2009

REPORT OF THE TWENTY-SIXTH ANNUAL MEETING OF THE COUNCIL

Molde, Norway

2-5 JUNE 2009

President:	Mr Arni Isaksson (Iceland)
Vice-President:	Ms Mary Colligan (USA)
Secretary:	Dr Malcolm Windsor

CNL(09)52

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Report of the Twenty-Sixth Annual Meeting of the Council of the North Atlantic Salmon Conservation Organization
Rica Seilet Hotel, Molde, Norway
2-5 June, 2009

1. Opening Session

1.1 The President, Mr Arni Isaksson, opened the meeting. A welcoming address was made by Ms Heidi Sørensen, State Secretary of the Ministry of the Environment, Norway (Annex 1). The County Governor of Møre Og Romsdal, Mr Ottar Befring, welcomed delegates to Molde (Annex 2). The President thanked the State Secretary and the County Governor for their welcomes and made an Opening Statement on the work of the Organization (Annex 3).

1.2 The representatives of Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway, the Russian Federation and the United States of America made Opening Statements (Annex 4).

1.3 An Opening Statement was made by the representative of the European Inland Fisheries Advisory Commission (EIFAC) (Annex 5). A written statement was distributed by the North Atlantic Marine Mammal Commission (NAMMCO).

1.4 A past president of NASCO (1992 – 1996), Mr Børre Petterson, also made a statement (Annex 6).

1.5 An Opening Statement was made on behalf of all the Non-Government Organizations (NGOs) attending the Annual Meeting (Annex 7).

1.6 The President expressed appreciation to the Parties and to the observer organizations for their statements and closed the Opening Session.

1.7 A list of participants is given in Annex 8.

2. Adoption of Agenda

2.1 The Council adopted its agenda, CNL(09)46 (Annex 9).

3. Financial and Administrative Issues

3.1 Report of the Finance and Administration Committee

The Chairman of the Finance and Administration Committee, Dr Boris Prischepa (Russian Federation), presented the report of the Committee, CNL(09)5. On the recommendation of the Committee, the Council took the following decisions:

(i) to accept the audited 2008 annual financial statement, FAC(09)2;

(ii) to authorise the Secretary to use up to US$48,000 (approximately £32,000) from the Working Capital Fund to purchase salmon in support of the SALSEA West Greenland Extended Sampling Programme in the event that this was the preferred option for obtaining the samples;

(iii) to adopt a budget for 2010 and to note a forecast budget for 2011, CNL(09)38 (Annex 10). *[Note: Following the decision by Iceland to withdraw from NASCO on financial grounds the Schedule of Contributions was revised following consultations among Heads of Delegations. The revised Schedule of Contributions has been annexed.];*

(iv) to appoint PricewaterhouseCoopers (PWC) of Edinburgh as auditors for the 2009 accounts, or such other company as may be agreed by the Secretary following consultation with the Chairman of the Finance and Administration Committee;

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

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

4. Scientific, Technical, Legal and Other Information

4.1 Secretary's Report

The Secretary made a report to the Council on the status of ratifications of, and accessions to, the Convention and membership of the Commissions. He reported on fishing for salmon in international waters by non-NASCO Parties. There had been no sightings during the year since 1 April 2008 but surveillance is limited to the summer months. He also reported on inter-sessional activities.

In accordance with Financial Rule 5.5, the Secretary reported on the receipt of contributions for 2009. All contributions had been received and there were no arrears.

The Secretary reported (CNL(09)6) that since the last Annual Meeting of the Council, two new non-government organizations had been granted observer status: the Irish Seal Sanctuary, Ireland; and the Northwest Atlantic Marine Alliance, USA. In total, NASCO currently has 35 accredited NGOs.

4.2 Report on the Activities of the Organization in 2008

In accordance with Article 5, paragraph 6 of the Convention, the Council adopted a report to the Parties on the Activities of the Organization in 2008, CNL(09)7.

4.3 Announcement of the Tag Return Incentive Scheme Grand Prize

The President announced that the winner of the $2,500 Grand Prize was Mr John Chaffey, Lewisporte, Newfoundland. The Council offered its congratulations to the winner.

On the recommendation of Standing Scientific Committee, the Council agreed to extend the scope of the Tag Incentive Scheme to include all tags returned in the West Greenland Commission area from the 2010 awards. The Secretary was asked to amend the rules of the scheme accordingly.

4.4 **Scientific Advice from ICES**

The representative of ICES presented the report of the ICES Advisory Committee (ACOM) to the Council, CNL(09)8 (Annex 11). The ICES presentations to the Council and Commissions were tabled, CNL(09)44.

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

The Secretary reported to the Council, CNL(09)36, that there had been two applications to conduct scientific research fishing since the last annual meeting. These applications were from Canada and Iceland and had been approved by the Heads of Delegations prior to the Annual Meeting. Last year, the Council had also approved an application from the SALSEA-Merge project to conduct scientific research fishing in 2008 and 2009. Detailed reports on scientific research fishing conducted during 2008 were made to the IASRB.

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

The report of the meeting of the Board, CNL(09)9 (Annex 12), was presented by its Chairman, Dr Ken Whelan (European Union). He reported on the first year of the SALSEA Programme which had been very successful. He reported that the Board had: updated its inventory of research related to salmon mortality in the sea; received advice from its Scientific Advisory Group including recommendations on research and workshops that might be supported by the Board; and had considered a range of financial and administrative matters. The Chairman's presentation is contained in document, CNL(09)47. He stated, however, that in spite of the success of the programme, the Board had very little funding. The Board had set up a small group to identify new funding sources.

The representative of Canada congratulated Dr Whelan on his presentation and indicated that opportunities to use this to promote SALSEA outside NASCO should be explored. He referred to the progress of SALSEA-North America which had involved investment and resources from various user groups. He thanked the US for their partnership in the post-smolt surveys and indicated that acoustic tagging projects were generating some interesting results.

The representative of the NGOs indicated that the SALSEA programme was delivering some very exciting results. He suggested that advocates for SALSEA might be appointed to promote the research programme with potential funders. He stressed that it would be very important to identify the management implications of the findings.

The Secretary referred to the 'Salmon Summit' planned for 2011. This would be the culmination of the SALSEA Programme and would cover not only the scientific findings but also the management implications. He confirmed that the programme had generated more than 100 times the original investment by NASCO but that funds are now very low.

4.7 Report of the Standing Scientific Committee

The Chairman of the Standing Scientific Committee, Dr Peter Hutchinson, presented a draft request to ICES for scientific advice. Upon the recommendation of the Committee, the Council adopted a request for scientific advice from ICES, CNL(09)10 (Annex 13).

5. Next Steps for NASCO

5.1 Special Session: Progress with the Next Steps Strategy

(a) Final Report of the Fisheries Management Focus Area Review Group

Focus area reports (FARs) are intended to provide in-depth assessments of the actions taken on the particular focus area under consideration and provide a basis for review of the actions taken and their efficacy in achieving NASCO's objectives. The first focus area is the management of salmon fisheries.

The Council had established an *Ad Hoc* Review Group to review and analyse the fisheries management FARs and highlight issues to be raised with the Parties and jurisdictions. This work was provided to the Council in the Group's interim report, CNL(08)13, and presented at a Special Session in 2008. The Group was then asked to complete its work by assessing the extent to which the information provided in the FARs indicates that NASCO's goals are being, or will be, achieved and by suggesting additional actions to ensure the consistency of fisheries management efforts with NASCO's agreements and by preparing a comparative overview of the FARs highlighting best practice and challenges and approaches to addressing these challenges in the management of salmon fisheries.

The final report of the Fisheries Management Focus Area Review Group, CNL(09)11 (Annex 14), was presented in a Special Session and there was considerable discussion of the findings. The Group had completed its Terms of Reference. Fisheries Management FARs had been received from Canada, IP(08)9rev; Denmark (in respect of Greenland), IP(08)7rev; EU - Denmark, IP(08)12; EU - Finland, IP(08)3; EU - Ireland, IP(08)13; EU - UK (England and Wales), IP(08)5rev; EU - UK (Northern Ireland), IP(08)4; EU - UK (Scotland), IP(08)2rev; Iceland, IP(08)10; Norway, IP(08)11; the Russian Federation, IP(08)8; and the USA, IP(08)6. A compilation of Fisheries Management FARs is contained in CNL(09)13 (available on CD). It is clear from the Group's assessments that while enormous progress has been made in managing fisheries some challenges remain.

No FARs were available to the Group from six jurisdictions and this jeopardizes the success of the review process. After the Review Group's report had been completed, and prior to the Annual Meeting, a fisheries management FAR was received from EU

- Sweden, IP(08)25. A paper was tabled on Salmon Fisheries and Salmon Stocks in France, CNL(09)31. A paper on Management of Salmon Rivers in Quebec, CNL(09)40, was tabled for information.

The Group had recommended to the Council that it consider formally adopting guidance on best practice, IP(08)23, as a way of providing clarification for NASCO's guidelines, agreements and definitions relating to fishery management. If the Council decided not to adopt the guidance, the Group had recommended that the Council revisits the guidelines, agreements and definitions with a view to clarifying ambiguities, contradictions and lack of clarity so that management can be based upon clearer principles and in order to facilitate the work of subsequent Groups reviewing the FARs on the management of salmon fisheries.

(b) Draft Report of the Habitat Protection, Restoration and Enhancement Focus Area Review Group

The interim report of the *Ad Hoc* Focus Area Review Group on Habitat Protection, Restoration and Enhancement was presented, CNL(09)12 (Annex 15). The Group had been asked to review and analyze the Focus Area Reports on Protection, Restoration and Enhancement of Habitat and prepare a report which identified common challenges and common management and scientific approaches to these challenges, as reported in the FARs; which compiled recommended best practice with the intention of increasing the collaborative learning aspect of the 'Next Steps' process; and which provided recommendations and/or feedback for each FAR where additional actions may be helpful to ensure consistency with the NASCO 'Plan of Action'.

The Group had reviewed and analysed the FARs and had provided feedback to the Parties and jurisdictions on additional actions. FARs had been reviewed for Canada, IP(09)3; EU – Denmark, IP(09)12; EU - Finland, IP(09)4; EU - Ireland, IP(09)10; EU - UK (England and Wales), IP(09)5; EU - UK (Northern Ireland), IP(09)14; EU - UK (Scotland), IP(09)8; Iceland, IP(09)6; Norway, IP(09)11; the Russian Federation, IP(09)13; and the USA, IP(09)7. A compilation of Habitat Protection, Restoration and Enhancement FARs is contained in CNL(09)13 (available on CD). All FARs and the Implementation Plans have been made available on the website. The Group had noted with concern the absence of FARs for a number of jurisdictions.

The Group presented its interim report during the Special Session and there were subsequent discussions. Prior to the Annual Meeting a habitat FAR had been received from EU(Sweden), IP(09)19.

(c) Progress in implementing a Public Relations Strategy

In 2007, the Council had received a report from its Public Relations Working Group, CNL(07)16. This Group had proposed that the initial priorities were to redevelop the IASRB and NASCO websites and to develop an annual 'State of the Salmon' report for media purposes. Last year, in order to progress this issue the Council established a PR Sub-Group that met during the Annual Meeting under the Chairmanship of Mr Chris Poupard, Chairman of the NGOs, with the following objectives:

- to propose a structure and contents for the 'State of Salmon' report on NASCO's website taking into account the elements recommended in CNL(08)14 and any additional components recommended;
- to propose the 'Next Steps' on a Communications Strategy.

A report on the Sub-Group's activities since last year was presented by its Chairman. This included a report by the Assistant Secretary on progress with development of the NASCO and IASRB websites. Since the last meeting the NASCO website had been redeveloped and further improvements had been made to the IASRB website. The Council welcomed the excellent progress made in improving these websites. Mr Poupard proposed that the priorities for the coming year would be to complete the website development, including incorporating the rivers database information, and to progress the 'State of the Salmon' report. The Council welcomed the progress made in redesigning the NASCO website and agreed that it should be launched at the end of June and further developed during the year by including information from the rivers database. The Council asked that the PR Group continue its work on developing a network of media contacts in the Parties and in identifying PR opportunities over the coming year. The PR Sub Group was also asked to develop a press release from the meeting.

5.2 **Decisions by the Council in the light of the 'Next Steps for NASCO' Special Session**

Management of Salmon Fisheries

The Council appointed a group under the Chairmanship of Ted Potter (European Union) to review the *Ad Hoc* Review Group's 'NASCO Guidance on Best Practice for the Management of Salmon Fisheries'. Mr Potter introduced document CNL(09)41 'NASCO Guidelines for the Management of Salmon Fisheries' which comprised ten key elements. After some revision, this document was adopted by the Council, CNL(09)43 (Annex 16). The representative of the NGOs indicated that he believed that the changes to the document represented a missed opportunity. While it is not a bad document, the Implementation Plans and FARs are a key element of the 'Next Steps' process and the NGOs, therefore, believed that the document should have been much more aspirational in nature.

Habitat Protection, Restoration and Enhancement

The President indicated that as there had been no specific comment on the Habitat Review Group's findings to date, it will continue with its work and report to the Council by the end of the year and at a Special Session in 2010.

The Council agreed that focus area reports on fisheries management and habitat protection, restoration and enhancement would be accepted if submitted to the Secretariat before 1 September 2009 and, where possible, would be reviewed.

Aquaculture and Related Activities

At its Twenty-Fifth Annual Meeting, the Council had developed draft Terms of Reference, CNL(08)37, for the third focus area, aquaculture and related activities, and agreed that any comments on these should be forwarded to the Secretariat by 1 April 2009. Any revisions to the Terms of Reference would then be issued prior to the 2009 Annual Meeting. The Secretary reported, CNL(09)15 (Annex 17), that no changes had been received from the Parties. The Council agreed with the recommendation of the Task Force to incorporate its Draft Guidance on Best Management Practices in the Terms of Reference for the FARs.

The President indicated that he believed that the Aquaculture Review Group should have the same composition as the previous two Groups and as laid down in the 'Guidelines for the Preparation of Implementation Plans and Reporting on Progress' adopted by the Council, NSTF(06)10. He suggested the NASCO representatives should be from Norway as the world's leading producer of both wild and farmed salmon, from Canada as the North American representative and from Denmark (in respect of the Faroe Islands and Greenland). He noted that there had been some discussions about the involvement of the salmon farming industry, but noted that they have already been involved in the work of the Task Force and he anticipated that they would be appropriately involved in the preparation of the FARs within each jurisdiction. Furthermore, the Secretary had committed to issue the Review Group's report to ISFA on the same day as it is issued to NASCO delegates and then to hold a Liaison Group meeting in early May to receive feedback from ISFA. ISFA would also be invited to participate in the Special Session in 2010. He believed that this would provide very good opportunities for input to the process by the industry and certainly more than for the other sectors that have been reviewed.

The representative of the European Union indicated that he felt that the Review Group would benefit from the addition of expertise from the European Union. He also referred to the need for continued engagement with the industry. However, he could accept the proposal.

The representative of Canada noted that despite opportunities for the industry to make their points it would be important for NASCO to engage with the industry more fully. He stressed that there had been benefits of close involvement, and he would like to see the Task Force and Liaison Group in this work.

The Council adopted the President's proposal.

The NGO Chair indicated that the NGOs had exactly the same difficulties in choosing their representation.

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

6.1 Annual Reports on Implementation Plans

The Council's Guidelines for the Preparation of Implementation Plans and for Reporting on Progress, NSTF(06)10, indicate that reports to the Council should be provided in two formats: written annual reports and focus area reports (FARs) presented at Special Sessions and subject to review. The primary purpose of the annual returns is to track progress in implementing the actions contained in the Implementation Plans. Last year, the Council had asked the Secretary to develop a simple reporting structure to be used in 2009 that should include the reporting obligations under the Convention.

The Secretary reported that a format for the annual returns had been agreed in correspondence with Heads of Delegations and had been used for the 2009 return. A summary of these returns was presented, CNL(09)16 (Annex 18). Returns had been received from Canada, CNL(09)30, Denmark (in respect of the Faroe Islands and Greenland) - Greenland, CNL(09)33, EU-Finland, CNL(09)23, EU-Ireland, CNL(09)20, EU-Sweden, CNL(09)29, EU-Spain, CNL(09)34 and CNL(09)35, EU-UK (England and Wales), CNL(09)28, EU-UK (Northern Ireland), CNL(09)27, EU-UK (Scotland), CNL(09)21, Iceland, CNL(09)26, Norway, CNL(09)25, the Russian Federation, CNL(09)22 and the USA, CNL(09)24.

The Council agreed that the new reporting format meant that the reporting burden was kept to an appropriate level while ensuring that progress in implementing the measures in the Parties and jurisdictions Implementation Plans could be tracked. It was agreed that the reporting format should be used for future annual reports.

6.2 Liaison with the North Atlantic Salmon Farming Industry

In 2008 the Council had decided to proceed with a Task Force comprising representatives of the Parties and an NGO representative and to which ISFA experts would be invited to participate. The Terms of Reference for the Task Force would be to develop a series of best practice recommendations to address the continuing impacts of salmon farming on wild salmon stocks designed to achieve impact targets.

The Co-Chair of the Task Force, Ms Mary Colligan (USA) introduced the interim report of the Task Force. This report was included in the report of the Liaison Group meeting, CNL(09)17 (Annex 19), which had been held at the request of the industry to allow for a review of progress made by the Task Force. She indicated that a meeting of the ISFA and NASCO Secretariats had been held on 10 November 2008 to discuss arrangements for the meeting of the Task Force, the meeting had developed recommendations on the composition, timetable and Terms of Reference for the Task Force which had been agreed by NASCO and ISFA.

The Task Force had met in Boston in March 2009. She indicated that the Task Force had noted the existing national and international Codes of Practice and legislation regarding management of impacts of salmon farming on the wild salmon stocks, and

considered that the Williamsburg Resolution remains valid. However, it needs to be strengthened in its interpretation and application, particularly in terms of defined goals and assessment of outcomes. She indicated that the Task Force believed that it is neither possible nor desirable to construct detailed international Codes of Practice which would cover all situations in which the Atlantic salmon is farmed. The Parties, jurisdictions and industries concerned are best placed to do that and there is no suggestion that there should be jurisdictional uniformity with regard to management of aquaculture. To this end, the Task Force has developed 'Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks' intended to assist the NASCO Parties and jurisdictions in framing the management of salmon aquaculture, in cooperation with their industries, in developing future NASCO implementation plans and in preparing their Focus Area Reports for the 2010 review and subsequently.

The Council supported the proposed continued work of the Task Force. The Council's decision in relation to the Task Force and Liaison Group recommendations are contained in paragraph 5.2.

6.3 **New or Emerging Opportunities for, or Threats to, Salmon Conservation and Management**

In accordance with the 'Strategic Approach for NASCO's Next Steps', this item had been included on the Council's agenda and ICES had been requested to provide relevant information, which is contained in document CNL(08)8. A paper was tabled by Iceland, CNL(09)37 that referred to environmental changes that might have damaging consequences for wild Atlantic salmon. Information was provided on red vent syndrome, flounder, sea lamprey, the parasite *Ichthyophonus hoferi* and the algae, *Didymosphenia geminata.* The representative of Canada indicated that ten rivers in Quebec are being monitored for red vent syndrome. The President indicated that there was valuable information on new factors affecting salmon abundance in document CNL(09)16.

6.4 **Incorporating Social and Economic Factors in Salmon Management**

Under the Strategic Approach for NASCO's 'Next Step', CNL(05)49, the key issues identified in relation to the social and economic aspects of the wild Atlantic salmon are:

- ensuring that appropriate emphasis is given to the social and economic aspects of the wild Atlantic salmon;
- strengthening the socio-economic data as a basis for managing salmon;
- integrating socio-economic aspects in decision-making processes; and
- disseminating socio-economic information to ensure due weight is given to the salmon compared to other important commercial and public interests.

To progress these aspects the Council had established a Working Group on Socio-Economics which had presented an interim report to the Council at its Twenty-Fifth Annual Meeting in 2008. It had been recognised that the Group would need several meetings to complete its work.

The Group had commenced work in developing an international collation of social and economic values to inform management and which would support NASCO's public relations work. In order to progress this work, the Working Group had established a Sub-Group. It had been proposed that a Special Session be held during the 2009 Annual Meeting but because of other commitments the Sub-Group was only able to make limited progress so the Special Session was postponed. A report on the work of the Sub-Group was presented by its Chairman, Dr Oystein Aas. The Council welcomed this presentation which is contained in CNL(09)50. The Council agreed that in order to make further progress in addressing the tasks assigned to it, the following work programme for a Sub-Group should be followed:

2009-2010

1. Continue work to collate all relevant social and economic values associated with wild Atlantic salmon;
2. Develop a report and a presentation on this collation for inclusion in the "State-of Salmon" report and the NASCO website;
3. Develop a proposed structure for inclusion of socio-economic information into the 'State of Salmon' and the NASCO website;
4. Present the recommendations of the Sub-Group to the 2010 Annual Meeting for consideration by the Council.

2010-2012

5. Prepare for a Special Session at the 2011 Annual Meeting to discuss approaches for incorporating social and economic aspects under the Precautionary Approach;
6. Consider approaches for conducting an Atlantic-wide study on the Total Economic Value of wild salmon and report in 2012.

The Sub-Group should continue to comprise Dr Guy Mawle (EU) - Chairman, Dr Oystein Aas (Norway), and Dr Gudni Gudbergsson (Iceland) together with representatives from North America, Denmark (in respect of the Faroe Islands and Greenland) and the NGOs. In addition, jurisdictions would be invited to nominate representatives to support the work of the Sub-Group. The Secretariat will liaise with the Parties on their nominations for this work. These representatives should be knowledgeable in social and economic aspects and have time and resources to participate fully in the Sub-Group's work. The representative of the European Union indicated that Sweden would wish to contribute to the work of the Sub-Group.

6.5 **St Pierre and Miquelon Salmon Fishery**

At its 2007 Annual Meeting the Council had asked the President to write to the French authorities to invite France (in respect of St Pierre and Miquelon) to accede to the Convention. The representative of France (in respect of St Pierre and Miquelon), Mrs Christiane Laurent-Monpetit, advised the Council, CNL(09)18, that the outcome of an inter-ministerial consultation in France was that full membership of NASCO by France (in respect of St Pierre and Miquelon) did not appear to be appropriate given the low level of the catch which is taken in a traditional fishery which had limited impact on the economic development of the archipelago. In this regard, France (in

respect of St Pierre and Miquelon) wishes to have its representation at NASCO as an observer confirmed. Reports were tabled on the 2008 salmon fishery at St Pierre and Miquelon, CNL(09)32 and on the sampling programme, CNL(09)39.

The Council expressed appreciation to the representative of France (in respect of St Pierre and Miquelon) for attending the Annual Meeting but expressed disappointment at the decision concerning accession to the Convention which would have been of benefit to both Parties. The Council authorised the President to write to France (in respect of St Pierre and Miquelon) to express disappointment at the decision and referring to concerns about the increased catch in 2008 which was the second highest in the time-series and was approximately 80% higher than in 2007. The President was also asked to express the Council's support for expanding the sampling programme at St Pierre and Miquelon to include genetic analysis and to request that information on the fishery and the sampling programme be made available earlier in the year in time for the ICES Working Group on North Atlantic salmon. A draft letter from the President, CNL(09)42 was circulated.

The representative of the NGOs said that they would consider how to support this initiative.

6.6 **Reports on the Work of the Three Regional Commissions**

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

7. Other Business

7.1 At the Twenty-Fifth Annual Meeting, the representative of the European Union had tabled a paper on salmon management in the Baltic Sea, CNL(08)26. The Council had agreed to seek close cooperation on matters concerning Baltic salmon through the European Union and the Russian Federation. The representative of the European Union reported on a stakeholder meeting held in Brussels on 28 April 2008 to consider options for a salmon management plan for Baltic salmon. He indicated that the Assistant Secretary of NASCO had presented information on the work of NASCO that had been well received. A response to questions posed by the NGOs was also tabled, CNL(09)45.

7.2 In response to a question from the NGOs concerning the phasing out of coastal fisheries in EU-UK (Northern Ireland), the representative of the European Union responded that the commitment in the Implementation Plan for Northern Ireland concerning phasing-out of coastal fisheries that intercept mixed stocks remains. Funds were received in 2008 to offer the remaining six coastal nets compensation to cease fishing but to date this had been declined by the fishermen. Further improvements to spawner escapement will require a range of additional measures that apply to all exploitation and it is in this context that a review has commenced. The representative of the NGOs thanked the European Union and indicated that in the light of the information which was not available at the start of the meeting it is clear that the commitment in the Implementation Plan remains intact although its

implementation may be delayed. Consequently he wished to withdraw the relevant part of the NGO's Opening Statement.

7.3 The Council agreed that delegates' e-mail addresses would in future be included in the List of the Participants.

8. Date and Place of Next Meeting

8.1 The Council accepted an invitation from Canada to hold its Twenty-Seventh Annual Meeting in Quebec during 1 - 4 June 2010.

8.2 The Council agreed to hold its Twenty-Eighth Annual Meeting during 7 - 12 June 2011 at a place to be decided.

9. Report of the Meeting

9.1 The Council agreed the report of the meeting.

10. Press Release

10.1 The Council agreed a press release, CNL(09)53 (Annex 20).

Note: The annexes mentioned above begin on page 27, following the French translation of the report of the meeting. A list of Council papers in included in Annex 21.

CNL(09)52

Compte rendu de la Vingt-sixième réunion annuelle du Conseil de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord Hôtel Rica Seilet, Molde, Norvège 2-5 juin, 2009

1. Séance d'ouverture

1.1 Le Président, M. Arni Isaksson, a ouvert la réunion. Ms Heidi Sørensen, Secrétaire d'État pour l'environnement (Norvège) a prononcé une allocution de bienvenue (annexe 1). Le Gouverneur du Comté de Møre Og Romsdal, M. Ottar Befring, a souhaité la bienvenue à Molde aux délégués (annexe 2). Le Président a remercié la Secrétaire d'État et le Gouverneur de Comté pour leurs déclarations de bienvenue. Il a ensuite prononcé une allocution d'ouverture sur le travail de l'Organisation (annexe 3).

1.2 Les représentants du Canada, du Danemark (pour les Iles Féroé et le Groenland), de l'Union européenne, de l'Islande, de la Norvège, de la Fédération de Russie et des États-Unis d'Amérique ont chacun prononcé une allocution d'ouverture (annexe 4).

1.3 Le représentant de la Commission Européenne Consultative pour les Pêches dans les eaux Intérieures (CECPI) a également prononcé une allocution d'ouverture (annexe 5). La Commission des Mammifères Marins de l'Atlantique Nord (CMMAN) a par ailleurs distribué une déclaration écrite.

1.4 M. Børre Petterson, ancien Président de l'OCSAN (1992 – 1996), a prononcé une allocution (annexe 6).

1.5 Une allocution d'ouverture a été prononcée conjointement, au nom de l'ensemble des organisations non gouvernementales (ONG) présentes à la réunion annuelle (annexe 7).

1.6 Le Président a exprimé sa reconnaissance aux Parties et aux organisations, présentes à titre d'observateur, pour leurs allocutions et a clos la séance d'ouverture.

1.7 Une liste des participants figure à l'annexe 8.

2. Adoption de l'ordre du jour

2.1 Le Conseil a adopté l'ordre du jour, CNL(09)46 (annexe 9).

3. Questions administratives et d'ordre financier

3.1 Rapport de la Commission financière et administrative

Le Président de la Commission financière et administrative, le Dr Boris Prischepa (Fédération de Russie), a présenté le rapport de la Commission, CNL(09)5. Fort des recommandations de celle-ci, le Conseil a pris les décisions suivantes:

(i) accepter la déclaration financière révisée de 2008, FAC(09)2;

(ii) autoriser le Secrétaire à retirer jusqu'à 48 000 dollars US du capital de roulement (ce qui équivaut approximativement à 32 000 livres sterling) pour acheter des saumons en vue de l'extension du programme d'échantillonnage de SALSEA au Groenland Occidental. Et ce, à condition que cette option soit retenue pour réaliser les échantillonnages;

(iii) adopter un budget pour 2010 et prendre acte du budget prévisionnel de 2011, CNL(09)38 (annexe 10) *[Note : Suite à la décision prise par l'Islande de se retirer de l'OCSAN pour raison financière, et suite aux consultations qui eurent lieu entre les Chefs de Délégation, le Barème des contributions a été révisé. Ce nouveau Barème figure en annexe.]*;

(iv) nommer soit PricewaterhouseCoopers (PWC) d'Édimbourg, Commissaire aux comptes pour l'an 2009, ou, après consultation auprès du Président de la Commission financière administrative, toute autre société recevant l'approbation du Secrétaire ;

(v) adopter le rapport de la Commission financière et administrative.

Le Président a remercié le Dr Prischepa et la Commission pour leur précieux travail.

4. Questions scientifiques, techniques, juridiques et autres

4.1 Rapport du Secrétaire

Le Secrétaire a rendu compte au Conseil des questions suivantes: ratifications de, et accessions à, la Convention; adhésions des membres des Commissions; pêche au saumon dans les eaux internationales par des Parties non adhérentes à l'OCSAN. À noter qu'il n'y avait eu, depuis le 1er avril 2008, aucune déclaration quant à ce type de pêche. La surveillance se limitait toutefois aux mois d'été. Le Secrétaire a également rendu compte des activités intersessionnelles.

Conformément au règlement financier 5.5, il a dressé un rapport sur les contributions de 2009. Elles avaient toutes été perçues. Il n'y avait donc aucun arriéré.

Il a aussi indiqué (CNL(09)6) que, depuis la dernière réunion du Conseil, deux nouvelles organisations non gouvernementales avait obtenu le statut d'observatrices, à savoir l'*Irish Seal Sanctuary* (le Sanctuaire irlandais pour les phoques, Irlande) et la

Northwest Atlantic Marine Alliance (Alliance Marine de l'Atlantique du Nord-Ouest, États-Unis). L'OCSAN compte désormais 35 ONG accréditées.

4.2 **Rapport sur les activités de l'Organisation de 2008**

Le Conseil a adopté le rapport d'activités 2008 de l'Organisation, CNL (09)7, adressé aux Parties conformément à l'article 5, paragraphe 6 de la Convention.

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

Le Président a annoncé que M. John Chaffey, de Lewisporte à Terre-Neuve avait remporté le Grand Prix de 2 500 $. Le Conseil a présenté ses félicitations au gagnant.

Fort de la recommandation émise par le Comité scientifique permanent, le Conseil a convenu d'étendre la portée du Programme d'encouragement au renvoi des marques à l'ensemble de celles qui provenaient de saumons capturés dans la zone de la Commission du Groenland Occidental, et ce à partir du prix de 2010. Le Secrétaire a été prié de modifier les règles du programme en conséquence.

4.4 **Recommandations scientifiques du CIEM**

Le représentant du CIEM a présenté le rapport du Comité consultatif (ACOM), CNL(09)8 (annexe 11). Les présentations du CIEM s'adressant au Conseil et aux réunions des Commissions figurent dans le document CNL(09)44.

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

Le Secrétaire a informé le Conseil que l'on avait enregistré deux demandes d'autorisation de pêche à des fins de recherche scientifique depuis la dernière réunion annuelle, CNL(09)36. Ces demandes émanaient du Canada et de l'Islande. Elles avaient été approuvées par les Chefs de délégations avant le début de cette réunion annuelle. L'année dernière, le Conseil avait également donné son approbation à une autre demande d'autorisation de pêche à objectif scientifique. Celle-ci avait été effectuée par le projet SALSEA-Merge pour 2008 et 2009. Des comptes rendus détaillés de cette pêche en 2008 avaient été envoyés à la CIRSA.

4.6 **Rapport de la Commission Internationale de Recherche sur le Saumon Atlantique (CIRSA)**

Le Dr Ken Whelan (Union européenne), Président de la Commission Internationale de Recherche sur le Saumon Atlantique, a présenté le rapport de la réunion de ladite Commission CNL(09)9 (annexe 12). Il a passé la première année du Programme SALSEA en revue. Celle-ci s'était avérée très fructueuse. Il a indiqué que la Commission avait: mis à jour l'inventaire des recherches concernant la mortalité du saumon en mer; obtenu des recommandations du Groupe consultatif scientifique portant notamment sur le type de recherche et d'ateliers qui pourraient être soutenus par la Commission; et étudié toute une série de questions administratives et d'ordre financier. La présentation du Président figure au document CNL(09)47. Le Président

a toutefois déclaré, qu'en dépit du succès obtenu par le programme, la Commission avait très peu de fonds. De ce fait, les membres avaient formé un petit groupe chargé d'identifier de nouvelles sources de financement.

Le représentant du Canada a félicité le Dr Whelan pour sa présentation. Il a par ailleurs ajouté qu'il serait bon d'explorer l'utilisation de cette présentation pour promouvoir le programme SALSEA en dehors de l'OCSAN. Il a fait particulièrement référence au progrès réalisé par *SALSEA-North America.* Ces progrès s'étaient traduits par une obtention de fonds et ressources auprès de différents groupes de partenaires. Le représentant du Canada a remercié les États-Unis pour leur participation aux études de post-smolts et a indiqué que les projets de marquage acoustique produisaient des résultats intéressants.

Le représentant des ONG a indiqué que le programme SALSEA fournissait des résultats fort passionnants. Il suggéré la nomination de « partisans » de SALSEA qui seraient chargés de la promotion de ce programme de recherche auprès de sponsors potentiels. Il a par ailleurs souligné combien il importait d'identifier les implications de gestion des résultats.

Le Secrétaire a fait allusion au « Sommet Saumon » planifié pour 2011. Ce sommet représenterait l'aboutissement du programme SALSEA. Aussi couvrirait-il, non seulement les résultats scientifiques obtenus, mais également les implications de gestion qui en découleraient. Il a confirmé que le programme avait multiplié par plus de 100 l'investissement de l'OCSAN, mais que les fonds étaient désormais très bas.

4.7 Compte rendu du Comité scientifique permanent

Le Dr Peter Hutchinson, Président du Comité scientifique permanent, a présenté une demande provisoire de recommandations scientifiques adressée au CIEM. Fort de l'avis du Comité, le Conseil a adopté la demande de recommandations scientifiques, CNL(09)10 (annexe 13), adressée au CIEM.

5. Le Processus «*Next Steps*» (Décisions à prendre à l'avenir par l'OCSAN)

5.1 Séance spéciale: État d'avancement de la stratégie à appliquer dans le cadre du Processus «*Next Steps*»

a) Dernier rapport du Comité temporaire de révision chargé du volet spécifique de la gestion des pêcheries

Les compte rendus FARs (concernant des volets spécifiques) sont censés fournir un examen approfondi des mesures prises à propos d'un sujet particulier, ainsi qu'une base à l'étude des dites mesures et de leur efficacité dans le cadre des objectifs de l'OCSAN. Le premier volet concerne la gestion des pêcheries de saumons.

Le Conseil avait établi un Comité temporaire de révision chargé de passer en revue et d'analyser l'ensemble des FARs concernant la gestion des pêcheries. Le Comité temporaire devait par ailleurs mettre en lumière les questions à soulever auprès des

différentes Parties et juridictions. Le rapport provisoire du Comité, présenté au Conseil lors d'une séance spéciale en 2008, rendait compte du travail accompli, CNL(08)13. Le Comité avait alors été chargé d'établir, en dernière tâche, jusqu'à quel point l'information fournie dans les rapports FARs indiquait que les objectifs de l'OCSAN étaient, ou seraient, atteints. Le Comité devait également apporter des suggestions de mesures supplémentaires à prendre pour garantir une cohérence entre les efforts de gestion des pêcheries et les accords de l'OCSAN. Le Comité devait enfin rédiger une étude comparative de l'ensemble des FARS, visant à souligner les meilleures pratiques, les défis posés par la gestion des pêcheries de saumon et les différentes manières d'y faire face.

Le rapport final du Groupe chargé du volet « Gestion des pêcheries », CNL(09)11 (annexe 14), a été présenté lors d'une séance spéciale. Les résultats de ce rapport avaient généré un grand débat. Le Groupe avait ainsi achevé son mandat. Les Parties qui avaient envoyé un rapport FAR concernant ce volet spécifique étaient les suivantes: le Canada, IP(08)9rev; le Danemark (pour les Iles Féroé et le Groenland), IP(08)7rev; UE – le Danemark, IP(08)12; UE – la Finlande, IP(08)3; UE – l'Irlande, IP(08)13; UE – le Royaume-Uni (Angleterre et Pays de Galles), IP(08)5rev; UE – le Royaume Uni (Irlande du Nord), IP(08)4; UE – le Royaume Uni (Écosse), IP(08)2rev; l'Islande, IP(08)10; la Norvège, IP(08)11; la Fédération de Russie, IP(08)8 et les États-Unis, IP(08)6. Une compilation des rapports FAR concernant le volet «Gestion des pêcheries» figure au document CNL(09)13 (disponible sur CD). Les études du Groupe démontraient clairement que, malgré d'immenses progrès effectués dans ce domaine de gestion des pêcheries, il demeurait toujours plusieurs défis à relever.

Six juridictions avaient omis d'envoyer leur rapport FAR au Groupe, ce qui compromettait le succès du processus d'étude. Un rapport FAR concernant le volet Gestion de pêcherie était arrivé en provenance de l'UE – Suède, IP(08)25, après que le rapport du Groupe de révision ait été rédigé, mais antérieurement à la réunion annuelle. Un document décrivant les pêcheries de saumons et l'état des stocks de saumons en France a également été présenté, CNL(09)31. On a aussi soumis, à titre d'information, un document portant sur la gestion des rivières à saumons au Québec, CNL(09)40.

Le Groupe avait recommandé au Conseil d'adopter impérativement les directives en matière de la meilleure pratique à suivre, IP(08)23, de façon à clarifier les orientations et les accords de l'OCSAN, ainsi que les définitions de termes se rapportant à la gestion des pêcheries. Si, toutefois, le Conseil décidait de ne pas suivre cette voie, le Groupe lui avait recommandé de revoir ces orientations, accords et définitions afin de clarifier toute ambiguïté, de rectifier toute contradiction et de supprimer tout manque de clarté des textes. La gestion serait ainsi désormais fondée sur des principes plus précis. La tâche des groupes ultérieurs de révision des rapports spécifiques concernant le volet « Gestion des pêcheries » s'en trouverait par ailleurs facilitée.

(b) Avant-projet du Comité de révision temporaire chargé du volet « Protection, Restauration et mise en valeur de l'habitat ».

Une présentation a été faite de l'avant-projet du Comité de révision temporaire, chargé du volet « Protection, Restauration et mise en valeur de l'habitat », CNL(09)12 (annexe 15). On avait chargé le comité d'étudier et d'analyser les rapports FAR traitant du cette question. Cette étude devait aboutir à la rédaction d'un rapport. Ce rapport identifierait, d'une part, les défis communs et les méthodes scientifiques et de gestion communes pour y faire face et, formulerait, d'autre part, une recommandation de meilleure pratique. Ceci s'inscrirait dans le cadre du partage des connaissances du processus «*Next Steps*». Par ailleurs, ce rapport devait fournir des recommandations et/ou un *feedback* pour chaque FAR qui nécessiterait des mesures supplémentaires, afin de garantir une cohérence avec le Plan d'Action de l'OCSAN.

Le Groupe avait examiné et analysé les FAR et avait donné leur *feedback* aux Parties et Juridictions quant à la prise éventuelle de mesures supplémentaires. Les FAR étudiés concernaient le Canada, IP(09)3; UE – le Danemark, IP(09)12; UE – la Finlande, IP(09)4; UE – l'Irlande, IP(09)10; UE – le Royaume-Uni (Angleterre et Pays de Galles), IP(09)5; UE – le Royaume-Uni (Irlande du nord), IP(09)14; UE – le Royaume-Uni (Écosse), IP(09)8; l'Islande, IP(09)6; la Norvège, IP(09)11; la Fédération de Russie, IP(09)13 et les États-Unis, IP(09)7. Une compilation des rapports FAR concernant le volet « Protection, Restauration et mise en valeur de l'habitat » figure au document CNL(09)13 (disponible sur CD). L'ensemble des FAR et des programmes de mise en pratique sont disponibles sur le site web. De nombreuses juridictions avaient omis d'envoyer leur FAR, ce que le Comité avait regretté.

L'avant-projet que le comité a présenté au cours d'une séance spéciale a donné lieu à un débat. L'UE (Suède) avait fait parvenir son rapport FAR concernant le volet de l'habitat juste avant la réunion annuelle, IP(09)19.

(c) **Progrès réalisés dans l'exécution d'une stratégie de Relations publiques**

En 2007, le Conseil avait reçu un rapport du Groupe chargé de la question des relations publiques, CNL(07)16. Ce groupe avait défini comme toute première priorité le remaniement des sites de l'OCSAN et de la CIRSA ainsi que l'élaboration, à des fins médiatiques, d'un rapport annuel « État du saumon ». L'année dernière, le Conseil avait créé un sous-groupe RP de façon à faire progresser cette question. Ce sous-groupe s'était réuni lors de la réunion annuelle de 2008, sous la direction de M. Chris Poupard, Président des ONG, avec pour objectif :

- de proposer la forme et le fond du rapport « État du saumon », tel qu'il serait posté sur le site de l'OCSAN, et tout en tenant compte, entre autres, des points recommandés dans le CNL(08)14;
- d'identifier ce qui constituerait les « prochaines étapes » en matière de stratégie de Communications.

Le Président dudit sous-groupe a présenté un rapport sur les activités de ce sous-groupe depuis l'année dernière. Ceci comprenait un rapport par le Secrétaire Adjoint sur les progrès réalisés quant au développement des sites de l'OCSAN et de la CIRSA. Ainsi, depuis la dernière réunion annuelle, le site de l'OCSAN avait été

remanié et des améliorations supplémentaires avaient été apportées à celui de la CIRSA. Le Conseil a accueilli favorablement les excellents progrès réalisés dans ce domaine. M. Poupard a suggéré les tâches suivantes comme priorité pour l'année à venir: achever le remaniement du site Web de l'OCSAN, y inclure notamment les informations concernant la base de données des rivières, et avancer dans la rédaction du rapport « État du saumon ». Le Conseil s'est aussi réjoui de la manière dont la création du nouveau site de l'OCSAN avait progressé et a convenu de le lancer à la fin de juin 2009. Des améliorations supplémentaires pourraient y être apportées au cours de l'année, comme par exemple l'inclusion des informations provenant de la base de données des rivières. Le Conseil a demandé au Groupe RP de continuer son effort quant à la constitution d'un réseau de contacts médiatiques auprès de chaque Partie et l'identification d'occasions propices à une activité de RP, au cours de l'année. Le Sous-groupe RP a également été prié de rédiger un communiqué de presse à l'issue de la présente réunion

5.2 Décisions prises par le Conseil à la lumière des conclusions émises lors de la Séance spéciale sur le processus «*Next Steps*»

Gestion des pêcheries de saumons

Le Conseil a nommé un groupe, qui aurait pour mandat d'étudier, sous la direction de Ted Potter (Union européenne), le rapport du Comité de révision temporaire chargé du volet «Gestion des pêcheries», intitulé « Conseils de l'OCSAN pour l'adoption d'une meilleure pratique dans le domaine de la gestion des pêcheries de saumons ». M. Potter a présenté le document CNL(09)41 « Orientations de l'OCSAN visant la gestion des pêcheries de saumons ». Celui-ci comprenait dix points clés. Après y avoir apporté quelques modifications, le Conseil a adopté ledit document, CNL(09)43 (annexe 16). Selon le représentant des ONG toutefois, les modifications apportées représentaient une chance manquée. Même s'il s'agissait d'un document tout à fait acceptable, les programmes de mise en application et les rapports FAR concernant chaque volet spécifique représentaient un élément clé du processus «*Next Steps*». De ce fait, les ONG étaient d'avis que le document aurait dû exprimer de plus hautes aspirations.

Protection, Restauration et Mise en valeur de l'habitat

Le Président a indiqué que les conclusions du Comité de révision chargé du volet Habitat n'avaient suscité, jusqu'à cette date, aucun commentaire spécifique. Le Comité continuera donc sa tâche et adressera un compte rendu du travail accompli au Conseil d'ici la fin de l'année et lors d'une séance spéciale en 2010.

Le Conseil a convenu d'accepter tous rapports FAR manquants, concernant les volets « Gestion des pêcheries » et « Protection, restauration et mise en valeur de l'habitat », à condition qu'ils soient soumis au Secrétariat avant le 1er septembre 2009. Dans la mesure du possible ceux-ci seraient également examinés.

Aquaculture et activités connexes

Lors de sa Vingt-cinquième réunion annuelle, le Conseil avait mis au point un avant-projet de mandat CNL(08)37 pour le troisième volet, à savoir « Aquaculture et

activités connexes ». Tous les commentaires sur ce mandat devaient être envoyés au Secrétariat au plus tard le 1 avril 2009. Les amendements du mandat seraient alors diffusés avant la réunion annuelle de 2009. Le Secrétaire a indiqué, CNL(09)15 (annexe 17), qu'il n'avait reçu aucune demande de modification de la part des Parties. Fort des recommandations de la *Task Force*, le Conseil a convenu toutefois d'incorporer au mandat de l'Aquaculture et activités connexes son avant projet d'Orientations sur les meilleures pratiques de Gestion. Ces Orientations feraient alors partie des exigences des rapports FAR

Le Président a proposé, pour le Comité de révision Aquaculture, une composition semblable à celle des deux autres Comités et comme il est spécifié dans les « Orientations pour la préparation des Programmes de mise en application et pour les rapports sur l'évolution desdits programmes » adoptées par le Conseil, NSTF(06)10. Le Président a suggéré de sélectionner les représentants de l'OCSAN parmi la Norvège, en tant que plus grand producteur au monde de saumons sauvages et d'élevage, le Canada, comme représentant de l'Amérique du Nord, et le Danemark (pour les Iles Féroé et le Groenland). Il a pris note du fait que l'on avait envisagé la participation du secteur de l'élevage salmonicole, mais a fait remarquer que ce secteur avait déjà pris part au travail de la *Task Force*. De plus, il anticipait que ce secteur participerait avec pertinence, au sein de chaque juridiction, à l'élaboration des rapports spécifiques FAR. Le Secrétaire s'était engagé, en outre, à envoyer le rapport du Comité de révision à l'AIES le même jour qu'il serait envoyé aux représentants de l'OCSAN et à organiser une réunion du groupe de liaison début mai afin de recueillir le *feedback* de l'AIES. On inviterait également l'AIES à participer à la séance spéciale de 2010. Le Président était d'avis que ceci fournirait de très bonnes opportunités pour une contribution de la part du secteur salmonicole et certainement beaucoup plus de chances que n'en avaient eu d'autres secteurs examinés auparavant.

Selon le représentant de l'Union européenne, le Groupe de révision bénéficierait de l'adjonction de l'expertise provenant de l'Union Européenne. Il a également rappelé la nécessité d'un engagement continu avec le secteur salmonicole. Il était toutefois en mesure d'accepter la proposition.

Le représentant du Canada a indiqué que, même si le secteur salmonicole avait plusieurs opportunités pour exprimer leur position, il importait que l'OCSAN soit plus pleinement engagé avec ce secteur. Il a souligné qu'une collaboration étroite s'était avérée jusque-là fructueuse et de ce fait il souhaitait voir la participation de la *Task Force* et du Groupe de liaison à ce travail.

Le Conseil a adopté la proposition du Président.

Le président des ONG a mentionné qu'elles rencontraient des difficultés semblables lors du choix de leurs représentants.

6. Conservation, Restauration, Mise en valeur et Gestion rationnelle du saumon atlantique dans le cadre de l'approche préventive

6.1 Rapports annuels concernant les Programmes de mise en application

Les Orientations du Conseil concernant la préparation des programmes de mise en application et la méthode de compte rendu sur les progrès réalisés, NSTF(06)10, indiquent que les rapports adressés au Conseil doivent être fournis en deux formats: rapport annuel écrit et rapport, sujet à examen, concernant un volet spécifique (FAR) à présenter lors de séances spéciales. L'objectif principal des renvois annuels est de suivre les progrès de l'exécution des actions contenues dans les programmes de mise en application. L'année dernière, le Conseil avait demandé au Secrétaire de mettre au point une structure de compte rendu simple, à utiliser en 2009 et qui comprendrait les obligations de compte rendu conformément à la Convention.

Le Secrétaire a signalé qu'un format pour les renvois annuels avait été décidé en liaison avec les Chefs de délégations et adopté pour les renvois de 2009. Une synthèse de ces renvois d'informations a été présentée, CNL(09)16 (annexe 18). Les pays suivants avaient tous envoyé leur contribution d'informations: le Canada, CNL(09)30, le Danemark (pour les Iles Féroé et le Groenland) – le Groenland, CNL(09)33, UE – la Finlande, CNL(09)23, UE – l'Irlande, CNL(09)20, UE – la Suède, CNL(09)29, UE – l'Espagne, CNL(09)34 et CNL(09)35, UE – le Royaume-Uni (Angleterre et Pays de Galles), CNL(09)28, UE – le Royaume-Uni (Irlande du Nord), CNL(09)27, UE – le Royaume-Uni (Écosse), CNL(09)21, l'Islande, CNL(09)26, la Norvège, CNL(09)25, la Fédération de Russie, CNL(09)22 et les États-Unis, CNL(09)24.

Le Conseil a convenu que le nouveau format de compte rendu signifiait que la charge en ce qui concernait les comptes rendus demeurait à un niveau approprié. Il permettait en outre de suivre la progression de l'exécution des mesures prises par les Parties et Juridictions dans leurs programmes de mise en application. Il a été décidé que les futurs rapports annuels devraient tous adopter ce format de compte rendu.

6.2 Liaison avec le secteur de l'élevage du saumon nord-atlantique

En 2008, le Conseil avait convenu d'établir une *Task Force* qui comprendrait des représentants des Parties et un représentant des ONG et à laquelle des experts de l'AIES seraient invités à participer. La *Task Force* aurait pour mandat d'élaborer une liste de recommandations de meilleure pratique afin de combattre la persistance des effets nuisibles du saumon d'élevage sur les stocks de saumons sauvage.

Ms Mary Colligan (États-Unis), Co-Présidente de la *Task Force*, a présenté le rapport préliminaire de la *Task Force*. Ce rapport figurait dans le compte rendu de la réunion du Groupe de liaison, CNL(09)17 (annexe 19). Cette réunion avait eu lieu à la demande du secteur salmonicole afin de passer en revue les progrès réalisés par cette *Task Force*. Ms. Mary Colligan a indiqué qu'une réunion avait eu lieu le 10 novembre 2008, entre les Secrétariats de l'AIES et de l'OCSAN afin de débattre des dispositifs concernant la réunion de la *Task Force*. Cette réunion avait mis au point des recommandations concernant la composition, l'emploi du temps et le mandat de la *Task Force*; recommandations qui avaient reçu l'aval de l'OCSAN comme de l'AIES.

La *Task Force* s'était réunie à Boston en mars 2009. Ms Mary Colligan a indiqué que ce groupe avait pris connaissance des Codes de bonne conduite et des législations nationales et internationales concernant la gestion des effets nuisibles provoqués par

le saumon d'élevage sur les stocks de saumons sauvages. Aussi la *Task Force* en avait-elle déduit que la Résolution de Williamsburg demeurait valide. Celle-ci nécessitait cependant d'être renforcée dans son interprétation et application, surtout pour ce qui concernait la définition des objectifs et l'évaluation des résultats. Ms. Mary Colligan a précisé que la *Task Force* pensait qu'il n'était ni possible, ni souhaitable d'élaborer des Codes de bonne conduite internationaux qui couvriraient toutes les situations imaginables dans lesquelles le saumon atlantique est élevé. Les Parties, juridictions et secteurs concernés sont mieux placés pour le faire et aucune suggestion n'a été soumise quant à une uniformisation juridictionnelle dans le domaine de la gestion d'aquaculture. À cet effet, la *Task Force* avait rédigé « Conseils sur les meilleures conduites à adopter dans le domaine de la gestion en ce qui concerne les effets nuisibles du poux de mer et des échappés de saumons d'élevage sur les stocks de saumons » ; l'intention étant d'assister les Parties et juridictions de l'OCSAN à développer un cadre à la gestion de l'élevage de saumons, en coopération avec les secteurs concernés; à élaborer les prochains programmes de mise en application de l'OCSAN et à préparer leurs FARs pour les révisions de 2010 et des années suivantes.

Le Conseil a appuyé la proposition de reconduction du travail de la *Task Force*. La décision prise par le Conseil en ce qui concerne les recommandations du Groupe de Liaison et de ladite *Task Force* figure au paragraphe 5.2.

6.3 Nouvelles opportunités ou opportunités naissantes pour, ou menaces contre, la conservation et la gestion du saumon

Conformément à l'Approche stratégique adoptée dans le cadre des « décisions à prendre à l'avenir par l'OCSAN », ce point avait été inclus à l'ordre du jour du Conseil et le CIEM avait été prié de fournir les renseignements appropriés. Ces données d'information figurent au document CNL(08)8. L'Islande a présenté un document, CNL(09)37, qui décrivait des changements du milieu dont les conséquences pourraient être nuisibles pour le saumon atlantique sauvage. Le texte fournissait des informations sur le « red vent syndrome » (syndrome dû au ver parasite *Anisakis simplex*), sur le flet, la lamproie, sur le parasite *Ichthyophonus hoferi* et sur l'algue *Didymosphenia geminata.* Le représentant du Canada a mentionné qu'au Québec, dix rivières étaient soumises à un contrôle quant au syndrome « red vent ». Le Président a indiqué que le document CNL(09)16 renfermait des informations précieuses sur les nouveaux facteurs affectant l'abondance du saumon.

6.4 Incorporation des facteurs socio-économiques dans la gestion du saumon

Dans le cadre de l'approche stratégique qui sous-tend les « décisions à prendre à l'avenir » par l'OCSAN, CNL(05)49, les points clés concernant les aspects socio-économiques liés au saumon Atlantique sauvage sont les suivants:

- garantir que l'on accorde l'attention qui leur est due aux facteurs socio-économiques liés au saumon atlantique;
- consolider les données socio-économiques afin qu'elles puissent servir de base à la gestion du saumon atlantique;
- intégrer les considérations socio-économiques dans le processus de prise de

décision de l'OCSAN;

- et diffuser l'information concernant cette question afin de garantir que le saumon reçoive l'attention nécessaire et dont il est digne par rapport aux autres domaines d'intérêt public et commercial.

De façon à faire avancer la tâche dans ce domaine, le Conseil avait établi un Groupe de Travail qui avait présenté un rapport provisoire au Conseil lors de sa Vingt-cinquième réunion annuelle en 2008. On avait convenu que ce Groupe nécessiterait plusieurs réunions pour achever son office.

Le Groupe avait commencé son travail par une collecte internationale des valeurs socio-économiques associées au saumon, et ce, en vue d'en guider la gestion. Ces données conforteraient d'autre part l'OCSAN dans ses relations publiques. De façon à aller de l'avant, le Groupe de travail avait établi un sous-groupe. L'on avait également proposé d'organiser une séance spéciale lors de la réunion annuelle de 2009. Toutefois, le sous-groupe n'avait pas pu beaucoup progresser dans son travail à cause d'autres engagements. Il a donc fallu repousser la séance spéciale. Le Dr.Oystein Aas, Président du sous-groupe, a présenté un rapport. Le Conseil a accueilli favorablement cette présentation, contenue dans le CNL(09)50 et a convenu du plan de travail suivant pour le Sous-groupe afin de réaliser des progrès supplémentaires dans les tâches qui lui avaient été assignées :

2009-2010

1. Continuer la collecte de toutes les valeurs socio-économiques appropriées liées au saumon atlantique sauvage;
2. Préparer une présentation et rédiger un rapport concernant cette collecte en vue de l'inclure dans le rapport État du saumon » et sur le site Web de l'OCSAN;
3. Élaborer une proposition de structure permettant d'incorporer les données socio-économiques dans le rapport « État du saumon » et sur le site Web de l'OCSAN;
4. Présenter pour examen, au Conseil, les recommandations du sous-groupe à la réunion annuelle de 2010.

2010-2012

5. Préparation en vue d'une séance spéciale, lors de la réunion annuelle de 2011, dont l'objectif serait de débattre les différentes méthodes d'inclusion des aspects socio-économiques, dans le cadre de l'approche préventive.
6. Examiner les différentes façons de mener une étude, portant sur la valeur économique globale attribuée au saumon sauvage, dans tout l'Atlantique. Rendre compte de cet examen en 2012.

La composition du sous-groupe devrait toujours inclure, sous la présidence du Dr Guy Mawle (UE), le Dr Oystein Aas (Norvège), et le Dr Gudni Gudbergsson (Islande) ainsi que des représentants de l'Amérique du Nord, du Danemark (pour les Iles Féroé et le Groenland) et des ONG. En outre, les juridictions seraient invitées à nommer des représentants qui apporteraient leur soutien au Sous-Groupe dans son travail. Le Secrétariat contactera les Parties à propos de leurs nominations pour cette tâche. Ces mandataires devraient être compétents dans le domaine socio-économique et avoir le temps et les ressources pour

participer pleinement au travail du sous-groupe. Le représentant de l'Union Européenne a indiqué que la Suède désirerait contribuer au travail du sous-groupe.

6.5 **Pêcherie de saumons à Saint Pierre et Miquelon**

Lors de sa réunion annuelle de 2007, le Conseil avait demandé au Président d'écrire aux autorités françaises dans le but d'inviter la France (pour Saint Pierre et Miquelon) à accéder à la Convention. Mme Christiane Laurent-Monpetit, représentante de la France (pour Saint Pierre et Miquelon), a informé le Conseil, CNL(09)18, qu'une consultation inter-ministérielle en France avait abouti à la conclusion qu'une pleine adhésion de la France (pour Saint Pierre et Miquelon) à l'OCSAN ne semblait pas appropriée, vu le bas niveau des captures. Ces captures faisaient partie d'une pêcherie traditionnelle qui exerçait peu d'incidence sur le développement économique de l'archipel. À ce sujet, la France (pour Saint Pierre et Miquelon) désirait donc que sa représentation auprès de l'OCSAN, en tant qu'observatrice, soit confirmée. Une présentation a été faite des comptes rendus concernant la pêcherie de 2008 à Saint Pierre et Miquelon CNL(09)32 et le programme d'échantillonnage, CNL(09)39.

Le Conseil a exprimé son appréciation auprès de la représentante de la France (pour Saint Pierre et Miquelon) pour sa participation à la réunion annuelle. Il a toutefois manifesté son désappointement quant à la décision prise concernant l'accession à la Convention, accession qui aurait été d'un bénéfice mutuel. Le Conseil a autorisé le Président à écrire à la France (pour Saint Pierre et Miquelon) pour traduire sa déception quant à la décision prise et pour exprimer les inquiétudes que suscitait l'augmentation des captures en 2008; captures qui figuraient au deuxième plus haut niveau de l'échelle dans le temps et qui dépassaient de 80% le niveau de 2007. On avait également prié le Président d'informer la France (pour Saint Pierre et Miquelon) que le Conseil appuyait l'extension du programme d'échantillonnage à Saint Pierre et Miquelon de façon à y inclure une analyse génétique. Par ailleurs, le Président devait aussi demander que l'information concernant la pêcherie et le programme d'échantillonnage soit disponible plus tôt dans l'année et parvienne à temps pour la réunion du Groupe de Travail du CIEM chargé de la question du saumon de l'Atlantique Nord. Le Président avait rédigé un brouillon de lettre, CNL(09)42, qu'il a fait circuler.

Le représentant des ONG a déclaré qu'elles évalueraient leur façon de soutenir cette initiative.

6.6 **Comptes rendus sur les activités des trois Commissions régionales**

Les Présidents de chacune des trois Commissions régionales ont soumis au Conseil un compte rendu des activités de leur Commission respective.

7. Divers

7.1 Lors de la Vingt-cinquième réunion annuelle, le représentant de l'Union européenne avait présenté un document portant sur la gestion du saumon en mer Baltique, CNL(08)26. Le Conseil avait convenu d'encourager une coopération étroite avec l'ensemble de l'Union européenne et la Fédération de Russie sur toute question concernant le saumon en mer Baltique. Le représentant de l'Union européenne a

rendu compte d'une réunion entre les parties intéressées, qui avait eu lieu le 28 avril 2008 à Bruxelles pour étudier les différentes options de gestion du saumon en mer Baltique. Il a indiqué que le Secrétaire adjoint de l'OCSAN avait présenté des informations, bien accueillies, concernant le travail de l'OCSAN. Une réponse aux questions des ONG a également été présentée, CNL(09)45.

7.2 En réponse à une question posée par les ONG, concernant la suppression progressive des pêcheries côtières au Royaume-Uni (Irlande du Nord) – UE, le représentant de l'Union européenne a déclaré que l'engagement pris dans le programme de mise en application par l'Irlande du Nord et concernant la suppression progressive de ces pêcheries demeurait inchangé. En 2008, la réception de fonds avait permis d'offrir une compensation aux six pêcheries côtières restantes afin qu'elles cessent leur activité de pêche. Jusqu'à ce jour toutefois, les pêcheurs avaient rejeté cette offre. Un accroissement supplémentaire de l'échappement des reproducteurs nécessiterait toute une gamme de mesures additionnelles. Comme ces mesures devraient s'appliquer à toute forme d'exploitation, une étude venait de débuter. Le représentant des ONG a remercié l'Union européenne. Il a également indiqué, qu'à la lumière de ces informations, qui n'avaient pas été pas disponibles au début de la réunion, il était désormais clair que l'engagement pris par l'Union européenne dans son programme de mise en application demeurait inchangé même si son exécution s'en trouvait retardée. Par conséquent, il désirait retirer la section de l'allocution d'ouverture des ONG qui se rapportait à cette question.

7.3 Le Conseil a convenu d'inclure dorénavant dans la liste des participants les adresses email des représentants.

8. Date et lieu de la prochaine réunion

8.1 Le Conseil a accepté l'invitation offerte par le Canada de tenir sa Vingt-septième réunion annuelle au Québec du 1 au 4 juin 2010.

8.2 Le Conseil a convenu de tenir sa Vingt-huitième réunion annuelle du 7 au 12 juin 2011 (lieu à déterminer).

9. Compte rendu de la réunion

9.1 Le Conseil a adopté le compte rendu de la réunion

10. Communiqué de presse

10.1 Le Conseil a accepté le communiqué de presse CNL(09)53 (annexe 20).

Note: La liste intégrale des documents due Conseil figure à l'annexe 21.

Annex 1

Welcoming Address by Ms Heidi Sørensen, State Secretary of the Ministry of Environment, Norway

Mr President, Ladies and Gentlemen. Good morning and welcome to Norway and to Molde!

In Norway we have more than 400 salmon rivers, with a broad genetic diversity. This represents around one third of the world's North Atlantic salmon resource. Norway's proportion of the salmon resource, and the great variation in nature and salmon rivers, implies that Norway may be considered as a "salmon superpower". It also means that we have a major responsibility for the species as such.

The River Tana is regarded as the most productive salmon river draining into the North Atlantic. In 2008, approximately 120 tonnes of salmon were caught in this river alone, representing 15 % of the total salmon catch in Norway. A special challenge is related to the mixed-stocks fisheries that exploit the more than the 30 different stocks in this river, several of which must be regarded as vulnerable or even threatened. The salmon stocks in the River Tana are a resource we share with Finland, and we have a bilateral agreement and close cooperation on the management of this valuable resource.

Fishing for salmon has always been an integral part of our culture and economy here in Norway. Almost 100,000 anglers take part in salmon fishing in Norway each year. The direct and indirect value of the river fisheries can be roughly estimated to be 1 billion Norwegian kroner (close to 100 million pounds sterling). However, the total socio-economic value and benefits to man of the wild salmon, cannot be precisely estimated. In addition, the wild Atlantic salmon is the basis for salmon aquaculture.

We are all aware of the considerable threats facing the North-Atlantic salmon stocks. In Norway, they include:

- Changes in sea temperature and marine ecology that probably have considerable effects on the stocks;
- *Gyrodactylus salaris* that has affected 46 Norwegian salmon stocks, and the parasite is still found in 21 rivers;
- Acid rain that affects large areas in southern Norway, and more than 25 stocks have been lost as a result;
- Sea lice that are considered to be one of the major threats to migrating smolts on the west coast;
- Hydro-electric power production that has affected 146 salmon stocks, 35 of these seriously;
- Escapees from salmon farms that represent a grave challenge, and may in the long-term be the most serious threat to our salmon stocks.
- Mixed-stock fisheries that pose a general threat to vulnerable stocks in all coastal regions.

These threats represent considerable challenges, both individually and in combination. Our common goal, however, must be to reduce the total pressure on the resource to an acceptable level.

In Norway, there is a broad political consensus on measures to conserve salmon stocks. These conservation measures, which cover all the challenges referred to above, were adopted through a White book presented to the Parliament by my Government in 2006. As part of the White book, the most valuable stocks have now been given special protection in 52 National Salmon Rivers and 29 National Salmon Fjords.

Combating the parasite *Gyrodactylus salaris* has a high priority in our salmon management. The budgetary spending has been increased threefold under my Government. Based on our experience, it is of vital importance to avoid further spreading of this deadly parasite to other NASCO Parties.

Norway produces about one half of the world's farmed salmon. Norway's experience as a major aquaculture producer has demonstrated the importance of reducing adverse effects from salmon aquaculture. In 2006, a new and ambitious Action Plan was introduced to reduce the number of escapees from aquaculture facilities. The Action Plan describes measures such as improved regulations, better practices and strengthened control. The aim is to reduce the number of escapees to levels that pose no threat to the wild salmon. Sea lice are currently another grave threat to salmon stocks, and my Government has recently presented a new strategy to reduce levels of infestation on wild salmon.

International cooperation on salmon management within the framework of NASCO is of vital importance. Norway is committed to, and greatly appreciates, the valuable work within this organization. I would also like to highlight the valuable contributions from the International Council for the Exploration of the Sea (ICES) and the constructive role of our NGOs. I am assured that this year's Annual Meeting will again produce important results, including guidance on habitat protection and restoration.

Mr President, NASCO's work and recommendations will continue to play an important role in shaping Norway's salmon policy. I wish you all a successful meeting and a pleasant stay in Molde.

Thank you for your attention!

Annex 2

Welcoming Address by Mr Ottar Befring, County Governor of Møre og Romsdal, Norway

Good morning ladies and gentlemen- president, state secretary! It is a pleasure for me to welcome all of you to the county of Møre and Romsdal and to this important conference. This county is full of contrasts – from mountain peaks to rounded hills, to fertile valleys and the mighty blue ocean. You will find an ever changing landscape. Our coastline stretches from Stadt, northeast to the inlet leading to Trondheim.

Furthest out to sea lay the weathered rocks of the coast, worn down over millions of years by glaciers, rain, wind and the never ending waves. There are many fjords long and deep, stretching far inland towards the mountains which are always there, creating the varied landscape.

In the mountain valleys and surrounding areas you will find rivers, creeks and numerous waterfalls. At this time of year the rivers and creeks should be full of salmon and trout, inspiring us to take out our fishing gear and spend a pleasant day and night catching fish from these waters.

We have been living here for more than 12.000 years, and making our living from land and sea alike; hunting for reindeer on land, for seals in the ocean and on the ice, and fishing in both fresh water rivers and salt water seas. There are 200 rivers with salmon in this county so we are very much aware of our responsibility for taking care of this important resource.

Since we live so close to the coast and are surrounded by the sea, we spend much of our living with maritime activities. Fishing, ship building and sea transport, oil and gas production are the most important industries. More than 1/3 of all white fish caught in Norway are landed in Møre and Romsdal. Over 20% of Norwegian fishermen come from this county. Fish from the sea and agriculture make us a food producing county. Møre and Romsdal is famous for klipfisk – salted and dried cdfish – and bacalao, Jarlsberg cheese and … not to forget the pizza! All Norwegians know about Pizza Grandiosa from Stranda.

Another important industry for us is the production of aluminium using hydroelectric power. The modern aluminium plant in Sunndal is the largest in Europe.

I want to tell you we also have a large furniture industry in our county. Have you heard of the stress less chair! Don`t use it too much.

Almost 25% of the work force in this county is involved in some form of industry. The average in Norway is 13 – 14%.

247,000 people live in 36 municipalities within our county. Oresund, Molde and Kristiansand are the major cities in the county.

Finally, we are surrounded by a mighty landscape in which the seasons, weather and light are constantly changing. But the old mountains never change. In our day to day business we are part of this greatness and we get on well with it. This is the world we live in. This is the place we call home.

We live a good life, and I hope you will feel the same after spending time her. Perhaps you will return and visit us again?

Welcome to Møre and Romsdal and to Molde; the city of roses and jazz. The roses you will find all around in the town, but the jazz is here right now for your enjoyment!

Annex 3

Opening Statement made by the President of NASCO

Statssekretär Sörensen, Fylkesman Befring, ærverdige Repræsentativer, mine Damer og Herrer. Det gir mig en stor fornöjelse at holde den seks og tyvende NASCO årsmöte i Molde og det skönne Möre-Romsdal område. Eg vil takke Miljöværndepartmentet for indbydelsen og en udmærket forberedelse for dette möte. Personlig föler jeg mig altid som "heima" når jeg er i Norge og i dette område er der mange ord som påminner at Norsk og Islandsk en gang var et fælles sprog.

It gives me great pleasure to hold this meeting in this beautiful area of Norway, where wild Atlantic salmon are still abundant in many rivers. Norway with its long coastline bordering the Atlantic has the largest catches of Atlantic salmon in a jurisdiction among the NASCO parties. As such it has always been active in NASCO matters and contributed a lot to the conservation of wild salmon. Paradoxically it has also pioneered and is the leading world producer of farmed salmon, which has been a real challenge with respect to the management of these diverse resources.

I hope you aware that it is exactly 25 years since we held our first NASCO Annual meeting in Edinburgh in 1984. On this 25th Anniversary I think we can be very proud of the achievements of our organisation. Over the years we have developed and approved agreements on fisheries management, on protection and restoration of habitat as well as the Williamsburg resolution on aquaculture introductions and transfers. These are all vital for our work today. We have also negotiated agreements with Greenland and the Faroe Island to protect migrating salmon and subsequently seen numerous measures introduced in homewaters. All these have involved considerable sacrifices for the stakeholders.

I also look back with some satisfaction to our pioneering work on development of the principles of the Precautionary Approach and the new light shed on all the socio-economic values of the wild stocks. I believe too that in integrating all these issues on fisheries, habitat, and aquaculture we are taking some steps to implement the ecosystem approach, which international fisheries organizations have been urged to do. When you consider too, the consultations with stakeholders in two continents on NASCO's work as a part of the "Next Steps" process, we have re-structured our organization in a particular way and become more inclusive and transparent. I thus believe to a great extent that we have met the concerns of our stakeholders and NGOs. Although some salmon stocks are still in precarious state we can be sure that all the NASCO agreements we have implemented have made a positive impact in many jurisdictions.

At this year's meeting we have some very interesting issues on the agenda. At the special session this afternoon we have the final report of the review group on the "Management of Salmon Fisheries" Focus Area. Since we will be leaving this issue for the time being it is very important to hear the views of managers as well as NGOs on the success of this process. Were the issues properly highlighted and are the conclusions regarding the management of Atlantic salmon in various jurisdictions correct. We strongly urge the Parties and respective NGO groups to participate in the debate as the special session is open for everyone´s input. The Parties responded in writing to the earlier criticism from the Review Group and these responses have been compiled in the final report of the group. The Group has also developed best practice guidance in relation to the management of salmon fisheries which the Council

will need to consider carefully and decide if it wishes to adopt.

The second issue covered at the special session will be the first review of the Habitat Protection Restoration and Enhancement Focus area. This Focus Area is in many ways more difficult to deal with than the one on Fisheries Management as it falls a little on the fringes of the expertise and management responsibilities of many NASCO participants. Since we are at an early stage in this process it is very important to get constructive criticism and balanced debate on this issue.

I would like to use this opportunity to thank the members of the two Ad Hoc Review Groups for their elaborate work on Fisheries Management and Habitat Protection issues.

Finally we will discuss the progress in implementing a NASCO Public Relations Strategy, where we are being guided by our NGOs.

We have some other very interesting issues before the Council such as the report of the International Atlantic Salmon Research Board, where we will hear about the success of the SALSEA program and any other research activities relating to salmon in the North Atlantic. We will then of course also deal with the work of NASCOs Commissions which will have to adapt the harvest of Atlantic salmon to the precarious state of many salmon stocks which emerges from the ICES advice. We will also have to come up with some terms of reference for a new Ad Hoc review group which will be dealing with Focus Area Reports on Aquaculture.

As usual we have a full agenda before us and a limited time to cover it. I am looking forward to a lively discussion and debate both in the "Special Session" and Council. The Next Steps Process opened up the floor for our NGOs to participate in the work of NASCO and I urge them to do so. Finally I want to reiterate my gratitude to the Ministry of the Environment for the invitation to hold this meeting in Norway and for excellent preparations for the meeting. As usual our Secretariat has secured efficient running of the meeting and are prepared to assist you in any way possible. Our Norwegian hosts have planned some interesting Post-NASCO tours on Friday and Saturday, which will offer some of us a chance to see more of this beautiful part of Norway.

Thank you.

Annex 4

Opening Statements made by the Parties

Opening Statement made by Canada

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

It is a great pleasure for the Canadian Delegation to be in Norway for this 26th Annual Meeting of NASCO. Molde is a most beautiful part of the country and I want to thank our hosts for providing us with the opportunity to work in such a beautiful, pristine and fresh environment.

Norway and Canada have many common interests in fisheries and aquaculture, but also in many other areas, and we cooperate and work closely together on many fronts bilaterally and in international organizations.

Atlantic salmon is clearly a most important area of common challenges, not only for Norway and Canada, but all of us in this room. And the primary concern for all of us has to be this most worrisome downward trend in Atlantic salmon returns. Year after year, efforts are made in hopes that salmon will come back, and they don't, or they only come back in small numbers – and no one knows exactly why.

Reproductive capacity is low in the North American and the Southern North-East Atlantic Commissions, and there has been no catch options in west Greenland for several years. As indicated by ICES, despite our concerted management efforts on reducing exploitation in recent years there has been little improvement in the status of stocks. The 1,696 t of salmon caught in 2008, although slightly higher than in 2007, is the second lowest in the time-series, and more than 660 t below the average of the last ten years (excludes catch and release).

In Canada, the provisional harvest of salmon was 148 t in 2008, which is 32% less than in 2007. The total population of 1SW and 2SW Atlantic salmon in the Northwest Atlantic has been around 600,000 fish on average over the 1993-2008 period, about half the abundance of the 1972-1990 period.

Regarding marine survival, Canada appreciates the efforts of NASCO under the SALSEA program and we hope that the 2009 campaign will be as successful as in the last year. In Canada, the Department of Fisheries and Oceans was able to organize a 24-day pelagic ecosystem survey of the northwest Atlantic to characterize the abundance and distribution of pelagic fish in the upper 10 meters of the water column.

Mr. President, NASCO is facing many major challenges: trying to better understand salmon behaviour and the impacts of climate change, ensuring that we all maintain our engagement towards better management, protecting and restoring habitat, and managing with the aquaculture industry the potential impacts on wild salmon. Efforts and cooperation are required at levels -- governments, non-governmental organizations, and the aquaculture industry. NASCO is where all these efforts can be brought together.

Before closing, Mr. President, I would like to say that Canada looks forward to a very productive week under your leadership. Joining me at the table is Commissioner Serge Tremblay, Chief, Forest Environment Protection at the Ministry of Natural Resources and Wildlife of Quebec. Unfortunately our Commissioner Bud Bird could not join us for personal reasons. Thank you.

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

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

Greenland and the Faroe Islands are most pleased to participate in the 26th Annual Meeting of NASCO, which has brought us up here to this unique and beautiful location of Molde.

For us, it is always a great pleasure to participate in the NASCO Annual Meetings and this year is no exception.

As you are well aware, the commercial salmon fishery at sea was once of utmost importance both to the Faroe Islands and to Greenland. Unfortunately, this is no longer the case. Only responsible and improved management of the stock can lead to a reopening of this fishery for us in the future, and we continue to hope that this will be possible.

Both the Faroe Islands and Greenland have taken the responsibility to refrain from commercial fishery for salmon in our fishery zones for the time being with a view to rebuilding the stock.

The Faroe Islands salmon fishery is on hold, and since 2002 Greenland has restricted its fishery to a so-called subsistence fishery only allowing fishery of an amount corresponding to the local consumption.

In our view, these measures demonstrate our strong commitment to responsible fisheries management, and we expect other Contracting Parties to recognize this.

At previous meetings we have underlined that both the Faroe Islands and Greenland reserve our full rights to establish quotas for a sustainable salmon fishery at sea in the future when the biological advice allows for this. This is a right we still retain.

An issue which is of continuous concern in Greenland and the Faroe Islands is the fact that a considerable part of the salmon catches are taken in mixed stock fisheries in coastal areas. While Greenland and the Faroe Islands have refrained from commercial fishery for salmon, the mixed stock fisheries continues to threaten the salmon stocks. If the salmon stocks are to be rebuilt it is necessary to regulate fisheries in the coastal areas. We believe that home water salmon fisheries should be included in the NASCO Convention and that the home water Parties should take into account the advice from ICES in their management of the salmon fishery.

We have stated this at a number of previous meetings, but nevertheless we reiterate our strong views on this matter once again this year.

This annual meeting continues the "NEXT STEP APPROACH" guiding the future work of this organization. Initiatives concerning the Fisheries Management Focus Areas, Habitat Protection and Progress in implementing a Public Relation Strategy are main issues - all very relevant and interesting issues to address. Although the Faroe Islands and Greenland are not

the main contributors of information on habitat protection we very much welcome the valuable work being carried out.

Mr. President, I would like to take this opportunity to thank our hosts as well as the Secretariat for all their efforts in the preparation of this meeting.

Finally, Mr. President the Faroe Islands and Greenland can assure you that we are prepared to work in a constructive way so we collectively can contribute to a successful outcome of this 26th Annual NASCO Meeting.

Thank you.

Opening Statement made by the European Union

Right Honorable State Secretary, Mr Governor, Mr President, Fellow Delegates, Ladies and Gentlemen.

Firstly, on behalf of the European Union I would like to warmly thank the Norwegian government for hosting the 26th Annual Meeting of NASCO in this spectacular setting of Molde, and the warm welcome and hospitality that we have received since arriving. We would also like to thank Arne Eggereide and his team for providing the magnificent facilities in this unique hotel. This must be one of the most outstanding setting in which NASCO has met, and I feel it will be hard to maintain our concentration.

This year we are continuing with the "Next Steps" review process, and we hope that the good work that has been achieved up to now will be maintained. We for our part, will fully participate in the discussions which we would hope will lead to the continued further development of the organisation. This should, in an ideal world, lead to an improvement in the wild salmon stock status. A crucial element to this process is the adequate reporting of the Parties. The EU recognises that it has not fully met this requirement, but it will do its utmost to redress this situation in the very near future. Indeed we hope that it has already been done in some cases.

We would like to recognise, and welcome, the decision taken at Gijon last year that moves forward the process of a Performance Review of the organisation as required by the United Nations. We would anticipate that this work commence in 2011 when the "Next Steps" process will have completed its first cycle of reviews. This would permit the current review to play a full part in the in-depth review of the organisation, a process that we have all subscribed to in New York regarding all organisations such as NASCO.

From the scientific advice we have seen a slight improvement in the stock situation, but this cannot be taken to mean that we have turned the road regarding the situation of the wild salmon stocks. We continue to be concerned about the mixed stock fisheries and the threat that this poses to the status of the wild salmon stocks. For our part, the EU has taken significant steps in recent years to address this issue, to a point where there are minimal coastal fisheries, and this action is ongoing. In this regard, we welcome the discussions that have taken place earlier this year on this issue, and I would underline that the EU also has an interest in these discussions, even though we were unfortunately not able to participate at this meeting.

We look forward to the discussions that are ahead of us this week, and we will fully play our part in reaching a successful outcome to this 26th Annual Meeting of NASCO.

Finally, Mr President, I would once again like to thank our hosts for the facilities that they have provided and Malcolm and the NASCO Secretariat staff for the excellent preparation and arrangements they have made for the meeting and express, in advance, our thanks for the massive efforts that they will undertake in the week ahead. Thank you.

Opening Statement made by Iceland

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

It gives us great pleasure to attend this annual meeting of NASCO in the beautiful setting of the town of Molde. Möre and Romsdal with other areas of western Norway harbour some of the best Atlantic salmon rivers in the world making Norway a key player in the NASCO forum. We want to thank our hosts for these outstanding meeting facilities and the opportunity to see some of the beautiful salmon rivers and the outstanding scenery of the region after the meeting.

As usually we have many important issues to deal with at this meeting. In addition to regular business issues we have a special session on the Next Steps Process dealing with the final review of the Focus Area Reports on fisheries management and our first review of the Habitat Protection issues. Following that debate we need to decide on the process with respect to the management of Aquaculture. We will also hear the report of the International Atlantic Salmon Research Board, which will have some progress reports from last year's SALSEA research cruises. We are delighted to report that the Icelandic government has enabled us to take part in the SALSE program by offering a research vessel for a cruise to the Irminger Sea this summer.

We are also happy to report that the Icelandic salmon catches were record high in 2008. The total angling catches were over 80 thousand salmon which was a 50 % increase from the previous year and 75 % over the 33 year average. Over 28 thousand salmon were caught in rivers, where angling is maintained through enhancement with smolts, which was about 35 % of the total angling catch. This increase seemed to be related to increased marine survival especially in the grilse component and over 19 % return rates were observed in wild microtagged grilse returning to the River Elliðaár, which is one of our index streams. Such return rates have not been observed in Iceland since the late 1970s. There are still concerns with respect to the 2SW component although some improvement was observed. There was an increase in the release of larger salmon especially in natural salmon rivers, where catch and release amounted to 34 %. The total proportion released in angling was, however, only 19 % as fewer salmon were released in rivers maintained through enhancement with smolts.

Salmon cage culture on Iceland´s east coast has been decreasing in recent years and Icelandic aquaculture is currently more or less dominated by the freshwater culture of arctic charr which amounted to 3000 tonnes in 2008. In the wake of drastic changes in the exchange rate of the Icelandic Krona there seems to be renewed interest in the marine aquaculture of salmon in the northwestern part of Iceland. All salmon producing areas are, however, protected from aquaculture activities through regulation nr. 460/2004 on protection areas with respect to salmon aquaculture.

This year ICES once more warns us of the precarious state of the MSW stocks and advises that in the light of the "precautionary approach" only maturing 1SW salmon from rivers with full reproductive capacity should be fished. We should all agree that this can only be done in terminal fisheries in or close to the respective rivers.

Finally, Mr. President, I want to thank you and the NASCO Secretariat for the efficient preparation of the meeting and our Norwegian hosts for their hospitality.

Thank you Mr. President.

Opening Statement made by Norway

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

It is a pleasure for Norway to host the Twenty-Sixth Annual Meeting of NASCO and I would like to add my welcome to that of the State Secretary. In her welcoming speech she summarised some of the major challenges facing Norwegian Salmon management and efforts to protect and conserve the Atlantic salmon. These challenges are by no means unique to Norway, but are more or less common to all North Atlantic countries. It was such common challenges that once led to the establishment of NASCO. The threats facing salmon stocks have not diminished, and NASCO is as important today as ever before.

NASCO has had a great impact on Salmon fishery policy and has contributed to sustainable harvest of Salmon among its member countries. In Norway this has led to more goal-oriented and structured fishery regulations. Mixed stock fisheries have been greatly reduced. However, there are still tasks ahead, especially concerning mixed stock fisheries both in the sea and in some larger rivers, and interceptory fishery in the sea. With regard to the latter, the Norwegian delegation will invite relevant NASCO members to discussions here in Molde.

Concerning habitat issues there are still good reasons for strengthening international cooperation. In Norway significant progress has been made concerning liming of acidified rivers, the battle against *Gyrodactylus* and adjustments to hydropower regulations. However the pressure on salmon habitat exerted by man is still a matter of the greatest concern both to Norway and other NASCO members. We, therefore, look forward with great interest to the special session at this meeting.

Aquaculture issues are no less relevant to NASCO members than they were in 1994 when the organization adopted the Oslo Resolution. Since then, the industry has increased manifold, and so have the problems with escaped farmed salmon and sea-lice. Last year, it was observed that on several fish-farms the Sea-lice had become resistant to pesticides. If this is a trait that spreads, the Sea-lice situation can come out of control. Salmon aquaculture is a formidable and fast growing industry throughout the North Atlantic. This poses equally formidable challenges to conservation of wild Salmon; challenges that require international cooperation and concerted actions. I will, therefore, emphasise the importance of continued NASCO engagement in this field.

Implementation of the precautionary approach in Salmon management is one of the most important undertakings by NASCO. It is a strategy which is turned into practice by concrete guidelines. It is a fruitful strategy that already has proven its worth in the management of Salmon fisheries, and I trust this meeting will take this important work a step forward.

Mr. President, in closing I would like to thank the Secretariat for excellent preparation and assistance in arranging this meeting and I wish you all a productive meeting and an enjoyable stay in Molde.

Opening Statement made by the Russian Federation

Mr President, Distinguished Delegates, Observers, Ladies and Gentlemen

I am pleased on behalf of the Russian delegation and the Federal Agency for Fisheries, representing the Russian Government in NASCO, to greet all participants of the 26th Annual Meeting of NASCO.

First of all, I would like to use this opportunity to express my appreciation of the cordial welcome and excellent arrangements for this meeting provided by our Norwegian hosts, and the magnificent beauty of the place, we are honoured to see.

A lot of important work lies ahead of us, and we are confident, that decisions of this meeting will be for the benefit of our collective course with the main objective of conservation of the pearl of our rivers, the Atlantic salmon, for future generations.

We are much concerned about declining numbers of salmon. We all know how diverse factors affecting its abundance could be and how often fragmentary and contradictory our knowledge of this species is, particularly, of its life in the ocean. Therefore, we are looking forward to progress reports on research undertaken last year under the SALSEA Programme, which, we are confident, will improve our understanding of the marine life of Atlantic salmon and factors behind increased mortality.

If before unsustainable exploitation of salmon both at sea and in homewaters was a major factor contributing to the decline of stocks, in the last decades, in our view, the NASCO Contracting Parties took unprecedented actions to reduce the pressure of fisheries and today there are other factors, which play the key role. Among them the deterioration of salmon habitat caused by human activities should be mentioned.

In this light, efforts made by Contracting Parties to fully implement the NASCO agreements relating to salmon habitat are very important. However, it may be that sometimes the progress with restoration of salmon habitat and the possibilities to implement the agreements do not fully meet the tempo of modern life. However, clearly there is a determination to resolve these issues, which means that eventually success will be achieved.

We have already highlighted on earlier occasions that the Russian Federation attaches great importance to enhancing the effectiveness of the use of Atlantic salmon resource and to the development of recreational salmon fishery to this end. We can today boast significant achievements in this area. This became possible thanks to that we could not only preserve the resource, but that we also used the best international practices available, in NASCO including. Despite the global crisis, to which we often refer nowadays, the recreational fishing companies operating in Russia are expecting a successful fishing season on salmon rivers this year too.

We continue to improve our legislation relating to conservation and management of Atlantic salmon. New amendments were made to the Law on Fisheries, recently established Anadromous Fish Commissions began working, a number of bylaws was adopted to fully implement the Law on Fisheries.

And in conclusion, our Annual Meeting is taking place in the country with which Russia has had close long-standing relations, particularly in the fisheries, I would like to note our good neighbourly cooperation of many years with Norway and common interests in both science and management of joint biological resources, in the Barents Sea, in the first place. We also have successful cooperation under joint long-term research programmes on Atlantic salmon and are working closely together to identify ways to resolve problems in the management of salmon fisheries.

I would like to thank Norway hosting this Annual Meeting once again for hospitality, and wish all of us success in working together during this week.

Thank you for attention.

Opening Statement made by the United States of America

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

On behalf of the United States, I would like to thank Norway for hosting this Twenty-Sixth Annual Meeting of NASCO in this beautiful location, so close to the many magnificent salmon rivers of Norway.

Since the last annual meeting of NASCO, we have taken further difficult steps in the United States to propose expansion of our endangered species listing to include Atlantic salmon populations in the Penobscot, Kennebec and Androscoggin Rivers. In addition, we have proposed to designate critical habitat for Atlantic salmon. Our commitment to salmon conservation and recovery is clear in the application of our strongest law to protect salmon and salmon habitat. The commitment comes at a significant cost to those industries, organizations, agencies and individuals who must modify their plans and activities to avoid and minimize impacts to Atlantic salmon. We recognize that these efforts at home are a prerequisite to our coming here to NASCO to work in a collaborative, balanced and fair way to rebuild Atlantic salmon stocks worldwide.

The Next Steps performance review process undertaken by NASCO has been a learning experience for the Organization, its Contracting Parties, and for each of us as individual salmon researchers and managers. The special session this afternoon will complete our first focus area review on fisheries management and highlight our second focus area review which examined implementation of the Habitat Action Plan. At this meeting we will also agree on terms of reference for the final focus area review on aquaculture, introductions and transfers and salmonids. Once we complete this cycle of implementation plans and focus area reviews it will be important to reflect back on the process and evaluate whether it has achieved the objectives of increased collaboration, accountability and transparency and improved the efficiency and effectiveness of NASCO.

Also consistent with the recommendations from the Next Steps process, multi-annual regulatory measures were adopted for the West Greenland Commission in 2006. With the Framework of Indicators developed by ICES, we are in a position this year to adopt a regulatory measure for 2009 through 2011. While not precisely in the same position as the WGC, we are also optimistic that the Northeast Atlantic Commission will both be able to agree on an appropriate regulatory measure this year and also to develop specific management objectives to allow ICES to develop quantitative catch advice for that Commission in the future. We also look forward to adoption and implementation this year of an Enhanced Sampling Program in Greenland, consistent with the recommendation from ICES, and view this as a critical component of the SALSEA program. It is very exciting to see the progress that has been made in SALSEA Merge and SALSEA North America and this provides evidence of what can be accomplished with international collaboration and a shared commitment to finding answers to critical questions facing salmon.

We welcome the interim report from the ISFA-NASCO Task Force on Best Practice in Aquaculture to Address Impacts on Wild Salmon Stocks. Agreed international goals, best management practices, and metrics to track our progress toward these goals provide a strong foundation upon which to rebuild our cooperative relationship with the international salmon farming industry.

In 2008, we saw significant increases in Atlantic salmon returns to U.S. Rivers and we are hopeful this is the sign of more improvement to come. But, while we are optimistic, we are also realistic. The challenges facing salmon in freshwater, estuaries and during their extensive marine migration are significant and we must remain vigilant in our efforts to identify, evaluate and reduce threats and seek to continuously improve our understanding. International collaboration is essential for salmon conservation and we look forward to working with the NASCO Parties and observers this week. Finally, I would like to thank our hosts and the Secretariat for the excellent preparations for this meeting.

Annex 5

Opening Statement made by the European Inland Fisheries Advisory Commission (EIFAC)

It gives me great pleasure to attend this meeting of NASCO as an observer from the European Inland Fisheries Advisory Commission.

For those that might be unaware, EIFAC is a statutory, advisory body of the Food and Agriculture Organization (FAO) of the United Nations. Established in 1957, it is an inter-governmental forum for collaboration and information exchange on inland fisheries and aquaculture across all European countries. Governments, institutions and agencies can benefit from international advice derived from the EIFAC network of policy-makers, managers, scientists and others working on inland fisheries and aquaculture issues. Scientific work is undertaken in Working Parties by specialists from member countries. Recent Working Party activity of relevance to salmon stakeholders includes the publication of the new Code of Practice for Recreational Fisheries and the ongoing development of best practice for migratory fish passage. The emerging issue of illegal, unreported and unregulated (IUU) fishing is also being addressed.

International consistency in the resolution of fisheries management issues is of increasing importance at the present time. Ecosystems and the services that humanity derives from them are being impacted by such pressures as land use practices, diffuse pollution, climate change and over-fishing, to name but a few. Consolidation and cascade of best practice advice to the inland fisheries sector and its stakeholders is where EIFAC has a major role. It has been recognised, however, that if EIFAC is to fulfil this role, and is to function efficiently, there is a need to enhance its relevance to the management and advisory challenges of modern times. Accordingly, a review of the functioning of EIFAC is being carried out.

At this stage of the review, information exchange and awareness of international emerging issues is vital. The social, economic, conservation and cultural value of salmon fisheries is not in doubt, and the need to maintain the sustainability of this resource is paramount. It is, therefore, very much appreciated that NASCO extended to EIFAC the invitation to observe this meeting.

I wish you all a productive session.

Thank you.

Annex 6

Opening Statement made by Mr Børre Pettersen, past President of NASCO (1992-1996)

Mr President, State Secretary, County Governor, Delegates, Ladies and Gentlemen.

Thank you Mr President for giving me the opportunity to speak to the Council of NASCO this morning. The last time I did so was in Gothenburg, Sweden in 1996.

As far as I can see, NASCO has developed since the "The Oslo Resolution" was adopted in 1994. The Oslo Resolution asked for a change and a new strategy was agreed; requiring that the Parties to NASCO should implement the decisions taken and report back to NASCO on an annual basis.

Now I can see that NASCO plays a key role and the Parties have to respond and report on the steps they have taken to implement NASCO advice into national policy and salmon management.

This strategy must be even stronger in the years to come. We all need a strong international body to stress national salmon management and, of course, supranational and national policy and management must develop in the same direction. Working together was after all the basic idea for the foundation of NASCO.

The management of the Atlantic salmon had to take place both on the international and on the national level, based on science and on a common management strategy.

I will not bother you with all the threats the Atlantic salmon is facing. You know everything about it but allow me to comment on two items.

First, the fish farming industry.

This industry represents the biggest threat to the Atlantic salmon with its rapidly increasing production of sea lice combined with locations close to or even in the key areas of smolt migration.

In addition the production of farmed salmon has increased significantly and so have the numbers of escaped farmed salmon.

In environmental policy as a whole "The polluter pays principle" was established a long time ago.

The governments which allowed fish farming on a larger and larger scale must implement this principle as a basic requirement in the regulations. The consequences will be that the fish farming industry has to deal with all the costs associated with their damaging behaviour to the wild salmon.

Escaped farmed salmon and production of sea lice is nothing else than biological pollution.

Second, marine fisheries.

Marine fisheries for salmon must be put to an end. Bag nets and bend nets are still operating along coastlines – fishing on mixed stocks – even stocks on their migration to other countries.

Fishing on mixed stocks is biologically wrong. NASCO put an end to line fisheries in international waters. Parties of NASCO have put an end to driftnets. Now we must take the next step. We must put an end to coastal fisheries.

Finally Mr President

The Annual Meeting in Oslo 1994 invited the NGO`s to play a more active role in NASCO. As far as I can see they have taken that opportunity seriously; they play an important role both at NASCO level and at the national level.

You have the knowledge, you have the spirit, the Atlantic salmon needs your effort, now more than ever.

I wish you all a successful meeting.

Thank you.

Annex 7

Opening Statement made by Non-Government Organizations

Mr President, State Secretary, County Governor, delegates, I think I speak for all the NGOs when I say this is probably the most spectacular location that NASCO has met in, so thank you for inviting us here.

I am pleased to present the joint opening statement on behalf of the NGO Group. This year we welcome two additional members, the Irish Seal sanctuary and the North West Marine Alliance. We wish to use this statement to highlight the main issues of concern to NGOs, which we will be returning to during the course of the week.

Madam State Secretary, in Norway everything about wild Atlantic salmon is "large". You have the largest wild stock of salmon in the North Atlantic and the largest stock in one river, the Tana; unfortunately you also have the largest mixed stock coastal fishery, in Finnmark, that intercepts about 65% of Tana salmon, as well as fish from Russia and Finland. You also produce the largest number of farmed salmon, some 75% of the one million tonnes produced in the North Atlantic; unfortunately this means you also have the largest number of escaped farm salmon, causing genetic pollution, and probably also the largest number of parasitic sea lice too, which impact on the survival of both salmon and sea trout smolts. Norway is also a victim of *Gyrodactylus salaris,* with its potential to devastate wild Atlantic salmon stocks. So, there are no shortage of challenges. Fortunately, you have an environment ministry, many scientists and NGOs dedicated to try and address these problems, and many of them, including you, are in this room today. We will be returning to all these subjects during this meeting, and look forward to the debates.

Mr President, on wider NASCO matters and faced with continuing depressing news from ICES on the status of wild salmon stocks in the North Atlantic the NGOs want to re-affirm their support for the SALSEA project, and we look forward to a progress report. We hope that a line can be drawn under the mis-understandings that led to the failure of the extended sampling programme at West Greenland last year, and that it <u>will</u> take place this year. However, we note the rising internal use fishery which has crept up to 26 tonnes, and stress that it is absolutely essential to ensure that any additional sampling does not lead to any further increase.

On the subject of fishery management, we finished the meeting last year on a highly critical note concerning the lack of progress by some jurisdictions in closing mixed stock fisheries. A theme for us remains the balance and fairness between distant and home-water *fisheries*, as emphasized by Demark (in respect of Greenland and Faroes) in their opening statement. While there has been some progress to report – Norway and Russia have met for preliminary talks about the impact of the Norwegian coastal fishery, and Scotland has instituted a mixed stock fishery review – we remain concerned at this slow rate of progress. I am disappointed to note that EU Finland did not attend the talks referred to above, despite their interest in the Teno (Tana). We note that in Canada, the mixed stock fishery off Labrador reached 36 tonnes in 2008, the largest amount since the commercial fishery was terminated in 1998 and the catch in St Pierre and Miquelon has risen by 70%. This is particularly significant for its impact on endangered North American stocks. These examples also highlight the growing impact of subsistence or first nation fisheries.

In Northern Ireland, the Minister there has reneged on written undertakings, and a long-standing commitment to phase out their remaining drift nets, announcing a review instead, which had already been carried out as described in their 2007 Implementation Plan. We take this particularly seriously as it is the first such breach of an IP and we will ask Council, through the President, how they propose to react.

We remind all the jurisdictions concerned of the conservation benefits in taking decisive action to close mixed stock fisheries as demonstrated recently by EU Ireland,

We look forward to the final report of the Fishery Management FAR group. The process has highlighted, as intended, the successes and shortcomings of the various parties, and we encourage those lagging behind, especially with regards mixed stock fisheries, to adopt the Best Practice guidance produce by the group.

We also look forward to the Habitat FAR group report. While the subject of habitat restoration is probably less controversial than fishery management practices, it is no less vital to salmon restoration

We are also pleased to note the first meeting of the Aquaculture Task Force. It would appear we now at last have a clear industry supported statement recognising the problems that escapes and disease – particularly sea-lice – can cause wild fish. This has been a long time coming but is nevertheless welcome and we regard this as a positive prelude to the Aquaculture FAR which starts later this year. However, I have to report that many of our NGOs on this side of the Atlantic are already calling for a move from voluntary to legal compliance, and taking robust measures to achieve this.

Finally, Mr President, this statement is rather longer than I would like. This is partly because of the number of challenges facing Atlantic salmon and partly a result of the Next Steps process, which has successfully incorporated the NGOs into the NASCO process. We are, of course, delighted with that, and would like to thank the secretariat and all the Parties for their help and co-operation in making this process work. It may sometimes be an uncomfortable process, but if it helps the conservation status of Atlantic salmon it will be worthwhile.

Thank you for your attention; we look forward to a productive meeting.

Annex 8

List of Participants

* Denotes Head of Delegation

CANADA

*Mr Guy Beaupré	Representative Department of Fisheries and Oceans, Ottawa, Ontario
Mr Serge Tremblay	Representative Ministére des Ressources Naturelles et de la Faune du Quebec, Quebec
Mr Doug Blake	Nunatsiavut Government, Happy Valley - Goose Bay, Newfoundland
Mr Tony Blanchard	Department of Fisheries and Oceans, St John's, Newfoundland
Mr Dany Bussières	Ministére des Ressources Naturelles et de la Faune du Quebec, Québec
Mr Gerald Chaput	Department of Fisheries and Oceans, Moncton, New Brunswick
Ms Nell Halse	Cooke Aquaculture Inc, St John, New Brunswick (President of International Salmon Farmers Association)
Mr Murray Hill	Department of Fisheries and Aquaculture, Pictou, Nova Scotia
Ms Chantal Lamadeleine	Department of Fisheries and Oceans, Ottawa, Ontario
Mr David Reddin	Department of Fisheries and Oceans, St John's, Newfoundland
Mrs Susan Rocque	Department of Fisheries and Oceans, Ottawa, Ontario
Ms Susan Waters	Department of Fisheries and Oceans, Ottawa, Ontario

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

* Ms Sonja Feldthaus	Representative Greenland Home Rule Agency of Fisheries, Hunting & Agriculture, Nuuk, Greenland

Mr Jacob Isbosethsen	Greenland Home Rule Agency of Fisheries, Hunting & Agriculture, Nuuk, Greenland
Ms Elin Mortensen	Ministry of Foreign Affairs, Torshavn, Faroe Islands
Mr Julius K Peedah	Ministry of Fisheries, Hunting and Agriculture, Nuuk, Greenland

EUROPEAN UNION

*Mr Alan Gray	Representative European Commission, DG Mare, Brussels, Belgium
Ms Aleksandra Kordecka	Representative European Commission, DG Mare, Brussels, Belgium
Dr Agnetha Alriksson	Ministry of Agriculture, Stockholm, Sweden
Ms Carmen Beraldi	Secretaria General del Mar, Madrid, Spain
Ms Elizabeth Black	Environment Agency, Penrith, Cumbria, England, UK
Dr Ciaran Byrne	Central Fisheries Board, Swords, Dublin, Ireland
Mr Hakan Carlstrand	Swedish Board of Fisheries, Gothenburg, Sweden
Mr Richard Cowan	Department of Environment, Food and Rural Affairs, London, England, UK
Mr Erik Degerman	Swedish Board of Fisheries, Örebro, Sweden
Mrs Louise Donnelly	Scottish Government, Marine Scotland, Edinburgh, Scotland, UK
Dr Cathal Gallagher	Central Fisheries Board, Swords, Dublin, Ireland
Dr Paddy Gargan	Central Fisheries Board, Swords, Dublin, Ireland
Ms Heather Jones	Scottish Government, Marine Scotland, Edinburgh, Scotland, UK
Mr Richard Kennedy	River Bush Salmon Station, Co. Antrim, Northern Ireland, UK
Ms Eija Kirjavainen	Ministry of Agriculture and Forestry, Helsinki, Finland
Mr Marcus McAuley	Department of Culture, Arts and Leisure, Belfast, Northern Ireland, UK

Mr John McCartney	Loughs Agency, Londonderry, Northern Ireland, UK
Mr Julian C MacLean	Fisheries Research Services, Montrose, Scotland, UK
Dr Ursula Monnerjahn	Federal Agency for Agriculture and Food, Bonn, Germany
Ms Majella O'Dea	Dept of Communications, Energy & Natural Resources, Dublin, Ireland
Dr Niall Ó Maoileidigh	Marine Institute, Newport, Ireland
Mr Pentti Pasanen	Employment and Economic Development Centre for Lapland, Rovaniemi, Finland
Mr Ted Potter	Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, England, UK
Mr Frank Sheridan	Department of Communications, Energy and Natural Resources, Dublin, Ireland
Mrs Benedicte Valadou	ONEMA, Direction Générale, Vincennes, France
Dr Ken Whelan	Marine Institute, Newport, Ireland

ICELAND

* Mr Gudni Gudbergsson	Representative Institute of Freshwater Fisheries, Reykjavik
Mr Arni Isaksson	President of NASCO Freshwater Fisheries and Salmonid Management Division, Hafnarfjordur, Iceland

NORWAY

* Mr Arne Eggereide	Representative Directorate for Nature Management, Trondheim
Mr Raoul Bierach	Representative Directorate for Nature Management, Trondheim
Mr Vidar Baarøy	Directorate of Fisheries, Bergen
Dr Oystein Aas	Norwegian Institute for Nature Research, Lillehammer
Ms Heidi Hansen	Directorate for Nature Management, Trondheim

Dr Lars Petter Hansen	Norwegian Institute for Nature Research, Oslo
Mr Steiner Hermansen	Ministry of the Environment, Oslo
Mr Helge Lorentzen	Ministry of the Environment, Oslo
Mr Børre Pettersen	LO, Slemmestad
Mr Christopher Grovdal Ronbeck	Ministry of Fisheries and Coastal Affairs, Oslo
Ms Janne Sollie	Directorate for Nature Management, Trondheim
Mr Ragnar Thorarinsson	Norwegian Food Safety Authority (Mattilsynet), Brumunddal

RUSSIAN FEDERATION

* Mr Mikhail Kumantsov	Representative Federal Agency for Fisheries of the Russian Federation, Moscow
Dr Boris Prischepa	Representative Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk
Ms Natalya Kalinina	Territorial Directorate of the State, Murmansk
Dr Svetlana Krylova	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk
Mr Dmitry S Lipatov	Karelrybvod, Petrozavodsk
Mr Viacheslav A Movchan	Karelrybvod, Petrozavodsk
Dr Sergey Prusov	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk
Ms Elena Samoylova	Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), Murmansk

USA

* Ms Patricia A Kurkul	Representative NOAA Fisheries, Gloucester, USA
Mr Stephen Gephard	Representative Department of Environmental Protection, Inland Fisheries Division, Old Lyme, Connecticut

Mr George Lapointe	Representative Maine Department of Marine Resources, Augusta, Maine
Mr Sebastian Belle	Maine Aquaculture Association, Maine, USA (Chairman of NASCO/ISFA Liaison Group)
Ms Kimberly Blankenbeker	National Marine Fisheries Service, Silver Spring, Maryland
Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts
Dr Jaime Geiger	US Dept of the Interior, US Fish and Wildlife Service, Hadley, Massachusetts
Ms Jessica Pruden	National Marine Fisheries Service, Gloucester, Massachusetts
Ms Nicole Ricci	US Department of State, Washington
Mr Rory Saunders	National Marine Fisheries Service, Orono, Maine
Mr Tim Sheehan	National Marine Fisheries Service, Woods Hole, Massachusetts, USA
Ms Boyce Thorne-Miller	Northwest Atlantic Marine Alliance, USA

STATES NOT PARTIES TO THE CONVENTION

France (in respect of St Pierre and Miquelon)

Ms Christiane Laurent-Monpetit	Ministère de I'Intérieur et de l'Outre-Mer et des Collectivités Territoriales, Paris

INTER-GOVERNMENTAL ORGANIZATIONS

Dr Jaakko Erkinaro	Chairman, ICES Working Group on North Atlantic Salmon
Ms Elin Mortensen	North Atlantic Marine Mammal Commission NAMMCO
Dr Henrik Sparholt	ICES, Copenhagen, Denmark
Mr Øyvind Walsø	European Inland Fisheries Advisory Commission

NON-GOVERNMENT ORGANIZATIONS **

Mr Chris Poupard	Chairman of NASCO's Accredited NGOs Institute of Fisheries Management, UK
Dr Frederic Mazeaud Ms Sylvie Tissier Mr Christian Vernes	Association Internationale de Défense du Saumon Atlantique, France
Mr Hugh Campbell Adamson Mr Andrew Wallace	Association of Salmon Fishery Boards, UK
Ms Sue Scott	Atlantic Salmon Federation (Canada)
Mr Anthony Andrews	Atlantic Salmon Trust, UK
Mr Gunnar Norén	Coalition Clean Baltic, Sweden
Mr Patrick Martin	Conservatoire National du Saumon Sauvage, France
Mr John Crudden	European Anglers' Alliance, Belgium
Mr Noel Carr Mr John Carroll	Federation of Irish Salmon and Sea-Trout Anglers, Ireland
Mr John Gregory	Institute of Fisheries Management, UK
Mr Patrick Peril	Irish Seal Sanctuary, Ireland
Mr Torfinn Evensen Mr Aage Wold	Norskelakseelver (Norwegian Salmon Rivers), Norway
Mr Espen Farstad Mr Oyvind Fjeldseth Mr Alv Arne Lyse	Norwegian Association of Hunters and Anglers, Norway
Mr Finn Erlend Odegard	Norwegian Farmers Union, Norway
Mr Paul Knight	Salmon and Trout Association, UK
Mr Robert Wemyss	Salmon Watch Ireland (SWIRL), Ireland
Prof David Mackay	Scottish Anglers National Association, UK
Mr Martin Arnould	World Wide Fund for Nature, France

***Only 2 representatives of a Non-Government Organization can attend meetings at any one time.*

SECRETARIAT

Dr Malcolm Windsor	Secretary
Dr Peter Hutchinson	Assistant Secretary
Ms Mairi Ferguson	PA to the Secretary
Ms Louise Erwin	PA

Support Staff

Mr Trond Haukebø

Ms Synnøve Ulleland

Ms Kjellaug Finnøy

Ms Solbjørg Jenset

Ms Grete Eidsæter

Annex 9

CNL(09)46

Agenda

1. Opening Session

2. Adoption of Agenda

3. Financial and Administrative Issues

3.1 Report of the Finance and Administration Committee

4. Scientific, Technical, Legal and Other Information

4.1 Secretary's Report
4.2 Report on the Activities of the Organization in 2008
4.3 Announcement of the Tag Return Incentive Scheme Grand Prize
4.4 Scientific Advice from ICES
4.5 Scientific Research Fishing in the Convention Area
4.6 Report of the International Atlantic Salmon Research Board
4.7 Report of the Standing Scientific Committee

5. Next Steps for NASCO

5.1 Special Session: Progress with the Next Steps Strategy

a) Final Report of the Fisheries Management Focus Area Review Group
b) Draft Report of the Habitat Protection, Restoration and Enhancement Focus Area Review Group
(c) Progress in implementing a Public Relations Strategy

5.2 Decisions by the Council in the light of the 'Next Steps for NASCO' Special Session

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

6.1 Annual Reports on Implementation Plans
6.2 Liaison with the North Atlantic Salmon Farming Industry
6.3 New or Emerging Opportunities for, or Threats to, Salmon Conservation and Management
6.4 Incorporating Social and Economic Factors in Salmon Management
6.5 St Pierre and Miquelon Salmon Fishery
6.6 Reports on the Work of the Three Regional Commissions

7. Other Business

8. Date and Place of Next Meeting

9. Report of the Meeting

10. Press Release

Annex 10

CNL(09)38

North Atlantic Salmon Conservation Organization
2010 Budget and 2011 Forecast Budget (Pounds Sterling)

Section	Description	Expenditure	
		Budget 2010	Forecast 2011
1	Staff-related costs	365,330	376,200
2	Travel and subsistence	45,500	45,400
3	Research and advice	61,870	63,700
4	Contribution to Working Capital Fund	0	0
5	Meetings	8,000	8,000
6	Office supplies, printing and translation	21,000	21,500
7	Communications	24,500	24,900
8	Headquarters Property	35,800	36,800
9	Office furniture and equipment	6,500	6,500
10	Audit and other expenses	11,000	11,200
11	Tag Return Incentive Scheme	4,800	4,800
12	International Atlantic Salmon Research Fund	0	0
13	Contribution to Contractual Obligation Fund	37,000	38,000
	Total	621,300	637,000

		Income	
		Budget 2010	Forecast 2011
14	Contributions - Contracting Parties	562,300	574,000
15	General Fund - Interest	2,000	8,000
16	Income from Headquarters Property	57,000	55,000
17	Surplus or Deficit (-) from 2008	0	0
	Total	621,300	637,000

Revised Adjustments to 2009 contributions (Pounds Sterling)
to take into account confirmed 2007 Catch Statistics

Party	2007 Provisional catch	2007 Confirmed catch	2009 Revised Contribution based on provisional catch	2009 Revised Contribution based on confirmed catch	Revised Adjustment to 2009 contribution
Canada	112	112	61,299	61,026	-273
Denmark (Faroe Islands and Greenland)	25	25	36,211	36,150	-61
European Union	441	453	156,171	158,528	+2,356
Norway	767	767	250,179	248,310	-1,869
Russian Federation	63	63	47,169	47,015	-154
USA	0	0	29,002	29,002	0
TOTAL	1,408	1,420	580,030	580,030	0

Note: A positive adjustment represents an underpayment in 2009.

Revised NASCO Budget Contributions for 2010 and Forecast
Budget Contributions for 2011 (Pounds Sterling)

Party	2008 Provisional catch (tonnes)	Revised Contribution for 2010	Revised Adjustment from 2009	Revised Adjusted contribution for 2010	Revised Forecast contribution for 2011
Canada	148	67,003	-273	66,730	68,397
Denmark (Faroe Islands and Greenland)	26	34,947	-61	34,886	35,674
European Union	444	144,779	+2,356	147,136	147,792
Norway	807	240,160	-1,869	238,291	245,157
Russian Federation	73	47,296	-154	47,143	48,280
USA	0	28,115	0	28,115	28,700
TOTAL	1,498	562,300	0	562,300	574,000

Contributions are based on the official catch returns by the Parties. Column totals can be in error by a few pounds due to rounding.

Annex 11

Council

CNL(09)8

Report of the ICES Advisory Committee

(Sections 1, 2 and 6 only)

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

1. Introduction

1.1 Main tasks

At its 2008 Statutory Meeting, ICES resolved (C. Res. 2008/2/ACOM06) that the Working Group on North Atlantic Salmon [WGNAS] (Chair: J. Erkinaro, Finland) will meet in Copenhagen, Denmark, from the 30th March–8th April 2009 to consider questions posed to ICES by the North Atlantic Salmon Conservation Organisation (NASCO). The terms of reference were met and the sections of the report which provide the answers are identified below:

a) With respect to Atlantic Salmon in the North Atlantic area:	Section 2
1) provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched Atlantic salmon in 2008[1];	2.1 and 2.2
2) report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];	2.3 and 2.4
3) continue the work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance[3];	2.5
4) provide a compilation of tag releases by country in 2008 and advise on progress with analysing historical tag recovery data from oceanic areas;	2.7
5) evaluate the results of studies that estimate the level of prespawning mortality of salmon caught and released by anglers and the implications for stock assessments;	2.6
6) identify relevant data deficiencies, monitoring needs and research requirements[4].	Sec 6
b) With respect to Atlantic salmon in the North-East Atlantic Commission area:	Section 3
1) describe the key events of the 2008 fisheries[5];	3.8
2) provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;	3.9
3) review and report on the development of age-specific stock conservation limits;	3.3

4) describe the status of the stocks and provide annual catch options or alternative management advice for 2010-2012, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6];	3.4, 3.6, and 3.8
5) further develop methods to forecast PFA for northern and southern stocks with measures of uncertainty.	3.6
6) further investigate opportunities to develop a framework of indicators that could be used to identify any significant change in previously provided multi-annual management advice	3.10

c) With respect to Atlantic salmon in the North American Commission area:	Section 4
1) describe the key events of the 2008 fisheries (including the fishery at St Pierre and Miquelon) [5];	4.9
2) provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;	4.10
3) update age-specific stock conservation limits based on new information as available;	4.3
4) describe the status of the stocks and provide annual catch options or alternative management advice for 2009–2012 with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6].	4.6, 4.7 and 4.9

d) With respect to Atlantic salmon in the West Greenland Commission area:	Section 5
1) describe the key events of the 2008 fisheries[5];	5.8
2) provide any new information on the extent to which the objectives of any significant management measures introduced in recent years have been achieved;	5.10
3) describe the status of stocks and provide annual catch options or alternative management advice for 2009–2011 with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding [6, 7];	5.1, 5.4 and 5.9
4) update the framework of indicators used to identify any significant change in the previously provided multi-annual management advice.	5.11

Notes:

1) *With regard to question a.1, ICES is asked to ensure that the terminology used in presenting the data on ranching is clearly defined. For the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal.*

2) *With regard to question a.2, ICES is requested to include information on any new research into the migration and distribution of salmon at sea.*

3) *With regard to question a.3, there is interest in determining if declines in marine survival coincide with changes in the biological characteristics of juveniles in freshwater or are modifying characteristics of adult fish (size at age, age at maturity, condition, sex ratio, growth rates, etc) and with environmental changes.*

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

5) *In the responses to questions b.1, c.1 and d.1, ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the bycatch of other species in salmon gear, and on the bycatch of salmon in any existing and new fisheries for other species is also requested.*

6) *In response to questions b.4, c.4 and d.3 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*

7) *In response to question d.3, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions b.4 and c.4*

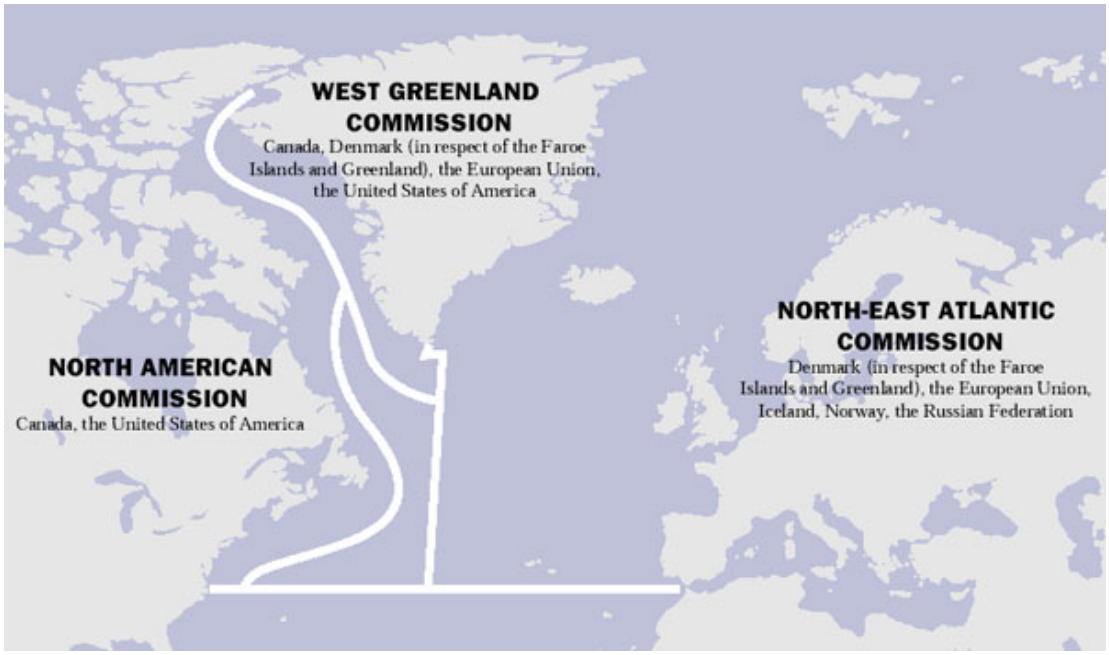
At the 2006 Annual Meeting of NASCO, conditional multi-annual regulatory measures were agreed to in the West Greenland Commission (2006–2008) and for the Faroe Islands (2007–2009) in the Northeast Atlantic Commission. The measures were conditional on a Framework of Indicators (FWI) being provided by ICES, and the acceptance of the FWI by the various parties of each commission. At the 2007 annual meeting of NASCO, Denmark (in respect of the Faroe Islands and Greenland) opted out of the multi-annual regulatory measures as a FWI was not provided by ICES for the fishery in the Faroes (ICES 2007c). In 2007 and 2008, NASCO indicated that no change to the management advice previously provided by ICES was required for the fishery at West Greenland. With the conclusion of the three-year conditional multi-annual regulatory measure agreed in 2006, NASCO requested that ICES undertake a full stock assessment, provide multi-annual catch advice and update the FWI in hopes of setting multi-annual regulatory measures for the 2009 fishing season.

In response to the remaining terms of reference, the Working Group considered 34 Working Documents submitted by participants.

1.2 Management framework for salmon in the North Atlantic

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

NASCO discharges these responsibilities via three Commission areas shown below:



1.3 Management objectives

NASCO has identified the primary management objective of that organization as:

"To contribute through consultation and cooperation to the conservation, restoration, enhancement and rational management of salmon stocks taking into account the best scientific advice available".

NASCO further stated that "the Agreement on the Adoption of a Precautionary Approach states that an objective for the management of salmon fisheries is to provide the diversity and abundance of salmon stocks" and NASCOs Standing Committee on the Precautionary Approach interpreted this as being "to maintain both the productive capacity and diversity of salmon stocks" (NASCO, 1998).

NASCO's Action Plan for Application of the Precautionary Approach (NASCO, 1999) provides interpretation of how this is to be achieved, as follows:

"Management measures should be aimed at maintaining all stocks above their conservation limits by the use of management targets".

Socio-economic factors could be taken into account in applying the Precautionary Approach to fisheries management issues":

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

1.4 Reference points and application of precaution

Conservation limits (CLs) for North Atlantic salmon stock complexes have been defined by ICES as the level of stock (number of spawners) that will achieve long-term average maximum sustainable yield (MSY). In many regions of North America, the CLs are calculated as the number of spawners required to fully seed the wetted area of the river. In some regions of Europe, pseudo stock–recruitment observations are used to calculate a hockey stick relationship, with the inflection point defining the CLs. In the remaining regions, the CLs are calculated as the number of spawners that will achieve long-term average maximum sustainable yield (MSY), as derived from the adult-to-adult stock and recruitment relationship (Ricker, 1975; ICES, 1993). NASCO has adopted the region specific CLs (NASCO, 1998). These CLs are limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability.

Management targets have not yet been defined for all North Atlantic salmon stocks. When these have been defined they will play an important role in ICES Advice.

For the assessment of the status of stocks and advice on management of national components and geographical groupings of the stock complexes in the NEAC area, where there are no specific management objectives:

- ICES requires that the lower bound of the 95% confidence interval of the current estimate of spawners is above the CL for the stock to be considered at full reproductive capacity.
- When the lower bound of the confidence limit is below the CL, but the midpoint is above, then ICES considers the stock to be at risk of suffering reduced reproductive capacity.
- Finally, when the midpoint is below the CL, ICES considers the stock to suffer reduced reproductive capacity.

It should be noted that this is equivalent to the ICES precautionary target reference points (S_{pa}). Therefore, stocks are regarded by ICES as being at full reproductive capacity only if they are above the precautionary target reference point. This approach parallels the use of precautionary reference points used for the provision of catch advice for other fish stocks in the ICES Area.

For catch advice on fish exploited at West Greenland (non maturing 1SW fish from North America and non maturing 1SW fish from Southern NEAC), ICES has adopted,

a risk level of 75% (ICES, 2003) as part of an agreed management plan. ICES applies the same level of risk aversion for catch advice for homewater fisheries on the North American stock complex.

2 Atlantic salmon in the North Atlantic area

2.1 Catches of North Atlantic salmon

2.1.1 Nominal catches of salmon

Nominal catches of salmon reported for countries in the North Atlantic for 1960–2008 are given in Table 2.1.1.1. Catch statistics in the North Atlantic include fish-farm escapees and in some Northeast Atlantic countries also include ranched fish.

Icelandic catches have traditionally been split into two separate categories, wild and ranched, reflecting the fact that Iceland has been the only North Atlantic country where large-scale ranching has been undertaken with the specific intention of harvesting all returns at the release site. The release of smolts for commercial ranching purposes ceased in Iceland in 1998, but ranching for rod fisheries in two Icelandic rivers continued into 2008 and has expanded (Table 2.1.1.1). Although ranching does occur in some other countries, this is on a much smaller scale. Some of these operations are experimental and at others harvesting does not occur solely at the release site. The ranched component in these countries has therefore been included in the nominal catch.

Reported catches in tonnes for the three NASCO Commission Areas for 1999–2008 are provided below.

AREA	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
NEAC	2073	2736	2876	2495	2303	1977	1998	1870	1409	1519
NAC	154	155	150	150	144	164	142	140	114	151
WGC	19	21	43	9	9	15	15	22	25	26
Total	2246	2913	3069	2654	2456	2156	2155	2032	1548	1696

The provisional total nominal catch for 2008 was 1696 tonnes, 148 t above the updated catch for 2007 (1548 t) and the second lowest in the time-series. The 2008 catch was over 370 t below the average of the last five years (2069 t), and over 660 t below the average of the last 10 years (2362 t). Catches were below the previous five- and ten-year averages in all southern NEAC countries and in two of the countries in northern NEAC.

ICES recognizes that mixed-stock fisheries present particular threats to stock status. These fisheries predominantly operate in coastal areas and NASCO specifically requests that the nominal catches in homewater fisheries be partitioned according to whether the catch is taken in coastal, estuarine or riverine areas. The 2008 nominal catch (in tonnes) was partitioned accordingly and is shown below for the NEAC and NAC Commission Areas. Figure 2.1.1.1 presents these data on a country-by-country basis. There is considerable variability of the distribution of the catch among individual countries. In most countries the majority of the catch is now taken in freshwater; the coastal catch has declined markedly.

AREA	COAST		ESTUARY		RIVER		TOTAL
	Weight	%	Weight	%	Weight	%	Weight
NEAC	476	32	48	3	986	65	1509
NAC	13	8	47	31	92	61	151

Coastal, estuarine and riverine catch data aggregated by region are presented in Figure 2.1.1.2. In Northern Europe, total catches have fluctuated over the period with no apparent trend. Typically about half the catch has been taken in rivers and half in coastal waters (although there are no coastal fisheries in Iceland and Finland), with estuarine catches representing a negligible component of the catch in this area. There was a small reduction in the proportion of the catch taken in coastal waters in 2008. In Southern Europe, catches in all fishery areas have declined over the period and, while coastal fisheries have historically made up the largest component of the catch, these fisheries have declined substantially, reflecting widespread measures to reduce exploitation in a number of countries. In 2008, the majority of the catch in this area was taken in freshwater.

In North America, the total catch over the period 2000–2008 has been relatively constant. The majority of the catch in this area has been taken in riverine fisheries; the catch in coastal fisheries has been relatively small in any year (13 t or less), but has increased as a proportion of the total catch over the period.

2.1.2 Catch and release

The practice of catch and release (C&R) in rod fisheries has become increasingly common as a salmon management/conservation measure in light of the widespread decline in salmon abundance in the North Atlantic. In some areas of Canada and USA, C&R has been practised since 1984, and in more recent years it has also been widely used in many European countries both as a result of statutory regulation and through voluntary practice.

The nominal catches presented in Section 2.1.1 do not include salmon that have been caught and released. Table 2.1.2.1 presents C&R information from 1991 to 2008 for ten countries that have records; C&R may also be practised in other countries while not being formally recorded. There are large differences in the percentage of the total rod catch that is released: in 2008 this ranged from 19% in Iceland to 100% in USA reflecting varying management practices and angler attitudes among these countries. Within countries, the percentage of fish released has tended to increase over time. Overall, over 204 000 salmon were reported to have been released around the North Atlantic in 2008, about 26 000 more than in 2007. There is also evidence from some countries that larger MSW fish are released in larger proportions than smaller fish. This issue of C&R is reviewed in more detail in Section 2.6.

2.1.3 Unreported catches

The total unreported catch in NASCO areas in 2008 was estimated to be 443 t however there were no estimates for Canada and Russia. The unreported catch in the North East Atlantic Commission Area in 2008 was estimated at 433 t and that for the West Greenland Commission Area at 10 t. There was no estimate for the North American Commission Area. The 2008 unreported catch by country is provided in Table 2.1.3.1. Over recent years efforts have been made to reduce the level of unreported catch in a number of countries (e.g. through improved reporting procedures and the introduction of carcase tagging and logbook schemes).

AREA	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
NEAC	887	1135	1089	946	719	575	605	604	465	433
NAC	133	124	81	83	118	101	85	56	-	-
WGC	13	10	10	10	10	10	10	10	10	10
Int'l. waters	Not available									

2.2 Farming and sea ranching of Atlantic salmon

The provisional estimate of farmed Atlantic salmon production in the North Atlantic area for 2008 is 981 kt. This represents a 5% increase on 2007 and a 16% increase on the previous 5-year mean. Production increased slightly in Norway (up 3% on 2007) and UK (Scotland; up 5% on 2007), and these two countries continue to produce the majority of the farmed salmon in the North Atlantic (76% and 14% respectively). Farmed salmon production continued to reduce considerably in Iceland (down 44% on 2007), but increased markedly in USA.

World-wide production of farmed Atlantic salmon has been in excess of one million tonnes since 2002. It is difficult to source reliable production figures for all countries outside the North Atlantic area and it has been necessary to use 2007 estimates for some countries in deriving a worldwide estimate for 2008. Noting this caveat, total production in 2008 is provisionally estimated at around 1482 kt (Figure 2.2.1), a 6% increase on 2007 and the highest in the time-series. Production outside the North Atlantic is dominated by Chile and is estimated to have accounted for 34% of the total in 2008. World-wide production of farmed Atlantic salmon in 2008 was thus over 870 times the reported nominal catch of Atlantic salmon in the North Atlantic.

The total harvest of ranched Atlantic salmon in countries bordering the North Atlantic in 2008 was 70 t, the majority of which (68 t) was taken by Icelandic ranched rod fisheries (Figure 2.2.2). Small catches of ranched fish were also recorded in each of the three other countries reporting such fish (Ireland, UK (N. Ireland) and Norway); the data includes catches in net, trap and rod fisheries.

2.3 Development of forecast models

ICES currently provides quantitative catch advice for the West Greenland fishery using two forecast models; one for the non-maturing 1SW salmon of North American origin, the other for 1SW non-maturing salmon from the southern NEAC complex (one of the four stock complexes in NEAC but the only one which is affected by the West Greenland fishery). ICES does not currently provide quantitative advice for the Faroes fishery because models have not been developed for the maturing 1SW stock complex from southern NEAC nor for any of sea age groups in the northern NEAC stock complex. As such, qualitative catch advice has been provided for the Faroes fishery based on the status of the stock complexes relative to stock complex conservation limits.

Following on from recommendations, a Study Group [SGSSAFE-Study Group on Salmon Stock Assessment and Forecasting] met in March 2009 to work on the development of new and alternative models for forecasting Atlantic salmon abundance and for the provision of catch advice. ICES reviewed an alternate model for the 2SW North American complex and new models for the combined maturing and non-maturing age groups of the southern NEAC and the northern NEAC stock

complexes. The proposed models were fitted and forecasts derived in a single consistent Bayesian framework under the OpenBUGS 3.0.3 software (http://mathstat.helsinki.fi/openbugs/; Lunn *et al*., 2000). The data inputs and models reviewed parallel the approaches currently used by ICES for forecasting and provision of catch advice but differ between the Commission areas:

PROPOSED MODELS		
	NAC	NEAC
Data inputs		
Time period of data	1978 to 2008	1978 to 2008 for southern NEAC 1991 to 2008 for northern NEAC
Spatial aggregation	Separately for six regions of North America	By southern and northern stock complexes
Age components	2SW salmon component only	1SW and MSW age components
Spawners	Lagged spawners by region for 2SW salmon only	Lagged eggs by sea age component for the southern and northern complexes
Returns	Returns by region of 2SW salmon only	Returns of 1SW and MSW age components by stock complex
Model structure		
Spatial aggregation	Spawners and returns of 2SW salmon for six regions	Spawners and returns for two sea age components for the southern and northern NEAC complexes
Dynamic function	Random walk dynamic	Random walk dynamic
	Region-specific recruitment rates linked with an annual recruitment rate variable	Sea-age specific recruitment rates linked with a probability of maturing variable
Latent variables of interest	PFA 1SW non-maturing Recruitment rate by region and year	PFA 1SW maturing and PFA 1SW non-maturing by stock complex Recruitment rate by sea age component and the probability of maturing variable
Forecast years	2009 to 2011	2009 to 2012

2.3.1 NAC model

The model is summarized in the Directed Acyclical Graph in Figure 2.3.1.1. The year is identified by the i index.

$PFA_{i,k}$ is assumed to be proportional to lagged-spawners ($LS_{i,k}$), with independent identically distributed (i.i.d.) lognormal errors, and is modelled separately for each region (k = 6; Labrador, Newfoundland, Quebec, Gulf, Scotia-Fundy, USA).

$$PFA_{i,k} = LogN(\mu.PFA_{i,k}\ , \sigma.PFA^2)$$
$$\mu.PFA_{i,k} = \log(LS_{i,k}) + a_{i,k}$$

The proportionality (log) coefficient $a_{i,k}$ between $LS_{i,k}$ and $PFA_{i,k}$ for each region is modelled dynamically as a random walk with the addition of a regionally common annually varying parameter ($e.y_i$).

$$a_{i+1,k} = a_{i,k} + e.y_{i+1} + \omega_{i+1,k} \qquad with \quad \omega_{i+1,k} \overset{i.i.d}{\sim} N(0, a.\sigma_k^2)$$

$$e.y_i \overset{i.i.d}{\sim} N(0, \sigma.y^2)$$

The common yearly variation ($e.y_i$) accounts for the fact that the fish share a common marine environment during part of their life cycle. The interaction term ($\alpha_{i,k}$) can be interpreted as accounting for regional specificities in the freshwater and / or the marine coastal environment.

The dynamic component of the model requires initialization for the first year (i = 1978) and an uninformative prior is assumed:

$$a_{1,k} \overset{i.i.d}{\sim} N(0, 100)$$

$LS_{i,k}$ is a weighted sum of spawners over the years (i) having contributed to produce the $PFA_{i,k}$. The $LS_{i,k}$ are not directly observed but estimated from the run-reconstruction model developed by ICES. The model provides probability distributions of LS, conditional on observed data and expertise. The probability distributions are assumed to be normal with known mean LS.m and variance tau.LS. The use of these distributions as likelihood functions is equivalent to having pseudo-observations equal to LS.m issuing from sampling distributions with means and variances equal to LS and tau.LS (Michielsens *et al*., 2008).

$LS.m_{i,k} \sim N (LS_{i,k}, tau.LS_{i,k})$

Similarly, the returns of 2SW salmon to the six regions ($NR2_{i,k}$) are not directly observed but estimated from the run-reconstruction model. The probability distributions were assumed to be normal with known mean NR2.m and variance tau.NR2. As with the LS variable, the NR2 were treated as pseudo-observations equal to NR2.m issuing from normal sampling distributions with means and variances equal to NR2 and tau.NR2

$NR2.m_{i,k} \sim N (NR2_{i,k}, tau.NR2_{i,k})$

In between the lagged spawners and returns as 2SW salmon, the catches in the various sea fisheries and conditioning for natural mortality as the fish move from the time of the PFA to homewaters are incorporated (Figure 2.3.1.1). The catches in the commercial fisheries at West Greenland and the Newfoundland and Labrador commercial and coastal fisheries (NG1.tot, NC1.tot and NC2.tot) are not directly observed but estimated with error. The catches are converted to numbers of fish of 1SW non-maturing and 2SW fish based on the characteristics of the fish in the catch. Their (prior) probability distributions are obtained from catch statistics according to a formal structure included in the model.

Catches of large salmon (assumed to be 2SW salmon) from the St Pierre and Miquelon fisheries are also included in the model as point estimates.

The natural mortality in the post-PFA time point was assumed constant between years, centred on an instantaneous rate value of 0.03 per month (95% confidence interval range of 0.02 to 0.04).

For the NAC 2SW component, the model was fitted to an historical dataseries of 30 years, lagged eggs from 1978 to 2006 (considers returns of 2SW salmon including 2007). Although the return and spawner estimates for NAC begin in 1971, the lagged eggs are only available from 1978 because of the smolt age distributions (1 to 6 years).

2.3.1.1 Comparisons with models currently used by ICES

The alternate model proposed by the Study Group differs from the model used by ICES in the way observations are considered, the procedure for model fitting, and in the way inferences are drawn on the variables of interest. The Bayesian framework considers the PFA as a latent variable i.e. a variable whose state is conditioned by several components directly influencing its distribution (the parents) and which cannot be observed directly. The model currently used by ICES considers the PFA to be an observation.

The recruitment rate dynamic between lagged spawners and returns is also modelled differently. The two phase model currently used by ICES considers that there have been (and will be) two levels of recruitment rate experienced by the populations in NAC. When the populations are in the low phase, they will either remain in the low phase or move to the high phase, there is no possibility of a further decline in recruitment rate or intermediate levels of recruitment rate. The random walk model proposed by the Study Group is more flexible. The recruitment rate may increase or decrease regardless of the present states of the populations. Abrupt changes are not adequately detected because the annual changes are smoothed and the magnitude constrained by the relative changes estimated from the past:

	CURRENT ICES MODEL	ALTERNATE MODEL
Input variables	Lagged spawners and PFA are generated from run-reconstruction and treated as observations	Distributions of lagged spawners and returns of 2SW salmon to regions are generated from run-reconstruction and treated as pseudo-observations in the model.
PFA period	August 1 of the second summer at sea for 1SW non-maturing salmon	Same as current ICES model
Model dynamic	Incorporates possibility of two phases of productivity between lagged spawners and PFA. Recruitment rate parameter can take one of two levels. NAC aggregate estimate of productivity assumed similar for all regions.	Random walk that models region specific recruitment rate in year i+1 as a function of region specific recruitment rate in year i plus an annual component of change in recruitment rate common to all regions.
Consideration of uncertainty	Uncertainty in LS and PFA are incorporated by creating multiple datasets of LS and PFA from Monte Carlo and summarizing predicted PFA from statistical fitting of the multiple datasets.	Uncertainty in lagged spawners and returns of 2SW salmon to regions are introduced as priors and can be updated. Posterior distributions of PFA and returns to regions are inferred from the model fitting.

Forecast capacity	Forecasts are based on lagged spawner values available for three years beyond the last observed 2SW return year and an estimate of the likelihood of being in the high phase or the low phase of productivity. Forecast values take one of two levels of recruitment rate.	Same forecast capacity as current ICES model excluding the need to estimate the probability of being in a high or low phase. Forecasts are based on estimated lagged spawners and the recruitment rate from the last observed year with variance from the entire time-series.
Risk analysis	Assume characteristics of the catches will be similar to the range of values observed during previous five years. Catch options scenarios are explored.	Same as current ICES model.

2.3.2 NEAC models

The proposed models for the northern NEAC complex and the southern NEAC complex have exactly the same structure and are run independently. A Directed Acyclic Graph (DAG) for the models is provided in Figure 2.3.2.1. The model considers both the maturing *PFA* (denoted *PFAm*) and the non maturing PFA (denoted *PFAnm*).

Two hypotheses about the time-structure of the productivity parameter $\alpha_{m,t}$ were contrasted: random walk and shift level model.

For each year *t*, a proportional relationship is assumed between lagged eggs (LE_t) and the expected means of the maturing PFA, with a recruitment rate factor αm_t (in the log-scale). The recruitment rate is considered to be random with i.i.d lognormal errors.

$$PFAm_t = LogN(\mu.PFAm_t\ , \sigma.PFAm^2)$$
$$\mu.PFAm_t = \log(LE_i) + am_t$$

Similarly, for each year *t*, a proportional relationship is assumed between LE_t and the expected means of the non maturing *PFA*, with a productivity factor αnm_t (i.i.d. multiplicative lognormal random errors).

$$PFAnm_t = LogN(\mu.PFAnm_t\ , \sigma.PFAnm^2)$$
$$\mu.PFAnm_t = \log(LE_i) + anm_t$$

The random environmental noise in the recruitment rate of maturing ($\sigma.PFAm_t$) and non maturing PFA ($\sigma.PFAnm_t$) are assumed independent.

However, the recruitment rate for the non maturing *PFA* is modelled dependently on the recruitment rate for the maturing PFA as:

$$\alpha nm_t = \alpha m_t + \log(\frac{1 - p.PFAm_t}{p.PFAm_t})$$

The expected rate of maturing *PFA vs.* total *PFA* recruitment rate is $p.PFAm_t$:

$$\frac{e^{\alpha m_t}}{e^{\alpha m_t} + e^{\alpha nm_t}} = p.PFAm_t$$

Therefore, the hypothesis underlying this model is that the time variability of the recruitment rate for maturing and non maturing PFA will be closely related. A high recruitment rate for maturing PFA will correspond to a high productivity of non maturing PFA. However, time variations of the parameter $p.PFAm_t$ introduce some flexibility in the synchrony of the maturing and non maturing recruitment rates.

Two alternative models for the recruitment rate parameter were explored for the Southern NEAC complex: the random walk model and the shifting level model (for the Northern NEAC complex, only the random walk model was tested because of the shorter time-series available).

In the random walk (RW) hypothesis, the recruitment rates are modelled as a first order time varying parameter following a simple random walk with a flat prior on the first value of the time-series:

$$t = 1,\ldots,n\text{-}1 \qquad \alpha m_{t+1} = \alpha m_t + \omega_t \qquad with \quad \omega_t \overset{i.i.d}{\sim} N(0, \sigma^2{}_\alpha)$$

The model can be used both for retrospective analysis and forecasts. Provided the variance $\sigma^2{}_\alpha$ is large enough, the random walk structure will allow us to capture any kind of change in the recruitment rate along the time-series of historical data. The persistence (memory) and possibility of variation will be accounted for at any time in the forecasts. If the productivity level is α at time $t = n$, then the forecasted productivity at time $t = n+1$ is random and normally distributed around the previous level of recruitment rate.

The shifting level (SL) model supposes that the recruitment rate remains constant for periods of time, with abrupt shifts in the levels between periods (Fortin *et al*., 2004). By contrast with the RW model, it is highly flexible because the number of periods, their duration and the corresponding levels of recruitment rates do not need to be specified *a priori*.

$$t = 1,\ldots,n\text{-}1 \qquad \alpha_{t+1} = \begin{cases} \alpha_t & with\ proba\ (1 - p_{shift}) \\ \alpha_t^{new} \sim N(\alpha_t, \sigma_\alpha^2) & with\ proba\ (p_{shift}) \end{cases}$$

Retrospective analysis allows inference *a posteriori* on the phase(s) (levels, shifting points and duration) in the historical series of data. The probability of seeing a shift at any time t is also estimated, and can then be used for forecasting. As with the RW model, the persistence (memory) and possibility of a shift will be accounted for at any time in the forecasts. If the productivity level is α at time $t = n$, then the forecasted productivity at time $t = n+1$ is defined as:

$$\alpha_{n+1} \quad \begin{cases} = \alpha_n & with\ probability\ (1 - p_{shift}) \\ = \alpha_n + \omega_n & where\ \omega_n \sim N(0, \sigma_\alpha{}^2) \quad with\ probability\ p_{shift} \end{cases}$$

Uncertainty in the lagged eggs were accounted for by assuming that the lagged eggs of 1SW and MSW fish were normally distributed with median and standard deviation issued from Monte-Carlo run reconstruction at the scale of the stock complex.

The model is designed to account for the uncertainty about the returns through the pseudo-observation method proposed by Michielsens *et al*., 2008 and used in the NAC model.

In the model presented to ICES, the uncertainty in the returns was not accounted for because of difficulties in model fitting. The model was run with virtually no observation errors on returns (σ_R=1).

The natural mortality in the post-PFA time point was assumed constant among years, centred on an instantaneous rate value of 0.03 per month (95% confidence interval range of 0.02 to 0.04).

Catches of salmon at sea in the West Greenland fisheries (as 1SW non-maturing salmon) and at Faroes (as 1SW maturing and MSW salmon) were introduced as covariates and incorporated directly within the inference and forecast structure of the model. The inputs for quantifying the uncertainties in the catches are those used for the run-reconstruction and those associated with the sampling procedures of the fisheries.

For southern NEAC, the model was fitted to a 29 year dataseries of lagged eggs and returns from 1978 to 2006. Although the return estimates to southern NEAC begin in 1971, the lagged eggs are only available from 1978 because of the smolt age distributions (1 to 5 years).

For northern NEAC, the model was fitted to a 16 year dataseries of lagged eggs and returns for 1991 to 2006. Returns and spawner estimates begin in 1983 but because of the smolt age distributions (1 to 6 years), the lagged eggs are only available from 1991 onward.

For both southern and northern NEAC complexes, forecasts were derived for 4 years of lagged eggs starting from 2007 to 2010. For illustrative purposes, forecasts were derived under the scenario of null exploitation rates (all sea catches =0).

Risks were defined each year as the posterior probability that the PFA would be below the age and stock complex specific SER levels.

2.3.2.1 Comparisons with model currently used by ICES

ICES has used a model to forecast the PFA of non-maturing (potential MSW) salmon from the Southern European stock group (ICES, 2002, 2003). The full model takes the form:

$$PFA = Spawners^{\lambda} \times e^{\beta_0 + \beta_2 \log(PFAm) + \beta_3 Year + \xi}$$

where: *Spawners* are expressed as lagged egg numbers (all age groups), *PFAm* is pre-fishery abundance of maturing 1SW salmon.

Parameter selection has been achieved by adding variables (*Spawners, PFAm* and *Year*) until the addition of others did not result in an increase in the explanatory power of the model. The model has been fitted to data from 1978 to the most recent

year and the parameters retained have always been *Spawners* (*LSeggs*) and *Year*. The final model takes the form:

$$Ln(PFA_t/LSeggs_t) = \alpha + \beta*Ln(LSeggs_t) + \delta*Year_t + \varepsilon$$

The year coefficient estimate is negative resulting in a continued decline in recruitment rate over time.

	CURRENT ICES MODEL	ALTERNATE MODEL
Input variables	Lagged eggs and PFA are generated from run-reconstruction and treated as observations.	Distributions of lagged eggs and returns of salmon by sea age group (1SW maturing, MSW salmon) to the southern NEAC and northern NEAC complexes are generated from run-reconstruction and treated as pseudo-observations in the model.
PFA period	January 1 of the first winter at sea of 1SW salmon	Same as current ICES model
Model dynamic	Proportionate model with year variable that generates a time-dependent change in productivity between lagged eggs and PFA. Only one sea age group (1SW non-maturing, i.e. MSW salmon) is modelled for the southern NEAC stock complex. Lagged eggs and year are explanatory and predictive variables in the model.	Random walk model for two age components modelled from a common lagged eggs component. Recruitment rate of 1SW maturing salmon and MSW salmon are not considered independent. Probability of maturing parameter allows annual flexibility in variations in recruitment rate between maturing 1SW salmon and MSW salmon.
Consideration of uncertainty	Midpoints of LSeggs and PFA are used in the fitting. Forecast uncertainty driven by residual error term of the model fit.	Uncertainties in lagged eggs are included as priors; treated as pseudo-observations resulting from the distributions from the Monte Carlo run-reconstructions. Posterior distributions of PFA and returns to stock complexes are inferred from the model fitting. Uncertainties in returns not fully implemented currently due to model fitting constraints.

	CURRENT ICES MODEL	ALTERNATE MODEL
Forecast capacity	Forecasts are based on lagged egg values available for four years beyond the last observed 2SW return year. Year variable has a negative coefficient. Forecasts limited to 1SW non-maturing salmon from southern NEAC complex.	Forecasts are based on lagged egg values available for four years beyond the last observed 2SW return year. Forecasts are based on estimated lagged spawners and the sea age specific recruitment rates from the last observed year with variance from the entire time-series. Models available for all four age and stock complex components for NEAC.
Risk analysis	Risk analysis was not developed beyond describing the probability that the PFA abundance of 1SW non-maturing salmon will be below the spawner escapement reserve (SER) prior to any sea fisheries.	Same as current ICES model. Risk analysis restricted to quantifying probability that the PFA abundance of the sea age groups within the southern and northern complexes will be below the respective SERs.

2.3.3 Preliminary results of the Bayesian framework models for NAC and NEAC

In the models proposed for NAC and NEAC, there was no significant ($p > 0.05$) first order autocorrelation in the residual errors of the PFA variables, most were centered on or close to 0 as per the assumption of the model structure. Further posterior checks of the models should be completed.

NAC model

The average annual recruitment rate parameter for the six regions of North America and the posterior predicted PFA values are consistent with the levels and trends previously reported by ICES (Figure 2.3.3.1). The recruitment rate declined from just under 2 (on the log scale; or 4 on the base 10 scale) prior to 1989 to about 0.5 or less (1.5 or less on the base 10 scale) and fell as low as -0.26 (0.77 PFA fish per lagged spawner in 2001; Figure 2.3.3.1). PFA values have fallen from the high of 840 000 fish in 1979 to an average of just over 110 000 fish between 1997 and 2006 (Figure 2.3.3.1).

Recruitment rates declined in all six regions of North America with the earliest steep decline noted for the USA and Scotia-Fundy stocks (1982 to 2001; Figure 2.3.3.2). The Labrador recruitment rates remained high into 1996 and declined rapidly into 2001. The highest recruitment rates in recent years are inferred for the stocks of Labrador, Quebec, and Gulf at about 1.8 PFA recruits per lagged spawner (Figure 2.3.3.2). In 1979 and 2002, the recruitment rates demonstrated a North American wide increase from the previous year whereas Northwest Atlantic wide declines in recruitment rate from the previous year were noted for 1992, 1993 and 2001 (Figure 2.3.3.2).

The region-specific structuring of the recruitment rate parameter in the NAC model can also provide estimates of region-specific PFA, exploitation rates and compliance with the management objectives. The probability of the returns of 2SW salmon having been sufficient to meet the region-specific management objectives defined for

the six regions of North America can also be assessed. Retrospectively, since 1991, the region-specific PFAs would have been insufficient for the 2SW returns to regions to be compliant with the present management objectives even in the absence of any fisheries having occurred at sea. The cumulative benefits of having attained higher spawning escapements back to rivers are not considered in this retrospective analysis. These issues will be explored after further diagnostic work.

NEAC models

The trends in the posterior estimates of PFA for both the southern NEAC and northern NEAC complexes closely match the descriptions of PFA trends previously provided by ICES.

The total PFA (mature and non-maturing 1SW salmon at January 1 of the first winter at sea) for the southern NEAC complex ranged from 3 to 4 million fish between 1978 and 1989 and declined rapidly to just over 2 million fish in 1990, and fell to its lowest level of just over one million fish in 2006. Over the entire time-series, the maturing proportions averaged about 0.6 with the smallest proportion in 1980 and the largest proportion in 1998. There is an increasing trend in the proportion maturing (8 of 13 values below the average during 1978 to 1990 compared with 3 of 16 values between 1991 and 2006; Figure 2.3.3.3). The productivity parameters for the maturing and non-maturing components peaked in 1985 and 1986, and reached the lowest values in 1997 (Figure 2.3.3.3).

The series of lagged eggs and returns for the northern NEAC complex is shorter than for the southern NEAC complex, beginning in 1991. Peak PFA abundance was estimated at about 2 million fish in year 2000 with the lowest value of the series in 2004 at over 1 million fish. The proportion maturing has varied around 0.5 over the time-series (Figure 2.3.3.4). The productivity parameter is higher on maturing 1SW salmon than on the non-maturing component (Figure 2.3.3.4). The recruitment rate parameters are higher for the northern NEAC compared with the southern NEAC complex, and particularly for the non-maturing 1SW component.

Shifting level models of the productivity parameter for southern NEAC

As mentioned previously, the shifting level (SL) model is an interesting alternative to the simple random walk model (Fortin *et al*., 2004). The SL model supposes that the level of productivity remains relatively constant for periods but can be subjected to abrupt shift in the levels. Under the SL model, the number of periods, their duration and the corresponding levels of productivity are unknown and need not be specified *a priori*.

The southern NEAC time-series of lagged spawners and returns suggested that there has been an abrupt shift in productivity between the 1989 and 1990 PFA years. Productivity was almost halved and this happened rather abruptly.

As a consequence of the shorter time-series for the northern NEAC model, the shift level dynamic was not fitted to that dataseries as there was no visual suggestion that such a shift in dynamic had occurred over the shorter time-series.

Despite there being some advantages to the SL model, it was not considered sufficiently developed for the provision of catch advice in 2009.

2.3.4 Further work

There is a need for further diagnostic evaluations and model exploration for the datasets in NAC and NEAC. The combined sea age model was not explored for the NAC complex and based on the results for NEAC, this model structure could be quite informative. The NEAC models have only been explored at the stock complex level and disaggregation to lower levels such as the national scale for returns and spawners as was done for NAC would also be a useful path of exploration.

ICES recommended that the Study Group (SGSSAFE) continue to develop the models presented for the NAC and NEAC areas, particularly for combining sea age classes and in the spatial disaggregation below the stock complex level.

2.4 NASCO has asked ICES to report on significant, new or emerging threats to, or opportunities for, salmon conservation and management

2.4.1 Genetic population structure and potential for local adaptation in Atlantic salmon

ICES noted the results from recent work to assess the genetic variability and evaluate the potential for local adaptation in wild Atlantic salmon in Canada. Analyses of neutral molecular markers in 51 salmon rivers revealed a hierarchical genetic structure and suggested the existence of seven regional groups in Québec, Labrador and New-Brunswick (Dionne *et al.*, 2008). Landscape genetic analyses suggested a predominant influence of gene flow and thermal regime adaptation in maintaining genetic differentiation. Indirect evidence also suggested that immigrants from a different regional group were less successful in establishing in the new environment compared with residents. Different levels of genetic structure were also found within some river systems (Dionne *et al.*, 2009). These results highlight the importance of maintaining small-scale variation at the catchment and sub-catchment level in managing Atlantic salmon populations.

Large scale genetic variability at an immunocompetence gene, the Major Histocompatibility Complex (MHC) class IIβ gene, revealed that genetic diversity increased with increasing temperature and bacterial diversity in rivers contrary to patterns with neutral microsatelite markers (Dionne *et al.*, 2007). Pathogen infections in juvenile salmon were found to be more frequent at the beginning of summer in southern rather than northern rivers, in concordance with pathogen selection pressure in the wild (Dionne *et al.*, in press).

2.4.2 Investigations of Atlantic salmon feeding ecology at West Greenland

As part of the International Sampling Programme at West Greenland, additional sampling was conducted in 2006 and 2007. The objectives were to (1) develop protocols for more intense biological sampling at West Greenland to be used during SALSEA West Greenland; (2) to collect current information on the feeding ecology of

Atlantic salmon at West Greenland; and (3) to augment historical diet information at West Greenland and investigate the stability of foraging regimes.

Predominantly, pelagic prey items were consumed although benthic organisms were also noted (Table 2.4.2.1). Overall, capelin was the primary item consumed in both years, followed by *Parathemisto* sp., a genus of amphipod. The composition of stomach contents differed slightly between 2006 and 2007 and was less varied than the data reported by Lear, 1980 for 1969–1970 (Table 2.4.2.1). Amphipods and capelin were both important in 2006 while capelin was the primary food item in 2007. The diet composition was similar between the stock complexes and sexes (Figure 2.4.2.1), except in 2006 when approximately 50% of the female diet consisted of *Parathemisto* sp., whereas males consumed primarily capelin (70% by weight). Additionally, MSW salmon appeared to feed almost exclusively on capelin and *Parathemisto* sp. The current data suggest that contemporary foraging conditions are similar to historical conditions.

Although evidence of a link between capelin and salmon productivity is lacking, there is evidence suggesting that the energy content of capelin has decreased. If the composition of the Atlantic salmon diet in West Greenland has not changed over time (as is suggested by historical and contemporary data), but the quality (i.e. energetic content) of the forage species has reduced, changes in body condition and productivity of salmon may be detectable through further investigations.

2.4.3 Red vent syndrome

Over recent years, there have been reports from both the NEAC and NAC areas of salmon returning to rivers with swollen and/or bleeding vents. The condition, known as red vent syndrome (RVS), has been noted since 2005, and has been linked to the presence of a nematode worm, *Anisakis simplex* (Beck *et al*., 2008). A number of NEAC countries observed a notable increase in the incidence of salmon with RVS during 2007 (ICES 2008), but levels were typically a lot lower during 2008. However, levels in UK (England and Wales) remained close to the high levels recorded in 2007 in a number of rivers, although were lower in other rivers and the severity of the symptoms was generally less prevalent in 2008 than in 2007. It remains unclear whether RVS affects the survival of the fish or their spawning success. However, affected fish have been taken for use as broodstock in a number of countries, successfully stripped of their eggs, and these have developed normally in hatcheries. Provisional results also suggest no significant differences in the condition factors of affected and unaffected fish.

2.4.4 Reduced sensibility and development of resistance towards treatment in salmon louse (*Lepeophtheirus salmonis*)

In 2008, a number of cases of reduced sensitivity to emamectin benzoate, the oral treatment for sea lice, were discovered on farms located in the west and middle parts of Norway (Johansen *et al*., 2009). Most of these farms were subsequently medicated with bath treatments using pyrethroids, however, some evidence of cross-resistance was observed. The lag time between discovery of resistant lice, and bath-treatment, may have given the opportunity for the resistant lice to spread. Treatments may sometimes result in salmon lice being exposed to sublethal doses of emamectin because of the large size of net pens, and strong currents at the farm locality, and this may contribute towards the development of resistance. The number of lice reported by fish farmers on a monthly basis demonstrates that the number of adult lice on

salmon in late 2008 and early 2009 were higher in several areas than in the previous two years (www.lusedata.no). This, together with a sudden increase in incidence of treatment failure and indications of resistance give cause for concern and could have severe consequences for wild salmon smolts should resistant lice become widespread (Revie *et al*., 2009).

2.4.5 Atlantic salmon stock assessment using sonar

There are few techniques for directly enumerating migrating salmon in large drainage basins. Recently, an improved sonar technology (Dual Frequency Identification Sonar -DIDSON; Sound Metrics Corporation: SMC) has become available. Ongoing trials in Canada and Ireland have demonstrated that counting efficiency can be high and that the system was capable of accurately measuring the size of fish. The development and use of these technologies will provide opportunities for assessing salmon in large rivers that are currently not being monitored and for improving advice to managers.

2.4.6 Smolt migration on the River Rhine

The downstream migration of Atlantic salmon smolts was again monitored in the River Rhine in 2008. The study aims to investigate the success of downstream migration and to assess the migration routes in relation to the obstructions within the Rhine Delta, particularly the Haringvliet sluices. Overall, 120 tagged fish were released into two tributaries of the River Rhine about 330 km from the sea. By the end of the migration period (end of April), 67% had been detected leaving the tributary and 18 % had been recorded reaching the sea after passage through the delta. Losses in 2008 were significantly higher than in 2007 when 46% were recorded reaching the sea. This may reflect higher discharge in 2007. The study will be repeated after the reopening of the Haringvliet dam by late 2010.

2.4.7 Reintroduction of salmon into the River Rhine

The programme of reintroducing Atlantic salmon to the River Rhine started 20 years ago and the first adult salmon was recorded in the River Sieg, a tributary of the Rhine, in 1990, more than 30 years after the extinction of salmon from the Rhine catchment. Naturally produced juvenile salmon were first observed in 1994 and since the start of the programme more than 5000 adult salmon have now been recorded in the Rhine and its tributaries. Stocking of juveniles is planned to continue. Access to suitable juvenile salmon habitat in the upper part of the catchment is still restricted by dams and weirs, and fish migrating downstream have to pass hydropower plants. However, future improvements in both fish passage and water quality are expected as a result of the implementation of the Water Framework Directive.

2.4.8 European regulations

ICES has previously noted the implications for salmon stocks arising from Council Directive 92/43/EEC (on the conservation of natural habitats and of wild flora and fauna) and of the Water Framework Directive (Directive 2000/60/EC).

The EU data collection regulation (EU DCR) has also been updated and expanded recently to include both salmon and eels and extended to inland waters. This will

have impacts at Community level relating specifically to the requirement for a multi-annual Community programme for collection, management and use of biological, technical, environmental, and socio-economic data concerning:

a) commercial fisheries carried out by Community fishing vessels:

  i) within Community waters and commercial fisheries for eels and salmon in inland waters;

  ii) outside Community waters;

b) recreational fisheries carried out within Community waters and recreational fisheries for eels and salmon in inland waters;

c) aquaculture activities related to marine species, including eels and salmon, carried out within the Member States and the Community waters;

d) industries processing fisheries products-these to be defined in accordance with the procedure referred to in Article 27(2).

2.5 NASCO has asked ICES to continue work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance

ICES considered a preliminary report from the Study Group on the Identification Of Biological Characteristics For Use As Predictors Of Salmon Abundance [SGBICEPS] which had the following ToR:

a) identify data sources and compile time-series of data on marine mortality of salmon, salmon abundance, biological characteristics of salmon and related environmental information;

b) consider hypotheses relating marine mortality and/or abundance trends for Atlantic salmon stocks with changes in biological characteristics of all life stages and environmental changes;

c) conduct preliminary analyses to explore the available datasets and test the hypotheses.

The Study Group completed a preliminary review of the available information on the life-history strategies of salmon and changes in the biological characteristics of the fish (including freshwater and marine stages) in relation to key environmental variables. Data were also collated on:

Biological characteristics-The Study Group continued the work initiated by ICES (ICES, 2008) to compile a suite of standard biological measures over time-series (>15 years) sufficient to account for natural variability and to facilitate trend analysis. Data for various biological characteristics were provided from Canada, USA, Iceland, Russia, Finland, Norway, Sweden, UK (Scotland), UK (England and Wales), UK (N. Ireland) and France.

Abundance metrics-A series of tables were assembled relating to available abundance metrics and datasets on survival/mortality for different indicator stocks and stock complexes around the North Atlantic. Supplementary information describing the different assessment methods was also compiled.

Environmental variables-The Study Group reviewed the types of environmental information that could be employed to develop exploratory analyses, with particular emphasis on marine environmental data. Constraints were recognized including the lack of a clear understanding of the distribution of salmon at sea.

Data quality issues

A number of constraints and caveats, mostly relating to sampling programmes and methodological differences were noted. For example weight/condition metrics are likely to vary according to where fish are sampled (net *vs.* rod fisheries) and ages determined from scale readings will be more reliable than ages estimated by a size (length or weight) split. The Study Group recommended that in taking forward and extending any further analyses, all datasets should include a full description of data sources and of the methodology used to record each variable.

Assessment of Fulton's K *vs.* Relative Mass Index, W_R

The Study Group considered the use of condition factors (Fulton's K) derived from the annual mean length and mean weight of each year class within a time-series against the alternative Relative Mass Index (W_R) approach described by Todd *et al*., 2008. The latter provides a reliable measure of condition factor for individual fish, and one which is largely free of length-dependence. The Study Group concluded that the simple condition factor provides an adequate qualitative descriptor of variation in condition at the population level. However, although these condition factors provide an objective, qualitative means of deciding whether or not a population time-series is demonstrating systematic increase, decrease, or no change, this approach has limitations for between-stock comparisons.

Preliminary data analyses

Trends over time-The Study Group examined various stock-specific biological characteristics over a standardized period (1984–2007) using the Mann-Kendall statistic (Mann, 1945; Kendall, 1975) assuming a null hypothesis of no trend. The results are presented in Table 2.5.1 and indicate significant trends over time for many of the variables explored.

Wider geographical patterns-The Study Group examined changes in biological characteristics over broader spatial scales. In the first analysis, individual river stocks were grouped between NAC (Canada and USA) and NEAC north (Russia, Norway, Finland, Iceland N&E) and NEAC south (UK, France and Iceland S&W). In the second analysis the NAC rivers were further subdivided into two groups based on a latitudinal split. Thus the Rivers Western Arm Brook, Middle Brook, Conne and Miramichi were allocated to a northern NAC group and the other N American rivers to a southern NAC group.

The first approach used a standardized (z-score) analysis to examine the trend in mean smolt age. This analysis was restricted to wild stocks. For this purpose, the data for year n were standardized in relation to the mean smolt age between 1984 and 1993 as follows:

$$Z_n = (\text{Mean smolt age}_n - \text{mean smolt age}_{1983\text{-}94}) / \text{STD}_{1983\text{-}94}$$

The results of this analysis (Figures 2.5.1 to 2.5.3) indicated that there was a significant decline in mean smolt age from the 1970s and 1960s from the NAC area and the NEAC Southern areas respectively ($P<0.05$). In contrast the NEAC Northern area smolt age has remained constant since the early 1970s ($P>0.05$).

The second approach used meta-analysis to explore relationships for most of the biological characteristics available; results are summarized in Table 2.5.2. These analyses indicated a number of significant trends over time for certain variables at the stock complex level. Including a significant decrease in smolt age for the NAC Northern area.

Declines in mean smolt age may be the consequence of increased growth rate as faster growing parr migrate to sea earlier (Metcalf *et al*., 1989; Økland *et al.,* 1993). The increase in growth rate may relate to an increase in temperature (Elliott *et al*., 2000), and/or an increase in growth as a result of density-dependent processes (Gibson, 1993; Jenkins *et al*., 1999; Imre *et al*., 2005; Lobón-Cerviá, 2005), and/or increased freshwater production. Increased growth rate and younger smolt age may dampen the impact of an increase in marine mortality assuming that the higher survival rate to younger smolts is not outweighed by increased marine mortality.

Two way plots-Simple linear regression models were used to test relationships between selected stock characteristics for individual rivers. Initial results suggest that, for a number of stocks, the size of returning 1SW salmon is positively correlated with the size of returning 2SW in both the same year and in the subsequent year. The former is consistent with common factors operating on the fish from the two sea-group groups during their return migration, whereas the latter may suggest that common factors operating in the first period at sea may have a larger influence on growth and size at maturity. A number of significant, but variable, relationships were also demonstrated between the river age of migrating smolts and the subsequent sea age and between the size of returning fish and the river-specific stock status variable. Further work is required to explore these relationships and to consider possible hypotheses.

Case studies-The Study Group reviewed information on biological characteristics from a number of discrete rivers and areas. On the River Frome (England) a general increase in the proportion of 1SW fish was noted with a later median date of migration into the river. Grilse size has declined while 2SW fish have increased in size. Mean size of smolts has increased after 1985 while at the same time the mean age of smolts has declined. There is also evidence of a strong link between smolt size and sea age. Small smolts have a lower probability of being grilse than large smolts. This relationship was particularly marked for females.

On the River Bush (N. Ireland) there has been a shift towards earlier smolt run timing and this has been linked to the subsequent survival of returning adults. One possible mechanism for this is a larger thermal discrepancy between river and seawater at the time of the smolt run. There have also been changes over the period in the proportion of 1SW returning salmon (increasing) and in their mean length (getting smaller).

In Norway there has been a significant positive relationship between the PFA of 1SW salmon stocks in one year and the PFA of 2SW salmon in the following year. However, in recent years there is evidence of three regions in Norway that more salmon return as 2SW fish than would be expected from the number of 1SW fish the

previous year. The apparent later age at maturity may be explained both by more salmon delaying age-at-maturity, or that the survival in the second year at sea has increased relative to the survival in the first year at sea.

Baltic Salmon-The Study Group noted that WGBAST were also addressing concerns related to marine survival of salmon. To date, the key findings from WGBAST included evidence of strong year effects among stocks suggesting common factors applying at a Baltic wide level; e.g. changes in environment or factors acting in the main feeding area. Some results suggest that seals may affect survival rates of salmon. However, the available information on grey seal diet is limited, and more information is needed on seal ecology, their spatial distribution in spring and summer, and on post-smolt migration routes in order to evaluate this.

ICES recognized the progress made by SGBICEPS and recommended that further coordinated efforts are made to collate data from stocks throughout the geographic range of Atlantic salmon and to continue with the analysis of datasets and the development of hypotheses.

2.6 NASCO has asked ICES to evaluate the results of studies that estimate the level of prespawning mortality of salmon caught and released by anglers and the implications for stock assessments

ICES reviewed information from a number of countries.

Pre-spawning mortality

Mortality of Atlantic salmon after catch and release (C&R) is highly variable, with temperature often cited as an important factor (Dempson *et al*., 2002; Thorstad *et al*., 2003a; Thorstad *et al*., 2008). C&R angling at low temperatures (below 17–18°C) generally demonstrates lower post release mortalities than C&R at higher temperatures (Table 2.6.1, Figure 2.6.1). There is, however, a lack of studies on the survival after C&R at higher temperatures from release until to spawning and there are no studies on its relationship with survival to repeat spawning. Most of the studies that report mortality rates after C&R have used skilled anglers or artificially hooked already captive fish. This may lead to lower mortality than would be expected if less experienced anglers caught fish. Efforts have been made in a number of countries to inform anglers about good C&R practice through, for example, free instruction videos and advisory leaflets.

ICES considered that C&R recreational fisheries provide an intermediate management strategy between a full retention fishery and fishery closure for populations that are below target levels. Although not fully explored, its population-level effects could be evaluated using the equilibrium dynamics models used to calculate reference points such as the fishing mortality at maximum sustainable yield (Fmsy) or biomass at maximum sustainable yield (Bmsy). The effects would be conditional on life-history traits such as freshwater productivity, survival at-sea and repeat spawning frequency. C&R fisheries would be expected to result in population sizes that are higher than those in a full retention fishery, but lower than those expected to result from fishery closure (Figure 2.6.2).

Multiple recaptures

In all studies, less than 25 % of fish that had been marked upon release after capture by rod and line were caught a second time, and an even smaller proportion was caught a third time (Table 2.6.2). In most rivers where we have estimates of exploitation rates for salmon caught for the first time, the recapture rates after C&R are lower than the exploitation rate (Table 2.6.2). Thus, using marking of C&R fish to estimate exploitation rates or population size is likely to lead to underestimation of the exploitation rate and overestimation of the true population size. There is a need for further studies of the recapture rate of C&R salmon in rivers where exploitation rates are assessed with other methods in order to quantify the relationship between multiple recaptures and exploitation rate.

Implications for stock assessments

If all C&R salmon are counted as survivors, this will lead to an overestimation of the number of spawners. The reasons for this are twofold: (i) released salmon will suffer increased mortality relative to uncaught salmon and (ii) a proportion of the fish will be caught more than once.

At present, the effect of catch on stock assessment is handled differently by different countries. Given the information presented, ICES recognized the need to correct for C&R mortality. However, river-specific conditions at the time of fisheries vary; Table 2.6.1 provides general guidance on appropriate values to apply.

2.7 NASCO has asked ICES to provide a compilation of tag releases by country in 2008 and advise on progress with compiling historical tag recovery data from oceanic areas

2.7.1 Compilation of tag releases and fin clip data by ICES Member Countries in 2008

Data on releases of tagged, finclipped, and otherwise marked salmon in 2008 were provided by ICES and are compiled as a separate report (ICES, 2009b). A summary of tag releases is provided in Table 2.7.1.1.

2.7.2 Summary of the Workshop on Salmon Historical Information- New Investigations from old tagging data (WKSHINI)

The Workshop updated information from historical oceanic tagging and recovery programmes carried out by a number of countries in the format agreed at the WKDUHSTI Workshop (ICES, 2007). A number of hypotheses relating to oceanic migration and distribution were tested.

NW Atlantic

Analysis of salmon (4743) tag recoveries in the NW Atlantic indicated that tag recoveries were not uniformly distributed across the respective NAFO divisions at Greenland with Canadian and USA salmon more commonly captured in northern locations (NAFO Divisions 1B and 1C), whereas European origin fish tended to be caught further south in NAFO Divisions 1E and 1F. Collectively, 35% of North

American tag recoveries originated in NAFO Divisions 1A and 1B *vs.* only 17% of European salmon; whereas 56% of the tag recoveries of European salmon came from NAFO areas 1E and 1F with only 17% of North American origin salmon reported recovered in these areas.

For both North American salmon and European salmon the distributions before and after 1989 were found to differ among NAFO Divisions. In both cases, salmon were found further south at Greenland in the later period then in the former. This may be related to temperature, as period 2 has been cooler then period 1, but may also reflect changes in fishing practices or periods.

The distribution of Canadian and USA tag recaptures at West Greenland was also found to differ, with Canadian salmon more commonly recaptured in northern areas than USA fish. A comparison of European salmon (Norway, UK (Scotland), Ireland and UK (England and Wales)) yielded similar results, with Scottish and Norwegian salmon recovered more in northern areas whereas salmon from Ireland and UK (England and Wales) were more likely to be recaptured in southwest Greenland.

NE Atlantic

In the area north of the Faroes, the distribution of tagged salmon recoveries (2509 recaptured fish) was not random, with clumping around two main areas, one northeasterly and one south-westerly. Catch areas for sea age groups 0, 1, 2 and 3 were clustered and the catches of MSW fish appear to have been more prevalent in the northeast catch area. However, sea age distribution might be confounded by the differences in the spatial distribution of the fishery in any year. Clear spatial differences were also apparent between recaptures in autumn and winter, with salmon caught early in the season clustered to the southwest, and fish caught later to the northeast. Fishing effort (cpue) needs to be incorporated to account for potential influences from changes in the fishery.

Visual inspection of the distribution of recaptures from northern (Norway, Sweden and UK (Scotland)) and southern (Ireland and UK (England and Wales)) stock groups suggests a more northerly location of recaptures from the northern group. This observation needs to be examined in more detail with significance testing and incorporation of data indicating fishing effort.

ICES has recommended that a similar Workshop be held to complete compilation of available data and analyses of the resulting distributions of salmon at sea. A Workshop on Learning from Salmon Tagging Records [WKLUSTRE]) will meet in London, UK, from 16–18 September 2009 (Chair: Lars Petter Hansen, Norway) to:

a) further develop the international database of marine tagging and tag recovery information for Atlantic salmon;

b) use the database to investigate the distribution of salmon of different river (stock) origins and sea ages in time and space, and assess changes in the distribution over time in relation to hydrographical factors;

c) investigate the use of the tagging database to verify outputs from migration models; and

d) make recommendations in relation to future salmon tagging studies and investigations of salmon mortality at sea.

WKLUSTRE will report by 30 November 2009 for the attention of the WGNAS, TGRECORDS and SCICOM.

Table 2.1.1.1 Reported total nominal catch of salmon by country (in tonnes round fresh weight), 1960–2008. (2008 figures include provisional data).

	NAC Area			NEAC (N. Area)							NEAC (S. Area)						Faroes & Greenland				Total	Unreported catches	
Year	Canada (1)	USA	St. P&M	Norway (2)	Russia (3)	Iceland Wild	Iceland Ranch (4)	Sweden (West)	Den.	Finland	Ireland (5,6)	UK (E & W)	UK (N.Irl.) (6,7)	UK (Scotl.)	France (8)	Spain (9)	Faroes (10)	East Grld.	West Grld. (11)	Other (12)	Reported Nominal Catch	NASCO Areas (13)	International waters (14)
1960	1,636	1	-	1,659	1,100	100		40	-	-	743	283	139	1,443	-	33	-	-	60	-	7,237	-	-
1961	1,583	1	-	1,533	790	127		27	-	-	707	232	132	1,185	-	20	-	-	127	-	6,464	-	-
1962	1,719	1	-	1,935	710	125		45	-	-	1,459	318	356	1,738	-	23	-	-	244	-	8,673	-	-
1963	1,861	1	-	1,786	480	145		23	-	-	1,458	325	306	1,725	-	28	-	-	466	-	8,604	-	-
1964	2,069	1	-	2,147	590	135		36	-	-	1,617	307	377	1,907	-	34	-	-	1,539	-	10,759	-	-
1965	2,116	1	-	2,000	590	133		40	-	-	1,457	320	281	1,593	-	42	-	-	861	-	9,434	-	-
1966	2,369	1	-	1,791	570	104	2	36	-	-	1,238	387	287	1,595	-	42	-	-	1,370	-	9,792	-	-
1967	2,863	1	-	1,980	883	144	2	25	-	-	1,463	420	449	2,117	-	43	-	-	1,601	-	11,991	-	-
1968	2,111	1	-	1,514	827	161	1	20	-	-	1,413	282	312	1,578	-	38	5	-	1,127	403	9,793	-	-
1969	2,202	1	-	1,383	360	131	2	22	-	-	1,730	377	267	1,955	-	54	7	-	2,210	893	11,594	-	-
1970	2,323	1	-	1,171	448	182	13	20	-	-	1,787	527	297	1,392	-	45	12	-	2,146	922	11,286	-	-
1971	1,992	1	-	1,207	417	196	8	18	-	-	1,639	426	234	1,421	-	16	-	-	2,689	471	10,735	-	-
1972	1,759	1	-	1,578	462	245	5	18	-	32	1,804	442	210	1,727	34	40	9	-	2,113	486	10,965	-	-
1973	2,434	3	-	1,726	772	148	8	23	-	50	1,930	450	182	2,006	12	24	28	-	2,341	533	12,670	-	-
1974	2,539	1	-	1,633	709	215	10	32	-	76	2,128	383	184	1,628	13	16	20	-	1,917	373	11,877	-	-
1975	2,485	2	-	1,537	811	145	21	26	-	76	2,216	447	164	1,621	25	27	28	-	2,030	475	12,136	-	-
1976	2,506	1	3	1,530	542	216	9	20	-	66	1,561	208	113	1,019	9	21	40	<1	1,175	289	9,327	-	-
1977	2,545	2	-	1,488	497	123	7	10	-	59	1,372	345	110	1,160	19	19	40	6	1,420	192	9,414	-	-
1978	1,545	4	-	1,050	476	285	6	10	-	37	1,230	349	148	1,323	20	32	37	8	984	138	7,682	-	-
1979	1,287	3	-	1,831	455	219	6	12	-	26	1,097	261	99	1,076	10	29	119	<0,5	1,395	193	8,118	-	-
1980	2,680	6	-	1,830	664	241	8	17	-	34	947	360	122	1,134	30	47	536	<0,5	1,194	277	10,127	-	-
1981	2,437	6	-	1,656	463	147	16	26	-	44	685	493	101	1,233	20	25	1,025	<0,5	1,264	313	9,954	-	-
1982	1,798	6	-	1,348	364	130	17	25	-	54	993	286	132	1,092	20	10	606	<0,5	1,077	437	8,395	-	-
1983	1,424	1	3	1,550	507	166	32	28	-	58	1,656	429	187	1,221	16	23	678	<0,5	310	466	8,755	-	-
1984	1,112	2	3	1,623	593	139	20	40	-	46	829	345	78	1,013	25	18	628	<0,5	297	101	6,912	-	-
1985	1,133	2	3	1,561	659	162	55	45	-	49	1,595	361	98	913	22	13	566	7	864	-	8,108	-	-
1986	1,559	2	3	1,598	608	232	59	54	-	37	1,730	430	109	1,271	28	27	530	19	960	-	9,255	315	-
1987	1,784	1	2	1,385	564	181	40	47	-	49	1,239	302	56	922	27	18	576	<0,5	966	-	8,159	2,788	-
1988	1,310	1	2	1,076	420	217	180	40	-	36	1,874	395	114	882	32	18	243	4	893	-	7,737	3,248	-
1989	1,139	2	2	905	364	141	136	29	-	52	1,079	296	142	895	14	7	364	-	337	-	5,904	2,277	-
1990	911	2	2	930	313	141	285	33	13	60	567	338	94	624	15	7	315	-	274	-	4,925	1,890	180-350

Table 2.1.1.1 continued.

Year	NAC Area			NEAC (N. Area)							NEAC (S. Area)						Faroes & Greenland				Total Reported Nominal Catch	Unreported catches	
	Canada (1)	USA	St. P&M	Norway (2)	Russia (3)	Iceland Wild	Iceland Ranch (4)	Sweden (West)	Den.	Finland	Ireland (5,6)	UK (E & W) (6,7)	UK (N.Irl.) (6,7)	UK (Scotl.) (6,7)	France (8)	Spain (9)	Faroes (10)	East Grld.	West Grld. (11)	Other (12)		NASCO Areas (13)	International waters (14)
1991	711	1	1	876	215	129	346	38	3	70	404	200	55	462	13	11	95	4	472	-	4,106	1,682	25-100
1992	522	1	2	867	167	174	462	49	10	77	630	171	91	600	20	11	23	5	237	-	4,119	1,962	25-100
1993	373	1	3	923	139	157	499	56	9	70	541	248	83	547	16	8	23	-	-	-	3,696	1,644	25-100
1994	355	0	3	996	141	136	313	44	6	49	804	324	91	649	18	10	6	-	-	-	3,945	1,276	25-100
1995	260	0	1	839	128	146	303	37	3	48	790	295	83	588	10	9	5	2	83	-	3,629	1,060	-
1996	292	0	2	787	131	118	243	33	2	44	685	183	77	427	13	7	-	0	92	-	3,136	1,123	-
1997	229	0	2	630	111	97	59	19	1	45	570	142	93	296	8	3	-	1	58	-	2,364	827	-
1998	157	0	2	740	131	119	46	15	1	48	624	123	78	283	8	4	6	0	11	-	2,396	1,210	-
1999	152	0	2	811	103	111	35	16	1	62	515	150	53	199	11	6	0	0	19	-	2,247	1,032	-
2000	153	0	2	1,176	124	73	11	33	5	95	621	219	78	274	11	7	8	0	21	-	2,912	1,269	-
2001	148	0	2	1,267	114	74	14	33	6	126	730	184	53	251	11	13	0	0	43	-	3,069	1,180	-
2002	148	0	2	1,019	118	90	7	28	5	93	682	161	81	191	11	9	0	0	9	-	2,654	1,039	-
2003	141	0	3	1,071	107	99	11	25	4	78	551	89	56	192	13	7	0	0	9	-	2,455	847	-
2004	161	0	3	784	82	112	18	19	4	39	489	111	48	245	19	7	0	0	15	-	2,156	686	-
2005	139	0	3	888	82	129	21	15	8	47	422	97	52	215	11	13	0	0	15	-	2,156	700	-
2006	137	0	3	932	91	96	17	14	2	67	326	80	29	192	13	11	0	0	22	-	2,032	670	-
2007	112	0	2	767	63	91	36	16	3	58	85	71	30	169	11	10	0	0	25	-	1,548	475	-
2008	148	0	4	807	73	125	68	18	9	71	88	68	22	146	12	10	0	0	26	-	1,696	443	-
Average																							
2003-2007	138	0	3	888	85	105	20	18	4	58	375	89	43	203	13	10	0	0	17	-	2,069	676	-
1998-2007	145	0	3	946	101	99	22	21	4	71	505	128	56	221	12	9	1	0	19	-	2,362	911	-

Key:

1. Includes estimates of some local sales, and, prior to 1984, by-catch.
2. Before 1966, sea trout and sea charr included (5% of total).
3. Figures from 1991 to 2000 do not include catches taken in the recreational (rod) fishery.
4 From 1990, catch includes fish ranched for both commercial and angling purposes.
5. Improved reporting of rod catches in 1994 and data derived from carcase tagging and log books from 2002.
6. Catch on River Foyle allocated 50% Ireland and 50% N. Ireland.
7. Angling catch (derived from carcase tagging and log books) first included in 2002.
8. Data for France include some unreported catches.
9. Weights estimated from mean weight of fish caught in Asturias (80-90% of Spanish catch). No data available for Spain for 2008; catch assumed as in 2007.
10. Between 1991 & 1999, there was only a research fishery at Faroes. In 1997 & 1999 no fishery took place; the commercial fishery resumed in 2000, but has not operated since 2001.
11. Includes catches made in the West Greenland area by Norway, Faroes, Sweden and Denmark in 1965-1975.
12. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.
13. No unreported catch estimate Canada in 2007-2008 and for Russia in 2008.
14. Estimates refer to season ending in given year.

Table 2.1.2.1 Numbers of fish caught and released in rod fisheries along with the % of the total rod catch (released + retained) for countries in the North Atlantic where records are available, 1991–2008. Figures for 2008 are provisional.

Year	Canada		USA		Iceland		Russia		UK (E&W)		UK (Scotland)		Ireland		UK (N Ireland) [1]		Denmark		Norway	
	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch
1991	28,497	33	239	50			3,211	51												
1992	46,450	34	407	67			10,120	73												
1993	53,849	41	507	77			11,246	82	1,448	10										
1994	61,830	39	249	95			12,056	83	3,227	13	6,595	8								
1995	47,679	36	370	100			11,904	84	3,189	20	12,151	14								
1996	52,166	33	542	100	669	2	10,745	73	3,428	20	10,413	15								
1997	57,252	49	333	100	1,558	6	14,823	87	3,132	24	10,965	18								
1998	62,895	53	273	100	2,826	8	12,776	81	5,365	31	13,464	18								
1999	55,331	50	211	100	3,055	11	11,450	77	5,447	44	14,846	28								
2000	64,482	55	0	-	2,918	12	12,914	74	7,470	42	21,072	32								
2001	59,387	55	0	-	3,607	15	16,945	76	6,143	43	27,724	38								
2002	50,924	52	0	-	5,985	19	25,248	80	7,658	50	24,058	42								
2003	53,645	55	0	-	5,361	17	33,862	81	6,425	56	29,160	56								
2004	62,316	55	0	-	7,294	17	24,679	76	13,211	48	46,279	50					255	19		
2005	63,005	62	0	-	9,224	19	23,592	87	11,983	56	45,970	55	2,553	12			606	27		
2006	60,486	62	1	100	8,735	23	33,380	82	10,959	56	47,471	55	5,409	22	302	18	794	65		
2007	44,423	59	3	100	9,263	24	44,341	90	10,913	55	55,472	61	13,125	40	470	16	959	57		
2008	58,004	57	61	100	15,398	19	41,881	86	11,947	54	55,366	63	13,312	37	648	20	2,033	71	5,512	-
Average 2003-2007	56,775	59	1	100	7,975	20	31,971	83	10,698	54	44,870	55								
1998-2007	57,689	56	49	100	5,827	16	23,919	80	8,557	48	32,552	43								

Key: [1] Data for FCB area only

Table 2.1.3.1 Estimates of unreported catches (tonnes round fresh weight) by various methods by country within national EEZs in the North East Atlantic, North American and West Greenland Commissions of NASCO, 2008.

Commission Area	Country	Unreported Catch t	Unreported as % of Total North Atlantic Catch (Unreported + Reported)	Unreported as % of Total National Catch (Unreported + Reported)
NEAC	Denmark	4	0.2	31
NEAC	Finland	15	0.7	17
NEAC	Iceland	12	0.6	6
NEAC	Ireland	9	0.4	9
NEAC	Norway	346	16.2	30
NEAC	Sweden	2	0.1	10
NEAC	France	3	0.1	0
NEAC	UK (E & W)	23	1.1	25
NEAC	UK (N.Ireland)	0	0.0	0
NEAC	UK (Scotland)	20	0.9	12
NAC	USA	0	0.0	0
WGC	West Greenland	10	0.5	28
	Total Unreported Catch *	443	20.7	
	Total Reported Catch of North Atlantic salmon	1,695		

* No unreported catch estimate available for Canada and Russia in 2008.
Unreported catch estimates not provided for Spain & St. Pierre et Miquelon

Table 2.4.2.1. Stomach composition of Atlantic salmon caught with gillnets in NAFO Divisions 1C and 1D from August 15 to November 4 in 1969 and 1970 (reported in Lear 1972; 1980) compared with Atlantic salmon caught in NAFO Division 1D in from August and September in 2006 and 2007.

YEAR	1969–1970	2006	2007
Month, Day	Aug 15–Nov 4	Sep 20–Sep 28	Aug 09–Sep 05
NAFO Division	1C & 1D	1D	1D
Prey Items	Per cent Composition (by weight)		
unidentified material	4.24	0.11	2.8
fish remains	5.35	6.34	1.47
unidentified invertebrates	0.14	0.06	
capelin	64.69	38.37	92.15
lancet	1.18	-	-
arctic cod	0.39	-	-
sandlance	14.55	0.81	0.46
daubed shanny	0.15	-	-
sculpin	0.01	-	0.35
polychaete	0.04	-	-
amphipod	7.35	53.84	2.76
euphausiids	1.9	0.05	-
squid	-	0.41	-
total	100	100	100

Table 2.5.1. Trends in biological characteristics over time: 'o' means not enough evidence at the 5% level to detect a trend. '+' is a positive trend (p>0.05), '-' is a negative trend (p<0.05).

Stock complex	Country	Stock	H/W	Time series	Latitude	Stock status	Median run date	Mean run date	Mean rver age	Mean sea age	Prop. 1SW in run	Prop. 2SW in run	Prop. PS in run	1SW length	1SW weight	1SW condition	2SW length	2SW weight	2SW condition	PS length	PS weight	PS condition	Prop. female in 1SW	Prop. female in 2SW	Prop. female in PS	Prop. maiden spawners - 1SW	Prop. maiden spawners - 2SW
NAC	Canada	Western Arm Brook	W	1984-06	51.2	+	-	o	-	+	o	o	o	+	+	+	-	o	o	+	+	o	o	o		o	o
	Canada	Middle Brook	W	1984-05	48.8	o	o	o	o	o	o	o	o	+	+	o				+	+	o	-			o	o
	Canada	Conne River	W	1984-06	47.9	-	o	o	o	+	-	o	+	+	+	o	o			o	o	o	o	o		-	+
	Canada	Miramichi	W	1984-07	47.0	-			-	+	o	o	+	+	o	-	+	o	o	+	+	o	-	+	+	o	o
	Canada	Nashwaak	W	1984-07	46.0	-	o	o	-	-	+	-		o			+						o	o		+	-
	Canada	St John (Mactaquac)	W	1984-07	45.3	-	-	-	-	o	+	o		o	o	o	o	-	-				o	o		o	-
	Canada	St John (Mactaquac)	H	1984-07	45.3	-	-	-	-	-	+	-		o	o	o	-	-	-				o	o		+	-
	Canada	La Have	W	1984-07	44.4	o	-	o	+	o	o	o	o	o	+	+	o	+	+	o	+		o	+	+	o	o
	Canada	La Have	H	1984-07	44.4	o	o	o	-	o	o	+	o	o	+	+	o	+	+	o	+		o	+	o	o	o
	USA	Penobscot	H	1984-07	44.5	-	-	-	o	-	+	o	o	o	+	+	o	o	+	o	o	o	-	o	o	+	o
N NEAC	Finland/Norway	Teno	W	1984-07	70.8	o			+	-	o	o	+	o	o	+	o	o	o	o	o	o	o	o	-		
	Finland/Norway	Näätämöjoki	W	1984-06	69.7	o			+	-	+	o	o	+	o	o	o	o	o	o	o	o	o	-	o		
	Russia	Tuloma	W	1984-08	68.9	o	o	+	-	-	o	o	o	o	o	o	-	-	o	o	o	o	o	o	o	+	o
	Norway	Årgårdsvassdraget	W	1992-07	64.3	o			o	+	o	+	o	o	o	o	o	o	o	o	o	o					
	Norway	Gaula	W	1989-07	63.3	o			-	+	o	o	+	o	o	o	o	o	o	o	o	o					
	Iceland (N&E)	Laxa I Adaldalur	W	1984-07	65.6						+												o	-			
	Iceland (N&E)	Hofsa	W	1984-07	65.4						+												o	+			
S NEAC	Iceland (S&W)	Nordura	W	1984-07	64.6						+												o	+			
	Iceland (S&W)	Ellidaar	W	1984-07	64.1						+												+	o			
	UK (Scot)	N. Esk	W	1984-07	56.7						o	o		-	-	-	o	-	o								
	UK (NI)	Bush	W	1984-07	55.1	-	+	o	o	o	+	-	o	o	o	o	o	-	-	o	o	o	o	o	o	+	-
	UK (E&W)	Lune	W	1987-07	54.0	o			o	o	o	o		o	o	o	o	-	o								
	UK (E&W)	Dee	W	1984-07	53.4	-			-	-	+	-	o	o	+	+	+	+	+	-	-	-	-	+	o		
	UK (E&W)	Wye	W	1984-07	51.6	o		+	-	-	+	+	-	+	+	o	o	o	o	-	-	o					
	UK (E&W)	Frome	W	1984-08	50.7	-			-					-			+										
	France	Bresle	W	1984-08	50.1					o	o	o	o	o			o										

Table 2.5.2. Results of meta analysis at the stock complex level, indicating significant increase (+) or decrease (-) relative to the mean (o denotes non-significant relationship).

Stock complex	H/W	Time series	Latitude	Stock size - 1SW	Stock size - 2SW	Mean river age	Mean sea age	Mean total age	Median run date	Mean run date	Prop. 1SW in run	Prop. 2SW in run	Prop. PS in run	Mean length - 1SW	Mean weight - 1SW	Condition - 1SW	Mean length - 2SW	Mean weight - 2SW	Condition - 2SW	Mean length - PS	Mean weight - PS	Condition - PS	Prop. female in 1SW	Prop. female in 2SW	Prop. female in PS	Prop. maiden spawners - 1SW	Prop. maiden spawners - 2SW
NAC (N)	W	1984-07	47.0 - 51.2	o	+	-	+	o	-	-	o	o	+	+	+	o	o	o	o	+	+	o	o	o	+	o	o
NAC (S)	H/W	1984-07	44.4 - 46.0	-	-	o	o	-	o	-	o	o	o	o	o	o	o	o	o	o	o		o	+	o	o	o
N NEAC	W	1984-07	65.4 - 70.8	+	o	o	o	o			+	+	o	o	o	o	-	-	o	o	o	o	o	o	-		
S NEAC	W	1984-07	50.1 - 64.6	o	o	-	-	-		+	+	o	-	o	o	o	o	o	o	-	-	o	o	+	+		

Table 2.6.1. Summary of C&R experiments on Atlantic salmon that provide mortality rates and details of the methods used. (NS-Nova Scotia; NB-New Brunswick; NL-Newfoundland; ON-Ontario).

Author	Purpose	Method	Origin	Location	Life stage	Telemetry	Method	Numbers of fish	Study Period	Mortality Rate in %	Water Temperature
Tufts et al. 1991	Pysiology	Hatchery	Wild	LaHave R, NS	Small		Chased	6	24 hours	0	18
Booth et al. 1995	Pysiology	In-river	Wild	Miramichi R, NB	Large		Hooked	20	24 hours	0	6 ± 1
Brobbel et al. 1996	Pysiology	In-river	Wild	Miramichi R, NB	Small		Hooked	24	12 hours	0	4 ± 1
Brobbel et al. 1996	Pysiology	In-river	Wild	Miramichi R, NB	Small		Hooked	25	12 hours	12	16 ± 1
Wilkie et al. 1996	Pysiology	In-river	Wild	Miramichi R, NB	Small		Hooked	10	12 hours	40	22
Anderson et al.1998	Pysiology	Hatchery	Wild	Exploits R, NL	Small		Hooked	5	72 hours	80	20 ± 2
Anderson et al.1998	Pysiology	Hatchery	Wild	Exploits R, NL	Small		Hooked	5	72 hours	0	16.5 ± 1
Anderson et al.1998	Pysiology	Hatchery	Hatchery	Alma, ON	Small		Hooked	6	72 hours	0	8 ± 1
Wilkie et al. 1997	Pysiology	Hatchery	Hatchery	Margaree R, NS	Small		Chased	10	72 hours	0	12
Wilkie et al. 1997	Pysiology	Hatchery	Hatchery	Margaree R, NS	Small		Chased	10	72 hours	0	18
Wilkie et al. 1997	Pysiology	Hatchery	Hatchery	Margaree R, NS	Small		Chased	10	72 hours	30	23
Dempson et al. 2002	Mortality	Natural	Wild	Conne R, NL	Small		Angled	8	14-40 days	0	12.2 ± 1.7
Dempson et al. 2002	Mortality	Natural	Wild	Conne R, NL	Small		Angled	20	14-40 days	10	16.1 ± 1.4
Dempson et al. 2002	Mortality	Natural	Wild	Conne R, NL	Small		Angled	21	14-40 days	9.5	19.4 ± 1.3
Thorstad et al. 2003	Mortality	Natural	Wild	Alta R, Norway	Small&large	Telemetry	Angled	30	Up to spawning	3	12.2 ± 2.2
Mäkinen et al. 2000	Migration	Natural	Wild	R. Teno, Finland	Small	Telemetry	Angled	5	Unknown	0	9.4 ± 1.0
Whoriskey et al. 2000	Mortality	Natural	Wild	R. Ponoi, Russia	Small&large	Telemetry	Angled	62	24 hours	2	Not listed
Webb 1998	Mortality	Natural	Wild	R. Dee, Scotland	Small&large	Telemetry	Angled	25	Up to spawning	4	Not listed
Grant 1980	Stocking	Hatchery	Wild	R. Grimsa&Adaldal, Iceland	Large		Angled	30	Up to spawning	4	Not listed
Gowan 2004	Mortality	Natural	Wild	River Eden, Cumbria, UK	Small&large	Telemetry	Angled	208	Up to spawning	7-37	5-18, 11.9 ± 3
Svenning 2007	Migration	Natural	Wild	Målselva, Norway	Small&large	Telemetry	Angled	37	Up to spawning	0	12
Thorstad et al. 2007	Mortality	Natural	Wild	Alta R, Norway	Large	Telemetry	Angled	18	Up to spawning	6	12-14
Thorstad et al. 2003b	Migration	Natural	Wild	Orkla R, Norway	Small&large	Telemetry	Angled	34	Up to spawning	0	11.5-15
Davidson et al. 1994	Egg survival	Laboratory	Wild	Miramichi R, NB	Small&large		Hooked	26	Up to spawning	0	5-6
Warner & Johnson 1998	Mortality	Natural	Landlocked	Moosehead lake, Maine	Small		Angled	175	minimum 2 days	22	16.5
Warner 1976	Mortality	Laboratory	Landlocked	Cobb fish cultural station, Maine	Small		Angled	1200	minimum 9 days	3	12.5
Warner 1979	Mortality	Laboratory	Landlocked	Casco cultural fish station, Maine	Small		Angled	1221	3-5 days	5	13-15

Table 2.6.2. Information relating to multiple recaptures of salmon after C&R.

Location	Study	Method	N	Percent recaptured once	Percent recaptured twice	Percent recapture of released a second time	Estimate of exploitation rate in river (percent)
Ponoi River, Russia	Whoriskey et al 2000	Floy tags	2520	11	0.5		10-19
Ponoi River, Russia	Whoriskey et al 2000	Telmetry	Unknown	7.2			10-19
Alta River, Norway	Thorstad et al. 2003a	Ancor T-tags	353	4	0.3		50-70
Aberdeeshire Dee, Scotland	Webb 1998 and references therein	Unknown	Unknown	5-20			Unknown
Hofsa, Iceland	Gudbergsson & Einarsson 2009	Floy tags or Dart tags	592	23.5	1.7	14.3	Unknown
Sela, Iceland	Gudbergsson & Einarsson 2009	Floy tags or Dart tags	605	24.6	2.3	22.2	75-80
Grimsa, Iceland	Gudbergsson & Einarsson 2009	Floy tags or Dart tags	234	17.9	0	0	Unknown
Haffjardara, Iceland	Gudbergsson & Einarsson 2009	Floy tags or Dart tags	379	14.8	0.3	6.7	Unknown

Table 2.7.1.1 Summary of Atlantic salmon tagged and marked in 2008; 'Hatchery' and 'Wild' refer to smolts and parr; 'Adults' relates to both wild and hatchery-origin fish.

		Primary Tag or Mark				
Country	Origin	Microtag	External mark	Adipose clip	Pit tag[1]	Total
Canada	Hatchery	0	9,705	784,004	35	793,744
	Wild	9,804	22,610	23,521	137	56,072
	Adult	0	2,693	3,256	57	6,006
	Total	9,804	35,008	810,781	229	855,822
France	Hatchery			448,700		448,700
	Wild		1,504	1,317	483	3,304
	Adult		606			606
	Total	0	2,110	450,017	483	452,610
Germany	Hatchery	35,103		6,000	0	41,103
	Wild			0	0	0
	Adult			0	0	0
	Total	35,103	0	6,000	0	41,103
Iceland	Hatchery	44,175	0	0	0	44,175
	Wild	1,886	0	0	0	1,886
	Adult	0	4,694	0	0	4,694
	Total	46,061	4,694	0	0	50,755
Ireland	Hatchery	287,945	0	0	0	287,945
	Wild	9,580	0	0	0	9,580
	Adult	0	0	0	0	0
	Total	297,525	0	0	0	297,525
Norway	Hatchery	60,414	59,826	0	0	120,240
	Wild		1,076	0	0	1,076
	Adult		1,306	0	0	1,306
	Total	60,414	62,208	0	0	122,622
Russia	Hatchery	0	0	1,145,420	0	1,145,420
	Wild	0	0	0	0	0
	Adult	0	2,602	0	0	2,602
	Total	0	2,602	1,145,420	0	1,148,022
Spain	Hatchery	311,967	0	329,465	0	641,432
	Wild	0	0	0	0	0
	Adult	0	0	0	0	0
	Total	311,967	0	329,465	0	641,432
Sweden	Hatchery	0	3,000	149,916	0	152,916
	Wild	0	448	0	0	448
	Adult	0	0	0	0	0
	Total	0	3,448	149,916	0	153,364
UK (England &	Hatchery	30,463	0	110,032	0	140,495
Wales)	Wild	11,353	0	15,564	0	26,917
	Adult	0	758	0	0	758
	Total	41,816	758	125,596	0	168,170
UK (N. Ireland)	Hatchery	17,177	0	28,690	0	45,867
	Wild	1,410	0	0	0	1,410
	Adult	0	0	0	0	0
	Total	18,587	0	28,690	0	47,277
UK (Scotland)	Hatchery	51,810	0	0	0	51,810
	Wild	6,975	3,426	0	3,479	13,880
	Adult		726	0	0	726
	Total	58,785	4,152	0	3,479	66,416
USA	Hatchery	0	0	463,479	842	464,321
	Wild	0	0	0	46	46
	Adult	0	2,372	0	1,643	4,015
	Total	0	2,372	463,479	2,531	468,382
All Countries	Hatchery	839,054	72,531	3,465,706	877	4,378,168
	Wild	76,111	29,064	46,402	4,145	155,722
	Adult	0	15,757	3,256	1,700	20,713
	Total	915,165	117,352	3,515,364	6,722	4,554,603

[1] Includes pit tags or other internal tags

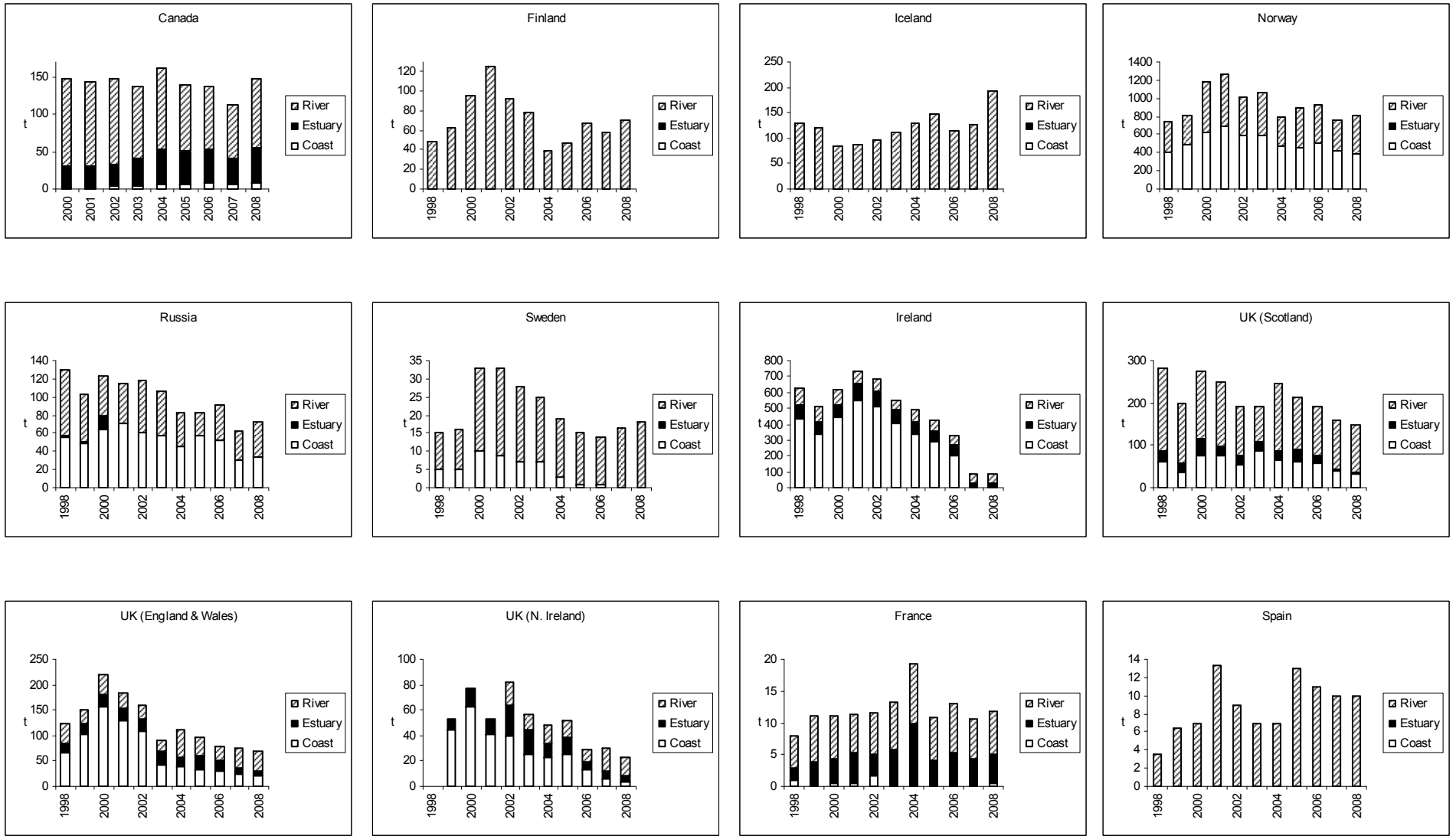


Figure 2.1.1.1. Nominal catch (tonnes) taken in coastal, estuarine and riverine fisheries by country. Note that time-series and y-axes vary.

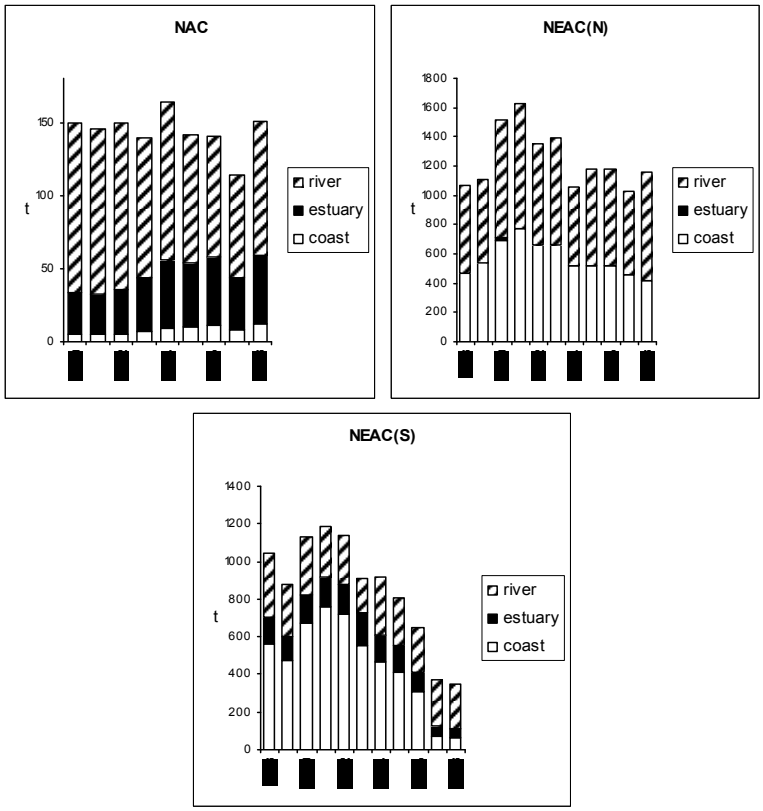


Figure 2.1.1.2. Nominal catch taken in coastal, estuarine and riverine fisheries for the NAC area, and for the NEAC northern and southern areas. Note that time-series and y-axes vary.

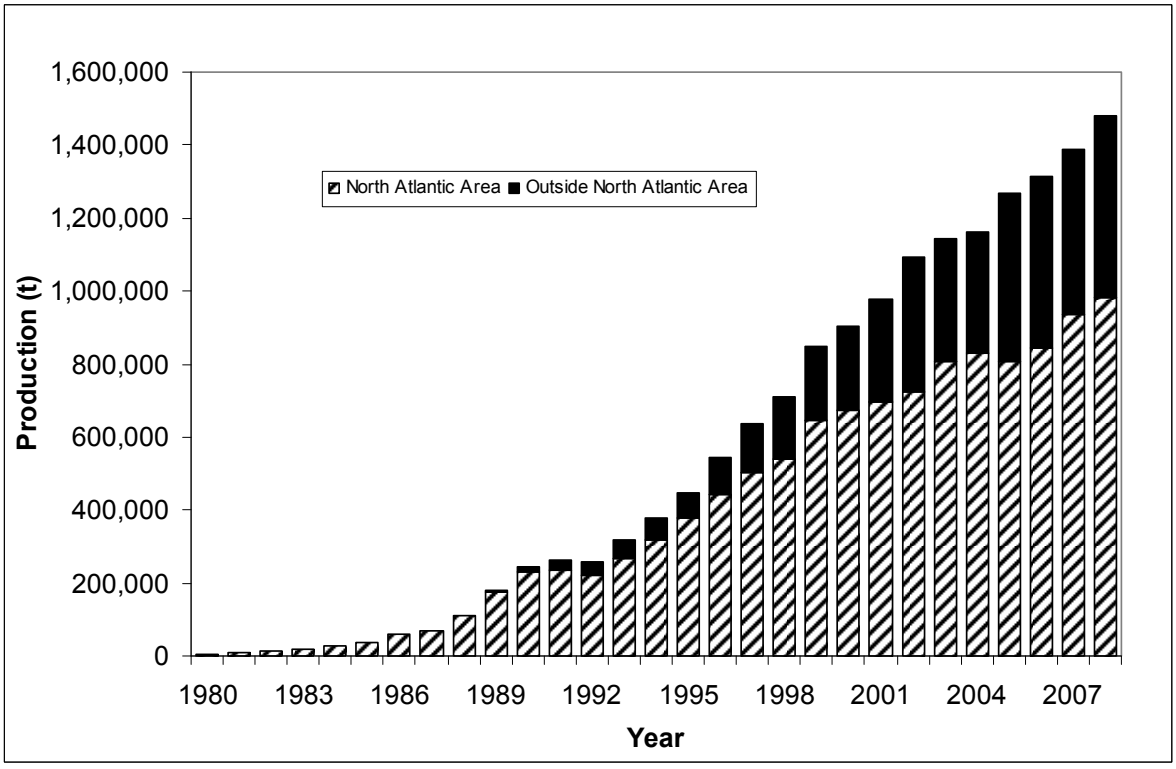


Figure 2.2.1. World-wide production of farmed Atlantic salmon, 1980–2008.

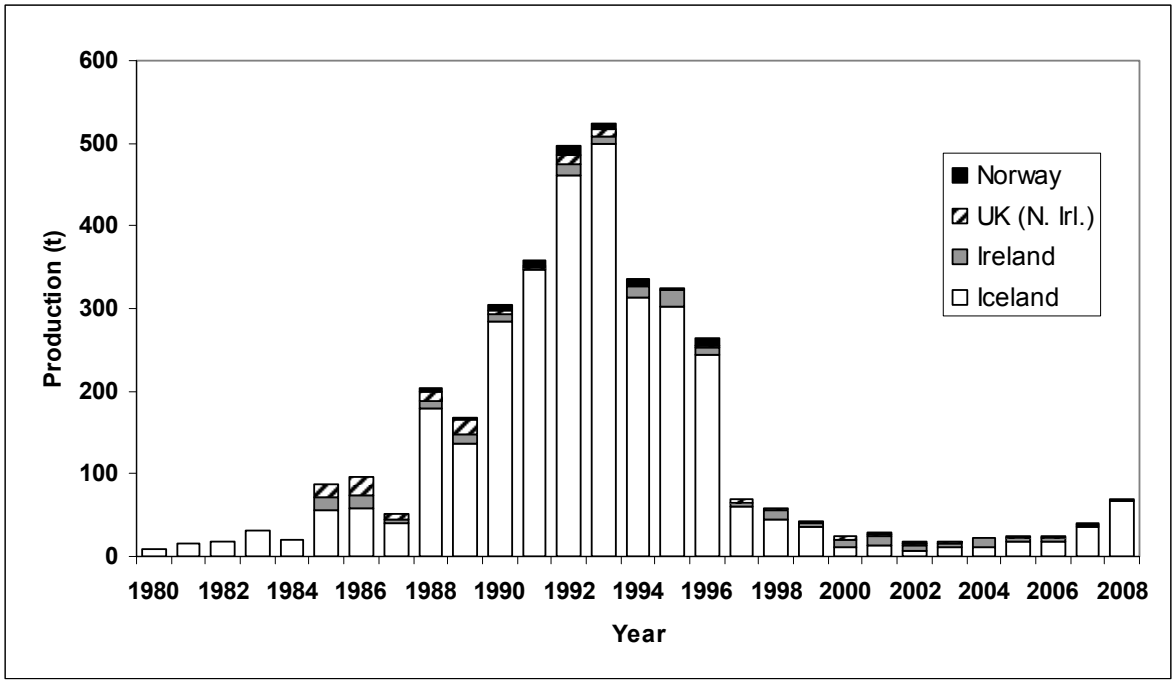


Figure 2.2.2. Production of ranched Atlantic salmon (tonnes round fresh weight) in the North Atlantic, 1980–2008.

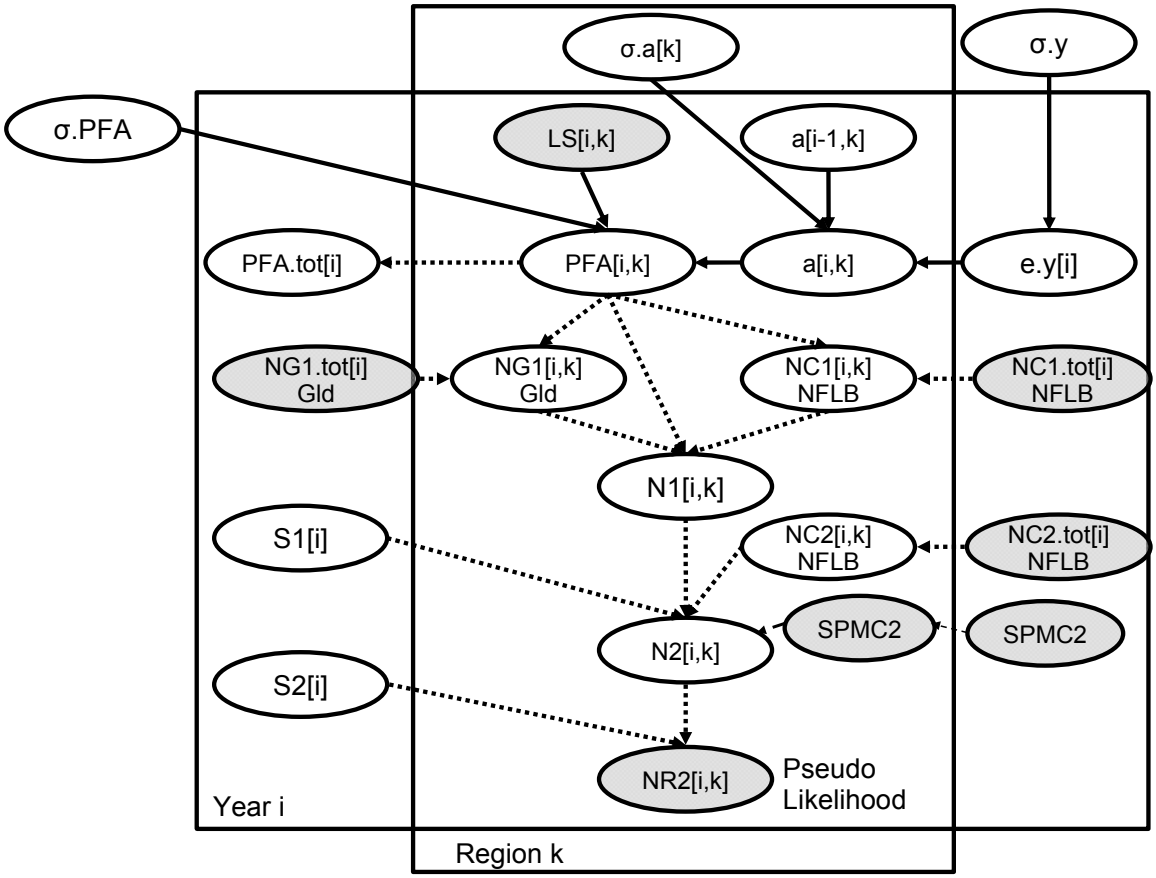


Figure 2.3.1.1 Directed Acyclical Graph (DAG) of the proposed structure of the region disaggregated forecast model for 2SW salmon of North American origin. Ellipses in grey are observations (or pseudo-observations) derived from sampling programmes or from submodels (run-reconstruction).

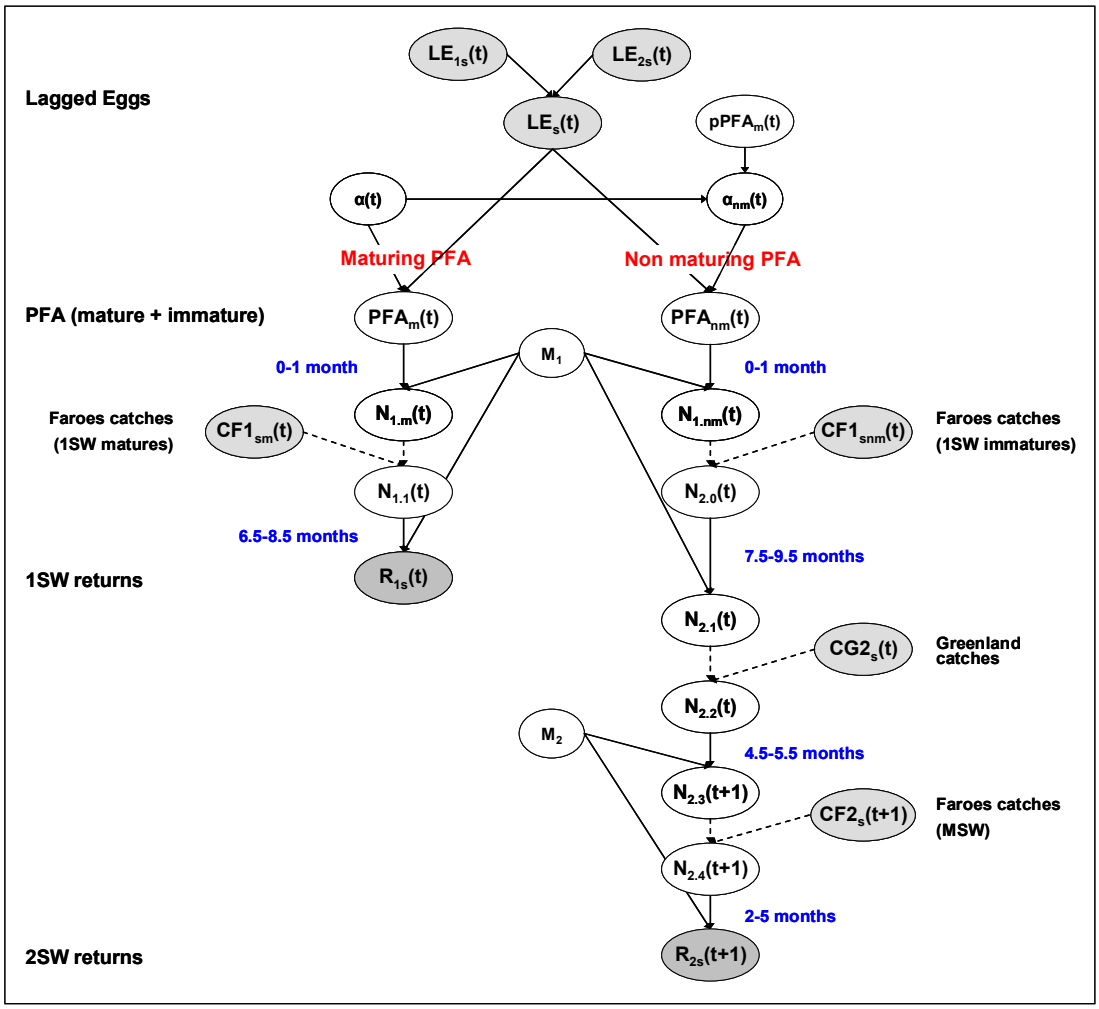


Figure 2.3.2.1 Directed Acyclical Graph (DAG) of the proposed structure of the combined sea age model for the southern NEAC and northern NEAC forecast models. Ellipses in grey are observations (or pseudo-observations) derived from sampling programmes or from submodels (run-reconstruction).

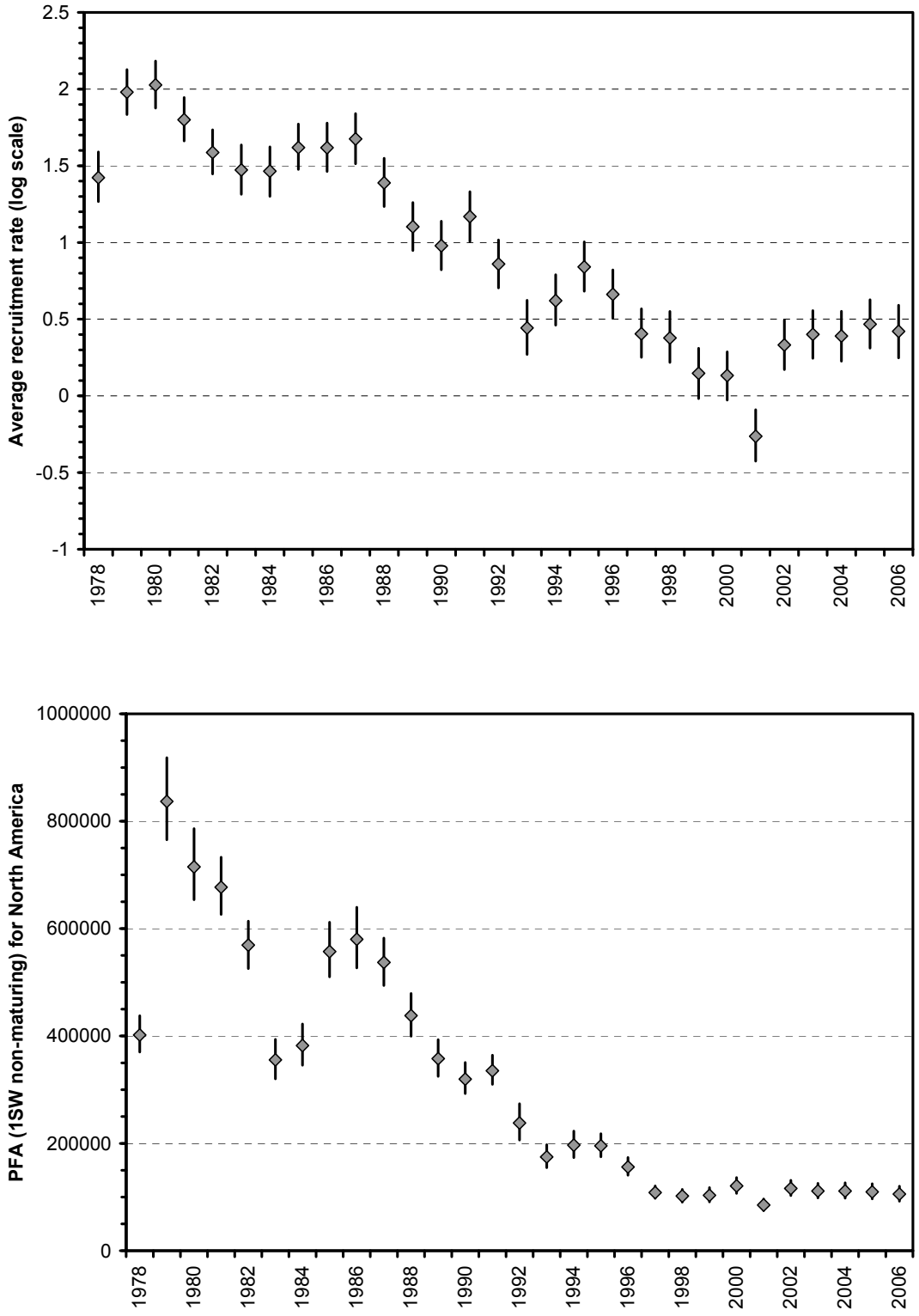


Figure 2.3.3.1 Average recruitment rate (log scale) (upper panel) and posterior distributions of PFA for North America (lower panel) based on the region-specific random walk model, for lagged eggs and PFA years 1978 to 2006. Diamond symbols are the medians and the vertical lines are the 95% Bayesian credible intervals of the posterior distributions.

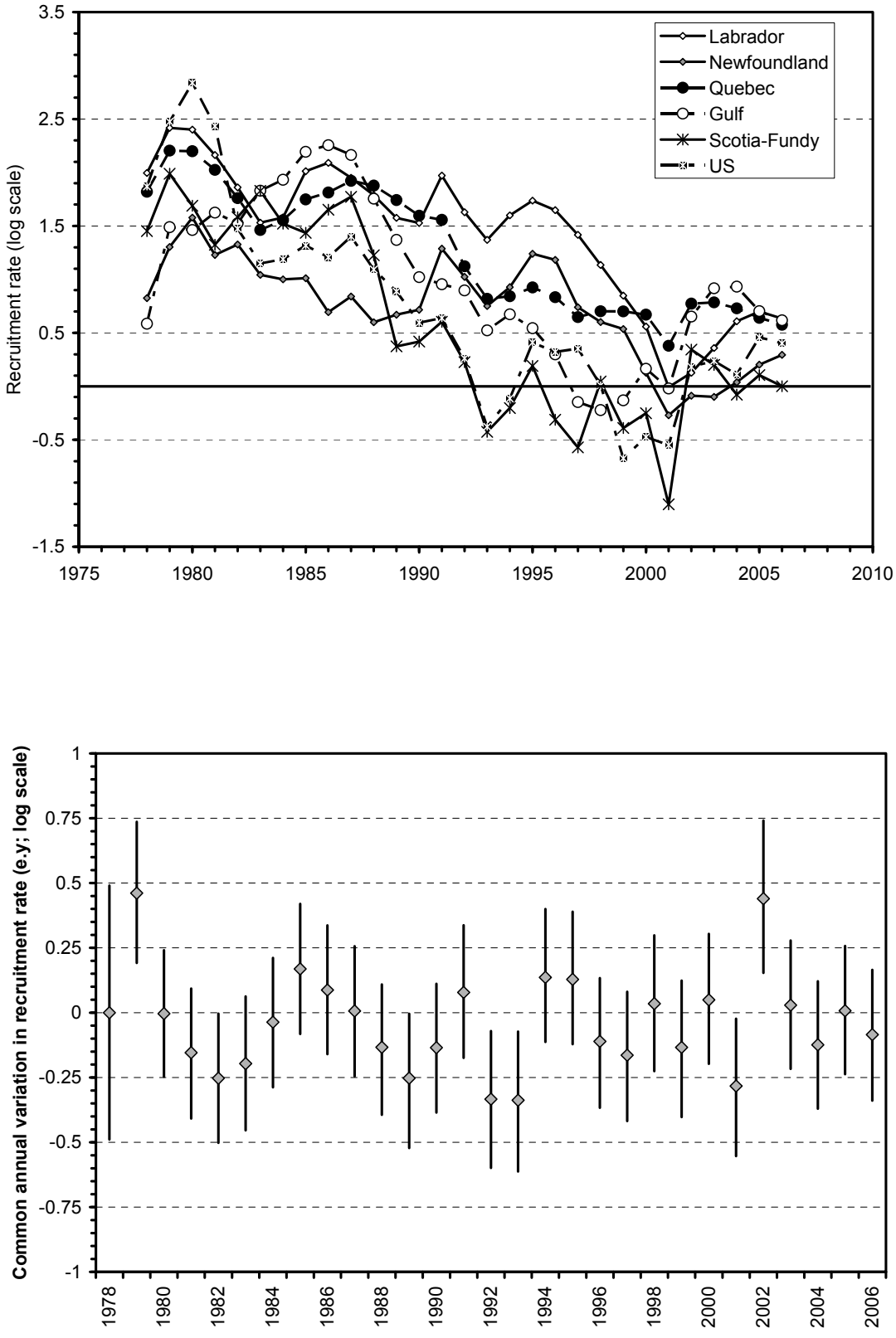


Figure 2.3.3.2 Point estimates of the region-specific recruitment rate (log scale) (upper panel) and posterior distributions of the regionally common annual variation (e.y; log scale; lower panel) based on the region-specific random walk model, for lagged eggs and PFA years 1978 to 2006. In the lower panel, diamond symbols are the medians and the vertical lines are the 95% Bayesian credible intervals of the posterior distributions.

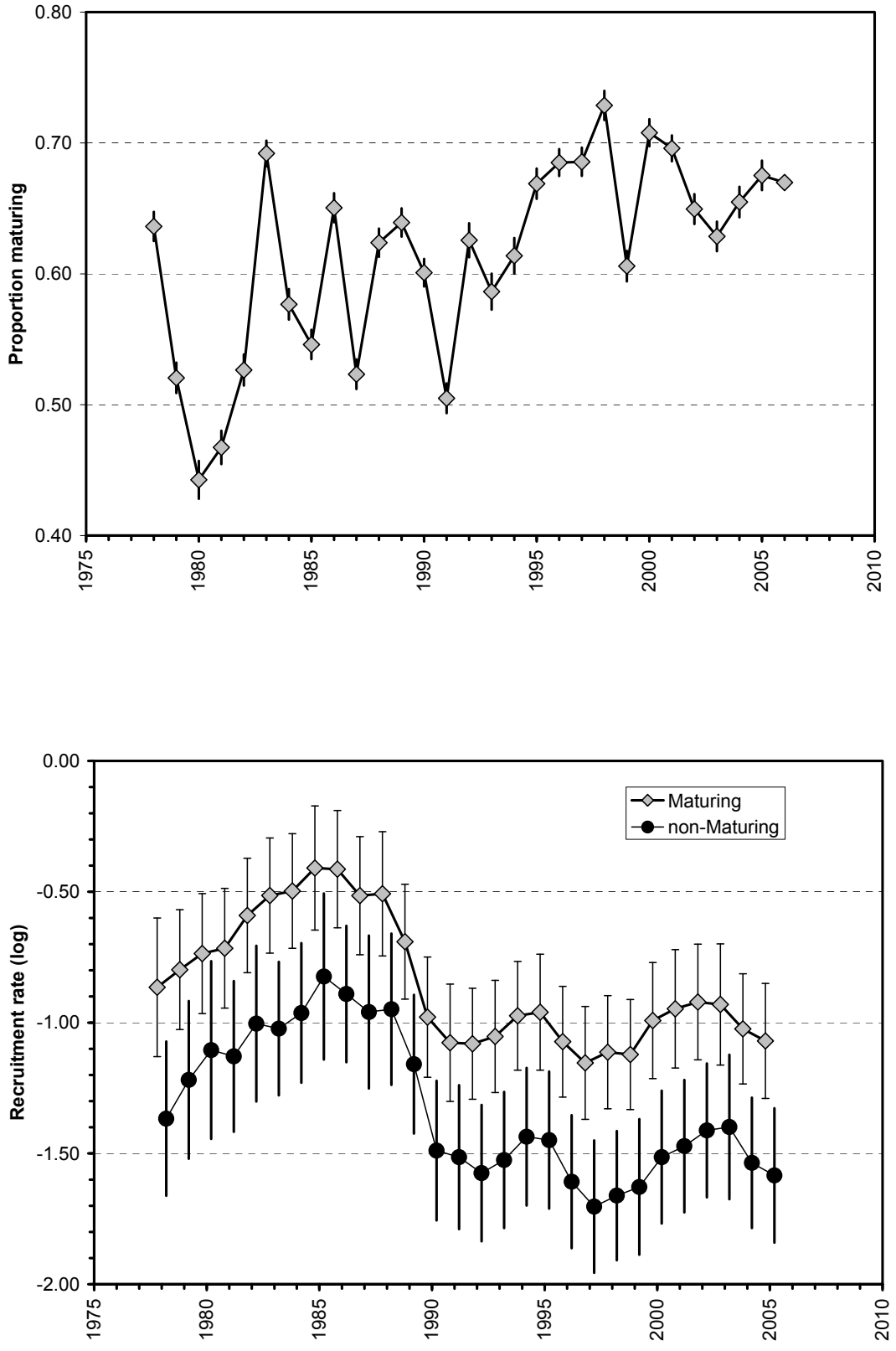


Figure 2.3.3.3 Median values (and 95% Bayesian credible interval range) of the posterior distributions of the proportion of the PFA maturing at 1SW salmon (upper panel) and of the recruitment rate parameter estimates for the maturing component and the non-maturing component (lower panel) for the southern NEAC stock complex.

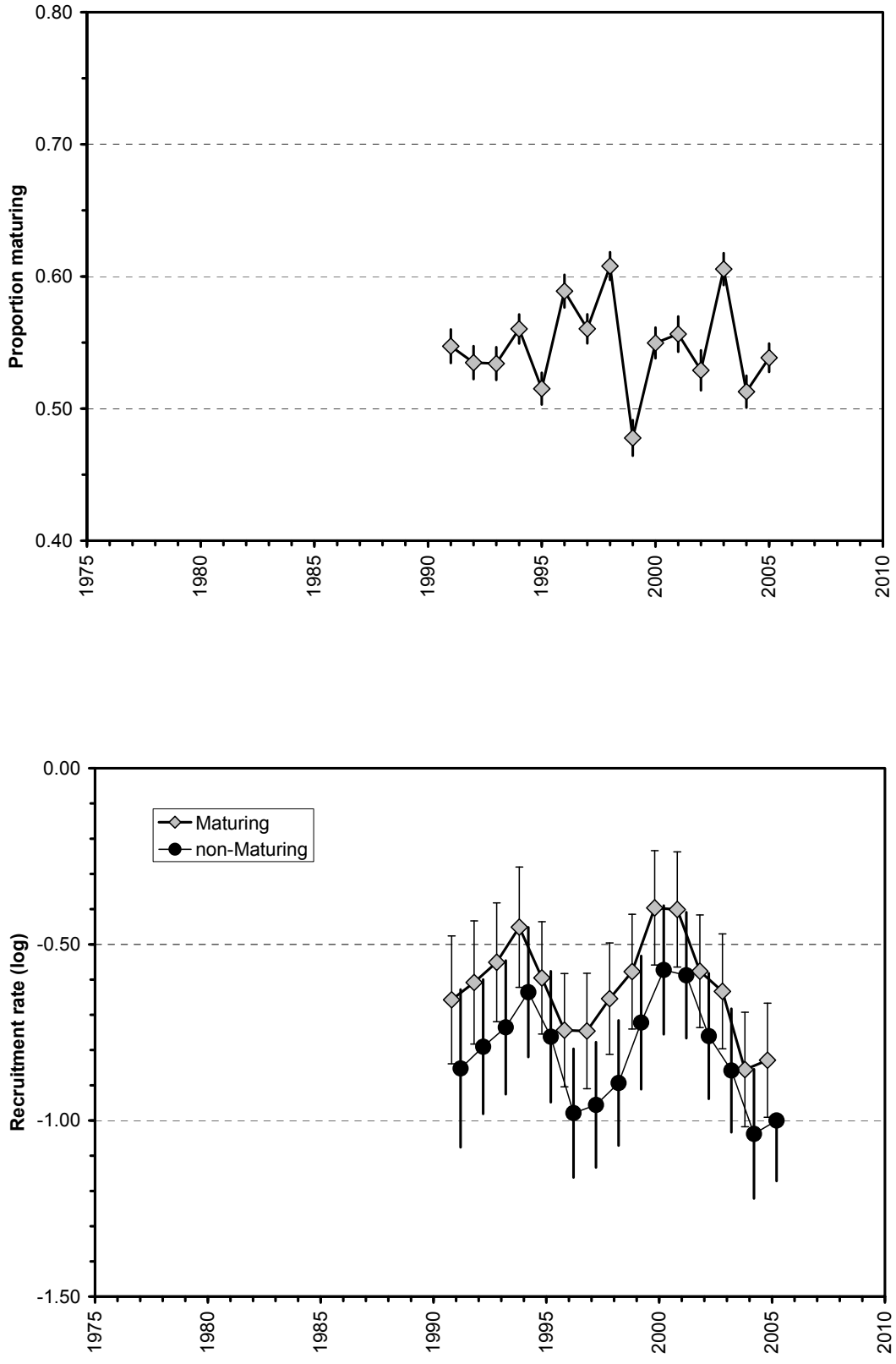


Figure 2.3.3.4 Median values (and 95% Bayesian credible interval range) of the posterior distributions of the proportion of the PFA maturing at 1SW salmon (upper panel) and of the recruitment rate parameter estimates for the maturing component and the non-maturing component (lower panel) for the northern NEAC stock complex.

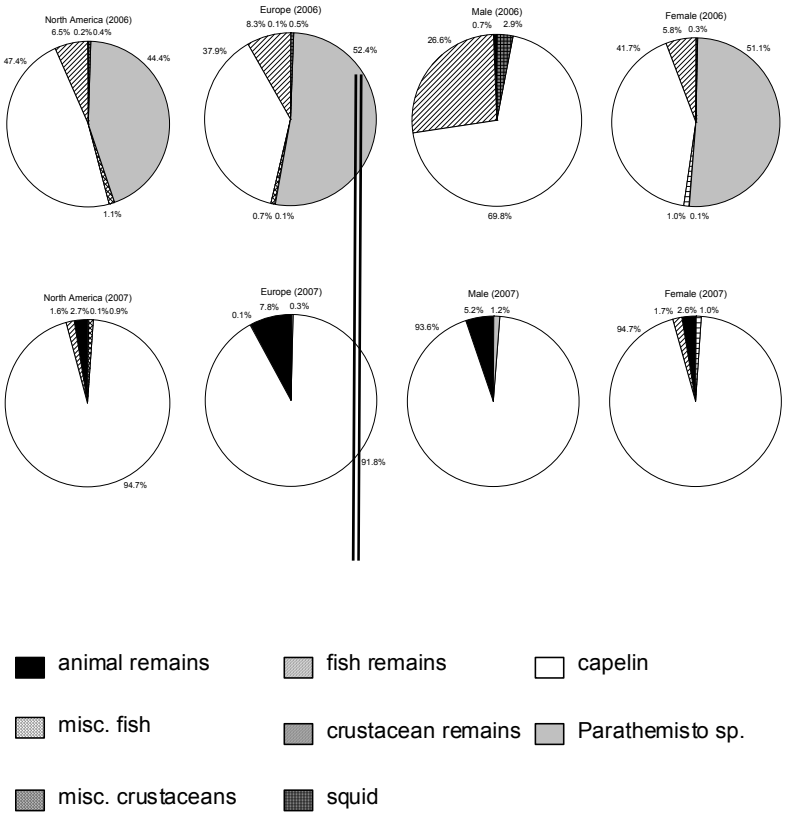


Figure 2.4.2.1. Dietary composition of North American *vs*. European (left) and male *vs*. female (right) Atlantic salmon collected from Nuuk, Greenland in 2006 and 2007. Miscellaneous fish include sculpin and sandlance. Miscellaneous crustaceans include hyperiids, gammarids and euphausiids.

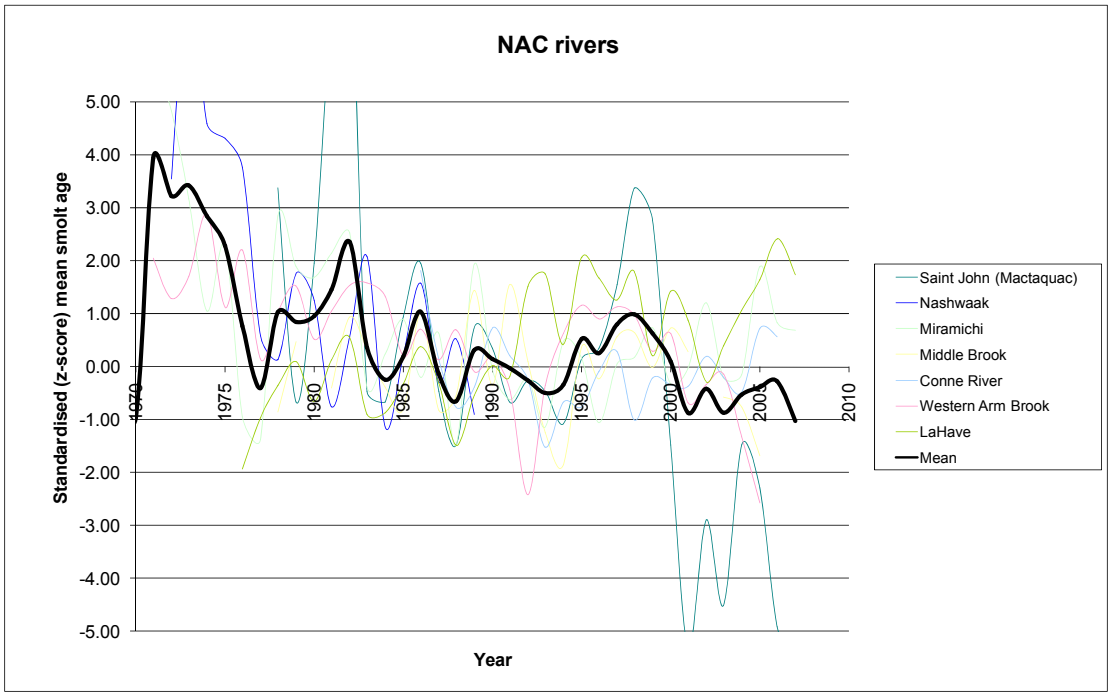


Figure 2.5.1. Standardised mean (z-score) smolt ages for available datasets from NAC rivers. Data back calculated from returning adult salmon and standardized in relation to the mean smolt age between 1984 and 1993.

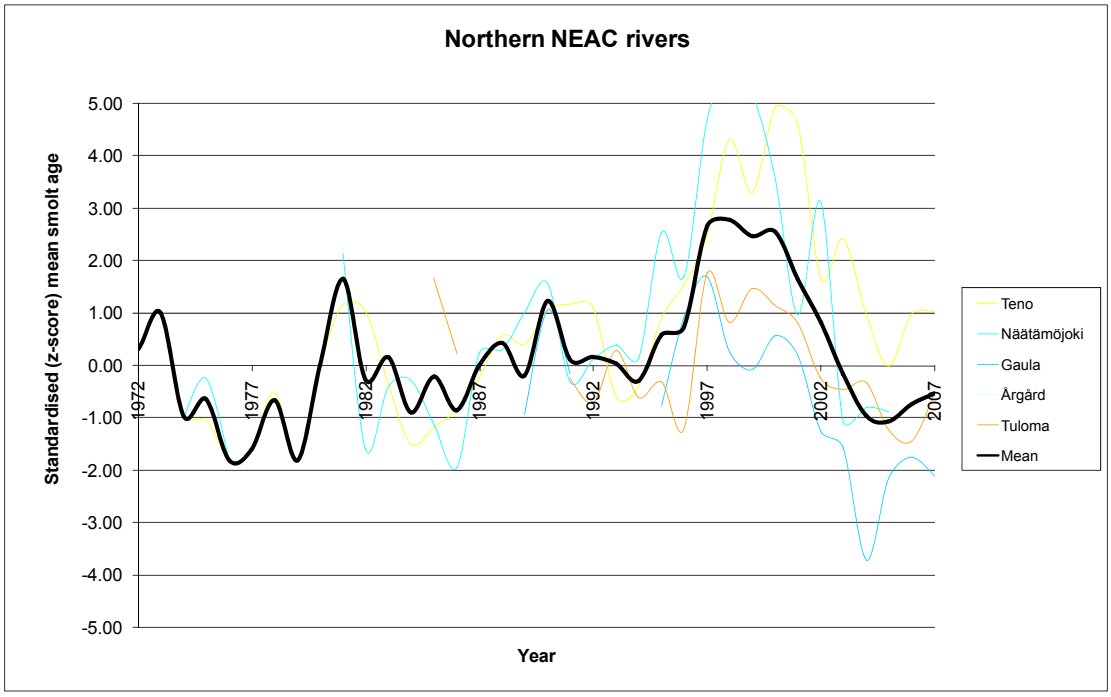


Figure 2.5.2. Standardised mean (z-score) smolt ages for available datasets from Northern NEAC rivers. Data back calculated from returning adult salmon and standardized in relation to the mean smolt age between 1984 and 1993.

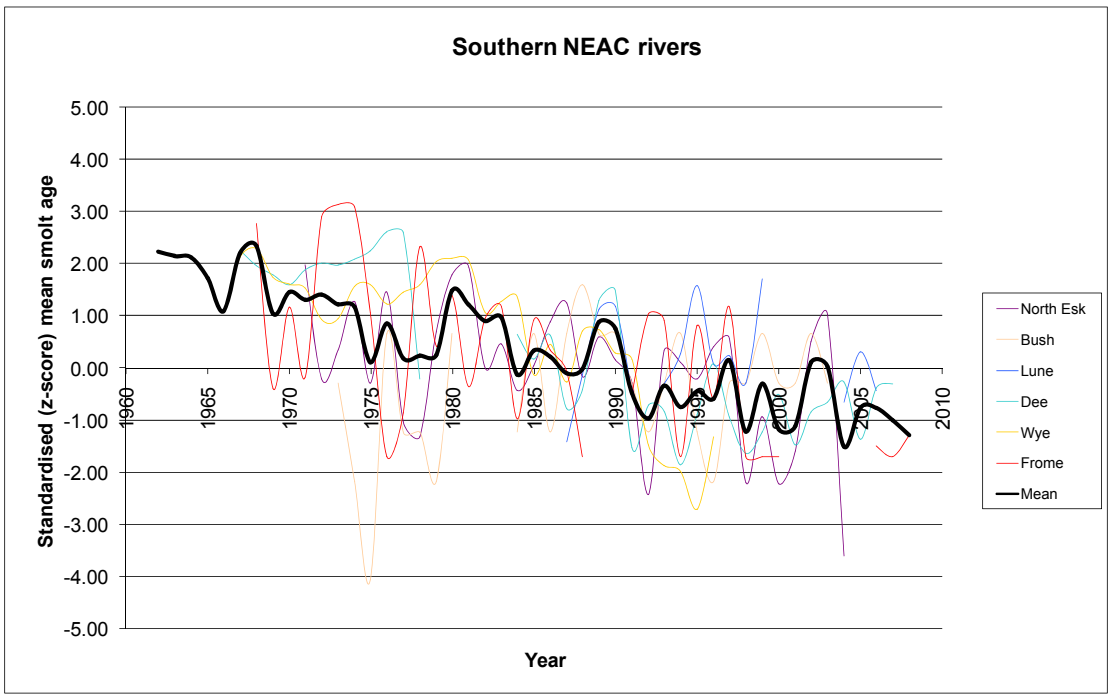


Figure 2.5.3. Standardised mean (z-score) smolt ages for available datasets from Southern NEAC rivers. Data back calculated from returning adult salmon and standardized in relation to the mean smolt age between 1984 and 1993.

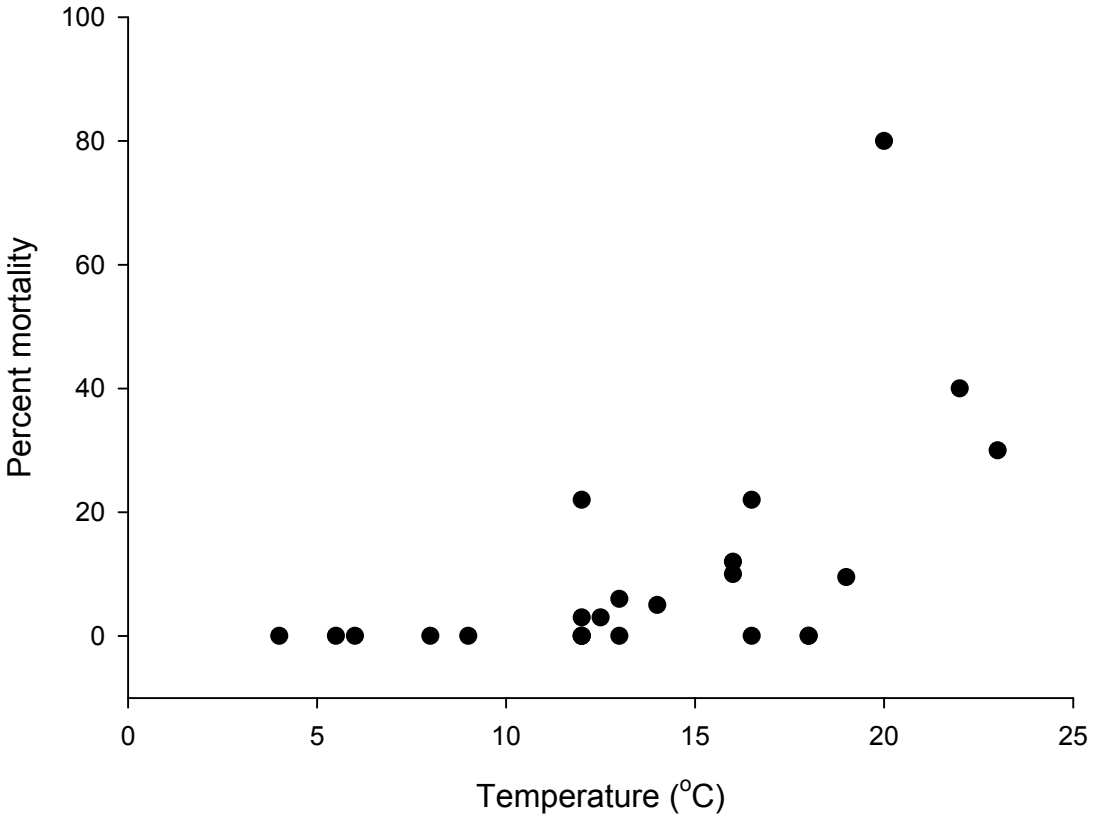


Figure 2.6.1. Mortality of Atlantic salmon after C&R at different water temperatures (average, if given, or median) (From the data presented in Table 2.6.1).

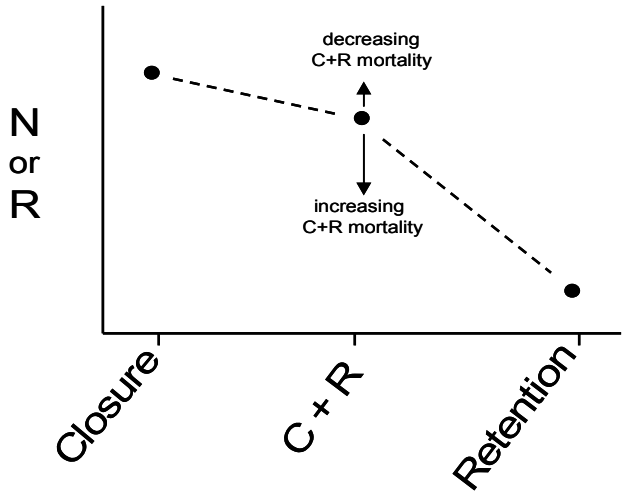


Figure 2.6.2. Schematic representation of the effect of C&R mortality on population size (N) and population growth rate (R) relative to fishery closures or full retention fisheries.

6. NASCO has requested ICES to identify relevant data deficiencies, monitoring needs and research requirements

ICES recommends that The Working Group on North Atlantic salmon should meet in 2010 to address questions posed by ICES, including those posed by NASCO. ICES intends for the Working Group to convene in the headquarters of the ICES in Copenhagen, Denmark from 7th April to 16th April 2010.

List of recommendations

1) ICES acknowledges progress on the development of pre-fishery abundance (PFA) modelling approaches inclusive of both NAC and NEAC areas. ICES recommends that the Study Group on Salmon Stock Assessment and Forecasting (SGSSAFE) meet to continue the efforts to:

- develop the models formulated for the NAC and NEAC areas, particularly with regard to combining sea age classes and in the spatial disaggregation below the stock complex level.
- incorporate physical and biological variables into the models that will allow prediction of salmon survival and thus provide a more realistic simulation of the recruitment process and

The Study Group will report back to the WGNAS in April 2010.

2) ICES recognized the work undertaken by the Study Group on the Identification of Biological Characteristics for use as Predictors of Salmon Abundance (SGBICEPS). ICES recommends that a further study group is held to collate additional data from stocks throughout the biogeographical range of Atlantic salmon and to continue with development of hypothesis and subsequent data analysis. Further investigations into the potential associations between biological characteristics of all life stages of salmon, environmental data, marine survival, and measures of abundance should be developed. The Study Group will report back to the WGNAS in April 2010.

3) ICES advises that additional information be requested from fishers in West Greenland. These data will help characterize the nature and extent of the current fishery and should include reference to catch site, catch date, numbers of nets, net dimensions, and numbers of hours the nets were fished.

4) ICES recommends the continuation of the broad geographic sampling programme (multiple NAFO divisions) to more accurately estimate continent of origin in the mixed-stock fishery at West Greenland. The Enhanced Sampling Programme designed for the 2008 fishery should be applied in 2009.

5) ICES noted that the sampling programme conducted in the Labrador subsistence fishery during 2008 provided biological characteristics of the harvest and that the information may be useful for updating parameters used in the Run Reconstruction Model for North America. As well it provides material to assess the origin of salmon in this fishery. ICES recommends that sampling be continued and expanded in 2009 and future years.

6) ICES recognizes that river-specific, regional and international management requires extensive monitoring and recommends expanded monitoring programmes across all stock complexes.

7) ICES recommends that specific management objectives for NEAC be developed in accordance with Section 3.6 to allow ICES to develop quantitative catch advice.

Annex 12

CNL(09)9

Report of the Eighth Meeting of the International Atlantic Salmon Research Board Rica Seilet Hotel, Molde, Norway Monday 1 June, 2009

1. Opening of the meeting

1.1 The Chairman, Dr Ken Whelan, opened the meeting and welcomed members of the Board, their scientific advisers and representatives of the accredited NGOs to Molde.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the agenda

2.1 The Board adopted its agenda, ICR(09)8 (Annex 2).

3. Election of Officers

3.1 The Board unanimously re-elected Dr Ken Whelan as its Chairman for a further two year period.

4. Report of the Scientific Advisory Group

4.1 The Chairman of the Board's Scientific Advisory Group (SAG), Dr Lars Petter Hansen, presented a report on the Group's meeting, SAG(09)9 (Annex 3). The SAG had reviewed the updated inventory of research, received a report from its inventory Review Group, reviewed applications for potential funding by the Board, reviewed progress in implementing the SALSEA Programme and considered plans for the 2011 'Salmon Summit'.

4.2 He advised the Board that for 2009, 47 ongoing projects had been included in the inventory with an annual expenditure of approximately £6 million. Six new projects had been included since the last update including information for the sampling programme at St Pierre and Miquelon. The Board agreed that there should be an opportunity to further review the information in the inventory and that any necessary amendments should be provided to the Secretariat by 1 July. Thereafter, the inventory would be made available on the Board's website, www.salmonatsea.com.

4.3 The SAG Chairman reported on a review of the inventory that had been carried out by a Sub-Group to identify areas where there may be merit in encouraging improved coordination of research and to highlight gaps in the research programme where new

work might significantly benefit the SALSEA Programme and which might be considered for funding by the Board. The Sub-Group had highlighted a number of workshops and study groups which might be considered for support by the Board to allow the participation of expert scientists who might not otherwise be involved. The Sub-Group had also made some suggestions for improvements to the presentation of the inventory that would facilitate future reviews. The SAG had recommended that it would be useful to conduct a further review in 2011 when the marine survey component of the SALSEA Programme would be completed. At that stage, it would be valuable to conduct a further review of the inventory and of the SALSEA plan to identify gaps in the research programme and to assist the Board in developing its future research priorities. The Board agreed to this approach.

4.4 He indicated that the SAG had developed a framework for assessing project proposals and used this to assess five projects that had been submitted to the Board. The SAG's assessments of whether or not the Board should support the variations proposals for support are as follows:

SAG(08)5: Changes in trophic levels of Atlantic salmon through the marine phase of their life-cycle. ***Support by IASRB.***

SAG(08)6: Inferring temperature history of Atlantic salmon at sea based on oxygen isotope rations in otoliths. ***Support by IASRB***

SAG(08)7: Food availability of Atlantic salmon post-smolt during their marine phase. ***Support by IASRB.***

SAG(08)8: A study of the relationship between ocean climate and inter-annual variation in adult summer migration distribution patterns of Atlantic salmon in Irish coastal waters over three decades. ***Important project proposal but is outside current IASRB priorities.***

SAG(09)4: Application to NASCO's International Atlantic Salmon Research Board (IASRB) to support research on salmon post-smolts in the Irminger Sea, Southwest of Iceland. ***SAG supports plan to sample in Irminger Sea but insufficient details of how funds will be used.***

4.5 In addition, the SAG recommends that the Board support the expert participation in the follow-up workshop on historical tagging information (WKLUSTRE - one GIS expert: £2,000) and the follow-up meeting of the biological characteristics Study Group (SGBICEPS – two experts: £4,000). With regard to the proposal for a workshop on scale microchemistry standardization the SAG wishes to seek additional information on the proposal.

4.6 The Board recognised that some of the projects evaluated by the SAG had been submitted with a view to seeking funds from the Board, while others were merely seeking endorsement from the Board and support in obtaining funds from other sources.

4.7 The SAG Chairman advised the Board that the SAG was aware that NPAFC had indicated that it would not now wish to be a Co-Convenor of the 2011 'Salmon Summit' because of economic issues and NPAFC had recently held a major international symposium on its BASIS research programme and there would be little new information available by 2011. While this was regrettable the SAG believed that the change would allow for additional focus on Atlantic salmon and more time available for presentation of the findings of the SALSEA Programme. There could still be input from the Pacific through inviting a number of keynote speakers to participate. The Secretary indicated that the possibility of sponsorship of the symposium had been explored and the initial response had been positive. The Board asked that the Steering Committee commence planning for the symposium in conjunction with ICES.

5. The SALSEA Programme

(a) Review of progress in implementing SALSEA

5.1 The Chairman referred to the fact that the SALSEA Programme encompassed the entire North Atlantic with separate components in the North-East Atlantic (SALSEA-Merge), the Northwest Atlantic (SALSEA-North America) and at West Greenland (SALSEA-West Greenland). He presented an overview of progress in implementing the SALSEA Programme, CNL(09)47. More detailed summaries of progress are contained in the report of the SAG (Annex 3).

5.2 The Board was advised that it had not been possible to implement the extended sampling programme at West Greenland in 2009. Concerns had been raised that the extended sampling could lead to an increase in the internal-use fishery. A range of options is being considered to ensure that it is possible to ensure that the sampling can proceed in 2009. The Board indicated that as there is a NASCO international sampling agreement for West Greenland the governments concerned should be able to resolve the difficulties that had been encountered in 2008. The scientific coordinator, Tim Sheehan, indicated that one option would be for the samplers to purchase the whole, fresh fish direct from the fishermen and the fishermen would submit a bill to the Greenland Nature Institute for payment. The Nature Institute would then receive reimbursement from the US. An alternative would be for the samplers to pay the fishermen for the fish and then seek reimbursement with their travel claims from their home countries/institutions. The Board stressed the importance of finding a mechanism to allow the extended sampling to be conducted in 2009 and that assistance from the Greenland Home Rule Government should be sought.

(b) Review of progress in promoting SALSEA

5.3 The Chairman referred to the progress that has been made in promoting SALSEA and indicated that the Board's new website had been very well received. The challenges now were to increase awareness of the website and to ensure that information is made available in a timely fashion from all the SALSEA projects to update the site. In this regard the NGO's had an important role to play in establishing links to the Board's website from their own websites.

5.4 It was noted that the ultimate outputs from each component of SALSEA should lead to management actions to benefit salmon. A major deliverable from the SALSEA programme is the 'Salmon Summit' scheduled for Spring 2011 which in addition to allowing for presentation of the enormous amount of new scientific information which is being generated through SALSEA will also include time for review of the management implications of the findings. In this regard it was noted that the funding for SALSEA-Merge had been delayed and it is possible that the completion date of the project may be extended to August 2011.

(c) Coordination of SALSEA

5.5 The Board noted that the SAG had reviewed progress in improving coordination of the SALSEA Programme (see Annex 3).

(d) Future actions

5.6 The Secretary noted that SALSEA is a three year programme and that there would be a need to consider how to proceed at that time. In particular, a large amount of new data will have been generated through the SALSEA research that may need additional funding to allow it to be analysed. There may be foundations willing to support such analyses and he suggested this matter be given further consideration next year.

6. Finance and administrative issues

6.1 The Secretary presented the Board's audited accounts, ICR(09)2. He indicated that after allowing for expenditure in the year to date and the existing funding commitments there was a balance remaining of around £25,000. He suggested that it would be prudent to retain this as a reserve. He noted that with very limited seed corn money the Board had been extremely successful in generating substantial funds to support the SALSEA Programme and in this regard the Board could be justifiably proud of its achievements.

6.2 The Chairman noted that the Board had received both internal and external sources of income and the latter had been very significant. Given the level of existing resources he believed it would be unwise to commit to funding additional projects at this stage. He noted that it had not been possible to fund all aspects of the SALSEA Programme and that the research today was generating other opportunities for important research. There may, therefore, need to be further fund-raising activities in support of the programme. He referred to the discussions at the Board's last meeting and the need to ensure that it was adequately funded. He noted that the owners of the Board are the Parties and NGOs and there is a need to ensure that sufficient funds are available to administer the Board and allow it to continue to work effectively. He asked that the Board consider two approaches to funding. First, he asked the Parties and NGOs to consider if they would be able to make funds available to the Board in blocks of £10,000. Second he suggested that a small Group be established comprising the Chairman of the Board, the Secretary, the NASCO President, a representative of the NGOs and three representatives from the Parties to develop innovative approaches to raising funds to support the work of the Board. The Board agreed to this proposal.

Raoul Bierach (Norway) and Alan Gray (EU) were appointed to serve on the Group and the NGOs and the US agreed to nominate a representative.

6.3 The Board agreed that it should maintain a reserve of around £25,000 rather than allocate these to the new projects identified by the SAG for potential support from the Board. The representative of Norway agreed to contribute the sum of £6,000 to support the workshops identified by the SAG for support by the Board. The NGOs noted that it was difficult for them to come up with block donations. He referred to the request for funding for the SALSEA-Irminger Sea project which is scheduled to be conducted in July 2009 and for which a sum of approximately £25,000 had been sought from the Board. He indicated that the NGOs would look into the possibility of raising funds to support this important component of the SALSEA Programme. The Chairman thanked Norway and the NGOs for their support.

7. Other business

7.1 There was no other business.

8. Report of the meeting

8.1 The Board agreed a report of its meeting.

9. Date and place of next meeting

9.1 The Board agreed to hold its next meeting in conjunction with the Twenty-Seventh Annual Meeting.

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

List of Participants

Canada
Gerald Chaput
Murray Hill
Chantal LaMadeleine
Sue Rocque
Susan Waters

European Union
Alan Gray
Aleksandra Kordecka
Ted Potter
Ken Whelan (Chairman IASRB)

Iceland
Gudni Gudbergsson
Arni Isaksson

Norway
Raoul Bierach
Arne Eggereide
Lars Petter Hansen (Chairman of SAG)

USA
Jessica Pruden
Rory Saunders
Tim Sheehan

Russian Federation
Sergey Prusov
Elena Samoylova

NGOs
Paul Knight
Frederic Mazeaud
Chris Poupard
Sylvie Tissier

Secretariat
Peter Hutchinson
Malcolm Windsor

ICR(09)8

Agenda

1. Opening of the meeting

2. Adoption of the agenda

3. Election of Officers

4. Report of the Scientific Advisory Group

5. The SALSEA Programme

   (a) Review of progress in implementing SALSEA
   (b) Review of progress in promoting SALSEA
   (c) Coordination of SALSEA
   (d) Future actions

6. Finance and administrative issues

7. Other business

8. Report of the meeting

9. Date and place of next meeting

SAG(09)9

Report of the Meeting of the Scientific Advisory Group of the International Atlantic Salmon Research Board
Rica Seilet Hotel, Molde, Norway
Sunday, 31 May, 2009

1. Opening of the meeting

1.1 The Chairman, Dr Lars Petter Hansen (Norway), opened the meeting and welcomed participants to Molde. He referred to the significant progress that had been made in implementing the SALSEA Programme since the Group's last meeting.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the agenda

2.1 The SAG adopted its agenda, SAG(09)8 (Annex 2).

3. Review of the updated inventory of research

3.1 An overview of the updated inventory of research relating to salmon mortality in the sea, SAG(09)2, was presented. For 2009, 47 ongoing projects had been included in the inventory with an annual expenditure of approximately £6 million. Six new projects had been included since the last update. The SAG welcomed the inclusion of information for the sampling programme at St Pierre and Miquelon although it was noted that the summary of progress related to 2007 and the project had not been costed. The SAG recommends that the Board Members be given an opportunity to further review the information in the inventory and to provide any necessary amendments to the Secretariat by 1 July. Thereafter, the inventory should be made available on the Board's website.

4. Report of the Inventory Review Group

4.1 Last year, on a recommendation from the SAG, the Board had agreed to establish a Sub-Group of the SAG, to review the inventory to identify areas where there may be merit in encouraging improved coordination of research and to highlight gaps in the research programme where new work might significantly benefit the SALSEA Programme and which might be considered for funding by the Board.

4.2 The Chairman of the Sub-Group, Mr Ted Potter (EU) presented the Sub-Group's report, SAG(09)10 (Annex 3). The Group had conducted its review using the 2009

inventory update, SAG(09)2, which had meant it had limited time in which to carry out its work. As the Sub-Group's TORs related specifically to the SALSEA Programme it had used the SALSEA plan, SAL(04)5, to organize the review. For each task in this plan, the Sub-Group had assessed the extent to which the projects listed in the inventory appeared to address research needs and in addition it had identified areas where there may be opportunities to further improve collaboration and coordination. In this regard, the Sub-Group had highlighted some workshops and study groups which might be considered for support by the Board to allow the participation of expert scientists who might not otherwise be involved.

4.3 The Sub-Group had also made some suggestions for improvements to the presentation of the inventory that would facilitate future reviews. Currently, the inventory is made available to the ICES Working Group on North Atlantic Salmon (WGNAS) to assist it in identifying relevant data deficiencies, monitoring needs and research requirements. The SAG discussed whether there might be merit in an annual review of the inventory by a Sub-Group. In this regard, it was noted that the review had been productive and had not involved a great deal of effort. The SAG agreed that it would be useful to conduct a further review of the inventory in 2011 when the marine survey component of the SALSEA Programme would be completed to identify any additional research that may be needed. The SALSEA plan should also be reviewed at this time to assist the Board in developing its future research priorities. While it was recognised that there may not be a further SALSEA marine survey programme, which was always planned to be a three year programme, there may be research projects which the Board could support based on the information generated through SALSEA. The Sub-Group's recommendations are referred to in section 5 below.

5. Review of Applications for Potential Funding by the Board

5.1 At its last meeting, the Board had agreed to an approach recommended by the SAG for seeking and prioritising research proposals that might be funded by the Board or for which the Board may support the proposer in seeking funds from other sources. Under this approach the Secretary would invite proposals for research to be submitted for evaluation by the SAG using the guidance developed previously by the Board ICR(03)14.

5.2 The Chairman introduced document SAG(09)3 (Annex 4). Since last year, a total of five proposals had been received as follows:

SAG(08)7: Food availability of Atlantic salmon post-smolt during their marine phase.

SAG(08)8: A study of the relationship between ocean climate and inter-annual variation in adult summer migration distribution patterns of Atlantic salmon in Irish coastal waters over three decades.

SAG(09)4: Application to NASCO's International Atlantic Salmon research Board (IASRB) to support research on salmon post-smolts in the Irminger Sea, Southwest of Iceland.

SAG(08)5: Changes in trophic levels of Atlantic salmon through the marine phase of their life-cycle.

SAG(08)6: Inferring temperature history of Atlantic salmon at sea based on oxygen isotope rations in otoliths.

5.3 Three of these proposals (SAG(08)5, SAG(08)6 and SAG(09)4) sought funds from the Board while SAG(08)7 and SAG(08)8 had been submitted with a view to endorsement by the Board with a view to seeking funds from other organizations. The total cost of the proposals received was £447,500 considerably in excess of the Board's current resources (around £25,000). The SAG reviewed these proposals. Two of the proposals were brought forward from last year (SAG(08)05 and SAG(08)06) and one of these (SAG(08)05) had received partial funding approval from the IASRB of CAN$39,000 last year. An update on progress with proposal SAG(08)05 (SAG(09)7) was provided. The sampling scheduled for 2008 which had been identified in the proposed study had not occurred at the sampling intensities identified in the original proposal. Since the laboratory analysis for the samples which had been collected in 2008 had been deferred to 2009, the project proponents had not requested any payments to date from the Board for this project. A revised proposal (SAG(09)7) was submitted and reviewed by the SAG. A revised proposal for SAG(08)6 was also provided to SAG based on the realized sampling effort in 2008.

5.4 The SAG also reviewed proposals for funding to support workshops or study groups on analysis of historical tagging data and on variations in biological characteristics of Atlantic salmon that may be associated with variations in marine survival. These proposals for support arose from the review of the inventory of research (see section 4) and related to workshops and study groups which had been supported or initiated in previous years. The SAG also discussed the possible need for a workshop on scale analysis.

5.5 The proposals were reviewed relative to a number of criteria including relevance to IASRB priorities, in the context of addressing broad ecological questions for salmon, the extent of collaborations, value-added, and potential to be successful. The comments relative to each of the evaluation criteria for the proposals are summarized in table format in SAG(09)11 (Annex 5). The SAG evaluated how relevant the proposals are to the SALSEA objectives and whether the proposals should be supported by IASRB. The SAG also prioritised the proposals for support of external experts to workshops or study groups. Four of the six proposals were recommended by SAG for support by IASRB. The request for support of the sampling program in the Irminger Sea, SAG(09)4 was considered to be within the priorities of the IASRB but there was insufficient information on how the funds would be used and it could not be adequately reviewed by SAG. The proposal to study the relationship between ocean climate and adult salmon summer migration, SAG(08)8 was considered to be an important research area but outside the present priorities of IASRB.

5.6 In summary, the SAG's assessments of whether or not the Board should support the various proposals is as follows:

SAG(08)5	Support by IASRB
SAG(08)6	Support by IASRB
SAG(08)7	Support by IASRB
SAG(08)8	Important project proposal but is outside current IASRB priorities
SAG(09)4	SAG supports plan to sample in Irminger Sea but insufficient details of how funds will be used.

5.7 In addition, the SAG recommends that the Board support the expert participation in the follow-up workshop on historical tagging information (WKLUSTRE - one GIS expert, up to £2,000) as a priority and secondly, the follow-up meeting of the biological characteristics Study Group (SGBICEPS – two experts, up to £4,000). With regard to the proposal for a workshop on scale microchemistry standardization the SAG wishes to seek additional information on the proposal.

5.8 The SAG recognised that the guidance developed previously by the Board on calls for proposals, ICR(03)14, had been developed several years ago and did not reflect the fact that the Board did not need full project applications for those projects not seeking funds from the Board. The SAG, therefore, recommends that the IASRB Chairman and the Assistant Secretary develop a revised guidance document for consideration by the SAG.

6. Progress with Implementing the SALSEA Programme

(a) Analysis of historical tagging data

6.1 At its 2007 meeting the SAG had received a report of an ICES Workshop on the Development and Use of Historical Salmon Tagging Information from Oceanic Areas which had been held in St John's, Newfoundland in February 2007. The Board had supported this workshop by funding the participation of a GIS expert and this had been extremely useful in facilitating the group's work. A follow-up Workshop on Salmon Historical Information - New Investigations from Old Tagging Data was held in Halifax, Canada in September 2008. The Board had funded the participation of both a GIS expert and a hydrographer. The Workshop had updated information from historical oceanic tagging and recovery programmes conducted by a number of countries in the format agreed and tested several hypotheses relating to oceanic migration and distribution.

6.2 As an example of the findings, analyses in the NW Atlantic indicated that tag recoveries were not uniformly distributed at Greenland with Canadian and USA salmon more commonly captured in northern locations whereas European origin fish tended to be caught further south. For both North American and European salmon the distributions before and after 1989 were found to differ. In both cases, salmon were found further south at Greenland in the later period then in the former. This may be related to temperature, as the more recent period has been cooler, but may also reflect changes in fishing practices or periods. The distribution of Canadian and USA tag recaptures at West Greenland was also found to differ, with Canadian

salmon more commonly recaptured in northern areas than USA fish. A comparison of European salmon (Norway, UK (Scotland), Ireland and UK (England and Wales)) yielded similar results, with Scottish and Norwegian salmon recovered more in northern areas whereas salmon from Ireland and UK (England and Wales) were more likely to be recaptured in southwest Greenland.

6.3 ICES intends to hold a further Workshop in London, UK, in September 2009 to complete compilation of available data and analyses of the resulting distributions of salmon at sea, and the SAG recommends further support to allow expert participation (see section 5 above).

(b) Report of the ICES Study Group on biological characteristics of salmon

6.4 At its last meeting the Board had agreed to fund participation of two scientists in the proposed ICES Study Group on the Identification of Biological Characteristics for Use as Predictors of Salmon Abundance (SGBICEPS). A sum of up to £5,000 was agreed. A preliminary report on the meeting of the Study Group which had been held in Lowestoft, UK in March 2009 was presented by Mr Ted Potter. The Study Group had the following ToRs:

a) identify data sources and compile time-series of data on marine mortality of salmon, salmon abundance, biological characteristics of salmon and related environmental information;
b) consider hypotheses relating marine mortality and/or abundance trends for Atlantic salmon stocks with changes in biological characteristics of all life stages and environmental changes;
c) conduct preliminary analyses to explore the available datasets and test the hypotheses.

6.5 The Study Group had devoted considerable effort to collating datasets and while problems remain in pulling the data together in a common format the preliminary work suggests this could be a valuable exercise. The Group had completed a preliminary review of the available information on the life-history strategies of salmon and changes in the biological characteristics of the fish (including freshwater and marine stages) in relation to key environmental variables. ICES had recognized the progress made by SGBICEPS and recommended that further coordinated efforts are made to collate data from stocks throughout the geographic range of Atlantic salmon and to continue with the analysis of datasets and the development of hypotheses. The SAG has recommended to the Board that it again consider funding the participation of invited scientists at a subsequent meeting of the Group (see section 5 above).

(c) Progress on stable isotope analysis of West Greenland samples

6.6 The Board had agreed at its last meeting to fund the first year of a three year study to continue work supported by the Board in 2007/2008 to examine any changes in trophic levels of Atlantic salmon through the marine phase of their life cycle. A sum of CAN$39,000 (approximately £22,000) had been agreed. Mr Gerald Chaput reported, SAG(09)7, that in 2008 30 smolts were sampled from each of the fifteen

index rivers in eastern Canada and tissue samples had been taken and stored for analysis. However, only 15 post-smolt salmon had been obtained from the marine survey in 2008. Tissue samples had been taken from these fish and potential prey items collected during the survey had been stored. The extended sampling had not been conducted at West Greenland in 2008. The analyses of tissue samples had been deferred into 2009 and the funds agreed by the Board to support the project had not therefore been requested. The revised costing for analysis of 2008 and 2009 samples is CAN$52,600, an increase of CAN$13,600 and the SAG recommends that the Board fund the additional sum requested.

(d) Report on the SALSEA-Merge project

6.7 The Chairman of the Board, Dr Ken Whelan, presented a summary of activities since the launch of the SALSEA-Merge project in April 2008. At a genetics symposium in Paris funded by the TOTAL Foundation, it had been concluded that salmon caught at sea could be assigned to their region or river of origin provided that adequate baseline samples had been collected. Progress had been made subsequently in establishing an international database of baseline genetic data and in standardizing analytical procedures among contributing laboratories. The microsatellite marker suite had been agreed. Meetings had also been held to develop scale reading protocols and successful marine surveys had been conducted by Irish, Faroese and Norwegian vessels resulting in the capture and extensive sampling of around 900 post-smolts and some adult salmon together with oceanographic and other sampling. The Norwegian surveys had been conducted in areas not previously sampled for salmon. In these Northern areas the post-smolts were widely dispersed. Analysis of the samples is underway and there has also been progress with development of migration models. The plans for the 2009 surveys have been agreed. In addition to the new material obtained, SALSEA-Merge will analyse archival material both to determine the origin of the fish and fine-scale growth patterns.

(e) Report on SALSEA North America

6.8 A pelagic ecosystem survey of the northwest Atlantic was conducted in August 2008 using the CCGS *Wilfred Templeman*. During 8 - 21 August, a total of 46 stations were sampled with the pelagic surface trawl. The survey covered an area extending from just south of 49°N to 56°N, 49°W to 55°W. Oceanographic data were collected at 16 stations and plankton samples were collected at 12 stations. Stations sampled were characterized by depths from 100m to over 3,000m, and water temperatures (at about 10m depth) ranging from 7.7° to 14.4°C. Very few (N=15) Atlantic salmon, were captured during the survey and 14 of 15 fish were captured at stations north of 52°N latitude. The highest individual trawl catch of salmon was three fish observed at two stations. The stations with salmon catches were characterized by a wide range of water depths (about 250 m to >3,000m depth) and temperatures (less than 10°C to over 13°C). Salmon were only captured during the daytime. The salmon ranged in size from 23 to 31 cm fork length, and whole weights of 0.14 to 0.34 kg.

6.9 Sea surface temperatures were warm in 2008 relative to previous years and the catches of post-smolts from 2008 occurred in the areas with cooler water temperatures (at or less than 12°C). In subsequent surveys in the same season, the sampling effort

should be focused on exploring the northern (north of 52°N) and cooler areas of the northwest Atlantic. Vessel time on a DFO (Canada) research vessel has been scheduled for 7 – 30 September 2009. Sampling is planned along a transect running between 56 to 58°N, extending from 42°W towards Labrador. Sampling with the pelagic surface trawl and with experimental gillnets is planned. Sampling protocols are similar to those used in 2008.

(f) Report on SALSEA West Greenland

6.10 Mr Tim Sheehan reported on the sampling programme in West Greenland in 2008. Seven samplers from five countries (Canada, Ireland, UK-England and Wales, UK-Scotland and the USA) participated in the 2008 sampling program. In addition, an eighth sampler from the Greenland Institute of Natural Resources in Nuuk, Greenland served as a local coordinator and collected additional samples on an *ad hoc* basis. The samplers were deployed to three different communities representing three different Northwest Atlantic Fisheries Organization (NAFO) Divisions (geographic delineations of the area). Two samplers were stationed in Sisimiut (NAFO Division 1B), three in Nuuk (NAFO Division 1D) and two in Qaqortoq (NAFO Division 1F).

6.11 After permission had been obtained to sample the fish, the sampler would inspect each fish for the presence of external tags and/or fin clips. The sampler would also obtain a length and weight and would collect a scale and tissue sample from as many fish as possible. The baseline sampling is non-invasive. Once the sampling is completed, the individual fish are returned to the fishermen/owner and are either displayed for sale or prepared for storage. In total, approximately 2,000 fish were inspected for the presence of identification tags or fin clips. Of these, 1,800 fish were further sampled for length and weight data and scale and tissue samples were collected. Scale samples will provide information on fish age and tissue samples will provide information on fish continent/region of origin through genetic analysis. No extended sampling had occurred at West Greenland in 2008 but discussions are ongoing in order to ensure that the sampling can proceed in 2009.

(g) Report on sonic telemetry studies

6.12 Information on sonic telemetry studies in eastern Canada is presented on the Atlantic Salmon Federation's website, www.asf.ca.

(h) Coordination of the SALSEA Programme

6.13 Last year the Board had agreed an initial approach to improving coordination of the SALSEA-Merge, SALSEA-North America and SALSEA-West Greenland projects. This approach involved the research coordinators (Jens Christian Holst, Gerald Chaput and Tim Sheehan) exchanging experience and results as soon as possible after each marine survey. In 2009 there had been a SALSEA-Merge meeting of all participating organizations. The SAG believes that there is good coordination in relation to planning and implementing the sampling but that efforts may be needed to ensure coordination in relation to processing of samples. The SAG has developed some recommendations for funding workshops in section 4. Furthermore, the SAG wishes to highlight the importance of disseminating the results of the projects to a wide audience in order to convey the progress being made so as to support future

fund-raising initiatives. The importance of regularly updating the Board's website and of increasing awareness of the website were stressed. The contact details of all key personnel involved with SALSEA are given on the website and these should be the first point of contact for those seeking additional information. The SAG notes that the PR Group will be proposing some new initiatives to raise the profile of NASCO's work at a Special Session during the Annual Meeting. The SAG also believes that the 2011 symposium is an excellent opportunity to disseminate the findings arising from the SALSEA programme, particularly the management implications of the research, and to seek political and public support for research on salmon at sea.

(i) 2011 Symposium

6.14 The Board had previously agreed to co-convene with ICES and the North Pacific Anadromous Fish Commission (NPAFC) an international symposium on mortality of salmon at sea in Spring 2011. In the interim, it had been agreed that there would be benefits from a continuing exchange between scientists working on these issues in the North Pacific and North Atlantic Oceans. To this end, representatives of NPAFC had been invited to participate in a Special Session on salmon at sea held during NASCO's Twenty-Fourth Annual Meeting in June 2007 and the Assistant Secretary had participated in the NPAFC BASIS Symposium in November 2008 to report on the SALSEA Programme.

6.15 Last year the Board had appointed the Secretary of NASCO (Dr Malcolm Windsor, Co-Convenor), the Assistant Secretary (Dr Peter Hutchinson), the Chairman of the SAG (Dr Lars Petter Hansen), the SALSEA-Merge Scientific Coordinator (Dr Jens Christian Holst) and Mr David Reddin (Canada) as its Steering Committee for the symposium. The Assistant Secretary reported that the symposium had been discussed at NPAFC's Research Planning and Coordination Meeting held in April 2009 and following this meeting the Executive Secretary of NPAFC had advised NASCO that NPAFC would not be able to Co-Convene the symposium because of funding issues related to participation of NPAFC scientists in a meeting in Europe and because it was felt that there would be little new information from research in the Pacific to report in 2011 following the 2008 BASIS Symposium. The SAG noted this decision and agreed that continuing cooperation between NASCO and NPAFC in future would be desirable. However, given the large amount of information being generated under the SALSEA programme and the commitment to hold a 'Salmon Summit' in the SALSEA-Merge contract with the European Commission, the SAG recommends that the Board proceed with the symposium and that keynote speakers be invited to provide overviews of research on salmon mortality at sea in the Pacific. The SAG believes that this arrangement will allow greater time for presentation of the enormous amount of information that has been generated by SALSEA while providing for an overview of the situation in the Pacific. The SAG also recommended that ICES be invited to nominate a Steering Committee member and that planning for the symposium commence.

(j) Other activities

6.16 The SAG was advised of an ICES/PICES Symposium entitled 'Climate Change Effects on Fish and Fisheries: Forecasting Impacts, Assessing Ecosystem Responses, and Evaluating Management Strategies'. There is no session on salmon in the symposium and so a group of salmon experts from ICES and PICES is requesting one of the five workshop time-slots that are available for the day before the symposium. This workshop would focus on expectations for Pacific and Atlantic salmon using the most up-to-date climate scenarios. The SAG considers that this workshop might provide a useful opportunity to obtain information that would assist the Steering Group in organizing the 'Salmon Summit'.

(k) Recommendations to the Board

6.17 The SAG's recommendations to the Board are presented separately under the relevant agenda items above.

7. Other business

7.1 There was no other business.

8. Report of the meeting

8.1 The SAG agreed a report of its meeting.

9. Date and place of next meeting

9.1 The SAG decided to agree the date and place of its next meeting by correspondence.

Annex 1 of SAG(09)9

List of Participants

Canada

Mr Gerald Chaput
Mr Dave Reddin

European Union

Mr Alan Gray
Dr Niall O'Maoileidgh
Mr Ted Potter
Dr Ken Whelan

Iceland

Mr Gudni Gudbergsson

USA

Mr Tim Sheehan

Chairman of the SAG

Dr Lars Petter Hansen

Secretariat

Dr Peter Hutchinson

SAG(09)8

Agenda

1. Opening of the meeting
2. Adoption of the agenda
3. Review of the updated inventory of research
4. Report of the Inventory Review Group
5. Review of Applications for Potential Funding by the Board
6. Progress with Implementing the SALSEA Programme
   - (a) Analysis of historical tagging data
   - (b) Report of the ICES Study Group on biological characteristics of salmon
   - (c) Progress on stable isotope analysis of West Greenland samples
   - (d) Report on the SALSEA-Merge project
   - (e) Report on SALSEA North America
   - (f) Reports on SALSEA West Greenland
   - (g) Reports on sonic telemetry studies
   - (h) Coordination of the SALSEA Programme
   - (i) 2011 Symposium
   - (j) Other activities
   - (k) Recommendations to the Board
7. Other business
8. Report of the meeting
9. Date and place of next meeting

SAG(09)10

Report of the SAG Research Inventory Review Group

1. Introduction

1.1 Background to the SALSEA Plan

Records of the numbers of salmon returning to monitored rivers indicate that, despite drastic reductions in directed fisheries, there has been at least a threefold reduction in marine survival rates since the early 1970s. The reductions in the numbers returning has been accompanied by a marked decline in the proportion of older sea age fish, so much so that 3SW fish are relatively rare in many systems and 4 & 5SW fish vanishingly so. Such a change in an age distribution is a classic symptom of a sustained increase in mortality rate, a conclusion which is supported by the current relative scarcity of repeat spawners in the returning populations.

Other factors which might have contributed to the proportional reduction in the representation of older fish include, higher rates of mortality on non-maturing fish than on maturing ones, a sustained increase in maturation rates and a reduction in the representation of late-maturing populations among the returning stocks. Although all three of these explanations are credible, they do not alter the main conclusion that Atlantic salmon, especially those in the southern part of the species' range, are currently suffering from a raised level of marine mortality which is sustained across all sea age classes.

The IASRB therefore developed the SALSEA Plan (SAL(04)05) to outline the research requirements to address this problem. This included studies of factors affecting juvenile salmon in freshwater and smolts emigrating through coastal waters which may affect their subsequent survival during the marine phase as well as factors directing impacting the fish while they are in the open ocean. While research is required in all these areas, the IASRB has specifically sought to support practical studies of the distribution and migration of salmon in the sea (including studies of by-catch in pelagic fisheries), and studies of biological processes (e.g. environmental, food, predation, growth, parasites and diseases) relating to the marine phase of the life-cycle for potential.

1.2 Terms of Reference

The International Atlantic Salmon Research Board's (IASRB) inventory of research relating to salmon mortality in the sea was established in 2002 and has been updated annually since then. It is an essential tool in the development of research priorities for potential funding and in better coordinating existing research efforts.

At its annual meeting in 2008, the Scientific Advisory Group (SAG) of the IASRB welcomed the valuable information presented in the inventory but agreed that consideration should be given to how this information could be better utilised. The

IASRB therefore agreed to a proposal from the SAG to establish a Sub-Group comprising at least one representative from each Party, chaired by Ted Potter (EU) and with the following terms of reference:

- to review the inventory to identify areas where there may be merit in encouraging improved coordination of research and
- to highlight gaps in the research programme where new work might significantly benefit the SALSEA Programme and which might be considered for funding by the Board.

The Sub-Group was to work by correspondence and report back to the SAG in 2009.

1.2 Summary of Research Inventory – SAG(09)02

The inventory of research is maintained by the NASCO secretariat. This involves seeking updates from NASCO Parties at the beginning of each year to include new projects that have been funded or approved, to record changes to existing projects and provide progress reports, and to note projects that have been completed. The NASCO secretariat also provide an annual summary of the projects in the form of four tables:

Table 1: Approximate annual expenditure on research in relation to salmon mortality at sea by topic area and Party;

Table 2: Inventory of research relating to salmon mortality in the sea – allocation of projects by topic area;

Table 3: Expenditure on ongoing projects in the inventory of research of relevance to the SALSEA programme; (NB This table contains no financial data and so the heading could be clarified by omitting 'Expenditure on').

Table 4: Summary of ongoing and completed research projects relating to salmon mortality in the sea. (a.) Ongoing projects (b) Completed projects

This report draws heavily on these very helpful tables as a basis for highlighting gaps and opportunities for collaboration and co-ordination.

1.3 Method of working

It was agreed that the Sub-Group would conduct their review on the 2009 update to the research inventory, which was made available to the Sub-Group towards the end of April. As the objectives of the review relate specifically to the SALSEA programme, the Sub-Group used the structure of the SALSEA Plan (SAL(04)05) to organise the review. Each member of the Sub-Group was asked to consider the work being undertaken in relation to a particular Workpackage Task in the Plan and assesses the extent to which the current research projects listed in the inventory appear to address the identified research needs (or new research requirements). In parallel with this, the work being undertaken under each Task was reviewed to identify areas where there may be opportunities to further improve collaboration and co-ordination. The conclusions from these reviews are reported below for each of the

Workpackage Tasks in the Plan with information relating to both terms of reference being combined; the final section summarises the recommendations.

The review was complicated by the fact that the projects listed in the inventory are renumbered each year, with completed projects having no numbers. In addition, less information is provided for the completed projects. It is suggested that the structure of the inventory should be reviewed to make it easier to access information on ongoing and completed projects.

Conclusion:

a. The structure of the IASRB research inventory should be reviewed to make it easier to access information on ongoing and completed projects relating to salmon mortality in the sea.

2. Work Package 1: Supporting Technologies

2.1 Workpackage 1 - Task 1: *Genetic tagging to determine stock origin* – (TP)

2.1.1 Task Objectives:

The overall objective of this task is to map regional genetic structure of Atlantic salmon and establish a standardised genetic baseline database for regional or river-specific populations.

The specific objectives are:

i. Review existing knowledge of genetic structure within the distribution area of Atlantic salmon, and establish an overall picture of population structure;
ii. Compile an inventory of available samples, both recent and historical, that could be used in a larger-scale mapping of genetic structure;
iii. Establish a cooperative programme between the principal genetic laboratories in Europe and North America to screen the major salmon stocks. This will be accomplished by selecting a suitable array of genetic markers, based upon the level of variation observed in previous studies and calibrating the scoring between participating laboratories;
iv. Based on the results from the above studies select an experimental set of populations to be sampled;
v. Review the results and determine whether sufficient precision is achieved for the purposes outlined in the core SALSEA tasks. Expand and include more areas and populations in the baseline as required;
vi. Establish a standardised database of genetic structure of baseline populations;
vii. Carry out comparative studies using conventional tags of known origin to provide support for genetic identification;
viii. Establish a "Biobank" of samples collected, and also of DNA extracts that can be made available for other purposes at later stages.

2.1.2 Assessment:

There are nine current projects (D1, E2, E11, E16, E19, E20, I4, N3, F1) and four completed projects in the inventory involving the use of genetics techniques, although not all are directly related to genetic stock identification (GSI) which is the central theme of this Task. The main areas being addressed are the development of genetic baselines of Atlantic salmon stock, the application of genetic stock identification in management and the use of genetic techniques in population studies. We are also aware of additional programmes to develop and apply genetic baselines (e.g. in USA), and to coordinate these studies (e.g. the SALMAN programme), which do not appear to be included in the inventory.

Genetic stock identification (GSI) is an integral part of the SALSEA Programme because it was selected in preference to tagging as the primary method to be used to identify the region of origin of fish sampled in marine surveys. In addition, increasing numbers of countries are developing more detailed genetic baselines for their stocks to aid in stock conservation and fishery management activities. To support this work extensive efforts have therefore been made in recent years to establish a network of groups working on salmon genetics, to agree upon sampling and analytical protocols, and to select a standard set of micro-satellite markers.

Baseline genetic datasets that have already been established for a number of countries including USA, Ireland and Canada, and this work is being extended as part of the SALSEA-MERGE project (E1) and in national programmes in Iceland (I4), UK(England and Wales) (E2) and Norway (N3). GSI is also being used to identify the continent of origin of salmon caught at West Greenland (D1), and thereby in the development of catch advice by ICES, and for samples collected in St Pierre et Miquelon (F1).

Other genetic studies are being undertaken on the heritable effects of fishing (E11), the exchange of stocks between rivers (E16), the susceptibility of stocks to G.salaris (E19), and to identify genomic regions that affect ecologically and economically important phenotypic traits (E20).

Conclusions:

a. It appears that there are good mechanisms in place (including through SALSEA-MERGE) to co-ordinate genetic studies in Europe, including ensuring all groups use the same satellite markers and comparable sampling and analytical techniques. However, there was felt to be some lack of co-ordinations between current genetics work on Atlantic salmon in Europe and North America, although the European groups were understood to have good contacts with geneticists working on Pacific salmon.
b. Some concern was expressed about the need to clearly distinguish between the delivery of practical results employing established techniques (e.g. microsatellite markers) from the efforts to develop new techniques (e.g. SNPs).

2.2 Workpackage 1 - Task 2: *Sampling equipment evolution to increase the sampling efficiency for salmon at sea* (TS)

2.2.1 Task Objective:

The overall objective of this task is to initiate research efforts to develop smolt trawl design to minimize size selection. No detailed objectives are specified within the SALSEA Plan.

2.2.2 Assessment:

According to the Inventory, there are no ongoing efforts being directed towards this task. However, as the inventory is an "Inventory of Research Relating to Salmon Mortality in the Sea", it is possible that some relevant research activities (e.g. possible in Norway) have not been reported because they directly involved with investigating salmon mortality at sea. In addition, significant efforts have been made to standardize the survey methods used between the current marine survey programmes.

There is one completed project (European Union – United Kingdom (Scotland) - Testing and development of Institute of Marine Research (IMR), Bergen, Norway, salmon trawl gear), which successfully trialed the use of an open trawl digital observer/analyzer.

The inventory list three projects being undertaken in Canada (C1), Europe (E1 - SALSEA-MERGE), USA (U5) which are undertaking marine surveys using similar gear, and these are assumed to impart a size selective bias in their catches. The objective of this Task was to find ways to reduce the size selection, but work in the area has not occurred to the extent envisioned in the SALSEA Plan (SAL(04)05). Any new or ongoing efforts will likely not benefit the SALSEA Programme as we are entering the 2nd and final year of the marine surveys.

Conclusions:

a. Efforts should be made to determine the extent of the possible selective bias in the current marine sampling programmes (e.g. of different sized smolts emigrating from different areas and at different times) in order that this can be taken into account in the analysis of the results.
b. There remains a need for further developmental work on methods to sample post-smolts and adult salmon in the open ocean that are less selective than the methods currently in use. Such work should be included in any future programme to extend marine survey and sampling programmes for salmon.

2.3 Workpackage 1 - Task 3: *Signals from scales* (SP)

2.3.1 Task Objectives:

The overall objective of this task is to establish standardised scale analysis techniques and identify marine growth histories and anomalies indicating common mortality factors on spatial and temporal scales.

The specific objectives are:

i. Ensure that results from scale analysis equipment in selected European and North American laboratories is comparable;
ii. Carry out scale analysis training for all participating laboratories by North American experts while ensuring that agreed-upon standardised scale examination procedures are being followed;
iii. Carry out scale analyses on selected scale sets with a view to establishing a comparable database between laboratories;
iv. Coordinate the examination of scale material available from several research agencies (or from different stocks and stock components) to identify spatial and temporal anomalies in the time series of scale growth during the marine

2.3.2 Assessment:

There are two main strands to this work area, relating to the analysis of scale growth patterns and scale microchemistry. Three ongoing projects listed in the inventory (E7, E10, C5) are specifically related to this Workpackage Task. These projects focus on the analysis of scales from existing and new collections in Scotland, England and Wales and Canada together with scales taken from salmon sampled in the ocean. In addition, at least four of the completed studies undertaken in Canada, USA, England and Norway addressed similar topics. These analytical techniques will also be applied to scale samples collected from salmon caught during the marine surveys (E1, C1, I5 and U5).

There is a considerable collection of historic scale material available from most salmon-producing countries, and the results coming out of the studies suggests that analysis of scale microchemistry is likely to provide very important insights into the factors affecting salmon in the sea. The first requirement in analysing these scale collections and comparing results between countries is to ensure the use of standardised scale analysis procedures between laboratories. It is understood that, significant efforts have been made to standardize the methods used within SALSEA-Merge (E1), particularly in relation to the analysis of growth patterns, but there remains a need for further co-ordination between the European and North American programmes.

The Review Group was aware that concerns have also been expressed about the need to establish standardized protocols for analysing scale microchemistry to ensure that results between laboratories and countries are comparable. Prof Clive Trueman (Southampton University, UK), who is managing project E7, is hoping to arrange such a workshop to bring together scientists using these techniques.

Conclusions:

a. It is important to ensure that the results obtained from the scale analyses being undertaken by different research groups are comparable and can be brought together in the ultimate synthesis of results. SAG should investigate this requirement further to determine whether there is a need for a workshop and whether this should be supported by the IASRB.
b. If a workshop on scale analysis is establish it could also discuss the feasibility of establishing a common scale database for all countries with historic scale data that may be used in scale growth and microchemistry analyses.
c. At their meeting in 2008, the ICES Study Group on Salmon Age Reading, which had previously included only Baltic salmon biologists, recommended that they should extend their remit to bring in Atlantic salmon biologists for a meeting in 2010. It was suggested that any future meeting of SGSAD should be coordinated with current activities with the SALSEA Plan.

3.1 Workpackage 2 - Task 1: *Investigate the influence of biological characteristics of Atlantic salmon smolts on their marine mortality* (TP)

3.1.1 Task objectives:

The overall aim of this task is to identify differences in the marine survival of smolts with different characteristics, and determine the extent to which such factors could account for widespread changes in salmon stock abundance.

The specific research objectives are to:

i. Identify the key biological variables among smolts that may affect marine survival and evidence of widespread changes in these characteristics in stocks;
ii. Determine the impact of smolt characteristics on migratory behaviour;
iii. Determine the impact of smolt characteristics on marine survival and return of spawning adults;
iv. Model the impact of smolt characteristics at the population level;
v. Determine management options.

3.1.2 Assessment:

The inventory lists 13 ongoing studies (C3, E5, E8, E9, E13, E15, E18, E21, I1, N2, R1, U4) that are collecting data directly relevant to this Task, and many of these are long-term monitoring programmes. In addition a number of completed projects have provided relevant information.

There is growing evidence from these and other studies that the growth and survival of salmon in the sea may be related to various biological characteristics of smolts. Studies in this area are therefore particularly important because these are also factors which are likely to be more amenable to management intervention.

Data from many of the above programmes provide important inputs to the work of the ICES North Atlantic Salmon Working Group and the development of advice for NASCO. In addition, in response to a specific question from NASCO, ICES has established the Study Group on the Identification Of Biological Characteristics For

Use As Predictors Of Salmon Abundance [SGBICEPS] which met in 2009 to: identify data sources and compile time series of data on marine mortality of salmon, salmon abundance, biological characteristics of salmon and related environmental information; consider hypotheses relating marine mortality and/or abundance trends for Atlantic salmon stocks with changes in biological characteristics of all life stages and environmental changes; and conduct preliminary analyses to explore the available datasets and test the hypotheses. IASRB provided some financial support for the first meeting of this Study Group, which enabled two scientists working outside national laboratories to participate.

The first meeting of this Study Group highlighted the value of combining the analysis of data from a number of different monitoring programmes around the North Atlantic, but also highlighted the severe difficulties in obtaining comparable data from these programmes. This Study Group is likely to have at least two more meetings.

This is a complex and difficult area of research. It is costly to run extensive monitoring programmes and data must generally be collected over a substantial time period (e.g. more than 10 years) to provide useful results. Furthermore, co-ordination of such programmes is problematic because the various on-going programmes use a range of different techniques and collect a range of different information. However, the drivers to maintain the same approaches with the time-series tends to be stronger that the driver to use comparable approaches with other groups undertaking similar studies.

Conclusions:

a. The ICES SGBICEPS could provide a suitable forum for co-ordinating work on the influence of biological characteristics of Atlantic salmon smolts on their marine mortality; consideration should therefore given to including this in the terms of the reference for future meetings;
b. IASRB should be asked to consider providing funding for the participation of two experts from outside national laboratories in the future meetings of SGBICEPS.

3.2 Workpackage 2 - Task 2 - *The impacts of physical factors in fresh water on marine mortality of Atlantic salmon* (LPH)

3.2.1 Task objectives:

The overall aim of this task is to assess the effects of physical variables on marine survival. The goal is to identify common or differing trends in freshwater physical conditions that are common throughout the geographic range, or within a geographic region, and that may modify factors such as smolt quality or migratory behaviour and reduce the ability of smolts to physiologically adapt to the marine environment.

The specific objectives are to:

i. Determine the impact of physical variables at the time of smolt emigration on survival to the open ocean (i.e. to adapt to sea water conditions and thrive and grow in marine conditions and return to natal fresh water to breed) (Sub-task 1);

ii. Determine the impact of key physical variables, such as temperature, flow, turbidity, on the run-timing of wild salmon smolts and consequent survival to the open ocean (Sub-task 2);
iii. Determine the impact of physical variables on behaviour of smolts during the transition between the freshwater and marine environments and on the abilities of smolts to survive the transition from fresh to sea water (Sub-task 3);
iv. Determine impacts of coastal transition waters on survival of returning adults into the river (Sub-task 4);
v. Model the impact of freshwater physical variables on Atlantic salmon at the population level (Sub-task 5);
vi. Determine management options for mitigating impacts (Sub-task 6).

3.2.2 Assessment:

Physical conditions experienced by Atlantic salmon smolts within fresh water may be critical to their subsequent survival in the sea. For instance, water flow and water temperature, both of which may be mediated by climate change, can modify growth, inhibit or delay smolt emigration, reduce sea water adaptation and marine survival, and influence maturation. Marine survival may also be affected by the transitional conditions, such as temperature, between fresh and saline waters.

The inventory lists two projects (E3 and E4) that specifically address the objectives of this Task. In addition, some of the projects in the inventory covering biological factors of smolts on marine mortality (WP 2:1) may include effects of physical variable as well, and there may also be overlap with WP 2:2, 2:3 and perhaps 2:4.

There is obviously a large amount of information available on how physical factors in freshwater affect the life history and behaviour of salmon, and consequently marine performance such as migration, growth and mortality. Interaction between several of these factors may result in synergistic effects which in turn may increase marine mortality.

There has been no major general and complete analysis of such information. The first step should be screening of literature and development of a network of scientists who are already funded and working in this area, to promote complementary studies, avoid duplication and gain from cooperative planning and analysis of existing data. A preliminary descriptive model of factors in freshwater that affects behaviour, life history and survival and the interaction between them should be developed. The next step would be to run the model(s) by utilizing available quantitative information. When focusing on marine survival this is not an easy task, but a first result of this may be to identify the major gaps in the knowledge and their relative importance.

The network should arrange workshops to synthesize the results, the first could prepare an inventory of completed and ongoing research (literature survey) and to develop the descriptive model. Later, workshops would then be held in order to synthesise results and coordinate ongoing and future work and/or develop an integrated research programme that would address various subtasks.

Realistically the main costs should be covered by the parties, but the fund could support the participation of external scientists with special skills.

Conclusions:

a. Efforts should be made to establish a network of scientists working on topics related to the effects of physical factors in fresh water on marine mortality of Atlantic salmon in order to promote complementary studies, avoid duplication and gain from cooperative planning and analysis of existing data. The ICES Study Group, SGBICEPS could provide a means for establishing such a network (see 3.2.1 Conclusion (a).)
b. A preliminary descriptive model of factors in freshwater that affects behaviour, life history and survival and the interaction between them should be developed and run utilizing available quantitative information. This should provide a mechanism to identify major gaps in knowledge and to assess their relative importance.

3.3 Workpackage 2 - Task 3: *Preparing to migrate – investigate the influence of freshwater contaminants on the marine survival of Atlantic salmon* (NOM)

3.3.1 Task objectives:

The aim of this programme is to assess the effects of freshwater contaminants that are common throughout the geographic range of Atlantic salmon, on marine survival and their potential role in the widespread decline of stocks.

Specific objectives:

i. Identify freshwater contaminants that are common throughout the geographic range of Atlantic salmon and that might be expected to modify migratory behaviour and/or reduce the ability of the smolts to physiologically adapt to the marine environment (Sub-task 1);
ii. Determine the effect of environmental levels of the target contaminants on the parrsmolt transformation and the ability of smolts to survive in marine conditions (Sub-task 2);
iii. Determine the impact of the target contaminants on run-timing of wild salmon smolts and the migratory behaviour of smolts during the transition between the freshwater and marine environments;
iv. Determine the impact of target contaminants on marine survival and return of spawning adults (Sub-task 5);
v. Model the impact of freshwater contaminants at the population level;
vi. Provide management options for resolving impacts identified in these studies.

3.3.2 Assessment:

The inventory lists only one current project (E3) and two completed projects (one of which was undertaken by the same team as E3) specifically aimed at understanding the role of freshwater contaminants in the early stages of salmon migration. However, the Review Group was aware of other ongoing studies, including in USA and Norway, which are not included in the inventory. The limited work in this area is unfortunate because these studies have clearly indicated that exposure of smolts to

some contaminants (including some widely used pesticides) can significantly reduce the survival of smolts on transition to salt water and these are areas which are clearly amenable to management intervention.

Sub-task 1: ***Identifying freshwater contaminants***
This is mainly a desk study and could be progressed relatively easily. There is probably some work ongoing in UK (England and Wales) and US.

Sub-task 2: ***Effects of contaminants on parr-smolt transformation***
This is mainly lab based – more difficult to progress – most work being undertaken in UK (England and Wales) and US.

Sub-task 3: ***Effects of contaminants on migratory behaviour and distribution***
Sub-task 4: ***Effects of contaminants on smolt behaviour and distribution***
Sub-task 5: ***Effects of contaminants on adult return rates***
All the above sub-tasks could be linked to any of the river monitoring or sampling programmes which handle smolts or other juvenile stages and which could provide sample material for telemetry or exposure to specific contaminants before release particularly if fish are being micro-tagged. The main focus is for groups of fish to be marked (e.g. PIT tagged) and exposed to environmental levels of contaminants for periods during the parr-smolt transformation. Therefore access to juveniles/smolts for PIT tagging, tracking of juveniles and survival is the common theme etc and links could be developed from some of the ongoing monitoring programmes. A large number of the projects listed in the inventory therefore have potential to provide suitable material to these sub-tasks (e.g. C4, E3, E4, E13, E8, E15, E17, E18, E21, I1, N2, N4, N6, R1, U1, U2, U3, U5)

Sub-task 6: Modelling impacts at a population level
This is mainly a desk study which would depend on some output from the laboratory experimental, field experimental and telemetry work above. This probably can't be progress too far yet.

Conclusions:
There is potential for a number of on-going programmes to contribute to the studies of the effects of freshwater contaminants on the marine survival of salmon, and those working in these areas should be encouraged to make best use of these opportunities.

3.4 Workpackage 2 - *Task 4: The part played by key predators (DS)*

3.4.1 Task objectives

The overall aim is to determine the contribution of predation by key predators to the marine mortality of salmon.

The specific objectives are to:

i. Determine the proportion of out-going smolts and returning adults that are removed by predation, to identify the predator(s) involved, and to determine the time, location, and circumstances of this predation;

ii. Compare current patterns and intensities of predation with the situation prior to the salmon decline.

3.4.2 Assessment:

The inventory lists one ongoing project (U6) related to reducing cormorant predation on emigrating smolts and one completed project on the effects of seals on adult salmon returning through estuaries.

The observed increases in marine mortality of salmon almost certainly mean that a greater proportion of the fish going to sea are being consumed by predators, but it is unclear whether this is a direct effect (e.g. the result of an increase in the number of predators) or a secondary effect (e.g. reduced fitness of the fish or other factors making them more vulnerable to predation). As a result of over-exploitation in human consumption fisheries, the numbers of large predatory fishes in the north Atlantic capable of catching salmon is at an all time low. However, there has been no such reduction in the numbers of surface-feeding and diving bird populations, nor in those of large marine mammals like dolphins and Atlantic grey seals, indeed, grey seal numbers are currently at record levels sustained, perhaps, by dead and dying fish discarded from fishing vessels. There is therefore remains a need to assess whether increased predator numbers in specific regions of the ocean or at specific times could account for observed reductions in marine survival of salmon. If this is demonstrated, direct investigation of predation on salmon could be focused on estimating losses to marine mammals and birds in areas where the problem appears greatest.

Because small fishes are easier to catch than large ones, studies of predation cannot be isolated from studies of growth and of the abundance of the prey species that sustain it. In the latter instance it is important to know how much reductions in the abundance of important prey species such as sandeels and capelin are driven by fishing mortality and how much by changes in marine climate.

Conclusions:

a. There is a need to assess whether increased predator numbers in specific regions of the ocean or at specific times could account for observed reductions in marine survival of salmon.
b. There are a range of options for extending current studies on the evaluation of levels of predation on salmon stocks in areas where potential problems are identified:
   - Extend the study the occurrence of salmon DNA in seal scats to a wider range of haul out sites (Marine Scotland FW Laboratory and SMRU).
   - Extend the application of P.I.T detection technology currently being used to study sea trout predation by seals to salmon (Marine Scotland FW Laboratory and SMRU).
   - Intensify observations on cetacean predation on salmon (SMRU).
   - Initiate study of the occurrence of salmon tags and salmon DNA at *coastal* bird colonies.
   - Review the current status of industrial fisheries in the north Atlantic.
   - Extend the study of salmon migration pathways to the central and northern North Sea.

3.5 Work Package 2 - *Task 5: The impacts of aquaculture on mortality of salmon* (TP)

3.5.1 Task objectives

The objective of this Task as stated in the SALSEA Programme was for NASCO and ICES to hold a symposium in 2005 on 'Interactions between aquaculture and wild stocks of Atlantic salmon and other diadromous fish species: Science and Management, Challenges and Solutions'.

The objectives of the symposium were:

i. To summarise available knowledge on the interactions between aquaculture and wild stocks of Atlantic salmon and other diadromous species;
ii. to identify gaps in current understanding of interactions and develop recommendations on future research priorities;
iii. to review progress in managing interactions of aquaculture, the challenges that remain and possible solutions;
iv. to make recommendations for additional measures, including cooperative ventures between the various stakeholders, to ensure that aquaculture practices are sustainable and consistent with the Precautionary Approach.

3.5.2 Assessment:

The Symposium specified in the objectives was held and the proceedings written up and published. Since that time the SALSEA Plan has not been updated and it is not clear what the priorities are for future work in this area, relating to the potential effects of aquaculture on marine mortality of salmon.

The inventory lists three ongoing projects (E11, N1 and N5) and four completed projects on the effects of sea lice on wild salmon, the treatment of sea lice in cages and the prophylactic treatment of wild smolts. In this context there is worrying evidence that some strains of sea lice may be gaining resistance to the current treatments in some areas. There have also been two studies involving the release of tagged farm fish to determine their patterns of dispersal and one on the effects of contaminants emanating from freshwater aquaculture facilities on the survival of smolts after they enter the sea.

We understand that the Salmon Farming Liaison Group will be reviewing research requirements relating to the potential impacts of aquaculture, and that the development of Focus Area Reports in this area will allow a more detailed evaluation of current research activities.

Conclusion:

a. The SALSEA Plan needs to be reviewed and updated to spell out the need for any future work on the impact of aquaculture on the marine mortality of salmon.

4. Work Package 3 – Investigating the Distribution and Migration of Salmon at Sea

4.1 Work Package 3 - Task 1: Distribution and migration mechanisms - (JAJ)

4.1.1 Task objectives:

The overall aim of this task is to develop theoretical migration models from existing studies to facilitate surveys and provision of advice for contemporary migration and distribution theory testing.

The specific objectives are:

i. To assemble all available scientific data, both near-shore and open ocean, on post-smolt distribution, migration, growth and feeding at sea;
ii. Review current investigations using oceanographic data so as to refine/develop predictive tools for assessing marine thermal habitat preferences and possible oceanic migration paths;
iii. Test the hypothesis that distribution and stock composition are stable over time by examining time series of oceanic and home-water tag recoveries and from scale sampling programmes;
iv. Review the existing information on differences in the behaviour and survival of hatchery and reared salmon at sea.

4.1.2 Assessment:

The first step in WP3.1 is to ensure that the best use is made of all existing survey, tracking and tagging results, available biological and oceanographic data, along with existing knowledge of salmon migrations, in order to develop hypotheses about salmon distribution and behaviour which can be tested, to improve the resolution of the proposed marine sampling tasks WP3.3.

There are no ongoing projects in the inventory that are solely related to this topic, but the development of migration models has also been addressed by two completed projects and is included within SALSEA-Merge (E1). Some work has also been done on salmon post-smolt migration in relation to sea-surface temperatures in the North Sea/Norwegian Sea by Norwegian scientists and west of Scotland/Norwegian Sea by Scottish scientists.

The analysis of historic tagging salmon data has also been addressed by a series of ICES Workshops.

Conclusion:

a. Further studies relating to the production and distribution of important marine organisms to physical parameters such as sea surface temperature, currents, wind speed, wave action, salinity, etc. are needed to facilitate and enhance a comprehensive study of the distribution and migration mechanisms for salmon in the sea.

4.2 Work Package 3 - Task 2 – A common approach –(TS)

4.2.1 Task objectives:

The overall aim of this task is to refine the plans for a large-scale marine survey programme and standardization of trawl survey techniques between the participating partners

The specific objective is:
To develop Standard Operating Procedures and plan the large-scale marine survey programme.

4.2.2 Assessment:

According to the Inventory, there are no ongoing efforts being directed towards this task. However, it is possible that some studies relevant to this task have not been reported because they are not considered to be directly related to investigating salmon mortality at sea. There have been various meetings to develop the details of the SALSEA research program and specifically plan the large-scale marine survey programmes and ensure that the same methods are used.

There are five projects (C1, E1, U5, D1, F1) listed in the inventory that will be undertaking marine surveys for salmon (both trawl and land based). There have been numerous coordination efforts within and between these projects to develop standardized operating procedures with standardized data collection requirements. Project leaders have informally met at various meetings (including the 2008 NASCO Annual Meeting) and communicated via email to develop standardized protocols. However, no overarching Trawl Standardization Working Group has been developed for the entire SALSEA Program (SALSEA-Merge, SALSEA North America and SALSEA Greenland).

***Conclusion*:**

a. Work on the further development of trawl survey techniques has not occurred to the extent envisioned in the SALSEA Plan. Any new or ongoing efforts will likely not benefit the current programme of marine surveys as we are entering the 2nd and final year of that programme.

4.3 Work Package 3 - *Task 3: Salmon at sea - (GG)*

4.3.1 Task objectives:

The overall aim of this task is to carry out a comprehensive marine survey to collect samples and information required to compare migration patterns, distribution and possible factors affecting survival of reared and wild salmon post-smolts at sea

The specific task objectives are to:

i. Determine the ocean migration patterns of salmon from fresh water to return to home waters;

ii Provide adequate samples to describe the major migration routes and distribution of Atlantic salmon at sea;
iii Provide samples for regional stock identification using the genetic baseline studies;
iv Collect information on sea surface temperature, salinity, current speed, direction and other oceanographic and hydrographic information;
v Collect information on the predators and prey of salmon;
vi Determine the distribution of salmon in relation to:
- Sea temperature and currents;
- Presence of prey;
- Presence of predators;
- Presence of competitors;
- Ocean up-welling and productivity;

vii Collect and analyse oceanic data (physical, chemical, biological) compared to the relative abundance of salmon (adults and post-smolts) captured in targeted trawl or sampling surveys;
viii Collect information (scales, growth information, sex ratios, etc.) for studies on the energetics of oceanic migration;
ix Integrate the SALSEA programme with major marine studies being undertaken by bodies such as ICES, NOAA and Fisheries and Oceans, Canada.

4.3.2 Assessment:

The inventory list 17 ongoing projects related to this Task, four marine surveys (C1, E1, I5, U5), nine acoustic tagging surveys (C2, C4, C6, E17, N4, N6, U1, U2, U3), two studies employing data storage tags (I2, I3) and one looking at trends in biological characteristics of returning salmon (E12). This part of the SALSEA Plan has been identified as being of prime important to the IASRB and is therefore central to their current research and funding efforts.

This WP is highly likely to give new and valuable information on presence/absence of post-smolts in the areas to be covered. Additional information on ocean conditions, presence of prey, presence of predators, ocean up-welling, as well as physical, chemical and biological information will be compared to relative abundance of salmon. The results can be compared to already available marine studies undertaken by ICES, NOAA and others.

Biological samples like genetic mapping and origin of fish, growth rate, scale pattern, isotopes, etc will also provide new information on salmon in the sea. In three areas there is a need to ensure that the results obtained by different groups are comparable, and it would be desirable to develop co-ordinated programmes to provide good coverage of the North Atlantic.

Information on environmental factors from fish that have survived the marine phase can be looked at as a “gap” in the already listed SALSEA projects. Although post-smolts are caught in the sea it will not be clear if they are those that will survive or the actual importance of those areas. WE will not know whether the surviving fish are coming from the “hotspot” areas covered by research ships cruises.

Information sampled by data storage tags (DST), like temperature, depth, salinity, location (GPS) etc. could to some extent fill this gap by giving additional information on at least some environmental factors sampled by DST recorders carried by the surviving fish. Areas known to have high sea survival of Atlantic salmon should be prioritized or other areas known to be important or of special value for the salmon distribution and/or existence. This could also be used in areas that are not covered by the SALSEA sampling program.

The use of DST should be encouraged for use on:

- Hatchery smolts. DST tags for tagging hatchery smolts are already available and in use. Although it is not known to what extent they reflect the lifecycle of wild salmon.
- Wild smolts. DST tags for wild smolts are under development. For example wild smolts from River Ellidaar, S-W Iceland will be tagged internally with dummy DST tags with PIT inside in spring 2009.
- Kelts. At least few types of DST suitable for tagging kelts are available and in use. In some areas they are giving valuable information on the ocean habitat preferred by kelts. This part of the salmon population is of high importance in many areas and needs more attention.
- Fish farm escapees – fish released intentionally. Large adult salmon from fish farms could be tagged with "pop-up" DST tags already in use for tagging Tuna. These tags could give information on the environment in areas used by both the fish recovered as well as from fish that do not survive. This will also have the potential for comparison of the fish that dies and fish that survive.

The advantages of using DST are:

- They do not require expensive marine vessels for collection of samples and measurements of environmental factors.
- They collect information from individuals closing the marine phase of the lifecycle.

Disadvantages are:

- The tagged fish needs to be recovered as well as the tags.
- Expensive, while the development costs are paid.
- High number of tags not recovered (depends on survival rate).
- Limited number of parameter recorded as well as limited number of records.

Conclusions:

a. The use of tagging technologies, particularly archival tags, should be encouraged as a cost effect method to complement and enhance the results from marine surveys.
b. Efforts should be made to co-ordinate studies of the condition and lipid content of 1SW & 2SW salmon returning to netting stations in northern and eastern Scotland (Marine Scotland FW Laboratory and Scottish Oceanographic Institute, St. Andrews) with related work elsewhere to provide comparable results from different parts of the North Atlantic.

4.4 Workpackage 3 - Task 4: Distribution and migration –(TP)

4.4.1 Task objectives

The overall aim of this task is to analyse and collate data from the marine surveys, report on the distribution of salmon at sea, report on the biological and physical oceanographic factors which influence migration and distribution of Atlantic salmon and report on natural and man-made mortality factors which may significantly affect survival of salmon at sea

The specific task objectives relating to different sets of results are:

Genetic assessment of stock composition:

- Evaluate the stock composition of the samples at differing geographic scales and assess deviations from expected proportions.

Man-made effects

- Evaluate ICES SGBYSAL report in relation to new data collected during trawl surveys;
- Evaluate the effects of directed fishing mortality;
- Assess the level of ocean contaminants in areas where post-smolts are located.

Predators

- Provide an assessment of predation from historical data and records;
- Compare the distribution of salmon and their predators.

Productivity

- Assess the effect of varying ocean productivity on survival of salmon;
- Combine existing time series of survival and growth of salmon with productivity studies, plankton surveys, weather satellite surveys, etc.

Food availability

- Examine whether the survival of salmon is dependent on the distribution and relative abundance of prey types (fish, crustaceans, squid);
- Investigate the distribution and abundance of prey types in relation to salmon survival.

Growth effects

- Investigate the relationship between survival and growth rate with new data and samples from the research surveys (Work Package 2).

Water temperature

- Investigate the relationship between survival and water temperature from existing long time-series and new data on SST, fixed stations and transects, DST data from the research surveys (Work Package 2).

Competition

- Examine the relationship between survival and competition with other pelagic fish species (herring, mackerel, blue whiting, lumpfish) taking into consideration: competition for food, competition for space, schooling effects.

Combined synergistic effects

- Consider overall natural mortality as a result of combined synergistic effects.

4.4.2 Assessment

The objectives in this Task are obviously picked up in many of the research projects in the inventory, particularly those such as SALSEA-Merge (E1) which involve large integrated programmes. There would be value in developing models which begin to bring some of these information streams together with the aim of exploring more fully the data coming out of these programmes and identifying more clearly the most important gaps in our understanding of the factors that may be having the greatest impact on marine survival.

Conclusion:
There is a need to initiate the development of an integrated model covering the whole pre-smolt and smolt phase with main focus on survival.

5. Summary of comments and conclusions:

This section summarizes the comments and conclusions from the review (numbers in parenthesis indicate the sections in which the conclusions appear in the report):

5.1 Overall conclusions:

a. There is a need for increased co-ordination between groups undertaking work related to the SALSEA Plan, particularly between North America and Europe (see further details below).
b. There is a need to ensure that groups not currently involved in the large SALSEA coordinated programmes can gain sufficient information on those programmes to avoid duplication of effort and generate compatible results.
c. A further review of the research inventory and update to the SALSEA plan should be undertaken after the completion of the current marine survey programmes in 2011.

5.2 Conclusions relating to the research inventory and SALSEA Plan:

a. The structure of the IASRB research inventory should be reviewed to make it easier to access information on ongoing and completed projects relating to salmon mortality in the sea. (1a)
b. The SALSEA Plan needs to be reviewed and updated to spell out the need for any future work on the impact of aquaculture on the marine mortality of salmon. (3.5.2)

5.3 Conclusions relating to improved co-ordination and communication:

a. It appears that there are good mechanisms in place (including through SALSEA-MERGE) to co-ordinate genetic studies in Europe, including ensuring all groups use the same satellite markers and comparable sampling and analytical techniques. However, there was felt to be some lack of co-ordinations between current genetics work on Atlantic salmon in Europe and North America, although the European groups were understood to have good contacts with geneticists working on Pacific salmon. (2.1.2.a)

b. It is important to ensure that the results obtained from the scale analyses being undertaken by different research groups are comparable and can be brought together in the ultimate synthesis of results. SAG should investigate this requirement further to determine whether there is a need for a workshop and whether this should be supported by the IASRB. (2.3.2 a)

c. If a workshop on scale analysis is established (2.3.2.a) it could also discuss the feasibility of establishing a common scale database for all countries with historic scale data that may be used in scale growth and microchemistry analyses. (2.3.2 b)

d. At their meeting in 2008, the ICES Study Group on Salmon Age Reading, which had previously included only Baltic salmon biologists, recommended that they should extend their remit to bring in Atlantic salmon biologists for a meeting in 2010. It was suggested that any future meeting of SGSAD should be coordinated with current activities with the SALSEA Plan. (2.3.2 c)

e. The ICES SGBICEPS could provide a suitable forum for co-ordinating work on the influence of biological characteristics of Atlantic salmon smolts on their marine mortality; consideration should therefore given to including this in the terms of the reference for future meetings; (3.1.2 a)

f. IASRB should be asked to consider providing funding for the participation of two experts from outside national laboratories in the future meetings of SGBICEPS. (3.1.2 b)

g. Efforts should be made to establish a network of scientists working on topics related to the effects of physical factors in fresh water on marine mortality of Atlantic salmon in order to promote complementary studies, avoid duplication and gain from cooperative planning and analysis of existing data. The ICES Study Group, SGBICEPS could provide a means for establishing such a network (see 3.2.1 Conclusion (a).) (3.2.2.a)

h. Efforts should be made to co-ordinate studies of the condition and lipid content of 1SW & 2SW salmon returning to netting stations in northern and eastern Scotland (Marine Scotland FW Laboratory and Scottish Oceanographic Institute, St. Andrews) with related work elsewhere to provide comparable results from different parts of the North Atlantic. (4.3.2 b)

5.4 Conclusions relating to additional research:

a. Efforts should be made to determine the extent of the possible selective bias in the current marine sampling programmes (e.g. of different sized smolts emigrating from different areas and at different times) in order that this can be taken into account in the analysis of the results. (2.2.1 a)

b. There remains a need for further developmental work on methods to sample post-smolts and adult salmon in the open ocean that are less selective than the methods currently in use. Such work should be included in any future programme to extend marine survey and sampling programmes for salmon. (2.2.1 b)

c. A preliminary descriptive model of factors in freshwater that affects behaviour, life history and survival and the interaction between them should be developed and run utilizing available quantitative information. This should provide a mechanism to identify major gaps in knowledge and to assess their relative importance. (3.2.2 b)

d. There is potential for a number of on-going programmes to contribute to the studies of the effects of freshwater contaminants on the marine survival of salmon, and those working in these areas should be encouraged to make best use of these opportunities. (3.3.2)

e. There is a need to assess whether increased predator numbers in specific regions of the ocean or at specific times could account for observed reductions in marine survival of salmon. (3.4.2 a)

f. There are a range of options for extending current studies on the evaluation of levels of predation on salmon stocks in areas where potential problems are identified (3.4.2 b):
   - Extend the study the occurrence of salmon DNA in seal scats to a wider range of haul out sites (Marine Scotland FW Laboratory and SMRU).
   - Extend the application of P.I.T detection technology currently being used to study sea trout predation by seals to salmon (Marine Scotland FW Laboratory and SMRU).
   - Intensify observations on cetacean predation on salmon (SMRU).
   - Initiate study of the occurrence of salmon tags and salmon DNA at *coastal* bird colonies.
   - Review the current status of industrial fisheries in the north Atlantic.
   - Extend the study of salmon migration pathways to the central and northern North Sea.

g. Further studies relating to the production and distribution of important marine organisms to physical parameters such as sea surface temperature, currents, wind speed, wave action, salinity, etc. are needed to facilitate and enhance a comprehensive study of the distribution and migration mechanisms for salmon in the sea. (4.1.2)

h. The use of tagging technologies, particularly archival tags, should be encouraged as a cost effect method to complement and enhance the results from marine surveys. (4.3.2 a)

i. There is a need to initiate the development of an integrated model covering the whole pre-smolt and smolt phase with main focus on survival. (4.2.2)

5.5 Other conclusions:

a. Some concern was expressed about the need to clearly distinguish between the delivery of practical results employing established genetic techniques (e.g. microsatellite markers) from the efforts to develop new techniques (e.g. SNPs). (2.1.2 b)

b. Work on the further development of trawl survey techniques has not occurred to the extent envisioned in the SALSEA Plan. Any new or ongoing efforts will likely not benefit the current programmme of marine surveys as we are entering the 2nd and final year of that programme. (4.2.2)

Annex 1 of SAG(09)10

Members of the Review Group

Gerald Chaput	Canada
Gudni Gudbergsson	Iceland
Lars Hansen	Norway
Jan Arge Jacobsen	Denmark (in respect of the Faroe Islands and Greenland)
Niall O'Maoileidigh	European Union
Ted Potter (Chair)	European Union
Sergei Prusov	Russian Federation
Elena Samoylova	Russian Federation
Tim Sheehan	USA
Dick Shelton	AST
Fred Whoriskey	ASF
Peter Hutchinson	NASCO Secretariat

SAG(09)3

Research proposals submitted to the International Atlantic Salmon Research Board

1. At the International Atlantic Salmon Research Board's (IASRB) last meeting in Gijón, Spain, it was agreed that the Parties should be invited to submit to the Secretariat, by 1 September 2008, proposals for research that might be funded by the Board or for which the Board may support the proposer in seeking funds from other sources. The SAG was asked to evaluate and prioritise these proposals using the guidance developed previously by the IASRB (Annex 1).

2. Two new proposals were received by the Secretariat before 1 September 2008. These were as follows:

   SAG(08)7: Food availability of Atlantic salmon post-smolt during their marine phase.

   SAG(08)8: A study of the relationship between ocean climate and inter-annual variation in adult summer migration distribution patterns of Atlantic salmon in Irish coastal waters over three decades.

3. Furthermore, at its Annual Meeting the Board had received a proposal, SAG(08)6, that it did not fund and a second proposal for a three year study the first year of which the Board agreed to fund (£20,000), SAG(08)5. These proposals are as follows:

   SAG(08)5: Changes in trophic levels of Atlantic salmon through the marine phase of their life-cycle.

   SAG(08)6: Inferring temperature history of Atlantic salmon at sea based on oxygen isotope rations in otoliths.

4. These projects, which are contained in Annex 2 were sent to members of the SAG by its Chairman, Dr Lars Hansen, on 16 October 2008 seeking feedback on the priority to be afforded to them. It was stressed, however, that the Board had limited available funds but that it may be able to support applications to other funding sources. The Chairman received very limited feedback from SAG members and he noted that this may have been related to the fact that some SAG members were involved in some of the projects. For this reason the Chairman had referred to the possible benefits of an independent evaluation of the projects in future. He, therefore, wrote again to SAG members on 17 February suggesting that the projects be reviewed further by the SAG at its meeting in Molde, Norway on 31 May 2008.

5. Since this last communication from the Chairman, a further proposal (Annex 3) has been received by the Secretariat. This research proposal is as follows:

   SAG(09)4: Application to NASCO's International Atlantic Salmon research Board (IASRB) to support research on salmon post-smolts in the Irminger Sea, Southwest of Iceland.

6. The SAG will be asked to evaluate these five projects and develop its recommendations to the Board on the priorities for support by the Board.

Secretary
Edinburgh
5 May 2009

ICR(03)14

CALL FOR PROPOSALS FOR RESEARCH

The North Atlantic Salmon Conservation Organisation's (NASCO's) International Cooperative Salmon Research Board (ICSRB), hereinafter referred to as "the Board", invites calls for proposals for **"Research into the migration, distribution and survival of North Atlantic salmon at sea**" focusing primarily on:

- *practical studies of the distribution and migration of salmon in the sea (including studies of by-catch in pelagic fisheries)*

- *studies of biological processes (e.g. environment, food, predation, growth, parasites and diseases) relating to the marine phase of the life-cycle.*

Within these broad areas the Board has identified the following sub-headings which are of particular interest:

Tagging
Large-scale marking or tagging (external, coded wire tags (CWT), PIT tags) - release and recovery programmes;
Tagging of adults, kelts, post-smolts or smolts with Data Storage Tags (DSTs);
Sonic tagging and active tracking of salmon movements;
Developments in electronic tag and data acquisition systems and technology.

By-catch
By-catch of salmon in near-surface pelagic trawling in the Norwegian Sea and elsewhere;
Identification of practical measures to reduce by-catch of post-smolts in these fisheries;
Development of sampling gears;
Inter-calibration of survey methods;
Practical methods to reduce by-catch.

Other
Oceanographic influences on migration and distribution and life-history of salmon;
Impacts of diseases, predators and parasites on salmon populations at sea;
Synergistic effects of predation/competition/food availability/freshwater influences on subsequent marine survival.

The Board will give priority to major multi-disciplinary and collaborative (multi-country) projects but will also consider smaller projects and proposals relevant to the topics above for:

Knowledge inventory studies;
Symposia and workshops;
Fellowships and studentships.

Funding may be provided in full or on a partial or matching basis. An application form is available from the NASCO website or on request from the NASCO Secretariat.

The deadline for receipt of completed applications is: XX/XX/XX

The application form could include the following, as an example:

1. Project title

Give the application a brief title which describes the work to be done.

2. Applicant – Institution/company responsible for the project

As a general rule, an institution or company should be the formal applicant, with legal responsibility for ensuring that the conditions attached to an allocation of funds are met.

3. Project Leader

This should be the name of the technical expert responsible for the project.

4. Project summary

Provide a brief summary of the project description, with an emphasis on describing the objectives of the project, the most important R & D challenges and the potential for application of the project results. The project summary will be made publicly available via the Board's inventory. For this reason, the text should be capable of being understood by non-experts, and should not exceed 200 words.

5. Principal goal and sub-goals

Describe the results that are expected to be obtained in the course of the project period. Formulate individual demonstrable sub-goals which lead to the principal objective.

6. Milestones – timetable

Indicate milestones for the principal activities that fulfil the main objectives and sub-goals of the project (e.g. data-acquisition, field-work, main activities in study plan and final report). Check off these milestones by date (or possibly include a calendar or time grid). Use keywords – maximum of 45 characters. A more detailed timetable may be provided in the project description.

7. Cost plan

The cost plan for the project should be summarized and preferably broken down into sub-costs (e.g. capital costs, contracts or services, consumables, travel and subsistence).

Personnel costs and indirect costs

Personnel costs and indirect costs cover salary, social security and indirect costs such as rent, secretarial help, telecommunications and computing costs, etc.

The "Project total" should show the same amount each year as the total in section 8: "Finance plan".

The Board should consider fixed rates for fellowships and certain types of positions. Companies or institutions may also calculate personnel costs and indirect costs on the basis of their own employees' hours of work on the project and their hourly rates. Consider only work done by their own R & D personnel, i.e. the project manager and research and technical personnel.

8. Finance plan

The finance plan should show how the costs shown in the cost plan are to be financed and the amount sought from the Board.

Own funding

This refers to the applicant's institution's input of own resources such as cash, personnel, infrastructure/goods/equipment into the project.

Other public-sector funding

This refers to public-sector grants such as direct support from ministries, the grants from the State Fund for Regional and Industrial Development, regional support schemes, funds from agricultural or fisheries agreements, local authority industrial development funds, etc.

Other private funding

This includes financial support from cooperating companies, trade organizations, private funds, etc. State-owned companies that operate as commercial concerns are also regarded as sources of private funding in this respect.

9. Active partners

Enter national and international partners who will participate actively in the project. Provide names of persons, universities, institutes, companies, programmes, bodies, etc. Confirmation provided by such partners of their participation in the project should be enclosed with the application. Enter the name of the doctoral fellowship or student supervisor if he or she is not the project manager.

10. Project publication plan

The Board considers that dissemination of information about the projects it supports is very important. Provide brief details of goals, target groups and type of information to be provided.

11. List of enclosures

List all documents enclosed with the application as backup and possibly confirmation of the skills and background of the proposers.

12. Signatures

The Board requires the signatures of the project manager and of a representative of the institution or company responsible for the project and may want to further develop the requirements regarding project manager and institution. If possible, candidates for fellowships or research positions should sign when their names have been confirmed.

Project description

The project description should provide more details of individual points in the application form and offer a basis for academic evaluation of the project proposal. The project description must not exceed 10 pages (including the list of references). (Recommended norm: A4 page format, 12pt Times New Roman font, single line spacing and 2cm margins). A distinction should be made between background material and planned activities. For the application to be considered, the project description must provide information on the following topics, where relevant.

Familiarity: The applicant must document good familiarity with the field of research concerned, both nationally and internationally.

Problem: The problem must be clearly formulated and satisfactorily limited in scope. It must be demonstrated that the project involves an expansion of existing knowledge, and/or that this knowledge provides a basis for further research in the field.

Method: It must be demonstrated that the methods and theories to be used are appropriate for the solution of the problem involved, or that there are good prospects of developing the necessary methods and theory. Analytical methods, including any statistical methods needed to evaluate the significance of the results, should also be described.

Objectives: Concrete, testable main objectives that provide a description of the expected results of the project must be formulated, as well as a set of sub-goals that will lead to the principal objectives.

Ethics: The project description must describe how ethical considerations are taken into account, where appropriate.

Implications for the environment: An assessment must be provided of whether the results of the project will have significant effects (whether positive or negative) on the physical

environment. If such is the case, the project description must describe whether there is a need for research related to the environmental consequences, and whether the project has defined objectives or sub-goals that aim to shed light on the environmental implications.

Research Fishing: If the proposal includes research fishing, details should be provided of the purpose of the research fishing; the dates of research fishing; the area in which research fishing will take place; the name, registration, call sign and a description of any participating vessel; the type and amount of gear to be used and the estimated total weight and number of salmon to be retained.

Timetable: A more detailed timetable than that shown in item 6 may be drawn up. At least one milestone must be identified.

Information: Describe plans for information dissemination and user contact, including purpose, target groups and form of information dissemination, and, if appropriate, usefulness and application potential.

Resources: Information should be provided (directly as well as indirectly via the project manager/group of researchers) regarding the resources available to the project.

Professional position: Describe the position of the project with respect to the institution's or company's range of activities, and any co-operation or co-operative agreements with other projects or institutions.

Information regarding professional competence

Project managers should submit their CV with a list of relevant publications for the last 5 years (maximum of four pages).

Specifically named persons for whom fellowships or positions are being sought must document their competence by submitting a CV and a list of publications of a maximum of 4 pages (the applicant should prioritise the information provided if necessary), as well as copies of relevant references and certificates. In applications for doctoral fellowships that are to be dealt with a brief presentation of the supervisor's or project manager's research supervision experience during the previous five years should be provided, stating the number of candidates who have completed their doctoral or master's degree. Similar supervisor information is required for all applications for studentships. Candidates for post-doctoral fellowships who have not completed their doctorate must provide a list of the articles that will be included in their doctoral dissertations.

Project managers who lack qualifications as senior lecturer/associate professor must document their competence in the same way as the persons for whom studentships are being sought.

Costs and financing
The process of evaluating project applications requires information regarding costs and financing, including the company's or institution's own contribution of resources.

Experts

The Board may wish to be able to consult referees proposed by applicants in addition to their own appointed experts when handling applications.

Please list the names, titles and addresses of three persons with a thorough knowledge of the applicant's field of research, who may be consulted as referees.

SAG(08)5

Proposal submitted to the International Atlantic Salmon Research Board relative to furthering the knowledge on marine ecology of Atlantic salmon. June 2008

By

Gérald Chaput, Tim Sheehan, and Brian Dempson
SALSEA North America

Changes In Trophic Levels Of Atlantic Salmon Through The Marine Phase Of Their Life Cycle

The following proposal for funding for 2008 is to analyze tissue samples from Atlantic salmon collected at index rivers in eastern Canada, as post-smolts in the northwest Atlantic, and as non-maturing 1SW salmon at West Greenland.

Costs associated with sample collection are covered by existing and new initiatives independent of this proposal.

Context

While the issue of Atlantic salmon survival is complicated by their complex life cycle requirements, there are various hypotheses regarding survival and production that may pertain to variations in Atlantic salmon abundance. One hypothesis stresses the implications of trophic structure and anthropogenic disturbances of trophic structure that have led to shortened food chains at sea. Hence, the need for investigations of variability in the trophic ecology of salmon. Trophic level can be evaluated by an examination of stomach contents over time, or through stable isotope analysis (SIA). While stomach contents provide a snapshot of recent dietary resource use, stable isotope analyses yield time integrated measures of energy assimilation since analyses are performed on body tissues built from diet assimilated over time. Consequently, SIA has been increasingly used in ecological studies as a reliable means of inferring trophic status and the impacts of anthropogenic disturbance on trophic relationships.

Atlantic salmon are considered opportunistic feeders during their freshwater and marine life-history phases. While in freshwater, juvenile salmon feed on aquatic invertebrates particularly various stages of insect groups. Differences in feeding strategies may occur between systems where parr rear extensively in lacustrine (lake) habitats versus other locations where fluvial (stream) rearing is common. During the marine phase, salmon often target prey in the upper end of the size spectrum with a preference for fish over crustaceans should both be available, but the point in the life cycle when this change happens and the relative importance of these components is poorly understood. Thus, owing to the opportunistic nature of salmon feeding habitats, the species lends itself well to studies

associated with aquatic environmental conditions and food web interactions. This is particularly relevant given the variability in freshwater habitats and differences in smolt size throughout Atlantic Canada, and the potential variation in ocean climate conditions that salmon encounter when first migrating to sea over a geographic range that extends from southern Nova Scotia and New Brunswick to Labrador and into the Ungava region of Quebec.

Variability in the trophic ecology of Atlantic will be examined from analyses of stable isotope signatures of carbon and nitrogen ($\delta^{13}C$ and $\delta^{15}N$). Nitrogen stable isotope analysis provides a quantitative means to determine trophic level since nitrogen signatures from organism tissue are consistently 3 to 5‰ more enriched than dietary sources. In contrast, carbon stable isotopes are conserved up the food chain owing to the slight 0.0 to 1.0‰ enrichment occurring between prey and consumer. Because ^{13}C is conserved during trophic transfer, but varies at the base of the food web, consumer tissue stable isotope signatures will also reflect dietary source information. Various tissues have been used in the analysis of isotopic signatures, including muscle, liver, scales, and fins. Scales tend to provide a longer term perspective of trophic information while analyses of muscle and liver tissue reflect more recent energy assimilation.

We propose to sample salmon at various points in its life cycle and characterize variations and changes in trophic state from the smolt to adult life-stage. This will be accomplished by sampling smolts and adult survivors back to the river from a broad geographic range in eastern North America. Smolt information will provide information on river-specific variability in freshwater feeding strategies. Intermediate marine life-history stages will be investigated from samples obtained at West Greenland as non-maturing one-sea-winter salmon, coupled with the proposed marine research survey intended to target the early post-smolt phase.

Study design

Variability in the trophic ecology of Atlantic will be examined from analyses of stable isotope signatures of carbon and nitrogen ($\delta^{13}C$ and $\delta^{15}N$) with comparisons among populations at the freshwater-smolt stage, as well as between life-history stages from post-smolts caught at sea, non-maturing 1SW salmon feeding at West Greenland, and with adults that return to respective rivers in the following year.

We propose to analyze isotope signatures from muscle, liver, scales and adipose fin tissue. In situations where lethal sampling of salmon is not an option (e.g., catch-and-release angling fisheries, populations at low abundance), scales and adipose fins provide non-lethal alternatives. As noted earlier, this approach will yield information on ontogenetic differences in isotope signatures across life-history stages (smolt, post-smolt, adult) across a broad geographic area.

Samples from West Greenland and from the proposed research cruise will be obtained on an opportunistic basis with a target of approximately 150 specimens from each but with potentially more samples from the marine research cruise should they be available; this, however, would increase the estimated costs of analysis. The potential river sampling locations and the respective tissues identified for stable isotope analyses are identified in Table 1.

To complement salmon trophic information, isotope analyses will also be carried out on a subset of other species that may be captured in the pelagic trawl, or obtained from stomach contents of salmon at sea. These data will provide insight into key dietary items of the food web structure within which salmon operate. Thus, five replicate samples of each of the key prey types within the size range consumed would be desirable.

Table 1. *Location, life stage and tissues to be sampled from Atlantic salmon to examine trophic ecology.*

							Returning adults			
			From Smolts				1SW salmon		2SW salmon	
SFA/Zone	River	Tributary	Muscle	Liver	Fin	Scales	Fin	Scales	Fin	Scales
23	Nashwaak		X	X	X	X	X	X	X	X
21	LaHave		X	X	X	X	X	X	X	X
18	Margaree		X	X	X	X	X	X	X	X
16	Miramichi	Southwest	X	X	X	X	X	X	X	X
		Northwest	X	X	X	X	X	X	X	X
15	Restigouche	Kedgwick	X	X	X	X	X	X	X	X
		Upsalquitch	X	X	X	X	X	X		
Q2	St-Jean		X	X	X	X	X	X	X	X
Q7	De la Trinite		X	X	X	X	X	X	X	X
11	Conne		X	X	X	X	X	X		
9	Rocky		X	X	X	X	X	X		
4	Campbellton		X	X	X	X	X	X		
4	Exploits		X	X	X	X	X	X		
14A	Western Arm		X	X	X	X	X	X		
2	Sand Hill		X	X	X	X	X	X	X	X
			Post-smolt and West Greenland							
Post-smolt			X	X	X	X				
West Greenland			X	X	X	X				

Samples will be collected over three years with the objective of tracking changes in trophic ecology of salmon through the marine phase (Table 2). In addition, annual variation in trophic state among 1SW maturing, 1SW non-maturing and 2SW salmon will be examined by sampling these stages even if some of the data on smolts or early post-smolt stages are not available. The samples from West Greenland will also provide inter-continental comparisons of trophic ecology for that life stage.

Table 2. *Schedule of samples to be collected by life stage.*

	2008					2009					2010				
	May	June	July	August	September	May	June	July	August	September	May	June	July	August	September
Smolt	X	X				X	X								
Post-smolt				X					X						
Marine prey (post-smolt)				X					X						
1SW salmon							X	X				X	X		
1SW non-maturing (WG)				X	X				X	X				X	X
Marine prey (WG)				X	X				X	X				X	X
2SW salmon							X	X				X	X		

Estimated cost of analysis over the next three years (2008 to 2010)

As the number of life stages sampled varies with the year, the cost of analysis also varies. Stable isotope analysis for C and N costs $10 per tissue sample. For 2008, the proposed cost of analysis is $39,000 (Cdn).

Life stage	Number of locations	Tissues	Number of samples per tissue	Total
Smolt	15 index rivers	Muscle, liver, scales, adipose	30	$18,000
Post-smolt	Labrador Sea	Muscle, liver, scales, adipose	150	$6,000
Marine prey	Labrador Sea, Two locations	20 prey item types	5	$2,000
1SW non-maturing (WG)	West Greenland	Muscle, liver, scales, adipose	150	$6,000
Marine prey	West Greenland	20 prey item types	5	$2,000
Labour for laboratory preparations				$5,000
Funding for analysis for 2008				**$39,000**

Smolt	15 index rivers	Muscle, liver, scales, adipose	30	$18,000
Post-smolt	Labrador Sea	Muscle, liver, scales, adipose	150	$6,000
Marine prey	Labrador Sea, Two locations	20 prey item types	5	$2,000
1SW salmon	15 index rivers	Scales, adipose	30	$9,000
1SW non-maturing (WG)	West Greenland	Muscle, liver, scales, adipose	150	$6,000
Marine prey	West Greenland	20 prey item types	5	$2,000
2SW salmon	9 index rivers	Scales, adipose	30	$5,400
Labour for laboratory preparations				$7,500
Funding for analysis for 2009				**$55,900**

1SW salmon	15 index rivers	Scales, adipose	30	$9,000
1SW non-maturing (WG)	West Greenland	Muscle, liver, scales, adipose	150	$6,000
Marine prey	West Greenland	20 prey item types	5	$2,000
2SW salmon	9 index rivers	Scales, adipose	30	$5,400
Labour for laboratory preparations				$4,000
Funding for analysis for 2010				**$26,400**

Timelines for the tissue collections and analysis

For 2008

The tissue collections from smolts from the index rivers began in May 2008 and will be completed by the end of June 2008. The post-smolt survey for the Labrador Sea is anticipated for August 2008 with tissue collection occurring on the vessel. The West Greenland samples would be collected in August and September and be available for analysis by the end of October 2008.

All the laboratory analyses would be conducted between September 2008 to February 2009 with preliminary analyses and interpretation available for the ICES Working Group meeting in April 2009 and the NASCO meeting of June 2009.

Timelines for other years would follow a similar schedule.

Coordination, data analysis and interpretation

Tissue collection from the index rivers and for post-smolts is being coordinated by Gerald Chaput (DFO Gulf Region).
Tissue collection and prey items from West Greenland are coordinated by Dr. Tim Sheehan (NMFS, NOAA, US).
Isotope analyses will be coordinated by Dr. Michael Power and conducted at the Environmental Isotope Laboratory, University of Waterloo (Canada).
Data analysis and interpretation will be lead by Brian Dempson (DFO NL, Canada) and Dr. Michael Power (U. of Waterloo, Canada).

SAG(08)6

Proposal submitted to the International Atlantic Salmon Research Board relative to furthering the knowledge on marine ecology of Atlantic salmon.

June 2008

By

Gérald Chaput, Tim Sheehan, and Brian Dempson
SALSEA North America

Inferring temperature history of Atlantic salmon at sea based on oxygen isotope ratios in otoliths

In addition to tissue samples to evaluate the trophic ecology of salmon, we propose to analyze oxygen isotopes that are deposited in otoliths. Because oxygen isotopes are deposited in equilibrium with the environmental waters in which the fish live, they can provide a temperature history experienced by the fish. Measurement of thermal habitat use relies on temperature dependent fractionation of δ^{18} oxygen isotopes during the formation of otoliths and established otolith δ^{18} oxygen–temperature relationships for conversion between the two. Ideally, insight into the thermal habitat use of salmon across various life-history stages from analyses of oxygen isotopes will be coupled with ecological information on smolt size and age and corresponding food web data as inferred from carbon and nitrogen signatures. Collectively, these analyses may shed additional insight into respective productivity differences among stocks throughout much of the natural distribution of salmon in the North West Atlantic Ocean ranging from Nova Scotia, New Brunswick, Quebec, Newfoundland and possibly southern Labrador.

This proposal complements the stable isotope research and uses the same material sources as for the stable isotope project. As such, the costing of this proposal is for analysis purposes only. A water sample is to be collected at every location where fish are collected.

SFA/Zone	River	Tributary	Smolts	1SW	2SW	Water sample
23	Nashwaak		X			X
21	LaHave		X			X
18	Margaree		X			X
16	Miramichi	Southwest	X	X	X	X
		Northwest	X	X	X	X
15	Restigouche	Kedgwick	X	X		X
		Upsalquitch	X	X		X
Q2	St-Jean		X	X		X
Q7	De la Trinite		X	X		X
11	Conne		X	X		X
9	Rocky		X	X		X
4	Campbellton		X	X		X
4	Exploits		X	X		X
14A	Western Arm		X	X		X
2	Sand Hill		X	X		X
			Post-smolt and West Greenland			
Post-smolt			X			X
West Greenland			X			X

Table 2. *Schedule of samples to be collected by life stage.*

	2008					2009					2010				
	May	June	July	August	September	May	June	July	August	September	May	June	July	August	September
Smolt	X	X				X	X								
Post-smolt				X					X						
1SW salmon							X	X				X	X		
1SW non-maturing (WG)				X	X				X	X				X	X
2SW salmon							X	X				X	X		
Water sample	X	X		X	X	X	X	X	X	X				X	X

Estimated cost of analysis over the next three years (2008 to 2010)

As the number of life stages sampled varies with the year, the cost of analysis also varies. Otolith analysis of oxygen isotopes costs $20 (Cdn) per sample. For 2008, the proposed cost of analysis is $17,900 (Cdn).

Life stage	**Number of locations**	**Tissues**	**Number of samples per tissue**	**Total**
Smolt	15 index rivers	Otoliths	30	$9,000
Post-smolt	Labrador Sea	Otoliths	150	$3,000
1SW non-maturing (WG)	West Greenland	Otoliths	150	$3,000
Water samples	20 locations (15 rivers + 3 Labrador Sea + 2 WG)	Water	1	$400
Labour for laboratory preparations				$2,500
Funding for analysis for 2008				**$17,900**

Smolt	15 index rivers	Otoliths	30	$9,000
Post-smolt	Labrador Sea	Otoliths	150	$3,000
1SW salmon	12 index rivers	Otoliths	30	$7,200
1SW non-maturing (WG)	West Greenland	Otoliths	150	$3,000
2SW maturing	Miramichi River (2 sites)	Otoliths	30	$1,200
Water samples	20 locations (15 rivers + 3 Labrador Sea + 2 WG)	Water	1	$400
Labour for laboratory preparations				$5,000
Funding for analysis for 2009				**$28,800**

1SW salmon	15 index rivers	Otoliths	30	$9,000
1SW non-maturing (WG)	West Greenland	Otoliths	150	$3,000
2SW salmon	Miramichi River (2 sites)	Otoliths	30	$1,200
Water samples	2 locations (WG)	Water		$40
Labour for laboratory preparations				$2,000
Funding for analysis for 2010				**$15,240**

Timelines for the tissue collections and analysis

For 2008
The otolith collections from smolts from the index rivers began in May 2008 and will be completed by the end of June 2008. The post-smolt survey for the Labrador Sea is anticipated for August 2008 with tissue collection occurring on the vessel. The West Greenland samples would be collected in August and September and be available for analysis by the end of October 2008. The otoliths will be extracted from the same fish sampled for tissues for C and N stable isotopes.

All the laboratory analyses would be conducted between September 2008 to February 2009 with preliminary analyses and interpretation available for the ICES Working Group meeting in April 2009 and the NASCO meeting of June 2009.

Timelines for other years would follow a similar schedule.

Coordination, data analysis and interpretation

Tissue and otolith collections from the index rivers and for post-smolts is being coordinated by Gerald Chaput (DFO Gulf Region).
Otolith collections from West Greenland are coordinated by Dr. Tim Sheehan (NMFS, NOAA, US).
Isotope analyses will be coordinated by Dr. Michael Power and conducted at the Environmental Isotope Laboratory, University of Waterloo (Canada).
Data analysis and interpretation will be lead by Brian Dempson (DFO NL, Canada) and Dr. Michael Power (U. of Waterloo, Canada).

SAG(08)7

Proposal submitted to the International Atlantic Salmon Research Board on the food availability of Atlantic salmon post-smolts during their marine phase.

August 2008

By

Webjørn Melle, Marianne Holm
Institute of Marine Research
Norway

Jan Arge Jacobsen
Faroese Fisheries Laboratory
The Faroe Islands

Niall O'Maoileidigh
Marine Institute
Ireland

SALSEA-Merge

FOOD AVAILABILITY OF ATLANTIC SALMON POST-SMOLT DURING THEIR MARINE PHASE

The following proposal for funding for 2009 to 2011 will be an integral part of SALSEA-Merge to analyse zooplankton, chlorophyll and nutrient samples collected during 6 international SALSEA-Merge cruises to the salmon post-smolt habitats of the Northeast Atlantic.

Costs associated with sample collection are covered by SALSEA-Merge, but the analyses and reporting of plankton and other key environmental samples lack funding.

Background

Below is the ABSTRAC of the SALSEA-Merge proposal to the EU quoted:
"Over the past two decades, an increasing proportion of North Atlantic salmon are dying at sea during their oceanic feeding migration. The specific reasons for the decline in this important species are as yet unknown, however, climate change is likely to be an important factor. In some rivers in the southern part of the species range, wild salmon now face extinction. This is in spite of unprecedented management measures to halt this decline. Arguably the greatest challenge in salmon conservation is to gain insight into the spatial and ecological use of the marine environment by different regional and river stocks, which are known to show variation in marine growth, condition, and survival. Salmon populations may migrate to different marine zones, whose environmental conditions may vary. To date it has been impossible to sample and identify the origin of sufficient numbers of wild salmon at sea to enable this vital question to be addressed. SALSEA-Merge will provide the basis for

advancing our understanding of oceanic-scale, ecological and ecosystem processes. Such knowledge is fundamental to the future sustainable management of this key marine species. Through a partnership of 9 European nations the programme will deliver innovation in the areas of: genetic stock identification techniques, new genetic marker development, fine scale estimates of growth on a weekly and monthly basis, the use of novel high seas pelagic trawling technology and individual stock linked estimates of food and feeding patterns. In addition, the use of the three-dimensional Regional Ocean Modelling System, merging hydrography, oceanographic, genetic and ecological data, will deliver novel stock specific migration and distribution models. This widely supported project, provides the basis for a comprehensive investigation into the problems facing salmon at sea. It will also act as an important model for understanding the factors affecting survival of many other important marine species."

In the SALSEA-Merge proposal it was stated that studying the food availability is an integral and important part of the research undertaken by SALSEA-Merge. Food availability, modulated by competition with other pelagic fish species, is important to post-smolt survival, through growth and predation processes. Further, food availability may influence distribution by active swimming of the post-smolts during the search for higher prey densities. Prey species abundances will also serve as major descriptors of post-smolt habitats throughout the SALSEA-Merge sampling areas.

During the process of adjusting the SALSEA-Merge application budget to the available funding it was decided to include sampling of potential food organisms during the cruises, while the analyses of these samples were excluded from the budgets because of the time and personnel consuming nature of such analyses.

Sampling design (by SALSEA-Merge)

The main prey of post-smolts at sea are macrozoooplankton organisms and juvenile fish. Prey abundance and distribution during SALSEA-Merge cruises are observed by macroplankton trawls, traditional plankton nets and multi-frequency acoustics. The macroplankton trawl is equipped with a multiple opening and closing codend to facilitate vertically resolved sampling. The traditional plankton net used during the first three cruises was a WP-2 net. This will probably be adjusted during the next year's cruises to facilitate better near surface sampling and also vertically resolved sampling. Probably, a MOCNESS sampler will be used. Table 1 summarises the anticipated number of samples from the six planned SALSEA-Merge surveys of the Northeast Atlantic and the costs involved in sample analyses.

Table 1. *Available zooplankton samples from six SALSEA-Merge cruises (Fig. 1) during 2008 (cruises 1, 2 and 3) and 2009 (cruises 4, 5, 6) and costs of analyses. Norwegian trawl samples are worked up at sea and need no extra funding. Hours of analysis per sample are 4.*

					Costs of sample analyses				
			Number of samples		Hours		Costs Euros		Total costs
Cruises	**Gear**	**Nation**	**2008**	**2009**	**2009**	**2010**	**2009**	**2010**	**Euros**
1 and 4	Macroplankton trawl	Ireland	0	0	0	0	0	0	
	Plankton net		10	30	40	120	3520	11040	
2 and 5	Macroplankton trawl	Faroe Islands	2	10	8	40	366.4	1832	
	Plankton net		13	30	52	120	2381.6	5496	
3 and 6	Macroplankton trawl	Norway	22	60	0	0	0	0	
	Plankton net		31	160	124	640	10912	58880	
Total			**78**	**290**	**224**	**920**	**17180**	**77248**	**94428**

Analyses and scientific interpretation

Norwegian samples of the macroplankton trawl are sorted, organisms identified, body length measured and weighed at sea. Plankton net samples are stored on formalin and analysed subsequently in the lab. In the present proposal we apply for funding of the analyses of macroplankton trawl samples not analysed at sea and net samples. Further we apply for funding of a Post Doc position over 18 months for analysis of multi-frequency acoustic data, the scientific interpretation of plankton data and for the participation in analyses and publication of results under SALSEA-Merge. See Work packages 4 and 5 of SALSEA-Merge proposal below. The Post Doc period will start 1. July 2010 to facilitate sufficient overlap with the work in SALSEA-Merge WPs 4 and 5:

Work package 4 S&T Objective: Biological Analysis of Samples

- analyse and rank available food items
- analysis of archival scale material
- analysis of scale samples collected in Work package 2
- establish digital scale library
- determine fine scale growth rates
- undertake dietary analysis and assessment of condition

Work package 5 S&T Objective: Merge and analyse genetic, biological and oceanographic data

- map spatial distribution of specific regional stocks or populations
- integrate distribution and migration of salmon with biological and oceanographic data
- develop models to integrate stock specific distribution and migration patterns, with patterns of growth, dietary differences and oceanographic conditions

The total costs of analyses of plankton samples and scientific interpretation, including Post Doc salary over 18 months, are given in Table 2.

Table 2. Total costs of plankton samples analyses and Post Doc salary.

Cost categories	**2009**	**2010**	**2011**	**All years**
Sample analyses	17180	77248	0	94428
Post Doc salery	0	52500	105000	157500
Consumables and travels for Post Doc		3750	3750	7500
Total	**17180**	**133498**	**108750**	**259428**

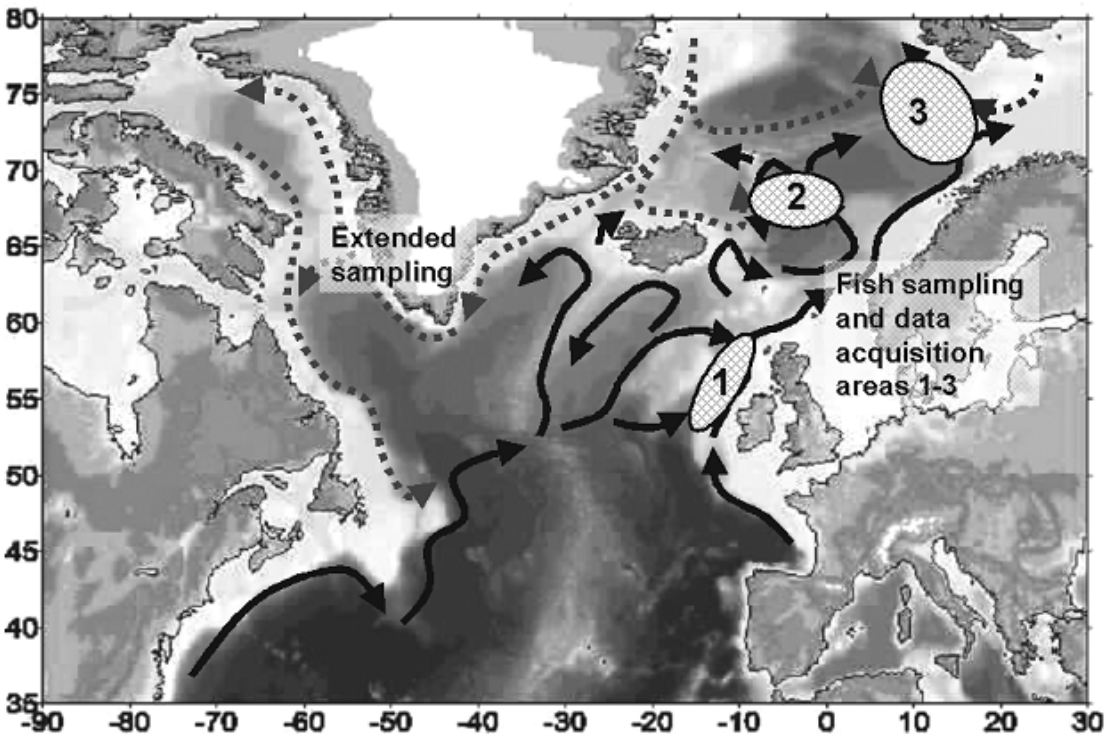


Figure 1. Proposed sampling areas during SALSEA-Merge

Timelines for the samples analysis

Samples will be collected at sea during 6 international cruises during the summers 2008 and 2009 (see above). Samples will be available for analyses after the cruise in the autumn 2008 and 2009. Sample analyses can be completed early 2009 and 2010 for samples collected in 2008 and 2009, respectively. Results of speciation and enumeration of potential food organisms will be disseminated to SALSEA-Merge (WPs 4 and 5) and for inclusion in SALSEA-Merge database immediately after completion of analyses.

Coordination, data analysis and interpretation

The sample transfer between laboratories, analyses and dissemination of results will be coordinated by Dr. Webjørn Melle (IMR, Norway). Scientific interpretation will be an integral part of SALSEA-Merge with additional help by the Post Doc.

List of Partners

Dr. Webjørn Melle, Institute of Marine Research, Norway
Dr. Marianne Holm, Institute of Marine Research, Norway
Dr. Jan Arge Jacobsen, Faroese Fisheries Laboratory, The Faroe Islands
Dr. Dr. Niall O'Maoileidigh, Marine Institute, Newport, Ireland

SAG(08)8

Proposal submitted to the International Atlantic Salmon Research Board relative to furthering the knowledge on marine ecology of Atlantic salmon.

August 2008

By

Phil McGinnity, Niall Ó Maoileidigh, Jamie Coughlan, Eleanor Jennings and Tom Cross.

A STUDY OF THE RELATIONSHIP BETWEEN OCEAN CLIMATE AND INTER-ANNUAL VARIATION IN ADULT SUMMER MIGRATION DISTRIBUTION PATTERNS OF ATLANTIC SALMON IN IRISH COASTAL WATERS OVER THREE DECADES.

Objectives

1. To determine, using genetic stock identification, the region and river of origin of fish captured and sampled in the Irish commercial drift net fisheries since 1980.
2. To determine the relationship between regional stock complex and individual population distribution (including survivorship, growth, timing) and key descriptors of the marine environment such as sea surface temperatures, NAO, Gulf Stream Index.
3. To predict regional population response to future marine climate scenario projections

Background

New data emerging from a genetic analysis of the Irish coastal drift net fisheries in 2005 and 2006 (National Atlantic Salmon Genetic Stock identification Programme) suggests occurrence of salmon populations from wide range of Irish and other southern European stock complex salmon populations. These data also suggest that salmon from many rivers aggregate off the west coast of Ireland before continuing their migration northwards and southwards from the area where they amass (Figure 1). Furthermore, and significantly from the perspective of understanding salmon response during their ocean migration to climate variability, the distribution or centre of this aggregation is variable among years. We hypothesise that the west coast of Ireland is an important migration route for most contributing populations that constitute the ICES defined southern population complex. The proximity of the continental shelf to Irelands coast (at it narrowest for Europe is off Irelands North West) and its significant influence on thermal and current regimes, in addition to the substantial influence of the Gulf Stream, provide strong geographical support for the hypothesis of a migratory 'funnelling point' or 'way mark' for returning adult salmon. We further hypothesise that the variation in salmon migration patterns revealed by the recent genetic analyses and consequent impact on the fishes ocean ecology is a response to both cyclical (Gulf Stream index, NAO) and stochastic (directional climate change) changes in the

marine environment between and among years. It is possible that an understanding of these oceanic processes will provide important new insights into those factors controlling marine survival in Atlantic salmon.

This proposal would seek to exploit the very significant Trans-European Genetic Stock Identification baseline being developed under the EU sponsored SALSEA-Merge Project. In addition we would seek to deploy the suite of new state of the art genetic markers also being advanced in the SALSEA-Merge Project. The proposed project would also endeavour to utilise a unique, long term, high resolution, biological archive representing of salmon scale collected systematically from the Irish drift net fisheries over three decades. There are approximately 15,000 scales in the collection. Accompanying the biological archive are data on capture location, time of capture and size at capture. It is proposed to supplement these data with information on fish age and growth rates acquired using latest methodological developments in scale imaging. Elemental isotope analysis of scales would be used to garner further biological information on the history of individual fish. Finally, both hind-casting and forecasting of oceanic climate environments would be undertaken to model fish distribution response.

This proposal is complimentary to the work being undertaken under SALSEA-Merge. Moreover the temporal component represents a significant additional element to SALSEA-Merge which aims primarily to ascertain salmon stock represents distribution at a single moment in time. The data derived from consistent (28 years) and directed sampling of a large number of fish will provide an opportunity for a significant advance in our knowledge.

We are cognisant that an opportunity exists to replicate the approach and methodology outlined above for the Greenland fishery. The Greenland fishery also represents and important long term biological archive that should represent the inter-annual temporal distribution of Atlantic salmon populations from North America and Europe and is representative of salmon at a different stage in their life cycle, specifically their winter feeding grounds. Studies of the distribution of salmon off Ireland's west coat and off Greenland would be complimentary. It should be possible at some future date to integrate these studies, with the current SALSEA-Merge project to provide a broad trans-oceanic perspective of the distribution of Atlantic salmon.

Materials & Methods

The project will comprise of three work packages. As the project will be based on archive material and does not depend on collection of new seasonally dependent biological material the start date for the project is flexible. A start date of January 2009 is assumed. The data generated from the three work packages below will be combined to provide an analysis of the historical distribution of individual river and region Atlantic salmon populations in Irish waters over three decades. Also, based on future marine and freshwater climate projections an attempt will be made to predict the distribution and migration patterns of adult Atlantic salmon on their summer spawning migrations.

Genetic analysis of archive scale collection

A representative sample of 5,000 scales will be selected from the archive scale collection. These will be assigned genetically to river and region of origin using mixed stock analysis and individual assignment methods.

Work Package Leader – Dr. Philip McGinnity, University College Cork.
Duration - January 2009 to December 2009
PDF – 6 months
Technician – 12 months
Estimated cost of work package including direct and indirect costs - €100,000

Acquisition of life history data from scales
Each set of individual scales is accompanied by information on the date of capture, location of capture, size of capture. In this work package information from the fisheries and age and growth information acquired using state of the art scale imaging will be combined to construct a detailed life history and migration distribution map for individual fish within each population as they move through the commercial fisheries.

Work package leader – Dr. Niall Ó Maoileidigh, Marine Institute, Newport, Co Mayo
Duration - July 2009 to December 2009
Technician – 6 months
Estimated cost of work package including direct and indirect costs - €25,000

Synthesis of freshwater and marine climate data
Both freshwater and marine environmental information will be synthesised in this work package. Long term data from 1980-2006 on size and timing of freshwater discharges (processed at national, regional and individual river levels) from the island of Ireland into the ocean, including information on temperatures will be collated. Data on the important indices of the marine environment which are likely to have an important bearing on adult fish migration will also be investigated, e.g. regionally specific sea surface temperatures, NAO, Gulf stream strength index. The leader for this work package has worked extensively with the Rossby Climate Research Institute in Sweden and the Hadley Climate Centre in the UK on providing climate projection information. This work package will seek to acquire freshwater and marine environment projections that could be used to predict future distribution patterns and trends of adult salmon in Irish coastal waters.

Work package leader – Dr. Eleanor Jennings, Dundalk Institute of Technology, Dundalk, Co. Louth.
Duration - July 2009 to December 2009
Technician – 6 months
Estimated cost of work package including direct and indirect costs - €25,000

Total Estimated Cost of Project - €150,000

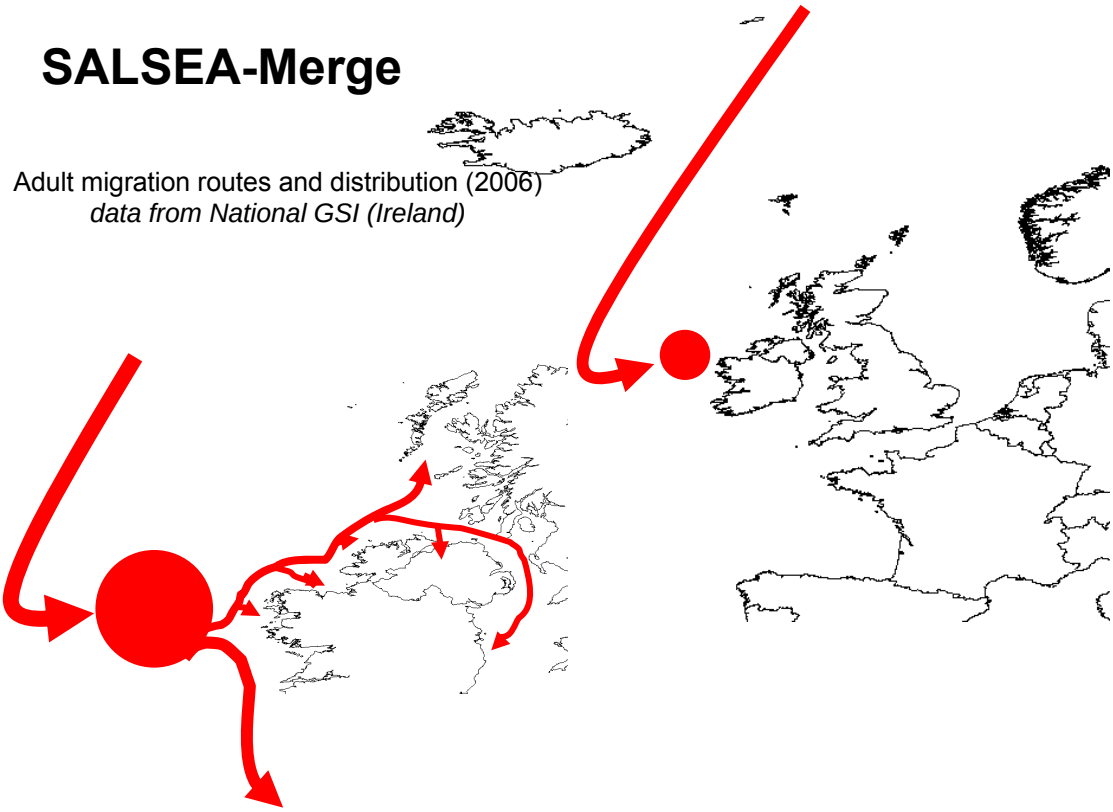

SALSEA-Merge
Adult migration routes and distribution (2006)
data from National GSI (Ireland)

Figure 1

SAG(09)4

Application to NASCO's International Atlantic Salmon Research Board (IASRB) to support research on salmon post-smolts in the Irminger sea southwest of Iceland

Sigurður Már Einarsson
Sigurður Guðjónsson

The research ship Arni Fridriksson

Institute of Freshwater Fisheries
Freshwater Fisheries • Freshwater Biology • Research • Consulting

Introduction

For the last two decades Atlantic salmon in the North Atlantic has seriously declined in abundance. This decline in catches has been attributed to increased mortality during the oceanic part of their life cycle. The decline is generally more pronounced with multi-sea-winter fish, but severe decline has also been observed in many one-sea-winter stocks. This trend is especially evident in some southern rivers, on both sides of the Atlantic where wild salmon face extinction. Arguably the greatest challenge in salmon conservation is to increase knowledge on spatial and ecological use of the marine habitat by different regions and river stocks, which are known to show variation in marine growth, condition and survival. Different stocks may be predisposed to use different marine areas where environmental condition may vary and differently affect growth, condition and survival. Until recently it has been impossible to sample and identify the origin of sufficient numbers of wild salmon caught at sea to enable this vital question to be addressed.

The year 2008 marked the initiation of the SALSEA-Merge project, on the marine ecology of Atlantic salmon, through a partnership of ten European nations. The project is funded under the EU 7th framework. The overall objective of SALSEA-Merge is, by merging ecological and genetic research, to advance understanding of stock specific migration and distribution patterns and overall ecology of the marine life of Atlantic salmon and gain insights in increases in marine mortality of the species.

In SALSEA-Merge an important part of the project is to acquire samples of post-smolts and associated critical oceanographic information in key marine areas of the North Atlantic. In 2008 three cruises were taken to areas in the Northern Atlantic (Figure 1) that were considered to be on the migratory route for post-smolts from European salmon stocks (Jacobsen et.al 2008, Holm et.al 2008, Maoiléidigh et.al 2008).

Initial proposal of SALSEA-Merge sampling of post-smolts included sampling of the Irminger Sea southwest of Iceland, but due to insufficient funding, the area was not included in the project. The Irminger area is on the junction of warm Gulf stream and the cold Greenland current and the area is rich in nutricients (Greene et.al. 2003). Toledano (2006) found relationships between the runs of Icelandic salmon from the west coast of Iceland and SST at certain times and location as well as to abundance of certain groups of zooplankton in the Irminger Sea southwest of Iceland. Recently several salmon, tagged with DST tags were recaptured in a small river in west Iceland, with continuous hourly temperature records and

depth regime recorded from the smolt stage until entry in freshwater as 1 SW fish (Guðjónsson et.al 2008). During the winter months the fish stayed in the surface layers of the sea in temperatures around 8°C. Comparison with SST from satellites indicates a strong possibility that the Irminger gear is the main habitat for Icelandic salmon at least from the south and west Iceland (Guðjónsson et.al. 2008). Furthermore the area may also been utilized by North American stocks and some European stocks.

The Marine Institute of Iceland is planning 2 cruises to the Irminger area in the summer of 2009, in cooperation with Germany and Russia due to research effort on redfish. This cruise creates a unique opportunity to include sampling of salmon post-smolts to the cruise program. However the cruise must be extended by some days to be able to include sampling of salmon. Funding of the project is still unclear, but applications have been sent to the Ministry of Fisheries and Agriculture in Iceland.

Research proposal

The main objective of the proposal is to acquire samples from salmon post-smolts and other oceanographic information in the Irminger area. The cruise will start late in June and will last almost through July 2009. The largest research vessel of Marine Research Institute, Arni Fridriksson will be used. Personnel from Institute of Freshwater Fisheries will be on board throughout the cruise. Another shorter cruise is planned in the autumn if sufficient funding will be obtained. Furthermore, sampling of salmon is possible in some cruises in the east and south of Iceland during the summer and autumn. The SALSEA methodology created for previous cruises for the sampling will be followed in the project and same type of sampling gear will be used.

Research cost

The prospects of getting some additional funding from the Icelandic government are reasonable good. However, further funding is needed. Therefore, we ask the *NASCO's International Atlantic Salmon Research Board (IASRB) t*o support this research work by ***25.000 €. (Euros)*** to be able to complete all the work in the cruise that is need.

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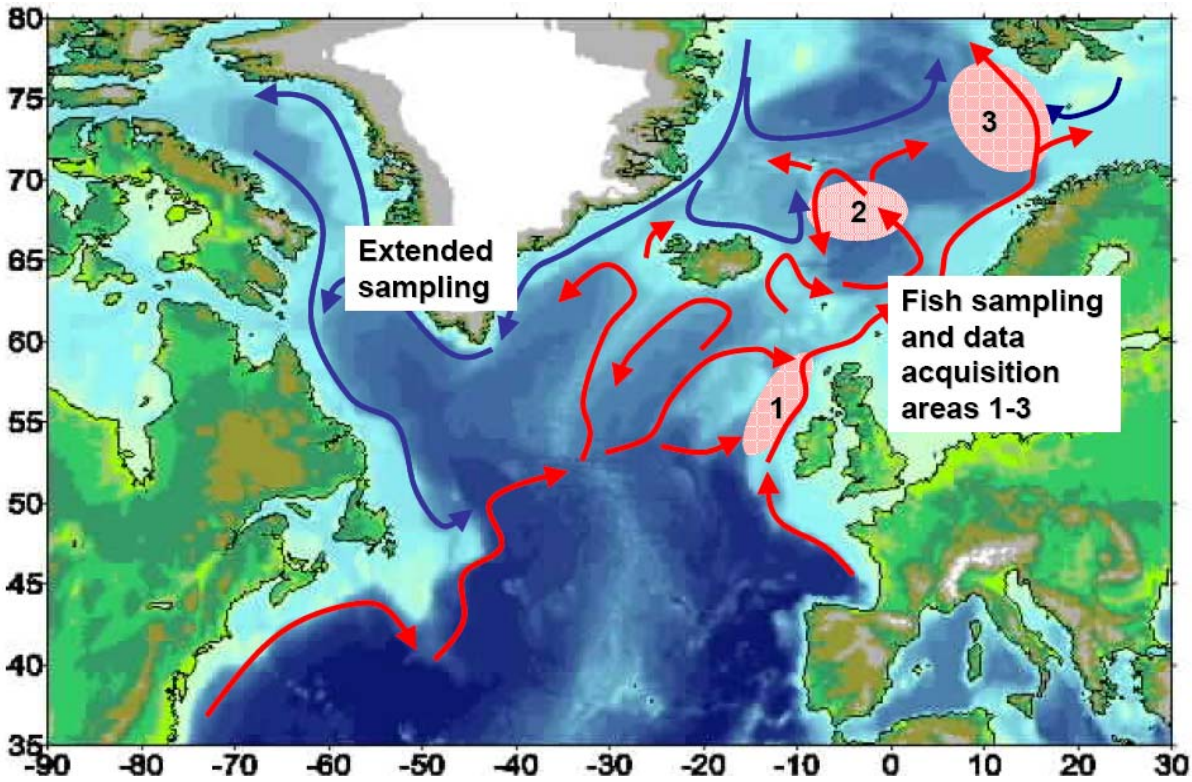

Figure 1.Location of key marine areas for sampling of post smolts, in the North Atlantic in 2008 and 2009 (Jacobsen et. al 2008).

Annex 5 of SAG(09)9

SAG(09)11
Summary of review of research proposals submitted to IASRB

	SAG(08)05 Changes in trophic levels of Atlantic salmon through the marine phase of their life cycle	***SAG(08)06 Inferring temperature history of Atlantic salmon at sea based on oxygen isotope ratios in otoliths***	***SAG(08)07 Food availability of Atlantic salmon post-smolt during their marine phase***	***SAG(08)08 A study of the relationship between ocean climate and inter-annual variation in adult summer migration distribution patterns of Atlantic salmon in Irish coastal waters over three decades***	***SAG(09)4 Post-smolt survey in the Irminger Sea***	***Workshops to improve collaborations (support external people)***
Relevance to IASRB priorities	Relevant to IASRB priorities - enhancement of existing projects	Relevant to IASRB priorities - enhancement of existing projects	Relevant to IASRB priorities - enhancement of existing projects	Peripherally relevant to IASRB priorities in that it addresses distribution of 1SW maturing fish (rather than post-smolt) at a very specific location.	Relevant to IASRB priorities (Irminger Sea sampling)	Workshops by priority – 1) GIS support for WKLUSTRE 2) support for SGBICEPS 3) proposal for microchemistry standardization (scales and other tissues?) – is there an issue that needs to be resolved?
Addresses broad question of salmon ecology at sea	Expected to provide information on ecology of salmon at sea, comparison of maturing and non-maturing stages, and status of survivors.	Expected to provide information on ecology of salmon at sea, comparison of maturing and non-maturing stages, and status of survivors.	Expected to provide information on ecology of salmon at sea Value of acoustic data is in the multi-dimension coverage not possible with	Would provide information on mixing of river stocks at sea on the return migration near the coast. Greatest value relates to the temporal variation in	Adds information of salmon distribution at sea in area which has not been well studied.	1) Analysis of historical tagging data using new technologies is providing new information on salmon distribution at sea 2) Study group is analyzing

			physical sampling gear.	stock distribution and its association with climatic factors.		characteristics of salmon throughout North Atlantic
Potential to be successful	Stable isotope technology is well described in literature. The only risk to the project is the extent of collections of post-smolts at sea. Update on progress shows few samples obtained in 2008 and no samples from West Greenland in 2008. - may require a review of standardization of methods among labs	Oxygen isotope technology to define temperature is well described in literature. The only risk to the project is the extent of collections of post-smolts at sea. Update on progress shows few samples obtained in 2008 and no samples from West Greenland in 2008. - may require a review of standardization of methods among labs	Sample collection is not an issue. Plankton sampling coverage is not extensive given the size of the area sampled and temporal coverage provided but acoustic sampling would provide more complete coverage as sounding is continuous. Is it possible to ground-truth acoustic data? Are there initiatives elsewhere that would allow interpretation of acoustic data? Not clear how much work is involved in analyzing acoustic data or which expertise would be called to guide the analysis.	Indicated in proposal that genetic identification of river-specific stocks is well advanced.	NA	Constructive results from previous workshops and study group participation of outside experts.
Details on costing	Costing is adequately described	Costing is adequately described	Costing is adequately described.	Costing is not adequately described	Costing is not adequately described - funding for science person to go to sea and to	Costing is approximate pending venue and number of experts

					pay for extra days at sea	
Cost of project	40,000 pounds ($79,000 Cdn)	22,500 pounds ($43,140 Cdn)	226,000 pounds (259,428 Euros)	131,000 pounds (150,000 Euros)	22,000 pounds (25,000 Euros)	1) GIS support for tagging workshop: 2,000 pounds 2) Study group on biological characteristics 4,000 pounds
Funding requested from IASRB (amount and % of)	20,000 pounds (50% of total) (approved in 2008)	22,500 pounds (100% of total)	226,000 pounds (100 % of total)	131,000 pounds (100 % of total)	22,000 pounds (XX% of total)	1) GIS support for tagging workshop: 2,000 pounds 2) Study group on biological characteristics 4,000 pounds
Number of years (single or multi-year)	Two (revised from three)	Two (revised from three)	Three	One	One ?	1) Third year of three(?) 2) One (?)
Extent of collaboration	Involves people from several national labs and one university.	Involves people from several national labs and one university.	Involves people from several national labs, no university.	Involves people from national labs and several universities.	Survey involves several countries (Iceland, Germany, Russia)	Extensive
Contributions of partners	Large amount of inkind and resources associated with collection of samples. A large amount of contributions not specifically included in proposal (marine vessels, WG sampling, freshwater monitoring).	Large amount of inkind and resources associated with collection of samples but these are covered in sampling associated with projet SAG(08)05. A large amount of contribution not specifically included in proposal.	Large amount of inkind and resources associated with collection of samples and real expenses from SALSEA-Merge. A large amount of contributions not specifically included in proposal.	Archived samples represent a large inkind contribution. A large amount of contributions not specifically included in proposal resulting from work in SALSEA-Merge and elsewhere.	Vessel time provided from participating countries	National participants on internal funds
Suggestions for	Would benefit from	Would benefit from	Provide details on	Could initially	Need details on	None

improving work	coordination / complementary analysis of trophic state of NEAC fish from smolt, post-smolt sampling, as samples from West Greenland include NAC and NEAC origin salmon.	complementary analysis of NEAC fish from smolt, post-smolt sampling, as samples from West Greenland include NAC and NEAC origin salmon. Temperature environment used by post-smolts differs between NAC and NEAC?	other biological oceanographic data that could be used to more completely describe the environment in this area. Provide detail on sampling of stomach contents of other species.	consider selecting scales / years to be processed based on observed important differences in environmental conditions (for ex. pick specific years of contrasting NOA indices or drought versus deluge freshwater conditions) and test these for explanatory power.	use of funds	
Funding potential from IASRB	Partial funding for this proposal already approved by IASRB. Additional funding level exceeds the current funding available from IASRB. Revised costing based on samples collected in 2008 and potential for collections in 2009 and 2010 provided.	Funding request exceeds the current funding available from IASRB. Requires a revised costing based on samples collected in 2008 and potential for collections in 2009 and 2010 (provided).	Funding request exceeds the current funding available from IASRB.	Funding request exceeds the current funding available from IASRB.	Funding request exceeds the current funding available from IASRB.	Funding request is within the scope of current funding by IASRB.
Recommendation	Support by IASRB	Support by IASRB	Support by IASRB	Important project proposal but is outside current IASRB priorities	SAG supports plan to sample in Irminger Sea but insufficient details of how funds will be used.	Support by IASRB

Annex 13

CNL(09)10

Request for Scientific Advice from ICES

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

1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and production of farmed and ranched Atlantic salmon in 2009[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 continue the work already initiated to investigate associations between changes in biological characteristics of all life stages of Atlantic salmon, environmental changes and variations in marine survival with a view to identifying predictors of abundance [3];

1.4 describe how catch and release mortality and unreported catch are incorporated in national and international stock assessments and indicate how they can best be incorporated in future advice to NASCO;

1.5 further develop approaches to forecast pre-fishery abundance for North American and European stocks with measures of uncertainty;

1.6 provide a compilation of tag releases by country in 2009 and advise on progress with analysing historical tag recovery data from oceanic areas;

1.7 identify relevant data deficiencies, monitoring needs and research requirements[4].

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

2.1 describe the key events of the 2009 fisheries[5];

2.2 review and report on the development of age-specific stock conservation limits;

2.3 describe the status of the stocks and provide annual catch options or alternative management advice for 2011-2013, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6];

2.4 further investigate opportunities to develop a framework of indicators or alternative methods that could be used to identify any significant change in previously provided multi-annual management advice.

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

3.1 describe the key events of the 2009 fisheries (including the fishery at St Pierre and Miquelon) [5];

3.2 update age-specific stock conservation limits based on new information as available;

In the event that NASCO informs ICES that the framework of indicators (FWI) indicates that reassessment is required:*

3.3 describe the status of the stocks and provide annual catch options or alternative management advice for 2010-2013 with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding [6].

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

4.1 describe the key events of the 2009 fisheries[5];
4.2 provide clarification of the levels of reported and unreported catch in the subsistence fishery since 2002,

In the event that NASCO informs ICES that the framework of indicators (FWI) indicates that reassessment is required:*

4.3 describe the status of stocks and provide annual catch options or alternative management advice for 2010-2012 with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding[6,7];

Notes:

1. *With regard to question 1.1, ICES is asked to ensure that the terminology used in presenting the data on ranching is clearly defined. For the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal.*
2. *With regard to question 1.2, ICES is requested to include information on any new research into the migration and distribution of salmon at sea.*
3. *With regard to question 1.3, there is interest in determining if declines in marine survival coincide with changes in the biological characteristics of juveniles in fresh water or are modifying characteristics of adult fish (size at age, age at maturity, condition, sex ratio, growth rates, etc.) and with environmental changes.*
4. *NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea will be provided to ICES to assist it in this task.*
5. *In the responses to questions 2.1, 3.1 and 4.1 ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Any new information on non-catch fishing mortality, of the salmon gear used, and on the by-catch of other species in salmon gear, and on the by-catch of salmon in any existing and new fisheries for other species is also requested.*
6. *In response to questions 2.3, 3.3 and 4.3 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice.*
7. *In response to question 4.3, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.3 and 3.3.*

- **The aim should be for NASCO to inform ICES by 31 January of the outcome of utilising the FWI**

Annex 14

CNL(09)11

Final Report of the Fisheries Management Focus Area Review Group

1. Focus area reports (FARs) are intended to provide in-depth assessments of the actions taken on the particular focus area under consideration and provide a basis for review of the actions taken and their efficacy in achieving NASCO's objectives. The first focus area is the management of salmon fisheries.

2. The Council established an *Ad Hoc* Review Group to review and analyse the FARs and highlight issues to be raised during the 2008 Special Session and provide questions to the Parties and Jurisdictions. This work was done during 2008 and presented to the Council last year, CNL(08)13. The Group was then asked to complete its work by assessing the extent to which the information provided in the FARs indicates that NASCO's goals are being, or will be, achieved and by suggesting additional actions to ensure the consistency of fisheries management efforts with NASCO's agreements and by preparing a comparative overview of the FARs highlighting best practice and challenges and approaches to addressing these challenges in the management of salmon fisheries. These tasks have now been completed and the Group's final report is attached.

3. In section 5 of the Report, IP(08)19, the Group's assessments of all the FARs are presented. It is clear from the Group's assessments that while enormous progress has been made in managing fisheries some challenges remain. No FARs were available to the Group for six jurisdictions and this jeopardizes the success of the review process.

4. In Annex 3 of the Report, the Group has developed recommendations on the elements that might be considered to constitute best practice in managing salmon fisheries. This is based closely on NASCO's agreements etc and is intended to address issues of lack of clarity, ambiguity and in some cases contradictory statements in these documents. The Group recommends that the Council formally adopt this guidance or, if this guidance is not acceptable, that the guidelines, agreements and definitions are revisited.

5. In Annex 5 of the Report, the Group has developed a comparative overview of the FARs. Although many of the examples of approaches being used to meet the challenges posed by the best practice guidance are not fully consistent with the guidance they all describe activities that are designed to address NASCO's agreements.

6. The *Ad Hoc* Review Group will present these findings at a Special Session open to all delegates during the Twenty-Sixth Annual Meeting when the Parties and jurisdictions will have an opportunity to respond. The Council is asked to consider the Group's report and decide on appropriate action.

Secretary
Edinburgh
7 April 2009

IP(08)19

Report of the Second Meeting of the Ad Hoc Review Group on Fisheries Management Focus Area Reports

DEFRA, 9 Millbank, London SW1P 3 JR
4 – 6 November 2008

1. Opening of the Meeting by the Coordinator

1.1 The Coordinator, Dr Malcolm Windsor, opened the meeting and welcomed the members of the Review Group to London for its second meeting. He thanked Ted Potter for the arrangements made and expressed appreciation to DEFRA for providing the meeting facilities. He referred to the importance of the Group's work in pioneering a new process within NASCO to review the measures taken by the Parties and jurisdictions on the three focus areas of management of fisheries, habitat protection and restoration and aquaculture and related activities. He noted that to date the Group had only sought clarification on the content of the focus area reports (FARs) on the management of salmon fisheries. The challenging task now before the Group was to suggest additional actions to ensure the consistency of fisheries management efforts with NASCO Agreements and to compile an overview of best practice and approaches to addressing challenges in managing salmon fisheries. This would require fairness and balance in the assessment of the FARs, clarity and consistency in identifying where additional actions were needed and diplomacy in formulating the recommendations. He stressed that the participants from the Parties are representing the Organization and the NGO representatives the international NGO community in NASCO. The Coordinator's role is to Chair the meeting and facilitate the Group's work; he would not be one of the reviewers, nor would the Assistant Secretary who would also facilitate the Group's work and serve as Rapporteur. He also stressed that it was not necessary for the Group to reach unanimous agreement on its assessments although this might strengthen its findings.

1.2 A list of participants is contained in Annex 1. The representative from Denmark (in respect of the Faroe Islands and Greenland) was unable to participate in the Group's second meeting.

2. Adoption of the Agenda

2.1 The Group adopted its agenda, IP(08)22 (Annex 2).

3. Review of the Terms of Reference and Consideration of Working Methods

3.1 The original functions of the Group as adopted by the Council, CNL(07)47, are as follows:

(a) the *Ad Hoc* Review Group shall review and analyze the Fisheries Management Focus Area Reports prepared by the Parties or Jurisdictions;

(b) in carrying out this task, the *Ad Hoc* Review Group should seek to assess the extent to which the information provided in the Fisheries Management Focus Area Reports indicates that NASCO's goals are being, or will be, achieved;

(c) the *Ad Hoc* Review Group will meet in May 2008 to review the Fisheries Management Focus Area Reports submitted for the Special Session, and collaborate to highlight issues to be raised during the 2008 Special Session and to provide any questions to the Parties or Jurisdictions by 15 May, 2008;

(d) following discussions in the Special Session on Fisheries Management, the *Ad Hoc* Review Group should prepare a short report to be submitted to the President in the course of the 2008 Annual Meeting, suggesting additional actions to ensure the consistency of fisheries management efforts with NASCO Agreements.

3.2 At its first meeting the Group had completed the tasks identified in sub-paragraphs (a) and (c) above and its report had been presented to the Council at a Special Session held during the Twenty-Fifth Annual Meeting at which the Parties and jurisdictions had responded to the questions developed by the Group. For the remaining tasks, the Group had stressed to the Council that because of the limited time available at the Annual Meeting it could not develop a fair and balanced assessment of the additional actions needed to ensure the consistency of fisheries management efforts with NASCO agreements. It had, therefore, proposed to the Council that the Parties send their responses in writing to the Group's questions to the Secretariat (and if they so chose amend their FAR to address the questions raised by the Group) by 31 July 2008. Thereafter, the Group would complete its work with a view to providing a report to the President by 31 October 2008. The Council had agreed to this proposal but, in addition to completing its original tasks, it had asked that the Group also undertake a comparative overview of the FARs highlighting best practice and challenges and approaches to addressing these challenges in the management of salmon fisheries. This overview would be presented to the Council prior to the 2009 Annual Meeting. The revised Terms of Reference are contained in document IP(08)21.

3.3 The Group decided that it would first develop recommendations on the elements that it considered comprised best practice and use these elements as a basis for identifying where additional actions were required by a jurisdiction to ensure consistency of fisheries management efforts with NASCO's agreements. In accordance with its TORs, the President would be asked to convey its findings to the Parties and jurisdictions indicating that while no response was expected the Group would welcome corrections to any factual errors or misinterpretation of the FARs made by

the Group. The Group would also develop a comparative overview of approaches to addressing challenges in the management of salmon fisheries. The Group's report and its findings would not be made available until after the deadline for the Parties and jurisdictions to respond to the letter from the President at which point both the Group's findings and any responses from the Parties would be made available in the Group's report to the Council.

4. Consideration of the elements of 'Best Practice' in management of salmon fisheries

4.1 A draft document detailing the elements that might be considered to constitute best practice in managing salmon fisheries was presented, IP(08)18. In terms of management of salmon fisheries, best practice was interpreted as those actions that are most likely to achieve NASCO's objective of promoting the diversity and abundance of wild salmon stocks. The Parties had invested considerable time and effort, drawing on the wide expertise available to them, in developing NASCO's agreements relating to the conservation, restoration, enhancement and rational management of salmon stocks and the Group had agreed that the elements contained in these agreements represent areas around which guidance on best practice should be developed. The intention in developing this guidance on best practice for the management of salmon fisheries is to assist the Parties and their jurisdictions in making further progress in implementing NASCO's agreements, to provide a basis for more consistent approaches to the management of salmon fisheries around the North Atlantic and to assist in the identification of what additional actions may be required. After some revision the Group agreed Draft NASCO Guidance on Best Practice for the Management of Salmon Fisheries, IP(08)23 (Annex 3).

4.2 The Review Group based this best practice guidance closely on the various NASCO guidelines, agreements and definitions relating to fishery management. However, it was found that the wording of some of these documents was unclear or ambiguous and at times contradictory. For example, the Agreement on Adoption of a Precautionary Approach, CNL(98)46, indicates that priority should be given to conserving the productive capacity of the resource. However, NASCO agreements also allow for the operation of fisheries on socio-economic grounds when stocks are below conservation limits (CLs). The basis on which such decisions may be taken on socio-economic grounds is not clearly prescribed. A second example relates to the use of biological reference points; the Agreement on Adoption of a Precautionary Approach, indicates that stocks should be managed by means of CLs and management targets (MTs), but the Decision Structure, CNL31.332, indicates that alternative measures of abundance may be used.

4.3 The Group recommends that the Council consider formally adopting the draft guidance on best practice, IP(08)23, as a way of providing clarification for the guidelines, agreements and definitions relating to fishery management. If this guidance is not adopted, the Group recommends that the Council revisits the guidelines, agreements and definitions with a view to clarifying ambiguities, contradictions and lack of clarity so that management can be based upon clearer

principles and in order to facilitate the work of subsequent Groups reviewing the FARs on the management of salmon fisheries.

5. Development of suggestions for additional actions to ensure consistency of fisheries management efforts with NASCO Agreements.

Jurisdictions not submitting a FAR

5.1 Before presenting its recommendations arising from the reviews of the FARs, the Group wishes to note with concern that six jurisdictions (Faroe Islands, EU-France, EU-Germany, EU-Portugal, EU-Spain, and EU-Sweden) have not presented a FAR although three of these jurisdictions (EU-France, EU-Germany and EU-Sweden) had presented information on management of salmon fisheries during the Special Session in June. Furthermore, two of these jurisdictions (EU-Spain and EU-Portugal) have not yet developed Implementation Plans either. If this, and subsequent, Review Groups are to assess whether the management actions of a Party or jurisdiction are in accordance with NASCO's agreements they need to have information from these jurisdictions. The development of Implementation Plans and subsequent reporting on progress through FARs is an essential part of the 'Next Steps' process. The lack of the fisheries management FARs means that it was impossible for the Group to assess if additional actions are required and to develop a comprehensive North Atlantic wide overview of approaches to addressing challenges in the management of fisheries. This also makes it difficult for the Council to consider fairness and balance in managing fisheries. The Group recommends that the President, on behalf of the Council, again take this up with the jurisdictions concerned. While the fisheries management Review Group has completed its work it considers it essential for the success of the reporting process and the sharing of experience that all jurisdictions submit FARs for subsequent reviews (and for two jurisdictions Implementation Plans as well).

5.2 The Group noted the following specific points in relation to salmon management in those jurisdictions that had not submitted a FAR:

Denmark (in respect of the Faroe Islands): The Faroe Islands have only four small salmon rivers but until the more recent declines in the stocks there was a commercial mixed-stock fishery regulated by NASCO in Faroese waters. An Implementation Plan has been developed. It is disappointing, therefore, that the Faroe Islands could not go the next step and produce a fisheries management FAR.

European Union – France: The Group is aware that France has some major salmon rivers, has established conservation limits for its stocks and there are issues relating to some mixed-stock fisheries. France has produced an Implementation Plan and made a presentation on the management of its fisheries at NASCO's Twenty-Fifth Annual Meeting in June 2008. It is disappointing, therefore, that France could not go the next step and produce a fisheries management FAR.

European Union – Germany: The Group is aware that Germany is taking valuable and important actions to restore and rebuild salmon stocks. Germany has produced an Implementation Plan and made a presentation on the management of its fisheries at NASCO's Twenty-Fifth Annual Meeting in June 2008. It is disappointing, therefore, that Germany could not go the next step and produce a fisheries management FAR.

European Union – Portugal: The Group is aware of the very small wild salmon stocks and their tenuous state in Portugal which, however, being at the southern limit of the range, are very important for genetic diversity. Portugal has not developed an Implementation Plan or a fisheries management FAR and the Group hopes that it can contribute to this important aspect of NASCO's work at the earliest opportunity.

European Union – Spain: The Group is aware that Spain has stocks which, being at the southern limit of the range, are important for genetic diversity but are vulnerable. Spain notified the Council that it was unable to produce an Implementation Plan and referred to the fact that salmon management is devolved to the Provinces. Such devolution is not unusual and the Group hopes that coordination within Spain will produce the necessary outcome so that it can contribute to this important aspect of NASCO's work at the earliest opportunity.

European Union – Sweden: The Group is aware that Sweden has a long history of salmon management, in rivers draining to both the North Atlantic Ocean and Baltic Sea. Sweden has produced an Implementation Plan and made a brief presentation on management of its fisheries at NASCO's Twenty-Fifth Annual Meeting in June 2008. It is disappointing therefore that Sweden could not go the next step and produce a fisheries management FAR.

Jurisdictions submitting a FAR

5.3 The Group welcomed the submission of the following twelve FARs which it reviewed, four of which had been revised following the Group's first meeting:

- Canada, IP(08)9rev;
- Denmark (in respect of Greenland), IP(08)7rev;
- EU - Denmark, IP(08)12;
- EU - Finland, IP(08)3;
- EU - Ireland, IP(08)13;
- EU - UK (England and Wales) , IP(08)5rev;
- EU - UK (Northern Ireland) , IP(08)4;
- EU - UK (Scotland) , IP(08)2rev;
- Iceland, IP(08)10;
- Norway, IP(08)11;
- Russian Federation, IP(08)8;
- USA, IP(08)6.

Methodology

5.4 In undertaking its reviews the Group took into account the responses to the questions raised with the Parties and jurisdictions following the Group's first meeting. All Parties and jurisdictions had responded to these questions during the Special Session in June 2008 and subsequently in writing. These written responses are contained in document IP(08)16 (Annex 4). The Group was also aware that the review of Implementation Plans had highlighted some aspects that needed to be addressed in the FARs. In carrying out its assessments the Group checked if any of these aspects related to the fisheries management FARs.

5.5 The Group noted that the review process would ideally involve an exchange of information between all jurisdictions with salmon fisheries in the North Atlantic and notes the Council's efforts to encourage France (in respect of St Pierre and Miquelon), which has a mixed-stock fishery that exploits North American stocks, to accede to the Convention. Such a move should lead to greater information exchange on this fishery and, together with submission of fishery management FARs for all NASCO's Parties and jurisdictions, would facilitate a complete exchange of information for all salmon fisheries and a more complete assessment of management challenges.

5.6 The Group developed a format linked to the structure of the guidance on best practice (see Annex 3) to facilitate an assessment of the consistency of fishery management actions as detailed in the FARs with the guidance on best practice. Each of the FARs was assessed against the elements in this format which covered the following aspects:

- Decision making process
- Description of the fisheries and the stocks exploited
- Powers to control exploitation
- Reference points (conservation limits or other measures of abundance)
- Achievement of the reference points or other measures of abundance
- Other factors influencing the stock(s)
- Management actions to control harvest
- Mixed stock fisheries (MSFs)
- Socio-economic factors
- Effectiveness of management measures

5.7 For each of these elements of best practice, where there was limited or no evidence of such an approach consistent with the best practice guidance being developed or if the approach was considered to be only partially developed recommendations on additional actions were formulated. An initial reviewer was assigned to each FAR from among the NASCO representatives on the Group and the NGOs also undertook reviews of all the FARs using the agreed format. These initial reviews formed the basis for deliberations by the whole Group and the development of its recommendations. These recommendations were then subject to a further review to ensure consistency across FARs. The Group then used the information in the FARs

and its assessments of these to develop a comparative overview of approaches to addressing challenges in management of salmon fisheries (see section 6).

Recommendations – General Comments on FARs

5.8 The Group identified a number of aspects of fishery management which the majority of the FARs failed to address in detail. This meant that is was difficult for the Group to conduct a comprehensive evaluation of the consistency of these aspects with NASCO agreements and guidelines. It is hoped that these aspects, and those in the Group's first report (CNL(08)13), can be more fully addressed the next time that the Council focuses on the management of salmon fisheries. The following five areas require particular attention:

1. The Agreement on Adoption of a Precautionary Approach requires the formulation of pre-agreed management actions in the form of procedures to be applied over a range of stock conditions; most jurisdictions failed to provide a clear decision structure or alternative description of the decision-making processes for fisheries management. For future FARs it would be helpful if jurisdictions provided flow diagrams or similar descriptions of the decision-making process.

2. The Agreement on Adoption of a Precautionary Approach requires that management measures, taking account of uncertainty, should be aimed at maintaining all salmon stocks above their conservation limit, taking into account the best available information, and socio-economic factors. The NASCO Guidelines and Agreements do not make it clear how fishery management decisions are to be taken when there are conflicts between socio-economic and conservation issues. Most FARs failed to provide a clear indication of how socio-economic factors are incorporated into decisions, and in particular how decisions are taken to permit fishing on stocks when they are below their reference point. For future reporting, it would be useful if this aspect could be addressed.

3. NASCO's objective for fishery management is to promote the abundance and diversity of salmon stocks. However, the mechanisms by which diversity should be conserved are not clearly spelt out in NASCO's agreements and guidelines. The FARs provided very variable responses on the information available on stock diversity, the extent to which fishery selectivity is taken into account and the measures taken to protect separate stock components. For future reporting, it would be useful if these aspects could be addressed.

4. The NASCO Decision Structure for the Management of North Atlantic Salmon Fisheries requires that consideration be given to whether the stocks are threatened by factors other than fisheries (e.g. habitat degradation, diseases and parasites). Most FARs failed to address this issue in any detail, possibly because it was felt that this would be addressed in subsequent FARs but a brief overview of such factors would be valuable in subsequent fishery management FARs.

5. The Agreement on Adoption of a Precautionary Approach requires the assessment of the effectiveness of management actions in all salmon fisheries. While many of the FARs provided information on routine stock monitoring programmes, they generally failed to describe programmes to assess the effectiveness of their management measures. For future reporting, it would be useful if this aspect could be addressed.

Recommendations – Additional Actions

5.9 The Group agreed that the letters from the President to the Parties and jurisdictions should refer in summary form to both the general concerns identified above about the reporting and the specific recommendations for additional actions to ensure consistency with NASCO agreements and guidelines. For most Parties and jurisdictions the Group felt that additional actions would be required to ensure consistency with NASCO's agreements and guidelines. As stated above, the lack of information provided on the interplay between stock conservation needs and incorporation of socio-economic factors in decision-making, for both single and mixed-stock fisheries, hampered the Group's ability to assess consistency with NASCO's agreements. In particular, there were very few clear indications of how decisions were taken to permit exploitation of stocks known to be below their reference points, or where information on stock status was lacking, and the consequences of these decisions for stock rebuilding. The Group's recommendations on additional actions together with any correction of factual errors or misinterpretations received back from the Parties are listed below:

Canada: The Group recognises that Canada has introduced major changes to the management of its salmon fisheries with the closure of all its commercial fisheries, restrictions on the recreational fisheries and development of agreements on the First Nation's fisheries. The Group had some difficulty in reviewing the Canadian FAR because much of the data was contained in annexed fishery management plans rather than in the form of succinct overviews, and little information was provided on Quebec. As a result, although conservation limits are used for many Canadian stocks, it is unclear how they are used in making management decisions and what is done in areas where they are not available. Although, there is a policy for the operation of mixed stock fisheries in Labrador, the Group is concerned that they are being operated despite a lack of information to characterise the exploited stocks. This is not consistent with the NASCO agreements and guidelines and needs additional actions.

Denmark (in respect of the Faroe Islands and Greenland) – Greenland: Greenland has only one salmon river, the stocks exploited in the Greenland fishery originate in other countries and management measures for the fishery are agreed internationally within NASCO. The Group recognises that in response to the scientific advice and measures agreed by NASCO, major reductions in catches have been made by Greenland and for most of the last decade the harvest has been limited to that for internal use only. Efforts are also being made to improve catch reporting in this fishery. The internal use fishery is not restricted by NASCO quota, and the Group is concerned that Greenland does not have powers to control the harvest. This is not consistent with the NASCO agreements and guidelines and needs additional actions.

European Union – Denmark: The Group notes that the Atlantic salmon resource in Denmark is currently small as a result of significant habitat degradation in the past. Valuable efforts are now being made to rebuild the stocks through stocking and habitat restoration work, and a National Salmon Management Plan has been developed. While recovery targets have been set for all major rivers, the Group notes that these appear to be fairly arbitrary and there are no clear efforts to assess whether these levels are being attained. In addition, the Group is concerned that significant in-river fishing mortality is permitted to occur on some of these recovering stocks without any assessment of the associated risks. The Group also notes that there are unregulated fisheries operating in coastal waters which may take salmon from a number of rivers. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

The following is a summary of a response received from European Union – Denmark:

The target of 1,000 adult salmon referred to in the FAR is based on genetic conservation considerations with the aim of maintaining the genetic integrity of the wild stocks.

The sport fishery in the four most important wild salmon rivers is permitted because the number of salmon returning to each river exceeds the number required for spawning with the habitat currently available.

Catches (a few kilograms) of salmon in commercial fisheries in coastal waters are reported to NASCO. It is not known if the fisheries in coastal waters by recreational fishermen (who can use up to three gill nets) are harvesting Baltic or Atlantic salmon. If Atlantic salmon are harvested in these recreational fisheries there is no requirement to report them. However, it is illegal to harvest Atlantic salmon in the North Sea and associated fjords although this is known to occur and is assumed to be at a low level.

A major project commenced in 2008 to assess the number of wild spawners in the four most important wild salmon rivers with one river being studied each year using radio tagging. Efforts are also being made to identify the present spawning areas and to assess the contribution from naturally spawned and stocked salmon.

European Union – Finland: The Group notes that the two rivers in Finland with Atlantic salmon fisheries are both border rivers with Norway and that their management is largely through bilateral agreements. There are also significant challenges in managing salmon in the Teno where stock structure is very complex. The FAR indicates that the bilateral agreement with Norway has not been modified for a number of years, and the Group is concerned that, except for the tourist fishery, there is limited flexibility to respond to changes in the status of the stocks. Finland has indicated that it is developing conservation limits but the group is concerned that no timescale has been given; furthermore, in the absence of such reference points there should be a clear alternative approach as a basis for management decisions. These issues are of particular concern because some tributary populations have been classified as 'threatened'. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

European Union – Ireland: The Group congratulates Ireland on the major improvements in the management of their salmon fisheries in recent years. Consistent with the scientific advice, the coastal mixed-stock fishery was closed at the beginning of 2007, and exploitation is now restricted to estuary netting and angling on stocks that are above their conservation limits. These procedures fully comply with the NASCO agreements and guidelines.

European Union – UK (England and Wales): The Group notes that stocks in England and Wales are managed through the use of river specific Salmon Action Plans and that conservation limits and management targets have been established and applied for the majority of rivers. Significant progress has been made in phasing out mixed-stock fisheries. Thus, only three of the ten fisheries operating in coastal waters in the early 1990s remain today, one of which takes very few salmon, and information is available on the stocks exploited. However, the Group is concerned that while there is a clear policy to phase-out MSFs there is no timescale for when this will be achieved and no clear indication of the measures to be applied until this occurs. This issue is not consistent with the NASCO agreements and guidelines and needs additional actions.

European Union – UK (Northern Ireland): The Group recognises that the fisheries in the Foyle system have been managed using reference points for more than thirty years and there is a programme to establish conservation limits on other rivers. Significant reductions have been made to the mixed stock coastal fisheries and compensation has been offered to the remaining nets in the Fisheries Conservancy Board area, but the Group is concerned that uncertainty remains about the timescale for the closure of this fishery and the measures to be applied until this occurs. This issue is not consistent with the NASCO agreements and guidelines and needs additional actions.

European Union – UK (Scotland): The Group recognises that Scottish rivers produce a significant proportion of the wild salmon in the Southern North-East Atlantic region. In recent decades there have been very significant reductions in netting effort and increases in catch and release in rod fisheries. Initiatives are underway to develop conservation limits for 109 catchments by March 2009, but there is still some uncertainty about whether these will be adopted for management and what will be done for the remaining rivers. The FAR provides some information on a proposed method for using catch data to assess stock status in the absence of CLs, but the Group notes that it is unclear whether this approach is being used and whether it provides a reliable reference point for satisfactory stock status. A strategy is being developed for the management of mixed-stock fisheries, but at present there is no clear policy. The Group is concerned that these fisheries are still being operated despite a lack of information to characterise the exploited stocks. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

Iceland: The Group recognises that salmon fisheries in Iceland have been largely limited to angling, and coastal mixed-stock exploitation has been banned for decades. Effort in rod fisheries is limited and reporting of catches is believed to be very accurate. A programme for developing conservations limits is underway, but the Group is concerned about the lack of a clear timescale for their development. The Group also notes a lack of clarity about how stock status is currently being assessed and how management decisions are therefore being taken; for example, the reliability of using reductions in the sale of rod licences as a measure

of stock status is questionable. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

Norway: The Group notes that Norwegian rivers produce a significant proportion of the wild salmon in the Northern North-East Atlantic region. Due to declines in the stock status, Norway has implemented major reductions in fishing effort. The Finnish FAR indicates that management of the River Tana fisheries is through a bilateral agreement with Norway, but this agreement has not been modified for a number of years, and the Group notes that, except for the tourist fisheries, there is limited flexibility to respond to changes in the status of the stock. The Norwegian FAR indicates that conservation limits have been established for 181 rivers, representing approximately 90% of the riverine catches, and there is a programme for developing them for other rivers. In the absence of CLs, where stocks are being managed on the basis of catch statistics, it is unclear whether this approach provides a reliable basis for sound fishery management. Although the FAR includes guidelines for the management of mixed-stock fisheries, the Group is concerned that it is not clear how these are being applied in the management of coastal fisheries, particularly in the Finnmark Region. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

Russian Federation: The Group notes that all fisheries for salmon in the Russian Federation are licensed, and there are comprehensive controls on exploitation by means of TACs and quotas, which are applied to all removals. Quotas in mixed stock fisheries are being gradually reduced, and catch and release is widely employed in recreational rod fisheries. The Group notes that there is limited information on the status of stocks and fisheries in some Regions (e.g. Karelia) and considers that efforts should be made to address this so as to provide a more consistent basis for salmon fishery management throughout Russia. The Group is concerned that mixed-stock fisheries are being operated despite a lack of information to characterise the exploited stocks; there is therefore a need for a clearer policy and management approach for these fisheries. These issues are not consistent with the NASCO agreements and guidelines and need additional actions.

USA: The Group notes that returns to rivers in the US are very low and that eight salmon populations have been listed as endangered under the Endangered Species Act. In the context of fishery management, most directed salmon fisheries have been closed and fishing is only permitted on reconditioned broodstock in two rivers and in a small catch and release fishery in the Penobscot River. The FAR refers to an extensive evaluation of the risks of opening such a fishery and indicates that the management authorities had different views about whether to permit a spring fishery that would result in a potential mortality of up to four fish per year. Given the critically low status of this stock and the outcome of the risk evaluation, the Group is concerned that the decision to open this fishery appears inconsistent with the NASCO agreements and guidelines, though it is recognised that the likely mortality is extremely low.

6. Development of an overview highlighting best practice and challenges and approaches to addressing these changes in management of salmon fisheries.

6.1 The Council asked that the Review Group undertake a comparative overview of the fisheries management FARs highlighting best practice and challenges and approaches to addressing these challenges in the management of salmon fisheries. This overview is contained in document IP(08)24 (Annex 5). One of the purposes of developing and reviewing the FARs is to facilitate the exchange of information and transfer of knowledge on the management of salmon fisheries envisaged in the Strategic Approach for NASCO's 'Next Steps', CNL(05)49, and to facilitate an assessment of progress towards fairness and balance in the management of distant-water fisheries. The Review Group has structured this comparative overview around its Best Practice Guidance, IP(08)23. It has identified a range of approaches being used by jurisdictions to try to meet the challenges posed by each of the ten elements of the Best Practice Guidance. Although many of these examples are not fully consistent with the Best Practice Guidance, they all describe activities that are designed to address various aspects of NASCO's agreements and guidelines relating to salmon fisheries management.

6.2 The overview has highlighted the different approaches that are being used by jurisdictions in the management of salmon fisheries. These differences are to be expected given the different ownership of the fisheries, the nature of the fisheries and the extent of the resource. However, it is clear that considerable progress is being made in incorporating the internationally agreed principles in NASCO's various agreements but that some significant challenges remain to be addressed. In this regard, the next FARs on fisheries management will provide a good opportunity to assess progress in addressing these challenges.

7. Arrangements for the 2009 Special Session

7.1 The Group had an initial discussion on the structure and content of its presentation at the 2009 Special Session. It agreed that this should include a brief introduction describing the task, the way it had approached its work and the nature of its reviews highlighting the transparency of the process with NGO involvement. It would then summarise the best practice guidance, its recommendations for additional actions, and the overview of approaches to meeting management challenges. Finally, the Group would seek to highlight the lessons learned both for future fisheries management FARs and the work of Groups on other focus areas. The Group agreed that it would work by correspondence to finalise the arrangements for the presentation at the 2009 Special Session when further details of the time available at this session were confirmed.

8. Report of the Meeting

8.1 The Group agreed a report of its meeting.

9. Any other business

9.1 There was no other business.

10. Close of the Meeting

10.1 The Coordinator thanked all the members of the Group for their very valuable pioneering work in what was a central element in the 'Next Steps' for NASCO process.

Annex 1 of IP(08)19

List of Participants

Mr Hugh Campbell-Adamson	Association of Salmon Fishery Boards, UK
Dr Peter Hutchinson	NASCO Secretariat
Mr Ted Potter	CEFAS, UK
Ms Sue Scott	Atlantic Salmon Federation, Canada
Mr Oyvind Walso	Directorate for Nature Management, Norway
Dr Malcolm Windsor	NASCO Secretariat (Review Group Coordinator)
Mr Tim Young	Dept of Fisheries and Oceans, Canada

Annex 2 of IP(08)19

IP(08)22

Second Meeting of the Ad Hoc Review Group on Fisheries Management Focus Area Reports

Agenda

1. Opening of the Meeting by the Coordinator
2. Adoption of the Agenda
3. Review of the Terms of Reference and Consideration of Working Methods
4. Consideration of the elements of 'Best Practice' in management of salmon fisheries
5. Development of suggestions for additional actions to ensure consistency of fisheries management efforts with NASCO Agreements.
6. Development of an overview highlighting best practice and challenges and approaches to addressing these challenges in management of salmon fisheries.
7. Arrangements for the 2009 Special Session
8. Report of the Meeting
9. Any other business
10. Close of the Meeting

IP(08)23

Draft NASCO Guidance on Best Practice for the Management of Salmon Fisheries

1. Introduction

NASCO and its Parties have agreed to adopt and apply a Precautionary Approach to the conservation, management and exploitation of salmon in order to protect the resource and preserve the environments in which it lives. Accordingly, their objective for the management of salmon fisheries is to promote the diversity and abundance of salmon stocks, and in support of this, they have developed the following guidelines and agreements:

- The Agreement on Adoption of a Precautionary Approach, CNL(98)46;
- The Decision Structure to Aid the Council and Commissions of NASCO and the relevant authorities in Implementing the Precautionary Approach to Management of North Atlantic Salmon Fisheries, CNL31.332
- The Minimum Standard for Catch Statistics, CNL(93)51.

A summary of the main elements of these documents is contained in Annex 1. NASCO has also agreed 'Guiding Definitions of Terms used in Salmon Fisheries Management', SCPA(00)11, which are contained in Annex 2. NASCO has also developed the following guidelines which are also relevant to the management of salmon fisheries:

- Guidelines for Incorporating Social and Economic Factors in Decisions Under the Precautionary Approach, CNL (04)57)
- Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks, CNL(04)55)

Best practice is defined here as a method, process or activity that is most effective at delivering a particular outcome based on repeatable procedures that have proven themselves over time. This document describes best practice for the implementation of the agreements and guidelines above as they relate to the management of salmon fisheries. The intention in developing this guidance is: to assist the jurisdictions in making further progress in implementing these agreements and guidelines; to provide a basis for and an exchange of information on more consistent approaches to the management of fisheries around the North Atlantic; and to assist in the identification of what additional actions may be required. NASCO is also seeking to improve fairness and balance in the management of homewater and distant-water fisheries.

2. Areas of 'Best Practice'

It is recognised that the size of salmon stocks, the management responsibilities and approaches, and the resources available for fishery management vary considerably among

countries. The mixed-stock distant-water salmon fisheries at West Greenland and the Faroes are subject to regulatory measures or decisions agreed within NASCO, but NASCO is not, and cannot be, prescriptive about the specific approaches that are used to manage homewater salmon fisheries. Nonetheless, the following elements of the agreements and guidelines, should be being applied in all countries in order to protect the abundance and diversity of salmon stocks, or there should be a clear timescale for introducing them.

2.1 Decision making process

a. Central to the application of a Precautionary Approach is the need to formulate pre-agreed management actions in the form of procedures to be applied over a range of stock conditions. There should, therefore, be clear descriptions available to all stakeholders of the process by which management decisions will be taken together with an indication of the types of decisions that might be expected under different stock conditions; these could take the form of a flow diagram or decision structure.

2.2 Description of the fisheries and the stocks exploited

a. A range of information should be collected on a routine basis through reporting and monitoring programmes, time series should be maintained, and reports should be published. This information should be collected for recreational, commercial, subsistence and scientific fisheries and include:
    - records of fishing activity (e.g. licence numbers, gear type, effort, location and timing);
    - catch statistics (e.g. number, size, age and origin of fish caught (both retained and released)); and
    - estimates of the level of unreported catches and other mortalities associated with the fishery.
b. Information should be sought on the by-catch of salmon in fisheries for other species and efforts made to identify their river of origin.

2.3 Powers to control exploitation

a. Managers should have the capability to regulate fishing effort and/or harvests through controls on the numbers of fish caught or the amount and type of fishing gear used so as to maintain the abundance and diversity of all river stocks;
b. These powers should allow managers to respond with sufficient speed to changes in individual stock status; furthermore, it would be desirable to be able to adjust harvest levels or fishing effort in-season to take account of actual run sizes or environmental conditions;
c. Managers should also have sufficient powers to enforce the measures that are in place to regulate fishing activity and to minimise the level of unreported catches.

2.4 Reference points (conservation limits or other measures of abundance and diversity)

a. Conservation limits (CLs) should be established to define adequate levels of abundance for all river stocks of salmon; these should be established for separate sea age components (i.e. one-sea-winter (1SW) and multi-sea-winter (MSW) salmon);

b. Ideally, these river specific CLs should be established based on data derived from each river;
c. For many river systems, however, information on the stock will be limited, in which case the CLs should be set on the basis of information derived from other rivers;
d. Where CLs have not been established, alternative measures should be used as reference points and should be shown to be effective in defining adequate stock levels;
e. Management targets (MTs) should also be established to assist fishery management such that there is a low risk of stock abundance falling below the CL, or alternative reference point; this risk level should be defined by managers;
f. Information should also be collected on the diversity of stocks (e.g. run-timing, age, size etc) to provide a basis for management.

2.5 Achievement of the reference points or other measures of abundance and diversity

a. It should be normal practice to evaluate the extent to which stock levels have met the management objectives with regard to stock abundance and diversity each year;
b. Ideally, stock levels should also be forecast for one or more years ahead to provide some predictions of future expected achievement of management objectives under current (or modified) management measures;
c. Assessments of stock abundance and diversity based on catches involve considerable uncertainty, so other sources of information should be used to confirm the status of stocks (e.g. juvenile surveys, counter and trap data); the management measures introduced should take into account the uncertainties in the data used;
d. Assessing the status of the stock and determining the need for management action should take account of the duration and degree of any failure to achieve the reference point, and the trend in stock abundance.
e. Where there is insufficient information on any failure to achieve the reference point, further research should be undertaken to understand the reason for the failure.

2.6 Other factors influencing the stock(s)

a. While the short-term response to a stock failing to exceed its reference point may be to reduce or eliminate exploitation in salmon fisheries, other factors may be driving abundance, and actions should also be taken to identify and address these problems.

2.7 Management actions to control harvest

a. In managing salmon fisheries, priority should be given to conserving the productive capacity of all individual salmon river stocks;
b. Managers should demonstrate that they are being more cautious when information is uncertain, unreliable or inadequate, and the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures;
c. Ideally, forecasts of stock abundance for all stocks contributing to the fishery would be used to determine the harvestable surplus or appropriate level of fishing effort, with in-season adjustments being made to reflect actual returns;

d. Where forecasts of abundance are not available, harvest levels could be based on historical data to assess if there is likely to be a harvestable surplus;
e. In certain circumstances fishing on a stock below its reference point may be acceptable if closure of the fishery would have undesirable social or economic impacts or have other adverse consequences for the management of the resource. However, in such cases, fishing should clearly be limited to a level that will still permit stock recovery.

2.8 Mixed-stock fisheries (MSFs)

In addition to the guidance in 2.7, the following actions should apply to MSFs:

a. NASCO has defined MSFs as fisheries exploiting a significant number of salmon from two or more river stocks; ICES has advised that these fisheries present particular threats to stock status and that they predominantly operate in coastal areas; particular caution should, therefore, be applied in managing salmon fisheries operating outside defined estuary limits;
b. Rational management of a MSF requires knowledge of the status of each stock that contributes to the fishery; where such fisheries operate managers should have a clear policy for their management that takes account of the additional risks associated with them;
c. Management actions should aim to protect the weakest of the contributing stocks; in this context NASCO has agreed that homewater fisheries should be based on the status of individual river stocks and distant water fisheries on the status of the stock complexes defined by managers.

2.9 Socio-economic factors

a. Conservation of the salmon resource should take precedence, and transparent policies and processes should be in place to take account of socio-economic factors in making management decisions and for consulting stakeholders.

2.10 Effectiveness of management measures

a. The expected extent of the effects of management actions and the expected timescale in which they will occur should be determined so as to facilitate assessment of the effectiveness of the measures.

Annex 1 of IP(08)23

Summary of NASCO's Agreements in Relation to Management of Salmon Fisheries

Agreement on Adoption of the Precautionary Approach

The Agreement on Adoption of the Precautionary Approach states that an objective for the management of salmon fisheries for NASCO and its Parties is to promote the diversity and abundance of salmon stocks and that for this purpose, management measures, taking account of uncertainty, should be aimed at maintaining all stocks above their conservation limit taking into account the best available information, socio-economic factors and other factors identified in Article 9 of the Convention. It states that salmon fishery management requires at least the following:

- That stocks be maintained above their conservation limit by the use of management targets;
- That conservation limits and management targets be set for each river and combined as appropriate for the management of different stock groupings developed by managers;
- The prior identification of undesirable outcomes including biological and socio-economic factors;
- That account be taken at each stage of the risks of not achieving the fisheries management objectives by considering uncertainty in the current state of the stocks, in biological reference points and fishery management capabilities;
- The formulation of pre-agreed management actions in the form of procedures to be applied over a range of stock conditions;
- Assessment of the effectiveness of management actions in all salmon fisheries
- Stock rebuilding programmes to be developed for stocks that are below their conservation limits.

Thus it is a requirement of this Agreement that conservation limits (CLs) and management targets (MTs) be set for each river. NASCO has defined the CL as the undesirable spawning stock level at which recruitment would decline significantly. It is currently defined by both NASCO and ICES as the number of spawners that will achieve long-term average maximum sustainable yield (MSY). The MT is the stock level employed by managers in order to achieve the objective of exceeding the conservation limit for the desired proportion of years taking into account uncertainties in the data.

With regard to stock rebuilding programmes (SRPs) the Council has developed guidance on the process of establishing SRPs, what such plans might contain, and providing a link between the various guidance documents developed by NASCO in relation to management of fisheries, habitat protection and restoration and aquaculture and related activities.

Decision Structure

The Decision Structure was developed by the Council to assist with application of the Precautionary Approach to the management of salmon fisheries and to provide a basis for more consistent approaches to the management of exploitation throughout the North Atlantic. It incorporates many of the elements contained in the Agreement on the Adoption of the Precautionary Approach described above although it indicates that alternative measures of abundance to reference points (CLs and MTs) could be used to define adequate stock abundance. It outlines a management procedure for both single and mixed stock fisheries (MSFs) as follows:

- Describe the fishery;
- Specify the reference points (conservation limit and/or management target) or alternative measures used to define adequate abundance;
- Describe stock status relative to the measure of abundance;
- Assess if the stock(s) is (are) meeting other diversity criteria;
- Assess if the stock(s) is (are) threatened by factors other than fisheries;
- Describe the management actions to control harvest including measures to address any failure or trend in abundance and diversity taking into account pre-agreed procedures;
- Provide an outline of the measures to monitor the effect of management measures, identify any information deficiencies and a timeframe for resolution.

While the Decision Structure is not prescriptive it does provide a framework for the management of salmon fisheries that is intended to be used widely by managers with the intention that management decisions are taken in accordance with an assessment of risk, such that, in the face of uncertainty, there is a low risk to abundance and diversity of the stock.

Minimum Standard for Catch Statistics

The Minimum Standard for Catch Statistics recommends *inter alia* that: catch statistics should include catches from all components of the salmon fisheries where these are retained and that measures to assess unreported catches and to reduce their level should be encouraged.

SCPA(00)11

Guiding Definitions of Terms Used in Salmon Fisheries Management

Distant water fisheries: Fisheries in areas outside the jurisdiction of the country of origin. With respect to the NASCO Convention this specifically refers to fisheries under the jurisdiction of the Faroe Islands and Greenland.

Homewater fisheries: Fisheries within the jurisdiction of the countries of origin (within 12 miles).

Population: A group of salmon, members of which breed freely with each other, but not with others outside the group. The smallest group that can be usefully managed.

Stock: A management unit comprising one or more salmon populations. This would be established by managers, in part, for the purpose of regulating fisheries. (The term may be used to describe those salmon either originating from or occurring in a particular area. Thus, for example, salmon from separate rivers are referred to as "river stocks" and salmon occurring at West Greenland may be referred to as the "West Greenland stock").

Mixed stock fishery: A fishery exploiting a significant number of salmon from two or more river stocks.

Conservation: The process of ensuring that the abundance of salmon in a stock is maintained at or above a satisfactory level (i.e. above the conservation limit with an agreed probability) and that natural diversity is maintained.

Conservation Limits (CL): CLs demarcate the undesirable spawning stock level at which recruitment would begin to decline significantly. The level cannot be used in management without also defining the acceptable probability (e.g. proportion of years) when the stock may be permitted to fall below the CL.

Currently NASCO and ICES define the CL as the spawning stock level that produces maximum sustainable yield. Formerly referred to as Minimum Biologically Acceptable Level (MBAL) or a Spawning Target.

Management Target (MT): The MT is the stock level employed by managers/scientists to aim at in order to achieve the objective of exceeding the CL for the desired proportion of years and for achieving other management objectives. The MT will therefore be greater than the CL with the margin between them at least reflecting the risks, decided by managers, of stocks falling below the CL.

Stock Rebuilding Programme (SRP): An SRP is an array of management measures, including possibly habitat improvement, exploitation control and stocking, designed to restore a stock above its conservation limit. An SRP could be a part of setting routine management plans.

IP(08)16

Answers to the issues raised with, and questions for, the Parties and relevant jurisdictions

Canada

Reference points:

The Gulf Region Integrated Management Plan indicates that the present conservation limits will be retained until such time as more 'finite stock-specific conservation level criteria become available'. The report indicates that these will be developed nationally. What is the timescale for development of these criteria?

Conservation limits or reference points have been defined. All are subject to review and updates as more information becomes available. There are no set deadlines for this to take place.

Stock status and abundance criteria:

The report indicates that there are about 900 salmon rivers and that about 70 of these rivers are assessed scientifically. This is a comprehensive monitoring programme, but almost half of these assessed rivers are in Quebec while in Labrador, where there is a mixed stock fishery, four rivers are monitored. Will the monitored sites in Labrador be maintained and are there plans to expand this monitoring in future?

The focus area report does not include details on how many stocks will be assessed in the future. The objective would be to have as many rivers as possible assessed but environmental conditions (i.e. high water, remoteness), fisheries management priorities, and resources all affect which rivers are actually assessed in any year. On a large number of other rivers, indicators or proxies of stock status are collected such as juvenile abundance as an index of recent stock status. These indicators are generally not presented in the ICES report of adult returns and spawners but are used in regional assessments of stock status.

Mixed stock fisheries:

The report refers to the introduction of measures, including prohibition of larger mesh nets, in 2006, to reduce the catch of large salmon in coastal areas of Labrador. The report indicates that the effectiveness of these measures will be evaluated and adjustments made if further reductions are warranted. What efforts are being made to determine the origin of the fish harvested in this fishery and what information is available on the effectiveness of the measures based on the evaluation of the fishery to date?

Sampling of the catches of the Labrador fishery is coordinated by the aboriginal groups and the Nunatsivut government. Scale samples and biological characteristics data are provided to for analysis. Based on river age of the harvests, it can be concluded that few to no fish from the southern areas are harvested in this fishery (no age one year old smolts, few to no age two year old smolts). When the genetic stock identification capabilities are more refined, it would be possible to confirm the river origin of these samples. For now, based on where the fisheries occur, the interception of non-Labrador origin salmon is expected to be very low.

Management actions:

The report indicates that Canada's First Nations fisheries will continue to be subject to annual agreements. Are there any such fisheries exploiting stocks below conservation limits and, if so, what factors were taken into account in allowing a harvest?

The right to fish for food, social, and ceremonial purposes by aboriginal peoples is protected under the Constitution of Canada. This aboriginal right can only be infringed upon by conservation concerns. Social and economic considerations are taken into account in fisheries management decisions. In some areas, aboriginal and recreational fisheries are allowed even when stocks are below the conservation levels. In these cases, consideration is made for the overall size of the river, the size of the fisheries relative to the size of the resource, the ability to manage the fisheries in an orderly manner. For example:

- *Both aboriginal and recreational fisheries have taken place on the Miramichi River despite the stock being intermittently below conservation. The proportion of the stock removed by these fisheries depends on how far below conservation the resource is, and the importance of these fisheries to the local communities. These are taken into consideration when making fisheries management decisions.*

- *In other cases where stocks are small and the fisheries can be comparatively large or difficult to manage, the rivers are closed to all fishing (e.g. the southeast rivers of New Brunswick Gulf Region).*

- *In yet other cases, the aboriginal communities have agreed not to fish but have agreed to permit a catch and release only recreational fishery because of the social and economic value of the recreational fishery in the area. (Recall aboriginal people have priority over recreational fisheries.) This despite the incidental loss of fish which can occur in catch and release fisheries and the stock being consistently below conservation (eastern Cape Breton Island in Nova Scotia).*

The report refers to a Recovery Potential Assessment that is being undertaken for the Bay of Fundy stocks which are of special concern and protected by the Species at Risk Act. What is the timescale for completion of this assessment?

Stocks from the Inner Bay of Fundy are of special concern. Severe management measures have been implemented. A report on the Recovery Potential Assessment to address recovery planning is currently being finalized. The report, previously expected this summer, will now

be available later this year. Updates on progress will be reported through the Implementation Plan process.

The report contains as annexes the management plans for Newfoundland and Labrador, Maritimes and the Gulf Region. There is no plan for Quebec. Does such a plan exist and can its key elements be summarised?

A management plan was established by Quebec and submitted for consultation. This plan has been used since 2000 and will be updated later in 2008. It will then be officially adopted. The key elements of the plan are: no commercial fishery, the river conservation limits must be met before a recreational fishery is permitted. If permitted, restrictive measures are imposed, a licence is required to capture a maximum of 7 salmon, and catch registration is mandatory within 48 hours. In-season adjustments are made if required.

Socio-economic factors:

The Group is aware of a survey of recreational fishing in Canada conducted in 2005 and released in 2007. It is understood that the information on salmon fishing is not presented separately from other species. When will the information relating to salmon fishing contained in this report be made available?

The Survey of Recreational Fishing in Canada 2005 was released in August 2007. Information from the Survey is available for Atlantic salmon and was provided at NASCO's annual meeting and to the working group on socio-economics. This information can be used as a means to measure the socio-economic importance of the Atlantic salmon recreational fishery.

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

Management actions:

The report refers only to the management of the current subsistence fishery. In the event that stock abundance improves and a commercial quota is allocated, how would such a fishery be managed?

The salmon fishery is regulated according to The Greenland Home Rule Executive Order no. 21 of August 10, 2002. In case the stock abundance is improved and a commercial quota is to be set this Executive Order will also be the foundation of the salmon management in Greenland.
Management measures regulating the exploitation of salmon include a quota system, which would replace the present subsistence fishery. If a quota system is chosen the Greenland Home Rule every year would agree upon a TAC for the Greenlandic salmon fishery. The fishermen would be allowed to fish the TAC in the fishing period also decided by the Greenland Home Rule and KNAPK. Greenlandic fishing plant would be allowed to buy salmon catches and export salmon for foreign markets. It is likely those fishermen who already hold a license for salmon fishery would be first in line to receive a license for commercial fishery in case there have to be some kind of restriction on the commercial salmon fishery. Alternatively all commercial fishermen in Greenland would be entitled to apply for a license for salmon fishery.

It is reported that there is a discrepancy between the number of licences issued and the number of licences for which catch returns are made. What is known about the cause of this discrepancy?

The standard procedure of reporting in the coastal fishery is that the fish plant reports on behalf of the individual fishermen who in this way avoid too much paper work. Because the subsistence fishery in Greenland is characterized by not allowing any landings by fish plants, the individual fishermen have to report their catches themselves. This task has not been broadly recognised and the information to the fishermen about the consequence of the lack of the standard reporting procedure has not been sufficient. As described above licensed salmon fishermen today is likely to have a "first right" for a license if a commercial quota is allocated. That is believed also to generate fishermen applying for a license just to maintain their rights if a commercial quota were to be set. This also cause the discrepancy. The conclusion is that it is likely not all catch returns are received because of changes in the usual reporting system and that there is issued more licenses than it is likely to be used.

The Review Group is aware that catches in the subsistence fishery have been increasing in recent years. The report indicates that a publicity campaign was instigated in 2006 and 2007 to improve catch reporting rates. What information is available on the success of this campaign in improving reporting of the catches in the subsistence fishery?

Licenses issued compared to "active licences" and received catch reports frequency is illustrated in the diagram below.

Year	*Catch reports*	*Licences*	*Used licences*	*Percentage of used licences*
2005	*144*	*185*	*29*	*16.0 %*
2006	*234*	*165*	*51*	*30.9 %*
2007	*226*	*261*	*105*	*40.2 %*

Further to the efforts in the recent years, table 2 in the revised FAR indicates that the number of reports received has reached a 10 year peak. There is identified a considerable change in return of catch reports in 2006 when the information campaign begun.

European Union – Denmark

Reference points:

It is noted that a target of at least 1,000 spawners annually has been set for each of four rivers. What is the basis for this target and what reference criteria are used for the management of other stocks?

Based on river areas (i.e. spawning and grow-up areas for salmon fry and parr) it has been estimated (i.e. smolt production and mortalities) that the eight rivers running to the North

Sea in the course of time could have an annual spawning run of 15,000 to 20,000 spawners. In the river Gudenå going to the Kattegat in future, a potential annual spawning run is estimated to be 4,000 – 5,000 spawners (like the potential production in river Skjern Å). Present efforts to restore salmon stocks is concentrated in the four rivers still with wild fish spawning stocks. A spawning run of at least 1,000 spawners in each of the four rivers is set as a minimum success criterion.

Diversity criteria:

No information is available on the diversity of Danish salmon stocks. What efforts are being made to obtain such information and take account of this in the management of fisheries?

*The four wild salmon stocks have been genetically analyzed (1: **Nielsen, E.E.**, Hansen, M.M. & Loeschcke, V. (1996). Genetic structure of European populations of Atlantic salmon (Salmo salar L.) inferred from RFLP analysis of PCR amplified mitochondrial DNA. Heredity, **77**, 351-358 and 2: **Nielsen, E.E.**, Hansen, M.M. & Loeschcke, V. (1997). Analysis of microsatellite DNA from old scale samples of Atlantic salmon: A comparison of genetic composition over sixty years. Molecular Ecology, **6**, 487-492) and the four stocks are kept separated during the stocking programme with parr.*

Mixed stock fisheries:

The report identifies mixed stock recreational fisheries operating in Danish coastal waters but provides no information on the contributing stocks. What information is available on the effects of these fisheries on individual stocks and how is this taken into account in the management of the fisheries?

In Denmark there is no information about recreational (anglers and non-professional fishermen) fisheries and catches in coastal waters. Therefore, we have no information about the numbers caught but we think it is not a major problem.

Management actions:

The report refers to recreational fisheries in fresh water. What approach is used to control harvests in these fisheries, what account is taken of socio-economic factors and what is the proposed timescale for achieving the recovery targets?

Recreational fisheries in fresh water are only angling. In two of the rivers (wild salmon) caught salmon are released and in the other two rivers (wild salmon) limits are set for numbers taken so the rest of the caught salmon are released. Socio-economic factors are at present not considered, but a new project about the value of recreational fisheries in fresh water will be started in year 2008.

European Union – Finland

Reference points:

The Review Group recognises that progress is being made with the development of conservation limits. What is the timescale for establishing these and for utilising them in management in the rivers Teno and Naatamo?

Preparations of the matter have been started, but we need a lot more background information before we could consider the possibility to base the regulation on establishing conservation limits and their utilisation. At the moment it is impossible to predict the timescale in which the matter will proceed. A joint Finnish-Norwegian expert group is planned to be established in 2008 that will start preparations for establishment of CL's and a management plan based on these.

Stock status and abundance criteria:

Concerns are raised about the abundance of MSW salmon from the upper tributaries and despite increasing effort in the recreational fisheries, catches in the last three years are among the lowest in the time-series. Given this information on abundance how is rod catch data being used to inform management of the fishery?

Each year comprehensive information on the stock status is taken as the starting point for considering the regulatory measures for fisheries. However, currently only tourist angling can be regulated on an annual basis and the share of rod fishing of the total catch of the Teno salmon is roughly 10% when fishing on the Norwegian coast is also taken into account.

Mixed stock fisheries:

The report refers to net fisheries along the Norwegian coast. What actions have been taken to seek cooperation with Norway in the management of this mixed stock fishery?

In 2008 a research project was launched concerning the collection of samples of the Norwegian coastal net catches, aiming at assigning the origin of the salmon in these fisheries. Finland is strongly involved in this research project.

Management actions:

The report indicates that while the management system for the majority of the fisheries is based upon a bilateral agreement dating from 1989 and is relatively inflexible, tourist angling is controlled in each country with regulations amended on an annual basis. What measures have been introduced or are planned to limit the tourist angling harvest, and is controlling this fishery alone sufficient to ensure conservation of the stocks?

Because the agreement allows annual negotiations on tourist fishing only, from time to time heavy pressure is directed to the regulation of this fishery, although its share in the total catches of salmon of the river Teno is small. Controlling this fishery is not alone sufficient for

ensuring conservation of the salmon stock complex of the Teno. Regulations concerning tourist fishing are negotiated on an annual basis between the relevant regional authorities in Finland and Norway and the need for restrictions is also negotiated in these discussions. Information produced by the Finnish Game and Fisheries Research Institute on the status of the salmon stock in the river Teno constitutes the basic data for negotiations on the restrictions.

The agreement between Finland and Norway concerning the organisation of fishing in the river Teno applies to all river fishing relating to salmon in the river Teno. Apart from tourist fishing the other types of fishing are regulated as well. However, the agreement allows an annual review of only the tourist fishing. This means that the regulation of tourist fishing involves more flexibility than that of other types of fishing.

European Union – Ireland

Stock status and abundance criteria:

The Review Group notes that management is based strictly on harvesting only the surplus above the conservation limits. What efforts are made to validate the status of the stocks using other measures of abundance such as juvenile surveys, etc?

The main thrust of the assessment is based either on direct counts (counters or traps) or extrapolation from rod exploitation rates. In many instances backup information is available from electro-fishing carried out by the RFBs and CFB. Since 2006 the advice of the SSC has been that at least two of the following should be available for assessments

From SSC report 2008

- *Redd count surveys as indices of total stock*
- *Juvenile assessment surveys as indices of total stock*
- *Survey draft netting and mark recapture assessments*
- *Installation of counters including both main stems and tributaries.*
- *Operate any existing traps to obtain stock indices at least in 2007 while other surveys are being developed*
- *Use of rod catch data if a catch and release fishery is allowed on these rivers*

Significant progress towards meeting this objective was made in 2007. Specific indices of the status of stocks are being developed currently. The SSC report for 2008 includes information on catchment wide electro-fishing on 30 Irish rivers which will be used as a validation of stock status in coming years. These indices will take a number of years to establish the relationship between juvenile production and subsequent adult returns. In the short term, however, direct comparisons of the juvenile densities of rivers which have been assessed to be meeting Conservation Limits and those failing to do so may provide a relative index for rivers without any other assessment capability. There was generally good agreement between the scientific forecast of attainment of salmon Conservation Limit in 2008 from rod catch or counter data undertaken by the Standing Scientific Committee and the results of the

catchment-wide electro-fishing surveys. However, while some discrepancies can be explained, there is still a significant amount of survey and research work to be carried out to develop the electro-fishing index fully.

Diversity criteria:

The report states that in many instances assessments are made for 1SW and MSW stocks separately. How are these assessments used in establishing the harvestable surplus for the fishery?

Conservation limits are established for all Irish rivers on the basis of transporting stock and recruitment parameters from rivers with stocks and recruitment relationships to rivers without time series of stock and recruitment data using a Bayesian Hierarchical Stock and Recruitment Analysis. The output from this is the Maximum Sustainable Yield in eggs for each river. This is subsequently converted to adult spawner requirements for the purposes of providing management advice.

In a number of rivers the Conservation Limit will be achieved by the contributions of both 1SW (grilse) and MSW (spring fish). There is conservation of biodiversity and fisheries development value in identifying and protecting both life history types. It is important for the fishery manager to be able to determine how much of the Conservation Limit is likely to be met by either MSW or 1SW fish and to regulate fisheries for both components separately.

Separate Conservation limits have been derived for 1SW and 2SW stocks in all rivers based on the observed proportions of each age group returning annually or where the proportion is unknown, based on the national estimate of approximately 7 to 10% MSW (grilse stocks predominate in Irish salmon populations). Sex ratios are assumed to be 60:40 female:male for grilse and 85:15 for MSW fish (based on observation in broodstocks and other sources). Egg deposition is assumed to be 3,400 per female 1SW and 8,000 per female 2SW (again from observations in broodstocks and wild stocks). Provided the average returns to the river can be apportioned into numbers of "spring" salmon (i.e. those returning early in the year and generally large MSW salmon) and grilse or 1SW salmon then the returns can be evaluated against the age specific CL in a risk analysis and the catch option which allows a 75% chance of meeting CL is generated for each age group separately. It should be noted that separate harvest options are only provided for 17 rivers where the numbers of MSW salmon are high enough to warrant separate management advice or where there is a clearly defined and separate spring salmon fishery.

Management actions:

The report indicates that the Department of Communications, Energy and Natural Resources is advised of any measures that may be required for the management of stocks by the Regional Fisheries Boards (RFBs). What are the obligations on the RFBs to seek implementation of management measures in line with national policy?
The Fisheries Boards are agencies of the State charged with responsibility for the management, protection, conservation and development of the inland fisheries resource

including salmon stocks. They are enabled in this regard by primary and secondary legislation in which they are identified as the statutorily responsible authority.

Socio-economic factors:

The report refers to a hardship scheme which was introduced for the fishermen affected by the decision to move to single stock salmon fishing only. Does this scheme have any implications for the level of fishing permitted in the fishery?

The Government decision to restrict the level of fishing to the stocks of those rivers meeting their conservation limits significantly restricted fishing permitted at sea. Recognising the impact that this would have, the hardship scheme was established for commercial fishermen and others severely affected by the curtailment of the wild salmon fishery. The scheme does not, therefore, have any implications for the level of fishing permitted in the fishery. To obtain payment from the scheme, fishermen gave an undertaking not to apply for commercial salmon fishing licences in the future.

The Review Group notes that since the closure of the mixed stock fishery, the bulk of the salmon harvested in 2007 was taken by the recreational sector. Reference is made to a direction from the Minister that there should be a re-balancing of the allocation of salmon quotas. What socio-economic and other factors will be considered in this re-balancing and will any reallocation to commercial fisheries be only to fisheries in estuaries rather than those in the ocean?

Any rebalancing between the recreational and commercial harvest would be within the surplus specified as available for exploitation in each river. The distribution of the quota for each river is determined by the Chief Executive Officer of the Regional Fisheries Board concerned following consultation with the fishery district committee, which comprises recreational and commercial fishing representatives. Decisions will be made based on historical catch, prospects for limiting the method of harvest to single stocks and other relevant local considerations. Exploitation will continue to be limited to single stocks meeting their conservation limits.

European Union – UK (England and Wales)

Mixed stock fisheries:

The Review Group notes that the Precautionary Approach principle was adopted to phase out some mixed stock fisheries. Is this same approach being applied to the management of the remaining mixed stock fisheries?

The remaining mixed stock fisheries operate in areas where information is available on the stocks being exploited. Nevertheless, additional research is being undertaken to develop genetic stock identification techniques to improve this information. The fisheries will be managed, taking account of social-economic factors and other constraints outlined elsewhere in the FAR, to ensure that the stocks being exploited are meeting their conservation limits or, where this is not the case, the fishery is not significantly prejudicing other efforts to ensure that this objective is achieved within a reasonable timescale. This is consistent with the

principles of NASCO's agreements on the application of the Precautionary Approach and use of the Decision Structure.

The report indicates that 'pragmatic decisions' had to be made to define the boundaries between coastal mixed stock fisheries and estuary fisheries. What criteria are used to make these decisions?

The FAR indicates that a pragmatic decision was made to define the boundary between the coastal mixed stock fisheries and estuary fisheries in two large estuary systems in England and Wales, the Severn estuary and the Solway Firth.
Because of the highly complex nature of the fisheries in the Severn Estuary, including heritage fisheries and fisheries with private rights, it was decided to develop a specific Salmon Action Plan for the whole estuary. This plan acknowledges that any of the fisheries in the estuary might, to differing extents, be regarded as mixed stock fisheries and therefore proposes appropriate management measures in each case. The general approach has been: closure of the drift net fisheries and some of those fisheries that have not operated in recent years; to reduce or cap fishing effort in other fisheries; and to plan a detailed evaluation of the mixed stock issues in the light of other management considerations.

The Solway Firth marks the border between England and Scotland. There are two principal salmon rivers (the Border Esk and Eden) entering the Solway which are totally or partly in England, but there is no obvious boundary between the estuaries (or common estuary) of these rivers and the coastal waters within the Solway. In English waters, a single fishery operates in the estuary/ies of these rivers employing haaf nets (see FAR Annex). The means of operation of these nets, the upstream extent of their use and the topography of the area led managers to conclude that this should be regarded as an estuarine fishery. In 2008, the seaward extent of the fishing was reduced in order that catches would be further limited to fish originating from these rivers. Fishing effort in the area is managed with the aim of ensuring the restoration of the weakest stock. Genetic stock identification is being developed for salmon stocks in UK and should aid the management of the fisheries in this area.

Management actions:

The Review Group notes that management plans are developed for the 64 'principal salmon rivers' and the Severn estuary. What is the approach to managing any salmon stocks in the remaining rivers?

The 64 'principal' salmon rivers are subject to a Ministerial Direction and their status must be reported on annually. There are a further 13 rivers shown in the FAR (Figure 1) that do not have SAPs. These generally have no catch or a very small catch (<15) of salmon and also have a significantly greater (more than 5 times) catch of sea trout. None of these rivers supports a net fishery, and the rod fisheries are managed principally to address the status of the sea trout stocks, although salmon catches are also taken into account. Other rivers lost their salmon stocks many decades ago and are in the very earliest stages of recovery; CLs are likely to be developed for these and management actions to improve salmon stocks will be included in Water Framework Directive programmes of measures as the recovery progresses.

The report includes a flow diagram indicating how the need for fishing controls is evaluated. When options are identified, how is a particular option selected and subsequently implemented?

The procedures for reviewing and selecting management options are as follows:

- *identify level of control required to meet conservation need over an appropriate timescale;*
- *assess regulatory options to achieve this;*
- *propose option(s) that best account for social and economic aspects;*
- *consult affected/interested parties informally and formally; and*
- *seek Ministerial confirmation for refined proposal.*

Timescales:

The report notes that there is a 5-10 year cycle for reviewing fishery regulations. Is there an ability to respond more rapidly to unexpected changes in stock abundance or diversity?

Management is largely by effort regulation and these regulations normally apply for a period of 5-10 years because it is difficult to assess the effectiveness of the measures over any shorter period and more frequent change is disruptive and more complex to manage. Nevertheless, the status of stocks is reviewed annually and if major new problems arise or there is an unexpected major change in the status of a stock, the authorities may review the existing byelaws or bring in new byelaws, which will take effect as soon as they are approved.

Although the mechanisms for reducing the permitted number of licences in a net fishery protects the rights of existing licence holders to continue to receive a licence, this could be superseded by a byelaw to introduce more rapid change or to close the fishery if there was clear evidence that the stock was in a particularly serious state. However, such approaches may not be used to bypass the protection afforded to licensees under normal circumstances. Provisions being proposed in new legislation would provide emergency byelaw making powers, avoiding delays for consultation. They also propose to adjust the balance between fish stock conservation and protection of licensees to more strongly favour the former.

European Union – UK (Northern Ireland)

Reference points:

The report indicates that conservation limits have been established for a number of rivers. What is the timescale for developing conservation limits on the other rivers and how is the status of these stocks currently being assessed?

The setting of conservation limits and the provision of tools to monitor compliance with them has been developed for each bio-geographical area and currently provides for stock status assessment at catchment/ river basin level.

There is a rolling programme to expand CL setting and the monitoring network to cover more key river/tributaries within main catchments to provide management information at even finer scale. This programme is reflected in the UK-NI IP. Adult salmon counting facilities are now in place on 13 of the 27 main salmon rivers in NI.

The development and refinement of methodology to assess stock size, and thus compliance with CL's, in rivers/tributaries without counting facilities using angling catch data is underway. A carcass tagging scheme provides robust catch data to facilitate this. Extensive catchment wide electric fishing surveys are conducted annually on a range of rivers in NI. The potential utilisation of juvenile indices to further develop conservation limits and assess stock status is being investigated.

Diversity criteria:

While the report indicates that there is a small component of MSW salmon in the stocks it does not indicate how this influences fishery management. How are the fisheries managed to ensure the conservation of this stock component?

The importance of conserving the small MSW component in the NI stock is recognised. Whilst CL's are not set specifically for this component, management measures to conserve MSW fish are introduced. These currently include mandatory catch and release of all fish caught by rod in the FCB area before 1 June, and a daily bag limit of 1 rod caught salmon before 1 June in the Loughs Agency Area. These measures reflect that the relatively small numbers of MSW fish enter NI rivers in the spring as determined from counter data, catch returns and scale readings.

Management actions:

The report indicates there has been a reduction in the number of nets in the coastal mixed stock fishery. What is the policy with regard to the remaining nets, how will socio-economic factors be taken into account and what is the timescale over which this policy will be implemented?

Netting in the Loughs Agency area is now restricted to the Foyle estuary. The fishery exploits a single catchment stock and is managed in year to ensure that the components of the stock are meeting CL's. It is therefore deemed to be sustainable.

It is policy to bring about a cessation of all coastal fishing in the FCB area whilst status of the Southern NEAC stock remains a concern. Discussions with the holders of the 6 remaining entitlements to fish are reaching a conclusion. These fishermen have been offered compensation to permanently forego this entitlement reflecting the socio-economic importance of salmon in NI and of the fishery to them.

The relevant NI Minister has undertaken to make a decision on a course of action regarding these remaining fishing engines by end 2008, if the fishermen have not volunteered to cease fishing by then.

European Union – UK (Scotland)

Reference points:

The report indicates that if useful conservation limits can be established they will used to set management targets designed to ensure sustainable fisheries. How will the validity of these conservation limits be assessed?

The usefulness of the derived catchment conservation limits (CL) will be assessed against our current best understanding of local stock status across Scotland and against the current national CL used for assessments of the distant water fisheries at the Faroe Islands and West Greenland.

CLs for all 109 catchments will be available by March 2009. Compliance assessments will remain preliminary until estimates of spawning stock can be refined. Until then, qualitative validation of such assessments will be made using catch and other data as comparators. Information from local managers will be factored into such assessments.

The report indicates that until useful conservation limits are available management decisions have to be based on other measures of abundance and that rod catch data are considered to be a proxy for abundance. To what extent is the rod catch methodology described in the report being used to inform management decisions? What checks are in place to confirm the accuracy of the catch figures and what allowances are made in the methodology for the effects of environmental conditions and other factors on catches?

Until useful CLs are available, management decisions have to use other measures of abundance. The outcome of detailed investigations by FRS into the use of catch data supports the view that rod catch data is a reasonable proxy for freshwater abundance.

Our proposed method requires the consideration of catches over several years, which should accommodate inter-annual variation in non-fisheries effort related factors e.g. changes in river conditions. Analysis has shown that whilst the catch returns used are those reported by anglers, the data collected since 1952 show remarkable coherence between districts over the years. It is likely therefore that they provide an accurate record. It is an offence to falsify catch returns. In addition, the situation should become clearer as DSFBs begin to use their legal power[1] to collect their own catch statistics. This will provide the means for greater scrutiny and strengthening of devolved fisheries management.

Stock status and abundance criteria:

The report explains that the Decision Structure was used to evaluate the need for conservation measures on the North and South Esks and the Annan. Is it being applied to other rivers, and if not what is the basis for making management decisions?

1 http://www.opsi.gov.uk/legislation/scotland/ssi2006/20060572.htm

Salmon fishery management is devolved to District Salmon Fishery Boards. Boards can apply to the Scottish Ministers, for a range of measures, when a potential salmon conservation issue is perceived. In addition, where it is apparent e.g. upon advice from Fisheries Research Services, that action is necessary but where Boards have not made an application for measures, the Scottish Ministers can make necessary regulations themselves. Full consultation would be necessary on such regulations, whether being proposed on application by a Board or by Ministers themselves.

This demonstrates the value of management of salmon fisheries being devolved to salmon fishery district level.

There are currently no applications pending for salmon conservation regulations in Scotland.

Mixed stock fisheries:

The report indicates that mixed stock netting accounts for 30% of salmon exploitation in Scotland. The decision structure was used to determine the need to close the Strathy Point mixed stock net fishery. What measures are being taken or planned to manage the other mixed stock fisheries so as to protect stocks that are not meeting abundance targets, and what are the timescales for their implementation?

A strategy for MSFs, is being developed under the Strategic Framework for Scottish Freshwater Fisheries[2]. All aspects of mixed stock fishing, including its impact on management and conservation, will be reviewed, taking advice from FRS and other scientists. This will consider international trends, guide lines and obligations as well as the financial issues concerning Mixed Stock Salmon Fishing. The project, which will commence in the summer of 2008, will culminate in a strategy report with associated timescales to be published by the end of 2009.

Management actions

The report refers to the use of Statutory Instruments. What is their purpose and function, and what other management measures can be used to control exploitation?

Statutory Instruments (SIs) are a form of legislation which allow the provisions of an Act of Parliament to be subsequently brought into force or altered without Parliament having to pass a new Act. They are also referred to as secondary, delegated or subordinate legislation.

Other management measures are as set out in the revised FAR.

Iceland

The following paragraphs further clarify the management of Atlantic salmon fisheries in Iceland and address specific questions from the Ad Hoc Group in the order that they were posed. It should be clarified that Atlantic salmon management in Iceland has been transferred from the Veterinary and Food Authority and is currently the responsibility of a

2 www.scotland.gov.uk/Publications/2008/06/26110733

separate "Salmon and Trout Division" within the Directorate of Fisheries, which will be referred to as the Competent Management Authority (CMA) in the following paragraphs.

Reference points:

Stocks are currently managed on the basis of maintaining stable catches but it is not clear how this is achieved, particularly considering that there is significant year to year variability in catches (the min-max ranges are typically around 5) and mean catches have changed significantly (both upwards and downwards) in individual rivers over the past 30 years. How are the catch data being used to establish the status of the stocks and to influence management decisions?

It must be stressed that the management of salmon fisheries in Iceland is not based on stable catches. Although it would be highly favourable for the marketing of rod fishing licenses we have to accept that there are considerable fluctuations in catches due to the ever fluctuating and variable environment both in rivers and in the sea. Return-rates for salmon smolts released for enhancement show as variable returns as those for wild fish. Smolt releases can thus not be used to even out fluctuations.

The effort, however, has been stabilized in Iceland. The length of the fishing season, daily fishing hours and number of rods and nets are the same from year to year. That can to some respect be regarded as a historic Conservation Limit (CL). Since there are strong correlation between the salmon run to a river and the rod catch, the catch statistics can be used as a measure of abundance. It has, however, been observed that exploitation rate is higher when the run is small than when it is large.

The ultimate target is to estimate reference points in key rivers where information on the size of the spawning stock and recruitment measured as parr densities is available. Catch statistics will subsequently be used to transfer CL between rivers according to the historic harvest based on the size and quality of the production area for salmon in those rivers. That will be possible when more information on wetted area suitable for salmon production becomes available for each river. This will, however, take some years.

It seems likely that when the salmon catch in a river is close to or below the reference point giving maximum sustainable yield (MSY) it will give a clear signal to the Salmon Management Authority (CMA). The rivers association or the river owners will also get a clear signal through the sales of their salmon fishing licenses as the demand is likely to drop with decreased catch thus resulting in decreased fishing effort.

Diversity criteria:

The report indicates that there has been a substantial decline in the catches of MSW salmon in Iceland and that the Angling Clubs have, therefore, been requested to introduce catch and release policies. In 2006, 32% of MSW salmon were released. Does the Competent Management Authority (CMA) consider this to be adequate, what level of protection is afforded to MSW stocks in individual rivers and what will the CMA do if this voluntary approach is not successful?

As pointed out by the "Review Group" the decline of the MSW salmon in Iceland has been of major concerns. There has been a voluntary release of MSW salmon following an encouragement to anglers from fisheries associations and experts. This request has led to an increase in the "Catch and release" of MSW salmon from 32% in 2006 to almost 58% in 2007. "Catch and release" of MSW salmon has thus increased dramatically without any management actions by the CMA. Whether this level of "catch and release" is sufficient is difficult to tell. Since the main reasons for the decline of MSW salmon are not known nor the effect of the MSW decline on recruitment, we cannot foresee whether or how such actions will work in practice.

The earlier data indicates that the number of MSW fish is not only lower but the mean weight of salmon has also dropped. That might indicate that the main reason for the MSW decline relates to changes in oceanic conditions. Provisional information from the 2008 fishing season in Iceland, however, indicates that there is a great improvement in the abundance and size of grilse and MSW salmon in most Icelandic rivers, which supports this viewpoint. This needs further studies e.g. in the on-going SALSEA research project which may shed further light on this problem. Until we have better knowledge we have to follow the precautionary principle, which has been underlying in Icelandic salmon management. We can always question whether actions taken have been adequate. It has, however, been noticed in the past that the best way of dealing with management problems is to involve the parties that have the greatest interests, which in this case are the in-river management authorities and the anglers.

In this context it should be pointed out that "Catch and release" is only one of many measures specified as a part of the "Conservation plan" to reduce the fishing mortality of MSW salmon as pointed out in the section on "Management actions". In many rivers it is only a voluntary action but once it has been specified as a part of a "Conservation plan" it would be mandatory on that particular river and enforced by the river association. The responsibility of making the appropriate "Effort" as well as " Conservation" plans thus rests with the local fisheries association (river owners), which the outfitters or angling clubs leasing the river would be obliged to follow.

Management actions:

The report indicates that the management proposals for in-river fisheries have to be set out in an Effort Plan prepared by the local Fishery Association. The Implementation Plan also refers to both an Effort Plan and a Conservation Plan but the relationship between these plans and their roles in fisheries management are not clear. What do these Plans contain, how are the management controls determined and what powers do the CMA have to make changes?

It appears that the main driver for the management of Icelandic salmon fisheries is the maintenance of catch levels and thereby their economic value. What mechanisms are available to management authorities to respond to evidence of poor stock status?

Since the enactment of a new Act on Freshwater Fisheries in 2006 (nr.61/2006) management authorities on each river, i.e. the local fisheries associations, must make a "nýtingaráætlun" (in Icelandic) that specifies the maximum effort (rod number) here referred to as an "Effort plan" as well as the effective fishing time, bait and bag limitations and any requirements to release the salmon caught here referred to as a "Conservation plan". The "Effort plan" which pertains to the number of permissible rods must apply for a period of 8 years but the "Conservation plan" refers to any other limitation on time and gear and has a more flexible timeframe. It should be stressed that the "Effort Plan" specifies the maximum number of rods that can be utilized, but the fisheries associations can adjust rod numbers downward, if stock status deteriorates. The upper limit of rods, on the other hand, must by law remain unchanged for the 8 year period.

Although these bear the same name in the Freshwater Fisheries Act it was decided to classify them separately in the "Implementation Plan" due to the difference in timeframe requirement. In order to construct sensible "Effort" and "Conservation" plans for the future the fisheries associations on each river must cooperate with scientists in gathering information on the stock status including information on size of the salmon run, catch statistics, spawning escapement, parr densities etc.

These plans need to be accepted and approved by the CMA after a review by the Institute of Freshwater Fisheries (IFF). Through this process the IFF can come up with advice regarding increased conservation measures and the CMA can set restrictions for exploitation if needed. Because of fluctuations in environmental factors affecting different part of the salmon lifecycle it is likely that these plans need to be flexible and revised periodically, especially with respect to bait and bag limitations as well as requirements to release angled salmon, although the maximum rod number must remain fairly constant.

As pointed out by the review group the economic value of angling is one of the main drivers for utilizing the Icelandic salmon stocks. It is up to the CMA to decide whether change in stock status in a certain river justifies an intervention to ensure that the stock is kept above the necessary CL. Due to the economic implications such interventions must be carefully implemented in cooperation with the relevant fisheries association. There are, however, provisions in the law, which permit emergency interventions by the CMA. These are, however, rarely pursued.

Timescales:

The report suggests that the development of conservation limits for all Icelandic rivers may take 5-10 years. However, the Icelandic Implementation Plan indicates that conservation limits will be prepared for all rivers by 2009. What is the expected timescale for development of conservation limits that will be used in fishery management?

Although setting the conservation limits for individual rivers may take 5-10 years depending on the urgency for each river and available resources, there is no reason to delay the setting

of "Effort" as well as "Conservation" plans. The Icelandic fishing associations have thus been urged to submit such plans prior to the end of 2008. With the changes made to the Freshwater Fisheries Act there is a clear need to confirm permissible rods on each salmon river, which is done through the official confirmation of the "Effort" plan. The "Conservation" plan will also provide considerable harvest limitations on Icelandic salmon rivers. If these plans are submitted to the Salmon Management Authorities (CMA) prior to 31 December 2008 the provisions could be valid prior to the 2009 salmon season on all the major salmon rivers. Conservations plans can be expected to be revised through official channels bi-annually or at regular intervals. Effort plans, on the other hand, must have a lifetime of 8 years as previously pointed out.

Norway

Stock status and abundance criteria:

Preliminary conservation limits have been established for 180 rivers and a programme is in place to develop conservation limits for the remaining stocks by 2009. How is stock status being assessed to support the current round of management changes on rivers without conservation limits?

- *The preferred approach would be to look for rivers amongst the 180 which could be similar or comparable to the river one is assessing, and then simply transfer the spawning target making necessary adjustments.*
- *If there are no suitable rivers amongst the 180, the assessment is done the "old fashion way", which means conducting a comprehensive stock assessment, using catch statistics and other information in order to put the river into a category, then using establish guidelines on fisheries management for each category.*

As the conservation limits are regarded as preliminary, what is being done to validate them and in what timescale?

- *We have already launched a four year research project aimed at identifying weak spots and bottle necks, and developing new methods for setting second generation spawning targets, including necessary field work.*
- *Monitoring programmes and research activities are being more focused on adult runs using fish counters and exploitation rates as means to determine run sizes.*

Management actions:

The report indicates that fishery regulations for 2008 - 2012 will be based on a number of sets of guidelines, and that County Governors are required to take these into account. What obligations are there upon local managers to follow these guidelines and how is the implementation of new management measures affected by private ownership of fisheries (e.g. in the coastal mixed stock fisheries)?

- *Fishing regulations on rivers are the responsibility of County Governors which are subordinate to the Directorate. This means that CGs have to follow guidelines.*
- *If the local management is organized well, river owners have the opportunity to develop a proposal for fishing regulations. In that case river owners have to follow the same guidelines, and County Governors have to make sure that fishing regulation are within the boundaries of the guidelines, otherwise they have to refuse the proposal.*
- *Private ownership of fishing rights affects management of fisheries in many ways.*
- *E.g. it makes it almost impossible to allocate resources from one user group to another if there is not a solid biological reason.*
- *In the sea fishery – at least in theory - anybody who owns a property with shoreline can set out a bag net. The number of fishermen participating in the fishery in any given year is therefore difficult to predict – although in practise fluctuation in number of fishermen from year to year tend to be small.*
- *But private ownership does not prevent that measures are taken.*

There are substantial numbers of fish farm escapees caught in Norwegian fisheries. How is this taken into account in assessing the status of stocks and determining the need for management measures?

- *We are very well aware of the huge problems escaped farmed salmon pose both in catch statistics, estimation of salmon runs and in relation to meeting spawning targets.*
- *The proportion of escaped farmed salmon is estimated in both coastal, fjord and river fisheries, and in the rivers also on spawning grounds.*
- *Although the monitoring program is quite limited, this information is used to estimate the wild proportion of the run.*
- *We have also asked the County Governors to make an estimate of escaped farmed salmon in each river.*
- *This year we have introduced special measures, like postponing the fishing season, in order to reduce the proportion of escaped farmed salmon on spawning grounds.*

The Review Group is aware that salmon from rivers in Finland and Russia are taken in mixed stock fisheries along the Norwegian coast. What actions have been taken to limit this interception to acceptable levels?

- *First of all we are not really sure what acceptable levels are, and we would have to consult with Russia and Finland in this regard.*
- *In the county of Finnmark, where most of this interceptory fishery occurs, fishing effort has been reduced by 25 % this year, compared to the previous 5 year period.*
- *The Directorate for Nature Management recommended even more strict regulations, but due to interventions by the Sami Parliament, proposed reductions were cut in half.*

Socio-economic factors:

The report indicates that stakeholders are consulted during the development of new management measures. What effect do stakeholder views and socio-economic factors have on decision making?

- *Regulatory process started in 2006 and was finished this spring*
- *The stakeholders were consulted formally and informally several times at all levels from national level down to in-river management*
- *Stakeholders view points are well expressed and taken into account every step of the way*
- *Salmon management is not and has never been simply conservation*
- *Fishing regulations are also in Norway a compromise between conservation and commercial and recreational interests*
- *One example is the viewpoints expressed by the Sami Parliament during that process and which lead to less strict regulations in the county of Finnmark.*

Russian Federation

Reference points:

Russia has developed conservation limits for the majority of its stocks, except those in Karelia, where data are limited and stocks are believed to be in a generally poor condition. The report indicates that in some rivers adult returns are very much larger than the conservation limits (e.g. more than 5 times), which suggests that the conservation limits may be too low. What process is there for reviewing whether the current conservation limits are correct, and how is the stock status determined in those rivers without conservation limits? What is the timescale for developing conservation limits in Karelia and how do the authorities currently use catch data to manage the fisheries.

The abundance of stocks in a number of rivers was assessed by mark-recapture method, which may overestimate the stock. However, a large difference between salmon returns and conservation limits does not create any concerns for it is only recreational fisheries, which are conducted on those rivers, predominantly catch-and-release with quotas for such fisheries established, anyway, at a very low level, which is acceptable to both scientists and managers and users.

Annually, conservation limits are reviewed for those rivers for which data on the area of spawning and nursery habitat become available or have been updated. These are those rivers for which conservation limits were originally determined by using the catchment area.

The timeframe for developing the conservation limits for stocks in Karelia has not been defined. At present only one stock, and that is in the river Keret, is exploited. There is limited fishing for salmon there for enhancement purposes and a small quota is allocated for recreational fishery. There is no fishery on other rivers in this republic.

Stock status and abundance criteria:

The Pechora river supports one of the largest salmon river stocks in the North Atlantic and has been well monitored for more than 30 years, but information on this river within the report is limited and it is not clear why the fisheries have been closed despite the adult returns being well above the spawner requirement. What was the basis for closing the fishery?

The decision to close the fisheries on the Pechora river taken in 1989 was justified from the point of view of the stock biology it was rather an administrative decision. The aim was to increase the escapement of salmon to the upper part of the river that administratively was under the governance of one of the subjects of the Russian Federation, while the commercial fishery at a barrier fence took place in the downstream of the river that was under the governance of another subject.

In 2003-2006 there were allocations of commercial quotas for the two subjects, of 0.35 to 13.5 t. The fisheries used drift nets with the mesh size 70 mm and more. In 2005-2006 there was also a quota for recreational fishery allocated annually of 0.3 t. In 2007 only a quota for scientific fishing was allocated.

The fisheries research institute responsible for provision of TAC advice for Pechora annually recommends such a level of TAC that would allow both commercial and recreational fishery. However, presently the decision to re-open the fishery is blocked at the federal level by authorities responsible for the State environmental impact assessment and, therefore, small quotas are allocated only to scientific fishing.

Mixed stock fisheries:

The report indicates that there is a policy to reduce the exploitation in the mixed stock salmon fisheries operating in the White Sea. What is the long-term management objective for this fishery and over what timescale will it be implemented?

Commercial fishing effort has substantially reduced since the development of recreational fisheries in 1990s. Management measures are aimed at reducing the commercial fishing effort and enhancing the development of recreational fisheries. These measures have led to a considerable decline in commercial catches in both rivers and coastal areas. For instance commercial catches in Murmansk region dropped from about 400 tonnes taken annually in 1980s to 100 tonnes in 1990s and to just 20 tonnes in 2007.

Today the commercial salmon fishery is viewed more as a social measure – a traditional way of fishing by indigenous people from Pomor villages along the White Sea cost. Further reductions are unlikely to be introduced. However, restrictions other than quotas to fisheries, which take stocks contributing to mixed stock fisheries below their Conservation Limits will be considered.

Management actions:

The report indicates that all salmon fisheries are licensed and that TACs and quotas are used

to control all harvests and other removals of salmon. How are the TACs established and how are quotas then allocated to the individual fisheries?

The stock status is assessed and the level of TAC then determined for each stock by the fisheries research institute subordinate to the Federal Agency for Fisheries and responsible for the development of the TAC advice. This advice is subject to the state environmental impact assessment by experts appointed by the Ministry of Nature Conservation. After the assessment is completed the Ministry of Agriculture issues an order to approve the level of TAC for Atlantic salmon, separately for the Barents Sea basin and for the White Sea basin, with each of the two TACs being a sum of TACs recommended by the fisheries research institute on a stock-by-stock basis. The next step is when the Ministry of Agriculture on the basis of advice by the Northern Science, Management and Industry Council issues an order on the allocation of quotas according to the type of fishery and then an order allocating these quotas among subjects of the Federation. In doing so it takes into account the conclusions of the state environmental impact assessment, therefore, each subject of the Federation is allocated its share of the TAC according to the status of stocks in the area of its jurisdiction. It is also in the federal authorities' power to allocate quotas for commercial fisheries to users of each of the subject of the Federation, which is done on the basis of their shares assigned for 10 years. Allocated at the federal level are also quotas for scientific fishing and for enhancement purposes. Quotas established for the fishery by indigenous people and for recreational fisheries are allocated among users by the administrations of the subjects of the Federation, i.e. at the regional level.

The report refers to illegal fishing in rivers flowing through populated areas and that 70% of the returning stock may be taken illegally in the river Umba. What is being done to manage this illegal activity?

A high level of illegal fishing on river Umba is, in the first place, due to social and economic situation in the area where it flows. The level of unemployment of the village Umba located at the river mouth is very high. Illegal fishing is the main source of income for a considerable part of the able-to-work population there. Prohibitive measures in force for many years have been of no effect. It is important opportunities are created for the community to be employed in other businesses than fishing, for instance, fish processing, extraction and processing of stones, eco-tourism.

The report indicates that 'users' can adjust the fishing effort applied to different biological groups of salmon. How is the need for such adjustments made and how are they addressed by regulatory measures?

Regulation of fishing effort applied to different biological groups of salmon can be implemented by users on a voluntary basis and based on scientific advice on how to rationally manage the stocks, that can be requested from a fisheries research institute. Such advice is developed for specified rivers and fishing sites and takes into account specific features of a given population (stock). In particular, to reduce the fishing pressure on large females, it is recommended to exercise only catch-and-release in the beginning of the run. Such scientific advice is a supplementary regulatory measure, which may be implemented by a user in addition to mandatory measures established according to the Law on Fisheries and

Conservation of Aquatic Biological Resources and Fisheries Regulations for enhancing the salmon stocks and their rational exploitation.

The report refers to possible by-catches in herring fisheries in the White Sea. What is being done to assess and manage this problem?

The fishing season for herring partly overlaps with the timing of salmon run. Fishing gears for herring (herring sein) are deployed in the coastal zone of the White Sea and there is a possibility that salmon are intercepted. Estimates of salmon by-catch in the herring fishery are not available. However, it is known, that the mesh size in the wings of herring sein and trap is such that salmon cannot be enmeshed. There are no records of reported salmon by-caught by this fishery, as according to the Fisheries Regulations when captured as by-catch all fish beyond quotas allocated to users of fishing sites must be released with as less damage as possible. The Fisheries Regulations are enforced by relevant State Control and Enforcement authorities

USA

Description of fisheries:

The report states that the subsistence fishery off West Greenland could harvest 3 – 45 % of the total documented returns to the listed rivers during the years 2000, 2001 and 2002. What is the basis for this statement?

The estimate that the internal use fishery in West Greenland could potentially harvest between 3 and 45% of the total documented returns to the listed rivers during the years 2000-2002 was derived from a Probabilistic-based Genetic Assignment model (PGA) developed in the U.S. The PGA can be used to identify the effects of fishing on individual stocks within any multi-stock complex where genetic samples from known origin are available. A finalized manuscript describing the PGA is currently awaiting peer review and publication. The PGA has been presented to, and favorably reviewed by both the US Atlantic Salmon Assessment Committee and the ICES Working Group on North Atlantic Salmon. The PGA model was applied to the 2000-2002 landings data from West Greenland. The North American component of the West Greenland harvest was genetically partitioned into country of origin. The US origin component was then partitioned to river or group of rivers of origin and adjusted for natural mortality during the return migration. The Gulf of Maine Distinct Population Segment (GOM DPS referred to above as "listed rivers") estimated contributions were then compared to the spawner estimates for those cohorts. As reported, we estimate that the harvest accounted for 3.0-46.7% of the total documented returns for those years. [NOTE: The higher end of the range was cited in our FAR as 45%, but is actually 46.7% as illustrated below.]

Our report cited years 2000-2002, but estimates are now available for 2003 as well. Our report should cite the years 2000 through 2003 and include a range from 3% to 46.7%. The estimates for each year are as follows:

2000 - 3.6%

2001 - 46.7%
2002 - 3.3%
2003 - 3.0%

Management actions:

The report refers to a wide range of measures to reduce by-catch of salmon in both marine fisheries and freshwater fisheries. These include public outreach and educational campaigns designed to reduce the potential for anglers to misidentify salmon. To what extent have these programmes been implemented?

Federal Programs:
As a condition of having a federal commercial fishing permit, reporting of bycatch of Atlantic salmon is mandatory. All federally permitted commercial fishermen receive Vessel Trip Reporting Instructions (VTR Instructions) outlining codes for all of the species that if caught must be recorded in vessel logbooks to comply with reporting requirements. Observers that are trained in species identification are also aboard some commercial vessels to document bycatch.

The NMFS and the USFWS also maintain active web pages and other outreach materials that contain up to date information on Atlantic salmon, the ESA and Atlantic salmon, federal regulations related to Atlantic salmon, as well as federally implemented recovery and restoration activities. In addition to distributing information upon request, federal biologists and managers attend certain public forums to provide information to interested individuals.

State Programs:
Maine, Connecticut, and New Hampshire all have recreational Atlantic salmon fisheries. All of these states have information for anglers on species identification, regulations, and other related species information in the form of published angler guides, web based resources, or signage located at or near known fishing sites. These resources are readily available to the public free of charge and help educate the public on release techniques for Atlantic salmon, misidentification of Atlantic salmon, and other related information on federal and state recovery and restoration programs. In some cases, for example in Connecticut, fisheries education courses and workshops are provided to the public. The Connecticut Aquatic Resources Education Program (CARE) offers free fisheries courses and workshops to interested individuals. The goal of this program is to foster resource stewardship, promote an understanding of aquatic systems and fishery management decisions and encourage both an understanding and utilization of aquatic resources.

Other Programs:
There are a number of non-governmental organizations that engage in Atlantic salmon education and outreach as part of their mission. For example, the Atlantic Salmon Federation (ASF) is in the progress of posting information on the conservation status of Atlantic salmon in Maine along with species identification information to educate anglers and reduce the misidentification of Atlantic salmon as trout. ASF also sponsors a number of other education programs throughout New England. Most of these NGO's have active and up to date web pages, other outreach materials, and community programs all aimed at

educating the public about Atlantic salmon and their habitat. Links to many of these organizations and their individual activities can be found on various state and federal web pages.

State, Federal, and Non-Governmental Organization Partner Programs:
There are also specific programs designed to educate school children on Atlantic salmon. These education programs help educate children on species identification, ecology, and restoration. The Fish Friends Program developed by ASF is a classroom program, used in 600 schools from Connecticut to Labrador that encourages stewardship of watersheds. The program is very popular with both teachers and children for its hands-on approach, as well as its flexibility and classroom-tested curriculum guide. Designed for grades 4 to 6, it has also been used in some higher grade levels of middle schools. During 2007, the Connecticut River Salmon Association (CRSA) conducted the ASF Fish Friends Program at schools in Connecticut. Trout Unlimited carried a similar message to schools in Massachusetts. Several cooperators including CRSA, US Forest Service, USFWS, New Hampshire Fish and Game, Vermont Fish and Wildlife and the Southern Vermont Natural History Museum cooperatively conducted the program in Vermont and New Hampshire. For the 2007-2008 school year 164 schools participated in this type of salmon education in the four states.

2007 marked the fifteenth year in which the Adopt-A-Salmon Family Program has been providing outreach and education to school groups in Maine, New Hampshire, and Massachusetts in support of Atlantic salmon recovery and restoration efforts. The program is administered by the USFWS Central New England Fisheries Resources Office with support from the USFWS Nashua National Fish Hatchery (NNFH), the Amoskeag Fishways, and a corps of very dedicated volunteers and Student Conservation Association interns. Most participating schools implement the program throughout the school year with highlights including a visit to NNFH for a ninety minute educational program in November, and incubating salmon eggs in the classroom beginning in January/February for release as fry into the watershed in the late Spring. In February 2007, 42 schools received 15,910 eggs to be reared in classroom incubators. Throughout the winter and spring, eggs were monitored by students until they hatched. In late spring, fry were released into the Merrimack River watershed. In November 2007, 1,532 students and 150 teachers and parents from 24 schools throughout central New England participated in the educational program at NNFH. During the visit, participants learned about the effects of human impacts on migratory fish and other aquatic species and observed Atlantic salmon spawning demonstrations.

The Review Group notes that the July 2006 Status Review for Anadromous Atlantic Salmon prepared by the state and federal agencies proposes that the rivers Androscoggin, Kennebec and Penobscot should be listed under the ESA. Is it proposed to implement this recommendation and if so in what timescale?
The draft Status Review was completed in January 2006 and underwent peer review. The Center for Independent Experts (CIE) completed the review and the BRT made revisions to the document based upon this critique. The Status Review was made available to the public during the fall of 2006. NMFS and the USFWS (collectively referred to as the Services) are currently considering the information presented in the 2006 Status Review, the comments from the peer reviewers, and the response of the BRT to the peer reviewers to determine if action under the ESA is warranted. The Services could determine that a change to the

boundaries or conservation status of the existing GOM DPS is warranted, that a separate listing action is warranted, or that no action is warranted. If the Services determined that a modification to the existing listing or a new listing was warranted, then a proposed rule will be published along with the rationale for that proposal. A proposed determination regarding the listing status of the expanded GOM DPS is expected in 2008.

IP(08)24

Comparative overview of the approaches used to address challenges in the management of salmon fisheries

Introduction

In the twenty-five years since NASCO's establishment, there have been enormous changes in the management of salmon fisheries all around the North Atlantic. These have included major reductions in quotas and effort, closure of some fisheries either with or without compensation payments, and increasing use of catch and release recreational fishing. These measures have been introduced in response to declining salmon abundance, both for domestic reasons and in recognition of international commitments under the NASCO Convention. Adapting the management regimes to the reduced abundance of salmon has been a considerable challenge involving sacrifices in commercial, recreational and subsistence fisheries. A wide variety of management approaches has been employed but abundance remains low, and in some areas critically low, with many stocks well below their conservation limits (CLs).

In accordance with the Strategic Approach for NASCO's 'Next Steps', CNL(05)49, each jurisdiction has been asked to prepare a Focus Area Report (FAR) on salmon fisheries management to demonstrate how it is addressing NASCO's agreements relating to the management of salmon fisheries. The *Ad Hoc* Review Group (hereinafter referred to as the Review Group) has assessed these reports, based on Best Practice Guidance that it has prepared (IP(08)23), and has commented on areas where jurisdictions are failing to fully meet the expectations of NASCO.

As part of its review, the Council also asked the Review Group to undertake a comparative overview of the fisheries management FARs highlighting best practice and challenges and approaches to addressing these challenges in the management of salmon fisheries. One of the purposes of developing and reviewing the FARs is to facilitate the exchange of information and transfer of knowledge on the management of salmon fisheries envisaged in the Strategic Approach and to facilitate an assessment of progress towards fairness and balance in the management of distant-water fisheries. The Review Group has structured this comparative overview around its Best Practice Guidance IP(08)23. It has identified a range of approaches being used by jurisdictions to try to meet the challenges posed by each of the ten elements of the best practice. Although many of these examples are not fully consistent with the Best Practice Guidance, they all describe activities that are designed to address various aspects of NASCO's agreements and guidelines relating to salmon fisheries management.

1 Decision making process

The Agreement on Adoption of a Precautionary Approach requires the formulation of pre-agreed management actions in the form of procedures to be applied over a range of stock conditions. The NASCO Decision Structure, adopted by the Council in 2002, provides a basis for more consistent approaches to the management of exploitation of Atlantic salmon. The Council's intention was that the Decision Structure would be widely applied by managers, in consultation with stakeholders, and that the results of using it should be monitored and evaluated to ensure that the actions taken in managing salmon fisheries are consistent with the Precautionary Approach. The Best Practice Guidance therefore indicates that there should be clear descriptions available to all stakeholders of the processes by which management decisions will be taken and an indication of the types of decisions that may be expected under different stock conditions; these could take the form of a flow diagram or decision structure.

Most FARs failed to address this issue, but some jurisdictions provided a clear structure for the decision-making process across a range of stock conditions. For example:

- The FAR for UK (England and Wales) provides an informative flow diagram describing the process being used to arrive at management decisions. It involves four stages: assessing compliance with the management objective; initial screening for potential management options taking account of socio-economic and stakeholder concerns; evaluation of options that could be employed to realise the required changes in exploitation; and final selection and implementation of measures to control exploitation.
- The Irish FAR describes the procedure used to determine whether there is a harvestable surplus (i.e. the CL is being exceeded) for each river stock, and thus whether a fishery should be permitted to operate and, if so, the procedure for deciding on the conservation measures that will apply.

The Review Group also noted that there is a well established procedure operated by NASCO for setting regulatory measures for the West Greenland fishery.

The Review Group recommends that all jurisdictions should develop clear flow diagrams or alternative descriptions of the decision-making process which can be disseminated to stakeholder groups and included in the next fisheries management FARs.

2 Description of the fisheries and the stocks exploited

The Best Practice Guidance proposes that each jurisdiction should collect a range of information on all their salmon stocks and on the fisheries exploiting them. The information should include records of fishing activity, catch statistics and estimates of the level of unreported catch. Information should also be sought on the by-catch of salmon in fisheries for other species. This information should be made available to stakeholders in regular reports.

It is clear that nearly all jurisdictions are collecting comprehensive information on their salmon stocks and fisheries although the extent that this can be reported within the FARs is inevitably dependent upon the number of rivers involved. For example, Canada refers to the presence of salmon in 900 rivers, Norway to 407 and UK (Scotland) to 382.

For future reporting the Group believes that it would be valuable for all FARs to include listing of salmon rivers with a summary of catches, CLs etc. and maps showing the location of rivers and management areas.

Catch statistics

Best practice should involve collection of statistics both for fish that are retained and those that are subsequently released as well as estimates of unreported catches. All jurisdictions collect catch statistics on their salmon fisheries but some have instigated approaches to improve the scope and reliability of these data. A common challenge identified in many of the FARs is the problem of unreported catches, both in terms of their estimation and efforts to minimise them. The following are examples of approaches being used to improve catch reporting and reduce unreported catches:

- The FAR for Iceland indicates that since 1946 catches have been required by law to be recorded in a log-book system. Under-reporting of the catch is considered to be infrequent and comprehensive information is provided including the length, weight and sex of the fish, the date of its capture, the beat fished and the fly, lure or bait used. The resulting catch statistics are considered to be a reliable indicator of stock abundance. An online system of reporting catches during the season is under development.

- In the FARs for Ireland and UK (Northern Ireland) it is indicated that carcase tagging and logbooks have been introduced to improve catch reporting and reduce unreported catches.

- The FAR for UK (Scotland) indicates that local management authorities have recently been given authority to collect catch statistics for their district in the expectation that this will lead to greater scrutiny of the data, quicker catch returns and improved assessments of unreported catches.

- In the US FAR, it is noted that illegal in-river harvests occur at low levels and actions taken to address this include closures to recreational fishing on sections of river prone to illegal fishing.

- The FAR for Greenland refers to the problem of collecting reliable catch data from the internal use fishery and describes the efforts being made to improve awareness of the need to report catches through an information campaign targeting salmon fishermen.

Origin of fish caught

Rational management requires knowledge of the origin of the salmon contributing to each fishery. This applies not only to coastal and distant water fisheries, which are known to exploit significant numbers of salmon from more than one river stock, but also to estuary

fisheries which may also exploit fish from neighbouring stocks. Various initiatives have been undertaken to obtain this information including the following:

- The continent of origin of salmon caught at West Greenland has been estimated for a number of years using scale analysis and genetic techniques, and these results are used in developing catch options for the fishery.

- With the development of improved genetic techniques a number of FARs, including those for Finland, UK (Scotland), UK (England and Wales) and the US, indicate that genetic analyses are being used to establish a baseline for identifying the river or region of origin of salmon to inform management. The Review Group noted that the development of such genetic baselines is also an important element of the SALSEA research programme.

By-catch

The Agreement on Adoption of a Precautionary Approach states that fisheries which could result in a by-catch of salmon should be subject to cautious conservation and management measures. Obtaining such information is an additional challenge. A number of FARs refer to the possible by-catch of salmon in fisheries for other species and efforts to estimate them.

For example:

- The FARs for several jurisdictions (Iceland, UK (Northern Ireland, UK (Scotland)) refer to the potential by-catch of salmon post-smolts in pelagic mackerel and herring fisheries in the North-East Atlantic. The Review Group notes that the Russian Federation has made particular efforts to try to quantify this by-catch through an observer programme on its pelagic vessels.

- The Icelandic FAR refers to a questionnaire survey conducted in 2004 and 2005 to assess the by-catch of salmon by the Icelandic commercial fishing fleet. The results suggest a by-catch of approximately 5,100 (3,165-7,055) salmon each year, mainly by large pelagic boats, but no information on the origin of the fish is available. Reference is also made to potential by-catch of salmon in coastal net fisheries for Arctic char, and the Review Group is aware that measures have been introduced in order to minimise this risk.

- The Norwegian FAR indicates that test fishing using mackerel gill nets, which are considered to be the most likely source of by-catch, has been undertaken and the information incorporated in estimates of unreported catch.

- The US FAR indicates that it is a condition of having a federal commercial fishing permit that any by-catch of salmon is reported and additionally observers are placed on some commercial fishing vessels to provide a third party estimate of by-catch. Commercial gillnet fisheries for American shad and recreational shad, striped bass, and trout fisheries are monitored for incidental salmon catch.

3 Powers to control exploitation

Best practice would ensure that managers have sufficient powers not only to control harvests but to respond with sufficient speed to changes in individual stock status and to adjust harvest levels or fishing effort in-season to take account of actual run sizes or environmental conditions (e.g. low flows and high water temperatures). It is clear that all jurisdictions have powers to control fishing effort and/or harvests in their fisheries although this may be limited to some extent by the ownership of the fisheries or other factors. Several FARs describe approaches and challenges:

- The FARs for UK (Northern Ireland - River Foyle) and for Canada indicate that they have powers to adjust management measures within the fishing seasons to take account of stock size and/or environmental conditions. For the River Foyle, if at certain dates during the season target numbers of fish have not been achieved then closures of the angling and/or commercial fisheries take place.

- The Canadian FAR indicates that a large number of rivers in Quebec are subject to in-season assessments and based on estimates of returns to date, retention of large salmon may be prohibited for the remainder of the season.

- Some FARs (e.g. UK (Scotland) and UK (England and Wales)) report progress towards being able to apply management measures more rapidly than in the past. Thus, in the UK (Scotland) the Ministers have recently acquired powers to make Salmon Conservation Regulations where necessary to protect stocks from any form of exploitation.

- A particular challenge was identified in the FAR for Finland where because the two salmon rivers both border Norway the management of their fisheries (other than tourist angling) is largely through bilateral agreements that do not facilitate rapid changes to the management regime in response to changes in abundance.

4 Reference points (conservation limits or other measures of abundance and diversity)

The Agreement on Adoption of a Precautionary Approach states that CLs and management targets (MTs) should be set for each river and combined as appropriate for the management of different stock groupings defined by managers. The NASCO Decision Structure further indicates that where these reference points have not been established alternative measures of abundance may be used.

Conservation Limits

The Agreement on Adoption of a Precautionary Approach proposes that jurisdictions should develop CLs based on the spawning stock that will achieve maximum sustainable yield, ideally for each sea-age component of their stocks. The Best Practice Guidance indicates that CLs should ideally be established on the basis of river specific information, but in the absence of such data they should be based on information derived from other rivers.

In view of the substantial costs involved, no jurisdictions have been able to set CLs using river specific data except for a small minority of river stocks. However, a variety of approaches have been used by jurisdictions to transfer information from closely monitored systems to other rivers including the following:

- In Canada and the US, standard egg deposition rates expected to maximise freshwater production are applied across a large number of rivers (e.g. 240 eggs $100m^{-2}$ of fluvial habitat in the US, Canadian Maritime Provinces and in Newfoundland; 190 eggs 100 m^{-2} of fluvial habitat in Labrador; and 1.67 eggs per unit of production area in Quebec with the unit of production varying with the type of river and latitude).

- In Norway, modelling of stock-recruitment relationships is being used to set area specific CLs with either 1, 2, 4 or 6 eggs m^{-2} being used to reflect the productivity of the river. These deposition rates are then scaled up using wetted area derived from digital maps.

- In the FARs for UK (Northern Ireland) and UK (England and Wales) it is stated that stock recruitment data from the River Bush, which has been monitored for over 30 years, has been used to establish CLs on other rivers. The model used in UK (England and Wales) adjusts the production level according to quantity and quality of the juvenile habitat.

- In the Irish FAR, it is reported that stock and recruitment data from thirteen monitored salmon rivers located in the North-East Atlantic have been used to establish CLs for all Irish rivers using available information on the size of the river (usable habitat or wetted area) and its latitude.

Management Targets

Both the Agreement on Adoption of a Precautionary Approach and the NASCO Decision Structure indicate that MTs should also be established to assist fishery managers such that there is a low risk of stocks falling below their CLs.

Several FARs indicate that management targets have been established. For example:

- The UK (England and Wales) FAR indicates that the management objective for each river is that the stock should be meeting or exceeding its CL in at least four of the last five years. MTs have been established based on the variability of historic egg deposition data, and these values are listed in their FAR.

- The FAR for UK (Northern Ireland) indicates that MTs are operated on the River Foyle on the basis that if at certain dates target numbers of fish have not been achieved then closures of the angling and/or commercial fisheries take place.

- The Russian Federation FAR states that MTs are set at a level higher than the CLs and used as reference points for managing the fisheries.

While some other jurisdictions have not set formal MTs they manage their fisheries to ensure a low probability of stock levels falling below their CLs. For example, the FAR for Norway

indicates that the objective is that the CL should be exceeded in at least three out of four years and the Irish FAR states that catch options are set on the basis of providing a 75% probability that the CL will be met.

Alternative reference points

Where CLs have not been established, the Best Practice Guidance indicates that alternative measures should be used as reference points and should be shown to be effective in defining adequate stock levels. Several jurisdictions are still in the process of establishing CLs for their stocks and are, therefore, using alternative measures for some or all rivers. In all cases where information was provided in the FAR, these are based upon catch data. However the main challenge in using these alternative measures is defining the reference levels at which management action is required, and at present there are no examples of clearly defined levels being used to trigger management action.

In the US FAR, it is stated that two additional measures are being established as reference points in addition to CLs; these are the replacement rate for all populations listed under the Endangered Species Act and quantitative recovery criteria. Draft recovery criteria have been developed and propose that a census population size of 500 should represent the upper threshold at which each of three Salmon Recovery Habitat Units would be considered to be threatened. To be considered recovered, each of the three units would have to have at least a 50% probability of remaining above 500 adults over the following 15 years and have trended towards recovery for the last 10 years.

In the FAR for Denmark, while no CLs or MTs have been set, it is stated that a reference point of 1,000 spawners is being used in the four rivers with wild Atlantic salmon and is based on genetic conservation considerations.

5 Achievement of the reference points or other measures of abundance and diversity

The Best Practice Guidance indicates that it should be normal practice to evaluate every year the extent to which stock levels have met the management objectives with regard to stock abundance and diversity. Assessments of stock abundance and diversity based on catches involve considerable uncertainty, so best practice would involve the use of other sources of information to confirm the status of stocks (e.g. juvenile surveys, counter and trap data) and the management measures introduced should take into account the uncertainties in the data used. Such assessments should normally be undertaken annually. In accordance with NASCO's Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks, CNL(04)55, the duration and degree of any failure to achieve the reference point, and the trend in stock abundance, should be considered in determining the need for, and nature of, management measures. Where there is insufficient information on any failure to achieve the reference point, further research should be undertaken to understand the reason for the failure. In addition, stock levels should ideally also be forecast for one or more years ahead to provide some predictions of future expected achievement of management objectives under current (or modified) management measures. For example:

- For the West Greenland fishery stock abundance is forecast for both North American and Southern European stocks and provides the basis for establishing regulatory measures.

Those jurisdictions that have established CLs generally estimate achievement of these levels on an annual basis. This is usually undertaken using catch statistics and estimates of exploitation rates, although these may be supported by the use of direct counts, mark recapture experiments and other techniques. For example:

- The Canadian FAR provides a particularly comprehensive example of how data from a range of sources is used. Assessments are conducted for a limited number of rivers as an indicator of patterns within that region. Estimates of returns are obtained using various techniques including total counts at fishways and counting fences, mark recapture experiments, visual counts made by snorkelling or from boats or the shore, and angling catches and estimated exploitation rates. Indices of freshwater production are available from a subset of assessed rivers based on smolt counts for 11 rivers and data on juvenile abundance.

- The FAR for UK (England and Wales) indicates that the performance of salmon stocks is assessed using a compliance scheme that summarises the performance of the stock over the last 10 years and forecasts the probability of future compliance with the management objectives. This methodology allows uncertainty in the performance of the stock to be taken into account. For, example, egg deposition may be consistently above the CL but the status of the stock may be uncertain as reflected in wide confidence intervals around the estimates.

6 Other factors influencing the stock(s)

NASCO's Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks, CNL(04)55, state that while the short-term response to a stock failing to exceed its conservation limit may be to reduce or eliminate exploitation, there will generally be a need to develop a programme to evaluate and address the causes of the stock decline. In more serious situations, there may be a need for a comprehensive programme of research and management, involving a wide range of management actions undertaken by a number of user groups. Similarly, the NASCO Decision Structure requires that consideration be given to whether the stocks are threatened by factors other than fisheries (e.g. habitat degradation, diseases and parasites).

Most FARs failed to address this issue in any detail, possibly because it was felt that this had been addressed in the Implementation Plans or would be addressed in subsequent FARs dealing with habitat and aquaculture and related activities. However, the Norwegian FAR describes a detailed inventory of other factors affecting their stocks. This inventory categorises all rivers on the basis of the status of their salmon stocks and identifies all adverse human impacts affecting the stock. Thus, the impact of factors such as hydro-power development, other habitat degradation, pollution, fish diseases, sea lice, *Gyrodactylus salaris* and acidification are considered. A useful summary of the number of rivers in each category and the threats affecting them is included in the Norwegian FAR.

The Review Group recommends that for future reporting on fishery management FARs a brief overview of factors other than the fisheries which may be influencing the stocks be provided.

7 Management actions to control harvest

The Best Practice Guidance suggests that in managing salmon fisheries, priority should be given to conserving the productive capacity of all individual river stocks. Furthermore managers should demonstrate that they are being more cautious when information is uncertain, unreliable or inadequate, and the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures. For example:

- The FAR for Ireland indicates that harvests can only occur in rivers where the stock is exceeding its CL. Separate harvest options for 1SW and MSW salmon are provided for 17 rivers where the numbers of MSW salmon are high enough to warrant separate management advice or where there is a clearly defined and separate spring salmon fishery. This FAR also provides an example of an approach to handling data-poor situations. In small Irish rivers where there is an absence of information on the status of the spawning stocks, it is assumed that they are only achieving 33% of their CL and no harvest will be permitted in these rivers until more information is available.

Ideally, forecasts of stock abundance for all stocks contributing to the fishery would be used to determine the harvestable surplus or appropriate level of fishing effort, with in-season adjustments being made to reflect actual returns. Where such forecasts are not available, harvest levels could be based on historical data to assess if there is likely to be a harvestable surplus. On the basis of information provided in the FARs, the only fishery for which management measures are set on the basis of forecasts of abundance is the West Greenland fishery. All other jurisdictions base management decisions on historical data. Examples of in-season management of fisheries are provided in Section 3.

8 Mixed stock fisheries (MSFs)

NASCO has defined MSFs as fisheries exploiting a significant number of salmon from two or more river stocks. ICES has advised that MSFs operate predominantly in coastal areas and can present particular threats to stock status. NASCO does not, and could not under its Convention, have a policy of prohibiting such fisheries but has sought to ensure that management measures for the distant-water MSFs protect the contributing stock complexes. Great sacrifices have been made by Denmark (in respect of the Faroe Islands and Greenland) and by some other Parties, in aligning the management of their salmon fisheries with the scientific advice. However, as part of the 'Next Steps' process the Council seeks to ensure that further action is taken to improve the fairness and balance in the management of distant-water and homewater fisheries.

Rational management of MSFs requires knowledge of the status of each stock that contributes to the fishery and where such fisheries operate managers should have a clear

policy for their management that takes account of the additional risks associated with them. Management actions for homewater MSFs should aim to protect the weakest of the individual contributing river stocks.

MSFs do not occur in Finland, Ireland, Iceland, or the US and substantial steps have been taken to reduce or eliminate them in other jurisdictions. Several jurisdictions have a clear policy to significantly restrict or prohibit the operation of coastal MSFs for salmon. The following are examples of approaches being used to manage MSFs:

- The Irish FAR indicates that the MSF, comprising principally drift nets and coastal draft nets, was closed in 2007 when the management regime was aligned with the scientific advice. A hardship scheme was introduced for fishermen affected by the closure.

- Some jurisdictions (e.g. UK (England and Wales) and UK (Northern Ireland)) have a clear policy to phase-out MSFs although no timescale for this is given. In the FAR for UK (Northern Ireland), it is reported that 90% of the licensed commercial fishing gear in the Fisheries Conservancy Board (FCB) area was removed through a voluntary buy-out scheme and the policy is for a voluntary buy-out of the remaining commercial nets. In the Loughs Agency area salmon fishing seaward of Lough Foyle has been prohibited. The FAR for UK (England and Wales) states that seven of the ten coastal MSFs have been successfully phased-out. The remaining MSFs operate in areas where information exists on the exploited stocks and, while the phase-outs will continue, management measures for these fisheries will aim to ensure that the exploited stocks meet their CLs or that this objective can be achieved in a reasonable timescale.

- In Canada all commercial salmon fisheries have been closed but in coastal waters in Labrador there are aboriginal food fisheries for Atlantic salmon and a food fishery for residents of Labrador in which a by-catch of salmon in nets set for trout and char is permitted. The Canadian FAR states that additional management measures were introduced in 2006 to reduce the catch of large salmon (including 2SW fish) in coastal areas of Labrador and the FAR reports that this appears to have been successful.

- The Russian Federation's FAR indicates that as the MSF may have adverse effects on the status of individual river stocks, the quotas for the coastal commercial fishery in the White Sea is being gradually reduced. Thus, in the Murmansk region the quota has been reduced from 51 tonnes in 2005 to approximately 35 tonnes in 2007. In the Archangelsk region the reduction has been from 44 tonnes in 2005 to approximately 17 tonnes in 2007.

- The FAR for Norway indicates that guidelines for MSFs have been developed in relation to the fishery regulations for 2008 – 2012. These guidelines state that fishing in coastal regions should only be permitted when the fisheries have little impact on stocks that are not at full reproductive capacity, and the status of the stocks in nearby regions, counties and countries should be taken into account. In fiords, the fisheries should be reduced when one or more of the stocks in the fiord is not at full reproductive capacity.

- The FAR for UK (Scotland) indicates that a strategy for MSFs is being developed under the Strategic Framework for Scottish Freshwater Fisheries and that Scottish Ministers

will support the policy of purchasing MSFs on a willing buyer/willing seller basis as a means of reducing exploitation and improving fishery management.

9 Socio-economic factors

The Agreement on Adoption of a Precautionary Approach indicates that priority should be given to conserving the productive capacity of the resource by maintaining all salmon stocks above their CLs. However, the same Agreement also indicates that management measures should take account of socio-economic factors. The stated purpose of NASCO's Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach, CNL(04)57, is to support and inform rather than providing a mechanism for decision-making. Thus, the NASCO Guidelines and Agreements do not make it clear how fishery management decisions are to be taken when there are conflicting socio-economic and conservation issues to be considered. The Best Practice Guidance proposes that conservation of the salmon resource should take precedence, and transparent policies and processes should be in place to take account of socio-economic factors in making management decisions and for consulting stakeholders.

While many FARs referred to the considerable socio-economic values of the Atlantic salmon (e.g. in Scotland the capital value of recreational fisheries has been estimated at £550 million and annual angler expenditure at £61.7 million) most failed to provide a clear indication of how socio-economic factors are incorporated into decisions, and in particular how decisions are taken to permit fishing on stocks when they are below their reference points.
All jurisdictions have to make decisions about the allocation of any harvestable surplus (or fishing opportunities) between different user groups and this may involve socio-economic considerations. For example, the FAR for Canada indicates that Aboriginal groups have priority to fish for food, social and ceremonial purposes after conservation requirements have been met. Similarly, the FAR for the Russian Federation indicates that priority is given to allocating a quota to the indigenous people rather than to scientific, recreational or commercial fisheries.

When stocks are below their reference levels, different approaches are taken to handling the interplay between socio-economic considerations and conservation issues. For example:

- The Irish FAR states that under the new management regime, there is no consideration of socio-economic factors in the decision-making process if there is no harvestable surplus. However, a hardship fund was established to support those affected by the change in management regime.

- The Canadian FAR indicates that in some areas, aboriginal and recreational fisheries are allowed on stocks that are below the conservation levels in order to maintain socio-economic benefits. In these cases, consideration is given to the overall size of the river, the size of the fisheries relative to the size of the resource, and the ability to manage the fisheries in an orderly manner.

- The FAR for UK (England and Wales) indicates that consideration is given to whether a proposed measure will have an unreasonable effect on someone's livelihood (e.g. net

- In Greenland an internal-use fishery has been allowed to operate in years when there is no allocated quota because of the dependency of the communities on fishing and in order to maintain a time-series of biological data to support the provision of catch options.

For future reporting, the Review Group recommends that an explanation be provided of how socio-economic factors are taken into account in decisions to permit fishing on stocks when they are below their reference points.

10 Effectiveness of management measures

The Agreement on Adoption of a Precautionary Approach requires the assessment of the effectiveness of management actions in all salmon fisheries. The Best Practice Guidance proposes that the expected extent of the effects of management actions and the expected timescale in which they will occur should be determined so as to facilitate assessment of the effectiveness of the measures. While many of the FARs provided information on routine stock monitoring programmes, they generally failed to describe programmes to assess the effectiveness of individual management measures. Examples where more information was provided include:

- The Irish FAR describes an assessment of the effect of the closure of the drift net fishery on returns to rivers where counts can be made. This assessment showed that the majority of rivers had increased escapement in 2008, although some of these increases were modest. However, many rivers showed considerable increases which allowed them to exceed their CL if this was not already the case. Some rivers in the UK (Northern Ireland) also clearly benefited from the closure of the Irish MSF.

- The FAR for UK (England and Wales) describes an assessment of the effectiveness of the measures restricting fishing effort introduced to protect multi-sea winter salmon (MSW) in the early part of the year when they comprise the majority of the catch. The analysis showed that for the majority of rivers there was no significant change in the proportion or abundance of MSW salmon suggesting that the diversity (ratio of 1SW:MSW) has remained relatively constant.

The Review Group recommends that for future reporting, it would be useful if FARs could describe programmes to assess the effectiveness of their management measures.

Conclusions

This overview has highlighted the different approaches that are being used by jurisdictions in the management of salmon fisheries. These differences are to be expected given the different ownership of the fisheries, the nature of the fisheries and the extent of the resource. It is clear that considerable progress is being made in incorporating the internationally agreed

principles in NASCO's various agreements, and this process should increase the fairness and balance in managing distant-water and homewater fisheries. Nonetheless, it is clear that there are some common management challenges, and the purpose of the 'Next Steps' review is to share information and highlight examples of best practice. In order to facilitate improved information exchange the next time the Council focuses on management of salmon fisheries, the Group has made some recommendations on the information to be contained in the reports. The Best Practice Guidance developed by the Group, if adopted by the Council, should assist in the review of the information presented in future FARs and in the assessment of consistency of the measures described with NASCO's agreements.

Annex 15

CNL(09)12

Interim Report of the Habitat Protection, Restoration and Enhancement Focus Area Review Group

1. The second focus area is the protection, restoration and enhancement of Atlantic salmon habitat. Last year the Council established an *Ad Hoc* Review Group to review and analyse the FARs; to identify common management and scientific approaches to challenges; to recommend best practice; and to provide feedback where additional actions may be helpful to ensure consistency with NASCO's Habitat Plan of Action. The Group met in London in February 2008 and in section 5 of this Interim Report has reviewed and analysed the FARs and provided feedback on where additional actions are needed.

2. The *Ad Hoc* Review Group will present its findings to date at a Special Session open to all delegates at the Twenty-Sixth Annual Meeting when the Parties and jurisdictions will have an opportunity to respond. The Council is asked to consider the Group's interim report and decide if any action is needed at this stage. The Group will present its final report in 2010.

Secretary
Edinburgh
11 May 2009

IP(09)18

Interim Report from the First Meeting of the Ad Hoc Review Group on Protection, Restoration and Enhancement of Salmon Habitat

NEAFC Headquarters, 22 Berner's Street, London E1T 3DY 17 - 20 February 2009

1. Opening of the Meeting by the Coordinator

1.1 The Coordinator, Dr Malcolm Windsor, opened the meeting and welcomed the members of the *Ad Hoc* Review Group to London. He referred to the lessons learned by the two previous Review Groups that might assist with the assessment of the habitat FARs. The task before the Group is to: review the habitat FARs; identify common management and scientific approaches to challenges; compile recommended best practice; and provide feedback on each FAR detailing where additional actions may be needed to ensure consistency with the NASCO Plan of Action. NASCO's objective is to maintain and, where possible, increase, the current productive capacity of Atlantic salmon habitat. He indicated that the process of reviewing FARs in a transparent and inclusive manner is a central element of the 'Next Steps' process. It is an inclusive review process involving representatives of the Parties and of the NGOs, it allows progress in implementing NASCO's agreements to be assessed and it allows an exchange of information on best practice and identification of common challenges, thereby facilitating the collaborative learning process that the Council seeks to encourage. He stressed that the members of the Group from the Parties are representing the Organization and specifically not their Parties. The NGOs represent the international NGO community in NASCO. The Coordinator's role is to chair the meeting and facilitate the Group's work; he would not be one of the reviewers, nor would the Assistant Secretary who would also facilitate the Group's work and serve as Rapporteur. He also stressed that it was not necessary for the Group to reach unanimous agreement on its assessments although consensus would strengthen its report.

1.2 A list of participants is contained in Annex 1. Boyce Thorne-Miller was unable to attend the meeting and Sue Scott served as her replacement.

2. Adoption of the Agenda

2.1 The Group adopted its agenda, IP(09)15 (Annex 2). The Group agreed that it would carry out the tasks under agenda item 5, including identifying any questions or issues for the jurisdictions, before developing its recommendations on best practice.

3. Review of the Terms of Reference and Consideration of Working Methods

3.1 The Terms of Reference for the *Ad Hoc* Review Group, as detailed in Council document CNL(08)33 are as follows:

1. Review and analyze the Focus Area Reports on Protection, Restoration and Enhancement of Habitat;

2. Prepare a report which includes the following:

a. Identification of common challenges in the FARs;
b. Identification of common management and scientific approaches to challenges, as reported in the FARs;
c. Compilation of recommended best practice with the intention of increasing the collaborative learning aspect of the 'Next Steps' Process; and
d. Recommendations and/or feedback for each FAR where additional actions may be helpful to ensure consistency with the "Plan of Action for the Application of the Precautionary Approach to the Protection and Restoration of Atlantic Salmon Habitat."

3.2 The procedure the *Ad Hoc* Review Group was asked to use to accomplish its work is as follows:

1. Meet in February 2009 to review the Focus Area Reports submitted, collaborate to highlight questions and/or issues to be sent back to the Parties/Jurisdictions by March 1, 2009. These answers should assist the *Ad Hoc* Review Group in preparing their report. Responses would be due from the Parties/Jurisdictions by April 1, 2009.

2. Provide a draft report, as described in item 2, by May 15, 2009 for circulation to contracting Parties prior to the annual meeting.

3. Present an overview of the draft report at the Special Session at the 2009 Annual Meeting, and facilitate a discussion on the five areas identified above (paragraph 3.1) in item 2. Parties and jurisdictions will not be expected to present their FAR during the Special Session, but may be asked to present information at the request of the *Ad Hoc* Review Group.

4. Following the Special Session, prepare a final report for submission to the President by August 31, 2009.

3.3 The Group discussed its working methods. Prior to the meeting a format for assessing the FARs had been developed based closely on the structure and content specified by the Council in document CNL(08)33. An initial reviewer was assigned to each FAR from among the NASCO representatives and the NGOs also undertook initial reviews of all the reports. These initial reviews from the NASCO representatives and the NGOs formed the basis for deliberations by the whole Group (see paragraph 5.9 below).

4. Consideration of the elements of 'Best Practice' relating to the protection, restoration and enhancement of salmon habitat.

4.1 The Group considered that best practice was those actions that are most likely to achieve NASCO's objective of maintaining and, where possible, increasing, the

current productive capacity of Atlantic salmon habitat. The Parties had invested considerable time and effort, drawing on the wide expertise available to them, in developing NASCO's Plan of Action and the Group believed that the elements contained in that agreement represented areas around which guidance on best practice might be developed. However, in view of the limited time available and some uncertainty about what was being sought the Group agreed to use the Special Session at NASCO 2009 to discuss this further with the delegates.

4.2 The Group also considered the question of whether NASCO might facilitate a more detailed exchange of information of specific issues related to habitat management e.g. fish passage, liming of acidified waters. Such a process would further enhance the collaborative learning approach envisaged under the 'Next Steps' process. For example, the Council might consider whether, in future, there might be Special Sessions on particular aspects from among the wide range of factors that can impact salmon habitat. These factors are described in the NASCO Plan of Action

5. Review and analysis of FARs and identification of additional actions to ensure consistency with NASCO agreements relating to habitat.

Jurisdictions not submitting a FAR

5.1 Before presenting its recommendations arising from the reviews of the FARs, the Group wishes to note that seven jurisdictions (Greenland, Faroes, EU-France, EU-Germany, EU-Portugal, EU-Spain, and EU-Sweden) have not presented a FAR. Furthermore, two of these jurisdictions (EU-Spain and EU-Portugal) have not yet developed Implementation Plans either. In the case of the Faroe Islands and Greenland, the lack of habitat FARs is perhaps to be expected. The Implementation Plan for Greenland indicates that there is only one small salmon river and no measures relating to habitat protection and restoration are included in the Implementation Plan. For the Faroe Islands there are only four small salmon rivers in which stocking was used to establish small salmon stocks. The Implementation Plan states that there are no external factors that affect the Faroese Atlantic salmon rivers and their estuaries. There are no proposed measures relating to habitat in the Faroese Implementation Plan.

5.2 For the other five jurisdictions (EU-France, EU-Germany, EU-Portugal, EU-Spain, and EU-Sweden), FARs were expected and the Group reiterates the views of previous Review Groups that if there is to be a complete assessment of whether the management actions being taken around the North Atlantic are in accordance with NASCO's agreements they need to have information from all jurisdictions. The development of Implementation Plans and subsequent reporting on progress through FARs is an essential part of the 'Next Steps' process. The lack of the habitat protection and restoration FARs means that it was not possible for the Group to assess if additional actions are required in these countries and to develop a comprehensive North Atlantic wide overview of approaches to addressing challenges in the management of salmon habitat. The Group recommends that the President, on behalf of the Council, again take this up with the jurisdictions concerned. While the habitat Review Group has completed its assessments of the FARs, it considers it essential for the success of the reporting process and the sharing of experience that all

jurisdictions submit FARs for subsequent reviews (and for two jurisdictions, Implementation Plans are needed as well).

5.3 The Group noted the following specific points in relation to habitat management in the five jurisdictions referred to in paragraph 5.2:

European Union – France: The Group is aware that France has some major salmon rivers and that the Implementation Plan refers *inter alia* to the presence of numerous dams creating obstacles for salmon and other migratory fish which have resulted in the loss of habitat and hindered restoration efforts. France has produced an Implementation Plan and it is disappointing, therefore, that France did not go the next step and produce a habitat FAR.

European Union – Germany: The Implementation Plan for Germany indicates that a combination of habitat restoration activities and efforts to reintroduce Atlantic salmon commenced in 1978. While a number of important areas of habitat have been successfully restored, self-sustaining populations of Atlantic salmon have not yet been established. The fact that Germany has produced an Implementation Plan but did not go the next step and produce a habitat FAR is disappointing.

European Union – Portugal: The Group is aware of the very small wild salmon stocks and their tenuous state in Portugal which, however, being at the southern limit of the range, are very important for genetic diversity. Portugal has not developed an Implementation Plan, a fisheries management FAR or a habitat FAR and the Group reiterates the views of the earlier Review Groups and hopes that Portugal can contribute to this important aspect of NASCO's work at the earliest opportunity.

European Union – Spain: The Group is aware that Spain has stocks which, being at the southern limit of the range, are important for genetic diversity but are vulnerable. Spain has not presented either a fisheries management FAR or a habitat FAR and has previously notified the Council that it was unable to produce an Implementation Plan referring to the fact that salmon management is devolved to the Provinces. Such devolution is not unusual and the Group hopes that coordination within Spain will produce the necessary outcome so that it can contribute to this important aspect of NASCO's work at the earliest opportunity.

European Union – Sweden: The Implementation Plan for Sweden indicates that a significant part of the Swedish rivers on the west coast are utilized for both hydro-power and for agriculture. The water quality is heavily affected by acidification but the pH in most of the rivers has been kept at an acceptable level through various liming programmes. In addition, it is stated that the water quality is affected by discharges from industries and some sections of rivers have been destroyed because of physical constructions used for water canals to supply important agriculture areas. Sweden has produced an Implementation Plan and it is disappointing therefore that it did not go the next step and produce a habitat FAR.

Jurisdictions submitting a FAR

5.4 The Group welcomed the submission of the following eleven FARs which it reviewed:

- Canada, IP(09)3;
- EU – Denmark, IP(09)12;
- EU - Finland, IP(09)4;
- EU - Ireland, IP(09)10;
- EU - UK (England and Wales), IP(09)5;
- EU - UK (Northern Ireland), IP(09)14;
- EU - UK (Scotland), IP(09)8;
- Iceland, IP(09)6;
- Norway, IP(09)11;
- Russian Federation, IP(09)13;
- USA, IP(09)7.

Methodology

5.5 The Group agreed on a number of 'ground rules', based on those used by the previous two *Ad Hoc* Review Groups to guide its work in undertaking the reviews. These were as follows:

(a) An initial reviewer was appointed for each FAR who was asked to lead the discussion within the Group and to develop an assessment of consistency of the actions documented in the FAR with the NASCO Plan of Action;

(b) The initial reviewers would remain anonymous in the report and in the event that one or more members of the Group did not agree with a particular aspect or aspects of the review then the report would indicate that there were dissenting views but not disclose which members of the Group expressed the dissenting views unless they wished to be identified;

(c) The Group would base its reviews only on the information presented in the FARs and the final Implementation Plans;

(d) Because not all jurisdictions were represented on the Group, it was agreed that the NASCO representative on the Group from a country whose FAR was being reviewed would not be present during the review of that report;

(e) While the Group recognized that the extent of the salmon stocks and the resources available to manage them varies markedly between jurisdictions, the Group took no account of these differences in undertaking its reviews;

(f) The Group recognized that in some jurisdictions the responsibility for management of salmon habitat rests to some extent with the riparian owners while in others the resource is managed exclusively by the public sector. The Group felt that, nonetheless, governments have or should have powers to protect and restore habitat and it should, therefore, be possible to summarise in the FAR the actions that are

expected to be taken by the appropriate bodies in the coming years. Such differences were not, therefore, taken into account in reviewing the reports;

(g) Following the completion of the reviews all assessments were re-examined to ensure consistency.

5.6 The Group's TORs allowed for questions and issues to be raised with the jurisdictions before the Group completed its assessment of the need for additional actions that may be helpful to ensure consistency with the NASCO Plan of Action. The Group decided that in view of the limited time available it would not seek further clarification from the jurisdictions but would base its assessments on the FARs as submitted. This would also be more transparent as any issues that either the Group or the jurisdictions wished to raise would be done so during the Special Session at the Annual Meeting. While not required under its TORs, the Group decided to ask the Secretary to send the draft assessments to the jurisdictions indicating that it did not seek any feedback until the Special Session at the Twenty-Sixth Annual Meeting. Following that Special Session, the Group would carefully consider all feedback on its findings when finalising its assessments. The Group was also aware that the review of Implementation Plans had highlighted some aspects that needed to be addressed in the FARs. In carrying out its assessments the Group checked if any of these aspects related to the habitat FARs.

Recommendations – General Comments on FARs

5.7 The Group noted that the Council had asked that the jurisdictions submit their FARs to the Secretariat no later than 31 December 2008. Many of the FARs were received well after this deadline and in two cases on the day prior to the Review Group meeting. This meant there was no time for the NGOs to complete their consultations within the jurisdictions concerned and limited time for the FARs to be reviewed by the Group. The Group wishes to stress that for the review process to work effectively the timetable set by the Council must be adhered to.

5.8 The Group noted that some jurisdictions (EU (Ireland), EU - UK(England and Wales), EU - UK(Northern Ireland), EU – UK (Scotland), Iceland, USA) had adhered exactly to the guidance from the Council on the structure and content of FARs as specified in document CNL(08)33. This had facilitated the Group's work and the Group urges all jurisdictions to adhere to the agreed format in future reporting. The Group also recommends that the Council considers providing further guidance to the jurisdictions concerning the amount of detail to be included in the FARs. It is suggested that a limit of no more than 20 pages be adopted with the option to provide more detailed information in annexes.

5.9 The Group developed a format to facilitate an assessment of the consistency of habitat management actions as detailed in the FARs with the guidance from the Council on the elements to be included. Each of the FARs was assessed against the elements in this format which covered the following aspects:

- There are inventories of the quantity and quality of habitat (historic and current);

- A clear process for identifying and designating priority/key habitat areas or issues is in place;
- A process for sharing and exchanging information on habitat issues and best management practice is in place;
- A comprehensive habitat protection restoration and enhancement plan has been established or is planned;
- The Plan identifies impacts and potential risks to productive capacity;
- The Plan includes procedures for implementing corrective measures;
- The Plan places the burden of proof on proponents of an activity that may impact habitat;
- The Plan describes how risks to salmon stocks are weighed with socio-economic factors;
- The Plan considers the effects of habitat activities on bio-diversity;
- The Plan takes into account other biological factors affecting salmon;
- There is an overview of ongoing habitat activities summarize progress in implementing the plan and describing the approach used to evaluate progress.

5.10 For each of these elements, where there was limited or no evidence of such an approach being developed or if the approach was considered to be only partially developed the Group's assessment would indicate that additional actions are needed. An initial reviewer was assigned to each FAR from among the NASCO representatives on the Group and the NGOs also undertook reviews of all the FARs using the agreed format. These initial reviews formed the basis for deliberations by the whole Group and the development of its recommendations. These recommendations were then subject to a further review to ensure consistency across FARs. The Group was not able to assess the effectiveness of the plans other than on the basis of information presented in the overview of activities that highlight progress in protecting and restoring habitat.

5.11 The NASCO Plan of Action states that each jurisdiction should develop a comprehensive salmon habitat protection and restoration plan. It further states that this should contain a general strategy for the protection of habitat for all salmon rivers including measures to minimise impacts and identify and prioritise requirements for restoration. The Group recognised that in some jurisdictions very strong protective measures have been afforded to designated rivers under, for example, the US Endangered Species Act and the Norwegian National Salmon Rivers programme. While the Group recognises the very strong measures applying to these rivers, the protection applies to only a proportion of rivers and cannot, therefore, be considered to be a general strategy for the protection of habitat for all salmon rivers. In these cases where clear progress has been made the Group has indicated that the approach is partially consistent with the Plan of Action. It anticipates that progress in developing national plans will be reported in the next habitat FARs. Furthermore, the Icelandic FAR states that a comprehensive plan is not needed because there are few pressures on habitat and, in fact, there has been a significant increase in available habitat through opening access to areas above natural barriers. In this case, although recognising that Iceland has successfully protected and restored habitat, the Group considered that the approach is not strictly consistent with the NASCO Plan of Action.

5.12 The Group identified a number of elements that many of the FARs failed to address in detail. This meant that is was difficult for the Group to conduct a comprehensive evaluation of the consistency of these aspects with the NASCO Plan of Action. It is hoped that these aspects can be fully addressed the next time that the Council focuses on the management of salmon habitat. The following areas require particular attention:

Quantity and Quality of Habitat

The Group believes that it would be useful if all FARs provided an overview of salmon rivers with a map showing their location, management jurisdictions etc. While some FARs provided information on the quantity and quality of current habitat (and in some cases historical habitat) many did not. This information is important in providing a benchmark for assessing progress in protecting and restoring salmon habitat and it is hoped that all plans will include such information next time the focus is on habitat issues.

Biodiversity

The NASCO Plan of Action states that habitat protection and restoration plans should aim to maintain biodiversity. The Group's interpretation was that the FARs should describe how habitat activities affect other species of flora and fauna in the area where these activities are conducted. Few FARs reported on this aspect. It is, perhaps, most important to assess the impact of habitat activities on biodiversity when salmon habitat restoration works are planned and particularly for habitat enhancement work which may involve providing access for salmon to habitats that they have not previously occupied.

Other biological factors

The NASCO Plan of Action requires that habitat protection and restoration plans should take into account other biological factors affecting the productive capacity of salmon. Most FARs failed to address this issue in any detail, possibly because it was felt that this would be addressed in the FARs dealing with other aspects of the Implementation Plans. A brief overview of such factors would be valuable in subsequent habitat FARs. In particular, the NASCO Plan of Action refers to predator-prey interactions but other factors might include invasive species, poor water quality, aquaculture and diseases and parasites. The Group notes that similar concerns were expressed in relation to the review of the fisheries management FARs. The Group felt that it would also be useful for subsequent habitat FARs to consider the issue of climate change and its expected impacts on salmon habitat and any approaches that are being considered or implemented to mitigate impacts.

Burden of proof

Under the NASCO Plan of Action, habitat plans should aim to place the burden of proof on proponents of an activity which may have an impact on habitat. This means that there is a requirement for proponents of an activity to demonstrate by weight of evidence that an activity would not significantly degrade the productive capacity of

the resource. The Group felt that while most FARs provided some details on how this important aspect of the habitat plans is addressed further clarification would be useful in the next habitat FARs.

Socio-economic factors

The NASCO Plan of Action states that the habitat plans should balance the risks and the benefits to the Atlantic salmon stocks with the socio-economic implications of any given project. The Agreement on Adoption of a Precautionary Approach states that priority should be given to conserving the productive capacity of the resource where the likely impact of resource use is uncertain. Thus, the NASCO Guidelines and Agreements do not make it clear how habitat management decisions are to be taken when there are conflicts between socio-economic and conservation issues. Most FARs also failed to provide a clear indication of how socio-economic factors are incorporated into decisions concerning the management of salmon habitat. For future reporting, it would be useful if this aspect could be addressed.

Recommendations – Additional Actions

Canada

The Group recognises that there is a large number of salmon rivers in Canada, many in remote areas. It is clear that there is a well-developed process for sharing and exchanging information on habitat issues. Furthermore, a range of legislative tools is available to protect habitat, there is a stated policy of 'No Net Loss' of habitat, and a detailed risk assessment process is described for evaluating proposed activities that could impact habitat.

However, the Group found it difficult to assess the FAR as it did not follow the guidance provided by the Council and many of the elements on which information was requested were not adequately addressed. Furthermore, a comprehensive habitat protection and restoration plan has not been developed. For the Inner Bay of Fundy salmon stocks, which are listed as endangered under the Species at Risk Act, no recovery plan has been developed. Similarly, there is no plan for a comprehensive liming programme of the 63 severely affected acidified rivers in Nova Scotia.

On the basis of the information presented to the Group, the approach is not consistent with the NASCO Plan of Action and in addition to the above, failed to adequately address the following issues:

- It is unclear how the burden of proof is placed on proponents of activities that could impact on salmon habitat;
- It is unclear how the effects of habitat activities on biodiversity are considered;
- No details are provided of how other biological factors are taken into account;
- There is no clear overview of ongoing habitat initiatives and the approach used to evaluate their effectiveness.

European Union - Denmark

The Group is aware that salmon stocks in Denmark are currently low as a result of severe habitat degradation. The FAR includes maps that illustrate the extent of contemporary salmon habitat, impact factors have been identified and there is a process for information exchange. A National Salmon Rehabilitation Plan has been developed which applies to the four salmon rivers with remnant wild stocks present. However, no details are provided on the content of the Plan, or on the management of habitat in rivers not covered by it but which are subject to severe anthropogenic stressors. On the basis of the extremely limited information presented to the Group, the approach is not consistent with the NASCO Plan of Action and in addition to the above, failed to adequately address the following issues:

- The potential risks to productive capacity are not clearly described;
- There are no details of procedures for implementing corrective measures;
- It is unclear how the burden of proof is placed on proponents of activities that could impact on salmon habitat;
- There is no information on how risks to salmon stocks are weighed with socio-economic considerations;
- It is unclear how the effects of habitat activities on biodiversity are considered;
- No details are provided of how other biological factors are taken into account;
- There is no clear overview of ongoing habitat initiatives and the approach used to evaluate their effectiveness.

European Union - Finland

The Group recognises that the salmon habitat in Finland is largely pristine, with few pressures from anthropogenic factors. However, efforts have been made to quantify problems associated with culverts and actions taken to address fish passage issues. The two rivers with wild Atlantic salmon are border rivers with Norway. In accordance with the EU Water Framework Directive, an international river basin district has been established for the Tenojoki-Naatamojoki-Paatsjoki (the latter having lost its salmon population due to dams) and a draft river basin management plan has been developed. During 2009 management measures for 2010 – 2015 will be developed. A well developed process is in place for information exchange.

On the basis of the information presented to the Group, the approach is not consistent with the NASCO Plan of Action because it fails to adequately address the following issues:

- There are no details of procedures for implementing corrective measures;
- It is unclear how the burden of proof is placed on proponents of activities that could impact on salmon habitat;
- There is no information on how risks to salmon stocks are weighed with socio-economic considerations;
- It is unclear how the effects of habitat activities on biodiversity are considered;
- No details are provided of how other biological factors are taken into account.

European Union – Ireland

The Group congratulates Ireland on an exceptionally comprehensive FAR and on the major initiatives to protect and restore salmon habitat that have been implemented in recent years. There is a comprehensive inventory and description of habitat impact factors for each river to support and inform appropriate habitat management. There are comprehensive habitat protection, restoration and enhancement plans in place both at the individual river level and for the four River Basin Districts established under the Water Framework Directive. A well-integrated process for information exchange exists and a training manual on habitat restoration has been prepared.

On the basis of the information presented to the Group, the approach is consistent with the NASCO Plan of Action.

European Union – UK (England & Wales)

This is a comprehensive FAR that is well structured and addressed all the required elements. There is a clear, comprehensive description of the approach being adopted under the Water Framework Directive including the procedures for close cooperation and partnerships with stakeholders. A River Restoration Centre has been established to provide a focal point for the exchange of information and expertise. There are comprehensive habitat protection, restoration and enhancement plans in place both at the National and individual river level, which identify impacts and potential risks that might lead to failure of ecological quality. The Group notes that alternative approaches to traditional predator control are being trialled and it would welcome an update in the next habitat FAR. The FAR also refers to the need for longer-term evaluation of restoration and enhancement schemes and similarly the Group would welcome a report on progress in this regard in the next habitat FAR.

On the basis of the information presented to the Group, the approach is consistent with the NASCO Plan of Action.

European Union – UK (Northern Ireland)

This is a comprehensive and detailed FAR, but the Group is concerned that it was submitted in draft form and was only received the day before the Group met creating difficulties for its review. There is a clear description of the approach used to assess habitat quantity and quality through the use of Geographical Information Systems (GIS). There is a well integrated process in place to share and exchange information and engage stakeholders. A River Basin Management Plan has been developed together with a programme of measures designed to address all the pressures affecting the water environment. Restoration plans have been developed or are under development for all rivers, strongly supported by use of data to identify issues and inform corrective measures.

On the basis of the information presented to the Group, the approach is consistent with the NASCO Plan of Action.

European Union - UK (Scotland)

This is a comprehensive FAR that is well structured and addressed all the required elements. A detailed inventory of historic and current habitat has been developed using a GIS approach and in accordance with the EU Water Framework Directive comprehensive salmon habitat protection and restoration plans have been developed with timelines for implementing corrective measures and monitoring. Local fishery management plans have been commissioned and are at various stages of development. Useful information on the effectiveness of habitat restoration initiatives in increasing access for salmon is provided. Monitoring programmes have been put in place to assess implementation of the plans.

On the basis of the information presented to the Group, the approach is consistent with the NASCO Plan of Action.

Iceland:

The Group recognises that the salmon habitat in Iceland is largely pristine, with few pressures from anthropogenic factors. Furthermore, through improvements to fish passage at natural waterfalls, the length of river accessible to salmon has been increased by 27%. There is a strong regulatory framework in place to reduce anthropogenic threats to salmon habitat. It is recognised that a high importance is afforded to salmon in Iceland and this has had clear benefits in protecting the resource from Hydro-electricity developments. However, the Group notes that some potential impacts have been referred to (including those associated with urbanisation around Reykjavik) in the FAR and a wider range of issues is identified in the Implementation Plan. However, no specific overview of impacts on a river-by-river basis is provided and no comprehensive habitat protection, restoration and enhancement plan has been developed although Environmental Impact Assessments or Biological Impact Assessments are required.

On the basis of the information presented to the Group, the approach is not consistent with the NASCO Plan of Action because of the lack of a habitat protection, restoration and enhancement plan.

Norway

The FAR describes a wide range of measures and approaches to managing salmon habitat in Norway. Threats to habitat and salmon generally are identified and prioritised. There is a well-developed, clear process for identifying and designating key habitat issues including a rigorous assessment of threats and how these are being addressed. A comprehensive liming programme is undertaken and has had significant benefits to date. An over-arching salmon restoration plan will be completed by 2010. National Salmon Rivers (52 rivers) and National Salmon Fjords (29 fjords) are afforded additional protection. While this is a relatively small proportion of Norway's 450 rivers they represent 75% of the present Norwegian salmon stock. An additional 118 rivers, not all of which contain salmon, have been designated under the National Protection Plan which protects them from further hydro-electric development.

However, there does not appear to be a habitat protection plan in place to cover all salmon rivers.

On the basis of the information presented to the Group, the approach is only partially consistent with the NASCO Plan of Action because there does not appear to be a habitat protection plan in place that covers all salmon rivers.

Russian Federation

The FAR contains a comprehensive overview of the Atlantic salmon habitat resources, particularly for the Murmansk Region. The threats to salmon habitat are generally well characterized. There is a strong regulatory framework in place to reduce anthropogenic threats to salmon habitat, and a process for implementing corrective measures for habitat impacts that do occur. There is also a compensation process that aims to fund projects to remedy habitat impacts at a local scale. There are programmes that aim to enhance natural productivity of salmon rivers. The Group recognizes that detailed habitat protection and restoration plans are under development for specific rivers and it looks forward to an update on progress the next time habitat FARs are reviewed.

On the basis of the information presented to the Group, the approach is only partially consistent with the NASCO Plan of Action because the plan is still under-development and it is not clear if the proposed plan will cover all salmon rivers.

USA

The Group notes that salmon habitat in the US has historically suffered severe degradation as a result of construction of dams and other factors and that major efforts are underway to rebuild and restore salmon stocks. Recently, a major initiative on the Penobscot River led by NGOs and the Penobscot First Nation has resulted in an agreement to purchase three dams at a cost of $25 million and funds are now being raised to allow for their removal. This initiative could open an estimated additional 1,000 miles to salmon and other anadromous fish. The protection afforded to the habitat in eight wild salmon rivers in Maine under the Endangered Species Act is extremely comprehensive and there is a Recovery Plan for these rivers. The Group notes that there are proposals to extend this protection to a further three large wild salmon rivers in Maine. The FAR is less clear in describing the measures currently in place to protect and restore salmon habitat in these three rivers.

On the basis of the information presented to the Group, the approach is only partially consistent with the NASCO Plan of Action because there does not appear to be a habitat protection plan in place that covers all salmon rivers.

6. Identification of common challenges and common management and scientific approaches to address them

6.1 The Council asked that the Review Group identify common management and scientific approaches to challenges as reported in the FARs. This overview will be

produced later taking account of the discussion in the Special Session at NASCO's 2009 Annual Meeting.

7. Report of the Meeting

7.1 The Group agreed this interim report and will either meet again or work by correspondence to carry out the tasks not yet completed and then issue a final report. The Group may not be able to complete its work by 31 August as requested but would assume that this will not cause problems as its final report cannot be presented until June 2010.

8. Any other business

8.1 There was no other business.

10. Close of the Meeting

10.1 The Coordinator closed the meeting and thanked the participants for their contributions.

Annex 1 of IP(09)18

List of Participants

Mr Tony Blanchard	Fisheries and Oceans, Canada
Dr Paddy Gargan	Central Fisheries Board, Ireland
Dr Peter Hutchinson	NASCO Secretariat (Rapporteur)
Mr Paul Knight	Salmon & Trout Association, UK
Dr Sergei Prusov	PINRO, Murmansk, Russian Federation
Mr Rory Saunders	NOAA Fisheries, USA
Ms Sue Scott	Atlantic Salmon Federation, Canada
Dr Malcolm Windsor	NASCO Secretariat (Coordinator)

IP(09)15

Agenda

1. Opening of the Meeting by the Coordinator
2. Adoption of the Agenda
3. Review of the Terms of Reference and consideration of working methods.
4. Consideration of the elements of best practice relating to the protection, restoration and enhancement of salmon habitat.
5. Review and analysis of FARs and identification of additional actions to ensure consistency with NASCO agreements relating to habitat.
6. Identification of common challenges and common management and scientific approaches to address them.
7. Arrangements for the 2009 Special Session.
8. Report of the meeting.
9. Any other business.
10. Close of the meeting.

Annex 16

CNL(09)43

NASCO Guidelines for the Management of Salmon Fisheries

1. Introduction

NASCO and its Parties have agreed to adopt and apply a Precautionary Approach to the conservation, management and exploitation of salmon in order to protect the resource and preserve the environments in which it lives. Accordingly, their objective for the management of salmon fisheries is **to promote and protect the diversity and abundance of salmon stocks**, and in support of this, they have developed the following guidelines and agreements:

- The Agreement on Adoption of a Precautionary Approach, CNL(98)46;
- The Decision Structure to Aid the Council and Commissions of NASCO and the relevant authorities in Implementing the Precautionary Approach to Management of North Atlantic Salmon Fisheries, CNL31.332
- The Minimum Standard for Catch Statistics, CNL(93)51.

NASCO has also agreed 'Guiding Definitions of Terms used in Salmon Fisheries Management', SCPA(00)11, which are contained in Annex 1, and has developed the following guidelines which are also relevant to the management of salmon fisheries:

- Guidelines for Incorporating Social and Economic Factors in Decisions Under the Precautionary Approach, CNL (04)57
- Guidelines on the Use of Stock Rebuilding Programmes in the Context of the Precautionary Management of Salmon Stocks, CNL(04)55

The intention in developing these guidelines is:

- to assist the jurisdictions in making further progress in implementing these agreements and guidelines;
- to provide a basis for and an exchange of information on more consistent approaches to the management of fisheries around the North Atlantic;
- to assist jurisdictions in the preparation of future Focus Area Reports on Fisheries Management as well as the process for reviewing the FARs; and
- to assist in the identification of what additional actions may be required. NASCO is also seeking to improve fairness and balance in the management of homewater and distant-water fisheries.

These guidelines are intended to serve as guidance to the NASCO Parties for the management of wild salmon fisheries subject to their national legislation.

2. Key elements of management

It is recognised that the size of salmon stocks, the management responsibilities and approaches, and the resources available for fishery management vary considerably among countries. The mixed-stock distant-water salmon fisheries at West Greenland and the Faroes

are subject to regulatory measures or decisions agreed within NASCO, but NASCO cannot be prescriptive about the specific approaches that are used to manage homewater salmon fisheries. Nonetheless, to protect the abundance and diversity of salmon stocks, the following elements of the agreements and guidelines, should be being applied in all jurisdictions or there should be a clear timescale for achieving this.

2.1 Decision making process

a. Consistent with the application of the Precautionary Approach, there should be clear descriptions available to all stakeholders of the process by which management decisions will be taken together with an indication of the types of decisions that might be expected under different stock conditions; this could take the form of a flow diagram or decision structure.

2.2 Description of the fisheries and the stocks exploited

a. A range of information should be collected on a routine basis through reporting and monitoring programmes, time series should be maintained, and reports should be published. This information should be collected for recreational, commercial, subsistence and scientific fisheries and include:
    - records of fishing activity (e.g. licence numbers, gear type, effort, location and timing);
    - catch statistics (e.g. number, size, age and river of origin of fish caught (both retained and released)); and
    - estimates of the level of unreported catches and other mortalities associated with the fishery.
b. Information should be sought on the by-catch of salmon in fisheries for other species and efforts made to identify their river of origin.

2.3 Powers to control exploitation

a. Managers should have the capability to close fisheries and regulate fishing effort and/or harvests through controls on the numbers of fish caught or the amount and type of fishing gear used so as to maintain the abundance and diversity of all river stocks;
b. Managers should be able to respond with appropriate speed to changes in individual stock status and, ideally, be able to implement pre-agreed measures to adjust harvest levels or fishing effort in-season to take account of actual run sizes or environmental conditions
c. Managers should be able to enforce the measures that are in place to regulate fishing activity and to minimise the level of unreported catches.

2.4 Reference points (conservation limits or other measures of abundance and diversity)

a. Conservation limits (CLs) should be established to define adequate levels of abundance for all river stocks of salmon; these should be established for separate sea age components (i.e. one-sea-winter (1SW) and multi-sea-winter (MSW) salmon);
b. Ideally, these rivers specific CLs should be established based on data derived from each river;
c. For many river systems, however, information on the stock will be limited, in which case the CLs should be set on the basis of information derived from other rivers;
d. Where CLs have not been established, alternative measures should be used as reference points and should be shown to be effective and appropriate in defining adequate stock levels;
e. Management targets (MTs) should also be established at a level above the CL to assist fishery managers in ensuring that there is a high probability of stocks exceeding their CLs, or alternative reference point; this probability level should be defined by managers;
f. Information should also be collected on the diversity of stocks (e.g. run-timing, age, size etc) to provide a basis for management.

2.5 Achievement of the reference points or other measures of abundance and diversity

a. It should be normal practice to evaluate the extent to which stock levels have met the management objectives with regard to stock abundance and diversity each year;
b. Ideally, stock levels should also be forecast for one or more years ahead to provide some predictions of future expected achievement of management objectives under current (or modified) management measures;
c. Assessments of stock abundance and diversity based on catches involve considerable uncertainty, so other sources of information should be used to confirm the status of stocks (e.g. juvenile surveys, counter and trap data);
d. The management measures introduced should take into account the uncertainties in the data used;
e. Assessing the status of the stock and determining the need for management action should take account of the duration and degree of any failure to achieve the reference point, and the trend in stock abundance.
f. Where there is insufficient information on any failure to achieve the reference point, greater caution should be exercised and further research should be undertaken to understand the reason for the failure.

2.6 Other factors influencing the stock(s)

a. While the short-term response to a stock failing to exceed its reference point may be to reduce or eliminate exploitation in salmon fisheries, other factors may be driving abundance, and actions should also be taken to identify and address these problems.[3]

3 In preparation of the FARs on Fishery Management, this information could be cross-referenced from other FARs

2.7 Management actions to control harvest

a. In managing salmon fisheries, priority should be given to conserving the productive capacity of all individual salmon river stocks;
b. Managers should demonstrate that they are being more cautious when information is uncertain, unreliable or inadequate, and the absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures;
c. Ideally, forecasts of stock abundance for all stocks contributing to the fishery would be used to determine the harvestable surplus or appropriate level of fishing effort, with in-season adjustments being made to reflect actual returns;
d. Where forecasts of abundance are not available, harvest levels could be based on historical data to assess if there is likely to be a harvestable surplus;
e. Fishing on stocks that are below CL should not be permitted. If a decision is made to allow fishing on a stock that is below its CL, on the basis of overriding socio-economic factors, fishing should clearly be limited to a level that will still permit stock recovery within a stated timeframe.

2.8 Mixed-stock fisheries (MSFs)

NASCO has defined MSFs as fisheries exploiting a significant number of salmon from two or more river stocks; NASCO has also agreed that management of homewater fisheries should be based on the status of individual river stocks and management of distant water fisheries on the status of the stock complexes defined by managers.

ICES has advised that the management of all fisheries should be based upon assessments of the status of individual stocks. Fisheries on mixed-stocks, particularly in coastal waters or on the high seas, pose particular difficulties for management, as they cannot target only stocks that are at full reproductive capacity if there are stocks below CL within the mixed-stock being fished. Conservation would be best achieved if fisheries target stocks that have been demonstrated to be at full reproductive capacity. Fisheries in estuaries and especially rivers are more likely to meet this requirement.

In addition to the guidance in 2.7, the following actions should therefore apply to MSFs:

a. Rational management of a MSF requires knowledge of the stocks that contribute to the fishery and the status of each of those stocks;
b. Where such fisheries operate, managers should have a clear policy for their management that takes account of the additional risks attributable to, among other things, the number of stocks being exploited and their size and productivity;
c. Management actions should aim to protect the weakest of the contributing stocks;
d. Consideration should also been given as to whether the above guidelines for MSFs apply to certain fisheries operating within larger rivers or estuaries.

2.9 Socio-economic factors

a. In evaluating management options conservation of the salmon resource should take precedence; and
b. Transparent policies and processes should be in place to take account of socio-economic factors in making management decisions and for consulting stakeholders.

2.10 Effectiveness of management measures

a. Managers should assess the expected effects of management actions and the timescale in which they will occur prior to their implementation;
b. Managers should also monitor the outcomes of the management actions to determine whether they have achieved the desired aims.

SCPA(00)11

Guiding Definitions of Terms Used in Salmon Fisheries Management

Distant water fisheries: Fisheries in areas outside the jurisdiction of the country of origin. With respect to the NASCO Convention this specifically refers to fisheries under the jurisdiction of the Faroe Islands and Greenland.

Homewater fisheries: Fisheries within the jurisdiction of the countries of origin (within 12 miles).

Population: A group of salmon, members of which breed freely with each other, but not with others outside the group. The smallest group that can be usefully managed.

Stock: A management unit comprising one or more salmon populations. This would be established by managers, in part, for the purpose of regulating fisheries. (The term may be used to describe those salmon either originating from or occurring in a particular area. Thus, for example, salmon from separate rivers are referred to as "river stocks" and salmon occurring at West Greenland may be referred to as the "West Greenland stock").

Mixed stock fishery: A fishery exploiting a significant number of salmon from two or more river stocks.

Conservation: The process of ensuring that the abundance of salmon in a stock is maintained at or above a satisfactory level (i.e. above the conservation limit with an agreed probability) and that natural diversity is maintained.

Conservation Limits (CL): CLs demarcate the undesirable spawning stock level at which recruitment would begin to decline significantly. The level cannot be used in management without also defining the acceptable probability (e.g. proportion of years) when the stock may be permitted to fall below the CL.

Currently NASCO and ICES define the CL as the spawning stock level that produces maximum sustainable yield. Formerly referred to as Minimum Biologically Acceptable Level (MBAL) or a Spawning Target.

Management Target (MT): The MT is the stock level employed by managers/scientists to aim at in order to achieve the objective of exceeding the CL for the desired proportion of years and for achieving other management objectives. The MT will therefore be greater than the CL with the margin between them at least reflecting the risks, decided by managers, of stocks falling below the CL .

Stock Rebuilding Programme (SRP): An SRP is an array of management measures, including possibly habitat improvement, exploitation control and stocking, designed to restore a stock above its conservation limit. An SRP could be a part of setting routine management plans.

Annex 17

CNL(09)15

Focus Area Report on Aquaculture, Introductions and Transfers, and Transgenics

At NASCO's Twenty-Fifth Annual Meeting the Council agreed that the third focus area topic would be aquaculture and related activities. Draft Terms of Reference (TORs), CNL(08)37 (attached), were developed. It was agreed that these should be issued to the Parties and that any comments on the draft TORs should be forwarded to the Secretariat by 1 April 2009. We have received no comments from the Parties. However, last year the Council established a Task Force to develop best practice guidelines and standards to address the impacts of aquaculture on wild salmon stocks. The interim report by the Task Force which includes draft guidance on best practice is contained in the report of the Liaison Group, CNL(09)17.

In the event that the Council adopts best practice guidance there may be a need to consider how this is incorporated into the TORs for the Review Group and how reporting on the best practice guidance is to be achieved.

Secretary
Edinburgh
11 May 2009

CNL(08)37

Focus Area Report on Aquaculture, Introductions and Transfers, and Transgenics

The first phase of the Next Steps process focused on the development of Implementation Plans by the Parties. The *Ad Hoc* Review Committee that met in March 2006 reviewed these plans for uniformity with the Council's Guidelines for their preparation [NSTF (06)10], and assessed how well the plans would lend themselves to evaluation in relation to NASCO's Resolution and Agreements.

Under the Next Steps process, Focus Area Reports (FARs) (as described in NSTF(06)10) are intended to provide an in-depth assessment of measures, as reflected in Implementation Plans, to implement NASCO Agreements, Resolutions, and Guidelines. The FARs provide the basis for review of the current management approach and proposed actions and to assess their efficacy in addressing the overall objectives of NASCO and in particular, to conserve and restore salmon stocks.

The Next Steps process identified three focus areas: Fishery Management, Protection and Restoration of Habitat, and Aquaculture and associated activities. The Fisheries Management FAR was conducted in 2007/2008; the Habitat Protection, Restoration and Enhancement FAR was conducted in 2008/2009; and the third focus area is scheduled for 2009/2010. The third and final focus area is aquaculture, introductions and transfers, and transgenics.

The primary relevant NASCO document is the "Resolution by the Parties to the Convention for the Conservation of Salmon in the North Atlantic Ocean to Minimize Impacts from Aquaculture, Introductions and Transfers, and Transgenics on the Wild Salmon Stocks" (The Williamsburg Resolution) (CNL(06)48). The Williamsburg Resolution identifies the desire of NASCO to minimize the possible adverse impacts of aquaculture, introductions and transfers and transgenics on wild stocks.

Focus Area Report on Aquaculture, Introductions and Transfers, and Salmonids

Each Party or Jurisdiction will prepare a Focus Area Report by December 31, 2009. The report should be broadly structured as follows:

1. Introduction:

To provide an overview of:

1.1. Activities within the Party or Jurisdiction related to aquaculture, introductions and transfers, and transgenics; and

1.2. Policy and management structure as it relates to aquaculture, introductions and transfers, and transgenics;

2. Implementation of the Williamsburg Resolution:

To provide an assessment of progress made and/or planned to address the following articles in the Williamsburg Resolution:

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

2.2 Each Party should require the proponent of an activity covered by the Williamsburg Resolution to provide all information necessary to demonstrate that the proposed activity will not have a significant adverse impact on wild salmon stocks or lead to irreversible change.

2.3 The Parties should develop and apply appropriate risk assessment methodologies in considering the measures to be taken in accordance with the Williamsburg Resolution.

2.4 Each Party shall take measures in accordance with Annexes 2, 3 and 4 of the Williamsburg Resolution to:

- 2.4.1 minimize escapes of farmed salmon to a level that is as close as practicable to zero through the development and implementation of action plans as envisaged under the Guidelines on Containment of Farm Salmon (Annex 3 of the Williamsburg Resolution - CNL(01)53);
- 2.4.2 minimize impacts of ranched salmon by utilizing local stocks and developing and applying appropriate release and harvest strategies;
- 2.4.3 minimize the adverse genetic and other biological interactions from salmon enhancement activities, including introductions and transfers; and
- 2.4.4 minimize the risk of disease and parasite transmission between all aquaculture activities, introductions and transfers, and wild salmon stocks.

2.5 Movements into a Commission area of reproductively viable Atlantic salmon or their gametes that have originated from outside that Commission area should not be permitted.

2.6 Introductions into a Commission area of reproductively viable non-indigenous anadromous salmonids or their gametes should not be permitted.

2.7 No non-indigenous fish should be introduced into a river containing Atlantic salmon without a thorough evaluation of the potential adverse impacts on the Atlantic salmon population(s) which indicates that there is no unacceptable risk of adverse ecological interactions.

2.8 The Parties should apply the Guidelines for Action on Transgenic Salmon (Annex 5 of the Williamsburg Resolution – CNL(04)41), to protect against potential impacts from transgenic salmon on wild stocks.

2.9 Parties should, as appropriate, develop and apply river classification and zoning systems in accordance with Annex 6 of the Williamsburg Resolution for the purposes of developing management measures concerning aquaculture, and introductions and transfers.

2.10 The Parties should initiate corrective measures without delay where significant adverse impacts on wild salmon stocks are identified.

2.11 Each Party should encourage research and data collection (as detailed in Annex 7 of the Williamsburg Resolution) in support of the Williamsburg Resolution and should take steps to improve the effectiveness of the Williamsburg Resolution.

2.12 Educational materials should be developed and distributed to increase awareness of the risks that introductions and transfers of aquatic species may pose to wild salmon stocks and the need for measures to control these activities.

In considering the above, the Report should identify the expected extent and timescale of effects and an explanation of how socio-economic factors are applied and how this affects the attainment of NASCO's objectives.

It should be noted that Article 10 of the Williamsburg Resolution states that full implementation of the measures in the Resolution and its Annexes is essential in order to have confidence that the wild stocks are protected from irreversible genetic change, from ecological impacts and from impacts of disease and parasites.

The *Ad Hoc* Review Group for the Focus Area Review on Aquaculture, Introductions and Transfers, and Transgenics

The *Ad Hoc* Review Group shall:

1. Review and analyze the FARs on Aquaculture, Introductions and Transfers, and Transgenics.

2. Prepare a report which includes the following:

   a. Identification of common challenges in the FARs;
   b. Identification of common management and scientific approaches to challenges, as reported in the FARs;
   c. Compilation of recommended best practice with the intention of increasing the collaborative learning aspect of the Next Steps Process; and
   d. Recommendations and/or feedback on each FAR where additional actions may be helpful to ensure implementation of the 12 commitments within the Williamsburg Resolution.

The procedure the *Ad Hoc* Review Group will use to accomplish its work is as follows:

1. Meet in February 2010 to review the FARs submitted, collaborate to highlight questions and/or issues to be sent back to the Parties/Jurisdictions by March 1, 2010. These answers should assist the *Ad Hoc* Review Group in preparing their report as outlined in item 2 above. Responses would be due from the Parties/Jurisdictions by April 1, 2010.

2. Provide a draft report, as described in item 2, by May 15, 2010 for circulation to contracting Parties prior to the annual meeting.

3. Present an overview of the draft report at the Special Session at the 2010 Annual Meeting, and facilitate a discussion on the four areas identified above in item 2. Parties and jurisdictions will not be expected to present their FAR during the Special Session, but may be asked to present information at the request of the *Ad Hoc* Review Group.

4. Following the Special Session, prepare a final report for submission to the President by August 31, 2010.

Composition of the *Ad Hoc* Review Committee

a. Denmark (in respect of the Faroe Islands or Greenland (but not both);
b. The remaining Parties to NASCO – 2 persons (to the extent possible reflecting balance among the membership and appropriate expertise);
c. The Standing Scientific Committee – 1 person;
d. Accredited NGO representatives – 2 persons (ideally one NGO from Europe and one from North America)

For 2009/2010, it was agreed that the persons representing NASCO would be X. The NGO representatives will be X.

The Secretary should act as *Ad Hoc* Review Group Coordinator. The individuals appointed by Parties should act in the interests of NASCO and in a personal capacity, specifically not representing their Party.

Schedule of Work

December 2009	Parties/Jurisdictions submit FARs
January 2010	Members of the *Ad Hoc* Review Group read and review FARs
February 2010	*Ad Hoc* Review Group meets to agree questions and issues to be raised with Parties/Jurisdictions
March 1, 2010	Secretariat to send questions and issues on FARs to Parties/ Jurisdictions
April 1, 2010	Parties/Jurisdictions return responses on questions and issues to *Ad Hoc* Review Group
April 2010	*Ad Hoc* Review Group conducts review of responses to see if questions were addressed and prepares draft report to the Council and for discussion at the Special Session
May 15, 2010	*Ad Hoc* review Group provides draft report to the Secretariat for distribution prior to the annual meeting
June 2010	Special Session
August 31, 2010	*Ad Hoc* Review Group submits final report to the President

Annex 18

CNL(09)16

Summary of Annual Reports on Implementation Plans

Background

1. The Council's Guidelines for the Preparation of Implementation Plans and for Reporting on Progress, NSTF(06)10, indicate that reports to the Council should be provided in two formats: written annual reports and focus area reports (FARs) presented at Special Sessions and subject to review. A compilation of the fisheries management and habitat FARs is contained in CNL(09)13 (on CD) and the reports of the Fisheries Management and Habitat *Ad Hoc* Review Groups are included in documents CNL(09)11 and CNL(09)12, respectively. The primary purpose of the annual reports is to provide a summary of all the actions that have been taken under Implementation Plans in the previous year including details of any actions in accordance with Articles 14 and 15 of the Convention. The information sought is as follows:

   - details of any significant changes to the management outlined in the introduction to the Implementation Plan;
   - a description of any significant changes in the status of stocks and information on catches;
   - a description of any new factors which may significantly affect the abundance of salmon stocks;
   - an account of all actions taken under the Implementation Plan;
   - details of any proposed revisions to the Implementation Plan.

2. Clearly, the combination of annual reports and FARs places a considerable burden on the Parties and jurisdictions and last year the Council asked that a simple reporting format be developed. This reporting format was agreed through correspondence with Heads of Delegations and was used for the first time in 2009. In order to avoid duplication it was agreed that no information needed to be provided in the annual return on the focus area topic under consideration unless a jurisdiction wished to supplement its FAR or had not submitted a FAR. The FAR topic for 2009 is habitat protection, restoration and enhancement.

3. To date, annual returns have been received from the following Parties and jurisdictions Canada, Denmark (in respect of the Faroe Islands and Greenland) - Greenland, EU - Finland, EU - Ireland, EU - Spain, EU - Sweden, EU - UK(England and Wales), EU - UK(Northern Ireland), EU - UK(Scotland), Iceland, Norway, Russian Federation and USA. These returns are presented separately in individual Council papers.

Changes to management outlined in the Introduction to Implementation Plans

4. The following changes have been notified:

Greenland: It is no longer permitted to sell salmon to hotels, restaurants, institutions, etc any more. Only sale on the open air markets is allowed.

EU - Ireland: The Standing Scientific Committee's advice on the number of stocks where there is an identifiable surplus over the conservation limit and consequently an opportunity for a harvest is presented. In summary, there are 57 stocks where a harvest can proceed in 2009. In addition, there are 13 MSW or spring stocks where a harvest of spring salmon is possible.

EU - UK(England and Wales): The Strategy for the Management of Salmon in England and Wales entitled "Better Sea Trout and Salmon fisheries: our strategy for 2008 – 2021" has been updated. Management planning for salmon is increasingly becoming aligned with the Water Framework Directive.

EU - UK(Northern Ireland): The River Faughan and tributaries in the Foyle catchment were designated as a Special Site of Scientific Interest and a candidate Special Area of Conservation under the EU Habitats Directive in 2008. Legislation will take effect on 1 June 2009 to transfer the functions of the Fisheries Conservancy Board to the Department of Culture, Arts and Leisure. The Northern Ireland Environment Agency has replaced the Environment and Heritage Service of the Department of the Environment.

EU – UK(Scotland): The Strategic Framework for Scottish Freshwater Fisheries was published on 4 July 2008. It places emphasis on holistic management aligning it with European Conservation Directives and the Water Framework Directive. It identifies a list of actions under eight main themes aimed at sustainably managed freshwater fish and fishery resources that provide significant economic and social benefits. Actions for salmon are also included in new River Basin Management Plans.

Iceland: The Competent Management Authority has changed from the Food and Veterinary Authority to the Salmonid Management Division of the Directorate of Fisheries.

USA: There are a number of changes in the US that will result in changes to the Implementation Plan although some will only be finalised in 2009. The Implementation Plan will be changed to indicate that a catch and release fishery occurred in the Penobscot River in Spring 2008. The Services have proposed that the three largest river systems in Maine, including the Penobscot, be included in the Gulf of Maine (GOM) Distinct Population Segment (DPS) listed under the Endangered Species Act (ESA). Designation of Critical Habitat under the ESA will also result in changes to the Implementation Plan. A Recovery Framework for the GOM DPS is also being developed to establish clear and common goals and direction among the various management agencies in Maine.

Changes in Stock Status and Catch Statistics

5. The catch statistics and information on unreported catches and on catch and release are presented in Annex 1 using the format previously agreed by the Council.

EU - Ireland: Information in tabular form has been provided which shows estimated returns in 2009, the conservation limit and the stated surplus in rivers where a harvest is possible. For rivers below their conservation limits the % attainment of the CL is shown (catch and release fishery is permitted if 65% of the CL is achieved). Information is also provided for small rivers (<10 fish) and impounded rivers. Finally, a figure showing changes in salmon counts between 2007 and 2008 is shown for a number of rivers.

EU - UK(England and Wales): The annual review of stock status for 2008 shows:

- 13 rivers (20%) were classified as 'not at risk' – i.e. had a high probability (> 95%) of meeting the management objective;
- 24 rivers (38%) were classified as 'probably not at risk' – i.e. had a probability of 50% to 95% of meeting the management objective;
- 15 rivers (23%) were classified as 'probably at risk' – i.e. had a probability of 5% to 50% of meeting the management objective;
- 12 rivers (19%) were classified as 'at risk' – i.e. had a very low probability (<5%) of meeting the management objective.

The 'at risk' category does not mean stocks are in danger of becoming extinct, but rather that they are falling well short of management objectives.

In 2000, the UK Government set a target of 27 principal salmon rivers in England meeting their Conservation Limits in 2008. The 2008 results show that this has been achieved; 27 rivers in England were at or above their CL. At the same time, a target to "reduce the estimated illegal and unreported catch from 35 to not more than 25 tonnes by 2008" has also been achieved. New targets are now under consideration.

EU - UK(Scotland): Taken over the time series as a whole, the total annual rod catch shows no clear long term trend suggesting stable overall numbers both entering fresh water and escaping to spawn. The increases in the 2004 to 2007 rod catches compared to previous 5-year averages may be taken as evidence of a recent increase in the numbers of fish entering fresh water and, given the record levels of catch and release reported, escaping to spawn. However, the status of stocks on smaller geographical scales (e.g. among or within catchments) may differ both from each other and also from the overall assessments presented above and the long term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak.

New factors which may significantly affect the abundance of salmon stocks

6. The following new factors have been reported:

EU - Sweden: A major review of the Implementation Plan started in 2008 and will most likely be completed in 2009. More comprehensive data are being collected in order to estimate the potential production of individual rivers.

EU-UK (England and Wales): The closure of the Irish drift net fishery in 2007 should mean that up to 5,000 more grilse returned to English and Welsh home-waters, representing about a 4% increase overall. However, this increase is too small to detect above the normal annual variation. Rivers in the south and west of England and Wales are expected to have benefited the most.

EU-UK (Northern Ireland): No new factors identified. Survival indices remain within recent temporal trends. Escapement data indicated generally increased adult returns on monitored catchments in 2008 suggesting that recent fishery and habitat management measures are conserving stocks. Comparison of 2008 rod CPUE with the previous 5 year average indicated an increase in 13 of 15 catchments.

EU-UK (Scotland): The closure of 2 major Scottish coastal fisheries in 2007 should mean that up to 2,000 more grilse and salmon will be enabled to return to their natal rivers. This represents an increase of less than 2% which is too small to detect within normal annual variation. Scottish rivers in the North and North-West are likely to be the main beneficiaries of this.

Iceland: Salmon catches resulting from enhancement of rivers with salmon smolts has increased and accounts for 35% of the total catch in 2008.

Norway: Reference is made to a number of concerns about diseases and parasites of salmon including Viral Haemorrhagic Septicaemia (VHS), Pancreas Disease (PD) and Heart and Skeletal Muscle Inflammation (HSMI). There are also concerns about sea lice levels, particularly given evidence of resistance to delousing chemicals. There is also a concern that sea lice may be a carrier and vector of several fish diseases including new pathogens such as microsporidium. Mass mortalities of wild juvenile salmon have occurred in some rivers due to Proliferate Kidney Disease (PKD) which may be associated with increased water temperatures. Heavy infections of red vent syndrome were observed in wild salmon broodstock. Global warming and increasing water temperatures will require increased awareness with regard to fish diseases. Concerns are also raised about exotic diseases becoming established in farmed cod which could pose a threat to salmon.

USA: The 2008 spring fishery authorised by the Maine Department of Marine Resources poses a biological risk to the population in the Penobscot River given that no US rivers are meeting their conservation limits. The Penobscot is suffering reduced reproductive capacity. Once the ESA listing decision is finalised and the associated ESA protections are in place, the Penobscot fishery would only be able to be permitted if it could be demonstrated to be for the benefit of the species.

Management Actions taken under the Implementation Plans

7. As there is a considerable amount of information on the management actions taken it is reported in the returns for each jurisdiction and is not summarised here.

Revisions to Implementation Plans

8. EU-UK (England and Wales): Work on the Environment Agency's Salmon Lifecycle Model is being deferred indefinitely because of priority being given to application of the Water Framework Directive.

EU-UK (Northern Ireland): The programme for the development of further conservation and management targets and catchment management plans 2008 – 2013 will be flexible. A review of the approach was concluded in 2008 and is reported in the Habitat FAR.

EU-UK (Scotland): The need for changes to the Implementation Plan will be based on an evaluation of the impact of the implementation of the priorities for action contained in the Strategic Framework for Scottish Freshwater Fisheries.

Norway: Proposed revisions regarding sea lice include new legislation designed to delay development of resistance in sea lice to chemical treatments and development of a monitoring programme to detect resistant sea lice. Work is ongoing to update some sections of the Implementation Plan.

USA: The likely revisions to the management regime described in paragraph 4 above will likely result in changes being made to the management actions throughout the Plan as necessary and appropriate. Revisions will also be made to reflect the development and implementation of the new salmon recovery framework. Revisions will also likely be made to the section on homewater recreational fisheries and associated management actions during 2009.

Conclusions

9. This is the first year that the annual returns have been submitted using the new format. Feedback from the Parties on this new format would be welcome, in particular whether it is an appropriate basis for the return in 2010.

Secretary
Edinburgh
27 May 2009

Table 1: Official Catch Statistics

	Provisional 2008 Catch (Tonnes)	Provisional 2008 Catch according to Sea Age						Confirmed 2007 Catch (Tonnes)
		1 SW		MSW		Total		
		No	Wt	No	Wt	No	Wt	
Canada	148	52,362	90	11,737	57	64,099	148	112
Denmark (in respect of Faroe Islands and Greenland)	26							25
Faroe Islands	0							0
Greenland	26							25
European Union	444	-	-	-	-	-	-	453
Iceland	193	-	-	-	-	-	-	127
Norway	807	89,228	170.2	103,151	636.3	192,379	806.5	767
Russian Federation	73	-	-	-	-	-	-	63
USA	0	-	-	-	-	-	-	0

Note: The breakdown of the Canadian catch by sea-age is into ‘small’ and ‘large’ salmon. Catch data for the Faroe Islands and the EU Member States that have not made an annual return are from the ICES ACOM report.

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

	Canada	Denmark (Faroe Islands and Greenland)	European Union	Finland	Iceland	Norway	Russian Federation	Sweden	USA
1960	1636	60	2641		100	1576	1100	40	1
1961	1583	127	2276		127	1456	790	27	1
1962	1719	244	3894		125	1838	710	45	1
1963	1861	466	3842		145	1697	480	23	1
1964	2069	1539	4242		135	2040	590	36	1
1965	2116	861	3693		133	1900	590	40	1
1966	2369	1338	3549		110	1823	570	36	1
1967	2863	1600	4492		146	2058	883	25	1
1968	2111	1167	3623		162	1752	827	150	1
1969	2202	2350	4407		133	2083	360	76	1
1970	2323	2354	4069		195	1861	448	52	1
1971	1992	2511	3745		204	1847	417	35	1
1972	1759	2146	4261	32	250	1986	462	38	1
1973	2434	2402	4604	50	156	2126	772	73	3
1974	2539	1945	4432	76	265	1973	709	57	1
1975	2485	2086	4500	76	166	1754	811	56	2
1976	2506	1479	2931	66	225	1530	542	45	1
1977	2545	1652	3025	59	130	1488	497	10	2
1978	1545	1159	3102	37	291	1050	476	10	4
1979	1287	1694	2572	26	225	1831	455	12	3
1980	2680	2052	2640	34	249	1830	664	17	6
1981	2437	2602	2557	44	163	1656	463	26	6
1982	1798	2350	2533	83	147	1348	364	25	6
1983	1424	1433	3532	79	198	1550	507	28	1
1984	1112	997	2308	75	159	1623	593	40	2
1985	1133	1430	3002	49	217	1561	659	45	2
1986	1559	1490	3524	38	330	1597	608	53	2
1987	1784	1539	2593	49	250	1385	559	47	1
1988	1311	1136	2833	34	412	1076	419	40	1
1989	1139	701	2450	52	277	905	359	29	2
1990	912	542	1645	59	426	930	316	33	2

	Canada	Denmark (Faroe Islands and Greenland)	European Union	Finland	Iceland	Norway	Russian Federation	Sweden	USA
1991	711	533	1139	69	505	877	215	38	1
1992	520	260	1506	77	636	867	166	49	1
1993	373	35	1483	70	656	923	140	56	1
1994	355	18	1919	48	448	996	141	44	0
1995	259	86	1852	-	439	839	130	-	0
1996	290	92	1474	-	358	787	131	-	0
1997	229	59	1179	-	154	630	111	-	0
1998	157	17	1183	-	164	740	130	-	0
1999	152	19	1016	-	147	811	102	-	0
2000	153	29	1336	-	85	1176	124	-	0
2001	148	42	1407	-	88	1267	114	-	0
2002	148	9	1245	-	97	1019	118	-	0
2003	141	9	1012	-	110	1071	107	-	0
2004	161	15	978	-	130	784	82	-	0
2005	139	14	884	-	149	888	82	-	0
2006	132	23	703	-	114	931	91	-	0
2007	112	25	453	-	127	767	63		0
2008	148	26	444	-	193	807	73	-	0

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

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

3. Figures from 1986 are the official catch returns to NASCO. Figures to 1986 are based on data contained in the ICES Working Group Reports. For 2007 and 2008 the catch data for Faroe Islands and the EU Member States that did not make a return to NASCO are from the ACOM report.

Catch and release

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Canada	62,106	58,961	54,425	51,442	57,005	45,886	49,279	42,820	58,000
Denmark (Faroe Islands and Greenland)	0	0	0	0	0	0	0	0	0
European Union	27,346	33,504	32,984	34,968	55,064	60,145	62,812	82,977	81,301
Iceland	2,918	3,607	5,576	5,357	7,294	9,150	8,261	6,175	15,400
Norway	0	0	0	0	0	0	0	0	5,512
Russian Federation	12,624	16,410	25,248	33,862	24,679	23,592	33,380	44,341	41,881
USA	0	0	0	0	0	0	424	-	61
Total	**104,994**	**112,482**	**118,233**	**125,629**	**144,042**	**138,773**	**154,156**	**176,313**	**202,155**

Notes:

No data available for the Faroe Islands or the EU Member States that did not make a return.
Reporting procedures for caught and released salmon will be introduced in EU - Sweden in 2009.
Reporting procedures for caught and released salmon were introduced in Norway in 2008 but the numbers are uncertain.
The catch and release figure for EU - UK(Northern Ireland) is for the FCB area only.

Unreported catches

Year	1999	2000	2001	2002	*2003*	2004	2005	2006	2007	2008
Canada	133	124	81	84	*118*	101	101	56	-	21
Denmark (Faroe Islands and Greenland)	10-15	10	10	11	*10*	11	11	11	12	10
European Union	215	240	169	165	*125*	116	114	95	72	54
Iceland	2	2	2	2	*2*	3	3	3	4	17
Norway	320-540	440-760	500-860	410-690	320-600	252-420	285- 475	299- 499	247 - 411	260 - 432
Russian Federation	237-255	249-309	200-252	166-206	99-152	110	70-103	70-103	25 - 77	-
USA	0	0	0	0	*0*	0	0	0	0	0
Total	**917-1,160**	**1,065-1,445**	**962-1,374**	**838-1,158**	***674-1,007***	**593-761**	**584-807**	**534-767**	**360 - 576**	**362 - 534**

Note: No data available for the Faroe Islands or the EU Member States that did not make a return.
The figure for Canada is based on unreported catches of 17 tonnes for Quebec and 3.2 tonnes for Gulf/Maritimes Region. In addition, 257 salmon were observed from illegal activities in Newfoundland and Labrador.

Annex 19

Council

CNL(09)17

Report of the meeting of North Atlantic salmon farming industry and NASCO Liaison Group

Attached is the report of the Liaison Group meeting with the North Atlantic salmon farming industry. This meeting was held at the request of ISFA. The report includes in Annex 3 the interim report of the Task Force on best practice in aquaculture to address impacts on wild salmon stocks.

Secretary
Edinburgh
7 April 2009

SLG(09)4

Report of the Meeting of North Atlantic salmon farming industry and NASCO Liaison Group

North Star Conference Room, Westin Copley Place Hotel, Boston, USA 16 March, 2009

1. Opening of the Meeting

1.1 The Chair, Ms Mary Colligan (USA) opened the meeting and welcomed participants to Boston. She referred to the progress made by the NASCO/ISFA Task Force which had met immediately prior to the Liaison Group and noted that all but three of the participants at the Liaison Group meeting had also participated in the work of the Task Force. The Liaison Group meeting had been requested by ISFA so that a progress report on the work of the Task Force could be made and to allow for feedback by the industry representatives on its findings. NASCO would consider the interim report from the Task Force at its Annual Meeting in June.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Liaison Group adopted its agenda, SLG(09)2 (Annex 2)

3. Report on, and any matters arising from, the 2007 Liaison Group Meeting

3.1 The report of the 2007 Liaison Group meeting is contained in NASCO Council document CNL(07)18. No matters arising from this meeting were raised.

4. Report of the meeting between ISFA and NASCO Secretariats on 10 November 2008

4.1 A meeting of the ISFA and NASCO Secretariats had been held on 10 November 2008 to discuss arrangements for the meeting of the Task Force. The meeting had developed recommendations on the composition, timetable and Terms of Reference for the Task Force. The report of the meeting (CNL32.1171) had been agreed by NASCO and ISFA.

5. Presentation of the Interim report of the Task Force on Best Practice in Aquaculture

5.1 The interim report of the Task Force meeting was made available to all participants at the Liaison Group meeting, ATF(09)8 (Annex 3).

6. Feedback from the Liaison Group on the Task Force's interim report

6.1 The Liaison Group welcomed the progress made to date by the Task Force. ISFA accepted the interim report of the Task Force. This report will be considered by NASCO at its Annual Meeting in June.

7. Election of Chairman

7.1 Under the Liaison Group's Constitution the Chairman is appointed to serve for a period of two years and is held alternately by representatives of NASCO and the North Atlantic Salmon farming industry. The current Chair, Mary Colligan (NASCO), chaired the 2007 and 2009 Liaison Group meetings. The Liaison Group elected Mr Sebastian Belle (ISFA) as its Chairman.

8. Date and Place of Next Meeting

8.1 The Liaison Group recommends that its next meeting be held in 2010 at a date and venue to be confirmed.

9. Any Other Business

9.1 There was no other business.

10. Report of the Meeting

10.1 The Liaison Group agreed a report of its meeting.

11. Close of the Meeting

11.1 The Chair thanked the participants for their contributions and closed the meeting.

Annex 1 of SLG(09)4

List of Participants

Sebastien Belle (Maine Aquaculture Association, USA)
(Rapporteur)

Mary Colligan (NOAA Fisheries, USA)
(Chair)

Paddy Gargan (Central Fisheries Board, Ireland)

Nell Halse (President of ISFA)

Peter Hutchinson (NASCO Secretariat)

Heather Jones (Scottish Government, UK)

Kjell Maroni (FHL Aquaculture, Norway)

Miranda Pryor (Newfoundland Aquaculture Industry Alliance, Canada)

Ruth Salmon (Canadian Aquaculture Industry Alliance, Canada)

Jamey Smith (Fisheries and Oceans, Canada)

Andrew Wallace (Association of Salmon Fishery Boards, UK - NGO representative)

Malcolm Windsor (NASCO Secretariat)

John Webster (Scottish Salmon Producers' Organization, UK)

Annex 2 of SLG(09)4

SLG(09)2

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Report on, and any matters arising from, the 2007 Liaison Group Meeting
4. Report of the meeting between ISFA and NASCO Secretariats on 10 November 2008
5. Presentation of the Interim report of the Task Force on Best Practice in Aquaculture
6. Feedback from the Liaison Group on the Task Force's interim report
7. Election of Chairman
8. Date and Place of Next Meeting
9. Any Other Business
10. Report of the Meeting
11. Close of the Meeting

ATF(09)8

Interim Report of the Meeting of the ISFA-NASCO Task Force on Best Practice in Aquaculture to Address Impacts on Wild Salmon Stocks

13 – 15 March 2009
North Star Conference Room, Westin Copley Place Hotel, Boston, USA

1. Opening of the Meeting

1.1 The Co-Chairs, Ms Mary Colligan (USA) and Dr John Webster (UK), opened the meeting, welcomed members of the Task Force to Boston and thanked Fisheries and Oceans Canada for hosting the meeting. Ms Colligan noted that while the Task Force had a significant challenge before it, there was an excellent basis on which to build including NASCO's Williamsburg Resolution, that had been developed in consultation with the industry, and the outcomes of the three international symposia co-convened by NASCO and ICES. The last symposium held in Bergen in 2005 had concluded that cultured salmon could have significant negative impacts on wild salmon and that while there had been considerable progress in addressing these impacts further action was needed, particularly in relation to sea lice and escapes, in order to safeguard the wild stocks. The Bergen symposium had also highlighted research requirements in relation to impacts of aquaculture on the wild stocks. She indicated that the role of the Task Force would be to review existing guidelines and standards to address impacts of aquaculture on the wild stocks and to identify those measures that are considered to be most effective in addressing impacts, what information is available to evaluate their effectiveness and the additional measures that may be needed to safeguard the wild stocks. Dr Webster referred to the progress made to date through the NASCO/ISFA Liaison Group and the need to make further progress to address the remaining challenges. He indicated that the industry had prepared a compilation of legislation and Codes of Practice to inform the work of the Task Force.

1.2 Dr Jamey Smith, on behalf of Fisheries and Oceans Canada, welcomed participants and indicated that it was a pleasure for the Canadian Government to host the meeting. He indicated that all those involved in the ISFA/NASCO Liaison Group recognise the importance of conserving and restoring wild salmon stocks and of supporting a sustainable salmon farming industry. He looked forward to a productive meeting.

1.3 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Task Force adopted its agenda, ATF(09)6 (Annex 2). The Task Force agreed that in undertaking its work under agenda item 5 'Review of existing best practice guidance and measures' it should focus on the effectiveness of the measures and what additional actions may be required. It was noted that during the development of the Liaison Group's Guidelines on Containment of Farm Salmon differences in the way the industry in different jurisdictions operates and the different environments in which farms are located meant that it had not been possible to develop specific measures applicable in all jurisdictions. The Task Force agreed that it should focus its work on developing outcomes and goals and that the specific measures used to achieve these would be a matter for each jurisdiction.

3. Nomination of a Rapporteur

3.1 Dr Peter Hutchinson (NASCO Secretariat) was appointed as Rapporteur.

4. Consideration of the Terms of Reference

4.1 The Task Force reviewed its Terms of Reference (TORs) and agreed on its working methods. The TORs agreed by NASCO and ISFA are as follows:

Taking account of the best practice and measures taken in member countries and those developed by international and other organizations to address the impacts of aquaculture on the wild salmon stocks:

- Identify a series of best practice guidelines and standards to address the impacts of aquaculture on wild salmon stocks;
- Identify knowledge gaps and research requirements to address them;
- Consider if and how impact targets can be identified.

4.2 The Task Force considered how its work relates to the review of Focus Area Reports (FARs) on aquaculture, introductions and transfers, and transgenics that NASCO will undertake in 2010. Ms Colligan indicated that following the 'Next Steps' for NASCO review process, each jurisdiction had been asked to prepare an Implementation Plan detailing measures to be taken in accordance with NASCO's agreements on management of fisheries, habitat protection and restoration and aquaculture and related activities. A FAR on one of these topics is to be presented for review each year on a three-yearly cycle. Fisheries management FARs had been reviewed in 2008 and habitat FARs are presently under review.

4.3 In 2010 the focus area topic will be aquaculture and related activities. Draft TORs have been developed for this review, CNL(08)37, and will be finalised at NASCO's Twenty-Sixth Annual Meeting in June 2009. These TORs require the Review Group to review and analyze the FARs and report to the Council of NASCO on common management and scientific approaches to challenges, on best practice and to identify

where additional actions may be helpful to ensure implementation of the Williamsburg Resolution. If these TORs are adopted in June 2009, the FARs will be developed by the jurisdictions between June and December 2009 and be subject to review in February 2010. The FARs will be structured around the main elements of the Williamsburg Resolution which applies to introductions and transfers, transgenics and stocking practices as well as salmon farming. Given the proposed timetable for preparation and review of the FARs the Task Force agreed that it would be useful if its recommendations on best practice could be finalised in the autumn so that they could be taken into account by the jurisdictions in developing their FARs and be available to the Group that will review the FARs.

4.4 The ISFA participants asked for clarification of whether the outcome of the review of the aquaculture FARs in 2010 would be presented to the Liaison Group before consideration by the Council of NASCO. The Secretary of NASCO indicated that while it was likely that jurisdictions would consult their salmon farming industry in developing the FARs, due to the timetable proposed the draft reviews of the FARs would not be available until shortly before the 2010 NASCO Annual Meeting. However, the industry would be welcome to participate in the Special Session at which the Group's findings will be presented and to provide feedback to the Review Group which will not complete its assessments and finalise its report until after the Annual Meeting. NASCO agreed to make the Review Group's draft report available to the ISFA Secretariat as soon as it is issued to NASCO delegates, probably in early May 2010, so that there would be an opportunity for ISFA to provide feedback. It was noted that the Review Group's assessments will relate to the individual FARs developed by each jurisdiction rather than the aquaculture industry generally.

5. Review of existing best practice guidance and measures

a) national initiatives

5.1 A collation of standards, codes of practice and legislation concerning the management of the salmon farming industry in Scotland, Ireland, Norway, Canada and the USA was made available to the Task Force on CD. Tables listing the various documents provided to the Task Force are contained in document ATF(09)7. Presentations summarising the information were made by Scotland, Canada and the USA. Brief verbal reports on the management of salmon farming in Iceland and in Ireland were also made.

b) international initiatives

5.2 The Task Force noted a number of international initiatives concerning the development of best practice guidance and measures. These include:

- NASCO's Williamsburg Resolution (including guidelines on containment of farmed salmon), the Focus Area Reports and the work of the Task Force;
- WWF Salmon Aquaculture Dialogue which is developing measurable environmental standards for salmon aquaculture (and for other cultured species). Much valuable scientific information has been developed through Working Groups including reports on sea lice, escapes and other fish diseases.

These reports will be used to develop standards that would be regularly updated. There had also been some discussions on how a secure database might be established that would deliver accountability and trust without breaching confidentiality. The dialogue has also highlighted a need for international cooperative research on topics relevant to wild and farmed salmon interactions. The dialogue seeks to promote risk management by identifying the most significant factors and applying appropriate mitigative measures;

- ISO Standards for Aquaculture – in response to a proposal from Norway, the International Standards Organization (ISO) is developing traceability standards for cage technology and for monitoring benthic impacts;
- Global Aquaculture Alliance (GAA) which seeks to establish standards of good practice for responsible aquaculture. Codes of Good Practice for shrimp, tilapia and catfish farming and for processing plants have been developed and GAA coordinates the development of Best Aquaculture Practices certification standards. Standards for salmon aquaculture are being developed;
- FAO Guidelines on Aquaculture Certification Programmes;
- A wide range of international certification schemes including those of GLOBALGAP, the Seafood Trust and Safe Quality Food.

5.3 The industry representatives referred to the challenge of knowing which of the various international initiatives would be most appropriate to follow. It was noted that there is considerable convergence among these different initiatives and that certification schemes would be able to draw on a range of standards that have been, or are being, developed. In the case of the recommendations arising from the Task Force, the aim was simply to provide guidance to NASCO's member governments on desirable outcomes and goals in relation to impacts from sea lice and escapes. This information could then be taken into account by NASCO jurisdictions and industry in managing aquaculture and in developing their FARs.

c) other initiatives

5.4 No other initiatives were drawn to the attention of the Task Force.

6. Development of recommendations on best practice guidance and standards to address the impacts of aquaculture on wild salmon stocks.

6.1 Having noted the existing Codes of Practice and legislation regarding management of impacts of salmon farming on the wild salmon stocks, it is the view of the Task Force that the Williamsburg Resolution remains valid but it needs to be strengthened in its interpretation and application, particularly in terms of defined goals and assessment of outcomes. By this the Task Force means that there should be much greater numeracy e.g. specific containment goals rather than 'minimising' escapes. By outcome the Task Force means that the effects of farming on wild salmon stocks in an area should be quantified and steps taken to eliminate any impacts. The basic principle is that salmon stocks in areas with salmon farming should be in as healthy a state as those in areas without salmon farming.

6.2 The Task Force believes that it is neither possible nor desirable to construct detailed international Codes of Practice which would cover all situations in which the Atlantic salmon is farmed. The Parties and jurisdictions and industries concerned are best placed to do that and there is no suggestion that there should be jurisdictional uniformity with regard to management of aquaculture. However, the Task Force has been asked by NASCO and ISFA to identify a series of best practice guidelines and standards to address the impacts of aquaculture on wild salmon stocks. To this end, the Task Force has developed 'Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks' intended to assist the NASCO Parties and jurisdictions in framing the management of salmon aquaculture, in cooperation with their industries, in developing future NASCO implementation plans and in preparing their Focus Area Reports for the 2010 review and subsequently.

6.3 In developing its recommendations, which it has laid out in the form of a matrix of best management practice, ATF(09)5 (Annex 3), the Task Force decided that it would agree international goals relating to sea lice and escapes and highlight elements of best management practice that could be used by each jurisdiction in managing aquaculture with a view to achieving these goals. The Task Force believes that the guidance developed in relation to sea lice will also have relevance to other fish health issues. The Task Force identified a need for clear mechanisms for assessing and reporting on progress in relation to the achievement of these goals. It is believed that document ATF(09)5 will assist the NASCO Parties and jurisdictions in developing their FARs and the *Ad Hoc* Review Group in assessing the FARs. The Task Force, therefore, recommends that NASCO include reference to this matrix in the TORs for the upcoming Review Group and ask that the Parties report on progress towards achievement of the international goals. Finally, the Task Force agreed that it would be desirable to identify those factors that could facilitate implementation of measures to achieve the goals. The Task Force recommends that NASCO and its jurisdictions explore, in collaboration with the salmon farming industry, opportunities for cooperative scientific research and development in support of the goal.

6.4 The Task Force briefly discussed issues of governance and communication. It was noted that Codes of Practice should be reviewed in the light of developments in scientific understanding of impacts of aquaculture and new technologies. Input from stakeholders should be taken into account as part of the review. With regard to communication, the NASCO website is currently being re-developed and will include copies of NASCO's various agreements (including the Williamsburg Resolution), the implementation plans and FARs and all documents developed through the Liaison Group. The best practice guidance will be included on the site once it has been agreed by ISFA and NASCO. Other sources of valuable information on sea lice and containment issues include the ICES website (www.ices.dk) and the WWF Salmon Aquaculture Dialogue website (www.worldwildlife.org/salmondialogue).

6.5 The Task Force agreed that it would be useful to develop an explanation of some of the terminology used in the 'Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks', ATF(09)5. For example, further clarification of terms such as 'risk-based approaches to siting' (including measures such as wild salmon protection areas) and 'integrated pest

management' might be helpful to NASCO's jurisdictions. The Task Force also felt that it would be helpful to develop a 'Decision Tree' to assist the jurisdictions in applying the guidance and to understand its relationship to national Codes and to the Williamsburg Resolution. It was agreed that these issues might be further developed by the Task Force through correspondence or at a subsequent meeting if this is considered necessary to address any feedback it receives on its recommendations from the Liaison Group and from NASCO.

7. Identification of knowledge gaps and research requirements

7.1 The Task Force noted that there has been significant progress in scientific understanding of the interactions between farmed and wild salmon and that the Conveners' report from the Bergen Symposium had highlighted areas where further research is needed to better inform management. The Task Force noted that during the WWF Salmon Aquaculture Dialogue it had been proposed that there should be enhanced international cooperative research on wild-farmed salmon interactions among scientists working in the industry and on the wild stocks. Document ATF(09)5 contains a number of initial recommendations for further research and development and the Task Force urges NASCO and its jurisdictions to explore, in collaboration with industry, opportunities for cooperative scientific work in support of the goals. The Task Force also believes that it would be valuable to have an exchange of information on ongoing and planned research relating to the management of impacts of aquaculture on wild salmon stocks and that mechanisms for facilitating such an exchange be further explored. For example, it would be possible to ask that Parties provide this information for the next meeting of the Liaison Group or through the FARs in 2010.

8. Recommendations on if, and how, impact targets can be identified

8.1 The Task Force discussed the issue of if, and how, impact targets can be identified. The need to have more quantitative targets in relation to sea lice and escapes than those included in the Williamsburg Resolution was recognised so that progress in each jurisdiction can be assessed. For example, the Williamsburg Resolution states that escapes of farmed salmon should be minimised to as close as practicable to zero. The findings presented at the Bergen Symposium show that considerable progress has been made in improving containment of farmed salmon. However, while the number of escapes may be only a fraction of 1% of the farm stock the scale of production means that the number of escapes may still be large relative to the abundance of wild fish. In developing its Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks (see paragraph 6), the Task Force decided that rather than further exploring the use of impact targets it would develop more quantitative international goals and focus on approaches to assessing progress towards achievement of these international goals.

9. Any other business

9.1 The Task Force discussed whether or not there may be merit in the Liaison Group engaging directly with the major multi-national companies engaged in the salmon farming industry. It was noted that these companies are represented through ISFA's

membership of the Liaison Group, but that opportunities for direct contact might be discussed at a future meeting of the Liaison Group. One possible mechanism might be a follow-up to the successful Trondheim Workshop which had been organized with the European Aquaculture Society and held during the AquaNor Exhibition in 2005.

9.2 There was no other business.

10. Date and place of next meeting

10.1 The Task Force decided that it would resolve if it needed to have a further meeting in the light of any feedback it receives on its recommendations from the Liaison Group and from NASCO. It noted that if there is a need for a further meeting it should be held in the autumn so that its final recommendations would be available to the NASCO Parties and jurisdictions in preparing their FARs on aquaculture and related activities.

11. Report of the meeting

11.1 The Task Force agreed a report of its meeting. In closing the meeting the Co-Chairs thanked the participants for their contributions to the work of the Task Force.

Annex 1 of ATF(09)8

List of Participants

ISFA

John Webster (UK – Scotland) – Co-Chair

Sebastien Belle (USA)

Ian Bricknell (USA)

Nell Halse (ISFA President)

NASCO

Mary Colligan (USA) – Co-Chair

Paddy Gargan (Ireland)

Gudni Gudbergsson (Iceland)

Kjetil Hindar (Norway)

Peter Hutchinson (NASCO Secretariat)

Heather Jones (UK – Scotland)

Trevor Swerdfager (Canada)

Jamey Smith (Canada)

Andrew Wallace (UK – Scotland, NGO representative)

Malcolm Windsor (NASCO Secretariat)

ATF(09)6

Agenda

1. Opening of the Meeting

2. Adoption of the Agenda

3. Nomination of a Rapporteur

4. Consideration of the Terms of Reference

5. Review of existing best practice guidance and measures

   a) national initiatives
   b) international initiatives
   c) other initiatives

6. Development of recommendations on best practice guidance and standards to address the impacts of aquaculture on wild salmon stocks.

7. Identification of knowledge gaps and research requirements

8. Recommendations on if, and how, impact targets can be identified

9. Any other business

10. Date and place of next meeting

11. Report of the meeting

ATF(09)5

Draft Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks

1. Since 1990, NASCO has co-convened three major international symposia to ensure that it had the best available information on interactions between wild and farmed salmon to guide its decisions. In 1994, in response to the information presented at these symposia, NASCO adopted the 'Oslo Resolution' designed to minimise impacts of aquaculture on the wild salmon stocks. The Oslo Resolution had been developed in consultation with the salmon farming industry and, in order to strengthen this relationship, a Liaison Group was established in 2000. The objective of the Liaison Group is to establish mutually beneficial working arrangements in order to make recommendations on wild salmon conservation and sustainable salmon farming practices, to maximise potential benefits and to minimise potential risks to both. Through the Liaison Group Guidelines on Containment of Farm Salmon were developed and reports on progress with developing and implementing containment action plans are made to the Liaison Group. These guidelines, together with Guidelines on Stocking and elements to ensure consistency with the Precautionary Approach, were incorporated into a new Resolution, the Williamsburg Resolution, CNL(06)48, adopted in 2003 and amended in 2004 and 2006.

2. The most recent NASCO/ICES symposium held in Bergen in 2005 highlighted that while much progress had been made in addressing impacts of aquaculture and in better understanding the nature of these impacts, sea lice and escapes were identified as continuing challenges both for the industry and the wild stocks and on which further progress was urgently needed. NASCO, therefore, decided that it would establish a Task Force comprising representatives of the Parties, the salmon farming industry and NASCO's accredited NGOs with the aim of: identifying a series of best practice guidelines and standards to address the impacts of aquaculture on wild salmon stocks; to identify knowledge gaps and research requirements to address them; and to consider if, and how, impact targets can be identified. In accordance with its Terms of Reference, the Task Force collated existing Codes of Practice as contained in document ATF(09)7 and developed this guidance on best management practices, framed around the elements of the Williamsburg Resolution, designed to achieve international goals to address the impacts of sea lice and escapes on wild Atlantic salmon. The guidance provides a range of measures from which those most appropriate to the local conditions should be put into place to safeguard the wild salmon stocks.

3. This guidance is intended to supplement the Williamsburg resolution and to assist the Parties and jurisdictions: in managing salmon aquaculture, in cooperation with their industries; in developing future NASCO Implementation Plans; and in preparing their 2010 and subsequent Focus Area Reports (FARs) on aquaculture and related activities. It is anticipated that the triennial reviews of the FARs will provide a mechanism for assessing progress towards achievement of the international goals. It

is the intention that NASCO and its jurisdictions explore, in collaboration with industry, opportunities for cooperative scientific research in support of the goals.

	Sea lice	Containment
International Goals	**100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms.**	**100% farmed fish to be retained in all production facilities**
	Use Williamsburg Resolution as basic guidance, supplemented as below	
Best Management Practices (BMPs)	Area management, risk-based, integrated pest management (IPM) programmes that meet jurisdictional targets for lice loads at the most vulnerable life-history stage of wild salmonids.	Codes of Containment including operating protocols
	Single year-class stocking	Technical standards for equipment
	Fallowing	Verification of compliance
	Risk-based site selection	Risk-based site selection
	Trigger levels appropriate to effective sea lice control	Mandatory reporting of escapes and investigation of causes of loss
	Strategic timing, methods and levels of treatment to achieve the international goal and avoid lice resistance to treatment	Adaptive management in response to monitoring results to meet the goal
	A comprehensive and regulated fish health programme that includes routine sampling, monitoring and disease control	
	Lice control management programmes appropriate to the number of fish in the management area	
	Adaptive management in response to monitoring results to meet the goal	
Reporting & Tracking	Monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms and wild salmonid populations.	Number of incidents of containment breach and standardised descriptions of the factors giving rise to escapes
	Lice loads on wild salmonids compared to areas with no salmon farms	Number and life-stage of escaped salmon (overall number; % of farmed production)
	Lice-induced mortality of wild salmonids (e.g. as monitored using sentinel fish, fish-lift trawling, using batches of treated smolts)	Number of escaped salmon in both rivers and fisheries (overall number; % of farmed production) and relationship to reported incidents
	Monitoring to check the efficacy of lice treatments	

	Sea lice	Containment
Factors Facilitating Implementation	Development of a monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms	Monitoring of rivers for escapes
	Access to a broad suite of therapeutants, immunostimulants and management tools	Site appropriate technology
	Collation and assessment of site selection and relocation criteria	Advanced permitting to facilitate recapture and exchange of information on effectiveness of recapture efforts
	Regulatory regimes which facilitate availability of alternative sites, as necessary, to support achievement of the goal	Technology development (e.g. cage design, counting methods for farmed salmon, methods to track origin of escaped salmon and their progeny)
	Training at all levels in support of the goal and to increase awareness of the environmental consequences of sea lice	Training at all levels in support of the goal and to increase awareness of the environmental consequences of escapes
	Monitoring of lice levels: in areas with and without farms; before, during and after a farm production cycle; and in plankton samples	Assessments of the relative risks to the wild stocks from escapes from freshwater compared to marine facilities and from large but infrequent escape events compared to small but frequent escape events.

Annex 20

CNL(09)53

Press Release
Conserving wild salmon stocks in the North Atlantic

Against the background of continuing declines of wild Atlantic salmon stocks across the North Atlantic, delegates met for the 26th Annual Meeting of the North Atlantic Salmon Conservation Organisation (NASCO) in Norway, which has the largest remaining stocks of this iconic species. The meeting was opened by Heidi Sorenson, the Norwegian State Secretary for the Environment, who stressed the importance of wild salmon to Norway and the role of NASCO in addressing the many problems that impact on this special fish.

Despite large reductions in exploitation and many conservation measures in all countries around the North Atlantic, the decline of wild salmon has continued and is now mainly attributed to lower marine survival during their extensive migration phase.

Salmon at sea

There was encouraging news from the SALSEA (Salmon at Sea) project, launched by NASCO in 2006 to investigate the mystery of what happens to salmon at sea. The first SALSEA ocean cruises to catch salmon at sea took place in 2008, and with the latest genetic fingerprinting techniques, the fish that were caught can now be attributed to their rivers of origin - for the first time salmon can be tracked on their long and complex journey to the ocean feeding grounds in Greenland and the Faroes. Further cruises, in the NW and NE Atlantic and the Irminger Sea, to expand this work, are planned in 2009. In support of SALSEA, an enhanced sampling programme at West Greenland was adopted which will operate within the current internal use fishery. For more details see www.salmonatsea.com

Regulatory measures for distant water fisheries

A multiannual measure was agreed for the salmon fishery at West Greenland, continuing the existing zero commercial quota for the years 2009 - 2011. Representatives of the Faroe Islands also agreed to continue their existing agreement not to fish for 2010. There has been no fishing for salmon at the Faroes since 2000. Both Greenland and the Faroes emphasized that these measures do not compromise their historic rights to fish.

Fisheries management, habitat restoration and aquaculture

As part of the Next Steps process (see www.nasco.int) NASCO agreed to review all its agreements and guidelines on these three subjects. At the Annual Meeting delegates agreed guidelines for management of all salmon fisheries. Guidelines for habitat restoration in home rivers will be debated in 2010, and a comprehensive review of measures for reducing the impacts of aquaculture on wild salmon will take place in 2010/2011. Norway also announced a timetable for consultation on new regulations for coastal fisheries which intercept salmon from other countries.

Aquaculture Task Force

NASCO has received a report from a Task Force with the International Salmon Farming Association (ISFA) which provided guidance on best practice and measures to reduce the impact of escaped farmed salmon and parasitic sea lice on wild Atlantic salmon.
The full report of the 2009 Annual meeting will be made available found at www.nasco.int

Arni Isaksson, the President of NASCO, said:

"'*NASCO is the only inter-governmental treaty organisation dedicated to wild Atlantic salmon. The continued co-operation promoted at NASCO between the contracting governments, NGOs and all those managing this precious resource is the only way forward if we are to succeed in conserving and restoring stocks of this iconic species for future generations*"'

Notes for Editors:

NASCO is an intergovernmental treaty organisation formed in 1984 and based in Edinburgh, Scotland. Its objectives are the conservation, restoration and rational management of wild Atlantic salmon stocks. The contracting Parties to the convention are: Canada, Denmark (in respect of the Faroe Islands and Greenland), European Union, Iceland, Norway, Russia and USA. There are 35 non-government observers accredited to the organisation.

For further information contact:

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Annex 21

CNL(09)00

List of Council Papers

Paper No.	**Title**
CNL(09)1	Provisional Agenda
CNL(09)2	Draft Agenda
CNL(09)3	Explanatory Memorandum on the Draft Agenda
CNL(09)4	Draft Schedule of Meetings
CNL(09)5	Report of the Twenty-Sixth Annual Meeting of the Finance and Administration Committee (issued at meeting)
CNL(09)6	Applications for Observer Status to NASCO
CNL(09)7	Report on the Activities of the North Atlantic Salmon Conservation Organization in 2008
CNL(09)8	Report of the ICES Advisory Committee (to be distributed by ICES)
CNL(09)9	Report of the Eighth Meeting of the International Atlantic Salmon Research Board (issued at meeting)
CNL(09)10	Request for Scientific Advice from ICES (issued at meeting)
CNL(09)11	Final Report of the Fisheries Management Focus Area Review Group
CNL(09)12	Interim Report of the Habitat Focus Area Review Group
CNL(09)13	Compilation of Fisheries Management and Habitat FARs (issued on CD)
CNL(09)14	Progress in Implementing a Public Relations Strategy (issued at meeting)
CNL(09)15	Terms of Reference for the Focus Area Report on Aquaculture, Introductions and Transfers and Transgenics
CNL(09)16	Summary of Annual Reports on Implementation Plans
CNL(09)17	Liaison with the North Atlantic salmon farming industry
CNL(09)18	St Pierre and Miquelon Salmon Fishery (issued at meeting)
CNL(09)19	Summary of Council Decisions
CNL(09)20	Annual Report on Actions Taken Under Implementation Plans: EU-Ireland
CNL(09)21	Annual Report on Actions Taken Under Implementation Plans: EU-UK(Scotland)
CNL(09)22	Annual Report on Actions Taken Under Implementation Plans: Russian Federation
CNL(09)23	Annual Report on Actions Taken Under Implementation Plans: EU-Finland
CNL(09)24	Annual Report on Actions Taken Under Implementation Plans: USA

CNL(09)25	Annual Report on Actions Taken Under Implementation Plans: Norway
CNL(09)26	Annual Report on Actions Taken Under Implementation Plans: Iceland
CNL(09)27	Annual Report on Actions Taken Under Implementation Plans: EU-UK(Northern Ireland)
CNL(09)28	Annual Report on Actions Taken Under Implementation Plans: EU-UK(England and Wales)
CNL(09)29	Annual Report on Actions Taken Under Implementation Plans: EU-Sweden (issued at meeting)
CNL(09)30	Annual Report on Actions Taken Under Implementation Plans: Canada (issued at meeting)
CNL(09)31	Salmon Fisheries and Status of Salmon Stocks in France: National Report for 2008 (Tabled by EU-France)
CNL(09)32	Report on the 2008 Salmon Fishery at St Pierre and Miquelon (issued at meeting)
CNL(09)33	Annual Report on Actions Taken Under Implementation Plans: Denmark (in respect of the Faroe Islands and Greenland) - Greenland
CNL(09)34	Annual Report on Actions Taken Under Implementation Plans: EU – Spain
CNL(09)35	Annual Report – Spain
CNL(09)36	Applications to conduct Scientific Research Fishing
CNL(09)37	Recent changes detected in the salmon environment in Icelandic rivers and in the sea. Potential threats to the abundance of Icelandic salmon.
CNL(09)38	North Atlantic Salmon Conservation Organization 2010 Budget and 2011 Forecast Budget (Pounds Sterling
CNL(09)39	Report on the biometric study carried out on salmon (*Salmo salar*) at St Pierre and Miquelon in 2008
CNL(09)40	Management of Salmon Rivers in Quebec, Canada
CNL(09)41	NASCO Guidelines for the Management of Salmon Fisheries
CNL(09)42	Draft letter to the Secrétaire Général de la mer concerning St Pierre and Miquelon
CNL(09)43	NASCO Guidelines for the Management of Salmon Fisheries
CNL(09)44	Presentation of ICES advice
CNL(09)45	Salmon Management in the Baltic Sea
CNL(09)46	Agenda
CNL(09)47	IASRB Chairman's Presentation to the Council
CNL(09)48	Draft Press Release
CNL(09)49	Revised Terms of Reference for the Aquaculture and Related Activities Review Group
CNL(09)50	Socio-economics Presentation
CNL(09)51	Draft Report of the Twenty-Sixth Annual Meeting of the Council of NASCO

CNL(09)52 Report of the Twenty-Sixth Annual Meeting of the Council of NASCO

CNL(09)53 Press Release