1996

THIRTEENTH ANNUAL MEETING

GOTHENBURG, SWEDEN

10-14 JUNE 1996

PRESIDENT:	MR BØRRE PETTERSEN (NORWAY)
VICE-PRESIDENT:	MR DAVID MEERBURG (CANADA)
SECRETARY:	DR MALCOLM WINDSOR

CNL(96)57

CONTENTS

CNL(96)57

REPORT OF THE THIRTEENTH ANNUAL MEETING OF THE COUNCIL 10-14 JUNE 1996, GOTHENBURG, SWEDEN

1. OPENING SESSION

1.1 The President, Mr Børre Pettersen, opened the meeting, and introduced the Swedish State Secretary in the Ministry of Agriculture, Mr Curt Malmborg, who made a Welcoming Address (Annex 1).

1.2 The President joined the State Secretary in welcoming the delegates to Gothenburg and made an opening statement on the work of the Organization (Annex 2).

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

1.4 Representatives of the North Pacific Anadromous Fish Commission and the International Baltic Sea Fishery Commission, Inter-Government Organizations (IGOs) attending the meeting as observers for the first time, made Opening Statements (Annex 4).

1.5 Opening Statements (Annex 5) were made by the following Non-Government Organizations (NGOs):

Association of Scottish District Salmon Fishery Boards, Atlantic Salmon Federation, Atlantic Salmon Trust, European Anglers Alliance, Federation of Irish Salmon and Sea-Trout Anglers, Institute of Fisheries Management, International Friends of Wild Salmon, National Anglers Representative Association, Norwegian Farmers Union, Norwegian Salmon Rivers, Salmon & Trout Association, Sami Parlamenta, Scottish Anglers National Association and the Salmon Net Fishing Association of Scotland.

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

1.7 A list of participants is given in Annex 6.

2. ADOPTION OF AGENDA

2.1 The Council adopted its agenda, CNL(96)48 (Annex 7).

3. ELECTION OF OFFICERS

3.1 The Council, on a proposal by the representative of Canada, seconded by the representative of Norway, elected Mr Einar Lemche Denmark (in respect of the Faroe Islands and Greenland) to be its President.

3.2 The Council, on a proposal by the representative of Russia, seconded by the representative of Iceland, elected Mr Ole Tougaard (European Union) to be its Vice-President.

4. ADMINISTRATIVE ISSUES

4.1 Secretary's Report

The Secretary made a report to the Council, CNL(96)6, on the status of ratifications and accessions to the Convention, membership of the regional Commissions, the ICES/NASCO Symposium on Impacts of Salmon Aquaculture, applications for non-government observer status, attendance at NASCO meetings by accredited media, possible topics for Special Sessions, receipt of contributions for 1996, project work and the Headquarters Property. Reports were also made on the audited accounts for 1995, CNL(96)7, and on the draft budget, CNL(96)9.

Last year the Council accepted a proposal from ICES to co-sponsor a meeting on interactions between wild and reared salmon. The Secretary was asked to liaise with ICES on the organisation of the meeting on the basis that it should be arranged so as to neither make a profit nor a loss. The Secretary reported that during the year the Co-Convenors and the Steering Group finalised the arrangements for the Symposium which will be held in Bath, England during 18-22 April 1997. The Symposium, entitled "Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: The Scientific and Management Issues", has the following objectives:

- to review the results of research on the interactions between salmon culture and wild stocks of Atlantic salmon;
- to examine the practical implications of such interactions for stock management;
- to identify gaps in current knowledge and to establish future research priorities.

The Secretary reported that the loan on the Headquarters Property had now been repaid one year early. The Organization now owns a substantial asset producing a significant annual income.

4.2 Report of the Finance and Administration Committee

The Chairman of the Finance and Administration Committee, Mr Eero Niemela (European Union) presented the report of the Committee, CNL(96)10. The representative of Iceland expressed his disappointment that the proposal concerning the exclusion of ranched fish from the catches used to calculate the contributions to NASCO had not been resolved, although he was able to accept the recommendation that the issue be considered further next year in the light of new information. Upon the recommendation of the Committee the Council took the following decisions:

(a) to appoint Coopers and Lybrand of Edinburgh as auditors for the 1996 accounts;

(b) to accept the audited 1995 annual financial statement, CNL(96)7;

(c) to adopt a budget for 1997 and to note a forecast budget for 1998, CNL(96)49 (Annex 8).

(d) include the following sentence at the end of Financial Rule 7.1: "Interest on amounts held in the Stabilisation Fund shall be credited to the Stabilisation Fund".

(e) to adopt the report of the Finance and Administration Committee.

The Council thanked the Chairman, Mr Niemela, for his work and that of the Committee.

4.3 Report on the Activities of the Organization

The Council adopted a report to the Parties, CNL(96)11, in accordance with Article 5, paragraph 6 of the Convention. The representatives of Norway and Iceland referred to the publication of the Ten Year Review and welcomed its presentation and content as a valuable contribution to the wider understanding of the work of the Organization. The representative of Norway proposed that a similar format might be used for the Organization's biennial report.

4.4 Provisions of Article 13 of the Convention

At its Twelfth Annual Meeting the Council considered a review of the provisions of Article 13 of the Convention. The different procedures in relation to regulatory and emergency regulatory measures could create problems for the Party in whose area of fisheries jurisdiction the measures would apply since the subsequent withdrawal of an objection to an emergency regulatory measure by another Party would imply a revival of the measure. The representative of Denmark (in respect of the Faroe Islands and Greenland) had proposed that the problem could be resolved if the Council agreed that Article 13 be interpreted in such a way that an objection under paragraph 5 cannot be withdrawn with the effect that the measure is revitalised. The Council, while agreeing in principle, felt that as this involved interpretation of the NASCO Convention, legal advice should be taken by the Parties before final approval could be given.

The Secretary reported, (CNL(96)12), on consultations on this issue since the Council's last meeting, which indicated that this interpretation was acceptable to the Parties. The effect is that, following agreement of an emergency regulatory measure by a Commission, if an objection is received within the 30 day period allowed for such objections to be raised, then the measure will fall and the obligation for the members of the Commission to make best efforts to implement the measure will cease to apply. This interpretation was agreed by the Council.

4.5 Future Issues for NASCO

At its Twelfth Annual Meeting the Council considered a discussion paper focusing on the future issues which might be faced by the Organization in achieving the objectives of the Convention. The Council agreed that the Secretary be asked to produce a review based on this discussion paper, on contributions tabled by Norway and Iceland

and on the deliberations in the Council proposing a priority list and needs for action on each item in the future.

The Secretary introduced document CNL(96)13 (Annex 9) which concluded that, while the Council is already addressing a wide range of issues, new threats to the well-being of wild salmon stocks arise with surprising speed. NASCO will therefore need to constantly update the issues dealt with as the future unfolds. The Council welcomed this review and congratulated the Secretary on this document. The Council agreed that the paper CNL(96)13 "Future Issues for NASCO" would serve as a basis for the future work of the Organization but that it be regularly reviewed to ensure that the Organization kept pace with changes.

The Secretary also introduced document CNL(96)44 (Annex 10) concerning the Precautionary Approach to fisheries management. The President indicated that while the Precautionary Approach is easy to understand, it is more difficult to implement as a management tool. He referred to the need to implement the Precautionary Approach and to the fact that NASCO Parties have signed other international agreements which encompass such an approach. The representative of the USA referred to Technical Guidelines prepared by FAO dealing with the Precautionary Approach to management, research, fishing techniques, and introductions and transfers.

The Council requested that the Secretariat prepare a paper for the next Annual Meeting which brought forward specific ideas as to how to adopt the Precautionary Approach to all of the work of NASCO. This paper should take account of the thinking by other international bodies on development of the Precautionary Approach.

5. SCIENTIFIC, TECHNICAL, LEGAL AND OTHER INFORMATION

5.1 Scientific Advice from ICES

The General Secretary of ICES, referred to the long-standing and fruitful relationship between ICES and NASCO and the joint symposium planned for 1997 was a further example of this cooperation. The representative of the ACFM presented the report of the Advisory Committee on Fishery Management (ACFM) to the Council, CNL(96)15 (Annex 11).

5.2 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 decision to request scientific advice from ICES, CNL(96)58 (Annex 12).

5.3 Catch Statistics and their Analysis

The Secretary introduced a statistical paper presenting the official catch returns by the Parties for 1995, CNL(96)17 (Annex 13), and historical data for the period 1960-1995. He referred to differences in the statistics provided by ICES and the official statistics provided to NASCO by the Parties. The Council agreed that the Secretary should consult the Parties to seek clarification of the reasons for the differences, and to report to the Council at its Fourteenth Annual Meeting.

At its Tenth Annual Meeting the Council had adopted a minimum standard for catch statistics which it was agreed would be in place for the 1995 statistics.

5.4 Salmon Tagging and the Tag Return Incentive Scheme

The Secretary presented a summary of tag release data, CNL(96)19 (Annex 14), which had been prepared from information submitted by ICES.

The Secretary reported on the Tag Return Incentive Scheme, CNL(96)20 (Annex 15). During 1995 favourable publicity for the work of the Parties and of the Organization had again been received as a result of the Scheme and the need to return scientific tags had again been publicised.

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

5.5 Database of Salmon Rivers in the North Atlantic

The Secretary presented a progress report, CNL(96)21 (Annex 16), on the establishment of a database of salmon rivers flowing into the Convention area. Information has been received from all Parties and incorporated into the database which now contains details of more than 1,800 rivers. Of these, approximately 76% are categorised as being "not threatened with loss". However, a total of approximately 7.5% of rivers fall into the categories "lost and maintained" and 12.6% are considered to be "threatened with loss". The database would be regularly updated to monitor progress. The Secretary confirmed that the information contained in the database is freely available for use by the Parties.

5.6 Review of International Salmon Related Literature Published in 1995

The Council took a note of a review of the literature concerning Atlantic salmon published during 1995, CNL(96)22, which had been prepared in accordance with Article 13, paragraph 2 of the Convention.

5.7 Laws, Regulations and Programmes

The Secretary presented a report on the Laws, Regulations and Programmes database, CNL(96)23.

6. CONSERVATION, RESTORATION, ENHANCEMENT AND RATIONAL MANAGEMENT OF SALMON STOCKS

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

The Secretary presented a report on the returns made under Articles 14 and 15 of the Convention, CNL(96)24 (Annex 17).

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

Protocol for Non-Contracting Parties and Actions Taken in Accordance with the Resolution

The Secretary presented a report, CNL(96)25 (Annex 18), which described developments in relation to the Protocol Open for Signature by States Not Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean and actions taken in relation to the Resolution on Fishing for Salmon on the High Seas, both of which were adopted by the Council at its Tenth Annual Meeting.

The Polish authorities have advised NASCO that a new Sea Fishery Act will enter into force on 22 June 1996. Under this Act the Minister of Transportation and Maritime Economy is authorised to forbid or limit catches, transport, landings, sale or storage of marine resources. It was understood that this gave the same powers as the Protocol would have done.

Information was presented to the Council on sightings of vessels fishing for salmon in international waters; scientific and technical data on the fishery; information on landings and transshipments and details of actions taken to establish contact with other international organizations. There have been no sightings since February 1994 but there have been very few surveillance flights over the winter and spring period and these would not have covered the entire area of international waters.

International Cooperation on Surveillance

At its Tenth Annual Meeting the Council had endorsed the recommendations of an International Meeting on Surveillance of Fishing for Salmon in International Waters on possible areas for international collaboration aimed at improving the surveillance information. The Secretary reported on progress with implementation of the recommendations (CNL(96)26). The project involved three separate phases which had been scheduled between November 1995 and May 1996. It is intended that the results of this surveillance project and developments in relation to the other recommendations will be reviewed at a second meeting of NASCO and the coastguard authorities to be held later this year. The Council asked the Secretary to present a report on this matter at its Fourteenth Annual Meeting.

6.3 Research Fishing for Salmon in Relation to the Provisions of Article 2 of the Convention

At its last annual meeting the Council considered the issue of whether there should be exceptions to Article 2 of the Convention so as to permit research fishing by the Parties. There is, and has in the past been, interest by the Parties in research fishing for salmon both in international waters and within areas of fisheries jurisdiction and such research fishing could provide valuable management information. However, the Council recognised that any change to the provisions of Article 2 would need careful consideration in the light of the problem of fishing for salmon in international waters and the Council's initiative in developing a Protocol for non-Contracting Parties. Research fishing, if permitted, would therefore need to be under carefully controlled conditions. The Council had unanimously agreed in principle to consider a draft

Resolution on this matter, but it was recognised that as this involved an interpretation of the NASCO Convention legal advice should be taken by the Parties before final approval is given. It was recognised that it would be desirable to resolve the issue as soon as possible so as to permit research fishing.

The Secretary introduced a report, CNL(96)27, on progress with the draft Resolution since the last meeting. During the year revised draft Resolutions were circulated to the Parties for comments. One version contained different conditions for research fishing within and outside areas of fisheries jurisdiction while in the other version the conditions applied to all research fishing in areas where fishing is presently prohibited by the Convention. The Council considered a draft Resolution covering Scientific Research Fishing, CNL(96)53 (Annex 19), and asked the Secretary to consult with the Parties with a view to adopting the Resolution by correspondence.

During July last year the Council unanimously approved a proposal by Norway to carry out research fishing. A further proposal from the European Union (Scotland) to carry out research fishing during May 1996 had also been approved. The representative of Norway tabled a proposal, CNL(96)47, for a continuation of the research programme initiated in 1995. The Council unanimously approved this proposal.

NOTE: The Resolution on Scientific Research Fishing was subsequently adopted by the Council by correspondence and is contained in Annex 20.

6.4 Impacts of Aquaculture on Wild Salmon Stocks

(a) Review of Progress with Oslo Resolution

The Secretary presented a report, CNL(96)28 (Annex 21), on the returns made in accordance with 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" adopted in Oslo in 1994. The President referred to the fact that the Council's intention was that there would be full implementation of the Resolution by the Fifteenth Annual Meeting in 1998 and that, to achieve this aim, further measures would be needed in the next two years.

(b) Advances in Relevant Research

The Secretary introduced a paper, CNL(96)29 (Annex 22), describing advances in relevant research in relation to impacts of salmon aquaculture.

(c) Transgenic Salmon

The Council considered a review on transgenic salmon, CNL(96)30 (Annex 23).

The Council considered a draft Resolution, CNL(96)55 (Annex 24), designed to control the risks and develop more information. The Council asked the Secretary to consult with the Parties with a view to adopting the Resolution by

correspondence. Some concern was expressed about an earlier proposal from the Chair to vote immediately on the adoption of the Resolution.

The Council may consider holding a Special Session on this topic as soon as practicable which would examine the risks and possible benefits in more detail.

NOTE: The Council was unable to agree the Resolution on transgenic salmon. The issue will be re-examined at the 1997 meeting.

(d) Closer Cooperation with the Salmon Farming Industry

At its last annual meeting the Council agreed that it wished to retain and strengthen the good relationship which had been established with the salmon farming industry and agreed terms of reference for a Liaison Group and the industry which might meet as required to discuss issues of mutual interest. Consultations with the industry had indicated that they would welcome the opportunity to cooperate internationally in this way with NASCO. The Secretary introduced a paper, CNL(96)31 (Annex 25), which indicated that the response from the international salmon farming industry had been very positive and confirmed that the industry welcomed the opportunity to strengthen the process of cooperation. The Council welcomed this step forward in liaison with the salmon farming industry and agreed an Agenda and Constitution for the first meeting of the Group which would also need to be endorsed by the salmon farming industry. However, the Council asked that the subject of transgenic salmon be raised at the first meeting of the Liaison Group and that this group be asked to make recommendations on this subject. The Secretary was asked to liaise with the industry with a view to holding the first meeting of the Liaison Group before the next annual meeting of the Council.

6.5 Long-Term Trends in Abundance

At its Tenth Annual Meeting the Council considered the value of long-term catch records as an indicator of trends in salmon abundance and agreed that it would be useful to review the available literature and to examine the availability of new data sets so that the present period of low abundance could be assessed in an historical perspective. The Secretary introduced a brief progress report, CNL(96)32. The President urged the Parties to draw the availability of any long-term data sets to the attention of the Secretariat.

6.6 Special Session: "The Atlantic Salmon as Predator and Prey"

In recent years concern has been expressed about the impacts of growing populations of predators on salmon stocks, particularly seals and fish-eating birds. Concern has also been expressed about the harvest of some of the prey species of salmon in industrial fisheries and a number of NASCO's NGOs had suggested that these issues be considered by the Council in a Special Session.

The Council held a Special Session entitled "Atlantic Salmon as Predator and Prey" during which the following presentations were made:

The Predators of Atlantic Salmon and Their Impact on Salmon Stocks - CNL(96)34.
The Public Perception of Predator Control Programmes - CNL(96)35
The Prey of the Atlantic Salmon - CNL(96)36
The Impact of Industrial Fisheries on the Prey of the Salmon - CNL(96)37

The President asked the Secretary to produce a report on any management or other implications arising from the meeting to be considered at the Fourteenth Annual Meeting of the Council.

6.7 **Guidelines on Catch and Release**

At its Eleventh Annual Meeting the Council considered a review on catch and release fishing which concluded that there had been growing interest in this technique in response to declining stock levels or components of the stocks in a number of North Atlantic countries. The Council had recognised that, to be effective as a management measure, it is important that stress and physical damage to fish intended for release is avoided, and that where catch and release is practised, guidelines could be of benefit in avoiding damage. The Council agreed that the Parties should provide comments to the Secretary on the draft with a view to their adoption by post as guidelines to be used at the discretion of the Parties or of interested organizations, CNL(96)39 (Annex 26).

6.8 **Guidelines on Stocking**

The Secretary presented a preliminary report, CNL(96)40 (Annex 27), on progress in developing guidelines on stocking. He indicated that there was evidence that stocking techniques, if wrongly applied, could do more harm than good. The Council agreed to consider draft guidelines on stocking at its Fourteenth Annual Meeting.

6.9 **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.

7. OTHER BUSINESS

7.1 The Secretary referred to the Kyoto Declaration, CNL(96)41, which arose from the International Conference on the Sustainable Contribution of Fisheries to Food Security. The Declaration had been conveyed to NASCO and other international organizations by the Government of Japan for their consideration and endorsement. The Council noted and welcomed the Kyoto Declaration.

7.2 The Secretary referred to a communication which had been received from the United Nations concerning Resolutions on Straddling Fish Stocks and Highly Migratory Fish Stocks (Resolution 50/24). NASCO, as the relevant regional organization for the conservation and management of North Atlantic salmon, welcomed the adoption by consensus and the opening for signature of the agreement. Although the Agreement does not apply to salmon it contains provisions which can contribute to the international conservation and management of North Atlantic salmon.

7.3 The Secretary referred to a further communication which had been received from the United Nations on large-scale pelagic drift-net fishing. The Council requested the Secretary to respond to the United Nations indicating to the UN that NASCO is not aware of any activities within the Convention area which would be inconsistent with the Resolution.

8. DATE AND PLACE OF NEXT MEETING

8.1 The Council confirmed its acceptance of the invitation to hold its Fourteenth Annual Meeting in Ilulissat, Greenland from 8-13 June 1997.

8.2 The Council agreed to hold its Fifteenth Annual Meeting in Edinburgh from 8-12 June 1998.

9. DRAFT REPORT OF THE MEETING

9.1 The Council agreed the draft report of the meeting, CNL(96)43.

10. PRESS RELEASE

10.1 The Council adopted a press release, CNL(96)56 (Annex 28).

ANNEX 1

WELCOMING ADDRESS BY THE STATE SECRETARY, MINISTRY OF AGRICULTURE

WELCOMING ADDRESS MADE BY MR CURT MALMBORG, THE STATE SECRETARY, MINISTRY OF AGRICULTURE

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

On behalf of the Swedish Government I welcome you all to Gothenburg, to Sweden and to this 13th Annual Meeting of the North Atlantic Salmon Conservation Organization (NASCO). It is both an honour and a pleasure for Sweden and for me as State Secretary to host this meeting. In one respect this meeting is a historical one as it is the very first Annual Meeting in an EU member state outside Great Britain and therefore co-sponsored by the European Commission. We would very much like to see this as clear evidence of the deep interest Sweden has on salmon issues. You should know that such issues are deeply rooted in the history of our country. There is a strong involvement from many interest groups and organisations, commercial fishermen, sport fishermen, environmentalists and so on.

Atlantic salmon has for a long time been an attractive and important species in the Swedish fisheries. That is the case both for the commercial fishermen and for the growing sport fishing tourism industry in the Baltic Sea area as well as along the Swedish west coast. In the following I intend to stick to the west coast salmon only, thereby leaving the Baltic salmon problems to another opportunity, how great they ever will be.

Today the west coast salmon is of great importance:

- The salmon is a target species in a small coastal fishery with fixed gears, although it is decreasing in volume and importance.
- There is an increasing recreational fishery for salmon in the west coast rivers.
- Finally, but not less important, the salmon is also of the greatest value with regard to biological diversity.

The management regime of the North Atlantic salmon today with mostly stock specific exploitation and conservation measures is well in line with the principles of biological diversity. In several of the west coast watercourses there are still aboriginal salmon stocks of very high protection value to be found.

From the very beginning wild salmon represented a valuable resource for people in the river valleys and in the coastal areas. But in the middle of this century several of the salmon rivers suffered severely from organic pollution, and the salmon stocks in some cases disappeared. Thanks to improved environmental legislation, administrative measures and also private initiatives, pollution was practically stopped. The salmon could again migrate into its former habitats. But after this success a new threat was recognized, acid rain. Sweden has at several annual meetings underlined the seriousness of this problem. We have argued that it seems to become a long-term feature of the salmon protection and enhancement work. The Swedish liming programme, which started in 1977, in order to mitigate the acidification, is well known. The effects have been very positive. Wild salmon generates considerable economic profits and is now an important element of growing tourism in Sweden based on fishing.

Not only enhancement but also regulatory measures within the framework of NASCO have been applied by Sweden during recent years. In view of the principle of shared burden Sweden was one of the very first states prohibiting fishing for salmon outside four nautical miles from the baseline. Some years ago restrictions were introduced limiting the number of

gears to be used by non-commercial fishermen. Last year the National Board of Fisheries elaborated an action plan aiming at enhancement and sustainable use of the west coast salmon stocks. It has been calculated that there is a potential area in the west coast rivers of about 200 hectares implying an annual production of 400,000 salmon smolts. Today the number of smolts produced is only about half that figure.

At the ICES/NASCO Dialogue Meeting in 1993 three principles related to salmon management were stressed:

- Environmental sustainability;
- Integrated resource management;
- and Partnership

In a situation threatening to deplete the salmon stocks, all Parties and partners must take responsibility, as transparent as possible, to correct the situation. Sustainable management of salmon stocks can only be achieved through an overall balanced policy.

This annual meeting just opened by the President may also be seen in a greater perspective. Issues on salmon and salmon fisheries are matters related to economic activities. These activities are ultimately depending on the status of the stocks. Salmon reacts and migrates independent of national borders. Therefore international agreements and regulations are the best means for the survival of the salmon and its exploitation. But there is also a very clear linkage to environmental issues. The Swedish Government is giving a high priority to environmental matters.

- There is no other choice!

Sweden like many other countries has experienced rapid growth and development during this century. But the strong economic growth has occurred at the cost of ruthless exploitation of nature. This type of exploitation cannot go on. But at the same time we need continued growth not the least for creating employment and remedy against the great curse of our time, high unemployment. This growth must, however, take new forms. We must create a society with ecological and sustainable use of the resources.

The society, the nature on land and at sea, which we will hand over to our children and grandchildren shall not be in a worse condition than the one we ourselves inherited.

In view hereof Sweden strongly emphasizes the importance of international cooperation in environmental issues. In the difficult area of managing a common international resource like the Atlantic salmon, we see the Salmon Convention and NASCO as the right forum for solving problems relating to salmon. It is our wish that NASCO continues to further strengthen its role as a forum for exchange of information and constructive discussions between the Parties. Thereby we can produce the best possible results for the future of a very valuable resource - the Atlantic salmon.

You are convened here at this meeting to discuss and negotiate on matters related to the wild stocks of Atlantic salmon. In the sum you will cover many aspects of the stocks with the clear aim to effectively conserve and manage Atlantic stocks throughout their range. Your agenda for this week is full.

Half a day during this meeting will be devoted to a special session called "Atlantic Salmon as Predator and Prey". We know, however, that there are many more characteristics of this species. One of them is salmon as a culinary speciality. I know that special arrangements have been made for you - to also have a special evening session on Thursday on this issue.

Once again, welcome to Gothenburg. I wish you success in completing the work ahead of you. Finally I wish you all a very pleasant stay here in Gothenburg.

ANNEX 2

OPENING STATEMENT BY THE PRESIDENT

OPENING STATEMENT MADE BY THE PRESIDENT

First, I want to welcome you to Gothenburg, a beautiful city which, unfortunately, looking at our agendas, I doubt we will have a great deal of time to enjoy. However, our Swedish hosts have arranged some excellent hospitality tonight and tomorrow, which will give us some opportunity to see the city.

Let me move on to what we would like to achieve at this meeting. In the Commissions we want to build on the Regulatory Measures that are in place to conserve salmon stocks. With regard to introductions and transfers, the North American Commission will be reviewing progress with its protocols and the North-East Atlantic Commission also has some important principles consider including a classification of salmon rivers and development of appropriate management measures and on the establishment of zones to prevent the spread of diseases and parasites. Their work on these issues will be very important given the pressure for removal of barriers to trade. I hope that they will succeed because, although trade is a great benefit to us all, we cannot sit by if the loss of control leads to the spread of disease among salmon stocks and further damage to them. It would be too high a price to pay and would certainly be contrary to the intention of the Convention.

The Council itself has some important issues to deal with. I refer particularly to the impacts of salmon aquaculture on the wild stocks. While our understanding of interactions is improving, we are still largely in the dark on the extent of some of these impacts. Our common sense, however, will tell us that we take serious risks by allowing millions of farmed salmon to interact with the fragile and now much smaller wild stocks. We agreed a Resolution in Oslo to start to deal with this problem and I want to see progress on implementing that Resolution. Equally, or even more worrying, is the development of transgenic salmon where genes from another species are inserted into a salmon so that it grows faster or exhibits other traits of commercial importance. We have before us an important review paper on this subject which I will ask the Council to consider very carefully. We have also made real progress in developing a dialogue with the salmon farmers and we need to encourage this since I believe we have many common concerns.

Our information is still limited so I am glad to see that the Symposium entitled "Interactions Between Salmon Culture and Wild Stocks of Atlantic Salmon: The Scientific and Management Issues", jointly sponsored by ICES and NASCO, has now been arranged. This international meeting will allow us to bring together the best experts on this matter. I want to stress, however, that we want that Symposium to consider the management implications and not just the science.

This week will see a Special Session on the Atlantic salmon as Predator and Prey, a subject which our NGOs proposed to us. I am glad that we have been able to take up their proposal and trust that our discussions on Thursday will throw some light onto this matter and show us if we need to do more. We also have to resolve the issue of research fishing. I will not go into the other items before us but you will already see that we have a lot to do in a very limited amount of time.

In conclusion, I want to ask you all to show the same good cooperative spirit and further demonstrate our determination to conserve the wild salmon as required by the NASCO Treaty. We see clearly that stocks are very low indeed and I believe that great sacrifices may be

needed by every group that benefits from the salmon if we are not to lose this most precious resource.

Thank you.

ANNEX 3

OPENING STATEMENTS MADE BY THE PARTIES

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF CANADA

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

May I begin with a special word of thanks to our Swedish hosts. It is a pleasure for the Canadian delegation to be in Gothenburg and to participate in the Thirteenth Annual Meeting of the North Atlantic Salmon Conservation Organization.

The environment for Atlantic salmon - and for people in the fishery - continues to be difficult, and uncertain. Reconciling the demands of tough scientific advice calling for stringent measures has been a defining theme for our Meetings in recent years, and that is the case again in 1996.

A commitment to science-based conservation continues to be the cornerstone of Canada's fisheries policy for all species. The reduction of our fishing effort is well known to NASCO, and I want to up-date our report to you on this issue. The total Canadian harvest of Atlantic salmon, including the commercial, recreational and native fisheries, has been reduced in every year since 1987. In 1994 it was 352 tonnes, down from 711t in 1991 - a reduction of over one half in three years. In 1995 the total Canadian catch was reduced again to 270t.

The Moratorium on commercial salmon fishing on the Island of Newfoundland, which started in 1992, continues. The only remaining commercial Atlantic salmon fisheries in Canada are in Labrador and in remote northern areas of Quebec.

One of our main challenges - which we share with other members of NASCO - is to serve the needs of northern communities. Last year, in Labrador, we implemented additional stringent conservation measures. Quotas were reduced by 20%, from 92t to 73.5t and the commercial season was delayed by one month to allow greater escapement. As a result, the Labrador commercial fishery took about 55t of salmon. Furthermore, in the recreational fishery, anglers in Labrador could retain only one large salmon for the season.

Canada is committed to maintaining progress on the road of conservation, but we are also committed to achieving this objective in combination with an adjustment program that serves the fundamental needs of our northern communities. We will continue to do everything possible to protect the salmon, but we will also strive to protect the communities whose very existence, since time immemorial, has been rooted in the fishery.

We will continue our work this week in several other important areas. Our perspective on these will be shaped, and our progress directed, by extending the work we began last year on Future Issues for NASCO. This includes several aspects of the impact of aquaculture on the wild stocks, an issue which illustrates the need for shared responsibility among all those who benefit from the resource. The Special Session on Atlantic Salmon as Predator and Prey will be a very important feature of the week.

Mr President, may I close by conveying to you, from your many Canadian friends, our warm appreciation for your leadership since 1993. We know that under your direction this Thirteenth Annual Meeting will be productive and, when you lay your gavel down this coming Friday - on schedule as usual, no doubt - you will carry with you the high regard and gratitude of all your NASCO colleagues.

Thank you.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

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

Three years ago in the Dialogue Meeting we saw the conservation of salmon set in a full context, where all factors affecting the abundance of salmon were reviewed and where the offshore fisheries at the Faroe Islands and West Greenland were only one of many factors having an effect. This holistic approach to the management of salmon seemed to have disappeared the last two years, when we reverted back to the situation of former years of focusing mainly on the offshore fisheries.

In 1993 the West Greenland Commission agreed on a quota calculation model. The quota could be based upon biological findings and would go up as well as down, depending upon stock developments. The quota calculation model has ensured that the science remains free from political influences.

Last year the model resulted in an advice of 77 tonnes salmon to West Greenland and Greenland accepted. The negotiations were particularly difficult like the years before the quota calculation model was agreed. This year the model gives 271 tonnes based upon the biological findings. We should be happy, because it means positive stock development.

As mentioned before there are many factors affecting the salmon stock situation today. Great losses of salmon caused by pollution and habitat damage is well known and the Parties should address these problems much more than has been done so far.

Human activities like the salmon farming and ranching industries are one of the serious threats of the wild salmon. Transgenic salmon is also an issue to be addressed by the Parties and guidelines should be developed on how to handle this new or coming problem to avoid negative consequences to the wild salmon.

For obvious reasons we do not know much about the unreported catches, but still it is recognized that unreported catches represent a considerable amount. There seems to be a special focus on Greenlandic unreported catches in the Report of the ACFM, even though the Greenlandic unreported catch is believed to be less than 1% of the total "guess-estimates". Therefore this delegation urges the Parties to consider appropriate steps in order to reach better estimates.

As regards the possibilities under the Convention to extend research fishing on salmon into international waters, this delegation hopes that a pragmatic solution will be found, which does not hinder valid and important research.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE EUROPEAN UNION

Mr President, State Secretary and distinguished delegates and observers:

This is the Thirteenth Annual Meeting of NASCO and the thirteenth meeting for the Community. For the Community, we come once again as a single Contracting Party, since Finland and Sweden have now withdrawn as individual members of the Organization and are fully integrated in the Community delegation. The Community's interest in NASCO, despite having only a single voice, continues to increase along with its commitment to the aims of NASCO. Throughout this meeting, as on all previous occasions, the points of view of all Member States of the European Union, from those in the very far north, such as Finland and Sweden, right down to the south, such as Spain and Portugal - a whole array of countries - will be expressed by the Community delegation. However, the Community believes that at this meeting, as always, it will also take full account of the views of all its partners, namely the other Contracting Parties.

It is now three years since we last held a meeting in our Organization's home city of Edinburgh and I know that with the exciting prospect of going to Greenland next year, it will be at least two years before we shall see that fair city again. Today, our meeting is being hosted at the invitation of the Swedish Government. Sweden is one of our three newest Member States; on behalf of the European Community, I would like to thank Sweden for taking the initiative to host this meeting which is co-sponsored by the Community; I am personally very satisfied with all the arrangements which have been made for our stay here and look forward to the remaining stay.

Once again this year, we have some important challenges concerning the fixing of maximum catch levels for salmon taken at sea. We, like all the other Contracting Parties, are fully committed to the sound management of fishery resources based on the best possible scientific information available. We anticipate that this will lead us in our work this week and will enable us to reach clear decisions on salmon catch limits.

I would like to inform you that as part of our continuing commitment to fisheries conservation, the European Union Fisheries Council meeting in Luxembourg yesterday agreed to sign the United Nations Agreement on Straddling Stocks. I consider this a very important step in the future of fisheries.

Finally, I can assure you that the Community is fully committed to contributing in a constructive way towards ensuring that all the objectives of NASCO are fully reached at this meeting.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF ICELAND

Mr President, Secretary of State, Distinguished Delegates, Observers, Ladies and Gentlemen.

It is a great pleasure to be here in the beautiful city of Gothenburg for the 13th Annual Meeting of NASCO. We thank Fiskeriverket and the Swedish Government for their hospitality.

The angling catches in Iceland in 1995 were about average, increasing about 20% from the 1994 catches, which were a record low. Oceanic conditions as well as growth and survival of marine fish such as capelin and cod have improved greatly over the past year, which raises hopes for increased salmon runs during the current year, especially in the two-sea-winter component.

As the overall abundance of salmon in the North Atlantic has remained low, there is a reason to press for lowering of quotas in all marine fisheries, coastal as well as oceanic. Considering the great quantities of reared salmon being marketed in recent years and the subsequent lowering of the overall price, it can be argued that wild salmon should primarily be harvested where they fetch the highest price, which is in freshwater sports fisheries.

NASCO has been involved in formulating international agreements regarding the transport of live fish and roe between areas and countries. Considering the great increase in salmon farming there are reasons to fear that various diseases of salmonids could easily spread between distant countries in spite of such regulations.

During the summer of 1995 *furunculosis* was diagnosed for the first time in Iceland. It occurred in Ellidaar, a lowland river in southwestern Iceland. The bacteria turned out to be resistant to various antibacterial agents, indicating that it had recently been exposed to such chemicals. This suggests that the bacteria was brought to Iceland with an escapee from distant cage culture or with an Icelandic fish exposed to a foreign salmon farming operation. There are also reasons to believe that increased vaccinations of farmed fish in cage culture leads to a greater number of healthy carriers, if escapes occur. This indicates that fish farming development in one country can have serious environmental effects in distant as well as neighbouring countries.

An ICES/NASCO conference on the interaction of wild and reared salmon, which will be held in Bath, England in 1997 is thus timely and will hopefully put things into perspective and answer many open questions. We give our full support to this conference.

The Icelandic Delegation looks forward to a useful and productive meeting under your able leadership, Mr President.

Thank you, Mr President.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF NORWAY

Mr President, Secretary of State, distinguished Delegates, Observers, Ladies and Gentlemen.

It gives me great pleasure to address the annual meeting of NASCO here in Gothenburg, the centre of an area that for several hundred years has been an important link between Norway and Sweden, and in our days also represents a link between Norway and the European Union.

This year's annual meeting takes place against a somewhat gloomy background as the catch statistics show yet another marked decrease in the wild stocks of Atlantic salmon. In this situation, we see it as necessary to reduce the threats on a broad scale. This indeed focuses on some important tasks for the Parties and for the Organization.

Crucial among these tasks will be to review and improve existing regulatory measures. To this end, the Parties for some years have put substantial effort into the establishment of stock-specific management systems within their homewaters. We see it as important that this meeting can result in further improvements in internationally agreed management measures as well.

The decrease in the salmon stocks also necessitates efforts to improve the scientific basis for our work, especially the knowledge of life history parameters of salmon in the ocean phases. To this end, research fishing is of vital importance. Consequently, we want to see a resolution that meets the real needs of management-related science in a flexible manner. At this point, I would like to thank the Parties for their swift and positive response to last year's Norwegian research proposal.

The Norwegian delegation sees the report from the Working Group on Introductions and Transfers in the North-East Atlantic as an important contribution to the work of NASCO. The report focuses on a number of important issues, and constitutes a solid basis for the implementation of conservation measures by single Parties as well as a basis for possible closer cooperation at the regional level. One specific issue from the report that deserves mentioning here is transgenic fish, as this is an issue of particular importance.

The issue of transgenic fish indeed illustrates the speed of development in certain fields and the need for NASCO to be prepared to address important themes when they arise. We therefore look forward to a discussion on strategies and issues that should be given priority for the future work of the Organization.

In closing I would like to thank our Swedish hosts and the Secretariat for their able work in organizing and preparing this meeting in pleasant surroundings here in Gothenburg. We look forward to constructive discussions, and assure you, Mr President of our full and positive cooperation.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE RUSSIAN FEDERATION

Mr President, Secretary of State, Distinguished Delegates, Ladies and Gentlemen:

On behalf of the Russian delegation I am pleased to see all participants at this Thirteenth Annual Meeting of the North Atlantic Salmon Conservation Organization.

We have already emphasized many times before the important role played by this Organization and we reiterate this appreciation. The contribution made by NASCO to conservation of Atlantic salmon stocks, and in particular in Russia where in many regions quite a difficult situation has developed around stocks of this precious species, could hardly be overestimated.

The past year was a complex one for our country, both politically and economically. Nevertheless we succeeded in fulfilling Atlantic salmon related projects, both scientific and economic.

In this respect further progress in developing recreational fishing can be referred to as our greatest success. The most recent evidence we have shows that a certain equilibrium has been established between the commercial and recreational fishery. But the commercial catch is still more than three times greater than the catch taken by anglers. However, along with this I would like to emphasise that about 80 salmon rivers in northwest Russia now have recreational fishing activities, while commercial fishing is conducted on 12 rivers only and a few coastal fishing stations.

When speaking about research projects we believe it is very important that research has been recently initiated in Russia to screen rivers in Karelia and the southern part of the Kola Peninsula for the parasite *Gyrodactylus salaris*. This project, together with the project promoting recreational fishing, have become feasible in many respects owing to NASCO's assistance.

We believe that a very substantial and significant effort was invested last year by NASCO to arrange a meeting of the Ad Hoc Working Group on Introductions and Transfers. Russia took an active part in it, as a big project on introductions, including salmonid species, is under way in our country. Economically this is a very important project, because it enables a better utilisation of available food supply in the White Sea, and in addition it provides an extra source of income for the local communities. In this light we are extremely interested in having the final document adopted, and we also fully support the initiative to hold an ICES/NASCO Symposium on Impacts of Salmon Aquaculture in April 1997. We believe it can be a further step forward in our efforts to identify the threats and eventually to minimize the risks posed by this industry to the wild salmon stocks.

We are much concerned about the continuing decline of North Atlantic salmon stocks and believe that a further more detailed analysis of the reasons behind it must be undertaken, probably area by area or country by country, to elaborate relevant measures. In this light the research fishing for salmon in international waters, as well as in areas of national fisheries jurisdiction, can provide valuable information to fill in the gaps in the current knowledge of the stocks.

We do hope that this meeting will contribute further to integration between NASCO Parties to achieve our common goal of conservation of the Atlantic salmon resource. Mr President, we look forward to a constructive dialogue and successful meeting and are fully committed to seek best effective solutions to the problems which face us.

Thank you, Mr President.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE UNITED STATES OF AMERICA

President Pettersen, State Secretary, Distinguished Delegates, observers, ladies and gentlemen:

It is my pleasure to address you for the first time as a United States Commissioner to the North Atlantic Salmon Conservation Organization and to enjoy the hospitality of Sweden for this meeting. It is the policy of the United States that fisheries be harvested sustainably, taking into account the best scientific evidence and using a precautionary, risk-averse approach to management in accordance with the FAO Code of Conduct for Responsible Fishing. The United States has strongly supported this approach to the management of Atlantic salmon within NASCO in the past and will continue to do so in the future.

To harvest sustainably means we must not sacrifice for short-term gain the long-term viability of individual river populations that comprise the salmon resource. The strong scientific basis we seek is the best, most up-to-date scientific information, carefully peer-reviewed and provided by ICES through ACFM as a recognized scientific authority on Atlantic salmon. The precautionary approach to management means that, facing the inevitable uncertainty about the future of the resource, we must be cautious in harvesting and other activities which may jeopardize the future recovery of salmon.

Today, the condition of North Atlantic salmon populations continues to decline. At home, the United States has proposed declaring our last remaining stocks of wild salmon "threatened" under our Endangered Species Act. This action is linked with action in developing a U.S. conservation plan and needs to be coupled with the ocean interceptory fisheries in Canada and Greenland.

The recent United Nations agreement to deal with high seas fisheries and to adopt the precautionary approach to fisheries management will aid efforts to recover Atlantic salmon stocks. NASCO took a scientifically based, rational approach to managing the West Greenland fishery by the establishment of a long-term agreement in 1993, based on the simple biological premise of protecting spawning stocks and only exploiting the surplus production. As the scientific information supporting this and future agreements improves, so will our ability to better manage the resource for all Parties. But, we, as managers, must have the will to act on this scientific information!

The scientific advice we have received from ICES ACFM is compelling and we must act accordingly. Salmon stocks continue to decline and ICES reports to us this year that there are not even enough salmon to meet the spawning requirements in Canadian and United States rivers. They also noted that populations in southern European rivers are not doing well. We should follow the clear scientific advice from ICES that West Greenland and Canadian interceptory fisheries should have a zero quota; otherwise we put this valuable resource at great risk.

The United States recognizes that the decline in salmon stocks cannot be turned around quickly. There are many factors that affect salmon including fisheries, habitat concerns and the interaction of wild and cultured stocks. The steps NASCO has taken are significant and we support NASCO as the forum for making the tough decisions needed to reverse the decline and restore the salmon and the fisheries that depend upon them. That is our goal. We must heed the advice of international scientists and respond with national and

international policies working together to rebuild healthy salmon stocks and sustainable fisheries.

Mr. President, in closing, please indulge me a personal comment. I am new to this forum and look forward to working together with my fellow Commissioners. While I may not have the experience in salmon management that many of you have, I have worked as a scientist and manager on many fisheries in many parts of the world, and I hope I can rise to the challenge. I am honored to be appointed to represent my country in NASCO and to take my place among you. I hope we have a productive meeting, moving a step closer to our common goal, and that I can build a long-term relationship with NASCO and each of you.

ANNEX 4

OPENING STATEMENTS MADE BY INTER-GOVERNMENT ORGANIZATIONS

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE INTERNATIONAL BALTIC SEA FISHERY COMMISSION

Mr President, Secretary of State, Delegates, Ladies and Gentlemen.

First of all IBSFC wants to thank NASCO for the invitation to attend this meeting in an observer capacity.

This is the first time that our Commission has been represented in NASCO and we do appreciate this opportunity. It also indicates our closer cooperation in recent years.

In 1993 NASCO and IBSFC co-sponsored with ICES a Dialogue Meeting on Atlantic Salmon in Edinburgh. This year NASCO attended, in an observer capacity, the IBSFC Working Group Meeting on Salmon Strategies in the Baltic Sea held in Alvkarleby, Sweden.

Allow me now to take this opportunity to invite NASCO to send an Observer delegation to our 22nd Session in September 1996 in Warsaw.

Being faced with similar problems, in particular the protection of the wild salmon stocks, we should further develop our cooperation. In this context I want to refer to the review received in June 1994 from the President and Secretary of NASCO called "NASCO - The First Ten Years" which states that:

"There would be benefits from developing our links with those who manage the Baltic and Pacific salmon stocks for we have much to learn from their experiences and, no doubt, they from ours".

Mr President we fully share this view.

When looking around this Hall I can see many familiar faces from our IBSFC Meetings. This highlights the opportunity we have to come to a closer cooperation between our two organizations now and in the future.

Thank you Mr President.

OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE NORTH PACIFIC ANADROMOUS FISH COMMISSION

Mr President, Secretary of State, Distinguished delegates, observers and guests.

My name is Irina Shestakova and I represent the North Pacific Anadromous Fish Commission, which was established under the provision of the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed in Moscow on 11 February, 1992 by Canada, Japan, the Russian Federation and the United States of America. The Convention entered into force on 16 February 1993. The States which negotiated and signed the Convention are the primary states of origin for salmon stocks in the North Pacific Ocean.

NPAFC's and NASCO's objective is to promote the conservation of salmon stocks in their respective Convention Areas, and I believe that my attending your Annual Meeting is just a beginning of our future cooperation in achieving both the Commission's goals.

I am very grateful for having been invited to this meeting and I hope that NASCO finds an opportunity to be present at the NPAFC's Fourth Annual Meeting in Tokyo, October 21-25, 1996.

I would also like to remind you that NPAFC announced an International Symposium on assessment and status of Pacific Rim salmonid stocks, to be held during 28-29 October 1996 at the Hokkaido University Conference Hall in Sapporo, Japan. Please consider this reminder as an invitation to NASCO scientists to participate in this event.

I wish your meeting great success.

Thank you for your attention.

ANNEX 5

OPENING STATEMENTS MADE BY NON-GOVERNMENT ORGANIZATIONS

OPENING STATEMENT MADE BY THE ASSOCIATION OF SCOTTISH DISTRICT SALMON FISHERY BOARDS

This Association is grateful to NASCO for the opportunity to make this short submission to the Thirteenth Annual Meeting. The ASDSFB is primarily concerned with the internal management affairs of Scottish District Salmon Fisheries Boards which are statutory bodies in their own right under Scottish law. However, by virtue of the migratory life cycle of the salmon, it has a keen interest in the research and management of the marine phase and in those organisations that exist to promote, conserve and sustain these fish when they are in international or the home waters of other nations.

Firstly, we would like to address the issue of commercial fishing and interceptory netting. The Association endorses the concept that, as far as is practicable, wild salmon should only be harvested in their river of origin and that any commercial exploitation should take place only within the estuary of the river. We fully support and give a priority to the continuing local, national and international efforts to put these concepts into practice. Within Scotland, where most salmon rights are privately owned, the increasing differential between the value (and profitability) of rod-caught and net-caught salmon, has led to large sums of private money being employed in the buying and closure of netting stations in home waters and internationally, similarly, market forces are focusing netting effort towards more abundant stock components. We therefore continue to support the NASF initiative until such times as it is proved beyond reasonable doubt that buying off the West Greenland and Faroese fisheries is a waste of money. We also strongly support any measures, expensive though they may be, to research more deeply into the marine phase of the salmon's life.

Secondly, we believe the time is right to address the issue of predation and welcome it as the topic for the Special Session on 13th June. The most serious predators of salmon)other than fish and man) are seals and fish-eating birds all of which are protected species in the UK and in many other countries and are increasing in numbers at an alarming rate. The Association believes that seals significantly reduce the number of salmon returning to their rivers of origin and that fish eating birds significantly reduce the number of smolts produced. The call by the European Parliament for the suspension of cormorant protection is the first sign for many years that progress might be possible in this area. The Association hopes that NASCO will draw attention to the serious problems for salmon caused by fish eating birds and grey seals with the aim of encouraging governments and the European Union to take a more active and balanced approach to the management of these species. There is also a need for further research into, for instance, why cormorants seem to be moving further inland.

In conclusion, we believe that pressure should be brought to bear now even though the scientific arguments may still be seen by some to be incomplete. Now is the time for the measured exercise of the precautionary principle.

OPENING STATEMENT MADE BY THE ATLANTIC SALMON FEDERATION

The Atlantic Salmon Federation (ASF) is an international, non-profit organization which promotes the conservation and wise management of the Atlantic salmon and its environment. Through the generous support of corporations, foundations and individuals who share the Federation's goals, the Atlantic Salmon Federation has saved many salmon from the detrimental effects of overharvesting, pollution and habitat loss. It has a network of seven regional councils (Nova Scotia, Newfoundland, Prince Edward Island, New Brunswick, Quebec, Maine and New England), which have a membership of 135 river associations and 40,000 volunteers. The network covers the freshwater range of Atlantic salmon, a migratory fish, in Canada and the United States. The Atlantic Salmon Federation's international headquarters is located in St Andrews, NB. As well the Federation operates regional offices in Maine, Quebec, New Brunswick, Prince Edward Island, Nova Scotia and Newfoundland.

ASF PRIORITY PROGRAMS

A. Elimination of Interceptory Fisheries
B. Problems Affecting Salmon at Sea
C. The Impact of Aquaculture on Wild Salmon Stocks

A. Elimination of Interceptory Fisheries

Commercial fisheries conducted in the ocean intercept mixed stocks of salmon and, therefore, harvest indiscriminately stocks from rivers which are threatened with extinction of their salmon (e.g. Maine's Downeast Rivers, New England, Bay of Fundy, south shore of Nova Scotia) along with stocks from rivers with relatively healthy populations (e.g. New Brunswick's Miramichi River, Newfoundland's Gander, Humber Rivers).

Approximately fifty percent (65% in 1995) of the salmon which the Greenland fishermen harvest originate in rivers of North America. Canada and the United States have spent more than 150 million dollars on restoration of Atlantic salmon in their rivers, only to have many of the salmon produced as the result of these conservation, enhancement and restoration programs killed in the nets of Greenland fishermen. Spawning escapement for Atlantic salmon was met or exceeded in only 30% of Canadian rivers in 1995. Every salmon river in New England is seriously underseeded and threatened with extinction.

The Labrador commercial fishery intercepts stocks migrating, not only to Labrador, but also mainland Canada and the USA. After studying tagging data and biological characteristics of the fish harvested, ICES scientists have estimated that 60 to 80 percent of the salmon being caught in the Labrador commercial fishery are destined for Labrador and 20 to 40 percent are destined for Newfoundland, the Quebec North Shore, mainland areas of Atlantic Canada, and the USA.

Since 1990, returns to Labrador have been significantly below the number required to meet target spawning escapement. This is troubling, however, the conservation threat may be even more serious than this indicates. At present, ICES scientists consider that Labrador rivers require about 40,530 MSW salmon to reproduce in the rivers of Salmon Fishing Areas 1, 2 and 14B to meet spawning requirements. We believe that this target is much too low because the rigorous surveys of spawning and juvenile rearing habitat necessary to determine true escapement requirements have not been conducted. Labrador spawner requirements are set

from an average estimate of the number of 2SW fish of Labrador origin which returned from their sea migration and were present in Labrador waters prior to any being caught in the Labrador commercial fisheries during the 1974-1978 period.

Labrador's vast area and diverse array of rivers have been allocated an MSW salmon requirement which we feel is seriously inadequate for conservation purposes. Our management system may be systematically underseeding these rivers because of the lack of good information. Commercial fisheries in Canada and Greenland which harvest these stocks could lead to disaster.

Recommendation ASF recommends the elimination of all mixed stock fisheries (with the exception of modest, controlled subsistence harvests for native populations), including Greenland and Labrador.

On average, over the past six years, the forecasts of pre-fishery abundance have turned out to be about 40 percent higher than the numbers of 2SW salmon that actually returned to North American rivers. In 1993, the real returns were about 85,000 lower than scientists had predicted. It is important to lean on the side of caution in estimating populations. Harvesting the Atlantic salmon faster than it can reproduce itself will lead to its depletion, a prospect which will be disastrous for every member country of NASCO.

Recommendation ASF strongly encourages NASCO to base the quota set for the Greenland fishery on the new scientific model which was recently developed by ICES. The new formula incorporates biological and habitat information on the salmon not taken into account in the old formula, and predicts more realistically pre-fishery abundance.

B. Problems Affecting Salmon at Sea

The Atlantic Salmon Federation, in consultation with scientists from around the North Atlantic, has identified four problems or potential problems in the ocean that may be contributing to declining populations of salmon:

a. cold ocean temperatures
b. mortality of smolt from predators and starvation in the first few months of migration
c. seal predation
d. commercial fisheries for species upon which the Atlantic salmon feeds.

The Federation is presently involved in researching the first two problems and is developing a proposal that meets scientific criteria to determine the effect of commercial fisheries for forage species on Atlantic salmon abundance. To shed light on whether seals are eating salmon, ASF is proposing to investigate the predatory behaviour of seals in areas where salmon are congregated, such as in rivers and estuaries.

Recommendation ASF recommends that member countries of NASCO pool their resources and expertise to conduct research on threats to Atlantic salmon in the ocean.

C. The Impact of Aquaculture on Wild Salmon Stocks

Aquaculture has been instrumental in saving wild stocks by providing an alternative to commercially-caught wild salmon in the market place. However, salmon escaping the

commercial sea cages in the aquaculture industry may be negatively affecting wild stocks. Since 1992, ASF, in cooperation with the University of New Brunswick (UNB), has studied the interaction between the wild stocks of the Magaguadavic River of New Brunswick and the farmed fish that have escaped from the nearby sea cages of New Brunswick's salmon aquaculture industry. Because of this ASF-sponsored research which begin in 1992, the Magaguadavic River has become the Canadian index river concerning the effect of aquaculture escapees on wild salmon. ASF has determined that wild and farmed salmon do interbreed, and there has been a change in the genetic profile of the Magaguadavic run of wild salmon because of interbreeding over the years. The focus of the research is now shifting to determine the magnitude of this change, and the degree of ecological fitness of the resulting hybrids.

Recommendation ASF recommends that NASCO countries continue to collaborate on research into the interaction between wild and farmed Atlantic salmon and the effects of the aquaculture industry on the environment with the goal of creating regulations that will protect wild stocks and their habitat.

OPENING STATEMENT MADE BY THE ATLANTIC SALMON TRUST

The Atlantic Salmon Trust welcomes the continuing increase in the level of participation in the NASCO meeting which is being allowed to Non Government Organisations, and look forward in particular to taking part in the special session on "The Atlantic Salmon as Predator and Prey". Special sessions are very important to NGOs, because they offer the sole opportunity for active contribution by NGOs to discussion in NASCO, other than in the form of making brief statements such as this one.

The Trust suggests that it would be helpful if NGOs could have some involvement in the actual planning of these special sessions.

The Trust would like to take up two issues which are known to be of concern to a number of NGOs:

Research on Problems Affecting Salmon in the Sea

The Trust has been active in trying to encourage international co-operation in marine research since the 1992 International Salmon Symposium in New Brunswick, which it helped to organise, and the subsequent Edinburgh workshop to explore methods of gathering data on the marine life of the salmon. This workshop led directly to one very fruitful international project, which is assessing historical information on salmon abundance in the light of a long data series of satellite sea surface temperature observations. A number of nations are undertaking research projects on various aspects, but these are by their very nature expensive in scientific effort, and the availability of suitable research vessels is limited. There is already good co-operation in making generally available the results of national research, but the Atlantic Salmon Trust believes that this should be taken a step further. By pooling scarce resources, it should be possible to undertake jointly projects that would be beyond the capability of individual nations.

The Trust urges NASCO to encourage such co-operation. In particular, the NASCO request to ICES for advice should include the need for more information on the behaviour and performance of the salmon during its marine phase, and should invite the development of active international co-operation in research projects.

The Impacts of Aquaculture on Wild Salmon Stocks

The Atlantic Salmon Trust is pleased to see the continued recognition by NASCO of the need to ensure that the growth of salmon-farming, which has many beneficial aspects, does not endanger the physical health or genetic integrity of wild stocks. This concern is reflected not only in the inclusion of the subject in the agenda for this meeting, but also in the plans for next year's joint ICES/NASCO symposium in Bath. The potential dangers are recognised, and there is no lack of research into possible interactions. NASCO introduced Guidelines for salmon farming in 1991 and built on these with a resolution adopted by the Contracting Parties in Edinburgh in 1994. Sadly, the returns of actions made under this resolution (CNL(96)28) does not indicate that much has been done by individual nations to translate the recommendations of the Resolution into national legislation. Research may still be in progress, but the precautionary principle in respect of Farming was specifically endorsed by the first scientific conference on this subject, and the Trust believes that this is an area where action should not be delayed. A number of salmon growing associations recommend high

standards of practice to their members, but they have no means of enforcing them over the whole industry in their country.

The Atlantic Salmon Trust suggests that NASCO should urge contracting parties to accelerate the translation of the 1994 resolution into national legislation, and should emphasise this aspect during the 1997 symposium.

OPENING STATEMENT BY THE EUROPEAN ANGLERS ALLIANCE

Mr President, Minister, Ladies and Gentlemen.

As the delegate of the European Anglers Alliance comprising eighteen nations, I would like to thank you for granting this organisation NGO status.

I would like to say a few words in support of the written statement which has been circulated. The success of NASCO in controlling high seas exploitation of the Atlantic salmon is well known, but there is little doubt that today, the most prolific and damaging drift net fishery now operating does so within the territorial waters of the Republic of Ireland, and is consequently outside NASCO jurisdiction.

Several nations on the continent of Europe, and the United Kingdom, are committing large resources to the restoration and management of their salmon resources and the interception of hundreds of thousands of mixed stocks of salmon bound for rivers in England, Wales, Scotland, Ireland, Spain and France is not in the spirit of the NASCO Treaty.

I understand that your organisation is constrained by its Constitution from intervening in national waters, but the interception of mixed stocks of salmon bound for rivers in many different countries must be a matter for concern which NASCO cannot ignore in view of the serious plight of the Atlantic salmon and I would urge that NASCO might reconsider its position.

Thank you Mr President.

OPENING STATEMENT MADE BY THE FEDERATION OF SALMON AND SEA TROUT ANGLERS

Mr President, Mr Secretary, Delegates and fellow NGOs:

We had hoped to be able to bring good news from Ireland, for a change! In June 1995, the Minister of State, Mr Eamon Gilmore, announced the setting up of a Salmon Management Task Force, to examine all aspects of wild salmon and sea trout harvesting in Ireland. The timescale was complicated, but the report was to be ready by March 1996. It is now mid-June, and still no report. The Department of the Marine has been instructed to draw up an "Action Plan" to compliment the Task Force Report. In reply to a Parliamentary Question on 29th May 1996, the Minister stated that the report was to go before the Dail, or a Committee of the House, for discussion prior to releasing it.

We see this as no more nor less than a further delaying tactic, and expect to see the Report, and Action Plan, ready for release in the last days of July, just before the Dail rises for their four-month hard-earned break. This ploy has been used on previous occasions with unpalatable legislation, in the hope that the fuss will have died down before the House sits again, in October/November, and too late to introduce legislation for the 1997 season.

We pray that we are wrong, and that there is a genuine will to actually do something to protect our wild salmon and sea trout stocks. We are, of course, well aware of a large number of reports, dating back to the mid-1920s, to protect our wild fish stocks, but they are gathering dust in the Department. There is more than enough law in Ireland to protect our wild fish stocks, but sadly no great political will to enforce it. Monofilament netting is illegal for salmon fishing, but it is used almost exclusively. If fish are caught illegally with mono, then they are illegal when landed and should be confiscated. Forty seven thousand in one Board area alone!

We believe that if salmonid-producing countries like Ireland were made accountable for their actions and inactions before their peers in a forum like NASCO, the feet-dragging might just stop! When, and if, we have good news to report, NASCO will be the first to know!

Finally, Mr President, we request the Council of NASCO to change the "S" in NASCO to read "SALMONID", in the hope that our ever-decreasing sea trout stocks will get the protection of this international body.

Thank you, Mr President.

OPENING STATEMENT MADE BY THE INSTITUTE OF FISHERIES MANAGEMENT

The Institute of Fisheries Management (IFM) was established in 1969, and is dedicated to the advancement of fisheries management in all its forms. Membership is drawn from fishing, angling and research organizations, environment agencies, fish farms, fishery consultants, and private individuals, and IFM represents those interests to government and conservation bodies. As such, the IFM is an independent body representing wide fisheries management interests and not just those of a single user group.

The Institute welcomes the opportunity to make a statement to NASCO, and wishes to put forward the following views in respect of the management of salmon stocks and the fisheries based on these stocks in international and territorial waters.

IFM recognises that those countries whose territorial waters are the feeding grounds of salmon from a variety of salmon-producing countries have a right to exploit these stocks. It is therefore necessary that we respect this right, and that we should not expect other countries, e.g. Greenland and the Faroes, to cease fishing. We consider that NASCO, in fixing quotas for the maximum allowable catches which can be taken by fisheries in those countries, is providing an adequate measure of control, provided that the quotas are properly monitored and enforced. We believe that the evidence of ICES, that a total buyout has not had any perceived statistically-significant effect on homewaters catches, supports the argument for a cessation of the buyout, which may otherwise be interminable. The finance provided for the buyout could be more effectively spent on research and management, e.g. stock-recruitment studies in more rivers (at present such information appears to be largely confined to a few "index" rivers, and those based on the assumption that they are broadly representative of the rivers of each respective salmon-producing country); improvements to spawning grounds and juvenile salmon habitats in home rivers.

IFM supports the case for more research into the marine phase of the life-cycle of the salmon, although we recognise the substantial costs involved. We believe that this research should extend to the investigation of the potentially damaging effects of unregulated industrial fishing for species such as sand-eels and capelin, not only in respect of their depletion as a food source, but also in view of the possible smolt/post-smolt bycatch (and increased marine mortality) in such fisheries.

In conclusion, we would also suggest that thought be given to the potentially serious problem of predation on stocks of salmon by species such as seals which are themselves protected by law in some countries from any measures to control their numbers, and which, as a result, may increase disproportionately to create an unnatural balance.

OPENING STATEMENT MADE BY THE INTERNATIONAL FRIENDS OF WILD SALMON

Mr President, delegates, fellow observers:

My name is Ed Chaney. I am President of Chinook Northwest, Inc., a natural resource consulting firm. I speak today on behalf of International Friends of Wild Salmon from the perspective of 30 years of professional experience in salmon management. I appreciate the opportunity to again address what I believe is NASCO's most important challenge in its second decade: protection and restoration of salmon habitat.

In its first decade NASCO made significant progress on the important issue of marine interceptions. In recent years the Organization's horizons broadened to include review of acid rain and salmon farming impacts on salmon. I urge you to begin now - at this meeting - the dialogue to further broaden the scope of your inquiry to include the entire life cycle of the salmon. This is the only path to meeting NASCO's charter to conserve the salmon of the North Atlantic.

Today I want to brief you on just one habitat issue that requires NASCO's thoughtful, immediate intervention: the European Union sheep subsidy program. In its present form the EU sheep subsidy encourages degradation of watersheds and attendant salmon habitat. I have no comment on the social objectives of this program. I have many comments on the unintended destructive consequences for salmon, which are pervasive and extremely serious. Importantly, the destructive effect of the EU sheep subsidy is not - as some have suggested - confined to the fragile peatlands of western Ireland watersheds. I've observed its effects in France and in Scotland in much fragile watersheds. In plain fact, the problem can be found virtually everywhere the subsidy and Atlantic salmon converge. For perspective, I suggest that in its present form, the EU sheep subsidy has a negative impact on Atlantic salmon of EU origin that is orders of magnitude greater than the positive impact of the proposals you will act on over the next few days. This should give all of us pause. The adverse impacts of the EU sheep subsidy appear to me and others to be contradictory to the letter and spirit of the EU Treaty and various directives. The problem is gaining recognition. There are initiatives such as the Rural Environmental Protection Scheme in Ireland, and the Countryside Stewardship Scheme in England, that have promise for protecting salmon against the unintended adverse consequences of the sheep subsidy program. However, this is a problem that is international in origin. It can only be effectively treated at its source by an international effort.

As the only international body charged with conserving the salmon of the North Atlantic, it is appropriate and necessary NASCO take the lead. Concerned fisheries and agriculture officials in EU member countries, and NGOs who are currently in the forefront of this issue, need NASCO's technical support on the ground and its political support in Brussels. I urge you to begin now, today, to address the effect of the EU sheep subsidy on NASCO's ability to fulfill its charter. Request NASCO staff to brief you on the problem, potential solutions, and recommended actions by NASCO, including what appropriately can be done relatively quickly. Begin now to plan a special session for next year on NASCO's role in protecting salmon habitat in general and on facilitating constructive changes in the EU sheep subsidy program in particular. Prepare now to take formal action at the 1997 meeting.

In closing, I reiterate my plea that NASCO move quickly to begin the long, difficult, essential task of protecting and restoring salmon habitat. This will include public education, and technical assistance to advocacy before member countries and the European Commission. NASCO is the only institution with the requisite charter.

Thank you for the opportunity to make these brief comments.

OPENING STATEMENT MADE BY THE NATIONAL ANGLERS REPRESENTATIVE ASSOCIATION

Having attained NGO status last year, we are pleased to attend this Thirteenth Annual Meeting of NASCO and to be able to make a contribution to its work.

We congratulate NASCO on the progress of its aims to conserve the wild Atlantic salmon and to bring economic benefits, employment, recreation and pleasure to many. I have no doubt, whatsoever, if NASCO had not existed since 1984, then at this stage neither would the Atlantic salmon.

We in Ireland share the concern that, in recent years, there has been a marked decline in catches of salmon in the North Atlantic. In Ireland we see stocks continue to reduce over the past number of years.

NARA is working, through its network of clubs, associate members and involvement with other organisations like the Central and Regional Fisheries Boards, to support efforts both nationally and internationally to reverse this trend.

During 1995 and 1996 the following events have taken place which were milestones on the way to making progress to conserve and improve Irish stocks of North Atlantic salmon.

On October 20 1995, in Dublin, the North Atlantic Salmon Fund (Ireland) organised a fundraising dinner and auction to contribute to Ireland's share of the cost of purchasing the salmon quotas of Greenland and the Faroese. This was a financial success and brought together the private fishery interests of fishery owners, angling clubs and concerned salmon anglers who worked together to make this gesture for the wild Atlantic salmon.

On the same night, at that dinner, the Minister of State at the Department of the Marine, Mr Eamon Gilmore, announced the setting of a Salmon Management Task Force. The remit of this Task Force was to examine policy options for an effective management framework to conserve wild salmon stocks. This Task Force has now reported back to the Minister, and we await with considerable interest both the Report and the follow-up action of the Minister.

NARA believes, in conjunction with a number of other wild salmon support groups in Ireland, that effective management of the salmon resource can only come about from the following actions:

- the elimination of drift and draft netting around the coasts of Ireland and the continuation of the non-fishing of the Greenland and Faroese salmon quotas, with reasonable compensation paid to the displaced netsmen.

- the setting-up of management committees on each river catchment to provide and act upon integrated catchment plans on the conservation and development of salmon stocks. Central to this is the setting of adequate spawning numbers for each river and to maximise the numbers of smolts going to sea. There is a need to expand upon the databases for each river so that a Geographical Information System (GIS) with information on terrain detail, hydrology, water quality, landuse, habitats, geology and other geographically distributed phenomena are known.

This management information, building up over time, will allow for community-based involvement and rational management of the resource.

The damaging impact of salmon fish farm aquaculture continues on wild salmonids, particularly sea trout stocks where salmon fish farms are located in bays and estuaries of rivers with wild stocks of salmon and sea trout.

It is regrettable that in 1996 after years of research and substantial funding, lice levels are allowed to be high on salmon fish farms during the critical spring months when salmon and sea trout smolts are going to sea to feed. This continues to result in the wiping out of sea trout stocks and to have a possible damaging effect on outgoing salmon smolts. We may also be seeing a build-up of lice levels around our coasts which could affect returning salmon during the summer months and force them to spend time in these lice-infested waters awaiting sufficient rainfall to run the rivers.

NASCO is indeed facing into an uncertain future with potential disastrous reduction or an abundance of wild salmon stocks. By working together, in a positive and cooperative manner, we must ensure that it is the latter which occurs.

OPENING STATEMENT MADE BY THE NORWEGIAN FARMERS UNION AND THE NORWEGIAN SALMON RIVERS

Mr President, Ladies and Gentlemen:

We are grateful for this opportunity to address the NASCO Council meeting.

Great strides have been taken by NASCO in order to secure the future of the Atlantic salmon but the pressure must be kept up.

We have asked ourselves whether it will be feasible to continue to develop management policies for the Atlantic salmon without seeking closer cooperation with other fisheries interests in the North Atlantic in the long run. Interactions between salmon interests and other fisheries are already frequent. We have reasons to believe that Atlantic salmon will be increasingly affected by the development of new fishing gear and methods in the future. This will follow as an inevitable result of the increased competition for the fish stocks in the North Atlantic. We believe that NASCO will have to be very observant on this issue in the future and initiate contacts and dialogue with other fisheries organisations.

We look forward to the Special Session on the Atlantic salmon as Predator and Prey, particularly to a possible evaluation of the seal as a problem for the salmon. We have noted the apprehension by various interests, also official authorities, to discuss the seal as a possible problem in Atlantic salmon management. We hope that NASCO will contribute actively in increasing our knowledge and understanding of seal biology and ecology by initiating more research, enabling us to get the facts on the table. The political conclusions and the consequences for salmon management and the seal population are a different matter which should not interfere with our efforts to clarify this issue. After all, the management of seal populations is also an international responsibility where management targets must be worked out in cooperation between the various nations.

Together with the Norwegian Nature Management Authorities, the riparian owners have developed a new management model for salmon rivers. The execution of the management plans is a responsibility of the owners which will emphasize general management objectives and economy. The planning objectives, however, will also include the preservation of biological diversity in the rivers and watersheds as well as enhancement of sport fishing as an activity. The planning activity will be organised as regional projects but with one plan for each river or river system.

Finally, we want to add a few remarks concerning fish farming. According to the prognosis, the Norwegian production of farmed salmon may exceed 1 million tons just after the year 2000. We are concerned that the negative effects on the wild salmon and the marine ecosystems will be based on the assumption that problems can be resolved when they appear. This will most certainly lower the ambition to adopt management strategies which avoids development that will harm natural processes. To develop sterile salmon in order to reduce the negative effects of escaped farm salmon may now be a necessity. If this salmon retain spawning instincts and behaviour and migrates into the rivers, it will still remain a considerable threat to the wild stocks.

OPENING STATEMENT BY THE SALMON AND TROUT ASSOCIATION

Mr President, Secretary of State, Delegates, Ladies and Gentlemen, the Salmon and Trout Association is a UK organisation formed in 1903 and dedicated to safeguarding salmonid fisheries and the interests of those who fish for them with rod and line. We welcome this opportunity to make an opening statement to this Thirteenth Annual Meeting of NASCO, with grateful thanks to our Swedish hosts.

I would like to concentrate on the impact of commercial salmon farming on wild stocks which you highlighted in your opening address.

I read in this year's report of the ICES Advisory Committee that production of farmed salmon in the North Atlantic area in 1995 was 413,200 tonnes. The salmon farming industry is now so huge that we must take care that it does not overwhelm our declining wild stocks. This must reinforce the point made by the Icelandic delegation that it must be sensible to concentrate harvesting wild salmon at their point of highest value, that is the recreational rod fishery.

The threats to wild sea trout stocks on the west coast of Ireland, Scotland and Norway are well known, and while the link to sea lice ordinating from salmon farms may not be scientifically proven, the circumstantial evidence is overwhelming. This subject must be high on your agenda when NASCO and the salmon farmers meet later this year.

We are all also well aware of the existing danger of genetic pollution from the very large numbers of escaping farmed salmon and of the new threat from work on transgenic salmon.

Experimental work with transgenic salmon has just started at a land-based salmon farm on the west coast of Scotland, which brings this threat very close to home, at least my home.

I have taken a strong personal interest in this development, and have been in detailed correspondence with the regulatory authorities in the UK. I was disturbed to discover that the current regulatory legislation is primarily concerned with threats to human health! I call on all member governments present to consider this situation as a matter of priority and to frame legislation which will provide adequate protection for wild stocks of Atlantic salmon.

OPENING STATEMENT MADE BY THE SAMI PARLAMENTA

For centuries, the salmon has been of vast importance to the Sami economy. Salmon migrating to spawn along the Norwegian coast have been easy to catch. The Sami's ancient home areas have frequently been situated along the salmon's migratory routes and close to salmon rivers. In the areas occupied by the Sami and in which the salmon continue migrating and ascending the rivers, catching them is still of the utmost importance to the survival of the Sami settlements.

Salmon spawn in fresh, running water, while their feeding and growing areas are in the sea. The southern limit of the wild stocks of Atlantic salmon lies at around 35 degrees north. At such latitudes lie the southernmost breeding rivers of the salmon on both sides of the Atlantic. At the northern limit on the European side there are salmon rivers right along the coast, the easternmost one being located in the Petsora area, in western Siberia. On the North American coast there are salmon rivers in the north right up as far as the Ungava Peninsula.

Over a long period of time the salmon populations have diverged genetically. Studies have revealed that the populations in different rivers differ from each other, the deviation becoming greater with increased distance between the rivers, or more locally where obstacles prevent interbreeding. For example, in the River Tenojoki, genetic differences are detectable among the wild salmon sub-populations breeding in different tributaries and current areas along the same river. There is gene flow from one sub-population to another and between populations in different rivers which again dilutes differentiation. Genetic differences result in differences in the salmon's migratory routes, in the marine feeding areas utilised and in migration time, growth rate, etc.

Here today at the NASCO meeting we are concerned with the Atlantic salmon, whose importance to the indigenous peoples of the northern hemisphere is irreplaceable. The salmon stocks of the Tenojoki and Näätämöjoki rivers are vital to the Sami and the preservation of these rivers as suitable fishing habitats from the standpoint of the Sami culture is a matter of great importance. The Sami have participated in the drafting of the latest agreements concerning the regulation for fishing in the Tenojoki and the Sami Parliament welcomes the opportunity to participate in the annual meetings of NASCO. The first agreement between Finland and Norway in regard to fishing in the Tenojoki was drawn up in 1873, while the latest one came into force at the beginning of 1990.

After the second world war, and particularly during the 1970s, there were rapid improvements in the efficiency of fishing, both in rivers and in the sea. Fishing in the marine feeding areas far from the salmon's spawning grounds affects growing fish and the catch from the sea reduces the number of fish returning to the rivers. Salmon fishing regulation realised as international cooperation at the instigation of NASCO is aimed at reducing salmon catches in the sea and ensuring that adequate numbers of salmon ascend the rivers, which in turn will help to preserve the river Sami culture.

Located in the centre of the Sami region, the Tenojoki and Näätämöjoki are salmon rivers supporting wild salmon populations. In both these rivers, diversity among the sub-populations and wild fry production has been retained. Fishing affecting the salmon populations of these rivers, in their estuaries and in the sea, has not increased to critical proportions in the two rivers, because the various restrictions on fishing have been relatively successful in regard to

their extent and timing. The success of the regulation of fishing is reflected in the fact that in the main parts of the Tenojoki watercourse fry production is still relatively good.

Young salmon descend the Tenojoki and Näätämöjoki to the sea after 4-5 years in the river. They set out from Teno fjord, following the coast westwards. The majority of migrating young fish head for the sea area to the north of the Faroes and an appreciable proportion of them migrate to the feeding areas on the eastern side of Greenland. After three years in the sea, the salmon return from Greenland waters to the Tenojoki. The return journey from Faroese waters generally takes place after two years in the sea, while the small salmon have spent only one year in the marine environment.

Over the past twenty years the salmon catches in the Tenojoki have fluctuated tremendously, which of course cannot be considered abnormal in the extreme Arctic environment. At best they have amounted to over 250 tons, and at worst to only 75 tons. In the 1990s the annual Tenojoki catches have been around the 150 ton level. The salmon catch from the Finnish side of the river has accounted for around 40% of the total catch. The Finnish salmon catch in the Näätämöjoki each year has been about 2-3 tons, with the total catch coming to just over 10 tons. In both rivers salmon are caught using rod and line and traditional gear. Sami living along the river banks employ both methods, but for people coming on fishing trips from elsewhere only rod fishing is permitted. The catch on rod and line appears to account for a significant part of the Tenojoki catch these days. From the economic perspective, the relative share of rod and line fishing in salmon fishing as a whole and its impact on the Sami river bank population is much greater than the actual proportion of the catch.

To safeguard the wild salmon population of the Tenojoki and its river fishing, restrictions on the fishing have been necessary in the sea, in the estuary and along the river itself. Through the research called for by the Tenojoki agreement, fluctuations and changes in both the salmon catches and fry production are monitored and if necessary revisions either to the agreement or to the fishing regulations will be made in response to stock abundance. The same applies to other threats which must be eliminated, such as salmon diseases, wastewater discharges along the Tenojoki, etc affecting the salmon population. Although construction projects on the Tenojoki waterway seem to be a thing of the past, new threats, such as an increase in wastewater discharges, mining activities, the spread of non-endemics, and the threat of fish diseases and parasites caused by increasing fish farming, have appeared. The spread of the dangerous salmon parasite *Gyrodactylus salaris* into the northernmost salmon river in the Sami region is a threat which calls for both international and national cooperation. The Sami Parliament wishes to draw attention in this connection to the part of the Rio agreement on diversity on the basis of which it was proposed that by 1994 the farming of salmon should be prohibited in the fjord of the Tenojoki to prevent dangerous fish diseases spreading up the Tenojoki, and to stop salmon escapees from cages diluting the Tenojoki salmon gene pool. We Sami wish to participate in this work, aimed as it is at preserving the wild salmon.

The Sami indigenous people and ethnic minority have a protected right to the salmon fishing that forms part of their culture in accordance with international regulations. Since 1978 the Finnish Parliament's constitution committee has considered that fishing is a form of livelihood which specially belongs to the kind of culture associated with the Sami people. Salmon fishing practised as a means of livelihood in its various forms is, in accordance with Article 27 of the UN's general agreement, part of the Sami minority culture. The UN's Human Rights Committee, which in the long run decides on complaints connected with contraventions

of this agreement, issued a statement in 1994 respecting the interpretation of Article 27. According to paragraph 7 of the general comments, minority and indigenous groups have a right to the protection of such activities as fishing. In the implementation of these rights we must ensure the adequate participation of people belonging to these minority groups in the decision-making that affects them.

The Sami are an indigenous people inhabiting an extensive area who have the right to maintain and develop their own language and form of culture to which, among other things, salmon fishing traditionally belongs. In addition, the Sami as an indigenous people in the Sami area should have the right to self-determination in respect of their language and culture. These rights have been strengthened by the amendment to Finland's Constitution approved by Parliament in 1995.

The Tenojoki salmon populations represent a renewable natural resource, the use of which creates a foundation for the form of livelihood practised by the Sami. This is also possibly in keeping with the principle of sustainable use, enabling the salmon populations, general biodiversity, and river Sami culture to remain unharmed.

OPENING STATEMENT MADE BY THE SCOTTISH ANGLERS NATIONAL ASSOCIATION

Mr President, Secretary of State, Distinguished Delegates, fellow Observers, Ladies and Gentlemen.

The Scottish Anglers National Association, representing some 35,000 members, has already submitted a written paper and, therefore, I will be fairly brief here.

We have highlighted what we consider two of many major problems - the perceived danger to food supplies from unrestricted industrial fishing and what we claim is growing damage caused by escalating and protected populations of piscivorous birds and seals.

We believe there is widespread agreement on the need to seek a better understanding of the impact of industrial fisheries on fish stocks in general and on the marine eco-system and, hopefully, there might be some movement on the question of regulating industrial fisheries - maybe under the precautionary principle - in the not too distant future. On the matter of the predation of salmon - in the juvenile and adult stages - we are said to be faced with "lack of scientific evidence".

However, even if scientific research eventually indicates the extent of damage being caused by predators, do Governments, in general, have the political will to act decisively on this and many other issues affecting the salmon?

It appears to us in the UK that, not infrequently over the years, Governments have initiated scientific research or established expert committees to deal with specific problems, then taken inadequate action on the recommendations which followed.

Perhaps the growing status of NASCO, coupled with the excellent scientific knowledge gathered through ICES and member States, may alter this situation in future in that such an international forum might influence or persuade individual Governments to pay more than lip service to a declared intent to protect and enhance our stocks of Atlantic salmon.

Thank you Mr President.

OPENING STATEMENT MADE BY THE SALMON NET FISHING ASSOCIATION OF SCOTLAND

The Salmon Net Fishing Association of Scotland welcomes this opportunity to make a brief opening statement.

We are greatly encouraged by the initiative shown by NASCO to include a special session on the topic of Atlantic salmon as prey and predator and we will be especially interested in the management implications both for salmon and seals which hopefully will be agreed by the end of this special session. Nevertheless, it was thought important to put the present seal predation problem into some perspective before the status of salmon stocks are examined and the intricate negotiations required to fix TACs for high seas salmon fisheries have commenced.

In our opening statement at the Twelfth Annual Meeting, we highlighted the rapid increase (from an estimated 65,000 animals in the mid-1970s to in excess of 100,000 animals in the mid-1990s) in the all-age grey seal population in British waters. We reported that if salmon composed only 1-2% of the grey seals diet it might be undetected, yet 2-4 times the 1994 British all-methods salmon catch would have been consumed. These quantities are equivalent to 515,000 - 1,030,000 adult salmon and not an insignificant number of fish.

Based on the generally accepted multiplying factor that the population of grey seals around the British coast is continuing to grow at 7% per annum, an additional 9,000 animals will have entered the food chain since we met in Glasgow last year. The estimated additional number of salmon lost as a direct result of this increase in seal numbers using the same model as previously would be of the order of 46,400 - 92,800 depending on whether 1 or 2% of the grey seals diet was composed of salmon.

In 1995, a total of 26,450 salmon were reported caught at West Greenland of which only 9,250 fish were of European origin.

The birth of new seal colonies around the Scottish coast has broadly kept in step, both in number and location, with the closure of the traditional net fisheries on perceived conservation grounds.

To take just one of many examples to illustrate the point. It is not unusual to count, at any one time, a colony consisting of some 30 seals, mainly grey, but including a relatively small number of common seals in and around the estuary of the Aberdeenshire Dee and on the immediate adjacent stretch of coast which were the sites of the now deserted esturial and coastal netting stations. Based on the same assumption as that used previously which assumes that each seal requires a minimum of 2.4t of food each year, this colony requires 72 tonnes (t) of food per annum to survive. The food item most easily caught with the least expenditure of energy at this site, particularly if the seals forage into freshwater, would be salmon or at least salmonids. However, even if 10% of the food eaten by the 30 seals was maiden salmon, this consumption would be equivalent to 1,800 potential spawners. In fact, the number eventually dying could be significantly higher since seals do not necessarily consume all the fish which they attack. Although these sums are simplistic, these results suggest that losses to predation just prior to entering freshwater may be significant.

In contrast, the total number of spring fish caught in 1984-93 by the coastal net fishery operating in the Dee Salmon Fishery District between February and April, when it is thought seal predation is most intense, amounted to only 1640 fish. The reported rod catch of spring fish in 1952-93 (the years for which data are available) dropped from a peak of 8641 fish in 1957 to 1156 in 1992.

Restricting, or at worst, closing net fisheries to conserve salmon stocks may be an easy option but can be counter productive because all the available evidence suggests that in the absence of these fisheries losses to seals alone can be greater than the sum of losses to predation and to catch in the presence of an active net fishery.

Since seals and fishermen prey together at the top of the food chain, the case for imposing restrictive controls on the grey seal populations is a compelling one. The magnitude of the problem is not in dispute but ignoring the escalating impact of seals on salmon stocks in coastal waters is no solution. We understand that both Canada and Norway have recently introduced control measures. As yet there is no evidence of any action or an attempt to construct a management plan by government or Scottish Natural Heritage (SNH). However, a minuscule shift in SNH's negotiating position occurred last year when they agreed that the increasing grey seal population was a serious problem, is most welcome.

The first Grey Seals' Protection Act was passed in the spring of 1914 when it was thought that the total grey seal population amounted to fewer than 500 animals. Fourteen years later the population was estimated to have increased to between 4,000 and 5,000 animals but in spite of this increase the second Grey Seals' Protection Act was passed in 1932 (protection having been continued in the intervening years under the Expiring Laws Continuance Acts). In the face of some opposition from salmon fishing interests the Bill was accepted, mainly because it now provided the Secretary of State for Scotland and the Minister of Agriculture and Fisheries with power to make an order curtailing the protection measures if the need should arise. Surely that need was recognised 25 years ago when the Seals Advisory Committee decided that the British coastal ecosystem could support 35,000 seals. Meanwhile, the grey seal population has continued to grow and the predicted 1997 population is 149,000 animals. Over roughly the same time scale the nominal Scottish salmon catch has decreased from 1392t to 457t.

We would again urge NASCO to use its influence towards the resurrection of a management programme along the lines of the one abandoned in the late 1970s which was aimed at reducing the seal population to the more reasonable level recommended at that time by the Seals Advisory Committee.

ANNEX 6

LIST OF PARTICIPANTS

* Denotes Head of Delegation

CANADA

*MR JEAN-EUDES HACHE	Representative Department of Fisheries and Oceans, Ottawa, Ontario
DR WILFRED CARTER	Representative Atlantic Salmon Federation, St Andrews, New Brunswick
MR PIERRE TREMBLAY	Representative Fédération québécoise pour le saumon atlantique, Quebec
MR RICHARD HEGAN	Department of Fisheries and Oceans, Ottawa, Ontario
MR MURRAY HILL	Department of Fisheries, Halifax, Nova Scotia
MR KEN JONES	Department of Fisheries and Oceans, Ottawa, Ontario
MR DAVID MEERBURG	Vice-President of NASCO Department of Fisheries and Oceans, Ottawa, Ontario
MR REX PORTER	Department of Fisheries and Oceans, St John's, Newfoundland

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*MRS AMALIE JESSEN	Representative Greenland Home Rule, Nuuk
MR EINAR LEMCHE	Representative Greenland Home Rule, Copenhagen
MR KAJ MORTENSEN	Representative Faroese Home Government, Torshavn
MR JAN ARGE JACOBSEN	Fishery Laboratory, Torshavn
MR PER KANNEWORFF	Greenland Home Rule, Copenhagen
MR JASPUR KRUSE	Felagid Laksaskip, Klaksvik

MR OLE LØWE	Royal Danish Ministry of Foreign Affairs, Copenhagen
MR HENRIK NIELSEN	Greenland Home Rule, Nuuk
MR FREDERIK OLSEN	KNAPK (The Organization of Hunters and Fishermen in Greenland), Nuuk
MR SOFUS POULSEN	Faroese Commercial Attaché, Aberdeen
MR ANTHON SIEGSTAD	KNAPK (The Organization of Hunters and Fishermen in Greenland), Nuuk
MR HEDIN WEIHE	Faroese Home Government, Torshavn

EUROPEAN UNION

*MR OLE TOUGAARD	Representative Commission of the European Communities, Brussels
MR ANDREW THOMSON	Representative Commission of the European Communities, Brussels
DR KARL-ERIK BERNTSSON	National Board of Fisheries, Gothenburg
MR MICHAEL BREATHNACH	Central Fisheries Board, Dublin
MR JOHN BROWNE	Fisheries Research Centre, Dublin
MS VERONICA CODY	Council of the European Union, Brussels
MR DAVID DICKSON	Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh
MR DAVID DUNKLEY	Scottish Office Agriculture, Environment and Fisheries Department, Edinburgh
DR PADDY GARGAN	Central Fisheries Board, Dublin
DR BO HOLMBERG	National Board of Fisheries, Gothenburg
DR CURT JOHANSSON	National Board of Fisheries, Gothenburg
DR LARS KARLSSON	Salmon Research Institute, Alvkarleby
MR IVOR LLEWELYN	Ministry of Agriculture, Fisheries and Food, London
DR GUY MAWLE	Environment Agency, Bristol
MR NIALL MCCUTCHEON	Department of the Marine, Dublin

MR JES BROGAARD NIELSEN	Ministry of Agriculture and Fisheries, Copenhagen
MR EERO NIEMELA	Finnish Game and Fisheries Research Institute, Helsinki
MR PEKKA NISKANEN	Ministry of Agriculture and Forestry, Helsinki
MR KJELL NYBACKE	Commission of the European Communities, Brussels
DR INGEMAR OLSSON	National Board of Fisheries, Göteborg
MR TED POTTER	Ministry of Agriculture, Fisheries and Food, Lowestoft
MR HENRIK SVENBERG	Ministry of Agriculture, Stockholm

ICELAND

*H.E. HELGI AGUSTSSON	Representative Ministry for Foreign Affairs, Reykjavik
MR ARNI ISAKSSON	Representative Directorate of Freshwater Fisheries, Reykjavik
MR ORRI VIGFUSSON	Ministry of Agriculture, Reykjavik

NORWAY

MR BØRRE PETTERSEN	President of NASCO Arbeiderens Opplysningsforbund i Norge, Oslo
*MR STEINAR HERMANSEN	Representative Ministry of the Environment, Oslo
MR ARNE EGGEREIDE	Representative Directorate for Nature Management, Trondheim
MR HELGE LORENTZEN	Representative Ministry of the Environment, Oslo
MR PER IVAR BERGAN	Directorate for Nature Management, Trondheim
MR DAGFINN GAUSEN	Directorate for Nature Management, Trondheim
DR LARS PETTER HANSEN	Norwegian Institute for Nature Research, Trondheim
MR YNGVE SVARTE	Directorate for Nature Management, Trondheim

RUSSIAN FEDERATION

*DR ALEXANDER ZELENTSOV	Representative Murmanrybvod, Murmansk
MR GUENRIKH BOROVKOV	Committee of Russian Federation on Fisheries, Moscow
MS ELENA SAMOILOVA	PINRO, Murmansk
DR ALEXANDER ZUBCHENKO	PINRO, Murmansk

USA

*DR ANDREW ROSENBERG	Representative National Marine Fisheries Service, Gloucester, Massachusetts
MR ROBERT JONES	Representative Connecticut River Salmon Association, S. Windsor, Connecticut
DR RAY B OWEN, JR.	Representative Maine Atlantic Sea Run Salmon Commission, Augusta, Maine
DR VAUGHN C ANTHONY	Special Advisor (Retired National Marine Fisheries Service), Boothbay, Maine
MS KIMBERLY BLANKENBEKER	National Marine Fisheries Service, Silver Spring, Maryland
MR JERRY CLARK	National Fish and Wildlife Foundation, Washington DC
MS MARY COLLIGAN	National Marine Fisheries Service, Gloucester, Massachusetts
DR KEVIN FRIEDLAND	National Marine Fisheries Service, Woods Hole, Massachusetts
DR JAMES GEIGER	US Fish and Wildlife Service, Hadley, Massachusetts
MR ALLEN PETERSON	National Marine Fisheries Service, Woods Hole, Massachusetts
DR JEAN-PIERRE PLE	Department of State, Office of Fisheries Affairs, Washington DC
MR STEVEN SWARTZ	Kennebec Aquaculture, Solon, Maine

INTER-GOVERNMENT ORGANIZATIONS

PROFESSOR CHRIS HOPKINS	International Council for the Exploration of the Sea, Copenhagen
MR ESKILD KIRKEGAARD	Danish Institute for Fisheries Research, Charlottenlund
DR WALTER RANKE	International Baltic Sea Fishery Commission, Warsaw
DR IRINA SHESTAKOVA	North Pacific Anadromous Fish Commission, Vancouver

NON-GOVERNMENT ORGANIZATIONS

MME SYLVIE TISSIER	AIDSA, France
MR BENNY LINDGREN	Association of Icelandic Angling Clubs, Iceland
Lt.Col. DOUGLAS KEELAN	Association of Scottish District Salmon Fishery Boards, Scotland
MR WILLIAM TAYLOR	Atlantic Salmon Federation, Canada
DR DEREK MILLS	Atlantic Salmon Trust, UK
CAPTAIN JEREMY READ	Atlantic Salmon Trust, UK Institute of Fisheries Management, UK
MR TOM BARNES	European Anglers Alliance
MR JIM MAXWELL MR RICHARD BEHAL	Federation of Irish Salmon and Sea-Trout Anglers, Ireland
MR ED CHANEY	International Friends of Wild Salmon, USA
MR BRIAN CURRAN	National Anglers Representative Association, Ireland
MR BJORNULF KRISTIANSEN	Norges Bondelag (Norwegian Farmers Union), Norway
MR BJORN MOE	Norske Lakseelver (Norwegian Salmon Rivers), Norway
MR CHRIS POUPARD	Salmon and Trout Association, UK
MR WILLIAM SHEARER	Salmon Net Fishing Association of Scotland, Scotland

MR JOUNI KITTI	Sami Parlamenta, Finland
MR IAN CALCOTT	Scottish Anglers National Association, Scotland

SECRETARIAT

DR MALCOLM WINDSOR	Secretary
DR PETER HUTCHINSON	Assistant Secretary
MISS MARGARET NICOLSON	PA to Secretary
MRS THERESA GAWTHORNE	PA

ANNEX 7

CNL(96)48

THIRTEENTH ANNUAL MEETING OF THE COUNCIL
10-14 JUNE 1996
SWEDISH EXHIBITION AND CONGRESS CENTRE, GOTHENBURG, SWEDEN

AGENDA

1. Opening Session

2. Adoption of Agenda

3. Election of Officers

4. Administrative Issues

4.1 Secretary's Report

4.2 Report of the Finance and Administration Committee

4.3 Report on the Activities of the Organization

4.4 Provisions of Article 13 of the Convention

4.5 Future Issues for NASCO

5. Scientific, Technical, Legal and Other Information

5.1 Scientific Advice from ICES

5.2 Report of the Standing Scientific Committee

5.3 Catch Statistics and their Analysis

5.4 Salmon Tagging and the Tag Return Incentive Scheme

5.5 Database of Salmon Rivers in the North Atlantic

5.6 Review of International Salmon Related Literature Published in 1995

5.7 Laws, Regulations and Programmes

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

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

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

(a) Protocol for Non-Contracting Parties and Actions Taken in Accordance with the Resolution
(b) International Cooperation on Surveillance

6.3 Research Fishing for Salmon in Relation to the Provisions of Article 2 of the Convention

6.4 Impacts of Aquaculture on Wild Salmon Stocks

(a) Review of progress with Oslo Resolution
(b) Advances in relevant research
(c) Transgenic Salmon
(d) Closer cooperation with the Salmon Farming Industry

6.5 Long-Term Trends in Abundance

6.6 Special Session "The Atlantic Salmon as Predator and Prey"

6.7 Guidelines on Catch and Release

6.8 Guidelines on Stocking

6.9 Reports on Conservation Measures Taken by the Three Regional Commissions

7. Other Business

8. Date and Place of Next Meeting

9. Draft Report of the Meeting

10. Press Release

ANNEX 8

COUNCIL

CNL(96)49

OUTLINE OF 1997 BUDGET, 1998 FORECAST BUDGET AND SCHEDULE OF CONTRIBUTIONS

NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
1997 BUDGET AND 1998 FORECAST BUDGET (Pounds Sterling)

SECTION	DESCRIPTION	EXPENDITURE	
		BUDGET 1997	FORECAST 1998
1	STAFF RELATED COSTS	193140	198920
2	TRAVEL AND SUBSISTENCE	35250	28580
3	CONTRIBUTION TO ICES	29700	30590
4	CONTRIBUTION TO WORKING CAPITAL FUND	0	0
5	MEETINGS	7400	23890
6	OFFICE SUPPLIES, PRINTING AND TRANSLATIONS	30820	34710
7	COMMUNICATIONS	11630	11960
8	HEADQUARTERS PROPERTY	-22280	-21650
9	OFFICE FURNITURE AND EQUIPMENT	7250	7460
10	AUDIT AND OTHER EXPENSES	8850	9110
11	TAG RETURN INCENTIVE SCHEME	4700	4700
	TOTAL	306460	328270

		REVENUE	
		BUDGET 1997	FORECAST 1998
12	CONTRIBUTIONS - CONTRACTING PARTIES	315460	334270
13	MISCELLANEOUS INCOME - INTEREST	9000	9000
14	STABILISATION	-18000	-15000
15	SURPLUS OR DEFICIT (-) FROM 1995	0	0
	TOTAL	306460	328270

NASCO BUDGET CONTRIBUTIONS FOR 1997 AND FORECAST BUDGET CONTRIBUTIONS FOR 1998 (Pounds Sterling)

CATCH (tonnes)	PARTY	BUDGET 1997	FORECAST 1998
270	CANADA	30742	32575
88	DENMARK (FAROE ISLANDS AND GREENLAND)	19133	20274
1697	EUROPEAN UNION	121762	129022
439	ICELAND	41521	43997
839	NORWAY	67035	71032
129	RUSSIAN FEDERATION	21748	23045
0	USA	13520	14326
3462	TOTAL	315460	334270

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

ANNEX 9

COUNCIL

CNL(96)13

THE FUTURE ISSUES FOR NASCO

CNL(96)13

THE FUTURE ISSUES FOR NASCO

1. Last year the Council considered a review, CNL(95)13, prepared by the Secretary, focusing on the future issues which might be faced by the Organization in achieving the objectives of the Convention. There was support from the Council for the need to look ahead and to focus the work of the Organization for the next decade and the Council asked the Secretary to produce a document, based on last year's review, on contributions tabled at the meeting by Iceland and Norway, and on the deliberations within the Council, proposing a priority list and needs for action on each item in the future. In accordance with this decision this paper reviews the issues identified last year and proposes (*in italics*) how they might be addressed.

2. <u>Science</u>

2.1 Foster, encourage and extend the role that science plays in establishing regulatory measures. Priority should be given to the development of target spawning escapement estimates for all salmon rivers so as to facilitate more rational management throughout the entire North Atlantic area.

Target spawning escapement estimates for North America form the basis, together with estimates of pre-fishery abundance, for the development of catch options for the West Greenland fishery. In 1994 the Council asked ICES to review the level of these targets in US rivers and in 1995 a request was made to review Canadian targets. Such targets have not been developed for all rivers in the North-East Atlantic area although advances have been made and last year the available information was used to provide advice on stock status. Last year the NASCO Council requested ICES to provide spawning targets for the North-East Atlantic area. Progress has also been made in the development of models of pre-fishery abundance of salmon originating in rivers in the North-East Atlantic Commission and the Chairman of ACFM reported at last year's meeting that it is hoped that links between the biology of the salmon and the environment could be investigated for all Commission areas. In this way predictive models could be developed facilitating the provision of catch options. The Council may wish to encourage the Parties to support such studies directly and through the annual request to ICES so as to extend the role that science plays in the management process. It is clear that, while we are not yet in a position where the scientific advice is as advanced as that for West Greenland, we are making progress. Last year the Norwegian delegation stressed the need for NASCO to adopt a policy which distinguished between production goals and conservation goals since these are not necessarily the same. In order to progress this issue a request was made to ICES last year to define criteria for designating specific stocks.

2.2 Encourage dialogue between scientists, users and managers so as to facilitate rational management.

We have started this process of dialogue through the successful Special Session we held in 1993 in conjunction with ICES. The process might be continued by holding further Special Sessions devoted to dialogue in the future. Perhaps we should consult with ICES with a view to planning one in about four years.

2.3 Ensure that the science remains free from political influences.

This is an essential prerequisite for our work. Those involved in drafting the Convention clearly recognised the benefit of separating the scientific (ICES) and management (NASCO) fora. There have in the past been occasions when political factors were thought to be influencing the work of the Working Group on North Atlantic Salmon. There is no evidence that there is now a problem. We are presently discussing with ICES a formal Memorandum of Understanding setting out the basis of the relationship between the supplier and the customer and we proposed to ICES that a statement stressing the need for the advice to be independent and free from political influence is incorporated in that Memorandum.

2.4 Research priorities might include further studies in the sea, development of multi-species assessments and studies of the impacts of salmon aquaculture and introductions and transfers.

Areas of research identified by the Council as being of a high priority for rational management should be included in the annual request to ICES and our Standing Scientific Committee could be given a specific brief to look at some of these areas so as to advise the Council in their questions to ICES. They might evaluate the present process and consider some of the longer term issues so that appropriate questions can be developed.

3. <u>Management</u>

3.1 Increased cooperation in future between the Parties on freshwater issues such as pollution and habitat damage which have caused great losses of salmon.

NASCO is already addressing many of the wider threats to Atlantic salmon and progress has been made on issues such as impacts of aquaculture and introductions and transfers. Last year the representative of Norway referred to the need to strengthen NASCO's role in providing a forum for exchange of information including information on threats to the stocks. It was proposed that the routines for reporting information to NASCO should be evaluated. Information is submitted annually by the Parties under Articles 14 and 15 of the Convention according to an agreed format. It is clear, however, that the nature and extent of the material submitted varies greatly between Parties. If the Council so wished, there could be a review of these reporting procedures and proposals for any modifications to the existing arrangements could be presented to the Council at its Fourteenth Annual Meeting.

3.2 Catch and release is likely to become more widespread so it will be useful to agree international principles for this practice.

Last year the Council took note of draft guidelines on catch and release and agreed that, following consultation with the Parties, and amendment where necessary, the guidelines would be considered for possible adoption at the Thirteenth Annual Meeting.

3.3 Salmon management involves finding an acceptable compromise which does not jeopardise the salmon or its environment through adherence to the principles of environmental sustainability, integrated resource management and partnership.

Last year the representative of Canada referred to the desirability of all Parties involved with the salmon being part of the decision-making process, including the salmon farming and ranching industries, and all involved in the fishery. NASCO is taking steps to improve cooperation with the salmon farming industry (see paragraph 8.2) and relations within our NGOs have grown both in nature and in scale (see paragraph 15.1). The proposal to hold Special Sessions from time to time (see paragraph 2.2) should also help to deepen this process and foster the involvement of all concerned with the resource. Last year the representative of Norway referred to the need to encourage public support for conservation of salmon stocks (see paragraph 12.1). In Norway great efforts have been made to secure public access to the resource in order to stimulate public support.

4. Precautionary Principle

4.1 There may be a need to adopt the Precautionary Principle in order to safeguard wild salmon stocks. Adopting such an approach does not lessen the need for the best scientific advice, it merely advocates that action is not postponed where scientific information is lacking.

Last year the representative of Denmark (in respect of the Faroe Islands and Greenland) acknowledged the importance of the Precautionary Principle but stressed the need to adopt an appropriate definition so as to avoid misuse of the Principle. An appropriate definition as considered during the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks might be that "the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures". The Council may wish to consider this definition in order to guide its use of the Precautionary Principle in future. A report on the Precautionary Approach to Fisheries Management, which has been enshrined in the recent UN Agreement concerning Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, is presented in paper CNL(96)44.

5. Payment of Compensation for NASCO Quotas

5.1 Whether or not compensation agreements proceed, stop or are interrupted, NASCO should continue to ensure that soundly-based regulatory measures are in place.

The compensation arrangement for Greenland did not take place in 1995 and the NASCO quota was in place. The measures needed to ensure that science plays an increasing role in the establishment of regulatory measures are referred to in paragraph 2.1. Last year the representative of the USA referred to the fact that such compensation agreements are often referred to as "buy-outs" which is inappropriate as they involve annual payments and are not permanent.

6. Predators and Prey

6.1 There is a need for a clearer understanding of the impact of predation on salmon stocks and of the impact of industrial fisheries on the salmon's prey.

The Council is holding a Special Session at its Thirteenth Annual Meeting entitled "Atlantic Salmon as Predator and Prey". There will be a need to consider any management implications which arise from this session and these will be presented to the Council.

7. Fishing for Salmon in International Waters

7.1 The strong actions by the Parties seem to have worked well to control this activity but it is a problem that could quickly reappear. Even catches by one or two vessels can undermine our conservation efforts. There is a need for constant vigilance so that the best possible surveillance information is available in support of diplomatic initiatives.

We will need to continue our initiatives to work with the coastguard authorities to improve cooperation on surveillance, including awareness of the latest technology, so that the best possible information is available in support of diplomatic initiatives. This year we intend to hold a second meeting with the coastguard authorities to see if further progress can be made. At present the problem appears to be restricted to one area of the North-East Atlantic but it could occur in other parts of the Convention area and we will need to be aware of this possibility and respond rapidly to address the problem if it arises. We will need to continue the process of cooperation with other international Commissions so that experiences of addressing this problem can be shared, and monitor the initiatives such as those within the FAO which should be helpful in dealing with this problem. Last year the representative of Norway referred to a prohibition on Norwegian citizens taking part in this fishery and indicated that this measure could help in dealing with the problem if it was more widely adopted.

8. Impacts of Salmon Aquaculture

8.1 NASCO has recognised the potentially serious threat to the wild stocks from salmon aquaculture and this issue is likely to be of major importance over the next decade. Salmon farming in particular is likely to continue its dramatic growth. The Resolution adopted in Oslo in 1994 was a major step forward and there will be a need to monitor its implementation and effectiveness.

Last year the Council agreed a format for the provision of information on the measures adopted, and research and development programmes carried out, in accordance with the 1994 Resolution. It was also agreed that the Council should re-examine at its Fifteenth Annual Meeting the situation with regard to implementation of recommendations contained in the Resolution with a view to considering whether additional measures are desirable. The Council has also agreed to co-sponsor a symposium with ICES on the Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: The Scientific and Management Issues, and this meeting will provide a very valuable opportunity to review present knowledge on the impacts and the implications for management. Last year the representative of Iceland indicated that there may be benefits to a more holistic approach in which interactions related

to salmonids and not just salmon are considered. Such an approach might be achieved by ensuring that future Working Groups have mandates which would allow consideration of problems related to salmonids and not just salmon.

8.2 Develop closer links with the salmon farming industry so as to seek cooperation in safeguarding the wild stocks.

Last year the Council agreed to further cooperation with the salmon farming industry through the establishment of a Liaison Group. The industry has welcomed this and it is proposed that the first meeting of the Group will be held during late 1996. A report on the proposals for furthering the cooperation with the industry is presented in document CNL(96)31.

8.3 Review developments in salmon farming so that the need for further action internationally can be assessed.

Aquaculture is a fast moving field. Last year the Council agreed that it would consider on an annual basis advances in research that might improve methods of minimising the impacts of salmon farming on the wild stocks. The Secretary will review this research and report back to the Council at its annual meetings. The establishment of the Liaison Group referred to in paragraph 8.2 above should assist in this process.

8.4 Salmon ranching may increase if marine survival improves, bringing new problems with it.

Aquaculture is a fast-moving field. NASCO will need to be aware of developments in ranching and take action as necessary. The Secretary will report to the Council on any significant developments.

8.5 The use of transgenic salmon in aquaculture will create complex problems in protecting the wild stocks. There is concern that such fish, if they occur in the wild, could destabilize aquatic ecosystems.

The issue of transgenic salmon has been included on the agenda for the Thirteenth Annual Meeting and a review of the technology and the environmental concerns has been prepared, CNL(96)30. Transgenic salmon are already being raised in land-based units at a fish farm in Scotland. Containment of transgenic salmon, if they are to be used in fish farming, will be an urgent priority and if the fish are to be reared in cages, biological containment through, for example, induction of sterility, will be important. This is a totally new development that was not envisaged when NASCO was established and the Council may wish to give this issue priority at a future meeting. Last year the representative of Norway stressed the serious nature of the threat posed to wild stocks by transgenic salmon and suggested that the Council should consider holding a Special Session on this issue.

8.6 Develop and keep under review international guidelines on stocking.

A report on progress in development of guidelines on stocking will be presented to the Council at its Thirteenth Annual Meeting.

9. Introductions and Transfers

9.1 The dangers from introductions and transfers have been highlighted by the damage to Norwegian stocks by the parasite *Gyrodactylus salaris*.

Both the North American Commission and North-East Atlantic Commission have made real progress and have adopted measures to protect the wild stocks. This is an issue that will need to be kept under review given the pressures for removal of barriers to trade. There will be a need to continue to develop and keep under review protocols for the introduction and transfer of salmon. Measures to address unintentional introductions and transfers and possible development of educational material on the issue should be considered further and the Council might wish to ask the Secretary to report back to the Council on these areas.

10. Global Warming

10.1 There is evidence of global warming though the existence or extent of it is not agreed. Some experts believe that the change in climate could be relatively sudden and this could result in a shift northwards in the distribution of the salmon.

In 1992 the Council considered a review of the possible impacts of global warming on salmon stocks. It is possible that this is already adversely affecting stocks. There is a need to continue to monitor the evidence for global warming and its possible impact on Atlantic salmon. The Secretary will report on any significant research developments in the field in future and no doubt ICES will take it into account in their advice.

11. Welfare Issues

11.1 Animal rights groups have put increasing pressure on all aspects of animal management and they have started to take an interest in fish.

NASCO should be aware of the activities of animal welfare groups in relation to fish since it seems likely that the Atlantic salmon, a much admired species, may be in the front line of their concerns. The total harvest level and some methods of exploitation might come under attack. We may need to be able to defend and justify our approach publicly to a greater extent than in the past.

12. Education

12.1 We will need changes in attitude and education and if future generations are to succeed and the wild salmon is not to be lost, we need to capture their interest in conservation at an early stage.

NASCO could play a role in educating the young on conservation and management of the Atlantic salmon, in particular from the perspective of international cooperation. The Council might wish to consider this in the future.

13. Catch Statistics

13.1 Despite their limitations, catch statistics are an important indicator of abundance and are the only data by which long-term trends in abundance can be examined.

The question of comparability of catch statistics has been addressed with the adoption of a minimum standard but the Council has recognised the particular problem of unreported catches. There may be benefits from further cooperation between the Parties on methods to estimate and minimise unreported catches. Analysis of long time series of catch statistics is underway in the Secretariat and when it is completed should allow the present catches to be placed into some historical context.

14. Socio-Economic Aspects

14.1 The need for socio-economic aspects of fisheries management to play a larger part in the management process has been recognised.

NASCO has carried out little work on social aspects but has kept economic values of salmon fisheries under review. We should continue to review the economic and socio-economic aspects of the Atlantic salmon. The dependency of certain communities might also be better understood if NASCO were able to hold some of its annual meetings in fishing communities rather than in large cities. In this respect the Council has accepted an invitation to hold its Fourteenth Annual Meeting in Ilulissat, Greenland, which will provide an opportunity for the Council to see, at first hand, the dependency of these northern communities on the marine resources.

15. Non-Government Organizations

15.1 The relations between NASCO and our Non-Government Organizations have grown gradually both in nature and in scale. We now have 23 NGOs and they bring to NASCO much experience and wisdom.

The need to further develop this relationship of cooperation and trust was identified so as to benefit the salmon and all involved in its management and exploitation. At its 1995 meeting the Council decided that, as attendance by NGOs at its meetings had been of mutual benefit, it would continue until further notice the present arrangement of allowing attendance at Council and Commission meetings, with statements by NGO representatives at "Special Sessions" of the Council and also during the Opening Session. The Council has therefore ended the trial period of attendance by NGOs and moved to a more permanent arrangement. In order that the benefits from this new arrangement are maximised, there will be a need to incorporate Special Sessions into future agendas at appropriate intervals and to consult the NGOs on the topics they would wish to see addressed. It might also be possible for the President, Vice-President and Secretary to develop further informal meetings with the NGOs during the annual meetings to discuss issues of mutual interest. We have also developed further the transparency of our work through our contacts with the Press by agreeing to admit media representatives.

16. **Cooperation with Other Inter-Governmental Fishery Commissions**

16.1 A closer relationship between inter-governmental Commissions could offer benefits.

There could be benefits from cooperation with the other Commissions dealing with salmon, e.g. IBSFC, NPAFC. There are certainly lessons to be learnt from other salmon Commissions and, hopefully, vice versa. It can also be valuable to have some contacts with Commissions involved with other species, e.g. ICCAT, NEAFC, NAFO but dealing with similar problems, e.g. the problem of fishing by non-Contracting Parties. We have started this process of cooperation and in this regard the Council has agreed to allow attendance at its meetings by IGO representatives in addition to those representatives from ICES who present the scientific advice. Last year the representative of Denmark (in respect of the Faroe Islands and Greenland) stressed the importance of NASCO being aware of developments in other fora.

17. **Working Methods**

17.1 At the Council's meeting in 1994 the representative of Norway referred to the fact that as NASCO had reached its tenth year it would be appropriate to examine its working methods. One of the underlying issues raised at Council meetings has been the change in structure of the Parties to NASCO.

There are now more countries with salmon stocks within the European Union than outside the EU. The challenge for NASCO and for the European Union is to find working methods that allow all the experience and knowledge of the EU's member States with salmon interests to be freely available and form part of the NASCO debate. Progress has been made on this, and NASCO does more of its detailed work through Working Groups than it used to. In these groups there is a more informal structure and all those with a contribution to make have been able to do so. Overall this is a complex procedural issue and is essentially a matter for the EU, but there is no doubt that it has an effect on the work of the Organization.

17.2 Last year the representatives of Norway and the EU referred to the importance of NASCO's role as a distributor of information.

The Secretariat will continue to monitor relevant factors and to bring issues before the Council. We will examine ways in which this information role may be improved in accordance with the wishes of the Parties.

18. **Conclusions**

It is clear from the above review that the Council is addressing a wide range of issues. As I concluded last year, it is much easier to predict the past than the future and there are probably many issues which are absent from this review. For example, who would have predicted in 1984 when the Convention entered into force that vessels registered in Latin America would be fishing in the North Atlantic and supplying markets is Switzerland? It is difficult to predict what might happen in one year, let alone try to look ahead and focus the work of the Organization for the next decade. For example, in discussing the Future Issues in the review presented to the Council last year, it was reported that the whole issue of transgenic salmon was just over the horizon. At that

time we did not envisage that less than six months later a fish farm in Scotland would be rearing such fish. A high priority for immediate attention must be to find ways of ensuring that these transgenic fish do not pose a threat to the wild stocks. Next year quite new issues could arise which will be of equal or greater importance. We will also need to continue the progress on developing the science to be more predictive and more precise, on measures to protect the wild stocks from any adverse impacts of aquaculture, from introductions and transfers, and on measures to prevent fishing for salmon in international waters by non-Contracting Parties.

Because of the lack of long-term data, we remain unsure of whether we are managing a species which is going through one low point in a number of periodic changes in abundance, or whether there is a real risk of the permanent extinction of some stocks. The past shows that new threats to the wellbeing of the wild salmon stocks develop with surprising speed. Most successful organizations pay considerable attention to the future and NASCO can be no exception. We shall need to constantly update the issues we deal with as the future unfolds.

Secretary
Edinburgh
19 April 1996

COUNCIL

CNL(96)44

THE PRECAUTIONARY APPROACH TO FISHERIES MANAGEMENT

CNL(96)44

THE PRECAUTIONARY APPROACH TO FISHERIES MANAGEMENT

1. At the Eleventh Annual Meeting of the Council a report was presented on the precautionary approach to fisheries management. Such an approach was discussed in the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. Although this conference did not deal with anadromous species, it was one of the significant developments in international fisheries management since UNCLOS and the principles and philosophies developed are likely to influence the future thinking of all fisheries management organizations. At the final session, from 24 July - 4 August 1995, the Conference adopted an Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

2. The Agreement was opened for signature on 4 December 1995 and enshrined in Article 6 of the Agreement is a requirement for States to apply a precautionary approach to managing straddling fish stocks and highly migratory fish stocks.

   This Article states that:

   (1) States shall apply the precautionary approach widely to conservation, management and exploitation of straddling fish stocks and highly migratory fish stocks in order to protect the living marine resources and preserve the marine environment.

   (2) States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.

3. In implementing the precautionary approach, States shall determine, on the basis of the best scientific information available, stock-specific reference points and the action to be taken if they are exceeded. A precautionary reference point is defined as "an estimated value derived through an agreed scientific procedure, which corresponds to the state of the resource and of the fishery, and which can be used as a guide for fisheries management". Two types of precautionary reference point are required - 'conservation or limit' reference points which set the boundaries which are intended to constrain harvesting within safe biological limits within which the stocks can produce maximum sustainable yield and 'target' reference points which are intended to meet management objectives. Under the Agreement, States shall take measures to ensure that, when reference points are approached, they are not exceeded and guidance is given on the measures to be taken by States in the event that they are exceeded. Where a natural phenomenon has a significant adverse impact on the status of straddling fish stocks or highly migratory fish stocks, conservation measures shall be adopted on an emergency basis to ensure that fishing activity does not exacerbate such adverse impacts.

4. It is anticipated that it will take approximately two years for ratification by the required 30 nations before the Agreement enters into effect. If and when this happens the precautionary approach will be enshrined in international fisheries law. Clearly such an approach will not diminish the need for the best scientific information but would require that the absence of such information is not used as a reason for failing to act. There are two examples of issues on the Council agenda for the annual meeting in Gothenburg which perhaps particularly justify the precautionary approach: impacts of aquaculture and transgenic salmon. The possible genetic impacts on the wild stocks from escaped farmed fish are not scientifically proven, but may be irreversible. The development and use of transgenic salmon in aquaculture brings new risks although these are as yet also unproven but at worst there is concern that they could destabilise aquatic ecosystems. In both cases, information, e.g. about genetic risks, is uncertain, unreliable and inadequate. Under such circumstances States are urged to be more cautious.

5. The UN Agreement does not apply to salmon but it seems likely that the precautionary approach will increasingly guide the work of international organizations in future in an attempt to halt the decline in the world's fish stocks. The Council may wish to consider the relevance of such an approach for NASCO in its future work (the use of the precautionary approach in NASCO's future work is also referred to in document CNL(96)13, "Future Issues for NASCO". For example, last year in NASCO, the Norwegian delegation referred to the need to consider both 'conservation' and 'target' reference points for salmon. As described above, such targets are required for straddling fish stocks and highly migratory fish stocks under the UN Agreement.

Secretary
Edinburgh
16 April 1996

ANNEX 11

COUNCIL

CNL(96)15

REPORT OF THE ICES ADVISORY COMMITTEE ON FISHERY MANAGEMENT

REPORT TO THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION

Source of information: Report of the Working Group on North Atlantic Salmon, April 1996 (ICES Doc. CM 1996/Assess:11).

Sections 1–6 of this report are set out in the order of the questions from NASCO to ICES (Appendix 1).

1. EVENTS OF THE 1995 FISHERIES AND THE STATUS OF STOCKS BY COMMISSION AREAS

1.1 Overview of Catches in the North Atlantic

1.1.1 Nominal catches of salmon in the North Atlantic

Nominal catches of salmon by country in the North Atlantic for 1960-1995 are given in Table 1.1.1 and reported catches by NASCO Commission Areas for 1990–1995 are shown below (in tonnes):

Area	1990	1991	1992	1993	1994	1995
NEAC	3758	2951	3379	3348	3596	3078
NAC	915	713	524	375	358	270
WGC	275	476	242	0	0	68
Total	4948	4140	4136	3723	3954	3416

The catch data for 1995 are provisional and incomplete, but the final figure is unlikely to exceed the 1994 total (Figure 1.1.1). Catches in most countries remain below the averages of the previous 5 and 10 years. Some of the decline in catches in recent years may be accounted for by management plans which have reduced fishing effort in several countries.

1.1.2 Unreported catches of salmon in the North Atlantic

The total unreported catch within the NASCO Commission areas in 1995 was estimated to be 1,050 t, a decrease of 18% compared with 1994 and 38% below the 1990–1994 five-year mean of 1,691 t (Table 1.1.1). No estimate could be made of the unreported catch in international waters in 1995. Estimates for the Commission Areas are given below (in tonnes):

Area	1990	1991	1992	1993	1994	1995
NEAC	1779	1555	1825	1471	1157	942
NAC	111	127	137	161	107	98
WGC	n/a	n/a	n/a	12	12	< 10
International waters	180-350	25-100	25-100	25-100	25-100	n/a

For most countries, information on unreported salmon catches is based upon the local knowledge of fishery managers or bailiffs who are familiar with the fisheries. The values are generally termed 'guess-estimates', indicating that they are not derived from annual surveys of fisheries or analyses of catch data. However, these values are usually supported, in part at least, by observations and survey results. Estimation of the level of landings for local consumption at West Greenland is discussed in Section 1.4.1. Although ICES was unable to evaluate the accuracy of the processes used for developing the estimates of unreported catches, it considered that the data provided represented the best available information. It is important that assessments are based upon estimates of the total fishing mortality and these should therefore be supported by better documentation of unreported catches and continued efforts to achieve full reporting wherever possible.

1.1.3 Production of farmed and ranched salmon in the North Atlantic

The production of farmed salmon in the North Atlantic area in 1995 was 413,200 t. This is the largest production in the history of the farming industry (Figure 1.1.2) and represented a further 26% increase compared to 1994 (326,630 t) and a 61% increase on the 1990–1994 average (256,123 t).

The total production of ranched salmon in countries bordering the North Atlantic in 1995 was 309 t which is the lowest value since 1990. The majority (94%) of the ranching is conducted in Iceland, where it represents about two thirds of the nominal catch.

1.2 Fisheries and Stocks in the North-East Atlantic Commission (NEAC) Area

1.2.1 Fishing in the Faroese area

Gear and effort: In accordance with the agreement between the Faroese Salmon Fishermen's Association and the North Atlantic Salmon Fund, commercial fishing for salmon in Faroese territorial waters was suspended for the years 1991 to 1996. A research fishery for salmon continued to operate in the Faroes area in the 1994/1995 season, and one research vessel fished a total of 49 long-line sets during 5 trips. The gear used was the same as in previous seasons.

Catch: The total catch in the research fishery in the 1994/1995 season was 7 t and the preliminary catch for the calendar year 1995 was 5 t, excluding fish that were tagged and released. The proportion of fish less than 60 cm (which should be discarded in the

commercial fishery) was 15.1%, which is at the upper end of the range observed since the 1982/1983 season.

Catch per unit of effort: The mean CPUE for the 1994/1995 season was 36 salmon per 1,000 hooks (Figure 1.2.1). This is the lowest value (equal with 1984/1985) since the 1981/1982 season. However, the CPUE data for the research fishery (since 1991/1992) may not be directly comparable with those for the commercial fishery (prior to 1991/1992).

Origin of the catch: In the 1994/1995 season 20% of the fish were estimated to be of farm origin. This is similar to 1993/1994 (19%) but is much lower than in the 1989/1990 to 1992/1993 seasons (31–46%). Figure 1.2.1 shows the CPUE for past seasons divided into wild fish and farm escapees. This suggests that the high CPUE values in the 1988/1989 to 1992/1993 seasons were due in part to the large numbers of farmed fish in the catch.

External tags and coded wire tags were recovered from countries regularly represented in the tag recovery programmes. As in the past, the highest recapture rates were from releases in Norway and Sweden; recapture rates from other areas were low.

In the 1992/1993 to 1994/1995 fishing seasons, a total of about 5,300 salmon caught on long-line were tagged and released in the open sea north of the Faroes. After three fishing seasons (i.e. 1993–1995) 98 tagged fish have been reported recaptured in 10 countries as shown below:

Country	Recaptures	
	Total to date	%
Norway	58	59
Scotland	12	12
Ireland	9	9
Russia	5	5
Sweden	5	5
Canada	4	4
Denmark	2	2
England	1	1
Iceland	1	1
Spain	1	1
Total	**98**	**99**

Further tag recoveries are expected, and the recovery data have not been analysed to take account of the age composition or proportion of farmed/reared fish in the tagged groups or weighted for different exploitation rates in homewater fisheries. The results do not therefore quantitatively indicate the origin of the salmon in Faroese waters, although they support earlier information that the majority of salmon in the Faroese area originate from Norway. Between 17% and 33% of the tagged fish were assumed to be of farm origin, and the recapture rate for these fish has been lower than for wild fish.

Exploitation Rates at Faroes: As there has been no commercial fishery, the exploitation rate on all monitored stocks in Faroese waters in 1994/1995 was very low.

1.2.2 Homewater fisheries in the NEAC area

Gear and effort: Minor changes in commercial and recreational salmon fishing effort were reported in 1995, continuing the reduction in commercial fishing effort in the North-East Atlantic area in recent years. These reductions mainly arise from conservation measures in the respective countries and the reduced value of commercially caught salmon.

Catch: Provisional figures suggest that nominal catches of salmon in North-East Atlantic countries in 1995 were at a similar level to, or below those in 1994. The final figures for 1994 were slightly higher than in the previous year but still below the previous 5 and 10 year averages.

CPUE: CPUE varies considerably among fisheries. In UK (Northern Ireland) and UK (England & Wales) levels in 1995 were similar to 1994.

Composition of catch: The proportion of 1SW fish in national catches varied from 58% to over 90%. The lowest proportions of 1SW fish in catches were reported in Norway, Finland and France (rod fishery) and the highest in Ireland, France (net fishery), Iceland and Russia. No significant changes in the 1SW/MSW salmon ratio were reported compared to the previous year. In Norway, the number of 2SW salmon was high following the high proportion of 1SW fish in 1994.

Origin of catch: Ranched fish continue to comprise the majority of the Icelandic catch and some straying is observed into rivers. In Norway, the proportion of farm origin fish in samples from coastal fisheries has increased slightly compared to 1994. Fish farm escapees are also observed at variable levels in coastal and in-river fisheries in UK (Scotland) and in small numbers in catches in Ireland and UK (Northern Ireland).

Exploitation rates: Exploitation rates in homewater fisheries vary considerably among different river stocks. Mean rates (1990–1994) for a small number of monitored stocks range from less than 20% to over 80%. In recent years, exploitation rates on some stocks have declined as a result of reduced fishing effort; however, in some other cases levels of exploitation have been maintained at a high level. Levels of exploitation in 1995 were similar to previous years in most fisheries although in-river exploitation rates were reduced in several rivers in UK, probably due to low river flow conditions.

1.2.3 Status of stocks in the NEAC area

There are well over 1,000 rivers supporting salmon in the NEAC area, but for most of these there is no information on the status of the stocks.

Minimum biologically acceptable levels (MBAL) have been established for 7 river stocks in the NEAC area. As yet, spawning targets have not been established for these stocks.

In three of the stocks, egg deposition exceeded MBAL in 1995 and in a fourth it was within 10% of MBAL. In the remaining three rivers egg deposition was less than 70% of MBAL. Of the five rivers for which data are available for at least 10 years, three exceeded the reference egg deposition level in at least 72% of years while the other two failed to meet their reference levels in at least 77% of the years.

Examination of the general trends suggests that there has been no significant change in smolt production in the North-East Atlantic as a whole. Adult runs in western European rivers appear to be increasing or at least remaining stable, probably due to lower exploitation in recent years.

Survival indices to homewaters for both wild and hatchery-reared 1SW and 2SW stocks showed a downward trend over the past decade. The wild and hatchery-reared 2SW stocks also showed a decrease over the last 5 years.

The implications of these observations for the management of salmon stocks in the NEAC area are discussed in Section 5.

1.2.4 Changes in natural mortality

Natural mortality may be affected by a wide range of factors. Changes in environmental factors and freshwater habitat may cause both short and long-term changes in mortality which may affect stock abundance. Some diseases (e.g. UDN) and parasites (e.g. *Gyrodactylus salaris*) have had significant impacts on some stocks, but they do not generally cause obvious problems. The effects of predators are often difficult to determine. Populations of a number of predators, including seal species and cormorants, are known to have been increasing in recent years, but their effects on salmon populations are not generally known.

Available estimates of the natural mortality throughout the marine phase of the life cycle for European stocks vary from about 70% (River Bush wild salmon) to over 97% (Drammen River hatchery-reared salmon). Levels have been variable and have generally been increasing over the last 5–10 years. Mortality is generally higher on hatchery-reared salmon than wild fish.

1.2.5 Surface trawl surveys in the NEAC area

Scientific surveys using surface trawls in the North-East Atlantic caught significant numbers of post-smolts off north-west Scotland in June 1995 and in the Norwegian Sea in July and August (Figure 1.2.2).

1.2.6 Data deficiencies and research needs for the NEAC area

ICES supports the continuation of the research fishing programme in the Faroes area and recognises that the results from the project will improve the possibility of assessing the stocks in the North-East Atlantic.

Norwegian scientists have obtained important preliminary information on the distribution of post-smolts in the North-East Atlantic area. Continued and enhanced

efforts should be made by all parties to provide more information on post-smolt biology.

Methods are required for establishing the appropriate level of spawning escapement targets related to management objectives.

Spawning reference levels and escapement targets have to be developed for the majority of salmon rivers in the NEAC area as soon as possible in order to advance the development of catch advice. To facilitate this, more information is required on juvenile production in rivers based on fry/parr surveys and smolt counting. More effort is also needed in quantifying habitat types in order to extrapolate spawning targets derived from rivers which have established stock and recruitment relationships to rivers where this information is not available.

Further work should be conducted on methods to discriminate farm origin and reared salmon in catches, with particular reference to the use of intra-abdominal lesions.

Information on fishing effort should be collected in more fisheries in order to develop time series of CPUE data for use in assessing stock status.

Reporting systems should be improved to cover all catches and estimates of presently unreported catches should be improved for all fisheries, particularly those in home waters. Every effort should also be made to instigate a surveillance programme to provide reliable estimates of the fishing effort for salmon in international waters and information should be obtained on by-catches of post-smolts in the surface trawl fisheries in the Norwegian Sea.

The estimates of pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area should be improved and possible relationships with environmental and biological (e.g. predation) variables should be investigated.

1.3 Fisheries and Stocks in the North American Commission (NAC) Area

1.3.1 Fisheries in the NAC area

Canada

Gear and effort: Restrictions on commercial and recreational fisheries introduced in Canada in 1992 remained in force. In addition, further regulations were introduced in Labrador: in the commercial fishery the quota was reduced from 92 t to 73.5 t, the opening date was delayed and the season was reduced in length; in the recreational fishery the number of large salmon that could be retained was reduced from 2 to 1.

Catch: The provisional landings for Canada in 1995 were 270 t, a reduction of 24% from 1994 (Table 1.1.1). The landings of small salmon (72,389) and large salmon (33,224) represented reductions of 6% and 23% respectively from 1994. First Peoples' landings were 78% of their 1994 landings and 10% below the previous 5 year mean. The recreational landings totalled 65,862 small and large salmon, the second lowest total recorded since 1974. The commercial landings in Labrador and Quebec declined

to less than 100 t in 1995 from a peak of more than 2,400 t in 1980. The increased restrictions were partly responsible for the reduction in catches.

Composition and origin of catch: No tagged fish of USA origin were reported from Canadian fisheries in 1995.

Returns to the majority of rivers in Newfoundland and Labrador comprised exclusively wild salmon. Hatchery origin fish were most abundant in returns to rivers in the Bay of Fundy and the Atlantic coast of Nova Scotia.

Aquaculture escapees were found in samples from a number of rivers in the Bay of Fundy, in the Conne River, Newfoundland, and in at least one river from Cape Breton. Approximately 90% of the salmon caught in the Macaguadavic River were of aquaculture origin in 1995.

USA

The retention of sea-run Atlantic salmon was prohibited in 1995 (from 9 June in the State of Maine) and the sport fishery was restricted to catch and release. As a result there were no landings of salmon. A total of 370 salmon were caught and released, a 41% increase over 1994.

France (Saint-Pierre and Miquelon Island)

The harvest of salmon by commercial nets was 414 kg. No estimate of the harvest by recreational nets is available.

1.3.2 Status of stocks in the NAC area

The North American Run-Reconstruction Model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971–1995. The 1994 estimate of pre-fishery abundance of non-maturing 1SW salmon was the lowest on record (Figure 1.3.1). The 1995 estimate of pre-fishery abundance of maturing 1SW salmon is slightly below that of 1994 and the lowest on record. The results suggest at best a levelling off of a decline to historical low levels. In addition to the steady decline in recruits over the last 10 years, there has been a steady increase in the proportion of the North American stock maturing as 1SW fish. This proportion has risen from about 45% at the beginning of the 1970s to around 70% in the last three years.

The estimate of the total number of 1SW salmon returning to Labrador and Newfoundland rivers and coastal waters of other areas of North America in 1995 is slightly lower than the estimate for 1994 and is the fifth lowest observed in the time series, 1971–1995. The estimates of returns were quite variable before 1988 and subsequently declined to the 1995 level. The estimate of 2SW returns is slightly above the estimates for 1993 and 1994 but well below levels in the 1970s (Figure 1.3.2).

The rank of the estimated returns in 1995 in the 1971–1995 time series for six regions in North America is shown below:

Region	Rank of 1995 returns in 1971-95 time series (1=highest)		Mid-point estimate of 2SW spawners as proportion of escapement target
	1SW	2SW	(%)
Labrador	18	1	69
Newfoundland	15	11	120
Quebec	14	24	30
Gulf	24	17	105
Scotia-Fundy	23	24	31
USA	17	19	6

In most regions the returns of both 1SW and 2SW fish are near the lower end of the 25 year time series. However, returns of 2SW salmon to Labrador in 1995 were the best in the time series.

The text table above also shows the estimated total spawning escapement of 2SW salmon in each region expressed as a percentage of the spawning escapement target. Only in Newfoundland and the Gulf of St. Lawrence were targets exceeded in 1995. The overall 2SW spawning escapement target for Canada could have been met or exceeded in only 3 of the past 25 years (considering the mid-points of the estimates) (1974, 1977 and 1980). In the remaining years, spawning targets could not have been met even if all in-river harvests had been eliminated.

The majority of the USA returns were recorded in the rivers of Maine, with the Penobscot River accounting for about 76% of the total. Salmon returns to the Penobscot River were 29% higher than the previous year, but were 35% lower than the previous 5-year average and 50% lower than the previous 10-year average.

Egg depositions exceeded or equalled the specific river targets in 22 of the 73 rivers which were assessed in Canada and were less than 50% of target in 22 other rivers. Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 10 of the 12 rivers assessed had egg depositions which were less than 50% of target (Figure 1.3.3).

The implications of these observations for the management of salmon stocks in the NAC and WGC areas are discussed in Section 4.

1.3.3 Possible predators and natural mortality of salmon in the NAC area

One cause of natural mortality in the sea is predation, but little is known about levels on salmon stocks. However, there is good evidence that marine mammals, especially seals, prey on salmon at some stage in their life. Grey, harbour, and ringed seals are known predators on salmon and all of these species occur in Canada. In 1993, the Canadian grey seals population was estimated to be 144,000 (82,000 from the Sable Island rookery off Nova Scotia and 62,000 from the Gulf of St. Lawrence) and increasing at 13% and 8% per year in the two areas respectively. The population of

grey seals in Maine, USA, has increased from approximately 30 animals in 1980 to between 600–1,200 in recent years.

Various fish species may also prey on salmon in marine areas. The successful striped bass (*Morone saxatilis*) restoration programme along the east coast of the USA has resulted in the possibility of increased predation upon Atlantic salmon smolts.

Studies suggest that cormorants and mergansers may consume substantial numbers of juvenile salmon in New Brunswick, Nova Scotia and Prince Edward Island, at least at some times and places. Cormorants are estimated to have consumed less than 7% of the hatchery-reared smolts stocked in the Penobscot River during the period 1992–1994, and most of the predation occurred in the head ponds of various mainstream hydro dams.

Available estimates of the natural mortality throughout the marine phase of the life cycle for North American stocks vary from around 95% (e.g. Western Arm Brook wild salmon) to over 99% (Penobscot River hatchery-reared salmon). Estimates of natural mortality rates indicate increasing trends in several North American stocks. Mortality rates are generally higher and more variable for hatchery than wild stocks.

1.3.4 Data deficiencies and research needs in the NAC area

Possible reasons for the apparent declines in 2SW returns to SFAs 15–23 and Q1–Q10 need to be evaluated.

Estimates should be developed of total recruits prior to all fisheries for each SFA for which estimates have not been made.

There is a need for improved habitat surveys for rivers in Labrador so that spawner requirements can be developed based on habitat characteristics.

The possible changes in the biological characteristics (mean weight, sex ratio, sea-age composition) of returns to rivers, spawning stocks, and total recruits prior to fisheries should be reviewed. As new information becomes available, estimates of spawning requirements in USA and Canada should be refined by incorporating new information such as on biological characteristics for individual stocks, habitat measurements and stock and recruitment analysis.

Annual estimates of smolt-to-adult salmon survival rates need to be obtained for Labrador, New Brunswick and Nova Scotia.

Sea survival rates of hatchery and wild salmon should be examined to determine if changes in survival of hatchery releases can be used as an index of sea survival of wild salmon.

1.4 Fisheries and Stocks in the West Greenland Commission (WGC) Area

1.4.1 Fishery in WGC area

Catch: After the suspension of the commercial fishery in 1993 and 1994, the salmon fishery at West Greenland (NAFO Sub-area 1) was re-opened for the period 14 August–15 October 1995. However, catches in the first two weeks approached the full quota (77 t) and so the fishery was closed on 1 September. The preliminary nominal catch figure is 68 t (Table 1.1.1) which is the lowest recorded catch since 1960 (excluding the years when fishing was suspended).

There have been no surveys of the landings taken for local consumption in the WGC area. Calculations based on tagging experiments in the Penobscot River, USA, suggest that these landings could be substantially greater than the 10–12 t given in Section 1.1.2, but there are some uncertainties about this analysis. There is therefore a need for independent survey data to support the results and further studies are encouraged.

Gear and effort: Only vessels of less than 42 ft (<12.8 m) were permitted to participate in the commercial salmon fishery in Greenland coastal waters in 1995. The commercial fishery was conducted under quotas, distributed at the community level and assessed through daily licensee reports to the License Control Office. Entry into the fishery was limited to professional fishers or hunters, fishing their own gear (single hook and line; 2,000 knot, 140 mm stretched mesh fixed or drifting gill net of any length) within 40 nautical miles of the west coast or 12 nautical miles of the east coast. Licences for salmon fishing are not issued to vessels with licences for the shrimp fishery.

Fishing for private consumption was restricted to residents of Greenland, using hook and line or a single fixed, 2,000 knot, 140 mm stretched mesh gill net, or a similar 30 fathom drift net, tended daily. Salmon taken by this fishery were not permitted to be sold and were not counted against the quota.

Permits may be issued for tourists to fish with hook only. There is no daily catch limit but the catch may not be sold. Few tourist licences were sold.

Origin of catches: Based on a discriminant analysis of characteristics from scale samples collected in the fishery in 1995 it was estimated that 65% were of North American origin (PropNA) compared with 54% in 1992. This proportion is the second highest in the time series since 1969, and there has been an increasing trend over the period.

Applying the discriminant function to the reported catch indicated that 43 t (17,200 salmon) of North American origin and 25 t (9,250 salmon) of European origin were landed at West Greenland in 1995.

Biological characteristics of the catch: The 1SW salmon of North American origin were significantly shorter and lighter than the European-origin salmon. The 2SW salmon of European-origin were significantly lighter and shorter than the 2SW North American-origin salmon.

The downward trend in mean length of both European and North American 1SW salmon since 1969 continued in 1995. The mean length of European 1SW fish (62.6 cm) was the shortest observed in the 1969–1995 series. The mean length of North American 1SW fish (62.1 cm) was the same as that recorded in 1985, and is the lowest value observed in the series. Similar observations were made for the mean weights of 1SW salmon at West Greenland in 1995.

The proportion of the European origin salmon that were river-age-1 (14.7%) was well below the mean of 20.1% for the period 1969–1995, while the proportion of river-age-3 fish (27.5%) was greater than the mean of 16.8%. This may indicate some change in the stock composition in the area. Proportions of river ages of North American origin salmon were not appreciably different from the 1968 to 1992 means.

1.4.2 Status of stocks in the WGC area

The salmon caught in the West Greenland area 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. The European stocks making the greatest contribution to the fisheries in West Greenland are thought to originate from the UK and Ireland.

Returns of the MSW component of most of these stocks to homewaters have declined during the past 5 years (see Section 1.2.3). Similar declines in abundance have been noted in many North American MSW stocks that contribute to the West Greenland fishery (see Section 1.3.2). The overall status of stocks contributing to the West Greenland fishery remains poor, and as a result, the status of stocks within the West Greenland area is thought to be low compared to historical levels.

Stocks originating in North-East Atlantic: There are well over 1,000 rivers supporting salmon in the NEAC area, but for most of these there is no information on the status of the stocks.

Minimum biologically acceptable levels (MBAL) have been established for 7 river stocks in the NEAC area. As yet, spawning targets have not been established for these stocks.

In three of the stocks, egg deposition exceeded MBAL in 1995 and in a fourth it was within 10% of MBAL. In the remaining three rivers egg deposition was less than 70% of the MBAL. Of the five rivers for which data were available for at least 10 years, three exceeded the reference egg deposition level in at least 72% of years while the other two failed to meet their reference levels in at least 77% of the years.

Examination of the general trends suggests that there has been no significant change in smolt production in the North-East Atlantic as a whole. Adult runs in western European rivers appear to be increasing or at least remaining stable, probably due to lower exploitation in recent years.

Survival indices to homewaters for both wild and hatchery reared 1SW and 2SW stocks showed a downward trend over the past decade. The wild and hatchery reared 2SW stocks also showed a decrease over the last 5 years.

Stocks originating in North America: The North American Run-Reconstruction Model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971–1995. The 1994 estimate of pre-fishery abundance of non-maturing 1SW salmon was the lowest on record (Figure 1.3.1). The 1995 estimate of pre-fishery abundance of maturing 1SW salmon is slightly below that of 1994 and the lowest on record. The results suggest at best a levelling off of a decline to historical low levels. In addition to the steady decline in recruits over the last 10 years, there has been a steady increase in the proportion of the North American stock maturing as 1SW fish. This proportion has risen from about 45% at the beginning of the 1970s to around 70% in the last three years.

The estimate of the total number of 1SW salmon returning to Labrador and Newfoundland rivers and coastal waters of other areas of North America in 1995 is slightly lower than the estimate for 1994 and is the fifth lowest observed in the time series, 1971–1995. The estimates of returns were quite variable before 1988 and subsequently declined to the 1995 level. The estimated 2SW returns are slightly above the returns for 1993 and 1994 but well below levels in the 1970s (Figure 1.3.2).

The rank of the estimated returns in 1995 in the 1971–1995 time series for six regions in North American is shown below:

Region	Rank of 1995 returns in 1971-95 time series (1=highest)		Mid-point estimate of 2SW spawners as proportion of escapement target
	1SW	2SW	(%)
Labrador	18	1	69
Newfoundland	15	11	120
Quebec	14	24	30
Gulf	24	17	105
Scotia-Fundy	23	24	31
USA	17	19	6

In most regions the returns of both 1SW and 2SW fish are near the lower end of the twenty five year time series. However, returns of 2SW salmon to Labrador in 1995 were the best in the time series.

The text table above also shows the estimated total spawning escapement of 2SW salmon in each region expressed as a percentage of the spawning escapement target. Only in Newfoundland and the Gulf of St. Lawrence were targets exceeded in 1995. The overall 2SW spawning escapement target for Canada could have been met or exceeded in only 3 of the past 25 years (considering the mid-points of the estimates) (1974, 1977 and 1980). In the remaining years, spawning targets could not have been met even if all in-river harvests had been eliminated.

The majority of the USA returns were recorded in the rivers of Maine, with the Penobscot River accounting for about 76% of the total. Salmon returns to the

Penobscot River were 29% higher than the previous year, but were 35% lower than the previous 5-year average and 50% lower than the previous 10-year average.

Egg depositions exceeded or equalled the specific river targets in 22 of the 73 rivers which were assessed in Canada and were less than 50% of target in 22 other rivers. Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 10 of the 12 rivers assessed had egg depositions which were less than 50% of target (Figure 1.3.3).

1.4.3 Data deficiencies and research needs in the WGC area

The mean weights, sea ages and proportion of fish originating from North America and Europe are essential parameters used by ICES to provide catch advice for the West Greenland fishery. It should be emphasized that these parameters have changed in the past and thus that they should be updated with new data periodically to ensure the greatest possible accuracy in the quota calculation.

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

2. RECENT RESEARCH DEVELOPMENTS

2.1 Possible Explanations for Changes in Sea-Age at Maturity

The sea-age at which each salmon becomes sexually mature is determined by both genetic and environmental factors. In a biological context, environment is defined to include all sources of non-genetic variation affecting growth, development and sexual maturity. Effects evident in the fisheries or among spawners may be caused by factors affecting the fish at any earlier stage.

In many populations and stocks males are more prevalent among 1SW fish than females and females predominate in the older classes.

Assessing the relative importance of environmental or genetic effects on sea-age at maturity in natural stocks or populations is difficult because the effects are not independent. Complex patterns of variation may result from interactions between factors at different stages of the life-cycle.

The relatively large estimates of heritability in aquaculture fish strongly suggest that a substantial genetic component is likely to exist for sea-age at maturity in all salmon - including wild salmon in natural environments.

The physical environment is likely to affect sea-age at maturity mainly through somatic growth which in turn affects the events that lead to sexual development. Growth and development in each successive phase of life is partly related to the outcome of earlier phases. Indeed, sea-age at maturity may be affected by juvenile development

The sexes differ in their tendency to become mature at particular ages in fresh water and in the sea. Many males become sexually mature as parr. Parr maturity is

associated with additional natural mortality that causes the sex ratio among smolts to be biased in favour of females.

Fisheries that occur at particular times of year or that are size selective may select fish of a particular sea-age. Because of the genetic component in sea-age at maturity this will also alter the genetic composition of populations at spawning. The genetic make up of the next generation can therefore be affected by fisheries. The magnitude of these changes will be related to the intensity of the fisheries, the extent of the bias of fishery mortality on the different sea-age classes and the magnitude of the genetic effect being expressed in sea-age at maturity.

2.2 Criteria for Defining Salmon Stocks

The salmon's homing behaviour results in relatively closed groups of individuals returning to reproduce in their natal rivers. Within any given river, subgroups may also develop (e.g. within tributaries). Natural selection acts to adapt the stocks to the conditions they will face in the home river and along their migration routes, and they become the best equipped to survive and reproduce. The subgroups which occur within the same river system are best described as 'Mendelian populations'.

There is a need to define management units encompassing one or more such populations as a practical basis for fishery management while still helping to ensure the conservation of the contributing populations. These units may be termed "stocks" and should be defined by managers after considering the following criteria *(No attempt has been made to prioritise these concerns)*:

1. The number and size of populations in the fishery area - (i.e. the more populations, the greater the risk of over-exploiting any individual population).

2. The proportion of fish from each population in the area - (i.e. this will affect the relative levels of exploitation on each population).

3. The number of fish in each population required to meet spawning targets - (i.e. more productive stocks or stocks experiencing less natural mortality can be exploited more heavily).

4. The proposed levels of exploitation on each population - (i.e. at high exploitation rates, smaller stock units are required to protect individual populations).

5. The percent of catches that are expected to be taken in mixed stock fisheries in distant and homewaters, and/or in-river fisheries (i.e. if a lower percentage of the total catch is taken in mixed stock fisheries, then larger stock units may be used).

6. Population structures and distribution (i.e. populations with greater temporal and spatial distribution are less vulnerable to the risk of extinction caused by local changes in natural or fishing mortality).

7. The probability of making management errors due to unanticipated or unavoidable events (e.g. errors in assessments, unpredictable shifts in environmental conditions, etc.).

8. Jurisdictional considerations (e.g. competing claims for resource use, problems in mounting effective enforcement).

2.3 A New Method for Identifying Reared Salmon

In Norway more than 90% of the farmed salmon are vaccinated as pre-smolts using intra-peritoneal injections of oil adjuvanted vaccines. A Norwegian study has shown that intra-peritoneal vaccination in commercial rearing produces a visible marker permitting simple and rapid discrimination of farmed and wild salmon on internal examination. This could be a valuable method for estimating the contribution of reared fish to fisheries and stocks.

2.4 Use of Strontium: Calcium Ratios in Otoliths to Determine Maturation Status

Elements may be differentially deposited in the otoliths of salmon during their life in response to changes in environmental variables such as temperature and salinity or physiological mechanisms, such as growth and maturation. In the case of maturation, chemical composition of otoliths may reflect sexual readiness and spawning events and thus provide a record of the variation that occurs between individuals and populations.

Salmon caught in Greenland were found to have declining strontium:calcium ratios in the outer zones of their otoliths. The ratios for immature fish suggested that sexual readiness was achieved during the feeding migration and that maturation regression occurred in the absence of cues to begin a spawning migration. Maturing fish were found to have similar Sr:Ca ratios to the immature fish of the same stock during the post-smolt period. A hypothesis has been developed that post-smolts that make a northerly migration after their first sea winter are influenced by environment not to mature as 1SW fish.

3. EVALUATION OF THE EFFECTS OF SOME MANAGEMENT MEASURES ON THE STOCKS AND FISHERIES OCCURRING IN THE RESPECTIVE COMMISSION AREAS

3.1 Quota Management and Closures Implemented after 1991 in the Canadian Commercial Salmon Fisheries

Newfoundland: The effect of the five-year moratorium on the commercial salmon fishery in insular Newfoundland in 1992 was evaluated by estimating the number of fish that would not have returned if the measures had not been taken. These estimates are summarised below:

Year	Total returns		Salmon saved due to closure	
	Small salmon	Large salmon	Small salmon	Large salmon
	(,000)	(,000)	(,000)	(,000)
1992	116-232	16-32	58-116	11-22
1993	131-262	8-16	66-131	6-11
1994	95-191	8-16	48-92	6-11
1995	111-224	9-18	56-112	6-13

There were significant increases in returns of small and large salmon in SFAs 4, 5, and 14A in years since the moratorium, 1992–1995, compared with the pre-moratorium period. For southern SFAs (SFAs 9–11) returns of small and large salmon decreased in three rivers and increased in three rivers. These results imply that southern stocks may not have benefited by the closure of the fisheries to the same extent as northern stocks. However, other factors such as natural mortality may have contributed to the decline in returns. The proportion of large salmon increased at all monitoring facilities in SFAs 4, 5, 10, 13, and 14A; however, decreases in this proportion were observed in three of the four rivers in SFAs 9 and 11.

Smolt to adult survival rates increased for several rivers, which is consistent with a decline in marine fishing mortality.

Labrador: Changes in the exploitation rates in the commercial fishery in Labrador since 1992 have been estimated, based on the reduction in fishing effort (indexed by number of fishing licences) and assumed levels of exploitation in 1991:

Year	Exploitation rate Small salmon	Exploitation rate Large salmon
1991	0.3 - 0.5	0.7 - 0.9
1992	0.22 - 0.39	0.58 - 0.83
1993	0.13 - 0.25	0.38 - 0.62
1994	0.1 - 0.2	0.25 - 0.43
1995	0.08 - 0.15	0.1 - 0.33

Levels of exploitation on salmon returning to the Sandhill River (SFA 2) have been observed to have declined in 1994 and 1995 compared with the early 1970s as a result of various changes in the fisheries, as shown below:

	Exploitation rate	
	1970–1973	1994–1995
Small salmon	0.62	0.12
Large salmon	0.95	0.45

These reductions in exploitation rates in Labrador would imply that the returns to the rivers in 1993–1995 were two to three times greater than would have occurred if there had been no management changes.

The effect of the shortened season on salmon landings in Labrador in 1995 was estimated by examining the temporal pattern of catches in 1993–1994. The estimated reductions are summarised below:

Reduction in landings resulting from shortened season				
SFA	Small salmon		Large salmon	
	%	t	%	t
1	0.8%	<1	91.5	<1
2	19.1%	2	52.0	27
14B	16.1%	<1	50.8	1

Thus, the shorter 1995 commercial salmon fishing season in Labrador may have resulted in a reduction in landings of 1,026 small salmon (2.2 t) and 7,485 large salmon (29.4 t), an overall reduction in landings of 36%.

Quebec: The closure of the commercial fishery on the Quebec North Shore fishery in 1994 is estimated to have resulted in 86–121 small salmon and 866–1103 large salmon not being caught, assuming that exploitation rates in 1995 would have been the same as in 1990–1992, if there had been no management change.

Other Areas: Although the Newfoundland and Labrador commercial salmon fisheries used to harvest small and large salmon with origins in Nova Scotia, New Brunswick, Quebec, and USA, increases in returns to these provinces cannot be quantified. The estimates of returns of 2SW salmon to SFAs 19–23, Q1–Q11, and USA from 1992–1995 are lower than the returns in 1987–1991 which is inconsistent with a reduction in marine fishing mortality.

3.2 Suspension of Commercial Fishing Activity at the Faroes Since 1991

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 saved from the fishery is estimated by subtracting the numbers of fish killed in the research fishery from the number that are expected to have been killed if the commercial fishery had operated. The increase in returns to all homewaters is then

estimated by subtracting the fish that would have died on their homeward migration. The great majority of these would be expected to return to European rivers although a small number of salmon tagged in the fishery have returned to North America. The expected catch in the Faroese fishery was estimated to be equal to the mean catch in the 1988/1989 to 1990/1991 seasons, a slightly different approach to that used in the ICES advice to NASCO in 1995. The estimates of the increased returns to homewaters in Europe for the years 1992–1995 are shown below:

Year	Increased returns to homewaters in Europe	
	1SW	MSW
1992	1,618	40,327
1993	5,852	55,466
1994	9,967	64,207
1995	6,412	67,936

In addition, nearly 90,000 escaped farmed fish are expected to have been saved from the Faroes fishery over the four seasons of the suspension. It is not known whether these fish will have returned to the areas from which they escaped.

The numbers of 1SW fish saved is very small and will have increased returns to all European rivers by less than 1%. The expected increase in returns of MSW salmon will have increased from 2–5% in 1992 to 5–10% in 1995. However, the majority of these fish are believed to have returned to Scandinavia, Finland and Russia (perhaps 75%). The estimated increase in the number of returns to these countries is therefore as summarised below:

Year	Estimated proportion of MSW salmon returning to Scandinavia, Finland and Russia derived from suspension of Faroes fishery	
	number	%
1992	30,245	3 - 7 %
1993	41,600	5 - 9 %
1994	48,155	7 - 13 %
1995	50,952	7 - 14 %

Although the additional returning fish are expected to have contributed to catches and spawning stocks, it appears that any increase in catches 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.

3.3 Suspension of Commercial Fishing Activity During 1993 and 1994 at West Greenland

The fishermen at West Greenland suspended commercial salmon fishing in 1993 and 1994 in accordance with an agreement between the Organisation of Hunters and Fishermen in Greenland and the North Atlantic Salmon Fund, although a small subsistence fishery was allowed to continue. The number of salmon saved from the fishery as a result of the 213 t and 157 t quotas not being taken in the West Greenland fishery in 1993 and 1994 is estimated from the quotas and the means weights of fish in the fishery. This number is adjusted to take account of non-catch fishing mortality and then divided into North American and European groups using the proportions obtained from the sampling programme. The increase in returns to homewaters in 1994 and 1995 is estimated by subtracting the fish that would have died on their homeward migration and is shown below:

Increased returns of MSW salmon

Year	N America	Europe
1994	44,524	37,928
1995	33,236	28,312

The estimates provided by ICES in 1995 were smaller than this because they only included 2SW fish and did not take account of non-catch fishing mortality.

The additional returns of 2SW salmon to North America represented 30–52% of the total estimated returns of 2SW fish in 1994 and 21–38% in 1995.

The results of smolt tagging experiments conducted over the past 25 years and adult tagging studies in the early 1970s suggest that the majority of the European fish would have returned to rivers in southern Europe. Assuming that all of the saved wild European salmon returned to Southern European countries (UK, Ireland, France and Spain) they will have represented about 5–10% of the returns of MSW fish in 1994, and 4–9% in 1995.

Although the additional returning fish are expected to have contributed to catches and spawning stocks, it appears that any increase in catches 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.

4. MANAGEMENT CONSIDERATIONS FOR THE NORTH AMERICAN AND WEST GREENLAND COMMISSION AREAS

Management advice for salmon stocks in the NAC and WGC areas is based upon spawning escapement targets to provide optimum smolt production.

4.1 Review of Age Specific Target Spawning Levels in Canadian Rivers

The revised 2SW spawning escapement target for the whole of North America is 180,495, a decrease of 3% from the previous estimate (186,486). The target number of 2SW spawners for Canada has been revised to 151,296 on the basis of an extensive review of the best available information. This represents a marginal decrease (4%) from the target of 157,287 used in 1995. Most (84%) of the 2SW North American target spawner escapement arises from rivers in Canada.

A theoretical analysis of the probabilities of achieving female spawning escapement for different stock sizes and stock complexes was also examined. To reduce the risk of female spawner under-escapement, more fish must be released, the additional releases being a relatively decreasing proportion of the target escapement level for the river as the size of the stock (target number of fish) increases.

A similar analysis shows the effect of treating North American salmon as a single stock or as 6 or 24 stocks. The total spawning escapement required to have a 50% probability of achieving the female spawning target is 180,495 (equal to the target). If North American salmon are treated as 24 stocks (corresponding to the fishing areas in Canada plus USA) this number increases to 188,500 assuming all stocks were producing to their potential.

Consideration should therefore be given to the number of distinct stocks used to develop the catch advice for mixed stock fisheries.

4.2 Development of Catch Options with an Assessment of Risks Relative to the Objective of Achieving Target Spawning Escapement

Pre-fishery abundance forecast

ICES addressed the concern expressed previously that in the forecast model used in 1995 all of the residual values since 1988 had been negative, indicating that the actual values would be considerably lower than those predicted. ICES also wished to include a biological component in the model which was hitherto simply a regression model with a single environmental variable.

A revised model was developed which includes an index of potential smolt production from Canada. The index is based on the number of spawners in the years contributing to the smolt run in each region, weighted according to the mean age composition of the smolts produced in that region. Data for spawners from the Gulf of St. Lawrence region were not included. The spawning escapement in this region has exceeded the target level in recent years and variation in the numbers of spawners above this level would not be expected to affect smolt recruitment. Thermal habitat data for February alone have been used because this gives the lowest residuals in recent years. Although the new model still tends to overestimate the pre-fishery abundance in recent years (Figure 4.2.1, Table 4.2.1), the residuals from 1988–1994 were smaller and the R^2 slightly higher than those obtained from the 1995 model formulation.

The forecast estimate of pre-fishery abundance of non-maturing 1SW North American salmon for 1996 based on this model is 178,099. The probabilities that the 1995 forecasts are less than a particular value were estimated and are shown in Table 4.2.2.

Development of catch options for 1996

The procedure for estimating the quota for West Greenland is summarised in Appendix 2. In addition to the estimate of pre-fishery abundance, this calculation requires estimates of 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]. Exponential smoothing model forecasts for 1996 utilising data collected during the 1995 fishery and using interpolated values for 1993 and 1994, with approximate 50% confidence limits, are summarised below:

Parameter	Forecast	Minus 1SE	Plus 1SE
PropNA	0.592	0.506	0.678
WT1SWNA	2.420	2.268	2.572
WT1SWE	2.620	2.430	2.810
ACF	1.133	1.030	1.236

Greenland quota levels for the forecast of pre-fishery abundance were computed with the revised model and are shown in Table 4.2.3 for different probable abundance levels and varying proportions of the harvestable surplus taken at West Greenland.

The 50% risk level is intended to produce spawning escapements in North America that will meet the summed target levels for all rivers 50% of the time. Even if this overall target is achieved (estimated to be a 50% probability), it is likely that some stocks will fail to meet their individual target spawner requirements while others will exceed target levels. This 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 level may result in some stocks failing to meet target levels over an extended period if the full TAC is harvested. This would be likely to result in the long-term decline in those stocks.

The table indicates that even with a zero TAC on non-maturing 1SW salmon the overall spawning target for North America 2SW salmon is not expected to be met.

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. We are observing record low abundance despite almost complete closures of mixed and single stock fisheries, a continuing trend of below target spawning escapements for 2SW salmon, and some of the lowest marine survival rates

for monitored stocks. If catch quotas are set as in 1995, by selecting the risk neutral level, the TAC will be zero. **ICES recommends that fishing mortality on salmon in the West Greenland and North American Commission areas should be reduced to the lowest possible level; and that there should be no landings of salmon from the West Greenland Commission area in 1996 and no landings of salmon from the North American Commission area in 1996 and 1997 except for in-river harvests from stocks in individual rivers which are above biologically-based escapement targets.**

5. MANAGEMENT CONSIDERATIONS FOR THE NORTH-EAST ATLANTIC COMMISSION AREA

Management advice for salmon stocks in the NEAC area is currently based partly upon estimates of the minimum biologically acceptable level for a number of stocks. Spawning escapement targets for management have not been specified.

5.1 Estimates of Age Specific Spawning Reference Levels and Spawning Escapement Targets

In Section 1.2, data are presented on 7 rivers for which reference spawning levels have been established in the NEAC area. Reference levels are being developed and should be available for all rivers in a number of countries in the next 1–3 years. However, little progress is being made in some other countries. **ICES recommends that if spawning escapement targets are to be used to develop management advice on the same basis as that derived for the North American stock all countries should establish preliminary spawning targets for all their rivers as soon as possible.**

5.2 Development of Catch Options

Pre-fishery abundance estimates for the NEAC area

ICES revised and extended the preliminary estimates of the pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area prepared in 1995. Figures 5.2.1–5.2.4 show the range of estimates of the pre-fishery abundance of maturing and non-maturing 1SW salmon in the NEAC area for the period 1970 to 1994 for northern and southern European stocks as defined below:

Southern European countries:	Northern European countries:
Ireland	Iceland
France	Finland
UK (England & Wales)	Norway
UK (Northern Ireland)	Russia
UK (Scotland)	Sweden

Overall it appears that both maturing and non-maturing components of the Southern European group have declined, with the non-maturing component declining more rapidly (Figures 5.2.1 and 5.2.2). These stocks are probably at their lowest level in the last 25 years. The maturing 1SW component from Northern European countries has remained relatively stable, although abundance may have been reduced in 1978 and 1982 rapidly (Figures 5.2.3 and 5.2.4). The non-maturing 1SW component appears to have declined in 1977, then increased rapidly to 1980 and declined again thereafter, probably to its lowest level in 25 years.

Relationship between thermal habitat and pre-fishery abundance of European stocks

ICES conducted an exploratory analysis of the effect of thermal habitat on the southern European non-maturing 1SW stock component. The area of 6 to 8°C water between Iceland and Greenland (29°W to 51°W) in the winter months was well correlated with the pre-fishery abundance (Figure 5.2.5). The regression line between abundance and habitat reveals a strong positive relationship with reasonable confidence limits on the regression (Figure 5.2.6). This relationship is remarkably similar to that observed for the North American non-maturing stock complex. However, there are a number of statistical issues that need to be addressed before these data can be applied in predictive models.

Catch advice

In view of the apparent decline in pre-fishery estimates to the lowest levels historically observed for maturing and non-maturing 1SW salmon in Southern European countries, non-maturing 1SW salmon in Northern European countries and near-lowest levels for maturing 1SW salmon in Northern Europe, it appears that these stocks in aggregate may be below minimum biologically acceptable levels (MBAL). The tenuous condition of these stocks is reinforced by downward trends in indices of survival from smolts to homewaters for wild and reared 1SW and 2SW stock components over the past decade and an increase in the proportion of maturing 1SW fish in the fisheries. These conditions are similar to those of North American stocks. **ICES recommends that, except for in-river fisheries on stocks in individual rivers which are above MBAL, measures should be introduced to reduce fishing mortality and increase escapement of salmon in the North-East Atlantic, especially for that component which spawns as multi-sea-winter fish.**

6. COMPILATION OF TAG RELEASE AND FINCLIP DATA FOR 1995

Data on releases of tagged and finclipped salmon in 1995 were provided by ICES and will be compiled as a separate report. In 1995, a total of just over 3.35 million salmon were marked and released, a substantially lower number than in 1994 (4.42 million). Most marks were applied to reared parr and smolts (3.27 million) and with only small numbers of wild parr and smolt (0.065 million) and adult fish (0.021 million) being marked.

APPENDIX 1

DECISION OF THE COUNCIL OF NASCO TO REQUEST SCIENTIFIC ADVICE FROM ICES

With respect to Atlantic salmon in each Commission area:

a) describe the events of the 1995 fisheries,

b) describe the status of the stocks and, where appropriate, evaluate the causes for any changes in salmon abundance with special reference to changes in natural mortality,

c) identify data deficiencies and research requirements relevant to the management of salmon stocks;

2) Report on significant research developments which might assist NASCO with the management of salmon stocks, with special reference to:

a) possible explanations for changes in sea-age at maturity of Atlantic salmon,

b) the criteria for defining salmon stocks;

3) Update the evaluation of the effects of the following measures on the stocks and fisheries occurring in the respective Commission areas:

a) quota management and closures implemented after 1991 in the Canadian commercial salmon fisheries,

b) the suspension of commercial fishing activity at the Faroes since 1991,

c) the suspension of commercial fishing activity during 1993 and 1994 at West Greenland;

4) With respect to the fishery in the West Greenland Commission area:

a) review the age specific target spawning levels in Canadian rivers,

b) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement;

5) With respect to fisheries and stocks in the North-East Atlantic Commission area:

a) provide estimates of age specific spawning targets,

b) provide catch options with an assessment of risks relative to the objective of achieving target spawning escapement;

6) With respect to Atlantic salmon in the NASCO area, provide a compilation of microtag, finclip and external tag releases by ICES Member Countries in 1995.

APPENDIX 2

COMPUTATION OF CATCH ADVICE FOR WEST GREENLAND

The North American Spawning Target (SpT) for 2SW salmon has been revised to 180,495 fish in 1996.

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 home waters (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

---

[1] New sampling data from the 1995 fishery at West Greenland were used to update the forecast values of the proportion of North American salmon in the catch (PropNA), mean weights by continent [WT1SWNA, WT1SWE] and the age correction factor [ACF] in 1996.

Table 1.1.1 Nominal catch of SALMON by country (in tonnes round fresh weight), 1960-1995. (1995 provisional figures).

Year	Canada (1)	Den.	Faroes	Finland	France	East Grld.	West Grld. (2)	Iceland	Ireland (3, 4)	Norway (5)	Russia	Spain (6)	St. P. & M.	Sweden (West)	UK (E & W)	UK N.Ireland (4,7)	UK (Scotland)	USA	Other (8)	Total Reported Catch	Unreported catches NASCO Areas	Unreported catches International waters (9)	Total Catch
1960	1636	-	-	-	-	-	60	100	743	1659	1100	33	-	40	283	139	1443	1	-	7237	-		-
1961	1583	-	-	-	-	-	127	127	707	1533	790	20	-	27	232	132	1185	1	-	6464	-		-
1962	1719	-	-	-	-	-	244	125	1459	1935	710	23	-	45	318	356	1738	1	-	8673	-		-
1963	1861	-	-	-	-	-	466	145	1458	1786	480	28	-	23	325	306	1725	1	-	8604	-		-
1964	2069	-	-	-	-	-	1539	135	1617	2147	590	34	-	36	307	377	1907	1	-	10759	-		-
1965	2116	-	-	-	-	-	861	133	1457	2000	590	42	-	40	320	281	1593	1	-	9434	-		-
1966	2369	-	-	-	-	-	1370	106	1238	1791	570	42	-	36	387	287	1595	1	-	9792	-		-
1967	2863	-	-	-	-	-	1601	146	1463	1980	883	43	-	25	420	449	2117	1	-	11991	-		-
1968	2111	-	5	-	-	-	1127	162	1413	1514	827	38	-	20	282	312	1578	1	403	9793	-		-
1969	2202	-	7	-	-	-	2210	133	1730	1383	360	54	-	22	377	267	1955	1	893	11594	-		-
1970	2323	-	12	-	-	-	2146	195	1787	1171	448	45	-	20	527	297	1392	1	922	11286	-		-
1971	1992	-	-	-	-	-	2689	204	1639	1207	417	16	-	18	426	234	1421	1	471	10735	-		-
1972	1759	-	9	32	34	-	2113	250	1804	1568	462	40	-	18	442	210	1727	1	486	10955	-		-
1973	2434	-	28	50	12	-	2341	256	1930	1726	772	24	-	23	450	182	2006	2.7	533	12770	-		-
1974	2539	-	20	76	13	-	1917	225	2128	1633	709	16	-	32	383	184	1708	0.9	373	11957	-		-
1975	2485	-	28	76	25	-	2030	266	2216	1537	811	27	-	26	447	164	1621	1.7	475	12236	-		-
1976	2506	-	40	66	9	<1	1175	225	1561	1530	772	21	2.5	20	208	113	1019	0.8	289	9557	-		-
1977	2545	-	40	59	19	6	1420	230	1372	1488	497	19	-	10	345	110	1160	2.4	192	9514	-		-
1978	1545	-	37	37	20	8	984	291	1230	1050	476	32	-	10	349	148	1323	4.1	138	7682	-		-
1979	1287	-	119	26	10	<1	1395	225	1097	1831	455	29	-	12	261	99	1076	2.5	193	8118	-		-
1980	2680	-	536	34	30	<1	1194	249	947	1830	664	47	-	17	360	122	1134	5.5	277	10127	-		-
1981	2437	-	1025	44	20	<1	1264	163	685	1656	463	25	-	26	493	101	1233	6	313	9954	-		-
1982	1798	-	865	54	20	<1	1077	147	993	1348	354	10	-	25	286	132	1092	6.4	437	8644	-		-
1983	1424	-	678	58	16	<1	310	198	1656	1550	507	23	3	28	429	187	1221	1.3	466	8755	-		-
1984	1112	-	628	46	25	<1	297	159	829	1623	593	18	3	40	345	78	1013	2.2	101	6912	-		-
1985	1133	-	566	49	22	7	864	217	1595	1561	659	13	3	45	361	98	913	2.1	-	8108	-		-
1986	1559	-	530	37	28	19	960	310	1730	1598	608	27	2.5	54	430	109	1271	1.9	-	9274	-		9274
1987	1784	-	576	49	27	<1	966	222	1239	1385	564	18	2	47	302	56	922	1.2	-	8160	2788		10948
1988	1311	-	243	36	32	4	893	396	1874	1076	419	18	2	40	395	114	882	0.9	-	7736	3248		10984
1989	1139	-	364	52	14	<1	337	278	1079	905	359	7	2	29	296	142	895	1.7	-	5900	2277		8177
1990	911	13	315	60	15	<1	274	426	586	930	315	10	2	33	338	94	624	2.4	-	4948	1890	180-350	6838
1991	711	3.3	95	70	13	4	472	505	404	876	215	15	1	38	200	55	462	0.8	-	4140	1682	25-100	5822
1992	522	10	23	77	20	5	237	635	630	867	166	16	1.3	49	186	91	600	0.7	-	4136	1962	25-100	6098
1993	373	9	21	70	16	-	-	656	543	923	140	14	1.8	56	270	83	547	0.6	-	3723	1644	25-100	5367
1994	355	6	6	49	18	-	-	448	817	996	138	15	2.7	44	319	91	649	0	-	3954	1276	25-100	5230
1995 (10)	270	-	5	48	9	-	68	439	712	839	129	9	0.4	37	311	83	457	0	-	3416	1050	n/a	4466
Means																							
1990-1994	574	8	92	65	16	5	328	534	596	918	195	14	2	44	263	83	576	1	-	4180	1691	-	5871
1985-1994	980	-	274	55	21	8	625	409	1050	1112	358	15	2	44	310	93	777	1	-	6008	-	-	7638

1. Includes estimates of some local sales, and, prior to 1984, by-catch.
2. Includes catches made in the West Greenland area by Norway, Faroes, Denm
3. Until 1994, includes only those catches sold through dealers.
4. Catch on River Foyle allocated 50% Ireland and 50% N. Ireland.
5. Before 1966, sea trout and sea charr included (5% of total).
6. Weights estimated from 1994 mean weight. Early years may be underestimates.
7. Not including angling catch (mainly 1SW).
8. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.
9. Estimates refer to season ending in given year.
10. Includes provisional and incomplete data

Table 4.2.1 Pre-fishery abundance, thermal habitat derived from sea surface temperature data for February, and logged spawners; predicted pre-fishery abundance of non-maturing 1SW North American salmon from H2 and SNLQ spawner model; and residuals (difference between predicted and observed values) from 1978–1996.

Year	Prefishery abundance midpoint	Thermal habitat for February	Lagged spawners	Prefishery abundance from H2 & SNLQ spawners	
				Predicted	Residual
1978	312202	1951	43284	452312	-140110
1979	696631	2058	51166	598639	97992
1980	602723	1823	53198	537571	65152
1981	589035	1912	55314	599527	-10492
1982	491090	1703	54354	507980	-16890
1983	268266	1416	48110	315973	-47707
1984	280453	1257	46603	235863	44590
1985	460860	1410	45202	274574	186286
1986	493787	1688	46360	394755	99032
1987	454006	1627	45536	360720	93286
1988	354961	1698	47060	407930	-52969
1989	284988	1642	50634	434962	-149974
1990	249462	1503	47601	341854	-92392
1991	292418	1357	41742	208075	84343
1992	181756	1381	40228	196728	-14972
1993	139902	1252	45268	216020	-76118
1994	141120	1329	42681	210178	-69058
1995		1310	39431	159294	
1996		1470	36356	178099	
Average 1988-94	234944			267970	-53029

Table 4.2.2 Probability that the forecast of 1996 pre-fishery abundance of non-maturing 1SW North American salmon is less than a particular level, from H2-SNLQ regression model and probability levels between 25–75%.

Cumulative Density Function %	Forecast
25	119,000
30	136,000
35	149,000
40	163,000
45	175,000
50	190,000
55	202,000
60	217,000
65	229,000
70	244,000
75	259,000

Table 4.2.3 Quota options (in tonnes) for 1996 at West Greenland based on H2-SNLQ regression forecasts of fishery abundance. Proportion at West Greenland refers to the fraction of harvestable surplus allocated to the West Greenland fishery. The probability level refers to the pre-fishery abundance levels derived from the probability density function.

Prob.	Proportion at West Greenland (Fna)										
level	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
25	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	1	1	1	1	2	2	2	2
60	0	7	15	22	30	37	45	52	59	67	74
65	0	13	26	40	53	66	79	92	105	119	132
70	0	20	41	61	81	102	122	142	163	183	203
75	0	28	55	83	110	138	165	193	220	248	275

Sp. res =	201,483
Prop NA =	0.59224
WT1SWNA =	2.42
WT1SWE =	2.62
ACF =	1.133

Figure 1.1.1 Nominal catches of salmon in four North Atlantic regions.

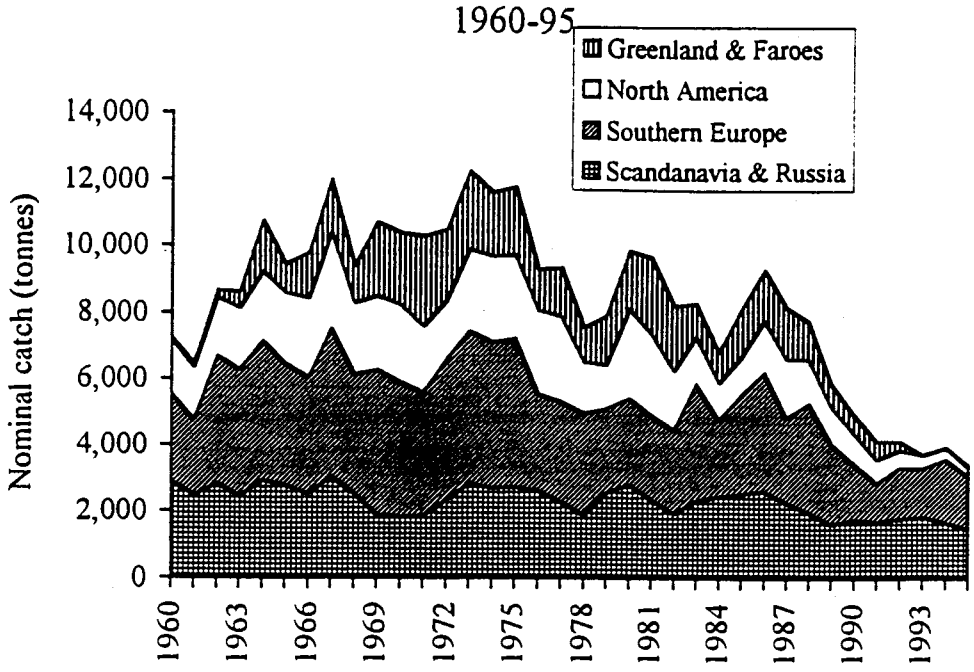


Figure 1.1.2 Production of farmed salmon (tonnes round fresh weight) in the North Atlantic, 1980–1995.

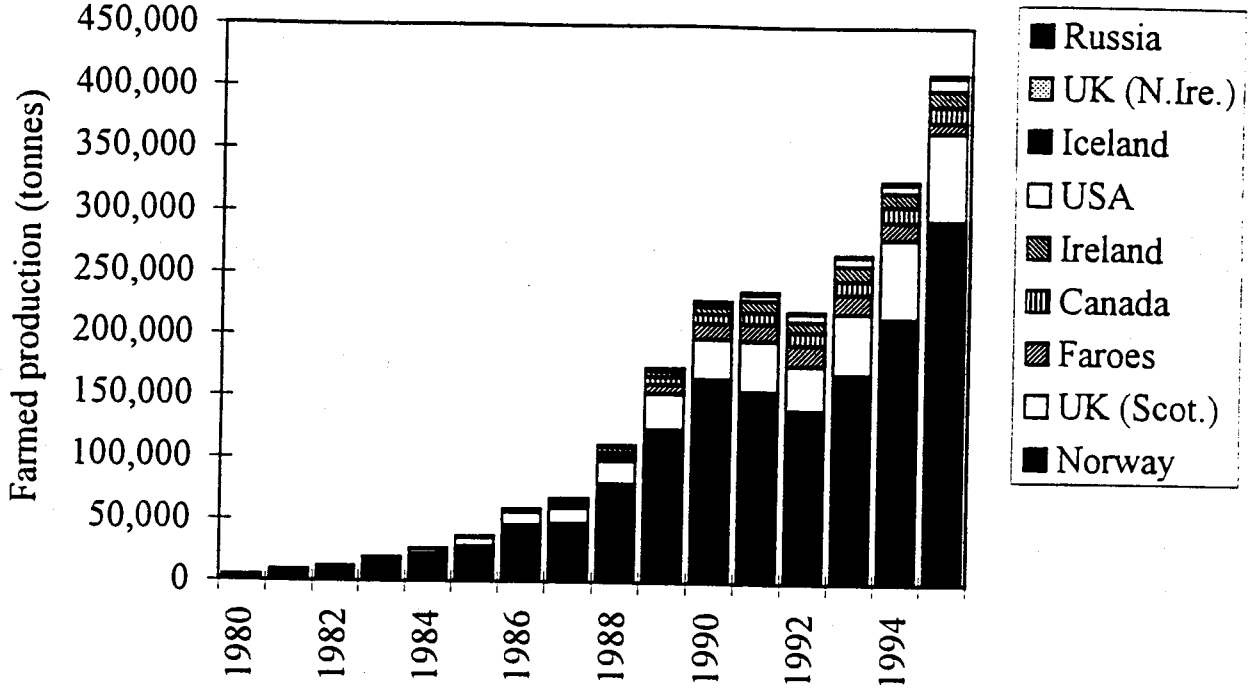


Figure 1.2.1 Catch per 1000 hooks (CPUE) in the Faroese fishery inside the EEZ since the 1982/1983 fishing season. The catch is broken into wild and farmed fish.

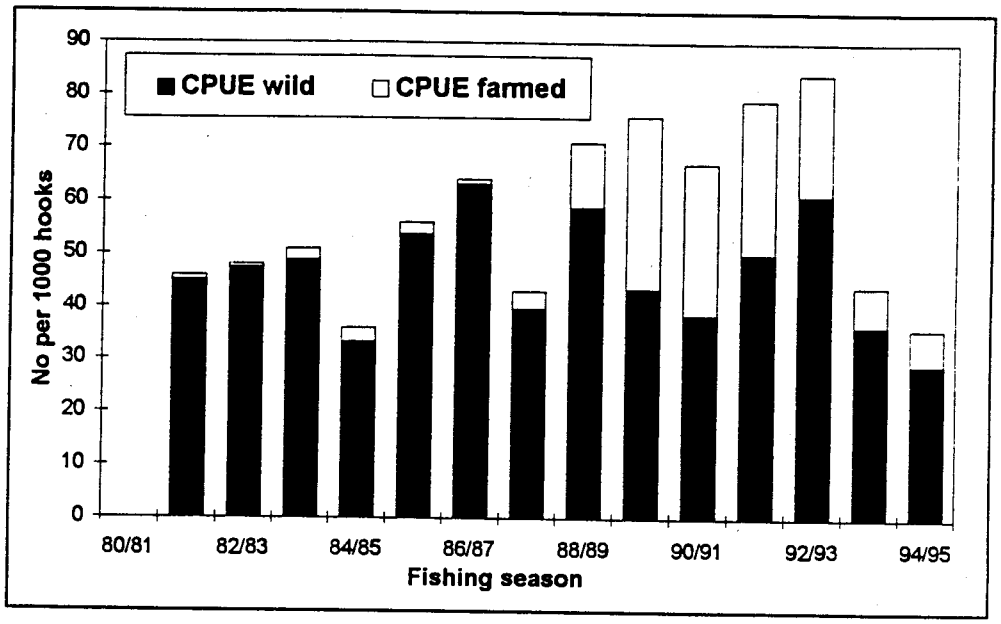


Figure 1.2.2 Post-smolt catches in surface trawl hauls during three research cruises in 1995. Stars show position of trawl stations without smolt catches while numbers indicate position and numbers of smolts caught. Stations south of 62°N were sampled in June. Stations north of that latitude were sampled in July. (From: Holm *et al.*, 1996).

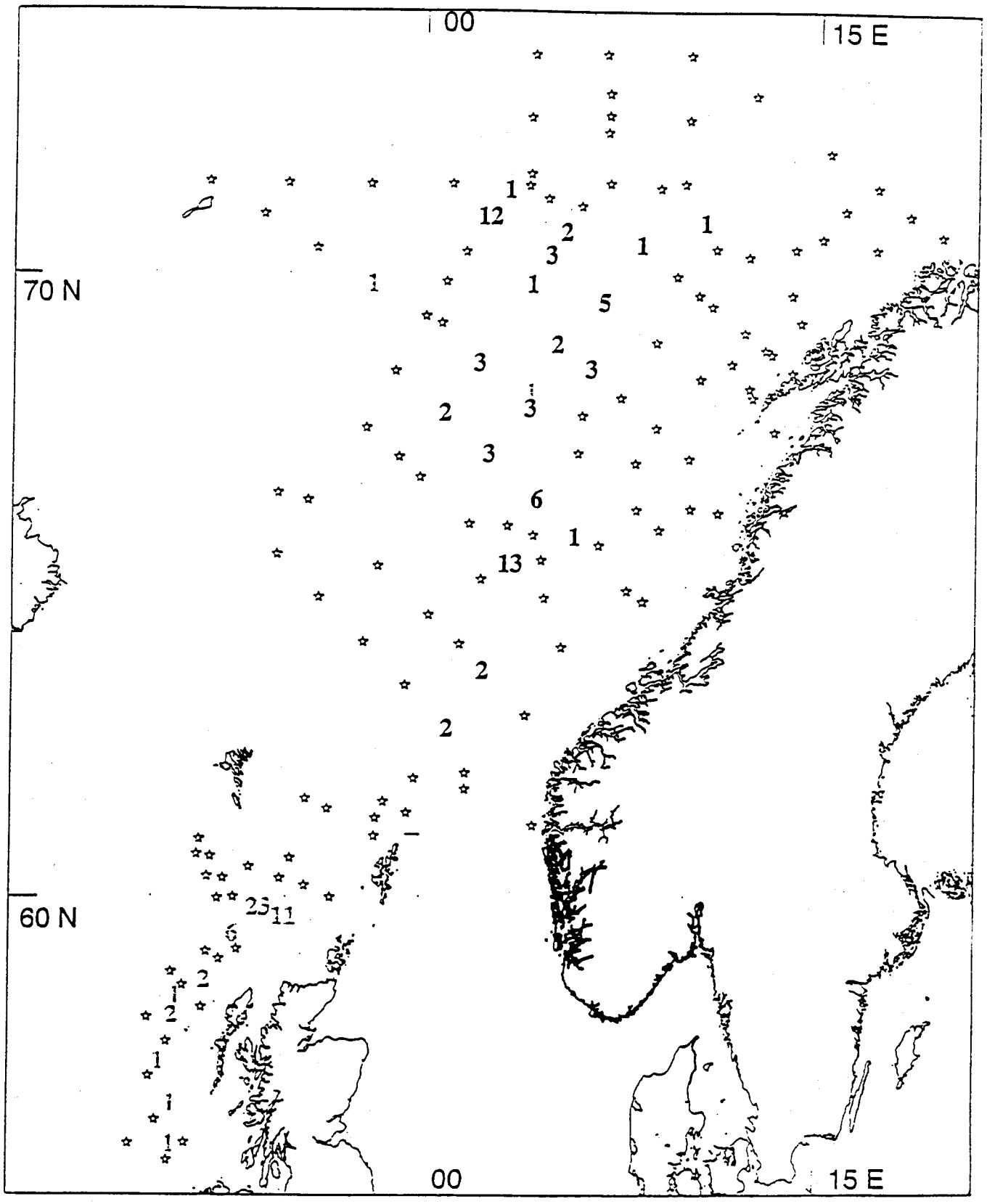


Figure 1.3.1 Pre-fishery abundance of maturing and non-maturing salmon in North America. (A) Total abundance and (B) proportion of the smolt class maturing after 1SW.

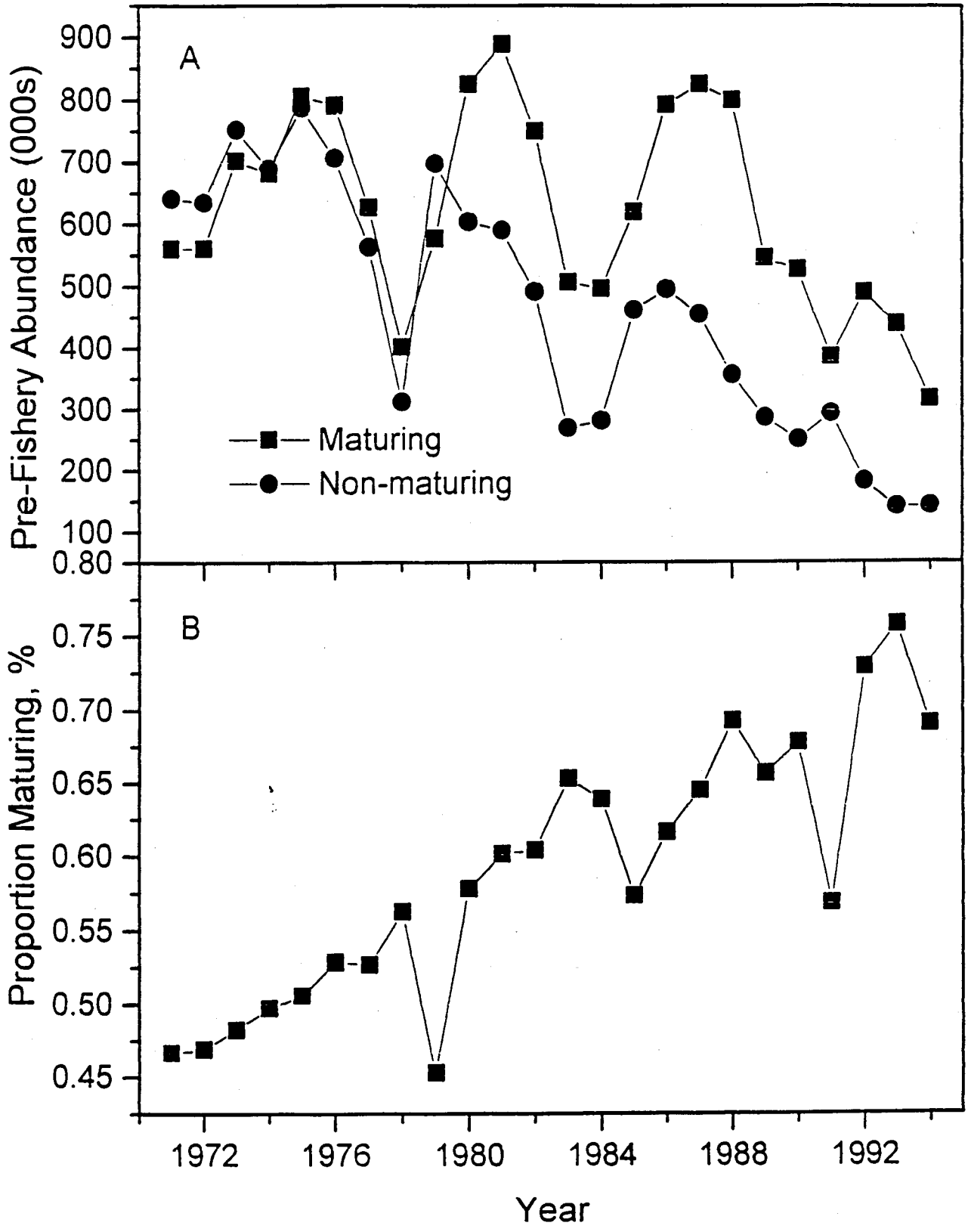
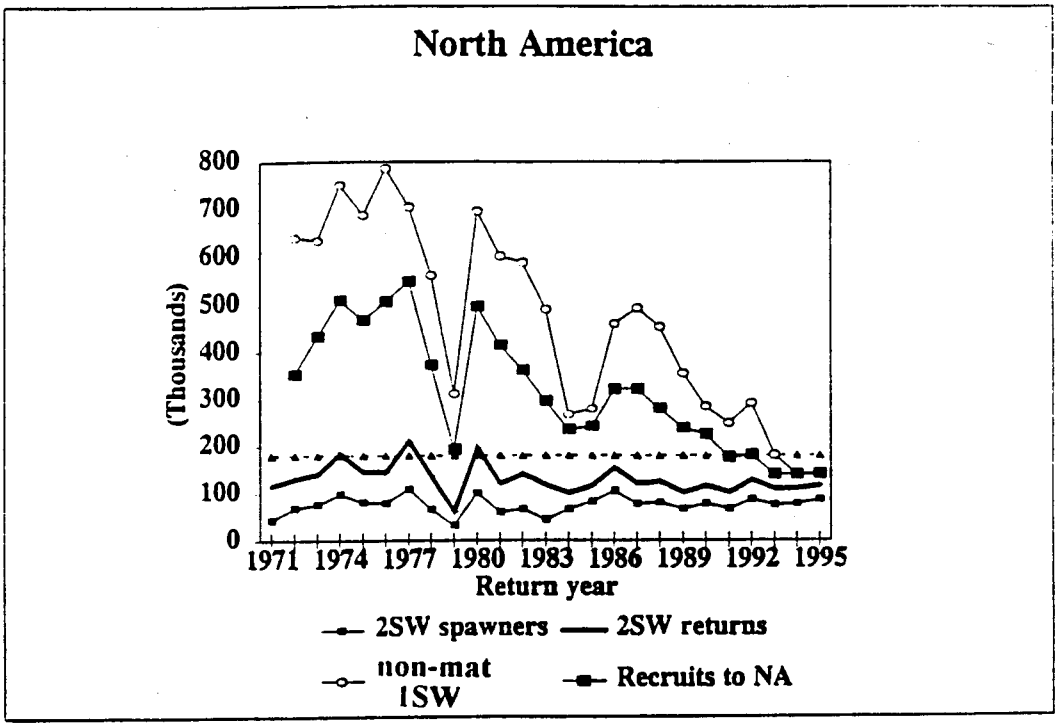


Figure 1.3.2 North American stocks of Atlantic salmon.
Top panel: 2SW fish (non-mature at 1SW), for 1971–1995 return year
a) pre-fishery abundance after 1sea winter: open circles,
b) number returning to coastal waters after 2 sea winters (after ocean fishery): large filled squares,
c) number entering river after 2 sea winters (after coastal fishery): solid line,
d) number spawning after 2 sea winters (after in-river fishery): small filled squares,
e) spawning escapement target: dashed line.
Bottom panel: 1SW fish (mature at 1SW), for 1971–1995 return year
a) pre-fishery abundance after 1 sea winter: filled triangles,
b) number entering river after 1 sea winter (no ocean fishery, after coastal fishery): solid line,
c) number spawning after 1 sea winter (after in-river fishery): small filled squares.



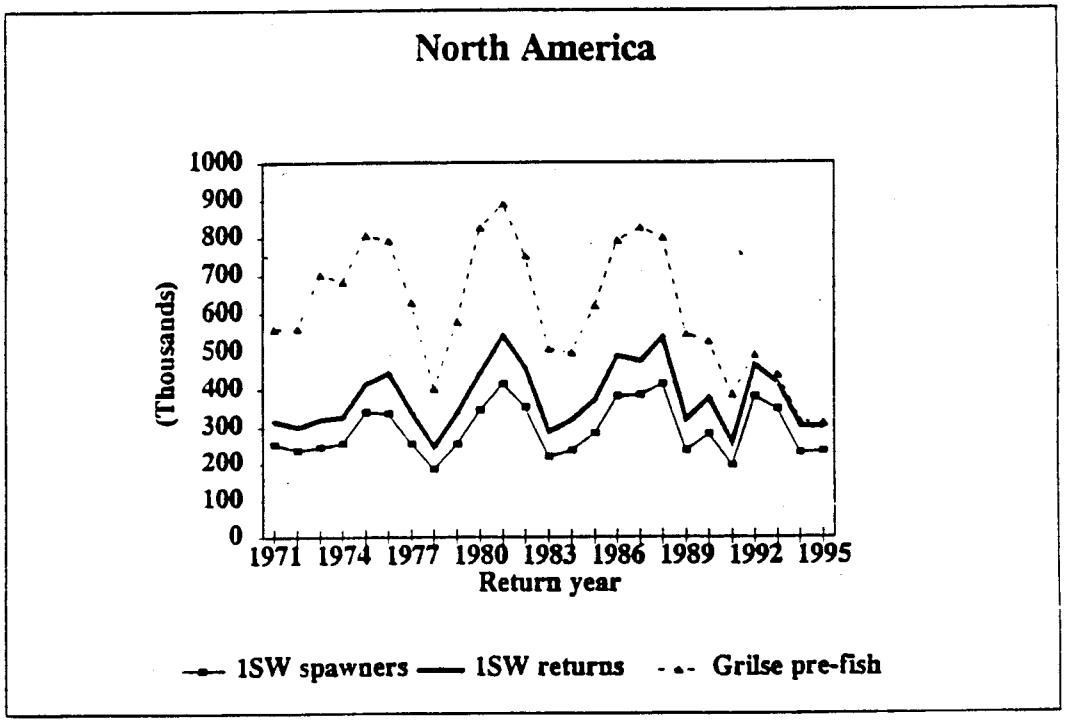


Figure 1.3.3 Proportion of egg deposition target attained in the rivers assessed in four geographic areas of eastern Canada, 1984 to 1995. The vertical line represents the range, the rectangle represents the interquartile range and the horizontal line is the median. The number above the range line indicates the number of rivers assessed in each year.

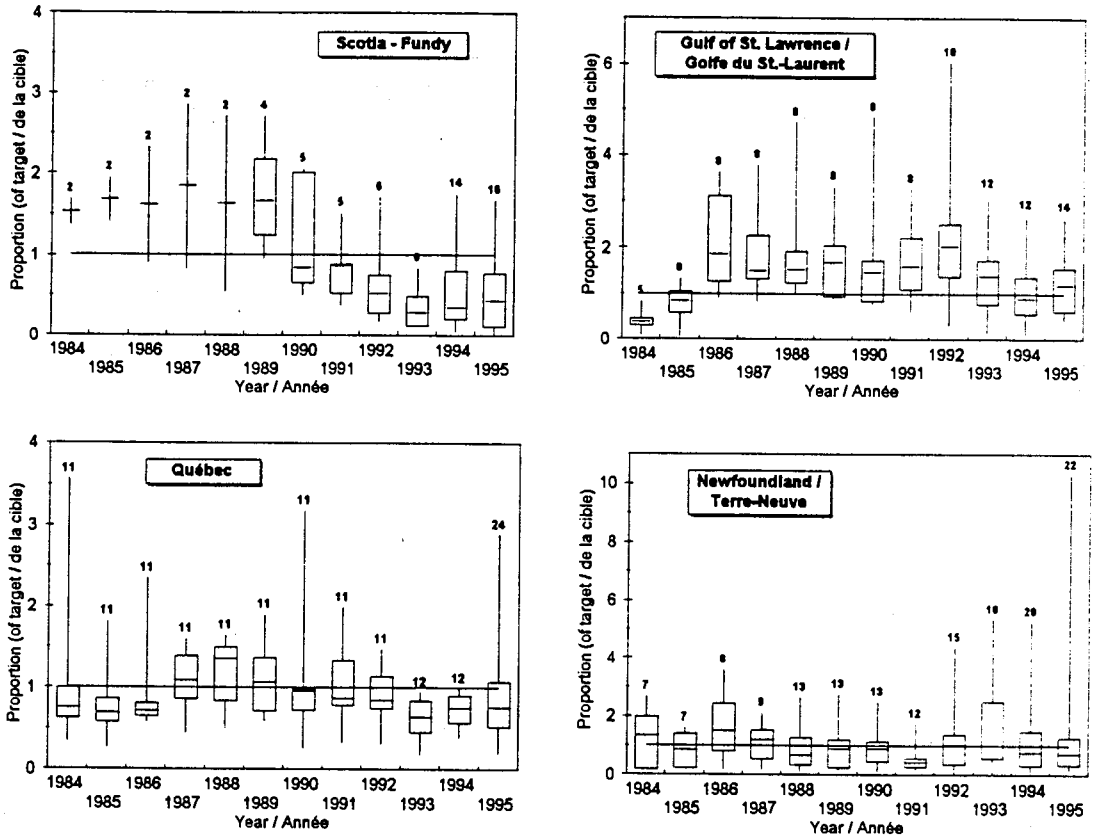


Figure 4.2.1 Observed (1979–1994) and predicted (1978–1996) pre-fishery abundance of non-maturing 1SW North American salmon.

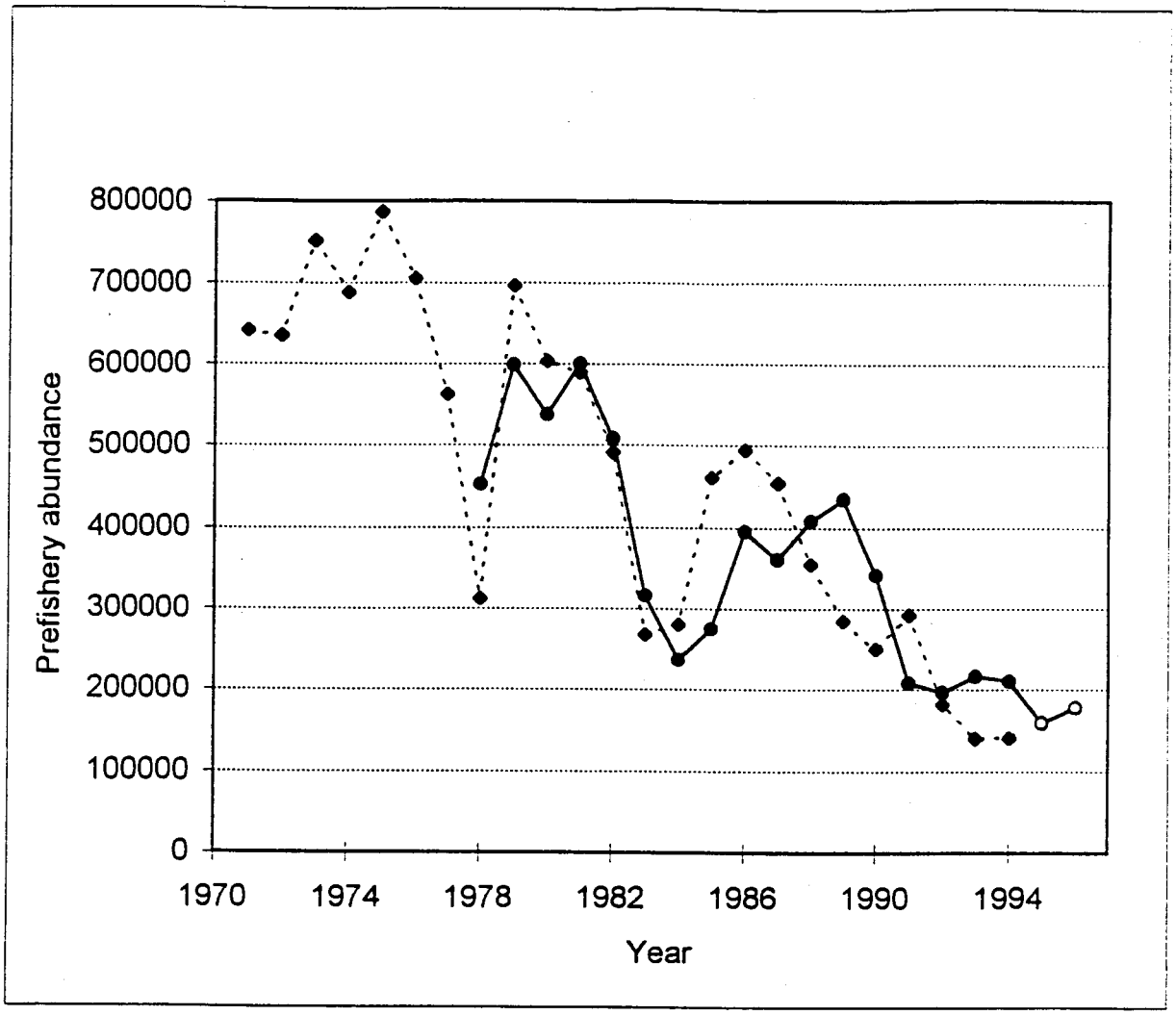


Figure 5.2.1 Maximum and minimum estimates of recruitment of maturing 1SW salmon in southern European countries.

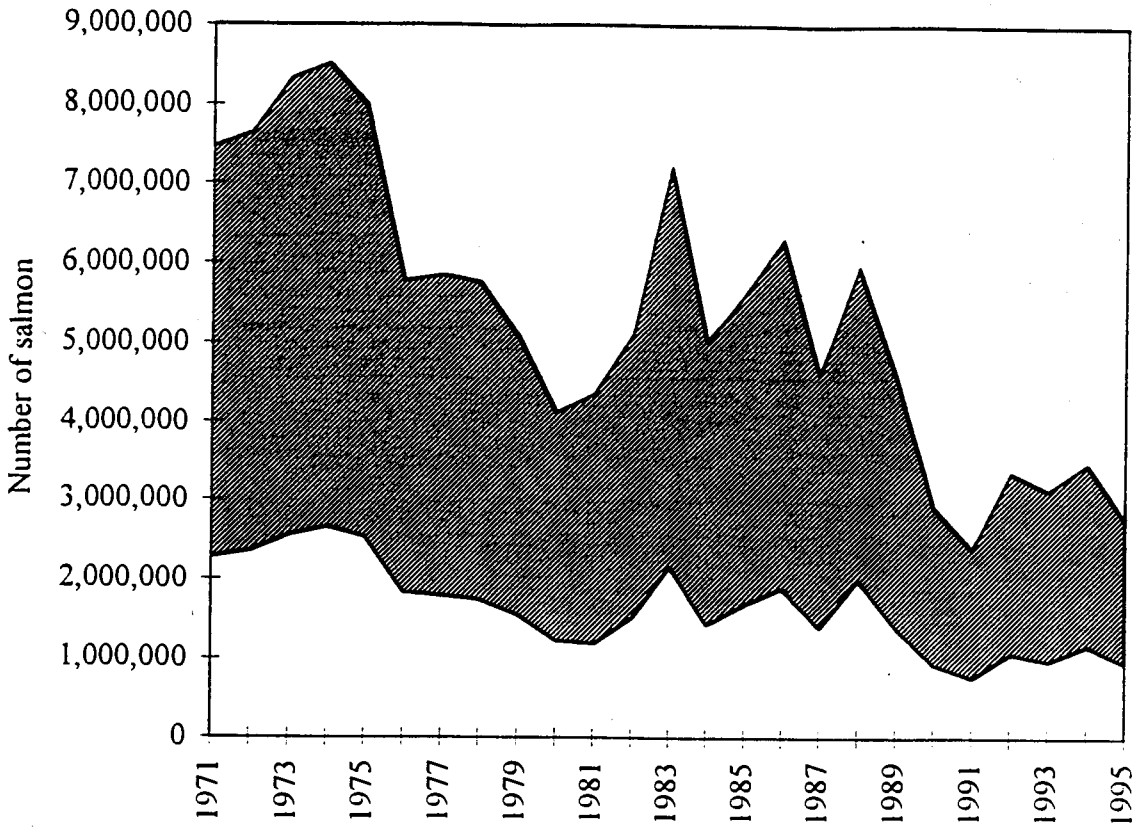


Figure 5.2.2 Maximum and minimum estimates of recruitment of non-maturing 1SW salmon in southern European countries.

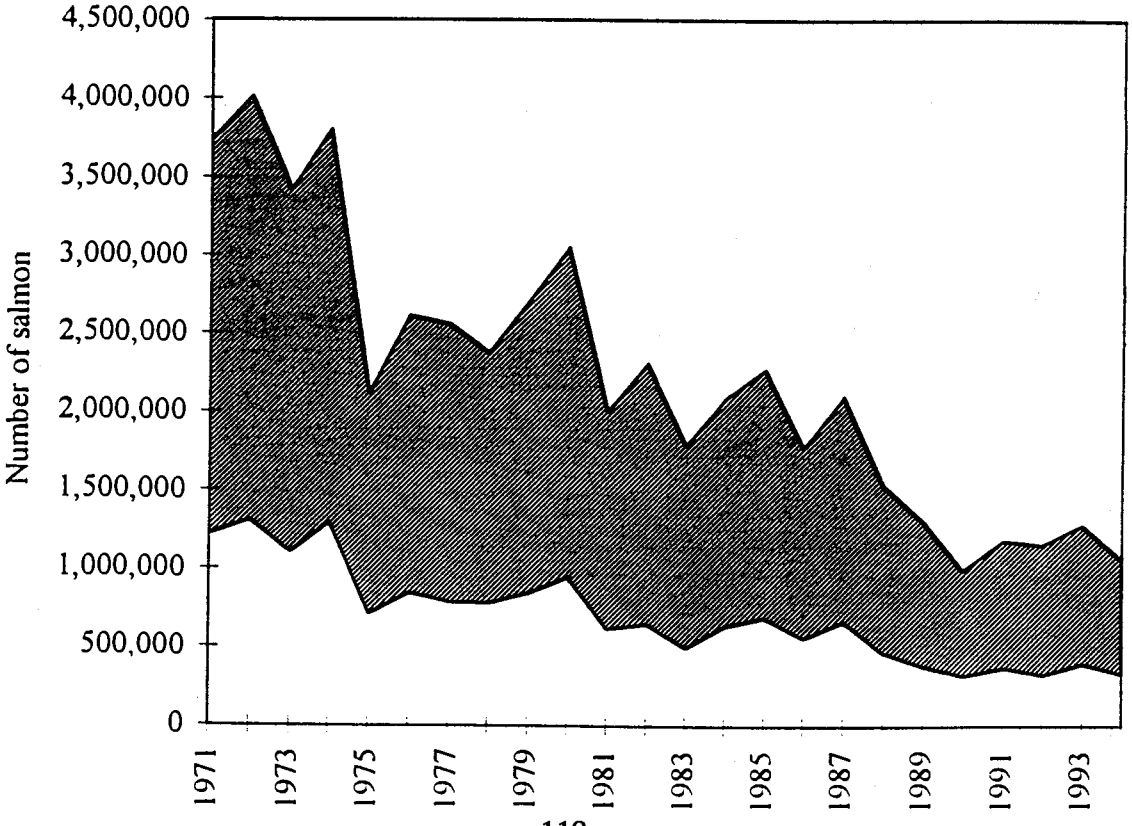


Figure 5.2.3 Maximum and minimum estimates of recruitment of maturing 1SW salmon in northern European countries.

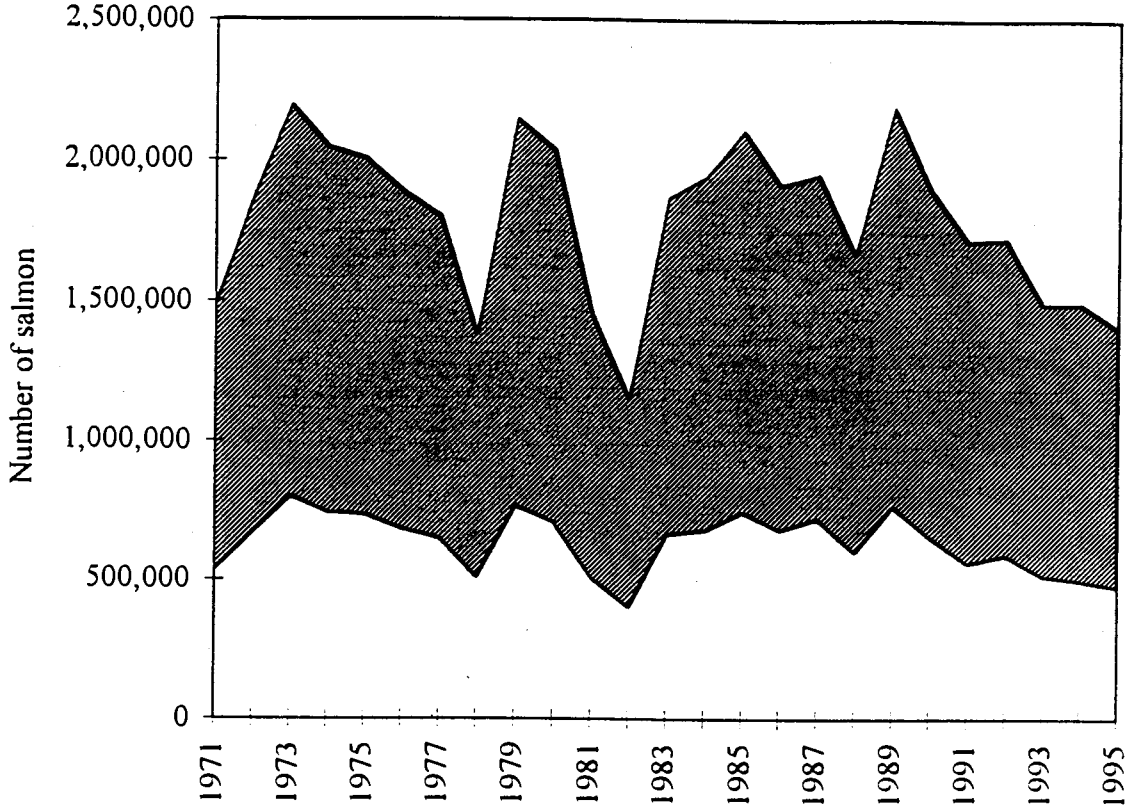


Figure 5.2.4 Maximum and minimum estimates of recruitment of non-maturing 1SW salmon in northern European countries.

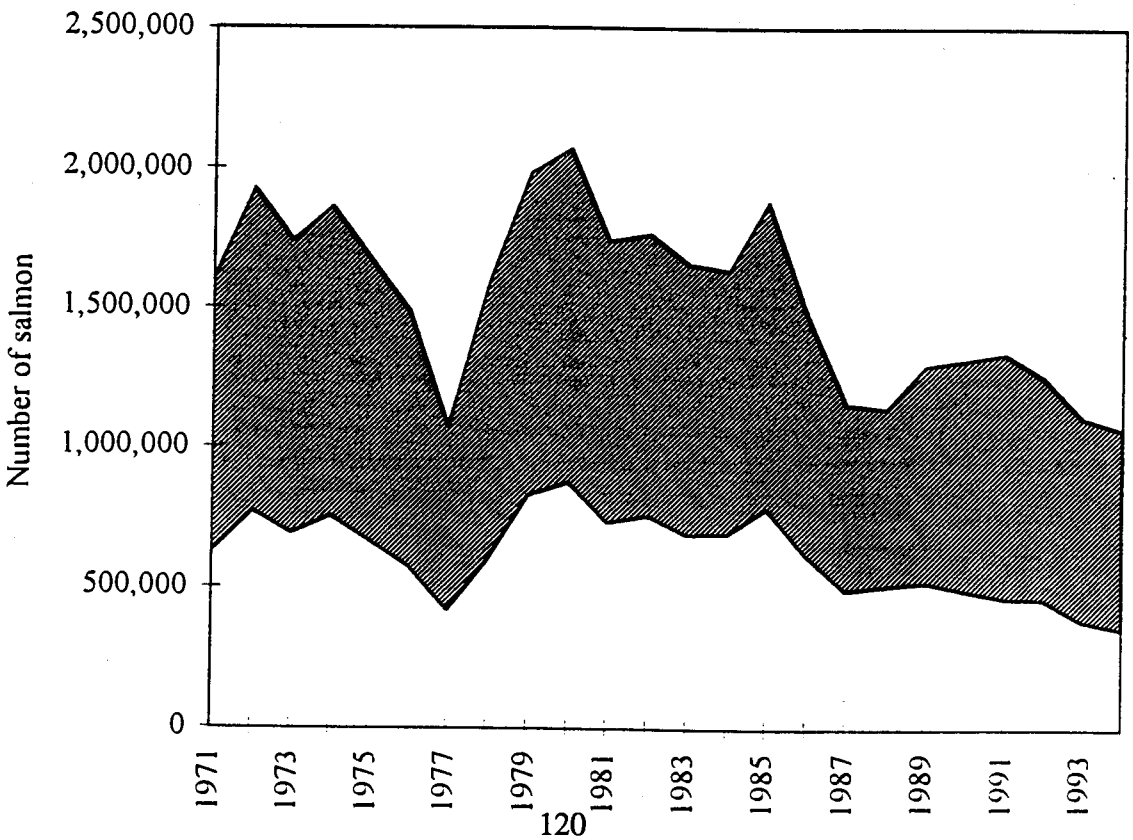


Figure 5.2.5 Time series trends of thermal habitat area and the abundance of non-maturing stock from southern Europe.

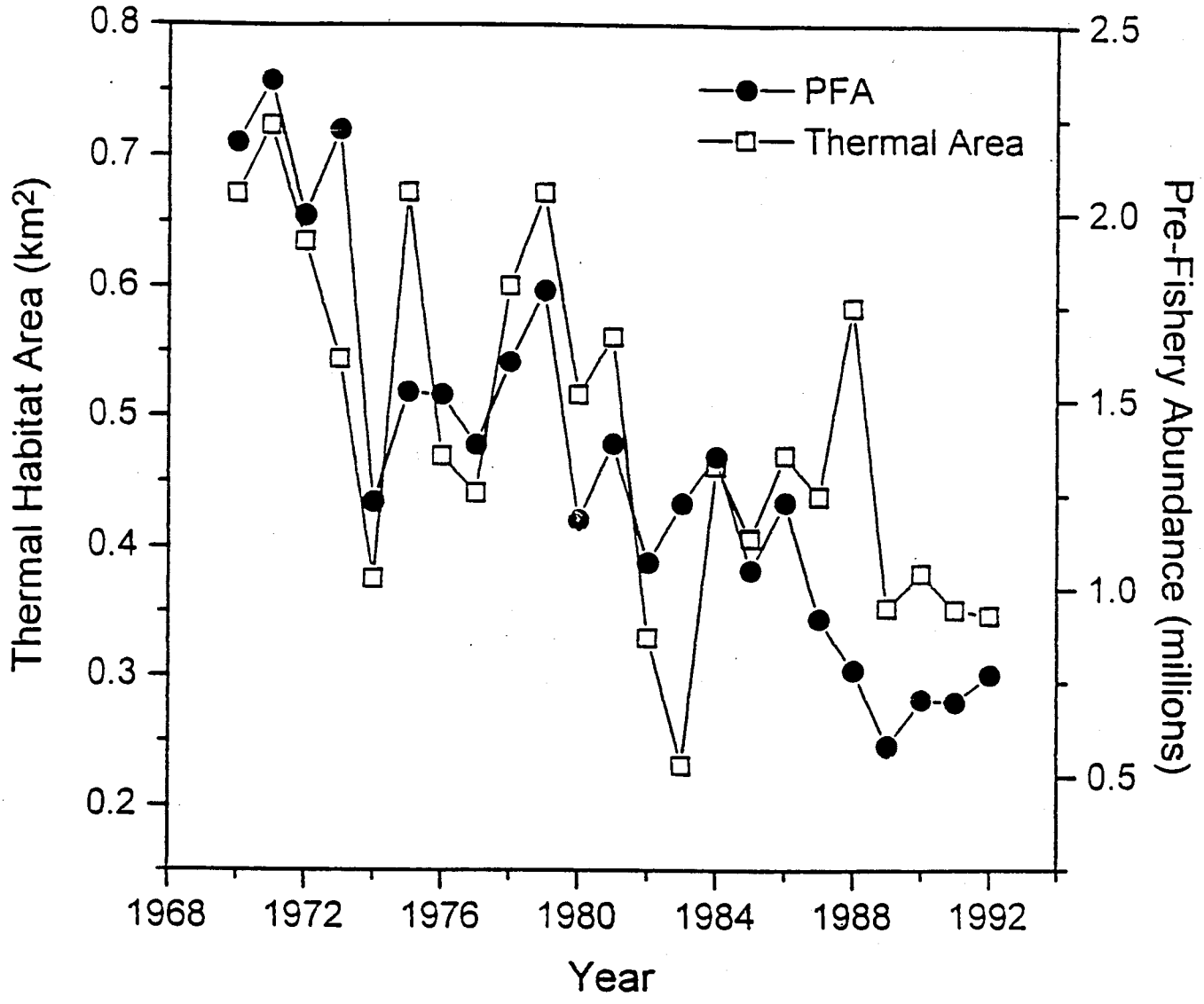
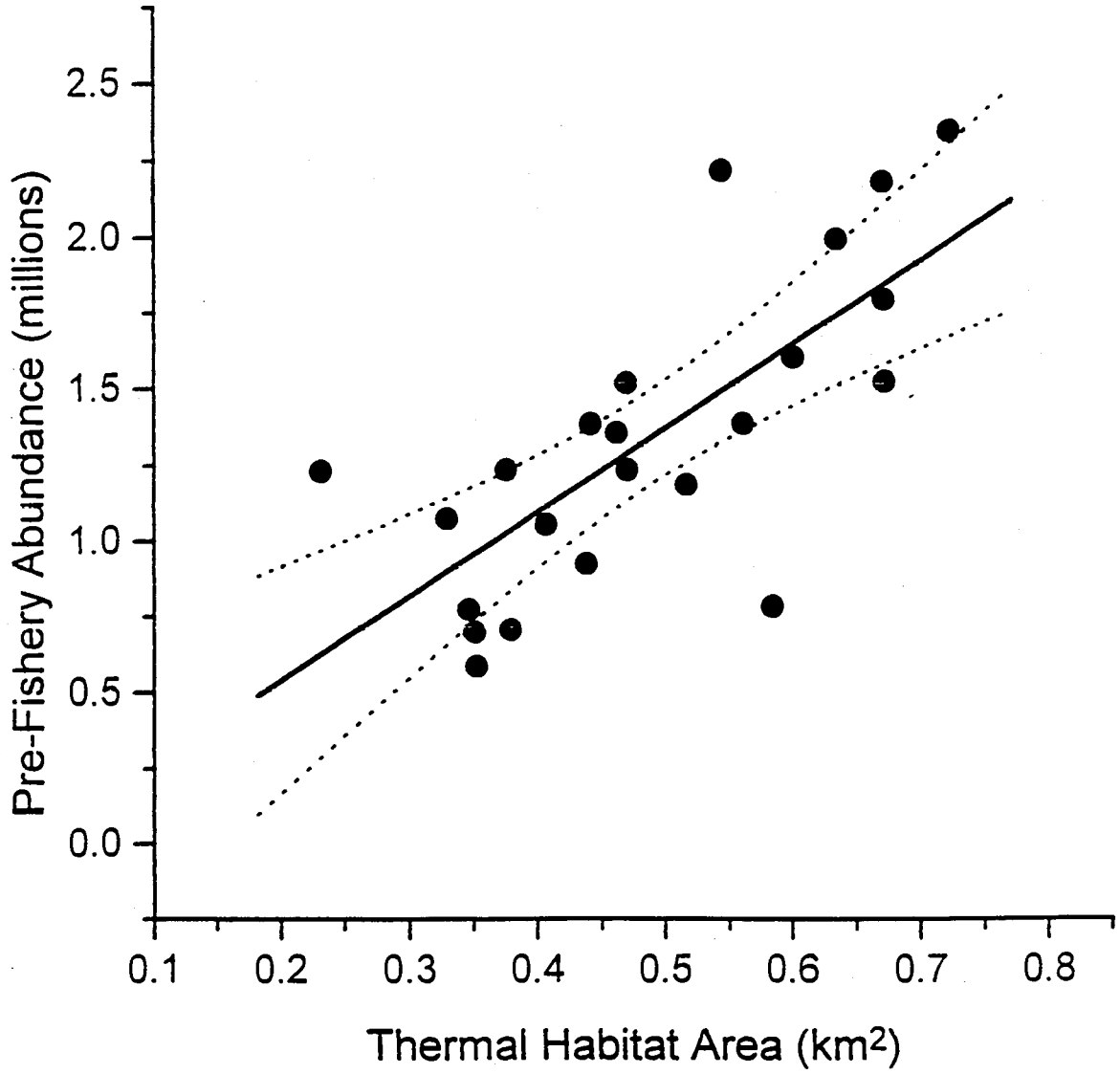


Figure 5.2.6 Relationship between thermal habitat area and the abundance of non-maturing stock from southern Europe.



ANNEX 12

COUNCIL

CNL(96)58

REQUEST FOR SCIENTIFIC ADVICE FROM ICES

CNL(96)58

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, including unreported catches, and production of farmed and ranched salmon in 1996;
   1.2 report on significant developments which might assist NASCO with the management of salmon stocks;
   1.3 describe the causes of long-term changes in sea-age composition of salmon stocks;
   1.4 describe the causes of changes in abundance of salmon with special reference to changes in natural mortality and ocean climate;
   1.5 review the development of assessments and management advice from the perspective of the precautionary approach;
   1.6 provide a compilation of microtag, finclip and external tag releases by ICES member countries in 1996.

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

   2.1 describe the events of the 1996 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 develop age specific spawning targets;
   2.4 provide catch options with an assessment of risks relative to the objective of achieving spawning targets;
   2.5 evaluate the potential by-catch of post-smolts in pelagic fisheries;
   2.6 identify relevant data deficiencies and research requirements.

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

   3.1 describe the events of the 1996 fisheries and the status of the stocks;
   3.2 update the evaluation of the effects on US and Canadian stocks and fisheries of quota management and closures implemented after 1991 in the Canadian commercial salmon fisheries;
   3.3 update age specific spawning targets based on new information as available;
   3.4 provide catch options with an assessment of risks relative to the objective of achieving spawning targets;
   3.5 provide multi-year projections of salmon abundance,
   3.6 identify relevant data deficiencies and research requirements.

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

   4.1 describe the events of the 1996 fisheries and the status of the stocks;
   4.2 provide catch options with an assessment of risks relative to the objective of achieving spawning targets;
   4.3 identify relevant data deficiencies and research requirements.

ANNEX 13

COUNCIL

CNL(96)17

CATCH STATISTIC RETURNS BY THE PARTIES

CNL(96)17

CATCH STATISTIC RETURNS BY THE PARTIES

1. The Official Catch Statistics, as submitted by the Parties, are tabulated overleaf (Table 1). The figures for 1995 are provisional. These catch statistics, which have been rounded to the nearest tonne, will be used to calculate the contributions to NASCO for 1997 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 1960-1995 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 1960-1995 is provided, for information only, in paper CNL(96)18.

Secretary
Edinburgh
20 May 1996

TABLE 1: OFFICIAL CATCH STATISTICS

	PROVISIONAL 1995 CATCH (TONNES)	PROVISIONAL 1995 CATCH ACCORDING TO SEA AGE						CONFIRMED 1994 CATCH (TONNES)
		1SW		MSW		TOTAL		
		NO	WT	NO	WT	NO	WT	
CANADA	270	-	122	-	148	-	270	355
DENMARK (in respect of Faroe Islands and Greenland)	88	-	-					18
FAROE ISLANDS *	5	0	0	1,963	-	1,963	-	6
GREENLAND *	83	-	-	-	-	-	-	12
EUROPEAN UNION **	1,697	-	-	-	-	-	-	1,919
FINLAND	-	-	-	-	-	-	-	48
ICELAND	439	-	-	-	-	-	-	448
NORWAY	839	134,341	248	98,656	591	232,997	839	996
RUSSIAN FEDERATION	129	27,775	62	11,835	67	39,610	129	141
SWEDEN	-	-	-	-	-	-	-	44
UNITED STATES OF AMERICA	0	-	-	-	-	-	-	0

* Breakdown of the Faroese catch according to sea-age is for the 1994/95 season and excludes fish which were tagged and released. Compensation agreements were in place for the Faroese fishery in 1994 and 1995 and for the Greenland fishery in 1994.

** The 1995 catch for the European Union include the catches by Finland and Sweden.

TABLE 2: CATCHES OF ATLANTIC SALMON BY THE PARTIES TO THE NASCO CONVENTION

	CANADA	DENMARK*	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	1976	462	38	1
1973	2434	2402	4604	50	256	2126	772	73	3
1974	2539	1945	4432	76	225	1973	709	57	1
1975	2485	2086	4500	76	266	1754	811	56	2
1976	2506	1479	2931	66	225	1530	772	45	1
1977	2545	1652	3025	59	230	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	354	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	270	88	1697	-	439	839	129	-	0

NOTES: *In respect of the Faroe Islands and Greenland

1. The European Union catch for 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 on are the official catch returns to NASCO. Figures to 1986 are based on data contained in the ICES Working Group Reports.
4. The Faroese fishery was subject to compensation agreements in 1991-1995. The West Greenland fishery was subject to compensation agreements in 1993 and 1994.

ANNEX 14

COUNCIL

CNL(96)19

SUMMARY OF MICROTAG, FINCLIP AND EXTERNAL TAG RELEASES IN 1995

CNL(96)19

SUMMARY OF MICROTAG, FINCLIP AND EXTERNAL TAG RELEASES IN 1995

1. The annual summary of the information on tagging programmes conducted by the Parties in 1995 is attached as Table 1. In excess of 3.2 million fish were either tagged or marked prior to release during 1995, of which 25.3% were microtagged, 70% were finclipped (principally adipose clips), 4.5% were tagged with external tags (principally Carlin tags) and 0.1% were branded or dyemarked. More than 830,000 fish bore auxiliary marks, principally adipose clips used in conjunction with microtagging. More than 97% of the fish marked were of hatchery origin.

2. Table 2 presents a comparison of the tagging programmes in 1994 and 1995. The 1995 figure of 3.2 million released marked fish is almost 21% lower than the number released the previous year. The main reason for this decrease was the decrease in the number of microtagged fish released. There were reductions in both the number of wild and hatchery reared fish marked in 1995 compared to 1994.

Secretary
Edinburgh
13 May 1996

TABLE 1

SUMMARY OF 1995 TAG RELEASES BY PARTY

PARTY	ORIGIN	MARKING METHOD				
		MICROTAGS	EXTERNAL TAGS	BRANDS, DYEMARKS ETC.	FINCLIPS	AUXILIARY TAGS, FINCLIPS, MARKS ETC.
CANADA	Hatchery	-	24,250	-	1,721,926	4,033
	Wild	-	10,157	-	2,133	78
	TOTAL	-	34,407	-	1,724,059	4,111
EUROPEAN UNION	Hatchery	539,667	7,431	1,619	446,009	539,667
	Wild	44,137	8,790	1,577	-	52,353
	Mixed*	-	-	327	-	327
	TOTAL	583,804	16,221	3,523	446,009	592,347
ICELAND	Hatchery	235,160	996	-	-	235,160
	Wild	7,268	36	-	-	7,268
	TOTAL	242,428	1,032	-	-	242,428
NORWAY	Hatchery	-	82,456	-	118,361	-
	Wild	-	3,868	-	-	-
	Mixed*	-	1,965	-	-	-
	TOTAL	-	88,289	-	118,361	-
RUSSIAN FEDERATION	Hatchery	-	-	-	-	-
	Wild	-	1,200	-	-	-
	TOTAL	-	1,200	-	-	-
USA**	Hatchery	-	3,585	-	-	-
	Wild	-	3,566	-	-	-
	Mixed*	-	33	-	-	-
	TOTAL	-	7,184	-	-	-
TOTAL	**Hatchery**	**774,827**	**118,718**	**1,619**	**2,286,296**	**778,860**
	Wild	**51,405**	**27,617**	**1,577**	**2,133**	**59,699**
	Mixed*	**-**	**1,998**	**327**	**-**	**327**
	TOTAL	**826,232**	**148,333**	**3,523**	**2,288,429**	**838,886**

* Either not differentiated into hatchery or wild fish or origin unknown.

** The figures for the USA include 301 PIT tags.

TABLE 2

COMPARISON OF 1994 AND 1995 TAGGING PROGRAMMES

	1994	1995	% CHANGE
MICROTAGS			
Hatchery	1,568,019	774,827	-50.59
Wild	66,392	51,405	-22.57
TOTAL	1,634,411	826,232	-49.45
EXTERNAL TAGS			
Hatchery	142,802	118,718	-16.87
Wild	26,698	27,617	+3.44
Mixed	1,014	1,998	+97.04
TOTAL	170,514	148,333	-13.01
BRANDS, DYEMARKS			
Hatchery	17,780	1,619	-90.89
Wild	330	1,577	+377.88
Mixed	-	327	-
TOTAL	18,110	3,523	-80.55
FINCLIPS			
Hatchery	2,294,218	2,286,296	-0.35
Wild	2,782	2,133	-23.33
Mixed	299	-	-
TOTAL	2,297,299	2,288,429	-0.39
TOTAL			
HATCHERY	**4,022,819**	**3,181,460**	**-20.91**
WILD	**96,202**	**82,732**	**-14.00**
MIXED	**1,313**	**2,325**	**+77.08**
TOTAL	**4,120,334**	**3,266,517**	**-20.72**

ANNEX 15

COUNCIL

CNL(96)20

NASCO TAG RETURN INCENTIVE SCHEME

CNL(96)20

NASCO TAG RETURN INCENTIVE SCHEME

1. At its Tenth Annual Meeting the Council considered the future of its Tag Return Incentive Scheme following the trial period which had been funded by the United States of America and which ended with the 1994 awards. It was agreed that the Scheme should continue and would be funded from 1995 by budgetary provision with a total of four prizes being awarded (a Grand Prize of $2500 and one prize in each of the Commissions of $1500). The awards are novel and well publicised and this has led to some benefits to the Organization in terms of knowledge at the fisherman level of NASCO's work. There is also evidence that the prizes have increased the return of tags, which was the main objective of the Scheme.

2. In accordance with the Rules of the Scheme those Parties wishing to participate in the draw for 1996 were requested to provide by 1 May a list of names and addresses of persons returning eligible external tags during the period 1 January - 31 December 1995. Details of the country in which the tag was recaptured were also requested in order that each tag could be allocated to the appropriate Commission area. A total of 5194 eligible tags was returned and entered into the draw for the Grand Prize. 1106, 23 and 4065 eligible tags were entered into the draws for the North American, West Greenland and North-East Atlantic Commissions respectively. The draw will be made by the auditors to NASCO in accordance with the Rules of the Scheme. The winner of the $2,500 prize will be announced by the President at the Thirteenth Annual Meeting of the Council. The winners of the $1,500 prize in each Commission will be announced by the Chairmen of the respective Commissions.

Secretary
Edinburgh
14 May 1996

ANNEX 16

COUNCIL

CNL(96)21

DATABASE OF SALMON RIVERS FLOWING INTO THE NASCO CONVENTION AREA

CNL(96)21

DATABASE OF SALMON RIVERS FLOWING INTO THE NASCO CONVENTION AREA

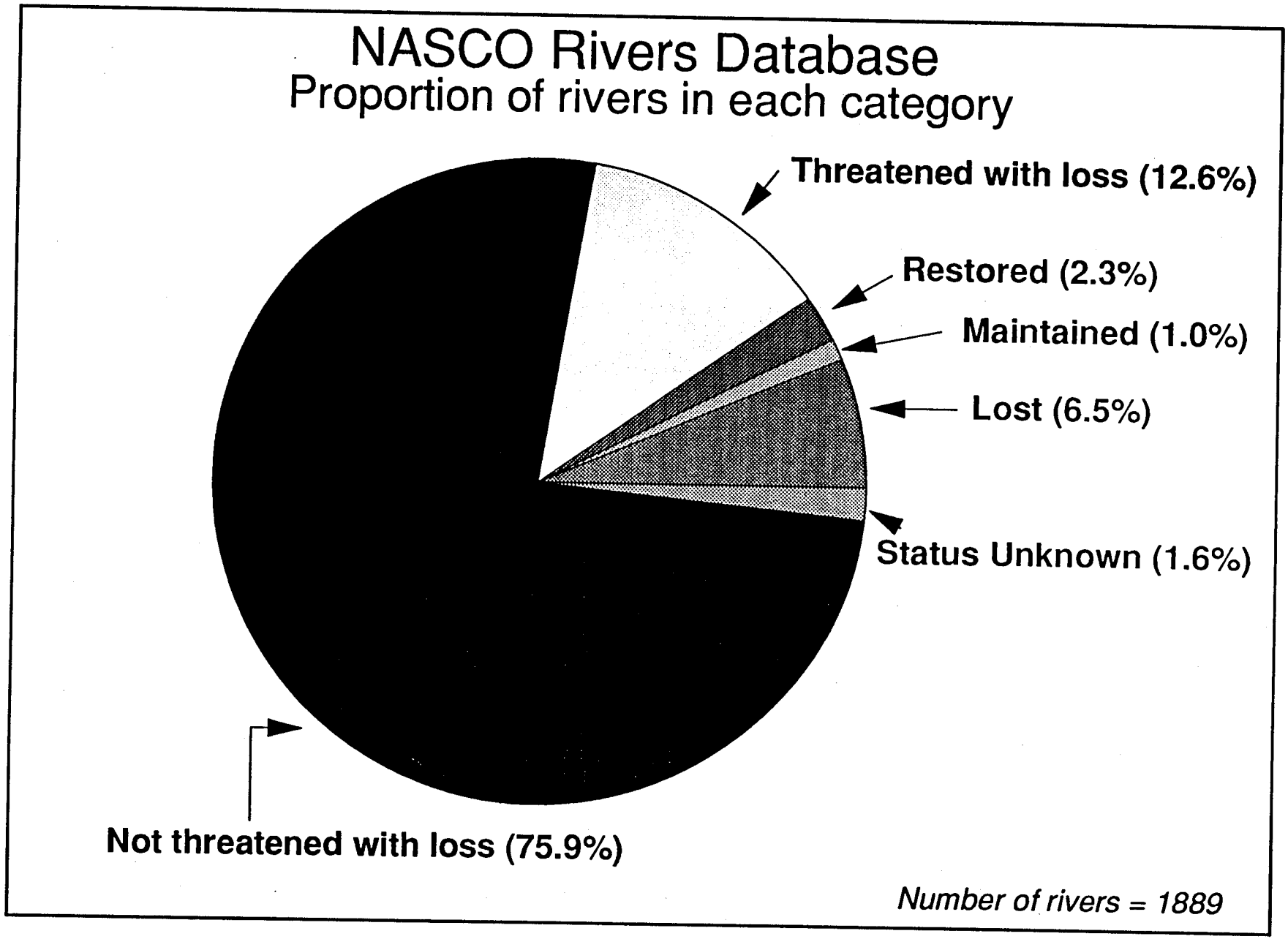
1. At its Sixth Annual Meeting the Council decided to establish a database of all salmon rivers flowing into the Convention area with an indication of their status. A format for provision of the information was agreed in 1990 and the information was requested from the Parties on 13 March 1991. In addition to the basic information requested (ie river name, location, category and information on the cause of loss or threats to the salmon stocks) additional information on the size of the rivers (expressed as either catchment area or mean annual flow) and on catch has been provided in some cases.

2. Last year we reported that returns had been received from six Parties (1356 rivers). Since then information has been received from the remaining Parties. In total, information on 1889 rivers has now been included in the database and the percentage of rivers in each category is illustrated in the pie chart overleaf. Of these rivers 75.9% are categorised as being 'not threatened with loss'. However, a total of 7.5% of the rivers fall into the categories 'lost' and 'maintained' and 12.6% are considered to be 'threatened with loss'. Threats to the stocks which have been identified include deterioration of water quality (including acidification); water regulation and abstraction; diseases and parasites; introductions and transfers (including escapes from fish farms); high marine mortality and over-exploitation (including illegal fishing).

3. At present the database consists of a simple listing of the information provided by the Parties which, because it is computer-based, can be rapidly interrogated and summaries prepared. Using commercially available software it will be possible to take data from the database and display it in digitised map form and to include other salmon related information.

4. While information has now been received from all Parties, details for some rivers are still outstanding and during the year we will contact the Parties concerned with a view to ensuring that the remaining information is included in the database to enable a comprehensive review to be presented to the Council at its Fourteenth Annual Meeting. There is already interest in using the information contained in the database. For example, at its meeting in Gothenburg, the North-East Atlantic Commission will be asked to consider a recommendation from its Ad Hoc Working Group on Introductions and Transfers that the rivers database be used as a basis for classifying rivers for the development of management measures in relation to introductions and transfers.

Secretary
Edinburgh
9 April 1996


NASCO Rivers Database
Proportion of rivers in each category
Threatened with loss (12.6%)
Restored (2.3%)
Maintained (1.0%)
Lost (6.5%)
Status Unknown (1.6%)
Not threatened with loss (75.9%)
Number of rivers = 1889

ANNEX 17

COUNCIL

CNL(96)24

RETURNS UNDER ARTICLES 14 AND 15 OF THE CONVENTION

CNL(96)24

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 1995 was circulated on 25 January 1996. 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, the Laws, Regulations and Programmes concerned have been lodged with the Secretariat and this 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 all EU member states which have salmon interests.

Secretary
Edinburgh
14 May 1996

ARTICLE 14

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 coastguard in Norway has continued the inspection of the high seas area. There have been no reports of any fishing in the area.

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 NEW ACTIONS

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

The quota for the commercial salmon fishery in Labrador was reduced from 92t to 73.5t in 1995.

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 NEW ACTIONS

2. ACTIONS TAKEN TO IMPLEMENT REGULATORY MEASURES UNDER ARTICLE 13 *(Article 14, paragraph 1)*

NO NEW ACTIONS

ARTICLE 15

3. LAWS, REGULATIONS AND PROGRAMMES ADOPTED OR REPEALED SINCE THE LAST NOTIFICATION *(Article 15, paragraph 5(a))*

Denmark (in respect of the Faroe Islands and Greenland)

Greenland

Two new regulations were introduced in 1995 concerning the catch of salmon (regulation no. 21) and buying and selling of salmon (regulation no. 22).

European Union

Ireland

A number of byelaws were made in 1995 varying the open season for salmon fishing by draft nets and/or rod and line in a number of locations as follows:

Region	Location	Extension	Fishing method
Shannon	Rivers Cashen/Feale	4 days	Draft netting
Shannon	River Fergus	4 days	Draft netting
Northern	Ballyshannon area excluding tidal waters of River Erne & River Abbey	4 days	Draft netting

United Kingdom

In the United Kingdom a number of new regulations were introduced in 1995. These include:

England and Wales

NRA Northumbria/Yorkshire Region - byelaws to harmonise the netting byelaws and the North-East Coast (Limitation of net licences) Order 1994 which limits the number of licences that may be issued for fishing for salmon and migratory trout with fixed (T and J) nets in a specified area.

NRA Severn-Trent Region - byelaw to prohibit the use of draft nets in the Severn Estuary.

NRA Anglian Region - Anglian Coast (Limitation of net licences) Order 1994 which will phase out the net fishery for sea trout.

NRA Welsh Region - The National Rivers Authority (Limitation of net fishing licences) Order 1995 which is designed to reduce the exploitation by netsmen where salmon and sea trout stocks are at risk.

Scotland

The Annual Close Time (River Eachaig Salmon Fishery District) Order 1995 which came into force on 1 January 1996 increases the annual close time in the River Eachaig Salmon Fishery District to 1 September - 30 April from 1 September - 15 February. Within the annual close time fishing for salmon by rod and line is permitted from 1 September - 31 October.

The River Nith Salmon Fishery District (Baits and Lures) Regulations 1995 which came into force on 1 January 1996 prohibit the use of natural prawns and shrimps (or any part of them) as bait when fishing in the River Nith and its tributaries by rod and line for salmon and sea trout.

The Alness Salmon Fishery District Designation Order 1995.
The Conon Salmon Fishery District Designation Order 1995.

In each case these Orders designate the area of the district and abolish the existing district which is superseded by it, and make provision for the annual close time and for the period during which fishing for and taking salmon by rod and line is permitted.

Northern Ireland

Fisheries (Licence Duties) Bye-Laws (Northern Ireland) 1995 which increase the licence duties payable from 1 January 1996 for fishing with rod and line and hand line for salmon and for commercial fishing engines used for the taking of salmon together with the fee payable for a licence allowing the holder to buy and sell salmon.

Foyle Area (Licensing of Fishing Engines) (Amendment) Regulations 1995 which increase the licence fees payable in 1996 in respect of each type of net used and game fishing licence issued in the Foyle Area.

Foyle Area (Angling) Regulations 1995 which specify the methods of angling in certain waters in the Foyle Area and provide for a minimum length and number of fish which may be retained in one day. They also specify stretches of certain rivers where angling by any method is prohibited, prohibit the use of prawns or shrimps as bait and restrict the use of floats. They also prohibit foul hooking of salmon and the use of boats for angling on certain waters.

Norway

Management changes

In 1995 the state authorities again invested much effort in the process of changing the organization of river and salmon-stock management. In 1995 a further NOK 1.55 million was spent principally on local management planning (§25), but also on establishing local "Salmon-River Councils". By the end of the year local management

planning had commenced in about 40 rivers, including some of the most important salmon rivers in Norway, e.g. Gaula, Namsen, Lærdalselva, Orkla and Numedalslågen. Local management planning follows guidelines which were formulated in 1994 by the organizations of landowners in cooperation with the Directorate for Nature Management (DN). These guidelines were supplemented in 1995.

The basic principles of the models (which are still provisional) developed for rivers with salmon stocks for local management have also been considered relevant for other aspects of nature management, such as management of other freshwater fish species and wildlife stocks which are exploited by fishing or hunting. Based on this and the wish to put even more effort into this work in the years to come, the state authorities have commenced a project covering the four years 1996-2000. Further development of local management of rivers with salmon stocks will be one of four areas covered by the project. One of the major goals is to provide a basis for sustainable local management models of, for example, rivers with salmon stocks.

In 1995 new local fishing regulations for sea areas and rivers were introduced with the intention of protecting weak and vulnerable salmon stocks. Preparations were made for the delegation of authority to the municipalities in 1996 with regard to organising holders of fishing rights and organising the fishing.

Supervision in territorial sea areas and watercourses

The total cost in 1995 of supervision in territorial sea areas and watercourses was NOK 7.8 million.

USA

State of Maine adopted "catch and release" for angling statewide, effective June 7, 1995. For the first time in US history no legal retention of Atlantic salmon was allowed anywhere.

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

The Fisheries Act and regulations promulgated thereunder are in the process of being rewritten and should provide a basis for more flexible and responsive conservation, regulation and co-management.

European Union

Ireland

A Salmon Management Task Force was established and has reported to the Minister.

The state-owned draft net fishery on the River Moy was closed in 1995.

United Kingdom

Northern Ireland

In its Special Support Programme for peace and reconciliation the European Union has allocated funding for a Salmonid Enhancement Scheme in Northern Ireland. The scheme, which is for the period 1995-97, will principally support projects designed to improve salmon stocks throughout Northern Ireland but projects for brown trout will also be considered. Priority will be given to projects submitted by properly constituted angling clubs and other organizations. Grant aid of up to 100% of approved expenditure will be provided for projects designed to provide economic and social benefits to the rural community. Eligible projects are likely to include habitat and stock surveys, rehabilitation of habitats, establishment or improvement of hatcheries, stocking with ova or fry, improvement of fish passage, installation of fish counters, facilities for acquiring broodstocks and improvement of access to fisheries.

Norway

Salmonid Register

The Directorate for Nature Management prepares every year a review of the status of stocks of anadromous salmonids in Norwegian rivers. The rivers are divided into categories based on an evaluation of the status of the fish species. Factors which threaten the fish populations are also recorded.

A complete updated survey of Norwegian watercourses containing Atlantic salmon modified to the NASCO categories will be presented separately to the NASCO Secretariat for inclusion in the rivers database.

As of 31 December 1995, 629 rivers were registered as having stocks of Atlantic salmon. According to the Norwegian categorization, there are 41 rivers where the

stocks have become extinct due to acid rain, river regulation, *Gyrodactylus salaris* or interaction with salmon which have escaped from salmon farms. 50 rivers have stocks which are threatened due to *Gyrodactylus salaris*, acid rain, overfishing and interaction with salmon which have escaped from farms. 137 rivers are categorised as having stocks which are vulnerable. The threats in these rivers are river regulation and other physical encroachments, acidification, agricultural and other pollution, escaped farmed salmon, *Gyrodactylus salaris*, other fish diseases and overfishing. 241 rivers have naturally small stocks with no significant human impact. 108 rivers have large stocks not influenced by any threats. In addition there are 6 rivers whose natural stocks have become extinct, but in which new stocks have been established. In 12 rivers there is uncertainty as to whether the species forms a stock. Finally, there are 34 rivers where a stock is present, but its status is unknown.

The system used to categorize the rivers is an important element in the national management strategy for anadromous salmonids. The category in which a river is placed is important in that it determines how the river will be managed and what priority will be given to it as regards protection and other measures. Guidelines for deciding the dates of the open season in the rivers are also based on the various categories.

There will still be a need for some minor adjustments to the system and an improvement of the basis on which the categorisation is made. When this has been achieved, we will be able to obtain an accurate picture of the status of all the stocks in Norwegian rivers and of changes in their status from year to year.

Monitoring

The Directorate for Nature Management has commenced a 2-year programme aimed at improving the national system for stock monitoring of anadromous salmonids. The programme includes: coordination of monitoring activities, establishment of permanent monitoring sites, improvement of catch statistics, development of databases and development of monitoring techniques (including fish counters, marking techniques and visual observation techniques). The total budget in 1995 was NOK 3.7 million and included financial support for existing monitoring activities.

Liming

In 1995 the liming of 16 Atlantic salmon rivers was carried out at a cost of NOK 30.0 million.

Rotenone Treatment

In 1995 one watercourse was treated with rotenone against *Gyrodactylus salaris*, bringing the total number of watercourses treated in Norway to 23. The experience with rotenone treatment is good. So far 11 rivers have been taken off the sick list. Another 9 rivers are expected to be taken off the sick list in 1996 or 1997. The Norwegian authorities spent NOK 3.8 million in 1995 on these activities. The prospects of exterminating the parasite from Norwegian rivers are good. A committee has proposed a strategy which proposes rotenone treatment of 14 rivers in the period 1996-2000.

Mandatory releases of salmon juveniles

No information is presently available for 1995.

Gene-bank and Sperm-bank

By the end of 1995 sperm from a total of 5702 salmon from 162 stocks has been frozen in the Norwegian gene banks to provide a possibility of rescuing stocks from extinction. 31 characteristic and valuable stocks have been taken into the "living gene banks" in Haukvik (Mid-Norway), in Eidfjord (Southwest Norway) and in Bjerka (North Norway).

In 1995 sperm from 112 salmon from 17 stocks was frozen. Male and female salmon from 12 stocks were taken into a "living gene bank". Norway is spending about NOK 7 million every year to operate the gene bank. In addition approximately NOK 4 million was invested in new facilities and equipment during 1995.

International research programmes

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

5. OTHER FACTORS WHICH MAY SIGNIFICANTLY AFFECT THE ABUNDANCE OF SALMON STOCKS SUBJECT TO THE CONVENTION *(Article 15, paragraph 5(c))*

European Union

Finland

Increasing salmon farming. *Gyrodactylus salaris* problem.

Iceland

The bankruptcy of a large ranching station will reduce the abundance of salmon in Icelandic waters.

Norway

Acidification

Acidification is one of the main threats to the salmon stocks in Norway. In the Agder counties in southern parts of Norway almost all natural stocks are extinct as a result of heavy acidification. Acidification is also a serious problem in salmon rivers in the western parts of Norway. During 1995 there has been progress in determining values of chemical parameters in river habitats which are critical for salmon survival at different juvenile stages.

Gyrodactylus salaris

The monogenean parasite *Gyrodactylus salaris* is one of the most serious threats to the Atlantic salmon in Norway today.

The total number of Norwegian rivers which are infested or have been infested with *Gyrodactylus salaris* is 38, the same number as in 1994. The parasite was also reported in 37 hatcheries. Rotenone treatment of the infested watercourses and clearing of infested hatcheries are being carried out to eliminate the parasite. This method has been used in 23 Gyrodactylus-infested rivers, and there is now only one hatchery infested with the parasite.

Sea lice

Sea lice (*Lepeophtheirus salmonis* and *Caligus elongatus*) in fish farms and on wild fish populations are still a problem in Norway. In 1995 the situation was similar to the situation in previous years. In 1996, a new research program has been commenced (running for at least 3 years) to investigate whether sea lice from fish farms can affect the population size of different salmon stocks.

Furunculosis

In 1995 there was no report of serious effects in rivers affected by the furunculosis bacteria (*Aeromonas salmonicida* sub-species *salmonicida*). The total number of rivers in which furunculosis has been recorded is similar in 1995 to 1994.

Escaped farmed salmon

The number of fish which escaped from fish farms was 646,500 in 1995 (570,000 in 1994). However it should be stressed that this is only the number of escaped salmon due to accidents which have been reported to the authorities. The actual number of salmon which escaped during the normal production cycles is not known.

In Norwegian coastal salmon fisheries the proportion of farmed salmon has varied between 34 and 49% (unweighted means) in the period 1989 to 1995, the lowest proportions (34% in 1994 and 42% in 1995 respectively) being recorded in the last two years. These proportions are significantly higher than in fjord fisheries where 10 to 21% of the catch has been of farmed origin and in 1995 the relative number was 17%. In freshwater the proportion of farmed salmon in anglers' catches is relatively low, and has varied between 4 and 7% during the same period (4% in 1995). In catches of brood stocks, the proportion is much higher and varied between 21 and 38% (23% in 1995). The incidence of farmed fish appears to have declined in recent years both in broodstocks and the sport fishery.

COUNCIL

CNL(96)25

FISHING FOR SALMON IN INTERNATIONAL WATERS

CNL(95)25

FISHING FOR SALMON IN INTERNATIONAL WATERS

1. At its Ninth Annual Meeting in Washington DC, the Council unanimously adopted the "Protocol Open for Signature by States not Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean" and the "Resolution on Fishing for Salmon on the High Seas". Developments in relation to the Protocol and actions taken in accordance with the Resolution are detailed below.

Protocol

2. Following adoption of the Protocol by the Council, copies were transmitted to the governments of Panama and Poland in December 1992 through their embassies in London. To date neither of these governments have agreed to sign the Protocol. Nevertheless the diplomatic efforts of the Parties and the Organization have resulted in actions by these two governments as if they had signed it. In 1994 we obtained evidence that Panama had removed the vessel 'Brodal' from its register. Prior to the Tenth Annual Meeting we received a response indicating that the government of Poland was in the process of developing new fisheries legislation and we have recently been advised (Appendix 1) that the new Sea Fishery Act will enter into force on 22 June 1996. Under this Act the Minister of Transportation and Maritime Economy is authorised to forbid or limit catches, transport, landings, sale or storage of marine resources.

3. Following its removal from the Panamanian register, it is possible that the registers of other States could now be sought by 'Brodal' and by other vessels in future so we shall have to remain alert. The action of the FAO in developing an "Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas" is a useful initiative complementary to the NASCO Protocol. This Agreement will enter into force, for those who have signed it, following receipt of the twenty-fifth instrument of acceptance, although this could take a considerable length of time. To date, eight Parties (Canada, St Kitts & Nevis, Georgia, Myanmar, Sweden, Madagascar, Norway and USA) have deposited instruments of acceptance.

Actions taken in accordance with the Resolution

Obtain and Compile Information on Sightings

4. Since 1990, information on the activities of vessels in international waters has been obtained principally from Norwegian and Icelandic coastguard airborne surveillance flights. The following surveillance flights have been undertaken between April 1992 and April 1996:

Icelandic Coastguard					Norwegian Coastguard				
1992	**1993**	**1994**	**1995**	**1996**	**1992**	**1993**	**1994**	**1995**	**1996**
2 Apr	15 Mar	28 Mar	23 Feb	11 Feb	10 Apr	3 Apr	11 Feb	18 Mar	5 Feb
4 Sep	21 Apr	22 Jun	7 June		24 Apr	17 Apr	18 Feb	6 Nov	
15 Sep	14 Jun	8 Aug	12 June		6 May	13 May	26 Feb		
2 Nov	7 Jul	1 Dec	21 June		8 May	19 May	2 Mar		
	16 Sep		18 Aug		24 May	3 Jun	29 Mar		
			10 Nov		5 Jun	28 Jun	27 May		
					22 Jun	23 Jul	16 Jun		
					7 Jul	17 Sep	19 Jun		
							22 Jul		
							25 Aug		
							17 Sep		

It is evident that very few surveillance flights have been conducted over the last autumn and winter period but it is known that fishing for salmon does occur at this time of year. A report on actions taken to improve cooperation on surveillance is presented separately, CNL(96)26.

5. The information on sightings from airborne surveys which has been received by the Secretary to date is as follows:-

Icelandic Coastguard				Norwegian Coastguard			
Date	**Vessel Name**	**Location**		**Date**	**Vessel Name**	**Location**	
17/01/90	Brodal	67°04'N	05°41'W	28/01/90	Uncle Sam	66°27'N	00°48'W
	Seagull	66°40'N	04°22'W	22/02/90*	Name unknown	66°51'N	01°09'W
26/01/90	Minna	66°22'N	04°15'W		Name unknown	66°55'N	00°24'W
	Seagull	67°41'N	04°22'W		Name unknown	67°05'N	00°20'W
21/02/90	Brodal	66°49'N	01°15'W		Name unknown	66°56'N	03°02'W
	Seagull	66°55'N	00°36'W		Name unknown	67°43'N	00°34'W
02/03/90	Brodal	66°58'N	02°33'W		Name unknown	67°41'N	00°30'W
	Annette Bri	66°58'N	02°33'W		Name unknown	67°50'N	00°40'W
				10/03/90	Brodal	66°45'N	03°17'W
				24/02/91	Name unknown	68°33'N	01°08'E
				06/05/92	Brodal	72°00'N	06°00'E
					Netanya	72°00'N	06°00'E
				08/05/92	Brodal	72°17'N	06°25'E
					Netanya	71°57'N	05°28'E
				19/05/93	Brodal	70°30'N	04°02'E
				03/06/93	Brodal	71°35'N	04°20'E
					Sea Gull	71°35'N	06°32'E
				11/02/94	Brodal	66°48'N	03°22'W

* Photographs taken of Annette Bri, Seagull, Minna, Brodal.

There have been no sightings since February 1994 but, as indicated in paragraph 4, there have been very few surveillance flights and these would not have covered the whole area. There were sightings during the period 29 April - 4 May 1996 of a number of vessels fishing for herring with purse seines in the area of international waters (64-66°N and 3-4°W).

6. In addition the following information has been received from ports about vessels known to fish for salmon in international waters:

Date	Vessel Name	Port
18/1/90	Minna	Torshavn
2/2/90	Minna	Torshavn
28/1/91	Brodal	Bodø
4/3/91	Brodal	Bodø
5/12/91	Brodal	Bodø
5/3/92	Brodal	Bodø
31/01/94	Brodal	Bodø

Drawing the Attention of Non-Contracting Parties to the Activities of their Vessels

7. Copies of the Protocol Open for Signature by States not Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean were transmitted to the governments of Poland and Panama through their respective London missions in December 1992 (see paragraph 2). No other non-Contracting Parties are known to have been involved in fishing in international waters.

Obtain and Compile Information on Landings and Transshipments

8. No new information on landings and transhipments has been obtained since last year's report.

Obtain and Compile Scientific and Technical Data on the Fishery

9. To date six vessels are known to have been involved in fishing for salmon in international waters. Their details are given below:

Name of Vessel	Registration Number	Country of Registration	Call Sign	Size of Vessel	
				Weight (GRT)	Length (m)
BRODAL	--	PANAMA	HP5157	133	29
MINNA	WLA69	POLAND	OZTH	84.5	
SEA GULL 1	--	PANAMA	3ELD6	148	--
ANNETTE BRI	WLA12	POLAND	OUHZ	--	
UNCLE SAM	--	PANAMA	OYXP	--	
NETANYA	SG76	SWEDEN	--	--	--

* A number of vessels do not display a registration number.

In addition, there are unconfirmed reports that two other vessels, "Bermuda" and "Marie Viking", have also been involved. The vessel "Bermuda" was registered in Panama but it is believed that this vessel may have reflagged to Poland in March 1991. Its call sign is OWRG and its Polish registration number is understood to be LEB72.

10. It is expected that most of the catch from international waters would be salmon of European origin. Information on catches by individual vessels has been obtained as

a result of vessels calling at ports and following the boarding of the vessel 'Brodal' by Scottish Fisheries Protection Agency officials. When the vessel 'Minna' called at Torshavn harbour in February 1990 it had 5 tonnes of salmon on board but the Faroese authorities were advised that the intention was to catch 25 tonnes before returning to Poland. When the vessel 'Brodal' was boarded it had 30 tonnes of salmon on board and we have information on landings by this vessel at Polish ports, which indicates catches of 36 tonnes and 11 tonnes. The catch by the vessel 'Netanya' is believed to have been 150kg.

11. Estimates of the catch in international waters by reflagged vessels based on known catches by individual vessels and the number of sightings have been made by ICES since 1989/90. No estimate is available for 1995/96. The time series of information is as follows:

Year	Estimated catch (tonnes)
1989/90	180-350
1990/91	25-100
1991/92	25-100
1992/93	25-100
1993/94	25-100
1994/95	25-100
1995/96	N/A

Establish Contacts with Other International Organizations with Interests in the Area

12. We have continued to develop our links with other international organizations who also have concerns about the activities of vessels registered to non-Contracting Parties fishing within their Convention areas. We have been invited to attend a Special Meeting of the NAFO Standing Committee on Fishing Activity of Non-Contracting Parties in the Regulatory Area (STACFAC) to be held in Brussels during 22-24 May. This meeting will review: the available information on activities of non-Contracting Parties' vessels in the Regulatory Area; the diplomatic initiatives by Contracting Parties in response to the problem; possible measures to discourage such fishing; a scheme to prevent landings of fish caught in the Regulatory Area by non-Contracting Parties' vessels and the implications of a NAFO system of denial of port facilities to fishing vessels from non-Contracting Parties which fail to cooperate. Any information of relevance to NASCO arising from this meeting will be presented to the Council.

Secretary
Edinburgh
21 May 1996

Appendix 1

Warszawa, 1996.05.15

MINISTERSTWO TRANSPORTU
i GOSPODARKI MORSKIEJ

Adres poczt: Ministerstwo Transportu
i Gospodarki Morskiej
00-928 Warszawa - ul Chałubińskiego 4/6

Departament Rybołówstwa Morskiego

TF-II-01/NASCO/96

Mr Malcolm Windsor
Secretary of
NASCO
Scotland
United Kingdom

Thank you very much for your letter of May 3, 1996, concerning a new Polish legislation which could empower Polish Administration to assist NASCO by preventing trade in salmon caught in international waters.

I would like to inform you that new Sea Fishery Act of January 18, 1996 has been enacted and will be in force since June 22, 1996. Under art. 7 sec 1 item 2, of the above mentioned Act, the Minister of Transportation and Maritime Economy is authorised to forbid or limit caughtes, transport, landings, sale or storage of particular organismis belonging to living marine resources.

Yours sincerely

DYREKTOR DEPARTAMENTU

Mirosław Kucharski

ANNEX 19

COUNCIL

CNL(96)53

DRAFT RESOLUTION BY THE PARTIES TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN CONCERNING SCIENTIFIC RESEARCH FISHING

CNL(96)53

DRAFT RESOLUTION BY THE PARTIES TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN CONCERNING SCIENTIFIC RESEARCH FISHING

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;

NOTING that under Article 2 of the Convention fishing of salmon is prohibited beyond areas of fisheries jurisdiction and within areas of fisheries jurisdiction beyond 12 nautical miles except in the West Greenland Commission area (up to 40 nautical miles) and in the North-East Atlantic (within the area of fisheries jurisdiction of the Faroe Islands);

NOTING that under Article 4 of the Convention the Council shall make recommendations to the Parties, the International Council for the Exploration of the Sea and other appropriate fisheries and scientific organizations concerning the undertaking of scientific research.

DESIRING to promote the acquisition, analysis and dissemination of scientific information pertaining to salmon stocks in the North Atlantic Ocean;

DESIRING to cooperate on scientific research fishing for Atlantic salmon that is consistent with the objectives of the Convention.

RECOGNISING the possible benefits to rational management of salmon stocks from scientific research fishing in the sea;

RESOLVE as follows:

Scientific research fishing in areas where salmon fishing is prohibited by the Convention may be undertaken by the Parties subject to the conditions detailed in Annex 1 to this Resolution.

In areas of fisheries jurisdiction where salmon fishing is subject to an allowable catch as part of a regulatory measure adopted by NASCO and where the catch from scientific research fishing will not be allocated as part of the allowable catch under the regulatory measure Annex 1 shall also apply.

ANNEX 1

1. Any Party or Parties wishing to undertake scientific research fishing for Atlantic salmon in accordance with this Resolution shall deliver a proposal to the Secretary no less than 45 days before it wishes to commence fishing.

   The proposal should, whenever possible, include details of:

   a) the purpose of the research fishing
   b) the dates during which the research fishing will take place
   c) the area in which the research fishing will take place
   d) the name, registration, call sign and a description of any participating vessels.
   e) the type and amount of gear to be used
   f) the estimated total weight of salmon to be retained

   The Secretary shall immediately transmit copies of the proposal to all Parties.

2. The results of this scientific research fishing shall be made available to the Council of NASCO and to ICES as soon as practicable, including details of any catches.

3. Atlantic salmon caught during scientific research fishing in accordance with this Resolution shall be discarded at sea except for those samples retained for scientific research.

4. Where the planned research is outside areas of fisheries jurisdiction a Party may object to the proposal by informing the Secretary within 30 days of the date of the Secretary's notification giving reasons for the objection. In the event of an objection being received by the Secretary the research programme shall not be implemented pending a decision by the Council, based upon a review of the scientific merits of such research.

COUNCIL

CNL(96)60

RESOLUTION BY THE PARTIES TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN CONCERNING SCIENTIFIC RESEARCH FISHING

CNL(96)60

RESOLUTION BY THE PARTIES TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN CONCERNING SCIENTIFIC RESEARCH FISHING

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;

NOTING that under Article 2 of the Convention fishing of salmon is prohibited beyond areas of fisheries jurisdiction and within areas of fisheries jurisdiction beyond 12 nautical miles except in the West Greenland Commission area (up to 40 nautical miles) and in the North-East Atlantic (within the area of fisheries jurisdiction of the Faroe Islands);

NOTING that under Article 4 of the Convention the Council shall make recommendations to the Parties, the International Council for the Exploration of the Sea and other appropriate fisheries and scientific organizations concerning the undertaking of scientific research;

DESIRING to promote the acquisition, analysis and dissemination of scientific information pertaining to salmon stocks in the North Atlantic Ocean;

DESIRING to cooperate on scientific research fishing for Atlantic salmon that is consistent with the objectives of the Convention;

RECOGNISING the possible benefits to rational management of salmon stocks from scientific research fishing in the sea;

RESOLVE as follows:

Scientific research fishing in areas where salmon fishing is prohibited by the Convention may be undertaken by the Parties subject to the conditions detailed in the Annex to this Resolution.

In areas of fisheries jurisdiction where salmon fishing is subject to an allowable catch as part of a regulatory measure adopted by NASCO and where the catch from scientific research fishing will not be allocated as part of the allowable catch under the regulatory measure the Annex shall also apply.

ANNEX

1. Any Party or Parties wishing to undertake scientific research fishing for Atlantic salmon in accordance with this Resolution shall deliver a proposal to the Secretary no less than 45 days before it wishes to commence fishing.

   The proposal should, whenever possible, include details of:

   a) the purpose of the research fishing
   b) the dates during which the research fishing will take place
   c) the area in which the research fishing will take place
   d) the name, registration, call sign and a description of any participating vessels.
   e) the type and amount of gear to be used
   f) the estimated total weight and numbers of salmon to be retained

   The Secretary shall immediately transmit copies of the proposal to all Parties.

2. The results of this scientific research fishing shall be made available to the Council of NASCO and to ICES as soon as practicable, including details of any catches.

3. Atlantic salmon caught during scientific research fishing in accordance with this Resolution shall only be retained for scientific research.

4. Where the planned research is outside areas of fisheries jurisdiction a Party may object to the proposal by informing the Secretary within 30 days of the date of the Secretary's notification giving reasons for the objection. In the event of an objection being received by the Secretary the research programme shall not be implemented pending a decision by the Council, based upon a review of the scientific merits of such research.

COUNCIL

CNL(96)28

RETURNS MADE UNDER THE RESOLUTION TO MINIMISE IMPACTS FROM SALMON AQUACULTURE ON THE WILD SALMON STOCKS

CNL(96)28

RETURNS MADE UNDER THE RESOLUTION TO MINIMISE IMPACTS FROM SALMON AQUACULTURE ON THE WILD SALMON STOCKS

At its Twelfth Annual Meeting the Council reviewed progress in relation to 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', henceforth called the 'Oslo Resolution' for brevity, it having been adopted in Oslo in 1994. The Parties agreed at this time that the subject of the impacts of aquaculture on the wild stocks would be reviewed annually and that the situation with regard to the implementation of the recommendations contained in the Oslo Resolution would be re-examined at the Fifteenth Annual Meeting in 1998 with a view to considering whether additional measures may be desirable. 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). Last year a format was agreed for the provision of this information which was circulated to the Parties with the request for annual returns under Articles 14 and 15 of the Convention. Details of the actions taken by the Parties are given below.

Have any measures been taken to minimise genetic and other biological interactions?

The scope of measures referred to in Article 2 of the Resolution is listed in Parts 1 and 2 of the Annex to the Resolution.

Canada

No new measures have been taken. As before, only sterile (triploid) rainbow trout may be used for commercial aquaculture in New Brunswick and Newfoundland. Also, under NASCO guidelines, no Atlantic salmon stocks can be imported to Atlantic Canada from continental Europe and Iceland, and aquaculture operators are encouraged to use only local stocks in their operations.

Denmark (in respect of the Faroe Islands and Greenland)

No measures have been taken.

European Union

Finland

No measures have been taken.

Ireland

Restrictions are in place regarding:

a) stocks and stock origin for enhancement/restocking/ranching programmes;
b) numbers of wild fish which may be taken for enhancement.

Sweden

Under Swedish regulations there are restrictions concerning introductions and transfers.

United Kingdom

The problems associated with escapes of farmed fish have been the subject of much scientific interest and investigation in recent years and scientists from The Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD) are well to the forefront of such work. No final conclusions have been reached on the long-term impact of such escapes on wild salmon populations but it is clear that escapes of fish should be prevented wherever possible and monitored where accidents occur. Against that background SOAEFD have been looking at the possibility of developing a code of practice on fish farm escapes which would be agreed with the fish farming industry and representatives of wild salmon interests.

Iceland

No measures have been taken.

Norway

A new report to the Government concerning Norwegian Aquaculture Politics and Policy has been put forward (Report to the Storting no. 48 1994-95). As a result of this report a further working group, the third one in the last eight years, has been set up with the purpose of formulating a new proposal regarding certification of technical equipment used in fish farming.

Russia

No measures have been taken.

USA

On-going river-specific stocking programmes.

The Governor of the State of Maine established an Atlantic Salmon Task Force in October 1995. The Task Force is preparing a "Conservation Plan" which will address genetics, aquaculture, diseases, etc. A report is expected in July 1996.

Have any measures been taken to minimise the risk of transmission of diseases and parasites to the wild stocks of salmon?

The scope of the measures referred to in Article 3 of the Resolution is listed in Parts 1 and 3 of the Annex to the Resolution.

Canada

In the Bay of Fundy, a serious outbreak of sea lice *Lepeophtheirus salmonis* occurred. Emergency release authorizations, under veterinary supervision, were carried out with H_2O_2 treatment, pyrethrin, and azamethiphos. Cypermethrin was authorized in Maine, USA. The illegal use of Cypermethrin in Canada resulted in enforcement actions. Infectious diseases are addressed by immunization procedures at hatcheries with screening for BKD and Furunculosis. Importation of salmonid eggs and fish, and inter-provincial transfers are controlled under the Fish Health Protection Regulations.

Denmark (in respect of the Faroe Islands and Greenland)

No measures have been taken.

European Union

Finland

No new regulations, decisions or laws. Earlier decisions of the Ministry of Agriculture and Forestry concerning transfers of fish are still valid.

Information about *Gyrodactylus salaris* has increased.

Ireland

Single Bay management in most bays with aquaculture installations and fallowing in most aquaculture sites.

Sweden

Under Swedish regulations there are restrictions concerning introductions and transfers.

United Kingdom

The Diseases of Fish Act 1937, amended by the Diseases of Fish Act 1983, requires the notification of any suspicion of the presence of a notifiable disease to the relevant Minister. The Act provides powers for those appointed as Inspectors under this Act to take samples of any fish, eggs of fish or foodstuffs of fish for testing purposes. Where the presence of disease is suspected or confirmed, all movements of live fish and eggs of fish may be controlled.

The Registration of Fish Farming and Shellfish Farming Businesses Order 1985 made under the Diseases of Fish Act 1983 requires anyone who carries on a business of fish farming to register the business with Fisheries Departments and to keep stocking and movement records.

The Fish Health Regulations 1992, as amended, implement Council Directive 91/67/EEC and Decisions made under it and control the movement into Great Britain from elsewhere in the EU of all live fish, their eggs and gametes; and certain dead fish. Directive 91/67 also makes provision for Member States to forward programmes for approval to the Commission to prevent the introduction or spread of certain diseases including IPN, BKD, SVC, Gyrodactylosis and Furunculosis as set out at List III of Annex A of 91/67. Great Britain is seeking controls in respect of IPN, BKD, Gyrodactylosis caused by *Gyrodactylus salaris* and Furunculosis in salmon.

The Diseases of Fish (Control) Regulations 1994 implement the disease control measures which are required on a EU-wide basis where suspicion and/or confirmation of the List I disease ISA, and the List II diseases IHN and VHS occurs. Should a List I or a List II disease be confirmed in Great Britain, the measures in these Regulations would come into effect. (As witnessed during the outbreak of VHS on Gigha in 1994).

Iceland

Annual reviews of applications are conducted by the Fish Disease Committee. Concerns regarding further spread of Furunculosis.

Norway

One river, the Skibotn river, was treated with rotenone in 1995. A proposal for a new fish disease act is under consideration. This proposal contains stricter regulations in general and allows for the regionalisation of the Norwegian fish farming industry.

Russia

No measures have been taken.

USA

On-going river-specific stocking programmes.

The Governor of the State of Maine established an Atlantic Salmon Task Force in October 1995. The Task Force is preparing a "Conservation Plan" which will address genetics, aquaculture, diseases, etc. A report is expected in July 1996.

Has any research, small-scale testing and full-scale implementation been carried out in support of the Resolution?

The scope of the research and development envisaged under the Resolution is listed in Part 4 of the Annex to the Resolution.

Canada

A monitoring of all sea lice treatments in the Bay of Fundy (Canada) and an assessment of residuals in non-target species (e.g. scallop, lobster, etc.) was carried out.

Research is underway on migration and behaviour of escapees in a nearby river (Magaguadavic River, NB) in the midst of the New Brunswick aquaculture industry. A study on using sterile Atlantic salmon in aquaculture has also been conducted.

Denmark (in respect of the Faroe Islands and Greenland)

No measures have been taken.

European Union

Finland

Normal biological research on smolt production, catch composition and the amount and share of escapees.

Ireland

Research ongoing:
Fisheries Research Centre - Marine Institute: Exploitation and Survival of Wild Stocks. Adult Stock Census.
Central Fisheries Board: Instream/Physical Rehabilitation/Restocking.
Electricity Supply Board: Restocking and Fish Passage.
Salmon Research Agency: Genetics and Restocking.

Sweden

No measures have been taken.

United Kingdom

No measures have been taken other than those referred to above.

Iceland

No measures have been taken.

Norway

New cage technology, the "Wild-catch system", designed to withstand hurricanes and winter storms is being tested. Research on the ecological effects of escaped triploid fish has commenced as part of an EU-funded project.

Russia

No measures have been taken.

USA

The river-specific stocking program represents a full scale implementation.

CONCLUSIONS

It is clear from the above returns that measures have been taken in accordance with the Oslo Resolution although to date not by all Parties. The Council's intention was that there would be full implementation of the Resolution by the Fifteenth Annual Meeting in 1998. That leaves only two years to complete the programme but there appear to be some provisions in the Resolution on which no actions have yet been taken. For example, no reports have been made on small-scale testing and full-scale implementation of wild salmon protection areas, aquaculture regions, or the use of sterile salmon (although there has been research). There have also been no reports on efforts to recapture escapees and with the exception of one Party there have been no reports on the use of local broodstocks in salmon farming.

ANNEX 22

COUNCIL

CNL(96)29

ADVANCES IN RELEVANT RESEARCH IN RELATION TO IMPACTS OF SALMON AQUACULTURE

CNL(96)29

ADVANCES IN RELEVANT RESEARCH IN RELATION TO IMPACTS OF SALMON AQUACULTURE

SUMMARY

1. The Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Stocks which was adopted by NASCO in 1994 in Oslo requires each Party engaged in salmon aquaculture to 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 agreement. A number of areas for research, small-scale testing and full-scale implementation were identified. This paper summarises the progress which has been made in relevant research.

2. Salmon which have escaped from farms are known to occur in the wild and successful spawning, although with reduced breeding success compared to wild fish, has been observed. Genetic changes in wild salmon have been demonstrated. Research aimed at assessing the implications for the fitness of the wild stocks is now being undertaken. The preliminary results provide further evidence of local adaptation in wild stocks and suggest that wild and farmed fish differ in performance in the wild. For example, the superior growth that has been observed in non-native fish does not necessarily equate to fitness in the wild. These preliminary results suggest that NASCO needs to adopt a more cautious approach with regard to genetic impacts and highlight the need for containment of farmed fish. In this regard, a new cage design, capable of resisting hurricane force winds, is being tested in Norway.

3. Research on the use of sterile salmon in aquaculture has shown that there are advantages but also some difficulties with the husbandry of these fish. Research shows that the viability and growth of triploid fish is comparable to or slightly lower than in diploids although faster growth has occasionally been reported. There are, however, some advantages such as the appearance of triploid fish and the elimination of maturation. The use of sterile fish in aquaculture could offer protection against genetic impacts but there are some concerns about the ecological effects of sterile fish in the wild. A research programme has recently commenced focusing on these aspects and releases of sterile fish to the wild have been made this year. In the meantime the risk of genetic damage to the wild stocks remains and the dilemma facing managers is whether the potential genetic threats to the wild stocks outweigh any ecological threats sterile salmon might pose.

4. Tagging or marking, particularly microtagging, of farmed fish might offer benefits to the industry and would allow the source of escapes to be traced to individual farms which could then be advised of appropriate measures to reduce escapes. It is expected that tagging of all farmed fish would result in costs of about 0.6-0.9% of the first sale value of the harvest but careful attention would be needed to the time at which tags are applied and to sampling programmes if information of value to managers is to be obtained. This issue could be considered further by the joint NASCO/Salmon Farming Industry Liaison Group which will meet later this year.

5. Sea lice continue to be a serious problem to fish farmers and there is concern about impacts on the wild stocks. There is evidence of reduced sensitivity of sea lice to the traditional chemotherapeutants and there is a considerable research effort to find alternative methods of combating the lice problem. This includes the development of a vaccine against sea-lice although initial trials with experimental vaccines suggest that greater efficacy will be needed before they will be of value on a commercial scale. New techniques to attract lice are being developed and guidelines on the use of fish such as wrasse which feed on sea lice on farmed salmon have been developed in order to reduce the need for chemical treatment. Research conducted in Scotland on possible genetic differentiation among sea lice populations has shown that there was homogeneity of sea lice sampled from wild salmon and sea trout whereas lice populations from farmed salmon showed highly significant levels of genetic differentiation both between wild and farmed salmonids, and between farms. Some individual sea lice on wild sea trout from the west coast of Scotland had putative "farm markers" possibly indicating that they had originated from salmon farms.

6. There have been no significant developments of which the Secretariat is aware on the other areas of research and development identified in the NASCO Resolution but progress will be monitored and reported annually to the Council. In this regard the establishment of the Liaison Group with industry representatives should facilitate monitoring of developments in future and the ICES/NASCO Symposium in 1997 will provide a valuable opportunity to review current research programmes and the implications for management.

Secretary
Edinburgh
21 May 1996

CNL(96)29

ADVANCES IN RELEVANT RESEARCH IN RELATION TO IMPACTS OF SALMON AQUACULTURE

Introduction

1. At its Eleventh Annual Meeting in Oslo, the Council unanimously adopted 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 Parties agreed that the subject of impacts of aquaculture on the wild stocks would be reviewed annually and that the situation with regard to implementation of the recommendations contained in the Resolution would be re-examined at its Fifteenth Annual Meeting in 1998 with a view to considering whether additional measures may be desirable. A report on the measures taken by the Parties in accordance with the Resolution is presented separately in paper CNL(96)28. Under Article 4 of the Resolution each Party engaged in salmon aquaculture is required to 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 Agreement. Part 4 of the Annex to the Resolution identifies a number of areas for research, small-scale testing and full-scale implementation, and relevant research which has been conducted on a number of these topics is summarised.

Aquaculture Production

2. Salmon aquaculture is dominated by the production of farmed salmon. Production in 1995 increased by more than 86,000 tonnes to 413,200 tonnes or 120 times the nominal catch of salmon in the North Atlantic (Anon, 1996). Production of ranched salmon in 1995 fell to 308 tonnes, the lowest value since 1990. In 1995, production in Iceland was 289 tonnes, a reduction from 308 tonnes in 1994 and from 496 tonnes in 1993 (Anon, 1996). One of the largest ranching companies in Iceland became bankrupt during 1995 (see CNL(96)24) and it is anticipated that ranched production will decline further in future. Elsewhere, ranching at experimental facilities in Ireland, Northern Ireland and Norway has remained low.

Occurrence and Behaviour of Reared Fish in the Wild

3. Data on the proportion of farmed fish in catches is provided in the Report of the Working Group on North Atlantic Salmon (Anon, 1996). Sampling in the Faroese zone in 1994/95 indicated that 19% of fish were of reared origin, an increase over the previous season of about 2% but approximately half the proportion of reared fish found in 1989/90 and 1990/91 despite a continuing increase in production of farmed salmon. In Norway the proportion of farmed fish in samples from the coastal fisheries increased in 1995 to 42%. The proportion of farmed fish in the fjord fisheries (17%) and rod catches (4%) were at about the same level as in 1994. In 1995 the estimated number of salmon known to have escaped from Norwegian salmon farms increased to almost 650,000 from 570,000 in 1994. In Ireland the proportion of fish farm escapees in catches ranged from 0.02% to 0.19% on a regional basis. In Scotland approximately 0.3% of the declared catch was of farmed fish. However, sampling on the west coast of Scotland in 1993 in the vicinity of the salmon farming industry

showed that 23-37.5% of catches between June-August were of farmed origin (Webb, 1995). In Northern Ireland over 4% of the commercially caught salmon in the summer grilse fishery were estimated to be of farmed origin, an increase of 1.2% over 1994. In Canada the returns to the majority of rivers in Newfoundland and the Gulf of St Lawrence and Quebec were exclusively wild fish but aquaculture escapees were sampled from the returns to several rivers of the Bay of Fundy (the region where the salmon farming industry is concentrated) and on the Conne River, Newfoundland. In the Magaguadavic River, Bay of Fundy, approximately 90% of the salmon catch in 1995 was estimated to be aquaculture escapees. It is clear therefore that farmed fish continue to escape to the wild on a large scale.

4. Studies in Norway have shown that intra-peritoneal vaccination as used in commercial rearing produces a visible marker (numerous fibrous adhesions between the internal organs and the peritoneum) permitting simple and rapid discrimination of farmed and wild salmon which could be a valuable method for estimating the contribution of reared fish to fisheries and stocks (Anon, 1996) in addition to existing methods based on morphology, scale characteristics and pigment analysis.

The Holmenkollen Guidelines for Sustainable Industrial Fish Farming

5. In August 1994 an international Symposium on Sustainable Fish Farming was held at Holmenkollen in Oslo. Representatives from research institutions, national and international governmental organizations as well as from the fish farming industry participated in the meeting and guidelines for sustainable fish farming were developed with general support from the participants. The guidelines, which include recommendations on research, have recently been published (Reinertsen and Haaland, 1995) and many of the elements are supportive of the measures contained in the Oslo Resolution. These measures include the following:

- All fish farms should be developed and managed within the context of integrated coastal zone management planning designed to facilitate efficient resource use.

- Integrated management must consider all positive and negative impacts on the coastal environment, placing those impacts from aquaculture and other developments in context and ensuring that regulatory and other instruments address such impacts in proportion to their significance.

- Precautionary approaches and environmental assessment procedures should be applied to proposed large-scale fish farm projects and other similar developments in coastal zones.

- The industry must develop and apply best available technology and procedures so as to minimize adverse environmental impacts.

- Feeding procedures should maximize nutrient retention and growth rate by farmed fish and minimize feed wastage and nutrient loss to the environment. Pollution from fish farms should be minimized.

- Proactive veterinary methods should be a dominant strategy in fish farm management. Use of drugs should be guided by specific rules of good practice, designed to minimize the release of bioactive substances to the environment and to reduce risks of development of drug-resistant pathogens.

- Stringent controls, including veterinary inspection and quarantine, should be imposed on the international or inter-catchment transfer of fish.

- The conservation of genetic diversity in the wild stocks from which farmed populations are derived should be an objective of overall management.

- Selective breeding of strains of fish for culture is desirable, but all fish farms should maintain high standards of containment to prevent genetic interchange with wild stocks.

- The farming of transgenic or other genetically manipulated fish should not be undertaken until internationally agreed safety and ethical criteria have been established.

Research and Development

Sterile Fish

6. The NASCO Working Group on Impacts of Aquaculture recommended that the use of sterile fish should be investigated as a matter of urgency as it may offer new opportunities to eliminate genetic interactions. However, the Oslo Resolution recognised the need for further research on production characteristics, disease susceptibility and the marketing aspects of sterile salmon and on the ecological implications of escaped sterile salmon.

7. Last year a report was made to the Council on research being carried out on the production of all-female triploid salmon (which are sterile) in Canada, and through a project funded by the Commission of the European Union involving researchers in Norway, Ireland and Scotland. The production of all-female triploid salmon is presently the only available technique for production of sterile fish on a commercial scale. All-female triploid salmon were used by salmon farmers in Scotland during the 1980s with approximately 7% of the egg production being triploid. There were, however, some husbandry problems such as development of cataracts and this problem has also been reported recently from a commercial farm in Ireland. All-female, and to a lesser extent all-female triploid, rainbow trout are, however, in regular use in aquaculture in the UK. In Canada, the New Brunswick government requires that only non-reproductive rainbow trout are used in aquaculture in order to protect wild salmon and a similar policy exists in parts of Newfoundland (McGeachy et al, 1995). In order to protect native stocks of Pacific salmon the government of British Columbia will require that Atlantic salmon reared in aquaculture from 1998 are all-female. Sterile fish offer advantages to salmon farms such as elimination of maturation and all-female salmon may offer benefits where production cycles are being reduced through modern techniques of photoperiod manipulation.

8. A recently conducted research project in Canada involving the Atlantic Salmon Federation, the University of New Brunswick and the New Brunswick Salmon Growers Association has reared mixed-sex triploids in six year classes through to harvest at market size. The results of this pilot scale study indicate that freshwater growth was comparable between triploids and diploids and that survival was similar between triploids and diploids except for the period prior to first feeding when survival was lower in the triploids. In seawater, survival was lower in the triploid fish which are apparently more susceptible to stress, but growth rates were higher and the appearance of market-sized triploid fish was excellent and was more like the appearance of wild salmon than the diploid fish. There was, however, a problem of jaw, and to a lesser extent, spinal, deformities in some fish which appeared to be most marked in the fastest growing individuals. While such deformed fish could be used to provide fillets or steaks they would attract a lower price than if sold as whole round fish.

9. Research carried out in Scotland through funding from the Ministry of Agriculture, Fisheries and Food has shown that in the freshwater phase diploid parr had significantly higher growth rates than triploid parr when reared separately and that this difference was due to higher growth during the early stages of the experiment. This difference was not, however, due to lower food consumption rate in triploid parr and the authors believed that it was related to lower water temperatures which influenced the appetite of the triploid fish. However, no such differences in growth rates were evident in mixed groups of diploid and triploid fish although there was evidence that in mixed groups triploid parr were more likely to be the recipients of agonistic actions than diploid parr (Carter et al, 1994). Subsequent studies comparing the performance of all-female diploid and triploid salmon smolts on transfer to sea water showed that the return to appetite was later and growth rates tended to be lower for triploid salmon when reared together with diploid fish. All mortalities (29%) of smolts were of triploid salmon (McCarthy et al, 1996).

10. A joint research programme involving researchers from the Institute of Marine Research, Bergen, Norway; University College, Galway, Ireland; St Andrews University, Scotland and the SOAEFD Marine Laboratory, Aberdeen, funded by the Commission of the European Union, was initiated in October 1994 in order to comprehensively evaluate the comparative biology of diploid and triploid Atlantic salmon. The project is intended to inform the debate on the usefulness of triploids given the concerns of fish stock managers that escaped farmed salmon are a potential threat to the wild stocks and of the fish farmers that triploids are more difficult to rear. The report of the first year of the project indicates that high pressure treatment resulted in essentially 100% triploid rates. Comparative performance of the different experimental groups (mixed sex diploids, mixed sex triploids, all-female diploids and all-female triploids) has been variable. While it is too early to draw meaningful conclusions the results confirm previous observations that the early survival of triploid eggs and fry in commercial practice may be marginally less good. In order to assess the environmental impact of triploids sex reversed and mixed sex groups of diploids and triploids will be released this year so that their comparative return behaviour can be compared. There is evidence from work with coho salmon that in the absence of maturation sterile fish would not enter freshwater and would therefore eliminate the risk of genetic introductions. However, there is a concern about, for example, the ecological impacts of "sterile super fish" through, for example, predation on wild

stocks although these concerns have not been substantiated to date by research in the Pacific.

11. In summary, research on triploid salmon shows that viability and growth of triploids is comparable to or slightly lower than in diploids, although faster growth has occasionally been reported (Galbreath et al, 1994). While there are some drawbacks to their use in salmon farming such as cataract formation, jaw deformities and greater susceptibility to stress, there are also some advantages such as their similarity in appearance to wild fish and increased resistance to some diseases. However, researchers at the Salmon Research Agency of Ireland believe that the economic benefits from elimination of maturation and prolonged growth at sea outweigh the drawbacks of higher egg cost, slightly lower growth and slightly higher mortality at first feeding. Research is presently being undertaken into the ecological threats sterile salmon could pose to the wild stocks but in the meantime the dilemma remains for managers of the wild stocks as to whether these threats outweigh the genetic threat to the wild stocks from escaped farmed salmon.

Genetics

12. It is known that escaped farmed salmon occur on the marine feedings grounds, in coastal fisheries and in rivers where they have been shown to spawn both with other farmed fish and wild fish although with reduced breeding success. Genetic changes in the wild salmon following spawning by fish farm escapees have been detected but the question which, so far, remains unanswered is whether or not these genetic changes in the wild stocks will affect the fitness of these populations.

13. Studies being carried out by researchers at the University of New Brunswick, in cooperation with the Atlantic Salmon Federation, on the Magaguadavic River in Canada have shown that escaped farmed salmon interbreed with wild fish resulting in a change in the genetic profile of the wild stocks. Research is now being carried out to determine the magnitude of the change and the fitness of the progeny of such interbreeding.

14. As reported last year, research aimed at addressing this question is being conducted with funding from the Commission of the European Union and involves research workers from Ireland, Northern Ireland, Scotland and Spain. The objectives of this study are: to determine whether genetic changes have occurred in wild populations as a result of escaped farmed salmon and stocking; to determine whether genetic differences among cultured and wild stocks affect their biological performance in the wild and to determine whether the distribution of different classes of genetic variation within and between populations provides evidence of adaptive population differentiation. The final report of this project is currently being prepared and there are some interesting findings. For example, evidence of local adaption to acid tolerance has been found in two neighbouring but different Scottish river systems and as previously reported preliminary results suggest that native and non-native stocks differ in performance in the wild. For example, studies in Spain indicate that foreign juveniles were growing twice as fast but surviving only 20% as well as the native stocks with the larger individuals being particularly vulnerable to predation.

15. Cross and Challanain (1991) found that one line derived from Norwegian and Scottish stocks dominated the salmon farming industry in Ireland and they concluded that if escaped fish from this line entered rivers and bred with wild fish in large numbers the present wild stock structure would be eliminated. The increasing evidence of local adaption and fitness in the wild stocks relative to non-native stocks suggests that NASCO needs to adopt a more cautious approach and to develop measures to ensure the containment of farmed stocks. More detailed findings from the ongoing research will be presented at the ICES/NASCO Symposium on Interactions between salmon culture and wild stocks of Atlantic Salmon: the scientific and management issues to be held in 1997.

Tagging/Marking

16. The NASCO Resolution states that 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 sources of escapes and to assess the interactions of escaped farmed salmon with the wild stocks. Industry representatives had indicated during the meetings of the Working Group on Impacts of Aquaculture that such tagging or marking might be acceptable to the industry, given the increasing use of vaccination and the possible benefits from allowing identification of stolen fish and in stock control, provided that the cost was reasonable.

17. Last year it was reported that the total cost of tagging (based on existing microtagging systems) would be about 0.6-0.9% of the first sale value of the harvest. However, concern was expressed about the cost of the screening programmes which would be necessary to ensure that information useful to managers in identifying sources of escapes could be obtained. Another aspect which would need careful consideration is the timing of application of the tags. From the point of view of identifying fish which have escaped prior to transfer to sea water the tags would need to be applied as early as possible during the freshwater phase. However, this would mean that the tags could not be coded for individual on-growing facilities thereby allowing sea farms with particular escape problems to be identified. Even if microtagging was conducted at the time of vaccination it may not be feasible to identify individual marine sites. This issue could be raised at the joint NASCO/Salmon Farming Industry Liaison Group meeting with a view to obtaining a more thorough evaluation of the advantages and drawbacks of a proposal to tag/mark all farmed salmon.

Diseases and Parasites

18. The Oslo Resolution recognises that transmission of disease and parasites from salmon reared in aquaculture to the wild stocks is an area of considerable concern. While it has been recognised that much progress has been made through reduction of stocking densities, fallowing, single bay management and prevention of disease through development of vaccines, it was reported last year that particular concern has been expressed about the possible effects of sea lice on wild salmonids. The principal treatment of sea lice in salmon farms has been the organophosphous pesticide dichlorvos (Roth et al, 1993) but there is evidence that lice are showing reduced sensitivity to this treatment. A wide range of compounds is being tested under field evaluation but the parasite continues to be a problem. Last year it was reported that research is underway to develop an anti-louse vaccine. This research has continued

and experimental vaccines have been prepared by recombinant DNA technology. These experimental vaccines are being tested and while positive effects have been observed, considerably greater efficacy will have to be achieved (Munro, personal communication).

19. In Ireland the Department of the Marine monitoring programme revealed that sea lice levels recorded at fish farms in the period January - March 1996 were higher than in the previous two years, leading to concern about the possible impacts on wild sea trout smolts. Urgent remedial action at all farms with stocks on site has been called for under the supervision of the Department of the Marine. In Canada, there was a serious outbreak of sea lice in the Bay of Fundy, and in Norway, sea lice continue to be a problem both on farmed and on wild fish populations and a new research programme has been initiated into the effects of sea lice on wild salmon populations. Tests are currently being carried out on a device to lure sea lice away from farmed salmon (Anon 1995). The device uses a light pattern to mimic the shimmering effect of light reflecting off a salmon's scales. The lice congregate around the device and an air lift and filter system allows them to be collected after which they could be processed into food for other farmed species such as halibut.

20. A collaborative, largely publicly-funded, study between St Andrews University and the SOAEFD Freshwater Fisheries Laboratory has been carried out with the assistance of fish farmers and fishery proprietors to examine possible genetic differentiation among populations of sea lice, *Lepeophtheirus salmonis*. Sea lice derived from farmed and wild salmon and wild sea trout captured from throughout Scotland have been examined. Overall, there was genetic homogeneity of sea lice populations sampled from wild salmon and sea trout whereas sea lice populations from farmed salmon showed highly significant levels of genetic differentiation both between wild and farmed salmonids and between farms. Some individual sea lice on west coast wild sea trout had putative "farm markers", possibly indicating that they had originated from salmon farms.

Other Research and Development

21. The NASCO Resolution also identified for research, small-scale testing and full-scale implementation: alternative production methods (land-based, closed or contained floating facilities, water recirculation and other containment technologies); wild salmon protection areas; use of local broodstocks and aquaculture regions (where all steps in the production process are carried out and which are separated from similar regions by areas without aquaculture). The Working Group on Impacts of Aquaculture recognised that salmon farming is predominantly conducted in cage units and that under the present conditions it would be uneconomical for the industry to transfer to on-growing in land-based units. The Group also recognised that a requirement to use local broodstocks might create serious economic and husbandry problems and that efforts should therefore focus on containment measures, both biological (sterile fish) and physical (minimising escapes). With regard to physical containment there have been some developments. For example, a new cage design is being tested by the Norwegian industry. However, farmed fish still make a significant contribution to catches and stocks in a number of countries (see paragraph 3) and this does create a risk to natural stock structure. Zones for the protection of wild salmon, where aquaculture is restricted or prohibited, had been established in a number of countries

prior to the adoption of the Oslo Resolution but there have been no reports of additional zones having been created. The Secretariat is not aware of any significant developments on any of these issues since last year's meeting but the Liaison Group proposed with the aquaculture industry should assist in monitoring developments in these areas in future.

REFERENCES

Anon (1995) This sea louse lure could be a scintillating winner. Fish Farmer 18(5).

Anon (1996): Report of the ICES Working Group on North Atlantic Salmon. NASCO Council Paper CNL(96)14.

Carter, C G; McCarthy, I D, Houlihan, D F; Johnstone, R; Walsingham, M V and Mitchell A I (1994): Food consumption, feeding behaviour and growth of triploid and diploid Atlantic salmon, *Salmo salar* L., parr. Canadian Journal of Zoology 72: 609-617.

Cross, T F and Challanain, D N (1991): Genetic characterisation of Atlantic salmon (*Salmo salar*) lines farmed in Ireland. Aquaculture 98: 209-216.

Galbreath, P F; St Jean, W; Anderson, V and Thorgaard, G M (1994): Freshwater performance of all-female diploid and triploid Atlantic salmon. Aquaculture 128: 41-49.

McCarthy, I D; Carter, C G; Houlihan, D F; Johnstone, R and Mitchell, A I (1996): The performance of all-female diploid and triploid Atlantic salmon smolts on transfer together to sea water. Journal of Fish Biology 48: 545-548.

McGeachy, S A; Benfey, T J and Friars, G W (1995): Freshwater performance of triploid Atlantic salmon (*Salmo salar*) in New Brunswick aquaculture. Aquaculture 137: 333-341.

Reinertsen, H and Haaland, H (1995): Proceedings of the First International Symposium on Sustainable Fish Farming. Oslo, Norway, 28-31 August 1994, A A Balkema, Rotterdam 307pp.

Roth, M, Richards, R M and Somerville, C (1993): Current practices in the chemotherapeutic control of sea lice infestations in aquaculture: a review. Journal of Fish Diseases 16: 1-26.

Webb, J (1995): Escaped farmed salmon in Scottish waters. Scottish Association for Marine Science, Oban, Scotland. Newsletter II. March 1995.

ANNEX 23

COUNCIL

CNL(96)30

TRANSGENIC SALMON

CNL(96)30

TRANSGENIC SALMON

SUMMARY AND POSSIBLE ACTION

1. The predicted demand for aquatic organisms from a rapidly increasing world population will require increasing use of biotechnology in aquaculture. New biotechnologies mean that as well as being able to use biological resources as found in nature, it is possible to alter them through "genetic engineering". Genes can be introduced from other organisms, which may or may not be of the same species, to produce transgenic organisms. Production of transgenic fish is much easier and cheaper than production of transgenic mammals for use in agriculture and therefore salmon are likely to be one of the first species where transgenics may be commercially viable.

2. During 1995 a company based in North America began licensing its transgenic technology to the salmon farming industry with a claim that the transgenic fish would grow 400-600% faster than "standard" fish. While this technology has not yet been approved for commercial trials in North America, transgenic salmon are now being reared at one fish farm site in Scotland. The techniques are not likely to be too complex and the benefits to the salmon farming industry could be large.

3. The extent to which transgenic fish will be utilised by this industry will depend on the regulatory environment and on predicted consumer reaction to a genetically modified product. Salmon farmers are naturally very cautious about this development because of a possible adverse reaction by the consumer to genetic tampering with a food which bases its appeal on the image of the wild fish. Nevertheless, history suggests that such new technologies tend to be used and that it is very difficult for producers to resist the tide of such changes.

4. If such salmon are used in existing cage technologies they will inevitably escape to the wild and there are good reasons to believe that the inserted genes, which may be from other species, will be transmitted to the wild stocks. There are great concerns about the effects of transgenic salmon which pose a completely new and significant risk to the conservation and management of the wild stocks, and which scientists believe could destabilise aquatic ecosystems. The UK Government's independent panel on sustainable development has stated that the next major environmental or health disaster is likely to be caused by genetically modified organisms.

5. Given the concerns by the scientists, including those involved in the production of transgenic salmon who have stressed the importance of containing these fish to avoid interactions with the wild stocks, we would be well advised to adopt a precautionary approach.

6. The Council will need to move quickly and may wish to debate the issue and to consider the following actions:

a) that the Parties advise the NASCO Council of any proposal to permit the rearing of transgenic salmonids, and provide details of the proposed method of containment and other measures to safeguard the wild stocks.

b) that the Parties ensure that the use of transgenic salmon, in any part of the NASCO Convention area, is confined to secure, self-contained facilities throughout their life-cycle.

c) that the Parties further consider permitting transgenic salmon, even in secure, self-contained facilities only if they are sterile, because it is possible that transgenic salmon will from time to time escape from such facilities. (Even with this measure there may still be a risk of adverse ecological impacts).

d) that the Parties take action to ensure that, where international trade agreements might leave room for the introduction of transgenic salmon, the provisions in those Trade Agreements to protect biodiversity and the environment be called into play.

e) that the Parties take steps to warn their salmon producers of the potentially very serious risks to wild stocks of this development so that inadvertent or accidental release, even at an experimental stage, is prevented.

f) that the subject of transgenic salmon be raised at the first meeting of the Liaison Group which has been agreed between NASCO and the international salmon farming industry and that this group be asked to make recommendations on the subject.

g) that the Council holds a Special Session on this topic which would examine the risks and possible benefits in more detail.

h) that research be urgently encouraged by the Parties on the impact of transgenic fish on the wild stocks.

7. In short, the insertion of modified genes, whether or not from another species, to produce transgenic salmon is unnatural and may have unknown and unforeseeable results if such fish are allowed to enter the environment of the wild stocks. This must be prevented. The Council will need to consider very quickly and very carefully the grave risks that might be run if this new technology is not under the most stringent controls.

Secretary
Edinburgh
19 April 1996

Introduction

1. By the year 2025 it is anticipated that demand for aquatic organisms from the growing world population will have increased from 100 to 165 million tonnes and with many of the world's fish stocks already considered to be exploited at or beyond their capacity it is clear that aquaculture will play an increasingly important role in meeting this demand. An increase in aquaculture production of this magnitude will require rapid improvements in, (Kryspin-Sørensen, 1994) and increased use of, biotechnology (Donaldson, 1994). The use of biotechnology, i.e. technology based on living organisms and their components, is not new, with "traditional biotechnology" methods dating back thousands of years. However, today a new generation of biotechnology is being developed (Anon, 1996a). Following the elucidation of the DNA double helix by Crick and Watson in 1953, it was discovered that DNA could be cut at specific sites into segments and later that these segments could be "stitched" end to end, paving the way for techniques to remove a specific gene and re-insert it either in another position in the same organism or in a totally different organism (Paddock, 1995). This new biotechnology means that, as well as being able to use biological resources as found in nature, it is possible to alter them in order to enhance and increase their use (Anon, 1996a). Techniques such as induced spawning and controlled sex differentiation (Donaldson et al, 1994) are already contributing to the success of aquaculture. Since the early 1980s, there has been a worldwide explosion of research on genetic manipulations in aquaculture species with the recent focus on gene transfer techniques (Kapuscinski, 1990) particularly with regard to growth enhancement in order to shorten production cycles (Devlin et al, 1994).

Transgenic Organisms

2. Organisms into which genes have been introduced from another organism are termed "transgenic" (Purdom, 1994). The introduced gene may or may not have been derived from the same species. These transgenic organisms may have potential environmental benefits. For example, genetically modified micro-organisms have been developed to break down pollutants, i.e. bioremediation. The micro-organisms used in bioremediation are usually recovered from natural sites but have had their natural capability for breaking down pollutants enhanced, and early results from the bioremediation of an oil spill in the Prince William Strait (USA) suggest that these procedures are effective, safe to humans and environmentally benign (Zilinskas, 1994). Genetic engineering has also been successfully exploited for the production of interferon, insulin and human growth hormone (Paddock, 1995) for use in human medicine. However, these developing technologies also raise important questions related to ecological consequences, product safety and consumer acceptance (Mohr, 1994).

3. During 1995, a company called Aqua Bounty Farms, a division of A/F Protein Inc with operations in Boston and St Johns, began licensing its transgenic technology to the salmon farming industry with a claim that the transgenic fish would grow 400-600% faster than standard fish. While the technique has not yet been approved for commercial trials in North America, transgenic Atlantic salmon are now being raised at one fish farm site in Scotland (Mackenzie, 1996). The advent of this new technology poses a completely new and significant risk to the conservation and management of the wild stocks.

4. The techniques involved in the production of transgenic organisms are highly specialised and complex and are beyond the scope of this review. However, a brief overview might facilitate a clearer understanding of the subject and in particular the environmental concerns. Maclean and Penman (1990) identified the following steps in the production of transgenic fish:

- *Acquisition of the gene* - from a gene library. Structural genes code for a specific protein (e.g. growth hormone) but to be successfully transferred and expressed these need to be combined with a 'promoter' and a terminating sequence. This combination is called a fusion gene. The promoter switches the structural gene on while the termination sequence indicates the end point for transcription (Kapuscinski, 1990).

- *Cloning of the gene* - so that millions of copies are available.

- *Introduction of the gene* - usually through microinjection of newly-fertilised eggs with millions of copies of the gene. This is clearly a laborious task and there is interest in techniques of mass transfer such as particle gun bombardment and electroporation where the gene is introduced via the sperm at the time of fertilisation (Fletcher and Davies, 1991).

- *Assaying for transgenism* - A relatively small proportion of the eggs injected may retain the inserted gene. For example, Devlin et al (1994) found that only 6.2% of the individuals surviving to one year of age retained the desired gene. Furthermore, some individuals known as chaemeric or mosaic transgenics may not carry the gene in all tissues.

- *Checking that the gene is 'expressed'* - i.e. does the introduction of a growth hormone gene result in the production of growth hormone? There is some evidence that the use of mammalian promoters in fish is not as effective as using promoters derived from fish. The choice of promoter is also important because it governs the site of expression. For example, growth hormone is normally produced in the pituitary gland where its production is controlled by feedback mechanisms. The use of a metallothionein promoter, for example, changes the site of production to the liver where there are no feedback mechanisms and the hormone is rapidly assimilated.

- *Demonstration that the inserted genes are transmitted to the progeny* - ideally all tissues in the transgenic fish should carry at least one copy of the new gene in each cell so as to facilitate transmission of inserted genes to subsequent generations bred from transgenic fish. This is clearly important for commercial use of the technique because microinjection is a time-consuming process and a wide range of growth enhancement has been reported in fish following microinjection, e.g. growth is between 0-37 times greater than in controls (Devlin et al, 1994).

5. The first report of gene transfer in animals was in mice (Kapuscinski, 1990) which showed dramatic increase in growth (up to 1.8-fold) as a result of introduction of the rat hormone gene (Palmiter et al, 1982). This was a major technical breakthrough which demonstrated the potential of the technology as an alternative to selective

breeding to improve growth rates in animal husbandry (Hew, 1989). Studies on large animals followed with the production of transgenic rabbits, sheep and pigs bearing introduced growth hormone genes (Hammer et al, 1985). However, production of such transgenic animals is expensive and, to date, the technology has been reserved for products of high value in human medicine rather than in food production. For example, a human gene associated with milk production has been successfully introduced to sheep in order to stimulate production of milk containing human fibrinogen, the agent responsible for bloodclotting. However, the species reared in aquaculture offer many advantages for the application of these techniques since most species have high fecundity, the eggs can be fertilised under controlled conditions, it is not necessary to return the eggs to the female reproductive tract as is the case in mammals (Maclean and Penman, 1990) and there is no need to work under sterile conditions (Fletcher and Davies, 1991). Considerable attention has therefore been devoted to the production of transgenic fish because of the relative ease of the research.

Use of Transgenic Fish in Aquaculture

6. The first transgenic fish to be produced were loach, goldfish and silver carp into which a human growth hormone gene had been incorporated and which resulted in the transgenic fish being 1-3 times larger than controls but with the largest individual 7 times the size of controls (in Hew, 1989). Within four years of the first report of the production of transgenic fish the technology was being applied in aquaculture with outdoor tests of rapidly growing transgenic carp bearing rainbow trout growth hormone genes (Fletcher and Davies, 1991). By 1989 production of 14 species of transgenic fish had been reported (Kapuscinski and Hallerman, 1990) with particular emphasis on growth enhancement. For example, Devlin et al (1994) achieved "extraordinary growth" in coho salmon using a gene construct derived from sockeye salmon. The scientists involved believed that the use of an "all salmon" gene would be more acceptable to the public. Of the 3,000 eggs treated, only 6.2% of the individuals surviving to one year of age retained the gene. Many of the treated fish showed no growth enhancement but on average the transgenic salmon were more than 11 times heavier than non-transgenic controls and one individual was 37 times heavier than the controls.

7. However, production of transgenic fish has not just been concerned with attempts to improve growth. One of the main problems of cage culture of salmon in Atlantic Canada is that during the winter the marine environment along most of the coast experiences temperatures between 0 and -1.8°C and Atlantic salmon freeze at temperatures below -0.7°C (Fletcher and Davies, 1991). Scientists attempted to address this problem by transferring antifreeze protein genes from winter flounder *(Pseudopleuronectes americanus)*, a marine species that is able to survive in ice-laden seawater (Fletcher et al, 1988). These studies strongly suggested that the antifreeze protein gene was successfully integrated into the salmon's genome. Although originally interested in cold water tolerance rather than improved growth, the scientists involved in this work isolated the promoter which instructs the flounder antifreeze gene to produce its protein when water temperature is low. By combining this promoter gene with a salmon growth hormone gene, they produced salmon which grow throughout the winter (Aqua Bounty Farms advertising literature). It is this technology that is being marketed and which offers the salmon farming industry the

opportunity to produce smolts three months after hatching and market-size salmon in 12-18 months. At present the only available genes with high value in aquaculture are for growth hormone and antifreeze protein but there are many other areas where transgenic technology could be of benefit in fish culture, e.g. in ability to utilize low-cost diets, in improving feed conversion efficiency, in disease resistance and in "tailoring" fish for the market (Fletcher and Davies, 1991). Research on some of these areas is under way. For example, Finnish scientists are presently trying to develop a vegetarian trout which would be cheaper to produce and would offer environmental benefits (Anon, 1996b).

8. Kapuscinski (1990) identified three major areas where progress was needed in order to facilitate the integration of transgenic fish into commercial aquaculture:

1) the development of protocols for cost-effective transfer of economically important genes into large numbers of fish;

2) techniques for identification of transgenic individuals at an early life stage;

3) selective breeding programmes to develop transgenic lines of fish exhibiting superior performance.

While research on genetic modification of animals is proceeding rapidly in government, university and company laboratories, translating this into marketable products is slow, mainly because of the lack of public support for such research (Anon, 1994a). Nonetheless, a transgenic tomato, the "Flavr Savr", the first whole food developed through biotechnology, was approved by the US Food and Drug Administration on 18 May 1994 and other genetically engineered foods such as modified cooking oils with potential health benefits and crops requiring fewer pesticides and fertilisers are likely to follow (Anon, 1994b). The potential benefits from transgenic salmon in terms of shorter production cycles are considerable and it seems likely that transgenic salmon will be used increasingly in aquaculture in future. The extent to which this will happen will vary depending on the regulatory environment. For example, Norway has a clear policy not to permit organisms modified by genetic engineering to be reared in the aquaculture industry (Mohr, 1994). Transgenic salmon are, however, already being reared at a fish farm in Scotland which specialises in egg production and this has given rise to considerable concerns from environmentalists and from other sectors of the salmon farming industry who presumably fear a consumer reaction to a product which has been genetically engineered.

Environmental Concerns

9. The Council of NASCO has already considered the genetic and other effects of farmed salmon on the wild stocks and the Working Group on Impacts of Aquaculture recognised the need to improve containment of these fish through improvements in physical containment and possibly biological containment, i.e. sterility, following further evaluation. Devlin and Donaldson (1992) recognised that transgenic fish would, however, require special attention because not only do they potentially contain new genetic information not easily acquired by a species during evolution, but they have also undergone a severe genetic bottleneck in their production. There is concern

about the transmission of inserted genes to wild fish if transgenic fish escape to the wild. Where transgenic fish have been reared to sexual maturity there are numerous examples of transmission of the inserted gene to the next generation although mosaicism in the parents leads to wide variation in the offspring carrying the gene (Fletcher and Davies, 1991). Transmission of these genes to wild fish could lead to physiological and behaviour changes and traits other than those targeted by the inserted gene(s) are likely to be affected (Kapuscinski and Hallerman, 1990).

10. There are also concerns about the ecological impacts of transgenic fish. Hindar (1993) believed that transgenic fish will be likely to pose greater ecological risks than conventional farmed fish. In support of this conclusion he quoted from the Ecological Society of America's position statement on genetically modified organisms, in which it is stated that "organisms with novel combinations of traits are more likely to play novel ecological roles, on average, than are organisms produced by recombining genetic information existing within a single evolutionary lineage" (Tiedje et al, 1989). The ecological interactions envisaged include intraspecific and interspecific competition. In such interactions transgenic fish exhibiting enhanced growth rates would be expected to have an advantage, although this might be influenced by higher mortality due to starvation during times of food shortage, with the combined effect depending on how and when the fish entered the ecosystem (Hindar, 1993). The ecological effects are anticipated to be greatest where transgenic fish exhibit substantially altered performance. Such fish could destabilise and reorganise aquatic ecosystems (Kapuscinski and Hallerman, 1990). The use of transgenic fish bearing antifreeze genes might be expected to allow expansion of salmon farming into northern areas where it is not presently conducted, posing a threat to the genetic and ecological integrity of some very important salmon rivers (Hindar, 1993).

11. The UK Government's independent panel on sustainable development has stated that the next major environmental or health disaster is likely to be caused by genetically modified organisms (GMOs) (Anon, 1996c). The successful use of transgenic fish requires that the product must be safe for the environment and for human consumption and it must be believed to be safe by the public (Fletcher and Davies, 1991). A cavalier approach is unlikely to benefit the technologies themselves (Anon, 1996c). The need for a cautious, case-by-case approach was stressed by the OECD Group of National Experts on Safety in Biotechnology on Environmental Impacts of Aquaculture using Aquatic Organisms derived through Modern Biotechnology (OECD, 1993). At the recent meeting of NASCO's North-East Atlantic Commission's Ad Hoc Working Group on Introductions and Transfers all Parties agreed that transgenic salmonids, which are now being marketed for use in aquaculture, could pose a major threat to the wild stocks. Concerns were expressed about the effects of the transmission of transplanted genes to the wild stocks through interbreeding and about the ecological effects of transgenic fish both in the marine and freshwater environments. The Group believed that there would inevitably be an interaction of some kind with the wild stocks and with the environment since the use of transgenic salmonids in farming based on existing technologies would invariably result in escape to the wild. While there were differences in approach by the Parties represented within the Group, it was stressed that when conducting any risk assessment the threats to the wild stocks should be recognised and there should be a strong presumption against any activity which would risk the introduction of transgenic salmonids to the

wild. The Group also urged the North-East Atlantic Commission to seek wider agreement concerning the whole North Atlantic area on this issue.

12. Clearly, if the wild stocks are to be safeguarded, there is a need to ensure that transgenic salmonids in aquaculture are contained either physically or biologically. Total containment is only possible in land-based facilities but on-growing is predominantly conducted in cage units from which escape is considered to be inevitable (NASCO, 1994) While there have been improvements in containment in the salmon farming industry in recent years considerable numbers of salmon still escape. For example in 1994 more than half a million salmon escaped from salmon farms in Norway alone (NASCO, 1995). At present the only technique of biological containment available for use on a commercial scale is the production of all-female triploid salmon which are sterile. These fish have in the past been used in salmon farming and all-female and, to a lesser extent, all-female triploid fish are used in trout farming. The Working Group on Impacts of Aquaculture established by the Council recommended that the use of sterile fish in aquaculture should be investigated further as a matter of urgency, as it may offer new opportunities to eliminate genetic interactions. It was further recommended that the Council should evaluate the situation annually in the event of new information becoming available with a view to the Parties considering implementing thereafter the use of sterile fish by the salmon farming industry, provided that no adverse impacts are shown (NASCO, 1994). This recommendation was made prior to the sudden availability to the salmon farming industry of transgenic salmon which heightens the need for such containment. The need to render transgenic salmon sterile before they are used commercially has been stressed by the researchers involved in their production and guidelines submitted to the US Department of Agriculture recommend that this should be 'a minimum precaution' (Mackenzie, 1996).

Industry concerns

13. Transgenic technologies could provide the salmon farming industry with a "quantum leap" over traditional selection and breeding methods and by allowing transfer of genes from new species would enable new phenotypes to be produced (Fletcher and Davies, 1991). However, farmed salmon are marketed heavily on the image of the wild salmon and many producers seem nervous about the public reaction to salmon that have been genetically modified. It seems likely that transgenic fish produced using genes from fish will be more acceptable to consumers than those which incorporate genes derived from other organisms particularly if these are of human or viral origin. Similar concerns about adverse consumer reaction were expressed by the industry in relation to the use of sterile salmon. However, despite these concerns sterile fish were reared at a number of sites during the 1980s, but the industry experienced some husbandry problems with these fish and they ceased to use them. Some salmon farmers have indicated that they have no intention whatsoever of using transgenic fish. Nevertheless we know that such work is going on and it seems likely that the first salmon farms that can produce salmon more quickly and at lower cost will do so and at that point those using the 'old' technologies may be forced to change. If reared in the present cage technology this would lead to the certainty that the transgenic fish would escape accidentally, bringing considerable risks to the wild stocks.

Conclusions

14. Technology can now create salmon with greatly enhanced growth rates. Such salmon will have a genetic make up that would not occur in nature. Their use in aquaculture based on present cage technology would lead inevitably to escape and there are considerable fears about the transmission of the genes to the wild stocks and about other interactions. The Council may wish to consider what action it should take but the pace of this development suggests the need for urgency.

Secretary
Edinburgh
19 April 1996

REFERENCES

Anon, 1994a: Animal biotechnology: a bumpy road ahead? Biotechnology Notes 7 (5) May 1994.

Anon, 1994b: Biotech tomato headed for grocery shores. Biotechnology Notes 7 (6) June 1994.

Anon (1996a): The new biotechnologies - opportunities and challenges. A starting point for discussion. Biotechnology and Biological Sciences Research Council, Cambridge. 20pp.

Anon (1996b): Vegetarian gene? Splice 2 (5): 12pp.

Anon (1996c): Living with the gene genie. New Scientist. 27 January 1996.

Devlin, RH and Donaldson, EM (1992): Containment of genetically altered fish. In: Transgenic Fish. Edited by Hew, C and Fletcher, G. World Scientific.

Devlin, RH; Yesaki, TY; Blagi, C; Donaldson, EM; Swanson, P and Chan, W-K (1994): Extraordinary salmon growth. Nature 371. 15 September 1994.

Donaldson, EM (1994): The application of biotechnology to aquaculture. In High Performance Fish. Proceedings of an International Fish Physiology Bymposium. Edited by D D Mackinlay. American Fisheries Society and Fish Physiology Association. 505pp.

Donaldson, EM; Devlin, RH; Higgs, DA and Price, IM (1994): Aquaculture biotechnology in Canada including the development of transgenic salmon. In: Aquatic Biotechnology and Food Safety. OECD. Paris. 100pp.

Fletcher, GL; Shears, MA; King, MJ; Davies, PL and Hew, CL (1988): Evidence for antifreeze protein gene transfer in Atlantic salmon (*Salmo salar*). Canadian Journal of Fisheries and Aquatic Sciences 45:352-257.

Fletcher, GL and Davies, PL (1991): Transgenic fish for aquaculture. Genetic Engineering 13:331-370.

Hammer, RE; Pursel, VG; Rexroad, CE; Wall, RJ; Bolt, DJ; Ebert, KM; Palmiter, RD and Brinster, RL (1985): Production of transgenic rabbits, sheep and pigs by microinjection. Nature 315. 20 June 1985. 680-683.

Hew, CL (1989): Transgenic fish: present status and future directions. Fish Physiology and Biochemistry. 7:409-413.

Hindar, K (1993): Genetically engineered fish and their possible environmental impact. Norsk Institutt for Naturforsking 450: 48pp.

Kapuscinski, AR and Hallerman, EM (1990): Transgenic Fishes. American Fisheries Society Position Statement. Fisheries 15(4):2-5.

Kapuscinski, AR (1990): Integration of transgenic fish into aquaculture. Food Reviews International 6(3):373-388.

Kryspin-Sørensen, I (1994): The food safety of transgenic fish. In: Aquatic Biotechnology and Food Safety. OECD. Paris. 100pp.

MacKenzie, D (1996): Can we make supersalmon safe?
New Scientist 27 January 1996.

Maclean, N and Penman, D (1990): The application of gene manipulation to aquaculture. Aquaculture 85: 1-20.

Mohr, V (1994): Fish farming and food safety. In: Aquatic Biotechnology and Food Safety. OECD. Paris. 100pp.

NASCO (1994): Report of the Working Group on Impacts of Salmon Aquaculture. Council document CNL(94)28.

NASCO (1995): Returns under Articles 14 and 15 of the Convention. Council document CNL(95)24.

OECD (1993): Report of the Workshop on Environmental Impacts of Aquaculture using Aquatic Organisms derived through Modern Biotechnology. Trondheim 1993. Group of National Experts on Safety in Biotechnology. OECD. Paris.

Paddock, P (1995): The blueprint of life. The Safety and Health Practitioner. August 1995.

Palmiter, RD; Brinster, RL: Hammer, RE; Trumbauer, ME; Rosenfeld, MG; Birnberg, NC and Evans, RM (1982): Dramatic growth of mice that develop from eggs microinjected with metallothionein - growth hormone fusion genes. Nature 300. December 16 1982. 611-615.

Purdom, C (1994): Aquatic biotechnology in the United Kingdom. In: Aquatic Biotechnology and Food Safety, OECD. Paris. 100pp.

Tiedje, JM; Colwell, RK; Grossman, YL; Hodson, RE; Lenski, RE; Mack, RN and Regal, PJ (1989): The planned introduction of genetically engineered organisms: ecological considerations and recommendations. Ecology 70:298-315.

Zilinskas, RA (1994): An overview of recent developments in aquatic biotechnology. In: Aquatic Biotechnology and Food Safety. OECD. Paris. 100pp.

COUNCIL

CNL(96)55

DRAFT RESOLUTION ON TRANSGENIC SALMON

CNL(96)55

DRAFT RESOLUTION ON TRANSGENIC SALMON

THE PARTIES:

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

HAVING REGARD to the potentially serious threat posed to wild salmon stocks from transgenic salmon, which are salmon that contain genes from another organism.

RECOGNISING that there is an urgent need to take steps to ensure the protection of the wild stocks.

TAKING INTO ACCOUNT the FAO Code of Conduct for Responsible Fisheries, in particular Article 9.3, and the ICES Code of Practice on the Introduction and Transfer of Marine Organisms.

AGREE that they will cooperate to develop means by which transgenic salmon cannot interact with wild salmon stocks and to this end will develop a more comprehensive resolution at the Fourteenth Annual Meeting and subsequent meetings.

RESOLVE that, in the light of the urgency of the matter, the Parties will, in the meantime:

a) take into account the ongoing work by the Parties to the Convention on Biological Diversity to develop a Protocol on Biosafety.

b) ensure that any development, transportation and growth of transgenic salmon incorporate the Precautionary Approach and the FAO Code of Conduct for Responsible Fisheries to safeguard the environment and biological diversity.

c) take into account the outcome of the NASCO/ICES Symposium on "Interactions between Salmon Culture and Wild Stocks of Atlantic Salmon: The Scientific and Management Issues" to be held in April 1997.

d) inform their salmon producers of the potentially serious risks to wild stocks of this development and consult with the salmon farming industry on this matter through the new Liaison Group established between NASCO and the international salmon farming industry.

e) take steps, as appropriate, to improve knowledge on the potential impacts of transgenic fish on the wild stocks.

f) examine the trade implications associated with transgenic salmon in accordance with World Trade Organization agreements and other instruments of international law.

ANNEX 25

COUNCIL

CNL(96)31

COOPERATION WITH THE SALMON FARMING INDUSTRY

CNL(96)31

COOPERATION WITH THE SALMON FARMING INDUSTRY

1. The process of cooperation with the salmon farming industry which commenced with the meetings of the Working Group on Impacts of Aquaculture has been welcomed both by the Council and by the industry. Such cooperation is vital in order to encourage the development of sustainable aquaculture designed to safeguard the wild stocks. At its Twelfth Annual Meeting the Council agreed that it would strengthen the relationship with the salmon farming industry through the establishment of a Liaison Group comprising representatives of NASCO and the industry which would meet to discuss issues of mutual interest. The following Terms of Reference were proposed for the Group: "To provide the international forum for liaison between the salmon farming industry and managers of the wild Atlantic salmon stocks on issues of mutual interest, and to make recommendations for action". The Secretary was asked to indicate this to the representatives of the salmon farming industry and to report back to the Council.

2. In accordance with this request I wrote to the representatives of the salmon farming industry on 4 October (Appendix 1) with some proposals for establishing the Liaison Group. The response to this letter from the International Salmon Farmers Association (ISFA) (Appendix 2) was very positive and confirms that the industry welcomes the opportunity to strengthen the process of cooperation. The Terms of Reference proposed by the Council last year were acceptable to all members of the ISFA represented at the General Meeting at which the Liaison Group was discussed. The ISFA has also indicated to me that a first meeting of the Liaison Group towards the end of 1996 would be acceptable to them.

3. In order that this process of cooperation can begin it is proposed that the first meeting of the Liaison Group be held in London on Thursday 14th November. The draft agenda (Appendix 3) for the meeting together with a draft Constitution for the Liaison Group (Appendix 4) are attached. The Council is asked to agree the constitution and to confirm its acceptance of the proposal to hold the first meeting in London (proposed date 14 November) with the draft agenda as a basis. The draft Constitution and the agenda for the first meeting will also have to be endorsed by the International Salmon Farmers Association.

Secretary
Edinburgh
19 April 1996

NASCO 11 Rutland Square Edinburgh EH1 2AS Scotland UK
Telephone: 031-228 2551 Telex: 94011321 NASC G Fax: 031-228 4384

CNL29.078

Appendix 1

4 October 1995

Mr William J J Crowe
Scottish Salmon Growers Association
Drummond House
Scott Street
PERTH
PH1 5EJ

NASCO
NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION
ORGANISATION POUR LA CONSERVATION DU SAUMON DE L'ATLANTIQUE NORD

Dear William

LIAISON BETWEEN SALMON FARMING INTERESTS AND WILD SALMON INTERESTS

At its recent Annual Meeting the Council of NASCO agreed that it would wish to continue and strengthen the process of cooperation with the salmon farming industry, which commenced with the Working Group on Impacts of Aquaculture, through the establishment of a Liaison Group. The following Terms of Reference were suggested:

> "To provide the international forum for liaison between the salmon farming industry and managers of the wild Atlantic salmon stocks on issues of mutual interest, and to make recommendations for action."

I have been asked to consult with the industry on this proposal and to report back to my Council, and I would welcome your views. I understand that you are willing to have this issue raised at the forthcoming aquaculture conference in Tasmania and it would, of course, be advantageous if we could have a coordinated response from the industry.

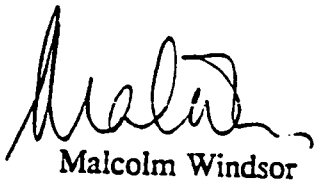
We would welcome your views on the structure and size of the proposed group, but my initial thoughts are that the Liaison Group should be quite small with no more than 1 or 2 representatives from each of those NASCO Parties wishing to participate (except for the EU where more would probably be necessary) and the same from the salmon farming industries in each North Atlantic country. There might also be advantages sometimes in inviting representatives of the industry from, for example, Chile or other countries where their cooperation would be valuable.

Continued .../

I would appreciate your views on this structure. I would imagine that the Liaison Group would only need to meet on demand, i.e. when there is sufficient business of mutual concern. That might not be every year but we should soon see. If it is acceptable to the industry I would suggest that the NASCO Secretariat might deal with the arrangements for meetings, preparation of background documents and the report of the meeting. We would need to elect a Chairman at our first meeting but if necessary I would act in that capacity to get things moving until that election. We might hold the first such meeting in October or November 1996 in London or wherever else you might propose. We could, of course, hold future meetings elsewhere.

I am grateful for your assistance in raising this issue, and I look forward to receiving the industry's views on this proposal. I have copied this letter to the salmon farming representatives listed below.

Yours sincerely



Malcolm Windsor
Secretary

Copy: Mr Torrent B Fernando, APROMAR (Spanish Marine Farming Association)
Baron Charles de Fierlant Dormer, Federation of the European Salmon and Trout Growers
Mr Frank Gjerset, Atlantic Salmon (Maine) Inc
Mr Knut A Hjelt, Norwegian Fish Farmers Association
Mr Courtney Hough, Federation of the European Salmon and Trout Growers
Dr John R Joyce, Irish Salmon Growers Association
Mr Victor A Nesvetov, JV Arctic Salmon
Mr Gordon H Rae, Scottish Salmon Growers Association
Mr William Thompson, New Brunswick Salmon Growers Association
Dr John Webster, Scottish Salmon Growers Association

Appendix 2

Mr. Malcolm Windsor
North Atlantic Salmon Conservation Organization
11 Rutland Square
Edinburgh EH1 2AS
Scotland

Trondheim, 12 January, 1996

Dear Malcolm,

First of all, - thank you for your Christmas greeting and very interesting Newsletter, which I received in my capacity as Secretary for the International Salmon Farmers Association (ISFA) even if I am not working for the Norwegian Salmon Farmers Association (NFF) anymore, as you may have noticed. I visit them occasionally to collect ISFA's mail, but my main job since June last year is in my old profession, as manager of the Central Norway branch of a large national/Scandinavian PR agency.

William Crowe of the SSGA probably informed you after ISFA's General Meeting in Tasmania in October, where communication between ISFA and NASCO was on the agenda. Formally, I should inform you directly, though, about the decision made there, which was:
" There should be one industry member from each North Atlantic country ..." in the Liaison Group.

During the discussion, it was agreed that the process of cooperation between the salmon farming industry and NASCO should continue and be strengthened, and the establishment of a Liaison Group and the Terms of Reference along the lines you suggested were accepted among the (5 out of 10) member nations present in the meeting. The need for "responsibilities on both sides, and consequently NASCO should not have all the organizational tasks by itself" was, however, also expressed very clearly, and I hope you agree with this.

Best regards and a Happy New Year to you and all of your team,

International Salmon Farmers Association

Leif Magnar Øveraas
Secretary

ISFA – c/o Norwegian Fish Farmers Association, Pirsentret, N–7005 Trondheim, Norway
Telephone + 47 73 51 70 40, fax + 47 73 51 70 17

Appendix 3

FIRST MEETING OF THE WILD AND FARMED SALMON LIAISON GROUP

LONDON, THURSDAY 14 NOVEMBER 1996

DRAFT AGENDA

1. Opening of the Meeting
2. Election of a Chairman
3. Nomination of a Rapporteur
4. Adoption of the Constitution for the Liaison Group
5. Advances in research of relevance to wild and farmed salmon interactions
6. Technical developments in the industry of relevance to wild-farmed salmon interactions
7. Progress and Difficulties in Implementing the Oslo Resolution of NASCO
8. Any Other Business
9. Date and Place of Next Meeting
10. Close of Meeting

WILD AND FARMED SALMON LIAISON GROUP

D R A F T C O N S T I T U T I O N

The Wild and Farmed Salmon Liaison Group is an advisory group established to provide an international forum for liaison between the salmon farming industry and managers of the wild Atlantic salmon stocks on issues of mutual interest, and to make recommendations for action. The Group will work by consensus.

The Liaison Group shall comprise representatives from each member Party of the International Salmon Farmers Association (ISFA) and representatives from each member Party of the North Atlantic Salmon Conservation Organization (NASCO).

The Liaison Group will meet on an annual basis or less frequently if it so decides.

The Liaison Group shall appoint from among its members a Chairman who shall serve for a period of two years.

The office of Chairman shall be held alternatively by representatives of NASCO and ISFA.

The Secretariats of NASCO and ISFA shall, following consultation, make the arrangements for the meetings of the Group and shall share the administrative responsibilities.

COUNCIL

CNL(96)39

GUIDELINES ON CATCH AND RELEASE

CNL(96)39

GUIDELINES ON CATCH AND RELEASE

1. At its Eleventh Annual Meeting the Council considered a review on catch and release fishing which concluded that there had been growing interest in this technique in response to declining stock levels or components of the stocks in a number of North Atlantic countries. The Council recognised that, to be effective as a management measure, it is important that stress and physical damage to fish intended for release is avoided, and that where catch and release is practised guidelines could be of benefit in avoiding damage.

2. At its Twelfth Annual Meeting the Council considered draft guidelines and asked that the Secretary consult with the Parties to amend these so that revised guidelines might be considered for possible adoption at the Thirteenth Annual Meeting. The draft guidelines are attached as Annex 1 and it would be helpful if the Parties could consider these with a view to their adoption by the Council, following any necessary revision, at the Thirteenth Annual Meeting. The value of the guidelines would simply be that they had some international endorsement. They would be used entirely at the discretion of the Parties or appropriate salmon management bodies.

Secretary
Edinburgh
18 April 1996

DRAFT GUIDELINES ON CATCH AND RELEASE

1. Introduction

In response to concern about stock levels, catch and release is being practised in a number of countries as a conservation measure in recreational fisheries. To be of value, Atlantic salmon which may have been caught by anglers, handled and then released must survive without a substantial reduction in fitness. While further studies are needed to assess the effects of catch and release, particularly on salmon caught early in the season, the research to date indicates that the survival following catch and release is high. Fish which have been carefully played and gently handled will have the best chance of surviving. If you intend to return salmon to the water after capture the following guidelines should assist you in your efforts to conserve the Atlantic salmon. In many countries, kelts and species other than salmon caught while salmon angling are released and use of these guidelines should improve the chance of survival of these fish following release.

The publication of these guidelines is simply to ensure that they have a degree of international recognition as being appropriate for the practice of catch and release. Their publication does not imply that NASCO endorses catch and release in any particular circumstances. The decision as to where and when it is appropriate can best be made by those managing the specific fishery concerned in the light of all the known factors about that particular stock.

2. Type of Gear

Artificial flies should be used since fish caught by this means are less likely to suffer serious damage than fish caught using baited hooks or lures.

Barbless single or double hooks should be used since they are easier to remove and reduce handling time which can be an important factor influencing survival.

Gaffs and tailers should not be used if the fish are intended for release but a large landing net with knotless mesh should be used if necessary.

The fishing gear used should enable the fish to be brought in quickly and should take account of the prevailing conditions and the possible size of fish that might be caught.

3. Bringing the Fish In

If a fish is caught it should be brought in quickly by keeping pressure on it until it can be guided into quiet water for handling and release. Alternatively the fish could be broken off after a couple of runs if it is showing no signs of tiring.

4. Handling the Fish

Fish intended for release should, wherever possible, be kept in the water. The weight of the fish can be estimated from its length so as to avoid removing the fish from the water. The table below gives approximate conversion values.

If the fish must be removed from the water use a landing net or support the fish from beneath and expose the fish to air for the shortest time possible. Fish should not be placed on dry or abrasive surfaces and should not be dragged across the ground prior to handling.

Handling of the fish should be minimised but when necessary the fish should be gently supported from beneath with wetted hands but should not be squeezed or held by the gills.

If the hook cannot be removed, the leader should be cut close to the hook prior to release.

After removing the hook, or cutting the leader if the hook could not be removed, the fish should be supported in the water facing into the current and allowed to recover until it swims off.

Fish which have suffered serious damage (hooked in the gills or eyes) should be retained in preference to lightly hooked fish unless this contravenes local or national regulations which prohibit such retention.

If the fish is to be photographed this should be done while supporting it in the water.

5. The Benefits

The evidence we have suggests that if fish are handled according to the above guideline, most of them will survice. Catch and release can therefore make a real contribution to conservation.

The North Atlantic Salmon Conservation Organization (NASCO) is an inter-governmental Commission established in 1984 to conserve, restore, enhance and rationally manage salmon stocks in the North Atlantic Ocean. The member 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. Further details about the Organization and additional copies of these guidelines can be obtained from:

NASCO
11 Rutland Square
Edinburgh EH1 2AS
Scotland

Tel: Int (44) 131 228 2551
Fax: Int (44) 131 228 4384

Length in centimetres	Approximate weight in kilograms	Length in centimetres	Approximate weight in kilograms	Length in centimetres	Approximate weight in kilograms
47	1.16				
48	1.23				
49	1.31				
50	1.39	70	3.77	90	7.95
51	1.48	71	3.94	91	8.21
52	1.56	72	4.10	92	8.48
53	1.65	73	4.27	93	8.76
54	1.75	74	4.45	94	9.04
55	1.85	75	4.63	95	9.33
56	1.95	76	4.82	96	9.62
57	2.05	77	5.01	97	9.92
58	2.16	78	5.20	98	10.23
59	2.27	79	5.40	99	10.54
60	2.39	80	5.61	100	10.86
61	2.51	81	5.82	101	11.19
62	2.63	82	6.03	102	11.52
63	2.76	83	6.25	103	11.86
64	2.89	84	6.48	104	12.20
65	3.03	85	6.71	105	12.55
66	3.17	86	6.95	106	12.91
67	3.31	87	7.19	107	13.27
68	3.46	88	7.44	108	13.64
69	3.62	89	7.69	109	14.02

If you have measured your fish in inches, multiply by 2.54 to get the length in centimetres. The approximate weight in pounds can be calculated by multiplying the weight in kilograms by 0.45.

COUNCIL

CNL(96)40

GUIDELINES ON STOCKING

At the Ninth Annual Meeting of the Council it was proposed that the concept of internationally endorsed guidelines could be successfully extended to cover the practical and technical aspects of stocking rivers with salmon. However, it was proposed that development of these guidelines should be delayed in view of the deliberations of the Working Group on Impacts of Aquaculture established by the Council in 1993 and the Working Groups on Introductions and Transfers established by the North American and North-East Atlantic Commissions, whose work included development of recommendations on stocking. While much progress has been made, the North-East Atlantic Commission's Working Group was unable to complete its work during 1995 with regard to the classification of salmon rivers and development of management measures and on zones to prevent the spread of diseases and parasites. These issues were referred to an Ad Hoc Working Group which met this year and the Group's recommendations will be considered by the North-East Atlantic Commission at the Thirteenth Annual Meeting.

It is therefore proposed that further consideration of the internationally endorsed guidelines on stocking be delayed until the Fourteenth Annual Meeting.

Secretary
Edinburgh
5 June 1996

COUNCIL

CNL(96)56

PRESS RELEASE

The Thirteenth Annual Meeting of the North Atlantic Salmon Conservation Organization (NASCO) which is concerned with international cooperation on the conservation, restoration, enhancement and rational management of the North Atlantic Salmon was held in Gothenburg, Sweden, during 10-14 June. This Organization has as its member Parties Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, the Russian Federation, and the United States of America. NASCO comprises a Council and three Commissions (North American Commission, North-East Atlantic Commission and West Greenland Commission). Observers from Inter-government and thirteen Non-Government organizations also participated.

NASCO's regional Commissions establish regulatory measures for salmon fisheries. The scientific advice presented to the Commissions indicated that salmon stocks are in poor condition in spite of the measures taken in recent years. In the West Greenland Commission, it was not possible to agree on a catch quota under the five-year agreement made in 1993; work will continue to establish an agreement. The North-East Atlantic Commission established a quota of 425 tonnes for the Faroese fishery in 1997 and additional restrictive regulatory measures. The Commission also agreed to proceed with the adoption of the report from its Working Group on Introductions and Transfers. Introductions and transfers may pose ecological and genetic threats and may lead to the spreading of diseases and parasites to the wild stocks. The North American Commission reviewed the 1995 fisheries and its Protocols on Introductions and Transfers, but was unable to agree on a regulatory measure.

The Parties reported on the actions taken to implement a Resolution adopted in 1994, concerning the risks to the wild salmon stocks from salmon aquaculture. The Council also agreed on steps to further develop liaison with the international salmon farming industry. The Council expressed concern about the possible impacts on wild salmon and the environment by transgenic salmon in aquaculture. The Council considered a number of steps to contain the risk and develop more information on this issue. The Council also agreed to consider in more detail the use of the precautionary approach as it might be applied to salmon.

A Special Session on 'The Atlantic Salmon as Predator and Prey' was held.

The Council elected Mr Einar Lemche (Denmark (in respect of the Faroe Islands and Greenland)) as its President and Mr Ole Tougaard (European Union) as its Vice-President.

The Fourteenth Annual Meeting of the Organization will be held in Ilulissat, Greenland during 9-13 June 1997.

ANNEX 29

LIST OF COUNCIL PAPERS

Paper No.	Title
CNL(96)1	Provisional Agenda
CNL(96)2	Draft Agenda
CNL(96)3	Explanatory Memorandum on the Draft Agenda
CNL(96)4	Proposed Schedule of Meetings
CNL(96)5	Election of Officers
CNL(96)6	Secretary's Report
CNL(96)7	Audited Accounts for 1995
CNL(96)8	Travel and Accommodation Arrangements for Fourteenth Annual Meeting in Greenland
CNL(96)9	Budget Commentary
CNL(96)10	Report of the Finance and Administration Committee
CNL(96)11	Report on the Activities of the Organization in 1995 (not for publication)
CNL(96)12	Review of the Provisions of Article 13 of the Convention
CNL(96)13	The Future Issues for NASCO
CNL(96)14	Report of the ICES Working Group on North Atlantic Salmon
CNL(96)15	Report of the ICES Advisory Committee on Fishery Management
CNL(96)16	Report of the Standing Scientific Committee
CNL(96)17	Catch Statistic Returns by the Parties
CNL(96)18	Historical Catch Record 1960-1995
CNL(96)19	Summary of Microtag, Finclip and External Tag Releases in 1995
CNL(96)20	NASCO Tag Return Incentive Scheme
CNL(96)21	Database of Salmon Rivers Flowing into the NASCO Convention Area

CNL(96)22	Review of International Salmon Related Literature
CNL(96)23	Report on Laws, Regulations and Programmes
CNL(96)24	Returns under Articles 14 and 15 of the Convention
CNL(96)25	Fishing for Salmon in International Waters
CNL(96)26	International Cooperation on Surveillance
CNL(96)27	Research Fishing in Relation to the Provisions of Article 2 of the Convention
CNL(96)28	Returns Made under the Resolution to Minimise Impacts from Salmon Aquaculture on the Wild Salmon Stocks
CNL(96)29	Advances in Relevant Research in Relation to Impacts of Salmon Aquaculture
CNL(96)30	Transgenic Salmon
CNL(96)31	Cooperation with the Salmon Farming Industry
CNL(96)32	Long-Term Trends in Salmon Abundance
CNL(96)33	Programme for Special Session
CNL(96)34	The Predators of Atlantic Salmon and Their Impact on Salmon Stocks
CNL(96)35	The Public Perception of Predator Control Programmes
CNL(96)36	The Prey of the Atlantic Salmon
CNL(96)37	The Impact of Industrial Fisheries on the Prey of the Salmon
CNL(96)38	Not issued
CNL(96)39	Guidelines on Catch and Release
CNL(96)40	Guidelines on Stocking
CNL(95)41	Kyoto Declaration
CNL(96)42	Dates and Places of 1997 and 1998 Meetings
CNL(96)43	Draft Report
CNL(96)44	The Precautionary Approach to Fisheries Management
CNL(96)45	United Nations Resolutions on Straddling Fish Stocks and Highly Migratory Fish Stocks and on Large-scale Pelagic Drift-Net Fishing

CNL(96)46	Cooperation with Other Inter-Government Organizations
CNL(96)47	Proposal for Research Fishing by Norway
CNL(96)48	Agenda
CNL(96)49	Outline 1997 Budget, 1998 Forecast Budget and Schedule of Contributions
CNL(96)50	Draft Press Release
CNL(96)51	Not Issued
CNL(96)52	Draft Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean Concerning Scientific Research Fishing (Not Issued)
CNL(96)53	Draft Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean Concerning Scientific Research Fishing
CNL(96)54	Not Issued
CNL(96)55	Draft Resolution on Transgenic Salmon
CNL(96)56	Press Release
CNL(96)57	Report of the Annual Meeting of the Council
CNL(96)58	Request for Scientific Advice from ICES
CNL(96)59	Not Issued
CNL(96)60	Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean Concerning Scientific Research Fishing
CNL(96)70	NGO Statement - The European Anglers Alliance
CNL(96)71	NGO Statement - Sami Parliament
CNL(96)72	NGO Statement - Atlantic Salmon Federation
CNL(96)73	NGO Statement - Scottish Anglers National Association
CNL(96)74	NGO Statement - Salmon Net Fishing Association of Scotland
CNL(96)75	NGO Statement - Ulster Angling Federation
CNL(96)76	NGO Statement - Norwegian Farmers Union and Norwegian Salmon Rivers

CNL(96)77	NGO Statement - Institute of Fisheries Management
CNL(96)78	NGO Statement - Federation of Irish Salmon and Sea-Trout Anglers
CNL(96)79	NGO Statement - Association of Scottish District Salmon Fishery Boards
CNL(96)80	NGO Statement - The Atlantic Salmon Trust
CNL(96)81	NGO Statement - International Friends of Wild Salmon

NOTE: This is a listing of all the Commission papers. Some, but not all, of these papers are included in this report as annexes.