust, the European Anglers Alliance, the Federation of Irish Salmon and Sea-Trout Anglers, the Institute of Fisheries Management, the National Anglers Representative Association, the Salmon Net Fishing Association of Scotland, and the Ulster Angling Federation. These opening statements are contained in Annex 3.

1.5 The President expressed appreciation to the Parties and to the NGOs for their statements and closed the Opening Session.

1.6 A list of participants is given in Annex 4.

2. Adoption of Agenda

2.1 The Council adopted its agenda, CNL(99)39 (Annex 5).

3. Administrative Issues

3.1 Secretary's Report

The Secretary made a report to the Council, CNL(99)5, on the status of ratifications and accessions to the Convention, membership of the regional Commissions, applications for observer status at the 1999 meeting, the Tag Return Incentive Scheme, a possible joint meeting with the North Pacific Anadromous Fish Commission (NPAFC) and the International Baltic Sea Fishery Commission (IBSFC), the FAO meeting of regional fisheries organizations, the Eleventh ICES Dialogue Meeting, the Organization's financial affairs, Year 2000 compliance, the Headquarters Property and the new Scottish Parliament.

The Secretary reported, CNL(99)34, that since the last Annual Meeting, the Coomhola Salmon Trust Limited had been granted observer status.

The Council decided that at its next meeting it would review the relationship with its observer organizations including the question of an observer fee to reflect actual costs. The Secretary was asked to produce a discussion paper on this issue.

In accordance with Financial Rule 5.5, the Secretary reported on the receipt of contributions for 1999. Contributions had been received from all Parties except the Russian Federation.

At its Fifteenth Annual Meeting, in response to an informal proposal from representatives of the NPAFC, the Council had agreed that there would be benefits from a joint meeting with NPAFC and IBSFC which should include sessions on the scientific aspects and on the application of the Precautionary Approach to salmon management. The IBSFC had also agreed to participate in a joint meeting, but the NPAFC, while agreeing on the desirability of such a meeting, felt that more time was needed to agree the details of the meeting and to arrange appropriate speakers. These aspects will be considered by NPAFC at its Seventh Annual Meeting in October 1999. The Council asked the Secretary to continue to liaise with NPAFC and IBSFC so as to progress the arrangements and to report back to the Parties.

The Council recognised that there could be benefits to a joint meeting of all the North Atlantic Fisheries Commissions (i.e. NASCO, ICCAT, NEAFC and NAFO) to discuss issues of mutual interest such as the Precautionary Approach, control and enforcement schemes and data collection. ICES and IBSFC might also be invited to participate. The Head of the EU Delegation and the Secretary were asked to liaise with these Organizations on this matter.

3.2 NASCO Website

The Council agreed to the establishment of a NASCO website to include a brief background to the Organization, the NASCO Convention, the Report on the Activities of the Organization, the Press Release, a list of available publications, the Organization's Resolutions and Guidelines and the ACFM report from ICES, possibly through a link to the ICES website. The Council asked the Secretary to examine the work required and costs involved in making the Organization's databases suitable for, and available on, the website.

3.3 New NASCO Handbook

The Council agreed that the NASCO Handbook should be reprinted in its present format and that the Organization's Resolutions, Agreements and Guidelines should be collated in A5 ring binder format so as to facilitate updating as new resolutions and guidelines are adopted or existing documents amended.

3.4 Report of the Finance and Administration Committee

The Chairman of the Finance and Administration Committee, Dr Jean-Pierre Plé, presented the report of the Committee, CNL(99)8. Upon the recommendation of the Committee the Council took the following decisions:

(a) to accept the audited 1998 annual financial statement, FAC(99)2;

(b) to accept a schedule for the payments to ICES during the period 1999-2001 and to adopt a Memorandum of Understanding (MoU) with ICES. The President was asked to sign the MoU on behalf of the Organization. There were significant increases in payments to ICES and the Council stressed the need for stability in future payments to ICES under any subsequent MoU and the urgent need for ICES to address the question of timeliness of the advice. The Secretary was asked to convey these concerns to ICES;

(c) to adopt a budget for 2000 and to note a forecast budget for 2001, CNL(99)40 (Annex 6);

(d) to appoint PricewaterhouseCoopers of Edinburgh as auditors for the 1999 accounts;

(e) to adopt the report of the Finance and Administration Committee. It was agreed, however, that with regard to the proposal from the Committee to circulate telephone and fax numbers and e-mail addresses, such details should be restricted to an exchange of information between representatives;

(f) to ask the Secretary to prepare a discussion paper on how the issues raised by Iceland on the calculation of the contributions might be resolved without amending the Convention.

The President thanked Dr Plé for his valuable work and for that of the Committee.

3.5 Reports 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 1998, CNL(99)9.

The Council agreed to publish a Report on the Activities of the Organization in 1998/99. This report will be agreed by correspondence with Heads of Delegations after the Sixteenth Annual Meeting.

3.6 Announcement of the Tag Return Incentive Scheme Grand Prize

The President announced that the draw for the Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 31 May. The winner of the $2500 Grand Prize was Mr Borge Tronstad, Mandal, Norway. The Council offered its congratulations to the winner.

4. Scientific, Technical, Legal and Other Information

4.1 Scientific Advice from ICES

The representative of ICES presented the report of the Advisory Committee on Fishery Management (ACFM) to the Council, CNL(99)12 (Annex 7).

4.2 Report of the Standing Scientific Committee

The Chairman of the 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(99)46 (Annex 8).

4.3 Catch Statistics and their Analysis

The Secretary introduced a statistical paper presenting the official catch returns by the Parties for 1998, CNL(99)14 (Annex 9), and historical data for the period 1960-1998, CNL(99)15. The statistics for 1998 are provisional and will be updated by the Parties.

4.4 Review of International Salmon-Related Literature Published in 1998

The Council took note of a review of the literature concerning Atlantic salmon published during 1998, CNL(99)16, which had been prepared in accordance with Article 13, paragraph 2 of the Convention.

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

5.1 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(99)17 (Annex 10).

The representative of Norway tabled a summary, CNL(99)32, of the report of the Norwegian Wild Salmon Committee. The Committee had been appointed by Royal Decree to review the overall situation facing the wild stocks in Norway and to present proposals for management strategies and action programmes. He invited comments from the Parties by 1 October on the recommendations in the report.

5.2 Adoption of an Action Plan for Application of the Precautionary Approach

At the Fifteenth Annual Meeting, NASCO and its Contracting Parties had agreed to adopt and apply a Precautionary Approach to the conservation, management and exploitation of Atlantic salmon in order to protect the resource and preserve the environments in which it lives. The Council had agreed a Preliminary Draft Action Plan and it had been agreed that a Working Group should further refine the Plan, taking into account the Council's Agreement on Adoption of a Precautionary Approach, proposing methods and detailed terms of reference for achieving the aims of the Draft Action Plan. During the year, the work in further developing the Draft Action Plan, CNL(99)18, had been completed by correspondence.

The Council adopted an Action Plan for Application of the Precautionary Approach to Salmon Management, CNL(99)48 (Annex 11).

The Council agreed that the Standing Committee on the Precautionary Approach (SCPA) would arrange a meeting on Application of a Precautionary Approach to Salmon Fisheries Management and report back to the Council at its Seventeenth Annual Meeting.

5.3 Unreported Catches

The Council expressed continuing concern about the high level of estimated unreported catches and emphasised the need to take stronger measures to minimise the level of such catches. The Secretary had been asked to request, on an annual basis, from each Contracting Party:

1) a description of its management control and reporting systems by country;
2) an explanation of how it arrives at the figure for unreported catch;
3) the extent of catch and release fishing;
4) the measures taken to further minimise the level of unreported catches.

The Secretary introduced document CNL(99)19 (Annex 12) which included the information provided by the Parties. The returns indicate that all Parties make considerable efforts to obtain detailed and accurate catch statistics from the salmon fisheries, but despite this, catches may be unreported for a number of reasons. Illegal fishing appears to be a particular problem for a number of Parties.

The Council recognised a number of discrepancies in the returns by the Parties. It was agreed that, in future, the Parties would also be asked for an estimate of unreported catch for each country. Norway was able to indicate that the proportion of its catch thought to be unreported was 35%. The figure for all countries should be broken down to show the different categories of the unreported catch, indicating whether they result from legal or illegal activities. The Secretary was asked to amend the format for return of information to include these additional questions. It was agreed that the responses to the request for information should be provided to the Secretariat by 1 February annually. The Secretariat would then have a period of one month to develop a first draft of the Council paper which would be submitted to the Parties by 1 March. Comments on this first draft would then be returned to the Secretariat by 1 April and the final paper would be issued by 1 May. It was, however, recognised that some Parties might not have the information available by 1 February but should make it available to the Secretariat at the earliest opportunity.

5.4 By-catch of Atlantic Salmon

At its Fourteenth Annual Meeting the attention of the Council was drawn to the enormous growth of fishing for pelagic species of fish in the North-East Atlantic Commission area, principally for herring and mackerel in ICES Division IIa. The concern had been raised that, even if a very small percentage of the catch in these fisheries is salmon post-smolts, the losses could be significant. Last year the Council had recognised that it needed further information on the possible by-catch of salmon in pelagic fisheries and asked that the Contracting Parties provide any available

information. The Secretary reported, CNL(99)20 (Annex 13), that information had been provided by the Russian Federation and the USA. Information provided by ICES suggests that the fishery with the greatest potential for catching post-smolts is probably the trawl fishery for mackerel but the representative of Iceland referred to anecdotal historical information from the purse-seine fishery for Atlanto-Scandian herring which suggested that there was a by-catch of salmon in this fishery. The representative of Iceland agreed to make this information available to the Secretariat. The Council was advised of a proposed collaborative project between PINRO, Russia and the Faroese Fisheries Laboratory to investigate the by-catch of salmon in herring and mackerel fisheries during 1999. The Council asked that the Secretary again contact the Contracting Parties to request any available information on by-catch.

5.5 **Fishing for Salmon in International Waters by Non-Contracting Parties**

The Secretary presented a report, CNL(99)21, describing actions taken in relation to the Resolution on Fishing for Salmon on the High Seas. There have been no sightings since February 1994 but there have been few surveillance flights over the winter and spring period. The Council asked the Secretary to continue to liaise with the Northwest Atlantic Fisheries Organization (NAFO) and the North-East Atlantic Fisheries Commission (NEAFC) with a view to obtaining relevant information on sightings. The Secretary was also asked to take action in relation to any future sightings.

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

The Secretary introduced document CNL(99)22 which summarised actions taken since the last annual meeting. Reports on the research conducted during 1998 by Canada, EU (Scotland) and Norway will be made available to the Secretariat for distribution to the Parties.

5.7 **Impacts of Aquaculture on Wild Salmon Stocks**

(a) Special Liaison Meeting to Review Measures to Minimise Impacts of Aquaculture on the Wild Stocks

The Council held a Special Liaison Meeting at which there were presentations by Canada and Norway on the measures taken to minimise the impacts of salmon aquaculture on the wild stocks. The Council confirmed that there would be a second Special Liaison Meeting on Aquaculture at the 2000 meeting. The presentations would be made by the European Union.

(b) Returns made in Accordance with the Oslo Resolution

The Secretary presented a report, CNL(99)24 (Annex 14), on the returns made in accordance with Article 5 of the Oslo Resolution. The Council noted that the new reporting procedure adopted in 1998 had resulted in more comprehensive returns. The Council asked the Secretary to review the format for returns under the Oslo Resolution so as to identify any ambiguity and to make any necessary improvements.

The representative of the European Union tabled a document concerning aquaculture in Finland, CNL(99)42 (Annex 15).

(c) Pros and Cons of the Use of Sterile Salmon in Aquaculture

The Secretary presented a report on the use of sterile salmon in aquaculture, CNL(99)25 (Annex 16).

The Council agreed that, in line with the Oslo Resolution, there was a need for further research in order to assess the possible contribution sterile salmon might make to containment and for further development work to determine if their use in aquaculture would be practical. The Council agreed that this issue might be raised in the Wild and Farmed Salmon Liaison Group at a future date. In this regard, the Secretariat should prepare a background paper considering the wider aspects associated with the use of sterile salmon in aquaculture.

(d) Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group

The Secretary presented a report, CNL(99)26 (Annex 17), of the second meeting of the Liaison Group between NASCO and the International Salmon Farmers' Association (ISFA). At this meeting, Terms of Reference had been agreed for a Working Group on Salmon Farming Practices to Minimise Impacts on the Wild Salmon. However, the ISFA representatives present did not have a mandate to commit the other ISFA members to the development of guidelines. It had been the intention of the Liaison Group that representatives of ISFA and the NASCO Secretariat would produce a first draft of guidelines by 1 February 1999 and that the Working Group should meet in early March to develop guidelines for appropriate measures to improve physical containment and husbandry practices in salmon farming which would minimise impacts on wild stocks and be internationally acceptable both to the salmon farming industry and to NASCO Parties. That meeting had not taken place.

The Secretary reported that he had been unable to make progress through the ISFA. Moreover, not all aquaculture industries represented by the NASCO Parties were members of ISFA. He suggested that the liaison needed a new start, a focus on salmon aquaculture industries in the North Atlantic and to broaden its base further than the ISFA. He also referred to an approach from a representative of the ISFA, CNL(99)36, inviting the President and Secretary to a meeting in Norway.

Following this encouraging letter the Council agreed that it wished to revise the process of liaison with the aquaculture industry so as to develop closer, more open and broader cooperation so that the industry throughout the North Atlantic can participate. This did not mean that the Council did not wish to maintain its link with the ISFA. It was agreed that NASCO would accept the invitation to meet with the ISFA in August and while this meeting will be largely for information the Contracting Parties could be invited to participate. Following this meeting the aim would be to organise a new liaison meeting

early in the year 2000. This liaison meeting will focus on the development of Guidelines on Physical Containment and Husbandry Practices and other relevant issues may be included on the agenda.

(e) Development of Guidelines on Physical Containment Measures and Husbandry Practices for Salmon Farming

The Secretary presented a report indicating that there had been no progress on the development of guidelines on physical containment measures and husbandry practices for salmon farming, CNL(99)27.

(f) Transgenic Salmon

At its Fourteenth Annual Meeting the Council had expressed its concerns about the risks posed by transgenic salmon and had adopted NASCO Guidelines for Action on Transgenic Salmon, designed to prevent impacts on the wild stocks. Under these guidelines the Parties agreed to advise the Council of any proposal to permit the rearing of transgenic salmonids, providing details of the proposed method of containment and other measures to safeguard the wild stocks.

(g) Implementation of the Oslo Resolution

At its Fifteenth Annual Meeting the Council had considered the Report of the Working Group on Implementation of the Oslo Resolution, CNL(98)27. The Council had adopted all of the recommendations and had asked the Secretary to prepare a document containing both the Oslo Resolution and the new recommendations. It had been agreed that the document should also refer to the Organization's other Resolutions and Guidelines concerning introductions and transfers and transgenic salmon. The Council adopted the Agreement on Implementation of the Oslo Resolution, CNL(99)28 (Annex 18), and asked that this be included in the handbook of resolutions/guidelines.

5.8 **Special Session on Habitat Issues**

The Council held a Special Session on Habitat Issues which included a Review of Freshwater Habitat Issues in Relation to Atlantic Salmon and reports from North America and Europe on measures to conserve, restore and enhance habitat.

5.9 **Guidelines on Stocking**

The Secretary reported that, due to other commitments, and because of ongoing initiatives in relation to the Precautionary Approach, e.g. consideration of stock rebuilding programmes which are of relevance to the question of stocking, it was proposed that the Guidelines on Stocking be considered at a later stage.

5.10 **Reports on Conservation Measures Taken by the Three Regional Commissions**

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

6. Other Business

6.1 At the request of the North American Commission the Council asked the Secretary to write to the French authorities expressing concern about the increased level of salmon catches at St Pierre et Miquelon in 1998.

7. Date and Place of Next Meeting

7.1 The Council agreed to hold its Seventeenth Annual Meeting in Miramichi, Canada, from 5-9 June 2000.

7.2 The Council agreed to hold its Eighteenth Annual Meeting from 4-8 June 2001, either in Edinburgh or elsewhere at the invitation of a Party.

8. Draft Report of the Meeting

8.1 The Council agreed the draft report of the meeting, CNL(99)33.

9. Draft Press Release

9.1 The Council adopted a press release, CNL(99)45 (Annex 19).

NOTE: The Annexes mentioned above begin on page 21, following the French translation of the report of the meeting.

CNL(99)47

Compte rendu de la Seizième réunion annuelle du Conseil 7-11 juin 1999, Westport, Irlande

1. Séance d'ouverture

1.1 Le Président, M. Einar Lemche, a ouvert la conférence, souhaité la bienvenue à Westport aux délégués et a prononcé une déclaration d'ouverture portant sur le travail de l'Organisation (annexe 1).

1.2 Au nom du Service de la marine, M. Maurice Mullen a souhaité la bienvenue en Irlande aux délégués et a espéré que la réunion serait à la fois agréable et fructueuse.

1.3 Les représentants du Canada, du Danemark (pour les îles Féroé et le Groenland), de l'Union Européenne, de l'Islande, de la Norvège, de la Fédération de Russie, et des Etats-Unis d'Amérique ont prononcé leur déclaration d'ouverture (annexe 2).

1.4 Les représentants des organisations non gouvernementales (ONG) présents à la réunion annuelle ont prononcé leur déclaration d'ouverture conjointement. Les organisations ci-dessous ont également prononcé leur déclaration d'ouverture (annexe 3) : la Fédération du saumon atlantique, le Trust du saumon atlantique, l'Alliance européenne des pêcheurs à la ligne, la Fédération des pêcheurs à la ligne de saumons et de truites de mer d'Irlande, l'Institut de gestion des pêcheries, l'Association nationale représentant les pêcheurs à la ligne, l'Association écossaise de la pêche du saumon au filet et la Fédération des pêcheurs à la ligne d'Ulster.

1.5 Le Président a exprimé sa reconnaissance aux Parties et aux ONG pour leurs déclarations et a clos la séance d'ouverture.

1.6 Une liste des participants figure en annexe 4.

2. Adoption de l'ordre du jour

2.1 Le Conseil a adopté son ordre du jour, le document CNL(99)39 (annexe 5).

3. Questions administratives

3.1 Rapport du Secrétaire

Le Secrétaire a rendu compte au Conseil, de par son rapport CNL(99)5, des questions suivantes : état d'avancement des ratifications et des adhésions à la Convention, nombre des adhérents aux Commissions régionales, demandes d'obtention du statut d'observateur à la réunion de 1999, programme d'encouragement au retour des marques, réunion éventuelle avec la Commission des poissons anadromes du Pacifique nord (CPAPN) et la Commission Internationale des Pêches de la mer Baltique (CIPMB), réunion entre l'OAA et les organisations de pêche régionales,

onzième réunion-débat du CIEM, état financier de l'Organisation, conformité An 2000, propriété du siège, et nouveau Parlement écossais.

Le Secrétaire a indiqué (CNL(99)34) qu'à la suite de la dernière réunion annuelle la société anonyme Coomhola Salmon Trust avait reçu le titre d'observateur.

Le Conseil a convenu d'étudier la nature des relations avec les organismes présents en tant qu'observateurs au cours de sa prochaine réunion, et d'envisager notamment l'introduction d'un tarif d'observateur fixé en fonction des coûts réels. Le Secrétaire a été prié de préparer un avant-projet à ce sujet.

Conformément à l'article 5.5 du règlement financier, le Secrétaire a rendu compte des contributions versées pour 1999. Les Parties avaient toutes envoyé leurs contributions, à l'exception de la Fédération de Russie.

Lors de sa Quinzième réunion annuelle, et pour répondre à une proposition faite par les représentants du CPAPN, le Conseil avait convenu qu'il serait utile de tenir une réunion conjointe avec la CPAPN et la CIPMB. Il avait été recommandé que cette réunion propose des séances réservées aux aspects scientifiques de l'approche préventive ainsi qu'à sa mise en application dans le cadre de la gestion du saumon. La CIPMB avait accepté de participer à une réunion conjointe, mais la CPAPN avait estimé qu'il fallait plus de temps pour convenir des détails de la réunion et organiser les intervenants appropriés, même si elle reconnaissait que cette réunion était souhaitable. La CPAPN étudiera ces questions lors de sa Septième réunion annuelle en octobre 1999. Le Conseil a demandé au Secrétaire de rester en contact avec la CPAPN et la CIPMB de façon à faire progresser les préparatifs. Le Secrétaire a été également prié d'en rendre compte aux Parties.

Le Conseil a reconnu qu'une réunion conjointe entre toutes les Commissions des pêcheries de l'Atlantique Nord (c.-à.-d. l'OCSAN, le CICTA, le CPANE et l'OPANO) faciliterait le débat de questions d'intérêt mutuel, telles que l'approche préventive, les programmes de contrôle et d'application et la collecte des données. Il serait peut-être également bon d'y inviter la participation du CIEM et de la CIPMB. Le Chef de la délégation européenne ainsi que le Secrétaire ont été priés de se mettre en rapport avec ces organismes à ce sujet.

3.2 Site internet de l'OCSAN

Le Conseil a donné son approbation à la création d'un site internet pour l'OCSAN. Ce site comprendrait un résumé rapide sur la création de l'Organisation, la Convention de l'OCSAN, le Compte rendu de ses activités, le Communiqué de presse, une liste des publications disponibles, les Résolutions et les Orientations de l'Organisation ainsi que le Compte rendu du CCGP du CIEM (obtenu par l'intermédiaire d'un lien au site internet du CIEM). Le Conseil a demandé au Secrétaire de bien vouloir examiner le travail nécessaire ainsi que les coûts d'adaptation des bases de données de l'Organisation et de leur livraison sur le site internet.

3.3 Nouveau manuel de l'OCSAN

Le Conseil a convenu que l'on devrait réimprimer le manuel de l'OCSAN dans son format courant et que les Résolutions, Accords et Orientations de l'Organisation devraient être rassemblées dans un classeur format A5 de façon à faciliter la mise à jour au fur et à mesure de l'adoption de nouvelles résolutions et orientations ou de l'amendement des documents existants.

3.4 Rapport de la Commission financière et administrative

Le Président de la Commission financière et administrative, Dr. Jean-Pierre Plé, a présenté le rapport de la Commission, CNL(99)8. Suite aux recommandations de la Commission, le Conseil a pris les décisions suivantes :

(a) accepter la déclaration financière révisée de 1998, FAC(99)2 ;

(b) accepter un programme de contributions au CIEM pour la période 1999-2001 et adopter un Protocole d'accord (PdA) avec le CIEM. Le Président a été prié de signer le PdA au nom de l'Organisation. Les contributions au CIEM ont augmenté sensiblement et le Conseil a souligné qu'il importait que tout Protocole d'accord à venir maintienne les contributions au CIEM à un niveau stable. Le Conseil a également souligné combien il était important que le CIEM examine la question de l'opportunité de leurs recommandations. Le Secrétaire a été prié de relayer ces points au CIEM ;

(c) adopter un budget pour l'an 2000 et prendre acte du budget prévisionnel pour l'an 2001, CNL(99)40 (annexe 6) ;

(d) nommer PricewaterhouseCoopers d'Edimbourg, vérificateur des comptes pour l'année 1999 ;

(e) adopter le rapport de la Commission financière et administrative. Il a été convenu, toutefois, qu'en ce qui concernait la proposition de la Commission de faire circuler les numéros de téléphone et de télécopie et les adresses de courrier électronique, il valait mieux laisser cet échange de renseignements à la discrétion des représentants.

(f) demander au Secrétaire de bien vouloir préparer un avant-projet examinant comment la question du calcul des contributions, soulevée par l'Islande, pourrait être résolue sans avoir recours à un amendement de la Convention.

Le Président a remercié le Dr. Plé de son excellent travail et de celui de la Commission.

3.5 Rapports sur les activités de l'Organisation

Le Conseil a adopté le rapport, CNL(99)9, adressé aux Parties sur les activités de l'Organisation en 1998 conformément à l'article 5, paragraphe 6 de la Convention.

Le Conseil a convenu de publier un rapport sur les activités de l'Organisation en 1998/99. Ce rapport sera soumis aux Chefs de délégations pour approbation par correspondance à la suite de la Seizième réunion annuelle.

3.6 Annonce du gagnant du Grand Prix du Programme d'encouragement au retour des marques

Le Président a annoncé que le tirage au sort du Programme avait été effectué par le Commissaire aux Comptes, au siège de l'OCSAN, le 31 mai. Le gagnant du Grand Prix de 2 500 $ est M. Borge Tronstad, de Mandal, en Norvège. Le Conseil a félicité le gagnant.

4. Questions scientifiques, techniques, juridiques et autres

4.1 Recommandations scientifiques du CIEM

Le représentant du CIEM a présenté au Conseil le rapport du Comité consultatif sur la gestion des pêcheries (CCGP), CNL(99)12 (annexe 7).

4.2 Compte rendu du Comité scientifique permanent

Le Président du Comité a présenté une demande provisoire de recommandations scientifiques au CIEM. Fort du conseil du Comité, le Conseil a adopté une demande de recommandations scientifiques au CIEM, CNL(99)46 (annexe 8).

4.3 Statistiques de captures et analyses

Le Secrétaire a présenté un document statistique portant sur les déclarations de captures officielles effectuées par les Parties en 1998, CNL(99)14 (annexe 9), et sur les données historiques pour la période 1960-1998, CNL(99)15. Les statistiques de 1998 sont provisoires et seront mises à jour par les Parties.

4.4 Revue des publications internationales portant sur le saumon parues en 1998

Le Conseil a pris acte d'une revue de publications portant sur le saumon atlantique parues en 1998, CNL(99)16, qui avait été compilée conformément à l'article 13, paragraphe 2 de la Convention.

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

5.1 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(99)17 (annexe 10).

Le représentant de la Norvège a présenté un résumé du rapport dressé par le Comité du saumon sauvage norvégien, CNL(99)32. Le Comité avait été nommé par décret royal, avec pour mandat d'examiner la situation générale à laquelle les stocks de saumons sauvages en Norvège se trouvaient confrontés ainsi que d'offrir des propositions en matière de stratégies de gestion et de programmes d'actions. Le représentant de Norvège a invité les Parties à envoyer leurs commentaires sur les suggestions proposées dans le rapport, le 1er octobre au plus tard.

5.2 Adoption d'un programme d'actions pour la mise en application de l'approche préventive

Lors de la Quinzième réunion annuelle, l'OCSAN et les Parties signataires avaient convenu d'adopter et d'appliquer le principe d'approche préventive à la conservation, la gestion et l'exploitation du saumon atlantique afin de protéger la ressource et de préserver les milieux dans lesquels elle évoluait. Le Conseil avait approuvé un projet de Programme d'actions préliminaire et il avait été convenu qu'un Groupe de travail soit chargé d'affiner ce programme, en tenant compte de l'accord du Conseil concernant l'Adoption d'une approche préventive. Le Groupe était par ailleurs censé proposer des méthodes ainsi que des instructions précises qui permettraient d'atteindre les buts proposés par l'intermédiaire du projet de Programme d'actions. La mise au point du projet de Programme d'actions, CNL(99)18, a été achevée par correspondance au cours de l'année.

Le Conseil a adopté un Programme d'actions pour l'application de l'approche préventive à la gestion du saumon, CNL(99)48 (annexe 11).

Le Conseil a convenu que le Comité permanent traitant des questions de l'approche préventive (CPAP) organiserait une réunion sur l'application de l'approche préventive à la gestion des pêcheries de saumons et rendrait compte des résultats de cette réunion, lors de la Dix-septième réunion annuelle du Conseil.

5.3 Captures non déclarées

Le Conseil a indiqué que le haut niveau de captures non déclarées continuait à lui susciter des inquiétudes et a insisté fortement sur la nécessité de minimiser le niveau de ces captures. Le Secrétaire avait été prié d'obtenir chaque année auprès des Parties signataires les informations suivantes :

1) une description du contrôle de gestion et des systèmes de compte rendu par pays ;
2) une explication de la méthode par laquelle elles arrivaient au nombre de captures non déclarées ;
3) le volume de la pêche avec remise à l'eau des captures ;
4) les mesures prises afin de réduire encore plus le niveau des captures non déclarées.

Le Secrétaire a présenté le document CNL(99)19 (annexe 12) contenant les informations fournies par les Parties. Les renvois d'information indiquaient que, même si chacune des Parties déployait des efforts considérables pour obtenir des

statistiques détaillées et exactes auprès des pêcheries de saumons, les captures pouvaient continuer à ne pas être déclarées pour nombre de raisons. Il semblerait que la pêche illégale soit un problème particulier pour plusieurs Parties.

Le Conseil a identifié des divergences dans les informations renvoyées par les Parties. Il a donc été convenu que dorénavant on demanderait également aux Parties d'estimer les captures non déclarées pour chaque pays. La Norvège a été en mesure d'indiquer que la proportion de sa capture non déclarée était de l'ordre de 35%. Chaque pays devrait détailler le pourcentage de façon à indiquer les différentes catégories de capture non déclarées et si elles résultaient d'activités légales ou illégales. Le Secrétaire a été prié d'apporter des amendements au format du formulaire des renvois d'informations afin d'inclure ces questions supplémentaires. Il a été convenu de répondre annuellement à la demande d'informations, le 1er février au plus tard. Le Secrétariat aurait alors une période d'un mois pour rédiger la première version du document du Conseil qui serait alors soumis aux Parties le 1er mars au plus tard. Tout commentaire sur cette version préliminaire devrait alors être envoyé au Secrétariat avant le 1er avril permettant ainsi de publier le document final le 1er mai au plus tard. On concevait toutefois que certaines Parties ne pourraient pas avoir les informations disponibles pour le 1er février, mais qu'il était essentiel qu'elles les fournissent au Secrétariat le plus tôt possible.

5.4 Prises accidentelles du saumon atlantique

Lors de la Quatorzième réunion annuelle, l'attention du Conseil avait été attirée sur le fait que la pêche aux espèces pélagiques dans la zone de la Commission de l'Atlantique du Nord-Est avait énormément augmenté, surtout dans le cas du hareng et du maquereau dans la division IIa du CIEM. Le fait que les pertes en saumon pouvaient être considérables, même si les saumons ne représentaient qu'un faible pourcentage des captures dans ces pêcheries avait en effet suscité des inquiétudes. L'année dernière, le Conseil avait accepté la nécessité de plus amples renseignements sur la possibilité de prises accidentelles de saumons dans les pêches pélagiques et avait demandé que les Parties signataires fournissent toutes les informations qu'elles avaient à leur disposition. Le Secrétaire a indiqué que la Fédération de Russie et les Etats-Unis avaient offert des informations, CNL(99)20 (annexe 13). D'après le CIEM, la pêcherie présentant le plus grand danger de prises de post smolts était probablement la pêcherie au chalut du maquereau, mais le représentant de l'Islande a fait allusion à un détail anecdotique sur la pêcherie à l'essaugure du hareng Atlanto-scandinave, détail qui porterait à croire que des prises accidentelles de saumons avaient lieu dans cette pêcherie. Le représentant de l'Islande a convenu de fournir l'information en question au Secrétariat. Le Conseil a pris acte d'une proposition de projet de collaboration entre PINRO de Russie et le laboratoire des Pêches féringiennes. Le projet examinerait la possibilité de prises accidentelles de saumons dans les pêches au hareng et au maquereau en 1999. Le Conseil a prié le Secrétaire de contacter de nouveau les Parties signataires et de leur demander de fournir toutes les informations existantes sur les prises accidentelles.

5.5 Pêche au saumon effectuée en eaux internationales par les Parties non-signataires

Le Secrétaire a présenté le rapport CNL(99)21 décrivant les mesures prises dans le cadre de la Résolution sur la pêche au saumon en haute mer. Aucun navire n'avait été détecté depuis février 1994, mais il fallait noter qu'il n'y avait eu que peu de vols de surveillance au cours des périodes hivernale et printanière. Le Conseil a prié le Secrétaire de rester en contact avec l'OPANO et la CPANE en vue d'obtenir des renseignements sur les détections. Le Secrétaire a également été prié de prendre les mesures nécessaires dans l'éventualité de toute détection à venir.

5.6 **Pêche à des fins scientifiques dans la zone de la Convention**

Le Secrétaire a présenté le document CNL(99)22 résumant les mesures prises depuis la dernière réunion annuelle. Des rapports sur les recherches menées en 1998 par le Canada, l'Union Européenne (Ecosse) et la Norvège seront également mis à la disposition du Secrétariat qui les distribuera aux Parties.

5.7 **Effets de l'aquaculture sur les stocks de saumons sauvages**

(a) Réunion spéciale de liaison visant à examiner les mesures prises en vue de minimiser les effets nuisibles de l'aquaculture sur les stocks de saumons sauvages

Le Conseil a tenu une réunion spéciale de liaison durant laquelle le Canada et la Norvège avaient présenté des comptes rendus sur les mesures prises par ces pays pour minimiser les effets de l'aquaculture du saumon sur les stocks sauvages. Le Conseil a confirmé qu'une seconde réunion spéciale de liaison sur l'aquaculture aurait lieu lors de la réunion de l'an 2000 et que les présentations proviendraient cette fois-ci de l'Union Européenne.

(b) Renvois réalisés dans le cadre de la Résolution d'Oslo

Le Secrétaire a présenté le rapport, CNL(99)24 (annexe 14), sur les renvois réalisés conformément à l'article 5 de la Résolution d'Oslo. Le Conseil a pris acte du fait que la nouvelle procédure de compte rendu adoptée en 1998 avait eu pour résultat des renvois d'informations plus complets. Le Conseil a prié le Secrétaire de revoir le format du formulaire des renvois effectués conformément à la Résolution d'Oslo de façon à identifier toute ambiguïté possible et d'y apporter les améliorations nécessaires.

Le représentant de l'Union Européenne a présenté un document concernant l'aquaculture en Finlande, CNL(99)42 (annexe 15).

(c) Le pour et le contre de l'utilisation du saumon stérile dans l'aquaculture

Le Secrétaire a présenté un rapport traitant de l'utilisation du saumon stérile dans l'aquaculture, CNL(99)25 (annexe 16).

Le Conseil a convenu que, conformément à la Résolution d'Oslo, il était nécessaire de mener des recherches supplémentaires pour établir le rôle que le saumon stérile pourrait jouer dans les situations de confinement. Il était également reconnu qu'il importait de continuer le travail de développement

afin de déterminer si leur utilisation en aquaculture serait pratique. Le Conseil a donné son accord pour que cette question soit abordée lors d'une réunion du Groupe de liaison chargé de la question du saumon sauvage et d'élevage à une date ultérieure. A ce propos, il serait bon que le Secrétariat prépare un document étudiant la situation et les questions plus larges associées à l'utilisation du saumon stérile dans l'aquaculture.

(d) Compte rendu de la Seconde réunion du Groupe de liaison chargé de la question du saumon sauvage et d'élevage

Le Secrétaire a présenté le rapport CNL(99)26 (annexe 17) de la seconde réunion du Groupe de liaison qui avait vu la participation de l'OCSAN et de l'Association Internationale des Eleveurs de Saumons (AIES). Au cours de cette réunion, un mandat avait été défini pour un Groupe de travail chargé d'étudier les pratiques d'élevage du saumon (en vue de minimiser les effets nuisibles sur le saumon sauvage). Cependant, les représentants de l'AIES présents à la réunion n'avaient pas eu le pouvoir d'assigner le rôle d'élaboration d'orientations à d'autres membres de l'AIES. Le Groupe de liaison avait au départ espéré que les représentants de l'AIES et le Secrétariat de l'OCSAN puissent préparer un avant-projet d'orientations avant le 1er février 1999. Il avait également été dans leur intention que le Groupe de travail se rencontre début mars pour mettre au point des orientations qui encourageraient la prise de mesures appropriées pour améliorer le confinement et les pratiques d'élevage dans l'industrie salmonicole et qui minimiseraient ainsi les effets nuisibles sur les stocks sauvages. Ces orientations devaient également être acceptables, au niveau international, tant pour les éleveurs de saumons que pour les Parties de l'OCSAN. La réunion du Groupe de travail n'a cependant pas eu lieu.

Le Secrétaire a indiqué qu'il n'avait pas pu réaliser de progrès au niveau de l'AIES. En outre, les industries aquacoles représentées par les Parties de l'OCSAN n'étaient pas toutes membres de l'AIES. Il a par conséquent émis la suggestion que le travail de liaison nécessitait un nouveau départ, qu'il importait de porter une attention particulière sur les industries salmonicoles de l'Atlantique Nord et d'élargir la base du travail de liaison au-delà de l'AIES. Il a également fait mention du courrier reçu de l'un des représentants de l'AIES, CNL(99)36, invitant le Président et le Secrétaire à une réunion en Norvège.

En réponse à cette lettre encourageante, le Conseil a convenu qu'il désirait réviser le processus de liaison avec l'industrie aquacole de façon à encourager une coopération plus étroite et plus ouverte et ainsi de permettre aux éleveurs de l'Atlantique Nord de prendre part. Ceci ne signifiait toutefois pas que le Conseil désirait rompre les liens avec l'AIES. Il a ainsi été convenu que l'OCSAN accepterait l'invitation de rencontrer l'AIES au mois d'août, et, même si l'objet de cette rencontre consistait surtout d'un échange d'informations, les Parties signataires pourraient être invitées à y participer. A la suite de cette réunion, le but serait d'organiser une nouvelle réunion de liaison au cours de l'an 2000. Cette réunion du groupe de liaison se pencherait surtout sur l'élaboration d'orientations sur le confinement physique et les

pratiques d'élevage. D'autres questions pertinentes pourraient toutefois être incluses à l'ordre du jour.

(e) Elaboration d'orientations sur les mesures prises en matière de confinement physique et sur les pratiques d'élevage du saumon

Le Secrétaire a présenté le rapport CNL(99)27 indiquant qu'aucun progrès n'avait été enregistré dans l'élaboration d'orientations sur les mesures prises en matière de confinement physique et sur les pratiques d'élevage du saumon.

(f) Saumon transgénique

Lors de sa Quatorzième réunion annuelle, le Conseil avait exprimé ses préoccupations quant aux risques posés par le saumon transgénique et avait adopté les orientations de l'OCSAN recommandant l'application de mesures concernant le saumon transgénique, conçues pour éviter les effets nuisibles sur les stocks sauvages. Selon ces orientations, les Parties avaient convenu d'informer le Conseil de toute proposition qui permettrait l'élevage de salmonidés transgéniques, donnant les détails de la méthode de confinement prévue et des autres mesures prises pour protéger les stocks sauvages.

(g) Mise en application de la Résolution d'Oslo

Lors de sa Quinzième réunion annuelle, le Conseil avait étudié le rapport soumis par le Groupe de travail chargé de la mise en application de la Résolution d'Oslo, CNL(98)27. Le Conseil avait adopté l'ensemble des recommandations de ce rapport et avait prié le Secrétaire de préparer un document qui contiendrait la Résolution d'Oslo et ces nouvelles recommandations. Ce document devait également faire mention des autres Résolutions et Orientations de l'Organisation concernant les introductions et transferts et le saumon transgénique. Le Conseil a adopté l'Accord sur la mise en application de la Résolution d'Oslo, CNL(99)28 (annexe 18) et a demandé que ce texte fût inclus dans le manuel des résolutions et orientations.

5.8 **Séance spéciale sur les questions d'habitat**

Le Conseil a tenu une séance spéciale sur les questions d'habitat. Parmi les sujets abordés ont figuré un nouvel examen de l'habitat en eau douce dans le cadre du saumon atlantique et des comptes rendus en provenance d'Amérique du Nord et d'Europe sur les mesures prises pour conserver, restaurer et améliorer l'habitat.

5.9 **Orientations sur le repeuplement**

Le Secrétaire a indiqué qu'en raison d'autres engagements et d'initiatives en cours sur l'approche préventive (par exemple, l'étude de programmes de repeuplement de stock ayant une incidence sur la question de repeuplement), la proposition était de reporter l'étude des orientations sur le repeuplement à une date ultérieure.

5.10 **Comptes rendus sur les initiatives de conservation prises par les trois Commissions régionales**

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

6. Divers

6.1 A la demande de la Commission Nord-Américaine, le Conseil a prié le Secrétaire d'écrire aux autorités françaises pour faire état de leur inquiétude à propos de l'augmentation des prises de saumons effectuées à Saint-Pierre et Miquelon en 1998.

7. Date et lieu de la prochaine réunion

7.1 Le Conseil a convenu de tenir sa Dix-septième réunion annuelle à Miramichi, au Canada, du 5 au 9 juin 2000.

7.2 Le Conseil a convenu de tenir sa Dix-huitième réunion annuelle du 4 au 8 juin 2001, à Edimbourg ou à tout autre endroit qui soit, à l'invitation de l'une des Parties.

8. Compte rendu préliminaire de la réunion

8.1 Le Conseil a adopté le compte rendu préliminaire de la réunion, CNL(99)33.

9. Communiqué de presse

9.1 Le Conseil a approuvé le communiqué de presse, CNL(99)45 (annexe 19).

ANNEX 1

Opening Statement made by the President

Distinguished Delegates, Ladies and Gentlemen:

This is our first meeting in Ireland and it is a real pleasure for us to be here in this beautiful countryside and with such excellent facilities. On behalf of all of us I would like to express our sincere thanks to our Irish hosts and to the European Union for the arrangements made. We do have a policy of, where possible, getting closer to the salmon for our Annual Meetings and Westport suits this admirably. From the programme I can see, too, that you have made much effort to keep us entertained during our spare time and I would like to thank you, in advance, for this hospitality which is very much appreciated.

It is, of course, the salmon that have brought us all together this week and we have much to do for them. Undoubtedly one of the major tasks this week will be to start the introduction of the Precautionary Approach by agreeing our plans for the next few years. We have already decided that NASCO and its Contracting Parties will adopt the Precautionary Approach. Now we have to put some meat on the bones. That means setting up our first Working Groups with clear mandates so that, this time next year, we shall have the first elements of our new policy in place. We have several years' work ahead of us before we can claim that the Precautionary Approach is fully applied but the steps we take this week will be crucial. NASCO has always been an organization with a good spirit and a willingness to get ahead and I have no doubt that this will carry us through this challenge.

Quite apart from the Precautionary Approach, we need to make progress on a number of other very important issues. We have already held two extra sessions yesterday, one on aquaculture and one on habitat issues. On aquaculture we have had the opportunity for an initial dialogue with some of our colleagues who are in, or who represent, that industry. I think they must realise by now that NASCO is not anti-salmon farming. But they must also realise that we cannot stand by and watch wild salmon stocks affected by disease and possibly by irreversible genetic change. We must act to stop, or at the very least to minimise, these impacts and we will take further steps this week. There are quite a number of issues to look at here such as the possible use of sterile salmon in farming and the development of containment Guidelines. We also wish to continue our efforts to reduce the level of catch which is unreported, and we have had some useful responses from the Parties on that. We will also look at the possible by-catch of salmon in the very large pelagic fisheries in the North-East Atlantic.

Last, but not least, the three regional Commissions of NASCO have important work to do in a climate of scientific advice which is, to say the least, not encouraging. There are hard and difficult choices to be made when salmon stocks appear to be so low. Nevertheless, I have no doubt that we shall be able to deal with all these problems. We have very rarely failed to make progress and the spirit of cooperation in NASCO is good.

Ladies and Gentlemen, I trust that we will all have a very productive and useful stay here in Westport and, if you have time, I hope that you will enjoy your stay here.

I now give the floor to the Parties and, as last year I started in alphabetical order, I will start this year at the end of the alphabet with the United States.

ANNEX 2

Opening Statements made by the Parties

Opening Statement made by Canada

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

I am delighted to be in Westport, Ireland, a most picturesque location, and I would like to extend a special thank you to our Irish hosts for selecting such a nice venue to hold NASCO's Sixteenth meeting. I am confident that together, we can have a productive week. I have to confess, however, that I cannot wait to do more travel down that emerald path of the neighborhood golf courses. But that can wait … for now. We have a busy week ahead of us. I would like to introduce, formally, Canada's new Commissioner, Jim Gillespie.

In Canada, we have announced the 1999 Atlantic Salmon Management Plan for the Maritimes, Newfoundland and Labrador back in February, 1999. The overall plan is based on the precautionary approach which, in practice, translates into proactive fishery management intervention in support of conservation. In Labrador, in accordance with the 3-year management plan announced, the commercial fisheries remain closed and similar strict conservation measures to 1998 are in effect. A new Adaptive Management Strategy has been introduced this year based on a river classification system for the island of Newfoundland and the Strait of Belle Isle. In Quebec, 80% of the licence holders on the Lower North Shore have opted to retire their licences under a 2-year Canada-Quebec joint voluntary licence retirement programme - 10,000 salmon saved. A small commercial fishery in the Ungava Bay area involving five licences and an allocation of 3,000 fish was discontinued in 1998.

Because the future of the stock remains unclear, a precautionary approach is essential. Unfortunately, the scientific assessment and advice for 1999 remain essentially similar to last year's. In sum, ICES calls for the closure of all Atlantic salmon fisheries in the Northwest Atlantic, excepting those in-river fisheries where stocks of both grilse and large salmon are being maintained above their conservation requirements. Again, our attention is drawn to the critical state of wild salmon throughout the North Atlantic. The situation calls for cohesiveness in our actions. This is what we have attempted to do with the aforementioned management plans (transmitted to you as paper NAC(99)3).

Minister Anderson was quite encouraged by the results of the 1998 meeting. For him, one of the highlights was the agreement in the West Greenland Commission on a regulatory measure which restricted the 1998 fishery to "that amount used for internal consumption in Greenland". This was similar to overall actions taken in Canada and for the Labrador fishery as regards the closure of the commercial fishery along with the closure over the last two years of the lower North Shore of Quebec. It is a vivid example of cohesiveness in approach. In the end, we must all share in the conservation burden if we want to see tangible results.

While it is not easily determined from the ICES reports, Canada has become aware that mixed stock driftnets are still a significant portion of the total catches within the North-East Atlantic commission (NEAC). Within Canada, the process of dealing with tough scientific advice has been difficult and costly. We also recognise the sacrifices of Greenland as well as the stringent management programme and expensive enhancement initiatives in the United States in recent years. It might now be the time to turn our attention to activities in the Northeast Atlantic. I note that, among regional fisheries management organizations, NASCO is far ahead as far as the precautionary approach is concerned. A paper was tabled last year along with a preliminary Action Plan. We have tackled the concept in a systematic manner

and, as a result, we are now looking at adopting an Action Plan, to which Canada will provide support for its implementation.

The application of the precautionary approach is linked to another important set of issues being considered at this meeting - aquaculture and the interactions of farmed and wild salmon. Canada was pleased to participate, jointly with Norway, in a presentation on the implementation of the *Oslo Resolution.*

Things are happening on the aquaculture front in Canada. The Canadian aquaculture industry is a small but growing part of the world aquaculture industry, growing from $7 million wholesale value in 1984 to $388 million in 1997. On December 16, 1998, a Commissioner for Aquaculture Development was named. In Canada, the Department of Fisheries and Oceans, a new Aquaculture Directorate, has the lead in policy development at the federal level, but 17 other departments and agencies are tasked with delivering programs and services to the industry, a complex issue.

In this context, my delegation was disappointed with the results of the liaison meeting between NASCO and the International Salmon Farmers' Association (ISFA). Canada is seriously questioning the progress made in this forum and is convinced that alternatives must be explored. There is a need for an approach that promotes bridging between wild and cultured farmed salmon stakeholders so that real progress can be accomplished on important questions such as containment. We will be discussing this further, with a view to finding practical solutions, during the forthcoming session.

It should be stressed that Canada is committed to its obligations under the NAC Protocols for Introductions and Transfers. While the 1994 version currently applies, we have given stakeholders until September to make their views known on the 1998 revision, after which time we will decide on next steps.

My comments underline, I believe, the need for a comprehensive approach to salmon management. My delegation was pleased to contribute to a special session on habitat issues which highlighted many factors that can affect salmon management. I believe that the buzzwords in international organizations these days are "good fisheries governance". For next year, it might be time for NASCO to revisit salmon predation and hold a special session on a topic that tends to be overlooked sometimes as we discuss the status of the stock. If we are to look at all components that affect salmon survival, we must do it in a comprehensive fashion.

Those here who know me are aware that I am not the literary type. However, as I was preparing for this meeting, I came across an almost poetic quote in the *Ten Year Review of the Activities of NASCO* which, I think, gives a new perspective to the work we are doing here today. I want to share it with you:

> "The salmon serves as a symbol of water purity and people simply feel happier knowing that the salmon is in their rivers and going about its migrations, even if they have no interest in exploiting it. In short, the salmon is one of the few species whose mystery exerts some hold on the human imagination and these facets of its value are impossible to quantify in monetary terms."

I would add that, in Canada, wild salmon can be found in all of our bordering oceans.

May these words of wisdom guide us as we go through this week's agenda. I was pleased to hear the remarks of my colleague that set a good tone for discussion and progress and look forward to the work, Mr President, under your experienced and wise leadership.

Thank you.

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

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

It is a pleasure to be here in Westport for the Sixteenth Annual Meeting of NASCO.

At this year's meeting we will once again have the opportunity to raise our concerns on matters affecting the salmon stocks. Many factors must be taken into consideration and it is difficult to emphasize some more than others, as they all work together. To use the title of a paper written by Allen Peterson, former President of NASCO, it will in the end always be a "matter of perspective".

That is one of the reasons why the co-operation of the Parties to the Salmon Treaty and the principle of burden-sharing is essential in the conservation, restoration, enhancement and rational management of salmon stocks and why the work of NASCO is so important.

The different factors should, however, all be scrutinized, which is why this year's Special Session of the Council on Habitat Issues is welcomed by our delegation. It is important that the available information is shared among the members and that new surveys are conducted in order to identify the problems. Therefore our delegation invites NASCO to continue focusing on the issue of habitat.

One of the major proofs of NASCO's conservation policy lies in the regulatory measures. Last year Greenland accepted a Regulatory Measure, which meant that the catch at West Greenland was restricted to that amount used for internal consumption in Greenland only. At the same time it was underlined by the Representative of Denmark (in respect of the Faroe Islands and Greenland) that the right in principle to fish commercially for salmon at West Greenland remained unchanged. This is important, as changes in the attitude of the fishermen are not created as easily as regulatory measures.

The report of the ACFM shows that the total estimates of unreported catch within the NASCO Commission areas in 1998 was 1,210 tonnes, nearly 35% of the total catch. The estimate for 1998 is an increase of 47% from 1997 to 1998. It is obvious that the Faroes and Greenland find it difficult to accept these high figures of unreported catches while the Contracting Parties are claiming that the Greenlandic and the Faroese quotas must go down in the name of conservation policy.

The basis for improving the management of the salmon stock is knowledge of the biology of the salmon in its different phases and there is always a requirement for new information. This year the ACFM has recommended that the research fishery at the Faroe Islands be continued in order to meet this requirement.

Mr President, Distinguished Delegates and Observers, on behalf of my delegation I would like to express my best wishes for a productive meeting in a constructive atmosphere of co-operation.

Thank you.

Opening Statement made by the European Union

Mr President, Distinguished Delegates and Observers:

We have reached the Sixteenth Annual Meeting of NASCO and are once again on the move. This time, I am delighted to find that we are in a new venue, namely the town of Westport in Mayo. I have been told that this is a unique town, being one of only two planned towns in Ireland. My first impressions, which I have to say are the strongest and most enduring, are that this is a town full of industrious but very welcoming people. Looking around, it's hard to believe that in terms of population, this is the smallest venue of any NASCO Annual Meeting, smaller even than Ilulissat; I certainly know that there are fewer dogs.

1999's Annual Meeting presents a number of important challenges for us all. Our duty today is to take the proper decisions to safeguard the future of the wild salmon stocks in the North Atlantic; these stocks are swimming out there only a short distance away from us. I know that everybody in this room is fully committed to the sound management of fishery resources based on the best possible scientific information available. It is a commitment which we must repeat year after year and which guides us in our endeavours towards reaching clear decisions on the future management of North Atlantic salmon. The European Union will contribute towards the successful outcome of this year's meeting.

Last year, we discussed in an open forum the Precautionary Approach to fisheries management specifically as it applies to salmon. That debate raised a number of important issues. Unfortunately we know and understand far too little about the salmon in our care. It is this fact which has led us all around this table to examine an approach which will be guided by greater caution and will therefore lead to even sounder management. In 1998, a Preliminary Draft Action Plan for the application of the Precautionary Approach was agreed at our Annual Meeting. This week, we will be asked to adopt an Action Plan which will enable us to schedule our efforts in this direction. The Precautionary Approach is a reality and is now under examination by a number of different Regional Fisheries Organisations, such as the IBSFC and NAFO.

Yesterday, we had a Special Liaison Meeting to review the measures to minimise the impacts of aquaculture on wild stocks. We followed that up with a Special Session of the Council on habitat issues. It is so clear to me that the whole subject of the Precautionary Approach is tied up to aquaculture and habitat. We cannot escape it so we must take on the challenge of the Precautionary Approach in the most efficient manner possible. The Precautionary Approach must signify sound management for NASCO.

Once again, we will all have read the long report of the ICES Working Group on North Atlantic Salmon. It's much easier to read the ACFM report but the message is the same. If we want the wild salmon to survive, we need to do something about it. We are the ones with all the cards, not the salmon. They need our help. We have the tools and we must use them responsibly. The European Union will insist that all the Contracting Parties to NASCO without exception must take their responsibilities seriously in order to guarantee that there are wild salmon for future generations.

Mr President, it is with great delight that I am here in Ireland with my delegation. I would like to take the occasion to thank our hosts for their warm hospitality and the very satisfactory

arrangements that have been made for our comfort. I very much look forward to the remainder of my stay.

Mr President, Distinguished Delegates and Observers, may I wish everyone here today the very best from my delegation and may we have success over the next few days. I look forward to working with you all constructively so that we can fulfil all the objectives which have been set.

Thank you.

Opening Statement made by Iceland

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

First of all, like others around this table, we would like to thank our Irish hosts for the opportunity to meet in these beautiful and historic surroundings. The County of Mayo is one of the most renowned areas in the world with respect to Atlantic salmon research as it harbours the Salmon Research Agency at Burrishoole where the late David Piggins did his pioneering salmonid research in the 1960s. Those years must also be considered the golden years for the salmon stocks, which returned in great numbers to the countries of origin and were plentiful in existing marine fisheries.

Unfortunately, today's scenario is different with multi-sea-winter stocks dwindling, both in the North-East as well as in the North-West Atlantic. According to information from ICES, those salmon stocks both in the northern and southern part of the North-East Atlantic are in a precarious state, and extreme caution should be exercised in harvesting these stocks in mixed stock fisheries. For the first time, byelaws have been issued in England and Wales to protect spring salmon, which include a mandatory "catch and release" of all salmon during the early part of the fishing season. These byelaws emphasise the gravity of the situation.

As we have reiterated on numerous occasions Iceland supports every effort to protect wild stocks and objects in general to mixed stock salmon fisheries, which endanger the smaller stocks. This viewpoint cannot be over emphasised in the light of the current scientific facts regarding the status of the salmon stocks. The NASCO quotas negotiated in the North-East Atlantic Commission should thus be severely reduced as well as any coastal fisheries for the corresponding stocks.

Once more Iceland has raised in the Finance and Administration Committee the inconsistencies associated with the use and interpretation of the financial procedures for calculating the contributions by the Parties in Article 16 of the Convention. According to that rule 70% of the NASCO budget is divided between the Contracting Parties on the basis of nominal salmon catches. As we are all aware, salmon catches are dwindling rapidly in many countries as a result of declining salmon abundance and various conservation measures such as "catch and release" and non-fishing of salmon quotas.

As a result, it will be the future destiny of the NASCO members with the highest salmon catches and relatively strong salmon stocks to pay most of the NASCO budget under the current system. Countries with voluntary and mandatory "catch and release" programmes and, in many cases, weakened salmon stocks, will be paying a relatively smaller contribution. These issues are further complicated by unacceptable levels of unreported catches in many countries and a reduction in the number of Contracting Parties to NASCO, following the membership of Finland and Sweden in the European Union. Iceland has proposed a formal working group within NASCO to look for a satisfactory and fair solution to this problem. Iceland is convinced that where there is a will there is a way.

In the days ahead we will be discussing many issues of great importance to the Atlantic salmon world. Aquaculture still poses a great threat to wild salmon in many countries and the response of the industry to NASCO's request for a liaison group have, so far, not been encouraging. Some consensus, however, seems to be emerging regarding the use of transgenic salmon for aquaculture. We want to express our appreciation regarding the special

sessions on aquaculture regulations and on habitat issues, which emphasised the diversity and complexity of the problems that the Atlantic salmon is facing.

We would again, Mr President, like to express our gratitude to our Irish hosts for arranging the meeting in such an appropriate setting and look forward to a useful meeting.

Thank you.

Opening Statement made by Norway

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

Norway is very pleased to participate at this Sixteenth Annual Meeting of NASCO here in Ireland. As a Norseman with a somewhat questionable historic reputation in these parts of Europe, I can assure our Irish hosts that they have nothing to fear. At this occasion we are only after the Faroese salmon quota.

In recent years, NASCO has given high priority to implementation of the Precautionary Approach in all of its activities. An essential part of this policy will obviously be to apply the Precautionary Approach both when NASCO decides on international measures and when the Parties make national management decisions.

Norway still believes that - possibly - the most important proof of NASCO's conservation policy lies in the regulatory measures. Having said this, Norway, of course, appreciates the role of NASCO in developing a broad common basis for salmon management. However, we believe that the ability of this Organization to implement the Precautionary Approach will mainly be evaluated by the regulatory measures decided for the mixed stock fisheries.

In the North-East Atlantic, ICES considers that the southern MSW stocks are outside safe biological limits. The condition of the Northern MSW stock complex is only slightly better. ACFM consequently has advised that extreme caution should be exercised in the management of mixed stock fisheries exploiting these stocks. In the light of this advice and NASCO's precautionary policy, I am certain that I am not the only one anxious to see the provisions of the regulatory measures for the next fishing season.

If the challenges in international salmon management are great, we certainly have no smaller challenges back home in Norway.

Our main challenge at present is to transform the proposals in the report from the Government's Wild Salmon Committee to management policy. The Committee, which was appointed by the government in 1997, considers it possible to rebuild the Norwegian salmon stock complex to its former strength. This, however, requires strengthened effort and better organised co-operation between all relevant sectors. To achieve a more comprehensive policy, the Committee considers it necessary to give special priority to the most important stocks. In practical terms, the Committee suggests stronger protective measures in 50 rivers and 9 fjords and coastal areas. In addition, a quota-based flexible catch rule system is proposed. For NASCO it may be of special interest that the Committee proposes to establish a network of international salmon heritage rivers.

The Report is now in a process of public consultation, and the Government will present its proposals to Parliament in a white paper in the end of October. The summary of the report is presented to the Council in a separate paper, and any comments from the Parties will indeed be welcomed.

Mr President, the challenges facing the wild stocks of Atlantic salmon are complex and numerous. I therefore want to wish us all success in facing these challenges at this meeting.

Thank you.

Opening Statement made by the Russian Federation

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

It is a great pleasure to be in such hospitable Irish surroundings. On behalf of all members of the Russian delegation I would like to express our deep appreciation for the welcome and quality of arrangements provided by our hosts. We look forward to fruitful discussions at this year's Annual Meeting and are prepared to do our utmost to contribute in the best way possible to this process.

As in previous years we have many issues to address. However, all of these must be considered against a background of serious concern about the status of Atlantic salmon stocks over the entire distribution range of this species.

The analysis of scientific data undertaken by the ICES Working Group on North Atlantic Salmon has shown that salmon stocks continue to decline and for the time being we do not have a clear understanding of the reasons, although our knowledge is increasing. Resolution of this issue will require even greater research efforts by all Parties and more extensive consultations between them will be needed. In these circumstances we attach paramount importance to the implementation of the Precautionary Approach since the future of salmon stocks is still uncertain.

At the beginning of 1998 substantial consultations were held in Russia between various user groups, scientific institutions, management authorities and industry, on the need for practical ways to apply the Precautionary Approach. As a consequence of this exercise the total allowable catch for some salmon rivers of the Kola peninsula was established on the basis of preliminary conservation limits. The last fishing season demonstrated that the use of conservation limits for setting the total allowable catch, for the Barents Sea rivers in particular, was absolutely justified since the returns to those rivers were very low. Therefore, a pressing need for application of the Precautionary Approach to salmon management in Russia was proved once again. We will take further action towards this end and support efforts by NASCO to adopt and implement the Action Plan for Application of the Precautionary Approach.

The Precautionary Approach is closely associated with other important issues which we need to address at this meeting; they are unreported catches, by-catch of salmon in pelagic fisheries and impact of aquaculture on the stocks of wild salmon.

Unreported catches have become a very pressing problem in Russia in recent years, which causes great concern because the level of such catches is in fact on a par with the legal catch. In this light, therefore, it is equally important for us to continue efforts to improve estimates of unreported catches and take strong measures to minimise them.

Of no lesser importance, in our view, is the issue of a by-catch of post-smolts in pelagic fisheries. Since the evidence available today indicates clearly that it is not possible to avoid by-catches of post-smolts, for example in the fishery for mackerel, we believe that there is an obvious need to make joint efforts to evaluate the potential for by-catch of post-smolts in various fisheries and to seek relevant information from other International Organizations.

However, we see the interaction between farmed and wild salmon as the most alarming issue. The occurrence of farm escapees in individual catches has, in our opinion, reached a critical level and a Special Liaison Meeting with the aquaculture industry has provided an excellent opportunity to have further detailed discussions on measures developed to minimise the impact of aquaculture on wild salmon in various countries. Aquaculture will no doubt expand further and although most countries are willing to see the development of an industry which is ecologically friendly, proposed solutions to various problems are often no more than declarations. And this in no way helps resolve this complicated issue. The Contracting Parties are taking vigorous measures under the Oslo Resolution. However, the overall implementation is far from being perfect.

Mr President, Distinguished Delegates, Observers, Ladies and Gentlemen, may I wish all of us a successful and productive meeting. I hope we shall succeed in reaching mutual understanding on all of the issues we are going to discuss. I am looking forward to a constructive exchange of views.

Thank you.

Opening Statement made by the United States of America

Mr President, Distinguished Delegates, Ladies and Gentlemen:

The United States is very pleased to participate in this Sixteenth Annual Meeting of NASCO set here on the very beautiful west coast of Ireland. Many Americans trace their ancestors to Ireland, including several on our delegation to this meeting, and that brings a special connection between our two countries.

Mr President, this is an extremely important meeting for NASCO. Yesterday, in introducing our Special Liaison meeting, you referred to concerns about "avoiding irreversible changes" in wild salmon stocks. This is a phrase that is used in many recent international agreements such as the UN Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fishing, and in the developing language of the precautionary approach. Mr President, this is not just a phrase of diplomacy and international negotiations. Atlantic salmon stocks in many places truly are on the brink of irreversible change and the U.S. believes in trying to prevent that from happening utilizing all the tools at our disposal. The Clinton Administration has stated with regard to many species that extinction should not be an option we consider. We must not lose our wild stocks of salmon, but if we look at the scientific information for this year's meeting, we see cause for worry all around the North Atlantic.

Mr President, we have made important progress in NASCO. Our Organization has responded to the crisis facing salmon stocks by sharply reducing catches and developing information and guidelines for additional conservation measures to protect against other impacts. Commercial fisheries have been closed, recreational fisheries moved toward catch and release or closure, and guidelines for reducing impacts of farmed fish have been developed and implemented. But, we must do more. The arbiter of our actions, the final judge, is the salmon. Biologically the prescription is simple; we must minimize mortality at all life stages for salmon stocks in trouble and maximize the chance of those stocks rebuilding. This means protecting and restoring habitat, developing better methods for preventing interactions between cultured and wild stocks, and reducing harvests even further on stocks at risk.

In the U.S., we are taking significant new actions to protect all life stages of salmon, in addition to the measures I have reported on in the past. These include closing catch and release fishing, regulating water withdrawal and working on a Code of Practice for the Responsible Containment of Farmed Atlantic Salmon in Maine Waters including monitoring and enforcement provisions.

We urge all Parties to continue and intensify their efforts. While our national efforts are clearly focusing on U.S. stocks, NASCO's role is to conserve Atlantic salmon throughout the North Atlantic. We are all interlinked by our Organization, our ocean, and our goal to conserve salmon.

Finally, Mr President, you note the important efforts we are making with regard to the Precautionary Approach. Precautionary management means exercising prudent foresight in taking actions to prevent problems. Some may say it is too late for foresight, but we think there are many areas where we must try to see into the future and find a path that will rebuild our stocks of wild salmon.

ANNEX 3

Opening Statements made by Non-Government Organizations

Joint Statement made by the Non-Government Organizations

NASCO NGOs fully appreciate that a major factor in the decline in North Atlantic wild salmon stocks is mortality at sea, probably influenced by climate and oceanic changes. This is an area which man can do little to influence in the short term, but the stark situation reported by ICES to this Council meeting renders it the more important that action should be taken wherever possible to restore an adequate number of fish returning to spawn successfully. The whole range of these actions were set out by NGOs in 1998 in the International Atlantic Salmon Accord, but two areas in which we can make a significant contribution have been the subject of special sessions before the formal start of this year's meeting, and this statement reflects the views of the NGOs on these two areas.

I. Habitat Maintenance and Improvement (in the context of integrated catchment management)

All NGOs support the concept that improvement or restoration of the habitat and water quality available to spawning salmon, growing juveniles, migrating smolts and returning adults, must be an integral part of the salmon management strategy of all Parties.

- The primary aim should be to maximise the sustainable production of juvenile fish and their survival to migrate as smolts and to return to spawn successfully.

- Action is needed to control and rectify problems resulting from:

  Abstraction
  Obstructions to access
  Afforestation
  Poor water quality due to pollution and eutrophication
  Poor management of riparian land, including agricultural contamination, grazing damage, siltation and uncontrolled bankside vegetation
  Drainage and flood control works

II. Effects of aquaculture

NGOs insist that the impact of aquaculture on wild salmonids must be minimised, and that action is needed to restore stocks that have declined in areas of intensive aquaculture. NGOs hold that implementation of the aquaculture guidelines, and of the subsequent Oslo Resolution, by Parties to the NASCO Convention has been very variable and, in some cases, inadequate. The following general points are significant:

- The precautionary approach should be applied in arriving at all management decisions.

- Expansion. No new aquaculture development should be permitted without rigorous independent examination of the likely environmental impact of the installation and the planned production level.

- Re-examination. Existing sites should be independently re-assessed in the light of increased understanding of the effect of aquaculture on the local ecology in terms of

organic pollution and the potential effects of medications, and their operation should be regularly monitored to ensure compliance with accepted standards.

- Sea lice. The effects of sea louse infestation on sea trout and salmon smolts during their seaward migration must be countered. Effective action is needed to minimise the exposure of wild salmonids to sea lice concentrations by:

a. Distancing aquaculture facilities from the migration routes of wild salmonid populations.

b. Effective and co-ordinated control of sea lice levels in aquaculture sites.

- Escapes. The effects of the current unacceptably high level of escapes must be minimised by:

a. The enforcement of strict containment installation standards.

b. Stocking either with local broodstock or with salmon which are incapable of interbreeding or competing with native wild fish.

c. Prohibition of the introduction of transgenic fish.

- Disease. Action is needed to prevent the possible transmission to wild stocks of disease occurring at levels exacerbated by the population concentrations and stresses experienced in aquaculture, by:

a. Strict control of the importation and movement of stocks between sites.

b. Continuing eradication and prevention programmes, including the destruction of infected or exposed fish, for Infectious Salmon Anaemia and *Gyrodactylus salaris*. Downgrading of either would be unacceptable.

c. Implementation as necessary of effective vaccination, medication and stock destruction programmes for farmed fish.

- Research. All interested parties, including governments, should support research into the effects on the wild stocks of cage aquaculture and escapes.

- Restoration. When justified by improved conditions, appropriate stock restoration measures should be launched to rectify historical damage, with the support of all interests involved.

- Collaboration and consultation. Local agreement should be reached on all installation, operation and rehabilitation questions.

Targets

NGOs recommend the adoption of the following Target Principles:

T1 Full adoption of the Precautionary Approach to the impacts of aquaculture on wild salmonids

T2 Full implementation of the Oslo Resolution

T3 Effective government or independent regulation of the Aquaculture Industry

T4 Establishment of sustainable management practices

T5 The need for independent inspection and subsequent enforcement of regulations

T6 Recognition of the value of wild stocks and the need to redress historical damage

Proposed Action Plan

NGOs suggest the adoption of a phased Action Plan:

A1 Establish co-ordinated effective lice treatment, set minimum lice numbers, and establish inspection and enforcement procedures

A2 Establish exclusion zones and acceptable distances for salmon farms from migratory routes

A3 Critically assess the environmental acceptability of all new proposals for openings

A4 Undertake retrospective assessments for all sites

A5 Commission research into new technology, e.g. on-land or highly exposed sites

A6 Address historic damage to wild stocks, and implement restoration programmes when justified by improved conditions

Opening Statement made by the Atlantic Salmon Federation

The Atlantic Salmon Federation (ASF) is encouraged by some of the progress made in North America during the past year to further the conservation principles outlined in the International Atlantic Salmon Accord.

That said, however, we are deeply concerned by this year's ICES advice which indicates that North American Atlantic salmon populations, and particularly, the important large salmon component, have declined to their lowest level ever.

With this in mind, the Atlantic Salmon Federation is urging the Parties to NASCO's West Greenland Commission to heed the advice from ICES and arrive at an agreement for zero harvest for Greenland's salmon fishery. The further decline of pre-fishery abundance of North American salmon to less than 50% of the spawning requirement clearly calls for this action. The fact that up to 80% of the salmon killed at Greenland are of North American origin, that Canada has permanently retired several thousand commercial salmon fishermen at great expense and personal loss, and that the few remaining wild Atlantic salmon in the United States are candidates for Endangered Species Listing warrants nothing less. During these times of critically low salmon abundance we must stop talking about precautionary management and do it.

ASF fully supports the NGO statement on aquaculture and habitat issues, which are consistent with the recommendations made in the International Accord. ASF is deeply concerned about the impact of aquaculture on wild salmon and their environment. There is overwhelming circumstantial and growing scientific evidence of negative impacts that the Atlantic salmon aquaculture industry is inflicting upon the wild Atlantic salmon populations of the rivers located near the industry in Maine and Canada.

On-going and proposed aquaculture practices in North America threaten wild stocks. One high profile example is the use of European strains of Atlantic salmon in Maine. This is a violation of NASCO protocols for the introduction and transfer of salmonids, the principles of precautionary management, and the Oslo Resolution to Minimize the Impacts of Salmon Aquaculture on Wild Salmon Stocks.

ASF believes that aquaculture and wild salmon can co-exist, but not under current conditions. We urge all NASCO Parties to develop international codes of practice for a sustainable aquaculture industry. All Parties must cooperatively research the interactions between wild and farmed salmon, identify the problems and develop mitigation plans. This does not mean that aquaculture can operate as its developers see fit until conservationists prove the harmful effects. In the face of uncertainty as to whether aquaculture operations will impact wild salmon populations, the precautionary approach requires that we do not take risks that could have irreversible impacts.

Research that ASF is carrying out on New Brunswick's Magaguadavic River, which has become the North American index river for the study of the interaction between wild salmon and aquaculture escapees, indicates that aquaculture fish are negatively impacting the wild run, which has steadily declined since the inception of the aquaculture industry. Aquaculture escapees comprise 67 to 70% of salmon entering the Magaguadavic River. Egg deposition fell to 2.3% of the conservation requirement in 1998. The problem is so acute that ASF initiated freezing wild stock milt to preserve genes. Our research, carried out in collaboration

with the New Brunswick and federal governments, has shown that, in recent years, sea cage escapees outnumbered wild fish in returns to this river by as much as eight to one; that aquaculture salmon are spawning in the river and introducing domesticated genes that are not specific to the river; and that aquaculture hatcheries on the Magaguadavic watershed are massively leaking domesticated juvenile salmon which are competing with the wild parr for habitat and food.

Collectively, we have the capacity to address the threats aquaculture poses to wild salmon; we simply need the political will and courage to act.

Opening Statement made by the Atlantic Salmon Trust

Mr President:

May I begin by confirming the support of the Atlantic Salmon Trust for the joint NGO statement, introduced by the representative of WWF (Norway). As regards the Trust itself, I should like to bring three points to the attention of the Council.

The first follows on from yesterday's liaison meeting on the impacts of aquaculture. It has to do with the specific problems of the West Highland rivers, where there has been a virtual collapse of sea trout and salmon stocks. I am pleased to inform the Council of the formation of a joint Working Group, involving the wild fishery management and conservation interests (including the Association of Salmon Fishery Boards and the Atlantic Salmon Trust, both represented here), the Scottish Salmon Growers' Association and the Scottish Office, which also chairs the group. This Working Group aims to involve all the parties in achieving a practical collaborative approach to the resolution of the problem. Its task is to develop and promote the implementation of measures for the restoration and maintenance of healthy stocks of wild and farmed fish, and for the regeneration of wild salmon and sea trout stocks.

The second piece of information is that the Atlantic Salmon Trust, in conjunction with the North Atlantic Salmon Fund (UK), has issued a paper on the interceptory exploitation of salmon. This paper reiterates the long-standing case against mixed-stock fisheries around the United Kingdom, and makes initial proposals for a means of closing these fisheries, with fair compensation. The paper has gone to the Review Group which is examining Salmon and Freshwater Fisheries in England and Wales, and will be submitted formally to government departments once the views of other organizations have been obtained.

My final point concerns the notice, which all delegates will have seen, of the publication later this year of "The Ocean Life of Atlantic Salmon". This book contains the collected papers and discussions from a workshop organised last November by the Atlantic Salmon Trust on the problems facing salmon in the sea. This workshop brought together an unprecedented group of climatologists, oceanographers, planktologists and marine and salmon biologists to examine the current decline in the marine survival of salmon. I recommend the book to delegates.

Thank you, Mr President.

Opening Statement made by the European Anglers Alliance

Ten NGOs from France, Norway, Ireland, England, Wales, Northern Ireland and Scotland support the general statement which has just been made, but wish to comment from a specific European perspective on the impacts of aquaculture.

This is a very short verbal statement; a full written statement will be circulated.

It is clear that implementation of the Oslo Resolution has been very variable. Since 1994 *Gyrodactylus* has devastated salmon rivers in Norway, sea lice have seriously impacted on sea trout and salmon stocks in Norway and on the west coasts of Scotland and Ireland. In addition there have been serious outbreaks of many bacterial and viral diseases, culminating in the latest outbreaks of ISA in Canada and Scotland.

We are all aware of these problems and take some comfort from the presentations made by Canada and Norway yesterday, and new initiatives in Ireland and Scotland. Even so, the fact that there are still an estimated one million escapees per annum in Norway, the lack of enforcement of existing legislation in Ireland and the absence of <u>any</u> independent regulatory structure in Scotland, are totally unsatisfactory.

Mr President, all the NGOs call for a <u>real</u> commitment from the Parties to fully implement the Oslo Resolution and the precautionary approach.

This statement is supported by:

AIDSA
EAA
FISSTA
NARA
Norwegian Farmers Union
Norwegian Salmon Rivers
SANA
STA
UAF
WWF (Norway)

Opening Statement made by the Federation of Irish Salmon and Sea Trout Anglers

A h-Uachtarain agus a chairdhe na mBradain ar fud an domhain. Cead Mile Failte gu leir chuig an dTir seo.

Mr President and Friends of the Wild Salmon from many parts of the world: a hundred thousand welcomes to you all to this country.

Although it gives me honour and pleasure to extend this welcome it is somewhat sad that FISSTA's deceased President and friend of many of you, Jim Maxwell, is not here to do so. He had eagerly looked forward to the day when the NASCO meeting came to Ireland.

FISSTA was among the first NGOs to get accreditation to NASCO and helped to develop their role in bringing invaluable practical experience and views to your deliberations. I shall be brief as we have produced a comprehensive booklet on our views and policies which each of you received.

FISSTA's annual statements have regrettably had to criticise the Irish Marine Department for its failure to protect the wild salmon from indiscriminate drift nettings of mixed migratory stocks of this country and indeed of other nations too. Allied to this has been the virtual collapse of our sea trout due to lice infestation from badly sited and managed salmon farm aquaculture.

So utterly frustrated, angry but very determined are our Federation members throughout Ireland to rectify these matters that large numbers wanted to converge upon this town to demonstrate before and remonstrate with the international delegates to bring their presence here and powerful influence to bear on the Irish authorities to end these wasteful and destructive practices.

However, FISSTA reluctantly decided to refrain from this course of action for several reasons. Perhaps through a sense of patriotism/pride of country in not wishing in the least that you, our foreign guests and friends, should feel Irish hospitality and warm welcome diminished. We are conscious also of the tremendous organisational input and lavish hospitality and functions arranged for you by the Marine Department, Central and Regional Fishery Boards for this event. Although our relationship with Governmental Fisheries Departments over their policies is very poor, we recognise that given correct conservation and enhancement policies and the necessary funding our fishery personnel and biologists should be among the foremost in the world. That was clearly seen and acknowledged by all following Dr Martin O'Grady's excellent presentation on aquatic habitat restoration.

FISSTA wishes to have a meaningful dialogue with the Marine Department - being consulted and spoken with, rather than "down to" as heretofore. We should trust, but expect, that FISSTA's restraint and gesture of good intent on this occasion will be reciprocated by the relevant authorities so that together we may enter the New Millennium with a new beginning, enabling Ireland to take its natural place as the "Mecca" amongst the salmonid nations.

Go Raibh Mile Maith Agaibh - A thousand thanks to you all.

Opening Statement made by the Institute of Fisheries Management

Mr President, Distinguished Delegates, Ladies and Gentlemen:

May I thank you on behalf of the Institute of Fisheries Management for once again being able to participate in your Annual Meeting and for the opportunity to contribute to the conservation of the Atlantic salmon.

The Institute is heartened to see the efforts of delegations and NGOs in promoting the case for the protection of salmon stocks and wishes to draw attention to two major issues which we believe are vitally important in securing exploitable populations of this most valuable resource.

The first is your Council's welcome decision at its meeting in Edinburgh last year to adopt the Precautionary Approach to Salmon Management. We note and support the efforts made by your working party to produce an action plan to promote this approach and we implore all Contracting Parties to ensure that their Governments and their Agencies fully adopt this principle in favour of the protection of wild stocks. We hope to see, Mr President, in the very near future, concrete examples of the implementation of this philosophy.

Secondly, Sir, we saw in your special session yesterday on habitat issues that much of the degradation of salmon habitat has resulted from the unsustainable development of agriculture, supported by inappropriate economic support schemes, which have given little thought to the protection of the environment. We request all relevant Contracting Parties to review their agricultural support mechanisms to ensure that environmental restoration becomes a condition of all such schemes.

Mr President, we wish you well, Sir, and extend our good wishes for a most successful Sixteenth Annual Meeting.

Opening Statement made by the National Anglers Representative Association

Mr President, Fellow Delegates:

On behalf of NARA I wish you and NASCO a Céad Míle Fáilte on your visit to Ireland for the Sixteenth Annual Meeting. As previously stated, I am in full agreement with the joint statement by the NGOs.

I do not wish to delay the meeting by repeating the valuable points made in that statement and other opening statements made so far.

I would like to refer to two initiatives by the Irish Government:

- the proposed introduction of tags and quotas;
- the proposed establishment of a Salmon Management Commission.

The Minister, Dr Michael Woods, announced that tags would be introduced for all salmon captured by all methods as of 1 May, 1999. We are disappointed that this has been deferred to January 1, 2000. We call on NASCO to impress on our Minister the urgent need to do this as promised.

The other initiative promised by Minister Woods was the establishment of the Salmon Management Commission to determine tags and quotas and to put in place a proper Management regime for wild Atlantic salmon. We believe that the appointment of this Commission is imminent and we call on NASCO to encourage the Irish Government to make this appointment as soon as possible in the interest of our beloved Atlantic salmon.

Mr President, I thank you for the opportunity to make this opening statement and I wish this conference every success during the week.

Go Raibh Mile Maith Agaibh.

Thank you.

Opening Statement made by the Salmon Net Fishing Association of Scotland

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

The Salmon Net Fishing Association of Scotland welcomes this opportunity to make an Opening Statement at this, the Sixteenth Annual Meeting of NASCO.

For the last seven years at each Annual Meeting of NASCO my Association has drawn attention to the rapid increase (from an estimated 65,000 animals in the mid 1970's to in excess of 100,000 animals in the mid 1990's and still increasing at about 7% per annum) in the all-age grey seal population in British waters with at least 90% associated with colonies breeding around the Scottish coast and adjacent islands. The increase in the numbers of common seals has been less dramatic but in some sensitive areas numbers have also increased.

Seals are no longer limited to the coast, sea lochs and estuaries as they are now regularly seen many miles above the head of tide in both small and large rivers. At such locations their diet is unlikely to be sand eels.

At some netting stations the number of seals can no longer be controlled and the fishermen are leaving netting berths vacant rather than set nets to catch salmon to feed seals.

Data collected in 1970-1997 at net fisheries located on the coast near Montrose and in the River North Esk by the Department's own scientists show a four-fold increase in the percentage of seal-damaged salmon in the catch taken before 1 June. Although the proportion of seal-damaged salmon occurring in catches taken at most stations after 31 May was generally less, the underlying trend was still upwards.

For the second successive year the Reports from both the Working Group on North Atlantic Salmon (CNL(99)11) and the Advisory Committee on Fishery Management (CNL(99)12) have drawn attention to the possible impact which predators, including seals, may be inflicting on returning salmon. One analysis of relevant data from North American rivers suggest that seals could have accounted for a substantial fraction of salmon mortality at sea and may have contributed to declining returns of North American salmon. In this context the implementation of the Canadian Fisheries Resource Council's recommendation to create "no-seal" zones in selected coastal areas of Atlantic Canada is an interesting concept.

Mr President, this Organization has made great progress since its establishment and has shown itself willing and able to deal with a wide range of issues facing the wild Atlantic salmon as they have arisen. These include fishing for salmon in international waters, transgenic salmon, introductions and transfers and the impacts of aquaculture. In addition it has established regulatory measures that have required very major sacrifices by Greenland and Faroes in order to ensure that the quotas fished reflect the declining state of the stocks. It is surely not unreasonable, therefore, to request the reinstatement of predation on the agenda. No longer can it be ignored simply because it is political dynamite in some countries. Otherwise fishermen across the North Atlantic who have had to bear the brunt of the restrictions placed on fisheries may have good reason to question the credibility of the decisions taken by NASCO.

This statement has the support of all NGOs, apart from one, attending this meeting.

Thank you, Mr President.

Opening Statement made by the Ulster Angling Federation

Greetings from the UK (Northern Ireland) to all those attending the meeting in Westport.

The adoption of the Precautionary Approach at the Fifteenth Annual Meeting of NASCO was a milestone and we ask all Parties to give the greatest commitment possible to the application of this approach - immediately.

Unfortunately, already in the UK (Northern Ireland) the Government have stated that the Precautionary Approach will not be implemented. A need for more research has been stated as the reason.

The levels of unreported catch continue to cause great concern and surely dwarf many of the other factors being cited as problems. Much more effort is needed to consider this.

Whilst many agencies and governments are promoting a vast amount of research and work in relation to the various "environmental" factors responsible for the reduction in salmon numbers, the netting of salmon in the UK and Ireland continues unabated. The UK and Irish Governments continue to run away rather than face the netting issue. How long are we going to dance around this subject, before it is addressed? Why should the Faroes and Greenland adopt quotas when our own drift nets work unhindered on mixed stock fisheries and, in the case of Ireland, increase their chances by the legalisation of the monofilament net.

"Do as I say, not as I do" is the official policy of the UK and Ireland on salmon netting. These two Governments very pointedly killed off a specific European Union Directive, which would have addressed the issue of salmon drift nets.

This issue, which has isolated the UK and Ireland so markedly in salmon policy, is perhaps the major barrier to progress facing NASCO, and we urgently request that the first steps are taken in this regard.

The present thrust of salmon policy at NASCO is reactive in nature and therefore will always be limited in its potential.

We implore NASCO to take the first steps towards the production of a proactive salmon policy to be a blueprint for the future. The "International Salmon Accord", as published at the Fifteenth Annual Meeting of NASCO, might form the nucleus of such a policy. At present we are walking down a road and just going where it may take us. A document is needed that states where we want to be. Then we can debate how to get there.

Anyone need directions?

We trust all those attending will enjoy their visit to Ireland - with best wishes for a successful meeting.

ANNEX 4

List of Participants

* Denotes Head of Delegation

CANADA

*Mr Jacque Robichaud	Representative Department of Fisheries and Oceans, Ottawa, Ontario
Mr James Gillespie	Representative Quispamsis, New Brunswick
Mr Pierre Tremblay	Representative Fédération québécoise pour le saumon atlantique, Quebec
Mr Luc Berthiaume	Government of Quebec, Quebec
Mr Michael Calcutt	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Ken Curnew	Department of Forest Resources and Agrifoods, Province of Newfoundland and Labrador, St John's, Newfoundland
Mr David Dunn	Department of Fisheries and Oceans, Moncton, New Brunswick
Mr Wayne Follett	Department of Fisheries and Oceans, St John's, Newfoundland
Ms Anne Frennette	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Murray Hill	Department of Fisheries, Pictou, Nova Scotia
Mr Marc Kielley	Newfoundland Aquaculture Industry Association, St John's, Newfoundland
Mr Pierre Lemieux	Department of Fisheries and Oceans, Ottawa, Ontario
Ms Kim Lipsett	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 Iola Price	Department of Fisheries and Oceans, Ottawa, Ontario

Ms Tara Smith	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Jack Taylor	Office of the Commissioner for Aquaculture Development, Ottawa, Ontario
Mr Peter Whittle	Department of Forest Resources and Agrifoods, St John's, Newfoundland

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*Mr Hedin Weihe	Representative Faroese Home Government, Torshavn
Mr Einar Lemche	President of NASCO Greenland Home Rule, Copenhagen
Ms Rikke Nielsen	Representative Greenland Home Rule, Nuuk
Mr Jan Arge Jacobsen	Fisheries Lab of the Faroes, Torshavn
Mr Per Kanneworff	Greenland Institute for Natural Resources, Copenhagen
Mr Niels Jacob Nielsen	Felagid Laksaskip, Klaksvik
Mr Mogens H Pedersen	Ministry of Foreign Affairs, Copenhagen
Mr Sofus Poulsen	Faroese Commercial Attaché, Aberdeen
Mr Emanuel Rosing	Greenland Home Rule, Nuuk

EUROPEAN UNION

*Mr Ole Tougaard	Representative European Commission, Brussels
Mr Andrew Thomson	Representative European Commission, Brussels
Mr Jacob K Andersen	Ministry of Food, Agriculture and Fisheries, Copenhagen
Mr John Browne	Department of the Marine and Natural Resources, Dublin
Ms Hazel Campbell	Department of Agriculture for Northern Ireland, Belfast
Mr Eamon Cusack	Shannon Fisheries Board, Limerick
Mr David Dunkley	Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh

Mr Paul Farrell	Central Fisheries Board, Dublin
Mr Lal Faherty	Western Fisheries Board, Galway
Mr Brian Finn	Fisheries Conservancy Board of Northern Ireland, Craigavon
Mr Richard Flynn	Irish Salmon Growers Association
Dr Greg Forde	Western Regional Fisheries Board, Galway
Mr Peter Funegard	National Board of Fisheries, Gothenburg
Dr Paddy Gargan	Central Fisheries Board, Dublin
Mr Peter Heffernan	Marine Institute, Dublin
Mr Curt Insulander	Salmon Research Institute, Alvkarleby
Ms Eilish Kennedy	Department of the Marine and Natural Resources, Dublin
Mr Heikki Lehtinen	Ministry of Agriculture and Forestry, Helsinki
Mr Ivor Llewelyn	Ministry of Agriculture, Fisheries and Food, London
Dr Guy Mawle	Environment Agency, Bristol
Ms Diane McLafferty	Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh
Mr Philip McMahon	Department of the Marine and Natural Resources, Dublin
Dr Nigel Milner	Environment Agency, Cardiff
Mr Maurice Mullen	Department of the Marine and Natural Resources, Dublin
Mr Pentti Munne	Ministry of Agriculture and Forestry, Helsinki
Mr Eero Niemela	Finnish Game and Fisheries Research Institute, Helsinki
Mr Michael O'Cinneide	Southern Fisheries Board, Clonmel
Mr John O'Connor	Central Fisheries Board, Dublin
Dr Martin O'Grady	Central Fisheries Board, Dublin
Dr Niall O'Maoiléidigh	Fisheries Research Centre, Dublin

Mr Ted Potter	Centre for Environment, Fisheries & Aquaculture Science, Lowestoft
Mr Gorm Rasmussen	Danish Institute for Fisheries Research, Silkeborg
Mr Robin Rosenkranz	Ministry of Agriculture, Stockholm
Mrs Susana Salvador	Ministry of Agriculture, Lisbon
Mr Lars Erik Svensson	Council of the European Union, Brussels
Mr George Thomson	Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh
Dr Achim Viereck	Ministry of Agriculture, Bonn
Dr Ken Whelan	Salmon Research Agency of Ireland, Newport
Prof Noel P Wilkins	National University of Ireland, Galway
Mr Alan Youngson	Scottish Office Agriculture, Environment and Fisheries Department, Aberdeen

ICELAND

Mr Eidur Gudnason	Representative Ambassador for Natural Resources and Environmental Affairs, Reykjavik
Mr Arni Isaksson	Representative Directorate of Freshwater Fisheries, 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 Bjarne Aalvik	Directorate of Fisheries, Bergen
Mr Dagfinn Gausen	Directorate for Nature Management, Trondheim
Dr Lars Petter Hansen	Norwegian Institute for Nature Research, Oslo
Ms Tone H Svensen	Ministry of Fisheries, Oslo

Ms Bente Wilhelms	Ministry of Agriculture, Oslo

RUSSIAN FEDERATION

*Mr Vladimir Moskalenko	Representative PINRO, Murmansk
Mr Alexej Grushko	State Committee for Fisheries, Moscow
Mr Victor Nesvetov	JV Arctic Salmon, Murmansk
Mr Boris Prischepa	Murmanrybvod, Murmansk
Ms Elena Samoilova	PINRO, Murmansk
Dr Alexander Zubchenko	PINRO, Murmansk

USA

*Dr Andrew Rosenberg	Representative National Marine Fisheries Service, Silver Spring, Maryland
Mr Robert Jones	Representative Connecticut River Salmon Association, S. Windsor, Connecticut
Dr Ray B Owen, Jr.	Representative Bangor, Maine
Ms Kimberly Blankenbeker	National Marine Fisheries Service, Silver Spring, Maryland
Dr Russell Brown	National Marine Fisheries Service, Woods Hole, Massachusetts
Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts
Dr James Geiger	US Fish and Wildlife Service, Hadley, Massachusetts
Mr David Kerstetter	National Marine Fisheries Service, Silver Spring, Maryland
Dr Dan Kimball	US Fish and Wildlife Service, Nashua, New Hampshire
Mr George Lapointe	Maine Department of Marine Resources, Augusta, Maine
Mr Joseph McGonigle	Maine Aquaculture Association, Brewer, Maine

Dr Jean-Pierre Plé	Department of State, Office of Marine Conservation, Washington DC
Mr Thomas Royal	Atlantic Salmon of Maine, Fairfield, Maine
Mr Randall Snodgrass	World Wildlife Fund, Washington DC
Ms Boyce Thorne-Miller	Sea Web, Dickerson, Maryland

INTER-GOVERNMENT ORGANIZATIONS

Prof Christopher Hopkins	International Council for the Exploration of the Sea, Copenhagen
Mr Jean-Jacques Maguire	International Council for the Exploration of the Sea, Sillery, Quebec

NON-GOVERNMENT ORGANIZATIONS *

Mr Frederic Mazeaud	AIDSA, France
Mr Juan Antonio Martin Ventura	AIDSA, Spain
Mr Brian Davidson	Association of Salmon Fishery Boards, Scotland
Mr William Taylor Ms Sue Scott	Atlantic Salmon Federation, Canada
Captain Jeremy Read	Atlantic Salmon Trust, UK
Mr Mark Boyden	Coomhola Salmon Trust Limited, Ireland
Mr Chris Poupard	European Anglers Alliance Salmon and Trout Association, UK
Mr Richard Behal Prof Graham Shaw Mr Declan Anderson Mr Noel Carr	Federation of Irish Salmon and Sea-Trout Anglers, Ireland
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 Bjorn Moe Mr Finn Odegard	Norskelakseelver (Norwegian Salmon Rivers), Norway
Mr William Shearer	Salmon Net Fishing Association of Scotland, Scotland

Mrs Fiona Willis	Salmon and Trout Association, UK
Mr Ian Calcott	Scottish Anglers National Association, UK
Mr Newell McCreight Mr Paul Johnston	Ulster Angling Federation, Northern Ireland
Mr Henning Roed	World Wide Fund for Nature, Norway

* *Up to two representatives from Non-Government Organizations are allowed to attend the meetings of the Council and Commissions at any time.*

SECRETARIAT

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

Support to the Secretariat

Ms Philomena Harte Ms Carol Deane	Department of the Marine and Natural Resources, Dublin

ANNEX 5

CNL(99)39

Sixteenth Annual Meeting of the Council
Hotel Westport, Westport, Ireland
7-11 June 1999

Agenda

1. Opening Session

2. Adoption of Agenda

3. Administrative Issues

3.1 Secretary's Report

3.2 NASCO Website

3.3 New NASCO Handbook

3.4 Report of the Finance and Administration Committee

3.5 Reports on the Activities of the Organization

3.6 Announcement of the Tag Return Incentive Scheme Grand Prize

4. Scientific, Technical, Legal and Other Information

4.1 Scientific Advice from ICES

4.2 Report of the Standing Scientific Committee

4.3 Catch Statistics and their Analysis

4.4 Review of International Salmon-Related Literature Published in 1998

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

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

5.2 Adoption of an Action Plan for Application of the Precautionary Approach

5.3 Unreported Catches

5.4 By-catch of Atlantic Salmon

5.5 Fishing for Salmon in International Waters by Non-Contracting Parties

5.6 Scientific Research Fishing in the Convention Area

5.7 Impacts of Aquaculture on Wild Salmon Stocks

(a) Special Liaison Meeting to Review Measures to Minimise Impacts of Aquaculture on the Wild Stocks
(b) Returns made in Accordance with the Oslo Resolution
(c) Pros and Cons of the Use of Sterile Salmon in Aquaculture
(d) Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group
(e) Development of Guidelines on Physical Containment Measures and Husbandry Practices for Salmon Farming
(f) Transgenic Salmon
(g) Implementation of the Oslo Resolution

5.8 Special Session on Habitat Issues

5.9 Guidelines on Stocking

5.10 Reports on Conservation Measures Taken by the Three Regional Commissions

6. Other Business

7. Date and Place of Next Meeting

8. Draft Report of the Meeting

9. Draft Press Release

ANNEX 6

Council

CNL(99)40

2000 Budget, 2001 Forecast Budget and Schedule of Contributions

North Atlantic Salmon Conservation Organization
2000 Budget and 2001 Forecast Budget (Pounds Sterling)

SECTION	DESCRIPTION	EXPENDITURE	
		BUDGET 2000	FORECAST 2001
1	STAFF RELATED COSTS	226,500	233,280
2	TRAVEL AND SUBSISTENCE	34,000	28,320
3	CONTRIBUTION TO ICES	25,260	29,350
4	CONTRIBUTION TO WORKING CAPITAL FUND	0	0
5	MEETINGS	6,000	19,290
6	OFFICE SUPPLIES, PRINTING AND TRANSLATIONS	26,000	32,810
7	COMMUNICATIONS	12,000	12,350
8	HEADQUARTERS PROPERTY	-23,520	-22,860
9	OFFICE FURNITURE AND EQUIPMENT	7,250	7,460
10	AUDIT AND OTHER EXPENSES	8,500	8,740
11	TAG RETURN INCENTIVE SCHEME	4,550	4,550
	TOTAL	326,540	353,290

		REVENUE	
		BUDGET 2000	FORECAST 2001
12	CONTRIBUTIONS - CONTRACTING PARTIES	329,265	360,290
13	MISCELLANEOUS INCOME - INTEREST	10,000	11,000
14	STABILISATION	-18,000	-18,000
15	SURPLUS OR DEFICIT (-) FROM 1998	5,275	0
	TOTAL	326,540	353,290

Adjustments to 1999 Contributions (Pounds Sterling) to take into account Confirmed 1997 Catch Statistics

Party	1997 Provisional Catch	1997 Confirmed Catch	1999 Contribution based on Provisional Catch	1999 Contribution based on Confirmed Catch	Adjustment to 1999 Contribution
Canada	225	229	35,888	35,937	+50
Denmark (Faroe Islands and Greenland)	59	59	19,673	19,585	-88
European Union	1,147	1,179	125,947	127,317	+1,370
Iceland	154	154	28,953	28,723	-229
Norway	630	630	75,447	74,509	-938
Russian Federation	111	111	24,752	24,587	-165
USA	0	0	13,910	13,910	0
TOTAL	2,326	2,362	324,570	324,570	0

Note: A positive adjustment represents an underpayment in 1999.

NASCO Budget Contributions for 2000 and Forecast Budget Contributions for 2001 (Pounds Sterling)

Party	1998 Provisional Catch (tonnes)	Contribution for 2000	Adjustment from 1999	Adjusted Contribution for 2000	Forecast Contribution for 2001
Canada	149	28,505	+50	28,555	31,190
Denmark (Faroe Islands and Greenland)	17	15,754	-88	15,666	17,238
European Union	1,185	128,581	+1,370	129,951	140,697
Iceland	164	29,954	-229	29,725	32,776
Norway	740	85,595	-938	84,657	93,660
Russian Federation	131	26,766	-165	26,601	29,288
USA	0	14,111	0	14,111	15,441
TOTAL	2,386	329,265	0	329,265	360,290

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

ANNEX 7

Council

CNL(99)12

Report of the ICES Advisory Committee on Fishery Management

CNL(99)12

Report of the ICES Advisory Committee on Fishery Management

Source of information: Report of the Working Group on North Atlantic Salmon, April 1999 (ICES Doc. CM 1999/ACFM:14).

Sections 1-4 of this report are set out in the order of the questions from NASCO to ICES (Appendix 1).

1. ATLANTIC SALMON IN THE NORTH ATLANTIC AREA

1.1 Overview of Catches

1.1.1 Nominal catches

Nominal catches of salmon by country in the North Atlantic (including ranched salmon in Iceland) for 1960-98 are given in Table 1.1.1. Reported catches (in tonnes), in four North Atlantic regions are illustrated in Figure 1.1.1, and those for NASCO Commission Areas, 1993-1998 are shown below:

Area	1993	1994	1995	1996	1997	1998
NEAC	3335	3569	3279	2746	2087	2239
NAC	376	358	261	294	231	151
WGC	0	0	85	92	59	11
Total	3711	3927	3625	3132	2377	2401

The catch data for 1998 (Table 1.1.1) are provisional and incomplete, but the final figures are unlikely to exceed 2 500 t. Catches in most countries remain below the averages of the previous 5- and 10- years. Much of the reduction in catches in recent years can be accounted for by management plans which have reduced fishing effort in several countries.

1.1.2 Catch and release of salmon

Catch and release data for 1SW (small), MSW (large) and/or 'total' salmon were provided for recent years by six countries. In 1998, the proportion of the total rod catch that was released ranged from 100% in the USA to 7% in Iceland. Eighty-one percent, 52%, 30% and 19% of catches in Russia, Canada, UK (England & Wales) and UK (Scotland), respectively, were caught and released.

1.1.3 Unreported catches of salmon

The total estimate of unreported catch within the NASCO Commission Areas in 1998 was 1 210 t (Table 1.1.1), nearly 35% of the total of reported and unreported catch. The estimate for 1998 is an increase of 46% compared with 1997 (827 t) and an increase of 2% compared to the 1993-1997 mean of 1 186 t. There are no data available on salmon catches in international waters in 1998. Estimates (in tonnes) for the Commission Areas are given below:

Area	1993	1994	1995	1996	1997	1998
NEAC	1471	1157	942	947	732	1108
NAC	161	107	98	156	90	91
WGC	12	12	<20	<20	5	11
International waters	25-100	25-100	n/a	n/a	n/a	n/a

ICES notes that for many countries the methods used to produce these estimates were developed some years ago. Recent reductions in returns of salmon to many areas and corresponding changes in management regimes may have resulted in the estimates of unreported catches being even more uncertain than in the past.

1.1.4 Production of farmed and ranched salmon

The world-wide production of farmed Atlantic salmon in 1998 was 710 342 t. This is the largest production in the history of the industry (Figure 1.1.4) and represents a 12% increase over 1997 (634 418 t) and a 50% increase on the 1993-1997 average (475 032 t). The worldwide production of farmed Atlantic salmon in 1998 was over 295 times the nominal catch of Atlantic salmon in the North Atlantic.

In 1998, the production of farmed Atlantic salmon in the North Atlantic area was 538 011 t, which was a further 7% increase compared to 1997 (501 067 t) and a 37% increase on the 1993-1997 average (391 627 t). The countries with the largest production were Norway and Scotland, which accounted for 64% and 21% of the total respectively. Production outside the North Atlantic Area reached 172 331 t, i.e. 24% of the total world production of farmed salmon. Areas of largest production outside the North Atlantic were Chile (73%) and western Canada (19%).

The total production of ranched Atlantic salmon in countries bordering the North Atlantic in 1998 was 47 t, 10 t less than in 1997. The majority (72%) of the ranching is conducted in Iceland where ranched production is now less than one third of the nominal catch of wild fish.

1.2 Evaluation of Non-Catch Fishing Mortality for all Atlantic Salmon Gear

Mortalities generated directly or indirectly by fishing but not included in recorded catches are referred to as non-catch fishing mortality. The following seven sources of non-catch fishing mortality for Atlantic salmon fishing gear are known to occur throughout the North Atlantic: (1) *Predation mortality* occurs when salmon caught in various types of fishing gear are subsequently removed, eaten, lost, or released from the gear (or badly damaged) by the activity of seals, otters, other species of fish, gulls or other predators; (2) *Dropout mortality* occurs when fish are caught and killed by the gear but lost prior to hauling the net; (3) *Haul-back mortality* occurs when fish are caught and killed by the gear but are lost as a result of hauling back; (4) *Escapement mortality* occurs when fish encounter and are temporarily caught by the gear, escape from it (or are intentionally released) or pass immediately through the gear but die later from various injuries or stress from the "encounter", or from increased predation due to their greater vulnerability to various predators; (5) *Discard mortality* occurs when fish that are caught are discarded (dead or alive) and not included in the reported catches; (6) *Catch and release mortality* (often termed hook and release) occurs in recreational angling fisheries when salmon are caught and released, either voluntarily or as a

result of mandatory requirements to do so, and (7) *Unreported catch* which results from local sales, consumption of salmon by fishermen, sale of fish directly to the consumer, by-catch of salmon taken in gear not licensed to harvest salmon, and catches not otherwise recorded in official catch statistics.

The contribution of most sources of non-catch fishing mortality is low (0-10%) but highly variable, and some forms (for example, dropout and haul-back mortality) do not apply to many of the currently operating fisheries for salmon, because the fishing methods and gear used are not immediately lethal to the fish. Some of the factors known to contribute to variation in non-catch fishing mortality within and among fisheries include gear type, duration of time that the gear is fished or set, gear selectivity, fish size and state of maturity, weather conditions, and the care used in releasing fish which are not retained.

1.3 Recent Research Developments

1.3.1 Atlantic salmon post-smolt nurseries in the Northwest Atlantic

ICES considered temperature and chlorophyll abundance data as indicators of the nursery habitat suitability in the Northwest Atlantic. From the analysis, it was suggested that optimal thermal conditions for post-smolts and production conditions for forage species may define nursery areas in inshore and offshore waters.

1.3.2 Migration of kelts in relation to sea water temperatures in Newfoundland

Data storage tags (DST) manufactured by Kiwi Inc. were applied to 139 Atlantic salmon kelts at enumeration facilities on Western Arm Brook, Humber, Campbellton and Highlands rivers in Newfoundland. Data from 11 recaptures at large for 34-112 days indicated differences in temperatures encountered by kelts of the different rivers as well as differences among kelts within a river. Salmon spent most of their time in 4.7-16.8^{o}C water but, unlike some Pacific salmon, did not exhibit detectable diurnal movements.

Water temperature profiles are useful for indicating water temperatures encountered by salmon in freshwater and in the sea and may prove useful for determining temperature preferences. This information is important for marine climate change models and water temperature protocols which may be used for closing angling fisheries in freshwater when water temperatures are high.

1.3.3 Release location of smolts

A total of 401 recaptures from 56 960 Carlin-tagged hatchery-reared smolts released between 1989 and 1997 in the River Dalälven (Bothnian Sea, Baltic) indicated that as little as 0.7 km distance between release sites effected significant differences in recapture locations. Smolts were produced in and released directly from two hatcheries situated 0.7 km apart. Recovery rates at a fishway located 0.8 km upstream of the upriver hatchery were significantly higher for fish originating from the upriver station than those originating at the downriver station. Salmon observed jumping at the outlet of the lower station prior to spawning suggested that hatchery return rates for the two stations could have been similar. If return rates were similar, the difference in recovery rates at the fishway may be a measure of the stray rate effected by a distance of 0.7 km.

1.3.4 Herring abundance and survival of salmon

Atlantic salmon post-smolts of European origin have been caught in the north-western Norwegian Sea a few weeks and months after leaving their home rivers. The distributions of Norwegian spring spawning herring and mackerel overlap with the timing and distribution of salmon post-smolts.

Post-smolts of Atlantic salmon may compete for food and space with other marine species, and thus adult herring may be competitors with Atlantic salmon in their area of overlap. Spawning biomass of Norwegian spring spawning herring and recapture rates of salmon tagged as smolts in the River Figgjo, Southeast Norway, were inversely related (Figure 1.3.4). This observation supports suggests an hypothesis that the presence of a large population of Norwegian spring spawning herring in the Norwegian Sea contributes could contribute to a decrease in recapture rate of salmon. The importance of this observation and range of possible explanatory hypotheses of mechanisms warrants further investigation.

1.3.5 Description of marine growth checks observed on the scales of salmon returning to Scottish homewaters in 1997

A substantial proportion of the scales collected and examined from salmon, in a number of fisheries throughout Scotland in 1997, exhibited summer growth "checks". For both 1SW and 2SW salmon, the incidence of checks was the highest on record. Checks were laid down in the 1996 calendar year in both sea age groups. The incidence of checks in 2SW salmon was significantly less than in 1SW salmon and varied significantly among months of capture for 1SW. In contrast, the position of the checks on the scales was consistent across all groups. While no significant link was shown with either growth or survival, these observations further focus attention on the marine phase of the salmon's life cycle and on changes in the marine environment that may have an impact upon growth and survival.

1.3.6 Seal and seabird predation

Available data are inadequate to evaluate the hypothesis that predation by seals and sea birds has directly caused the recent decline in North American salmon returns. For a causal relationship to be important, it must be shown that seals or sea birds can account for a substantial fraction of salmon mortality at sea.

Salmon were infrequent in the diets of gannets during August on the northeast coast of Newfoundland, 1977-1989, but increased in the 1990s to a peak of 6.4% in 1993. North American sampling programmes to examine seal diets have been designed to provide estimates for consumption of groundfish prey, particularly cod, so sampling of seals has not been intensive in many habitats where salmon post-smolts are thought to be relatively common. Moreover, diets are reconstructed from hard parts recovered in stomachs and scats, where again salmon otoliths may be less likely to be recovered than larger demersal otoliths from cod and other groundfish. Thus, although salmon remains were found in only 9 of over 5 000 seal stomachs, total consumption of salmon by seals may still be substantial, relative to sizes of salmon stocks present. A model based on estimated numbers of smolts leaving North American rivers, daily salmon biomass, predator vulnerability windows for various predators, and salmon consumption rates suggest that seals could have accounted for a substantial fraction of salmon mortality at sea. Results also suggested that, for these predator

populations, extremely large sample sizes would be required to detect and accurately characterise salmon predation.

Populations of grey, harp, and hooded seals and of gannets and common murres have increased in eastern North America since the 1970s. The rising populations of seals and some seabirds suggest that it is plausible that consumption by these predators may have contributed to declining returns of North American salmon. However, marine trophic interactions are complex and rising predator numbers do not necessarily depress prey populations.

1.3.7 Stock-recruitment relationships to define a conservation threshold and targets for Québec salmon rivers

Conservation thresholds for Atlantic salmon in Québec are being established using stock-recruitment (SR) analysis. Ricker's parameters (α, ß) were replaced respectively with the mean maximal catch over many years (Copt), and the catch rate at maximal catch, Copt (h*). The catch rate is equal to (Copt/(Sopt + Copt)) where Sopt is the average spawner requirement need to obtain Copt. A Bayesian approach was used to assess the uncertainties around the estimates, and to provide a risk analysis for suggested management actions. The new conservation thresholds will be defined by taking the MSY points determined from available SR relationships. These MSY points will initially be precautionarily fixed at 75% probability levels ($Sopt^{75\%}$). Management targets should be set at a higher level than the conservation threshold, depending on long-term management objectives.

SR relationships, associated reference points, and probability distributions, were calculated for six rivers for which good data were available (Figure 1.3.7). To export the reference points to other rivers for which data were more limited, a measure of eggs per unit of production (UP) or eggs per m^2 which corresponded to the conservation threshold was used as a basis of comparison. UP was based on habitat suitability indices (HSI), but can as well be based on wetted area accessible to salmon.

Two regressions were derived correlating either UP ($Y=1.67*UP$; $r^2= 0.89$) or wetted areas ($Y=1.04*m^2$; $r^2= 0.96$) with $Sopt^{75\%}$ values. The equations can be used to export Sopt values to rivers where SR relationships are unavailable; the slope is the eggs per unit value, and Y is the number of eggs needed to meet the conservation threshold. Further analysis on transporting conservation limits across rivers is underway using Bayesian hierarchical analysis. The output of this analysis is both an *a posteriori* probability distribution of Sopt for each of the index rivers, and an *a posteriori* predictive probability distribution of Sopt for a new river where no SR data are available. The posterior predictive distribution was wider than those of most of the index rivers reflecting increased uncertainty in Sopt for rivers where no SR data are available.

1.3.8 Forecasting 1999 returns and assessment of alternative management options on the R. Scorff, Brittany, France

Since 1995, smolt output and adult returns have been estimated on the River Scorff (southern Brittany, France). These data and the estimate of smolt output for 1998 were used to forecast 1SW returns in 1999. The analysis was undertaken under a Bayesian framework which took into account the uncertainty of the estimates of smolt production and adult returns

(measurement errors). The posterior predictive probability distribution (90% values) for the grilse returns in 1999 were 130 to 1 340 fish.

To evaluate the probability that escapement in 1999 will be above the conservation limit, the range of MSW returns, exploitation rates by sea-age class, and the current TAC based system of regulating exploitation were taken into account. The distribution of the egg deposition indicated that the probability of exceeding the conservation limit in 1999 is only 55%. Even if no fishery was allowed, the probability of falling below the conservation limit is still 30%, mainly because of the low smolt output in 1998. The probability distributions of the egg deposition obtained with or without TAC were compared and found to be mirror images, i.e. the TAC would not provide protection against overexploitation. Even a halving of the exploitation rates in 1999 from previous years would not reduce the probability of not achieving the conservation limit under the existing TAC.

Although preliminary, the analyses suggested that further evaluation of the performance of the management strategy currently applied on the salmon rivers of Brittany is required. The Bayesian statistics provide a more realistic view of stock status or management strategies than is provided by deterministic methods because they allow for a description of the uncertainty in the assessment process. Further work in this field should be promoted.

1.3.9 Salmon survey in the Labrador Sea in 1998

Experimental fishing was conducted by a Canadian research vessel fishing in the Labrador Sea in the fall of 1998. In total, nine stations were fished with surface-set fleets of monofilament gillnets of mesh size 77 mm, 89 mm, 102 mm, 115 mm, and 127 mm. In total, 38 salmon were caught, 24 of which were post-smolts, and the remainder of which were 1SW salmon. Catch rates were lower than previously experienced by research vessels fishing in the same area in the late 1980s. These data will be added to the information base of research in the Labrador Sea. More research on post-smolt and adult salmon at sea is encouraged.

1.3.10 North American salmon recruitment, smolt indices, marine habitat and harp seal populations

Significant relationships between recruitment of North American salmon, indices of smolt production based on 15 standard electrofishing sites in the Miramichi River, and either an index of salmon marine habitat (SHI) or annual population estimates of harp seals were reviewed. Development of a weighted index of North American pre-smolts followed (see Section 3.1.2) which also proved to be significantly correlated with the index of habitat, harp seals and recruitment of North American salmon (see Section 4.5). The appropriate model should be further specified and supported (see Section 4.5), a more comprehensive index of the relative change in marine predators of salmon in the Northwest Atlantic should be developed, and the assumption of direct proportionate production of smolts from the pre-smolt indices should be verified. The high degree of correlation among variables and the paucity of evidence for the consumption of salmon by harp seals prevent the derivation of specific conclusions concerning the nature of the relationships among recruits, habitat, or the harp seal population. Because these variables cannot be controlled in the experimental sense, only additional years of data may provide the natural variation required for testing the validity of these models. However, if measures are taken to alter substantially the abundance of any salmon predators (for example implementation of the Canadian Fisheries Resource Council recommendation to create “no-seal” zones in selected coastal areas of Atlantic

Canada) intensive monitoring of salmon stocks in affected those areas would be particularly informative.

1.4 Framework for Stock Rebuilding Programmes

The maintenance of self-sustaining stocks of salmon by means of targets or conservation limits requires that stock rebuilding programs be considered when conservation values have not been achieved. It will be necessary to consider a range of issues before a stock rebuilding program is initiated and a flow-chart (Figure 1.4.1) has been constructed to provide a framework for decision making.

The approach that has been developed envisages that a conservation limit or target has been set previously as part of a stock management plan, and that the plan requires that the stock be monitored in order to assess achievement of the target. If monitoring shows achievement of the target or conservation limit, the monitoring cycle can be resumed without further action. If a deficit is detected, a sequence of decisions must be made before the next monitoring season. In some cases, no action beyond increased vigilance during future monitoring cycles will be required, but if a stock rebuilding program is required, it will also be necessary to decide which of a range of approaches is appropriate.

In particular, it may be possible to establish causes or correlates of failure to achieve the target, by linking trends in abundance with changes in environmental or fishery variables. If the causes of failure in achieving the target can be identified, it may be possible to target action as part of the stock-rebuilding program. It is suggested that consideration of causes and correlates of failure centre on changes with time in four categories of effect: *climate, biological interactions, physical habitat* and *fisheries*. If the cause of failing to achieve target is known but no remedy is available, it may be necessary to reset the conservation value to a new, lower level value before monitoring and assessment resumes. In the case of a deficit of indeterminate cause, the precautionary approach requires that a stock rebuilding program be initiated, in order to expedite recovery while further information on the underlying problem is sought.

Much of the information necessary to make further progress on providing frameworks for stock rebuilding programs is available, but the information is dispersed and requires peer review. Moreover there is no clear consensus on the methods nor the extent of stock rebuilding programmes. ICES recommends that the detailed scientific background for stock rebuilding programmes should be considered in a wide scientific context, in order to develop a consensus view on the likely validity of all the possible options.

1.5 Compilation of Egg Collections and Juvenile Releases for 1998

ICES compiled 1998 data summaries of artificially spawned eggs and egg and juvenile releases in Table 1.5.1. These data were provided to estimate the effects of egg collection on wild production and to characterise the overall scale of enhancement work by ICES member countries.

1.6 Compilation of Tag Releases and Finclip Data by ICES Member Countries in 1998

Data on releases of tagged and fin-clipped salmon in 1998 were provided by ICES under separate cover. Slightly over 2.59 million salmon were marked in 1998, a 14% decline from the 3.02 million fish marked in 1997. The Adipose clip was the most used primary mark (1.66 million), with microtags (0.70 million) the next most used primary mark. Microtag marking declined by 5% from 1997. Secondary marks (primarily adipose fin clips) were applied to 0.87 million fish. Most marks were applied to hatchery-origin juveniles (2.53 million), while 0.04 million wild juveniles and 0.02 million adults were marked.

2. ATLANTIC SALMON IN THE NORTH-EAST ATLANTIC COMMISSION AREA

2.1 Events of the 1998 Fisheries and Status of Stocks

2.1.1 Fishing in the Faroese area 1997/1998

In the period 1991-1998 inclusive, the Faroese salmon quota was bought out. However, the Faroese Government continued sampling inside the 200 mile EEZ during most of the period. No commercial fishery has taken place during the 1998/1999 fishing season and no buy-out has been initiated for 1999/2000.

The salmon long-liner M/S "Polarlaks" conducted a research fishery from January to early April, 1998. Four separate trips were carried out and 31 sets were fished. The total catch was 5.8 t (1 763 salmon) including discards. The catch rate (CPUE) in 1998 was 30 salmon per 1 000 hooks employed. This is below the range of 36 to 84 fish per 1 000 hooks when the fishery was taking place from 1981 to 1995.

Composition and origin of the research catch: As in previous fishing seasons, 2SW salmon dominated (75%) with 1SW (19%) and 3+SW (6%) caught in lower proportions. The proportion of 2SW fish was within the previous observed range, but the proportions of 1SW and 3+SW fish were the highest and lowest, respectively, since 1991/1992.

The proportion of discards (i.e. salmon < 60 cm) in the January-April catches was 16.9%, higher than the previous full-season range of 1.8 to 15.6%. An early fishery (October to November) normally contributed the highest proportions of discards in previous years.

2.1.2 Homewater fisheries in the NEAC area

Since the late 1980s there has been a declining trend in salmon catches in the NEAC area. This reflects attempts by many countries to reduce commercial fishing activities. Other associated factors are lower stock sizes and a reduction in the value of commercially caught salmon.

Gear and effort: The restrictive measures introduced in Ireland in 1996 to reduce fishing effort were also applied in 1998. In April 1999, new national measures were introduced in the UK (England and Wales) to protect early running MSW ("spring") salmon. In Russia, due to conservation measures, only five barrier fences were operated commercially compared to seven in the two previous years, and ten in 1995. In Iceland, the coastal gillnet fishery,

which in recent years has accounted for a small percentage of the nominal catch, was permanently bought out prior to the beginning of the season. The ban on the use of bend nets along the Norwegian coast from Rogaland County to Troms County introduced in 1997 was again applied in 1998.

Catches: Provisional catch figures show an increase in salmon catch from 1997 to 1998 in most northern European countries (Iceland, Norway, Finland, Russia) and in Ireland, Spain and France (Table 1.1.1). This increase is due mainly to increased grilse catches. The provisional nominal catch for 1998 was 2 239 t which when finalised will be less than 2 500 t. The final value (including ranched fish) for 1997 was 2 087 t (see Section 1.1.1).

CPUE: Commercial fishing effort continued to decrease in net fisheries in the UK. In Finland and France, catch per angler season shows an increasing trend. Similarly, CPUE of rod fisheries in the Russian rivers of the White Sea basin showed a significant increase, whereas that of the Barents Sea basin rivers has decreased.

Composition of catches: In Finland, France, Norway, Russia and the UK (Scotland), the proportion of 1SW fish in the 1998 catch has increased relative to long-term indices. Compared to the previous 5-year mean, the proportion of the catch comprising 1SW fish in 1998 increased in UK (England and Wales), and decreased in Sweden.

Farmed salmon continue to represent a large proportion of the coast, fjord and broodstock catches in Norway (22-45%), although the proportion has remained relatively stable over the past few years. The proportion of farmed fish is generally less than 1% in fisheries in the UK, Ireland, and Finland. Ranched fish comprise 40% of the salmon catch in Sweden and 20% in Iceland, whereas the proportion in other countries is generally less than 1%.

Origin of catch: In Sweden, it was estimated that 10% of the salmon catch in 1998 consisted of recaptures of tagged salmon which originated from Danish experimental releases at the islands of Møn and Bornholm. No other new information was made available.

Exploitation rates: Of 16 stocks for which there were data, exploitation rates increased in twelve and decreased in four stocks between 1997 and 1998. There was a significant downward trend for rivers flowing to the Barents Sea for both the past 10- and 5-year periods, and for the past 10-year period for the rivers flowing to the White Sea. For the past 5-year period there has been a significant downward trend in exploitation rates for 2SW stocks in UK (Scotland), Iceland, Norway and Sweden.

2.1.3 Status of stocks in the NEAC area

There are over 1 500 rivers supporting salmon in the NEAC area, but for most of these there is no information on the status of stocks. In this Section, stock status is described for the 40 monitored rivers of which about one-half are in UK (England and Wales) and Russia. Many are of small size and contribute a proportionately small quantity of the salmon production in the NEAC area. Stock status as inferred from summed estimates of national Pre-fishery Abundances (PFAs) and spawning escapement are presented in Section 2.4.

Attainment of conservation requirements: Analysis of attainment of conservation limits (CL) on 16 rivers (five each from Russia and UK (England and Wales), three from France and one each from Ireland, UK (Northern Ireland), and UK (Scotland) indicated variable

status of salmon stocks in different rivers of the NEAC area (Figure 2.1.1). Five rivers have never or seldom reached their CL over the last 10 years, whereas six rivers have been mostly or consistently above their CL. Several rivers that have reached their CL in most years show a decreasing trend in escapement, however, and no tendency to recover was observed for rivers with low escapement levels. Two general points emerged: first, that at low escapement there is no tendency for that stock to recover, and second, that in most instances stocks having average egg deposition levels equal or greater than their CL tend to exhibit some deterioration in their escapements or at best they fluctuate around the mean.

Adult returns to rivers: Cluster analysis was used to help define groups of rivers showing common features in the numbers of adults returning to rivers over time. In most cases, adult salmon counts in 33 index rivers within the NEAC area increased from 1997 to 1998. However, over the last 10 years, adult returns have been declining or showed no trend, and were improving in only one case. Regional differences in returns over the last 10 years are evident when the data are partitioned into two broad regions. In the Northeast region (Scandinavia and Russia), ten of fourteen rivers showed a decline whereas in the Southwest region (Ireland, UK and France), the split between rivers decreasing or with no trend was almost equal (9 declining against 10 stable or showing some improvement). Therefore, of the stocks examined, those of the Northeast region appear to be of more concern than those from the Southwest region. In-river catches as an index of returns indicate, however, that early-running MSW ("spring") salmon have declined throughout the Southwest region.

Smolt production: The analysis of smolt output data from 10 rivers indicated that the temporal patterns were not consistent between different rivers or regions. Some rivers showed a significant improvement in smolt production whereas the smolt output of other rivers declined. A significant downward trend was detected for wild smolt survival (1SW returns) over the past five years and for hatchery smolt survival (1SW and 2SW returns) over the past ten years.

2.2 Evaluation of the Effects of the Suspension of Commercial Fishing Activity at Faroes

Since 1991 the Faroese fishermen have agreed to suspend commercial fishing for the salmon quota set by NASCO in exchange for compensation payments. The number of fish spared as a result of this suspension is the catch that would have been taken if the fishery had operated, minus the catch in the research fishery.

The increase in returns to all homewaters is then estimated by subtracting the fish that would have died on their homeward migration. Most fish would be expected to return to European rivers. ICES concluded that the full quota would have been taken had the quota purchase not been in effect. Thus, the maximum catch that would have been taken in 1997/98 was 380 t.

Current discard rates, age composition, and recent 3-year mean proportion farm fish were used to evaluate the increased returns to Europe in 1998. The estimated increased returns of wild 1SW and MSW salmon to homewaters in Europe and their contribution to the total estimated returns to the NEAC area for the years 1992-1998 follow:

Year	Quota (t)	Estimated increased returns to homewaters in Europe			
		1SW	%	MSW	%
1992	550	2,842	0	70,809	6
1993	550	11,429	1	106,307	10
1994	550	21,078	1	134,159	11
1995	550	12,949	1	138,533	13
1996	470	10,573	1	122,196	12
1997	425	9,578	0	105,368	14
1998	380	19,699	1	103,169	13

The calculated additional returns represent between 6% and 14% of MSW fish and 0% to 1% of 1SW fish returning to homewaters from 1992 to 1998. Approximately 65% of MSW salmon caught in the Faroes fishery would return to Scandinavian countries, Finland and Russia. If this were the case, they might have represented from 8% to 19% of MSW returns and from 0% to 1% of 1SW returns to northern European homewaters between 1992 and 1998. However, any increase in catches either has been too small to be detected as a statistically significant change above the normal annual variation, or has been masked by other factors such as reduced marine survival or reduced exploitation rates in homewaters.

2.3 Development of Age-Specific Conservation Limits

France and UK (England and Wales) have developed conservation limits for all their rivers, although some are still provisional. Progress has also been made in the development of river-specific conservation limits in most other countries. However, in order to develop catch advice, ICES employed the lagged-egg deposition model to estimate conservation limits for NEAC countries. This approach generates pseudo-stock-recruitment relationships, i.e. plots of lagged eggs (stock) against 1SW adults in the sea (recruits) for national stocks, and ICES evaluated the most appropriate conservation limit options to use (Table 2.3.1) based on the nature of the 'pseudo-stock-recruitment relationships' and local knowledge.

In order to compare the conservation limits with the PFA, conservation limits must be raised to take account of natural mortality between 1 January in the first sea winter and the time of return to homewaters to provide the spawning escapement reserve (SER). Estimates of the SER [$CL/e^{-M\,t}$] for each conservation limit (Table 2.3.1) are based on values of M = 0.01 and 't' of 7 months for 1SW and 17 months for MSW salmon. The SER values for the northern and southern stock groups are plotted on Figure 2.3.1 and Figure 2.3.2 with the PFA estimates; the dashed portion of the lines indicate that these SERs may be less appropriate for evaluating the historic status of stocks.

2.4 Expected Abundance of Salmon for Smaller Stocks in the NEAC Area

NEAC-PFA model: ICES made some minor improvements to the model used to estimate pre-fishery abundance of salmon in the NEAC area. These include the addition of recruitment estimates derived from catches in the distant water fisheries of Greenland and Faroes to national estimates based upon historic tagging data. No new information was available to modify the way that stocks are grouped, but Iceland was added to the northern Europe complex. The pre-fishery abundance estimates are therefore divided into northern Europe (all Nordic countries plus Russia and Iceland) and southern Europe (Ireland, UK and France) groups (Figures 2.3.1 to 2.3.3).

Trends in the PFA for NEAC stocks: Figure 2.3.1 suggests that there has been no overall trend in the recruitment of maturing 1SW salmon (potential grilse) in the northern countries, although the numbers have fluctuated quite widely around a level of approximately one million recruits. However, this pattern is largely driven by a simultaneous decline in Norway and an increase in Russia. Numbers of non-maturing 1SW recruits (potential MSW returns) for the northern countries appear to have fallen from approximately one million in the 1970s to about 0.6 million in the 1990s. The majority of this overall decline appears to have occurred in the mid 1980s.

For the southern European countries (Figure 2.3.2), the numbers of maturing 1SW recruits is driven largely by the Irish and UK (Scottish) stocks which have fallen substantially since the 1970s. Thus the Southern group of countries show an overall halving of the number of maturing 1SW recruits over the period, with stocks falling to their lowest level in 1997. The abundance of non-maturing 1SW recruits in the Southern European countries is largely driven by the UK (Scottish) stocks which account for about 80% of the estimated numbers of recruits over the past 10 years, while Ireland and UK (England & Wales) together account for about 15% of the recruits. All these countries have shown a very marked decline in the numbers of non-maturing 1SW recruits, such that overall production has fallen relatively steadily to about one third of its size in the early 1970s.

Forecasting the PFA: In order to use the PFA estimates to provide catch advice, a forecast is required of the PFA of recruits in the year preceding the fisheries. Thus, for example, the PFA of non-maturing 1SW recruits must be predicted for 1999 in order to provide advice for the West Greenland fishery in 1999; the Faroes fishery (MSW stock) in 1999/2000; and homewater fisheries in 1999. Because the latest estimate of non-maturing 1SW recruits is for 1997, the PFA must be forecast two years ahead, as is currently practised for the North American assessment. For maturing 1SW stocks, a single year's projection is sufficient. No new information was presented on methods to predict future levels of PFA from the historic time-series and in view of the uncertainty in the PFA estimates, ICES resorted to qualitative extrapolations from the historic estimates (see Section 2.5).

2.5 Catch Options or Alternative Management Advice with an Assessment of Risks

ICES considers that river/stock-specific conservation limits and stock-specific exploitation rates are most appropriate for the management of homewater fisheries. The aggregate of all river/stock-specific conservation limits for rivers of nations that contribute to a distant fishery, e.g. West Greenland, would be most appropriate for the management of that fishery.

In the absence of much of the river/stock-specific data, ICES considers the use of "national" stock conservation limits and the current aggregated estimate of SERs for northern and southern European components (see Section 2.3.and Figures 2.3.1 and 2.3.2) as an important first step in furthering the understanding of the status of stock complexes. However, in view of the uncertainties about the most appropriate stock groupings and the preliminary nature of the conservation limit estimates, ICES considers that it would be inappropriate to provide quantitative catch options at this stage. The following qualitative advice is based upon the PFA data and estimated SERs shown in Figures 2.3.1 and 2.3.2. ICES noted, however, that annual adjustment of the TACs for mixed stock fisheries based on changes in the mean status of the stocks is also unlikely to provide adequate protection to the individual river stocks that are most heavily exploited by the fishery or are in the weakest condition.

Northern European 1SW stocks: Very few 1SW salmon have been caught outside homewater fisheries in Europe at any stage in the time series, even when fisheries were operating in the Norwegian Sea. ***ICES considers 1SW salmon from northern Europe to be within safe biological limits as a stock complex (although it is recognised that the status of individual stocks within the complex may vary), and exploitation at the current rate is acceptable. ICES, however, advises that management of maturing 1SW salmon should be based upon local assessments of the status of river or sub-river stocks.***

Northern European MSW stocks: These are the main stocks that have contributed to the fisheries in the Norwegian Sea in past years. The PFA of non-maturing 1SW salmon from northern Europe has been declining since the mid-1980s and is now approaching the conservation limit estimates. The exploitable surplus has declined from over 800 000 recruits in the 1970s to around 250 000 recruits in 1996 and 1997. ***ICES considers the stock complex to be within but close to safe biological limits (although it is recognised that the status of individual stocks within the complex may vary). ICES therefore advises that great caution should be exercised in the management of these stocks particularly in mixed stock fisheries and exploitation rates should not be allowed to increase.***

Southern European 1SW stocks: The PFA for maturing 1SW salmon from southern Europe has been low for at least 9 years and is still close to the historic low of 1997. ***ICES considers the 1SW salmon from southern Europe to be within but close to safe biological limits when considered as a stock complex (although it is recognised that the status of individual stocks within the complex may vary). ICES advises that measures to reduce exploitation should be taken where possible, and that management of maturing 1SW salmon should be based on local assessments of the status of river or sub-river stocks.***

Southern European MSW stocks: This group includes the main European stock contributing to the West Greenland fishery. The PFA of non-maturing 1SW salmon from southern Europe has been declining since the 1970s and ICES analysis suggests that it fell below the conservation limits in both 1996 and 1997. Projection of these data suggest that the PFA was also likely to have been below the conservation limits in 1998, resulting in low availability of MSW salmon to fisheries in 1999. ***ICES considers this stock to be outside safe biological limits and advises that extreme caution should therefore be exercised in the management of mixed stock fisheries exploiting these stocks and that reductions in levels of exploitation rates are necessary. Management of non-maturing 1SW salmon should be based on local assessments of the status of river or sub-river stocks.***

2.6 Estimates of the By-Catch of Salmon Post-Smolts in Pelagic Fisheries

Surface research trawl techniques have been developed and have proved successful in capturing post-smolts of salmon. Trawl surveys have now been undertaken by a number of institutes and the area investigated stretches from the south of Ireland to the northern Norwegian Sea. Concentrations of post-smolts have been found along the north-west European continental shelf and extensively in the Norwegian Sea.

Post-smolts and herring overlap spatially mostly in July and early August in the areas north of 68°N. The purse seine fishery for herring takes place in the areas west of Iceland up to the Jan Mayen Island as early as April and into June and is therefore not likely to intercept young salmon. In June, 1998, an attempt was made by the Fishery Laboratory of the Faroes to

collect information on salmon by-catches in a Faroese purse seine fishery for herring in these areas. Crew members on two of ten Faroese purse seine vessels were asked to look specifically for post-smolts when sampling the herring catch for mandatory documentation of weight distributions to the buyers on land. No post-smolts were reported. In addition, no post-smolts were found in a screening of 1-3% of the landed catch of herring from one vessel and mackerel from another.

The fishery with the greatest potential for catching post-smolts in June and July is probably the trawl fishery for mackerel in the Faroes EEZ and the international area of the Norwegian Sea. This fishery is presently at a high and is not anticipated to diminish in the near future. In this regard, the Fishery Laboratory of the Faroes and the Russian Polar Institute (PINRO) have initiated a bilateral collaboration in the investigation of by-catch of salmon post-smolts in the herring and mackerel fisheries north of the Faroes in 1999.

Although preliminary investigations have been carried out, ICES was unable to provide quantitative estimates of the by-catch of post-smolts in pelagic fisheries. Observations of catch on board pelagic fishing vessels are possible but are unlikely to provide more than a qualitative assessment of post-smolt by-catch. An alternative approach is to carry out directed research fisheries with similar gear and at similar locations and time as commercial fishing boats, or conduct co-operative fishing with a commercial fishing vessel. Data forthcoming from a number of other ICES Working Groups on the number of vessels and amount of gear fished at depths less than 15 m in a number of ICES areas, their catches, swept area and effort are expected to contribute base line information for future estimates of by-catch.

2.7 Data Deficiencies, Monitoring Needs and Research Requirements in the NEAC Area

More research into the biology of salmon in the early marine phase is required and extension of recent research on the biology of post-smolts is recommended. Competitive interactions with other marine species should be explored. Additionally, by-catches of post-smolts in marine fisheries for other species should be monitored and estimates of mortality from this source should be derived. There is a continuing requirement to monitor trends in marine mortality for a wider range of stocks than at present, and to identify causes for current low values of marine survival.

The research fishery at Faroes should be continued, and material acquired during previous studies should continue to be analysed.

The quality of data used to set conservation limits should continue to be improved and the PFA model should continue to be developed. More and better input data should be obtained from a greater range of sources. Data collection should be targeted at catch components that are poorly represented. New ways of handling data, including GIS applications, and particularly new methods for grouping sub-divisions (e.g. populations, or alternative divisions based on biological characteristics such as sea-age or run-timing) should continue to be explored, developed and validated. In particular, sensitivity analyses are essential to assess the confidence with which data derived from the theoretical models can be used in an applied management context.

Methods to provide better estimates of unreported catches in the Northeast Atlantic area should be developed.

Assessment methods for juvenile salmon and for freshwater habitat parameters should continue to be developed. Attempts should be made to couple these parameters with adult return parameters, via life-history models of appropriate scale. Habitat and life history variables should be used together to examine the extent to which stock-recruitment relationships from a limited range of index rivers are transferable to other rivers.

The status of southern and central European rivers with respect to *Gyrodactylus* species, and particularly *G. salaris*, should be established without delay. Monitoring of the spread and occurrence of *G. salaris* should be encouraged in salmon-producing countries, and in other countries that are vulnerable to transfer of the parasite.

3. ATLANTIC SALMON IN THE NORTH AMERICAN COMMISSION AREA

3.1 Events of the 1998 Fisheries and Status of Stocks

3.1.1 Fisheries in the NAC area

Gear and effort: Restrictions on commercial and recreational fisheries introduced in Canada in 1992 remained in force in 1998. In addition, further regulations were introduced in Labrador: the commercial fishery in SFA 1 and 2 of Labrador was closed, as was the commercial fishery in zone Q11 of Ungava, Québec (see Figure 3.1.1). In Québec the commercial fishery continued in zone Q9, although reduced compared to 1997 as a result of a voluntary buyback of commercial licenses. In the recreational fishery, some areas of New Brunswick and Nova Scotia were closed to fishing and hook-and-release regulations for small salmon were extended to some rivers in Québec; the retention of large salmon continued only in Québec and northern Labrador. Following river-specific in-season reviews of returns, non-retention of salmon regardless of size and in some cases, complete closure, was imposed.

In the USA there is no commercial fishery for salmon and angling (catch-and-release only) for sea-run salmon in 1998 was permitted only in the State of Maine.

Commercial and recreational fishing using gillnets continued in Saint-Pierre et Miquelon (France) in 1998 and effort increased from that recorded in 1997.

Catch: The provisional landings for Canada in 1998 were 149 t, a decrease of 35% by weight from 1997 (Table 1.1.1). The landings of small salmon in numbers (46 687) and large salmon (13 270) represented decreases of 21% and 49%, respectively, from those of 1997. Recreational fisheries exploited the greatest number of small salmon in each province, accounting for 88% of the total small salmon harvests in eastern Canada. Aboriginal fisheries took the largest share of large salmon (57% by number). Commercial fisheries harvested 2% (by number) of the total small salmon and 8% of the total large salmon in eastern Canada. Unreported catch for the NAC area was estimated at 91 t.

In 1998, the second year for which catch and release estimates are complete for Canada, over 50 000 salmon (21 000 large and 30 000 small) were caught and released. Most of the fish released were in Newfoundland (45%), followed by New Brunswick (41%), Nova Scotia (7%), Québec (6%) and Prince Edward Island (< 1%). Expressed as a proportion of the fish

caught, that is, the sum of the retained and released fish, the highest percentage (87%) was released in Nova Scotia, followed by New Brunswick and Newfoundland (56% each), Prince Edward Island (55%) and Québec (22%).

In the USA the estimated number of salmon caught and released in 1998 was 273 fish - 18% lower than in 1997 and 32% and 33% below the 5- and 10-year means.

In Saint-Pierre et Miquelon (France) the harvest was 2.3 t, up 53% from 1997 and the highest value since 1994.

Composition and origin of catch: No external tagged fish of USA origin were reported from Canadian fisheries in 1998. In Canada, returns to the majority of rivers in Québec, Newfoundland and Labrador are comprised exclusively of wild salmon. Hatchery-origin fish were most abundant in returns to rivers in the Bay of Fundy and along the Atlantic coast of Nova Scotia.

In the USA, some salmon that were caught in the sport fishery in 1998 were assumed escapees from aquaculture operations in Maine and New Brunswick (Canada). In addition, a few of those caught and released originated from captive broodstock that were released into four rivers.

3.1.2 Status of stocks in the NAC area

Returns, recruits and spawners: Estimated (mid-point) 1SW and 2SW returns, as well as spawners, spawner thresholds and in the case of Newfoundland, recruits, in 1998 are shown for five of six regions in North America in Figures 3.1.2.1 and 3.1.2.2. Labrador returns and thus total North American returns are unavailable in 1998. With the exception of Newfoundland, returns of 2SW fish in 1998 were similar to or lower than the low values in 1997; 1SW returns increased slightly over those of 1997.

The rank of the estimated returns in 1998 within the 1971-1998 time series and the estimated total spawning escapement of 2SW salmon in each region expressed as a percentage of the spawning threshold for each region (except Labrador) follows. The closer the rank of 1998 returns is to 1, the better the relative performance of the stock.

	Rank of 1998 returns in 1971-1998 time series (1=highest)		Mid-point estimate of 2SW spawners as proportion of escapement requirement
Region	**1SW**	**2SW**	**(%)**
Labrador	unknown	unknown	unknown
Newfoundland	9	1	198
Québec	13	28	28
Gulf (Mainland)	22	27	37
Scotia-Fundy	23	28	16
USA	13	22	5

In most regions the returns of 2SW fish are near the lower end of the 28-year time series except Newfoundland where they are at the highest. However, Newfoundland comprises

only a small proportion of total salmon production. Returns of 1SW salmon were at the lower end of the time series in the Gulf and Scotia-Fundy, and about at the mid-point in Newfoundland, Québec and USA.

The North American run-reconstruction model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971-1998. The projected numbers of potential 2SW spawners that could have returned to North America in the absence of fisheries can be computed from estimates of the pre-fishery abundance taking into consideration the 11 months of natural mortality at 1% per month. These values, termed potential 2SW recruits, along with total North American 2SW returns and spawners (1971-1997) and requirements are shown in Figure 3.1.2.3, and indicate that the overall North American spawner requirement could not have been met in any of the years 1993-1998 even in the absence of all fisheries.

There are two important changes to the calculations that determine pre-fishery abundance of non-maturing 1SW salmon for 1997. The first change was made because of the inclusion of Aboriginal food harvests of small and large salmon in the reported catches for 1998. As Aboriginal harvests occurred in both Lake Melville and coastal areas of northern Labrador, a new parameter was added to define the fraction of these catches that are immature. This was necessary because non-maturing salmon do not occur in Lake Melville where approximately half the catch originated. However, non-maturing salmon do occur in coastal marine areas in the remainder of northern Labrador.

The second change was necessitated by the closure of the commercial fishery in Labrador in 1998. In past reports, salmon returns and spawners for Labrador which make up one of the five geographical areas contributing to returns estimates for Canada were based on commercial fishery data. Since the commercial fishery was closed in Labrador in 1998, the time series also ended. However, in order to estimate pre-fishery abundance it was still necessary to include Labrador returns for 1998. Consequently, a raising factor was developed by dividing pre-fishery abundance without Labrador into pre-fishery abundance with Labrador based on the time series of Labrador recruit estimates and pre-fishery abundance data from 1971-96. The raising factor to estimate returns to Labrador for 1998 for 2SW salmon was set to the low and high range of values in the time series, which was 1.05 to 1.27.

Similar to calculations to determine non-maturing 1SW salmon, a raising factor was also required to include Labrador returns in the maturing component of pre-fishery abundance. Consequently, a raising factor was developed by dividing pre-fishery abundance without Labrador into pre-fishery abundance with Labrador based on the time series of Labrador recruit estimates and pre-fishery abundance data from 1971-97. The raising factor to estimate returns to Labrador for 1998 for 1SW salmon was set to the low and high range of values in the time series which was 1.04 to 1.59.

The estimate of pre-fishery abundance of 97 899 non-maturing 1SW salmon for 1997 was the lowest on record (Figure 3.1.2.4), and 23% below the previous year. The most recent year is shown with hollow symbols to denote the use of a raising factor for Labrador. Similarly, for maturing 1SW salmon, there was a 32% decrease from 1996 in the 1997 estimate (319 065) of pre-fishery abundance. An estimate of 412 480 maturing 1SW fish in 1998 is 29% greater than that of 1997 and the sixth lowest in the 28-year time series. The total Northwest Atlantic population of 1SW recruits (maturing and non-maturing) originating

in North America in the Northwest Atlantic has varied but generally trended downwards since the 1970s, and the abundance recorded in 1993-1998 was the lowest in the time series (Figure 3.1.2.5). During 1993 to 1997, the total population was about one-half million fish, 45% of the average abundance 1972 to 1990. The decline has been more severe for the 2SW salmon component than for maturing 1SW salmon which have risen from about 45% of the total at the beginning of the 1970s to between 65 and 80% in the last five years.

The estimated 2SW returns (1 526 salmon) to USA rivers in 1998 represents about 5% of the spawner requirements for all rivers. Estimated spawning escapements in the Penobscot, Connecticut and Merrimack rivers remained very low (about 10% for the Penobscot River spawning requirement, and about 2% of requirements established for the Connecticut and Merrimack rivers).

Egg depositions: Egg depositions in 1998 exceeded or equalled the river-specific conservation requirements in 21 of the 71 assessed rivers (30%) and were less than 50% of conservation in 24 other rivers (Figure 3.1.2.6). Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where eight of the 12 rivers assessed had egg depositions which were less than 50% of requirements. In insular Newfoundland, 71% of the assessed rivers met or exceeded the conservation egg requirements, almost all the others had egg depositions which were less than 50% of requirement.

Smolt production: A relative index of smolt production, (i.e. measured abundance of juveniles or smolts for $river_j$ in $year_i$ / average abundance for the years 1995-1998 in $river_j$, for Newfoundland, Québec, Gulf and Scotia-Fundy rivers weighted by the relative proportion of the conservation requirements of the zone or SFA to the total conservation egg requirements of the zones under consideration) suggests relative smolt production at three levels since 1971 - at about one-third the 1995 to 1998 average between 1971 and 1979, at about 60% of the average during 1980 to 1985, and at about average since 1986. The Miramichi River receives 45% of the total weight for the index because of its large area, so the trend in the overall index tracks the trend in Miramichi juvenile production fairly closely. The index does however correspond to the documented status of many other rivers. Smolt production from Newfoundland rivers has approximately doubled over the 1971 to 1998 time period. The Gulf smolt index is at its highest level in the 1990s. The Québec smolt index has declined between 1983 and 1998, driven by the de la Trinité time series which is one of the largest of the Québec index rivers, and therefore receives a high weighting. The relative index for Scotia-Fundy peaked around 1990 and has since declined.

Survival rates to 1SW and 2SW fish have been variable in recent years but with some exceptions have declined on average by 50% or more in monitored rivers of Québec, among other areas. Returns have continued to decline despite major changes in fisheries management to reduce harvest, and many populations are currently threatened with extirpation, particularly in the Bay of Fundy and Atlantic coast of Nova Scotia. Although no direct evidence yet exists that can conclusively indicate that predators contribute significantly to the salmon declines, increasing numbers of predators, particularly seals and seabirds, at the same time that marine survival is declining, suggests that there is a possibility of linkage (Figure 3.1.2.7). USA salmon stocks exhibit the same downward trend that has been shown for many Canadian salmon stocks, especially those located in the Bay of Fundy and along the Atlantic coast of Nova Scotia. Most salmon rivers in the USA are hatchery-dependent and remain at low levels compared to conservation requirements.

3.2 Effects on US and Canadian Stocks and Fisheries of Management Measures Implemented after 1991 in the Canadian Commercial Salmon Fisheries

In 1992, a moratorium was placed on the commercial Atlantic salmon fishery in insular Newfoundland, while in Labrador and Québec North Shore and Ungava, fishing continued under quota or allowance catch. In conjunction with the commercial salmon fishing moratorium, a voluntary commercial license retirement program went into effect in insular Newfoundland, in SFAs 1, 2 and 14B of Labrador, and in Q7, Q8 and a part of Q9 in Québec. In 1997, the commercial fishery in SFA 14B of Labrador was closed and a voluntary buyback program for licences introduced. Additional restrictions were imposed in 1998 (Section 3.1.1).

No new analyses were presented to evaluate the effects of quota management and commercial closures. Previously, ICES considered a detailed assessment of the impact of the Newfoundland-Labrador changes on Newfoundland stocks. At that time, estimates were made of commercial exploitation rates on small salmon during pre-moratorium years (1984-1991) which ranged from 29% to 66%, averaging 49% for all areas combined. On large salmon, they ranged from 64% to 98% and averaged 76%.

3.3 Age-Specific Stock Conservation Requirements

Spawning requirements are now considered as threshold reference points, and are defined as the conservation requirement. The conservation requirements for North America have been expressed in terms of the number of 2SW fish required for all production areas of North America. Requirements for USA (29 199) and Canadian (154 653) rivers are unchanged; North American 2SW requirements now total 183 852 fish.

3.4 Catch Options or Alternative Management Advice with an Assessment of Risks

It is possible to provide catch advice for the North American Commission area for two years. The first is a revised estimate for 1999 for 2SW maturing fish based on improved estimates of the 1998 pre-fishery abundance and accounting for fish which were already removed from the cohort by fisheries in Greenland and Labrador in 1998. The second is an estimate for 2000 based on the pre-fishery abundance forecast for 1999. A consequence of these annual revisions is that the catch options for 2SW equivalents in North America may change compared to the options developed the year before.

3.4.1 Catch option for 1999 fisheries on 2SW maturing salmon

A revised estimate of the pre-fishery abundance for 1998 of 99 956 fish (Table 3.4.1.1) is less than the 113 899 value forecast in 1998. A pre-fishery abundance of 99 956 in 1998 equates to 90 444 2SW-salmon equivalents after adjustment for natural mortality of 1% per month for 10 months (a factor of 0.904837). There have already been harvests of 2 977 2SW salmon equivalents in 1998 as 1SW non-maturing salmon in Labrador (239) and Greenland (2 738) fisheries. The text table below uses the probability density projections for the revised pre-fishery abundance estimate of 99 956. Catch option values = [(PFA-spawner reserve of 205 230) * 0.904837) - 2 977].

Catch Options for 1999 North American Fisheries (Probability levels refer to probability density function estimates of pre-fishery abundance)		
Probability Level	Pre-fishery Abundance Forecast	Catch Options in 2SW Salmon Equivalents (no.)
25	16,337	0
30	34,995	0
35	52,277	0
40	68,585	0
45	84,405	0
50	99,956	0
55	115,444	0
60	131,402	0
65	147,627	0
70	164,803	0
75	183,333	0
80	204,038	0
85	228,282	17,881
90	258,795	45,491
95	304,286	86,653

Low returns of 2SW salmon to North America would be consistent with the generally low returns of mature 1SW fish from the same smolt class in 1997. The size of the mature 1SW fish was above or at near average values and suggested that age-at-maturity, if changed by unusual environmental conditions, would be lower rather than higher.

Catch advice for the NAC Area is included in the section relevant to West Greenland (Section 4.6.5).

3.4.2 Catch option for 2000 fisheries on 2SW maturing salmon

The advice for 2000 is based on a pre-fishery abundance of 79 450 in 1999 (Table 3.4.1.1) and assumes a 40% Greenland / 60% North America division of the surplus for harvest (after reserving the spawner requirement of 205 230). Catch options below are expressed as 2SW salmon equivalents (by considering 10 months of mortality at 1% per month, a factor of 0.904837). There is large uncertainty in the forecast abundance and caution is warranted.

Catch Options for 2000 North American Fisheries (Probability levels refer to probability density function estimates of pre-fishery abundance)		
Probability Level	Pre-fishery Abundance Forecast	Catch Options in 2SW Salmon Equivalents (no.)
25	795	0
30	18,398	0
35	34,579	0
40	49,917	0
45	64,810	0
50	79,450	0
55	94,097	0
60	108,959	0
65	124,344	0
70	140,537	0
75	158,302	0
80	177,300	0
85	200,047	0
90	229,030	12,921
95	272,057	36,281

The above numbers of fish refer to the composite North American fisheries. On individual rivers, where spawning requirements are being achieved, there would be little biological reasons to restrict harvests further than the regulations in force over the period when spawning requirements have been achieved.

Catch advice for the NAC Area is included in the section relevant to West Greenland (Section 4.6.5).

3.5 Data Deficiencies, Monitoring Needs and Research Requirements

There is an urgent need to monitor salmon returns and develop habitat-based spawner requirements in Labrador and Ungava.

There is a need to investigate changes in the biological characteristics (mean weight, sex ratio, sea-age composition) of returns to rivers, spawning stocks, and total recruits prior to fisheries. These data and new information on measures of habitat and stock recruitment are necessary to re-evaluate existing estimates of spawner requirements in Canada and USA.

There is a requirement for estimates of additional smolt-to-adult survival rates for wild salmon, especially for rivers in Labrador, New Brunswick and Nova Scotia. Sea survival rates of wild salmon from rivers stocked with hatchery smolts should also be examined to determine if hatchery return rates can be used as an index of sea survival of wild salmon elsewhere.

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

4. ATLANTIC SALMON IN THE WEST GREENLAND COMMISSION AREA

4.1 Events in the 1998 Fisheries and Status of Stocks

4.1.1 Fishery in the WGC area

Catch: In 1998, the West Greenland Commission of NASCO agreed that the catch at West Greenland should be restricted to that amount used for subsistence in Greenland, which in the past has been estimated at 20 t. The Greenland authorities subsequently set the TAC for 1998 at 20 t.. The fishery began on August 16 and fishing continued through to the end of the year. The nominal catch totalled 11 t of which a substantial part was taken late in the season. No landings went to fish plants in 1998. Regulations in 1998 required that private sales and catches by food fishermen be recorded. With reporting being the responsibility of individual fishermen and the fishery being more scattered than before, unreported catches are estimated to be relatively larger than when most landings went to fish plants. The unreported catch in 1998 is estimated to be approximately 11 t.

Gear and effort: No new information was available on fishing gear and effort. However, only 49 licensed fishermen (out of 321 issued licences) reported having fished in 1998. Twenty-one non-licensed fishermen (food fishermen) reported catches. The total number of active persons in the salmon fishery has declined over the last decade and in 1998 numbered less than half of those who fished in 1997.

Origin of catches: Based on discriminant analysis of characteristics from scales sampled in the fishery, 79% of fish in 1998 were of North American origin, two percentage points higher than in 1997. The catch at West Greenland in 1998 was estimated to consist of 8.6 t (3 100 salmon) of North American origin and 2.6 t (900 salmon) of European origin. These values represent reductions of 82 and 76% from respective North American and European landings in 1997.

The 1998 analysis was based on only 540 scales of which 532 were collected in NAFO Div.1D, August 17-21. Samples of muscle tissue were also collected for identification of continent of origin based on nuclear DNA (microsatellites). ICES felt that the samples were valid for defining the continent of origin within the time frame and geographical scale collected but inadequate for defining the biological characteristics of salmon in the four month fishery.

This was the fourth year that nuclear and mitochondrial DNA had been collected from the fishery and analysed. For the DNA analysis, the overall percent North American in 1998 was 78%, a difference of 1% from the samples determined by scale analysis. Comparison of results for 1995-1997 indicated that DNA with appropriate analysis for small sample sizes will allow for better classifications with lower error rates. Use of DNA-based splits of continent of origin and resultant revisions to biological characteristics and numbers of salmon of North American and European origin harvested at West Greenland is tentatively scheduled for 2000.

Biological characteristics of the catch: One-sea-winter fish of North American and European origins comprised 96.8% and 99.4%, respectively, of the catch samples from West Greenland in 1998, and were among the highest proportions of a 12-year data set. Two-sea-winter fish comprised the lowest proportions (0.5% North American and 0.0% European) of the data series; previous spawners comprised the remainder.

Mean lengths of 62 cm and 62.7 cm for respective North American and European 1SW fish at West Greenland declined by about 0.5 cm over lengths in 1997 but were within the range of those values observed in the 1990s. Mean weights (2.7 and 2.8kg for NA and European fish, respectively) of 1SW fish increased slightly over those of 1997 but were also within the range of those values observed in the 1990s.

Percentage river ages among fish sampled at West Greenland in 1998 were:

River age	1	2	3	4	5	6+
N American	0.4	20.4	50.4	22.9	2.9	2.9
European	28.6	60.0	7.6	2.9	1.0	0.0

All but the 7.6 value for river-age-3 European fish were within the range of values 1968-1998. However, for the 1990s, North American river age-1 and -2 fish had the lowest and second lowest values, river-age 3 and -4 had the highest values. The pattern among the percentage European river ages in 1998 relative to those of the 1990s was the opposite. River-age 1 and -2 had the highest values while river-ages 3 and -4 had the lowest and second lowest, respectively.

4.1.2 Status of stocks in the WGC area

Salmon caught in the West Greenland fishery are non-maturing 1SW salmon or older, nearly all of which would return to homewaters in Europe or North America as MSW fish if they survived. While non-maturing 1SW salmon make up more than 90% of the catch there are also 2SW salmon and repeat spawners. The most abundant European stocks in West Greenland are thought to originate from the UK and Ireland although low numbers may originate from northern European rivers. For North American MSW salmon, the most abundant stocks in West Greenland are thought to originate in the southern area of the range.

Stocks originating in the Northeast Atlantic: Run-reconstruction estimates of pre-fishery abundance of non-maturing 1SW salmon from southern areas (Figure 2.3.2b) have been volatile over the period 1971-1997, but in steady decline over the past 13 years. In 1996 and 1997, it was estimated that even in the absence of all fisheries, the numbers of non-maturing recruits from the southern area were below the proposed spawning equivalent reserve. Non-maturing 1SW salmon from northern stocks (Figure 2.3.1b) have declined since 1985, particularly in 1986-1987.

In most cases, adult salmon counts in index rivers within the NEAC area increased from 1997 to 1998. However, over the last ten years, adult returns have been declining or showed no trend, and were improving in only one case. Analysis of attainment of conservation limits (CL) indicated variable status of salmon stocks in different rivers of the NEAC area. Some rivers have never or seldom reached their CL over the last 10 years, whereas others have been consistently above their CL. Many rivers that have reached their CL in most years show a decreasing trend in escapement, however, and no tendency to recover was observed for rivers with low escapement values.

Stocks originating in North America: The run-reconstruction estimate of pre-fishery abundance of non-maturing 1SW salmon for 1997 was 98 899 fish, 23% below that of 1996 and the lowest on record (Figure 3.1.2.4). In addition to the steady decline in non-maturing and maturing salmon over the last ten years, maturing 1SW salmon (grilse) have become an

increasingly large percentage of the North American stock complex. This percentage has risen from about 45% at the beginning of the 1970s, to around 70% in 1992-1995 to almost 80% in 1996 and 1997.

Total returns of 2SW fish to Labrador and thus Canada could not be estimated in 1998. However, with the exception of insular Newfoundland where 2SW salmon are only a small proportion of the total salmon production, returns to the important Gulf, Québec and Scotia-Fundy production areas were either the lowest or second lowest of the 28-year time series, 1971-1998 (Figure 3.1.2.2). The estimated 2SW returns and spawners to USA rivers in 1998 were 5% below the 1997 estimate and 18% and 41% below the previous 5- and 10-year averages, respectively. Returns to most USA rivers are hatchery-dependent. Spawning escapements remained at low levels compared to conservation requirements.

Egg depositions exceeded or equalled the specific conservation requirements in only 21 of the 71 rivers (30%) that were assessed in Canada and were less than 50% of requirements in 24 other rivers (34%). Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 8 of the 12 rivers assessed had egg depositions that were less than 50% of requirements (Figure 3.1.2.6).

North American salmon stocks remain low relative to the 1970s. The steady decline over the last ten years is alarming (Figure 3.1.2.5). The 1SW non-maturing component continues to be depressed with river returns and total production amongst the lowest recorded. In addition, returns in 1998 of maturing 1SW salmon (grilse) to North American rivers were very low. This being the case, improvement in 2SW salmon returns and spawners is unlikely in 1999.

Thus, despite some improvements in 2SW returns to some rivers in European and North American areas, the overall status of stocks contributing to the West Greenland fishery is low compared to earlier (historical) levels.

4.2 Effects on European and North American Stocks of the West Greenlandic Management Measures Since 1993

There have been two significant changes in the management regime at West Greenland since 1993. First, NASCO adopted a new quota allocation model to derive TACs based upon ICES' assessment of the PFA of non-maturing 1SW North American salmon and the spawner requirements for these stocks. This resulted in a substantial reduction in the TAC in 1993 from that of 1992, and further reductions in subsequent years. The second change in management was the suspension of fishing in 1993 and 1994 for compensation payments.

The estimated numbers of salmon returning to homewaters in the absence of a fishery, 1993-1994, or had the fishery in 1995-1998 not taken place, are:

Year	Quota t	Grnl TAC	Catch t	EU Fish	NA Fish
1993	89	89	0	12461	14017
1994	137	137	0	19188	21580
1995	77	77	83	9434	18846
1996	174	0	92	12191	14343
1997	57	0	58	7508	11429

1998	20	0	11	712	2758

Estimation of TACs for 1993 and 1994 was based on the NASCO model; biological parameters (mean weights, proportions of NA fish, and age correction factors etc.) were assumed to be the same as those of 1992. For the remaining years, estimates of fish that would have returned to homewaters had there not been a fishery were based on same year biological characteristics and a natural mortality between Greenland and homewaters of 0.10. The mean number of potential returns per tonne caught at Greenland is 176 and 131 North American and European salmon, respectively.

In the years 1972-1992, exploitation rates in Greenland of the North American component of the salmon stock averaged about 30% but varied between 10 and 45%. The management measures in force since 1995 resulted in an average exploitation rate of 13%.

ICES notes that these calculations assume that natural mortality of salmon at sea has remained unchanged. As highlighted in several places in this document, marine survival has declined markedly, particularly for salmon of North American origin. Methods are being explored for including a downward trend in survivorship in this and various other calculations. Because this year's forecast of pre-fishery abundance in West Greenland (Section 4.6) already indicates no harvestable surplus for West Greenland, allowing for a higher natural mortality would not change current advice. In general, the effect of this improvement will be to lower harvestable surpluses for a given number of 2SW salmon, as long as current levels of natural mortality persist.

4.3 Changes to the Model Used to Provide Catch Advice

The models (see Section 4.5) used to predict pre-fishery abundance of the North American non-maturing stock complex and subsequent quota levels for West Greenland were unchanged from the 1998 assessment. The same independent variables used previously were found to provide an improved fit over last year's model. However, some of the input data were modified to reflect new information. These included: improvement of the catch reporting system in the Province of Newfoundland and Labrador by inclusion of catch statistics from Aboriginal fisheries in northern Labrador; data from an estimation procedure for returns to Labrador in lieu of commercial catches (see Section 3.1.2), improvements in the procedure used to estimate continent of origin in Greenland and the addition of another year of data to all data series. In summary, the 1998 catch advice of 0 t would not have been different if the 1998 assessment had been done with the revised input data and models from this year.

4.4 Age-Specific Stock Conservation Limits for all Stocks Occurring in the WGC Area

Sampling of the fishery at West Greenland since 1985 has shown that both European and North American stocks harvested there are primarily (greater than 90%) 1SW non-maturing salmon that would mature as either 2SW or 3SW salmon, if surviving to spawn. Usually less than 1% of the harvest are salmon which have previously spawned and a few percent are 2SW salmon which would mature as 3SW or older salmon, if surviving to spawn. In 1998, 96.8 and 99.4% of the sampled catch was 1SW salmon of North American and European origins, respectively. For this reason, conservation limits defined for North American stocks (see Section 3.3) have been limited to 2SW salmon that may have been at Greenland as 1SW

non-maturing fish. The total requirement is 183 852 fish, with 154 653 and 29 199 prescribed for Canadian and USA rivers, respectively; the reserve spawner requirement (includes 10 months of mortality at 1%) is 205 230 fish.

Tagging information and biological sampling indicates that the majority of the European salmon caught at West Greenland originate from the southern group of stocks. Estimates of provisional conservation limits for MSW salmon in Europe are based on the methods developed in 1998 and revised in 1999. The provisional conservation limit for southern European MSW stocks is now approximately 470 000 fish with a spawner escapement reserve equaling about 550 000 fish (see Section 2.4).

4.5 Critical Examination of the 'Model' Used to Provide Catch Advice

Background: This is the second year that ICES has been asked to critique the "model" to provide catch advice. Catch advice, and associated risk, for North American stocks in West Greenland are the result of a series of steps summarised in 1998, which begin with the estimation of 2SW returns to regions of North America. The procedure encompasses a number of estimations, e.g. several models are used in estimating returns to North America. In 1999, ICES extended its critique and examined:

1. the utility of confidence limits in the pre-fishery forecast model to develop a bootstrap sample of pre-fishery abundance forecasts,
2. the impact of measurement errors in lagged spawners and PFA forecast, and
3. alternative models for characterising salmon abundance.

Confidence limits: Currently, estimates of pre-fishery abundance forecast error in the model to forecast salmon in the Northwest Atlantic are based on a series of empirically derived confidence intervals developed for some, but not all, of the variables included in the regression model. ICES considered an alternate estimation procedure that utilises the error structure from the base regression model residuals to develop a bootstrap sample of forecasts. The resultant probability density function from the bootstrap sample appeared to contain bias, a feature not uncommon for this class of models. However, ICES felt it would be premature to apply the bootstrapping approach until this bias could be better understood and a correction procedure appropriate to the data could be developed.

Impact of measurement errors: The forecast of the North American PFA is based on a two variable linear model: the lagged spawners and the February habitat. Measurement errors can have disruptive effects on model fitting and on the uncertainty of the predictions. Thus, an analysis within a Bayesian framework and Monte Carlo simulations was conducted to assess the potential effect of measurement errors on the 1999 PFA estimate and the lagged spawners (the habitat variable was regarded as being measured without error).

Measurement errors were assumed to be independent between years and between variables. The structure of the errors was defined as triangular distributions with a mode located at the point estimates currently used and ranging between a minimum and maximum representing -/+ X% of the point estimates. Three values of error were considered: -/+ 10%, -/+ 25% and -/+ 50%. The same level of error was assigned to both the PFA and the lagged spawners as a preliminary approach. A total of 5 000 simulations were conducted for each level of error. The analyses indicated that increasing measurement errors can have major disruptive effects

on both the uncertainty of the prediction and the most probable value of the 1999 PFA forecast.

The analyses suggested that the extent of the measurement error inherent in the run-reconstruction model should be estimated, that with increasing uncertainty, probability levels other than 50% should be considered, that other indices of adult salmon abundance should be examined and used as prior information, and that alternative models should be explored to provide some index of plausibility of the quantitative forecasts. Each point is reiterated in Section 4.7.

Alternative models for characterising salmon abundance: The spawning stock variable (lagged spawners) used in the PFA forecast model excludes the spawners from the Gulf and USA and therefore only considers part of the spawners contributing to PFA in the Northwest Atlantic. Also, the spawning stock variable only considers 2SW spawners while other age groups (1SW, 3SW and previous spawners) also contribute to egg depositions and undoubtedly salmon maturing as 2SW fish. Inclusion of all the spawning stock component from eastern North America is not a significant explanatory variable of PFA variability. The Gulf spawning stock has remained well above its area conservation requirement during the 1990s in contrast to other areas where spawning stock has declined.

A more useful variable for characterising salmon abundance in the ocean would be an estimate of the annual smolt output from rivers of North America. If smolt output is known, factors determining mortality at sea could be explored directly using the standard survival relationship:

$N_t/N_o = e^{-Z}$
where N_t = population size at time t (for example PFA before West Greenland fishery)
N_o = population size at an earlier time (for example smolt output)
Z = instantaneous mortality rate which in the absence of fisheries =M.

Some of the factors contributing to natural mortality could be characterised by an environment signal (as in the currently used model) and predation and the survival model could be written:

$N_t/N_o = e^{-(\alpha Pred + ß Env + c)}$
where N_t and N_o are as previously defined
Pred = variable measuring predator abundance (absolute or relative)
Env = variable describing the environmental factor (absolute or relative)
α = coefficient of the relative instantaneous mortality per unit predator
ß = coefficient of the relative instantaneous mortality per unit of environment
c = constant proportional mortality

This formulation differs from the model currently used because the variables are considered to have a proportional effect on instantaneous mortality. For both variables, the relative instantaneous mortality is constant and independent of size of the salmon. But overall mortality is a function of relative levels of the variables. For example, as relative predator abundance increases, the overall mortality increases. But the relative change in mortality rates would decline as the variables increase. The relative change in mortality is always less

than the relative change in the variables. In the absence of any predator or environment effect modifying survival, then survival is proportional to abundance.

A preliminary exploration of this model was undertaken using a relative index of smolt production (see Section 3.1.2), the sum of the maturing and non-maturing components to eastern North America, the population size of harp seals in the Northwest Atlantic and the February habitat index in the Northwest Atlantic. The absence of contrasting states in the variables examined inhibited the testing of alternative hypotheses to describe the observed declines in Atlantic salmon survival rates. General conclusions were that:

1. the increased relative smolt production from North America has been insufficient to compensate for the increased mortality factors on Atlantic salmon;
2. the observed decline in relative survival associated with the increased relative smolt production is not sufficient to draw any conclusions on the nature of the mortality function, i.e. density dependent or density independent; and
3. in the absence of evidence for density-dependent mortality of Atlantic salmon at sea, the objective of achieving conservation in all salmon rivers of eastern North America remains valid.

4.6 Catch Options or Alternative Management Advice with an Assessment of Risks

4.6.1 Overview of provision of catch advice

ICES was asked to advise on catch levels that would maintain spawning escapements at conservation limits. Although advances have been made in our understanding of the population dynamics of Atlantic salmon and the exploitation occurring in the fisheries, the concerns about the implications of applying TACs to mixed stock fisheries are still relevant. In principle, adjustments in catches in mixed-stock fisheries provided by means of an annually adjusted TAC would reduce mean mortality on the contributing populations. However, there is no assurance that reductions in exploitation will affect those stocks that are not meeting conservation requirements, and benefits that might result for particular stocks would be difficult to demonstrate, in the same way that damage to individual stocks is difficult to identify.

The procedures to develop catch advice, an evaluation of the models, and vulnerabilities in the existing procedures were presented in the 1997 assessment. The processes remain unchanged in 1998 although some of the input data were modified to reflect new information (Section 4.3).

North American run-reconstruction model: The model is used to estimate pre-fishery abundance of 1SW non-maturing and maturing 2SW fish adjusted by natural mortality to the time prior to the West Greenland fishery. Region-specific estimates of 2SW returns are shown in Figure 3.1.2.2. Estimates of 2SW returns prior to 1998 in Labrador are derived from estimated 2SW catches in the fishery using a range of assumptions regarding exploitation rates and origin of the catch. With the closure of the Labrador fishery, returns were unknown but 1998 pre-fishery numbers were estimated from a raising factor developed by dividing pre-fishery abundance without Labrador into pre-fishery abundance with Labrador based on the time series of Labrador recruit estimates and pre-fishery abundance data from 1971-1996 (see Section 3.1.2).

Update of thermal habitat: Thermal habitat has been updated to include 1999 data. Two periods of decline in the available habitat are identified (1980-1984 and 1988-1995) in the February index (Table 3.4.1.1). Available habitat for February declined from 1 849 units in 1998 to 1 749 units in 1999, a decrease of 6%. The 1999 February value is the second highest of the last 17 years and continues the return to the high values experienced in the 1970s. The variable "February habitat" in the 1998 and 1999 forecast models of pre-fishery abundance now, however, accounts for less of the variability than it did previously (see Section 4.6.2).

4.6.2 Forecast model for pre-fishery abundance of North American 2SW salmon in 1999

The model employed in 1998 using thermal habitat for February and lagged spawners [sum of lagged spawners from Labrador, Newfoundland, Scotia-Fundy and Québec] was updated to reflect the addition of the new data. The linear fit to the 1999 model of pre-fishery abundance versus February thermal habitat and lagged spawners (SNLQ) produced a significant relationship between observed and predicted values at less than the 5% level (R^2=0.81). With the 1997 data point added there is an improvement in fit over that of last year (R^2=0.81 in 1999 versus 0.79 in 1998, 0.71 in 1997 and 0.68 in 1996). The model parameters are all significant, with lagged spawners accounting for most (28%) of the total sum of squares (February habitat accounting for 15%). Individually, the two predictor variables used are also significantly related to pre-fishery abundance.

The forecast of pre-fishery abundance for 1999 using simulation methods and the February thermal habitat and lagged spawner model is about 79 450 fish at the 50% probability level (Table 3.4.1.1). Application of the 1999 forecast model to forecast the 1998 value results in a forecast of 99 956 which is 12% less than the previous estimate of 113 899 fish. Deterministic and simulated forecast values will show differences due to the method of calculation.

4.6.3 Development of catch options for 1999

The spawning requirement for all North American rivers is currently set at 183 852 2SW fish which is the equivalent of 205 230 pre-fishery recruits (spawning reserve) prior to natural mortality between Greenland and homewaters. The procedure for estimating the quota for West Greenland is summarised in Appendix 2. Forecast parameter values for the proportion of the stock at West Greenland which is of North American origin [PropNA], mean weights of North American and European 1SW salmon [WT1SWNA and WT1SWE, respectively], and a correction factor for the expected sea age composition of the total landings [ACF] used in the procedure are given in Table 4.6.3.1.

Greenland quota levels for the forecast of pre-fishery abundance were computed with the revised model and are shown in Table 4.6.3.1. For the point estimate level and the stochastic regression estimate using NN1, the quota options are 0 t at all probabilities. For the F_{NA} level used in recent management measures for the West Greenland Commission (at the 0.4 allocation rate), the quota is 0 t at the 50% risk.

4.6.4 Risk assessment of catch options

The provision of catch advice in a risk framework involves the incorporation of the uncertainty in all the factors used to develop the catch options. An analysis of the probability of not meeting the conservation requirements in the six stock areas of North America was conducted by incorporating the uncertainty in all the parameters used to evaluate the spawning escapement to North America. They included i) the conservation requirement risk plot ii) the uncertainty in many of the pre-fishery abundance forecast, and iii) uncertainty in the biological parameters used to translate catches (proportion North American origin, weight of 1SW North American origin, weight of 1SW European origin, age correction factor) into numbers of North American origin salmon.

Under the assumption of recruitment in direct proportion to the spawner requirement, just over 200 000 fish are required to escape to North America to produce a 50% probability of achieving the spawner requirement concurrently in all six stock areas. This value is higher than the 183 852 fish point estimate of total requirements to North America because it incorporates the annual variation in the proportion of females.

The risk analysis assumed that the management of West Greenland and North American fisheries in 2000 would be similar to that of recent years and that exploitation rates in North America would be at most 0.15 and 0.25. The impact of these fisheries on the salmon returning to homewaters in 2000 in the absence of any fishery at Greenland in 1999 results in a high risk (85%) of not meeting the conservation requirements in at least one of the six stock areas (Figure 4.6.4.1, lower panel). This assumes that salmon will return to each geographic area in proportion to the relative conservation requirements in each area and that the exploitation rates in each of the six stock areas are similar.

The cumulative consequences of fisheries at Greenland (1999) and in North America (2000) on the potential spawning escapements to North American stock areas increases the risk of severe under-escapement (50% of conservation requirements) in North America. There is a 55% risk of severe under-escapement with no fisheries and the risk rises to greater than 61% at a Greenland catch option of 50 t and exploitation rates between 0.15 and 0.25 in North America (Figure 4.6.4.1). Considering the uncertainty in the assessment of the abundance of North American salmon in West Greenland in 1999, precautionary approach principles in managing both the Greenland and North American salmon fisheries are advised.

Even if fisheries are restricted to harvests which provide a 50% probability that the overall escapement requirements are achieved, it is likely that some stocks will fail to meet their individual spawner requirements while others will exceed requirement levels. This unequal achievement of escapement goals may result from random variation between years or from systematic differences in the patterns of exploitation on fish from different rivers or regions. In the latter case, adoption of a 50% probability may result in some stocks failing to meet requirements levels over several consecutive years if the full TAC is harvested. This would be likely to result in a long-term decline in those stocks.

4.6.5 Catch advice

It is evident from indicators of stock status, including the current and predicted estimates of pre-fishery abundance, that the North American stock complex is in a tenuous condition. If the forecast is accurate then pre-fishery abundance in 1999 will be lower than any other pre-fishery abundance value previously estimated despite nearly complete closures of mixed and

single stock fisheries. This is due to the continuing trend of below-requirement spawning escapements for 2SW salmon, and the low marine survival rates for some monitored stocks. The increasing advantage associated with each additional spawner in under-seeded river systems makes a strong case for a conservative management strategy.

ICES considers this stock complex to be outside safe biological limits and recommends that there should be no exploitation of the 1998 smolt cohort as non-maturing 1SW fish in North America or at Greenland in 1999, and also recommends that the cohort should not be exploited as mature 2SW fish in North America in 2000. Exceptions are in-river harvests from stocks which can be shown to be above biologically-based escapement requirements. Further, fishing mortality on this cohort should be minimised in the North American Commission and in the West Greenland Commission Areas by controlling by-catch in other fisheries. From a precautionary perspective, in light of uncertainties in changing maturity schedules and spatial distributions, ICES advises that there should be no exploitation of the 1998 smolt cohort as maturing 1SW fish in North America, except for in-river harvests from stocks which are above biologically-based escapement requirements, consistent with existing conservation measures.

4.7 Data Deficiencies, Monitoring Needs and Research Requirements in the WGC Area

The mean weights, sea ages and proportion of fish originating from North America and Europe are essential parameters to provide catch advice for the West Greenland fishery. As these parameters are known to vary over time, ICES recommends that the sampling programme which was carried out in 1995-1998 be continued and improved to cover as much of the landings as possible.

Efforts should be made to improve the estimates of the annual catches of salmon taken for local consumption at West Greenland.

The catch options for the West Greenland fishery are based almost entirely upon data derived from North American stocks. In view of the evidence of a long-term decline in the European stock components contributing to this fishery (southern European non-maturing 1SW recruits) ICES emphasises the need for information from these stocks to be incorporated into the assessments as soon as possible.

The bootstrapping approach to improve confidence intervals for the pre-fishery abundance forecast error estimates shows promise, and should be explored further.

An evaluation should be made of the fraction of the PFA estimate that is directly based on catches and assessed returns (hard data), versus the fraction that results from less certain information such as scaling factors for potential productive habitat.

The extent of the measurement error inherent in the run-reconstruction model should be estimated to describe the potential bias in the model and the description of uncertainty associated with the PFA forecast.

The inclusion of measurement error in the forecast model increases the uncertainty of the forecast. Under increased uncertainty, alternative risks to the 50% point should be considered, consistent with the precautionary approach.

Other indices of adult salmon abundance should be examined and used as prior information to constrain the plausible range of abundance.

Alternative models should be explored (for example different predictive variables, model formulations, univariate time series, non-parametric change-of-state analyses) to provide some index of uncertainty of the quantitative forecasts of PFAs.

APPENDIX 1

CNL(98)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 stock complex and catch and release, and worldwide production of farmed and ranched salmon in 1998;
    1.2 evaluate non-catch fishing mortality for all salmon gear;
    1.3 report on significant developments which might assist NASCO with the management of salmon stocks;
    1.4 develop a framework for stock rebuilding programmes;
    1.5 provide a compilation of egg collections and juvenile releases in 1998;
    1.6 provide a compilation of microtag, finclip and external tag releases by ICES member countries in 1998.

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

    2.1 describe the events of the 1998 fisheries and the status of the stocks;
    2.2 update the evaluation of the effects on stocks and homewater fisheries of the suspension of commercial fishing activity at Faroes since 1991;
    2.3 further develop the age-specific stock conservation limits for smaller stock units in the Commission area, where possible based upon individual river-based estimates;
    2.4 further develop methods to estimate the expected abundance of salmon for smaller stock units in the Commission area;
    2.5 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
    2.6 provide an estimate of the by-catch of salmon post-smolts in pelagic fisheries;
    2.7 identify relevant data deficiencies, monitoring needs and research requirements.

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

    3.1 describe the events of the 1998 fisheries and the status of the stocks;
    3.2 update the evaluation of the effects on US and Canadian stocks and fisheries of management measures implemented after 1991 in the Canadian commercial salmon fisheries;
    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;
    3.5 identify relevant data deficiencies, monitoring needs and research requirements.

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

4.1 describe the events of the 1998 fisheries and the status of the stocks;
4.2 evaluate the effects on European and North American stocks of the Greenlandic management measures since 1993;
4.3 provide a detailed explanation of any changes to the model used to provide catch advice and of the impacts of any changes to the model on the calculated quota;
4.4 provide age-specific stock conservation limits (spawning targets) for all stocks occurring in the Commission area based on best available information;
4.5 examine critically the model used to provide catch advice, looking at all the assumptions, and comment on the confidence limits on the output from the model;
4.6 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
4.7 identify relevant data deficiencies, monitoring needs and research requirements.

APPENDIX 2

COMPUTATION OF CATCH ADVICE FOR WEST GREENLAND

The North American Spawning Target (SpT) for 2SW stands at 183,852 fish.

This number must be divided by the survival rate for the fish from the time of the West Greenland fishery to their return of the fish to homewaters (11 months) to give the Spawning Target Reserve (SpR). Thus:

Eq. 1. $SpR = SpT * \exp(11*M)$ (where $M = 0.01$)

The Maximum Allowable Harvest (MAH) may be defined as the number of non-maturing 1SW fish that are available for harvest. This number is calculated by subtracting the Spawning Target Reserve from the pre-fishery abundance (PFA).

Eq. 2. $MAH = PFA - SpR$

To provide catch advice for West Greenland it is then necessary to decide on the proportion of the MAH to be allocated to Greenland (f_{NA}). The allowable harvest of North American non-maturing 1SW salmon at West Greenland NA1SW) may then be defined as

Eq. 3. $NA1SW = f_{NA} * MAH$

The estimated number of European salmon that will be caught at West Greenland (E1SW) will depend upon the harvest of North American fish and the proportion of the fish in the West Greenland fishery that originate from North America [PropNA][1]. Thus:

Eq. 4. $E1SW = (NA1SW / PropNA) - NA1SW$

To convert the numbers of North American and European 1SW salmon into total catch at West Greenland in metric tonnes, it is necessary to incorporate the mean weights (kg) of salmon for North America [WT1SWNA][1] and Europe [WT1SWE][1] and age correction factor for multi-sea-winter salmon at Greenland based on the total weight of salmon caught divided by the weight of 1SW salmon [ACF][1] .

The quota (in tonnes) at Greenland is then estimated as

Eq. 5. $Quota = (NA1SW * WT1SWNA + E1SW * WT1SWE) * ACF/1000$

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[1] New sampling data from the 1997 fishery at West Greenland were used to update the forecast values of the proportion of North American salmon in the catch (PropNA), the mean weights by continent [WT1SWNA, WT1SWE] and the age correction factor [ACF] in 1998.

PropNA	=	0.5844
WT1SWNA	=	2.623
WT1SWE	=	2.740
ACF	=	1.118

ANNEX 8

Council

CNL(99)46

Request for Scientific Advice from ICES

CNL(99)46

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 salmon in 1999;
    1.2 describe and evaluate methods currently used for estimating unreported catch by country and advise on improvements to these methods where appropriate;
    1.3 advise on the data requirements and methods for the scientific evaluation of bird and marine mammal predation on Atlantic salmon;
    1.4 report on significant developments which might assist NASCO with the management of salmon stocks;
    1.5 provide compilations of egg collections and juvenile releases and of tag releases, by country in 1999;
    1.6 provide estimates of escapement from marine salmon farms by country and assess the reliability and comparability of estimates of salmon farm escapees in fisheries and stocks.

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

    2.1 describe the events of the 1999 fisheries and the status of the stocks;
    2.2 evaluate the effects on stocks and homewater fisheries of significant management measures introduced since 1991;
    2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;
    2.4 further develop methods to estimate the expected abundance of salmon in the Commission area;
    2.5 determine the most appropriate stock groupings for the provision of catch options or alternative management advice;
    2.6 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
    2.7 provide an estimate of the by-catch of salmon post-smolts in pelagic fisheries;
    2.8 identify relevant data deficiencies, monitoring needs and research requirements.

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

    3.1 describe the events of the 1999 fisheries and the status of the stocks;
    3.2 update the evaluation of the effects on US and Canadian stocks and fisheries of management measures implemented after 1991 in the Canadian commercial salmon fisheries with special emphasis on the Newfoundland stocks;
    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;

3.5 identify relevant data deficiencies, monitoring needs and research requirements.

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

4.1 describe the events of the 1999 fisheries and the status of the stocks;
4.2 critically evaluate, and provide sensitivity analyses of, the effects on European and North American stocks of the Greenlandic quota management measures and compensation arrangements since 1993;
4.3 provide estimates of uncertainty and evaluate apparent recent changes in the proportion of continent of origin detected in the West Greenland fishery catches;
4.4 provide a detailed explanation and critical examination of any changes to the model used to provide catch advice and of the impacts of any changes to the model on the calculated quota;
4.5 provide age-specific stock conservation limits for all stocks occurring in the Commission area based on best available information;
4.6 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits;
4.7 identify relevant data deficiencies, monitoring needs and research requirements.

Notes:

1. 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 new fisheries for other species is also requested.

2. 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 9

Council

CNL(99)14

Catch Statistics - Returns by the Parties

CNL(99)14

Catch Statistics - Returns by the Parties

1. The Official Catch Statistics, as submitted by the Parties, are tabulated overleaf (Table 1). The figures for 1998 are provisional. These catch statistics, which have been rounded to the nearest tonne, will be used to calculate the contributions to NASCO for 2000 and the adjustment to the 1999 contributions (in the light of the confirmed 1997 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 1960-1998 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 1960-1998 is provided, for information only, in paper CNL(99)15.

4. For the 1998 catch data there is only one minor discrepancy in the information provided to ICES and that provided to NASCO. The reason for this discrepancy (in the statistics for EU (England and Wales)) is that the figure provided to ICES includes fish which have been caught and released, whereas that used by NASCO is for salmon which have been caught and killed.

Secretary
Edinburgh
14 May, 1999

Table 1: Official Catch Statistics

	Provisional 1998 Catch (Tonnes)	Provisional 1998 Catch according to Sea Age						Confirmed 1997 Catch (Tonnes)
		1SW		MSW		Total		
		No	Wt	No	Wt	No	Wt	
Canada	149	46,687	79	13,270	70	59,957	149	229
Denmark (In Respect Of Faroe Islands And Greenland)	17	-	-	-	-	-	-	59
Faroe Islands *	6	-	-	-	-	-	-	0
Greenland	11	-	-	-	-	-	-	59
European Union	1,185	-	-	-	-	-	-	1,179
Iceland**	164	-	-	-	-	-	-	154
Norway	740	162,185	295.6	82,335	444.6	244,520	740.2	630
Russian Federation	131	34,870	92	7,662	39	42,532	131	111
United States Of America	0	-	-	-	-	-	-	0

* The catch for the Faroe Islands was from research fishing in the period January - April 1998.

** The 1998 catch for Iceland includes 33.6 tonnes of ranched salmon.

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	149	17	1185	-	164	740	131	-	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. Since 1991 there has only been research fishing for salmon in the Faroese zone. In 1997 there was no salmon fishing in the Faroese zone. The West Greenland fishery was subject to compensation agreements in 1993 and 1994.

ANNEX 10

Council

CNL(99)17

Returns under Articles 14 and 15 of the Convention

CNL(99)17

Returns under Articles 14 and 15 of the Convention

The request for the return of information required under the NASCO Convention and relevant to the period 1 January - 31 December 1998 was circulated on 18 January 1999. All Parties were requested to make a return even if there had been no changes since the last notification. Where changes have been notified under Article 15, and the laws, regulations and programmes concerned have been lodged with the Secretariat, the information will be incorporated into the Laws, Regulations and Programmes database. Copies of the detailed submissions are available from the Secretariat. A summary of the new actions taken under Articles 14 and 15 of the Convention is attached. At the time of preparation of this paper, information has not been received from three EU Member States (France, Portugal and Spain) which have salmon interests.

Secretary
Edinburgh
14 May, 1999

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

The Norwegian Coast Guard Squadron North have made surveillance flights over international waters in the Norwegian Sea in the period 1 April to 31 December 1998. During these flights no fishing for salmon has been observed.

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)***

No actions reported by any Party.

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]**

Canada

Closure of the commercial salmon fishery in Labrador (Zones 1 and 2). Voluntary licence program established for Labrador fishers. Continuation of previous management measures (closure of trout fishery, gear limits in place) to reduce salmon by-catches. The moratorium on commercial salmon fishing remained in effect for the Island of Newfoundland. Commercial salmon fishing licence buy-back program established for the remaining licences on the Lower North Shore of Quebec.

USA

No measures reported.

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

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

Canada

A commercial salmon fishing licence retirement program was established for Labrador and the Lower North Shore of Quebec. The fishery was closed in Labrador and Ungava and the fishery decreased significantly on the lower North Shore of Quebec.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

No changes reported.

Greenland

Under Greenland Home Rule Executive Order No. 23 of 10 August 1998 concerning commercial fishing for salmon, Section 6, subsection 1, states that limited use of drift nets is allowed, with a maximum of 20 lengths, and Section 7, subsection 3 states that catches may only be sold at local markets, to hotels, restaurants, butchers' shops and public eating places, and that catches may not be exported outside Greenland.

Under Greenland Home Rule Executive Order No. 24 of 10 August 1998 on buying and selling of salmon and reporting of the salmon catch, Section 3, subsection 1 states that hotels, restaurants, butchers' shops and public eating places must report each purchase of salmon to the Greenland Fishing License Control Authority on a daily basis.

European Union

Denmark

No changes reported.

Finland

No changes reported.

Ireland

No changes reported, but the conservation by-laws introduced in 1997 have been retained for 1998.

Sweden

No changes reported.

United Kingdom

In the United Kingdom a number of new regulations were introduced. For England and Wales, these included the Environment Agency (Rivers Taw and Torridge) (Limitation of Salmon and Trout Netting Licences) Order 1998, which limits the number of licences that may be issued for fishing for salmon and trout with draft or seine nets, and National Byelaw 5 regulating the design of keepnets, keepsacks and landing nets (e.g. it is an offence to use a landing net with any knotted meshes or meshes of metallic material). In November 1998 the Environment Agency in England and Wales advertised detailed proposals for changes to national byelaws. The main elements of these byelaws, which will enter into force from 15 April 1999, are:

- a delay in the salmon and sea trout netting season to 1 June (a few specified fisheries may still net for sea trout although any salmon caught must be returned);
- the introduction of catch and release before 16 June - any angler catching a salmon before that date must return it with minimum injury;
- the use of artificial fly or artificial lure only when angling for salmon before 16 June (on some rivers existing, more stringent local regulations will remain in force).

For Scotland, regulations were introduced which restricted the use of certain baits and lures in specified Salmon Fishery Districts (River Ewe, River Esk and River Tweed). For Northern Ireland, byelaws were introduced which increase the licence duties payable for fishing for salmon (and freshwater fish) with rod and line and commercial fishery engines, and which specify the fee payable for a licence to buy and sell salmon.

A number of byelaws in England and Wales were revoked or expired during 1998.

Iceland

There was a significant change in the Icelandic salmonid laws enacted in mid-1998, transferring all management responsibilities regarding salmonids and freshwater species to the Directorate of Freshwater Fisheries. This was a follow-up of the separation of research activities from the management responsibilities through an act of parliament in 1997.

Norway

Management changes

The process of changing the organisation of river and salmon stock management has proceeded in 1998 and is part of a state-wide project (1996-1999). One of the major goals of this project is to provide a basis for sustainable local management plans, for wildlife and fisheries management in a broad sense. A further NOK 4.7 million (both inland fish and salmon management) were invested in these local efforts in cooperation with the authorities for agriculture. By the end of 1998 local planning had commenced in about 140 rivers. Salmon River Councils had been established in 42 rivers and Regional Salmon Management Councils in about 10 areas, e.g. for the Oslofjord and Skagerrak coastline and the Trondheimsfjord.

In addition to the strong regulations on the sea fishery introduced in 1997 the fishing season for bend nets in Sogn og Fjordane county was shortened by 14 days in 1998. At the same time fishing with bend nets was prohibited or strongly regulated in two fjord areas in the western part of Norway.

Supervision in territorial sea areas and watercourses

In 1998 the total cost of supervision in territorial sea areas and watercourses was NOK 7.8 million. The Norwegian Nature Inspectorate has taken measures to improve the quality and efficiency of the supervision activities. The reporting routines have improved.

Russian Federation

No changes reported.

USA

The 1996 Amendments to the US federal fishery management legislation, the Magnuson-Stevens Fishery Conservation and Management Act (known as the Sustainable Fisheries Act) emphasized the importance of habitat protection to healthy fisheries and strengthened the ability of the fishery management councils and the National Marine Fisheries Service to protect and conserve the habitat of marine, estuarine and anadromous finfish, mollusks, and crustaceans. Under this Amendment, essential fish habitat has been designated for Atlantic salmon in the United States. Essential fish habitat for Atlantic salmon was described as all waters currently or historically accessible to Atlantic salmon within the streams, rivers, lakes, ponds, wetlands and other waterbodies of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

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

Canada

No new commitments reported.

Denmark (in respect of the Faroe Islands and Greenland)

No new commitments reported.

European Union

Denmark

No new commitments reported.

Finland

No new commitments reported.

Ireland

Publication of:

"Implementation of the Recommendations of the Salmon Management Task Force"

Marine Institute report commissioned by the Department of the Marine to outline the methodology for carcass tagging and quotas as a means of managing salmon stocks.

Sweden

No new commitments reported.

United Kingdom

No new commitments reported for England and Wales or for Scotland. For Northern Ireland the Fisheries Division of the Department of Agriculture continued to administer the Salmonid Enhancement Scheme for Northern Ireland.

Iceland

The changes to the Salmonid Act enacted in 1998 considerably strengthened the rules concerning transportation of salmonids between watersheds for fishing and various methods of enhancement using indigenous or non-indigenous stocks. These changes are specifically detailed in article 23 of the Salmonid Act.

Norway

Norwegian Salmonid Register

The status of salmon stocks as of 31 December 1998 according to the Norwegian categorisation system is as follows:

No. of rivers containing a stock of salmon	667
Rivers whose natural salmon stock has become extinct	49
Rivers whose salmon stock is threatened with extinction	55
Rivers containing vulnerable salmon stocks	155
Rivers containing small, natural salmon stocks	239
Rivers containing large, long-established salmon stocks	76
Rivers whose natural salmon stock is extinct and a new one has been established	11
Rivers where there is uncertainty as to whether salmon form a stock	13
Rivers where a salmon stock is present, but its status is unknown	69

The following threats are recorded:

Regulation of rivers; other forms of physical disturbance; acidification; agricultural pollution; other forms of pollution; escape of farmed salmon; *Gyrodactylus salaris*; other fish diseases; overfishing; unknown threats.

Liming

In 1998, 19 Atlantic salmon rivers were limed in Norway at a cost of NOK 40 million. Among these were three large watercourses in southern-most Norway - Tovdalselva, Mandalselva and Bjerkreimselva. In Tovdalselva and Mandalselva the natural Atlantic salmon stocks are extinct due to acidification. Before acidification, catches of salmon were as high as 30 tons per year at the end of the last century. In both rivers a restocking program is carried out in connection with the liming program. Bjerkreimselva still has a small population of its natural salmon stock and catches in 1998, the first year after liming, were 10 tons, the highest reported catches according to official statistics. A new liming project in Suldalslågen was established in 1998.

Gyrodactylus salaris

Because of three occurrences - the spreading of the parasite to the River Lærdal (1996) and its re-appearance in the river Rauma (1996) and river Steinkjer (1997) - a revised strategy has been drawn up for future work associated with the salmon parasite *Gyrodactylus salaris*. The approved strategy is founded on limiting the infection and exterminating the parasite from infected rivers. The strategy presupposes that significant emphasis is placed on eliminating potential sources of infection for the individual river or drainage basin, that the probability of exterminating the parasite from the river using rotenone is considered to be high, and that the implementation of suitable measures for preserving species that are significantly affected by the rotenone treatment is possible from a practical and economic viewpoint. Research on the parasite, the impacts of methods used to eliminate it and the development of alternative methods of eliminating it will be carried out simultaneously as part of the strategy.

The total number of watercourses treated with rotenone in Norway is 25. Eleven of these rivers have been successfully treated and have been removed from the restricted list and opened for fishing. In a further 8 rivers it is too early to conclude whether or not the treatments have been successful. The Norwegian authorities spent NOK 4.0 million in 1998 on these activities.

Gene-bank and milt-bank

By the end of 1998 milt from a total of about 6000 wild salmon from 166 stocks has been frozen in the Norwegian Gene Bank to provide a possibility of rescuing stocks from extinction. In 1998 milt from 382 individuals, from 31 different stocks was frozen. 33 characteristic and valuable stocks have been taken into the "living gene banks". A total of three living gene banks, in northern, mid and south-western Norway, are operated.

International research programmes

The cooperation between Norway and Russia on environmental issues and on research and management of Atlantic salmon has continued. Cooperation between Norway, Finland and Karelia in Russia has commenced in connection with research and monitoring of *Gyrodactylus salaris*.

Russian Federation

No new commitments reported.

USA

The National Marine Fisheries Service, US Fish and Wildlife Service and the State of Maine have embarked on an ambitious effort for the recovery of populations of Atlantic salmon in Maine. Much of this program was described in the 1998 submission of the United States and will not, therefore, be repeated here. A critical component of that cooperative program is fry stocking. Available habitat is now nearly saturated with fry that will lead to improved adult returns in future years.

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

Canada

There were low returns of large salmon as expected in 1998, although small salmon returns improved marginally. There are indications that this results from generally low rates of sea survival, despite recent indications that marine habitat has improved, and is probably related to increased levels of predation on salmon.

Denmark (in respect of the Faroe Islands and Greenland)

No factors reported.

European Union

Denmark

No factors reported.

Finland

New permission has been granted for salmon cage culture in Northern Norway which can negatively affect the abundance of the salmon stocks in the Näätämö and Teno rivers.

Ireland

No factors reported.

Sweden

There is increasing infection of *Gyrodactylus salaris* in several wild salmon rivers and an increasing number of Baltic salmon in the coastal and river catches because of straying, most likely from experiments with delayed release.

United Kingdom

No factors reported.

Iceland

The marine environment and biological conditions around Iceland seem to have improved.

Norway

No factors reported.

Russian Federation

No factors reported.

USA

No factors reported.

ANNEX 11

Council

CNL(99)48

Action Plan for Application of the Precautionary Approach

CNL(99)48

Action Plan for Application of the Precautionary Approach

1. Organisation of Activities

1.1 *Finalise Draft Action Plan for consideration by the Council*

At its 1998 meeting the Council agreed a Preliminary Action Plan for Application of a Precautionary Approach to Salmon Management. It was agreed that the Contracting Parties would be given the opportunity to make written submissions to the Secretariat concerning this Preliminary Draft Action Plan and that a Working Group should refine it.

1.2 *Agreement and adoption of Action Plan*

Following the further development of the Draft Action Plan, the Council will be asked to consider it at its 1999 meeting with a view to its adoption.

1.3 *Establish a Standing Committee/Working Group on the Precautionary Approach*

The adoption of a Precautionary Approach to salmon conservation, management and exploitation is a major undertaking which places obligations on NASCO and on its Contracting Parties. The implementation of a Precautionary Approach is likely to be an evolving process over a number of years and the Council will wish to consider progress in implementing the Action Plan and the need for further actions.

Actions relating to Section 1
Action to date: • The Preliminary Draft Action Plan was circulated to Heads of Delegations on 12 August 1998. No written submissions were received. **Future action:** • Finalise the Draft Action Plan, either by correspondence or, if necessary, by a meeting of the Working Group. **Timescale: June 1999** • Consideration of the Draft Action Plan with a view to its adoption by the Council at its Sixteenth Annual Meeting. **Timescale: June 1999**

- The Council should form a Standing Committee on the Precautionary Approach (SCPA) which will comprise the Heads of Delegations plus additional experts as appropriate. The Standing Committee on the Precautionary Approach will meet as directed by the Council and will have the following objectives:
  - to co-ordinate the implementation of the Action Plan;
  - to ensure co-ordination and consistency in implementing the Precautionary Approach in each regional Commission;
  - to report to the Council on:
  - progress in implementing the Action Plan;
  - the need for additional actions in relation to the application of a Precautionary Approach;
  - the activities relating to the Precautionary Approach of other organizations.

  Timescale: June 1999

- The Standing Committee on the Precautionary Approach should meet as required and annually in conjunction with the Annual Meetings of NASCO and report to the Council. **Timescale: 2000 onwards**

2. Management of North Atlantic Salmon Fisheries

2.1 *Clarify interpretation of NASCO's fisheries management objectives and concepts*

Article 3 of the NASCO Convention states that the objective of the Organization shall be to contribute through consultation and co-operation to the conservation, restoration, enhancement and rational management of salmon stocks subject to the Convention, taking into account the best scientific evidence. The Agreement on Adoption of a Precautionary Approach states that an objective for the management of salmon fisheries for NASCO and its Contracting Parties is to promote the diversity and abundance of salmon stocks and that for this purpose management measures should be aimed at maintaining all stocks above their conservation limits. ICES has noted that it is not clear that these objectives are fully compatible. ICES expressed concern about the lack of a clear definition of the word "conservation" in NASCO's objectives and was uncertain whether it has the same meaning as in the term "conservation limit".

2.2 *Conservation limits and management targets*

2.2.1 *Develop age-specific conservation limits for all stocks taking due regard of biological diversity*

The Agreement on Adoption of a Precautionary Approach states that management measures should be aimed at maintaining all stocks above their conservation limits (currently defined by NASCO as the spawning stock level that produces maximum sustainable yield). Where stocks are below their conservation limits, stock rebuilding programmes should be developed. Conservation limits have been established for all stocks in the North American Commission area, but some are based upon limited data. There will be a requirement for ICES to continue to review and, where possible, improve these conservation limits. Current conservation limits for the North-East Atlantic Commission area are largely based upon very imprecise data. The Council has identified as a priority for immediate action the establishment of river-specific conservation limits for stocks in the North-East Atlantic Commission area. As the

Precautionary Approach is applied more widely, consideration will need to be given to other factors that may need to be taken into account when setting biological reference points; these will include the need to maintain biological diversity.

2.2.2 *Develop management targets*

The Agreement on Adoption of a Precautionary Approach states that stocks should be maintained above the conservation limits by the use of management targets. These will be set relative to the conservation limits on the basis of the risks of not achieving the fishery management objectives. As a basis for setting management targets, assessments are required of the degree of uncertainty in the current state of the stocks, in the biological reference points and of the fishery management capabilities. Once the appropriate risk levels for setting management targets have been agreed by NASCO, management targets will then need to be developed for all stocks by ICES.

2.2.3 *Stock groupings to be used in management*

The Agreement on the Adoption of a Precautionary Approach states that conservation limits and management targets set for each river should be combined as appropriate for the management of different stock groupings defined by managers. ICES has also noted that there may be scientific reasons for linking particular groups of stocks. These biological data need to be integrated with appropriate management rationales to determine appropriate stock groupings for management purposes.

2.3 *Pre-agreed management actions for fisheries*

The Agreement on Adoption of a Precautionary Approach states that the application of a precautionary approach to salmon fishery management requires the formulation of pre-agreed management actions in the form of procedures to be applied over a range of stock conditions. It is important that a consistent approach is adopted for different fisheries, as appropriate to the particular conditions.

Actions relating to Section 2

Action to date:

- In its 1998 request for scientific advice, the Council asked ICES to further develop the age-specific stock conservation limits for smaller stock units in the North-East Atlantic Commission area, where possible based upon individual river estimates.

- For the North American Commission area, ICES has been asked to update age-specific stock conservation limits based on new information as available.

- ICES has also been asked to assess the risks relative to the objective of exceeding stock conservation limits when providing catch options or alternative management advice.

Timescale: The response from ICES to these questions will be presented at the Council's 1999 Annual Meeting.

Future action:

- The Council should continue to request that ICES review and improve the conservation limits being developed by the Contracting Parties throughout the North

Atlantic area taking account of factors such as the maintenance of biological diversity. **Timescale: 1999 onwards**

- The development by the Contracting Parties of river-specific conservation limits for the North-East Atlantic Commission area is a priority for immediate action. **Timescale: 1999 onwards**

- ICES should be asked to advise on the most appropriate stock groupings based on biological information. The Commissions should consider this advice and decide on the stock groupings to be used in management. **Timescale: 1999 onwards**

- The Standing Committee on the Precautionary Approach should:

  - further clarify the interpretation of the fisheries management objectives and concepts of NASCO and its Contracting Parties;
  - recommend risk levels for establishing management targets taking account of uncertainty in the current state of the stocks, in biological reference points and fishery management capabilities;
  - propose procedures for developing pre-agreed management actions for distant water fisheries;
  - develop guidelines for preparing pre-agreed management actions for homewater fisheries;
  - advise on the circumstances under which stock rebuilding programmes would be required, procedures for disseminating information on these programmes, and procedures for assessing the effectiveness of these programmes.

  Timescale: To be recommended by SCPA

- The Council should consider the recommendations of the Standing Committee on the Precautionary Approach on the application of a precautionary approach to salmon fisheries management and decide on future actions. **Timescale: To be recommended by SCPA**

3. Socio-Economic Issues

3.1 *Indicate how socio-economic factors could be included in fisheries management, aquaculture, introductions and transfers, stock rebuilding programmes, by-catches*

Article 9 of the Convention refers to a number of socio-economic factors that shall be taken into account by the Commissions of NASCO in establishing regulatory measures and such factors have formed a major input to the NASCO measures to date. The Agreement on Adoption of a Precautionary Approach states that socio-economic factors could be taken into account in applying the Precautionary Approach to fisheries management issues. They may also need to be considered in relation to the application of this approach to other salmon management and conservation activities. However, concerns have been expressed that consideration of socio-economic factors could negate the effectiveness of the Precautionary Approach unless clear priority is given to conservation issues. Resolving how socio-economic factors can be included in implementation of a Precautionary Approach to salmon conservation, management and exploitation without negating its effectiveness will require careful consideration and possibly the development of guidelines.

Actions relating to Section 3
Future action: • The Standing Committee on the Precautionary Approach will ensure that the relevant short-term and long-term socio-economic factors are taken into account in implementing the Precautionary Approach in relation to, *inter alia*: - fisheries management; - aquaculture; - introductions and transfers; - stock rebuilding programmes; - by-catches. Preparatory discussion papers should be sought from independent sociologists and economists to outline the principles that might need to be considered by the Standing Committee on the Precautionary Approach. **Timescale: To be recommended by SCPA** • The Council should consider the recommendations of the Standing Committee on the Precautionary Approach on socio-economic aspects in the precautionary approach and decide on future actions. **Timescale: To be recommended by SCPA**

4. Unreported Catches

4.1 *Develop and improve estimation procedures*

The Agreement on Adoption of a Precautionary Approach recognises that efforts to improve estimates of unreported catches are consistent with the Precautionary Approach. ICES has indicated that it is unable to evaluate the accuracy of the processes used to develop "guess-estimates" of unreported catches but has stressed the need for efforts to improve them. Concern has been expressed within NASCO that the information provided by ICES does not give a breakdown by country of the "guess-estimates" of unreported catches and does not provide an explanation of how each country determined its value.

4.2 *Improve catch reporting procedures*

The Council has expressed concern about the high level of unreported catches and strongly emphasised the need to take stronger measures to minimise the level of such catches. The Agreement on Adoption of a Precautionary Approach recognises that efforts to minimise unreported catches are consistent with the Precautionary Approach.

Actions relating to Section 4
Action to date: • Since 1985, the Council has, on an annual basis, requested ICES to provide estimates of unreported catches. This information has been provided by Commission area only. In 1998, the Council requested that ICES provide a breakdown of unreported catches on a stock complex basis. • At its 1998 Annual Meeting the Council agreed that each Contracting Party should provide, on an annual basis, an explanation of how it arrives at its figure for unreported catch. • At its 1998 Annual Meeting the Council agreed that each Contracting Party should provide, on an annual basis, a description of its management control and reporting systems by country, the extent of catch and release fishing and the measures taken to further minimise the level of unreported catches. **Future action:** • The Council should consider ways to reduce levels of unreported catch by improving reporting mechanisms. • The Contracting Parties should review their management control and reporting systems with the aim of reducing the level of unreported catches. • The Council should review the progress on measures taken to minimise the level of unreported catches. **Timescale: 1999 onwards**

5. Scientific Advice and Research Requirements

5.1 *Reformulate the request to ICES with respect to CNL(98)46*

Under the Agreement on Adoption of a Precautionary Approach it is agreed that ICES or other scientific advisors should be requested, *inter falia*, to: provide stock conservation limits and management targets for all river stocks; advise on the risks of not achieving the objectives of NASCO or its Contracting Parties; provide catch options or alternative management advice with associated risk assessments; advise on stock rebuilding programmes; identify the monitoring and data collection required; advise on the impacts on salmon stocks of existing and new fisheries for other species, and of salmon fisheries on non-target species.

5.2 *Reformulate the request for advice in the light of management decisions on application of the Precautionary Approach*

It is anticipated that as the Precautionary Approach is applied to the conservation, management and exploitation of salmon, there will be a need to modify the existing request for advice and seek additional information from ICES.

Actions relating to Section 5
Action to date: • At its 1998 meeting, the Council agreed on the scientific advice that might be sought in support of a Precautionary Approach (CNL(98)41) and this was taken into account by the Standing Scientific Committee in developing the 1998 request for scientific advice from ICES. The response from ICES to this revised request for advice will be presented at the Council's meeting in 1999. **Future action:** • The Standing Scientific Committee should reformulate the request for scientific advice, as necessary, in the light of management decisions on application of the Precautionary Approach. **Timescale: 1999 onwards**

6. Stock Rebuilding Programmes

6.1 *Develop framework for stock rebuilding programmes (SRPs)*

Under the Agreement on Adoption of a Precautionary Approach it is recognised that application of the Precautionary Approach to salmon fishery management is an integrated process that requires, *inter alia*, that stock rebuilding programmes (including, as appropriate, habitat improvement, stock enhancement and fishery management actions) be developed for stocks that are below their conservation limits. ICES has been asked to develop a framework for stock rebuilding programmes.

6.2 *Provide advice on SRPs*

The Agreement on Adoption of a Precautionary Approach indicates that stock rebuilding programmes should be developed for stocks that are below their conservation limits. There is a need to consider in detail the circumstances under which such Plans will be required and how they will be implemented and managed.

6.3 *Identify stocks requiring SRPs*

Once the circumstances under which SRPs would be required have been agreed, there will be a need to identify those stocks for which SRPs are required.

6.4 *Develop SRPs for stocks identified above*

The development of stock rebuilding programmes by the Contracting Parties, with appropriate involvement of and co-ordination with the regional Commissions, will be a long-term commitment which should commence once the relevant stocks have been identified.

6.5 *Report to Council on SRPs*

The Council will wish to be advised, through the Standing Committee on the Precautionary Approach, on progress with the development of SRPs and resulting changes in the status of the stocks.

Actions relating to Section 6

Action to date:

- In 1998 the Council requested ICES to develop a framework for stock rebuilding programmes. The response from ICES should be available at the Sixteenth Annual Meeting in 1999.

Future action:

- The Standing Committee on the Precautionary Approach should: :

  - identify the circumstances under which stock rebuilding programmes would be required;
  - develop procedures for disseminating information on stock rebuilding programmes and for reviewing progress on these programmes;
  - develop procedures for assessing the effectiveness of stock rebuilding programmes.

  Timescale: To be recommended by SCPA

- The Council should consider the recommendations of the Standing Committee on the Precautionary Approach, as these apply to stock rebuilding programmes, and decide on future actions. **Timescale: To be recommended by SCPA**

- In the light of the decision of the Council, the Contracting Parties, with appropriate involvement of and co-ordination with the regional Commissions should:

  - identify those stocks requiring stock rebuilding programmes; **Timescale: To be recommended by SCPA**
  - develop appropriate stock rebuilding programmes and report to the Council on progress with their development and effectiveness. **Timescale: To be recommended by SCPA**

7. Introductions, Transfers, Aquaculture and Transgenics (including stocking and ranching)

The Agreement on Adoption of a Precautionary Approach states that it is essential that there be full implementation of the measures developed by NASCO in the various agreements

concerning introductions and transfers and aquaculture. It is further stated that the Contracting Parties agree to report to the Council or appropriate Commission on the steps taken to achieve the measures described in the agreements, ensure full implementation of these agreements and consider whether the agreements need to be re-examined and complemented by additional steps.

NASCO and its Contracting Parties recognise that the development of a number of these issues requires close collaboration with appropriate industry representatives which deal with fish farming or stock enhancement.

7.1 *Introduce, review, develop and extend reporting procedures*

A reporting procedure has already been initiated for the North American Commission's Protocols on Introductions and Transfers, NAC(92)24 and NAC(94)14.

Under Article 5 of the Oslo Resolution (CNL(94)53) there is a requirement for the Contracting Parties to provide to the Organization, on an annual basis, information concerning the measures adopted and the research and development carried out. A format for the provision of this information was agreed in 1995 and revised in 1998.

Under the NASCO Guidelines for Action on Transgenic Salmon, CNL(97)48, there is a requirement for the Contracting Parties to report to the Council 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 stocks. Time is allocated on the Council agenda for these reports to be made.

The North-East Atlantic Commission's Resolution to Protect Wild Salmon Stocks from Introductions and Transfers (NEA(97)12) contains no requirement to report on the measures taken by the Contracting Parties.

Actions relating to Section 7.1
Action to date: • In 1998 the Council agreed a new, more detailed format for the provision of information concerning the measures taken by the Contracting Parties under the Oslo Resolution. The first returns were presented to the Council at its June 1998 Meeting. • In 1998 the North-East Atlantic Commission agreed that in the interests of transparency it would be desirable to introduce a regular reporting system for measures taken in accordance with the Resolution to Protect Wild Salmon Stocks from Introductions and Transfers. The Secretariat was asked to develop a format for the provision of this information.

Future action:

- The Council will work on the development of a new liaison structure between NASCO and the North Atlantic salmon aquaculture industry. **Timescale: Commencing autumn 1999**

- The Standing Committee on the Precautionary Approach will develop further objectives for the implementation of the Precautionary Approach for introductions, transfers, aquaculture and transgenics following the Liaison Meeting. **Timescale: to be recommended by SCPA**

- The system for reporting under the North American Commission's Protocols should be kept under review and improved as required. **Timescale: To be recommended by SCPA**

- The information provided by the Contracting Parties, under the new format, on measures taken in accordance with the Oslo Resolution will be recorded in a database by the Secretariat. This reporting system should be kept under review and improved as required. **Timescale: 1998 onwards**

- At its 1999 meeting the North-East Atlantic Commission will review a format for reporting under the Resolution to Protect Wild Salmon Stocks from Introductions and Transfers. Once this procedure has been agreed by the Commission it will need to be kept under review. **Timescale**: **1999 onwards**

7.2 *Take account of the application of a Precautionary Approach in the review of NAC(94)14*

The Protocols on Introductions and Transfers were agreed by the North American Commission in 1992 and were amended in 1994. They are presently under review.

Actions relating to Section 7.2

Action to date:

- At the North American Commission's 1998 meeting a Discussion Document for revision to the Protocols was tabled. The Commission agreed that recommendations for modifications to the Discussion Document should be provided during the calendar year so that revised protocols can be presented to the Commission for approval at its Sixteenth Annual Meeting in 1999.

Future action:

- In the light of the decision of the Council and Contracting Parties to adopt and apply a Precautionary Approach, the review of the North American Commission Protocols should ensure their consistency with this approach, and take account of appropriate risk assessments. **Timescale: To be recommended by SCPA**

7.3 *Re-examine the other NASCO Agreements and consider the need for additional steps in the light of the Precautionary Approach*

Under the Council's Agreement on Adoption of a Precautionary Approach it is stated that the Contracting Parties should ensure full implementation of the existing agreements and consider whether they need to be re-examined and complemented by additional steps.

Actions relating to Section 7.3
Future action: • The Standing Committee on the Precautionary Approach will: - review the measures contained in the Oslo Resolution, CNL(94)53, Guidelines for Action on Transgenic Salmon, CNL(97)48, and the NEAC Resolution to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12 and advise on their consistency with the Precautionary Approach; - make recommendations for additional measures where these are required to safeguard the wild stocks; - review measures to prevent unintentional introductions and transfers. • In reviewing these agreements and measures, and in making recommendations for additional measures, the Standing Committee on the Precautionary Approach should take account of appropriate risk assessments. **Timescale: To be recommended by SCPA** • The Council should consider the recommendations of the Standing Committee on the Precautionary Approach on introductions, transfers, aquaculture and transgenics and decide on future actions. **Timescale: To be recommended by SCPA**

7.4 *Review the use of sterile salmon in aquaculture*

The use of sterile salmon in aquaculture might offer a way forward to protect the genetic integrity of the wild stocks. However, there could be disadvantages for industry in terms of yield, fish health, ecological impacts, consumer resistance and other marketing factors. Concerns have also been raised about the possible ecological impacts of sterile salmon on the wild stocks. These disadvantages would have to be balanced against the risks to the wild stocks from existing practices. The results of on-going research on the feasibility of using all-female triploid sterile salmon in aquaculture and on their ecological impacts should be available in 1999.

Actions relating to Section 7.4
Action to date: • The Council has agreed that the question of the use of sterile salmon in farming should be the subject of a substantial review in 1999. **Future action:** • In the light of this review the Council agree to encourage further research on the use of sterile salmon in aquaculture. **Timescale: 1999 onwards**

7.5 *Review measures to prevent unintentional introductions and transfers of salmonids and of diseases and parasites*

There is concern about the impact of unintentional introductions of aquatic species which may adversely affect wild salmon stocks. Such introductions can occur, for example, in ships' ballast water, or on fishing equipment.

Actions relating to Section 7.5
Future action: • The Standing Committee on the Precautionary Approach will develop advice on measures to prevent unintentional introductions and transfers. **Timescale: To be recommended by SCPA** • The Council should consider the recommendations of the Standing Committee Precautionary Approach on the application of a precautionary approach to introductions, transfers, aquaculture and transgenics, as these apply to unintentional introductions and transfers, and decide on future actions. **Timescale: To be recommended by SCPA**

8. Habitat Issues

8.1 *Special Session on Habitat Issues*

There is little doubt that the degradation of freshwater habitats as a result of a wide range of aquatic and terrestrial factors is contributing to the decline of salmon stocks in some areas. This is a complex topic involving a wide range of disciplines. Initial discussion on these issues will take place during a Special Session on Habitat Issues at the Sixteenth Annual Meeting.

8.2 *Consider application of a Precautionary Approach to Freshwater Habitat Issues*

The Council will need to consider how the Precautionary Approach will be applied to freshwater habitat issues. The Council has agreed that this should be considered in the second phase of implementing the Precautionary Approach.

Actions relating to Section 8

Action to date:

- The Council has agreed to hold a Special Session on habitat issues at its 1999 Annual Meeting. This session will provide a forum for a review and discussion of habitat issues which may impact on Atlantic salmon.

Future action:

- The Standing Committee on the Precautionary Approach should establish methods for ensuring exchange of information between Contracting Parties on restoration methods. **Timescale: To be recommended by SCPA**

- The Council has agreed that habitat improvement may be one of the elements in Stock Rebuilding Programmes. Measures to address habitat issues may be introduced as these measures are implemented. **Timescale: Long-term**

- The Standing Committee on the Precautionary Approach should consider the application of a Precautionary Approach to habitat issues. **Timescale: To be recommended by SCPA**

9. By-catches

9.1 *Consider application of the Precautionary Approach to by-catch problems*

The Council has agreed that by-catch is an issue that should be considered in the second phase of implementing the Precautionary Approach.

In recent years there has been a significant growth in fishing for pelagic species of fish in the North-East Atlantic Commission area, and concern has been expressed about the possible by-catch of salmon in these fisheries.

Under the Agreement on Adoption of a Precautionary Approach it is stated that new fisheries targeted on salmon, or fisheries which could result in a by-catch of salmon, should be subject to cautious conservation and management measures and that the Contracting Parties shall invite the attention of non-Contracting Parties to any significant by-catch of salmon by its vessels. It is also stated that ICES or other scientific advisors should be requested to advise on the impacts on salmon stocks of existing and new fisheries for other species, and of salmon fisheries on non-target species.

Actions relating to Section 9

Action to date:

- The Council has advised the non-Contracting Parties (Estonia and Latvia) involved in the fishery for mackerel of its concerns about the possible by-catch of salmon.

- The Council is seeking information from ICES and from the Contracting Parties on the by-catch of salmon and has agreed that information also be sought from the North-East Atlantic Fisheries Commission (NEAFC).

Future action:

- The Council should continue to seek information on the by-catch of salmon and consider appropriate action in the light of the information obtained. **Timescale: 1999 onwards**

- ICES should be asked to advise on the impacts on salmon stocks of any new fisheries for other species and of fisheries targeted at salmon on other species. **Timescale: 1999 onwards**

- The Council should encourage the appropriate management authority to manage new fisheries in a manner which would minimise the by-catch of salmon. **Timescale: 1999 onwards**

- The Standing Committee on the Precautionary Approach should consider the application of a precautionary approach to by-catch issues. **Timescale: To be recommended by SCPA**

ANNEX 12

Council

CNL(99)19

Unreported Catches

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Introduction

1. Last year the Council reviewed previous NASCO actions in relation to unreported catches. This review summarised the factors which could lead to unreported catches, the methods which might be used to assess unreported catches, the minimum standard for catch statistics and the methods which have been used to reduce the level of unreported catches. During the period 1985-1996, the "guess-estimates" of unreported catch provided by ICES accounted for a significant proportion (28%) of the estimated total catch. A concern expressed by the Canadian delegation was that the information provided by ICES does not give a breakdown by country of the "guess-estimates" of unreported catches and does not provide an explanation of how each country determined its value.

2. The Council has expressed concern about the high level of unreported catches and has strongly emphasised the need to take stronger measures to minimise the level of such catches. It was agreed that ICES should be requested to provide a breakdown of unreported catches on a stock area basis and the Parties were, therefore, encouraged to provide as detailed information as possible. The response from ICES will be presented in document CNL(99)12. It was further agreed that the Secretary should be asked to request, on an annual basis, from each Contracting Party:

    1) a description of its management control and reporting systems by country;
    2) an explanation of how it arrives at the figure for unreported catch along the lines of the breakdown given in paragraph 10 of document CNL(98)22;
    3) the extent of catch and release fishing;
    4) the measures taken to further minimise the level of unreported catch.

    In accordance with this decision, information was requested from the Contracting Parties on 18 January 1999 with the form for return of information under Article 14 and 15 of the Convention. The responses from the Parties are attached.

3. It is clear from the return of information on management control and reporting systems that all Parties make considerable efforts to obtain detailed and accurate catch statistics for the salmon fisheries. Despite this, catches may be unreported for a number of reasons including suppression of information thought to be unfavourable (for financial reasons or because of concern about the introduction of management measures), innocent inaccuracy, and local sale or consumption. Illegal fishing appears to be a particular problem and is the main source of unreported catch for three Parties and for one EU member state. The returns also indicate that the practice of catch and release fishing is becoming more common, although not in all areas of the North Atlantic, and concern has been raised about the impact this practice may have on the interpretation of catch statistics. Under the Minimum Standard for Catch Statistics adopted by the Council in 1995, it is only the figure for catches which are caught and retained that is submitted to NASCO.

4. The information in the returns by the Parties is not in a form such that the significance of each source of unreported catch can be estimated. 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 the information on unreported catches referred to in paragraph 2 above on an annual basis.

Secretary
Edinburgh
14 May, 1999

1. Description of management control and reporting systems by country

Canada

Within Quebec, all legally harvested commercial and recreational salmon have to be registered. In the rest of Atlantic Canada, recreational fisheries are estimated by licence stub return systems and surveys. Aboriginal Food Fisheries are either reported by the Native People themselves or estimated by local enforcement staff. This means that all legal fisheries have reporting systems and unreported catches arise mainly from those harvests which are illegal. Unreported catches are generally estimated by local enforcement or scientific staff based on local assessment of illegal activity.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

No commercial fishery has taken place in Faroese waters during the 1998/1999 fishing season. The salmon long-liner m/s "Polarlaks" went out on a research fishery in January 1998 and returned in early April. A report regarding the research fishery was given to the Department of Fisheries.

Greenland

All commercial catches of salmon must be reported to the Greenland Fishing Licence Control Authority (GFLK) on a daily basis. Catches from the recreational fishery must be reported as soon as possible. Every purchase of salmon must be reported to the GFLK. Only persons licensed for commercial salmon fishing can sell their catches. The catches from the commercial salmon fishery can only be sold at local markets and local shops, to hotels, schools, hospitals and other public eating places.

European Union

Denmark

There are no figures for unreported catch in Denmark but DIFRES believe the figure to be insignificant.

Finland

Recreational fishing catch statistics are well reported (angler response rate was 75%). The total salmon catch is estimated.

Local salmon catches (set nets, drift nets, weirs and rod and reel fishing) are requested after the fishing season ends. Fishermen are asked to complete a catch report or answer personally to interviews (out of a total of 800 fishermen, 50-65% report their catch). Reported salmon catches are underestimated by about 20-30%.

Ireland

The Department of the Marine and Natural Resources is charged with the enactment and enforcement of fisheries legislation. Authorised officers in seven regional fisheries areas carry out enforcement and fisheries protection. Commercial catch statistics are reported from licensed salmon dealers' registers in all regions except one, where an estimate is made based on sample fishermen's catches. Angling catch returns are not collected systematically and best estimates are made in most regions.

Sweden

The level of unreported catches is assumed to be between 5 to 25% of the total catch. The level has been estimated based on the official catch figures collected yearly by the National Board of Fisheries through the mandatory log-books and sales notes regarding the licensed professional fishing, and the county administrations regarding all salmon catches in the coastal area and in the rivers. The county administrations issue fishing licences to fishermen, a condition of which is the submission of a yearly report of all catches. Sport fishing organisations and fisheries management areas managing the salmon fishing through the sale of one-day fishing licences for smaller areas in the rivers are also obliged to report all catches of salmon including specification of individual length, weight, sex and date of the catch. Even the place of the catch and fishing method used are commonly reported. The information is compiled yearly at the respective county administration's fishing unit and submitted to the Board of Fisheries. The information regarding sport fishing with rod and line and professional fishing with fixed gears is estimated to be quite complete but the catch by the public because of their right to fish with a limited number of nets is assumed to be the major part of the Swedish unreported catch.

UK - England and Wales

All net, fixed engine and rod fishing is subject to licence. All licensees are required to submit a mandatory catch return. The proportion of netsmen submitting returns is usually at, or very close to, 100%, with active follow-up of non-respondents. A lower proportion of rod licensees respond; a postal reminder system operates. Declared catches are adjusted for under-reporting.

UK - Northern Ireland

Returns from netsmen as a licence condition.

UK - Scotland

Wild resources are policed by the District Salmon Board's bailiff force. Catch return forms are sent to owner/occupiers of the salmon fishery. A reminders system is in place to maximise returns. A return rate of 95% or greater received annually.

Iceland

There is accurate logging of salmon from sports fisheries in rivers. This is not expected to be a major source of error. Catch and release, however, might be

underestimated. There are mandatory catch reports from freshwater netting fisheries. This reporting is less precise than the reporting from angling and might be a source of some error. Catches from ranching stations are provided in numbers and tonnage and are not a source of a major error.

Norway

The main responsibility for the collection and administration of catch reports lies with the County Governors. The County Governors collect reports from land owners on the rivers at the end of the year. A report from each County is sent to the official bureau "Statistics Norway". Sea-fishermen are registered by the County Governor before the fishing season starts. Catch reports from sea fishing are sent directly from each fisherman to Statistics Norway.

Russian Federation

For all types of fishing a licence is issued by the Fishery Protection authorities. For commercial fishing for salmon, and fishing based on "catch and release", a special seasonal day-book is available in which the daily catch statistics are registered. During "catch and retain" fishing the catch statistics enter a licence to further submit to the Fishery Protection authorities. Reporting on commercial fishing is practised on a decade basis and that on licensed recreational fishing - after the termination of the season. When the catch statistics are not reported the fishing licence is cancelled.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis.

2. Explanation of how the figure for unreported catch is arrived at

2.1 Absence of a requirement for catch statistics to be collected

Canada

See 2.5.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

Greenland

Official gamekeepers have confirmed that not all catches are reported. Unreported catches are estimated at 1.224kg (1.2 tonnes). This figure is arrived at by comparing the number of registered catches and purchases of salmon to the number of licenses issued.

European Union

Finland

There is a requirement for the Finnish Game and Fisheries Research Institute to collect catch statistics from salmon fishermen.

Ireland

No estimate is made in relation to this possible source of unreported catches.

Sweden

None.

UK - England and Wales

Catch statistics are required from all salmon gear so no estimate is made of unreported catch from this source.

UK - Northern Ireland

Catch statistics are required from all salmon gear so no estimate is made of unreported catch from this source.

UK - Scotland

Catch statistics are required from all salmon gear so no estimate is made of unreported catch from this source.

Iceland

All salmon catches must be reported.

Norway

Catch reports are not collected for by-catch in commercial sea fishing and legal catches in the sea by angling. The estimated distribution of unreported catches is based on observations.

Estimated distribution of unreported catches in 1998:

Illegal catches in the sea, 20-30%.
By-catch in commercial sea fishing, 2-8%.
Legal catches in the sea by wedge-shaped seine and bend net, 15-25%.
Legal catches in the sea by angling, 15-25%.
Illegal catches in rivers, 2-8%.
Legal catches in rivers, mainly by angling, 20-30%.

Russian Federation

There is a requirement for catch statistics to be collected from all salmon fisheries.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

2.2 Suppression of information thought to be unfavourable

Canada

See 2.5.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

Finland

Salmon catches may be unreported both as a result of human inaccuracy (failure to record catches each day in log books) and a sceptical attitude to authority (adhering to fishing rules). These are believed to be important sources of unreported catches. Local salmon catches (set nets, drift nets, weirs and rod and reel fishing) are requested after the fishing season ends. Fishermen are asked to complete a catch report or answer personally to interviews (out of a total of 800 fishermen, 50-65% report their catch). Reported salmon catches are underestimated by about 20-30%.

Ireland

No estimate is made in relation to this possible source of unreported catches.

Sweden

It is possible that some information regarding limited catches is not reported through the relevant county administrations for tax reasons. However, the level of these catches is considered to be of no significance to the estimation of the total size of the catch.

UK - England and Wales

No estimate - included in overall total.

UK - Northern Ireland

Suppression of information thought to be unfavourable is not believed to be a problem, so no estimate is made of unreported catch from this source.

UK - Scotland

Suppression of information thought to be unfavourable is not believed to be a problem, so no estimate is made of unreported catch from this source.

Iceland

Some legal freshwater net fisheries might not provide accurate catch statistics as it might be considered unfavourable for various reasons. This might be responsible for 25% of unreported catches.

Norway

Frequency of report returns is collected and analysed.

Russian Federation

To cut taxes the catch statistics are reduced by salmon fishermen fishing in the coastal zone. To estimate the size of unreported catch by the methods suggested is impossible. According to the estimate from experts, this figure annually constitutes 25-40 t.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

2.3 Local sale or consumption

Canada

See 2.5.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

Greenland

It has been established that salmon have been sold illegally in the towns of Nuuk, Aasiaat and Maniitsoq, but not how many. Not all purchases of salmon by hotels in Nuuk have been reported.

European Union

Finland

Salmon caught by recreational fishermen are mainly kept for their own consumption. There is some sale of salmon caught by local fishermen. However, it is unknown if this is reported or unreported.

Ireland

An unknown proportion of the unreported catch.

Sweden

Some 25% of the unreported catches are presumed to be sold to customers directly at landing or for consumption by their own family.

UK - England and Wales

No estimate - included in overall total.

UK - Northern Ireland

Local sale or consumption is not believed to lead to unreported catch, so no estimate is made of unreported catch from this source.

UK - Scotland

Local sale or consumption is not believed to lead to unreported catch, so no estimate is made of unreported catch from this source.

Iceland

This is related to suppression of information thought to be unfavourable from some legal freshwater net fisheries. The unreported catch from this source is included in the figure for 2.2.

Norway

This is not believed to be a source of unreported catches.

Russian Federation

This is not believed to be a source of unreported catch.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

2.4 Innocent inaccuracy in making returns

Canada

See 2.5.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

Greenland

Not all purchases by hospitals have been reported on time.

European Union

Ireland

No estimate is made in relation to this possible source of unreported catch.

Finland

Salmon catches may be unreported both as a result of human inaccuracy (failure to record catches each day in log books) and a sceptical attitude to authority (adhering to fishing rules). These are believed to be important sources of unreported catches. Local salmon catches (set nets, drift nets, weirs and rod and reel fishing) are requested after the fishing season ends. Fishermen are asked to complete a catch report or answer personally to interviews (out of a total of 800 fishermen, 50-65% report their catch). Reported salmon catches are underestimated by about 20-30%.

Sweden

Some catches by non-professional fishermen fishing with small-scale nets are not reported and are estimated to be 25% of the unreported catches.

UK - England and Wales

In England and Wales the Environment Agency has estimated that declared salmon rod catches should be increased by 10% to allow for under-reporting of the legal rod catch. This has been based on a study of catch returns made following reminders. Exceptions to this apply for a number of rivers for which the fishery owner's returns are regarded as more accurate. For net fisheries in England and Wales, the rate of reporting is generally considered to be high in most regions and this has been supported by the findings of two studies. On the basis of these and opinions on the level of under-reporting in regional net fisheries, collected from Environment Agency

fisheries personnel, a figure of 8% has been used for estimating the level of under-reporting of the national net catch. It has been suggested that over-reporting of catches may be occurring in the north-east coast fishery, in response to continuing rumours about a potential future buy-out in that fishery (and the perception that compensation will be based on declared catches).

UK - Scotland

Unable to estimate the under-reporting. People sign forms and they are believed. Sampling has found these people's reporting to be accurate. All unreported catches are deemed to be from unlawful fisheries.

Iceland

There could be some inaccuracy in catch reporting because of catch and release activities.

Norway

Estimated distribution of unreported catches in 1998:

Illegal catches in the sea, 20-30%.
By-catch in commercial sea fishing, 2-8%.
Legal catches in the sea by wedge-shaped seine and bend net, 15-25%.
Legal catches in the sea by angling, 15-25%.
Illegal catches in rivers, 2-8%.
Legal catches in rivers, mainly by angling, 20-30%.

Russian Federation

This is not believed to be a source of unreported catch.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

2.5 Illegal fishing

Canada

Unreported catch is attributed principally to illegal fishing.

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

European Union

Finland

Illegal fishing takes place in unpatrolled tributaries throughout the summer and in the main river in the darkness of fall. This is an important source of unreported catches.

Ireland

This is an unknown proportion of the unreported catch.

Sweden

The level of illegal fishing is presumed to be of minor scale accounting for some 50% of the unreported catches.

UK - England and Wales

Recent estimates of illegal catches, expressed as a percentage of the declared catch, ranged from 5% to 18% for different Regions in England & Wales. A figure of 12% has been used to estimate the total illegal catch. N.B. Total unreported and illegal catch (combined) estimated at 30 tonnes in 1998.

UK - Northern Ireland

Illegal fishing is not believed to be a problem, so no estimate is made of unreported catch from this source.

UK - Scotland

100%.

Iceland

Legal lump-fish and char fisheries operate along the Icelandic coast during a critical time during the summer. The fisheries are known to catch some quantity of salmon as a by-catch. Sometimes these fisheries target salmon and salmon might also be targeted by haddock and cod fishermen during the summer. This probably accounts for 75% of the unreported catch.

Norway

Estimated distribution of unreported catches in 1998:

Illegal catches in the sea, 20-30%.
By-catch in commercial sea fishing, 2-8%.
Legal catches in the sea by wedge-shaped seine and bend net, 15-25%.
Legal catches in the sea by angling, 15-25%.
Illegal catches in rivers, 2-8%.
Legal catches in rivers, mainly by angling, 20-30%.

Russian Federation

According to expert opinion, illegal fishing annually makes up from 50 to 100% of commercial catch. Calculations based on the assessment of spawners (parent stock) and fry (offspring) indicate that in 1997 illegal fishing on the Tuloma river constituted about 50% of the fish released for spawning.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

3. The extent of catch and release fishing

Canada

29,518 small salmon
20,797 large salmon

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

None.

Greenland

None.

European Union

Denmark

Catch and release techniques are not used in Denmark.

Finland

There is no catch and release fishing except for a requirement to release kelts.

Ireland

Catch and release is not carried out extensively in Ireland.

Sweden

Catch and release fishing is not yet a common practice in Sweden but is growing at a local level in some rivers where sport fishing and conservation of salmon are high priorities for the local communities. The major reason for applying catch and release is because of specific local fisheries regulations in order to save females during the most important spawning period.

UK - England and Wales

The Environment Agency estimates that 30% of the declared salmon rod catch in 1998 (for returns submitted up to 8th February 1999) was subsequently released, representing 5,116 fish.

UK - Northern Ireland

Not applicable.

UK - Scotland

18.5% (19.5% by weight) of all salmon and grilse caught by rod and line were released in 1998 (provisional figure).

Iceland

For the first time the salmon from catch and release activities are excluded from the tonnage reported to NASCO. This corresponds to approximately 7% of the Icelandic sport catch and is increasing. Iceland is making every effort to get more accurate information on the extent of catch and release fishing as it can conceal its true abundance of salmon. From the Icelandic standpoint the exclusion of these fish from the nominal catches reported to NASCO seems to be a highly questionable practice in the light of the rapid expansion of this practice in NASCO member states, which will eventually lead to a minor share of countries promoting angling in the 70% share of the NASCO budget, which is based on catches. As "catch and release" is being used as a management tool in some countries it seems likely that the countries with the greatest problems and weakest stocks of Atlantic salmon would thus end up paying the smallest part of the NASCO budget.

Norway

The extent of catch and release fishing is sporadic and accidental.

Russian Federation

12776 salmon, which was 80.9% of the total catch by rod.

USA

The estimated number of Atlantic salmon caught and released in Maine in 1998 was 270.

The only other sport fishery in the United States is in the Merrimack River. Under this programme, 1,888 surplus broodstock were released in 1998 from the hatchery to provide angling opportunities. There is a small late fall and mid-winter release of kelts and non-spawners and a larger spring release of re-conditioned kelts. This fishery resulted in the catch of 1,528 fish in 1998.

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

Denmark (in respect of the Faroe Islands and Greenland)

Faroe Islands

There is no unreported catch.

Greenland

As a new measure local shops, hotels, restaurants, schools, hospitals and other public eating places have had to report any purchase of salmon to the GFLK in 1998.

European Union

Finland

Each year the river police assess the number of set nets and weirs in the rivers. On the basis of this information, the number of fishing licences sold and responses to questionnaires, it is possible to estimate the total catch.

Ireland

The recent legalisation (1996) of mono-filament netting has reduced the unreported catch in many regions.

Sweden

During the last years there have been significant efforts taken to encourage a complete reporting of all catches in combination with fisheries officers collecting data directly from chosen fishermen. These data are used to estimate the level of catches from specific fishing gears and through surveys of the total number of fishing gear used within a given area the total catch is estimated by the county administration. The National Board of Fisheries has also developed a monthly reporting system for coastal fishing by boats less than 10m length. The system will be in full-scale operation within the coming months in order to make it easier for the individual fishermen to report their daily catches.

UK - England and Wales

The Environment Agency issues multiple reminders to rod fishermen who fail to submit returns and actively pursues missing returns from net licensees.

UK - Northern Ireland

Illegal fishing is not believed to be a problem so no measures have been taken.

UK - Scotland

Scottish Fisheries Protection Agency patrols use fishery protection vessels, helicopters and fixed wing aircraft to minimise illegal fishing. Efforts are maintained to ensure all owners of fisheries make returns. Reminder system in place to maximise returns.

Norway

The frequency of catch report returns from anglers is reported from land owners on rivers to the County Governor. This report is not yet complete. Special efforts to improve the river fishing statistics is taken by motivating and enabling anglers and land owners to perform catch reporting of a certain standard.

Russian Federation

To minimise the level of unreported catches it has been suggested that commercial fishing conducted in the White Sea coastal areas should be prohibited. However, this suggestion is not supported by the local authorities since it is a traditional fishery for the population of coastal settlements.

USA

Not applicable; all fishing for Atlantic salmon is on a catch and release basis. There is no unreported catch of Atlantic salmon.

ANNEX 13

Council

CNL(99)20

By-catch of Atlantic Salmon

CNL(99)20

By-catch of Atlantic Salmon

1. The enormous growth of fishing for pelagic species of fish in the North-East Atlantic Commission area, principally for herring and mackerel in ICES Division IIa, has given rise to concern that even if a very small percentage of the catch in these fisheries was salmon post-smolts the losses could be significant. Information provided by ICES indicates that the fisheries for mackerel and herring in the Norwegian Sea overlap spatially and temporally with the suggested routes of post-smolts on their north-ward feeding migration. Last year the representative of Denmark (in respect of the Faroe Islands and Greenland) provided the Council with additional information on the spatial and temporal distribution of Atlantic salmon post-smolts and of the pelagic fish species. This report is contained in Appendix 1. In summary, it was suggested that the large and dense schools of herring targeted by purse-seine vessels would tend to deter salmon post-smolts from mixing with the school and that the potential for by-catch of salmon post-smolts in the herring fishery might, therefore, be low. Similarly, the potential for by-catch of salmon post-smolts was thought to be low in the blue whiting and capelin fisheries because of differences in preferred water depth and water temperature respectively of the target species and Atlantic salmon. However, it was suggested that the mackerel fishery might have the greatest potential for an impact on salmon post-smolts although it was stressed that information on by-catch is lacking from all the fisheries.

2. Last year the Council recognised that it needed further information on the possible by-catch of salmon in the pelagic fisheries and asked that the Contracting Parties provide any available information to NASCO. In accordance with this decision, I wrote to the Contracting Parties on 20 January 1999 requesting any available information and indicating that no response was required if there was no new information. Only the United States and the Russian Federation responded to this request for information. The responses are given in Appendix 2. Herring surveys using surface or near-surface trawls were conducted by the Russian Federation in 1998, with the intention of assessing the possible by-catch of post-smolts in pelagic trawl fisheries. A total of 24 hauls with the headline at 0-5m depth and 3 hauls with the headline at 5-15m depth were conducted. Three salmon in the length range 46-56cm were captured but no post-smolts were recorded. The absence of post-smolts might be related to the timing of the surveys since there is evidence from Norwegian research that post-smolts do not reach the Norwegian Sea until July and August and the Russian trawls were conducted in June. The US submission concludes that observer coverage of pelagic trips has been insufficient to detect Atlantic salmon by-catch in these fisheries and there is little information to suggest that Atlantic salmon by-catch is significant in other fisheries where observer coverage has been more consistent.

3. New information provided by the ICES Working Group on North Atlantic Salmon (see CNL(99)11) indicates that the herring fishery occurs earlier in the year (April - June) than the period when herring and post-smolts overlap spatially (July and early August), suggesting that by-catch in this fishery is unlikely. ICES has also indicated that the fishery with the greatest potential for catching post-smolts is probably the trawl fishery for mackerel in the Faroese EEZ and international waters in the

Norwegian Sea. This fishery is presently at a high level and is not anticipated to diminish in the near future. (Note: The information in the ICES Working Group report has not, as yet, been considered by the ACFM. Some of this advice may be modified by the ACFM in document CNL(99)12).

4. Given the lack of information on by-catch one possibility might be to estimate catch rates in pelagic fisheries from catch rates in research fishing. However, ICES had previously advised that the methods used in scientific research fishing for post-smolts may not be comparable with those used in the commercial fisheries for pelagic species, and catch rates from research fishing cannot, therefore, be used to estimate the catch of post-smolts in the fisheries for pelagic species. In 1997 ICES proposed (see CNL(97)42) that some focused sampling of the catches should be carried out on vessels in those areas and at times when salmon have been recorded by research vessels. This year the North Atlantic Salmon Working Group has advised that observing post-smolts in large catches of pelagic fish is difficult since the pelagic species may be similar in size and coloration to post-smolts, and that to be certain of the absence of post-smolts, the whole catch would need to be screened. They have also advised that assessment of by-catches on board commercial fishing vessels may not be practicable but that efforts should be made to screen the whole catch at landing sites. An alternative approach suggested by ICES would be to carry out directed research fisheries with similar gear, locations and timing as commercial fishing boats or to carry out comparative fishing with a commercial fishing vessel. Given the available information, the mackerel fishery might be considered a high priority for any sampling programme.

5. In summary, such large pelagic fisheries, operating in the same place and at the same time as post-smolts migrate through the area, might lead to by-catch of salmon which could be significant in terms of salmon stocks. It seems likely that the mackerel fishery has the greatest potential for by-catch of post-smolts. However, there is presently no information which would help us to estimate the extent of the by-catch of salmon. The Council is asked to consider what future action it wishes to take in relation to by-catch of Atlantic salmon.

Secretary
Edinburgh
14 May, 1999

Appendix 1

By-catch of salmon post-smolts in pelagic fisheries in the North-East Atlantic Commission area

Presentation to the Council of NASCO at its Fifteenth Annual Meeting by the Representative of Denmark (in respect of the Faroe Islands and Greenland)

Introduction

In CNL(98)23 "By-catch of Atlantic salmon" concern is raised about the "enormous growth in fishing for pelagic species of fish in the North-East Atlantic Commission area, principally for herring and mackerel in ICES Division IIa and Vb". It is further stated that there is a spatial and temporal overlap between the feeding migration route of European post-smolts and the pelagic fishery in these areas.

In CNL(98)23 some details were given of the pelagic fisheries and their possible impacts on salmon post-smolts. It is stated that to date it is not possible to estimate the potential by-catch mortality on post-smolts.

In the ICES Working Group Report (CNL(98)11) it is recommended that other ICES assessment Working Groups which deal with pelagic species be asked to provide details to facilitate further development of the process to obtain estimates of possible by-catch of salmon post-smolts in pelagic fisheries for other species. See Fig. 3.9.1.1 on p. 147 in CNL(98)11 for post-smolt distribution in 1997.

The present contribution aims at clarifying and outlining some of the elements in the by-catch topic and suggesting where to focus effort to obtain by-catch estimates. Furthermore the on-going fisheries in the North-East Atlantic where salmon post-smolts might be caught as by-catch will be considered briefly.

Necessary steps in estimation of by-catch

In order to investigate the by-catch in pelagic fisheries, certain general rules can be laid out on how to approach this task. In this respect two elements are essential, temporal and spatial overlap of the species in question. Thus to investigate by-catch of salmon post-smolts in the pelagic fisheries in the North-East Atlantic *inter alia* the following factors must be known or estimated:

- the spatial location and temporal occurrence of salmon post-smolts in the sea
- the spatial location and temporal occurrence of the pelagic fisheries.

Thereafter the temporal and spatial overlap can be assessed. To estimate the actual by-catch, it is necessary to establish if any interaction occurs in the overlapping area. If so, the degree of interaction must be estimated and by-catch estimates should (in theory) be obtainable.

The depth distribution of salmon post-smolts means that the pelagic fisheries for some species are unlikely to result in a by-catch of salmon (see next section). From Norwegian pelagic trawling experiments it is suggested that post-smolts are found only in the uppermost 5-10 m or so.

Fisheries where salmon might be caught as by-catch

Herring

The catch figures for herring given in Fig. 1 (CNL(98)23) include also the coastal fishery in the autumn on the Norwegian coast. If it is anticipated that salmon post-smolts mainly occur in the Norwegian Sea and west of the British Isles during summer, the herring catches reported in CNL(98)23 are too high for that area and time period. In the ICES WG (CNL(98)11) section 3.9.2 (p. 30) more appropriate catch figures for herring are given for the anticipated area of overlap with the post-smolt feeding migrations during summer. The herring is almost exclusively taken with purse-seines operated from the surface. The purse-seine is considered to be unselective (in the sense of catching whatever is encircled by the seine), with a radius of, say, 230 m and a depth of approx. 130 m from the surface.

If we look at the behaviour of schooling pelagic fishes, it is known that a large and very dense school of fish would tend to "frighten" other fish from mixing with the school. When the pelagic fish are found in loose concentrations the probability is higher of mixing with other species in the sea. The herring purse-seiners mainly target the large dense shoals of about 50-100 tonnes or larger. Therefore the purse seine fishery is thought to have a low potential for interference with salmon post-smolts. It is, however, recommended that the statements made above are verified.

No post-smolts were observed by the Faroese and Icelandic vessels in the joint ICES-coordinated international survey on herring in the Norwegian Sea in May 1998. They operated in the southern and western part of the area. No information was available from the Norwegian research vessel.

Mackerel

Much of the mackerel is caught by trawling at the surface. This is therefore the fishery that has the greatest potential impact on post-smolts in the Norwegian Sea. The yearly catches of mackerel range from 50,000 t to 150,000 t in the Norwegian Sea (CNL(98)11) and is taken in Faroese, EU, Norwegian and international areas.

Relatively little is known about the gear used in the mackerel fishery in the Norwegian Sea and west of the British Isles. The fishery in international waters is mainly undertaken by Russian vessels and vessels from the Baltic states.

More effort should be put into investigations to obtain post-smolts by-catch rates in the mackerel fishery undertaken with pelagic trawls towed at the sea surface.

Blue whiting

Blue whiting is usually caught from 150 m down to 450 m depth, i.e. at depths below those where salmon post-smolts are thought to be found. This fishery should therefore not interfere with salmon post-smolts.

Horse mackerel

Horse mackerel is caught in relatively small quantities and in some cases as by-catch in the mackerel fishery. Potential interference with salmon is unknown.

Capelin

Capelin is caught with purse-seines in the Icelandic/Jan Mayen areas and in the Barents Sea (the Barents Sea fishery will re-open in 1999). Capelin is caught in relatively cold water, often at the ice edge, at temperatures lower than those expected to be favourable to salmon post-smolts. The potential for a by-catch of salmon in this fishery is, however, unknown.

References

CNL(98)11, "Report of the ICES Working Group on Atlantic salmon"
CNL(98)23, " By-catch of Atlantic salmon"

Appendix 2

Return of Information by the Contracting Parties to NASCO on By-Catch of Salmon Post-Smolts

Russian Federation

In 1998, trawl surveys were carried out by the RV "F.Nansen" MI-776 (cruise 37) in the open Norwegian Sea. One of the tasks of the survey was aimed at studying post-smolt distribution in the open sea, as well as attempting to assess the possible by-catch of post-smolts during pelagic fisheries using a trawl. The area surveyed was from 62° to 68°N between 00° and 07°E. Trawling was done with a TR-2492 pelagic trawl with a 50-meter vertical and horizontal opening (16mm mesh size). From 2 June to 1 July, 24 hauls were made with an upper headline at 0-5 m depth and 4 hauls with an upper headline at 5-15 m depth. In the first case, the mean speed of trawling was 4.4 knots and 3.9 knots, in the second, the mean time of trawling was 38 and 53 minutes, respectively.

Each fish specimen in the catch was individually examined. The catch consisted mainly of herring, mackerel and blue whiting. On 2 June, one specimen of salmon 46cm long was caught (65°26'N; 07°04'E) during a 30-minute trawl with an upper headline at 0-5 m depth, and 3 specimens of Atlantic salmon 52-56cm long were caught (67°30'N; 06°35'E) during a 60-minute trawl with an upper headline at 5-15 m depth on 12 June. No post-smolts were found in catches.

USA

Although the information request appeared to be specific to the North-East Commission area, the United States investigated the information available in the Northeast Fisheries Science Center's Sea Sampling/Observer Database with the objective of providing any available information of Atlantic salmon by-catch in pelagic fisheries. The Sea Sampling Program has been operated continuously since 1989 and has targeted fisheries where by-catch issues of marine mammals or non-target fish have been deemed important.

Observer Coverage of Pelagic Fisheries Trips

Observer coverage of trips targeting pelagic fish (Purse Seine, Paired Mid-water Trawl, Mid-water Trawl) has been sparse throughout the sampling program. Since 1989, only 8 paired mid-water and 3 mid-water trawl trips have been observed in areas to the north and east of the Connecticut River system. Table 1 summarises the seasonal distribution of observed trips in the database.

Observed Atlantic Salmon Captures

The NEFSC Sea Sampling database contains 7 records of Atlantic salmon caught during observed commercial fishing trips. None of these captures were made during trips where pelagic fish were the primary target species. Five of the Atlantic salmon were captured during a single gillnet trip during November 1992 in area 537 (Southern New England). One Atlantic salmon capture was recorded on a June 1990 gillnet trip in area 512 (Downeast Maine), and one capture was recorded on a June 1992 otter trawl trip in area 537 (Southern New England). No captures have been observed since 1992.

Observer coverage of pelagic trips has likely been insufficient to detect Atlantic salmon by-catch in these fisheries. There is little information to suggest that Atlantic salmon by-catch is significant in other fisheries (bottom otter trawl, gillnet) where observer coverage has been more consistent.

Table 1. Seasonal distribution of observed mid-water and paired mid-water trips north and east of the Connecticut River system summarized in the Sea Sampling database from 1989-1998.

Year	Gear	June	July	August	September	October	Total
1991	Mid-water Trawl	0	0	0	0	1	1
1993	Paired Mid-water Trawl	1	1	1	1	0	4
1994	Paired Mid-water Trawl	0	0	1	1	0	2
1995	Mid-water Trawl	1	1	0	0	0	2
1995	Paired Mid-water Trawl	0	0	0	1	1	2

ANNEX 14

Council

CNL(99)24

Returns Made in Accordance with the Oslo Resolution

CNL(99)24

Returns Made in Accordance with the Oslo Resolution

The Background

1. The Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the "Oslo Resolution") was adopted by the Council in 1994. Under Article 5 of the Resolution each Party is required to provide to the Organization, on an annual basis, information of a scope to be determined by the Council concerning measures adopted under Article 2 (measures to minimise genetic and other biological interactions), Article 3 (measures to minimise the risk of transmission of diseases and parasites to the wild stocks of salmon) and on research and development (Article 4).

2. Last year the Council adopted a revised, more detailed format for the returns by the Parties under the Oslo Resolution so as to ensure that the Organization has available to it comprehensive information concerning the measures in force when deciding if additional measures to those contained in the Oslo Resolution may be necessary. The information was requested from the Parties according to this format on 18 January 1999. The returns are attached.

The Returns

3. Since its introduction last year, the new reporting procedure has certainly led to a more comprehensive return of information, as was the intention, although the measures reported are not necessarily new commitments. The information provided has been recorded in a database by the Secretariat. As discussed during the meeting of the Working Group on Implementation of the Oslo Resolution, salmon aquaculture, as defined in the Resolution, is thought to be conducted to some extent by all Parties, although the scope of the returns would be expected to vary considerably depending on each Party's involvement in the different forms of aquaculture. It is clear from the returns that not all Parties have yet provided full information. We will take this up with those Parties concerned at the time of next year's request for information. The new format requests that the Parties indicate on their returns whether or not the measures are mandatory and how they are enforced. In some cases this has been done, but few returns provide details of how the measures are enforced. Furthermore, some aspects of the Oslo Resolution, particularly those concerned with minimising genetic and other biological interactions (Part 2) are regarded by the Parties as already covered by "good industry practice" and, as a result, few measures have been introduced and there appear to be few enforcement procedures.

4. Despite the measures taken by the Parties since the adoption of the Oslo Resolution, last year the Council recognised that containment measures are not adequate to deal with the problem of escapes and recommended that:

   - renewed efforts be made to minimise escapes and that a more effective enforcement policy be adopted by the Parties;

- efforts to improve recapture procedures should be increased provided that these can be conducted without adversely affecting the wild stocks;
- efforts be made to obtain better data on the effectiveness of containment measures and on the level of escapes;
- the Parties give emphasis, where appropriate, to the use and effects of wild salmon protection zones;
- the use of sterile salmon in farming be reviewed in 1999.

This year's returns indicate that there have been some new initiatives on containment since last year (including a new regulation and Codes of Practice concerning containment measures, although some of the latter are still proposals or are at the development stage, and may not be mandatory). There has, however, been little new action in relation to wild salmon protection zones and efforts to recapture farmed salmon after escape (since it may be difficult to avoid capture of wild salmon or there may be risks to human safety when the escapes are associated with storms), and initiatives with regard to sterile salmon are still at the research stage. The pros and cons of the use of sterile salmon in aquaculture (CNL(99)25) and the development of guidelines on containment and husbandry practices (CNL(99)27) are considered elsewhere on the Council agenda. The Special Liaison Meeting will also provide a forum for further consideration of these issues. In spite of mandatory disease regulations, we have seen the viral disease ISA appear in salmon farming in Canada and Scotland, so the measures in the Oslo Resolution concerning disease and parasite interactions might also require further consideration.

Conclusions

5. The reporting process agreed by the Council has been a valuable clarification step. Progress is being made. It is not easy to generalise when there are returns from 16 different countries, but it seems that those aspects of the Oslo Resolution which concern measures to minimise genetic and other biological interactions through containment of farmed fish are largely left to the industry to implement through the use of "good practice". It appears also that there has been limited progress with regard to wild salmon protection zones, use of local stocks in farming (although these are often required in enhancement programmes), recapturing escaped fish, use of sterile fish, and the development of improved physical containment. Given the Council's concerns about containment, it will be particularly important to make progress on this matter. Items 5.7(a), (c), (d), (e) and (g) on the Council Agenda are relevant.

Secretary
Edinburgh
14 May, 1999

Add returns from database

36 pages

ANNEX 15

Council

CNL(99)42

Statement from the European Union on the Returns Made in Accordance with the Oslo Resolution

Whilst there is production of Baltic Sea salmon smolts in the southern parts of Finland, this production is mainly for stock enhancement.

However, aquaculture is prohibited both in the catchment area of the Rivers Teno and Naatamo. There is a general ban on both introductions and transfers to northern parts of Finland from other parts of Finland. Inside the northern areas, it is prohibited to transfer or introduce fish from one catchment area to another.

ANNEX 16

Council

CNL(99)25

Conservation of the Genetic Diversity of Wild Salmon - the Use of Sterile Salmon in Aquaculture

CNL(99)25

Conservation of the Genetic Diversity of Wild Salmon - the Use of Sterile Salmon in Aquaculture

Attached is a discussion paper on how the use of sterile salmon in aquaculture might contribute to the protection of the genetic diversity of wild salmon stocks. In summary:

- There is conclusive genetic evidence that farmed fish interbreed with wild salmon and concern that this will lead to genetic homogenisation with loss of local adaptations in the wild stocks. Such changes, which could be irreversible, would be contrary to the Precautionary Approach, the Oslo Resolution, the Convention on Biological Diversity, and other international agreements. It would also not be in the interests of the salmon farming industry. The use of sterile salmon in aquaculture has been advocated as a measure to reduce or eliminate such genetic impacts on the wild stocks.
- The Council has recognised that in order to have confidence that the wild stocks are protected from irreversible genetic change, the measures in the Oslo Resolution need to be fully implemented and stronger measures developed. Under this Resolution, small-scale testing and full-scale implementation of the use of sterile salmon in aquaculture is recommended.
- A practical and relatively low-cost method would be to require the use of all-female triploid salmon in farming; newly completed research suggests that this would eliminate genetic interactions.
- There may be some disadvantages to the salmon farming industry from the use of sterile salmon, in that there is some evidence of lower yields, and some husbandry problems (e.g. increased incidence of jaw deformities and cataracts). However, it is likely that these effects can be minimised. There may also be some advantages to the industry (e.g. improvement in freshwater performance, control of maturation, appearance).
- Salmon farmers are concerned about marketing aspects but the Tasmanian industry already uses sterile salmon and such fish could be properly promoted as a conservation measure. Sterile rainbow trout are marketed without problems.
- The industry will naturally be concerned about any increase in its costs but the other options for protecting the genetic diversity of the wild fish, such as almost complete containment in sea cages, use of land-based units, use of local stocks and efforts to recapture escapees, also involve costs.
- The rather smaller costs of using sterile salmon may be a price worth paying to ensure that the wild stocks are protected and the industry is sustainable. As long as the requirements are uniform in all North Atlantic countries, there should be little loss of competitiveness.

The Council is asked to:

- **consider the pros and cons of using sterile salmon in aquaculture at some future date;**
- **decide on what action is needed by NASCO and by its Contracting Parties.**

Secretary
Edinburgh
19 April, 1999

CNL(99)25

Conservation of the Genetic Diversity of Wild Salmon - the Use of Sterile Salmon in Aquaculture

Background

1. The widescale use of sterile salmon in aquaculture to reduce genetic risks to the wild salmon stocks was recommended by the ICES Study Group on Genetic Risks to Atlantic Salmon Stocks in 1991 and at the ICES/NASCO Symposium on "Interactions between salmon culture and wild stocks of Atlantic salmon: the scientific and management issues" in 1997. Under the 1994 Oslo Resolution it is recommended that research, small-scale testing and full-scale implementation of sterile salmon should be carried out. However, the returns by the Parties indicate that activities in relation to sterile salmon have been restricted to research. The North American Commission Protocols on Introductions and Transfers also include recommendations concerning the use of sterile salmonids in the vicinity of Class I rivers. The NASCO Working Group on Impacts of Aquaculture, which reported to the Council in 1994, recommended that, as the use of sterile salmon in aquaculture offers opportunities to eliminate genetic interactions, the Council should evaluate the situation, in the light of new information, particularly in relation to the behavioural and ecological interactions of sterile fish in the wild. Thereafter, the Parties should consider implementing the use of sterile salmon by the salmon farming industry provided that no adverse impacts are shown. Similarly, the NASCO Working Group on Implementation of the Oslo Resolution, which reported to the Council last year, accepted that sterile salmon might offer a way forward to protect the genetic integrity of the wild stocks and recognised that the perceived disadvantages of sterile salmon, e.g. some reduction in yield, would have to be balanced against the risks to the wild stocks from existing practices. The Working Group recommended that the use of sterile salmon in farming be the subject of a substantial review by the Council in 1999 when the results of ongoing research would be available.

2. This paper summarises present knowledge on the performance of sterile salmon in order to assist the Council in considering the need for recommendations in relation to the use of sterile salmon in aquaculture. It takes into account the findings of the recently completed European Commission-funded project entitled "Minimising the Interaction of Cultured and Wild Fish: A Comprehensive Evaluation of the Use of Sterile, Triploid, Atlantic Salmon" (AIR3-CT94-2216). The report of this project has been circulated by the research programme co-ordinator to all who participated in the NASCO Working Group on Implementation of the Oslo Resolution. This important project involved releases to the wild of tagged sterile salmon in Ireland and Norway in order to assess the ecological risks they may pose to the wild stocks.

The Genetic Problem and Possible Solutions

3. At the ICES/NASCO Symposium on "Interactions between salmon culture and wild stocks of Atlantic salmon: the scientific and management issues", information was presented which showed that the abundance of cultured salmon in the natural environment is large and has resulted in a mixing of fish from different populations to an extent never seen before. Conclusive genetic evidence was presented that farmed salmon interbreed with wild salmon and concern was expressed that there is the potential for serious genetic intrusion into the wild stocks with consequent homogenisation effects. It was concluded that if nothing is done to protect the wild stocks from genetic change, the impact may be irreversible. Such a genetic change to the wild stocks would be inconsistent with the Precautionary Approach adopted by NASCO and its Contracting Parties, with the Oslo Resolution, the Convention on Biological Diversity, and with other international agreements. Furthermore, it would not be in the interests of the salmon farming industry, which benefited from the genetic diversity present in the wild stocks in developing strains with favourable production characteristics and may need to draw on this diversity in the future. The Council has recognised that in order to have confidence that the wild stocks are protected from irreversible genetic change (and other impacts) the measures in the Oslo Resolution need to be fully implemented and stronger measures developed where appropriate. The Oslo Resolution includes measures in relation to containment, siting, use of local broodstocks, recapture of escaped farmed salmon and the use of sterile salmon.

4. While it is in the interests of the salmon farming industry to minimise escapes, and there have been improvements to cage structures, the Council has recognised that containment measures are currently not adequate to deal with the problem. Through the Wild and Farmed Salmon Liaison Group it is hoped to develop guidelines on physical containment in conjunction with the industry (see Council paper CNL(99)27) but with farmed production in excess of 400,000 tonnes, an escapement of only 1% of production (i.e. 4,000 tonnes) would lead to a significant proportion of farmed salmon in the wild. An escapement of about this level would be consistent with observations made in Norway and the Norwegian Sea. However, any further increases in farmed salmon production would mean that containment levels would need to improve just to ensure that the number of salmon escaping remains stable, but the cost of increasing the percentage containment further could be prohibitively expensive. Given that containment in sea cages cannot be 100% effective, that the recapture of escaped farmed salmon has been shown to be difficult and expensive (e.g. there is a proposal in the US to construct four weirs on salmon rivers for research purposes and to facilitate a cull of aquaculture escapees), and that ongrowing in land-based units and the use of local broodstocks are both considered by the industry to be uneconomical, the use of sterile salmon in aquaculture might provide a way to avoid irreversible genetic changes to the wild stocks. By eliminating maturation in the farmed stocks, which leads to deterioration in flesh quality and appearance and requires marketing at a smaller, less profitable size, the use of sterile salmon might also offer benefits to the salmon farming industry.

5. In the late 1980s approximately 7% of the stock reared by the Scottish salmon farming industry was sterile but the technique was discontinued because of husbandry problems. In Tasmania, where most farmed salmon mature as grilse, sterile salmon have been used for more than ten years in order to extend the harvest period and the size of fish at harvest, resulting in economic benefits to the salmon farmers. Demand

for sterile salmon in Tasmania is increasing. In New Brunswick and Newfoundland, rainbow trout farmers are required to use only sterile fish, and in the UK all-female rainbow trout dominate production, and at sea-water sites some sterile rainbow trout are also used to a limited extent.

Production of Sterile Salmon

6. A number of techniques for sterilisation of fish have been investigated including surgical removal of gonads, chemosterilisation, exposure to gamma or X irradiation, treatment with sex hormones, production of triploids, production of sterile hybrids, production of sterile transgenics and induction of autoimmunity. A review of sterilisation techniques was considered by the NASCO Working Group on Impacts of Aquaculture, so details of these techniques are not given here. For use in aquaculture, the sterilisation technique adopted should render the fish functionally and hormonally sterile so that the development of undesirable secondary sexual characteristics is avoided. Some of the techniques are unlikely to be acceptable to the industry for economic reasons (e.g. surgical removal of the gonads), or marketing reasons (treatment with sex hormones, chemosterilisation, irradiation), or because of variability in results. Research is being undertaken on the production of reversibly sterile transgenic fish and there has also been interest in inducing sterility through stimulating an immune response to the sex hormones. However, the only technique for the production of sterile salmon that is presently available for use on a commercial scale is the production of triploid salmon.

7. Triploid salmon possess three sets of chromosomes in their cells rather than the normal two sets (one maternal and one paternal set) found in diploid salmon. The additional set of chromosomes present in triploid salmon is inherited from the mother and is usually expelled shortly after fertilisation of the egg. However, its retention can be induced through pressure or thermal shock. The presence of this extra set of chromosomes affects egg and sperm production rendering the fish functionally sterile. Male triploid fish can, however, continue to produce sex hormones which in fish farming would lead to deterioration in their condition. It is usual, therefore, to produce all-female lines first by treating genetic females (XX chromosomes) with male hormone at a critical period in their early development and crossing these functional males, but genetic females, with other genetic females (XX). All the eggs produced from these crosses will be female (XX) and they can then be treated either by pressure shock or thermal shock to produce all-female triploids. For fish with large eggs such as salmonids, pressure treatment appears to be more efficient and less variable than heat treatment and triploid yields of 100% have been reported using these techniques. Although the production of all-female triploid salmon involves treatment with hormones, there is no hormone treatment of the generation of fish harvested.

Pros and Cons of Sterile Salmon

8. At the first meeting of the Wild and Farmed Salmon Liaison Group it became clear that there are industry concerns about the perceived drawbacks of sterile salmon (slower growth, deformities, health problems and marketing aspects), although these perceptions are based on very limited commercial experience of their use. Given the

possibility of adverse production characteristics and fears about marketing, salmon farmers are unlikely to use sterile salmon voluntarily in the North Atlantic region unless they also perceive some advantages to their use. While some salmon farmers have indicated that they remain interested in the technique, presumably those in areas where early maturation of farmed stocks is a problem, others believe that the drawbacks of sterile salmon outweigh the benefits. Despite these concerns, considerable research into the comparative performance of diploid and triploid salmon, much of it with industry funding, has been undertaken on both an experimental and commercial scale. The results are summarised below.

Freshwater Performance

9. Several studies of growth, survival and smolt yield have shown that these aspects of performance in triploid salmon are similar or better than for diploid salmon in both commercial and experimental-scale trials. There is some evidence that survival may be slightly lower in triploid salmon in the early stages of the life-cycle, but this is subsequently compensated for by improved performance later in the freshwater phase. Canadian research has shown that in two out of the six strains tested, diploid salmon had significantly higher proportions of S1 smolts (fish which reach the smolt stage after one year) than triploid salmon but in the other strains there were no significant differences. No differences in the proportion of S1 smolts in triploid and diploid salmon have been reported in European studies.

Seawater Performance

10. Commercial-scale trials in Norway and Ireland have shown that growth and mortality rates of triploid and diploid salmon in sea cages can be similar under certain conditions. Indeed, in tank trials of mixed sex fish in Norway, triploid fish were significantly heavier than diploid fish and a similar result has been obtained from cage trials in Canada. In studies in Ireland, diploid and triploid salmon were shown to have the same dressed-out weight. However, the survival of triploid salmon may be lower than diploid salmon and this could lead to an overall reduction in yield. For example, sea-water survival in a Canadian study was lower in triploid salmon than in diploid salmon. In Ireland, losses under low oxygen conditions were higher in triploid salmon (53%) than in diploid salmon (33%), but otherwise survival rates of both were high until harvest. The reason for the lower survival of triploid salmon is unclear. There is a perception that triploid salmon are more prone to stress and that this may lead to higher levels of mortality following transfer to sea cages and under sub-optimal environmental conditions. However, research conducted in Tasmania suggests that the mortality is not associated with differences in the stress response in diploid and triploid salmon.

Condition Factor/Appearance

11. Several studies have reported that the condition factor (weight at a given length) of triploid salmon is lower than for diploid fish, causing them to resemble wild fish. This feature of triploid salmon might offer a marketing advantage.

Deformities and Cataracts

12. A variety of deformities have been observed in farmed salmon, including lower jaw and gill deformities, and shortened gill covers, and the incidence of these is somewhat higher in triploid salmon than in diploid salmon. However, the levels appear to vary depending on site, continent of origin of the salmon and other factors. In Canada, jaw and body deformities which were present in diploid and triploid fish in fresh water became more evident as the fish grew in sea water and the incidence of deformities was higher in triploid (9.1-28.0%) than in diploid (1.5-13.6%) salmon. Jaw deformities were the most prominent. Jaw deformities have also been reported from Tasmania, where Canadian strains form the basis of the industry. There are reports of up to 25% of some triploid populations in Tasmania exhibiting jaw deformities, although in other studies the incidence was low (<7%). High levels of gill deformity (up to 60% in triploid salmon compared to 4% in diploid salmon) have also been reported from Tasmania, but despite the high frequency of deformities at some sites, the advantages of triploid salmon are considered to exceed the drawbacks. Deformities were not a problem in European triploid salmon, and the incidence of a "humpback" condition was higher in diploid salmon than in triploid salmon in trials in Ireland, although not of commercial significance. It is possible that certain genetic strains of salmon reared under certain environmental conditions are particularly prone to develop deformities, suggesting that there may be scope to minimise the problem.

13. The presence of cataracts has also been reported in farmed salmon and was a problem for the Scottish industry when it experimented with sterile salmon on a commercial scale. In European studies, a higher incidence of cataracts has been reported in triploid salmon, although, as with the deformities, their presence did not appear to affect growth. In Norwegian tank trials the incidence of cataracts in triploid salmon (45%) was significantly higher than in diploid salmon (15%), although no consistent differences were observed in cage trials.

14. The presence of deformities in triploid fish would lead to costs to the industry since such salmon could not be marketed as Grade 1 fish. However, they could still be used to produce salmon steaks and fillets, and for smoking. Growth and survival do not appear to be affected. The presence of deformities and of cataracts in sterile salmon also raises welfare issues which would need careful consideration. However, the benefits from the use of sterile salmon in protecting the wild stocks may be a powerful argument in countering these issues.

Disease Susceptibility

15. Studies in Tasmania have indicated that there are no significant differences in disease susceptibility between diploid and triploid fish, either in fresh water or during sea-water rearing. Furthermore, live agent challenge tests conducted in Scotland have failed to reveal any differences in the comparative susceptibility of diploid and triploid salmon. Triploid salmon have been found to produce antibodies more quickly and in greater quantities than diploid salmon.

Control of Maturation

16. Studies involving rearing of all-female triploid salmon through to harvest have failed to reveal evidence of maturation in these fish. This may be a particular advantage to the salmon farming industry under conditions leading to early maturation. For

example, in Tasmania, the use of triploid salmon leads to increased yields. However, in many parts of the North Atlantic, the problem of maturation in farming has been addressed by choice of stock or by adopting a one-year sea-water production cycle and harvesting at a weight of 2-3kg. Elimination of maturation in triploid salmon is of considerable relevance to managers of the wild stocks, since it indicates that if all-female triploid stocks escape from salmon farms, they would be unable to breed in the wild.

Other Husbandry Aspects

17. It is likely that the use of sterile salmon in aquaculture would require careful attention to rearing practices and procedures (such as those for production of all-female lines and for pressure shocking) if performance is to be maximised in commercial rearing conditions. This will involve some staff training, and research and development programmes in support of the use of sterile salmon so as to maximise their benefits may also be desirable. Furthermore, all-female stocks required for the production of sterile salmon would need to be reared separately from other stocks. All of these factors could to lead to additional costs. The actual cost of treatment (both hormone and pressure shock) is low, and large quantities of eggs can be treated quickly if the procedures that have been developed are followed. The elimination of maturation may reduce the need for labour-intensive grading, which might offer cost savings in some circumstances. However, if farmed salmon were to be retained for longer periods in cages rather than using a one-year sea-water production cycle, there could be implications for disease control, and this aspect would need to be considered.

Ecological Impacts in the Wild

18. Experimental releases suggest that the use of sterile salmon in aquaculture would minimise the risk of genetic impacts on the wild stocks, not only because all-female triploid salmon have a marked tendency not to return to fresh water, but also because they remain immature and would not, therefore, be able to interbreed. It is possible that if all-female triploid salmon were able to attract wild "mates" there could be a reduction in the effective population size of spawning wild fish, which could have genetic implications. However, since all-female triploid salmon are immature and exhibit no secondary sexual characteristics, it seems unlikely that they would attract "mates" in the presence of mature females. The fate of sterile fish that do not return to fresh water remains unclear, although the poorer return could be due to increased mortality at sea, reduced drive to return to the area of release or reduced catchability.

Marketing

19. The Wild and Farmed Salmon Liaison Group noted that there are industry concerns about the marketing aspects of triploid salmon, and in this regard, it was recognised that appropriate product labelling would be important. Given recent public concerns about genetically modified foods in Europe, this aspect will need careful consideration. The Working Group on Impacts of Aquaculture noted that there had been some adverse publicity in the media in the early 1990s in relation to triploid fish but felt that if this occurred again in future there would be a need to defend the use of sterile salmon as a contribution to the conservation of the wild stocks. It is clear from the press articles in the literature review (Council document CNL(99)16) that there is

considerable press coverage in relation to concerns about the impacts of present salmon farming practices on the wild stocks. The use of sterile fish may be a way of countering this criticism. The Tasmanian salmon farming industry is based on sterile salmon and sterile rainbow trout are also used in aquaculture without any apparent marketing problems.

20. Linked to the marketability of triploid salmon is concern that the flesh quality may be lower. However, few differences in product quality of commercial significance between diploid and triploid salmon have been found. Any deterioration in quality linked to the early stages of maturation in diploid fish would not be a problem in triploid salmon.

Future Use of Sterile Salmon in Aquaculture

21. It seems likely that, given the present knowledge of the husbandry of triploid salmon, their use in farming could lead to both costs and benefits, although the extent of these may vary, depending on local conditions during the sea-water phase and the husbandry practices adopted. Estimates made on the basis of studies in Europe suggest that there could be a reduction in yield of about 10-15%. The presence of deformities as reported from Canada and Tasmania would add to this cost, and there may be other costs associated with rearing triploids. However, all alternative measures designed to prevent genetic impacts on the wild stocks such as 100% containment, land-based farming, recapturing escapees, use of local stocks or farming of non-indigenous species (such as Pacific salmon in the Atlantic), would also involve costs.

22. The Working Group on Impacts of Aquaculture considered the question of added costs and felt that, even if the use of sterile fish led to more expensive production methods for farmed salmon, it might well be justified in protecting the wild stocks. However, it was recognised that the salmon farming industry in any one North Atlantic country should not be disadvantaged in its competitive status, so any regulation on the use of sterile fish that led to a more expensive product should be introduced throughout all NASCO countries. It was recognised that there are other countries producing farmed salmon outside the North Atlantic region which are not members of NASCO, e.g. Tasmania and Chile. These countries, which have no indigenous wild salmon stocks, might have been expected to resist such a change, but Tasmania is already using sterile fish. However, even if Chile did not adopt sterile salmon, it did not alter the view of the NASCO Working Group on Impacts of Aquaculture that there must be progress in North Atlantic countries to protect the wild stocks. "Dolphin-friendly" tuna attracts a premium price, indicating that consumers are prepared to pay towards protection of a resource. It may, therefore, be feasible to market sterile salmon on the basis of their contribution to protecting the wild stocks.

23. The results of the now completed research project, which the two NASCO Working Groups recommended should be considered before the Council could review the use of sterile salmon in farming as a measure to minimise genetic impacts, have been summarised in this review. As with earlier studies, the results of this project confirm that triploid fish are remarkably "normal" in all respects except their sterility. The Council will now need to consider whether it wishes to recommend to the Parties that sterile salmon be used in farming in order to protect the genetic diversity of the wild

stocks. Such a measure would be in addition to measures to minimise disease and parasite and ecological impacts from salmon farming on the wild stocks and on containment, since the use of all-female triploid salmon would address only the concern about genetic impacts of farmed salmon on the wild stocks. One possibility, as recommended in the Oslo Resolution, would be to move towards full-scale implementation on the basis of small-scale testing, perhaps at any new sites assigned for salmon farming or in particular areas. In this way, there would be an opportunity to further assess the pros and cons of sterile salmon in commercial production and to undertake the necessary research and development in support of their full-scale implementation throughout the industry in NASCO countries at some future date.

24. In the event that the Council did recommend the use of sterile salmon in farming, there would be a delay before the first sterile smolts could be placed in sea cages. Assuming that the industry would wish to continue to use its existing broodstocks, and therefore develop its own all-female lines, the first sterile smolts would be available for stocking to sea about four years after the first hormone treatments of eggs/fry were conducted (assuming eggs of grilse rather than parr were used). In other words, if a programme was commenced in the year 2000 it would be 2004 before the first sterile smolts could be stocked in sea cages. This period could be reduced by two years if sex-reversed milt was available in commercial quantities. The Department of Fisheries and Oceans in Canada is conducting research to develop an all-female line of Atlantic salmon, and in the USA there is research on raising a Penobscot strain of triploids.

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NASCO Documents referred to:

CNL(94)28 Report of the Working Group on Impacts of Salmon Aquaculture

CNL(97)27 Report of the ICES/NASCO Symposium on "Interactions between salmon culture and wild stocks of Atlantic salmon: the scientific and management issues"

CNL(98)27 Report of the Meeting of the Working Group on Implementation of the Oslo Resolution

CNL(98)29 Report of the Meeting of the Wild and Farmed Salmon Liaison Group

Information was also obtained through personal communication with:

Dr Deirdre Cotter, Salmon Research Agency of Ireland, Newport, Ireland
Dr Ray Johnstone, SOAEFD Marine Laboratory, Aberdeen, Scotland
Dr Jo Sadler, School of Aquaculture, Launceton, Tasmania, Australia

ANNEX 17

Council

CNL(99)26

Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group

CNL(99)26

Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group

1. The first meeting of the Wild and Farmed Salmon Liaison Group was held in Glasgow on 20 March 1998. The meeting represented a first step in co-operating more closely with the salmon farming industry with the aim of avoiding adverse impacts on the wild stocks in concert with the development of that industry. The report of the meeting was presented to the Council last year at its Fifteenth Annual Meeting. The Council supported the proposals in the report and encouraged wider participation and closer liaison.

2. At the First Meeting of the Liaison Group, the ISFA had indicated that, because it has limited funds and because it wished to have the widest possible representation at the next meeting of the Liaison Group, it would like to invite NASCO to meet during the ISFA AGM to be held in Santiago, Chile, in early December 1998. Following consultation with Heads of Delegations it was agreed that, in spite of the distance, NASCO could agree that the Second Liaison Meeting would be held at this time. However, at the last moment, just a few days before the meeting, we were told that most ISFA Members from the North Atlantic region would not be attending. After further consultation with those NASCO Parties that had indicated that they would be attending the Liaison Meeting, it was agreed to proceed with the meeting, although the approach adopted by the ISFA did not give us confidence that the industry is serious about dealing with the problem of interactions with the wild stocks or that they are committed to cooperation. Only the Norwegian industry was formally represented, together with the ISFA Secretariat.

3. The report of the Second Meeting of the Liaison Group, which has been agreed by both NASCO and ISFA representatives who attended the meeting, is attached. The main aim in Santiago was to seek agreement to the establishment of a Joint Working Group to develop a Code of Practice or Guidelines on Salmon Farming Practices to Minimise Impacts on the Wild Salmon. However, the ISFA representatives present in Chile indicated that they did not have a mandate to commit the other ISFA members to the development of guidelines. The meeting in Chile in December agreed to a meeting in early March to develop guidelines, but the Norwegian Chair was unable to deliver this, so no progress has been made since the Liaison Group Meeting. However, we are still working on the matter and a report on this initiative is presented separately as Council paper CNL(99)27.

4. The Council is asked to consider the report of the Second Liaison Group Meeting, to comment on the future direction of collaboration with the ISFA and to consider whether other steps may be necessary.

Secretary
Edinburgh
19 April, 1999

SLG(98)17

Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group

Parque Ferial Fisa-Maipu
Santiago, Chile
2 December 1998

1. Opening of the Meeting

1.1 In the absence of the Chairman of the Liaison Group, Mr Otto Gregussen (Norway), the meeting was opened by Mr Knut Hjelt (Norway), who conveyed to the Group the Chairman's apology for his absence. The NASCO delegation proposed that Mr Hjelt be elected as Acting Chairman for the meeting. He was duly elected. Mr Hjelt indicated that he was disappointed by the poor attendance by the ISFA member countries. He confirmed that the report of the First Meeting of the Liaison Group had been accepted by the ISFA.

1.2 The Secretary of NASCO stated that NASCO welcomes the continuing process of cooperation with the salmon farming industry at an international level on issues of mutual concern. He thanked the ISFA for hosting the meeting and congratulated the ISFA on its Tenth Anniversary. He stated that the proposals in the report of the First Meeting of the Liaison Group were unanimously endorsed by the Council of NASCO, which wishes to encourage closer liaison with a view to avoiding adverse impacts on the wild stocks in concert with the development of the salmon farming industry. In this regard NASCO looks forward to receiving responses from the ISFA to the issues raised at the First Meeting. He stated that NASCO would like to make concrete progress in developing a mutually acceptable Code of Practice on containment and husbandry practices, and stressed that there is urgency to this matter. He indicated that, because of the venue of the meeting, it was not possible for all NASCO Parties to be represented, but NASCO had unanimously agreed a position on each of the agenda items before the Liaison Group. Just a few days before the Liaison Group meeting, NASCO had been advised that representatives of the salmon farming industries of Canada, Scotland and Ireland had decided not to attend the meeting. In the light of the fact that NASCO had agreed to come to Santiago at the request of the ISFA, so as to fit in with the ISFA Annual General Meeting, there was considerable disappointment within NASCO at the poor industry representation, and in response to this situation a number of the NASCO delegates decided that their attendance could not be justified. He stressed that these delegates urged that progress be made at the meeting and that the first steps be taken on the issues before the Group.

1.3 A list of participants is contained in Appendix 1.

2. Nomination of a Rapporteur

2.1 Dr Peter Hutchinson, Assistant Secretary of NASCO, was appointed as Rapporteur for the meeting.

3. Adoption of the Draft Agenda

3.1 The Liaison Group adopted an agenda for the meeting (Appendix 2).

4. Advances in Research of Relevance to Wild and Farmed Salmon Interactions

(a) Response by the ISFA to the Conclusions in the Convenors' Report of the ICES/NASCO Symposium

4.1 At the First Meeting of the Liaison Group, some representatives of the ISFA had indicated that they did not agree with some of the conclusions in the Convenors' Report. It had been agreed that the ISFA would make its best endeavours to respond to NASCO, detailing its response to the conclusions in the Convenors' Report, by the end of the year.

4.2 The Acting Chairman indicated that the ISFA was not yet in a position to respond to the conclusions in the Convenors' Report. He noted that industry representatives from Scotland, Ireland and Canada had attended the ICES/NASCO Symposium and he offered to seek their comments so that a response might be made at a future meeting of the Liaison Group. The observers from Canada questioned whether the ISFA was equipped to respond to the Convenors' Report and they suggested that it might be more appropriate to respond to the Oslo Resolution.

4.3 NASCO advised the Liaison Group that at its 1998 meeting the Council had taken note of the Convenors' Report. In the light of the information presented at the ICES/NASCO Symposium and the recommendations of the NASCO Working Group on Implementation of the Oslo Resolution, the Council had recognised that, 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, the measures in the Oslo Resolution need to be fully implemented and stronger measures considered as appropriate. In this regard, the Council has recognised the need to cooperate with the industry on improvements in the management of salmon farming so as to reduce escapes and protect the wild stocks.

4.4 The observers from Canada expressed concern that industry scientists had not participated in the ICES/NASCO Symposium. NASCO indicated that the symposium was an open meeting and they had no control over who participated. Industry scientists from some countries had participated, and representatives of the industry from Canada, Scotland and Norway had been invited to participate in a Panel Session during the Symposium to summarise their impressions.

(b) Advances in research since the ICES/NASCO Symposium

4.5 A brief summary of the scientific literature on the interactions between wild and farmed salmon, which had been published since the ICES/NASCO Symposium in

April 1997, was presented by NASCO, who suggested that this latest information tends to support the concerns raised at the ICES/NASCO Symposium. It was agreed that a copy of the annual review of scientific information of relevance to the conservation and management of wild salmon stocks would be sent to the ISFA.

4.6 The observers from Canada referred to the need for thorough peer review of the science and to problems associated with the uncertainty concerning impacts. They also noted that the salmon farming industry felt that it was being blamed for the demise of the wild salmon, and referred to the fact that stocking of Atlantic salmon has been conducted for over a century for enhancement purposes and that this had probably caused genetic changes in the wild stocks. NASCO representatives confirmed that the scientific information used as a basis for development by NASCO of measures to protect the wild stocks had been through a thorough peer review process. NASCO representatives stressed that the Organization is addressing a wide range of issues which could be adversely affecting the wild stocks, and was certainly not just focusing on aquaculture. They confirmed that the Oslo Resolution deals with enhancement and ranching as well as farming, and advised the meeting that the Council is also developing guidelines on stocking. With regard to scientific uncertainty, they indicated that the Council has agreed to adopt a Precautionary Approach which commits the Organization and its Contracting Parties to act where there is scientific uncertainty so as to avoid irreversible damage. The Council is particularly concerned about avoiding irreversible change, and the impacts of aquaculture is a classic case of where the Precautionary Approach should apply. The view was expressed that if the industry was shown to be damaging the wild stocks there could well be an adverse consumer reaction to the farmed product.

4.7 The observers from Canada suggested that if NASCO wishes to conserve the wild stocks, it should develop a policy on seals since there is great concern about the impact of seal predation on the wild stocks.

4.8 The observers from Canada indicated that the salmon farming industry was frustrated since it was not able to have an input to the measures developed by NASCO. NASCO found it hard to accept this, as the industry representatives had participated fully in the work which had led to the development of the Oslo Resolution. The intention of this Liaison Group is to further improve consultation between managers of the wild salmon and the salmon farming industry. However, in the light of some of the comments made earlier in the meeting, and if the industry was hostile to this consultation process, it could be ended, and NASCO would have to proceed by other means. The Acting Chairman stressed that the Liaison Group was a new forum which presented an opportunity for improved cooperation between the ISFA and NASCO, allowing salmon farmers an input into the measures being developed to safeguard the wild stocks.

5. Technical Developments in the Industry of Relevance to Wild and Farmed Salmon Interactions

(a) Summary of management measures and research in ISFA member countries

5.1 At the First Meeting of the Liaison Group, representatives of the ISFA indicated that there is a continuous process of development of new technologies aimed at reducing

escapes of salmon from farms, that there has been progress in developing a coordinated approach to treatment of lice and that industry-funded research is being undertaken on aspects such as genetic markers and fish health. They agreed to prepare a brief report summarising these measures.

5.2 Documents were tabled detailing the industry measures in place in the Faroe Islands (SLG(98)19, Appendix 3) and the management measures and research on sea lice and escapees in Norway (SLG(98)20, Appendix 4). NASCO thanked the ISFA for these useful papers. The Acting Chairman agreed to seek further information from the other ISFA member countries so that this could be made available to the Liaison Group at its next meeting.

(b) Sterile salmon

5.3 NASCO advised the Liaison Group that the Council has accepted that sterile (all-female triploid) salmon might offer a way forward to protect the genetic integrity of the wild stocks but has recognised that such fish could have disadvantages in terms of yield, fish health, ecological impacts, consumer resistance and other marketing factors. However, the Council of NASCO has agreed that these disadvantages would have to be balanced against the risks to the wild stocks from existing practices. It is NASCO's intention to carry out a review at its Sixteenth Annual Meeting of the pros and cons of sterile salmon as a way forward to protecting the genetic integrity of the wild stocks. The Acting Chairman indicated that the industry would welcome the opportunity to have an input into the debate. NASCO indicated that the views of the industry on the pros and cons of sterile salmon would be most welcome. The view was expressed by the observers from Canada that the industry would respond more favourably to triploid salmon if they did not present any husbandry problems.

(c) Transgenic Atlantic salmon

5.4 The ISFA representatives indicated that it remains opposed to transgenic salmon and a protocol on transgenic salmon has been developed. The Liaison Group recognised that there is a different attitude to genetically modified organisms between North America and Europe. However, with regard to transgenic Atlantic salmon, concerns are shared by both wild and farmed salmon interests.

6. Progress and Difficulties in Implementing the Oslo Resolution of NASCO

6.1 At the First Meeting of the Liaison Group, NASCO had agreed to make available to the ISFA copies of the Report of the Working Group on Implementation of the Oslo Resolution, the Report of the Working Group on the Precautionary Approach to Salmon Management and information provided by ICES concerning the occurrence of farmed salmon in the wild. These documents had been distributed to the ISFA representatives as papers SLG(98)13, SLG(98)14 and SLG(98)15 respectively. The ISFA thanked NASCO for this information.

6.2 The Liaison Group had previously agreed that the question of cooperation on development of a Code of Conduct or Code of Practice on containment measures and husbandry practices should be considered at the Second Meeting of the Group. The ISFA felt that they should be called Guidelines. The Liaison Group agreed that the development of these guidelines could best be achieved through the establishment of a joint ISFA/NASCO Working Group on Salmon Farming Practices to Minimise Impacts on the Wild Salmon. The following Terms of Reference for this Working Group were agreed:

"To develop draft Guidelines for appropriate measures to improve physical containment and husbandry practices in salmon farming which will minimise impacts on wild stocks and be internationally acceptable both to the salmon farming industry and to NASCO Parties".

It was further agreed that:

- *the Working Group should be made up of representatives nominated by NASCO and by the ISFA and that the report of the Working Group should be considered by NASCO and the ISFA with a view to there being jointly agreed guidelines;*

- *there should be no limitation on numbers participating in the Working Group but it is desirable that numbers be kept to a minimum;*

- *the Working Group should deal only with North Atlantic salmon within the North Atlantic region;*

- *two representatives from the NASCO Secretariat and two representatives from the ISFA should work together to produce a first draft of the guidelines which should be circulated by 1 February 1999 for consideration by the Working Group;*

- *the Working Group should meet for one day during the period 2-4 March 1999 at a place to be agreed".*

6.3 The Acting Chairman indicated that he could not commit those ISFA member countries which were not represented at the Liaison Group meeting to these Terms of Reference. However, NASCO and those ISFA representatives at the meeting adopted the Terms of Reference and agreed to urge the other ISFA Parties to participate in the Working Group so as to avoid further delays. The NASCO representative from the USA circulated a Code of Practice for the Responsible Containment of Farmed Atlantic Salmon in Maine Waters which had been adopted in July 1998 by the Maine Aquaculture Association and its Member Farms. She suggested that the elements in the Code might be of interest to the Working Group as examples of the sort of measures that might be considered. She also stressed the need for the Working Group to commence its work at the earliest possible opportunity so as to avoid further delays which would not be consistent with the Precautionary Approach. The NASCO representative from the Russian Federation also stressed the need for urgency so that the draft Guidelines developed by the Working Group can be considered by NASCO

and the ISFA at their next meetings. In his capacity as Chairman of NASCO's North-East Atlantic Commission, he expressed concern about the continuing occurrence of farmed salmon which have escaped from farms in the environments of the wild stocks. The Acting Chairman indicated that, so far as the ISFA is concerned, the measures which will be developed by the Working Group are intended to avoid potential impacts on the wild stocks since the ISFA does not necessarily accept that the industry is adversely affecting the wild stocks.

6.4 NASCO advised the ISFA of its intention to hold Special Liaison Meetings on Measures to Minimise Impacts of Aquaculture in conjunction with its Annual Meetings. The first such meeting will be held on 7 June 1999 during the Sixteenth Annual Meeting of NASCO in Westport, Ireland, and the ISFA would be welcome to participate in this meeting. Presentations will be made by Norway and Canada on the measures in place to minimise impacts of aquaculture on the wild stocks.

6.5 The concern was expressed by the observers from Canada that there was poor consultation between Governments and the salmon farming industry on issues discussed in NASCO that affect their industry. For example, they suggested that the North American Commission Protocols on Introductions and Transfers had been tabled without prior consultation with the industry. NASCO expressed some surprise as there were delegates from the aquaculture industry at NASCO meetings, but they agreed to communicate these concerns. The Acting Chairman indicated that the Norwegian Fish Farmers Association had not been consulted on the Special Liaison Meetings until after NASCO had decided to hold such meetings. He stressed, however, that in general there was a good process of consultation between the Government departments concerned with salmon farming in Norway and the industry. The Acting Chairman said that the NASCO/ISFA Liaison Group could play a valuable role in improved cooperation and exchange of information between managers of the wild salmon stocks and the salmon farming industry. The meeting agreed that there are considerable advantages to working internationally to minimise impacts since there would be a "level playing field", and as a result no industry in a particular North Atlantic country should be at a competitive disadvantage.

7. Any Other Business

7.1 At the First Meeting of the Liaison Group the ISFA had asked for clarification of the role of Non-Government Organizations (NGOs) within NASCO. Details of the procedures concerning application for NGO status had been sent to the ISFA (document SLG(98)12). NASCO expressed the view that the Liaison Group and the Special Liaison Meetings (referred to in paragraph 6.4) probably provide a better forum for cooperation on issues of mutual concern and that many of the items on the NASCO Agenda may not be of particular relevance to salmon farmers. However, the ISFA could proceed with an application for NGO status in its capacity as a member of the Liaison Group.

7.2 The observers from Canada referred to the requirement for the Organization applying for NGO status to have objectives compatible with those of NASCO. NGOs present at NASCO meetings had in the past used the media present to victimise the farming industry and this had not helped to build confidence between NASCO and the farming

industry. The observers from Canada felt that NGO status at NASCO meetings would be beneficial to the industry.

7.3 The Acting Chairman indicated that if there were specific agenda items of relevance to the ISFA, it might be worth considering applying for NGO status but otherwise the Liaison Group and the Special Liaison Meetings provide a better forum for cooperation on issues of mutual concern.

8. Date and Place of Next Meeting

8.1 The Secretary of the ISFA indicated that it is now their intention to hold a meeting in Brussels in April 1999, in connection with the Seafood Exposition, and later that year in Vancouver. It was agreed that the next meeting of the Liaison Group should be held in conjunction with one of these meetings depending on progress in developing the guidelines on containment measures and husbandry practices.

9. Close of Meeting

9.1 Dr Windsor thanked the ISFA for the meeting; the Liaison Group could provide a valuable forum for cooperation on issues of mutual concern and for developing trust between the two organizations. He welcomed the progress that had been made in taking the first steps to developing mutually agreed guidelines on containment and husbandry practices. He thanked Mr Hjelt for agreeing to serve as the Acting Chairman for the meeting. He also thanked Ms Amanda Courtney, who has resigned from her post as Secretary to the ISFA, for all her work over recent years. Ms Courtney indicated that Mr Peter Shelley, Tasmania, Australia, had been appointed as her successor. In closing the meeting, Mr Hjelt thanked all the participants for their contributions and for making the long journey to Chile.

Appendix 1

Second Meeting Of The
Wild And Farmed Salmon Liaison Group

Parque Ferial Fisa-Maipu
Santiago, Chile
Wednesday 2 December 1998

LIST OF PARTICIPANTS

INTERNATIONAL SALMON FARMERS' ASSOCIATION

MS AMANDA COURTNEY	International Salmon Farmers' Association, Cheltenham, UK
MR KNUT A HJELT Acting Chairman	Norwegian Fish Farmers Association, Trondheim, Norway

INDUSTRY OBSERVERS

MR BRAD HICKS	International Aqua Foods Limited, Vancouver, British Columbia, Canada
MR MARC KIELLEY	Newfoundland Aquaculture Industry Association, St John's, Newfoundland, Canada
MR BRIAN T MEANEY	Department of Fisheries and Aquaculture, St John's, Newfoundland, Canada

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

MS MARY BOWERS	US Embassy, Santiago, Chile
DR PETER HUTCHINSON Rapporteur	NASCO Secretariat, Edinburgh, UK
DR VLADIMIR MOSKALENKO	PINRO, Murmansk, Russia
MS ELENA SAMOILOVA	PINRO, Murmansk, Russia
DR MALCOLM WINDSOR	NASCO Secretariat, Edinburgh, UK

Note: Under the Constitution agreed at the First Meeting, the Liaison Group shall comprise industry members from each North Atlantic country and representatives from each member Party of the North Atlantic Salmon Conservation Organization (NASCO). No provision is made for the attendance of observers at the meetings, but at the request of the ISFA, NASCO agreed to the attendance of three observers at the meeting.

Appendix 2

Wild And Farmed Salmon Liaison Group

Second Meeting Of The
Wild And Farmed Salmon Liaison Group

Parque Ferial Fisa-Maipu
Santiago, Chile
Wednesday 2 December 1998

A G E N D A

1. Opening of the Meeting

2. Nomination of a Rapporteur

3. Adoption of the Draft Agenda

4. Advances in Research of Relevance to Wild and Farmed Salmon Interactions

   (a) Response by the ISFA to the Conclusions in the Convenors' Report of the ICES/NASCO Symposium
   (b) Advances in research since the ICES/NASCO Symposium

5. Technical Developments in the Industry of Relevance to Wild and Farmed Salmon Interactions

   (a) Summary of management measures and research in ISFA member countries
   (b) Sterile salmon
   (c) Transgenic Atlantic salmon

6. Progress and Difficulties in Implementing the Oslo Resolution of NASCO

7. Any Other Business

8. Date and Place of Next Meeting

9. Close of Meeting

SLG(98)19

Measures Contained in the Annex to the Oslo Resolution
Faroe Islands - 1997 - New and Existing Measures

GENERAL MEASURES

Sites

The number of sea farms in the Faroes has been reduced from 63 farms in 1990 to 24 farms operated by 17 companies in 1997, and the long term policy of the authorities aims at having only one farm in each fjord.

Siting and marking of aquaculture units

As all other units at sea, the aquacultural units shall follow IALA standards. The farming of salmon has been rather unstable in the Faroes for the last 10 years, but in the very near future, all aquacultural sites will be showed on the charts.

Operations

The harsh weather conditions in the islands ensure that equipment used in the fish farming industry is upgraded as soon as new technological improvements become available.

On the most exposed sites, fish cages of Bridgestone and Dunlop type are in use.

Transfers

All transfers of smolts from the smolt units to the sea farms, as well as all movements of fish from one fjord to another, require inspection by a fish disease veterinarian and an approval from the Chief Veterinary Officer.

MEASURES TO MINIMISE GENETIC AND OTHER BIOLOGICAL INTERACTIONS

Technical specifications

No official standards or specifications of technical equipment used in fish farming are required. On the other hand, the fish farmer needs an approval of cages and mooring systems from the insurance company before start-up, and cages containing fish with a value exceeding 2 mill. D.Kr. require a double netting.

Inspection

Representatives from the insurance companies inspect the farms and technical equipment twice a year, as well as when the fish farm is expanding, and/or new equipment is purchased. Scuba diving on a regular basis to inspect equipment and fish is practised on most fish farms.

Salmon enhancement

Only local stock is used for the release of fry in the streams by the sport fishermen's associations.

Salmon ranching

Experiments with salmon ranching from the Faroes were discontinued from 1990.

Salmon farming

The "local" salmon stock (originally imported from Iceland) is inferior for farming, as it is a 100% grilsing strain.

Recapture of escaped salmon

During the last few years, the fish farming industry in the Faroes has seen a change from 63 small companies operating in the fjords, to 17 bigger, better managed and economically stronger companies in operation in 1997.

This radical change in the industry, together with gained farmed experience and substantial new technological improvements of farming equipment, has considerably reduced the problem of fish escaping from the farms.

During collection of broodfish for enhancement purposes, escaped farmed fish are removed from the spawning grounds in the streams.

MEASURES TO MINIMISE DISEASE AND PARASITE INTERACTIONS

Health protection

The Faroese Parliamentary Act no. 26 of April 30, 1987 addressed diseases in fish, shellfish and crayfish. This act replaces the act of 1970 regarding provisions in relation to disease, destruction, import etc. This act also provides the Chief Veterinary Officer of the Faroe Islands with far-reaching authority.

Husbandry techniques

All smolts and rainbow trout are vaccinated with triple-vaccines before transfer to the sea farms. Disinfection of transportation equipment and use of disinfection baths in lock gates is standard in production facilities, smolt farms and in conjunction with visitors on sea farms.

Removal of dead/dying fish

Dead or dying fish are, as a rule, removed daily or every second day from the pens. Dead fish and fish not suitable for human consumption are ensiled together with the offal from the

processing of salmon and trout, and used a food for mink. Material not suitable for this purpose, as well as dead fish from the smolt farms, is transported in special containers to the incinerator plans for burning.

Separation of aquaculture facilities

Despite the very big reduction in the number of companies operating in the fish farming industry, there are still some fjords with more than one fish farming company in operation.

The long term policy of the regulatory authorities is, however, to have only one company farming on each fjord, and on most locations this is the situation today. Farming companies with access to more than one fjord work with fallowing, and rearing of different generations in separate fjords, while the majority of the companies only have access to work in this way between different sites on the same fjord.

Use of medicines

All fish farms are, on a regular monthly basis, visited by the fish disease veterinarians, and medicines and disinfectants can only be purchased through the veterinary system.

List of diseases

- IPN: screening of broodfish.
- Furunculosis and Cold Water Vibriosis are controlled by vaccination of all smolts.
- BKD: ELISA screening of broodfish and rearing of the broodfish in facilities separated from commercial fish farming.
- Lepoptheirus and Caligus are a problem in some of the fjords, and here the fish have to be treated regularly under veterinary control.

RESEARCH AND DEVELOPMENT

Wild salmon protection areas

Originally, trout (*Salmo trutta*) was the only anadromous salmonid fish spawning in the Faroese streams. From 1947, however, salmon fry (*Salmo salar*) were introduced from Iceland, and the three most important streams with self-sustaining grilse populations of this origin are naturally separated from the farming fjords.

Designation of aquaculture regions

The Faroese Parliamentary Act no. 57 of May 24, 1974 addressed building, arrangement, establishment and expansion of plants for hatching roe and for farming fish. This act states that an aquaculturist must acquire a permit from the Faroese government prior to building or expanding a hatchery or a fish farm.

The Faroese Act no. 134 of October 29, 1988 addressed protection of the environment. If an aquaculturist wishes to establish or expand a fish farm, it is necessary to obtain approval from the Ministry of Environment, according to the Environmental act administered by the Hygienic Institute.

The long term policy of the Faroese government today is: no more than one fish farm on each fjord suitable for fish farming.

Alternative production

One land-based farm, rearing broodstock for the national breeding programme for Atlantic salmon, is in operation.

Land-based, closed or contained floating facilities, or the use of sterile salmon, are, for the time being, economically non-feasible in commercial fish farming in the Faroe Islands.

Use of local broodstock

The first experiments with salmon farming at sea in the Faroes were conducted by the Fisheries Laboratory in 1977, with fish of Faroese origin. In 1979 further experiments followed, now using material originating from eggs imported from Iceland. But slower growth and early maturation made these fish quite inferior to the Norwegian "Sundalsøra-strain" imported by the Fisheries Laboratory as eyed eggs in the years 1978-1984.

Understanding of genetic introductions

The Faroese Parliamentary Act no. 46 of June 23, 1970 prohibited import of live trout and salmon. This act was in place ten years before the first commercial fish farms even started. The Faroese government was already trying to protect the future industry of aquaculture, and the environment, from the transfer of diseases. All smolts for the industry are produced in the islands, and no live salmonid fish or eggs have been imported to the Faroes after 1984.

Prevention and control of diseases and parasites

Prevention and control of diseases has a high priority in the national breeding programme for Atlantic salmon. The criteria for selection are high growth rate, late sexual maturation, resistance towards diseases and quality at slaughtering.

To minimise the risk of diseases in the broodstock used in this breeding programme, a big land-based broodfish farm has been constructed on Sandoy, one of the few islands with no commercial fish farming.

All salmon farmed in the Faroe Islands have their origin from the national breeding programme.

A general "Fish Health Programme" for the entire fish farming industry, worked out by the Chief Veterinary Officer of the Faroe Islands, is under consideration.

SLG(98)20

Management Measures and Research on Sea Lice and Escapees

1. New regulation on certification of equipment and nets. The association has strongly supported it.

   NFF is working for a closer following up on technical equipment and want more inspection from officials. 15% is being inspected annually; NFF want a higher frequency on this (both on new and old equipment).

2. New regulation on management and preventional disease control for fish farms, including density, treatment of dead fish, transport of fish, treatment of nets, logging on farm, location and site level, frequency of logging, protection nets, labelling of sites and licence, under treatment, fishing with nets to detect escapees, counting of lice at intervals and treatment etc.

   Also including reporting routines.

3. There is a special regional regulation on lice control. Counting of lice at intervals, lice treatment, number of mature female lice before treatment. 1997: Used about 4 million wrasse.

4. There is a white paper under preparation. This will include the need for aquaculture-free zones, lice control, safe technology, etc. The paper will probably be ready in February/March and will be the base for further discussion and action in a cooperation between the industry and the Government/officials. One of the members in the working group is coming from the industry.

   The leader is Georg Fredrik Rieber Mohn and their mandate is to look at threats to wild salmon and possible action.

5. The Norwegian Research Council has the responsibility for research. They are organised in different programs with funding (from different ministries) and with different sectors for research. Fish and animal health is one of the programs, another is "Production of salmonids". The research being undertaken in these programs has the aim to fill in gaps where more knowledge is wanted, to solve problems and to look into the future. The governmental funding for aquaculture research is about 190 mill. NKR; the industry is using approximately 180 mill. on research.

6. Sterile salmon is not being heavily discussed, but will be a part of the discussion following the white paper. There is also being some research going on sterile salmon (EU Project).

ANNEX 18

Council

CNL(99)28

Agreement on Implementation of the Oslo Resolution

CNL(99)28

Agreement on Implementation of the Oslo Resolution

1. At its Fifteenth Annual Meeting the Council considered the Report of the Working Group on Implementation of the Oslo Resolution, CNL(98)27. This Working Group had been established to consider further the implementation of the Oslo Resolution in the light of the information arising from the ICES/NASCO Symposium on "Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: the Scientific and Management Issues." The Council adopted all of the Working Group's recommendations and asked the Secretary to prepare a document containing both the Oslo Resolution and these new recommendations. It was further agreed that the document should also refer to the Organization's other Resolutions and Guidelines concerning introductions and transfers and transgenic salmon. The need for consistency between the recommendations adopted for aquaculture and those concerning the Precautionary Approach was stressed.

2. We have now prepared the attached document, "Measures to Minimise the Impact of Salmon Aquaculture on the Wild Salmon Stocks," which contains the recommendations of the Working Group on Implementation of the Oslo Resolution, the Oslo Resolution and a listing of the Organization's other Resolutions and Guidelines concerning introduction and transfers and transgenic salmon. The North American Commission is presently in the process of revising its Protocols for the Introduction and Transfer of Salmonids. The listing in the attached document may therefore need to be updated in the light of any decisions taken by the North American Commission in June.

3. The Council is asked to consider and adopt the attached document. Following the annual meeting we would propose to bind the document, after making any necessary amendments, and distribute it to all delegates.

Secretary
Edinburgh
19 April, 1999

Measures to Minimise the Impacts of Salmon Aquaculture on the Wild Salmon Stocks

C o n t e n t s

BACKGROUND

The Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks (the "Oslo Resolution") was unanimously adopted by the Council in 1994. At the time of its adoption by the Council it was agreed that the subject of impacts of aquaculture would be reviewed annually and that the situation regarding implementation of the recommendations in the Resolution would be re-examined in 1998 with a view to considering whether additional measures may be desirable. However, in 1997 the Council recognised that if there was to be full implementation of the Oslo Resolution by 1998 additional measures would be needed. A Working Group was, therefore, established to consider further the implementation of the Oslo Resolution in the light of the information arising from the ICES/NASCO Symposium on "Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: the Scientific and Management Issues". The Council adopted all of the recommendations in the report which have been developed into an Agreement on Implementation of the Oslo Resolution. This document also contains the Oslo Resolution and details of the other guidelines/resolutions which have been developed by NASCO concerning introductions and transfers and transgenic salmon.

AGREEMENT ON IMPLEMENTATION OF THE OSLO RESOLUTION

Reporting Procedures

1. The Parties should provide comprehensive information to the Council in advance of each Annual Meeting concerning the measures in force to minimise the impacts from aquaculture on the wild salmon stocks. This information should be based on the list of measures contained in Annex 1. The returns should indicate whether or not the measures are mandatory and how they are enforced. The information provided by the Parties should be recorded by the Secretariat in a database in the same way as the information provided under Articles 14 and 15 of the Convention.

2. During NASCO's Annual Meetings time should be allocated on the agenda for discussion of the measures taken by the Parties to minimise the impacts from salmon aquaculture on the wild salmon stocks. The Council should focus each year on the measures implemented by two or three Parties so that experiences of minimising impacts of salmon aquaculture can be shared.

Measures

3. In order to have confidence that the wild stocks are protected from irreversible genetic change, from ecological impacts and from the impacts of diseases and parasites, the measures in the Oslo Resolution should be fully implemented. Stronger measures should be considered where appropriate.

4. The Council agreed not to change the structure of the Oslo Resolution but to clarify the differences between enhancement, ranching and farming and to stress that the major aquaculture impact is currently that of salmon farming.

Enhancement

5. Priority should be given to ensuring that the existing measures in the Oslo Resolution concerning enhancement and the guidelines on stocking being developed by the Council, if and when agreed, are fully implemented.

Ranching

6. Priority should be given to ensuring that the measures in the Oslo Resolution concerning ranching are fully implemented.

Farming

7. Priority should be given to ensuring that the measures in the Oslo Resolution concerning salmon farming are fully implemented.

8. While it is appreciated that it is in the interests of the salmon farming industry to minimise escapes, and that there have been improvements to cage structures to reduce

escapes, containment measures are currently not adequate to deal with the problem. Renewed efforts should, therefore, be made to minimise escapes and a more effective enforcement policy should be adopted by the Parties. Efforts to improve recapture procedures should be increased provided that these can be conducted without adversely affecting the wild stocks.

9. There is a need to cooperate on improvements in the management of salmon farming so as to reduce escapes and protect wild stocks. There should be a closer co-operative effort on developing guidelines on physical containment measures and husbandry practices for salmon farms. The salmon farming industry should be invited to participate in this process. Efforts should be made to obtain better data on the effectiveness of containment measures and on the level of escapes.

10. Sterile salmon might offer a way forward to protect the genetic integrity of the wild stocks but there could be disadvantages in terms of yield, fish health, ecological impacts, consumer resistance and other marketing factors. However, these disadvantages need to be balanced against the risks to the wild stocks from existing practices. This question should be the subject of a substantial review by the Council in 1999 when the results of ongoing research should be available.

11. The Parties should give emphasis, where appropriate, to the use and effects of wild salmon protection zones. Whilst not included in the Oslo Resolution, gene banks, though expensive, can be of value as a measure to protect the genetic diversity of the wild stocks, where these are threatened with loss, and as part of restoration programmes.

Introductions and Transfers

12. The North-East Atlantic Commission's Resolution containing guidelines to protect wild salmon stocks from introductions and transfers and the North American Commission's Protocols on introductions and transfers, although not yet fully implemented, are consistent with the Oslo Resolution.

Research

13. The Council endorses the recommendations of the Convenors of the ICES/NASCO Symposium for future research. In addition, research into the effects of time spent in sea cages prior to escape on rate of return of farmed salmon, and on methods to reduce predator damage at salmon farms, would be desirable. Details of relevant ongoing research should be submitted to NASCO with the annual returns made under Article 15 of the Convention so that the Council may play a role in avoiding duplication of research effort.

Liaison Group

14. The Council strongly endorses the need for close dialogue with the salmon farming industry through the Liaison Group established between NASCO and the International Salmon Farmers' Association (ISFA).

Annual Return Of Information Under Article 5 Of The Resolution By The Parties To The Convention For The Conservation Of Salmon In The North Atlantic Ocean To Minimise Impacts From Salmon Aquaculture On The Wild Salmon Stocks

(Where additional space is required to complete your return, please use separate sheets and indicate which section the measures refer to (e.g. 1.2.2)).

1. General Measures		**Details of Action Taken** (Please indicate whether or not the measures are mandatory and how they are enforced)
1.1	**Sites:**	
1.1.1	Sites only to be assigned for aquaculture where hydrographical, epidemiological, biological and ecological standards can be met	
1.1.2	Siting of units to avoid risk of damage by collision	
1.1.3	Adequate marking of aquaculture units	
1.2	**Operations:**	
1.2.1	Management of aquaculture units to prevent and control diseases and parasites	
1.2.2	Management of aquaculture units to prevent escape of fish	
1.3	**Transfers:**	
1.3.1	Transfers conducted so as to minimise potential for disease/parasite transmission and for genetic and other biological interactions	
1.3.2	Introduction of mechanisms to control transfers where necessary	

2.	**Measures To Minimise Genetic And Other Biological Interactions**	
2.1	**Design standards for Aquaculture Units:**	
2.1.1	Establishment of standards and technical specifications for the design and deployment of aquaculture units (marine and freshwater)	
2.1.2	Optimisation of containment of fish through use of appropriate technology for prevailing conditions	
2.1.3	Regular routine inspection and maintenance of aquaculture systems and upgrading of equipment as new technological improvements become available	
2.1.4	Regular monitoring and use of efficient security systems	
2.2	**Salmon Enhancement:**	
2.2.1	Use of local stocks wherever possible	
2.2.2	Implementation of criteria for broodstock selection and management	
2.3	**Salmon ranching:**	
2.3.1	Use of local stocks or alternatively local ranching stocks	
2.3.2	Harvesting of ranched fish at or close to release site or in fisheries managed in a way that prevents over-harvesting of wild stocks	

2.4	**Salmon farming:**	
2.4.1	Use of local broodstocks where practicable	
2.4.2	Efforts to recapture escaped farmed salmon	
2.4.3	Establishment of site specific contingency plan in the event of large escapes	
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 (vaccination, use of optimum stocking densities, careful handling, frequent inspection of fish, proper diet and feeding regimes, avoidance of unnecessary disturbance, detailed health inspections, disinfection of transportation equipment and use of disinfection baths at production facilities)	
3.1.2	Treatment or removal of diseased stock and measures to ensure diseased fish are not released to the wild	
3.2	**Stocking density:**	
3.2.1	Aquaculture production adapted to the site's holding capacity and stocking density should not exceed levels based on good husbandry practices	

3.3	**Removal of dead or dying fish:**	
3.3.1	Removal of dead/dying fish and disposal along with waste materials in an approved manner	
3.3.2	Establishment of procedures for effective removal and disposal of infectious material	
3.3.3	Establishment of contingency plans for disposal of mortalities from emergency situations	
3.4	**Adequate Separation:**	
3.4.1	Separation of aquaculture facilities on the basis of a general assessment of local conditions	
3.5	**Year-Class Separation:**	
3.5.1	Rearing of different generations in separate locations where possible	
3.6	**Fallowing of Sites:**	
3.6.1	Use of a fallowing regime wherever possible	
3.7	**Use of Medicines and Disinfectants:**	
3.7.1	Careful use of medicines and disinfectants in accordance with manufacturers' instructions, Codes of Practice and in compliance with regulatory authorities	
3.8	**Lists of Diseases:**	
3.8.1	Lists of prevailing infectious diseases and parasites and methods for control to be maintained by appropriate authorities	

4.	**Research And Development**	
4.1	**Research, small-scale testing and full-scale implementation of:**	
4.1.1	Wild salmon protection areas	
4.1.2	Sterile salmon	
4.1.3	Tagging and Marking	
4.1.4	Designation of aquaculture regions	
4.1.5	Alternative production methods (land-based, closed or contained floating facilities and other containment technologies)	
4.1.6	Use of local broodstocks	
4.1.7	Understanding of genetic interactions	
4.1.8	Prevention and control of disease and parasites	

RESOLUTION BY THE PARTIES TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN TO MINIMISE IMPACTS FROM SALMON AQUACULTURE ON THE WILD SALMON STOCKS

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;

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;

BEING CONSCIOUS of the threats to the wild stocks of salmon from different human activities, including possible adverse effects from salmon aquaculture;

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

RECOMMEND as follows:

ARTICLE 1

Cooperation between the Parties

The Parties shall cooperate in order to minimise possible adverse effects to the wild salmon stocks from salmon aquaculture.

ARTICLE 2

Measures to minimise genetic and other biological interactions

In accordance with Parts 1 and 2 of the Annex to this Resolution each Party shall take measures, to the full extent practicable, to:

Minimise escapes of farmed salmon.

Minimise the straying of ranched salmon.

Minimise adverse genetic and other biological interactions from enhancement activities.

ARTICLE 3

Measures to minimise the risk of transmission
of diseases and parasites to the wild stocks of salmon

Each Party shall take measures to minimise the risk of transmission to wild salmon stocks of diseases and parasites that may exist in salmon aquaculture and shall to this end establish appropriate measures in accordance with Parts 1 and 3 of the Annex to this Resolution.

ARTICLE 4

Research and development

Each Party that is engaged in salmon aquaculture shall develop practices, including research and development as appropriate, which minimise effects on wild salmon stocks and improve the effectiveness of the measures contained in the Annex to this Resolution.

ARTICLE 5

Exchange of information

Each Party shall provide to the Organization, on an annual basis, information of a scope to be determined by the Council concerning the measures adopted under Articles 2 and 3 and the research and development carried out under Article 4.

The Organization shall request from ICES and other relevant scientific organizations appropriate information on the extent of the intermingling in rivers and at sea between wild salmon and salmon of aquaculture origin.

ARTICLE 6

Definitions

For the purposes of this Resolution:

1. "Salmon aquaculture" is the culture or husbandry of Atlantic salmon and includes salmon farming, salmon ranching and salmon enhancement activities.

2. "Salmon farming" is a production system which involves the rearing of Atlantic salmon in captivity for the duration of their life-cycle until harvested.

3. "Salmon ranching" is the release of reared juvenile Atlantic salmon with the intention of harvesting all of them on their return.

4. "Salmon enhancement" is the augmentation of wild stocks in individual river systems by the release of Atlantic salmon at different stages in their life-cycles.

5. "Wild salmon" are salmon which originate naturally and have not been subjected to

aquaculture.

6. "Transfer" is the deliberate or accidental transport of Atlantic salmon within their native or natural range.

ANNEX TO THE RESOLUTION

PART 1

GENERAL MEASURES

§ 1. Sites

Sites for salmon aquaculture shall only be assigned 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. Units should be sited so as to avoid the risk of damage by collision with vessels and should be adequately marked.

§ 2. Operations

Aquaculture units should be managed, taking into account established measures to prevent and control diseases and parasites and by taking precautions to prevent the escape of fish.

§ 3. Transfers

Transfers of salmon shall be conducted so as to minimise the potential for transmission of diseases and parasites, and for genetic and other biological interactions. Mechanisms to control transfers should be introduced where necessary.

PART 2

MEASURES TO MINIMISE GENETIC AND OTHER BIOLOGICAL INTERACTIONS

§ 4. Design standards for aquaculture units

Standards and technical specifications should be established for the design and deployment of marine and freshwater aquaculture units. The design of aquaculture units should be appropriate for the assigned site so as to optimise the containment of fish. The risk of escape of fish from aquaculture units as a result of storm or ice damage should be minimised by using appropriate technology for the prevailing conditions. Aquaculture systems, including anti-predator nets and devices, should be routinely inspected, maintained and upgraded as new technological improvements become available. Regular monitoring and the use of efficient security systems are required.

§ 5. Salmon enhancement

Local stocks, i.e. stocks from the same river, or stocks with similar biological characteristics from a neighbouring river with similar ecological conditions, should be used wherever possible for enhancement purposes. In enhancement programmes consideration should be given to: using broodstocks which are representative of the entire spawning run of the donor stock; using broodstocks which comprise at least 100 fish which should be used in single paired matings (where the number of one sex is less than 50 the number of the other sex should be increased to achieve 100 broodfish); using broodstocks which are held in captivity for no more than one generation; avoiding selection of fish with favourable attributes; avoiding the use of escaped farmed fish.

§ 6. Salmon ranching

Local stocks, or alternatively local ranching stocks, shall be used for salmon ranching.

Ranched salmon should be harvested at or close to the site of release or in fisheries managed in such a way as to prevent the overharvesting of the wild stocks.

§ 7. Salmon farming

It is desirable to use local broodstocks for salmon farming where practicable.

Efforts should be made for the efficient recapture of escaped farmed salmon provided that these can be conducted without adversely affecting the wild stocks. Each site operation should have a site-specific contingency plan in place in the event of an incident involving a large number of escaped fish.

PART 3

MEASURES TO MINIMISE DISEASE AND PARASITE INTERACTIONS

§ 8. Control and prevention of diseases and parasites

All steps in the aquaculture production process from hatchery to processing plant, including transportation of live fish materials, shall be conducted in accordance with appropriate fish health protection and veterinary controls. 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.

Diseased stock should be treated, or removed, and measures should be taken to ensure that such diseased fish are not released to the wild.

§ 9. Stocking density

Aquaculture production should be adapted to the holding capacity of an individual site

and not exceed density levels based on good husbandry practices.

§10. Removal of dead or dying fish

Fish which have died 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 that address the effective removal and disposal of infectious material. Contingency plans should be established for the disposal of mortalities from emergency situations.

§11. Adequate separation

The separation distance between aquaculture facilities at marine sites should be based on a general assessment of local conditions.

§12. Year-class separation

Wherever possible, different generations of salmon should be reared in separate locations.

§13. Fallowing of sites

As local conditions permit, a fallowing regime should be practised wherever possible as a means of minimising outbreaks of disease and parasites.

§14. Use of medicines and disinfectants

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.

§15. Lists of diseases

A list of the prevailing infectious diseases and parasites, and the methods in practice for their control, should be maintained by the appropriate authorities.

PART 4

RESEARCH AND DEVELOPMENT

§16. Research, small-scale testing and full-scale implementation should be carried out, as appropriate, in support of this Resolution. Regard should be paid to the following items:

- Wild salmon protection areas

  Wild stocks of salmon may be protected by the establishment of protection areas where salmon aquaculture is restricted or prohibited. Such protection areas may minimise genetic, disease, parasite and environmental impacts.

- Sterile fish

  The production of all-female, triploid salmon and other techniques which produce sterile fish could offer protection from genetic impacts. Practical methods have been developed to produce sterile fish; however, further research is needed on production characteristics, disease susceptibility and the marketing aspects of sterile salmon and on the ecological implications of escaped sterile salmon.

- Tagging and marking

  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. The statistical significance of proposed tagging or marking studies should be assessed prior to implementation. The economic viability of tagging or marking large numbers of salmon produced in aquaculture should be evaluated.

- Aquaculture regions

  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, could prove an effective means of providing a management framework for the aquaculture industry and controlling the spread of fish diseases and parasites.

- Alternative production methods

  Land-based production facilities, closed or contained floating facilities, water recirculation and other containment technologies may reduce the current problems of disease and parasite transmission and escapes.

- Local broodstocks

  Research on the use of local wild salmon stocks, including hybrids with local and non-local stocks, as the basis for aquaculture broodstock development, should be conducted.

- Genetics

  The potential genetic interactions between salmon which have been reared in aquaculture and the wild stocks needs to be better understood. Research designed to improve understanding of these interactions should be encouraged.

- 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 methods to prevent and control disease and parasite outbreaks in aquaculture should be encouraged.

OTHER NASCO RESOLUTIONS/GUIDELINES IN RELATION TO INTRODUCTIONS AND TRANSFERS AND TRANSGENIC SALMON

Council

NASCO Guidelines for Action on Transgenic Salmon, CNL(97)48.

North American Commission

North American Commission Protocols on Introductions and Transfers, NAC(92)24.

Amendments to the North American Commission Protocols on Introductions and Transfers, NAC(94)14.

Discussion Document for Revisions to the Protocols for the Introduction and Transfer of Salmonids, NAC(98)6.

North-East Atlantic Commission

Resolution by the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12.

ANNEX 19

CNL(99)45

Press Release

- **New, stronger measures designed to conserve wild stocks of Atlantic salmon were agreed internationally by the North Atlantic Salmon Conservation Organization meeting this week. The Annual meeting was held in Westport, Ireland at the invitation of the Government of Ireland.**

- The scientific advice indicates that in spite of restrictive management measures introduced both nationally and internationally in recent years, salmon stocks are still at seriously low levels. The reasons for the decline in abundance are not fully understood but appear to be linked to conditions in the marine environment. In the light of this difficult situation, agreement was reached on a multi-year measure for the West Greenland salmon fishery which restricts the catch to that amount used for internal consumption in Greenland. Under a regulatory measure for the Faroese fishery for the year 2000 a reduced quota of 300 tonnes was agreed with further limitations on fishing effort.

- In order to give long-term protection to wild salmon stocks NASCO and its Contracting Parties agreed an Action Plan for implementation of a Precautionary Approach to salmon management. This is in line with international agreements in the United Nations. The Action Plan envisages the application of this approach to the management of salmon fisheries, socio-economic factors, introductions and to transfers, aquaculture, by-catch and habitat issues. The first step of the Action Plan will be to elaborate its application to the conservation, management and exploitation of salmon in fisheries.

- NASCO is eager to cooperate more closely with the salmon aquaculture industry in the North Atlantic as there are risks of adverse genetic, disease, parasite and other interactions with the wild salmon. A Special Liaison Meeting was held to review the measures taken to minimise impacts of aquaculture on the wild stocks. The measures taken by Canada and Norway were highlighted this year and those taken by the European Union will be reviewed next year.

- NASCO also decided to broaden the basis for its present cooperation with the North Atlantic salmon aquaculture industry and to initiate new links on an internationally acceptable code of containment and other issues of mutual interest.

- There was a Special Session on habitat issues. Measures were also agreed to reduce the level of unreported catches and to consider the effects of by-catch in other fisheries.

- A NASCO website will open shortly.

- This Press Release was issued in Westport, Ireland on 11 June 1999.

Notes to Editors:

1. The North Atlantic Salmon Conservation is an international Organization established by a treaty with the objective of contributing to the conservation, restoration, enhancement and rational management of salmon stocks. The Contracting Parties 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.

2. The Organization consists of a Council, three regional Commissions (North American, North-East Atlantic, and West Greenland) and a Secretariat.

3. The Sixteenth Annual Meeting of the Organization was held in Westport, Ireland during 7-11 June 1999.

4. Contact on this press release:

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ANNEX 20

List of Council Papers

Paper No.	Title
CNL(99)0	List of Papers
CNL(99)1	Provisional Agenda
CNL(99)2	Explanatory Memorandum on the Agenda
CNL(99)3	Draft Agenda
CNL(99)4	Draft Schedule of Meetings
CNL(99)5	Secretary's Report
CNL(99)6	Development of a NASCO Website
CNL(99)7	Proposals for a New NASCO Handbook
CNL(99)8	Report of the Sixteenth Annual Meeting of the Finance and Administration Committee
CNL(99)9	Report on the Activities of the North Atlantic Salmon Conservation Organization in 1998 (not for publication)
CNL(99)10	Report on the Activities of the North Atlantic Salmon Conservation Organization in 1998/1999 (for publication)
CNL(99)11	Report of the ICES Working Group on North Atlantic Salmon
CNL(99)12	Report of the ICES Advisory Committee on Fishery Management
CNL(99)13	Draft Request for Scientific Advice from ICES
CNL(99)14	Catch Statistics - Returns by the Parties
CNL(99)15	Historical Catch Record 1960-1998
CNL(99)16	Review of International Salmon-Related Literature Published in 1998
CNL(99)17	Returns under Articles 14 and 15 of the Convention
CNL(99)18	Draft Action Plan for Application of the Precautionary Approach to Salmon Management
CNL(99)19	Unreported Catches

CNL(99)20	By-catch of Atlantic Salmon
CNL(99)21	Fishing for Salmon in International Waters by Non-Contracting Parties
CNL(99)22	Scientific Research Fishing in the Convention Area
CNL(99)23	Programme for the Special Liaison Meeting to Review Measures to Minimise Impacts of Aquaculture on Wild Stocks
CNL(99)24	Returns Made in Accordance with the Oslo Resolution
CNL(99)25	Conservation of the Genetic Diversity of Wild Salmon - the Use of Sterile Salmon in Aquaculture
CNL(99)26	Report of the Second Meeting of the Wild and Farmed Salmon Liaison Group
CNL(99)27	Development of Internationally Agreed Guidelines on Salmon Farming Practices to Minimise Impacts on the Wild Salmon
CNL(99)28	Agreement on Implementation of the Oslo Resolution
CNL(99)29	Programme for the Special Session on Habitat Issues
CNL(99)30	Guidelines on Stocking
CNL(99)31	Dates and Places of 2000 and 2001 Meetings
CNL(99)32	Report of the Norwegian Wild Salmon Committee
CNL(99)33	Draft Report of the Sixteenth Annual Meeting of the Council
CNL(99)34	Application for Non-Government Observer Status to NASCO by the Coomhola Salmon Trust Limited
CNL(99)35	Draft Press Release
CNL(99)36	Liaison with the Salmon Farming Industry
CNL(99)37	Opening Remarks by the President at the Special Liaison Meeting to Review Measures to Minimise Impacts of Aquaculture on the Wild Stocks
CNL(99)38	Special Session on Habitat Issues - Introduction by the Secretary
CNL(99)39	Agenda
CNL(99)40	2000 Budget, 2001 Forecast Budget and Schedule of Contributions

CNL(99)41	Draft Action Plan for Application of the Precautionary Approach to Salmon Management (Revision 1)
CNL(99)42	Statement from the European Union on the Returns Made in Accordance with the Oslo Resolution
CNL(99)43	Scientific Research Fishing Conducted by Norway
CNL(99)44	Draft Action Plan for Application of the Precautionary Approach (Revision 2)
CNL(99)45	Press Release
CNL(99)46	Request for Scientific Advice from ICES
CNL(99)47	Report of the Sixteenth Annual Meeting of the Council
CNL(99)48	Action Plan for Application of the Precautionary Approach
CNL(99)70	Joint Statement by the Non-Government Organizations
CNL(99)71	Statement made by the Atlantic Salmon Federation
CNL(99)72	Statement made by the Ulster Angling Federation
CNL(99)73	Statement made by the National Anglers Representative Association
CNL(99)74	Statement made by the European Anglers Alliance
CNL(99)75	Statement made by the Salmon Net Fishing Association of Scotland
CNL(99)76	Statement made by the Federation of Irish Salmon and Sea-Trout Anglers
CNL(99)77	Statement made by the Salmon and Trout Association
CNL(99)78	Statement made by the Institute of Fisheries Management
CNL(99)79	Statement made by the Atlantic Salmon Trust
NOTE:	This is a listing of all the Council papers. Some, but not all, of these papers are included in this report as annexes.