# REPORT OF THE EIGHTH ANNUAL MEETING OF THE COUNCIL

11-14 JUNE 1991 EDINBURGH, UK

PRESIDENT:

VICE-PRESIDENT:

SECRETARY:

MR ALLEN E PETERSON (USA) MR SVEIN AAGE MEHLI (NORWAY) DR MALCOLM WINDSOR

CNL(91)45

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#### CNL(91)45

# REPORT OF THE EIGHTH ANNUAL MEETING OF THE COUNCIL OF THE NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 11-14 JUNE 1991, SHERATON HOTEL, EDINBURGH, SCOTLAND, UK

### 1. **OPENING SESSION**

- 1.1 The President, Mr Allen E Peterson, opened the meeting and welcomed delegates to the Eighth Annual Meeting of the Council (Annex 1).
- 1.2 The representatives of Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Economic Community, Finland, Iceland, Norway, Sweden, the Union of Soviet Socialist Republics, and the United States of America, made opening statements (Annex 2).
- 1.3 A list of participants is given in Annex 3.
- 1.4 The President expressed appreciation to the Members for their statements and closed the Opening Session.

#### 2. <u>ADOPTION OF THE AGENDA</u>

2.1 The Council adopted its agenda, CNL(91)41, (Annex 4).

#### 3. <u>SECRETARY'S REPORT</u>

- 3.1 The Secretary made a report, CNL(91)5, to the Council on the status of ratifications of and accessions to the Convention, membership of the regional Commissions, the Headquarters property at 11 Rutland Square, the Headquarters Agreement and external relations, and projects being carried out by the Secretariat, the audited accounts for 1990, CNL(91)6, and receipt of contributions for 1991, CNL(91)7.
- 3.2 The Secretary also reported to the Council on applications for non-government observer status to NASCO. Since the Seventh Annual Meeting, no new applications had been received.
- 3.3 The Council considered the question of holding a Special Session but decided that in view of the likely extent of other business it would probably not be possible to hold a Special Session in 1992.

# 4. <u>REPORT OF THE FINANCE AND ADMINISTRATION COMMITTEE</u>

- 4.1 The Chairman of the Finance and Administration Committee presented the report of the Committee, CNL(91)9.
- 4.2 The Council, upon the recommendation of the Committee, took the following decisions:

- (a) to appoint Coopers and Lybrand Deloitte of Edinburgh as auditors;
- (b) to modify Financial Rule 6.3 by deleting reference to 30,000 pounds sterling and inserting 40,000 pounds sterling, CNL(91)42, (Annex 5);
- (c) to accept the audited 1990 annual financial statement, CNL(91)6;
- (d) to adopt a budget for 1992 and to note a forecast budget for 1993, CNL(91)43, (Annex 6).
- 4.3 The Council thanked the Chairman of the Finance and Administration Committee, Mr Arni Isaksson, for his work and that of the Committee.

#### 5. <u>SCIENTIFIC RESEARCH</u>

#### Report to NASCO from the ACFM of ICES

5.1 The representative of ICES presented the report of the ICES Advisory Committee on Fishery Management (ACFM) to the Council, CNL(91)11, (Annex 7).

#### Request to ICES for Scientific Advice for 1991

5.2 The Council adopted a decision to request scientific advice from ICES, CNL(91)48, (Annex 8). The General Secretary of ICES referred to the possibility of holding an ICES Dialogue meeting on salmon management. The Council agreed that the Secretary should consult with the General Secretary of ICES to explore this possibility.

# 6. <u>IMPLEMENTATION OF THE CONVENTION</u>

#### Returns under Articles 14 and 15 of the Convention

6.1 The Secretary presented a report on the returns made under Articles 14 and 15 of the Convention, CNL(91)12, (Annex 9). The Council requested that the Secretary make any necessary amendments to the annual presentation of the returns under these Articles so that responses under the various paragraphs of Article 15 may be clearly identified.

#### Laws, Regulations and Programmes

6.2 The Secretary presented a progress report on the Laws, Regulations and Programmes database, CNL(91)13. The database is now complete in that information has been included for all Parties and will be available for use by the Parties once checking is complete. It will be updated annually by the return made by the Parties under Article 15.

#### **Return of Catch Statistics**

6.3 The Secretary introduced a statistical paper presenting the official catch returns by the Parties for 1990 and historical data by Party, CNL(91)14, (Annex 10).

#### Analysis of Catch Statistics

- 6.4 At its Seventh Annual Meeting the Council agreed that the establishment of a minimum standard for catch statistics was desirable and that the Parties should be requested to consider what action might be taken concerning comparability. In order to assist the Parties the Secretary presented a paper, CNL(91)16, (Annex 11), summarising the main differences. The paper listed a number of areas where improvements might be made with regard to the comparability of present statistics:
  - (a) the inclusion of all components of the salmon fisheries;
  - (b) the inclusion of salmon caught in non-salmon gear where retention is legal;
  - (c) the inclusion of statistics on both number and weight differentiated according to sea-age (allocated to grilse and multi-sea winter salmon);
  - (d) the inclusion of returns to ranching units and catches of fish which have escaped from fish farms;
  - (e) an examination of the basis for the use of different conversion factors to calculate whole round weight.
- 6.5 The Council also received a review, CNL(91)17, (Annex 12) of the problems of assessing unreported catches. The Secretary further presented a review of methods of reducing the level of unreported catches, CNL(91)18, (Annex 13).
- 6.6 The Council agreed that the Secretary should contact the Parties with a view to addressing the general issues of comparability and unreported catches. He should provide them with the information on NASCO concerns as outlined in the three papers CNL(91)16, 17 and 18 and ascertain the nature of any problem areas concerning these issues. With regard to the possible means to reduce unreported catches the Secretary was asked to produce a review of the pros and cons of carcass tagging as a method of reducing the illegal harvest of salmon as this might be suitable in some situations.

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

- 6.7 At its Seventh Annual Meeting the Council adopted a resolution calling upon the Parties and the Organization to take action through diplomatic channels to ensure that this fishery was ended. The Secretary presented a report, CNL(91)19, (Annex 14) indicating that although Panama had issued a resolution urging compliance with the NASCO prohibitions no response had so far been received from Poland. Further unconfirmed information that vessels were engaged in fishing activities in international waters had been received, although the level of activity appeared to have been reduced compared to the previous year.
- 6.8 The Council agreed that this was a very serious matter that could undermine the conservation work of the Organization. Further action was necessary and the Council considered a number of options which could be taken to address the problem. The representative of Canada tabled a draft protocol document, CNL(91)39, (Annex 15). The representative of the USA tabled a draft protocol document, CNL(91)40, (Annex 16).
- 6.9 The President proposed that a Special Meeting, to be held before the Ninth Annual Meeting, be set up to consider ways in which to assess the nature and extent of such

fishing activities, the possible remedial actions and any need for interaction with other international organizations and with non-contracting Parties. The Council accepted this proposal and asked the Secretary to consult with the Parties on the agenda date and venue for the meeting.

# 7. <u>CONSIDERATION OF THE PRINCIPLE OF THE PAYMENT OF</u> <u>COMPENSATION FEES FOR NASCO QUOTAS</u>

7.1 The Council received a report, CNL(91)20, (Annex 17) of the meeting of a Working Group which had been set up, in accordance with the decision of the Council at its Seventh Annual Meeting, to consider the principle of the payment of compensation for NASCO quotas. A number of possible options concerning the role NASCO might play in such purchase agreements were outlined in paper CNL(91)21, (Annex 18). The Council took note of these two papers.

#### 8. <u>SALMON TAGGING</u>

#### Repository of Tag Release Data

8.1 The Secretary presented a summary of tag release data, CNL(91)22, (Annex 19) from the information submitted by ICES.

#### NASCO Tag Return Incentive Scheme

- 8.2 The Secretary reported on the NASCO Tag Return Incentive Scheme, CNL(91)23, (Annex 20) during the second year of its operation. The Scheme had been well publicised prior to the 1990 fishing seasons and considerable media coverage had been received for the prize ceremonies resulting from the previous year's draw. A total of 1950 tags had been entered into the 1991 draw, an increase of 58.3% over the first year.
- 8.3 The President advised the Council that the draw for the Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 4 June. He announced that the winner of the \$2500 prize was Ms Hanne Bitsch, Hirtshals, Denmark. The Council offered its congratulations to the winner.

# 9. <u>DATABASE OF SALMON RIVERS FLOWING INTO NASCO CONVENTION</u> <u>AREA</u>

9.1 The Secretary presented a progress report, CNL(91)24, (Annex 21) on the establishment of a database of salmon rivers flowing into the Convention area. In accordance with the decision of the Council at its Seventh Annual Meeting, the information had been requested from the Parties according to the agreed format, for inclusion in the database.

# 10. <u>ADVISORY CODE OF PRACTICE TO MINIMISE THE THREATS TO WILD</u> <u>SALMON STOCKS FROM SALMON AQUACULTURE</u>

10.1 At its Seventh Annual Meeting the Council discussed draft guidelines designed to minimise the threats to the wild stocks from salmon aquaculture. While the discussion

document had been considered to be of value to the Parties it had been agreed that a further opportunity for comment was required. In accordance with this decision the document had been circulated for comment and where received these had been incorporated into a revised document, CNL(91)25.

10.2 The Council reviewed and amended this document and adopted it as forming guidelines for use as appropriate by the Parties on a voluntary basis, CNL(91)47, (Annex 22). The document would need to be reviewed from time to time to take account of changes in fish farming practices and any growth in salmon ranching. The Council asked the Secretary to transmit it to the Parties and to other interested bodies and to indicate that some elements of the guidelines would also apply to ranching.

# 11. CLIMATE CHANGE AND SALMON STOCKS

11.1 The Secretary presented a preliminary review, CNL(91)26, (Annex 23) on the possible implications of climate change for the wild salmon stocks. The salmon may be particularly vulnerable to global warming because of its life cycle which includes a phase in cold freshwater. The Council agreed that they should keep the evidence on climate change and its impacts on salmon stocks under review.

## 12. <u>SEA-RANCHING</u>

12.1 The Council considered a review, CNL(91)27, (Annex 24) of sea-ranching which included a definition of sea-ranching as it relates to other enhancement activities. This activity appears to be expanding and the Council agreed that this subject would need to be kept under review.

# 13. INTERNATIONAL MANAGEMENT BY OTHER SALMON COMMISSIONS

13.1 The Council considered a preliminary report, CNL(91)28, (Annex 25) on the management of salmon by other international Commissions. A more detailed review will be presented to the Council at its Ninth Annual Meeting.

# 14. ECONOMIC VALUE OF ATLANTIC SALMON

14.1 The Secretary presented a review, CNL(91)29, (Annex 26) of the available information on the economic value of Atlantic salmon. This referred to the many facets of the economic value of the salmon some of which were difficult or impossible to value in monetary terms. The Council asked to be kept informed of additional information on the economic value of the resource.

# 15. <u>REPORTS FROM THE REGIONAL COMMISSIONS</u>

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

# 16. <u>REPORTS ON THE ACTIVITIES OF THE ORGANIZATION</u>

16.1 The Council adopted a report on the Activities of the Organization, CNL(91)30, for publication.

16.2 The Council adopted a report to the Parties, CNL(91)31, in accordance with Article 5, paragraph 6 of the Convention.

#### 17. OTHER BUSINESS

17.1 At its Seventh Annual Meeting the Council had adopted a resolution endorsing UN Resolution 44/225 and reiterating that fishing of salmon by any means beyond areas of jurisdiction was contrary to the objectives and spirit of the Convention. The Council considered a further UN resolution calling for regional fishery organizations to study urgently large-scale pelagic drift net fishing and its impact on living marine resources and decided that the Secretary should be authorised to respond to the United Nations indicating NASCO's general acceptance of this resolution. The Council considered that the fisheries carried out by the contracting Parties within the NASCO Convention area were consistent with this.

#### 18. DATE AND PLACE OF NEXT MEETING

- 18.1 The Council confirmed its acceptance of the invitation to hold its Ninth Annual Meeting at the State Department in Washington DC, USA from 8-12 June 1992.
- 18.2 The Council agreed that its Tenth Annual Meeting be held in Edinburgh from 7-11 June 1993.
- 18.3 The Council accepted an invitation from Norway to hold its Eleventh Annual Meeting there from 6-10 June 1994.

## **19. DRAFT REPORT OF THE MEETING**

19.1 The Council agreed the draft report of the meeting, CNL(91)34.

#### 20. PRESS RELEASE

20.1 The Council adopted a press release, CNL(91)46, (Annex 27).

#### **OPENING STATEMENT MADE BY THE PRESIDENT**

Vice-President Mehli, Secretary Windsor, distinguished representatives and delegates, observers, ladies and gentlemen. It is a pleasure for me to welcome you to Edinburgh, Scotland for the 8th Annual Meeting of the North Atlantic Salmon Conservation Organization.

It is indeed a personal pleasure to meet with you again; I want to thank you, belatedly, for re-electing me your President during the 7th Annual Meeting of the Organization held last June in Helsinki. I look forward to serving as your President through 1992 and continuing to be active in NASCO for many years thereafter.

I would like to take this opportunity to draw your attention to the agendas for the Council and Commission meetings. We have many issues to consider, and our time is limited. Several of these issues are complex, many will be controversial, and their final resolution will require considerable compromise by all Parties.

All three Commissions have important decisions to make. The West Greenland and North-East Atlantic Commissions will need to agree to regulatory measures before the close of the meeting on Friday. This will not be an easy task. Events over the past year may have again brought the Parties to positions and views that might be quite divergent. Accommodating these differences will require our best skills and full commitment.

There are two issues confronting us that are so profound that they may affect the very viability of the Organization and the Convention itself. These are the continuing and perhaps growing practice of high seas fishing for salmon and the sale of fishing rights.

The Council has previously addressed the problem of illegal fishing on the high seas. The Organization and its Parties have made good faith attempts to stop this fishing. Unfortunately, those persons who pursue this activity apparently have not been dissuaded, and in fact, there are indications that the level of fishing on the high seas may be increasing. The information currently available to NASCO does not shed light on the extent of this fishing, whether it is still being conducted by vessels of countries Party to the Convention, or by vessels who have reflagged to other nations. Regardless of whether the fishing is legal or illegal, it should be obvious that such fishing practices are contrary to the intent of the Convention and can seriously complicate the conservation and management of Atlantic salmon. I am not an expert on international maritime law, but it would appear to me that the Organization can do very little to stop this fishing on its own and must depend on the cooperation of its Parties or other nations to see that this fishing is stopped. If not, it is only a matter of time before it will expand and efforts to deal with fisheries within the Commission areas and of member Parties will be futile.

I would now like to turn to the issue of the sale of fishing rights. The Organization held a meeting of interested Parties to discuss NASCO's role with regard to initiatives to buy-out salmon quotas in the Greenland and Faroe Islands last January. We will be reviewing proceedings of that meeting and will need to determine what role NASCO has, if any, in such buy-outs.

Recently NASCO has been informed that a buy-out agreement between private parties and Faroese fishermen, with the apparent blessing of several member Party governments, has been concluded. The announcement of this agreement was heralded in some quarters as one of the most significant advancements in the conservation of Atlantic salmon. It is not for me to judge whether that is, or is not, the case. However, as your President, I feel compelled to make you aware of some important considerations.

We must remember that the management of salmon across national boundaries has been problematic to the proper conservation and management of this species for several decades. Early attempts to control high seas fisheries were done through threat, coercion, bilateral agreement, and regulatory measures under a now defunct international organization (ICNAF). Many people considered these arrangements to be less than satisfactory and a better means of conserving and managing salmon was sought. Their concerns led to a series of meetings and diplomatic conferences which culminated in the establishment of the Convention for the Conservation of Salmon in the North Atlantic Ocean and the creation of NASCO. During the formative years of NASCO, agreements on regulatory measures for some fisheries were difficult to achieve and bilateral arrangements outside of the Convention were again employed, but this practice proved to be untenable and ultimately brought the Organization to a crossroad. The very viability of the Organization was in question if it could not achieve one of the major objectives of the Convention. Fortunately, through the willingness and compromise of many Parties, we met that challenge and agreements on regulatory measures in all Commission areas were adopted. The Organization matured and the efficacy of the Convention was generally recognized.

But, now we are confronted with a new type of bilateral agreement. The Convention is silent with regard to whether or not a Party can sell its fishing rights, whether for purposes to catch or not to catch salmon. The Convention, however, does refer us to the Draft Convention of the Third United Nations Conference on the Law of the Sea (UNCLOS) and under Article 9, spells out what factors Commissions should take into account in carrying out their functions and responsibilities. Neither UNCLOS nor Article 9 address the sale of fishing rights directly, so we must interpret them for the applicability of these provisions to current circumstances. If we believe the sale of fishing rights or quotas is allowable, the question becomes, how does this affect the development of regulatory measures? Can we truly negotiate these when there are predetermined provisions and NASCO heads?

As your President I am not offering an opinion with regard to these concerns, rather I propose to you that they are not trivial but rather are fundamental to the precepts upon which the Convention is based. How NASCO confronts these issues today may very well affect its ability to deal with even more complex problems in the future. Once again NASCO may be at a crossroad. I am confident, as in the past, we have the intellect and the will to find a way to deal with these difficult issues.

I wish you all the best of success. Thank you.

# **OPENING STATEMENT MADE BY THE REPRESENTATIVE OF CANADA**

It is a pleasure for the Canadian delegation to participate in the Eighth Annual Meeting of the North Atlantic Salmon Conservation Organization in Edinburgh.

Canada's dedication to the conservation and sound management of Atlantic salmon has been made known to NASCO since its inception. Canada and its NASCO partners share a responsibility for the rational management of salmon and a commitment for its preservation and development for the generations to come. In this light Canada introduced additional steps for 1991 to further impose strict domestic conservation measures for this species. On May 24 the Minister of Fisheries and Oceans announced the 1991 salmon management plan which included a further reduction in the commercial salmon quota, a continuation of the ban on commercial harvesting of salmon in our Maritime Provinces, a continuation of the moratorium on license transfers, a continuation of the prohibition on anglers in most areas for keeping large salmon and an announcement that options are being considered for the retirement of commercial fishing licenses.

This is the second year that Canada has instituted quotas for the Canadian commercial salmon fishery in Newfoundland. A further reduction of the 1991 Newfoundland quota should continue the positive trend towards substantially reducing the problem of interception. Canada is concerned over a number of issues which we will endeavour to address during our deliberations this week. I would like to briefly address four of those issues:

# I. <u>Status of the Salmon Stocks</u>

Canada believes there is good reason to be concerned over the status of the salmon stocks. Most indicators suggest that large salmon producing stocks are in a major decline and Canada believes serious steps are necessary to reverse this trend. Salmon harvests throughout the Atlantic are, for many countries, at an all time low. The composition of the West Greenland fishery showed an unusually high incidence of North American origin fish in 1990.

Traditionally the Canadian harvest of salmon has been far greater than the harvest of grilse. Since the mid 1980s we have noticed evidence of decreasing production of large salmon, both in our catches and in returns to rivers. A similar decrease has not occurred in the grilse component of the stocks. NASCO at this meeting must find a means to begin the process of effectively reversing the declining trend in salmon populations.

### II. <u>Reporting of Catch</u>

Canada believes that all salmon that are harvested must be reported for NASCO statistical purposes and where applicable must be counted against NASCO quotas. Without accurate catch data NASCO is approaching the salmon conservation issue with one arm tied behind its back.

### III. <u>High Seas Interceptions</u>

NASCO Members continue to explore means for conserving salmon yet fishermen using flags from countries not associated with NASCO have evaded NASCO rules and have harvested salmon on the high seas. The problem for now appears to be isolated but NASCO must work to develop approaches which will discourage high seas interceptions. Canada is willing to participate actively in this exercise.

#### IV. <u>New Approaches</u>

Canada believes that in areas such as the establishment of regulatory measures, NASCO should explore approaches, based on conservation, which could advance the discussions in controversial areas such as quota negotiations. NASCO must base its decisions on sound principles of conservation. Canada has developed some options in this area which NASCO may wish to review. Some of the options are based on ideas which have been discussed among some delegations in the past. However, Canada would like to point out that our intention is to facilitate discussion rather than promote a fixed position. We will be flexible in undertaking to find ways to arrive at meaningful regulatory measures. However, measures adopted at this year's annual meeting must yield demonstrable improvements in the status of the stocks within a predefined time frame.

Canada will work with NASCO in continuing the work necessary to conserve the Atlantic salmon. Canada comes with a spirit of cooperation and a desire to work long and hard with our NASCO colleagues to resolve outstanding issues and provide a solid framework for salmon conservation into the future.

Thank you Mr President.

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

#### Mr President,

I would like to refer to our Opening Statement in 1990. It briefly touched upon some items, which - to our minds - make the work and approach to basic problems of the Organization unbalanced.

NASCO is supposed to establish the framework of cooperation between the countries from whose rivers the salmon originates and those countries in whose sea areas the salmon grazes. In making decisions on measures to safeguard the well-being of the salmon stocks, due consideration has to be given to rights and obligations of both types of salmon countries.

It is, therefore, with concern that this delegation observes that the perennial problem of unreported catches seems in no way closer to any solution. Although the estimated amount of unreported catches has decreased in absolute numbers it has increased from 32 to 36%, relative to total reported catches, from 1988 to 1990. In absolute numbers the estimated unreported catches are higher than the aggregated quota granted to the two countries with major grazing areas.

When considering the allowable catches of salmon in their different life stages this delegation has for several years been a proponent of basing regulations on scientific advice on various catch levels, based on biological considerations. We understand the difficulties involved in calculating these, but this leaves NASCO in the difficult position of not being able to evaluate the consequences of different lines of action.

Both the Greenland and the Faroe Islands quotas will be discussed at this meeting. The Greenland and the Faroe Islands authorities are interested in establishing realistic catch limits, which safeguard the well-being of salmon stocks. The success of the fishery in the grazing areas is just as dependent on sound salmon stocks as the fisheries in homewaters. When discussing the quotas it will, however, be very important to gauge proposed regulations for the fisheries in the grazing areas against commitments in the countries of origin to safeguard the spawning success of the salmon stocks.

This delegation with appreciation notes the progress that seems to have taken place in the field of stopping fishing activities in the high seas of parties not Members to NASCO. This should encourage us in our search for fair and balanced solutions to the problems of Parties to NASCO.

## OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE EUROPEAN ECONOMIC COMMUNITY

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

The Eighth Annual Meeting of NASCO has brought us all back to the headquarters of our Organization - headquarters of which we are rightly proud. As years have passed we have been confirmed of the wisdom in the decision we took when we acquired 11 Rutland Square here in Edinburgh. Not only do we have a valuable piece of property, but we also have a very dedicated staff which is able to represent the Organization in those long periods of the year, when we are not in session.

The Eighth Annual Meeting is an important meeting during which important decisions will have to be taken. The regulatory measures adopted by the North-East Atlantic Commission and the West Greenland Commission are about to expire and will have to be replaced. These regulatory measures are in the view of the Community essential for obtaining the goals as established in the Convention. It is rare that regulatory measures in two of the Convention Areas have to be discussed at the same annual meeting. The Community delegation is however confident that with the experience gained over the years the two Commissions will be able to complete their tasks in such a way that the interceptory fishery may be kept within limits which will not endanger the conservation of the salmon stocks.

The Community is of the opinion that when catch opportunities have been established by NASCO it is up to the Contracting Party concerned to decide how that catch is to be taken. This may include arrangements under which the catch may be taken by someone else or indeed not be taken or be taken somewhere else when that is permissible. All these decisions are in conformity with the provisions of the Law of the Sea and the Community itself is constantly involved in taking such decisions in a number of contexts. The Community is following with interest the scheme which has been developed regarding the purchase of open seas salmon quotas.

At the same time as we in NASCO are discussing management measures for the salmon fisheries it is a painful fact that vessels are catching salmon outside the limits of exclusive economic zones in the North Atlantic. Such activities are not only contrary to the NASCO Convention but also to the provisions of the Law of the Sea Convention, which in Article 66 envisages that this kind of fishery may only be conducted under very special conditions which are not fulfilled in this case. Fishing for salmon in international waters by non-contracting parties is a matter of grave concern to the Community. Within the Community steps have been taken to prevent vessels from carrying out such a fishery. Furthermore the Community has been in contact with the non-contracting Parties concerned through diplomatic channels in order to encourage such states to intervene in order to bring these activities to a halt. The Community intends to continue to put pressure on these countries within the limits of its international obligations.

The Eighth Annual Meeting will also deal with a number of issues of importance for the future work of this Organization.

NASCO is very dependent on the scientific advice it receives from ICES. It is important that the advice is given in the best possible format.

We shall be discussing guidelines to minimise the threats to wild salmon stocks from aquaculture as well as the development of sea-ranching.

We shall also be addressing - in a very preliminary way - climate change and salmon stocks.

It all leads me to conclude, Mr President, that there will be matters to deal with in this Organization which go far beyond the Eighth Annual Meeting.

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Thank you, Mr President.

# **OPENING STATEMENT MADE BY THE REPRESENTATIVE OF FINLAND**

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

Mr President, in this meeting we have to decide in NEAC a regulatory measure regarding the salmon fishery in the Faroes fishing zone. Although it is quite clear that salmon in these waters originate from European and Icelandic rivers, Finland understands the importance of this fishery to Faroes fishermen. However, this kind of interceptory fishery is harmful for spawning stocks and may lead to insufficient recruitment of smolts. Therefore the level of the catch must be based on biological facts and determined properly taking into account both the conservation of salmon stocks and the fishery.

A new concept has been brought to NASCO's attention as a means of regulatory measure, namely the purchase of NASCO quotas. From Finland's point of view this activity is not in conformity with the work of NASCO and is therefore not acceptable if it is carried out within the framework of our Organization. On the other hand Finland has nothing against this if this activity is done privately outside NASCO.

Finland is very concerned regarding the fishing in the international waters of the Convention area by vessels whose Flag States are not Members of NASCO. This fishery might catch even more salmon than the quotas established. Despite the efforts made by our Organization, this fishery seems to continue. Finland among other member countries and NASCO has intervened by sending notes to such Flag States, but eventually some other means should be found to stop this fishery.

Mr President, if you allow me, I would like to say some words concerning the situation of Teno river, which along with the other smolt producing river, the Neiden, is of prime interest to Finland. These rivers also contribute to the Convention area with large amounts of smolts.

The revised Teno Fishing Agreement with Norway has been successful. The catches have increased somewhat and smolt density is growing also upstream. One important factor for better migration to the river is the drift net ban along the Norwegian coastal areas. However, fishing with standing gear in Teno Fjord is still at too high a level. About 80% of the total yield from Teno stock is taken in the fjord area and only 20% in the river. By reducing fishing effort enough in the fjord, the migration to the river would be protected.

Unfortunately, Mr President, there are still other threats to Teno river salmon stock. Salmon farming in Teno Fjord seems to be increasing although there is strong opposition from the Finnish side as well as in Norway from local authorities and fishery organizations. Despite this, and taking into account that Article 11 of the Teno Fishing Agreement restricts salmon farming in the Teno Fjord, the Ministry of Fisheries in Norway has not taken further action to restrict salmon production. As a result the threat of fish diseases and genetic disorders is increasing. To safeguard salmon stocks in the Teno River from these risks salmon farming should be terminated altogether in the fjord area.

We are also concerned at increasing pollution by air from industry in the Kola Peninsula. If there is not a change for the better, the acidification will gradually decrease smolt production and finally destroy the living conditions of the salmon. In this regard we look forward to actions which are planned to decrease emissions from industry. Mr President, NASCO provides an excellent forum for us to discuss problems related to conservation of Atlantic salmon. Our work has until now proved to be successful and I am convinced that this meeting will further enhance our objectives.

Thank you Mr President.

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# **OPENING STATEMENT MADE BY THE REPRESENTATIVE OF ICELAND**

Mr President, Distinguished Delegates, Observers, Ladies and Gentlemen. It is a pleasure to be back in familiar surroundings in Edinburgh and an even greater pleasure to have our President back at the head table.

During the last year there have been many developments which will influence Icelandic salmon fisheries. Ranching continues to grow and constituted over 70% of the Icelandic salmon catch in 1990. There have been some incidences of ranched fish in salmon streams, especially those in the vicinity of large ranching stations. These occurrences are being monitored by the Institute of Freshwater Fisheries both through scale sampling and recovery of microtagged salmon. The incidence of reared salmon in Icelandic salmon streams is, however, greatly reduced as a result of a decline in the number of salmon cages due to the poor economics of farming.

The 1990 sport fishing season was rather poor, but total landings were a record high, when ranched salmon are included. Actual return rates to ranching operations, however, were low, probably as a result of adverse feeding conditions off the Icelandic coast during the marine phase. Sea conditions have changed for the better within the last year, which might benefit the 1991/1992 salmon runs.

Within Iceland a contract has been reached between the net-fishermen in Hvita, one of Iceland's best salmon rivers, and the riparian owners on its tributaries to refrain from net fishing in the 1991 salmon season. This experimental closure is expected to make many more salmon available in the upstream sport fisheries, especially in years of low runs. The permanency of this arrangement is uncertain, however, as it is dependent on annual negotiations.

Earlier this year the "Committee for the Purchase of Open Sea Salmon Quotas" closed an agreement with Faroese fishermen with the consent of Faroese authorities to purchase the NASCO quota for the next three years. This event makes a precedent that other high seas fisheries might follow in the years to come, and is an important step in reducing the heavy exploitation of many salmon stocks in the North Atlantic. One can only hope that the countries of origin will similarly reduce the heavy fishing pressures in their homewater fisheries, in order to allow the escapement to reap the benefits of this change.

Icelandic authorities and the "Quota Committee" were also involved in persuading Panamanian authorities to issue a regulation, prohibiting Panamanian vessels from engaging in salmon fishing in international waters. The government of Poland was also persuaded to enact similar regulations and prohibit landings of salmon from these waters.

In Iceland there are also plans to set up an international fund to collect, manage and distribute funds through suitable international or national bodies for the purpose of buying salmon quotas in the North Atlantic and develop international support for the conservation of Atlantic salmon and its habitat.

Thank you Mr President.

# **OPENING STATEMENT MADE BY THE REPRESENTATIVE OF NORWAY**

Mr President, distinguished delegates, observers, ladies and gentlemen.

The Norwegian delegation looks forward to the Eighth Annual Meeting of NASCO. We will contribute to constructive discussions between the contracting Parties to the benefit of Atlantic salmon and in the spirit of cooperation.

The catches of Atlantic salmon in Norway have been gradually reduced during the last years. This may be due to many factors, but depleted stocks and reduced fishing effort seem to be among the most important. On the other hand threats like acid waters and diseases and parasites have put heavy pressure on the salmon stocks. These factors combined with the reality that Atlantic salmon is a small resource compared with other fish resources could easily lead to reduced interest for this species. In fact we see the opposite.

In Norway private people and public interests have seen the stress on the salmon stocks as a challenge and have contributed in different ways to raise money and to put more effort into salmon research, management, enhancement and restoration.

Sea-ranching of Atlantic salmon is among those areas which are given special attention in Norway. Sea-ranching may represent a beneficial activity for people in coastal areas, and for this reason the potential needs to be evaluated. But we can also clearly see that sea-ranching in our situation may have strong negative effects on wild stocks if it is not properly run. Diseases, straying to other rivers and increased exploitation may be mentioned as key words in this connection. In Norway we have just started a special programme which will last until 1996 and which will have the necessary size to evaluate the most important elements.

Fishing for salmon in international waters is a field in which Norway has given priority to register the activity in the open sea. The Norwegian coastguard, ships and planes, have documented that the fishery takes place. But the actual areas for supervision are huge and for this reason there is a real need for better cooperation. We will express deep concern about what will happen in the future if the legal base and diplomatic activity does not show sufficient to control this fishery.

The buy-out programme for the Faroese fishery is another area which has been given great attention in Norway. We regard this as a conservation measure which will help the recovery of the Norwegian salmon stocks. There are many different aspects in such a buy-out programme and for some of them we don't know the final effects. However, I can assure you Mr President, that Norway wants to contribute to reach a conclusion based on what is the best solution for the salmon.

Norway is a major state of origin for the North Atlantic salmon stocks. We are well aware that this also gives us a special responsibility to manage the salmon stocks in a proper way. The work which is put into this and the great financial resources devoted to protect, secure and to restore the Atlantic salmon stocks reflects the importance of the Atlantic salmon in Norway. The great interest for Atlantic salmon among Norwegian authorities is reflected by the fact that three different Ministries, the Ministry of Environment, The Fishery Ministry and the Foreign Ministry are included in this delegation. Further we continuously develop programmes for Atlantic salmon and a new salmon act is close to being placed before the Parliament.

The Norwegian authorities want to contribute to fulfil the wishes of the Council to have meetings outside the NASCO homebase. We therefore hope that the Council will accept our invitation to host a NASCO meeting in Norway in 1993 or 1994.

Mr President, we are very happy to see you at this meeting. We know that the situation has not been easy during the last year, but as we can see the recovery has been excellent and we wish you all the best in this meeting. Finally Norway compliments the NASCO Secretary and his staff for excellent preparatory work.

Thank you Mr President.

# **OPENING STATEMENT MADE BY THE REPRESENTATIVE OF SWEDEN**

Mr President, ladies and gentlemen.

Like a migrating salmon the North Atlantic Salmon Conservation Organization is now back here in Edinburgh from the visit to Helsinki last year. It might be appropriate to designate Edinburgh and its beautiful surroundings as the "state of origin" of the Organization.

At this meeting there are many tasks to perform and problems to solve. It is sufficient to mention that new regulatory measures will have to be established within the three Commissions. In Helsinki last year it was stated in the welcoming address that only by joining the knowledge and the resources of all member countries can one expect useful, practical and fruitful results in management work. Within NASCO we have reached a high level of international cooperation despite a certain institutional imbalance. The Organization has in any case attained an acceptable stability in the management of the North Atlantic salmon. All Parties seem to have accepted to give firm commitments to the maintenance and restoration of the salmon stocks. As an example one can mention the strict regulations introduced by Norway in the 1989 season which have improved the spawning escapement to Norwegian rivers. From the ACFM report this year it can be assumed that these Norwegian management measures also have affected Swedish west coast stocks in a positive way.

The Swedish homewater fishery showed in 1990 an increase by 4 tonnes or 14%. This increase can mainly be attributed to the recreational fishery in the rivers, while the commercial coastal fishery with trap nets had to face a slight decrease. One serious problem in this coastal fishery is the present eutrophication of the sea water with the subsequent high production of filamentous algae growing on the nets. There may still also be some effects on the fishery due to the intensive algal bloom in the sea in 1988, when a considerable number of salmon smolts might have been killed. The environmental conditions in the rivers are still to a large extent dependent on regular liming to mitigate the acidification effects. For about a decade up to 1990 liming operations have been carried out in Swedish west coast salmon river catchment areas up to a total cost of about 35 million US dollars. Almost 50% of this liming was put directly into the waters. These extensive liming operations should be regarded as a major contribution to the restoration of the North Atlantic salmon stocks concerned.

A sample survey of the Swedish recreational fishery undertaken in 1990 indicates that the number of persons fishing has increased considerably since a similar investigation in 1973. Most of the fish is still taken with hand gear but there has been a very strong increase in the use of other gears, especially nets. Many of the recreational fishermen prefer to fish in rivers, especially in west coast rivers carrying salmon and sea-trout.

In this meeting the Swedish delegation is prepared to participate with a open mind in constructive dialogues and substantive negotiations on regulatory measures etc. It might be that NASCO might not have the full knowledge about all relevant aspects. Where there is uncertainty it would be advisable to take an approach in accordance with the precautionary principle, in other words, to have a safety margin when determining and applying conservation measures.

Thank you, Mr President.

## OPENING STATEMENT MADE BY THE REPRESENTATIVE OF THE UNION OF SOVIET SOCIALIST REPUBLICS

Mr President, Distinguished Representatives and delegates, ladies and gentlemen.

On behalf of the Soviet delegation, I am glad to greet you at this meeting.

All our previous activities have proved to be fruitful and advantageous and I am sure that the present meeting will be a further contribution into consolidation of our efforts in conservation and enhancement of stocks of one of the most valuable fish species.

In the Soviet Union, in 1990 and at the beginning of this year, a number of steps were undertaken to harden the regulatory and protection measures applied to Atlantic salmon stocks.

First of all, after in-depth discussions held in scientific institutions and environment protection bodies, the fishery has been stopped in a few large rivers flowing into the White Sea. The fishing pattern has been altered on some other rivers. The issue of transferring the salmon rivers under the jurisdiction of local authorities has received a legislative solution.

At present, we devote an unremitting attention to development of recreational fishing. This year we have received much assistance from Mr Mehli and Dr Windsor who took an active part in the arrangements of the international workshop on this issue that was held in Murmansk, USSR last April. The workshop was attended by experts from Scotland, Norway, Finland, Iceland and the USA. It is possible to state that the workshop has attained its goal, and by now, a number of contracts concerning the development of recreational fishing in some salmon rivers of the Kola peninsula have already been signed.

Let me thank once more Mr Mehli and Dr Windsor for their assistance in solving such essential problems. I also would like to add that this became possible thanks to our cooperation within NASCO, and this cooperation should be further expanded in all ways.

The Soviet delegation shares the common opinion about the prohibition of non-legal salmon fishing in international waters.

Concluding my brief speech, I'd like to wish everybody present here a fruitful and successful work, all the best, and prosperity to your countries.

Thank you for your attention.

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

Mr President, Dr Windsor, distinguished representatives, observers, ladies and gentlemen.

We are all appreciative for your return Mr President; the organization of NASCO and our personal efforts on the behalf of NASCO at this Eighth Annual Meeting will benefit by your presence here.

The United States continues to be committed to the principles that led to the creation of NASCO. The United States continues to believe that the restoration of natural stocks of *Salmo salar* throughout the North Atlantic is a laudable and defensible objective. This Eighth Annual Meeting faces several significant issues, but I will mention only a few of the more important agenda items in these brief opening remarks.

The single most important NASCO topic for the United States continues to be the exploitation of our salmon stocks in the interception fisheries of Canada and Greenland.

Annual removals by these fisheries represent over 60% of the adult population likely to return to home rivers the following year, of which the United States harvests only 13%. The United States urgently seeks an immediate remedy for this burden of disproportionate exploitation. New management accommodations must be found, changes in time and area closures for example, to more evenly distribute that burden. The United States is committed to exploring these possibilities or looking for other alternatives.

The United States also urgently calls the Council's attention to the problems of lost age structure and lost genetic diversity, but does so with little hope. The ironic reality is that if after eight years some of the Parties still refuse to supply NASCO with complete and comparable catch statistics, what likelihood is there of age and DNA data being returned on a reliable annual basis?

The United States continues to believe that NASCO cannot approach its potential as a fisheries management organization until the often repeated subjects of (1) unreported catch (2) the compatibility of catch statistics and (3) illegal fishing are appropriately dealt with by the individual Parties. What NASCO speaks to in principle has virtually no effect without implementation by the individual Parties to convert those abstract principles into the hard realities of everyday scientific participation, regulation and enforcement.

This is not to say that if NASCO had all of the scientific answers we would automatically proceed to optimum management decisions. There are numerous historical examples of fishing institutions supported by adequate data and sufficient scientific analysis that nevertheless produced management decisions driven by greed and short term politics.

The NASCO historical record is just beginning to be written but even at this relatively early date it cannot be said that a lack of data or scientific analysis is a limiting factor in NASCO deliberations. It is also important, therefore, that NASCO reach out and be aware of what the history of other fishery organizations can teach us. I ask that you support my request to the Council, Mr President, that the Secretary be instructed to expand our current study of other organizations that deal with salmon. I believe that such a review could provide illuminating insights for our consideration.

In conclusion I once again must emphasize that the total population of wild salmon in the North Atlantic is overfished and that dickering about precise quota numbers will not solve the fundamental problem that NASCO faces. If the prime NASCO objective is to return sufficient numbers of wild salmon to the rivers and produce a scientifically determined annual surplus which can then be distributed among various user groups on an equitable basis, then NASCO must require of its Members a higher level of commitment to the ethic of conservation and a deeper responsibility to the restoration of natural stocks than the Parties have demonstrated thus far in fulfilment of their treaty obligation.

Thank you Mr President. The United States looks forward to making every contribution it can toward the success of this year's meeting as well as to the eventual achievement of our goals.

#### ANNEX 3

# EIGHTH ANNUAL MEETING OF THE COUNCIL 11-14 JUNE 1991, SHERATON HOTEL, EDINBURGH, SCOTLAND

# **LIST OF PARTICIPANTS**

\* Denotes Head of Delegation

# **CANADA**

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*MR JEAN E HACHE	Representative Department of Fisheries and Oceans, Ottawa, Ontario			
DR WILF CARTER	<u>Representative</u> Atlantic Salmon Federation, St Andrews, New Brunswick			
DR GABY WARD	<u>Representative</u> Champlain College, Quebec			
MR MIKE CALCUTT	Department of Fisheries and Oceans, Ottawa, Ontario			
MR DAVID CLARK	Atlantic Salmon Federation, New Brunswick, Canada			
MR DAVID MEERBURG	Department of Fisheries and Oceans, Ottawa, Ontario			
MR MATT MURPHY	Food, Fisheries & Allied Workers/Canada Auto Workers Staff Representative, Newfoundland			
MR REX PORTER	Department of Fisheries and Oceans, St John's, Newfoundland			
MR DAVID RIDEOUT	Department of Fisheries and Oceans, Ottawa, Ontario			
MR DAVID VARDY	Department of Fisheries, Government of Newfoundland and Labrador, St John's, Newfoundland			

# **DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)**

*MR KJARTAN HOYDAL	<u>Representative</u> Faroese Home Government, Torshavn, Faroe Island		
MR EINAR LEMCHE	Representative		

Greenland Home Rule, Copenhagen

MR PETER DAVIDSEN	Greenlandic Fishermen & Hunters Association			
MR HJALTI I JAKUPSSTOVU	Fisheries Research Institute, Torshavn, Faroe Islands			
MR JENS MOELLER JENSEN	Greenland Fisheries Research Institute, Copenhagen			
MRS AMALIE JESSEN	Department of Fisheries & Industry, Greenland Home Rule, Nuuk			
MR JOHN PETERSEN	Minister of Fisheries, Torshavn, Faroe Islands			
MR SOFUS POULSEN	Faroese Commercial Attaché, Aberdeen			
MR ORLA SANDBORG	Greenlandic Fishermen & Hunters Association			
<u>EEC</u>				
*MR HENRIK SCHMIEGELOW	<u>Representative</u> Directorate-General of Fisheries, EC Commission, Brussels			
MR HARRY KOSTER	<u>Representative</u> Directorate-General of Fisheries, EC Commission, Brussels			
MR ANDREW THOMSON	<u>Representative</u> Directorate-General for External Relations, EC Commission, Brussels			
MR LUIS T DA COSTA	Secretariat of the Council of the European Communities, Brussels			
MR JOHN CARBERY	Secretariat of the Council of the European Communities, Brussels			
MS NICOLE P F BOLLEN	Ministry of Agriculture & Fisheries, Netherlands			
DR TONY BURNE	Ministry of Agriculture, Fisheries and Food, London			
MR J CALVERA	Agriculture, Fisheries & Food Attaché, Spanish Embassy, London			
MR RONAN CORVIN	Representation of Ireland to EC, Brussels			
MR DAVID DUNKLEY	Scottish Office Agriculture & Fisheries Department, Montrose			
MRS PAM JARVIS	Ministry of Agriculture & Fisheries, London			

MR JESPER KAAE	Danish Embassy, London
MR TOM KELLY	Scottish Office Agriculture & Fisheries Department, Edinburgh
MR JOHN KEOHANE	Department of the Marine, Dublin
MR CHRISTIAN LE GROS	Ministère de la Mer, Paris
MR CHARLES MCCALL	Ministry of Agriculture, Fisheries and Food, London
DR KEVIN O'GRADY	National Rivers Authority, London
MR TED POTTER	Ministry of Agriculture, Fisheries and Food, Lowestoft
MR WOLFGANG THOMAS	Bundesministerium fur Ernährung, Landwirtschaft und Foresten, Bonn
MR BOB WILLIAMSON	Scottish Office Agriculture & Fisheries Department, Edinburgh
FINLAND	
*MR PEKKA NISKANEN	Representative Ministry of Agriculture and Forestry, Helsinki
MR EERO NIEMELA	<u>Representative</u> Finnish Game and Fisheries Institute, Helsinki
ICELAND	
*MR ARNI ISAKSSON	<u>Representative</u> Institute of Freshwater Fisheries, Reykjavik
MR ORRI VIGFUSSON	Association of Icelandic Fishing Clubs
<u>NORWAY</u>	
*MR SVEIN MEHLI	<u>Representative</u> Directorate for Nature Management, Trondheim
MR OYVIND VASSHAUG	<u>Representative</u> Country Administration of Hordaland, Bergen
MR STEINAR HERMANSEN	Representative Ministry of the Environment, Oslo

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MR RUNE BILDENG	Ministry of Fisheries, Oslo			
DR LARS PETTER HANSEN	Norwegian Institute for Nature Research, Trondheim			
MR KJELL HARVOLD	Ministry of the Environment, Oslo			
MR MARIUS HAUGE	Fisheries Councillor, Norwegian Embassy, London			
MR BJORNULF KRISTIANSEN	Norwegian Farmers Association, Oslo			
MS ASTRID LANGVATN	Directorate for Nature Management, Trondheim			
MR BORRE PETTERSEN	Norwegian Hunters and Anglers Organization			
MR GEORG RIEBER MOHN	Regional Board of Salmon Fishery, Oslo			
MR NIKOLAI SKEIE	Consul General of Norway, Edinburgh			
MR TROND WOLD	Norske fiskeoppdretteres forening, Trondheim			
SWEDEN				
*MR GUNNAR HOERSTADIUS	Representative Ministry of Agriculture, Stockholm			
DR INGEMAR OLSSON	Representative National Board of Fisheries, Goteborg			
<u>USA</u>				
*MR ALLEN PETERSON	<u>Representative</u> National Marine Fisheries Service, Woods Hole Massachusetts			
DR FRANK CARLTON	<u>Representative</u> National Coalition for Marine Conservation, Savannah, Georgia			
MR CLINTON TOWNSEND	<u>Representative</u> Maine Council of the Atlantic Salmon Federation, Canaan, Maine			
DR VAUGHN ANTHONY	National Marine Fisheries Service, Woods Hole, Massachusetts			

DR JENNIFER BAILEY National Marine Fisheries Service, Maryland

MR EDWARD T BAUM Atlantic Sea Run Commission, Maine

MR DAVID EGAN	Connecticut River Atlantic Salmon Commission, Guilford
DR KEVIN FRIEDLAND	National Marine Fisheries Service, Woods Hole, Massachusetts
MR ROBERT JONES	Connecticut Bureau of Fisheries, Hartford, Connecticut
MR HENRY LYMAN	Atlantic Salmon Federation, Boston, Massachusetts
MR JAMES MCCALLUM	US House of Representatives, Washington DC
MR ARTHUR NEILL	National Marine Fisheries Service, Woods Hole, Massachusetts
MR GILBERT RADONSKI	Sport Fishing Institute, Washington DC
MR RICHARD ROE	National Marine Fisheries Service, Gloucester, Massachusetts
MR STETSON TINKHAM	Dept of State, Office of Fisheries Affairs, Washington DC
DR JAMES WEAVER	US Fish and Wildlife Service, Newton Corner, Massachusetts

# <u>USSR</u>

*DR GEORGY LUKA	Representative PINRO, Murmansk
MR G BOROVKOV	Representative Ministry of Fisheries, Moscow
MR KONSTANTIN BUDANOV	<u>Representative</u> Murmanrybvod, Murmansk

# <u>ICES</u>

DR EMORY ANDERSON	International Copenhagen	Council	for the	Exploration	n of the	Sea,
DR RICHARD GRAINGER	International Copenhagen	Council	for the	Exploration	n of the	Sea,
DR FREDRIC SERCHUK	National Ma Massachusett	urine Fis s	sheries	Service, N	Voods	Hole,

## **NON-GOVERNMENT OBSERVERS**

#### AIDSA

Association of Scottish District Salmon Fishery Boards

Atlantic Salmon Trust

Federation of Irish Salmon and Sea-Trout Anglers

Institute of Fisheries Management

Salmon and Trout Association

Scottish Anglers National Association

#### CAPTAIN JEREMY READ

CAPTAIN JOHN PROUDLOCK COLONEL ROBERT CAMPBELL

ADMIRAL JOHN MACKENZIE DR DEREK MILLS

MR JIM MAXWELL MR RICHARD BEHAL

MR ALAN HOLDEN

COL JAMES FERGUSON LORD HUNTER

MR WILLIAM BROWN MR ALASTAIR HUME

#### **SECRETARIAT**

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

# CNL(91)41 EIGHTH ANNUAL MEETING OF COUNCIL 11-14 JUNE 1991 SHERATON HOTEL, EDINBURGH, SCOTLAND, U.K.

<u>AGE</u>	<u>ENDA</u>	PAPER NO
1.	Opening Session	
2.	Adoption of the Agenda	CNL(91)1 CNL(91)2 CNL(91)3 CNL(91)4
3.	Secretary's Report	CNL(91)5 CNL(91)6 CNL(91)7
4.	Report of the Finance and Administration Committee	CNL(91)8 CNL(91)9
5.	Scientific Research	
(a)	Report to NASCO from the ACFM of ICES	CNL(91)10 CNL(91)11
(b)	Request to ICES for Scientific Advice for 1992	
6.	Implementation of the Convention	
(a)	Returns under Articles 14 and 15 of the Convention	CNL(91)12
(b)	Laws, Regulations and Programmes	CNL(91)13
(c)	Return of Catch Statistics	CNL(91)14 CNL(91)15
(d)	Analysis of Catch Statistics	CNL(91)16 CNL(91)17 CNL(91)18
(e)	Fishing for Salmon in International Waters by Non-Contracting Parties	CNL(91)19
7.	Payment of Compensation for NASCO Quotas	CNL(91)20 CNL(91)21

# 8. Salmon Tagging

(a)	Repository of Tag Release Data	CNL(91)22
(b)	NASCO Tag Return Incentive Scheme	CNL(91)23
9.	Database of Salmon Rivers Flowing into the NASCO Convention Area	CNL(91)24
10.	Advisory Code of Practice to Minimise the Threats to Wild Salmon Stocks from Salmon Aquaculture	CNL(91)25
11.	Climate Change and Salmon Stocks	CNL(91)26
12. ຶ	Sea-Ranching	CNL(91)27
13.	International Management by Other Salmon Commissions	CNL(91)28
14.	Economic Value of Atlantic Salmon	CNL(91)29
15.	Reports from the Regional Commissions	
16.	Reports on the Activities of the Organization	CNL(91)30 CNL(91)31
17.	Other Business	CNL(91)32
18.	Date and Place of Next Meeting	CNL(91)33
19.	Draft Report of the Meeting	CNL(91)34
20.	Press Release	CNL(91)35

#### CNL(91)42

#### DECISION OF THE COUNCIL ON WORKING CAPITAL

Having regard to the need to review the level of the Working Capital Fund in the light of the Organization's responsibilities for the Headquarters Property and other factors the Council decides:

- to change the level of the Working Capital Fund from 30,000 pounds sterling to 40,000 pounds sterling and therefore to amend Financial Rule 6.3 to read:
- "The Working Capital Fund will be established in the initial budget at 3,000 pounds sterling and may be increased by budgetary provision, miscellaneous income and any cash surplus in the General Fund at the close of a financial year that is not required to meet outstanding commitments in terms of Rule 4.3 until the fund reaches 40,000 pounds sterling. Any surplus above 40,000 pounds sterling shall be entered as income in the budget and used to offset Members' contributions for the next financial year".

COUNCIL

CNL(91)43

# 1992 BUDGET AND 1993 FORECAST BUDGET

# CNL(91)43

# NORTH ATLANTIC SALMON CONSERVATION ORGANIZATION 1992 BUDGET AND 1993 FORECAST BUDGET (Pounds Sterling)

SECTION	DESCRIPTION	EXPENDITURE	
		BUDGET 1992	FORECAST 1993
1	STAFF RELATED COSTS	143570	155040
2	TRAVEL AND SUBSISTENCE	31440	25850
3	CONTRIBUTION TO ICES	24770	26740
4	CONTRIBUTION TO WORKING CAPITAL FUND	500	0
5	MEETINGS	6000	21410
6	OFFICE SUPPLIES, PRINTING AND TRANSLATIONS	28510	30780
7	COMMUNICATIONS	9270	10000
8	HEADQUARTERS PROPERTY	32770	32320
9	OFFICE FURNITURE AND EQUIPMENT	8200	8850
10	AUDIT AND OTHER EXPENSES	8370	9020
	TOTAL	293400	320010
		RE	VENUE
11	CONTRIBUTIONS - CONTRACTING PARTIES	285253	312510
12	MISCELLANEOUS INCOME - INTEREST	7500	7500
13	SURPLUS OR DEFICIT(-)FROM 1990	647	0
	TOTAL	293400	320010
SECTION 1	STAFF RELATED COSTS	BUDGET 1992	FORECAST 1993
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1.1	Secretariat members' salaries	80860	87320
1.2	Temporary and support staff costs	15750	17010
1.3	1.3 Pensions, allowances, public liability, insurances and other staff related costs		50710
	TOTAL	143570	155040
SECTION 2	TRAVEL AND SUBSISTENCE	BUDGET 1992	FORECAST 1993
2.1	Travel to post and annual meeting	7500	0
2.2	Official travel and subsistence	23940	25850
	TOTAL	31440	25850
SECTION 3	CONTRIBUTION TO ICES	BUDGET 1992	FORECAST 1993
3.1	Annual contribution	23950	25860
3.2	Supplementary contribution	820	880
	TOTAL	24770	26740

SECTION 4	CONTRIBUTION TO WORKING CAPITAL FUND	BUDGET 1992	FORECAST 1993
4.1	Working capital	500	0
SECTION 5	MEETINGS	BUDGET 1992	FORECAST 1993
5.1	Costs of annual meeting	4000	19250
5.2	Costs of other meetings	2000	2160
	TOTAL	6000	21410
SECTION 6	OFFICE SUPPLIES, PRINTING AND TRANSLATION	BUDGET 1992	FORECAST 1993
6.1	Office Supplies	14410	15560
6.2	Printing	9000	9720
6.3	Translations	5100	5500
	TOTAL	28510	30780
SECTION 7	COMMUNICATIONS	BUDGET 1992	FORECAST 1993
7.1	Telephone charges	4500	4860
7.2	Telex charges	350	370
7.3	Postal charges	4420	4770
	TOTAL	9270	10000

SECTION 8	HEADQUARTERS PROPERTY	BUDGET 1992	FORECAST 1993
8.1	Capital and interest payments	53800	51500
8.2	Maintenance, services and other building related costs	23180	25030
8.3	LESS Income from property	44210	44210
	TOTAL	32770	32320
SECTION 9	OFFICE FURNITURE AND EQUIPMENT	BUDGET 1992	FORECAST 1993
9.1	Furniture	1700	1830
9.2	Equipment	6500	7020
	TOTAL	8200	8850
SECTION 10	AUDIT AND OTHER EXPENSES	BUDGET 1992	FORECAST 1993
10.1	Audit and accountancy fees	4120	
10.2	Bank charges and insurance	4120	4440
10.2	Bank charges and insurances	400	430
10.3	Miscellaneous	3850	4150
	TOTAL	8370	9020

## NASCO BUDGET CONTRIBUTIONS FOR 1992 AND FORECAST BUDGET CONTRIBUTIONS FOR 1993 (Pounds sterling)

CATCH (tonnes)	PARTY		BUDGET 1992	FORECAST 1993
870	CANADA DENMARK	(FAROE ISLANDS) (GREENLAND)	47282	51800
542		(TOTAL)	33041	36198
1438	EEC		71943	78817
59	FINLAND		12070	13223
420	ICELAND		27744	30395
919	NORWAY		49409	54130
33	SWEDEN		10941	11987
2	USA		9595	10512
316	USSR		23228	25448
4599	TOTAL		285253	312510

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

# ANNEX 7

## COUNCIL

## PAPER CNL(91)11

## **REPORT OF THE ICES ADVISORY COMMITTEE** ON FISHERIES MANAGEMENT

#### CNL(91)11

## REPORT OF THE ICES ADVISORY COMMITTEE ON FISHERIES MANAGEMENT

# 1. INFORMATION OF INTEREST TO ALL COMMISSIONS OF NASCO

Source of Information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

## 1.1 Catches of North Atlantic Salmon

Total nominal catches of salmon by country, in all fisheries 1960-1990 are given in Table 1.

The total catch reported for all fisheries (4,554 t) and for homewater fisheries (4,000 t) in 1990 are shown in the text table below. The decline in the catch of wild salmon may be greater than suggested by the total due to the inclusion of fish farm escapees and ranched fish in the North-East Atlantic. Also, management plans in several countries are designed to decrease catches in the sea.

Catch (t)

Year	1985	1986	1987	1988	1989	1990*
Total	8095	9249	8142	7716	5894	4554
Homewater	6655	7737	6598	6574	5190	4000

\* Preliminary

The lack of information on fishing effort presents major difficulties in interpreting the catch data as changes in stock size. However, in several of the European countries exploitation rates in homewaters in 1990 were significantly reduced compared to previous years (see Section 3.9.2).

The total unreported catch in 1990 was estimated to be approximately 1,640 t.

## 1.2 <u>Advances in Modelling Approaches to Describe Fishery Interactions and Effects</u> of Management

In order to achieve management objectives, fishery managers and scientists need to know 1) the contribution that individual stocks make to each fishery and 2) the exploitation rates on those stocks in these fisheries. The Working Group is endeavouring to provide approaches to modelling the marine life history of Atlantic salmon which describe the interaction of the harvest in one fishery with catches in subsequent fisheries. Although the modelling results should be considered exploratory and at this stage only show the possibilities that exist, further development and refinement of the modelling work is encouraged by ACFM.

#### 1.2.1 Index rivers

The term "index river" has previously been used (e.g. ICES, Doc. C.M.1985/Assess:11) to describe a small number of rivers in the North Atlantic that are monitored in detail; patterns of change in the salmon stocks in these rivers are not necessarily considered to be representative of larger groups of stocks. The Working Group has also defined the theoretical concept of "indicator stocks or rivers" which may be representative of a larger region or of a number of rivers (ICES, Doc. C.M.1987/Assess:12).

The Working Group feels that there is now confusion because the terms are very similar and it suggests that "index rivers" should be referred to as "monitored rivers". The term "indicator river" should only be used for rivers where changes in some measurable parameter, such as catch, are indicative of the status of stocks in other rivers.

### 1.2.2 <u>Regional run reconstruction models</u>

#### 1.2.2.1 Introduction

Exploitation Rates

The term exploitation rate as defined by the Working Group (ICES, Doc. C.M.1985/Assess:11) is based on the number of fish of the appropriate stocks and smolt classes extant at the time of the fishery, i.e., the "extant exploitation rate".

Estimates are also made of the level of exploitation on that proportion of the appropriate stocks and smolt classes estimated to be within a defined fishery area; these are referred to as "fishery area exploitation rates".

Single Stock Models

Single stock models are run reconstruction models based on data for a single stock; these data are usually of the form of a time series of tag returns from distant and homewater fisheries.

Regional and Continental Models

Regional models consist of two or more run reconstruction models for stocks whose biological characteristics are sufficiently similar to allow description of a broader geographical area. Continental models can be developed either as a collection of individual stocks, each appropriately weighted, or as total, age-specific catches of a continent.

Regional and continental models can be approached in two general ways. Models can be constructed in a "bottom-up" approach in which individual stocks are weighted to

assemble a continental stock. Relative homogeneity of rivers and stocks within an area is a pre-requisite for this approach.

Alternatively, "top-down" approaches are those based on the age or size structure of catches in fisheries. Fish surviving fisheries are exploited in subsequent fisheries and comparisons of predicted and observed spawning escapements can be made. Deductions from the models apply to broad geographical regions but offer no insights into specific stocks. "Top-down" models allow utilization of existing catch data, but the issues of the reliability of nominal landings, estimates of river and sea-age composition and difficulties in distinguishing maturing and non-maturing fish need to be addressed.

## 1.2.2.2 Catch trends in fisheries and homewaters

Catches of North American and European MSW salmon in homewaters were compared to catches of their respective 1SW component caught the previous year at West Greenland and the Faroe Islands. The West Greenland catch that is of North American origin (1SW salmon destined to have been MSW returns) is on average 43% (1981-1989) of the total landed MSW catch of North American salmon. The corresponding figure for salmon of European origin is 17% (1982-1989). The difference in these proportions suggests that the proportion of North American salmon available to the Greenland fishery appears to be about twice as high as the proportion of European salmon available to the same fishery.

# 1.2.2.3 Constraints on exploitation rates in West Greenland

Run reconstruction techniques cannot provide statistical estimates of population parameters, but models can indicate feasible ranges of parameters. To illustrate the potential applicability of run reconstruction to large groups of stocks, the Working Group examined the West Greenland fishery and its relationship to the landings in Canada for two recent catch years. The model illustrates how feasible ranges or constraints, in this case on fishery area exploitation rate at West Greenland, can be established. A graphic illustration is given in Figure 1 and the details are given in the Working Group Report.

# 1.2.2.4 Prediction of national contributions, use of indicator stock data

The Working Group used the "bottom-up" approach to develop a European continental model. It was assumed that 1SW fish from a monitored river would behave in a similar way to other 1SW fish from the same region or country, and that the same would be true for MSW fish. The results of tagging experiments on the monitored river could, therefore, be scaled up if age groups were treated separately. In addition, a correction factor could be introduced if data were available to suggest that exploitation rates on the monitored stock were different from those for national stocks. Estimates of the exploitation rates on each sea age class in each fishery were provided by the model. These estimates were then used to scale the tag data to the national stock level.

The total catches for the Faroes and West Greenland fisheries derived from the model were fairly close to the recorded catches.

## 1.3 <u>Distribution of Parasites and Diseases</u>

The Working Group on Pathology and Diseases of Marine Organisms was asked by ICES to consider the distribution of parasites and diseases harmful to Atlantic salmon in the North-East Atlantic and West Greenland areas. The Working Group was unsure of the purpose behind the request and suggested that a more detailed specification should be obtained from NASCO.

ACFM felt that it would be possible to produce a qualitative list of parasites and diseases that are harmful to Atlantic salmon by region. However, an assessment of the effects of parasites and diseases on wild salmon stocks would be difficult, even with a detailed specification of distribution and possible salmon mortality rate for each pathogen by region. In the absence of this detailed information, it was not possible to assess the effects on wild stocks.

# 1.4 Workshop on Identification of Fish Farm Escapees and Wild Salmon

The reported production of farmed salmon by several countries was 224,259 t in 1990, about 50 times larger than the wild catch.

Production ('000 t)

 1985
 1986
 1987
 1988
 1989
 1990

 37
 59
 68
 111
 165
 224

A review of the Workshop report revealed that fish farm escapees could be identified most easily using changes to external characteristics associated with rearing. These were erosion and deformation of the tail, dorsal and pectoral fins, the snout and gill covers; and a greater degree of spotting. The first four characteristics are the most useful for diagnostic purposes.

## 1.5 <u>Study Group on Genetic Risks to Atlantic Salmon Stocks</u>

ACFM believes that the proposed examination by the Study Group of genetic, ecological and behavioural interactions between wild and farmed salmon should provide information on the genetic risks of introgression.

## 1.6 <u>Compilation of Tag Releases and Fin-clip Data for 1990</u>

In excess of 1.89 million micro-tags (CWTs) and 0.28 million external tags were applied to Atlantic salmon released in 1990. In addition, 1.73 million salmon were finclipped. Thus, more than 3.90 million marked fish were released.

## 1.7 <u>Recommendations</u>

ACFM draws the attention of managers to the many research recommendations made by the Working Group and the various Study Groups.

ACFM recommends that the work on modelling the status of salmon stocks and fisheries be continued.

ACFM recommends that data sets indicative of stock status and sustainability in national agencies be made available to the Working Group in a format specified by the Working Group.

ACFM recommends that an effort be made to improve and increase screening for tags in the catches, especially at West Greenland.

ACFM recommends that the investigations into methods of discrimination to determine continent of origin of Atlantic salmon should continue.

ACFM recommends that the investigation into gonadal and somatic growth be continued and intensified.

ACFM endorses the recommendation of the Working Group that at least two characteristics of farmed fish should be identified before fish are classified as fish farm escapees.

ACFM recommends that a workshop be held jointly by the Working Group on North Atlantic Salmon and the Baltic Salmon and Trout Assessment Working Group to discuss topics of mutual interest.

# 2. INFORMATION OF INTEREST TO THE WEST GREENLAND COMMISSION

Source of information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

### 2.1 <u>Catches</u>

In 1990, the fishery at West Greenland was opened on 1 August and ended in November, although the official closing date was 31 December. The total nominal catch was 227 t.

Year	1985	1986	1987	1988	1989	1990
Quota	852	909	935	_	900	924
Catch	864	960	966	893	337	227 <sup>1</sup>

Quota and Catch (t)

<sup>1</sup> Preliminary

The salmon fishery at Greenland in recent years has been predominantly an in-shore, coastal small boat (<30ft) fishery. No information on effort is available for 1990, but the landings during the first week, and the two first weeks, are the lowest in the time series. The low catches appear to have been caused by lower water temperatures in the fishery area and a low abundance of salmon.

## 2.2 <u>Composition and Origin of the Catch</u>

The results of classifying salmon in samples from commercial catches in 1990 indicated that the North American proportion was 75% (95% CL = 79,70), and the European proportion was 25% (95% CL = 30,21).

An alternative estimate of the overall proportion of North American- and Europeanorigin salmon for the years 1982-1990 was derived by weighting NAFO Division samples by catch in numbers. The table below gives the results:-

Year	i 	Weighted n numbe	l by ca ers	Percentage of all samples combined		
	1	NA		EU	NA	EU
	%	Wt(t)	%	Wt(t)		
1982	57	_	43	-	62	38
1983	40	-	60	-	40	60
1984	54	-	46	-	50	50
1985	47	-	53	-	50	50
1986	59	537	41	423	57	43
1987	59	556	41	411	59	41
1988	42	349	58	544	43	57
1989	55	179	45	158	56	44
1990	74	168	26	59	75	25

ACFM is concerned about the lack of a suitable test sample of scales of known origin salmon for the discriminant analysis.

In 1990, the estimated number of fish caught was 62,353 from North America and 21,721 from Europe for a total of 84,074.

An estimate of the number of Maine salmon harvested at West Greenland in 1990 using the proportional harvest method was 3,968 fish.

## 2.3 <u>Biological Characteristics of the Harvest</u>

As previously observed, North American 1SW salmon were significantly shorter and lighter than their European counterparts, both overall and on an individual NAFO Division basis.

The sea age composition in 1990 of 95.9% 1SW, 3.2% 2SW, and 0.9% previous spawners indicated that there were proportionally more 1SW salmon and fewer 2SW and previously spawned salmon than in 1989.

The increasing number of farmed fish escaping at various life stages which turn up in the catches at sea in unknown quantities may reduce the precision of the discriminant analysis. For instance the proportion of North American-origin river age 1 salmon has increased from 2% in the 1986 samples to 8.8% in the 1990 samples. This could be the result of an increasing production of North American hatchery-origin salmon or because of increasing numbers of fish farm escapees of unknown origin in the fishery. The decrease in numbers of North American salmon of river age 4 years and older from the mean value of 22.5% from 1968-89 to 15.1% in 1990 suggests that either production or migration of salmon from the northerly portion of the range in North America has decreased.

The CWT harvest estimate in 1989 for Maine-origin salmon was 3,533 fish.

Year	1987	1988	1989
Harvest	5538	4236	3533

CWT Harvest, Maine-Origin Salmon

### 2.4 <u>Carlin Tag Reporting Rates</u>

The three methods of harvest estimation available for US-origin salmon in the West Greenland fishery (Carlin tag recoveries, CWT recoveries, proportional harvest) provide independent and complementary results. Comparison of the available time series of harvest estimates (Figure 2) shows that the estimates from the proportional harvest model averaged several-fold greater than the Carlin estimates.

The ratio of Carlin-based estimates to the other methods provides an indirect estimate of reporting rate because neither the CWT estimate nor the proportional model rely on voluntary returns of tags to estimate harvest.

Figure 3 shows the estimates of reporting rate derived from comparisons between the CWT and proportional methods for the period 1976-1989. Results suggest a steady increase in the apparent reporting rate since the early 1980s when estimates were below 20% for the period. The higher level of overall reporting rate in the latter period may be related to the increase in tag rewards from 25 to 100 DKr in 1986, the

initiation of the NASCO lottery in 1989, and increased scientific sampling in recent years.

None of the available comparisons support the previously-used baseline reporting rate of 80%. For the historical time series, the inter-annual pattern of variability in reporting rates could be sufficiently characterized by multiplying the Carlin estimate by 2.

The Carlin tag based harvest estimates of 1SW Maine-origin salmon for the 1989 fishery totalled 3,784 fish. This is the highest harvest estimate of Maine-origin 1SW salmon from Carlin tag data ever computed for the Greenland fishery.

Carlin Harvest, Maine-Origin Salmon

Year	1984	1985	1986	1987	1988	1989
Harvest	849	1469	2035	2075	2287	3784

## 2.5 Exploitation at West Greenland

The extant exploitation rates for 1SW Maine salmon in 1989 averaged 59%, which was higher than the previous year and the long-term average. The extant exploitation rates for 2SW salmon in 1989 were lower than in 1988 and approximately equal to the long-term average (1989 average = 82%).

Exploitation rates of 1SW salmon of Maine-origin for 1989 show an increase in Canada, above the previous three years, whereas at West Greenland exploitation appears to have remained at about the same level as in the previous three years. The effects of different reporting rates of Carlin tags and different P values on the possible range of fishery area exploitation for the years 1987 to 1989 are presented in Figure 4.

The capture of Maine-origin salmon outside the fishing areas at West Greenland and Canada suggests that the value FU = 0.1 (the proportion of the stock unavailable to either fishery) as previously assumed is too low. This in turn implies higher fishery area exploitation rates on these stocks at both West Greenland and Canada.

# 2.6 Effects of Management Measures in the Fishery at West Greenland

The total TAC agreed for the period 1988-1990 was 2,520 t, with an annual opening date of 1 August. In addition, the annual catch was not permitted to exceed the annual average (840 t) by more than 10%. The total harvest for the period corrected for an opening date of 1 August was 1,360 t and in no region was the annual limit exceeded. In 1988 the fishery was closed 4 December because the nominal catch was 893 t which corresponded to a catch of 820 t if the opening date had been 1 August. Hence, only in 1988 was the catch limited by the quota.

## 2.7 <u>Quantitative Estimates of the Effects of Fish Farm Escapees</u>

No quantitative estimates of fish farm escapees were available. Examination of the scale characters of samples from West Greenland in 1990 indicates that there may be some fish farm escapees in the catch.

## 3. <u>INFORMATION OF INTEREST TO THE NORTH-EAST ATLANTIC</u> <u>COMMISSION</u>

Source of Information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

## 3.1 <u>Description of the Fishery in the North-East Atlantic</u>

The gear used in the Faroes fishery is long lines. The numbers of licenses issued for the 1989/90 and 1990/91 seasons were 14 and 13, respectively; of these, 11 and 8, respectively, were used. This shows a continuing reduction in the number of vessels participating in the fishery from 1988/89, when 19 licenses were issued, 12 of which were used.

In the 1989/90 season, the licensed vessels were allowed to fish from 1 November to 20 December and 3 January to 12 April. No fishing took place outside the Faroes EEZ.

### 3.2 Catch at Faroes in the 1989/90 and 1990/91 Seasons

The total nominal catch in the 1989/90 season was 361 t. The catch for the calendar year 1990 was 312 t and the preliminary catch figure for the first half of the 1990/91 season (1 November - 20 December 1990) was 120 t.

Catch (t)

Year	Catch	Season	Catch
1985	566	84/85	598
1986	530	85/86	545
1987	576	86/87	539
1988	243	87/88	208
1989	364	88/89	309
1990	312	89/90	361

The discard rate was 9.4% during the 1989/90 season, which is within the range observed in the seasons 1982/83 to 1988/89.

## 3.3 <u>Catch per Unit Effort in the Faroes Fishery</u>

The catch in numbers per 1,000 hooks (CPUE) by statistical rectangle is shown for the whole 1989/90 season in Figure 5. The CPUE was high at the beginning of the season, decreased in January and February, but improved again for the remainder of the season. In December, the highest CPUE was recorded close to the Islands, but as the season progressed, the best catch rates were recorded further to the north.

## 3.4 <u>Biological Characteristics of the Catch at Faroes</u>

As in previous years, the catch was predominantly 2SW salmon (92.8%), with small numbers of 1SW and 3SW and older fish.

The proportions of river age 1 and 2 fish have increased in the catch as the proportions of river age 3 and 4 fish have decreased. This may reflect changes in the stocks contributing to the fishery, including an increase in fish farm escapees.

## 3.5 Origin of Salmon in the Faroes Fishery

Microtagged salmon from the Faroe Islands have been recaptured predominantly as 2SW fish in the Faroes fishery. Recaptures from Ireland and UK (N. Ireland) have been mainly 1SW, many being in the discards. Recovery rates for tagging in the remainder of UK have been fairly evenly split between 1SW and MSW fish.

Of the 221 external tags recovered in 1990, 205 (93%) were of Norwegian origin. Tags were also recovered from Sweden (11) and Scotland (4); there was one tag of unknown origin.

## 3.6 <u>Exploitation Rates in the Faroes Fishery</u>

Extant exploitation rates on 2SW salmon from the Imsa (Norway) have generally been high (up to 50%), although there has been a fairly steady decrease from the 1982/83 season to 1989/90. The decrease in recent seasons probably reflects the lower total catches in the Faroes fishery and possibly the cessation of fishing outside the Faroes EEZ. However, there appears to have been a corresponding increase in the exploitation of 2SW salmon from the River Drammen.

Season	85/86	86/87	87/88	88/89	89/90
Drammen	30	3	6	36	45
Imsa (w)	38	13	5	3	.5
Imsa (h)	30	28	21	10	15

Exploitation

New data have been provided on the River Lagan stock (Swedish west coast) showing that extant exploitation rates on 2SW salmon in the Faroes fishery have averaged

about 10% in the last three seasons. Data from Ireland and all parts of the UK confirm that those countries are relatively minor contributors to the Faroes fishery with extant exploitation rates on both 1SW and 2SW fish being less than 1%, although rates on River North Esk salmon have been higher at some times in the past.

## 3.7 <u>Effects of Fish Farm Escapees on Catches at Faroes</u>

Experiments to investigate the migratory behaviour of farmed fish provide direct evidence that farmed fish contribute to the Faroes fishery. From a preliminary examination of samples collected from the fishery it appears the contribution of farm fish may be substantial.

## 3.8 Effects of Management Measures at Faroes

The Working Group assessed the operation of the management measures at Faroes. The nominal catch of 312 t in the Faroes fishery in 1990 was only 49% of the permitted maximum of 632.5 t.

No area closures were ordered because of the presence of undersized fish. ACFM again noted that area closures are unlikely to be an effective measure without extensive monitoring or the cooperation of fishermen.

In 1990, salmon fishing was permitted for 150 days for vessels over 50 GRT. Effort data are not available for the calendar year of 1990. A total of 532 sets was estimated to have been fished in the 1989/90 season. This is 33% of the total of 1600 permitted in both 1989 and 1990.

ACFM, therefore, concluded that, as effort had been well below that permitted, the catch had not been limited by the effort or quota measures agreed by NASCO.

### 3.9 <u>Homewaters Fisheries</u>

#### 3.9.1 <u>Catches</u>

Total nominal catches by country are given in Table 1. In many countries there was a reduction in the proportion of 1SW salmon in the catch.

#### 3.9.2 <u>Exploitation rates</u>

Exploitation rates in Ireland, Norway, Sweden and UK (Northern Ireland) were considerably lower than the averages for recent years, while estimates for one stock in Iceland and two in UK (England) were within the ranges previously observed. Exploitation on the River Burrishoole (Ireland) and River Bush (UK [Northern Ireland]) stocks in coastal fisheries decreased in 1990. This is partly attributed to reduced effort. The regulatory measures introduced in Norway in 1989 have resulted in a considerable decrease in the exploitation rate on Norwegian stocks. In the USSR, exploitation rates on most rivers were about 50% except for the Kola river, where all fisheries were removed, and the Keret and Varzuga rivers, where it was 25-30%.

	(Åverage)				
Location (River)	1SW	2SW	All Ages		
Iceland (Ellidaar)	44(40)				
Ireland (Burrishoole)			54(76)		
Norway (Drammen)	5(53)	40(50)	- ()		
Norway (Imsa, wild)	22(58)	42(78)			
Norway (Imsa, hatchery)	68(72)	68(85)			
Sweden (Lagan)	45(72)	22(49)			
UK, E & W (Itchen, net)			19(14)		
UK, E & W (Itchen, rod)			49(47)		
UK, E & W (Test, rod)			37(33)		
UK, N. Ire. (Bush)	61(71)	38(45)			
UK, Scot. (N. Esk)	37(32)	37(34)			

### 3.9.3 Status of stocks

As no targets for stock production were available, ACFM considered that it could only assess the status of particular stocks on the basis of changes in production or survival at different life stages. Counts and estimates of wild smolt runs for five stocks showed wide variation and no clear trends between years. There was no evidence of common patterns between regions.

Preliminary 1990 Exploitation

Adult salmon counts for seven rivers in the North-East Atlantic have been very variable with no apparent trends during this period and no clear common patterns between systems.

## 3.10 Effects of Fish Farm Escapees on Stocks and Catches in Homewaters

The greatest proportions of farm escapees were found in catches in Norway, Scotland and Iceland. (In Iceland there were also substantial numbers of ranched fish). The estimated proportion of farmed fish in samples from Icelandic rivers varied between 9.6% and 25.2%, whereas the proportion of ranched fish was estimated at between 16.1% and 36.1%. The proportion of both ranched and farmed salmon in the catches tended to increase towards the end of the fishing season.

The estimates of farmed fish in Norwegian marine fisheries were highly variable among sites. Catches in outer coastal fisheries (16-64%) contained a higher proportion of farmed fish during the fishing season than did catches at fisheries in fjord areas (6-36%). The incidence of farmed fish was much lower in samples taken in freshwater during the angling season than in samples taken during the autumn after the angling season had finished. The reason for this is that farmed fish enter the fjords and the rivers later in the season than wild fish.

# 3.11 Effects of Regulations Introduced in Norwegian Salmon Fisheries in 1989

The impact of the measures on catches in Norwegian homewaters in 1989 and 1990 is shown below.

	1986	1987	1988	1989	1990
Drift	795	552	527	0	0
Other	497	461	314	488	504
Freshwater Proportion in	306	372	235	417	404
freshwater	.19	.27	.22	.46	.44

Catch (t)

It is likely that the ban on drift netting in 1989 has resulted in a larger number of salmon being available to the other marine homewater fisheries. The additional regulation of these fisheries has probably resulted in a substantial increase in freshwater escapement as suggested by increased catches in freshwater. In 1989 and 1990, freshwater catch increased by 35% over the average catch for 1982-88 and accounted for 45% of the total nominal catch compared to 21% in the period 1982-88. Increased freshwater escapement is also suggested by the reduction in marine exploitation rates on most components of the River Imsa salmon stock. This was not the case for salmon of the River Drammen stock, however, because drift net exploitation on this stock has always been low.

The salmon fishery on the west coast of Norway intercepts stocks from the USSR, Finland and the Swedish west coast on their return to their home rivers. Exploitation on 1SW fish tagged as smolts on the River Lagan (Sweden) was lower in 1989 and 1990 (average 2%) than in 1985-88 (average 7%). This suggests that the management measures introduced in Norway in 1989 also affected Swedish west coast stocks.

The frequency of net-marked salmon entering a river may also give information about changes in netting effort on the migration route. The proportion of net-marked salmon recorded in samples of river fisheries in 1990 was much lower than the unweighted means during the period 1978-88. The reduced proportion of net-marked fish may be accounted for by the management measures introduced in the Norwegian homewater fishery in 1989.

# 4. INFORMATION OF INTEREST TO THE NORTH AMERICAN COMMISSION

Source of Information: Report of the Working Group on North Atlantic Salmon, March 1991. ICES, Doc. C.M.1991/Assess:12.

## 4.1 <u>Description of the Fishery in Canada, 1990</u>

Two new management measures were introduced in the Newfoundland and Labrador commercial fisheries in 1990:

Quotas by Salmon Fishing Area (SFA) were introduced in the Newfoundland commercial salmon fishery. Salmon Fishing Area 1 had an allowance of 80 t. An allowance is an estimate of expected catch and not a limitation on allowable harvest. Monitoring of the quotas was conducted by fisheries officers who were in contact with buyers and fishermen on a weekly or daily basis.

SFA	1990 Catch (t)	Quota (t)
1	30	80 <sup>1</sup>
2	151	200
3	135	155
4	92	100
5	25	25
6	19	20
7-11	72	80
13-14	87	95
Q7-9	64	NA <sup>2</sup>
Q11	1	15

<sup>1</sup> Allowance

Not Applicable

Along the Quebec North Shore, the opening of the commercial fishing season, previously 1 June, was delayed by 10 days in Q7 and Q8 and by 1 month in Q9. The total quota in numbers was reduced by 12% to 29,605 salmon. Commercial fishing was prohibited within a 500 m zone from the mouth of the rivers.

The total salmon landings for Canada in 1990 were 870 t (Table 1); this is the lowest recorded level in the period 1960-90. The recreational fisheries harvested 22% (191 t), commercial fisheries 74% (644 t), and native fisheries 4% (35 t) of the total landings by weight.

Catches in the Newfoundland commercial fishery are given in text table below:

### Newfoundland Commercial Fishery

Year	1985	1986	1987	1988	1989	1990
Catch (t)	881	1230	1485	972	867	586 <sup>1</sup>

Preliminary

1

## 4.2 <u>Composition and Origin of Catch</u>

Only salmon of Canadian and USA origin were caught in Canada during 1990. Recaptures of tagged 1SW salmon of USA and Canadian Origin occurred in the Newfoundland and Labrador fisheries.

### 4.3 <u>Exploitation Rates in Canadian Fisheries</u>

Exploitation rates on 1SW salmon for the Restigouche River have averaged 48% for early and late runs combined. The combined rate for 1SW salmon in the Miramichi River is 25%. The Margaree River late run 1SW exploitation rate is 17%.

### 4.4 <u>Status of Canadian Stocks</u>

Estimates of egg depositions in 1990 approximated or exceeded target egg requirements in six rivers. However, egg deposition was 32% below target in the Saint John River. With the exception of the Conne River, most rivers obtained a major component of eggs from MSW salmon.

Additional assessments (based on counts obtained at fishways, counting fences and by divers) made in 1990 suggest that target egg depositions approximated or were below requirements on 4 rivers. Four rivers of the inner Bay of Fundy (SFA 23), had returns that were down relative to historical returns. Reasons for shortfalls in target egg deposition vary by river system and include the effects of low water levels on juvenile survival in 1987, natural cycles, low pH and increased marine mortality.

Counts of 1SW fish at 10 of 12 fishways on systems in insular Newfoundland were down from the 1984-1989 mean. In 8 of 12 cases, the few large salmon counted in Newfoundland were below 1984-1989 mean. In the Maritime provinces, counts of 1SW salmon were similar to or above the mean at all 3 fishways (in SFA 20, 21, 23); counts of MSW salmon declined at all fishways. Counts of 1SW fish in Quebec increased over the 1984-1989 mean at all fishways; counts of MSW salmon were similar to or increased above mean at 2 out of 4 fishways.

# 4.5 <u>Harvest Estimates of USA-Origin Salmon in Canada</u>

The Working Group updated the time series of Carlin tag returns and harvest estimates of Maine-origin 1SW salmon in Newfoundland and Labrador. The total harvest of 1,717 Maine-origin salmon in the 1989 fishery was distributed primarily in SFAs 1-5.

Carlin Harvest, Maine-Origin Salmon

Year	1984	1985	1986	1987	1988	1989
Harvest	1329	2288	552	580	393	1717

Comparative harvest estimates based on CWT and Carlin tag recoveries were calculated for the communities and Statistical Sections sampled.

The proportional harvest model was used to estimate the harvests of 1SW Maineorigin salmon in two communities in Labrador and one in Newfoundland. ACFM concludes that the proportional harvest method cannot be used to estimate the total harvest of Maine-origin salmon in the Newfoundland and Labrador commercial fisheries without a greatly expanded scale sampling program for river age data.

## 4.6 <u>Evaluation of the Effects of the 1990 Quota on the Commercial Salmon Fishery</u> of Newfoundland and Labrador

In 1990, Canada introduced quota management for the Newfoundland and Labrador commercial salmon fisheries (see Section 4.1). Quotas were attained in 8 of the 12 SFAs (4, 5, 6, 8, 10, 11, 13 and 14) resulting in closing dates in these fisheries ranging from June 21 to July 25.

To evaluate the effects of the closures, the Working Group used two approaches, both of which relied on the weekly distribution of landings by SFA for 1984 to 1989. In the first approach, the closure date that occurred in each SFA in 1990 was applied to each SFA and year (1984-1989) to compute the percent reduction in harvest for that year. The minimum, maximum and mean percentages were then applied to the 1990 catches to predict the range of catches forgone in 1990. This approach was called the "Fixed Closure Date Prediction".

It is estimated that the catch of 1SW salmon forgone in SFAs 4, 5, 6, 8, 10, 11, 13 and 14 due to early closure was between 20,000 and 120,000 fish. The catch of large salmon forgone in these SFAs was between 4,000 and 22,000 fish.

The estimates of harvest of USA salmon are highly variable, thus the effects could range between 0% and 71% reduction in the harvest, equivalent to 0 to 185 fish.

In the second approach, the 1990 quota was applied to the temporal distribution of catches in each SFA for the years 1984 to 1989. The date on which the quota used in 1990 would have been fulfilled, the landings that would have been caught, and the estimated reduction in the interceptions of Maine-origin salmon were computed. This approach was called the "Fixed Quota Prediction".

The predicted reduction in total catch, 1984-89, ranged from 98 t (13%) to 746 t (53%) with a mean predicted reduction of 321 t (30%). The total predicted reduction

in harvests of 1SW salmon of Maine-origin ranged from 130 to 364 fish with a mean reduction of 228 fish.

Some salmon released from one SFA due to closure of fisheries may be caught in fisheries that are still open. This may lower the predicted reduction in harvests.

## 4.7 <u>Description of the Fishery in the USA, 1990</u>

Recreational catches of Atlantic salmon (fish kept) of 627 were about 30% higher in 1990 than in 1989. The increased catch was attributed to increased effort as evidenced by higher sales of licenses, excellent angling conditions and, in some instances, larger runs of salmon. The number of salmon caught and released in Maine rivers exceeded the number caught and killed.

The angling exploitation rate on combined age classes in the Penobscot River for 1990 (13.0%) was the same as for 1989 (12.6%) based upon the fish passage efficiency (.85) and reporting rate (.80) adopted by the Working Group in previous years.

## 4.8 <u>Status of the USA Stocks</u>

Catches in 1990 in Maine rivers with salmon runs that are primarily of wild origin increased but were 44% below the long-term average.

Spawning escapement of MSW female salmon to the Penobscot, Merrimack and Connecticut rivers is well below established targets based on the full habitat utilization of 2.4  $eggs/m^2$ .

Documented (counted or reported) Atlantic salmon returns to rivers in the United States totalled 4,442 in 1990. This figure is 23% greater than that recorded for 1989.

ACFM notes that the number of wild-origin 1SW and 2SW salmon in the Penobscot River has increased in recent years. The percentage of wild 2SW salmon in Penobscot River trap counts has increased from less than 1% in 1981 to over 8% in 1990; increases for wild 1SW salmon have been even greater, up 17% in 1990.

# 4.9 Description of the Fishery in the Islands of St. Pierre and Miquelon (France)

A catch of 1 t of salmon for the Islands of St. Pierre and Miquelon was given in the Working Group report. These catches were made by professional fishermen and do not include catches by pleasure boat fishermen. In 1989, there were 13 professional fishermen and 37 licensed pleasure boat fishermen. Tag returns from previous years indicate that salmon of Canadian and US origin have been captured in the commercial fisheries of St. Pierre and Miquelon.

## 4.10 <u>Quantitative Estimates of the Effects of Fish Farm Escapees</u>

USA

The total number of salmon that escape from net pens in the USA is unknown, since most rivers in the vicinity of net pens do not have fish trapping facilities. About 20%

of the 1990 angling catch in the East Machias River was of salmon of aquaculture origin. Small numbers of fish were also documented in two other Maine rivers. The effects of fish farm escapees on USA salmon stocks is unknown, but is thought to be small.

#### Canada

Most of the aquaculture production in Canada occurs in southern New Brunswick and is based primarily upon stock originally from the Saint John River. The number of salmon that escape from net pens annually is unknown, although it is known that there are occasional losses of fish due to predators or storm damage. A recent example occurring in 1990 was the loss of about 19,000 large salmon from one cage site in southern New Brunswick. ACFM notes that the aquaculture facility in Quebec is land-based, therefore the probability of escape from this facility is very low.

Documentation of aquaculture escapees in Canadian rivers during 1990 was restricted to the Saint John River at the Mactaquac trap facility. A provisional estimate is that 6% (221) of the total MSW returns were of farmed origin. The effects of the escapees on the wild stocks could not be quantified.

Year	Canada <sup>5</sup>	Denmark	Faroes	Finland	France	East Green- Land	West Green- Land	Iceland	Ireland <sup>2</sup>	Norway <sup>4</sup>
1960	1,636	-	-	-	75	_	60	100	743	1 650
1961	1,583	-	-	-	75	-	127	100	743	1,039
1962	1,719	-	-	-	75	-	244	127	1 4 50	1,355
1963	1,861	-	-	-	75	-	466	145	1,459	1,935
1964	2,069	-	-	-	75	-	1.539	135	1,450	1,700 2 1/7
1965	2,116	-	-	-	75	-	861	133	1,017	2,147
1966	2,369	-	-	-	75	-	1.370	106	1,738	1 701
1967	2,863	-	-	-	75	-	1,601	100	1,250	1,771
1968	2,111	-	5	-	75	-	1,127	162	1 412	1,700
1969	2,202	-	7	-	75	-	2,210	133	1,730	1,314
1970	2,323	-	12	-	75	-	2,210	195	1,750	1,305
1971	1,992	-	-	-	75	-	2.689	204	1,707	1,171
1972	1,759	-	9	32	34	-	2.113	250	1 804	1,207
1973	2,434	-	28	50	12	-	2.341	256	1,004	1,508
1974	2,539	-	20	76	13	-	1.917	225	2 128	1,720
1975	2,485	-	28	76	25	-	2.030	266	2,120	1,035
1976	2,506	-	40	66	9	<1	1,175	225	1 561	1,537
1977	2,545	-	40	59	19	6	1.420	230	1 372	1,550
1978	1,545	-	37	37	20	8	984	291	1,372	1,400
1979	1,287	-	119	26	10	<1	1.395	225	1,230	1 821
1980	2,680	-	536	34	30	<1	1,194	249	947	1 830
1981	2,437	-	1,025	44	20	<1	1.264	163	685	1,656
1982	1,798	-	865	54	20	<1	1.077	147	993	1 348
1983	1,424	-	678	57	16	<1	310	198	1 656	1,540
1984	1,112	-	628	44	25	<1	297	159	820	1,550
1985	1,133	-	566	49	22	7	864	217	1 595	1,025
1986	1,559	-	530	38	28	19	960	310	1,323	1,501
1987	1,784	-	576	49	27	<1	966	222	1,730	1,396
1988	1,311	-	243	34	32	4	893	396	1 874	1,505
1989	1,139	-	364	52	14	<1	337	278	1 079	905
1990 <sup>1</sup>	870	13	312	59	15	<1	227	421	442	908

Table 1Nominal catch of Salmon by Country (in tonnes round fresh weight), 1960-1990

<sup>1</sup> Provisonal figures.

Catch on River Foyle allocated 50% Ireland and 50% Northern Ireland.
 Not including angling catch (mainly willy)

<sup>3</sup> Not including angling catch (mainly grilse). <sup>4</sup> Before 1066 and trout and are show in 1.1

<sup>4</sup> Before 1966, sea trout and sea charr included (5% total).

<sup>5</sup> Includes estimates of some local sales and by-catch.

<sup>6</sup> Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.

cont'd.

Table 1 cont'd.

Year	St-Pierre and Miquelon	Sweden (West Coast)	UK England + Wales	UK Scotland	UK Northern Ireland <sup>23</sup>	USA	USSR	Others <sup>6</sup>	TOTAL
1960	-	40	283	1,443	139	1	1,100	-	7,279
1961	-	27	232	1,185	132	1	790	-	6,519
1962	-	45	318	1,738	356	1	710	-	8,725
1963	-	23	325	1,725	306	1	480	-	8,651
1964	-	36	307	1,907	377	1	590	-	10,800
1965	-	40	320	1,593	281	1	590	-	9,467
1966	-	36	387	1,595	287	1	570	-	9,825
1967	-	25	420	2,117	449	1	883	-	12.023
1968	-	20	282	1,578	312	1	827	403	9,830
1969	-	22	377	1,955	267	1	360	893	11,615
1970	-	20	527	1,392	297	1	448	922	11,316
1971	-	18	426	1,421	234	1	417	471	10,794
1972	-	18	442	1,727	210	1	462	486	10,925
1973	-	23	450	2,006	182	2.7	772	533	12,746
1974	-	32	383	1,708	184	0.9	709	373	11,941
1975	· –	26	447	1,621	164	1.7	811	475	12,209
1976	2.5	20	208	1,019	113	0.8	772	289	9,537
1977	-	10	345	1,160	110	2.4	497	192	9,495
1978	-	10	349	1,323	148	4.1	476	138	7,650
1979	-	12	261	1,076	99	2.5	455	193	8,090
1980	-	17	360	1,134	122	5.5	664	277	10,081
1981	-	26	493	1,233	101	6.0	463	313	9,930
1982	-	25	286	1,092	132	6.4	364	437	8,645
1983	3	28	429	1,221	187	1.3	507	466	8,732
1984	3	40	345	1,013	78	2.2	593	101	6,893
1985	3	45	361	913	98	2.1	659	-	8,095
1986	2.5	54	430	1,271	109	1.9	608	-	9,249
1987	2	47	302	922	56	1.2	564	-	8,142
1988	2	40	395	882	114	0.9	419	-	7,716
1989	2	29	296	895	142	1.7	359	-	5,894
1990 <sup>1</sup>	1	33	297	543	94	2.4	316	-	4,554

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#### COUNCIL

#### PAPER CNL(91)48

# DECISION OF THE COUNCIL TO REQUEST SCIENTIFIC ADVICE FROM ICES

- 1. With respect to Atlantic salmon in each Commission area, where relevant:
  - (a) Describe the events of the 1991 fisheries with respect to catches, gear, effort, composition and origin of the catch (including escapees and sea ranched fish), and rates of exploitation;
  - (b) Describe the status of the stocks occurring in the Commission area;
  - (c) Begin a time series of aggregate estimates of all unreported catches, including those taken in international waters (the latter should be provided separately);
  - (d) Specify data deficiencies and research needs.
- 2. With respect to the West Greenland Commission, propose and evaluate methods to estimate:
  - (a) abundance of salmon in the area of the fishery at the time it operates;
  - (b) total abundance of stocks exploited by the fishery wherever they are;
  - (c) possible catch levels based upon maintaining adequate spawning biomass;
  - (d) some index based on the rivers which make a major contribution to the West Greenland fishery.
- 3. Evaluate the following management measures on the stocks and fisheries occurring in the respective Commission areas:
  - (a) regulations introduced into the Norwegian salmon fisheries in 1989;
  - (b) quota management measures taken in 1990 and 1991 in the Newfoundland and Labrador commercial salmon fisheries.
- 4. With respect to Atlantic salmon in the North-East Atlantic Commission and West Greenland Commission areas, provide an inventory of parasites and diseases of wild and reared salmon by country.
- 5. With respect to Atlantic salmon in the West Greenland Commission area, evaluate the effects which management of the West Greenland fishery has had on stocks in homewaters.
- 6. With respect to Atlantic salmon in NASCO area, provide a compilation of microtag, finclip, and external tag releases by ICES Member Countries in 1991.

## COUNCIL

## PAPER CNL(91)12

## RETURNS UNDER ARTICLES 14 AND 15 OF THE CONVENTION

#### CNL(91)12

## **RETURNS UNDER ARTICLES 14 AND 15 OF THE CONVENTION**

The form for the 1990 return was circulated on 17 January 1991 for completion by the Parties. All Parties were requested to complete and return the form 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.

Secretary Edinburgh 13 May 1991

### ARTICLE 14

## 1. <u>ACTIONS TAKEN TO MAKE EFFECTIVE THE PROVISIONS OF THE</u> <u>CONVENTION</u>

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.

\* 40 nautical miles at West Greenland

\* Area of fisheries jurisdiction of the Faroe Islands

#### **NO NEW ACTIONS**

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.

#### <u>EEC</u>

The Community is not aware of any non-contracting Parties fishing salmon in the Convention area, with the exception of certain vessels flying the flag of Poland. The Community has sent diplomatic notes to the Governments of Panama and Poland drawing attention to the fishing of salmon in international waters in the North Atlantic.

#### Iceland

Notification to Danish authorities regarding fishing in international waters east of Iceland.

#### <u>Norway</u>

Diplomatic notes were sent to the Governments of Panama and Poland concerning fishing for salmon in international waters in the North Atlantic.

#### Sweden

Swedish verbal notes on fishing in international waters have been handed over to the Embassies of Poland and Panama in Stockholm due to certain developments occurring in international waters which are prejudicing efforts on international cooperation in relation to the conservation of North Atlantic salmon stocks.

#### <u>USA</u>

Considerable embassy cable traffic regarding fishing activities in international waters by vessels reflagged in Panama and Poland.

1.3 Measures to minimise the by-catches of salmon originating in the rivers of the other member. [North American Commission members only]

#### <u>Canada</u>

Quotas were introduced in the Newfoundland commercial salmon fishery.

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. [North American Commission members only]

#### **NO NEW ACTIONS**

## 2. <u>ACTIONS TAKEN TO IMPLEMENT REGULATORY MEASURES UNDER</u> <u>ARTICLE 13</u>

<u>Canada</u>

A Quota Monitoring Plan was developed to ensure quotas in the Newfoundland commercial salmon fishery were not exceeded. Elements of the monitoring plan included the requirement for fishermen to complete and submit individual daily log records, fishermen to tag all commercially caught salmon, salmon buyers to complete buyer reports and an increased presence of Departmental field staff.

## Denmark (in respect of Faroe Islands and Greenland)

In Greenland, Home Rule Orders 28 and 39 were introduced on 7 June 1990 and 10 September 1990 respectively.

### ARTICLE 15

## 3. <u>LAWS, REGULATIONS AND PROGRAMMES ADOPTED OR REPEALED</u> <u>SINCE THE LAST NOTIFICATION</u>

#### Denmark (in respect of the Faroe Islands and Greenland)

In Greenland, Home Rule Orders 28 and 39 were introduced on 7 June 1990 and 10 September 1990 respectively.

In the Faroe Islands, a new Law (Logtings Act No. 77) on Fisheries in the inner inshore areas and in rivers and lakes was introduced on 12 June 1990.

#### <u>EEC</u>

The wealth of salmon legislation of a Community, national, regional or local nature within the European Community is subject to a process of continuous review and assessment to ensure its effectiveness for the conservation and rational management of the salmon stocks concerned. Therefore, whilst major framework legislation are not by their nature in the short-term subject to modification, laws are enacted, adopted or repealed relating to the day-to-day management of the stocks at the level of rivers or river systems in conformity with the objectives of Community management. The Community has submitted:

- (a) New regulations introduced in England and Wales, Northern Ireland and Scotland in 1990;
- (b) Regulations under consideration in England and Wales and Scotland;
- (c) A list of Byelaws introduced in 1990 in Ireland.

#### <u>Iceland</u>

Revision of net fishing regulations regarding the sea fishery for arctic char.

#### Norway

A ban on the use of monofilament in nets was introduced. Precise definitions/descriptions of the different types of gear in use is given.

#### Sweden

Extended closed area in the river Stensån.

#### <u>USA</u>

Definition of overfishing of Atlantic salmon: All returning Atlantic salmon of US origin are needed to occupy the available spawning habitat to support the Atlantic salmon restoration programmes. Overfishing of Atlantic salmon is defined as the intentional taking of any Atlantic salmon from the United States EEZ. Included in the definition of intentional taking is the failure to return salmon to the sea immediately

and in such a manner as to ensure maximum possible survival for any Atlantic salmon taken incidental to fishing for another species. This definition amends the Atlantic Salmon Management Plan, Section 5.4, paragraph 2.

## 4. <u>OTHER NEW COMMITMENTS RELATING TO THE CONSERVATION,</u> <u>RESTORATION, ENHANCEMENT AND RATIONAL MANAGEMENT OF</u> <u>SALMON STOCKS SUBJECT TO THE CONVENTION</u>

<u>EEC</u>

These new commitments are incorporated in the above mentioned section.

#### Canada

Introduction of quotas to the Newfoundland commercial salmon fishery.

#### Denmark (in respect of the Faroe Islands and Greenland)

In the Faroe Islands, three Departmental Orders were introduced during 1990. These were as follows:

Proclamation No 92 of 26 June 1990 on trout and salmon fisheries; Proclamation No 115 of 5 September 1990 making "vid Air" a protected area; Proclamation No 121 of 25 September 1990 making the Estuary at Leynar a protected area.

#### <u>Norway</u>

Arrangement of the Loen Symposium on the interactions between farmed and wild salmon. Establishment of a living gene bank for threatened stocks. Introduction of an inspection programme for sea cages for salmon production to improve the technical standard and subsequently to reduce the escapement.

#### <u>USSR</u>

Pursuant to the USSR Ministry of Fisheries and RSFSR Committee for Nature Protection decisions the commercial fishery on the rivers Mezen' and Onega was prohibited.

## 5. <u>OTHER FACTORS WHICH MAY SIGNIFICANTLY AFFECT THE</u> <u>ABUNDANCE OF SALMON STOCKS SUBJECT TO THE CONVENTION</u>

#### <u>EEC</u>

Awaiting the ACFM Report to analyse this factor.

#### Iceland

Ranching is increasing rapidly comprising about 70% of the Icelandic salmon catch.

## Sweden

Negotiations concluded between Norway and Sweden concerning an Agreement on the fishery for salmon and sea-trout in a border river system.

## ANNEX 10

## COUNCIL

# PAPER CNL(91)14

# CATCH STATISTIC RETURNS BY THE PARTIES

#### CNL(91)14

### CATCH STATISTIC RETURNS BY THE PARTIES

- 1. The Official Catch Statistics for 1990, as submitted by the Parties, are tabulated overleaf (Table 1). These catch statistics, rounded to the nearest tonne, will be used to calculate the contributions to NASCO for 1992 unless the Secretary is advised otherwise.
- 2. Under Article 12 of the Convention, the Secretary is to compile and disseminate statistics and reports concerning salmon stocks subject to the Convention. Table 2 presents catch statistics for the period 1960-1990 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 1960-1990, is provided for information only in paper CNL(91)15.

Secretary Edinburgh 10 May 1991

## COUNCIL

# PAPER CNL(91)16

## COMPARABILITY OF CATCH STATISTICS
#### CNL(91)16

# **COMPARABILITY OF CATCH STATISTICS**

- 1. At its Seventh Annual Meeting the Council considered a discussion paper, CNL(90)18, reviewing the means to achieve improved comparability of catch statistics. A number of differences in the methods of collecting salmon catch data and in the scope of the published statistics were identified and possible actions to assist in achieving more comparable statistics were detailed. Under Article 15 paragraph 1 of the Convention there is a requirement to provide catch statistics to the Council and it would seem desirable that the data submitted by each Party are broadly comparable and as complete as possible. The question of unreported catches, which were estimated by the ICES Working Group to amount to 2000 tonnes in 1989, is dealt with separately in papers CNL(91)17 and CNL(91)18.
- 2. The Council agreed that the establishment of a minimum standard for catch statistics was desirable and that at its Eighth Annual Meeting the Parties should be requested to consider what actions might be taken concerning the problems of comparability in terms of:
  - (a) the inclusion of all components of the salmon fisheries in the statistics;
  - (b) the inclusion of statistics for salmon caught in non-salmon gear where such retention is legal;
  - (c) collection of statistics for both number and weight of salmon caught according to sea-age (or allocated to grilse and multi-sea-winter salmon);
  - (d) where ranching of salmon is practised, the inclusion of such catches in the statistics;
  - (e) the use of different conversion factors to calculate whole round weight.
- 3. In order to help the Parties in considering what actions might be taken concerning the problems of comparability the main differences noted in last year's report (CNL(90)18) are summarised below:
  - (a) In most cases the published statistics include catches from all components of the salmon fishery. However, the review noted that in the case of the EEC (France, and Northern Ireland (excluding the river Foyle)) and the Faroe Islands the statistics do not include catches from the recreational fisheries, and that no statistics are published for the EEC (Portugal). The magnitude of these omissions is, however, unknown.
  - (b) There are differences in the way in which salmon caught in non-salmon gear are treated by the Parties. Some Parties make retention of such salmon illegal (Canada, Iceland, EEC (Scotland)) while others allow retention. In Norway and Sweden catch returns are required for salmon caught in non-salmon gear

while in EEC (England and Wales, France and Ireland), Faroe Islands, Finland and USSR such catch returns are not required.

- (c) The published statistics for some Parties include information on both number and weight of salmon caught. However, those for the EEC (France and Northern Ireland), Greenland, Faroe Islands, Finland (commercial catches) and the USSR include only weight data. Only Canada, Finland and the EEC (Scotland) differentiate their catches into multi-sea-winter salmon and grilse although a number of Parties allocate their catches to weight classes. The format for the return of catch statistics adopted by the Council requests details, where available, of the catch in numbers and weight according to sea-age or allocated to multi-sea-winter salmon and grilse.
- (d) At present only Iceland includes details of returns of salmon to ranching stations in its published statistics. A review of sea-ranching of salmon is presented separately in paper CNL(91)26. While ranching is at present on a pilot scale in the North Atlantic it is possible that this form of aquaculture will expand in the future.
- (e) In most cases the published weight data are derived from actual weighings of whole round fish. However, in the Faroe Islands, Greenland and to a limited extent in Sweden the fish are landed either glazed and gutted (Faroe Islands) or gutted (Greenland and Sweden) and converted to round fresh weight equivalent using raising factors. Different raising factors are used (1.11 for Greenland and Faroe Islands; 1.1 for Sweden). The basis for these different raising factors is not, however, clear.

#### 4. SUMMARY

- 4.1 In accordance with the decision of the Council at its Seventh Annual Meeting the Parties are asked to consider establishing a minimum standard for catch statistics. To assist in this process the Council might ask the Secretary to consult with the Parties concerning any problems in implementing the following improvements with a view to agreeing a minimum standard in 1992:
  - (a) the inclusion of all components of the salmon fisheries;
  - (b) the inclusion of salmon caught in non-salmon gear where retention is legal;
  - (c) the inclusion of statistics on both number and weight, differentiated according to sea-age (allocated to grilse and multi-sea-winter salmon);
  - (d) the inclusion of returns to ranching units;
  - (e) an examination of the basis for the use of different conversion factors to calculate whole round weight.

Secretary Edinburgh 27 March 1991

# ANNEX 12

# COUNCIL

# PAPER CNL(91)17

# ASSESSMENT OF UNREPORTED CATCHES

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#### CNL(91)17

# ASSESSMENT OF UNREPORTED CATCHES

- 1. Due to the nature of its life-cycle the assessment of unreported catches is probably more difficult in the case of salmon than for most other species of fish.
- 2. Unreported catches are an important component in Atlantic salmon stock assessment. Estimates indicate that such catches may add in the region of 40% to the reported catch.
- 3. The ICES North Atlantic Salmon Working Group concluded that the accuracy of unreported catch estimates will continue to be a problem in the future because few assessments are being undertaken. A number of proposals were made regarding estimation of unreported catches (Appendix 1), although these would not address the new problem of fishing for salmon in international waters.
- 4. The need to assess unreported catches would be reduced if the level of unreported catches could be limited. Methods to minimise unreported catches are discussed in paper CNL(91)18. In the foreseeable future it is likely, however, that the problem of unreported catches will continue to require attention.
- 5. In order to make progress on this issue, the Council may wish to consider, at its Ninth Annual Meeting, draft recommendations for assessing unreported catches, based on those put forward by ICES, but including other elements. The aim would be to develop an internationally accepted set of recommendations for the guidance of fishery officers, but their use would be entirely voluntary.

Secretary Edinburgh 17 April 1991

#### CNL(91)17 ASSESSMENT OF UNREPORTED CATCHES

- 1. At its Seventh Annual Meeting the Council considered a review, CNL(90)19, of the range of problems which could lead to unreported or under-reported catches. It was agreed that the Secretary should, in consultation with ICES, review any problems in implementing the methods for assessing unreported catches listed by the North Atlantic Salmon Working Group (Anon, 1989). In accordance with this decision this paper was sent to the General Secretary of ICES and his comments have been incorporated. The methods for assessing unreported catches identified by the Working Group are:
  - (1) Local inspectors or fisheries officers could be requested to estimate illegal catches in illegal angling and commercial fisheries from their local knowledge;
  - (2) Logbooks could be issued to legal commercial or rod fishermen and the results used to estimate unreported catches;
  - (3) Creel or commercial catch surveys could be used to estimate unreported catches by comparing catches from surveys to reported catches;
  - (4) Mark-recapture techniques could be used to estimate total catch and unreported catches calculated by comparisons to the recorded catches;
  - (5) Landings in market categories could be compared to expected values;
  - (6) Surveys of coastal areas by fishery officers for illegally set nets could be used to estimate total illegal catch from records of catch per net and local knowledge of the number of illegal nets in use;
  - (7) Local sales for a community could be estimated by a survey of households for the number of salmon bought directly from fishermen;
  - (8) A tagging scheme for landed salmon could be introduced.
- 2. Unreported catches are an important component in Atlantic salmon stock assessments and it has been recommended that reliable estimates of unreported catches be obtained for index rivers for input to the run reconstruction models (Anon, 1989). Furthermore, the Working Group has recommended that the run reconstructions models should be developed for national stocks by scaling up index river data according to estimates of total catches, smolt production or spawning escapement (Anon, 1990). Since 1986 the Working Group has provided "rough estimates" or "guess-estimates" of unreported catches, although in the past not all countries have provided information. These indicate that unreported catches were provided by all countries the reliability of the figures was not evaluated (Anon, 1990) but the Working Group believes that the accuracy of unreported catch estimates will continue to be a problem in the future as there are few definitive studies being undertaken.

- 3. A number of the methods described in paragraph 1 have been used to assess unreported catches, although there are few references to this type of assessment in the literature. Champion (1989) reported on an assessment of unreported catches which involved daily monitoring of landings which were then compared with returns and which revealed discrepancies of 20-30%. Similarly, Harris (1988) reported the results of a study to assess unreported catches from commercial salmon fisheries in Wales. Although limited in its scope, duration and focus the study indicated that the true catch in question was 300-400% greater than declared. Tuomi (1987) compared the catches submitted in response to a mail survey to those from field and creel estimates and demonstrated differences. Winstone (1991) described the introduction of a pilot log-book scheme in Wales, whereby log-books were issued to a random sample of 2000 season licence holders to assess if improvements in returns could be made. The Working Group attempted to use the proportion of landings in 1988 which were second class to assess whether or not non-reported catch had increased in the West Greenland fishery in 1988 following the establishment of individual boat quotas (Anon, 1989). In a number of countries tagging schemes for landed salmon have been introduced with the intention of reducing the illegal harvest and improving the catch statistics (see CNL(91)18).
- By their nature unreported catches are difficult to investigate (Champion, 1989) and 4. because of the nature of its life-cycle the assessment of unreported catches may be more difficult in the case of salmon than for other species of fish. From a review of the literature it would appear that very few attempts have been made to assess unreported catches although some of the methods described by the Working Group have been adopted. A number of problems in assessing unreported catches have been identified. Firstly, not all of the methods identified by the Working Group are appropriate in all countries (Anon, 1989). Secondly, these methods would not be appropriate for assessing fishing for salmon in international waters, the potential unreported catch from which may be of the order of 630 tonnes (Anon, 1990). Thirdly, Walker (1991) has referred to the high costs involved in obtaining more accurate catch figures and Whittaker (1988) pointed out that the number of enforcement staff was inadequate. Many of the studies which have been reported in the literature have been of limited scope and focus and unreported catches may vary considerably from region to region. It will therefore require considerable effort to obtain reliable figures on a national basis. Furthermore, Williamson (1988) pointed out that the unlawful catch of salmon can be substantial and has varied markedly from year to year. Such temporal variations will require ongoing evaluation with consequent commitment of resources if reliable assessments are to be made. The need to assess unreported catches would be reduced if they could be reduced to insignificant levels and methods to minimise unreported catches are discussed in paper CNL(91)18. In the foreseeable future, however, it is likely that the problem of unreported catches will continue to require attention.
- 5. In view of the value of unreported catches in salmon stock assessments and the problem of accuracy of unreported catch estimates due to the lack of studies being conducted, the Council might wish to consider draft recommendations for assessing unreported catches based on those put forward by ICES. The aim would be to develop an internationally accepted set of recommendations for guidance but their use would be entirely voluntary.

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# COUNCIL

# PAPER CNL(91)18

# **REDUCING THE LEVEL OF UNREPORTED CATCHES**

<u>Note</u>: This paper has previously been circulated to the Parties and where comments were received these have been incorporated.

#### CNL(91)18

#### **REDUCING THE LEVEL OF UNREPORTED CATCHES**

- 1. The Council has previously considered the range of problems which could lead to unreported catches under the following headings:
  - (a) Absence of a requirement for catch statistics to be collected;
  - (b) Suppression of information thought to be unfavourable;
  - (c) Local sale or consumption;
  - (d) Innocent inaccuracy in making returns;
  - (e) Fishing in international waters by non-contracting Parties;
  - (f) Illegal fishing.

The relative importance of these sources of unreported catches is likely to vary between countries. The Secretary was asked to prepare in consultation with the Parties a review of the possible methods to reduce unreported catches (Appendix 1).

- 2. With regard to point (a) the Council has already considered methods to achieve improved comparability of catch statistics and has agreed that the establishment of a minimum standard for catch statistics is desirable. Inclusion of all components of the fisheries (i.e. recreational, commercial and others) in the statistics and inclusion of catches of salmon in non-salmon gear where retention of such fish is legal will reduce the level of unreported catches from these sources (see CNL(91)16).
- 3. With regard to points (b), (c) and (d) there are a number of possible methods of improving the completeness and accuracy of the catch statistics. These include collection of statistics from all fishermen in all areas; the provision of catch return forms which are unambiguous and well designed; the provision of log-books to enable catches to be recorded at the time of capture and allowing validation of catches; a requirement that returns are made at frequent intervals when catches are likely to be large and the use of postal reminders in the case of non-return. In addition close liaison between fishery officials and fishermen might also improve the accuracy of the information provided.
- 4. With regard to point (e) fishing for salmon in international waters, the Council has already acted to eliminate this source of unreported catches and the subject will be considered further at the Eighth Annual Meeting (see CNL(91)19).
- 5. Illegal fishing (point (f)) has been identified in the literature as a particular problem in some areas, which in some cases has continued despite increased enforcement effort, better equipment and training for enforcement staff and severe sentences following successful proceedings. One technique that has been used in an attempt to address this problem is a tagging scheme for landed salmon (carcass tagging).

Secretary Edinburgh 10 May 1991

Appendix 1

#### CNL(91)18

#### **REDUCING THE LEVEL OF UNREPORTED CATCHES**

- 1. At its Seventh Annual Meeting the Council considered a review of the range of problems which could lead to unreported catches, (CNL(90)19). These were grouped under five headings as follows:
  - (a) Absence of requirement for catch statistics to be collected;
  - (b) Suppression of information thought to be unfavourable;
  - (c) Local sale or consumption;
  - (d) Innocent inaccuracy in making returns;
  - (e) Fishing in international waters by non-contracting Parties;
  - (f) Illegal fishing.

The Secretary was asked to prepare, in consultation with the Parties, a review of the possible methods to reduce the impact of the factors which lead to unreported catches.

# 2. <u>ABSENCE OF A REQUIREMENT FOR CATCH STATISTICS TO BE</u> <u>COLLECTED</u>

- 2.1 In some cases there is no requirement for salmon catch statistics to be collected from particular parts (beats) of rivers, from certain river systems or from certain types of fishery. Last year the Council considered a paper dealing with means of achieving improved comparability of catch statistics (CNL(90)18). This paper showed, for example, that not all Parties collect statistics from recreational fisheries. In addition, there are differences in the way that salmon caught in non-salmon gear are treated. Some Parties make retention of such salmon illegal, while others allow retention with or without an obligation to make returns.
- 2.2 The Council has agreed that the establishment of a minimum standard for catch statistics is desirable and that at its Eighth Annual Meeting the Parties should be requested to consider what actions might be taken concerning the problems of comparability (see paper CNL(91)16). The areas addressed in this paper include the possible inclusion of all components of the fisheries and the inclusion of salmon caught in non-salmon gear where retention is legal. The establishment of a minimum standard of catch statistics should result in more complete statistics and the level of unreported catches from this source should therefore be reduced. It will then be necessary to ensure that the statistics obtained from each component of the fishery are as complete and accurate as possible.

# 3. <u>SUPPRESSION OF INFORMATION THOUGHT TO BE UNFAVOURABLE</u>

3.1 Unreported catches can result from a link between the level of declared catch and management measures which the fishermen perceive as adverse. Furthermore, in some cases declared catches are used in assessing taxes, rates or other financial liabilities assessed on catches and returns may therefore be deliberately falsified for financial reasons.

3.2 This is clearly a difficult problem to resolve. Harris (1988) believed that unreporting in the commercial fishery may be occurring as a result of pressure from the recreational fisheries for its reduction and ultimately its abolition. Close liaison between fisheries staff and fishermen in which the value of statistics in conservation and rational management is stressed may result in more complete statistics. For example, Gudjonsson (1988) reported that in Iceland there was reluctance to report catches accurately because of a link between catches and taxes. However, with time and as a result of the efforts of the fisheries staff considerable improvement in the statistics has resulted. Special logbooks were provided in all angling huts and netsmen cooperated in providing statistics after the fishing season. However, Winstone (1991) questioned the reliability of the statistics submitted by commercial fishermen who under-reported the actual catch despite 100% return rate. In such cases attempts to validate the statistics such as field and creel surveys may be necessary although validation may be difficult in remote fisheries.

#### 4. LOCAL SALE OR CONSUMPTION

4.1 Salmon may be taken by the fishermen either for their own consumption or to be sold locally, and may therefore be unreported. In some cases it may be lawful for fishermen to catch salmon for their own consumption without declaring such catches (Anon, 1989). It may be possible therefore to require catch returns to be made. Browne (1985) pointed out that the advent of home freezers coupled with a raised standard of living greatly increased the local purchase of salmon. In some countries salmon sales and purchases must be through authorised dealers who may be required to provide statistics. Enforcement may however be difficult and unreported catches from this source may be linked to the factors described in paragraph 3.1. In some countries local sales are estimated by enforcement staff. In addition, carcass tagging schemes have been introduced (see paragraph 7).

# 5. <u>INNOCENT INACCURACY IN MAKING RETURNS</u>

- 5.1 Unreported catches may result from innocent inaccuracy by the fishermen in making their returns although not all countries rely on the fishermen making returns but use a system of surveys to obtain catch statistics. Unlike the suppression of information thought to be unfavourable to the fishermen, innocent inaccuracy in the returns may lead to over-reporting as well as under-reporting. Where fishermen are required to submit their returns, the necessary documentation should be unambiguous, easy to complete and well designed. The value of the statistics in the conservation and rational management of the resource, and hence the need for accurate returns, should be stressed to the fishermen. Provision of log-books or recording sheets prior to the fishing season may also assist the fishermen in maintaining accurate records. Where catches are likely to be large a requirement to record catches daily and make returns more frequently (monthly for example) may also be advantageous.
- 5.2 A further source of unreported catches may arise through failure of fishermen to make returns, although in some countries fishermen are not required to make returns. Again return forms should be well designed and unambiguous so that fishermen are not deterred from providing information. In addition fishermen should be made aware of the value of catch statistics in conservation and management, if necessary through publicity campaigns. Postal reminders may increase the completeness of returns

although these should be sent out as early as possible to avoid problems of accuracy in recalling catches. There is some evidence that successful fishermen are more likely to make a return (Winstone, 1991), so the level of unreported catch from this source may be lower than anticipated. In some cases, the cost effectiveness of postal reminders has been questioned (Walker, 1991).

# 6. <u>FISHING IN INTERNATIONAL WATERS BY NON-CONTRACTING</u> <u>PARTIES</u>

- 6.1 During late 1989 and early 1990 evidence became available of a salmon fishery in international waters in the North-East Atlantic by vessels registered in countries that are not Parties to the NASCO Convention. The Working Group on North Atlantic Salmon estimated that, on the basis of 7 vessels making three trips per year and taking an average of 30 tonnes per tip, the total potential unreported catch from this source may be of the order of 630t. It was considered unlikely that this was achieved in 1989/90 because of adverse weather. Clearly, if this level of catch was achieved it could become a significant source of unreported catches.
- 6.2 At its Seventh Annual Meeting the Council adopted a resolution calling for action by the Parties and the Organization to make representations through diplomatic channels to the countries which permit the registration of those vessels in order to prevent fishing for salmon in international waters. A report on the actions taken is presented separately. There have again been reports of vessels operating in the North-East Atlantic. The Council has acted swiftly to address this problem and thereby reduce the unreported catches from this source. Options for further action to eliminate this fishery are presented in CNL(91)19.

# 7. <u>ILLEGAL FISHING</u>

- 7.1 Although no assessment of the relative importance of the factors which lead to unreported catches is possible a number of authors have drawn attention to the problem of illegal fishing. (Crawford, 1988; Harris, 1988; Hazell, 1988; Mehli, 1988; Whittaker, 1988; Williamson, 1988; Champion, 1989; Veitch, 1989). Williamson (1988) believed that the unlawful catch is sometimes substantial and varies markedly from year to year. In some cases illegal fishing has been described as a professional and commercial undertaking of "epidemic proportions" (Anon, 1983). However, since fish caught by illegal methods or at illegal times may appear in the returns of authorised fishermen (Crawford, 1988), not all illegally taken salmon is necessarily unreported. Champion (1989) believed that the control of illegal fishing is by far the biggest problem of salmon fisheries management (other than allocation), and is the biggest cost in any fishery manager's budget.
- 7.2 A number of different types of illegal salmon fishing have been identified although these will depend on the statutory controls in each country. They include fishing without authority, fishing during prohibited periods or in prohibited areas and fishing with illegal gear. Effective control of illegal fishing and reduction of the unreported catch from this source requires enforceable legislation, adequate investment in enforcement activities and appropriate penalties for infringements. However, there is evidence from some countries that despite increased enforcement effort, better equipment and training for enforcement staff and severe sentences following

successful proceedings, the growth in illegal fishing has continued (Anon, 1983). Whittaker (1988) believed that there had been a recent escalation in the illegal fishery as a result of inadequate legislation, reluctance of the courts to impose adequate penalties, high unemployment in rural communities, availability of cheap nets and the high price of salmon. However, Mehli (1988) believed that there had been only a slight increase in illegal fishing in recent years and Crawford (1988) believed that illegal fishing might have declined in recent years.

7.3 One technique that has been introduced in a number of North Atlantic countries in order to curtail illegal fishing and provide improved catch statistics is salmon tagging, (carcass tagging). This was first introduced in New Brunswick, Canada in 1980 following the introduction of a ban on the commercial salmon fishery and the increase in the incidental catch of salmon (Bird, 1983). The principle behind the scheme is that when those who possess illegally caught fish can be identified by a visible means the economic incentive for illegal fishing is dramatically reduced and where there are no easy markets for illegal salmon the illegal salmon are few. Carcass tagging schemes have since been introduced in the State of Maine and in Spain. Harris (1988) believed that this type of tagging scheme would enable the collection of much more accurate catch records as well as providing a cheap, simple, effective and practical means of regulating the sale of salmon. The Working Group on North Atlantic Salmon has identified tagging schemes for landed salmon as one possible method for assessing unreported catches.

#### 8. <u>CONCLUSIONS</u>

- 8.1 A number of possible methods of minimising unreported catches have been identified although the cost effectiveness of some of these resources has been questioned. The Council is already taking action to address some of the potential sources of unreported catches. While the relative importance of the sources of unreported catches is likely to vary, a number of authors have drawn attention to the significance of illegal fishing. In some cases despite increased efficiency of enforcement activities and severe penalties the problem remains.
- 8.2 One method that has been used in a number of countries in order to reduce the illegal harvest is carcass tagging, a technique which could also be used to assess unreported catches. At the Third International Atlantic Salmon Symposium a recommendation was made that NASCO should investigate the value of a salmon tagging scheme, such as is in operation in eastern Canada and Spain, both for a more reliable collection of catch data and for more effective controls of illegal fishing.

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# COUNCIL

# PAPER CNL(91)19

# FISHING FOR SALMON IN INTERNATIONAL WATERS BY NON-CONTRACTING PARTIES

#### CNL(91)19

# FISHING FOR SALMON IN INTERNATIONAL WATERS BY NON-CONTRACTING PARTIES

- 1. At its Seventh Annual Meeting the Council discussed the problem of fishing for salmon in international waters by vessels re-flagged in Poland and Panama so as to avoid the provisions of the NASCO Convention. The Council adopted a resolution, CNL(90)49, calling upon the Parties and the Organization to take action through diplomatic channels to ensure that this fishery was ended.
- 2. In accordance with this resolution notes were sent by the President, on behalf of the Organization, to the Ambassadors of the Polish People's Republic and of the Republic of Panama in London drawing attention to the activities of the vessels and calling for the Polish and Panamanian authorities to take action to bring this fishery to an end. Copies of these notes were circulated to all Parties. To date, we have received only an acknowledgement from the Polish authorities. The Panamanian authorities have, however, issued a resolution, previously copied to all delegates, urging all captains, shipowners, and legal representatives of Panamanian ships to comply with NASCO's prohibitions and advising them that the Bureau of Consular and Maritime Affairs (SECNAVES) has the authority to sanction violations or non-fulfilment of the resolution.
- 3. In addition, the NASCO Resolution called upon the contracting Parties to intervene through diplomatic channels. Where copies of these interventions were sent to the Secretariat these have also been circulated to all delegates. The Polish authorities have informed the Danish authorities that Poland is considering adhering to the NASCO Convention if this would be agreeable to the contracting Parties. The NASCO Convention is not framed in such a way as to permit such adherence so it would be necessary to amend the Convention in order to facilitate this.
- 4. In accordance with the NASCO Resolution I also drew the Resolution to the attention of the international organizations on the attached list (Appendix 1).
- 5. During January 1991 I received further unconfirmed information that a number of vessels were again engaged in fishing in international waters and that their catches were landed in Poland. On behalf of the Organization I sent a further note to the Ambassador of Poland drawing attention to these further reports and requesting a response from the Polish authorities. I also received information from the Norwegian authorities that the Norwegian coastguard had observed a vessel fishing with longlines in February at a location of 68°33'N and 01°08'E. This vessel was not identified. The vessel "Brodal" which had previously been sighted fishing with longlines in the Norwegian Sea called at a Northern Norwegian harbour in March. The attached map shows the location of the sightings to date of vessels fishing with long-lines in international waters (Appendix 2).
- 6. In view of these continuing reports of fishing for salmon in international waters the Council might like to consider what further action might be taken to address this problem. There are a number of further options that might be considered including

adoption of a resolution calling for further measures to be taken, a requirement for imports to be accompanied by a certificate of origin and the establishment of a protocol. These options are contained in Appendix 3.

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# Conclusion

7. The problem of fishing for salmon in international waters by non-contracting Parties can be dealt with on a case-by-case basis as has been done with Panama and Poland. The options outlined above may represent ways to improve on this process. These options can be considered independently or collectively and should have the effect of reducing interceptions of salmon by non-member States. The problem will require constant vigilance because of the large numbers of countries whose flags can be used.

# COUNCIL

# CNL(91)39

# DRAFT PROTOCOL TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN Tabled by Canada

#### CNL(91)39

#### DRAFT PROTOCOL TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN Tabled by Canada

The Parties to this Protocol,

NOTING the provisions of the North Atlantic Salmon Conservation Organization (NASCO);

RECOGNIZING that the conservation of Atlantic salmon will be enhanced by broad international agreement on conservation measures;

HAVE AGREED as follows:

#### Article I

#### Definitions

For the purposes of this protocol:

- 1. "Convention" means the <u>Convention for the conservation of salmon in the North</u> <u>Atlantic Ocean concluded at Reykjavik on 2 March, 1982.</u>
- 2. "NASCO" means the North Atlantic Salmon Conservation Organization established pursuant to the Convention.
- 3. "Fishing" means:
  - a. any activity which results in, or can reasonably be expected to result in, the catching, taking, or harvesting of fish; or
  - b. any operation at sea in preparation for or in direct support of any activity described in subparagraph (a).
- 4. "Directed fishing" means fishing primarily for a particular species or stock of fish.
- 5. "Incidental taking" means catching, taking, or harvesting a species or stock of fish while conducting directed fishing for another species or stock of fish.
- 6. "Fishing Information" includes scientific or technical data, samples of fisheries data, including catch and fishing effort statistics and time and area of vessel and fleet operations, for Atlantic salmon in the Convention Area, or any other information intended to be provided or exchanged under this Convention.
- 7. "Zone" means any maritime area in which coastal States <u>exercise</u> sovereign rights for the purpose of exploring, exploiting, conserving and managing the living resources in accordance with international law, extending seaward from the outer limit of the territorial sea to a limit of 200 nautical miles from the baselines from which the territorial sea is measured.

#### Article II

#### Measures to Conserve Atlantic Salmon

- 1. Directed fishing for salmon stocks referred to in Article 1(1) of the Convention is prohibited beyond the zones of the Parties to the Convention.
- 2. Incidental taking of Atlantic salmon shall be minimized in accordance with Appendix 1.
- 3. The retention on board a fishing vessel of Atlantic salmon taken as an incidental catch in a directed fishing activity is prohibited.
- 4. The sale, purchase, importation, export, landing, retention, possession, transfer and transport of Atlantic salmon, whether or not in processed form, harvested in the Convention Area contrary to the provisions of this Protocol is prohibited.
- 5. Nothing in this Protocol shall be construed as preventing any Party from taking measures, consistent with international law, against fishing activities contrary to the provisions of this Protocol which are stricter than those required by this Protocol.

#### Article III

#### Enforcement

- 1. If there are reasonable grounds to believe there may be <u>activities</u> contrary to the prohibitions set out in Article II of this Protocol by a vessel flying the flag of a Party to this Protocol, the flag State will not object to the taking of appropriate enforcement action by a Party to the Convention which may include seizure of the vessel and imposition of penalties.
- 2. In the case of seizure pursuant to paragraph 1 of this Article, notification shall be given promptly through diplomatic channels to inform the flag State of the facts and action taken. The flat State's vessel and crew shall be released promptly, subject to the posting of reasonable bond or other security.
- 3. In the event of <u>a vessel under a Party's flag</u> fishing contrary to the provisions of this Protocol, <u>that</u> Party, acting in accordance with international law, shall impose penalties which shall be limited to appropriate fines, forfeiture, or revocation or suspension of fishing privileges.
- 4. Parties will prohibit vessels registered in its jurisdiction from registering in a State which is not a Party to the <u>Convention For The Conservation of Salmon in the North</u> <u>Atlantic Ocean</u> or this Protocol for the purpose of avoiding the provisions of this Protocol.

#### Article IV

#### Information

- 1. Each Party shall provide information to NASCO on measures adopted by it pursuant to this Protocol.
- 2. Each Party shall cooperate with NASCO in providing information concerning enforcement action relating to fishing activities prohibited by this Protocol, scientific information relating to Atlantic salmon in the Convention Area, and such other information as may be relevant and useful for the conservation of Atlantic salmon in the Convention Area.

#### Article V

#### No Prejudice

Nothing in this Protocol shall be deemed to prejudice:

- a. the extent and the exercise by States of sovereign rights over maritime areas in accordance with international law;
- b. the positions or views of any Party with respect to its rights or obligations under international law, including, but not limited to, treaties and other international agreements to which it is a party; or
- c. any arrangements between or among the Parties concerning fisheries enforcement in the <u>Atlantic Ocean</u> or the position of any Party concerning the extent of its zone.

#### Article VI

#### Reservations

1. This Protocol shall not be subject to reservations.

#### Article VII

#### Withdrawal

1. Any Party may withdraw from this Protocol. Withdrawal shall become effective twelve (12) months after the date on which it formally notifies the Depositary of its intention to withdraw.

#### Article VIII

#### Depositary

1. The Depositary shall be \_\_\_\_\_.

#### Article IX

#### **Final Provisions**

- 1. This Protocol shall be open for signature at \_\_\_\_\_\_ by any State or regional economic organization representing a group of States ("REO").
- 2. This Protocol shall be subject to ratification by signatories thereto and shall remain open for accession by any other State or REO.
- 3. This Protocol shall enter into force ninety (90) days following the deposit of the <u>(#)</u> instrument of ratification or accession. Thereafter, it shall enter into force for any State or REO on the day of the deposit of its instrument of ratification or accession.
- 4. Instruments of ratification or accession shall be deposited with the depositary.
- 5. Any Party may propose amendments to this Protocol by submitting a proposal to the Depositary. The Depositary shall promptly provide a copy of the proposal to all Parties. No amendment shall come into force until all states party to this Protocol as at the date the Depositary gave notice of the proposal, have deposited instruments of ratification, acceptance or approval of the proposal.
- 6. The Depositary shall notify all Parties of receipt of any instruments of ratification or accession, and withdrawal notices.
- 7. The original of this Protocol in the English and French languages, each version being equally authentic, shall be deposited with the Depositary, which shall transmit certified copies thereof to all of the signatories.

IN WITNESS WHEREOF the undersigned, being duly authorized by their respective Governments, have signed this Protocol on the dates indicated next to their signatures. With respect to Article II(2) of the Protocol the Parties shall take the following measures aimed at the minimization of the incidental taking of salmon stocks referred to in Article 1(1) of the Convention beyond the Zones of the Parties to the Convention:

- 1. In order to facilitate the gathering of scientific information concerning the nature and extent of incidental taking of anadromous fish in the Area Concerned:
  - (a) each Original Party may send through diplomatic channels to any other Party a request to accommodate the Original Party's scientific observer or observers, at the expense of the Original Party, on board any vessel or vessels of the other Party engaged in a fishery which the Original Party has reasonable grounds to believe may incidentally take anadromous fish in the Area Concerned. Any such request shall be complied with promptly by the other Party;
  - (b) the logistics for the transportation and accommodation of scientific observers shall be agreed upon by the Parties concerned.
- 2. Pursuant to Article 4(1)(d), NASCO may request research into and analyses of data concerning the incidental taking of Atlantic salmon in the area referred to in Article 1(1) of the Convention, including analyses of data obtained by the scientific observers referred to in paragraph 1 of this Appendix, and may make recommendations to the Parties based upon such research and analyses, including recommendations on appropriate measures concerning avoidance, adjustments to gear, area closures and other steps to minimize the incidental taking of Atlantic salmon in the Area Concerned.

# COUNCIL

# CNL(91)40

# DRAFT PROTOCOL TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN Tabled by the United States of America

#### CNL(91)40 DRAFT PROTOCOL TO THE CONVENTION FOR THE CONSERVATION OF SALMON IN THE NORTH ATLANTIC OCEAN Tabled by the United States of America

#### PROTOCOL

The Parties to this Protocol,

Noting the provisions of the Convention for the Conservation of Atlantic Salmon in the North Atlantic Ocean ("the Convention") have agreed as follows:

#### Article 1

#### Application of the Convention

Nothing in this Protocol shall affect or prejudice the views or positions of any Party with respect to the Law of the Sea.

#### Article 2

#### Measures Regarding Nationals and Vessels

Each Party undertakes to prohibit its nationals and fishing vessels documented under its laws from engaging in fishing operation intended to catch Atlantic salmon in the Convention Area.

#### Article 3

#### Transmission of Information

Each Party shall expeditiously convey to the Depositary information on the measures adopted by it pursuant to the implementation of this Protocol.

#### Article 4

#### Enforcement

Each Party shall take appropriate measures to ensure the application of the provisions of this Protocol.

#### Article 5

#### Withdrawal

At any time after one year from the date on which this Protocol has entered into force for a Party, that Party may withdraw from the Protocol by giving written notice to the Depositary. The Depositary shall immediately inform all Parties to the Convention or its Protocols of receipt of a withdrawal notice. Withdrawal shall take effect one year after receipt of such notice by the Depositary.

#### Article 6

#### Final Clauses

- 1. This Protocol shall be open for signature by any State.
- 2. This Protocol shall be subject to ratification. Instruments of ratification shall be deposited with the Council of the European Communities, which shall be the Depositary.
- 3. This Protocol shall enter into force for each State on the date of deposit of its instrument of ratification with the Depositary.
- 4. This Protocol shall not be subject to reservations.

Done at \_\_\_\_\_\_this \_\_\_\_\_day

of \_\_\_\_\_.

In witness whereof the undersigned, being duly authorized by their governments have signed this Protocol.

# COUNCIL

# PAPER CNL(91)20

# REPORT OF THE MEETING OF THE WORKING GROUP ON THE PURCHASE OF NASCO QUOTAS

#### CNL(91)20

# REPORT OF THE MEETING OF THE WORKING GROUP ON THE PURCHASE OF NASCO QUOTAS

#### INTRODUCTION

- 1. At its Seventh Annual Meeting the Council considered the principles involved in the purchase of NASCO quotas (CNL(90)21). The three basic principles reviewed concerned the compatibility with the NASCO Convention, the willingness of Parties offered compensation to accept it, and the willingness of other Parties to pay it or to facilitate payment by other bodies.
- 2. The Council agreed that the Secretary should chair a Working Group of the contracting Parties to further examine the principles involved in the purchase of NASCO quotas. This meeting was held on the 22nd January 1991 at the Waldorf Hotel, London. A list of participants is given in Appendix 1. In order to assist the Working Group in its deliberations a further paper, CNL(90)54, was circulated to the Parties prior to the meeting. This paper included a list of nine questions which addressed the three principles described in paragraph 1 above, and each delegation was requested to be prepared to answer each question, at least provisionally, at the meeting.

#### **GENERAL DISCUSSION**

3. The Working Group had a general discussion about the principle of payment of compensation and the possible roles that NASCO could play in any quota compensation agreements. Iceland supported the principle and felt that such agreements should be considered as conservation measures provided that the quotas were not sold for fishery purposes in the area of jurisdiction of the Party selling the The EEC questioned whether the proposed quota purchase was for quota. conservation or economic reasons. Where the purchase was made to facilitate the transfer of fishing rights the EEC considered that it could not be regarded as a conservation measure. However, the EEC believed that it is the right of coastal states to dispose of their NASCO quotas as they deem fit provided the catch is maintained with the limits of the quota. Canada tabled a statement (Appendix 2) expressing concern that the exploitation rate at Greenland remained too high and considered that a reduction in the West Greenland quota through NASCO would benefit the conservation of stocks. However, Canada felt that compensation agreements as a method for resolving conservation problems should be actively discouraged. Denmark (in respect of the Faroe Islands and Greenland) accepted the principle that quotas could be sold but stressed that any arrangement for quota compensation must not imply a cut in an existing NASCO quota. Finland tabled a statement (Appendix 3) expressing concern that compensation agreements could shift the basis of negotiations away from the scientific advice provided by ICES. Since the quotas agreed within NASCO establish quotas which should prevent harmful effects to stocks, Finland could not see any conservation value of relinquishing such quotas. Canada expressed concern that there might be an indirect linkage between the negotiations on quotas within NASCO and the financial aspects of compensation agreements. The USA

considered, however, that NASCO quotas were not based purely on scientific advice but on political and economic considerations as well. Sweden supported the concept and regarded it as a conservation measure but stressed that in the event that a quota is sold the Party relinquishing the quota must still have responsibility for control. Norway supported the concept as long as a specific proposal could be accepted by NASCO as a conservation measure.

# SUMMARY OF RESPONSES TO QUESTIONS IN CNL(90)54

# Q1.1 Do you consider that a Party in possession of a NASCO Quota can receive compensation for not exercising its rights to that quota?

It was generally agreed that there was nothing in the Convention that would prohibit such compensation payments. A wide range of views was expressed on the desirability of this principle. Norway and Iceland considered that this practice should be actively encouraged while Canada and Finland felt the practice should be actively discouraged. Some concern was expressed about possible linkage between the setting of NASCO quotas and the financial aspects. There were also different opinions as to how quotas could be sold. Though legally it might be possible for a NASCO quota to be sold to a third party, not a NASCO Member, it might not be desirable. There was, however, general agreement that there was nothing in the Convention to stop a quota being sold.

#### Q2.1 Do you consider that now or at some future date you might be willing to enter into a negotiation to accept a compensation payment for a NASCO Quota? If so, would you be willing to accept compensation from either public or private sources.

It was indicated that there was a difference in approach between the Faroe Islands and Greenland. In the Faroe Islands the question was under consideration and the government accepted that private negotiations were proceeding. In the final stages the Faroese government would need to approve such an agreement. The Greenland authorities were not at present considering entering into any negotiations for quota compensation. In both the Faroe Islands and Greenland there was no differentiation between willingness to accept private or public funds.

# Q2.2 Would you consider relinquishing all of the quota or only a part of it? Would you consider only a year-by-year compensation agreement or would you link it to the length of time of the NASCO Quota or would you want to see a longer term compensation?

The Faroe Islands and Greenland considered that the amount of salmon forming part of the compensation agreement would be a matter for the Parties involved in that agreement. Both governments felt that the period of the compensation agreement would have to be linked to the period of the NASCO quota.

Q3.1 Do you consider that now or at some future date you might be willing to enter into negotiations to pay compensation from public funds to a Party to relinquish its NASCO quota? If so, do you think a formula should be agreed among the contracting Parties so as to share the cost or do you think the funding should be entirely voluntary?

Most Parties stated that they could see no justification for using public funds to pay compensation for NASCO quotas. Norway was willing to envisage this possibility and had set up some mechanisms for it. The possibility of the use of public funds by Iceland was not excluded. As most Parties did not intend to contribute there was no need for a formula to be used.

#### Q3.2 If you do not consider that the use of public funds is appropriate would you be willing to accept that private organizations in your territory might negotiate such compensation with a Party or Parties prepared to accept it?

The Parties in general accepted that private organizations in their territories might negotiate compensation agreements for NASCO quotas with Parties willing to accept it. The views expressed on this question reflected the division of views expressed in response to question 1.1.

#### Q4.1 Do you consider that the negotiation of the financial elements of compensation should take place within NASCO following the agreement on the Quota even if it were, for example, an issue between NGO's to NASCO and Parties accepting compensation?

A majority of the Parties were of the opinion that negotiation of financial compensation should not take place within NASCO. The Norwegian position was that it found it acceptable that financial negotiations involving a NASCO quota should take place within NASCO.

#### Q4.2 If you consider that the compensation negotiation should not be within NASCO, do you believe that the result of a successful negotiation by private organizations should be formally transmitted back to the NASCO Commission which had established the quota?

There was full agreement that it would be natural to request that when a Party had completed a successful negotiation with another organization or organizations to purchase all or part of a NASCO quota that it should transmit that information to NASCO.

# Q4.3 If NASCO was not involved in the negotiation of the Compensation would you find it acceptable, in order to safeguard the interests of all Parties, that the Financial Rules permitting voluntary contributions were used to receive the funds from those bodies wishing to participate?

Although there were those who felt that it would be advantageous if NASCO were involved in a neutral role as bank or fund holder so as to facilitate the compensation arrangements, the majority were opposed to NASCO playing such a role and could see some possible legal and practical disadvantages.

# Q4.4 In the event that compensation arrangements were established do you believe that the mechanisms for ensuring that they are properly operated is by the annual Article 14 and 15 declarations on enforcement made to NASCO by the contracting Parties?

The Parties were unanimously of the opinion that it was the responsibility of the contracting Party concerned to ensure compliance with the NASCO regulatory measure and that Article 15 was one appropriate mechanism to monitor the changes in those fisheries affected by compensation agreements. It was felt that the information provided under Article 15 by those Parties accepting compensation would need to provide information on the effects of negotiations for compensation, but that NASCO did not have a role in monitoring the compensation agreement.

Secretary Edinburgh 25 January 1991

#### Appendix 1

# MEETING OF THE WORKING GROUP ON NASCO QUOTA COMPENSATION

# WALDORF HOTEL, LONDON, 22 JANUARY 1991

# **LIST OF PARTICIPANTS**

#### **CANADA**

MR DAVID RIDEOUT	Department of Fisheries	& Oceans,	Ottawa,	Canada
MR BARRY RASHOTTE	Department of Fisheries	& Oceans,	Ottawa,	Canada

# **DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)**

MR EINAR LEMCHE Greenland Home Rule, Copenhagen

<u>EEC</u>

MR HENRIK SCHMIEGELOW	Fisheries Directorate-General, EC Commission, Brussels
DR TONY BURNE	Ministry of Agriculture, Fisheries & Food, London
MR JUAN CALVERA	Embassy of Spain, London
MR HYWEL DUCK	Secretariat of the Council of the European Communities, Brussels
MR CAREL HERINGA	Royal Netherlands Embassy, London
MR HARRY KOSTER	Fisheries Directorate-General, EC Commission, Brussels
MR JESPER KAAE	Royal Danish Embassy, London
MR CHARLES McCALL	Ministry of Agriculture, Fisheries & Food, London
MR BOB WILLIAMSON	Department of Agriculture, Fisheries & Food, Edinburgh
FINLAND	

IR PEKKA NISKANEN	Ministry of Agriculture and Forestry, Helsinki
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# **ICELAND**

MR HELGI AGUSTSSON	Icelandic Embassy, London
MR ARNI ISAKSSON	Institute of Freshwater Fisheries, Iceland
MR ORRI VIGFUSSON	Reykjavik, Iceland
NORWAY	
MR MARIUS HAUGE	Norwegian Embassy, London
<u>SWEDEN</u>	
DR INGEMAR OLSSON	National Board of Fisheries, Goteborg
USA	
DR FRANK CARLTON	National Coalition for Marine Conservation, Savannah, Georgia
<u>SECRETARIAT</u>	
Secretary	DR MALCOLM WINDSOR
Assistant Secretary	DR PETER HUTCHINSON

The USSR was not represented.
#### Appendix 2

#### **OPENING STATEMENT MADE BY CANADA**

Despite the apparent reduced salmon harvest off West Greenland in recent years, it appears that the exploitation rate off West Greenland remains too high. Canada considers that a further reduction in the West Greenland quota for salmon would be of long-term benefit to the conservation of North Atlantic Salmon stocks. A large proportion of salmon catches off West Greenland are of Canadian origin and these catches as a proportion of total catches represent a high interception rate.

However the reduction should be achieved through Greenland's agreement in NASCO, Canada cannot support the proposed quota compensation initiative in principle, as the suggestion of compensation to resolve conservation problems raises the following concerns:

- (a) The prospect of monetary compensation for a quota holder to give up all or part of a quota, inherently creates an incentive for the quota holder to maximize its quota in order to:
  - i) have more fish to catch; and/or
  - ii) increase its compensation;
- (b) The private sector cannot make a legally binding commitment to fund any program. The Canadian government cannot undertake any contribution, now or in the future;
- (c) Compensation for quotas would set awkward domestic and international precedents. Canada has considerably reduced effort in the past by retiring, at great expense, commercial salmon licences. Canada has never considered annual payments to reduce quotas in perpetuity, and would not consider a program of this kind a sound conservation measure;
- (d) Acceptance of compensation for quotas will establish a relationship between the setting of quotas and quota compensation levels that could confuse and undermine the quota setting process;
- (e) If private interests wish to make arrangements of this kind there is nothing governments can do to stop them, but they should be discouraged as much as possible from doing so because of the problems outlined. In any event the negotiation of quota compensation should not take place as part of the NASCO inter-governmental activity.

For the aforementioned reasons Canada regards the quota compensation proposal as fundamentally flawed. Canada believes that other measures should be used to achieve a reduction in exploitation rates in the Greenland fishery. Such measures could include a shorter fishing season, improved catch monitoring mechanisms, a voluntary and/or mandatory licence retirement program to reduce effort, and a further reduction in quotas.

#### **OPENING STATEMENT MADE BY FINLAND**

It has been proposed from the private side that the conservation of salmon in the Convention area could be made more effective by purchasing those catch quotas or part of them which NASCO has established. Relinquishing quotas could be arranged through a special compensation fund financed by public or private sources or both.

As regards the aims and objectives of the NASCO Convention, one must keep in mind that management and conservation measures are and should be based on biological facts. NASCO receives this information from ICES, although factors other than biological are often involved in establishing quotas. These come from the Party receiving a quota and are often based on the socio-economic situation of the fisheries concerned. These factors tend to increase quotas.

However, negotiations resulting in a given quota are mostly based on the state of the salmon stocks. In other words it has been considered that the salmon stocks can be exploited to the extent of that quota without harmful effects. If so, there is no need to relinquish or reduce that quota because the question is of normal fishery without harmful effects.

On the other hand, if there is a need to reduce or relinquish the quota, then the question arises as to whether NASCO has failed in executing the aims and objectives of the Convention. More concretely, in this case NASCO has obviously established a quota which is too high and which endangers the salmon stocks. As a result, the proper function of NASCO would become doubtful. Furthermore, if a fund for compensating quotas is established and is functioning within the framework of NASCO, it could distort the image and work of our Organization. It could lead for example to a situation where scientific advice would not have the importance it deserves and consequently quotas might be established more easily at too high a level.

From Finland's point of view this kind of activity is not in conformity with the spirit of the NASCO Convention. For this reason Finland is not in favour of supporting the proposal being executed within the framework of NASCO and is not prepared to finance such activity from public sources.

However, if some private organizations and some Parties to the Convention are willing to accept quota compensation, Finland would not oppose it as long as NASCO, as an organization, is not involved. In this case it would be necessary for NASCO to be properly informed of the activities and funding of quota compensation.

## ANNEX 18

# COUNCIL

# PAPER CNL(91)21

# OUTLINE OF OPTIONS FOR QUOTA PURCHASE

#### **OUTLINE OF OPTIONS FOR QUOTA PURCHASE**

- 1. In accordance with the decision of the Council at its Seventh Annual Meeting a Working Group was set up to further discuss the principles involved in the purchase of NASCO quotas. A report of their meeting is presented separately, CNL(91)20. The report shows that the Parties hold a wide range of views on this matter. Although it was generally agreed that there was nothing in the Convention to stop a quota being sold, different views were expressed concerning the desirability of this practice. If the Council accepts the principle that NASCO quotas can be sold there is still a difference to be resolved between selling a quota to another body who will fish it and selling a quota in the sense of surrendering the right to fish it. The objective of this paper is, however, to aid the Council by outlining the main options seen in the light of the London meeting. These are as follows:
  - **Option 1:** The Council could indicate that it would play no part in cooperating in the purchase of NASCO quotas. In this case Council would simply request that it be kept informed of the result of any negotiation to purchase a NASCO quota.
  - **Option 2:** The Council could indicate its willingness to assist with any agreement reached for compensation for NASCO quotas by offering to administer any such agreements once they had been made elsewhere. This assistance would not extend to involvement in the financial negotiations. NASCO would offer no legal or financial guarantees and the financial involvement of any Party would be entirely voluntary.
  - **Option 3:** The Council could indicate its willingness to cooperate in the negotiation for the payment of compensation for NASCO quotas by providing administrative support for the running of the financial negotiations between NGO's and any Parties concerned and by administering any agreement reached. NASCO would offer no legal or financial guarantees and the financial involvement of any Party would be entirely voluntary.
- 2. In all or any form of cooperation offered, NASCO could clearly not act as a guarantor but simply act in the same way that a bank or legal organization accepts documentation and funds and transfers them without itself being part of any agreement.
- 3. If it is accepted by the Council that NASCO quotas can be sold then the Council needs to resolve to what extent the Organization wishes to facilitate or assist such negotiations. It is clear from the meeting held in London that few Parties are willing to commit public funds to the purchase of NASCO quotas so the question only concerns to what extent the Parties would render administrative assistance to those bodies involved in such purchase.

4. To judge from the London meeting there would be little support for Option 3 and some support for Option 2; the majority of the Parties present appeared to favour Option 1.

Secretary Edinburgh 15 April 1991

# COUNCIL

# PAPER CNL(91)22

# SUMMARY OF MICROTAG, FINCLIP AND EXTERNAL TAG RELEASES IN 1990

#### SUMMARY OF MICROTAG, FINCLIP AND EXTERNAL TAG RELEASES IN 1990

- 1. The Annual summary of the information on tagging programmes conducted by the Parties in 1990 is attached as Table 1. In excess of 3.8 million fish were either tagged or marked during 1990, prior to release, of which 48% were microtagged, 44% were finclipped (principally adipose clips), 7% were tagged with external tags (principally Carlin tags) and less than 1% were branded or dyemarked. Approximately 1.9 million fish bore auxiliary marks, principally adipose clips used in conjunction with microtagging. Thus a total of almost 3.4 million adipose clipped fish were released in 1990 of which only about 1.8 million carried microtags. Out of the total of 3.8 million marked fish released, approximately 98% were of hatchery origin.
- 2. Table 2 presents a comparison of the tagging programmes in 1989 and 1990. The 1990 figure of 3.8 million released marked fish is 3% less than the number released the previous year. There was a 14% increase in the release of microtagged fish and a 5% increase in the number of externally tagged fish. The reduction overall, however, was due to an 18% reduction in the number of fish that were finclipped only. The number of wild fish tagged or marked declined by almost 58% compared to 1989.

Secretary Edinburgh 10 May 1991

# <u>TABLE 1</u> <u>SUMMARY OF 1990 TAG RELEASES BY PARTY</u>

PARTY	ORIGIN	MARKING METHOD				
		MICROTAGS	EXTERNAL TAGS	BRANDS, DYEMARKS ETC.	FINCLIPS	AUXILIARY TAGS FINCLIPS, MARKS ETC.
Canada	Hatchery Wild Mixed*	74329 30384 	56897 8263 1650	7500	842938 1589 	107333 26720
	TOTAL	104713	66810	7500	844527	134053
Denmari (Faroe Islands)	k Hatchery Wild	11820				11820
13141103)	TOTAL	11820				11820
EEC	Hatchery Wild	441273 26361	520 18576	20477	143895	422383 35075
	TOTAL	467634	19096	20477	143895	457458
Iceland	Hatchery Wild	405019 2641				405019 2641
	TOTAL	407660				407660
Norway	Hatchery Wild		100580 2822			
	TOTAL		103402			
Sweden	Hatchery Wild		8841		45510 	1991 
	TOTAL		8841		45510	1991
USA	Hatchery Wild	857306	50807		207646	857306
	TOTAL	857306	50807		207646	857306
USSR	Hatchery Wild		4000 617		459174	3000
	TOTAL		4617		459174	3000
TOTAL	Hatchery Wild Mixed	1789747 59386 	221645 30278 1650	27977 	1699163 1589 	1808852 64436
	TOTAL	1849133	253573	27977	<u>1700752</u>	<u>1873288</u>

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

## TABLE 2

# COMPARISON OF 1989 AND 1990 TAGGING PROGRAMMES

	<u>1989</u>	<u>1990</u>	<u>% CHANGE</u>
MICROTAGS			
Hatchery	1593678	1789747	+12.3
Wild	23863	59386	+148.9
TOTAL	1617541	1849133	+14.3
EXTERNAL TAGS			
Hatchery	220928	221645	+0.3
Wild	17386	30278	+74.1
Mixed	2489	1650	-33.7
TOTAL	240803	253573	+5.3
BRANDS, DYEMARK	ΧS		
Hatchery	19019	27977	+47.1
Wild TOTAL	19019	27977	 +47.1
FINCLIPS			
Hatchery	1899869	1699163	-10.6
Wild	174125	1589	-99.1
Mixed	48		
TOTAL	2074042	1700752	-18.0
TOTAL			
HATCHERY	3733494	3738532	+0.1
WILD	215374	91253	-57.6
MIXED	2537	1650	-34.9
TOTAL	<u>3951405</u>	<u>3831435</u>	<u>-3.0</u>

## ANNEX 20

# COUNCIL

# PAPER CNL(91)23

# NASCO TAG RETURN INCENTIVE SCHEME

#### NASCO TAG RETURN INCENTIVE SCHEME

- 1. The NASCO Tag Return Incentive Scheme was established on a trial basis for four years: 1989; 1990; 1991 and 1992 to encourage and improve the return of external The United States agreed to fund the scheme for the trial period and tags. participation by the Parties is on a voluntary basis. Last year was the first year of operation and there were some minor initial problems in implementing the Scheme, particularly with regard to publicity. However, the Scheme was better publicised prior to the 1990 fishing seasons. Announcement of the prize winners from last year was made in the Press Release issued at the close of the Seventh Annual Meeting in Helsinki. In addition since the whole aim of the scheme is to improve awareness of the need to return tags, I attended a ceremony in Godhab, Greenland where the Grand Prize and the West Greenland Commission prizes were presented to the Organization of Hunters and Fishermen in Greenland (KNAPK) in the presence of the Minister of Finance. The prize ceremony in Greenland and the presentation of awards in the other Commissions received considerable coverage in the press. All prize winners were awarded a certificate, a copy of which is attached.
- 2. In accordance with the Rules of the Scheme the participating Parties were requested to provide, by 1 May, a list of names and addresses of persons returning eligible external tags during the year 1 January 31 December 1990. Alternatively, a list of serial numbers only was considered acceptable provided that the identity of the person returning the tag was known by the Party concerned. The country of recapture of the tag was also requested in order that each tag could be allocated to its appropriate Commission area.
- 3. A total of 1950 eligible tags were returned and entered into the draw for the Grand Prize. This represented an increase of 58.3% over the number entered in the previous year's draw. 423, 97, 1430 eligible tags were entered into the draws in the North American Commission, the West Greenland Commission and the North-East Atlantic Commission, respectively. The draw will be made on 4 June in the presence of the auditors to NASCO, and in accordance with the Rules of the Scheme. The winner of the \$2500 prize will be announced by the President at the Eighth Annual Meeting of the Council. The winners of the prizes in each Commission area will be announced by the Chairmen of the respective Commissions at the Eighth Annual Meeting. Lists of prize winners will be circulated to all delegates after the announcement of the awards.

Secretary Edinburgh 10 May 1991

# COUNCIL

# PAPER CNL(91)24

# DATABASE OF SALMON RIVERS FLOWING INTO THE NASCO CONVENTION AREA

#### DATABASE OF SALMON RIVERS FLOWING INTO THE NASCO CONVENTION AREA

- 1. At its Sixth Annual Meeting the Council asked the Secretary to prepare, in consultation with the Parties, a list of all salmon rivers flowing into the Convention area. A format for collection of the information was agreed at the Seventh Annual Meeting and the Secretary was requested to proceed with establishing the database in consultation with the Parties.
- 2. In accordance with this decision I wrote to all Parties on 13 March 1991 requesting that the information be submitted according to the agreed format for inclusion in the database.
- 3. Establishing this database is clearly a large undertaking and its completion could take several years. A progress report on the information received and on the structure and capabilities of the database will be submitted to the Council at its Ninth Annual Meeting. When complete the project will provide a unique record of all North Atlantic salmon rivers with an indication of their status at the end of the 20th century.

Secretary Edinburgh 27 March 1991

ANNEX 22

# COUNCIL

## PAPER CNL(91)47

#### GUIDELINES TO MINIMISE THE THREATS TO WILD SALMON STOCKS FROM SALMON AQUACULTURE

#### GUIDELINES TO MINIMISE THE THREATS TO WILD SALMON STOCKS FROM SALMON AQUACULTURE

- 1. In recent years there has been growing concern about the possible impacts of salmon aquaculture (i.e. salmon farming, ranching and enhancement programmes) on the wild stocks. While enhancement programmes have been undertaken in the North Atlantic since the middle of the 19th century there has been a very rapid expansion of aquaculture in the last 20 years with the development of salmon farming. There is also growing interest in salmon ranching in the North Atlantic (see paper CNL(91)27). A number of papers have previously been considered by the Council (CNL(88)21; CNL(89)19; CNL(89)20; CNL(89)21; CNL(90)26; CNL(90)27; CNL(90)28; CNL(90)29) which have reviewed the literature concerning the potential impacts on the wild stocks. In addition, the North American Commission's Scientific Working Group on Introductions and Transfers has considered in detail the threats to wild stocks from introductions and transfers and has prepared protocol documents concerned with ecological, genetic and disease risks associated with stock movements (NAC(89)13, NAC(89)14, NAC(89)15, NAC(89)16). These protocols were agreed in principle by the Commission and have been referred to in preparing the present Guidelines.
- 2. At its Seventh Annual Meeting the Council discussed draft guidelines for developing Advisory Codes of Practice (CNL(90)31) designed to minimise the threats to the wild stocks from salmon aquaculture which had previously been circulated to the Parties for comment. Existing Codes of Practice, as submitted by the Parties, were annexed to this paper for information. This discussion document was considered to be of value to the Parties but it was agreed that a further opportunity for comment on the document was necessary, after which a revised document would be tabled at the Eighth Annual Meeting. In accordance with this decision, the draft document (CNL(90)31) was circulated to all the Parties on 30 October 1990 with a request for comments by 15 February 1991. A number of Parties were able to accept the document without revision while others provided comments. Where comments were received these were incorporated, including comments received from the NAC Scientific Working Group. The amended Guidelines are attached (Appendix 1).
- 3. The approval of internationally agreed Guidelines for national use at the discretion of the Parties offers some advantages both to governments and the aquaculture industry. Clearly not all measures are appropriate in all situations but these Guidelines could serve as a basis for the production of any voluntary or mandatory guidelines should a Party decide to establish them.

Secretary Edinburgh 17 June 1991

#### Appendix 1

#### GUIDELINES TO MINIMISE THE THREATS TO WILD SALMON STOCKS FROM SALMON AQUACULTURE

#### 1. MEASURES TO REDUCE THE POSSIBLE GENETIC AND ECOLOGICAL IMPACTS OF REARED FISH

#### 1.1 Establishing and Maintaining Broodstocks For Intentional Release To The Wild

- local stocks, i.e. stocks from the same river, or stocks with similar biological characteristics from a neighbouring river with similar ecological conditions, should be used wherever possible.
- broodstocks should be representative of the entire spawning run of the donor stock, e.g. fish should not be selected on the basis of size etc.
- broodstocks should comprise at least 100 pairs of parental fish which should be used in single paired matings. If the number of one sex is less than 50 the number of broodfish of the other sex should be increased to achieve a minimum number of 100 broodfish.
- broodstocks should not be held in captivity for more than one generation so as to avoid genetic changes induced by hatchery rearing.
- detailed records of the origin of broodstocks should be maintained.
- selection of fish considered to have favourable attributes should be avoided.
- care should be taken to avoid the use of escaped farmed fish as broodstock.
- stocking to the wild with early life stages (eggs, unfed fry or parr) is preferable.

#### **1.2 Establishing Broodstocks for Salmon Farming**

- wherever possible broodstocks for salmon farming should be developed using local stocks or, where these are limited, neighbouring stocks.
- careful attention should be paid to methods of minimising escapes and consideration should be given to the use of sterile stocks.

#### **1.3** Minimising escapes

- efficient security systems should be installed and used at all sea-based and land-based units.
- efficient anti-predator nets should be used on all systems.

- efficient inlet and outlet screens should be installed at all land-based units.
- the risk of escape of fish from rearing units as a result of storm or ice damage should be minimised by using appropriate technology for the prevailing conditions.
- sea units should be sited so as to avoid the risk of damage by collision with vessels and should be adequately marked.
- immediate notification of escapes should be provided to the authorities concerned so that any appropriate action can be taken, e.g. emergency netting.
- a proportion of farmed stocks could be tagged to enable ease of identification in the event of escape.

#### **1.4** River and Coastal Management

- management measures should be maintained in order to protect the abundance of wild stocks.
- wild stocks of salmon should be protected by the establishment of zones free of salmonid aquaculture. Priority should be given to protecting those rivers which are considered to be generally pristine in nature.

#### **1.5** Other Measures

- all female, triploid stock which are sterile could be used.
- gene banks for wild stocks considered to be threatened could be established.
- surplus stock from salmon farms should not be released into rivers containing salmon unless these stocks have been reared in accordance with the conditions laid down in Section 1.1.

#### 2. MEASURES TO MINIMISE THE POSSIBLE ADVERSE EFFECTS FROM INTRODUCTIONS AND TRANSFERS

- appropriate mechanisms to control introductions and transfers should be introduced where necessary, e.g. licensing system.
- the appropriate authorities should be consulted at the earliest possible stage prior to the intended introduction and inventories of introductions and transfers should be maintained.
- the potential for genetic, ecological and health impacts between the introduced or transferred species and native salmon stocks should be carefully reviewed and evaluated at the application stage by an appropriate scientific committee.
- precautions to prevent introduction of disease and parasites should be taken such as quarantine and health inspection reports prior to the introduction. (The

North American Commission's Scientific Working Group has made a number of specific recommendations concerning inspection and quarantine procedures contained in paper NAC(89)14).

- intercontinental movements of Atlantic salmon should be avoided and movements across national boundaries discouraged or carefully monitored.
- measures should be taken to prevent the escape of introduced and transferred stocks.

### 3. MEASURES TO MINIMISE DISEASE AND PARASITE INTERACTIONS

- careful attention should be paid to husbandry techniques to minimise the risk of disease in the reared stock, e.g. use of appropriate stocking densities, careful handling, frequent inspection of fish, avoidance of unnecessary disturbance to fish and provision of a nutritionally balanced diet.
- careful attention should be paid to stock movements to prevent the spread of diseases between farms, e.g. detailed health inspections, disinfection of transportation equipment, provision of disinfectant wheel and foot baths. (The North American Commission's Scientific Working Group has made a number of specific recommendations concerning inspection and quarantine procedures contained in paper NAC(89)14).
- careful attention should be paid to the separation distance between fish farms.
- diseased stock must not be released to the wild.
- dead or dying fish should be removed from cages and disposed of in an approved manner, e.g. buried in quick or slaked lime or burned.
- particularly valuable stocks of salmon should be protected by the establishment of zones free of salmonid aquaculture.
- careful attention should be paid to site selection and measures should be taken to minimise deterioration of the environment around the cages so as to minimise stress to the reared fish.

# 4. MEASURES TO MINIMISE THE IMPACTS OF AQUACULTURE ON THE ENVIRONMENT

- a detailed site survey should be carried out before approval to develop a site for aquaculture is granted, e.g. chemical, biological and hydrographical.
- poorly flushed, shallow sites should be avoided.
- management practices to minimise the impact of waste feed on the environment should be adopted, e.g. careful attention to the amount and timing of feeding, rotation of cages, use of low pollution feeds.

- chemicals must be used with care and in accordance with any manufacturers' instructions and Codes of Practice. Chemicals should not be released into the aquatic environment in concentrations likely to damage the natural flora or fauna. Alternatives to chemical treatment might be considered, e.g. the use of wrasse to control sea-lice.
- waste materials such as viscera, dead fish and blood must be disposed of in an approved manner.
- careful attention should be paid to the separation distance between fish farms.
- valuable stocks of salmon should be protected by the establishment of zones free of salmonid aquaculture.

ANNEX 23

# COUNCIL

# PAPER CNL(91)26

# CLIMATE CHANGE AND SALMON STOCKS

#### **CLIMATE CHANGE AND SALMON STOCKS**

- 1. Man-made emissions of a number of gases, including carbon dioxide, resulting from processes such as fossil fuel burning, are enhancing the natural greenhouse effect of the earth and there is evidence that this is resulting in global warming.
- 2. Over the past century it is possible that these emissions have already resulted in a temperature increase of 0.5°C. Complex models have been used to predict how the earth's climate will change during the next century under a number of different emission scenarios. Assuming no change in the emissions it is predicted that the global average surface temperature will increase by about 4°C over the pre-industrial levels. If these predictions are correct, temperatures on earth would not have changed so much so rapidly since the end of glacial climates. The temperature change may be accompanied by sea-level rise, reduced soil moisture in mid-latitudes and possibly increased frequency of extreme events.
- 3. Clearly such changes could have marked impacts on aquatic ecosystems although predictions are difficult because of lack of detailed regional data, of information on precipitation patterns and of information on how the marine environment will change. However, the impact on the Atlantic salmon, which spends part of its life cycle in cold freshwaters, may be particularly marked. It is anticipated that there will be a northward shift in distribution and impacts on the population dynamics throughout its range resulting from changes in the temperature regimes of rivers. There may also be changes in flow and water quality of salmon rivers. In the marine environment there may also be changes in distribution of the species and impacts on the age at maturity. Changes in oceanic circulation could also influence the level of salmon production and migration patterns.
- 4. At present detailed predictions of how climate change will affect salmon stocks are not possible. It is clear that all aspects of salmon biology could be affected by the predicted changes with implications for distribution changes in freshwater and in the ocean, and for management of the resource. The Council may therefore wish to be kept informed of developments in this field or consider holding a Special Session on this topic in the future.

Secretary Edinburgh 6 June 1991

## CLIMATE CHANGE AND SALMON STOCKS

#### 1. <u>INTRODUCTION</u>

1.1 "Humanity is conducting an unintended, uncontrolled, globally pervasive experiment whose ultimate consequences could be second only to a global nuclear war. The Earth's atmosphere is being changed at an unprecedented rate by pollutants resulting from human activities, inefficient and wasteful fossil fuel use and the effects of rapid population growth in many regions. These changes represent a major threat to international security and are already having harmful consequences over many parts of the globe".

The statement above is not a result of sensationalist journalism but is one of the conclusions of the International Conference on the Changing Atmosphere: Implications for Global Security held in Toronto in 1988 and attended by more than 300 scientists and policy makers from 46 countries (Anon, 1988a). More recently the Intergovernment Panel on Climate Change stated that:

"We are certain [that] emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases... These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface".

1.2 At its Seventh Annual Meeting the Council considered a report from the Secretary, CNL(90)6, which contained details of areas of work where the Organization might play a fruitful role where resources permit. These included the possible impacts of global warming on fisheries. This preliminary outline explains the "greenhouse effect", and the predicted impact on the earth's climate and considers some possible impacts for the Atlantic salmon.

#### 2. <u>THE GREENHOUSE EFFECT</u>

The driving force of the earth's weather and climate systems is solar radiation, the 2.1 amount of heat received from stars and other celestial bodies being negligible (Critchfield, 1960). Before incoming solar radiation, or insolation, which consists principally (99%) of short wave-length radiation can reach the earth's surface it must pass through the earth's atmosphere, a deep blanket of gases which buffers the earth from violent diurnal temperature fluctuations. It has been estimated that without the atmospheric gases temperatures on earth would fluctuate between +200°F during the day and -300°F at night (Critchfield, 1960). The atmosphere consists principally of four gases - nitrogen, oxygen, argon and carbon dioxide together with stable gases such as methane, hydrogen and nitrous oxide and less stable gases including ozone and radon. These gases vary in concentration throughout the atmosphere, but most gases have little effect on the earth's climate (Hare, 1988). Some gases, however, play very important roles. Near the outer limit of the stratosphere, for example, ozone concentrations are at their highest and this gas plays an important role in filtering harmful UV rays.

2.3 The atmosphere is nearly transparent to the incoming short-wave radiation from the sun (Lockwood, 1974) although 34% is lost by reflection from clouds and the earth's surface and also by being scattered into space (Critchfield, 1960). Like the glass of a greenhouse, the earth's atmosphere allows short-wave radiation to pass through but blocks the heat (longer wave-length) that is radiated. Only about 9% of the emitted radiation escapes directly into space (Lockwood, 1974). This is the so-called "greenhouse effect" and it is a natural phenomenon which raises the surface temperature to a global average of 15°C, 35°C warmer than if this effect did not exist (Hare, 1988). The concern being expressed today relates to an enhancement of this effect as a result of anthropogenic emission of a variety of gases to the atmosphere, which will cause the temperature of the Earth to increase beyond this natural level. This effect is known as "global warming".

#### 3. <u>THE ENHANCED GREENHOUSE EFFECT</u>

- The most important greenhouse gases in the atmosphere are water vapour, ozone, 3.1 carbon dioxide, nitrous oxide, methane and the chlorofluorocarbons (CFC's). Water vapour has the largest greenhouse effect but on a global scale its concentration is not affected by human sources (Houghton et al, 1990). Emissions of the gases responsible for the enhanced greenhouse effect are the result of industrial development, agricultural expansion and increased energy consumption. The concentrations of these gases change naturally but they have increased since pre-industrial times due to human activities (Houghton et al, 1990). Carbon dioxide levels for example have increased by about 26% since pre-industrial times as a result of fossil fuel and biomass burning, deforestation and other land use changes. It is presently increasing at about 0.4% per annum (Hare, 1988). Other greenhouse gases are also increasing but not all at the same rate. At high southern latitudes ozone has decreased considerably in the lower stratosphere due to the effects of CFC's and there are indications of a global scale decrease which should act to cool the earth's surface (Hare, 1988). However, a decrease in ozone concentration may adversely affect human health and the productivity of terrestrial and aquatic ecosystems.
- 3.2 There are marked differences in the effectiveness of the different gases at absorbing radiation and therefore to create radiative forcing of the climate. For example, nitrous oxide is 250 times more effective than  $CO_2$  at absorbing radiation (Power, 1990). At present the enhanced greenhouse effect is due about half to rising carbon dioxide levels and half to the other greenhouse gases (Hare, 1988). Some of the greenhouse gases (carbon dioxide, CFC's and nitrous oxide) persist in the atmosphere for considerable lengths of time. It has been estimated, for example, that if all human emissions of carbon dioxide had ceased in 1990 about half of the increase in concentration caused by human activities would still be evident in the year 2100 (Houghton et al, 1990). Furthermore, a lag effect caused by the oceans means that if emission controls stabilised the chemical composition of the atmosphere now, temperatures would continue to rise for as much as twenty years.

#### 4. <u>HOW WILL CLIMATE BE AFFECTED BY THE ENHANCED GREENHOUSE</u> <u>EFFECT?</u>

4.1 There have been a number of climatic anomalies in recent years, the most devastating of which has been the African drought (Hare, 1988). The four warmest years since

detailed records of surface temperature began in the mid-nineteenth century all occurred in the 1980's with 1981 and 1987 being the warmest years (Anon, 1988b) and there has therefore been speculation that these anomalies are a manifestation of the enhanced greenhouse effect. Based on changes in the chemical composition of the atmosphere over the last century estimates suggest that the enhanced greenhouse effect should have resulted in increases in temperature of 0.3-0.7°C. Assessing the extent to which temperatures have actually changed during this period is complicated by the need to harmonise historical records with modern observations and although this introduces uncertainties warming of 0.3-0.6°C (Houghton et al, 1990) and 0.5-0.6°C (Jones et al, 1986) have been reported. However, although the observed warming is close to predictions the temperature rise could be due to natural mechanisms and the natural variability must be exceeded before an enhanced greenhouse effect can be established.

- Forecasting global climate change is complex because of the uncertainty associated 4.2 with future patterns of fossil fuel use, rates of deforestation and other activities leading to greenhouse gas emissions and the response of the climate system to a given level of emissions (Jaeger, 1988). The debate about how predicted changes in the concentration of greenhouse gases will modify the earth's climate is based on theory and analysed by complex models known as General Circulation Models (GCM's) (Smith 1990). These models are used to predict atmospheric concentrations under a number of emission scenarios. They incorporate feedback mechanisms such as changes in cloud cover and water vapour but despite their complexity the models are comparatively crude (Houghton et al, 1990). The role of terrestrial and marine plants in regulating the global carbon budget and the ability of the oceans to act as a carbon sink are poorly understood (Gucinski et al, 1990). Nevertheless, General Circulation Models appear to be in some agreement on global temperature changes associated with increasing concentrations of greenhouse gases. They have, however, been less successful in providing a consensus regarding regional changes in temperature and precipitation (Glantz, 1990). The main intended use of the models is to aid fundamental research of the atmosphere rather than providing information concerning impacts and the models are unlikely to be able to provide much information on changes in climatic variability and the frequency of extreme events (Anon, 1989; Smith, 1990).
- In 1979 the US National Academy of Sciences estimated that global temperatures 4.3 would increase by 1.5-4.5°C in response to a doubling of carbon dioxide concentrations over pre-industrial levels (in Smith and Tirpak, 1989). It has been predicted that the combined future effect may by the equivalent of a carbon dioxide doubling by the 2030's, that this may induce a global increase in surface temperature of 1.5-4.5°C, that the impact is likely to be non-uniform with high latitudes warming the most especially in autumn and winter, that available soil moisture will be less abundant in mid-latitudes in the Northern Hemisphere and that sea-level may rise between 20-140cm. The Inter-Governmental Panel on Climate Change predicted that if emissions of greenhouse gases followed a "business as usual" pattern the likely increase in global mean temperature would be about 4°C above the pre-industrial level before the end of the next century (Houghton et al, 1990). Recent climatic models are in general agreement and suggest that global average surface temperatures will increase by some 2-6°C during the next century with sea level rises of 0.5-1.5 metres (Schneider, 1989).

4.4 While these temperature changes may seem rather low they would amount to a revolutionary change in world climate - not since the end of glacial climates would temperatures have changed so much so rapidly (Hare, 1988). It is not known how ecosystems will respond to such rapid changes although attempts are now being made to forecast the expected impacts (Gucinski et al, 1990).

## 5. IMPACTS ON AQUATIC ECOSYSTEMS

- 5.1 The rapidity with which the climate is predicted to change may have significant implications for natural ecosystems since the ability of these systems to adapt to rapid warming is limited (Smith and Tirpak, 1989). Ecosystems will change in structure because species with small ranges may be prone to local or even global extinction (Melillo et al, 1990). In the case of aquatic systems climate change may lead to significant changes in the location and type of fish stocks (Anon, 1989) and these changes may be particularly marked for stenothermal (cold water) species such as the Atlantic salmon (Power, 1990). The initial assessments of the potential impacts on North American marine and freshwater fish populations suggest a general northwards shift in the distribution of some species (Meisner, 1990a). The problem is that while it is certain that the predicted climate change will have major impacts on fisheries it is virtually impossible to predict what these will be (Francis, 1990). However, in order that there may be informed speculation on the effects of climate change on aquatic ecosystems three approaches have been used (Kennedy, 1990):
  - data on physiological adaptations of fish;
  - inferences drawn from the effects of historical changes in climate on fisheries or "forecasting by analogy" (Glantz, 1990);
  - study of the biogeographical ebb and flow of populations over past millennia.

#### **Freshwaters**

Freshwater ecosystems may be affected in drastic ways if climate change proceeds as 5.2 anticipated (Gucinski et al, 1990). Water temperatures in freshwaters will rise as a result of atmospheric warming with the effect being most pronounced in rivers and streams (assuming unchanged solar radiation) (Meisner et al, 1987) especially through changes in maximum summer temperatures and minimum winter temperatures (Regier and Meisner, 1990). Groundwater temperature will also increase (Gucinski et al, 1990). Temperature determines growing season of Atlantic salmon and mean smolt age and it controls the timing and synchrony of events such as spawning, incubation and emergence which may in turn determine mortality rates, parr densities, growth and age at smolting (Power, 1986). In the case of the Atlantic salmon there may be marked changes in its distribution. Power (1990) forecast that the predicted warming may result in the loss of Atlantic salmon from streams at the southern extreme of its range in US, Canada, Spain, France and other parts of Europe. There may, however, be an expansion of its range in the north by the occupation of rivers in Ungava Bay and possibly Hudson Bay in Canada and on Baffin Island and in Greenland (which presently has one salmon river). In the Eastern Atlantic the range may shrink unless salmon can occupy rivers to the east in Siberia. Power (1990) cautioned that rivers colonised in the north may be characterised by high sediment loads and changed hydrology with implications for productivity and suitability for salmon. The longer and warmer summers anticipated will reduce the coldwater habitat of headwaters and

warmwater fish populations will expand their range (Regier and Meisner, 1990). In parts of the range those rivers still capable of supporting Atlantic salmon may experience a contraction of suitable salmon habitat through displacement upstream as a result of thermal barriers. Such displacement has been suggested recently on the basis of empirical relationships developed to forecast the impact on brook trout (*Salvelinus fontinalis*) (Meisner, 1990b). Warming may, however, enable salmon to colonise streams to higher altitudes where suitable accessible habitat is available.

The hydrology of freshwater systems may also change (Smith and Tirpak, 1990) with 5.3 alterations to streamflow patterns, groundwater recharge and release and lake levels. It is anticipated that the number of juvenile salmon in streams will change with changes in local precipitation and streamflow (Regier and Meisner, 1990). There may also be changes in sediment loads which would influence channel morphology and stability, substrate composition and habitat complexity (Gucinski et al, 1990). These changes may impact on the quality and stability of spawning grounds. Changes in stream flow may influence in-river migration patterns of salmon. Where water quantity is anticipated to decline (eg in the Great Lakes) there would be less water to dilute pollutants so water quality may decline (Smith and Tirpak, 1990). In other areas water quantity may increase and quality improve. Higher temperatures may enhance primary production with consequences for water quality (Smith and Tirpak, 1990) and in the Great Lakes it is anticipated that an increase of 2°C in average annual temperature would lead to a 26% increase in maximum sustainable yield of commercially valuable fish species, although the yield of different species will be affected differently (Meisner et al 1987).

#### **Estuaries**

5.4 At least five environmental factors of significance to estuaries and coastal ecosystems might be modified as climate warms - sea level rise, water column warming, precipitation, wind and water circulation (Kennedy, 1990). Although predictions about changes in freshwater input to estuaries are uncertain the predicted rise in sea-level through thermal expansion would increase the size and salinity of estuaries (Smith and Tirpak, 1989). Such changes may have considerable impacts on estuarine ecosystems which are important nursery areas for many species and also for offshore populations through the provision of nutrients (Anon, 1989). Sea-level rise may result in intrusion of marine waters and associated organisms, increased hypoxia and storm surges and changes in the temperature regimes of estuaries may result in a range expansion of warm tolerant species (Kennedy, 1990). The implications of such changes for Atlantic salmon are unclear but the early marine phase of the salmon is characterised by high mortality and estuaries are an important transition zone in adaptation to marine conditions.

#### Marine waters

5.5 Interactions in the marine environment are complex but one of the obvious effects of global warming may be on sea-surface temperatures (Glantz, 1990). The North Atlantic region is predicted to warm more than the world as a whole (Murawski and Mountain, 1990) and changes in the temperature will have an effect on fish populations during all life-stages (Glantz, 1990) affecting temperature dependent processes such as growth, maturity and feeding rate (Murawski and Mountain, 1999)

and distribution. Dunbar and Thomson (1978) reviewed the records of Atlantic salmon abundance at West Greenland in association with climatic variations. They found evidence that the periods of salmon abundance were associated with periods when the marine climate was cooling following a warmer period. They proposed a possible hydrographic mechanism for this effect with the East Greenland current and Irminger current increasing in the formation of the West Greenland current. Similarly, Reddin and Murray (1985) examined the effect of environmental conditions in the Northwest Atlantic on catches of salmon at West Greenland. Their analysis indicated that the abundance of salmon at West Greenland was significantly correlated with the northward extent of the 4°C water isotherm in January and August and that the low catches of salmon at West Greenland in 1983 and 1984 could be partly attributed to colder than normal water temperatures. It is clear that changes in the temperature of the ocean would be expected to have an impact on the distribution of salmon at sea. However, Francis (1990) cautioned that until it is known how the ocean environment will respond to atmospheric changes there is no basis for prediction of how marine fish are likely to respond.

- Sea temperature has also been linked to age at maturity of salmon stocks. Martin and 5.6 Mitchell (1985) examined temperatures in the subarctic in relation to catches of grilse and multi-sea-winter salmon in the River Dee. It was shown that increase in temperature was associated with increased numbers of fish returning as multi-seawinter salmon and fewer grilse. They hypothesised that the temperature of the subarctic influences the migratory pattern with fish travelling further north into the Arctic and subarctic in years when the minimum temperature remained above 2°C. However, analysis by Dempson et al (1986) showed no significant contribution of sea temperature to sea age at maturity. There was also no evidence of any significant effect of temperature on within-stock variation in age at maturity. Since this result was at variance with other studies they concluded that it is possible that over the wide range of the Atlantic salmon there may be stocks for which sea temperature does have an influence on sea age at maturity. Analysis has indicated that prey species of Atlantic salmon in marine waters such as capelin, Mallotus villosus, may also be displaced northwards being replaced at its southern limit (Gucinski, 1990).
- 5.7 If there is a decrease in meridional temperature gradients, oceanic circulation might become less vigorous leading to less turbulence, vertical mixing and coastal upwelling (Anon, 1989). Other studies have suggested that global warming could intensify alongshore wind stress leading to increased coastal upwelling in some regions (Smith, 1990). Variations in the intensity and location of ocean upwellings have been shown to have an influence on the relative production of coho salmon year classes (Nickelson et al, 1984). In the low latitudes the great ocean currents, including the Gulf Stream, may be reduced and the eddies thrown off by these currents may decline in frequency and size (Gucinski et al 1990). In the North Atlantic the eddy system formed by the frictional movements of the Labrador current, North Atlantic current, Irminger current and West Greenland current is of importance to Atlantic salmon (Reddin et al, 1984). The extent and position of high productivity sub-arctic surface gyres is of known importance to the salmon (Power, 1990). Cold southward flowing currents such as the Labrador current may intensify (Gucinski et al, 1990) and there may be less convective overturn in high latitudes (Anon, 1989). There is, however, considerable uncertainty about how ocean circulation will be affected making it difficult to predict

the impacts on marine fish until more is known about how climate will change on a regional basis (Smith, 1990).

5.8 Extreme events have been shown to have a major impact on critical life-history stages of marine fish populations and it is therefore important to know how climate change will influence the variability and frequency of extreme events in the ocean environment.

#### 6. <u>CONCLUSIONS</u>

6.1 Limitations in the data make it difficult to make detailed predictions about how climate change will affect aquatic ecosystems. A number of techniques for forecasting impacts have been used and these suggest that there may be drastic changes as a result of the predicted changes in climate. In the case of the Atlantic salmon there could be marked impacts on all stages of the life-cycle including distribution changes in freshwaters and the ocean with implications for management of the resource. The Council may therefore wish to be kept informed of developments in this field or to consider holding a Special Session on this topic in the future.

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ANNEX 24

# COUNCIL

# PAPER CNL(91)27

# SEA-RANCHING OF ATLANTIC SALMON

## SEA-RANCHING OF ATLANTIC SALMON

- 1. Sea-ranching of salmon may be defined as a system of aquaculture involving the release of reared juvenile salmon to marine waters, in which they migrate freely, with the intention of harvesting them when they reach marketable size. A number of other definitions have been used and these are contained in the attached review (Appendix 1). Although ranching and enhancement have often been used synonymously the principal objective of ranching is the harvest of released stock for food. The principal objective of enhancement is augmentation of the wild stock. The different forms of aquaculture are illustrated in the diagram overleaf.
- 2. Salmon ranching in the North Atlantic is presently on a pilot scale compared to the Pacific. The largest ranching programmes involving Atlantic salmon are those in the Baltic and in Iceland. However, following improvements in rearing techniques and changes in management measures in homewaters, prospects in the North Atlantic may be more favourable for ranching which might become an economic alternative to farming if an adequate return rate of released fish can be achieved.
- 3. Whereas farmed salmon are not subject to the NASCO Convention, unless they escape and migrate beyond areas of fisheries jurisdiction, ranched fish are released specifically to migrate freely and thus may become subject to the Convention.
- 4. Ranching involves the deliberate release of large numbers of reared fish and thereby poses a number of potential threats to the wild stocks. These include the possibilities of overfishing the wild stocks, since ranched and wild fish may occur in the same fisheries, of genetic impacts on the wild stocks and of impacts on the grazing capacity of marine waters.
- 5. In view of the expansion of salmon aquaculture through salmon farming the Council has already adopted a precautionary approach to the conservation of wild stocks and has taken a number of steps to minimise the threats to the wild stocks. The voluntary Code of Practice (CNL(91)25) being developed by the Council to safeguard the wild stocks applies to all forms of salmon aquaculture (i.e. enhancement, ranching and farming) and would address some of the potential threats posed by ranching. Other potential threats such as the possible overfishing of wild stocks and possible overgrazing are new and may also require to be considered if ranching does expand. The Council may therefore wish to give some more detailed consideration, at its Ninth Annual Meeting, to the prospects for the growth of salmon ranching and its impact on the work of NASCO.

Secretary Edinburgh 17 April 1991 increased. In its most distinctive form ranching involves the release of young fish to sea through ponds, enclosures or channels, to which they home on maturation and which then become the harvesting device (Thorpe, 1980a). There is, therefore, a total harvest of all fish returning to the release site. Thus, the objective of ranching is to produce a commercial harvest, and a variety of animal husbandry techniques, including selective breeding, may be used to reduce production costs and improve the quality of the product (Isaksson, 1988a). Salmon ranching may be conducted in the public sector by governments wishing to increase the number of fish available to fisheries or by entrepreneurs with exclusive harvesting rights at or near the release site (Saunders, 1982), although ranching in this form would not be legal, under existing legislation, in some countries (Larsson, 1982).

## 3. <u>STATUS OF SALMON RANCHING IN THE NORTH ATLANTIC</u>

- 3.1 Ranching of salmon in the North Atlantic can be considered to be on a pilot scale compared to operations in the Pacific (Isaksson, 1988a) where, for example, releases from hatcheries in the USSR alone are expected to increase to 5 billion juvenile salmon by the year 2000 (Konovalov, 1980). The largest ranching programmes presently being undertaken with Atlantic salmon are those in the Baltic and Iceland. At the beginning of this century the Baltic rivers produced about 7.3 million smolts (Larsson, 1980) but by 1987 this had declined to approximately 1 million smolts (Anon, 1988). In contrast, the quantity of hatchery reared smolts released into the Baltic doubled in the period 1979-87 to more than 5.5 million smolts in 1987 (Anon, 1988). Isaksson (1988a) believed that the future of Baltic sea ranching was bright provided that the countries involved could work out methods for sharing the smolt production costs.
- 3.2 In Iceland, sea fisheries for salmon have been forbidden for over 50 years and only terminal fisheries are allowed. In addition there is an abundant supply of warm water springs which facilitate the production of S1 smolts (Anon, 1986). Private salmon ranching has been a growing industry in recent years and because of the concentration of natural production of salmon in certain areas it should be possible to avoid conflict with natural salmon stocks (Isaksson, 1988a). In 1988 the production in Iceland from ranching was 160 tonnes (CNL(90)15). A review of the Report of Activities submitted to the ANACAT Committee of ICES (CNL(90)15) indicates that sea ranching occurs in several other North Atlantic countries but on a limited scale.
- 3.3 In recent years a number of developments have occurred which may favour the development of salmon ranching in the North Atlantic. One of the factors limiting commercial investment in ranching in some countries has been the risk of loss of fish to existing fisheries (Saunders; 1979; Thorpe; 1979). Salmon released into the North Atlantic as part of ranching programmes would be subject to the provisions of the Convention provided they migrate beyond areas of fisheries jurisdiction and Howarth (1989) refers to the favourable impact on ranching of the restrictions on marine fisheries outside territorial waters contained in the NASCO Treaty. Furthermore, a number of recent management measures have been introduced into homewater fisheries which have been designed to decrease the commercial catch of salmon and in some cases it is likely that these measures have resulted in improved escapement to freshwater (Anon, 1990). Such conditions may be favourable to an expansion of salmon ranching. Furthermore, as a result of the very rapid expansion of salmon

farming the industry has the capacity to produce smolts in vast numbers (eg the Norwegian industry has the capacity to produce approximately 200 million smolts a year). Salmon farming has also led to improved efficiency in smolt rearing methods which is vital to the development of economic and efficient methods of ranching (Thorpe, 1982). Thus, following improvements in Irish smolt husbandry techniques, which have enabled a high proportion of S1 smolts to be produced, a recent review considered that Ireland would now seem to be ideally suited for ranching (Anon, 1986). Given recent reports of some difficulties for the farming industry, including problems of disease and marketing (the latter influenced by environmental controversies surrounding the industry) it may be that ranching, where national legislation permits, would be more attractive since the costs of containment, feeding and other overheads are considerably greater in the marine phase of farming than in freshwater (Howarth, 1989).

# 4. POSSIBLE IMPACTS OF RANCHING ON THE WILD STOCKS

- 4.1 At its last two Annual Meetings the Council of NASCO has held Special Sessions on the Impacts of Aquaculture on the Wild Stocks. A number of concerns have been expressed about possible adverse effects of aquaculture on the wild stocks. The recent large scale expansion of aquaculture operations has been in salmon farming. Until the necessary research has been undertaken to fully assess these threats a precautionary approach to salmon management has been recommended and in accordance with this principle the Council has agreed a number of courses of action including consideration of a Voluntary Code of Practice to Minimise the Threats to the Wild Stocks (CNL(91)25). If ranching is to develop on a significant scale in the future the Council might wish to consider the possible adverse effects on the wild stocks.
- 4.2 A number of possible concerns have been expressed about the development of salmon ranching and the possible interactions with the wild stocks. These include the need to protect the wild stocks from overfishing; the genetic impact of ranched fish on wild stocks and the possibility that the capacity of the marine environment to support salmon may be exceeded by large scale releases of smolts (McNeil, 1980; Thorpe, 1979). However, a number of the environmental impacts associated with on-growing of salmon in marine waters, such as problems of disease and waste products, should not occur with ranching (Howarth, 1989). Ranching also has biological validity being a net producer of protein whereas farming is a net consumer of protein (Thorpe, 1980a).
- 4.3 Hatchery fish can withstand a much higher rate of exploitation than wild fish and concern has been expressed about the conservation of natural populations where wild and ranched fish intermingle in common property (McNeil, 1980) and mixed stock (Hansen, 1987) fisheries. For example, Hansen (1987) expressed concern that if an increased output of reared fish led to a higher fishing effort then natural salmon stocks may be over-exploited. Thorpe (1979) believed that over exploitation of wild stocks as a result of increased fishing following ranching could be avoided by exploiting on a stock basis together with artificial imprinting of ranched fish to permit their decoying as adults into separate harvesting devices.
- 4.4 A number of papers have previously been presented to the Council which have described the stock structure of Atlantic salmon and the possible impact of cultured

fish on these wild stocks. Variations in life history parameters exist between and within different river populations of salmon and some of these are interpreted as adaptations. There is evidence that fish produced in hatcheries may show marked changes in fitness and interactions could therefore be damaging to the wild stocks. There is evidence that a ranching stock evolves when hatchery reared smolts have been released from a ranching station over a few generations (Isaksson, 1985) and care is therefore needed in the choice of genetic material for ranching (Thorpe, 1979) and subsequently in broodstock management (Thorpe, 1988) to minimise effects on the wild stocks. Saunders (1979) believed that the best stock for ranching would be the native stock of the river in which the smolts will be released or one near to it. It is important for any ranched stock to have a minimal straying rate (Isaksson, 1988b) but where large scale ranching of smolts occurs (5-10 million smolts) a straying rate of only 1% could result in 5-10 thousand straying salmon which could concentrate in relatively few streams (Isaksson 1985). There is therefore an urgent need to find ways to minimise these effects such as using sterile stock or by introducing wild genes to the ranching stock to maintain genetic diversity (Isaksson, 1985).

- 4.5 The carrying capacity of the seas for salmon is largely unknown (Thorpe, 1979), and for a relatively scarce fish in marine terms the question of carrying capacity may seem unimportant (Thorpe, 1980c). However, McNeil (1980) considered it possible that artificial propagation of salmon will continue to expand at a rapid rate until the carrying capacity in Pacific waters is approached. Little is known about the grazing capacity of the Atlantic Ocean but Isaksson (1988a) believed that grazing conditions are unlikely to be a major limiting factor. In the waters around Iceland the total biomass of capelin (*Mallotus villosus*) is several million tonnes, and this resource is probably only utilised by some 100,000 salmon, a figure which could be increased into millions despite competition with a growing capelin fishery (Isaksson, 1980). Thorpe (1980b) pointed out that historically the Atlantic must have been able to support a considerably greater stock of feeding salmon and estimated that the annual loss of production from major European rivers by the beginning of this century must have been at least 40 million smolts.
- 4.6 In recent years, however, the numbers of salmon in the North Atlantic has probably been supplemented by the escape of farmed fish from sea cages. Increase in the salmon stock through ranching might lead to competition between salmon and other pelagic species (Isaksson, 1985). It is likely that any problems associated with marine grazing conditions will occur in coastal areas close to the point of release where the smolts will be concentrated (Isaksson, 1988a; Thorpe; 1980b) and suitable prey may be scarce (Isaksson, 1988a). Thorpe (1980a) concluded that it is probable that both the Pacific and Atlantic could sustain a greater production of salmonids but cautioned that the growth rate and maturation fluctuations evident in virtually all North Atlantic stocks require thorough study to ensure that augmentation is neither detrimental to the salmon nor to their environment (Thorpe, 1980b). Howarth (1989) considered the implications of large scale ranching programmes under international law. He speculated that if a nation developed ranching on a scale which amounted to an effective alternative to conventional methods of commercial fishing then it might be thought improper that the conservation motivated provisions of Article 66 of UNCLOS should be utilized to justify a disproportionate harvesting of living marine resources.

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ANNEX 25

# COUNCIL

# PAPER CNL(91)28

# INTERNATIONAL MANAGEMENT BY OTHER SALMON COMMISSIONS

## INTERNATIONAL MANAGEMENT BY OTHER SALMON COMMISSIONS

- 1. At the Seventh Annual Meeting of the Council the representative of Finland referred to the desirability of NASCO being fully aware of the problems and progress in international management by other fisheries Commissions dealing with salmon. It was agreed that the Secretary be asked to obtain such information for presentation to the Council.
- 2. In addition to NASCO, there are three other international fisheries Commissions dealing with salmon. These are the International Baltic Sea Fishery Commission established by the Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts, of 1973, with its headquarters in Warsaw, Poland; the International North Pacific Fisheries Commission established by the International Convention for the High Seas Fisheries of the North Pacific Ocean, of 1953, and with its headquarters in Vancouver, Canada; and the Pacific Salmon Commission established by the Pacific Salmon Treaty, of 1985, also with its headquarters in Vancouver, Canada.
- 3. It is undoubtedly valuable to be aware of both the progress and any problem areas of other organizations involved in the management of salmon, some of which have been in existence for longer than NASCO. For example, the Baltic Commission manages the same species as NASCO but production is dominated by ranching, an area considered in paper CNL(91)27. Information from these organizations, including their Conventions, Annual Reports and other publications, is now being reviewed and will be presented to the Council at its Ninth Annual Meeting.

Secretary Edinburgh 8 April 1991

## COUNCIL

# PAPER CNL(91)29

# ECONOMIC VALUE OF ATLANTIC SALMON

#### ECONOMIC VALUE OF ATLANTIC SALMON

- 1. The wild Atlantic salmon has many aspects to its economic value
  - its value as a prime food;
  - its contribution to the economy of countries dependent on fisheries;
  - its value to communities of commercial fishermen in other countries;
  - the value it adds to property;
  - its value as a source of tourism;
  - the creation of employment often in areas where it is difficult to create jobs;
  - the added value to businesses such as hotel, restaurants, tackle shops, gear manufacturing;
  - added business to transportation industries, airlines, car hire, fuel etc.
- 2. Expenditure associated with recreational fishing in Canada, Iceland, Ireland, Scotland and Wales amounts to about £190 million. This expenditure is often in areas where such economic benefits are difficult to produce. If we made the assumption that the expenditure estimates for these countries are typical, then it could be estimated that the total wild salmon stocks may generate about £300 million in economic benefits over the whole of the North Atlantic. These expenditures accrue in areas where such benefits are difficult to produce.
- 3. In addition the resource brings values which cannot be economically measured. The salmon helps to support the very existence of certain communities, for example in Greenland, and an economic value can hardly be placed on this. The fishery brings relaxation, recreation and enjoyment to thousands of people and this cannot be valued in money terms. The fact that salmon exist in the rivers and go about their migrations at sea gives pleasure to millions. We know that the salmon serves as a symbol of water purity to many people; they simply feel happier knowing that the salmon is there even if they have no interest in fishing. In short the salmon is one of the few species whose mystery exerts some hold on human imagination. None of these aspects can be valued in money terms.
- 4. This paper is intended simply to stress that the salmon has many aspects to its economic value and has some very important values that cannot be measured in money. Nevertheless the Council may wish to be kept in touch with current economic studies and a summary paper of some such work is attached and might be updated from time to time.

Secretary Edinburgh 13 May 1991

#### ECONOMIC VALUE OF ATLANTIC SALMON

### 1. INTRODUCTION

- 1.1 At its Seventh Annual Meeting the Council considered a report from the Secretary, CNL(90)6, which included details of a number of project areas that might be undertaken. These included a review of the economic value of Atlantic salmon.
- 1.2 The economic value of a particular use of a natural resource provides a monetary measure of a society's preference for that use. Within that society the individual's preferences are reflected in their willingness to pay for the product of that resource use (Radford and Hatcher, 1991). Assessing willingness to pay, however, is difficult, particularly where there is no market for that use and two main approaches have been used the travel cost method and the contingent valuation method (use of questionnaires to assess willingness to pay). In addition, however, there may be benefits to society resulting from a particular resource use which may not be reflected in assessment of willingness to pay such as "option value", "existence value" and "bequest motivation" (Radford, 1984). Studies to date have assessed the economic aspects of the recreational and commercial fisheries. However, there may be other economic impacts associated with Atlantic salmon.
- 1.3 The fact that salmon return to the rivers of their birth after extensive migrations creates interest and gives pleasure to many. The Romans christened the salmon "salar" (the leaper) and interest is created wherever the spectacular acrobatics of this fish are exhibited. To some the salmon serves as a symbol of water purity and people simply feel happier knowing that the salmon is there even if they have no interest in exploiting the resource. In short, the salmon is one of the few species whose mystery exerts some hold on human imagination and these facets of its value are hard to quantify in monetary terms. In addition, some communities are particularly dependent on the Atlantic salmon and it is hard to place a value on this. The recreational fishery brings relaxation and enjoyment to thousands of people and it is clear that the willingness to pay for this enjoyment is high. There may be benefits to society from this relaxation that are hard to assess.
- 1.4 It is clear that throughout the North Atlantic the salmon is a highly valued natural resource which generates economic impacts throughout its range. Economic value measures the value of the resource to society as a whole. Other economic aspects include the economic impacts of the resource on incomes and employment. In some cases there may be distributional impacts on a regional basis, but where visiting anglers from other countries are involved or where the product is exported the impacts may be of benefit to the national economy. This paper reviews the literature available on economic aspects of the Atlantic salmon. In many cases the studies have provided gross expenditure estimates associated with salmon fishing rather than an assessment of economic value. Gross expenditure can only provide an estimate of the fisherman's valuation of the trip since willingness to pay must at least be equal to actual expenditure (Mawle and Randerson, 1983). A number of techniques have been used to assess "economic value" but as no standard technique has been adopted comparisons between and even within countries are, therefore, difficult (Mills, 1989).

## 2. <u>CANADA</u>

- 2.1 The 1985 Survey of Sportfishing in Canada indicated that an estimated 55,400 "active" Atlantic salmon anglers spent \$39 million on recreational fishing. In addition \$72 million was invested on major durables and property in conjunction with these activities, of which almost \$45 million was attributable to salmon angling (Tuomi, 1987). Atlantic salmon anglers represented only 3% of all resident anglers on the Atlantic seaboard. In contrast, despite significantly higher licence fees and related costs, between a third and a half of all non-resident anglers fished for Atlantic salmon in Nova Scotia, Newfoundland and New Brunswick. Almost three-quarters of the non-resident fishermen in New Brunswick, Nova Scotia and Quebec were from the United States. 89% of all non-resident salmon anglers said that fishing for salmon was the main reason for their visit, and in Quebec 78% said they would not have visited the Province if there hadn't been any fishing opportunities. Salmon anglers estimated the market value of the sportfishing gear and equipment owned by them and members of their household solely for sportfishing to be \$121.9 million. Although this figure was only 6% of the total existing investment of all anglers on the Atlantic seaboard, it indicates what salmon anglers are prepared to forego in lieu of other uses of their money. Using an approximation that each \$40,000 in sales and expenditures creates a job, it was estimated that the recreational fisheries created the equivalent of about 2,090 person years of employment and the commercial salmon fisheries 163 person years of employment.
- 2.2 Two provinces in Canada - New Brunswick and Quebec - have kept their fisheries as private property, i.e. an individual or organization can own, buy, sell or lease the exclusive right to fish in freshwater either in conjunction with or separate from ownership of the underlying land. The various transactions that take place with respect to these properties provide direct market measures of what the fisheries are worth for management and investment purposes. The other three provinces converted their freshwater fisheries into common property - open for access to all residents. The generally lower, nominal licence fees paid by salmon anglers in these provinces do not provide a measure of the market values of the right to fish. Tuomi (1987) estimated that the public cost of salmon supply was estimated to be \$47 per fish in 1985. Charging the recreational fisheries for these costs would have an immediate effect on some anglers in the common property fisheries while in the private property fisheries the reaction would in many instances be minor. Tuomi (1987) believed that the effect of charging these costs to the economically marginal commercial fishery would be prohibitive.

#### 3. <u>DENMARK (FAROE ISLANDS AND GREENLAND)</u>

3.1 Kreiberg (1980) described the salmon fishery at West Greenland and included information on the economic value of the fishery to Greenland. In 1980, the salmon fishery was a substantial source of income to Greenland where the fishing industry accounts for 70% of the annual economy. Estimates by KNAPK (the fishermen's association) indicate that salmon fishing forms 30-35% of the annual income of a Greenlandic fisherman, and that 50% of the fishermen could not meet their current vocational and domestic expenses without the salmon fishery. Kreiberg (1980) concluded that in an economy so heavily based on fishery resources many people

other than fishermen depend on the salmon fishery for related income of gear and equipment sales and repair, shore processing and domestic needs.

## 4. <u>EUROPEAN ECONOMIC COMMUNITY</u>

## 4.1 UNITED KINGDOM - SCOTLAND

- 4.1.1 During 1981-1982 the Tourism and Recreational Research Unit (TRRU) of the University of Edinburgh undertook a study (Anon, 1982) of the economic value of sport salmon fishing in three areas of Scotland the Kyle of Sutherland (Rivers Carron, Cassley, Oykell and Shin), the Tay (between Perth and Meikleour) and the Spey (between Grantown and Ballindalloch). Because of limited resources the study was seen as a pilot exercise. Data was collected by both direct interview with the fishermen using a standard questionnaire and by completion of the questionnaire independently by the fishermen and the information obtained was used to establish the level of expenditure for the whole fishing trip, differentiated into that spent locally and that spent outside the study area. By surveying proprietors of fisheries nationally it was possible to obtain information on the total number of rod days let and hence an estimate of total expenditure for Scotland.
- 4.1.2 Despite the small size of the samples a number of general conclusions were drawn from the TRRU study:
  - (a) In the majority of cases fishing was the primary reason for the visit;
  - (b) In fishings near centres of population there were more day-trip fishers who contribute less to the local economy, there were more trips associated with business entertainment and residents of Scotland were more in evidence than in more distant fishings;
  - (c) The range of available accommodation affects the type of fishing parties and their effect on the economy;
  - (d) Fishermen using Association waters were "more like" the average holidaymaker, using a wide range of accommodation and encompassing holiday groups, many of whom were non-fishers.
- 4.1.3 Overall the average amount spent locally per rod day on the private beats ranged between £69-£92 and the amount spent non-locally ranged between £19-£25. The major expenditure was on accommodation and permits. Those using the Fishing Association Waters spent considerably less with an average per rod day of £31 spent locally and £12 spent outwith the area. Accommodation was the major item of expenditure and spending in shops and restaurants exceeded that on the permit. When these figures were grossed up the overall expenditure by sport salmon fishermen in Scotland was estimated to be between £22 million £46 million at 1982 prices.
- 4.1.4 Stansfeld (1989) pointed out that, as recognised in the report, the sampling locations chosen included some of the most famous salmon angling beats in the world and questioned the use of the data for extrapolation to the whole of Scotland. This information had been used as evidence in favour of the proposition that a rod-caught salmon is of greater value to the Scottish economy than a net-caught one. Stansfeld (1989) adjusted the data obtained by the TRRU study and considered three scenarios in which angling was abolished, netting was abolished and the existing combination

of both was maintained. In the first scenario in which only netting was practised the value of salmon fishing to the Scottish economy was estimated to be £21 million. In the situation where only angling occurred the value to the Scottish economy was assessed to be £26.5 million and in the situation where both netting and angling continued the value to the Scottish economy was assessed to be £27 million.

- 4.1.5 A more recent survey of the economic importance of salmon fishing and netting in Scotland was conducted during 1988-1989 for the Scottish Tourist Board and the Highlands and Islands Development Board (Anon, 1989). The methodology consisted of face to face interviews with anglers, proprietors, netting operations and hotels and other businesses in the case study areas together with questionnaires for anglers, proprietors, netting operations and hotels and other businesses throughout Scotland. Ten case study rivers/areas were chosen - Thurso, Lewis and Harris, Conon, Orkney, Spey, Dee, Tay, Loch Lomond area, Nith and Tweed.
- 4.1.6 The results of the survey indicated that the majority (97%) of anglers were from within the UK (57% from England and Wales) and that the average length of holiday was significantly higher than for all holiday trips in Scotland. The most popular type of holiday group comprised family or friends (or both). The majority of visitors (98%) stated that fishing was the sole or main reason for their decision to visit Scotland, and 98% said they would return to Scotland to fish indicating a very high degree of satisfaction. Despite this, 91% thought that the quality of the angling could be improved.
- 4.1.7 From the anglers' questionnaires, average daily expenditure figures of £117.26 for visiting anglers and £32.14 for day anglers were derived. Substantial differences existed among the case study rivers ranging from £155.73 in Lewis and Harris to £21.11 in the Loch Lomond area. The main items of expenditure were fishing permits, accommodation, meals and travel. For the case study areas the average daily expenditure figures were multiplied by the number of rod days and adjusted for expenditure not spent locally and multiplier effects. In this way an estimate of total expenditure in 1988 in the ten case study areas of £22.7 million was derived. Three rivers, the Spey, Dee and Tay, accounted for 80% of this total. Grossing up this figure produced a total expenditure on angling of £50.4 million in Scotland, supporting 3,360 jobs on a full time equivalent basis. A survey of netting operations indicated that the total revenue of the netting industry was £1.8 million with the creation of 390 full-time job equivalents. Catches, revenue and employment in the netting sector had all decreased in the three years prior to the report because of a reduction in netting operations, lower catches and lower prices because of competition from farmed salmon.
- 4.1.8 The report also considered ways of increasing the economic benefits and concluded that growth in the number of rod days, average daily expenditure or multiplier effects would result in economic benefits. However, since the study indicated that the vast majority of anglers said they would return to Scotland to fish again the authors believed that there was not much wrong with salmon angling as a "tourist product".

## 4.2 UNITED KINGDOM - ENGLAND AND WALES

- 4.2.1 Mawle and Randerson (1983) examined the economic aspects of recreational fishing in South Wales for two contrasting rivers - the Usk and the Taff. The river Taff does not contain Atlantic salmon. Their survey involved circulation of questionnaires by post to 13750 of the 18600 anglers who had purchased rod licences for the areas concerned in 1978. Although a return rate of 52% was achieved it was considered too low to disregard the possibility of non-response bias and investigation suggested that anglers of higher socio-economic status might have been over-represented.
- 4.2.2 The survey indicated that the vast majority of trips (94%) were made to the rivers with the sole purpose of fishing. On the Usk the majority of anglers were from Wales although salmon fishing trips had a higher proportion of non-Welsh anglers (1 in 5) than trout or coarse fishing trips. The study indicated that gross expenditure at 1978 prices by salmon anglers on the river Usk amounted to £84,000, considerably less than the expenditure on brown trout (£128,000). However, gross expenditure only gives a minimum estimate of the anglers' valuation of the fishing trips since willingness to pay must at least be equal to actual expenditure.
- 4.2.3 Mawle and Randerson (1983) also examined the social class structure of Usk salmon and trout anglers which was found to differ significantly from that of all economically active males in England and Wales due to the small proportions of manual workers (skilled and unskilled) in these groups of anglers. The difference in social class structure was most marked in salmon anglers with 52% of those involved coming from professional, managerial and executive classes.
- 4.2.4 Angling may be of value to tourism and expenditure by non-Welsh anglers was estimated to be £76,000 for salmon and £54,000 for trout. These totals do not include expenditure on accommodation which on the neighbouring river Wye constituted 20% of total expenditure. The study also indicated that over 100 hours fishing or 16 trips were required to catch one salmon from the Usk.
- 4.2.5 Radford (1984) undertook an assessment of the economics and value of recreational salmon fisheries in England and Wales for the rivers Wye, Mawddach, Tamar and Lune. The principal components of salmon angling net value were considered to be consumer's surplus and economic rent. Consumer's surplus has been defined as the difference between the amount consumers would be prepared to pay for something and what they are actually required to pay for it (Radford and Hatcher, 1991). Economic rent is defined as payments received by fishery owners in excess of those required to cover the costs of any materials and labour used to "run" the fisheries (Radford and Hatcher, 1991). A number of techniques have been used to estimate the willingness to pay of anglers including the travel cost method and the contingent valuation method (questionnaire method). Radford (1984) concluded that the travel cost method was the most appropriate technique for assessing consumer's surplus. A capitalised value for economic rent was calculated by subtracting from the market value of the fishing rights a capitalised value of the net costs of the salmon angling activity.
- 4.2.6 On the basis of a discount rate of 10% and a time horizon of 10 years applied to consumer surplus Radford (1984) estimated the total net economic value of recreational fishing at 1984 prices to be:

River Wye	£28,716,000
River Mawddach	£4,910,000
River Tamar	£15,886,000
River Lune	£ 2,397,000

It was concluded that salmon fisheries are extremely valuable national assets. Expenditure estimates have often been used to value salmon fishing and Radford (1984) believed that this was in part due to the lack of availability of net value estimates. However, he noted that even when net value estimates are produced the actual expenditures of anglers are generally treated with greater significance since these figures are invariably more impressive and easily understood.

4.2.7 A recent study by Radford and Hatcher (1990) estimated that the total net economic value of the recreational salmon fisheries in the Welsh National Rivers Authority region was almost £30 million at 1988 prices. Cross sectional analysis of data on rod fisheries throughout England and Wales predicted that a 10% overall increase in average catch would, other things being equal, produce a 5.5% increase in net economic value. Total expenditure by visiting anglers on goods and services (other than travel) in the Welsh region was estimated to be approximately £2.4 million.

## 4.3 IRELAND

- 4.3.1 Studies carried out in the early seventies and in 1982 (described in Whelan and Whelan, 1986) estimated the value of the Irish salmon industry to be IR £11.5 million and IR £8.72 million respectively (both at 1982 prices). Angling accounted for 34% of the value in 1970 and 57% of the value in 1982, even though it accounted for less than 6% of the catch. It was estimated that commercial fishing employed about 1100 full-time job equivalents and angling 500. A marginalised model indicated that in 1974 each additional salmon allocated to recreational exploitation was worth £2.81 as opposed to £2.45 for each additional salmon allocated to commercial exploitation, i.e. a margin of 15% in favour of recreational exploitation. Re-estimating at 1982 prices gave a margin of 38% in favour of recreational exploitation.
- 4.3.2 Whelan and Marsh (1988) reported on an economic evaluation of Irish angling conducted in 1986, using the Economic Impact Approach, i.e. it attempted to value the angling resources by reference to the income and employment generated.
- 4.3.3 In 1986, 54,000 visiting anglers went to Ireland with the main purpose of fishing. 9,000 of these were salmon and sea-trout fishermen. The most common means of transport was car and the average duration of fishing trips was 10 days. Over half of the bed nights were in farmhouses or guesthouses. Over one third of the visiting anglers thought that the fishing had deteriorated since their previous visit and excessive commercial netting was the most frequently mentioned reason. Overall expenditure per angler amounted to just over £500 with the main items of expenditure being accommodation, meals and travel. Based on these figures the total expenditure by visiting anglers was estimated to be about IR £28 million with some IR £12.6 million attributable to game fishermen.
- 4.3.4 It was estimated that of the 122,000 anglers in Ireland 81,000 were game anglers. Most anglers had been fishing for at least 5 years with an average investment of

IR £1,029 on rods, tackle, equipment and caravan/holiday homes etc. On average anglers fished about 30 days per year mainly on local waters. Some 29% of all anglers made trips involving an overnight stay. About 80% of Irish anglers believed the quality of angling had deteriorated since they first started fishing with pollution being the most commonly mentioned reason. Over-netting was also frequently mentioned. Irish anglers spent an annual average of IR £100 on costs associated with day trips while those on overnight trips spent on average IR £302. The total expenditure of all kinds by Irish anglers was estimated to be IR £29 million of which IR £16 million was by game anglers.

4.3.5 The total value of game fishing was therefore estimated to be about IR £28.3 million. The total value of Irish angling was expected to be IR £57.2 million. It was also estimated that non-specialist angler expenditure would add a further IR £6.9 million and commercial catches a further IR £8million giving a total of IR £72 million, which slightly exceeds the total value of all commercial sea-fish landed in Ireland in 1986. It was estimated that angling generated some 1900 full-time job equivalents and direct tax revenue of IR £15 million from VAT, excise duty etc.

## 5. <u>ICELAND</u>

- 5.1 Mills (1989) stated that no detailed economic evaluation of the salmon resource in Iceland is available but quoted estimates made by the Institute of Freshwater Fisheries in Reykjavik which indicated that the value of commercial netting, ocean ranching and angling was IsKr 215 (approximately £3.6 million) at 1986 prices. Mills (1989) also quoted the average rental price for 21 Icelandic rivers in 1985 as IsKr 2.83 million (£47,000) and the average price of each rod-caught salmon as IsKr 5300 (£88).
- 5.2 A recent study of salmon angling in Iceland has indicated that there is a total of 31,000 rod days available for angling of which 5000 rod days (16%) are taken by visiting anglers, principally from the US, Britain, Spain, France, Italy and Scandinavia (Gudbransson, 1990). Total expenditure on permits to fish amounts to £6.5 million with visiting anglers contributing £2.5 million. Overall expenditure on salmon angling in Iceland may amount to £15-20 million (Tomasson, personal communication).

## 6. <u>NORWAY</u>

- 6.1 Recreational fishing is one of the most popular leisure activities in Norway with 26.5% of the Norwegian population (over 15 years of age) participating (Navrud, 1991). 1.5 million person days annually are spent fishing for Atlantic salmon and seatrout. In addition, it has been estimated that 56,500 foreign anglers visited Norway in 1977 and this was believed to be a minimum estimate.
- 6.2 Navrud (1991) believed the primary social benefits of recreational fishing for salmon included net revenues from selling licences, the recreational value of fishing, reduced social costs of health care as a result of health effects of recreational fishing and the value of hard currency from foreign anglers. Secondary effects include benefits from revenue injected into the local economy. The value of recreational salmon fishing in four Norwegian rivers, including net revenues from fishing licences to the owners, was estimated to be (1991 prices):

River Gaula River Vikedalselva River Stordalselva River Audna NOK 17,225,000 (£1.5 million) NOK 698,755-1,011,990 (£60,700-88,000) NOK 715,780-936,020 (£62,200-81,400) NOK 654,780 (£57,000)

### 7. <u>CONCLUSIONS</u>

- 7.1 Assessing the many facets of the economic value of the Atlantic salmon is complex. Many of the studies detailed in this review have relied on an assessment of the gross expenditure associated with a particular use of the resource, principally the recreational fisheries. Such estimates can only provide an estimate of willingness to pay which must at least be equal to actual expenditure (Maule and Randerson, 1983). However, in the case of salmon angling the higher the total expenditure the smaller may be the net economic value to society (Redford and Hatcher, 1991). As has been stated earlier, there are many facets to the value of the Atlantic salmon and the economic impacts associated with these remain to be assessed.
- 7.2 Nevertheless it is clear from the information available that the Atlantic salmon is an extremely valuable resource which generates economic impacts on both a regional and national basis. By making crude adjustments to 1990 prices the recreational fisheries in Canada, Ireland, Iceland, the UK (Scotland and Wales) alone may generate expenditure of around £190 million. The economic impact of this expenditure may be greater because of multiplier effects. Furthermore, visiting anglers from outside a particular country may have an impact on the national economy. Some national economies are particularly dependent on fisheries and salmon may make a significant contribution to these economies. In addition to national impacts there may be marked distributional impacts within a country. Salmon fishing may be located in remote communities with limited employment opportunities and these communities may be particularly dependent on the economic benefits generated by these fisheries.
- 7.3 It is clear from a review of the literature that the information provided by economic assessment of salmon fisheries has often been cited in resource allocation issues. The values presented, however, are total values and are of limited predictive value unless there is a complete demise of the fishery concerned. If this is not a realistic prospect then total values are not very useful and it is more informative to have some idea of the sensitivity of total values to changes in production (Radford and Hatcher, 1991).

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## ANNEX 27

# COUNCIL

# PAPER CNL(91)46

## PRESS RELEASE

#### PRESS RELEASE

The North Atlantic Salmon Conservation Organization addressed the problem of fishing for salmon by non-contracting Parties in international waters within the Convention area north of the Faroe Islands during its Eighth Annual Meeting in Edinburgh. Last year at its meeting in Helsinki the Organization adopted a resolution calling for diplomatic action to stop this fishery which was threatening to undermine its conservation measures. These diplomatic efforts had succeeded in producing cooperation in the form of new regulations from one non-contracting Party which required its fishing vessels to comply with the NASCO prohibitions. NASCO agreed to continue its diplomatic initiatives and to explore the possibility of further action.

NASCO has been concerned for some time by the risks to wild salmon stocks posed by salmon aquaculture and also those which may be posed by sea-ranching. The Organization adopted a set of guidelines to minimise the threats to wild stocks for use by its Members on a voluntary basis.

Several NASCO Members expressed serious concern regarding the possible decline in some salmon stocks. Considerable time was spent by Members in an effort to find a means of more precisely defining the nature of the problem.

A new private initiative to pay compensation for not fishing NASCO quotas was the subject of some debate.

The North-East Atlantic Commission achieved success in reaching agreement on a quota for the Faroe Islands fishery for 1992. This agreement involved establishing a quota of 550 tonnes with significant reductions in the number of licences issued, the number of fishing days permitted and the fishing season.

The North American Commission did not complete its business and recessed its meeting for consideration of further issues.

The West Greenland Commission was unable to agree on a regulatory measure for 1991 so there will not be a NASCO measure in force in that Commission area. The Commission discussed at length the nature and scope of the advice it requests annually from the International Council for the Exploration of the Sea. It decided to seek specific advice on methods for establishing the abundance of stocks and possible catch levels in the West Greenland fishery.

NASCO also considered a range of other subjects relevant to salmon including the impacts of climate change on salmon stocks, the economic value of Atlantic salmon and the expansion of sea-ranching in the North Atlantic.

NASCO agreed to respond to a request from the United Nations concerning the use of large scale pelagic driftnets.

NASCO operates a Tag Return Incentive Scheme to encourage the return of scientific tags applied to salmon. Prizes range from \$100-\$2500 and the President of the Organization,

Allen E Peterson (Jnr), announced that the winner of the Grand Prize was Ms Hanne Bitsch, Hirtshals, Denmark.

The Organization will hold its next Annual Meeting in Washington DC, during 8-12 June 1992.

#### ANNEX 28

## LIST OF COUNCIL PAPERS

- Paper No. Title
- CNL(91)1 Provisional Agenda
- CNL(91)2 Draft Agenda
- CNL(91)3 Explanatory Memorandum on the Draft Agenda
- CNL(91)4 Proposed Schedule of Meetings of the Council and Commissions of NASCO
- CNL(91)5 Secretary's Report
- CNL(91)6 Audited Accounts for 1990
- CNL(91)7 Contributions by the Parties
- CNL(91)8 Outline of 1992 Draft Budget and 1993 Forecast Budget
- CNL(91)9 Report of the Finance and Administration Committee
- CNL(91)10 Report of the ICES North Atlantic Salmon Working Group
- CNL(91)11 Report of the ICES Advisory Committee on Fisheries Management
- CNL(91)12 Returns under Articles 14 and 15 of the Convention
- CNL(91)13 Progress Report on Laws, Regulations and Programmes
- CNL(91)14 Catch Statistic Returns by the Parties
- CNL(91)15 Historical Catch Record 1960-1990
- CNL(91)16 Comparability of Catch Statistics
- CNL(91)17 Assessment of Unreported Catches
- CNL(91)18 Reducing the Level of Unreported Catches
- CNL(91)19 Fishing for Salmon in International Waters by Non-Contracting Parties
- CNL(91)20 Report of the Meeting of the Working Group on the Purchase of NASCO Quotas

<u>Paper No.</u>	<u>Title</u>
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- CNL(91)21 Outline of Options for Quota Purchase
- CNL(91)22 Summary of Microtag, Finclip and External Tag Releases in 1990
- CNL(91)23 NASCO Tag Return Incentive Scheme
- CNL(91)24 Database of Salmon Rivers flowing into the NASCO Convention Area
- CNL(91)25 Advisory Code of Practice to Minimise the Threats to Wild Salmon Stocks from Salmon Aquaculture
- CNL(91)26 Climate Change and Salmon Stocks
- CNL(91)27 Sea-Ranching of Atlantic Salmon
- CNL(91)28 International Management by Other Salmon Commissions
- CNL(91)29 Economic Value of Atlantic Salmon
- CNL(91)30 Report of the Activities of the Organization in 1989-1990 (for publication)
- CNL(91)31 Report on the Activities of the North Atlantic Salmon Conservation Organization in 1990 (not for publication)
- CNL(91)32 United Nations Resolution on Large Scale Pelagic Driftnet Fishing
- CNL(91)33 Dates and Places of 1992 and 1993 Meetings
- CNL(91)34 Draft Report of the Eighth Annual Meeting of the Council
- CNL(91)35 Draft Press Release
- CNL(91)36 NASCO Tag Return Incentive Scheme 1991 Grand Prize
- CNL(91)37 Draft Decision of the Council on Working Capital
- CNL(91)38 Figures from the Chairman of the ACFM's Presentation to the Council
- CNL(91)39 Draft Protocol to the Convention for the Conservation of Salmon in the North Atlantic Ocean, Tabled by Canada
- CNL(91)40 Draft Protocol to the Convention for the Conservation of Salmon in the North Atlantic Ocean, Tabled by the United States of America
- CNL(91)41 Agenda
- CNL(91)42 Decision of the Council on Working Capital

Paper No.	Title
CNL(91)43	1992 Budget and 1993 Forecast Budget
CNL(91)44	Draft Decision of the Council to Request Scientific Advice from ICES
CNL(91)45	Report of the Eighth Annual Meeting of the Council
CNL(91)46	Press Release
CNL(91)47	Guidelines to Minimise the Threats to Wild Salmon Stocks from Salmon Aquaculture
CNL(91)48	Decision of the Council to Request Scientific Advice from ICES

<u>NOTE:</u> This list contains all papers submitted to the Council prior to and at the meeting. Some, but not all, of these papers are included in this report as annexes.