2003

REPORT OF THE TWENTIETH ANNUAL MEETINGS OF THE COMMISSIONS

EDINBURGH, SCOTLAND, UK

2-6 JUNE 2003

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

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REPORT OF THE

TWENTIETH ANNUAL MEETING

OF THE

NORTH AMERICAN COMMISSION

2-6 JUNE 2003
EDINBURGH, SCOTLAND, UK

Chairman:	Mr Pierre Tremblay (Canada)
Vice-Chairman:	Mr George Lapointe (USA)
Rapporteur:	Ms Kimberly Blankenbeker (USA)
Secretary:	Dr Malcolm Windsor

NAC(03)10

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NAC(03)10

Report of the Twentieth Annual Meeting of the North American Commission of the North Atlantic Salmon Conservation Organization 2-6 June 2003, Edinburgh, Scotland, UK

1. Opening of the Meeting

1.1 The Chairman, Mr Pierre Tremblay (Canada), opened the meeting and welcomed the participants.

1.2 The Chairman invited opening comments from the NAC members. The representative of the United States underscored the poor situation of US salmon populations, noted the importance of establishing a sampling program in St. Pierre and Miquelon, and expressed the expectation that the proposed revisions to the NAC protocols on introduction and transfers will be addressed over the course of the next year so that this issue can be resolved at the 2004 NASCO meeting.

1.3 The Chairman opened the floor for opening comments by NGO observers. No NGO statement was made.

1.4 A list of participants at the Twentieth Annual Meeting of the Council and Commissions of NASCO is included on page 215 of this document.

2. Adoption of the Agenda

2.1 The agenda, NAC(03)12 (Annex 1), was adopted without modification.

3. Nomination of a Rapporteur

3.1 Ms Kimberly Blankenbeker (United States) served as Rapporteur.

4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of the ICES Advisory Committee on Fishery Management (ACFM), Dr Walter Crozier, reviewed the 2002 fisheries in the NAC area and presented the scientific advice relevant to the Commission, CNL(03)8. The ACFM report, which contains the scientific advice relevant to all Commissions, is included on page 127 of this document. The presentation overheads are contained in document CNL(03)44.

4.2 There were no questions from the Parties on the scientific advice.

5. Review and Discussion of the 2003 Canadian and U.S. Salmon Management Measures as they relate to the Mandate of the Commission and to the Findings of the ACFM Report from ICES

5.1 A representative of the United States presented a report on the U.S. Atlantic salmon management and research activities in 2002, NAC(03)7 (Annex 2).

5.2 A representative of Canada reviewed Canadian Atlantic salmon management measures for 2003, NAC(03)8 (Annex 3).

6. Application of the Precautionary Approach to the Work of the Commission

6.1 The Secretary noted that issues pertaining to the application of the Precautionary Approach to NASCO's work cut across all Commission areas and impact the work of the Council. He noted that the Council was addressing Precautionary Approach issues to ensure consistency within the Organization. He noted that it might be redundant to continue to include this item on Commission agendas and suggested that this item be deleted from the NAC agenda in the future. The members of the North American Commission recognized that the Precautionary Approach guided all of the work of the Commission and concurred that it did not need to be a separate agenda item.

7. The St. Pierre and Miquelon Salmon Fisheries

7.1 The Secretary presented a report, NAC(03)3, on the St. Pierre and Miquelon salmon fishery. In particular, he noted the significant discrepancy in the catch data provided by the French authorities to NASCO for 2002 (approximately 2 mt) and those data provided to ICES for the same period (3.6 mt). The Secretary also noted that NASCO had finally received a response from St. Pierre and Miquelon concerning a longstanding proposal to establish a cooperative sampling programme for its Atlantic salmon fishery. This response was positive toward setting up a sampling programme. He asked for direction from the Commission on how to proceed relative to these matters.

7.2 Concern was expressed about the discrepancy in the reported catch figures for 2002.

7.3 While welcoming the response from France (in respect of St. Pierre and Miquelon) with respect to a sampling programme, the Parties recalled past experience on this matter which had been quite frustrating. The North American Commission members expressed a sincere hope that a sampling programme along the lines set out by ICES would be implemented in the near term. In that regard, it was agreed that letters should be developed responding to France (in respect of St. Pierre and Miquelon) that would clearly state NASCO's view that the sampling programme be instituted in 2003 (including the genetics elements), seek clarification of elements of the French proposal (such as the meaning of "biometric study") and specify those elements of the sampling programme that appear to be missing from the French proposal, and indicate that relevant NASCO members are prepared to assist St. Pierre and Miquelon in developing and implementing the sampling programme. The letters from the President and Secretary, as agreed by the Council, are attached as Annex 4.

7.4 The United States and Canada agreed to consult with one another to coordinate their involvement in the sampling effort.

8. Salmonid Introductions and Transfers

8.1 A representative of the United States presented a report on the 2002-03 activities of the NAC Scientific Working Group on Salmonid Introductions and Transfers, NAC(03)5. The Scientific Working Group raised concerns with respect to the shipments of mixed-sex diploid Gaspé strain Atlantic salmon into Newfoundland, and the continued use of mixed-sex rainbow trout in marine cage rearing in Atlantic Canada. The United States has initiated a process to eliminate European strains of Atlantic salmon from Maine cage rearing by 31 July 2004. The Scientific Working Group reported the detection of European ancestry in two juvenile Atlantic salmon in the Upper Salmon river.

8.2 The representative of the United States noted the uncertainties associated with the status of the protocols. The Parties took note of the internal review process ongoing in Canada. It was agreed that a bilateral working group should be set up to work on this issue intersessionally with a view to making a decision on the disposition of the revised protocols by the 2004 NASCO meeting.

9. Impacts of Acid Rain on Salmon

9.1 A representative of the United States presented a report on U.S. activities regarding acid rain, NAC(03)6. She noted that the focus of work in this area was on mitigation as opposed to causes and effects. She stressed the interest of the United States in reaching out to experts in other countries, such as Canada and Norway, relative to developing and implementing mitigation measures – in particular relative to a pilot liming project being planned for either 2004 or 2005.

9.2 The representative of Canada noted the importance of the issue. In this regard, he pointed out that Canada had ratified the Kyoto (Climate Change) accord. He noted Canada's interest in moving forward on this issue, recognizing resource limitations. He indicated Canada's intention to work with the United States to develop a work plan on this issue, which would include possible areas of cooperation. Toward this end, the representative of the United States encouraged Canada to become involved in the work of an acid rain task force created to research, coordinate, and steer the development of both the referenced pilot liming study and long-term management actions.

9.3 The Chairman urged the Parties to work out the details of this matter bilaterally and to report back in 2004.

10. Sampling in Labrador

10.1 A representative of Canada reported that a sampling programme had been initiated in Labrador based on a 2001 decision and that two major river systems and two small rivers were monitored in 2002. In 2003, Canada intends to continue to monitor these river systems. The representative noted that the work provides important information with respect to the status and trends of Labrador salmon stocks. Canada is considering

expanding its sampling programme to southern Labrador, possibly as soon as 2004 if funds are available.

10.2 The representative of the United States noted the importance of this sampling effort and supported its continuation in 2003.

11. Announcement of the Tag Return Incentive Scheme Prize

11.1 The draw for the North American Commission prize in the NASCO Tag Return Incentive Scheme was made by the Auditor at NASCO Headquarters on 21 May 2003. The winning tag was of Canadian origin. The tag was applied to a wild female salmon on 1 October 2001 at the trapnet at Millerton, New Brunswick, on the Main Southwest Miramichi River. It was recaptured by an angler on 23 April 2002 at Blissfield, New Brunswick, on the Main Southwest Miramichi River. The winner of the Commission's prize of $1500 was Mr Colin Gilks, Storytown, New Brunswick. The Commission offered its congratulations to the winner.

12. Recommendations to the Council on the Request to ICES for Scientific Advice

12.1 The Commission reviewed the relevant section of document SSC(03)2 and agreed to recommend it to the Council as part of the annual request to ICES for scientific advice. The request to ICES, as agreed by the Council, is contained in document CNL(03)12 (Annex 5).

13. Other Business

13.1 The Chairman expressed his gratitude to the members of the Commission for another efficient and productive meeting. He thanked the NASCO Secretariat and the Rapporteur for their hard work. The Parties thanked the Chairman for his able leadership.

13.2 There was no other business.

14. Date and Place of the Next Meeting

14.1 The Commission agreed to hold it next meeting at the same time and place as the Twenty-First Annual Meeting of the Council, 7-11 June 2004.

15. Report of the Meeting

15.1 The Commission agreed a report of the meeting, NAC(03)10.

Note: The annexes mentioned above begin on page 15**,** following the French translation of the report of the meeting. A list of North American Commission papers is included in Annex 6 on page 35 of this document.

NAC(03)10

Compte rendu de la Vingtième réunion annuelle de la Commission Nord-Américaine de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord, 2-6 juin 2003, Édimbourg, Écosse, Royaume-Uni

1. Séance d'ouverture

1.1 Le Président, M. Pierre Tremblay (Canada), a ouvert la réunion et souhaité la bienvenue aux délégués.

1.2 Le Président a invité les membres de la Commission Nord-Américaine à présenter leurs déclarations d'ouverture. Le représentant des États-Unis a souligné combien la situation des populations de saumons des États-Unis était grave et a fait remarquer combien il était important de définir un programme d'échantillonnage à Saint-Pierre et Miquelon. Il a par ailleurs exprimé qu'il s'attendait à ce que la proposition de révision des protocoles de la CNA sur les introductions et transferts soit abordée au cours de l'année prochaine de façon à pouvoir résoudre la question lors de la Réunion annuelle de l'OCSAN de 2004.

1.3 Le Président a invité les ONG, présentes en tant qu'observateurs, à présenter leurs déclarations d'ouverture. Les ONG ne firent aucune déclaration.

1.4 Une liste des participants à la Vingtième réunion annuelle du Conseil et des Commissions de l'OCSAN figure à la page 215 de ce document.

2. Adoption de l'ordre du jour

2.1 L'ordre du jour, NAC(03)12 (annexe 1), a été adopté sans modification.

3. Nomination d'un Rapporteur

3.1 Ms Kimberly Blankenbeker (États-Unis) a rempli le rôle de Rapporteur.

4. Examen de la pêcherie de 2002 et rapport du CCGP du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du Comité Consultatif sur la Gestion des Pêcheries (CCGP) du CIEM, Dr Walter Crozier, a passé en revue les pêcheries effectuées en 2002 au sein de la zone de la Commission Nord-Américaine (CNA) et a présenté les recommandations scientifiques pertinentes à la Commission, CNL(03)8. Le rapport du CCGP du CIEM qui présente les recommandations scientifiques intéressant l'ensemble des Commissions, figure à la page 127 de ce document. Le document CNL(03)44 regroupe les diapositives projetées au cours de la présentation.

4.2 Les Parties n'ont posé aucune question sur les recommandations scientifiques.

5. Examen et Discussion des mesures de gestion du saumon proposées pour l'an 2003 par le Canada et les États-Unis dans le cadre du mandat de la Commission et des conclusions offertes par le rapport du CCGP du CIEM

5.1 Un représentant des États-Unis a présenté un rapport sur la gestion du saumon atlantique des États-Unis en 2002 et sur les activités de recherche effectuées au cours de la même année, NAC(03)7 (annexe 2).

5.2 Un représentant du Canada a présenté un rapport qui passait en revue les mesures de gestion du saumon atlantique proposées pour 2003 par le Canada, NAC(03)8 (annexe 3).

6. Application de l'approche préventive au travail de la Commission

6.1 Le Secrétaire a noté que l'application de l'approche préventive, dans le cadre du travail de l'OCSAN, intéressait chacune des zones de Commission et impactait également sur le travail du Conseil. Il a en effet fait remarquer que le Conseil étudiait cette question afin de garantir une homogénéité au sein de l'Organisation. Il a noté qu'il serait donc peut-être redondant de continuer à inclure cette question à l'ordre du jour de la Commission et a suggéré de la supprimer de l'ordre du jour de la CNA. Les membres de la Commission Nord-Américaine ont reconnu que l'approche préventive instruisait la totalité du travail de la Commission et, de ce fait, ont concédé qu'il était inutile d'inclure cette question à l'ordre du jour, comme point à part.

7. Pêcheries de saumons à Saint-Pierre et Miquelon

7.1 Le Secrétaire a présenté le rapport NAC(03)3 concernant la pêcherie de saumons à Saint-Pierre et Miquelon. Il a souligné, en particulier, combien les données de captures fournies à l'OCSAN par les autorités françaises pour 2002 (environ 2 tonnes) divergeaient des données couvrant la même période, fournies au CIEM (3,6 tonnes). Le Secrétaire a aussi fait remarquer que l'OCSAN avait enfin reçu une réponse de Saint-Pierre et Miquelon à propos de la proposition de longue date qui visait à établir un programme coopératif d'échantillonnage des pêches au saumon atlantique à Saint-Pierre et Miquelon. Cette réponse, positive, acceptait d'établir un programme d'échantillonnage. Le Secrétaire a demandé conseil à la Commission quant à la manière de procéder à ce sujet.

7.2 La divergence qui existait dans les statistiques de captures déclarées de 2002 suscitait des inquiétudes.

7.3 Même si elles accueillaient la réponse de la France (pour Saint-Pierre et Miquelon) avec enthousiasme, les Parties ont fait allusion à d'anciennes expériences concernant cette question de programme d'échantillonnage qui s'étaient avérées très frustrantes. Les membres de la Commission Nord-Américaine ont indiqué qu'ils espéraient sincèrement qu'un programme d'échantillonnage en accord avec les prescriptions du CIEM ait lieu dans un avenir proche. À ce sujet, il a été convenu d'envoyer à la France (pour Saint-Pierre et Miquelon) des courriers qui indiqueraient clairement que, selon l'OCSAN, le programme d'échantillonnage (y compris les éléments génétiques) devait être effectué en 2003. Les lettres chercheraient également à obtenir des clarifications sur certains

éléments de la proposition de la France (comme par exemple la signification de « l'étude biométrique »). Elles devraient par ailleurs spécifier les éléments du programme d'échantillonnage que la proposition de la France semblait avoir omis et indiquer que les membres appropriés de l'OCSAN étaient prêts à assister Saint-Pierre et Miquelon dans l'élaboration et la mise en œuvre dudit programme d'échantillonnage. Les lettres rédigées par le Président et le Secrétaire, approuvées par le Conseil, constituent l'annexe 4.

7.4 Les États-Unis et le Canada ont convenu de se consulter pour coordonner leur engagement dans l'exercice d'échantillonnage.

8. Introductions et transferts de salmonidés

8.1 Un représentant des États-Unis a présenté un rapport sur les activités de 2002-2003 du Groupe de travail scientifique sur les introductions et transferts, NAC(03)5. Le Groupe de travail scientifique avait exprimé son inquiétude quant aux cargaisons de diploïdes (mâles et femelles) de la souche de saumons atlantiques de Gaspé destinées à Terre-Neuve et quant à l'utilisation continue de truites arc-en-ciel (mâles et femelles) dans un élevage de cages marines au Canada Atlantique. Les États-Unis avaient initié un processus qui visait à éliminer, d'ici le 31 juillet 2004, les souches européennes du saumon atlantique de l'élevage en cage du Maine. Le Groupe de travail scientifique a signalé qu'on avait détecté un lignage européen chez deux saumons juvéniles de la *Upper Salmon river* (Rivière haute à saumons).

8.2 Le représentant des États-Unis a noté les incertitudes qui résultaient de l'état actuel des protocoles. Les Parties ont pris note d'un processus interne de révision qui avait lieu au Canada. Il a été convenu de créer un groupe de travail bilatéral qui serait chargé d'étudier cette question entre les réunions de l'OCSAN. L'objectif serait d'arriver à une décision sur l'état actuel des protocoles révisés d'ici la réunion de l'OCSAN de 2004.

9. Effets nuisibles des pluies acides sur le saumon

9.1 Un représentant des États-Unis a présenté un compte rendu des démarches des États-Unis concernant les pluies acides, NAC(03)6. Elle a fait remarquer que le travail dans ce domaine concernait surtout la question de mitigation plutôt que de déterminer les causes et effets des pluies acides. Elle a souligné que les États-Unis seraient intéressés à établir des contacts avec les experts d'autres pays, tels que le Canada et la Norvège, afin de définir et de mettre en œuvre des mesures de mitigation – applicables en particulier à un projet de chaulage, planifié pour 2004 ou 2005.

9.2 Le représentant du Canada a noté l'importance de la question. À ce propos, il a souligné que le Canada avait ratifié l'accord de Kyoto. Il a indiqué que le Canada désirait voir cette question progresser, étant donné les limites de la ressource. Il a fait connaître l'intention du Canada à travailler avec les États-Unis sur le développement d'un plan de travail sur cette question qui inclurait des sujets sur lesquels il serait possible de coopérer. À cette fin, le représentant des États-Unis a encouragé le Canada à participer aux activités d'un groupe de travail « pluies acides ». Ce groupe était chargé d'effectuer les recherches nécessaires à la mise au point de l'étude pilote de chaulage susmentionnée

et à l'élaboration des mesures de gestion à long terme et de coordonner et de diriger ces initiatives.

9.3 Le Président a conseillé vivement aux Parties de finaliser bilatéralement les détails de cette question et de rendre compte en 2004 des progrès réalisés.

10. Echantillonnage au Labrador

10.1 Un représentant du Canada a signalé que, conformément à la décision prise en 2001, un programme d'échantillonnage avait été initié au Labrador et que l'on avait, en 2002, soumis deux systèmes fluviaux importants et deux petites rivières à un contrôle. En 2003, le Canada avait l'intention de continuer à surveiller ces systèmes fluviaux. Le représentant a noté que ce travail fournissait des informations cruciales à propos de l'état des stocks de saumons du Labrador et des tendances observées chez ces stocks. Si ceci était possible financièrement, le Canada envisageait d'étendre son programme, probablement en 2004, au sud du Labrador.

10.2 Le représentant des États-Unis a noté l'importance de cet échantillonnage et a soutenu sa continuation en 2003.

11. Annonce du Prix du Programme d'encouragement au renvoi des marques

11.1 Le tirage au sort du prix de la Commission Nord-Américaine du Programme d'encouragement au renvoi des marques de l'OCSAN fut effectué par le vérificateur des Comptes au Siège social de l'Organisation, le 21 mai 2003. La marque gagnante était d'origine canadienne. La marque avait été posée sur un saumon sauvage femelle le 1 octobre 2001 au filet piège à Millerton, au Nouveau-Brunswick, dans la rivière principale Miramichi du sud-ouest. Elle fut recouverte par un pêcheur à la ligne le 23 avril 2002 à Blissfield, au Nouveau-Brunswick, dans la même rivière. Mr Colin Gilks, de Storytown, au Nouveau-Brunswick a remporté le prix de la Commission de 1 500 dollars. La Commission a félicité le gagnant.

12. Recommandations au Conseil en matière de recherches scientifiques dans le cadre de la demande adressée au CIEM

12.1 La Commission a examiné les sections pertinentes du document SSC(03)2 et a convenu de les recommander au Conseil dans le cadre de la demande annuelle de recommandations scientifiques adressée au CIEM. La demande de recommandations scientifiques adressée au CIEM et approuvée par le Conseil figure dans le document CNL(03)12 (annexe 5).

13. Divers

13.1 Le Président a exprimé sa gratitude aux membres de la Commission pour une réunion, qui s'était avérée, encore une fois, efficace et productive. Il a remercié le Secrétariat de l'OCSAN et le Rapporteur pour leur travail ardu. Les Parties ont remercié le Président pour ses qualités de leader.

13.2 Aucune autre question n'a été traitée.

14. Date et lieu de la prochaine réunion

14.1 La Commission a convenu de tenir sa prochaine réunion en même temps (soit du 7 au 11 juin), et au même endroit que la Vingt-et-unième réunion annuelle du Conseil.

15. Examen du compte rendu de la réunion

15.1 La Commission a accepté le compte rendu NAC(03)10 de la réunion.

Note: Une liste des documents de la Commission Nord-Américaine figure à l'annexe 6, à la page 35 de ce document.

ANNEX 1

NAC(03)12

Twentieth Annual Meeting of the North American Commission Balmoral Hotel, Edinburgh, Scotland, UK 2-6 June, 2003

Agenda

1. Opening of the Meeting

2. Adoption of the Agenda

3. Nomination of a Rapporteur

4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area

5. Review and Discussion of the 2003 Canadian and US Salmon Management Measures as they relate to the Mandate of the Commission and to the Findings of the ACFM Report from ICES

6. Application of the Precautionary Approach to the Work of the Commission

7. The St Pierre and Miquelon Salmon Fisheries

8. Salmonid Introductions and Transfers

9. Impacts of Acid Rain on Salmon

10. Sampling in the Labrador Fishery

11. Announcement of the Tag Return Incentive Scheme Prize

12. Recommendations to the Council on the Request to ICES for Scientific Advice

13. Other Business

14 Date and Place of the Next Meeting

15. Consideration of the Draft Report of the Meeting

ANNEX 2

North American Commission

NAC(03)7

Report on US Atlantic Salmon Management and Research Activities in 2002

NAC(03)7

Report on US Atlantic Salmon Management and Research Activities in 2002

Returns

The documented adult salmon return to US rivers was 962 fish in 2002, representing only 1.7% of the estimated 2SW spawner requirement for the US. Most returns were recorded in Maine, with the Penobscot River accounting for 81% of all US returns. Overall, 45% of the adult returns were 1SW salmon and 55% were MSW. Most returns (88%) originated from hatchery smolts and others (12%) originated from either natural spawning or hatchery fry.

Stock Enhancement Programs

During 2002, over 12 million salmon fry were released into 20 river systems. Smolts were also stocked in the Penobscot (54,700), Merrimack (51,900), Connecticut (560), Saco (4,100), Dennys (49,000) and St. Croix Rivers (4,100).

Tagging and Marking Programs

Tagging and marking programs facilitated research and assessment programs including: identifying the life stage and location of stocking, evaluating juvenile growth and survival, instream adult and juvenile movement, and estuarine smolt movement. A total of 373,259 salmon released into USA waters in 2002 were marked or tagged. Tags used on parr, smolts and adults included: Floy, Carlin, PIT, radio and acoustical, fin clips, and visual implant elastomer. Calcein immersion was used to experimentally mark fry. The calcein immersion study is in its second year and is comparing mortality between calcein-marked and unmarked fry stocked in the Sheepscot River in Maine. The ability to evaluate the performance of fry stocking has been hindered by the lack of practical technology that allows mass marking of fry with subsequent non-lethal mark detection. Therefore, the use of calcein immersion to produce an externally visible mark could potentially offer a significant solution.

About 0.5% of all marked fish were released into the Connecticut River watershed, 1.6% into the Merrimack River watershed, 75.4% into the Penobscot River watershed, and 22.5% into other Maine rivers.

Description of Fisheries

Commercial and recreational fisheries for sea-run Atlantic salmon are closed in US waters. Salmon incidentally caught must be released immediately, alive and uninjured, without being removed from the water. A highly regulated recreational fishery for 2,271 surplus broodstock occurred in the Merrimack River.

Aquaculture Production

Production of farmed fish in 2002 was 6,804 mt, a decrease from 13,154 mt produced in 2001. Depopulation of aquaculture operations in Cobscook Bay due to Infectious Salmon Anemia virus (ISAv) reduced production. ISAv was detected in US waters in 2001. Since

the confirmed outbreak in US waters, the US Department of Agriculture has implemented an aggressive control program involving the following components: Bio-security, Surveillance (including monthly mandatory veterinarian inspections), Testing, Disease Reporting, Quarantine, Depopulation and Indemnity. The US program resulted in depopulation in 2002 of 1.1 million fish, with subsequent equipment decontamination and site fallowing. Monitoring suggests that US sites near Canadian waters may have been exposed again to the virus, and industry representatives and regulators remain highly vigilant for new occurrences of ISAv in US waters.

The Gulf of Maine Distinct Population Segment (DPS) of Atlantic Salmon

The Gulf of Maine DPS was listed as endangered in 2000. Since 1991, the total number of returning salmon to the DPS has been estimated. This estimate is calculated using capture data on all DPS rivers with trapping facilities (Narraguagus, Dennys and Pleasant Rivers) combined with redd count data from the other 5 rivers of this group. Estimated returns are extrapolated from redd count data using a return-redd regression established from the 1991-2000 Narraguagus River and 2000 Pleasant River assessments by the Maine Atlantic Salmon Commission. The 90% probability estimate for returns to the DPS in 2002 ranged from 26 to 41. This range represents a 64-70% decline from 2001 return estimates. Additionally, this estimate is the lowest on record for the 1991-2000 time series.

A population viability analysis (PVA) model has been developed for Atlantic salmon in Maine. The model incorporates uncertainty in juvenile and adult survival rates, direct and indirect linkages among populations in different rivers, and a number of potential human removals or stocking in a flexible, modular program. Results from this model will form the basis for delisting and recovery criteria for the Gulf of Maine DPS of Atlantic salmon.

Litigation Update

Following the decision to list the Gulf of Maine distinct population segment of Atlantic salmon as endangered in 2000, the State of Maine along with 8 other Plaintiffs filed motions for summary judgement challenging the validity of this listing as arbitrary and capricious. In response to this lawsuit, the National Marine Fisheries Service and the US Fish and Wildlife Service compiled an extensive administrative record documenting the scientific basis for the listing decision. The court reviewed the administrative record to determine if the decision-making process to list the GOM DPS was reasonable in light of the best available scientific information. On April 24, 2003, the court determined that decision to list the GOM DPS of Atlantic salmon as endangered was not arbitrary and capricious and thereby denied the State's request for summary judgement. In addition to challenging the listing, the 8 other Plaintiffs in the lawsuit had requested summary judgement on four other claims, all of which the court dismissed due to a lack of standing.

Connecticut Program

In 2002 the Connecticut River Atlantic Salmon Commission (CRASC) was recognized with the Department of Interior Conservation Service Award for its cooperative commitment to restoring Atlantic salmon and other migratory fish to the Connecticut River.

This award highlights the strength of the Connecticut program which continues to emphasize hatchery releases, dam relicensing and removal, and research. In addition, the CRASC

devoted increased time to environmental education partnerships, fishway construction, dam removal, habitat restoration and increased federal government support. A total of 44 sea-run Atlantic salmon were observed returning to the Connecticut River watershed. Approximately 7.3 million juvenile Atlantic salmon were stocked and 1,151 adult domestic broodstock were stocked in the Connecticut River.

The Connecticut River Salmon Association (CRSA) and the Deerfield/Millers River Chapter of Trout Unlimited are carrying conservation messages to over 2,000 students in 80 schools in the lower watershed annually by their sponsorship of salmon egg incubation activities (for educational purposes) in classrooms in Connecticut and Massachusetts. The CRSA assisted the Southern Vermont Natural History Museum and the Vermont Institute of Natural Science to establish a similar project for over 300 students in 18 schools in Vermont.

Merrimack Program

A total of 56 sea-run Atlantic salmon returned to the Merrimack River in 2002. Approximately 1.46 million juvenile Atlantic salmon were released in the Merrimack River basin, this release included 1.41 million unfed fry, 1,900 parr, 1,200 two-year smolts, and 50,000 yearling smolts. Other efforts underway in the Merrimack Program include effort by the multi-agency NH River Restoration Task Force to identify dams for removal in the state, and continuing support for the Adopt-A-Salmon program which marked its 10th anniversary in 2002.

Dam Removals

Two major dam removals occurred in 2002 in Maine. These were the Smelt Hill Dam on the Presumpscot River and Sennebec Dam on the St. George River. The Smelt Hill Dam was completely removed opening up seven miles of riverine habitat in the lower Presumpscot River. The Sennebec Dam was also completely removed. To ensure that water levels in Sennebec Pond remained at historic levels and provide upstream and downstream fish passage, a rock ramp was constructed at the natural outlet of the pond. One major dam removal occurred in 2002 in New Hampshire. The Winchester Dam on the Ashuelot River, a tributary of the Connecticut River, was completely removed. The Winchester Dam was the 5th dam in a series of 6 dams on the Ashuelot River. Removal of the West Swanzey Dam, the 6th dam, is currently being investigated.

Salmon Habitat Enhancement and Conservation

Salmon habitat enhancement and conservation efforts in New England in 2002 focused on habitat restoration projects including dam removals, habitat protection projects including the development of conservation easements, implementation of stream restoration assessment tools, and the development of an optimal flow methodology for a dam to optimize salmon habitat. These cooperative efforts have involved state and federal fishery resource agencies, watershed councils, non-government organizations, corporate sponsors, volunteers, and numerous other public and private groups. Habitat protection projects in New England have included technical assistance to local conservation groups, federal, state and private funding for land acquisition projects, riparian and stream channel restoration, and state-sponsored fish habitat programs that generate revenues to support salmon habitat enhancement and conservation.

Databases and Geo-referencing Systems

Microsoft Access and Environmental Systems Research Institute (ESRI), GIS products have been employed to manage Atlantic salmon tabular and spatial data for Maine rivers in a common, standardized, compatible and expandable format. Standardized nomenclature and a shared linear geo-referencing system have been developed and are incorporated into a "hub and spoke" system of relationally linked databases. This system can be used to register interagency research activities into "real space" and to enable linear distance analyses between locations of research activities.

Other Research and Items of Interest

Efforts to investigate the role of acidity from acid rain on Atlantic salmon parr and smolt survival in Maine DPS rivers is underway. The adult returns of remnant populations of wild Atlantic salmon in Maine have reached historic lows. One potential issue that could be compounding low survival is the low acid-neutralizing capacity of water in these rivers, and precipitation is acidic due to acid rain. Studies in Norwegian and Canadian rivers have shown that rivers with low Ph and aluminum concentrations that exceed 100µg/L can have adverse effects on smolt survival. Therefore, gill tissue samples were taken from smolts in several DPS rivers and captive hatchery populations to investigate ATPase activity and aluminum deposition. The results obtained during this study were compared with samples taken from smolts in Norwegian rivers. While enzyme analysis does indicate that river-produced smolts have abnormally low activity levels, there is no indication that river acidity is the cause.

The Annual Report of the US Atlantic Salmon Assessment Committee, Report Number 15 – 2003 Activities, can be accessed at: http://www.fws.gov/r5cneafp/atsasscom.htm

ANNEX 3

North American Commission

NAC(03)8

Review of Atlantic Salmon Management Measures for 2003

(tabled by Canada)

NAC(03)8

Review of Atlantic Salmon Management Measures for 2003

(tabled by Canada)

Introduction

Atlantic salmon stocks continue to be in poor condition throughout Atlantic Canada. There are still many areas where there are serious concerns for conservation of the stocks. Low returns are generally associated with low marine survival.

Canadian management measures are tailored to the needs of specific rivers and watersheds to meet conservation targets, while striving for an overall Precautionary Approach.

Commercial Fisheries

There are no commercial fisheries for Atlantic salmon on Canada's east coast. The last commercial fishery, a small fishery on Québec's Lower North Shore, concluded in 1999.

Commercial fisheries moratoria in Labrador and insular Newfoundland remain in place indefinitely.

Aboriginal Food Fisheries

Aboriginal food fisheries for Atlantic salmon take place throughout Atlantic Canada and Québec. Aboriginal fisheries for food, social and ceremonial purposes are permitted after conservation requirements have been addressed, and take precedence over recreational fishing.

The federal Department of Fisheries and Oceans (DFO) seeks to develop food fishery licences with Aboriginal groups that identify allocations, monitoring system requirements (guardians/logbooks, etc.) and scientific projects such as tagging or gear trials (e.g. the use of trapnets instead of gillnets).

The food fishery for Atlantic salmon for the Labrador Inuit Association (LIA) is managed under a communal licence. The Innu Nation Food Fishery is managed under a special management plan for Lake Melville.

For the 2002 season, LIA had an assigned quota of 10mt, and reported landings of 10.1 tonnes (preliminary) compared to 9.6 tonnes in 2001. The Innu Nation had a quota of 1,500 salmon in 2002, with reported landings of 1.3 tonnes (preliminary) compared to 2.4 tonnes in 2001. Both of these Aboriginal food fisheries were strictly monitored by DFO with the assistance of Aboriginal fishery guardians. Management measures included tagging and mandatory log returns, along with reduced seasons and selected closed areas.

A resident food fishery has been implemented in Southern Labrador for the past three years. The fishery is managed under a special management plan, which permits the retention of four salmon as a by-catch in the trout and charr fishery. Recorded landings for 2002 were 5.5

tonnes (preliminary) compared to 4.1 tonnes in 2001. Similar to management measures imposed on the Aboriginal food fishery, the resident food fishery has reduced seasons to permit early-run (MSW) salmon to escape to the rivers. In addition, tagging and mandatory log returns are part of the management strategy. Guardians employed by the Labrador Métis Nation assist DFO in monitoring and enforcement of the fishery. In 2002, approximately 95% of the logs were returned to DFO, which is exceptional compared to other commercial and Aboriginal fisheries.

Recreational Fisheries

Newfoundland and Labrador

2002 was the first year of a new multi-year (2002-2006) Atlantic salmon management plan.

The Plan features a River Classification and Adaptive Management Strategy for Insular Newfoundland and areas of Southern Labrador. The Plan permits different retention limits based on the health of individual river stocks. These limits range from retention of six grilse on a Class I river, to catch and release only on a Class IV river. The retention of MSW salmon is only permitted on select rivers in Zones 1 & 2 in Labrador.

Other key management measures include the mandatory use of barbless hooks on all scheduled salmon rivers, closures based on environmental protocols (i.e. low water levels or high water temperatures), as well as selected river closures for the entire season for conservation reasons.

New conservation management measures implemented for the past two years in Southern Labrador for the recreational salmon fishery will continue in 2003. These measures include the introduction of a river classification system for selected rivers. All rivers impacted by the construction of the Trans Labrador Highway have a Class III designation (2 grilse seasonal limit). No retention of large fish (i.e. greater than 63cm) is permitted on these rivers. For all other salmon rivers in Zones 1 & 2, the seasonal bag limit of three grilse and one large salmon will apply.

Recreational catches in Newfoundland and Labrador totaled 42,401 salmon in 2001 compared to 44,190 in 2002.

Maritimes Region

The Maritimes Region consists of five Salmon Fishing Areas (19, 20, 21, 22 and 23). In 2002, there were no salmon rivers in the Region that achieved spawning requirements. Rivers in two of these Areas (20 and 21) are negatively impacted by acid rain and are generally of low productivity. Given the stock status and the forecast for similar returns in 2003, management options are limited. Complete closures will be applied to most rivers in the Region with some limited hook and release angling opportunities and Aboriginal harvests limited essentially to hatchery-origin fish. Angling licence sales have declined in Nova Scotia by 74% within the past decade.

Area 19 will open for hook and release only. In Areas 20 and 21, a pilot river categorization scheme introduced in 2001 will continue in 2003. Five rivers with hatchery supplementation will be open to hook and release, and food fisheries on those same five rivers will be

permitted for fin-clipped hatchery grilse. This limited access in Areas 20 and 21 is not expected to contribute to any a further decline in the stocks.

Rivers in the Inner Bay of Fundy portion of Areas 22 and 23 remain closed to salmon fishing (since 1990) and salmon stocks in this area were listed as "endangered" by the Committee on the Status of Endangered Wildlife in Canada in 2001. A live-gene bank program for Inner Bay of Fundy salmon stocks was initiated in 1998 and a recovery plan for these stocks has been prepared. Canada's *Species At Risk Act* is expected to be promulgated in June 2003, which will trigger strict measures to protect these endangered stocks.

Gulf Region

The Gulf Region consists of four Salmon Fishing Areas (15, 16, 17 and 18). Salmon return patterns in the Southern Gulf of St. Lawrence rivers range from declining through stable. Large salmon returns were lower than in 2001 in all assessed rivers of the Maritime Provinces. Small salmon returns generally increased in 2002. Returns in most rivers in Gulf Region were close to or at their minimum conservation requirement. In 2002, there were no closures due to warm weather or low water conditions. Atlantic salmon were harvested by two user groups in 2002: Aboriginal peoples and recreational fishers.

The **Restigouche River** (SFA 15) appears to have fallen short of the conservation requirement in 2002. Large salmon abundance was lower than in 2001, whereas small salmon abundance was much greater. Returns in 2003 should be similar to the last five years, approximately at the minimum conservation requirement.

The **Miramichi River** (SFA 16) system overall and the Southwest Miramichi did not meet the conservation requirements in 2002, the fourth time in five years. The Northwest Miramichi did not meet the conservation requirements in 2002, the fifth consecutive year. Small salmon returns in 2002 were up 30% from the previous five-year average. The outlook for 2003 is for a return of large salmon greater than 2002 in both the Northwest and Southwest Miramichi rivers. The southern portion of SFA 16 will remain closed for 2003.

Because the majority of salmon returning to the Morell and other PEI rivers (SFA 17) in 2002 are of hatchery origin, current fisheries have little impact on future runs and status quo will apply.

Angling catches in the rivers of Northumberland Strait area of Nova Scotia (SFA 18) remained low in 2002. Juvenile densities were equal to or greater than reference levels in four of eight rivers surveyed. Escapement to the Margaree River was just above the conservation requirement. The juvenile densities in the Margaree River remained high.

In 2002, allocations for Aboriginal bands on the Miramichi River were 13,117 grilse and 1,444 salmon. Preliminary estimates of removals were 2,587 grilse and 221 salmon. Allocations for 2003 are still under negotiation.

2003 management measures for SFA 15, 16, 17 and 18 are unchanged from 2002.

Province of Québec

Stocks continue to decline, especially on the Upper and Mid North Shore. River survival is being maintained, but at-sea survival is declining. For 2003, a small increase in large salmon is expected.

Québec has developed a multi-year salmon plan which establishes conservation limits and management targets for each river. Where the conservation limit is not met, catch and release fishing only is permitted for large salmon and to some extent for grilse, if the latter contribute more than 10% to the egg deposition, to reach to conservation limit for each river. The fishing of MSW salmon is permitted, with restrictions, on rivers where the conservation limit is exceeded.

Since 1984, the reporting of catches is mandatory in Quebec. In 2003, an on-line catch reporting system has been implemented to provide timely information on catches (date, length, weight, location). This information will enable managers to react more quickly with better management decisions.

ANNEX 4

Letters from the President and Secretary to the Ministry of Agriculture, Food, Fishing and Rural Affairs, France regarding St Pierre and Miquelon

CNL39.032

12 June, 2003

Mr Christian Ligeard
Maritime Fisheries Assistant Manager
Ministry of Agriculture Food, Fishing and Rural Affairs
3 Fontenoy Place
75007 Paris
FRANCE

Thank you for your letter of 29 May.

I very much appreciate the information you provided and the background you gave NASCO on the salmon fisheries surrounding the great historic islands of St Pierre and Miquelon.

I particularly welcome France's expression (in respect of St Pierre and Miquelon) of its willingness to engage in a salmon sampling program in 2003. It is very important for NASCO to have a better understanding of the migration patterns of salmon caught in St Pierre and Miquelon waters. As you know, salmon stocks are at very low levels and the sampling will contribute to enhanced management and conservation of the resource. We would like to express our desire to participate with your scientists in this very important project. In view of the great urgency to begin our scientific cooperation during the coming fishing season in July and August, Dr Malcolm Windsor will contact you to arrange details on this project.

Mr Ligeard, let me express to you the great amount of goodwill that your letter generated within NASCO during our Twentieth Annual Meeting in Edinburgh. This project will certainly benefit both the citizens of St Pierre and Miquelon and the NASCO Contracting Parties but, more importantly, will contribute greatly to safeguarding the Atlantic salmon. I look forward to a strong partnership between France (in respect of St Pierre and Miquelon) and NASCO.

Yours sincerely

Jacque Robichaud
President

CNL39.033

12 June, 2003

Mr Christian Ligeard
Maritime Fisheries Assistant Manager
Ministry of Agriculture Food, Fishing and Rural Affairs
3 Fontenoy Place
75007 Paris
FRANCE

I want to echo the statement made by the NASCO President, Jacque Robichaud, and thank you for the information you provided in your recent letter regarding the salmon fishery at St Pierre and Miquelon.

We particularly welcome the expression by France (in respect of St Pierre and Miquelon) of its willingness to increase its cooperation with NASCO. In that context you have agreed to improve our knowledge of the Atlantic salmon by a sampling programme.

I believe that this programme reflects broadly the request the President and I made when we visited the Islands in October 2001. I have a comment about the timing of the programme that you have outlined. The genetic study that you have proposed could be started in 2003 because the samples required for genetic analysis can readily be taken from the same fish used in the biometric study. We are, like you, eager to begin this sampling programme this fishing season, in July and August. Please let me know of your acceptance so that we can make the necessary arrangements with the appropriate NASCO scientific representatives to determine how they can assist with the sampling programme.

I look forward to working with France (in respect of St Pierre and Miquelon) and NASCO Contracting Parties to foster the sharing of information on subsistence fishing in conjunction with the scientific cooperative programme. In this way, both NASCO and France (in respect of St Pierre and Miquelon) can gain from each other's experiences.

Yours sincerely

Dr Malcolm Windsor
Secretary

ANNEX 5

CNL(03)12

Request for Scientific Advice from ICES

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

    1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and worldwide production of farmed and ranched Atlantic salmon in 2003;
    1.2 report on significant developments which might assist NASCO with the management of salmon stocks;
    1.3 provide a compilation of tag releases by country in 2003;
    1.4 identify relevant data deficiencies, monitoring needs and research requirements taking into account NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea.

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

    2.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    2.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;
    2.4 provide catch options or alternative management advice, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    2.5 provide estimates of by-catch of salmon in pelagic fisheries and advise on their reliability.

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

    3.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    3.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    3.3 update age-specific stock conservation limits based on new information as available;
    3.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    3.5 provide an analysis of any new biological and/or tag return data to identify the origin and biological characteristics of Atlantic salmon caught at St Pierre and Miquelon;
    3.6 provide descriptions (gear type; and fishing depth, location and season) for all pelagic fisheries that may catch Atlantic salmon.

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

   4.1 describe the events of the 2003 fisheries and the status of the stocks; [1, 2]
   4.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
   4.3 provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes);
   4.4 provide catch options or alternative management advice with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding.[3]

Notes:

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

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

3. In response to questions 2.4, 3.4 and 4.4 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice. With respect to stock rebuilding, consider and evaluate various alternative baseline measures for use in risk analysis.

ANNEX 6

List of North American Commission Papers

Paper No.	Title
NAC(03)1	Provisional Agenda
NAC(03)2	Draft Agenda
NAC(03)3	The St Pierre and Miquelon Salmon Fisheries
NAC(03)4	Draft Report
NAC(03)5	NAC Scientific Working Group on Salmonid Introductions and Transfers - Report of Activities - 2002/2003
NAC(03)6	Report to the NAC on US Activities Regarding Acid Rain
NAC(03)7	Report on US Atlantic Salmon Management and Research Activities in 2002
NAC(03)8	Review of Atlantic Salmon Management Measures for 2003 (tabled by Canada)
NAC(03)9	Draft Letter to France regarding St Pierre and Miquelon
NAC(03)10	Report of the Twentieth Annual Meeting of the North American Commission
NAC(03)11	Draft Letter from the Secretary to France regarding St Pierre and Miquelon
NAC(03)12	Agenda
NAC(03)13	Letter from the President to France regarding St Pierre and Miquelon
NAC(03)14	Letter from the Secretary to France regarding St Pierre and Miquelon

Note: This is a listing of all the Commission papers. Some, but not all, of these papers are included in this report as annexes.

REPORT OF THE

TWENTIETH ANNUAL MEETING

OF THE

NORTH-EAST ATLANTIC COMMISSION

2-6 JUNE 2003
EDINBURGH, SCOTLAND, UK

Chairman:	Mr Árni Olafsson (Denmark (in respect of the Faroe Islands and Greenland)
Vice-Chairman:	Mr Steinar Hermansen (Norway)
Rapporteur:	Dr Niall Ó Maoiléidigh (European Union)
Secretary:	Dr Malcolm Windsor

NEA(03)13

CONTENTS

NEA(03)13

Report of the Twentieth Annual Meeting of the North-East Atlantic Commission of the North Atlantic Salmon Conservation Organization 2-6 June 2003, Edinburgh, Scotland, UK

1. Opening of the Meeting

1.1 The Chairman, Mr Árni Olafsson (Denmark (in respect of the Faroe Islands and Greenland)), opened the Twentieth Annual Meeting of the North-East Atlantic Commission and welcomed delegates to Edinburgh.

1.2 An opening statement was made on behalf of the Non-Government Organizations attending the Annual Meeting (Annex 1).

1.3 A list of participants at the Twentieth Annual Meeting of the Council and Commissions is included on page 215 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its agenda, NEA(03)14 (Annex 2).

3. Nomination of a Rapporteur

3.1 The Commission appointed Dr Niall Ó Maoiléidigh (European Union) as its Rapporteur for the meeting.

4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of ICES, Dr Walter Crozier, presented the scientific advice relevant to the North-East Atlantic Commission, CNL(03)8, prepared in response to a request from the Commission at its Nineteenth Annual Meeting. The ACFM Report from ICES, which contains the scientific advice relevant to all Commissions, is included on page 127 of this document.

4.2 The representative of Iceland noted that the description of the stock status of non-maturing Northern European stocks did not appear to reflect the Icelandic situation which was similar to that for the non-maturing Southern European stocks. He referred to the statement from ICES that the proportion of multi-sea-winter salmon (46%) in Northern European stocks had never been higher. He sought clarification as to whether this was due to an increase in the abundance of the multi-sea-winter component or a decrease in the abundance of the one-sea-winter component. The representative of ICES stated that the pre-fishery abundance (PFA) for the maturing component of Northern European stocks was decreasing while that of the non-

maturing stocks was increasing and the number of multi-sea-winter recruits was higher than in previous years.

4.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that the Southern European MSW stocks were in a tenuous condition and that ICES had advised that there should be no harvest of these stocks. He asked if this advice would apply to both distant water and homewater fisheries. The representative of ICES indicated that the catch advice presented for the non-maturing Southern European stocks had been developed in a quantitative framework which included risk analysis. The existing sharing arrangement between Greenland (40%) and North America (60%), would imply that there could be no harvest of these stocks at West Greenland or in homewaters. The exception to this is in-river fisheries on stocks which are meeting their conservation requirements as there was no biological reason to restrict catches in these situations.

5. Salmonid Introductions and Transfers

5.1 The Secretary introduced documents NEA(03)4 (Annex 3) and NEA(03)6 (Annex 4) detailing the returns by the Parties under the Commission's Resolution to Protect Wild Salmon Stocks from Introductions and Transfers. He referred to the development by the Council of a new umbrella resolution (the "Williamsburg Resolution") incorporating all NASCO's agreements in relation to aquaculture, introductions and transfers and transgenics. He suggested that the returns under the Commission's Resolution might, in future, be made to the Council under the reporting procedures of the new Resolution, assuming it is adopted by the Council. The Commission accepted this suggestion.

5.2 The representative of Norway referred to an EU Directive (91/67) covering trade in aquaculture animals. An exemption under this Directive for Norway had expired on 31 December 2002 and Norway is now, therefore, obliged to allow the movement of live salmonids into Norwegian coastal waters and water courses. He expressed his concern that this would increase the risk of spreading disease and parasites. While this concern had been expressed to the relevant authority in the EU he wished to inform the Commission that the Directive is currently under review and in this regard he suggested that two provisions be considered:

(a) the possibility of establishing protection zones for wild salmonids where introductions and transfers of salmonids would be forbidden or restricted;

(b) allowing the movement of salmonid eggs only since, in most cases, this posed less risk of introducing diseases and parasites than movements of live fish.

These provisions would be consistent with the Precautionary Approach in general and the measures contained in Annex 2 of the new "Williamsburg Resolution".

5.3 The representative of Iceland recognised that this was an issue being dealt with in the context of the European Economic Area (EEA). However, Iceland's exemption under this Directive had expired in mid-2002 and in this regard they were in a similar position and echoed the sentiments and concerns which had been raised by Norway.

5.4 The representative of the European Union noted the statements made by Norway and Iceland and agreed to convey these sentiments and concerns to the proper authorities. However, he felt that it was not normal or appropriate that in NASCO there were discussions concerning one Party's legislation. Furthermore, both of the Parties concerned had participated in the EEA discussions and had fully accepted the consequences. The representative of Norway disagreed with this view since the Directive is under review.

6. Risk of Transmission of *Gyrodactylus salaris* in the Commission Area

6.1 The representative of Norway introduced document NEA(03)8. It is the intention of the Directorate for Nature Management to host a workshop on the risk of transmission of *Gyrodactylus salaris* in the Commission area. The representative of the European Union noted the provisional list of participants and requested that the meeting be open to all delegations. The representative of Norway agreed to this request.

7. Application of the Precautionary Approach to the Work of the Commission

7.1 The Secretary referred to the work of the Council in relation to application of the Precautionary Approach to salmon management. The Commission agreed that this item could be removed from its agenda but recognised that the Precautionary Approach will continue to influence its work in the future.

7.2 The representative of the European Union noted that there had been no report to the Council by Denmark (in respect of the Faroe Islands and Greenland) in relation to actions taken to implement the Decision Structure for management of fisheries and asked why this was the case. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that the Faroe Islands had stated their support for the Precautionary Approach several times and were willing to comply with it.

8. Regulatory Measures

8.1 The representative of Denmark (in respect of the Faroe Islands and Greenland) reported that there had been no commercial fishery at Faroes in 2002 or to date in 2003 and no research fishery. He reminded the Commission that whenever regulatory measures have been discussed during the last twenty Annual Meetings, his delegation had stressed that the ocean and its marine resources are vital to the wellbeing of the people of the Faroe Islands and that rational utilisation of these resources is, therefore, in their interest. He noted that, under the Convention, one of the factors to be taken into account in establishing regulatory measures is the extent to which the salmon stocks concerned feed in the areas of fisheries jurisdiction of the respective Parties. For 2002 and 2003 the Commission did not set a quota for the fishery, on the understanding that the fishery would be managed in a precautionary manner. His delegation proposed that the decision applying in 2003 should remain in 2004.

8.2 The representative of the European Union indicated that he did not know what the proposal entailed, since there is no regulatory measure in place for 2003. He asked

the representative of Denmark (in respect of the Faroe Islands and Greenland) if he could be more specific as to the intention and content of the proposal.

8.3 The representative of Denmark (in respect of the Faroe Islands and Greenland) referred to document NEA(02)12 contained in the report of the Nineteenth Annual Meeting of the Commission. The proposal would involve changing the date in this document but leaving the remaining text unchanged. The representative of the European Union noted that this was a decision of the Commission, not a regulatory measure, and he asked what regulatory measures had applied to the Faroese salmon fishery in 2002. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that the Act governing commercial fishing in the Faroes requires that all fishermen wishing to fish for salmon at sea must apply for a licence. In 2002 no licences had been issued.

8.4 The representative of the European Union expressed the opinion that no regulatory measures applied to the salmon fishery in 2002 but no licences had been issued. He asked why there had been no requests for licences. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that this was not a question that the Ministry of Fisheries could answer; it was a question that would have to be addressed to the fishermen. He also stated that if the decision to issue a licence or not rests with the Ministry, this constitutes a regulatory measure.

8.5 The representative of the European Union asked if the Chairman of the North Atlantic Salmon Fund (NASF) had offered compensation to the fishermen in Faroes for not fishing. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that he was not in a position to answer this question. The representative of the European Union stated that it was his impression that the Chairman of NASF had been to the Faroes. He reiterated that rational management by an international organization responsible for regulating fishing for salmon should be in the form of a TAC. He expressed concern about temporary compensation arrangements in the absence of a TAC because of the uncertainty associated with these arrangements, which depend on funds being available. He indicated that his delegation wishes an appropriate TAC to be agreed for the 2004 salmon fishery at Faroes so that there is appropriate management of the fishery under international auspices and in accordance with the Convention. He indicated that his delegation could not turn a blind eye to these responsibilities. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that there was no better way of applying the Precautionary Approach than not fishing. The representative of the European Union agreed with this and questioned why it could not, therefore, be stated clearly that there would be no fishing in Faroes in 2004. The representative of Denmark (in respect of the Faroe Islands and Greenland) reiterated that the Faroes have a right to fish for salmon, and that since the discussions were not making progress, he again put forward his proposal.

8.6 The representative of the European Union stated that, as he was not getting answers to his questions, he would re-phrase them. He asked how much salmon the Faroe Islands would fish if it did exercise its legitimate right to fish under the Convention. The representative of Denmark (in respect of the Faroe Islands and Greenland) responded that, in accordance with the decision agreed at the Nineteenth Annual Meeting, the Faroe Islands would follow the advice from ICES and also conduct a

research fishery. However, he could not say how much the Faroes would fish. The representative of the European Union stated that he could not understand how the delegation from Denmark (in respect of the Faroe Islands and Greenland) could attend the meeting without knowing how much they wish to fish. The representative of Denmark (in respect of the Faroe Islands and Greenland) stated that he was not prepared to make any further comments on this issue.

8.7 The representative of the European Union requested that the dialogue continue as it is the objective of the Commission to set regulatory measures. He expressed his disappointment at the approach adopted by Denmark (in respect of the Faroe Islands and Greenland) and their failure to clarify their position.

8.8 The representative of Norway confirmed that his delegation shared the concerns of the European Union and would like to see a regulatory measure for a low quota allowing only a research fishery, as recommended by ICES. He was pleased that the Faroe Islands had acted responsibly by not exercising their right to fish.

8.9 The representative of ICES stated that ICES had not recommended that a research fishery take place but if there is a fishery, the results of any sampling would be of interest to ICES. The representative of the European Union referred to last year's decision which stated that the Faroe Islands would take management decisions with due regard to the ICES advice, and noted that the advice was that there should be no fishery. He concluded, therefore, that there would be no fishery and he asked if that was correct. He stated that research is necessary but ICES had recommended no fishery and he asked, therefore, whether Denmark (in respect of the Faroe Islands and Greenland) would accept ICES' advice not to fish in 2004.

8.10 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted that ICES had recommended sampling of the resource so there was a need for a research fishery. The representative of ICES reiterated that ICES had not recommended the nature and type of fishery but that if there is a fishery they would welcome access to information from it.

8.11 The representative of Norway indicated that the main point is that if a fishery takes place it should be a research fishery, according to advice from ICES.

8.12 The representative of Denmark (in respect of the Faroe Islands and Greenland) introduced document NEA(03)10 outlining recommendations made by ICES concerning a research fishery at Faroes over the past eight years. This document concluded that the Faroes research fishery had been duly recommended by ICES. The representative of ICES responded that a research fishery had not been specifically recommended by ICES in 2003 although this had been the case in the past. He reiterated that information from any fishery at Faroes should be made available to ICES as this would enhance several areas of the assessment process. Although he was not in a position to state that ICES had recommended a research fishery in 2003, he was willing to endorse this on behalf of ICES. The Commission amended the document to reflect this, NEA(03)11.

8.13 The representative of the European Union tabled document CNL(03)41 which provided details of salmon fisheries in European Union Member States. He indicated

that the document was relevant to the work of the Council and the West Greenland and North-East Atlantic Commissions.

8.14 The Commission considered a proposal from the Chair, NEA(03)9, for a decision regarding the salmon fishery in Faroes waters in 2003. The Commission adopted this decision, NEA(03)12 (Annex 5).

8.15 The representative of the European Union made the following statement in relation to the decision:

"Mr. Chairman, Denmark (in respect of the Faroe Islands and Greenland) is a signatory to the NASCO Convention and this means that they have agreed to take decisions on the promotion of the conservation, restoration, enhancement and rational management of salmon stocks occurring in their waters through international co-operation. Article 8(b) of the Convention specifically states that the function of the Commission is to "propose regulatory measures for fishing in the area of fisheries jurisdiction of a member of salmon originating in the rivers of other Parties". I would also refer Denmark (in respect of the Faroe Islands and Greenland) to paragraph 4 of Article 66 of the United Nations Convention on the Law of the Sea, which states that in cases where anadromous stocks migrate into or through the waters landward of the outer limits of the exclusive economic zone of a State other than the State of origin, such State shall co-operate with the State of origin with regard to the conservation and management of such stocks.

To my mind, Mr. Chairman, this means that the Faroe Islands have clear obligations to co-operate. Any management decisions on the fisheries taking place in their waters are a joint responsibility, which is shared with their partners in NASCO. So, Mr. Chairman, the obligation to regulate the wild salmon fisheries rests with NASCO. There is no legal basis for the management of salmon fisheries in the absence of a genuine regulatory measure.

It is for this reason, Mr. Chairman, that from the very outset, my Delegation has proposed that NASCO should take its responsibilities and revert to the earlier practice of establishing a TAC and possible accompanying measures with the objective of controlling the impact of any mixed stock fishery. This practice has not been used for the last three years, during which time we, as the responsible NASCO Contracting Parties, appear to have abdicated from our responsibilities by agreeing not to take a decision on these fisheries.

Mr. Chairman, I understand the real concerns of Denmark (in respect of the Faroe Islands and Greenland) with regard to the management of wild salmon occurring in their waters. Nevertheless, whilst being exceptionally prepared to accept that we do not set a quota for the Faroe Islands fishery for 2004, I can only urge Denmark (in respect of the Faroe Islands and Greenland) to accept its obligations under the NASCO Convention as well as under the UN Convention on the Law of the Sea. On this basis, I hope that Denmark (in respect of the Faroe Islands and Greenland) will be able to accept that a full NASCO regulatory measure can be established for the fishery in 2005. I cannot accept any further derogation from the obligations we all hold."

8.16 The representative of Denmark (in respect of the Faroe Islands and Greenland) noted the statement by the European Union that the rational management of fish stocks should be in the form of a TAC. The European Union had experience of using TACs and this was part of European fishery policy. However, Denmark (in respect of the Faroe Islands and Greenland) was not sure that this was the ideal way to manage fisheries. With regard to interceptory fisheries, he reminded the Commission that there were major interceptory fisheries in the European Union. He suggested that it was more important to focus on the objectives of fishery management rather than the methods to achieve them and he reiterated that all Parties were concerned with the conservation of wild salmon.

8.17 The representative of Norway agreed with the European Union that the situation regarding the use of a decision rather than a regulatory measure was a cause for concern. The crucial point is that the Faroe Islands has not been exercising its right to fish and this was the main emphasis for Norway. Therefore, although he could accept the proposal put forward by the Chairman, he reiterated that Norway would prefer to have seen a small quota allowing a research fishery.

8.18 The representative of Iceland welcomed the decision and stated that he appreciated the restraint demonstrated by Denmark (in respect of the Faroe Islands and Greenland) to date and encouraged the same restraint and responsibility in future.

9. Announcement of the Tag Return Incentive Scheme Prize

9.1 The Chairman announced that the winner of the Commission's $1,500 prize was Mr J.C. Brookes, Bridgemere, Cheshire, England. The Commission offered its congratulations to the winner.

10. Recommendations to the Council on the Request to ICES for Scientific Advice

10.1 The Commission reviewed the relevant sections of document SSC(03)2 and the changes from the advice requested in 2002 and agreed to recommend it to the Council as part of the annual request to ICES for scientific advice. The request to ICES, as agreed by the Council, is contained in document CNL(03)12 (Annex 6).

11. Other Business

11.1 The representative of Norway tabled a proposal for an experimental tagging programme for investigating the behaviour of escaped farmed salmon, NEA(03)7 (Annex 7). The representative of the European Union stated that this was a worthwhile initiative and he would recommend that his delegation participate in the programme. The representative of Denmark (in respect of the Faroe Islands and Greenland) also endorsed the initiative. The representative of Iceland stated that he considered this to be a very important initiative and that Iceland would look forward to collaborating on the project. The representative of Norway thanked the delegates and proposed that the project be co-ordinated by Dr. Lars Petter Hansen of the Norwegian Institute for Nature Research. The Commission endorsed this proposal.

12. Date and Place of Next Meeting

12.1 The Commission agreed to hold its next Annual Meeting in conjunction with the Twenty-First Annual Meeting of the Council during 7-11 June 2004.

13. Report of the Meeting

13.1 The Commission agreed a report of the meeting, NEA(03)13.

Note: The annexes mentioned above begin on page 57**,** following the French translation of the report of the meeting. A list of North-East Atlantic Commission papers is included in Annex 8 on page 81 of this document.

NEA(03)13

Compte rendu de la Vingtième réunion annuelle de la Commission de l'Atlantique du Nord-Est de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord 2-6 juin 2003, Édimbourg, Écosse, Royaume-Uni

1. Ouverture de la réunion

1.1 Le Président, M. Árni Olafsson (Danemark (pour les Îles Féroé et le Groenland)), a ouvert la Vingtième réunion annuelle de la Commission de l'Atlantique du Nord-Est et a souhaité aux délégués la bienvenue à Édimbourg.

1.2 Une déclaration d'ouverture a été prononcée au nom des Organisations non gouvernementales présentes à la Réunion annuelle (annexe 1).

1.3 Une liste des participants à la Vingtième réunion annuelle du Conseil et des Commissions figure à la page 215 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté son ordre du jour, NEA(03)14 (annexe 2).

3. Nomination d'un Rapporteur

3.1 La Commission a nommé Dr Niall Ó Maoiléidigh (Union européenne), Rapporteur de la réunion.

4. Examen de la pêcherie de 2002 et du rapport du CCGP du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du CIEM, Dr Walter Crozier, a présenté les recommandations scientifiques du CIEM intéressant la Commission de l'Atlantique du Nord-Est, CNL(03)8, formulées à la suite d'une demande émanant de la Commission lors de sa Dix-neuvième réunion annuelle. Le rapport du CCGP du CIEM contenant les recommandations scientifiques pour l'ensemble des Commissions figure à la page127 de ce document.

4.2 Le représentant de l'Islande a noté que la description de l'état des stocks non matures de l'Europe du Nord ne semblait pas refléter la situation de l'Islande, qui était par contre semblable à la situation des stocks non matures de l'Europe du Sud. Il s'est reporté à la déclaration du CIEM, à savoir que la proportion des saumons PHM (46%) des stocks de l'Europe du Nord n'avait jamais été si importante. Il a cherché à savoir si ceci était dû à une augmentation de l'abondance de la composante PHM ou d'une baisse de l'abondance de la composante 1HM. Le représentant du CIEM a déclaré que l'abondance pré-pêche (APP) de la composante mature des stocks d'Europe du Nord

baissait tandis que celle des stocks non matures augmentait et que le nombre de PHM était plus élevé qu'au cours des années précédentes.

4.3 Le représentant du Danemark (pour les Îles Féroé et le Groenland) a noté que les stocks PHM de l'Europe du Sud se trouvaient dans une situation précaire et que le CIEM avait recommandé de ne pas exploiter ces stocks. Il a demandé si cette recommandation s'appliquait aussi bien aux pêcheries hauturières qu'aux pêcheries en eaux territoriales. Le représentant du CIEM a indiqué que les recommandations de captures offertes pour les stocks non matures d'Europe du sud avaient été formulées quantitativement et reposait en partie sur une analyse des risques. Selon l'accord actuel de la répartition entre le Groenland (40%) et l'Amérique du Nord (60%), aucune récolte de ces stocks ne serait possible ni au large du Groenland Occidental, ni dans les eaux territoriales. L'exception à la règle concernait la pêche en rivière des stocks qui avaient atteint leurs limites de conservation, puisqu'il n'existait dans ce cas aucune raison d'ordre biologique qui pourrait justifier la restriction des captures.

5. Introductions et transferts de salmonidés

5.1 Le Secrétaire a présenté les documents NEA(03)4 (annexe 3) et NEA(03)6 (annexe 4) qui décrivaient en détails les renvois d'informations effectués par les Parties aux termes de la Résolution visant à protéger les stocks de saumons sauvages contre les introductions et les transferts. Il a mentionné que le Conseil élaborait une nouvelle résolution « générique » (la « Résolution de Williamsburg ») qui incorporerait l'ensemble des accords de l'OCSAN relatifs à l'aquaculture, aux introductions et transferts et aux transgéniques. Il a suggéré que les renvois, effectués au terme de la Résolution de la Commission, soient dorénavant adressés au Conseil selon les procédures de soumission d'information de la nouvelle Résolution, en supposant que celle-ci soit adoptée par le Conseil. La Commission a accepté cette suggestion.

5.2 Le représentant de la Norvège a fait allusion à une Directive de l'UE (91/67) qui concernait le commerce des animaux d'aquaculture. L'exemption, dont bénéficiait la Norvège selon cette Directive, était arrivée à terme le 31 décembre 2002. La Norvège se trouvait par conséquent contrainte à permettre le mouvement de salmonidés vivants dans les eaux côtières norvégiennes ainsi que dans ses cours d'eau. Le représentant de la Norvège a exprimé son inquiétude quant à l'augmentation du risque de propagation des maladies et des parasites que ceci représenterait. Bien qu'il ait fait connaître son appréhension aux autorités compétentes de l'UE, il désirait informer la Commission que la Directive était actuellement en cours de révision. À ce propos, il suggérait que deux dispositions soient envisagées :

(a) la possibilité d'établir des zones de protection des salmonidés sauvages dans lesquelles les introductions et transferts de salmonidés seraient interdits ou restreints ;

(b) l'autorisation, uniquement, de mouvements d'œufs de salmonidés puisque, dans la plupart des cas, ceux-ci posaient moins de danger vis-à-vis de l'introduction de maladies et de parasites que les mouvements de poissons vivants.

Ces dispositions seraient conformes à l'approche préventive en général ainsi qu'aux mesures figurant à l'annexe 2 de la nouvelle « Résolution de Williamsburg ».

5.3 Le représentant de l'Islande reconnaissait que c'était dans le contexte de l'Espace Economique Européen (EEE) que cette question était traitée. Cependant, l'exemption, dont bénéficiait l'Islande aux termes de cette Directive, était également arrivée à terme au milieu de 2002. Sur cette question, ils se trouvaient donc dans une situation semblable à la Norvège et par conséquent éprouvaient des sentiments et inquiétudes similaires à ceux de ce pays.

5.4 Le représentant de l'Union européenne a pris note des déclarations de la Norvège et de l'Islande et a convenu de transmettre ces sentiments et appréhensions aux autorités pertinentes. Cependant, à son avis, il n'était ni normal ni bienséant de débattre de la législation d'une Partie au sein de l'OCSAN. En outre, les deux Parties concernées avaient participé aux débats de l'EEE et avaient entièrement accepté les conséquences de leur adhésion à cet organisme. Le représentant de la Norvège n'était pas d'accord avec cette opinion, étant donné que la Directive était en cours de révision.

6. Risque de Transmission du *Gyrodactylus salaris* dans la zone de la Commission

6.1 Le représentant de la Norvège a présenté le document NEA(03)8. Le *Directorate for Nature Management* (Le Conseil pour la gestion de l'environnement) avait l'intention d'organiser un atelier sur le risque de la transmission du *Gyrodactylus salaris* dans la zone de la Commission. Le représentant de l'Union européenne a pris acte de la liste provisoire des participants et a demandé que la réunion soit ouverte à toutes les délégations. Le représentant de la Norvège a accepté cette demande.

7. Application de l'approche préventive au travail de la Commission

7.1 Le Secrétaire s'est reporté au travail du Conseil en ce qui concernait l'application de l'approche préventive à la gestion du saumon. La Commission a convenu qu'en conséquence cette question pouvait être supprimée de son ordre du jour, mais a souligné que l'approche préventive continuerait à influencer son propre travail.

7.2 Le représentant de l'Union européenne a remarqué que le Danemark (pour les Îles Féroé et le Groenland) n'avait pas rendu compte des mesures prises pour mettre en œuvre le Cahier des charges concernant la gestion des pêcheries et a demandé pourquoi. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a répondu que les Îles Féroé avaient indiqué plusieurs fois qu'elles soutenaient l'approche préventive et qu'elles étaient prêtes à l'observer.

8. Mesures de réglementation

8.1 Le représentant du Danemark (pour les Îles Féroé et le Groenland) a signalé qu'il n'y avait eu en 2002 et jusqu'à ce jour en 2003 aucune pêche commerciale aux Îles Féroé. Il n'y avait également eu aucune activité de pêche menée à des fins de recherche. Il a rappelé à la Commission qu'à chaque fois que le sujet des mesures de réglementation avait été abordé au cours des vingt dernières réunions annuelles, sa délégation avait

insisté sur le fait que l'océan et ses ressources marines étaient essentielles au bien-être des populations des Îles Féroé et qu'une exploitation rationnelle de ces ressources était par conséquent dans leur intérêt. Il a fait remarquer qu'aux termes de la Convention, un des facteurs à prendre en considération, dans l'établissement de mesures de réglementation, était l'ampleur de l'alimentation des stocks de saumons concernés dans les zones de juridiction de pêche des Parties respectives. La Commission n'avait pas fixé de quota pour la pêche de 2002 et 2003, étant entendu que celle-ci serait gérée préventivement. Sa délégation proposait que la décision en vigueur en 2003 soit maintenue en 2004.

8.2 Le représentant de l'Union européenne a indiqué qu'il ne savait pas ce que la proposition impliquait, puisqu'on n'avait mis aucune mesure de réglementation en place pour 2003. Il a demandé au représentant du Danemark (pour les Îles Féroé et le Groenland) s'il pouvait être plus spécifique quant à l'intention et le contenu de ladite proposition.

8.3 Le représentant du Danemark (pour les Îles Féroé et le Groenland) s'est reporté au document NEA(02)12 qui faisait partie du rapport de la Dix-neuvième réunion annuelle de la Commission. La proposition consisterait à modifier la date de ce document, mais de garder le restant du texte tel quel. Le représentant de l'Union européenne a fait remarquer qu'il s'agissait d'une décision de la Commission, et non d'une mesure de réglementation. Il a alors demandé quelles mesures de réglementation avaient été appliquées à la pêcherie de saumons des Îles Féroé en 2002. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a répondu que la Loi qui régissait la pêche commerciale aux Îles Féroé exigeait que tous les pêcheurs désireux de pêcher le saumon en mer fassent une demande de permis. En 2002 on n'avait distribué aucun permis.

8.4 Le représentant de l'Union européenne a indiqué qu'à son avis on n'avait appliqué aucune mesure de réglementation à la pêcherie de saumons en 2002 et, qu'en effet, aucun permis n'avait été distribué. Il a demandé pourquoi il n'y avait eu aucune demande de permis. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a répondu que ceci n'était pas une question à laquelle le Ministère de la pêche pouvait répondre, mais que c'était une question à adresser aux pêcheurs. Il a aussi ajouté que, dans la mesure où la décision d'allouer un permis ou non appartenait au Ministère, ceci constituait une mesure de réglementation.

8.5 Le représentant de l'Union européenne a demandé si le Président du Fonds pour le Saumon de l'Atlantique Nord (FSAN) avait proposé une compensation aux pêcheurs des Îles Féroé s'ils s'abstenaient de pêcher. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a répondu qu'il n'était pas en mesure de répondre à cette question. Le représentant de l'Union européenne a indiqué qu'il comprenait que le Président du FSAN s'était rendu aux Îles Féroé. Il a réitéré que c'était par l'établissement d'un TAC qu'un organisme international responsable de la réglementation de la pêche au saumon devait exprimer une gestion rationnelle. Il a indiqué que les accords de compensation temporaires (faute de TAC) l'inquiétaient, car ils demeuraient aléatoires puisqu'ils dépendaient des disponibilités financières. Il a indiqué que sa délégation désirait voir l'adoption d'un TAC approprié pour la pêche au saumon de 2004 aux Îles Féroé de façon à ce que la pêcherie soit gérée correctement sous les auspices d'un organisme international et conformément à la

Convention. Il a précisé que sa délégation ne pouvait fermer les yeux sur ces responsabilités. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a déclaré que l'on ne pouvait faire mieux pour appliquer l'approche préventive que de s'abstenir de pêcher. Le représentant de l'Union européenne a indiqué qu'il était d'accord avec ce point de vue et a demandé par conséquent pourquoi on ne pouvait donc pas indiquer clairement qu'il n'y aurait pas de pêche aux Îles Féroé en 2004. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a réitéré que les Îles Féroé avaient le droit de pêcher le saumon. Il représentait ainsi sa proposition puisque les débats n'aboutissaient nulle part.

8.6 Le représentant de l'Union européenne a déclaré que, puisqu'il n'obtenait pas de réponse à ses questions, il les présenterait d'une autre façon. Il a demandé combien de saumons les Îles Féroé récolteraient si elles exerçaient leur droit légitime à la pêche aux termes de la Convention. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a répondu que, conformément à la décision prise au cours de la Dix-neuvième réunion annuelle, les Îles Féroé suivraient les recommandations du CIEM et organiseraient aussi une pêche à des fins de recherche. Cependant, il ne pouvait dire combien de poissons les Îles Féroé récolteraient. Le représentant de l'Union européenne a déclaré qu'il ne pouvait pas comprendre comment la délégation du Danemark (pour les Îles Féroé et le Groenland) pouvait participer à la réunion sans savoir combien de poissons elle désirait pêcher. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a indiqué qu'il n'était pas disposé à apporter d'autres commentaires sur cette question.

8.7 Le représentant de l'Union européenne a demandé que le dialogue continue puisque l'objectif de la Commission était de fixer des mesures de réglementation. Il a exprimé sa déception quant à l'approche adoptée par le Danemark (pour les Îles Féroé et le Groenland) et leur incapacité à clarifier leur position.

8.8 Le représentant de la Norvège a confirmé que sa délégation partageait l'inquiétude de l'Union européenne et qu'elle désirerait voir l'adoption d'une mesure de réglementation qui permettrait un quota bas pour une pêche à des fins de recherche uniquement, comme le recommandait le CIEM. Il était heureux de voir que les Îles Féroé avait agi de manière responsable en choisissant de ne pas exercer leur droit à la pêche.

8.9 Le représentant du CIEM a déclaré que le CIEM n'avait pas recommandé qu'une pêche à des fins de recherche ait lieu, mais que si celle-ci avait lieu, le CIEM serait intéressé par les résultats de tout échantillonnage. Le représentant de l'Union européenne s'est reporté à la décision de l'année précédente qui indiquait que les Îles Féroé prendraient des décisions de gestion en accord avec les recommandations du CIEM et a noté que les recommandations étaient de ne pas effectuer de pêche. Il en a donc conclu qu'aucune pêche ne devait avoir lieu. Il a demandé si ce raisonnement était correct. Il a par ailleurs déclaré que la recherche était nécessaire mais que le CIEM avait recommandé une absence de pêche. Aussi, a-t-il demandé si le Danemark (pour les Îles Féroé et le Groenland) accepterait les recommandations du CIEM de ne pas pêcher en 2004.

8.10 Le représentant of du Danemark (pour les Îles Féroé et le Groenland) a noté que le CIEM avait recommandé un échantillonnage de la ressource ; il était donc nécessaire

d'organiser une pêche à des fins scientifiques. Le représentant du CIEM a répété que le CIEM n'avait recommandé ni la nature, ni le type de pêche, mais avait simplement indiqué que si une pêche avait lieu, ils apprécieraient d'avoir accès aux renseignements qui en découleraient.

8.11 Le représentant de la Norvège a indiqué que le point principal était que, si une pêche avait lieu, ceci devrait être une pêche menée à des fins de recherche, conformément aux recommandations du CIEM.

8.12 Le représentant du Danemark (pour les Îles Féroé et le Groenland) a présenté le document NEA(03)10 qui donnait un aperçu des recommandations proposées par le CIEM à l'égard de la pêche menée à des fins de recherche aux Îles Féroé au cours des huit dernières années. Ce document concluait que ce type de pêche, aux Îles Féroé, avait été dûment recommandé par le CIEM. Le représentant du CIEM a répondu que cet organisme n'avait pas spécifiquement recommandé de pêche menée à des fins de recherche en 2003 même si ceci avait été le cas au cours des années précédentes. Il a réitéré que les informations glanées au cours de tout type de pêche aux Îles Féroé devraient être mises à la disposition du CIEM car ceci améliorerait la procédure d'évaluation dans plusieurs domaines. Bien qu'il ne soit pas en mesure d'affirmer que le CIEM avait recommandé qu'une activité de pêche soit menée en 2003 à des fins de recherche, il était prêt à appuyer cette opinion au nom du CIEM. La Commission a amendé le document NEA(03)11 afin de refléter ceci.

8.13 Le représentant de l'Union européenne a présenté le document CNL(03)41 qui fournissait des détails sur les pêcheries de saumons dans les États membres de l'Union Européenne. Il a précisé que le document était pertinent au travail du Conseil et des Commissions du Groenland Occidental et de l'Atlantique du Nord-Est.

8.14 La Commission a étudié une proposition du Président, NEA(03)9, qui offrait une décision sur la pêche au saumon dans les eaux des Îles Féroé en 2003. La Commission a adopté cette décision, NEA(03)12 (annexe 5).

8.15 Le représentant de l'Union européenne a prononcé la déclaration suivante par rapport à la décision prise :

« M. Président, le Danemark (pour les Îles Féroé et le Groenland) est une Partie signataire de la Convention de l'OCSAN ce qui signifie que le pays a convenu de prendre, en coopération internationale, des décisions sur la promotion de la conservation, restauration, mise en valeur et gestion rationnelle des stocks de saumons se trouvant dans leurs eaux. L'Article 8(b) de la Convention précise que la fonction de la Commission est « de proposer des mesures de réglementation concernant les activités de pêche, dans une zone de juridiction de pêche d'une Partie, qui récolteraient des saumons provenant de rivières d'autres Parties. » J'aimerais également attirer l'attention du Danemark (pour les Îles Féroé et le Groenland) sur le paragraphe 4 de l'article 66 de la Convention des Nations Unies sur le Droit de la Mer qui énonce que, dans les cas où des stocks anadromes pénètrent dans, ou traversent, les eaux à l'intérieur des limites extérieures de la zone économique exclusive d'un État autre que l'État d'origine, cet État devra coopérer avec l'État d'origine sur les question de conservation et de gestion de ces stocks.

À mon avis, M. Président, ceci signifie que les Îles Féroé ont clairement le devoir d'offrir leur coopération. Toute décision de gestion concernant les pêches ayant lieu dans leurs eaux est une co-responsabilité, partagée avec leurs partenaires au sein de l'OCSAN. Donc, M. Président, c'est à l'OCSAN qu'incombe la responsabilité de réglementer les pêcheries de saumons sauvages. Il n'existe aucune base légale à la gestion des pêcheries de saumons sans véritable mesure de réglementation.

C'est pour cette raison, M. Président, que ma délégation a proposé, dès le départ, que l'OCSAN prenne ses responsabilités et adopte à nouveau l'ancienne pratique d'établir un TAC et éventuellement d'autres mesures, et ce afin de contrôler l'impact de toute pêcherie de stock mixte. Cela fait trois ans que nous n'avons pas utilisé cette pratique ; trois ans au cours desquels nous, en tant que Parties responsables de l'OCSAN, semblons avoir abdiqué nos responsabilités en acceptant de ne pas prendre de décision à propos de ces pêcheries.

M. Président, je comprends les véritables préoccupations du Danemark (pour les Îles Féroé et le Groenland) à l'égard de la gestion du saumon sauvage présent dans leurs eaux. Cependant, bien que nous soyons disposés, exceptionnellement, à accepter de ne pas fixer de quota pour la pêche des Îles Féroé de 2004, je ne peux que recommander vivement au Danemark (pour les Îles Féroé et le Groenland) d'accepter ses obligations conformément à la Convention de l'OCSAN et à la Convention des Nations Unies sur le Droit de la Mer. Ceci étant, j'espère que le Danemark (pour les Îles Féroé et le Groenland) sera en mesure d'accepter l'établissement d'une mesure de réglementation complète pour la pêche de 2005. Je ne peux accepter d'autre dérogation au devoir qui nous incombe à tous. »

8.16 Le représentant du Danemark (pour les Îles Féroé et le Groenland) a pris note de la déclaration de l'Union Européenne, à savoir que la gestion rationnelle des stocks de poissons devait s'effectuer par l'établissement d'un TAC. L'Union européenne avait l'habitude d'utiliser les TAC car ceci faisait partie de la politique européenne de la pêche. Cependant le Danemark (pour les Îles Féroé et le Groenland) n'était pas convaincu que ceci soit la meilleure façon de gérer les pêcheries. En ce qui concernait les pêches d'interception, il a rappelé à la Commission que l'on comptait de nombreuses et importantes pêches d'interception au sein de l'Union européenne. Il a suggéré qu'il était plus important de se pencher sur les objectifs de la gestion des pêches que sur les méthodes pour les atteindre. Il a réitéré que la conservation du saumon sauvage concernait toutes les Parties.

8.17 Le représentant de la Norvège était d'accord avec l'Union européenne. On avait en effet des raisons de s'inquiéter en ce qui concernait l'utilisation d'une décision plutôt que d'une mesure de réglementation. L'essentiel pour la Norvège toutefois était que les Îles Féroé n'avait pas exercé leur droit à la pêche. Par conséquent, bien qu'il fût en mesure d'accepter la proposition du Président, il a réitéré que la Norvège aurait préféré voir l'établissement d'un petit quota permettant d'effectuer une pêcherie à des fins de recherche.

8.18 Le représentant de l'Islande a accueilli favorablement la décision prise et a déclaré qu'il appréciait la modération dont avait fait preuve le Danemark (pour les Îles Féroé et le Groenland) jusqu'à ce jour. Il a incité le Danemark (pour les Îles Féroé et le

Groenland) à appliquer la même modération et le même sens des responsabilités à l'avenir.

9. Annonce du prix du programme d'encouragement au renvoi des marques

9.1 Le Président a annoncé que M. J.C. Brookes, de Bridgemere, du comté de Cheshire en Angleterre avait remporté le prix de 1 500 dollars de la Commission. La Commission a offert ses félicitations au gagnant.

10. Recommandations au Conseil s'inscrivant dans les cadre de la demande au CIEM de recommandations scientifiques

10.1 Après avoir passé en revue les sections pertinentes du document SSC(03)2, et la façon dont celles-ci différaient de la demande de recommandations de 2002, la Commission a convenu de les recommander au Conseil dans le cadre de la demande annuelle de recommandations scientifiques au CIEM. Le document CNL(03)12 (annexe 6) contient la demande de recommandations scientifiques adressée au CIEM et approuvée par le Conseil.

11. Divers

11.1 Le représentant de la Norvège a présenté une proposition de programme expérimental de marquage qui permettrait d'étudier le comportement des saumons échappés d'élevages, NEA(03)7 (annexe 7). Le représentant de l'Union européenne a déclaré que ceci était une initiative intéressante et qu'il recommanderait la participation de sa délégation au programme. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a également donné son soutien à l'initiative. Le représentant de l'Islande a déclaré qu'il considérait ce projet comme une initiative très importante et que l'Islande se réjouissait à l'avance de pouvoir y apporter sa collaboration. Le représentant de la Norvège a remercié les délégués et a proposé que le projet soit coordonné par Dr Lars Petter Hansen de l'Institut norvégien pour la recherche de la nature. La Commission a appuyé la proposition.

12. Date et lieu de la prochaine réunion

12.1 La Commission a convenu de tenir sa prochaine Réunion annuelle lors de la Vingt et unième réunion annuelle du Conseil, qui se tiendra du 7 au 11 juin 2004.

13. Examen du compte rendu de la réunion

13.1 La Commission a approuvé le compte rendu NEA(03)13 de la réunion.

Note: L'annexe 8 contient, à la page 81**,** une liste des documents de la Commission de l'Atlantique Nord-Est.

ANNEX 1

NGO Joint Opening Statement to the North-East Atlantic Commission

Mr Chairman,

As announced in our joint statement to the Council, the NGOs want to highlight two special problems to the North-East Atlantic Commission:

1. The parasite *Gyrodactylus salaris*
2. The significant number of escapes from sea farms

Gyrodactylus salaris

There is no longer any doubt that the parasite *Gyrodactylus salaris* is a major threat to the wild Atlantic salmon. The parasite wipes out stocks with almost 100 per cent mortality of juveniles. So far, 44 Atlantic salmon stocks are infected in Norway, and several Atlantic salmon stocks on the west coast of Sweden. The Baltic salmon seems to be naturally adapted to the parasite, but 30 years after the parasite was accidentally introduced into Norway from a Swedish hatchery, there is no evidence that the Norwegian stocks of Atlantic salmon are developing resistance.

A number of restrictive measures have been taken in Norway in order to stop the parasite from spreading further to new, and at present, healthy rivers. Measures include disinfection of fishing gear and boats, limiting the stocking of fish and spreading of infected water, closing fish ladders, installing fish weirs and using Rotenone to fight the parasite. In spite of all this, the parasite was recorded in two new rivers last year, most likely coming from infected rivers through estuarial transfer.

A plan for eradicating *Gyrodactylus salaris* in Norway over a period of 10 years has been worked out, but so far, not all the funds needed have been made available. In the meantime, we fear that the parasite keeps invading new rivers. Our concerns are especially focused on infection spreading from Swedish and Finnish watercourses close to the Norwegian border. Bearing in mind the cases of infected farmed rainbow trout in the Swedish Lake Bullaren, the source of a Norwegian salmon river, the scenario of spreading from one country to another is very realistic.

And, may we also remind the Commission that there is a very short distance from infected areas in Finland to the border river Tana, which probably is the largest salmon river in the whole NASCO area, with its annual yield of about 200 tons of Atlantic salmon.

Against this background, we urge the NASCO Parties to take action to:

- implement adequate legislation to handle any situation when detecting the parasite in watercourses with Atlantic salmon stocks;
- increase surveillance and control activities for the parasite in the Baltic, Scandinavia and North-East Atlantic Commission area;
- increase control of anglers and other water-sports coming from infected watercourses to ensure they only use disinfected gear and boats.

Escapes

In spite of the efforts of the fish farming industry to prevent escapes, the fact is that in recent years the number of escaped farmed salmon and rainbow trout is still increasing. In Norway there were 630,000 reported escapes last year, and from the Faeroe Islands 600,000 fish of 1-2 kg escaped in one incident in March 2002. We have no information about where these escaped fish are. What we do know is that in some Norwegian rivers last year, 80 per cent of the catches were farmed salmon! And, in the famous river Namsen, more than 40 per cent of the salmon recorded on the spawning grounds in 2002 were farmed salmon.

In addition to the damage caused by interbreeding in the rivers, some escaped farmed fish stay in the fjords, close to the cages, increasing the problem with sea lice infestations. Against this background, we urge the following:

- that the ICES proposal for tagging and tracking farmed fish should be implemented as soon as possible;

- that the Parties should develop minimum international standards for cage containment, maintenance and management.

Thank you for your attention.

ANNEX 2

NEA(03)14

Twentieth Annual Meeting of the North-East Atlantic Commission Balmoral Hotel, Edinburgh, Scotland, UK

2-6 June, 2003

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area
5. Salmonid Introductions and Transfers
6. Risk of Transmission of *Gyrodactylus salaris* in the Commission Area
7. Application of the Precautionary Approach to the Work of the Commission
8. Regulatory Measures
9. Announcement of the Tag Return Incentive Scheme Prize
10. Recommendations to the Council on the Request to ICES for Scientific Advice
11. Other Business
12. Date and Place of the Next Meeting
13. Report of the Meeting

ANNEX 3

North-East Atlantic Commission

NEA(03)4

Returns under the North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers

NEA(03)4

Returns under the North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers

1. In 1997, the Commission unanimously adopted a Resolution to Protect Wild Salmon Stocks from Introductions and Transfers, NEA(97)12. The 2002 returns, the fourth year of returns, are attached. Measures previously reported by some Parties may still apply (see NEA(00)4, NEA(01)4, NEA(01)6 and NEA(02)4) but these are not reported here. At the time of preparation of this paper, information has not been received from the Faroe Islands and some EU Member States which have salmon interests (Denmark, France and Spain).

2. The main areas of note are as follows:

   (a) During 2002, 1.8 million salmon ova from Tasmania and 0.5 million salmon ova from the USA were imported to Scotland. There were no other movements into the Commission area of live Atlantic salmon and their eggs which originated from outside the Commission area.

   (b) There were no proposals to release transgenic salmonids to the environment or use them in aquaculture during 2002.

   (c) Details of epidemiological zones were provided by EU (Ireland) and Norway. New management measures including monitoring programmes within epidemiological zones were reported by EU (Ireland and Sweden) and Norway. Only one Party reported movements of live salmonids from a zone where a specified disease was present to a zone free of the disease. In this case the transfer was from a hatchery which was subsequently found to be infected with *G. salaris.* Specific restrictive measures are imposed at all Norwegian hatcheries known to be, or suspected of being, infected with *G. salaris* in order to eliminate the parasite.

   (d) In the UK, a contingency plan for a *G. salaris* outbreak is being developed with the aim of identifying where eradication or other control methods are feasible. In Scotland it is intended to introduce statutory reporting of unexplained mortalities in fish farms, and in Northern Ireland a contingency plan to deal with disease outbreaks has been developed and contingency plans concerning escape of farm salmon are to be introduced. A new parasite, *Parvicapsula sp.*, was discovered on farmed salmon in Finnmark county, Norway and the salmon were slaughtered.

   (e) There were no known movements from hatcheries to areas with salmon, or to facilities where there is a risk of transmission of infection to such areas, other than those from hatcheries where regular health inspections did not detect significant diseases or parasites.

(f) There were no reports of introductions of non-indigenous anadromous salmonids into rivers containing Atlantic salmon. Rainbow trout eggs from health-certified sites in South Africa were introduced to England and Wales.

(g) There has been no progress in introducing the NEAC system of classifying salmon rivers.

(h) With regard to unintentional introductions and transfers, a bye-law has been introduced in north-west England precluding the use of live bait in specified waters.

3. The Commission has previously noted that the term "non-indigenous" is not defined in the Resolution. The Secretary was asked to consult with the Parties with a view to adopting a definition at the Twentieth Annual Meeting. The Commission had agreed to use the definition adopted by the North American Commission on an interim basis and had recognised that, in the event that a definition other than that used by the North American Commission was adopted, the issue would need to be resolved by the Council. However, the Standing Committee on the Precautionary Approach has proposed to the Council that the various agreements concerning aquaculture, introductions and transfers and transgenics be consolidated into one 'umbrella Resolution' with standardised definitions, including a definition of non-indigenous. The Council will be considering this issue at its Twentieth Annual Meeting and we have not, therefore, proposed a definition here.

Secretary
Edinburgh
2 May, 2003

Article 1: Movements originating from outside the North-East Atlantic Commission Area

1.1 Details of known movements into the Commission area of live Atlantic salmon and their eggs which have originated from outside the Commission area

European Union

United Kingdom

The following Atlantic salmon ova were imported into Scotland in 2002:

Australia (Tasmania)	1.8 million
USA	0.5 million

Other Parties

No movements of live Atlantic salmon and their eggs which originated from outside the Commission area were reported by the other Parties or the other EU Member States.

Article 2: Transgenic Atlantic Salmon

2.1 Details of any proposals to release transgenic salmonids to the environment (including their use in aquaculture) and details of any risk assessment undertaken

There have been no proposals to release transgenic salmonids to the environment by any Party.

Article 3: Movements within the North-East Atlantic Commission Area

3.1 Specified diseases and parasites

3.1.1 Details of any epidemiological zones, i.e. zones free of specific pathogens, which have been established

European Union

Ireland

VHS: The entire country, with the exception of a small area around Cape Clear (off the south-west coast), is free from VHS.
IHN: The entire country is free from IHN.
G. salaris: The entire country is free from this parasite.

ISA: The entire country, with the exception of two mini–zones in County Mayo, is free from ISA (see 3.1.2 below).

Norway

Infectious Haematopoietic Necrosis (IHN): Previously reported measures still apply.
Viral Haemorrhagic Septicaemia (VHS): Bufferzone along the border with Russia. Free zone in the rest of the country.
Infectious Salmon Anemia (ISA): Map of outbreaks provided to Secretariat.
Gyrodactylus salaris: The County of Finnmark in Northern Norway has been confirmed, through the surveillance programme, as being free of the parasite *G. salaris*.

Other Parties

No details of the establishment of epidemiological zones were provided by the other Parties or the other EU Member States.

3.1.2 If epidemiological zones have been established:

(a) ***Details of any new management measures (including monitoring to confirm the disease status of the zone and eradication) which have been undertaken***

European Union

Ireland

ISAV was isolated from two rainbow trout sites in County Mayo, in the absence of clinical disease. Movement restrictions and tight biosecurity measures were put in place as soon as the presence of the virus was confirmed. One site was harvested out (market-sized fish), cleaned, disinfected and fallowed for 6 months. Following risk assessment, the other site, which held smaller fish, was allowed to on-grow until the end of June 2003, under strict conditions. This site will then be cleaned, disinfected and fallowed for 6 months. All other marine aquaculture facilities in the country have been tested and ISAV has not been isolated. In excess of 400 wild fish have also been tested with similar results. An epidemiological study is currently underway to determine how long the virus might have been on site prior to detection and where it might have originated from.

Sweden

The monitoring programme for *Gyrodactylus salaris,* which was expanded in 2001 to cover all Swedish west coast salmon rivers where the parasite has not been found, now also includes monitoring of fish farms with rainbow trout located in the lower parts of these salmon rivers.

Norway

ISA: A new contingency plan has been developed, with instructions relating to measures on suspicion of and/or confirmation of ISA (which are consistent with Directive 93/53/EEC). The plan has been made available to the Secretariat.

The official surveillance program for *Gyrodactylus salaris* has been extended, and 50% of the freshwater fish farms are now examined for *G. salaris* every year. New outbreaks of *G. salaris* occurred in three salmon hatcheries in Nordland county.

Other Parties

No new management measures were reported by the other Parties or the other EU Member States.

(b) ***Details of any known movements of live salmonids and their eggs from a zone where any of the specified diseases is present to a zone free of these diseases***

Norway

One transfer occurred of live salmonids from a hatchery which was subsequently found to be infected with *G. salaris*. The hatchery was in Nordland county and the transfer was to Nord-Trøndelag county. Specific restrictive measures are imposed at all hatcheries known to be, or suspected of being, infected with *G. salaris* in order to eliminate the parasite.

Other Parties

No movements of live salmonids and their eggs from a zone where any of the specified diseases is present to a zone free of these diseases were reported by the other Parties.

3.2 Unknown diseases and parasites

3.2.1 Details of new procedures and changes to existing procedures for the early identification and detection of, and rapid response to, an outbreak of any new disease or parasitic infection likely to affect Atlantic salmon

European Union

United Kingdom

A developing contingency plan for a *Gyrodactylus salaris* outbreak aims to identify where eradication or other control methods are feasible. In Scotland, it is intended to introduce a statutory requirement for the reporting of unexplained mortalities on fish farms. In Northern Ireland, sampling and monitoring checks are in place. Contingency plans to deal with disease outbreaks in draft form.

Norway

A new parasite (*Parvicapsula sp*.) was discovered on farmed salmon in Finnmark county (Alta and Gamvik municipalities). All farmed salmon at infected sites were slaughtered.

Other Parties

No new procedures or changes to existing procedures have been reported by the other Parties or the other EU Member States.

3.2.2 Details of any additional protective measures which have been introduced

European Union

United Kingdom

In Northern Ireland, contingency plans for farmed salmon escapement measures to be introduced.

Other Parties

No additional protective measures were reported to have been introduced by the other Parties or other EU Member States.

3.3 Health inspection of donor facilities

3.3.1 Details of any known movements of live salmonids and their eggs from hatcheries to areas containing Atlantic salmon stocks, or to facilities where there is a risk of transmission of infection to such areas, other than those from facilities where regular inspections have not detected significant diseases and parasites

No movements other than those from facilities where regular inspections did not detect the presence of significant diseases and parasites were reported by any Party.

Article 4: Movements of Non-Indigenous Fish

4.1 Details of any known introductions of non-indigenous fish species into a river containing Atlantic salmon

No known introductions of non-indigenous fish species into a river containing Atlantic salmon reported by any Party.

4.2 Details of any known introductions of non-indigenous anadromous salmonids into the Commission area

European Union

United Kingdom

Rainbow trout eggs from health-certified sites in South Africa.

Other Parties

No introductions of non-indigenous salmonids were reported by the other Parties or the other EU Member States.

Article 5: Classification of Rivers

5.1 Has the NEAC system of classifying rivers been introduced for the purpose of developing management measures concerning introductions and transfers?

The NEAC system of classifying rivers has not been introduced by any Party.

Article 6: Management Measures

6.1 Details of any new management measures developed for each class of river detailed in the Resolution

No new management measures were reported by any Party.

Article 7: Unintentional Introductions and Releases

7.1 Details of any steps which been taken to limit the risks from unintentional introductions (e.g. in ships' ballast water, through release of live bait, etc.)

European Union

United Kingdom

Bye-law introduced in north-west England precluding the use of live bait in specified waters in the Lake District.

Other Parties

No steps to limit the risks from unintentional introductions reported by the other Parties or the other EU Member States.

Other Information

Details of other relevant information in relation to the implementation of the Resolution

No other relevant information provided by any Party.

ANNEX 4

North-East Atlantic Commission

NEA(03)6

Return by Denmark (in respect of the Faroe Islands)
under the North-East Atlantic Commission Resolution
to Protect Wild Salmon Stocks from Introductions and Transfers

NEA(03)6

Return by Denmark (in respect of the Faroe Islands) under the North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers

Article 1: Movements originating from outside the North-East Atlantic Commission Area

1.1 Details of known movements into the Commission area of live Atlantic salmon and their eggs which have originated from outside the Commission area

No known movements.

Note: Import permitted when complying with Faroese legislation and with EU Directives and Decisions. No import of salmonids during the last 15-20 years.

Article 2: Transgenic Atlantic Salmon

2.1 Details of any proposals to release transgenic salmonids to the environment (including their use in aquaculture) and details of any risk assessment undertaken

No proposals.

Article 3: Movements within the North-East Atlantic Commission Area

3.1 Specified diseases and parasites

3.1.1 Details of any epidemiological zones, i.e. zones free of specific pathogens, which have been established

VHS and IHN have never been diagnosed on the Faroe Islands. Sixteen outbreaks of ISA have been recorded since March 2000.

3.1.2 If epidemiological zones have been established:

(a) ***Details of any new management measures (including monitoring to confirm the disease status of the zone and eradication) which have been undertaken***

No new measures.

Note: Faroese legislation in agreement with EU Directives and Decisions.

(b) ***Details of any known movements of live salmonids and their eggs from a zone where any of the specified diseases is present to a zone free of these diseases***

No known movements.

Note: Movements of live salmonids from ISA-infected seafarms are not allowed.

3.2 Unknown diseases and parasites

3.2.1 Details of new procedures and changes to existing procedures for the early identification and detection of, and rapid response to, an outbreak of any new disease or parasitic infection likely to affect Atlantic salmon

No new procedures.

3.2.2 Details of any additional protective measures which have been introduced

No additional protective measures.

3.3 Health inspection of donor facilities

3.3.1 Details of any known movements of live salmonids and their eggs from hatcheries to areas containing Atlantic salmon stocks, or to facilities where there is a risk of transmission of infection to such areas, other than those from facilities where regular inspections have not detected significant diseases and parasites

No known movements.

Article 4: Movements of Non-Indigenous Fish

4.1 Details of any known introductions of non-indigenous fish species into a river containing Atlantic salmon

No known introductions.

4.2 Details of any known introductions of non-indigenous anadromous salmonids into the Commission area

No known introductions.

Article 5: Classification of Rivers

5.1 Has the NEAC system of classifying rivers been introduced for the purpose of developing management measures concerning introductions and transfers?

NEAC system not introduced.

Article 6: Management Measures

6.1 Details of any new management measures developed for each class of river detailed in the Resolution

Not applicable.

Article 7: Unintentional Introductions and Releases

7.1 Details of any steps which been taken to limit the risks from unintentional introductions (e.g. in ships' ballast water, through release of live bait, etc.)

No steps taken.

Other Information

Details of other relevant information in relation to the implementation of the Resolution

No other relevant information.

ANNEX 5

NEA(03)12

Decision Regarding the Salmon Fishery in Faroese Waters 2004

The North-East Atlantic Commission,

RECOGNIZING the right of the Faroe Islands to fish for salmon in their area of fisheries jurisdiction;

ACKNOWLEDGING the restraint demonstrated by the Faroe Islands by not utilizing their agreed NASCO quotas for a number of years;

WORKING expeditiously with ICES to improve the estimation of a combined conservation limit and thus to enable catch advice for the Faroe Islands salmon fishery to be given on an effort or a quantitative basis;

AGREEING to continue to work together to establish an agreed mechanism to allocate any exploitable surplus between the Faroe Islands and homewater fisheries on a fair and equitable basis;

NOTING that the Faroe Islands will manage any salmon fishery on the basis of the advice from ICES regarding the stocks contributing to the Faroese salmon fishery in a precautionary manner and with a view to sustainability, taking into account relevant factors, such as socio-economic needs and other fisheries on mixed stocks;

MINDFUL of the desire of the members of the Commission, supported by repeated ICES recommendations, that a research fishery should take place in the Faroese area;

ACKNOWLEDGING that the Faroe Islands will make management decisions with due consideration to the advice of ICES concerning the biological status of the stocks contributing to the fishery, and that if such fishing be decided upon, it will be limited in scope compared to the management measures agreed by NASCO in previous years, and that the fisheries shall be subject to close national surveillance and control;

FURTHER ACKNOWLEDGING that any fisheries will be organized in close cooperation between the fishermen and the authorities, taking due regard of the desire of the Parties, in conformity with ICES recommendations, to provide further scientific knowledge of the salmon resource;

NOTING that, Denmark (in respect of the Faroe Islands and Greenland) will, in case of any decision to open the fishery, promptly inform the NASCO Secretariat and all members of the Commission of that decision and of the attached conditions. In that event, other members of the Commission could call for a Commission meeting in accordance with Article 10 (7) of the Convention. In such a case, it is agreed to derogate from the provisions of Rule 16 of the Rules of Procedure;

decides not to set a quota for the Faroe Islands fishery for 2004.

ANNEX 6

CNL(03)12

Request for Scientific Advice from ICES

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

    1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and worldwide production of farmed and ranched Atlantic salmon in 2003;
    1.2 report on significant developments which might assist NASCO with the management of salmon stocks;
    1.3 provide a compilation of tag releases by country in 2003;
    1.4 identify relevant data deficiencies, monitoring needs and research requirements taking into account NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea.

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

    2.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    2.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;
    2.4 provide catch options or alternative management advice, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    2.5 provide estimates of by-catch of salmon in pelagic fisheries and advise on their reliability.

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

    3.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    3.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    3.3 update age-specific stock conservation limits based on new information as available;
    3.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    3.5 provide an analysis of any new biological and/or tag return data to identify the origin and biological characteristics of Atlantic salmon caught at St Pierre and Miquelon;
    3.6 provide descriptions (gear type; and fishing depth, location and season) for all pelagic fisheries that may catch Atlantic salmon.

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

   4.1 describe the events of the 2003 fisheries and the status of the stocks; [1, 2]
   4.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
   4.3 provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes);
   4.4 provide catch options or alternative management advice with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding.[3]

Notes:

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

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

3. In response to questions 2.4, 3.4 and 4.4 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice. With respect to stock rebuilding, consider and evaluate various alternative baseline measures for use in risk analysis.

ANNEX 7

NEA(03)7

Proposal for an Experimental Tagging Programme for Investigating the Behaviour of Escaped Farmed Salmon

(tabled by Norway)

Salmon escape from fish farms in all countries producing farmed fish. They are caught in fisheries and enter fresh water to spawn. In some fisheries and stocks the incidence of farmed salmon is high, but there is little knowledge of their survival and migratory behaviour.

In 2002, NASCO requested ICES to advise on an appropriate methodology to improve knowledge of the distribution and movements of escaped farmed salmon. ICES provided a proposal for a research design including experimental tagging and release of farmed salmon (CNL(03)8; section 4.5.2).

Norway suggests that a coordinated collaborative study as outlined by ICES should be carried out by the countries producing farmed salmon in the NEAC area, and that the pilot study should start in March/April 2004. The costs, which are suggested to be moderate for the pilot study, should be covered by the participating Parties. Norway is willing to coordinate such a study.

ANNEX 8

List of North-East Atlantic Commission Papers

Paper No.	Title
NEA(03)1	Provisional Agenda
NEA(03)2	Draft Agenda
NEA(03)3	Not issued
NEA(03)4	Returns under the North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers
NEA(03)5	Draft Report
NEA(03)6	Return by Denmark (in respect of the Faroe Islands) under the North-East Atlantic Commission Resolution to Protect Wild Salmon Stocks from Introductions and Transfers
NEA(03)7	Proposal for an Experimental Tagging Programme for Investigating the Behaviour of Escaped Farmed Salmon (tabled by Norway)
NEA(03)8	The Risk of Transmission of *Gyrodactylus salaris* in the Commission Area. Information on a Workshop to be arranged in Norway in Autumn 2003 (tabled by Norway)
NEA(03)9	Draft Decision Regarding the Salmon Fishery in Faroese Waters 2004
NEA(03)10	ICES recommendation of the continuation of the Faroese research fishery (tabled by Denmark (in respect of the Faroe Islands and Greenland))
NEA(03)11	Summary of ICES recommendation of the continuation of the Faroese research fishery (tabled by Denmark (in respect of the Faroe Islands and Greenland))
NEA(03)12	Decision Regarding the Salmon Fishery in Faroese Waters 2004
NEA(03)13	Report of the Twentieth Annual Meeting of the North American Commission
NEA(03)14	Agenda

Note: This is a listing of all the Commission papers. Some but not all, of these papers are included in this report as annexes.

REPORT OF THE

TWENTIETH ANNUAL MEETING

OF THE

WEST GREENLAND COMMISSION

2-6 JUNE 2003
EDINBURGH, SCOTLAND, UK

Chairman: Ms Patricia Kurkul (USA)

Vice-Chairman: Ms Julia Barrow (Canada)

Rapporteur: Ms Julia Barrow (Canada)

Secretary: Dr Malcolm Windsor

WGC(03)10

CONTENTS

WGC(03)10

Report of the Twentieth Annual Meeting of the West Greenland Commission of the North Atlantic Salmon Conservation Organization 2-6 June 2003, Edinburgh, Scotland, UK

1. Opening of the Meeting

1.1 The Secretary opened the meeting and informed the Commission that the Chairman, Mr Rollie Schmitten (USA), had advised that, regrettably, he would be unable to continue to act as Chairman. In accordance with the Commission's Rules of Procedure, an election was held and Ms Patricia Kurkul (USA) was elected to serve for the remaining term of office. The Chair welcomed delegates to Edinburgh.

1.2 An opening statement was made on behalf of the NGOs by their Chairman. He indicated that the NGOs welcome the five-year conservation agreement with KNAPK to suspend the commercial salmon fishery at West Greenland and hope that this can become a permanent arrangement. He stated that, against this background, and in the context of the continued particular weakness of North American stocks, the NGOs urge the Commission to set a zero commercial quota, as recommended in the scientific advice from ICES, subject to an allowance for subsistence consumption.

1.3 A list of participants at the Twentieth Annual Meeting of the Council and Commissions is included on page 215 of this document.

2. Adoption of the Agenda

2.1 The Commission adopted its agenda, WGC(03)11 (Annex 1).

3. Nomination of Rapporteur

3.1 The Commission appointed Ms Julia Barrow (Canada) as its Rapporteur for the meeting.

4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area

4.1 The representative of Denmark (in respect of the Faroe Islands and Greenland) presented a report, WGC(03)5 (Annex 2), on the 2002 salmon fishery at West Greenland. In accordance with the 2002 *Ad hoc* Management Programme the quotas available would have been between 20-55 tonnes of commercial landings to fishing plants during up to two harvest periods, depending on the observed commercial CPUE during the first harvest period. Shortly before the opening date of the 2002 fishing season, the Organisation for Fishermen and Hunters in Greenland (KNAPK) and the North Atlantic Salmon Fund (NASF) came to an agreement to suspend all commercial fishing for Atlantic salmon with the purpose of supplying fishing plants, factories, shops, grocers, smokehouses and marketing associations or export. The Greenland Home Rule Government decided to set a national quota for commercial landings of

Atlantic salmon to fishing plants of 0 tonnes for 2002. Exports of Atlantic salmon from Greenland were prohibited. However, a fishery for local sales to the open markets, hospitals, restaurants, etc. and a fishery for private consumption (the subsistence fishery) were permitted. A catch of 2.6 tonnes was reported for private consumption and a catch of 6.4 tonnes was reported sold at local markets, hotels, institutions, etc. In total there was a reported and unreported catch of Atlantic salmon in the subsistence fishery of approximately 20 metric tonnes in 2002.

4.2 The representative of ICES, Dr Walter Crozier, presented the scientific advice from ICES relevant to the West Greenland Commission, prepared in response to a request from the Commission at its Nineteenth Annual Meeting. The ACFM report from ICES, which contains the scientific advice relevant to all Commissions, is included on page 127 of this document. Dr Crozier's overhead presentation to the Commission is contained in document CNL(03)44.

4.3 The representative of the United States complimented ICES for the clear and comprehensive presentation of the advice. She referred to the sampling programme at West Greenland and asked for clarification as to why catch-per-unit effort (CPUE) could not be calculated for the 2002 fishery and what information would be required to allow such an assessment. The representative of ICES indicated that CPUE could not be calculated for the subsistence fishery in 2002 because some information on catch had been reported late and could not, therefore, be assigned to a particular standard week. Furthermore, some catches by vessels had been combined with those of other vessels. With regard to the information required, he indicated that previous *ad hoc* management measures developed by the Commission relied on the relationship between CPUE and pre-fishery abundance. The validity of this relationship depends on the accuracy of historical information and, following analysis, ICES had indicated that more information was needed to better understand the dynamics of the relationship. In particular, information concerning variation in CPUE by standard week at different times of the fishing season and for all NAFO divisions is desirable. Information on soak time of individual nets is required to establish the unit of effort. The very small and dispersed nature of the fishery in 2002 did not provide the opportunity for investigation of fishing effort parameters, such as soak times.

4.4 The Chair noted that, for North American stocks, ICES had provided advice in relation to the probability of achieving conservation requirements in the four northern regions and the probability that returns to southern regions would increase by at least 10% relative to the returns of the previous five years. She noted that the representative of ICES had cautioned about the appropriateness of this five-year baseline period for providing catch advice since, during a period of progressively declining returns, the baseline for stock rebuilding would also be declining. The representative of ICES stated that the scientists would welcome a clear statement from the managers of their objectives for stock rebuilding in order to facilitate the provision of appropriate advice. The representative of the European Union suggested that the baseline period could be extended to perhaps ten years. The representative of ICES agreed that this would be an improvement.

5. Regulatory Measures

5.1 There were no initial statements from the Parties.

5.2 Following discussions by the Heads of Delegations, the Chair tabled a document "Proposal from the Chair for a Regulatory Measures for the Fishing for Salmon at West Greenland for 2003", WGC(03)7. There were no comments from the Parties on the proposal. The regulatory measure was adopted, WGC(03)9 (Annex 3).

5.3 The representative of the European Union expressed the gratitude of the European Union to Greenland for their cooperation in agreeing to restrict their catch to a subsistence fishery. The European Union recognizes the sacrifices made by the people of Greenland and their restraint from fishing in the interest of wild salmon conservation. The European Union looks forward to continued future cooperation and improvements in the abundance of wild salmon as a result.

5.4 The representative of the United States noted the continuing decline in returns to United States rivers and the clear and compelling scientific advice from ICES that supported all action to reduce harvests to the lowest possible level. She expressed appreciation that Denmark (in respect of the Faroe Islands and Greenland) could agree to limit its fishery in 2003 to internal subsistence. While indicating her general support, she indicated that the United States would not be in a position to vote in favour of the regulatory measure given the potential that any fishery off West Greenland could harvest US-origin Atlantic salmon.

5.5 The representative of Canada also recognized the sacrifice that Greenland is making to reduce their salmon fishery as well as the excellent cooperation of all Parties in reaching agreement on the regulatory measure.

6. Application of the Precautionary Approach to the Work of the Commission

6.1 The Secretary referred to the initiatives of the Council in relation to application of the Precautionary Approach. The Commission agreed that this item could, in future, be removed from the Commission's agenda and should be dealt with in a uniform manner at Council, but recognised that the Commission will continue to apply the Precautionary Approach in its work in establishing regulatory measures for the West Greenland salmon fishery.

7. Sampling in the West Greenland Fishery

7.1 The representative of the United States presented a report on the North American/European Union sampling programme at West Greenland in 2002, WGC(03)4 (Annex 4). The representative of Denmark (in respect of the Faroe Islands and Greenland) complimented the United States for the presentation which provided accurate and honest observations on the nature of the fishery and the sampling programme concluded during 2002. He confirmed that Greenland would be willing to participate in a sampling programme in 2003.

7.2 All of the Parties agreed to participate in an international cooperative sampling programme for the West Greenland subsistence fishery in 2003. A sampling agreement for 2003 is attached, WGC(03)8 (Annex 5).

7.3 The representative of Canada indicated that Canada, in partnership with the Atlantic Salmon Federation, will be providing a sampler for the sampling programme in 2003.

8. Announcement of the Tag Return Incentive Scheme Prize

8.1 The Chair reported that, for the second year in succession, no tags were entered into the annual award scheme for the West Greenland Commission and so there could be no award. The representative of Denmark (in respect of the Faroe Islands and Greenland) asked ICES for clarification as to the reasons for the absence of any tag returns from Greenland. The representative of ICES stated that the vast majority of the tags currently being applied are internal, coded wire tags which do not rely on return by the fishermen and are not eligible for entry into the scheme. Furthermore, with a relatively low catch in a subsistence-only fishery the probability of recapture of an externally tagged salmon is very low.

9. Recommendations to the Council on the Request to ICES for Scientific Advice

9.1 The Commission reviewed the relevant sections of document SSC(03)2 and agreed to recommend it to the Council as part of the annual request to ICES for scientific advice. The request, as agreed by the Council, is contained in document CNL(03)12 (Annex 6).

10. Other Business

10.1 There was no other business.

11. Date and Place of Next Meeting

11.1 The next meeting of the West Greenland Commission will be held during the Twenty-First Annual Meeting of the Council from 7-11 June 2004.

12. Report of the Meeting

12.1 The Commission agreed a report of its meeting, WGC(03)10.

Note: The annexes mentioned above begin on page 97**,** following the French translation of the report of the meeting. A list of West Greenland Commission papers is included in Annex 7 on page 125 of this document.

WGC(03)10

Compte rendu de la Vingtième réunion annuelle de la Commission du Groenland Occidental de l'Organisation pour la Conservation du Saumon de l'Atlantique Nord 2-6 juin 2003, Édimbourg, Écosse, Royaume-Uni

1. Séance d'ouverture

1.1 Le Secrétaire a ouvert la réunion et a annoncé à la Commission que le Président, M. Rollie Schmitten (États-Unis), avait indiqué que, regrettablement, il ne serait plus en mesure de continuer à agir en tant que Président. Conformément au règlement de la Commission, une élection a eu lieu et Ms Patricia Kurkul (États-Unis) a été élue et remplira les fonctions de Président pour le restant du mandat. La Présidente a souhaité aux délégués la bienvenue à Édimbourg.

1.2 Une déclaration d'ouverture a été prononcée au nom des ONG par leur Président. Celui-ci a indiqué que les ONG accueillaient favorablement l'accord de conservation quinquennal qui avait été conclu avec KNAPK, l'Organisation des pêcheurs et des chasseurs du Groenland et qui consistait à interrompre la pêche commerciale au saumon au Groenland Occidental. En outre, les ONG espéraient que ceci pourrait devenir une décision permanente. Le Président des ONG a déclaré que, dans ce contexte, et sans oublier le fait que les stocks Nord-Américains continuaient à se trouver dans une situation précaire, les ONG incitaient vivement la Commission à fixer, exception faite d'une quantité destinée à la consommation de subsistance, un quota commercial nul, conformément aux recommandations scientifiques du CIEM.

1.3 Une liste des participants à la Vingtième réunion annuelle du Conseil et des Commissions se trouve à la page 215 de ce document.

2. Adoption de l'ordre du jour

2.1 La Commission a adopté son ordre du jour, WGC(03)11 (annexe 1).

3. Nomination d'un Rapporteur

3.1 La Commission a nommé Ms Julia Barrow (Canada), Rapporteur de la réunion.

4. Examen de la pêcherie de 2002 et du rapport du CCGP du CIEM sur les stocks de saumons dans la zone de la Commission

4.1 Le représentant du Danemark (pour les Îles Féroé et le Groenland) a présenté un rapport, WGC(03)5 (annexe 2), sur la pêcherie de 2002 au Groenland Occidental. Conformément au Programme de gestion *Ad hoc* de 2002, les quotas disponibles auraient permis le

débarquement commercial dans des usines de transformation de poisson de 20 à 55 tonnes de poissons, échelonné sur deux périodes de récoltes, suivant la CPUE commerciale observée au cours de la première récolte. Mais, très peu de temps avant la date d'ouverture de la saison de la pêche de 2002, KNAPK et le Fond pour le Saumon de l'Atlantique Nord (NASF) avaient conclu un accord d'interrompre toute forme de pêche commerciale au saumon atlantique destinée à approvisionner les usines de transformation de poisson, les usines, les magasins, les épiciers, les fumoirs, les associations de marketing et les sociétés d'exportation. Par ailleurs, le Gouvernement autonome du Groenland a décidé de fixer, pour 2002, un quota national pour les débarquements commerciaux de saumons atlantiques dans les usines de transformation de poisson de 0 tonne. Il était de plus interdit d'exporter le saumon atlantique. La pêche destinée aux ventes locales sur les marchés, aux hôpitaux et aux restaurants, etc. était toutefois autorisée. De même il était permis de pêcher pour une consommation personnelle (pêcherie de subsistance). Aussi avait-on enregistré 2,6 tonnes de poissons assignées à la consommation individuelle et 6,4 tonnes de captures destinées à la vente sur les marchés, aux hôtels, et à diverses institutions. En tout, les captures déclarées et non déclarées de saumons atlantiques de la pêcherie de subsistance dénombraient, en 2002, environ 20 tonnes.

4.2 Le représentant du CIEM, Dr Walter Crozier, a présenté les recommandations scientifiques du CIEM intéressant la Commission du Groenland Occidental, formulées à la suite d'une demande émanant de la Commission lors de sa Dix-neuvième réunion annuelle. Le rapport du CCGP du CIEM contenant les recommandations scientifiques pour l'ensemble des Commissions figure à la page 127 de ce document. Le document CNL(03)44 présente les diapositives utilisées par Dr Crozier lors des sa présentation.

4.3 Le représentant des États-Unis a complimenté le représentant du CIEM pour la clarté et le détail de sa présentation des recommandations. Elle s'est ensuite reportée au programme d'échantillonnage du Groenland Occidental et a cherché à savoir pourquoi les captures par unité d'effort (CPUE) ne pouvaient pas être calculées pour la pêche de 2002 et quelles informations seraient nécessaires pour qu'une telle évaluation puisse avoir lieu. Le représentant du CIEM a indiqué que l'on n'avait pas pu calculer la CPUE pour la pêche de subsistance en 2002 parce que certaines statistiques de captures avaient été déclarées en retard et ne pouvaient par conséquent pas être assignées à une semaine particulière. De plus, les captures effectuées par certains bateaux avaient été combinées à celles d'autres bateaux. En ce qui concernait l'information dont on avait besoin, il a indiqué que les mesures précédentes de gestion *ad hoc* mises au point par la Commission reposaient sur le rapport entre la CPUE et l'abondance pré-pêche. La validité de ce rapport dépendait de l'exactitude des statistiques historiques et, suite à une analyse de ces statistiques, le CIEM avait indiqué que des renseignements complémentaires étaient nécessaires pour mieux comprendre la dynamique de ce rapport. En particulier, il serait utile d'avoir des renseignements sur la variation de la CPUE pour chaque semaine, à différents moments de la saison de la pêche et pour toutes les divisions de l'OPAN. Des renseignements sur le temps d'immersion de chaque filet étaient également essentiels à l'établissement de l'unité d'effort. Le fait que la pêche en 2002 avait été si réduite et si éparpillée n'avait pas permis d'étudier les paramètres de l'effort de pêche tels que les temps d'immersion.

4.4 La Présidente a noté que, dans le cas des stocks Nord-Américains, le CIEM avait fourni des recommandations en fonction de la probabilité d'atteindre les limites de conservation dans les quatre régions du nord, et en fonction de la probabilité que les remontées vers les régions du sud augmenteraient d'au moins 10% par rapport aux remontées des cinq années précédentes. Elle a également pris note du fait que le représentant du CIEM avait mis la Commission en garde contre l'à propos de l'utilisation de cette période de cinq ans comme base pour les recommandations de capture, puisque, au cours d'une période affichant des remontées de moins en moins importantes, la base pour repeupler les stocks serait également moins élevée. Le représentant du CIEM a déclaré que les scientifiques apprécieraient une explication précise de la part des gestionnaires quant à leur objectif de repeuplement des stocks, et ce afin de faciliter la définition de recommandations appropriées. Le représentant de l'Union européenne a suggéré d'étendre la période de base à dix ans. Le représentant du CIEM a convenu que ceci serait une amélioration.

5. Mesures de réglementation

5.1 Les Parties n'ont prononcé aucune déclaration initiale.

5.2 À la suite des débats entre les Chefs de délégations, la Présidente a présenté le document intitulé « Proposition du Président visant à établir une mesure de réglementation à la pêcherie de saumons pour 2003 au Groenland Occidental », WGC(03)7. Les Parties n'ont offert aucun commentaire sur cette proposition. La mesure de réglementation a donc été adoptée, WGC(03)9 (annexe 3).

5.3 Le représentant of l'Union européenne a exprimé la reconnaissance de l'Union européenne envers le Groenland pour la coopération qu'ils avaient démontré en acceptant de limiter leurs captures à une pêche de subsistance. L'Union européenne était consciente des sacrifices consentis par les habitants du Groenland et appréciait le fait qu'ils se soient abstenus de pêcher, dans l'intérêt de la conservation du saumon sauvage. L'Union européenne se réjouissait à l'avance d'une coopération continue et de l'amélioration de l'abondance du saumon sauvage que ceci engendrait.

5.4 Le représentant des États-Unis a noté la baisse constante des remontées vers les rivières des États-Unis. Elle a également pris note des recommandations scientifiques, claires et indiscutables du CIEM qui soutenaient toute mesure qui réduirait les récoltes au plus bas niveau possible. Elle a exprimé son appréciation envers le Danemark (pour les Îles Féroé et le Groenland) pour avoir consenti à limiter sa pêche de 2003 à une pêche de subsistance. Bien qu'elle soit en accord en principe avec la mesure de réglementation, elle a toutefois indiqué que les États-Unis ne pourraient voter en faveur de cette mesure étant donné la possibilité de récolte de saumons atlantiques d'origine américaine dans toute activité de pêche qui aurait lieu au large du Groenland Occidental,.

5.5 Le représentant du Canada reconnaissait également le sacrifice fait par le Groenland pour réduire leur pêche au saumon. Il était également reconnaissant envers toutes les Parties pour l'excellente coopération qu'elles avaient démontrée dans la conclusion d'un accord sur une mesure de réglementation.

6. Application de l'approche préventive au travail de la Commission

6.1 Le Secrétaire s'est reporté aux initiatives du Conseil portant sur l'application de l'approche préventive. La Commission a convenu que ce point pouvait désormais être supprimé de l'ordre du jour de la Commission et qu'il devait être traité centralement au niveau du Conseil afin de garantir une uniformité d'approche. La Commission a précisé toutefois qu'elle continuerait d'appliquer l'approche préventive à son travail, en établissant des mesures de réglementation à la pêcherie de saumons du Groenland Occidental.

7. Échantillonnage de la Pêche du Groenland Occidental

7.1 Le représentant des États-Unis a présenté un rapport sur le programme d'échantillonnage effectué par l'Amérique du Nord et l'Union Européenne au Groenland Occidental en 2002, WGC(03)4 (annexe 4). Le représentant du Danemark (pour les Îles Féroé et le Groenland) a complimenté les États-Unis pour avoir présenté honnêtement et clairement le caractère du programme d'échantillonnage conclu en 2002. Il a confirmé que le Groenland serait disposé à prendre part à un programme d'échantillonnage en 2003.

7.2 Les Parties ont toutes convenu d'apporter leur coopération en 2003 à un programme d'échantillonnage international de la pêche de subsistance du Groenland Occidental. Le document WGC(03)8 (annexe 5) contient l'accord concernant ce programme d'échantillonnage pour 2003.

7.3 Le représentant du Canada a indiqué que le Canada fournirait, de pair avec la Fédération du Saumon Atlantique, un échantillonneur pour le programme d'échantillonnage de 2003.

8. Annonce du Prix du Programme d'encouragement au renvoi des marques

8.1 La Présidente a indiqué que cela faisait deux années de suite qu'on n'enregistrait aucune marque au programme annuel d'encouragement au renvoi des marques du Groenland Occidental, et de ce fait, on ne pouvait procéder à aucune remise de prix. Le représentant du Danemark (pour les Îles Féroé et le Groenland) a demandé au CIEM d'expliquer les raisons de cette absence de renvoi de marques du Groenland. Le représentant du CIEM a déclaré que la vaste majorité des marques que l'on appliquait en ce moment était des marques internes, codées, de fil de fer qui ne nécessitaient pas d'être renvoyées par les pêcheurs et qui ne remplissaient pas les conditions nécessaires pour être entrées au programme. De plus, étant donné le peu de captures effectuées au cours d'une pêche qui se résumait à une pêche de subsistance, la chance de re-capturer un saumon marqué extérieurement était très faible.

9. Recommandations au Conseil s'inscrivant dans le cadre de la demande au CIEM de recommandations scientifiques

9.1 Après avoir passé en revue les sections pertinentes du document SSC(03)2, la Commission a convenu de les recommander au Conseil dans le cadre de la demande

annuelle de recommandations scientifiques au CIEM. La demande de recommandations scientifiques adressée au CIEM et approuvée par le Conseil figure dans le document CNL(03)12 (annexe 6).

10. Divers

10.1 Aucune autre question n'a été abordée.

11. Date et lieu de la prochaine réunion

11.1 La Commission a convenu de tenir sa prochaine Réunion annuelle lors de la Vingt-et-unième réunion annuelle du Conseil, qui se tiendra du 7 au 11 juin 2004.

12. Examen du compte rendu de la réunion

12.1 La Commission a approuvé le compte rendu WGC(03)10 de la réunion.

Note: L'annexe 7 contient, à la page 125**,** une liste des documents de la Commission du Groenland Occidental.

ANNEX 1

WGC(03)11

Twentieth Annual Meeting of the West Greenland Commission Balmoral Hotel, Edinburgh, Scotland, UK 2-6 June, 2003

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Nomination of a Rapporteur
4. Review of the 2002 Fishery and ACFM Report from ICES on Salmon Stocks in the Commission Area
5. Regulatory Measures
6. Application of the Precautionary Approach to the Work of the Commission
7. Sampling in the West Greenland Fishery
8. Announcement of the Tag Return Incentive Scheme Prize
9. Recommendations to the Council on the Request to ICES for Scientific Advice
10. Other Business
11. Date and Place of Next Meeting
12. Report of the Meeting

ANNEX 2

West Greenland Commission

WGC(03)5

The 2002 Fishery at West Greenland

(tabled by Denmark (in respect of Faroe Islands and Greenland))

WGC(03)5

The 2002 Fishery at West Greenland

(tabled by Denmark (in respect of Faroe Islands and Greenland))

At the Annual Meeting of NASCO in June 2002 the West Greenland Commission agreed upon an *Ad hoc* Management Programme for the 2002 Fishery at West Greenland (WGC(02)13). In accordance with the 2002 *Ad hoc* Management Programme the quotas available would have been between 20 and 55 tonnes of commercial landings to fishing plants during up to two harvest periods, depending on the observed commercial CPUE during the first harvest period.

Shortly before the opening date of the 2002 fishing season, the Organisation for Fishermen and Hunters in Greenland (KNAPK) and the North Atlantic Salmon Fund (NASF) came to an agreement to suspend all commercial fishing for Atlantic salmon with the purpose of supplying fishing plants, factories, shops, grocers, smokehouses and marketing associations or exporting the catch.

Upon a clear request from KNAPK to suspend all commercial fishing for Atlantic salmon with the purpose of supplying fishing plants, the Greenland Home Rule Government decided to set the national quota for commercial landings to fishing plants of Atlantic salmon to 0 tonnes for 2002, and prohibited exports of Atlantic salmon from Greenland in 2002. However, it still allowed a fishery for local sales to the open markets, hospitals, restaurants, etc. and allowed a fishery for private consumption – the so-called subsistence fishery.

This subsistence fishery of Atlantic salmon was opened on Monday 12 August 2002, and the fishing season was open until the end of the year 2002.

During the 2002 fishery at West Greenland, 2.6 tonnes were reported caught for private consumption and 6.4 tonnes were reported sold at local markets, hotels, institutions, etc.: in total a subsistence fishery of Atlantic salmon of approximately 9 metric tonnes in 2002.

The fishery for Atlantic salmon in 2002 at West Greenland was regulated in Greenland Home Rule Executive Order No. 21 of 10. August 2002 on Salmon Fishing. This Executive Order distinguishes between the fishery of Atlantic salmon in Greenland for commercial landings to fish plants, the subsistence fishery by residents of Greenland, and finally rod fishery by tourists (non-residents).

All fishermen who wish to sell Atlantic salmon at local markets, hotels, etc. must have a licence issued by the Greenland Fisheries Licence Control (GFLK). In total 93 licences for Atlantic salmon fishing was issued to professional fishermen, but only a total of 24 licences were reported active.

All catches of Atlantic salmon must be reported to GFLK.

Catches are landed to local markets, sold privately or kept for private consumption. Due to this, any unreported catches will go under the category of "sustainable fishery" and are thereby considered legal. However, in 2002 there were two incidents of professional fishermen reporting sale of Atlantic salmon without having any licence. These two cases are still under administrative inquiry. Due to the scattered nature of the fishery, recordings of landings are considered incomplete.

Wildlife and Fisheries Officers of GFLK make random checks at local markets in towns and settlements along the West coast of Greenland. GFLK officers have made random checks at hotels, restaurants, butchers shops, hospitals and schools in various towns in order to compare purchases of salmon with reported catches.

In 2002 neither the Wildlife and Fisheries Officers of GFLK nor the fisheries inspection vessels of the Royal Danish Navy have reported any incidents of illegal fishing for Atlantic salmon in Greenland.

To avoid the presumed underreporting of the catches for private consumption and for local open markets, more information on the rules and procedures of salmon fishing has been given to fishermen and the municipalities.

ANNEX 3

West Greenland Commission

WGC(03)9

Regulatory Measure for the Fishing of Salmon at West Greenland for 2003

WGC(03)9

Regulatory Measure for the Fishing of Salmon at West Greenland for 2003

RECALLING that the Parties to the West Greenland Commission have previously worked cooperatively to utilize scientific advice from the International Council for the Exploration of the Sea (ICES) in establishing regulatory measures for fishing of salmon at West Greenland;

Having regard to the advice from ICES that:

- The stock complex at West Greenland is considered to be outside safe biological limits;

- There are no fishery allocations that would ensure the objective of achieving the conservation requirements for 2SW salmon in the NAC or NEAC areas.

In 2003, the catch at West Greenland will be restricted to that amount used for internal subsistence consumption in Greenland, which in the past has been estimated at 20 tons. There will be no commercial export of salmon.

The Parties:

(1) Seek to enhance biological sampling of salmon during the fishery to improve scientific information available for management, including data necessary for CPUE calculations, mean weights, sea and freshwater ages and continent of origin;
(2) Acknowledge the good work undertaken by Greenland to improve the estimates of the annual catches of salmon taken for private sales and local consumption in Greenland and encourage Greenland to continue this work; and
(3) Commit to cooperate in the design and implementation of a sampling program that will be closely coordinated with the fishery.

Denmark, on behalf of Faroe Islands and Greenland, will inform the other Parties on the outcome of the 2003 fishery.

ANNEX 4

West Greenland Commission

WGC(03)4

Report on North American/European Union Participation in the NASCO West Greenland Sampling Agreement in 2002

WGC(03)4

Report on North American/European Union Participation in the NASCO West Greenland Sampling Agreement in 2002

1. Summary

An international sampling program was instituted in 2001 which continued into 2002 to sample landings at West Greenland. The sampling program included sampling teams from Greenland, United Kingdom, Ireland, United States, and Canada. Teams were in place at the start of the fishery on August 12 and continued until 28 September. In total, about 1,300 specimens were sampled for presence of tags, fork length, weight, scales, and tissue samples for DNA analysis. Samples were obtained from four landing sites, Qaqortoq and Narsaq (NAFO Division 1F), Nuuk (1D) and Maniitsoq (1C). The sampled salmon were measured, scales were removed for ageing, gutted weight recorded and tissue samples were removed and preserved for DNA analysis. The Working Group recommends that the sampling program continue in 2003.

2. Objectives

Under the NASCO West Greenland Sampling Agreement, 2002 (WGC(02)14) Parties to the NASCO West Greenland Commission agreed to provide staff to sample catches of Atlantic salmon in the West Greenland fishery during the 2002 fishing season. The objectives of the sampling program were to:

- Obtain biological data including lengths and weights of landed fish,
- Examine fish for tags, fin clips and other marks,
- Collect scale samples to be used for age and growth analyses,
- Collect tissue samples to be used for genetic analysis and disease screening, and
- Collect other biological data as requested by ICES scientists.

Samplers from both North America and Europe were deployed during the course of the salmon fishing season, as much as possible covering the whole fishery both temporally and spatially. Samplers worked throughout the course of the season in Nuuk, Maniitsoq and Qaqortoq (a few samples were collected in the nearby community of Narsaq) (Figure 1). The EU agreed to provide a minimum of six person weeks, Canada three person weeks and the United States four person weeks in support of the programme. Staff from various countries were involved in the program as follows:

Country	Institute	Period	Location
UK-1	CEFAS, Lowestoft	1 – 14 September	Maniitsoq/Sisimiut
UK-2	FRS, Montrose	15 – 28 September	Maniitsoq/Sisimiut
ROI	Marine Institute	8 – 21 September	Nuuk
Canada	DFO, NF Region	12 – 31 August	Nuuk
USA-1	Woods Hole	12 – 24 August	Qaqortoq
USA-2	Woods Hole	25 August – 7 September	Qaqortoq
Greenland	Natural Resources	All of above dates	All above locations

The deployment of the staff contributing to the sampling program was co-ordinated by Canada/Greenland. The Greenland Institute also provided staff to assist with the sampling and to act as translators at all of the above locations and times.

3. Quotas, catches and fishing periods

Under the NASCO *Ad hoc* Management Programme for the 2002 Fishery at West Greenland (WGC(02)13), the season for the commercial fishery was divided into two periods, with the continuation of the fishery into the second period dependant on sufficiently high catch per unit effort (CPUE) being obtained in the first period. The potential seasonal quota for three levels of CPUE would be 20, 38 and 55 tonnes, respectively.

Shortly before the opening of the fishing season the Organisation of Fishermen and Hunters in Greenland (KNAPK) and the North Atlantic Salmon Fund (NASF) agreed to suspend the commercial fishery for salmon in Greenland. The non-commercial fishery for personal and local consumption was not affected by this agreement. As in the past the non-commercial fishery was without a quota limit, and there was no closing date set.

Reports from the fishery were received from the opening date (August 12) to late in the year. Total reported landings amounted to 9.0 tonnes by the end of the year. A breakdown of the landing information into landing sites and market categories is given in Table 1. Figure 1 shows a map of southwest Greenland with the main communities where salmon is normally landed. As in preceding years some unreported catch is likely to occur; however, there is presently no quantitative approach to estimate the magnitude of this catch, but it is thought to be at the same level as estimated for recent years (about 10 tonnes).

4. Samplers' observations on the fishery

During their stay in Greenland, the samplers also made observations of the fishery and the way that catches were handled. These observations were based upon occurrences in a small number of locations during a limited part of the fishing season. They may not, therefore, be typical of the whole fishery.

The vessels operating in the salmon fishery were small (only vessels less than 10m are allowed to fish for salmon) with some having wheelhouses but many being open dinghies about 6 or 7m in length. Vessels were normally operated by two people fishing set nets and drift nets. Sometimes when fishing deep within a fjord, drift nets were anchored at one end to prevent them from drifting into shore. Fish were landed gutted to avoid pollution in the coastal harbours; however, calculated whole weight is used throughout this report derived from the measured gutted weight raised by a factor of 1.11.

Salmon are landed in the small fishing harbours by local inshore fishers who sell their catch in local markets ("braettet" in Danish), to restaurants and institutions such as hospitals and old-age homes. Other species landed by local inshore fishers included cod, birds, and halibut, with some harbour porpoise and catfish. Salmon were purchased after being landed in a gutted state with heads on. Although the price per kilogram for cod was less than that for salmon, the average cod catch was greater. It was, therefore, more profitable for fishermen to fish for cod than salmon. There are also other more profitable fisheries in operation in West Greenland, in particular the snow crab and shrimp fisheries. Fishermen from communities in northern areas mainly target snow crab and shrimp, as in southern areas such as Qaqortoq

there were no processing facilities for these species. As a result of these market forces, effort directed at the salmon fishery was low, particularly in communities from which snow crab and shrimp were fished, but would likely have increased for salmon had catches and prices been higher. The influence of caribou hunting is also important, especially in the north. Local residents and fishers pursuing fish for food or for sale locally will typically switch to caribou when the caribou season opens. Income from the sale locally of caribou meat is typically higher than for fish.

5. Sampling programmes

Landed fish were sampled at random and where possible the total catch was examined. Fish were measured (fork length) and weighed (gutted weight). Scales were taken for ageing and tissue for DNA analysis; both scale and tissue analyses contribute to assigning continent of origin. In addition, fish were examined for external tags, brands or elastomer marks and adipose clipped fish were sampled for microtags.

Maniitsoq

In Maniitsoq (a city of less than 4,000 people), there are probably between 100 and 150 people sustained by fishing and hunting (i.e. commercial fishers). However, many of these are employed on cod trawlers/whalers, and in the snow crab, shrimp, and halibut fisheries. Almost every physically able person in Maniitsoq fishes (nets and longlines) or hunts (rifles), or most often does both, either for their own use or for sale. The commercial fishers' livelihoods are protected as the private fishers and hunters cannot land to the local market. Maniitsoq's small size and closely dependent communities appear to confer some degree of 'local' regulation.

There are in excess of 200 boats in the harbour and approximately a third of these are capable of acting as drift net boats (~5 metre GRP or fibreglass boats with usually 40HP Yamaha/Mariner outboard engines). They are either fully open boats and the outboards are hand steered or have small cuddys (cabins) with steering consoles.

Only approximately 20 individuals regularly fished for the local market and of these only five or six were primarily concerned with netting for salmon. They usually fished alone or occasionally in pairs. The other fishermen are primarily longliners, fishing chiefly for catfish, or hunting seals and porpoises with rifles. The porpoise is not capable of breaking the monofilament nets and are, therefore, occasionally landed together with salmon.

There is a profusion of unused drift nets (~4 inch stretch diamond mesh) lying in piles around the city, an indication of the potential effort that could be employed during a commercial fishery, although the advent of cheap imported frozen farmed salmon (readily available in both the city's two supermarkets) presumably acts as a disincentive for the fishermen to target salmon. The drift nets are of a standard design, a marker buoy with a red flag and occasionally a radar reflector at one end, and a float at the other. They vary in length from less than 100m to less than 200m. There are four or five boats that regularly carry drift nets.

The half dozen netsmen at Maniitsoq, fishing primarily for salmon, do not always carry drift nets. It is usual for a fisherman to have several nets, both fixed and drift. The fisherman will have more than one fixed net station, usually either anchored on shore and in the sea or anchored solely on-shore with the free end attached to a buoy. These nets seem to be left to

fish continuously throughout the available fishing season and are checked periodically (often daily). The fixed nets reportedly are more effective in the colder months when salmon move closer to the shore. Drift nets are often set (unattended) for less than four hours, in order to maintain the condition of the fish and to prevent seals tracking the net. The nets are often set in shallow water (less then 15m) around congregations of feeding seabirds, which are thought to act as an indication that salmon are feeding and forcing fish to the surface. Most of the salmon landed at Maniitsoq for the local market were caught in drift nets.

The average catch was extremely small, with many fishers landing between one and ten fish (often together with porpoise or seals) and the effort appeared to be very low, with most boats tied up at the market for the majority of the day. On many days no salmon were landed to the market at all. However, when the season opens in August, the effort directed at salmon is greater, as people wish to stock their freezers for winter; there is also more interest in salmon as fresh table food. By September, most people have the supplies of salmon they need and the absence of a commercial fishery inhibits fishers from targeting salmon, as the local market appeared to be easily saturated (many salmon appeared on the market for several consecutive days, despite the very low catch levels). The reindeer and musk ox hunting seasons finish at the end of September and many hunters were reportedly away and would return to the fishery in October. The reindeer herds are very substantial and people can make more money in August by hunting rather than by fishing. The lack of effort also reflects the fact that fishers are aware that salmon are considerably less abundant than in the past. Fishing does seem to be in decline in Maniitsoq, as many young people have moved to Denmark and the average age of fishers is consequently increasing. Maniitsoq's fish processing plant (Greenland Ocean, formerly Royal Greenland) was due to close in October 2002, as catches of commercial fish species were inadequate to sustain it.

At Maniitsoq, similar to other communities, the local market was open seven days a week from 08:30 until 16:30. It appeared to serve as a social as much as a commercial function. All species could be landed at any time, including before the market opened. The most popular species on the market were porpoise, fresh and dried whale, and catfish. Reindeer and cod also sold reasonably well, but salmon only sold well on the day of capture. Salmon were landed gutted for hygiene reasons and were then thoroughly cleaned, occasionally including the removal of scales with hoses. Fish were on the market floor within half an hour of landing. Prime salmon were selling for only 40 DKr per kg, i.e. an average 2.5 kg salmon would sell for 100 DKr (~£10 or $16 US). Any unsold fish were placed, without ice, in a shipping container overnight for sale the next day (or later). Although ascertaining precise details on the capture location of individual fish was problematic (due to the language barrier), it is believed that all of the catches were made within close proximity to Maniitsoq.

Qaqortoq/Narsaq

The fishers in both Qaqortoq and Narsaq were very helpful and readily accepted the sampling program. At Qaqortoq, sampling in 2002 was very different from 2001. In 2001, there was a very large commercial fishery in NAFO Division 1F as the majority of the catch for the entire coast was landed here. In 2002, fishermen all reported that fishing was only good for a couple of weeks with nothing before and nothing after. Prices for salmon at the local market were highly variable but in the beginning were about 80 DKr (~£ 8 and $13 US) per kg.

In total, only two fish were observed with a clipped adipose and no tags were detected or observed on these fish. No tags were found on the other fish sampled either. On some days

the number of fish at the market were very low, making sampling difficult as sometimes the fish were sold before they could be sampled. This resulted in no samples from those days.

All fish looked really good, healthy with no outstanding deformities/scars or weaknesses. All the salmon sampled appeared externally to be wild fish. Fishermen used gill nets in this area. The average size of most salmon landed was from 2-4 kg and 50-70 cm fork length. The fishers in both Qaqortoq and Narsaq were very helpful and accepting of this program.

Fishermen all reported to the sampling team that fishing was only good for a couple of weeks. At Narsaq, fishers commented that they never catch a lot of salmon, the main landings being shrimp and other fish species in that area. In fact, when the Qaqortoq market was too full with salmon, the fishermen went to Narsaq. Dolphins were sometimes caught as by catch in salmon nets and sold in the local market along with salmon.

Fishermen use gill nets in this area. All fish caught appeared to be in good condition with no obvious deformities/scars or weaknesses. All the salmon sampled appeared, from external observation, to be wild fish. Most salmon landed were 2-4 kg in weight and 50-70 cm fork length. Only two fish were observed with a clipped adipose and no tags were detected or observed on any sampled fish.

Nuuk

At Nuuk, the buy-out of the commercial fishery caused a decline in the availability of fish to sample over what was the case in 2001 and consequently overall numbers declined. As a result, the first sampling team found the sampling program in Nuuk was very difficult in 2002. Fortunately, the local market was a ready source of salmon for samples but also the local hospital, restaurants and the old-age home were visited to obtain potential specimens for inclusion in the sampling program.

The second team, in Nuuk, found on arrival that most restaurant and institutional sales were already made. This meant the sampling programme was a little more challenging than was the case for the first team. Trying to be in the right place at the right time was never easy but great exercise brought the sampling team into close contact with meat and fish merchants at the city's local market Kalaaliaraq. During the period, salmon or Kapisilit ("Laks" in Danish) sold at about 50 DKr (~ $8 US or £5) per kg gutted, head on. Despite the cold and curtailment of their commercial catch, the men at the market were always kind and helpful and, like all Inuit, show a genuine interest in conservation and careful exploitation of their natural resources.

6. Sampling practicalities

In 2002, the commercial fishery was subject to an agreement between the Greenlandic salmon fishermen's representative organisation KNAPK and the North Atlantic Salmon Fund (NASF) that will close the commercial portion of the fishery for the next three years but will not include sales within Greenland. This means that sales to restaurants, institutions and individuals from local markets will still continue and only sales to fish plants will not be permitted. Catches in food fisheries are typically low and broadly distributed, posing many sampling problems. This occurred also in 1998-1999 as a result of a NASCO agreement to have only a subsistence fishery; however, participants in the sampling program did succeed in obtaining about 600 samples although the distribution could have been better (only one active

sampling team) but it was still a success. It is very difficult to sample this type of fishery adequately as the fishery can be spread out over 1000 km of coastline and several weeks or even months in extent. The advent of the caribou-hunting season in August/September also needs to be factored in as people generally switch to caribou hunting when the season opens, making salmon more difficult to find. The major difference between the sampling programs in 2001 and 2002 was the effect of this 'buy-out' agreement between the Greenland authorities and the North Atlantic Salmon Fund. Therefore, instead of having salmon readily available at a central and common point, typically the local fish plant, salmon had to be vigorously searched out in local markets, homes, on the wharf, in restaurants, and at public institutions and hospitals.

As an example of the difficulties of sampling a local-use fishery, the following was reported by the sampler in Maniitsoq as an example applicable to all sites. In communities outside of Nuuk, most older Greenlanders do not speak English and, at Maniitsoq, two students from the fishing technology school were assigned to help make contacts in the city. It emerged that many of the institutions (e.g. hospital, hotel and restaurants) which had been sampled in previous years now used frozen farmed salmon, thus most sampling had to be done via the market or through contact with individual fishermen. To facilitate this, notices were placed, in Greenlandic, at the market and elsewhere describing our intentions; and as many fishers as possible were contacted in person. At one point, it was suggested that the presence of samplers had stopped fishermen landing much, if not all, of their catch to the market. This was based on the belief that samplers were either involved in fishery control or were working for Greenpeace. To help alleviate any such concerns and prevent the situation from deteriorating, it was arranged for a message to be broadcast over the local radio to explain the presence of the samplers. Despite some initial antagonism to sample fish, many fishers were eventually happy to co-operate, although most remained bemused that no compensatory payment was made for the samples taken. On balance, the small numbers of salmon landed at the market appeared to reflect limited effort (and perhaps low abundance) rather than as a result of fishers avoiding the market.

7. Summary of results to date

An international sampling program requested by NASCO was instituted in 2001 to sample landings at West Greenland, and repeated in the 2002 fishing season. The sampling program included sampling teams from Greenland, United Kingdom, Ireland, United States and Canada. Teams were in place at the start of the fishery and continued to the end of September although landings continued until December.

In total, 1,374 specimens, representing 44 % by number of the landings, were sampled in 2002 for presence of tags, fork length, weight, scales, and tissue samples for DNA analysis. The limitation of the fishery to subsistence fishing caused severe practical problems for the sampling teams; however, the sampling program was successful in adequately sampling the Greenland catch temporally and spatially.

The sampled salmon were measured, scales were removed for ageing, tissue for analysis, and gutted weight recorded. No disease sampling was conducted in 2002 because of logistical difficulties; however, the Working Group thinks that disease sampling is important and recommends that it be undertaken in 2003.

Continent of Origin

A total of 501 tissue samples have been genotyped at 11 microsatellite DNA loci for assignment to continent of origin. The analysis, using a Bayesian maximum likelihood algorithm, is based on a reference data set of 4,373 Atlantic salmon individuals of known origin: 459 from Europe and 3,914 from North America and is estimated to give an almost 100% correct assignment to continent of origin. In total, 338 (67.5 %) of the salmon sampled from the 2002 fishery were of North American (NA) origin and 163 (32.5 %) fish were determined to be of European origin (Figure 2).

Differences among the continental percentages in the three NAFO divisions (see table below) means that catch sampling must be undertaken in all areas to obtain an accurate estimate of the contribution of fish from each continent to the mixed fishery.

NAFO Division	**North America**		**Europe**	
	Number	**%**	**Number**	**%**
1C	102	69.9	44	30.1
1D	181	88.7	23	11.3
1F	55	36.4	96	63.3

Applying the continental percentages for reported catch by NAFO Division results in estimates of 6.4 t (2,200 salmon) of North American origin and 2.6 t (900 salmon) of European origin fish landed in West Greenland in 2002. Changes in the estimated catch in numbers of North American and European salmon are shown in Figure 3.

Biological characteristics of the catches

Biological characteristics (length, weight, and age) were recorded from 1,297 fish sampled in 2002. There has been a general downward trend in mean weight (also reflects in means lengths) of both European and North American 1SW salmon from 1969–1995 (Figure 4). This reversed in 1996, when mean lengths and weights began to increase again, although there was a sharp drop, mainly for the North American component, in 2000. In 2001 and 2002, mean lengths and mean weights increased again to a level close to the overall average for the recent decade.

The river age of fish in the catch was determined from scale samples. The mean river age of the European salmon in 2002 (2.2 years) was slightly above the overall average (1968-2002) of 2.0 years. The percentage that was river age-1 fish has been quite variable in recent years, and the percentage in 2002 (10 %) was among the lowest in the time series. A low percentage of this group suggests a lower contribution from the most southerly European stocks. Percentages of river age-3 fish have also been very variable but were close to the long-term mean of ~17 % in 2002.

The mean river age of the North American origin samples has varied throughout the last 10 years, but in 2002 was slightly above age 3.0, the overall mean. The percentage of river age-2 salmon of North American origin was close to the average (~34%) in 1998, at its lowest recorded level (15%) in 2001 but back up to 27% in 2002.

The sea-age composition of the samples collected from the West Greenland fishery showed no significant changes in the percentages in the North American component of fish from 1998 to 2002. The percentage of 1SW salmon in the European component has been very high since 1997 (99.3 %), and was 100 % from 1999 to 2000.

8. Acknowledgements

The financial contribution by the Atlantic Salmon Federation to Department of Fisheries and Oceans Canada so that DFO staff could take part in the sampling program is gratefully acknowledged. The cooperation and assistance of fishers and residents in Greenland who provided access to their fish for samples is appreciated.

9. References

(WGC(02)13) 2002. *Ad hoc Management Programme for the 2002 Fishery at West Greenland*. NASCO Report of the Annual Meetings of the Commissions, p. 130-132.

(WGC(02)5) 2002. *Report on European Union Participation in NASCO West Greenland Sampling Agreement in 2001*. NASCO Report of the Annual Meetings of the Commissions, p. 139-146.

(WGC(02)14) 2002. *West Greenland Fishery Sampling Agreement, 2002*. NASCO Report of the Annual Meetings of the Commissions, p. 148-150.

Table 1. Reported landings of Atlantic Salmon in Greenland 2002 by landing site and market category.

NAFO Division	Landing site	Reporting persons	'Sold'	Private	Total
1A	Ilulissat	1	0	14	14
1A total		**1**	**0**	**14**	**14**
1B	Sisimiut	1	78	0	78
1B total		**1**	**78**	**0**	**78**
1C	Maniitsoq	9	1158	942	2100
1C total		**9**	**1158**	**942**	**2100**
1D	Nuuk	13	3478	275	275
1D total		**13**	**3478**	**275**	**3752**
1E	Ivituut	2	0	180	180
1E	Paamiut	7	371	866	1237
1E total		**9**	**371**	**1046**	**1417**
1F	Nanortalik	1	0	6	6
1F	Narsaq	4	999	305	1304
1F	Qaqortoq	3	312	39	351
1F total		**8**	**1311**	**350**	**1661**
Total		**41**	**6395**	**2626**	**9022**

Figure 1. Map of southwest Greenland showing communities to which salmon have regularly have been landed. NAFO Divisions are also shown.

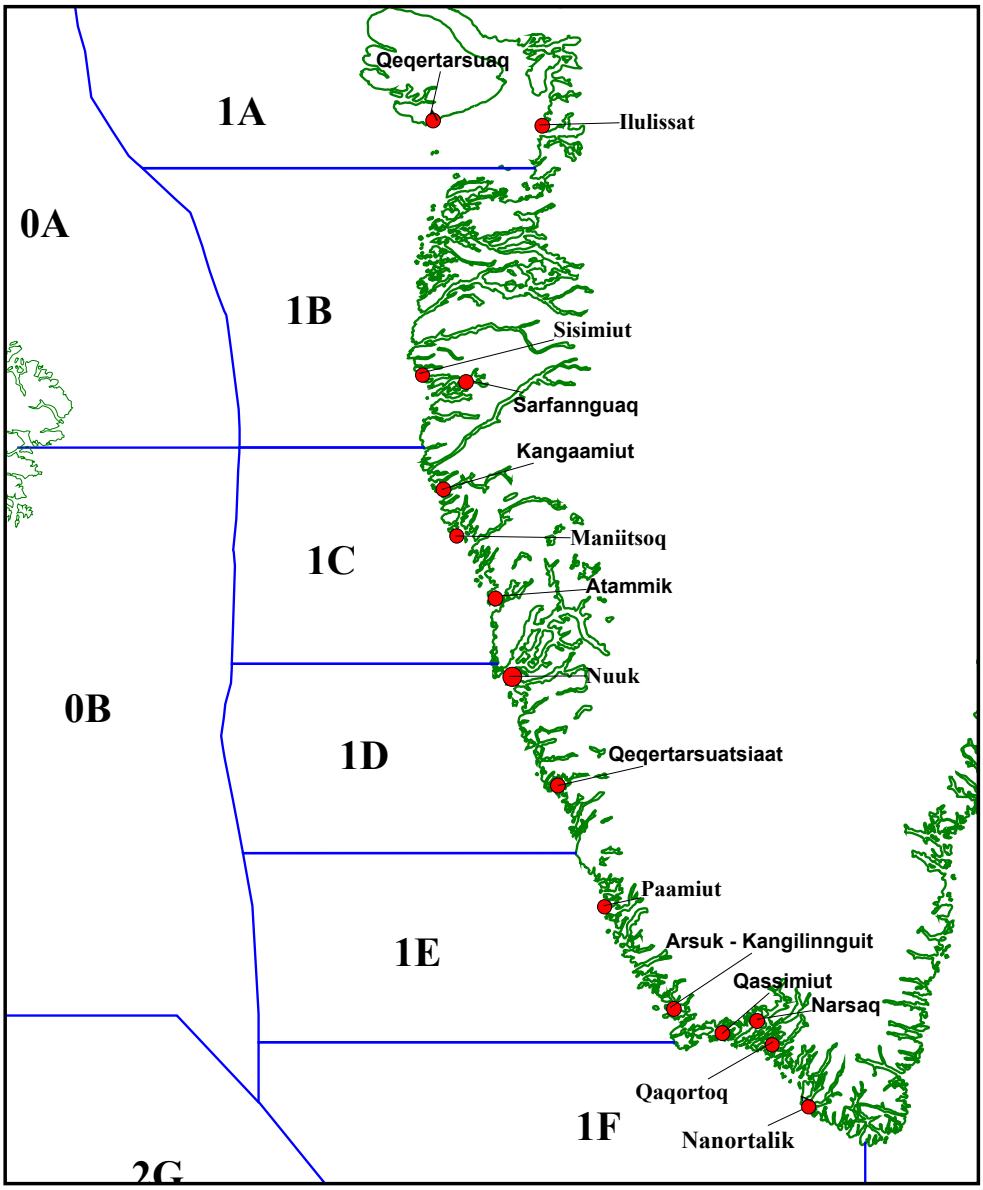


Figure 2. The proportion of North American salmon sampled in the sampling programs at west Greenland, 1969-2002.

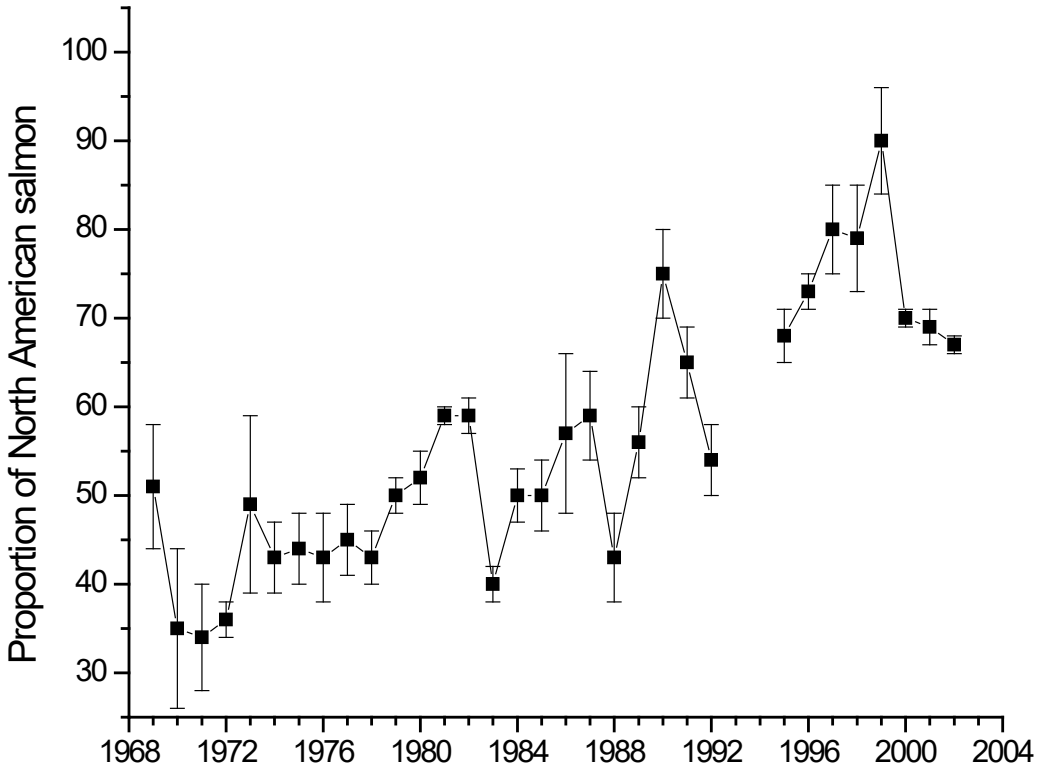


Figure 3. Numbers of North American and European salmon caught at West Greenland 1982-1992 and 1995-2002 derived from catch information and results on mean weights from the sampling programs.

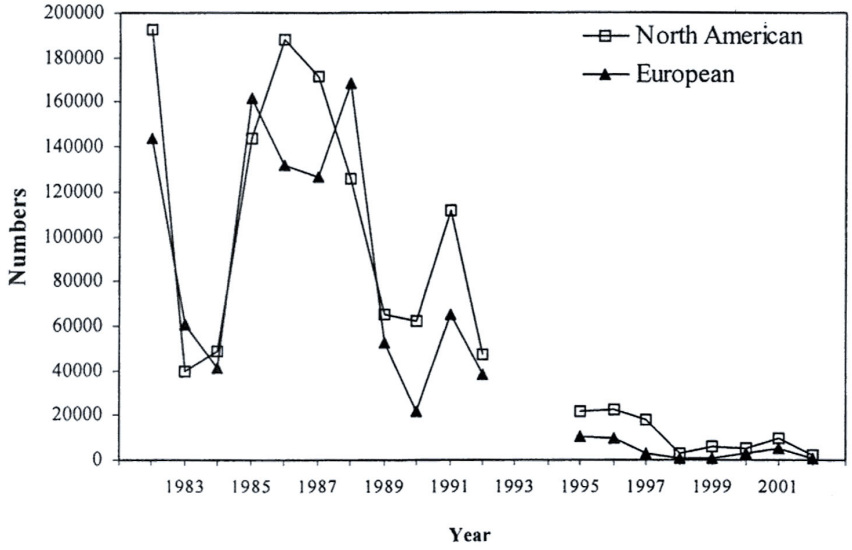
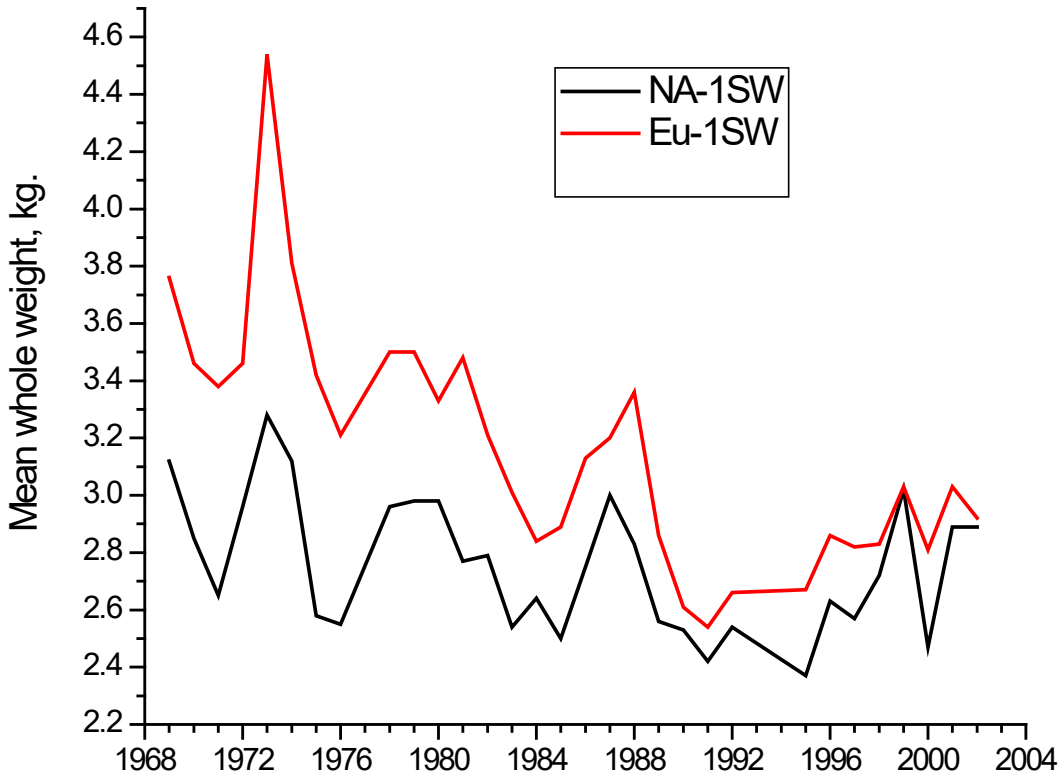


Figure 4. Mean weights of one sea-winter North American (bottom line) and European salmon (top line) sampled from landings in the fisheries at west Greenland, 1969-2002.



ANNEX 5

West Greenland Commission

WGC(03)8

West Greenland Fishery Sampling Agreement, 2003

WGC(03)8

West Greenland Fishery Sampling Agreement, 2003

Each of the Parties in the West Greenland Commission recognizes the important contribution of sound biological data to science-based management decisions for fisheries prosecuted in the West Greenland Commission area. The Parties in the West Greenland Commission have worked cooperatively over the past three decades to collect biological data on Atlantic salmon harvested at West Greenland. These data provide critical inputs to the stock assessment completed by the ICES North Atlantic Salmon Working Group annually.

The objectives of the sampling programme in 2003 are to:

- Continue the time series of data (1969-2002) on continent of origin and biological characteristics of the salmon in the West Greenland Fishery.

- Provide data on mean weight and length and continent of origin for input into the North American and European run-reconstruction models.

- Collect information on fish diseases, and recovery of micro-tags and external tags.

To this end the sampling programme in 2003 will collect :

- Meristic data including lengths and weights of landed fish
- Information on tags, fin clips, and other marks
- Scale samples to be used for age and growth analyses
- Tissue samples to be used for genetic analyses
- Tissue samples to be used for disease sampling for the detection of ISA, BKD and other disease and parasite organisms
- Other biological data requested by the ICES scientists and NASCO cooperators

External Staffing Inputs:

Parties external to Greenland with interests in the mixed stock fishery at West Greenland, including Canada, the European Union, and the United States, have historically provided personnel and analytical inputs into the cooperative sampling programmes. The NASCO Parties agree to provide the following inputs to the cooperative sampling programme at West Greenland during the 2003 fishing season:

- The European Union[1] agrees to provide a minimum of 6 person weeks[2] to sample Atlantic salmon at West Greenland during the 2003 fishing season.
- The United States agrees to provide a minimum of 4 person weeks[2] to sample Atlantic salmon at West Greenland during the 2003 fishing season.

[1] The Republic of Ireland and the United Kingdom.

[2] For the purposes of this agreement, a person week of sampling is defined as a trained individual who works on site at West Greenland to collect samples of Atlantic salmon for a period of 7 days.

- Canada, in partnership with the Atlantic Salmon Federation, agrees to provide a minimum of 3 person weeks to sample Atlantic salmon at West Greenland during the 2003 fishing season.
- The United States agrees to co-ordinate the sampling programme for 2003.

In addition, external NASCO Parties agree to provide the following technical analysis inputs to analyze samples and data collected at West Greenland:

- The United States of America agrees to provide microsatellite DNA analysis of tissue samples collected from Atlantic salmon harvested at West Greenland.

- Canada agrees to provide ageing and other analyses of scale samples collected from Atlantic salmon harvested at West Greenland.

- The United States of America agrees to provide disease analysis of tissue samples collected from Atlantic salmon harvested by West Greenland.

- The European Union (UK, England & Wales) agrees to act as a clearing house for coded wire tags recovered from the fishery.

Greenland Home Rule Government Coordination Efforts:

The Home Rule Government of Greenland agrees to provide 15 person weeks[3] annually to facilitate sampling of Atlantic salmon by samplers from other NASCO Parties. In addition, the Home Rule Government of Greenland agrees to identify a mechanism to provide sampling access to landed Atlantic salmon before grading/culling and before fish are subject to health regulations that would restrict or prohibit activities associated with sampling.

The Home Rule Government of Greenland agrees to inform persons designated by cooperating NASCO Parties of important developments in the management of the West Greenland fishery including planned openings and closures of the Atlantic salmon fishery at West Greenland.

The Home Rule Government of Greenland agrees to provide necessary waivers to the regulation that Atlantic salmon must be landed in a gutted condition to allow for the collection of biological samples (up to 120 salmon) required to complete disease sampling. To facilitate land-based collection of tissue samples required for disease sampling, the Home Rule Government of Greenland agrees to provide samplers with written permits that allow for landing of a total of 120 salmon.

The allocation of available scientific sampling personnel will be determined annually by ICES scientists to provide spatial and temporal coverage to characterize both the fishery and the Atlantic salmon populations along the West Greenland coast. Data and analyses of collected biological samples will be reported through the ICES North Atlantic Salmon Working Group in the year following data collection. Parties participating in the cooperative

[3] For the purposes of this agreement, a person week of sampling is defined as an individual who is capable of communicating with external samplers in English and fishers, and others in either Danish, Greenlandic, or preferably both, for a period of 7 days.

sampling programme will share access to resulting data and work cooperatively in the publication of information.

ANNEX 6

CNL(03)12

Request for Scientific Advice from ICES

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

    1.1 provide an overview of salmon catches and landings, including unreported catches by country and catch and release, and worldwide production of farmed and ranched Atlantic salmon in 2003;
    1.2 report on significant developments which might assist NASCO with the management of salmon stocks;
    1.3 provide a compilation of tag releases by country in 2003;
    1.4 identify relevant data deficiencies, monitoring needs and research requirements taking into account NASCO's International Atlantic Salmon Research Board's inventory of on-going research relating to salmon mortality in the sea.

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

    2.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    2.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    2.3 further develop the age-specific stock conservation limits where possible based upon individual river stocks;
    2.4 provide catch options or alternative management advice, if possible based on forecasts of PFA for northern and southern stocks, with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    2.5 provide estimates of by-catch of salmon in pelagic fisheries and advise on their reliability.

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

    3.1 describe the key events of the 2003 fisheries and the status of the stocks; [1]
    3.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
    3.3 update age-specific stock conservation limits based on new information as available;
    3.4 provide catch options or alternative management advice with an assessment of risks relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding;[3]
    3.5 provide an analysis of any new biological and/or tag return data to identify the origin and biological characteristics of Atlantic salmon caught at St Pierre and Miquelon;
    3.6 provide descriptions (gear type; and fishing depth, location and season) for all pelagic fisheries that may catch Atlantic salmon.

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

   4.1 describe the events of the 2003 fisheries and the status of the stocks; [1, 2]
   4.2 evaluate the extent to which the objectives of any significant management measures introduced in recent years have been achieved;
   4.3 provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes);
   4.4 provide catch options or alternative management advice with an assessment of risk relative to the objective of exceeding stock conservation limits and advise on the implications of these options for stock rebuilding.[3]

Notes:

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

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

3. In response to questions 2.4, 3.4 and 4.4 provide a detailed explanation and critical examination of any changes to the models used to provide catch advice. With respect to stock rebuilding, consider and evaluate various alternative baseline measures for use in risk analysis.

ANNEX 7

List of West Greenland Commission Papers

Paper No.	Title
WGC(03)1	Provisional Agenda
WGC(03)2	Draft Agenda
WGC(03)3	Draft Report
WGC(03)4	Report on North American/European Union Participation in the NASCO West Greenland Sampling Agreement in 2002
WGC(03)5	The 2002 Fishery at West Greenland (tabled by Denmark (in respect of the Faroe Islands and Greenland))
WGC(03)6	Draft West Greenland Fishery Sampling Agreement, 2003
WGC(03)7	Proposal from the Chair for a Regulatory Measure for the Fishing for Salmon at West Greenland for 2003
WGC(03)8	West Greenland Fishery Sampling Agreement, 2003
WGC(03)9	Regulatory Measure for the Fishing for Salmon at West Greenland for 2003
WGC(03)10	Report of the Twentieth Annual Meeting of the West Greenland Commission
WGC(03)11	Agenda

Note: This is a listing of all the Commission papers. Some, but not all, of these papers are included in this report as annexes.

Report of the ICES Advisory Committee on Fishery Management (Sections 5 to 7 only)

CNL(02)8

Report of the ICES Advisory Committee on Fishery Management
(Sections 5 to 7 only)

5 NORTH-EAST ATLANTIC COMMISSION

5.1 Status of stocks/exploitaton

The status of this stock complex with respect to conservation requirements is:
Northern European 1SW stocks fell sharply below the Conservations limit (CL) in 2002.
Northern European MSW stocks were above CL in 2002 and are within safe biological limits.
Southern European 1SW and MSW stocks were close to CL in 2002

Therefore, with the exception of northern MSW stocks, these stocks are considered outside safe biological limits.

The status of stocks is shown in Figures. 5.1.1 to 5.1.4 and is elaborated upon in Section 5.9.1.

5.2 Management objectives

The general NASCO management objectives apply (See Section 3).

5.3 Reference points

As precautionary reference points have not been developed for these stocks, management advice is therefore referenced to the S_{lim} conservation limit. Thus, these limits should be avoided with high probability (ie at least 75%).

Development of age-specific conservation limits

In all, there are around 15-25 stock and recruitment datasets in the NEAC area, ranging from long time series to rivers where stock-recruitment (S/R) relationships are in the process of being (or could be) developed. These include a mixture of smaller rivers and tributaries of large river systems. Given the time and resource difficulties with collecting meaningful S/R data, it is unlikely that many further datasets will be developed in the near future. However, as these rivers are spread throughout the NEAC area and cover a wide array of river types and productivity levels, even incomplete S/R datasets may provide useful information for helping to identify BRPs for transport of conservation limits to rivers with little or no data.

River-specific conservation limits

General developments and progress with setting of conservation limits in the NEAC area have been reported in the draft final report of the EU-funded SALMODEL concerted action (Anon., 2003). Specific progress in individual countries in 2002 is summarised below:

In UK (England & Wales) the river-specific assessment procedures have been modified by addition of a Management Target (MT) for each river. The MT is a spawning stock level for managers to aim at, to ensure that the objective of exceeding the conservation limit (CL) is met in four years out of five (i.e. 80% of the time). It provides an additional mechanism to assist managers in safeguarding stocks.

In UK (N. Ireland), the most comprehensively developed conservation limit for N. Ireland at present is that for the R. Bush, derived from a whole river stock/recruitment relationship. Work is in progress to extend CL setting to all salmon producing rivers in the Fisheries Conservancy Board (FCB) area of N. Ireland, and to install fish counters to enable compliance to be assessed in key indicator rivers. Provisional CLs for all other rivers in the FCB area have been set by transporting the Bush CL on the basis of catchment area (ICES 1998/ACFM:13). These CLs are indicative only and not presently used for management. However, further work to refine these CLs by using available river-specific habitat data is in progress, with revised CLs being set for the Blackwater, Maine and Glendun rivers in 2002. Counters installed on these rivers to assess compliance with the CLs were operated for the first full year in 2002.

National Conservation Limits

The national model has been run for the countries for which no river-specific conservation limits have been developed (i.e. all countries except France, UK (England & Wales), and Sweden). For Iceland, Russia, Norway, UK (Northern Ireland), and UK (Scotland) the input data for the PFA analysis (1971-2002) have been provided separately for more than one region; the lagged spawner analysis has therefore been conducted for each region separately and the estimated conservation limits summed for the country. ICES has previously noted that outputs from the national model are only designed to provide a provisional guide to the status of stocks in the NEAC area and that this approach only provides a basis for qualitative catch advice.

CLs for NEAC stock complexes

For catch advice to NASCO, conservation limits are required for stock complexes. These have been derived either by summing of individual river CLs to national level, or taking overall national CLs, as provided by the national CL model.

For the NEAC area, the conservation limits have been calculated by ICES as 299,760 1SW spawners and 151,676MSW spawners for the northern NEAC stock grouping, and 510,709 1SW spawners and 262,935 MSW spawners for the southern NEAC stock grouping.

5.4 Advice on management

ICES has been asked to provide catch options or alternative management advice, if possible based on a forecast of pre-fishery abundance (PFA), with an assessment of risks relative to the objective of exceeding conservation limits in the NEAC area.

ICES emphasises that the national stock conservation limits discussed above may not be appropriate for the management of homewater fisheries because of the relative imprecision of the national conservation limits and because they will not take account of differences in the status of different river stocks or sub-river populations. Nevertheless, ICES agreed that the combined conservation limits for the main stock groups (national stocks) exploited by the distant water fisheries could be used to provide general management advice to the distant water fisheries.

Due to the preliminary nature of the conservation limit estimates, ICES is unable to provide quantitative catch options for most stock complexes at this stage. An exception is the provision of a quantitative prediction of PFA for southern European MSW stocks (Figure 5.4.1).

Given the state of the stocks ICES provides the following advice on management:

Northern European 1SW stocks: ICES recommends that the overall exploitation of the stock complex be decreased so as to meet conservation limits. It should be noted, however, that the inclusion of farmed fish in the Norwegian data will result in the exploitable surplus being over-estimated. Since very few of these salmon have been caught outside homewater fisheries in Europe, even when fisheries were operating in the Norwegian Sea, management of maturing 1SW salmon should be based upon local assessments of the status of river or sub-river stocks.

Northern European MSW stocks: ICES recommends that caution should be exercised in the management of these stocks particularly in mixed stock fisheries and exploitation should not be permitted to increase to ensure that conservation limits continue to be met.

Southern European 1SW stocks: ICES recommends that the overall exploitation of the stock complex be decreased so as to meet conservation limits. ICES considers that mixed stock fisheries present particular threats to conservation and recommends that reductions in exploitation rate be implemented for as many stocks as possible.

Southern European MSW stocks: The preliminary quantitative prediction of PFA for this stock complex indicates that PFA will remain close to present low levels in 2003 (prediction 524,000) (Figure 5.4.1). There is evidence from the prediction that PFA will decrease in the near future and the spawning escapement has not been significantly above conservation limit for the last seven years (Figure 5.1.4b and 5.4.1). **ICES**

recommends that the overall exploitation of the stock complex be decreased so as to meet conservation limits. ICES considers that mixed stock fisheries present particular threats to conservation and recommends that reductions in exploitation rate be implemented for as many stocks as possible.

5.5 Relevant factors to be considered in management

For all fisheries, ICES considers that management of single stock fisheries should be based upon assessments of the status of individual stocks. Conservation would be best achieved if fisheries can be targeted at stocks that have been shown to be above biologically based escapement requirements. Fisheries in estuaries and rivers are more likely to fulfil this requirement.

Based on recent work on resolving the most appropriate stock groupings for management advice for the distant water fisheries, ICES agreed that advice for the Faroese fishery (both 1SW and MSW) should be based upon all NEAC stocks. Advice for the West Greenland fishery should be based upon southern European MSW salmon stocks only (comprising UK, Ireland and France).

5.6 Catch forecast for 2003

In order to develop quantitative catch options for NEAC stock complexes, forecasts of PFA are required for each stock complex and for each sea age component. These are currently only available for the MSW component of the southern European stock complex. The forecast of PFA for 2003 has been used in the catch advice for West Greenland for 2003 (section 7). The development of this forecast is summarised below:

ICES had previously considered the development of a model to forecast the pre-fishery abundance of non-maturing (potential MSW) salmon from the Southern European stock group (comprising Ireland, France and all parts of UK) (ICES 2002/ACFM:14). Stocks in this group are the main European contributors to the West Greenland fishery. This year, the model was fitted to data from 1977-2001 and used to predict PFA in the years 2002-2003 (Table 5.6.1, Figure 5.4.1). These predictions were used, together with PFA forecasts from North America, to provide quantitative catch advice for the 2003 West Greenland fishery.

5.7 Medium to long term projections

The quantitative prediction for the southern NEAC MSW stock component gives a projected PFA (at 1st January 2003) of 524,000 fish for catch advice in 2003. No projections are available beyond that, or for other stock components or complexes in the NEAC area.

5.8 Comparison with previous assessment

National PFA model and national conservation limit model

Some changes were made to the input data to these models by several countries. To run the NEAC PFA model most countries are required to input the following time-series information (beginning in 1971) for 1SW and MSW salmon:

Catch in numbers
Unreported catch levels (min and max)
Exploitation levels (min and max)

In some instances, the above information has been supplied in two or more regional blocks per country. In these instances, the model output is combined to provide one set of output variables per country. Descriptions of how the model input has been derived were presented in detail at the in ICES 2002/ACFM:14. Where there have been modifications to these derivation methods an explanation is given below.

Changes were made to the exploitation and unreported inputs for the Swedish data based on re-consideration of information available for wild salmon. In the case of UK (England & Wales) minor modifications were made to the values of unreported catch for the earlier part of the time series.

Changes were made to the Russian Kola Peninsula: Barents Sea Basin input data for 2003. In previous years, catches taken in the recently developed recreational rod fishery were not included, as the numbers were

insignificant. Account was taken of these recreational catches in the "unreported catch" term in the model. As recreational catches are now substantial, they are now included in the 2003 catch input and the exploitation rate is adjusted accordingly.

As a result of these changes, conservation limits for the overall NEAC area increased by 7% for 1SW fish and by 1.2% for 2SW fish.

PFA forecast model

The model developed in 2002 to forecast PFA for southern NEAC MSW stocks was modified in 2003 to reflect the non-informative role of the previously used habitat variable. The model therefore used lagged spawners and year as the main input variables, together with the historical PFA values obtained from the run-reconstruction model. The revised forecast for 2002 PFA of southern NEAC MSW stocks was within 1.3% of the previous forecast.

5.9 Response to specific requests for information from NASCO:

5.9.1 NASCO has requested ICES to: describe the key events of the 2002 fisheries and the status of the stocks

Key events of the 2002 fisheries:

Fishing in the Faroese area 2001/2002 commercial fishery

No fishery for salmon was carried out in 2002 or, to date, in 2003. Consequently, no biological information is available from the Faroese area for this season. No buyout arrangement has been made since 1999.

Homewater fisheries in the NEAC area:

Significant events in NEAC homewater fisheries in 2002:

A range of measures aimed at reducing exploitation were implemented or strengthened in the NEAC area in 2002. These included: the prohibition of particular fishing gears, restrictions on fishing seasons, buy-out arrangements, the provision of protected areas, voluntary restrictions, and increasing use of catch and release. In Russia, in-river gill nets were prohibited in the Archangel Region to reduce unreported catches. In addition, ongoing efforts are being made to enhance the development of recreational catch-and-release fisheries on the Kola Peninsula. A carcass tagging and logbook scheme was introduced in UK (N. Ireland). This is designed to improve records/returns for rod caught fish and to facilitate regulation of catches (by quota) should this prove necessary.

Gear and effort: Apart from the prohibition of gill nets in parts of Russia, there have been no other changes in the types of commercial fishing gear used in the NEAC area. The number of licensed gear units has, in most cases, continued to fall; most fisheries for which data are available record a reduction of over 40% in gear units operated over the last 10 years. There are no such consistent trends for the rod fishing effort in NEAC countries over this period. Further initiatives to reduce fishing effort were introduced in several countries.

Catches: In the NEAC area there has been a general reduction in catches since the 1980s (Table 4.1.1.1). This reflects a decline in fishing effort as a consequence of management measures and the reduced commercial viability of some fisheries, as well as a reduction in the size of stocks. The overall nominal catch in the NEAC area in 2002 (2,464 t) was reduced on 2001 (2,876 t), but remained above the mean of the previous five years. Catches in both the NEAC northern and southern areas fell in comparison with 2001 (down 17% and 11% respectively). However, while the catch in the northern area was 7% above the five-year average, catches in the southern area were just below the average.

CPUE: CPUE data for various net and rod fisheries in the NEAC area do not indicate any consistent pattern. The reduction in the number of fisheries operating can benefit those fisheries still in operation and the lack of consistent trends in CPUE may reflect the imprecise nature of these indices.

Composition of catches: The percentage of MSW salmon in the catches in Northern Europe increased in 2002 to 46%, the highest value in the available time series. The percentage of MSW salmon in catches in Southern

Europe remained close to the five and ten year average. Despite the continued high levels of production in the salmon farming industry, the incidence of farmed salmon in NEAC homewater fisheries was generally low (<2%) and similar to recent years. The exception to this is Norway, where farmed salmon continue to form a large proportion of the catch in coastal, fjord and rod fisheries.

Origin of catch: In 2002, a number of tags originating from other countries (UK (N. Ireland), UK (England & Wales), UK (Scotland) and Spain) were recovered in Irish coastal fisheries. An update of the adult recovery information derived from tagged smolts released in Norway was made available to ICES. Between 1996 and 2001 a total of 532,742 smolts, mainly hatchery-reared, were tagged and released. A total of 5,065 adult recoveries were reported from Norway and 24 from other countries (0.5% of the total number of salmon recovered). This is consistent with previous observations that very few Norwegian salmon are intercepted in other countries.

Summary of homewater fisheries in the NEAC area: In the NEAC area, there has been a general reduction in catches since the 1980s. This reflects a decline in fishing effort, as well as a reduction in the size of stocks. The overall nominal catch in the NEAC area in 2002 (2,464 t) represented a 14% decrease on the catch for 2001. The percentage of MSW salmon in 2002 was the highest (46%) since 1987 in catches in the NEAC Northern area and has increased sharply since 2000. The percentage of MSW salmon has been more stable in Southern Europe and the 2002 figure is close to the mean of the previous five years.

***Elaboration of* status of stocks in the NEAC area**

In the evaluation of the status of stocks, PFA or recruitment values should be assessed against the spawner escapement reserve values while the spawner numbers should be compared with the conservation limits.

Northern European 1SW stocks: The PFA of 1SW salmon from the Northern European stock complex has been above the spawning escapement reserve throughout the time series (Figure 5.1.1a). However, the spawning escapement was at or below the conservation limit until 1997 (Figure 5.1.2a). There has been an upward trend throughout the time series until 2002 when there was a sharp decline taking the stock complex below the conservation limit again**.**

Northern European MSW stocks: The PFA of non-maturing 1SW salmon from Northern Europe has been declining since the mid 1980s and the exploitable surplus has fallen from around 1 million recruits in the 1970s to about half this level in recent years (Figure 5.1.1b). ICES considers the Northern European MSW stock complex to be within safe biological limits, as spawners are above CL and trending in a positive direction (Figure 5.1.2b) although the 2002 value shows a decrease on the previous year. However, it should be noted that the status of individual stocks may vary considerably. In addition, the inclusion of farmed fish in the Norwegian data will result in the exploitable surplus being over-estimated.

Southern European 1SW stocks: Recruitment of maturing 1SW salmon in the Southern European stock complex has shown a strong decreasing trend throughout most of the time series (Figure 5.1.3a). Moreover, the spawning escapement for the whole stock complex has fallen below the conservation limit in three of the past five years, although a small improvement was noted in 2002 (Figure 5.1.4a). Despite a small surplus above SER of around 300,000 fish during the last three years, exploitation in these years was clearly high enough to prevent conservation limits being consistently met.

Southern European MSW stocks: The PFA of non-maturing 1SW salmon from Southern Europe has been declining steadily since the 1970s (Figure 5.1.3b). The spawning escapement has for the last 6 years been at or below the conservation limit.

This applies to the total stock complexes. ICES notes that the national conservation limits may not be appropriate for quantitative catch advice at national level, however they are regarded as useful indicators of overall stock status. Stock status summaries are presented by country below:

Northern NEAC area

Finland

- 1SW spawners below CL in 2002.
- MSW spawners at or above CL in 2002.

Iceland

- 1SW spawners below CL in 2002.
- MSW spawners below CL in 2002.

Norway

- 1SW spawners below CL in 2002.
- MSW spawners at or above CL in 2002.

Russia

- 1SW spawners at or above CL in 2002.
- MSW spawners at or above CL in 2002.

Sweden

- 1SW spawners at or above CL in 2002.
- MSW spawners at or above CL in 2002.

Southern NEAC area

France:

- 1SW spawners at or above CL in 2002.
- MSW spawners below CL in 2002.

Ireland:

- 1SW spawners at or above CL in 2002.
- MSW spawners at or above CL in 2002.

UK (England & Wales):

- 1SW spawners at or above CL in 2002.
- MSW spawners at or above CL in 2002

UK (Northern Ireland):

- 1SW spawners at or above CL in 2002.
- MSW spawners at or above CL in 2002

UK (Scotland):

- 1SW spawners at or above CL in 2002.
- MSW spawners below CL in 2002

For individual rivers the status with respect to conservation requirements may vary considerably from this picture.

Survival indices

A majority of the survival indices for the latest smolt year classes for both the wild and hatchery-reared smolts were below the previous year as well as the 5- and 10-year averages. These observations are consistent with the numbers of returning and spawning fish derived from the PFA model and is consistent with the view that returns are strongly influenced by factors in the marine environment.

The status of stocks, as derived from the NEAC PFA model is described above.

5.9.2 NASCO has requested ICES to: evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved.

The effect of specific management measures on stocks and fisheries has been evaluated in a number of NEAC countries. In summary:

NEAC northern area
Russia - commercial catches declining as a result of various management changes. Mean catch in last five years (1998-2002) is 15% below that of the previous five years (1993-1997).
Norway - large decline in the fishing effort along part of the Norwegian coast in 1997. Effect not quantified, but exploitation has fallen markedly.

NEAC southern area
Ireland - management measures in the commercial fishery in 1997 effectively reduced effort by at least 20%. Fishing effort on spring salmon also reduced. Measures have contributed to a reduction in both the overall catch and the exploitation rate on Irish stocks.

UK (N. Ireland) - significant management introduced in the Fisheries Conservancy Board area in 2002. The number of netting licences reduced and accompanying measures to regulate angling also introduced on a voluntary code-of-practice basis, pending introduction of appropriate byelaws. While the effects of these measures on stock status will require some years to fully evaluate, this probably contributed to the reduction in net catch in the FCB area from 23.4t in 2001 to 9.4t in 2002.

UK (England and Wales) - in 2002, national measures to protect spring salmon are estimated to have saved around 2,800 salmon from capture by net fisheries and around 1,300 by rod fisheries before June 1. A policy to phase out coastal mixed stock salmon fisheries has continued. There have been large annual fluctuations in declared catches, but the overall effect of these measures has been to reduce catches in these coastal fisheries from an average of about 39,000 fish (1993-97) to a little under 32,000 (1998-2002). These measures have had more of an impact at the local level.

Scotland - voluntary agreement to delay start of fishing has resulted in about an 80% reduction in the catch of MSW salmon by nets and fixed engines in February and March, compared with the five years previous.

France - TACs have operated in several regions in an effort to reduce exploitation of spring salmon. However, catch data suggest this merely delayed exploitation in these small rivers. New closed periods for the net fishery in the Adour estuary resulted in a higher proportion of 1SW salmon in the catch (58%) than in 2001 (16%), but did not reduce the level of exploitation on 2SW salmon.

ICES noted that management measures introduced in the last 5 years and the overall reduction in gear units have continued to reduce levels of exploitation on NEAC stocks.

5.9.3 NASCO has requested ICES to: further refine the estimate of by-catch of salmon post-smolts in pelagic trawl fisheries for mackerel and provide estimates for other pelagic fisheries that may catch salmon

Atlantic salmon post-smolts have been observed to overlap in time and space with some of the mackerel fishing areas in the North east Atlantic, and both species appear to follow the warm and saline Atlantic current on their northward migration. The potential risk of salmon post-smolts being taken in commercial fisheries has been a concern for some time and initial, highly provisional, estimates for 2001 suggested by-catch might be significant. ICES was requested to further refine this estimate and provide estimates for other pelagic fisheries that may catch salmon.

Research surveys and distribution of salmon

Norwegian research surveys carried out since 1990 using a specially designed “salmon trawl” have captured a total of 4,164 post-smolts and 171 older salmon in 2,438 surface trawl hauls in the northern Norwegian Sea (Figure 5.9.3.1). Since the start of dedicated salmon cruises in the Norwegian Sea in 1999, CPUE values for post-smolts (number caught per trawl hour) have been relatively high, reaching a peak of 28 in 2001. In 2002,

values were lower (Table 5.9.3.1, Figure 5.9.3.2), but more evenly distributed over the area than in 2001, indicating that the timing of the cruise must have been favourable in relation to the density of post-smolt cohorts passing through the survey area. The largest densities of post-smolts were recorded from June 21 to 24 around 68°N, earlier and further north than previously recorded. The smolt age distribution of these fish indicated a southern origin; this was supported by the fact that 9 of the 10 microtagged fish retrieved were of Irish origin.

It had previously been thought that the surface 'salmon trawl' would not catch larger adult salmon due to the relatively low trawling speed (3.2 – 3.8 kt), and video recordings performed in the trawl in 2000-2002 seemed to support this. As a result, no efforts had previously been made to calculate CPUE values for larger salmon. However, in a Nordic Data storage tag (DST) tag and release experiment to the north of the Faroes in the period October to January, substantial numbers of pre-adult and adult salmon were captured using a modified salmon trawl. This raised the additional concern that larger salmon may also be subject to by-catch in pelagic fisheries.

One of the objectives of a Russian pelagic fish survey in the Norwegian Sea from 29 May to 26 July 2002 was to map the distribution of post-smolts in the area. This survey was completed as part of an annual international research programme to study commercial species (herring, blue whiting and mackerel) in the Norwegian and Barents Seas. Hauls were taken by a pelagic research trawl according to agreed survey protocols; both surface and non-surface hauls were completed. In surface hauls the headline moved at depths from 0 to 5 m; most non-surface hauls were at depths of 5 to 40 m, but a small number of hauls were made at depths of 190-290 m. In all cases, the whole catch was screened and each fish was handled and identified to species. In June hauls were taken mainly in the southern part of the Norwegian Sea, and 14 of the 30 hauls contained mackerel. Mackerel were mainly taken in hauls with the headline towed at a depth of 0-5 m. No post-smolts were recorded in these hauls, although one adult salmon was caught in international waters. In July fishing took place in the mid-part of the Norwegian Sea, up to the island of Jan Mayen, and mackerel were found in 26 of 52 hauls. Another two adult salmon were caught in two of these hauls. The highest catches of post-smolts were made in July, north of 69°N. In four hauls on 8, 9 and 15 July, 32 post-smolts were recovered. In the two most northern hauls (2 and 17 post-smolts) no mackerel were caught, while in the other two (2 and 11 post-smolts) the catch of mackerel was 3 and 28 kg respectively.

By-catches of post-smolts and salmon

A dedicated Norwegian salmon and mackerel research cruise was completed in 2002 in the Norwegian Sea in the international area to the west and north of the Voeringplateau and the Norwegian EEZ (66°N – 69.7°N and 1°W – 17.4° E). In total, 44 tows were carried out between 21st June and 1st July to investigate by-catch: 590 post-smolts, 8 salmon and 19,125 kg mackerel were caught. Post-smolt catches were higher in the north, at the beginning of the cruise, and declined as the cruise moved southwards approaching 66°N. Post-smolt captures in single tows were smaller in the Norwegian EEZ than in the international zone, but every haul in this area contained post-smolts. In contrast, 56 % of the hauls in the international zone contained post-smolts. Large catches of mackerel were made in the same tows. Average CPUE was 10 post-smolts per trawl hour in the international zone and 11.9 post-smolts per trawl in the Norwegian EEZ. The mean CPUE (catch per trawl hour) for mackerel was 224 kg in the Norwegian EEZ and 598 kg in the international zone.

The ratio of post-smolt numbers per kg of mackerel was 0.026 in the international zone in 2002; this area was not surveyed in 2001. In the Norwegian EEZ, 0.057 post-smolts per kg of mackerel were caught in 2002 compared with 0.025 in 2001 (Table 5.9.3.2). The 2002 investigations confirm there is some degree of spatial and temporal overlap between the mackerel distribution and the northward migration routes for the post-smolts from south and central Europe and southern Norway. However, both mackerel and salmon post-smolts were found earlier in the year and further to the north and north-west than noted during previous cruises.

In 2002, the Russian Federation carried out a comprehensive programme in the Norwegian Sea to study the potential by-catch of Atlantic salmon and post-smolts in the Russian mackerel fishery. In the period June to August 16 scientific observers and fisheries inspectors were deployed on Russian fishing vessels, and their tasks included screening the mackerel catch for potential by-catch of salmon. Approximately 50 Russian vessels fished for mackerel in the Faroese fishing zone and international waters in 2002 and catches were screened on 20 of these. Scanning was carried out both on individual vessels during the discharging of the trawl into bins and at a factory ship during grading. The vessel's crew assisted in this work. The catch in the screened hauls varied from a few hundred kilos to 87 t; the average catch per haul for inspected vessels was 17.5 t and varied from 2 t to 42 t among vessels. For larger catches (> 10 t), sub-sampling was necessary and one to three samples of 3 t each were taken for screening. Catches from a total of 1,070 hauls, 25% of all hauls taken by Russian vessels during the fishing season, were screened. As a result of the screening, 15 adult salmon (one of which

carried a Swedish Carlin tag) and 12 post-smolts were recorded (Table 5.9.3.3). The highest occurrence of post-smolts was recorded in June (0.065 per haul), this fell to 0.015 post-smolts per haul in July and no post-smolts were found in August. The by-catch of post-smolts, except one, and salmon was taken along the Norwegian 200-mile limit in the area bounded by co-ordinates 65°30' to 66°30'N and 01°00' to 03°00'E.

ICES also received additional information on by-catch in other fisheries. Almost 200 salmon (1 – 2 kg) were reported from an Icelandic herring catch of 800 metric tonnes taken in the Spitsbergen area in August 2002. The fish were captured by a multi-gear-vessel in a mid-water trawl. One of the salmon caught was tagged as a smolt in the River Drammen, Norway. Historical information from the 1960s also indicated a by-catch of up to 30 salmon per haul in the herring fishery in Iceland. No specific screening for salmon post-smolts has been initiated in recent years in the Faroes. However, routine sampling of catches of herring, blue whiting and mackerel at a fish-meal factory has not revealed any salmon by-catch.

The discrepancy between the large numbers of post-smolts caught with mackerel in the Norwegian research fishery and the low by-catch observed in the commercial mackerel fishery may have a number of possible explanations:

- Detection rates may decrease with increasing sample size. Therefore the rate of non-detection may be higher in the Russian survey as larger numbers of fish were sampled in the catches. However, Russian samplers considered it unlikely that significant numbers of post-smolts were overlooked.
- The targeted research fishery, and the trawl methods used, may lead to over-estimation of the salmon by-catch in commercial pelagic fisheries as these fisheries are expected to be more effective in targeting and catching mackerel.
- Most of the post-smolts may have migrated through international waters before the large-scale mackerel fishery starts. In contrast, the research fishery specifically aims to sample the peak post-smolt migration in the area.

There are substantial differences between the Norwegian research trawl and the gear used in the commercial mackerel fishery. The behaviour of post-smolts in relation to these different gears is not known.

The best method to estimate by-catches in the commercial fishery is undoubtedly direct observation onboard the commercial vessels.

Given the large differences between the results from the Norwegian by-catch studies in 2001-02 and the Russian research trawling and screening of commercial catches, ICES agreed it was necessary to continue to collect data on the biology and distribution of post-smolts and older Atlantic salmon in the sea.

ICES made a number of recommendations for further research on this topic (Section 4.7).

Description of mackerel and other commercial pelagic fisheries

ICES noted that there are many pelagic fisheries operating in the North Atlantic. Information on those that might overlap with the known distribution of salmon post-smolts in the sea, and thus could have potential implications with regard to the by-catch of salmon, was reviewed. The Russian Federation provided a detailed description of the Russian mackerel fishery in the Norwegian Sea (Figure 5.9.3.3). Details for other fisheries were taken from the reports of the Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy (ICES CM2003/ACFM:07) and the Working Group on Northern Pelagics and Blue Whiting (ICES CM2002/ACFM:19). Information on the following fisheries was compiled and is presented in the Working Group report (ICES CM 2003/ ACFM 19):

Mackerel (678,000 t in 2001);
Norwegian spring-spawning herring (756,845 t in 2001)**;**
Blue-Whiting (1,780,000 t in 2001);
Horse mackerel (283,000 t in 2001);
Icelandic summer-spawning herring (95,278 t in 2001);
Capelin in the Iceland, East Greenland and Jan Mayen area (276,000 t in June/July 2001 and 955,000 t in the 2002 winter season).

Table 5.6.1 Predictions and 95% bootstrap confidence limits (thousands) of *PFA non-m* using *Year* and *Spawners*.

Year	Egg Numbers	Prediction	Lower limit	Upper limit
2002	2481	537	345	847
2003	2020	524	315	840

Table 5.9.3.1. Catch numbers, weight and catch per unit of effort (CPUE, trawl hours) of post-smolts and mackerel in the international area of the Norwegian Sea, 21st June – 01st July 2002.

Fished area	Date, YYMMDD	Tow time Hrs	Station no.	Mackerel		Post-smolts		
				Catch, kg	CPUE, kg h^{-1}	Catch, no.	CPUE, No. h^{-1}	No. per CPUE of mackerel
Internat. Zone	020622	2.0	235	61.1	31.31	49	25.13	1.56
- " -	020622	2.0	236	293.4	146.70	133	66.50	0.91
- " -	020622	2.1	237	272.0	131.61	40	19.35	0.30
- " -	020623	1.0	238	14.0	14.18	2	2.00	0.14
- " -	020623	1.0	239	1,152.0	1,152.00	11	11.00	0.01
- " -	020623	1.0	241	272.0	276.61	0	0.00	0.00
- " -	020623	1.0	242	92.0	92.00	6	6.00	0.07
- " -	020623	1.0	243	858.0	858.00	86	86.00	0.10
- " -	020624	0.9	244	95.7	106.33	29	32.22	0.27
- " -	020624	1.0	245	1,100.0	1,100.00	18	18.00	0.02
- " -	020624	1.0	247	14.9	14.86	0	0.00	0.00
- " -	020625	1.0	249	96.5	96.50	0	0.00	0.00
- " -	020625	1.3	252	195.0	153.95	0	0.00	0.00
- " -	020625	1.1	253	1,386.0	1,320.00	11	10.48	0.01
- " -	020626	1.0	254	1,000.0	1,000.00	0	0.00	0.00
- " -	020626	1.0	255	92.6	94.17	0	0.00	0.00
- " -	020626	1.1	256	95.0	87.69	1	0.92	0.01
- " -	020626	1.2	257	45.2	36.62	10	8.11	0.27
- " -	020626	1.2	258	66.5	57.83	6	5.22	0.10
- " -	020627	0.9	260	320.0	342.86	0	0.00	0.00
- " -	020627	1.0	261	1,330.0	1,330.00	3	3.00	0.00
- " -	020628	1.0	268	2,300.0	2,300.00	0	0.00	0.00
- " -	020629	0.5	271	198.0	396.00	0	0.00	0.00
- " -	020629	0.6	272	81.0	142.94	0	0.00	0.00
- " -	020629	1.0	274	198.0	198.00	1	1.00	0.01
- " -	020629	1.0	275	530.0	530.00	1	1.00	0.00
- " -	020629	1.0	276	640.0	640.00	0	0.00	0.00
- " -	020630	0.5	277	2,200.0	4,400.00	0	0.00	0.00
- " -	020630	0.5	278	480.0	929.03	0	0.00	0.00
- " -	020630	1.0	279	560.0	560.00	0	0.00	0.00
- " -	020701	1.0	280	190.0	190.00	14	14.00	0.07
- " -	020701	1.0	282	120.0	120.00	10	10.00	0.08
Internat. zone, Sum		33.7	32	16,348.9	Mean, 589.04	431	Mean, 10.00	Mean, 0.12

Ratio of total no of post-smolts captured per total catch of mackerel = 0.026
Mean number of post-smolts per haul = 13.47

Table 5.9.3.1. contd. Catch numbers, weight and catch per unit of effort (CPUE, trawl hours) of post-smolts and mackerel in the Norwegian EEZ of the Norwegian Sea, 21st June – 01st July 2002.

				Mackerel		Post-smolts		
Fished area	Date YYMMDD	Tow time hours	Station no.	Catch, kg	CPUE, kg h^{-1}	Catch, no.	CPUE, no. h^{-1}	No. per CPUE of mackerel
Norw. EEZ	020621	2.0	234	24.4	12.21	36	18.00	2.95
- " -	020624	1.0	246	264.0	264.00	47	47.00	0.18
- " -	020624	1.0	248	759.0	759.00	5	5.00	0.01
- " -	020625	1.0	250	280.5	275.90	2	1.97	0.01
- " -	020625	1.0	251	95.5	93.93	9	8.85	0.10
- " -	020627	1.0	262	27.6	27.56	20	20.00	0.73
- " -	020627	1.0	263	363.0	363.00	4	4.00	0.01
- " -	020628	1.0	265	231.0	231.00	8	8.00	0.03
- " -	020628	1.0	266	39.3	39.34	12	12.00	0.31
- " -	020628	1.0	267	185.0	185.00	13	13.00	0.07
- " -	020628	1.5	269	429.0	286.00	1	0.67	0.00
	020629	0.5	273	78.5	151.94	2	3.87	0.01
Norw. EEZ, Sum		13.0	12	2,776.8	Mean, 224.07	159	Mean, 11.86	Mean, 0.37
Total fished area		46.7	44	19,125.7	Mean, 89.50	590	Mean, 10.51	Mean, 0.14

Ratio of total no of post-smolts captured per total catch of mackerel = 0.057
Mean number of post-smolts per haul= 13.25

Table 5.9.3.2. Ratio between post-smolts and mackerel in Norwegian research trawl captures in the Norwegian Sea

	Norwegian zone		International zone	
Year	Total ratio	Unwght. mean	Total ratio	Unwght. mean
2001	0.016	0.025	-	-
2002	0.057	0.370	0.026	0.120

Table 5.9.3.3. Details of the screening of catches from the Russian mackerel fishery in the Norwegian Sea in June-August 2002.

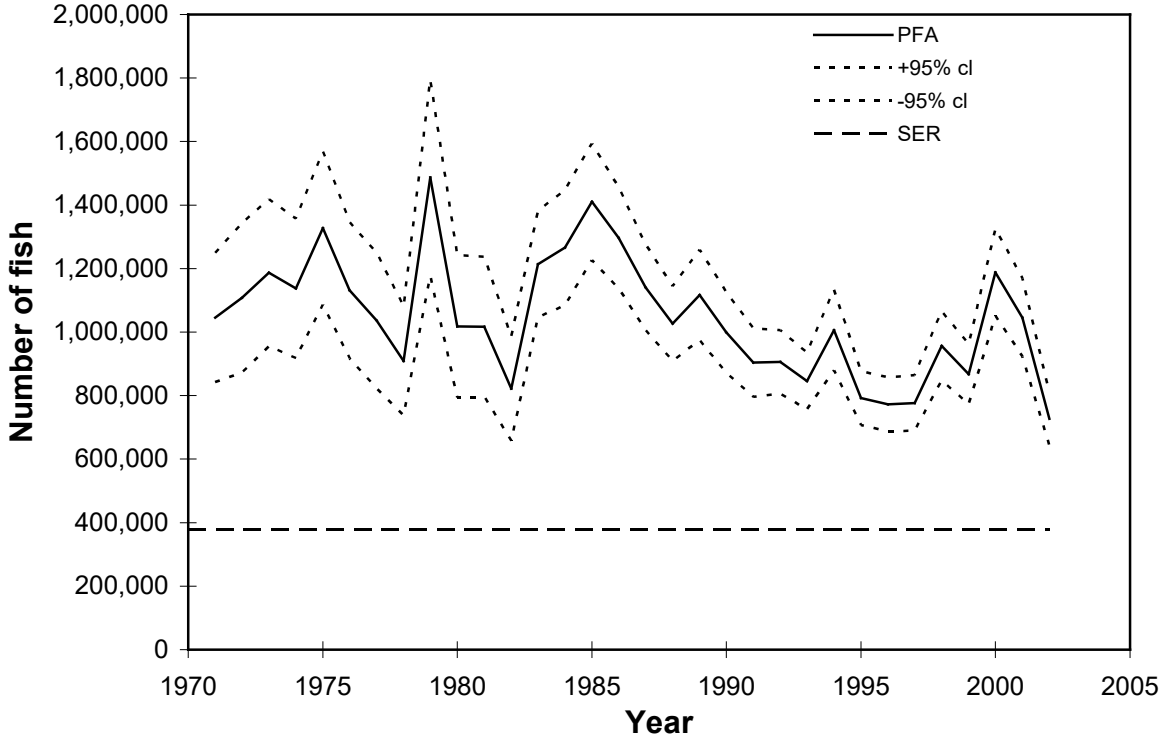
Month	Number of hauls		Catch, t					
			Total*		In screened hauls			
	Total	Screened	All species	Mackerel	All species	Mackerel	Post-smolts, indiv.	Salmon, indiv.
June	232	46 (5 vessels)	2,344	2,135	289	245	3	3
July	2897	595 (20 vessels)	35,744	29,802	5,683	4,156	9	9
August	1222	429 (14 vessels)	14,334	7,509	4,940	3,359	0	3
Total	4351	1070 (20 vessels)	52,422	39,446	10,912	7,760	12	15

* Provisional figures

Figure 5.1.1 Estimated recruitment (PFA) and Spawning Escapement Reserve (SER) for maturing and non-maturing salmon in Northern Europe, 1971-2002

a) Maturing 1SW recruits (potential 1SW returns)

(Recruits in Year N become spawners in Year N)



b) Non-maturing 1SW recruits (potential MSW returns)

(Recruits in Year N become spawners in Year N+1)

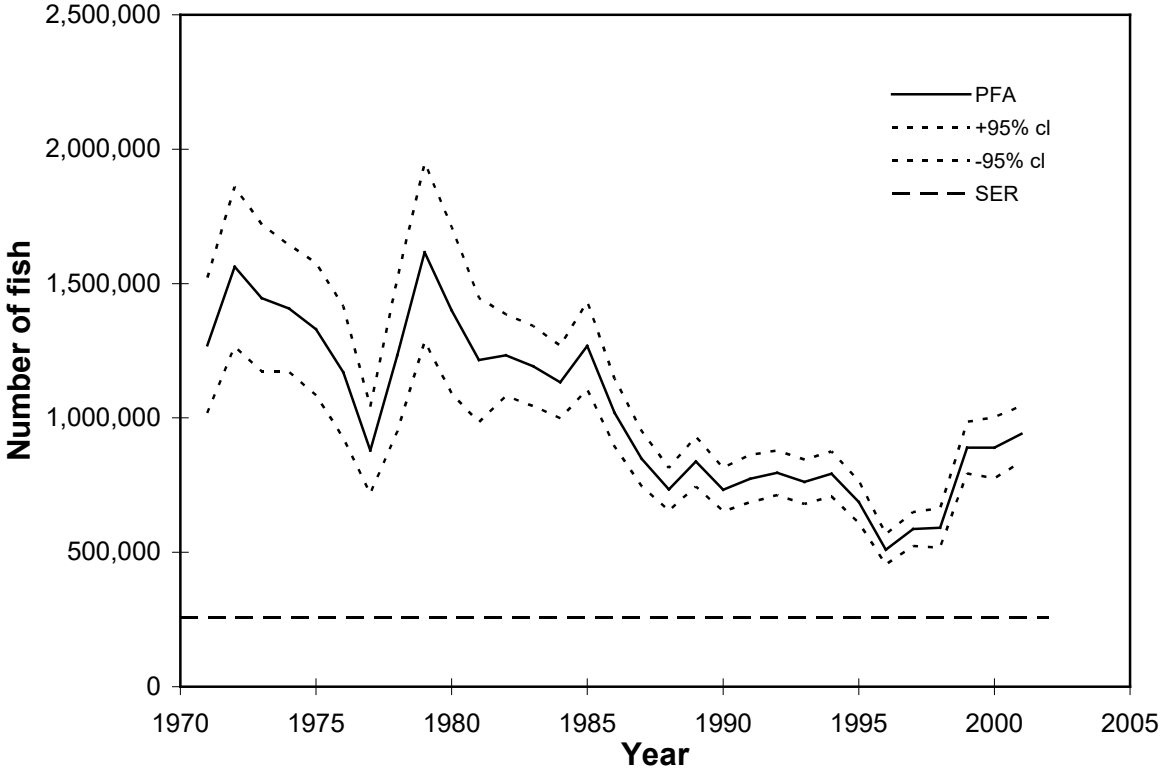
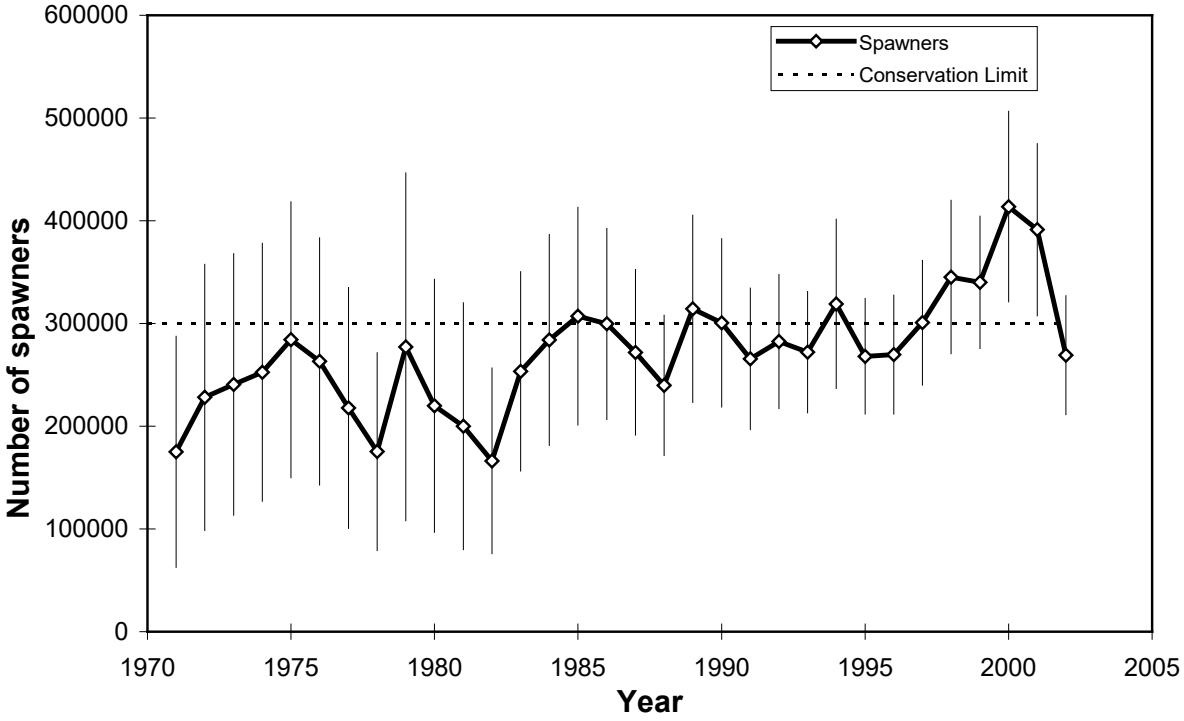


Figure 5.1.2 Estimated spawning escapement of maturing and non-maturing salmon in Northern Europe, 1971-2002

a) 1SW spawners (and 95% confidence limits)



b) MSW spawners (and 95% confidence limits)

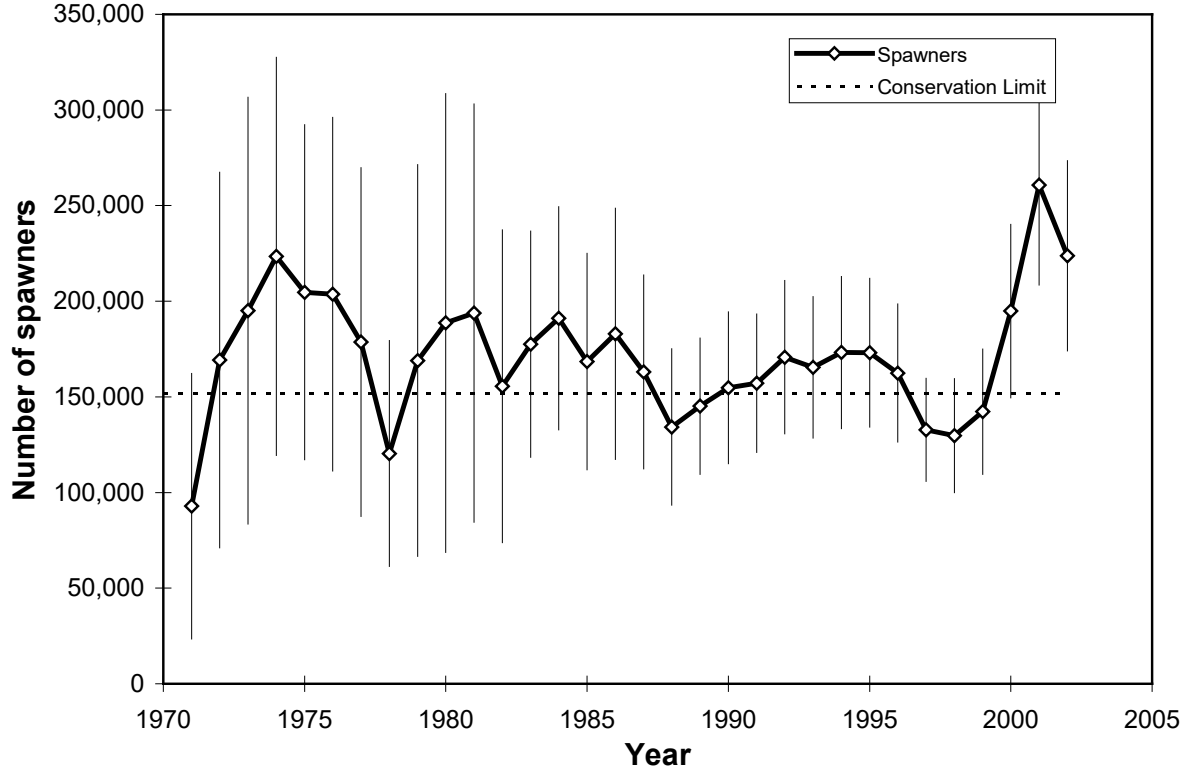
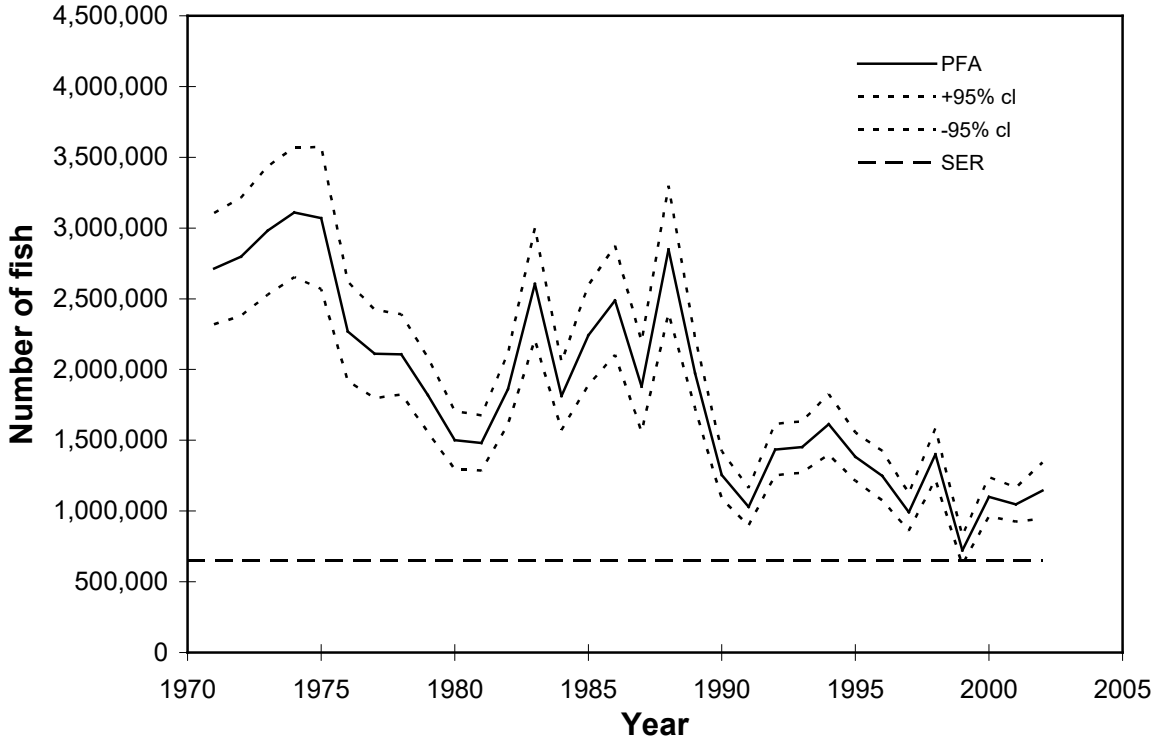


Figure 5.1.3 Estimated recruitment (PFA) and Spawning Escapement Reserve (SER) for maturing and non-maturing salmon in Southern Europe, 1971-2002

a) Maturing 1SW recruits (potential 1SW returns)

(Recruits in Year N become spawners in Year N)



b) Non-maturing 1SW recruits (potential MSW returns)

(Recruits in Year N become spawners in Year N+1)

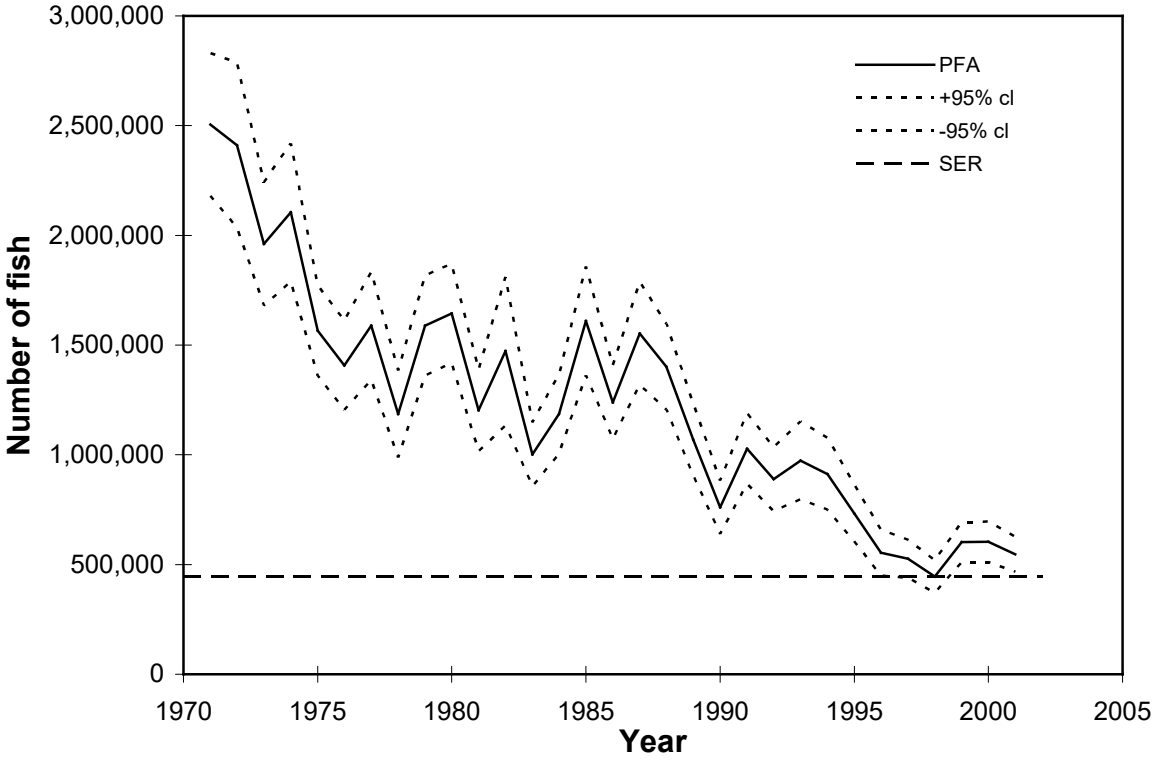
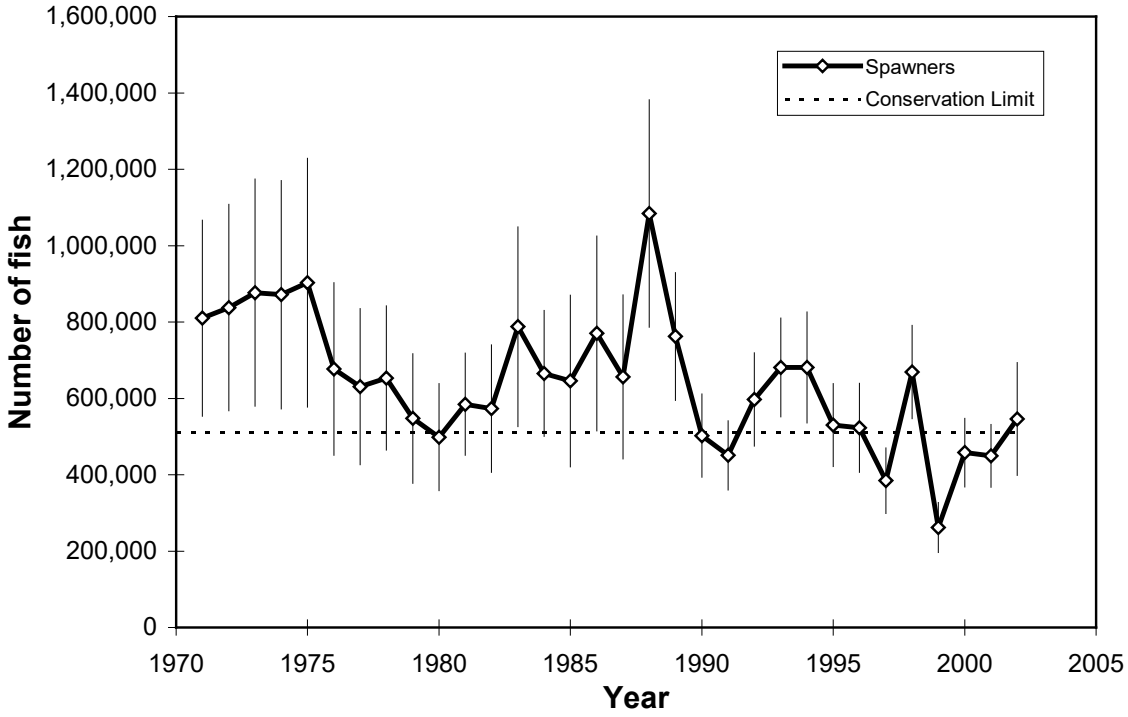


Figure 5.1.4 Estimated spawning escapement of maturing and non-maturing salmon in Southern Europe, 1971-2002

a) 1SW spawners (and 95% confidence limits)



b) MSW spawners (and 95% confidence limits)

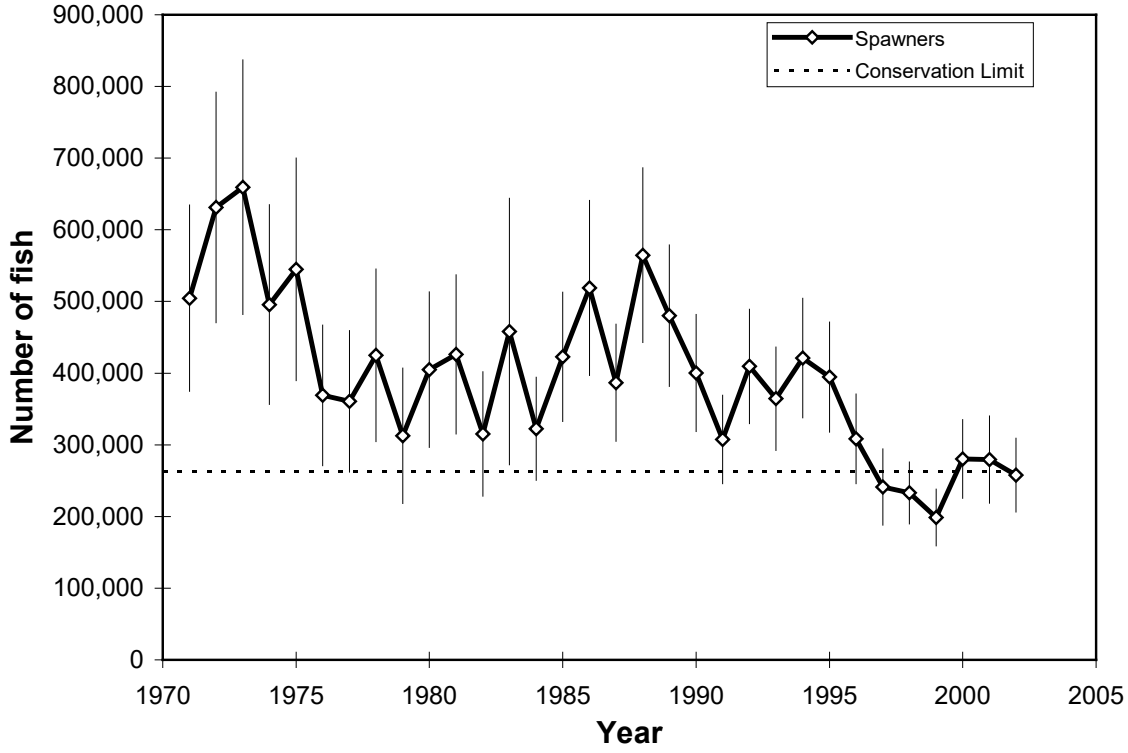


Figure 5.4.1 *PFA non-maturing* trends and predictions (+/- 95% confidence intervals) for Southern European stock complex.

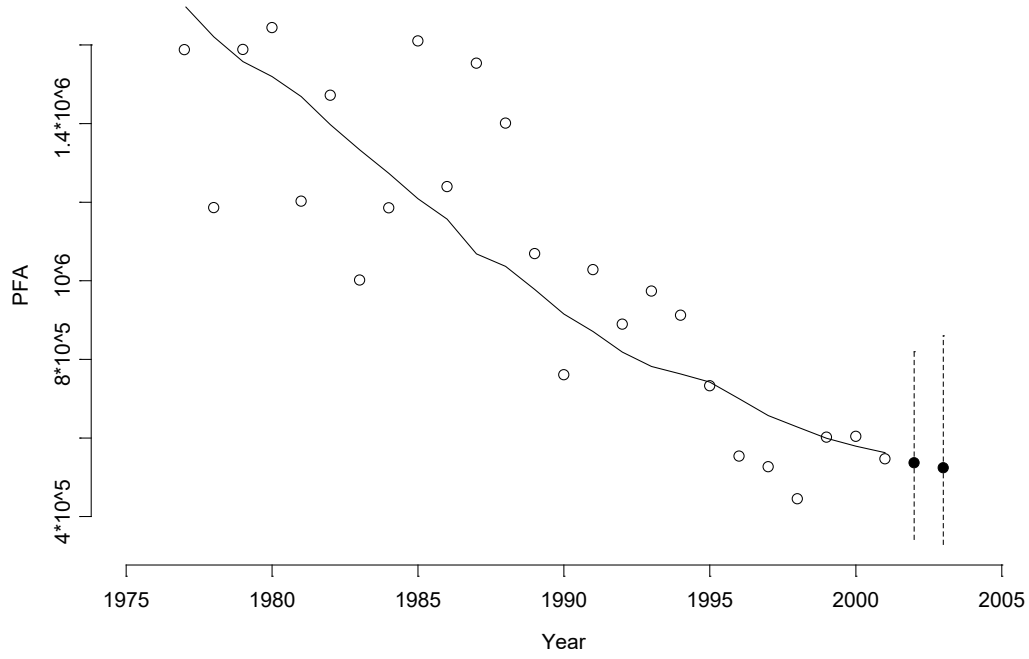


Figure 5.9.3.1. Distribution of Scottish and Norwegian post-smolt captures 1990 – 2001 (Holm et al. 2003; Shelton 1997). Numbers of post-smolts in catches presented as symbols, legends in figure.

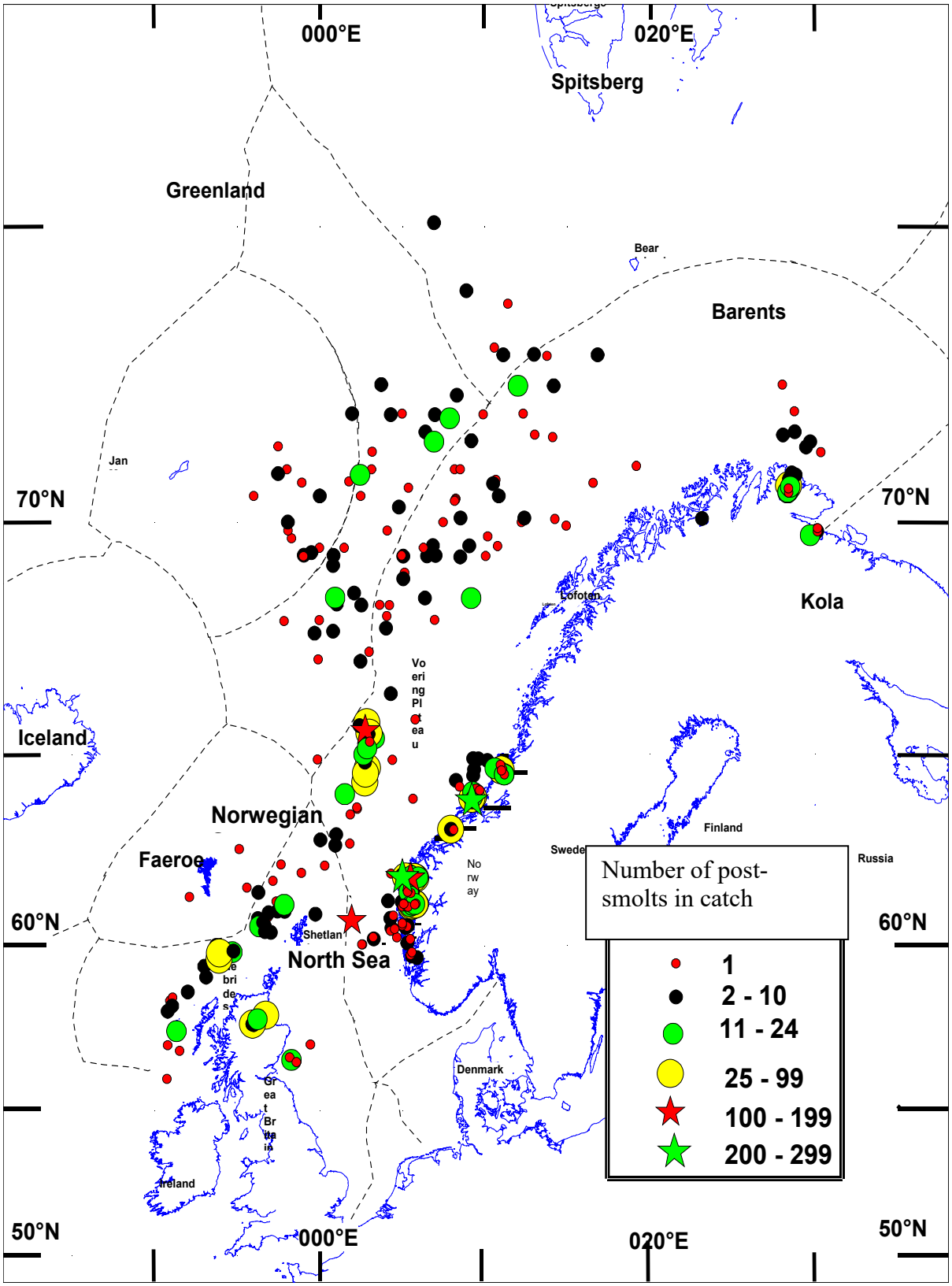
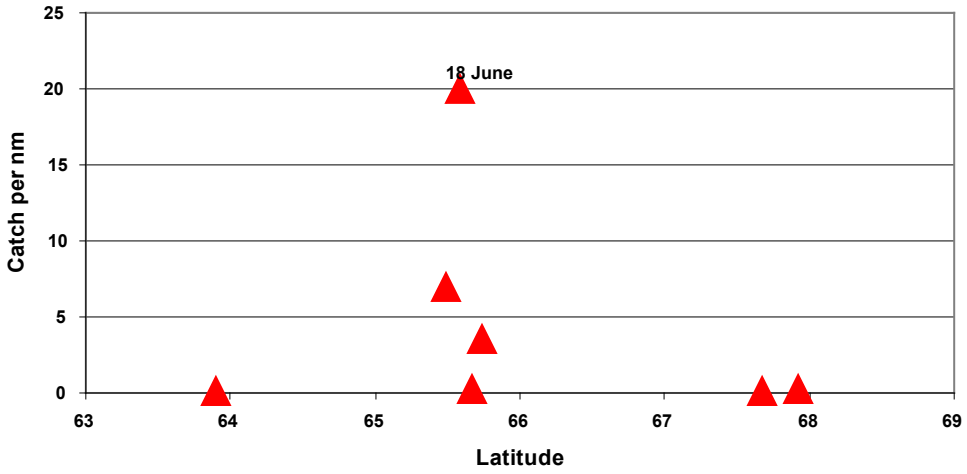
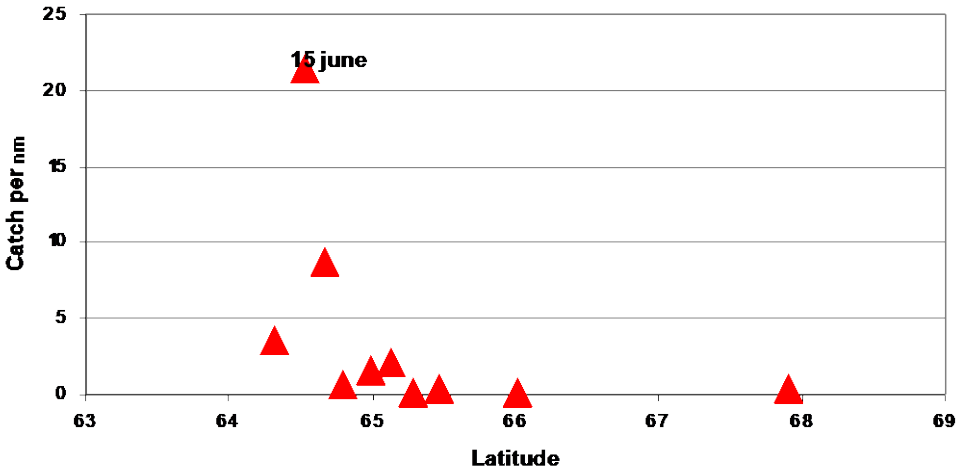


Figure 5.9.3.2 Catch per unit of effort (CPUE, number per nautical miles) of post-smolts by latitude. Timing of peak CPUE in 2000 (upper panel), 2001 (mid panel) and 2002 (lower panel). All cruises have been going from north to south.





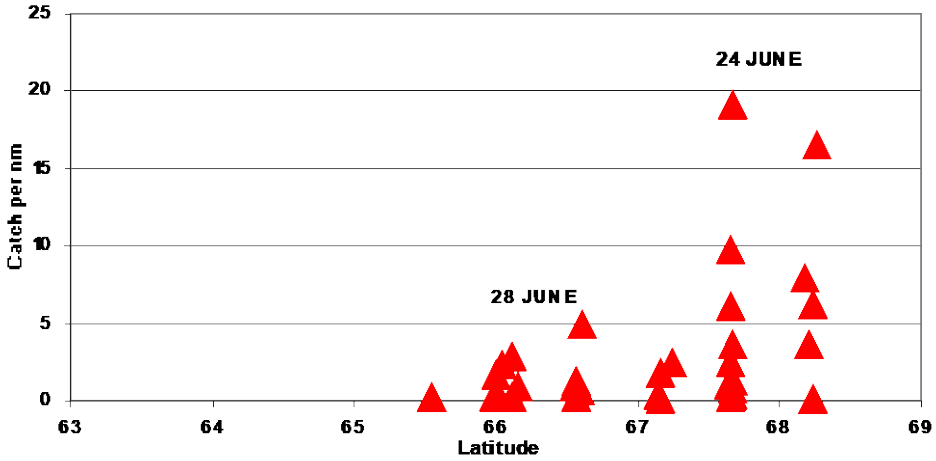
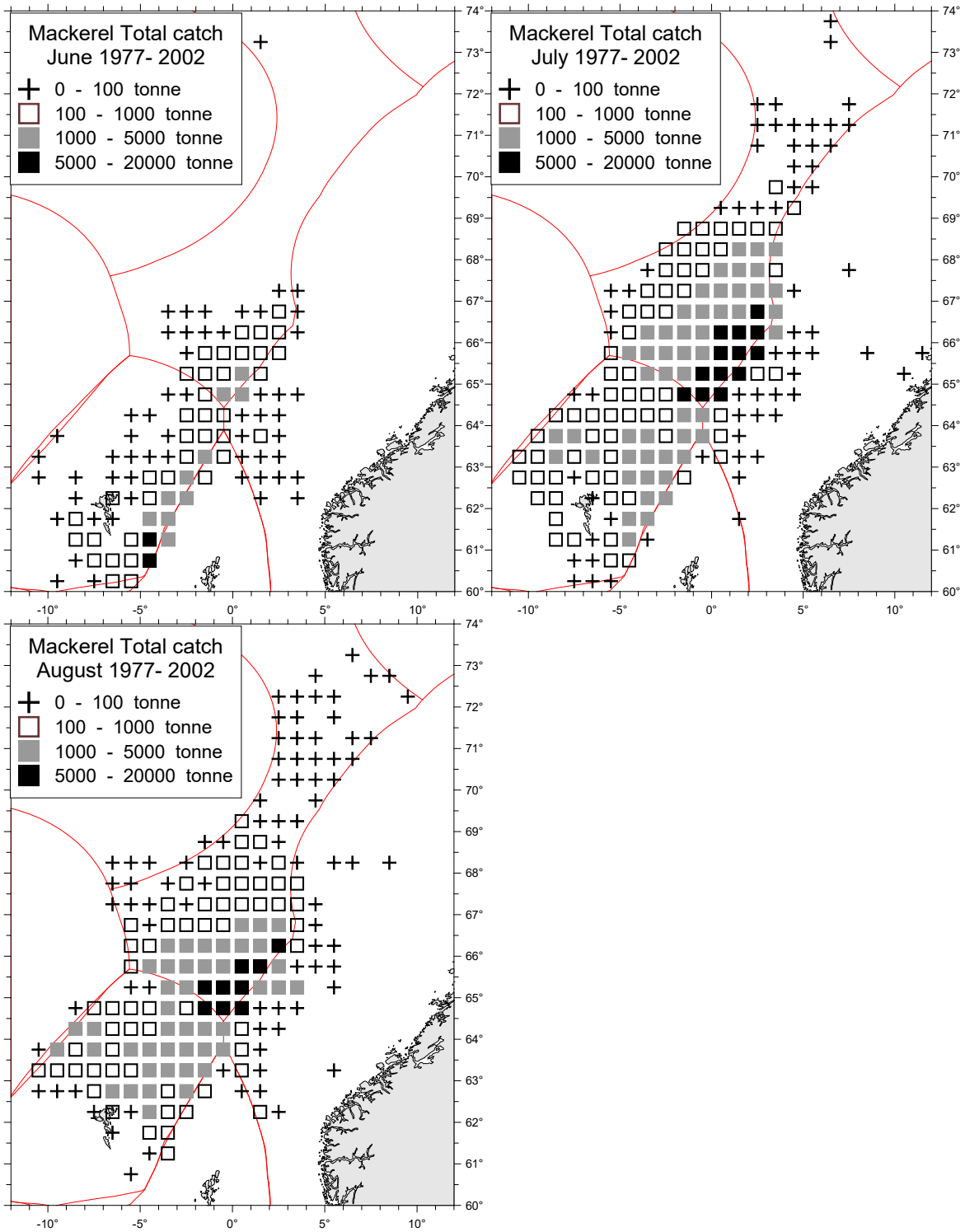


Fig. 5.9.3.3. Russian mackerel catches in 1977-2001. (1977-1997 NEAFC database, 1998-2001 WGMHSA 1999-2002).



6 ATLANTIC SALMON IN THE NORTH AMERICAN COMMISSION AREA

6.1 Status of stocks/exploitaton

In 2002, the overall conservation limit (S_{lim}) for 2SW salmon was not met in any area except for Newfoundland, therefore the stock complexes in these regions are considered to be outside safe biological limits. However, for the Newfoundland region, although the mid-point estimate of spawners in 2002 was above CL, it is not known if this overall stock complex is within safe biological limits, as the statistical confidence intervals of the spawner estimates are not available.

The stock status is elaborated in section 6.9.1.

6.2 Management objectives

The general NASCO management objectives apply (See Section 3).

6.3 Reference points

As precautionary reference points have not been developed for these stocks, management advice is therefore referenced to the S_{lim} conservation limit. Thus, these limits should be avoided with high probability (i.e. at least 75%).

In Atlantic Canada, CLs have been set on the basis of stock and recruitment studies which provided for MSY on a limited number of river stocks where data was available, and these derived egg deposition rates were used on the remainder of rivers where only habitat area and spawner demographics were available, as documented in O'Connell, et al. (1997). The added production from lacustrine areas in Labrador and Newfoundland was also accommodated. In USA, conservation limits were set following a similar approach. Recently, for stocks in Quebec, stock-recruitment analysis for six local rivers was used to define the CL, defined as the S_{MSY} level at 75% probability level, calculated by Bayesian analysis. For the purposes of management, egg deposition requirements are converted into 2SW fish equivalents. These are presented by fishery management zone in Table 6.3.1.

There are no changes recommended in the 2SW salmon conservation limits (S_{lim}) from those recommended previously. Conservation limits for 2SW salmon for Canada now total 123,349 and for the USA, 29,199 for a combined total of 152,548.

6.4 Advice on management

As the biological objective is to have all rivers reaching their conservation requirements, river-by-river management is necessary. On individual rivers where spawning requirements are being achieved, there are no biological reasons to restrict the harvest. Advice regarding management of this stock complex in the fishery at West Greenland is provided in Section 7.

6.5 Relevant factors to be considered in management

For all fisheries, ICES considers that management of single stock fisheries should be based upon assessments of the status of individual stocks. Conservation would be best achieved if fisheries can be targeted at stocks that have been shown to be above biologically-based escapement requirements. Fisheries in estuaries and rivers are more likely to fulfil this requirement.

Reduced exploitation on large salmon in the in-river and estuarine fisheries of the Miramichi has resulted in an expanded age structure in which repeat spawners have comprised as much as 50% of the large salmon returns. It is therefore necessary to consider that if this is a widespread response to fishery closures, a large proportion of the actual egg deposition may in future be provided by fish which are not presently considered in setting CLs and assessing whether CLs have been achieved.

6.6 Catch forecast for 2003

Catch options are only provided for the non-maturing 1SW and maturing 2SW components as the maturing 1SW component is not fished outside of home waters, and in the absence of significant marine interceptory fisheries, is managed in homewaters by the producing nations.

It is possible to provide catch advice for the North American Commission area for two years. The revised forecast for 2003 for 2SW maturing fish is based on a new forecast of the 2002 pre-fishery abundance and accounting for fish which were already removed from the cohort by fisheries in Greenland and Labrador in 2002 as 1SW non-maturing fish. The second is a new estimate for 2004 (see section 6.7) based on the pre-fishery abundance forecast for 2003 from Section 7. A consequence of these annual revisions is that the catch options for 2SW equivalents in North America may change compared to the options developed the year before.

Catch advice for 2003 fisheries on 2SW maturing salmon

The revised forecast of the pre-fishery abundance for 2002 provides a PFA mid-point of 133,087.

In order to compare the PFA to conservation limits, the pre-fishery abundance of 133,087 can be expressed as 2SW equivalents by considering natural mortality of 3% per month for 11 months (a factor of 0.72), resulting in 95,679 2SW salmon equivalents. There have already been harvests of this cohort as 1SW non-maturing salmon in 2002 for both the Labrador (299) and Greenland (1,499) fisheries (Tables 6.3.1 and 6.6.1) for a total of 1,798 2SW salmon equivalents already harvested, when the mortality factor is considered, leaving 93,881 2SW salmon returning to North America.

As the predicted number of 2SW salmon returning to North America (93,881) is substantially lower than the 2SW conservation limit (S_{lim}) of 152,548, there are no harvest possibilities at forecasted levels considered risk-averse (at probability levels of 75% and below). The numbers provided for catch options refer to the composite North American fisheries. As the biological objective is to have all rivers reaching their conservation requirements, river-by-river management is necessary. On individual rivers, where spawning requirements are being achieved, there are no biological reasons to restrict the harvest.

6.7 Medium to long term projections

Catch advice for 2004 fisheries on 2SW maturing salmon

Most catches (92%) in North America now take place in rivers or in estuaries. The commercial fisheries are now closed and the remaining coastal food fisheries in Labrador are mainly located close to river mouths and likely harvest few salmon from other than local rivers. Fisheries are principally managed on a river-by-river basis and, in areas where retention of large salmon is allowed, it is closely controlled.

Catch options which could be derived from the pre-fishery abundance forecast for 2003 (111,042) would apply principally to North American fisheries in 2004 and hence the level of fisheries in 2003 needs to be accounted for before providing them.

Accounting for mortality and the conservation limit and considering an allocation of 60% of the surplus to North America, the only risk averse catch option for 2SW salmon in 2004 is "zero" catch. This "zero" catch option refers to the composite North American fisheries. As the biological objective is to have all rivers reaching or exceeding their conservation limits, river-by-river management will be necessary. On individual rivers, where conservation limits are being achieved, there are no biological reasons to restrict the harvest.

6.8 COMPARISON WITH PREVIOUS ASSESSMENT AND ADVICE

The revised forecast of the pre-fishery abundance for 2002 provides a PFA mid-point of 133,087. This is much lower than the value forecast last year at this time of 329,552. This is mainly due to changes to the model used to forecast PFA for these stocks, as detailed in Section 7.

6.9 Response to specific requests for information from NASCO

6.9.1 NASCO has requested ICES to describe the key events of the 2002 fisheries and the status of the stock

Key events of the 2002 fisheries

Catch histories of North American salmon

Catch histories for this stock complex are provided in Tables 6.9.1.1 and 6.9.1.2, expressed as 2SW salmon equivalents. The Newfoundland-Labrador commercial fisheries were, historically, a mixed stock fishery and harvested both maturing and non-maturing 1SW salmon as well as 2SW maturing salmon. Mortalities within North America peaked at about 365,000 in 1976 and are now about 10,000 2SW salmon equivalents. In the most recent four years estimated (that is those since the closure of the Labrador commercial fishery), those taken as non-maturing fish in Labrador comprise 3%, or less, of the total in North America.

Of the North American fisheries on the cohort destined to be 2SW salmon, 86% of the catch comes from terminal fisheries in the most recent year. This value has ranged from as low as 20% in 1973, 1976 and 1987 to values of 77-91% in 1996-2002 fisheries (Table 6.9.1.1). The percentage increased significantly with the reduction and closures of the Newfoundland and Labrador commercial mixed stock fisheries, particularly since 1992.

The percentage of the total 2SW equivalents that have been harvested in North American waters has ranged from 48-100%, with the most recent year estimated at 58% (Table 6.9.1.2.).

Gear and effort

The 23 areas for which the Department of Fisheries and Oceans (DFO) manages the salmon fisheries are called Salmon Fishing Areas (SFAs); for Québec, the management is delegated to the Société de la Faune et des Parcs du Québec and the fishing areas are designated by Q1 through Q11 (Figure 6.9.1.1). Three user groups exploited salmon in Canada in 2002: Aboriginal peoples, residents fishing for food in Labrador, and recreational fishers. There were no commercial fisheries in **Canada** in 2002.

Aboriginal peoples' food fisheries: In Québec, Aboriginal peoples' food fisheries took place subject to agreements or through permits issued to the bands. In the Maritimes and Newfoundland (SFAs 1 to 23), food fishery harvest agreements were signed with several Aboriginal peoples groups (mostly First Nations) in 2002. The signed agreements often included allocations of small and large salmon and the area of fishing was usually in-river or estuaries, except in Labrador. In Labrador (SFAs 1 and 2), food fishery arrangements with the Labrador Inuit Association and the Innu resulted in fisheries in estuaries and coastal areas. Under agreements reached in 2002, several Aboriginal communities in Nova Scotia agreed to retain only "adipose clipped" 1SW salmon from five Atlantic coast rivers using methods that allowed live release of wild fish.

Residents food fisheries in Labrador: In the Lake Melville (SFA 1) and the coastal southern Labrador (SFA 2) areas, DFO allowed a food fishery for local residents. Residents who requested a license were permitted to retain a maximum of four salmon of any size. All licensees were to complete logbooks.

Recreational fisheries: Unless otherwise determined by management authorities, licenses are required for all persons fishing recreationally for Atlantic salmon, gear is generally restricted to fly fishing and there are restrictive daily/seasonal bag limits. Recreational fisheries management in 2002 varied by area. Except in Québec and Labrador (SFA 1 and some rivers of SFA 2), only small salmon could be retained in the recreational fisheries. Other measure included seasonal and daily bag limits, hook and release fisheries and total closures.

There was no fishery for sea-run Atlantic salmon in the **USA** in 2002 as a result of angling closures that have been in place since 1999.

For the **Saint-Pierre and Miquelon** fisheries in 2002, there were 12 professional and 42 recreational gillnet licenses issued. Since 1997, the number of professional fishermen has doubled from six to 12 and the number of recreational licenses has increased by six to 42. There is no legal limit on the number of professional and recreational licences. However, local authorities have restricted these numbers to 12 (professional) and 42 (recreational) so far, based on the maxima observed since the beginning of the statistics recording on salmon

fishing at SPM in 1990. Due to a sharp decline in other fish resources exploited by the professional fishermen (lumpfish, snow crab and cod), more of them have expressed interest in having salmon licenses and have asked for an increase in the number of licences that could be compensated by a reduction in the number of recreational licences.

Catches in 2002

The provisional harvest in Canada of salmon in 2002 by all users was 148 t, the same as the 2001 harvest (ie retained fish) (Table 4.1.1.1, Figure 6.9.1.2). The 2002 harvest was 53,832 small salmon and 8,401 large salmon, 5% more small salmon and 27% fewer large salmon, compared to 2001. The dramatic decline in harvested tonnage since 1988 is in large part the result of the reductions in commercial fisheries effort, the closure of the insular Newfoundland commercial fishery in 1992, the closure of the Labrador commercial fishery in 1998, and the closure of the Québec commercial fishery in 2000. These reductions were introduced as a result of declining abundance of salmon.

The 2002 harvest of small and large salmon, by number, was divided among the three user groups in different proportions depending on the province and the fish-size group exploited. Newfoundland reported the largest proportion of the total harvest of small salmon and Québec reported the greatest share of the large salmon harvest. Recreational fisheries exploited the greatest number of small salmon in each province, accounting for 83% of the total small salmon harvests in eastern Canada. Unlike years previous to 1999 when commercial fisheries took the largest share of large salmon, food fisheries (including the Labrador resident food fishery) accounted for the largest share in 2002 (69% by number).

Aboriginal peoples' food fisheries: Harvests in 2002 of 45.9 t, about 12,400 fish (57% small by number) were up 9 % from 2001 and 3 % above the previous 5-year average harvest.

Residents fishing for food in Labrador: The estimated catch in 2002 was 5.9 t, about 2,700 fish (83% small salmon by number).

Recreational fisheries: Harvest in recreational fisheries in 2002 totaled 47,140 small and large salmon, 5 % below the previous 5-year average and 4 % below the 2001 harvest level and the lowest total harvest reported (Figure 6.9.1.3). The small salmon harvest of 44,518 fish was about the same as the previous 5-year mean. The large salmon harvest of 2,622 fish was a 51 % decline from the previous five-year mean. Small and large salmon harvests were up 3 % and down 53 % from 2001, respectively (Figure 6.9.1.3).

Hook-and-release salmon fisheries: In 2002, about 54,400 salmon (about 18,700 large and 35,700 small) were caught and released (Table 6.9.1.3), representing about 54% of the total number caught, including retained fish. This was a 7 % decrease from the number released in 2001. Most of the fish released were in Newfoundland (53 %), followed by New Brunswick (33%), Québec (10%), Nova Scotia (4%), and Prince Edward Island (0.4%). Expressed as a proportion of the fish caught, that is, the sum of the retained and released fish, Nova Scotia released the highest percentage (87%), followed by Prince Edward Island (67%), New Brunswick (57%), Newfoundland (55%), and Québec (37%). There is some mortality on these released fish, which is accounted for when individual rivers are assessed for their attainment of conservation limits.

Unreported catches: Canada's unreported catch estimate for 2002 was about 83 t and no estimates were available for New Brunswick or for parts of Nova Scotia. Estimates provided for Newfoundland and Labrador were the same as those estimated in 2001 and estimates were available for only three of five SFAs in Nova Scotia. By stock groupings used for Canadian stocks throughout the report, the unreported catch estimates for 2002 were:

Stock Area	Unreported Catch (t)
Labrador	4
Newfoundland	45
Gulf	< 1
Scotia-Fundy	< 1
Québec	34
Total	83

All fisheries (commercial and recreational) for sea-run Atlantic salmon within the **USA** are now closed, including rivers previously open to catch-and-release fishing. Thus, there was no harvest of sea-run Atlantic salmon in the USA in 2002. Unreported catches were estimated to be zero t.

The harvest for **Saint-Pierre and Miquelon** in 2002 was reported to be 3.6 t from professional and recreational fishermen, 67% higher than in 2001 and the largest catch recorded since before 1960 (Table 4.1.1.1). Professional and recreational fishermen reported catching 2,437 kg and 1,153 kg of salmon, respectively. There was no estimate available of unreported catch for 2002.

Origin and composition of catches: In the past, salmon from both Canada and the USA have been taken in the commercial fisheries of eastern Canada. These fisheries have been closed. The Aboriginal Peoples' and resident food fisheries that exist in Labrador may intercept some salmon from other areas of North America although there are no reports of tagged fish being captured there in 2002. The fisheries of Saint-Pierre and Miquelon catch salmon of both Canadian and US origin. Little if any sampling occurs in these remaining marine fisheries.

The returns in 2002 to the majority of the rivers in Newfoundland and to most rivers of the Gulf of St. Lawrence and Québec were comprised exclusively of wild salmon. Hatchery-origin salmon made up varying proportions of the total returns and were most abundant in the rivers of the Bay of Fundy, the Atlantic coast of Nova Scotia and the USA. Aquaculture escapees were noted in the returns to five rivers of the Bay of Fundy and the coast of USA (Saint John, Magaguadavic, St. Croix, Dennys, Union).

In the Magaguadavic River which is located in close proximity to the center of both the Canadian and USA east coast salmon farming areas, the proportion of the adult run composed of fish farm escapees has been high (greater than 50%) since 1994. However, while fish farm escapees have dominated the run in terms of percentages, in absolute terms, their numbers have been trending downwards, with the exception of 2000. Fish farm escapees were also monitored in the St. Croix River (Canada/USA border), and Maine's Dennys, Narraguagus and Union rivers. The St. Croix and Dennys rivers are also in close proximity to the principal USA and Canadian salmon farming areas, whereas the Narraguagus and Union are more to the south, but have a few farm sites located in their vicinity. Percentages of returns that were fish farm escapees in the returns to the St. Croix and Dennys rivers in 2002 were 66% and 20% respectively. In the Union and Narraguagus rivers, fish farm escapees in 2002 made up 55% and 0% of the runs, respectively.

Elaboration on status of stocks in the NAC area

Information is provided below on *returns, recruits and spawners*.

The status of the stocks in geographical regions can be summarized as:

Newfoundland:
- 2SW returns third lowest in the last 10 years
- 2SW spawners in 2002 at approximately 1.5 times the 2SW stock conservation limits (S_{lim})

Labrador:
- 2SW returns peaked in 1995, and decreased again in 1996 and 1997
- no estimate is given after 1997 from this area when the commercial fishery, the basis for the return and spawner model for Labrador has ended.

Québec:
- 2SW returns lowest in a 32-year time-series
- 2SW spawners in 2002 at 52% of 2SW conservation limit (S_{lim})

Gulf of St. Lawrence:
- 2SW returns second lowest in a 32-year time-series
- 2SW spawners in 2002 at 38% of 2SW conservation limit (S_{lim})

Scotia-Fundy:
- 2SW returns lowest in a 32-year time-series
- 2SW spawners in 2002 at 6% of 2SW conservation limit (S_{lim})
- inner Bay of Fundy stocks listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada

United States:

- 2SW returns second lowest in a 32-year time-series
- 2SW returns in 2002 at 3% of 2SW conservation limit (S_{lim})
- stocks in 8 rivers listed as Endangered under the Endangered Species Act

Based on the genera1ly increased 1SW returns in 2002, some modest improvement is expected for large salmon in 2003; however, this improvement will be from usually record low returns of large salmon in 2002. An additional concern is the low abundance levels of many salmon stocks in rivers in eastern Canada, particularly in the Bay of Fundy and Atlantic coast of Nova Scotia. USA salmon stocks exhibit these same downward trends. Most salmon rivers in the USA are hatchery-dependent and remain at low levels compared to conservation requirements. Despite major changes in fisheries management, returns have continued to decline in these areas and many populations are currently threatened with extirpation.

Exploitation rates: There is no exploitation in Canada by commercial fisheries and the only remaining fisheries are for recreation and food. In the Newfoundland recreational fishery, exploitation rates ranged from 7% to 41% with a mean value of 14%. In the Québec recreational fishery, exploitation rates of small salmon ranged from 3% to 69% with a mean of 38%; exploitation rate for large salmon ranged from 1% to 25% with a mean of 12%. Overall exploitation rates by the Québec recreational fishery, using mid-point estimates of total returns and recreational landings, were 23% for small salmon and 8% for large salmon.

There was no exploitation of USA salmon in homewaters, and no salmon of USA origin were reported in Canadian fisheries in 2002.

However, there is potential for exploitation on these stock complexes if fishing takes place at west Greenland.

Estimated (mid-point) 1SW and 2SW returns, spawners, and spawner requirements are shown for five of six regions in North America in Figures 6.9.1.4 and 6.9.1.5. Labrador returns and thus total North American returns have been unavailable since 1998.

Estimates of pre-fishery abundance suggest a continuing decline of North American adult salmon over the last 10 years (Figure 6.9.1.6). The total population of 1SW and 2SW Atlantic salmon in the northwest Atlantic has oscillated around a generally declining trend since the 1970s, and the abundance recorded in 1993–2001 was the lowest in the time-series (Figure 6.9.1.7) with 2001 at 428,300 being the lowest point. During 1993 to 2000, the total population of 1SW and 2SW Atlantic salmon was about 600,000 fish, about half of the average abundance during 1972 to 1990. A further 50% decrease has occurred between 2000 and 2001, the most recent year for which it is possible to estimate the total population. The decline has been more severe for the 2SW salmon component than for the small salmon (maturing as 1SW salmon) age group.

In most regions the returns in 2002 of 2SW fish are at or near the lower end of the 32-year time-series (1971-2002). In Newfoundland, the 2 SW salmon are a minor age group component of the stocks in this area and even here, decreases of about 30% have occurred from peak levels of a few years ago. Returns of 1SW salmon generally increased from the extremely low values of 2001 in all areas except Newfoundland.

The rank of the estimated returns in 2002 in the 1971–2002 time-series for six regions in North America is shown below:

Region	Rank of 2002 returns in 1971-2002 (1=highest)		Rank of 2002 returns in 1993-2002 (1=highest)		Mid-point estimate of 2SW spawners as proportion of conservation limit (S_{lim})
	1SW	2SW	1SW	2SW	(%)
Labrador	Unknown	Unknown	Unknown	Unknown	Unknown
Newfoundland	25	11	8	8	144
Québec	13	32	4	10	52
Gulf	21	31	5	10	38
Scotia-Fundy	28	32	7	10	6
USA	12	31	2	9	2

Trends in abundance of small salmon and large salmon within the geographic areas show a general synchronicity among the rivers. Returns of large salmon in North America were generally decreased from 2001 often to record low values, while small salmon returns increased. Any increases however in small salmon returns were from often record low values in 2001. For the rivers of Newfoundland, large salmon returns decreased from 2001, but remained high relative to the years before the closure of the commercial fisheries. Large salmon in Newfoundland are predominantly repeat-spawning 1SW salmon, while in other areas of eastern Canada, 2SW and 3SW salmon make up varying proportions of the returns.

Egg depositions in 2002 exceeded or □qualled the river-specific conservation limits (S_{lim} for eggs) in 23 of the 85 assessed rivers (27%) and were less than 50% of conservation in 40 other rivers (47%)(Figure 6.9.1.8). Large deficiencies in egg depositions were noted in the Bay of Fundy and Atlantic coast of Nova Scotia where 10 of the 11 rivers assessed (91%) had egg depositions that were less than 50% of conservation limits. Proportionally fewer rivers in Gulf (0%) and Québec (38%) had egg depositions less than 50% of conservation. Only 40% of the Gulf rivers and 33% of the Québec rivers had egg depositions that □qualled or exceeded conservation. In Newfoundland, 30% of the rivers assessed met or exceeded the conservation egg limits, and 35% had egg depositions that were less than 50% of limits. The deficits mostly occurred in the east and southwest rivers of Newfoundland (SFA 13) and in Labrador. All USA rivers had egg depositions less than 5% of conservation limits.

In 2002, the overall conservation limit (S_{lim}) for 2SW salmon was not met in any area except Newfoundland. The overall 2SW conservation limit for North America could have been met or exceeded in only nine (1974-78, 1980-82 and 1986) of the past 31 years (considering the mid-points of the estimates) by reduction of terminal fisheries (Figures 6.9.1.5 and 6.9.1.9). In the remaining years, conservation limits could not have been met even if all terminal harvests had been eliminated. It is only within the last decade that Québec and the Gulf areas have failed to achieve their overall 2SW salmon conservation limits.

Measures of marine survival rates over time indicate that survival of North America stocks to home waters has not increased as expected as a result of fisheries changes**.** There have been no significant increasing trends in survival indices of any of the stock components since commercial closures in 1992.

Substantive increases in spawning escapements in recent years in northeast coast Newfoundland rivers and high smolt and juvenile production in many rivers, in conjunction with suitable ocean climate indices, were suggestive of the potential for improved adult salmon returns for 1998 through 2002. Colder oceanic conditions both nearshore and in the Labrador Sea in the early 1990s are thought to have contributed to lower survival of salmon stocks in eastern Canada during that period.

6.9.2 NASCO has requested ICES to evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved

The management of Atlantic salmon in eastern North America has focused on the management of spawning escapement to meet or exceed conservation limits. Significant measures introduced in the last five years in order to meet this objective have included the closure of all commercial fisheries in eastern Canada as of 2000, the complete closure of numerous rivers to any fishing including Native and recreational fisheries, and the imposition of catch and release only access in others. Within Newfoundland, the commercial fishery closure resulted in increased escapements of both small and large salmon, increased catches of large salmon increased escapements of both size groups. However in some areas, the increased escapements did not always result in increased smolt production nor were the increased escapements realized in all areas. The latter response indicates that factors other than fishing were impacting on survival of Atlantic salmon at sea.

Management measures may have impacts on Atlantic salmon stocks beyond changes in abundance of returning and spawning Atlantic salmon. Of the changes resulting from reductions in fisheries, changes in spawning escapement and subsequently juvenile production are the most anticipated. Looking back three decades at the performance of some Maritime provinces stocks to changes in fisheries management, spawning escapements responded initially to the 1984 management plan (closure of commercial fisheries and mandatory catch and release of large salmon throughout the Maritimes) but the higher escapements were not sustained into the 1990s. Juvenile abundance has generally increased in the Miramichi River but a statistically significant response in this abundance was not observed until six years after the increases in escapement.

Reduced exploitation on large salmon in the in-river and estuarine fisheries of the Miramichi has resulted in an expanded age structure in which repeat spawners have comprised as much as 50% of the large salmon returns.

Particularly notable is that since 1995, salmon with six previous spawnings have been observed in the returns to the Miramichi and salmon on the third to fifth spawnings are more abundant (Fig. 4.3.3.1). That it took over 11 years after the management plan of 1984 to see these older salmon is consistent with the time required for the first maiden fish of 1984 to reach that sea age (9 sea years of age).

There are fewer repeat spawner components in the Saint John River than in the Miramichi and there has not been any change in relative proportions over time as was seen in the Miramichi. The post-spawner survival in the Saint John River is likely constrained by downstream fish passage through 2 to 3 hydro-generating facilities which cannot be managed like the fishing exploitation rates on the Miramichi stock. For the Saint John River, therefore, reduced fisheries exploitations have not resulted in improved post-spawner survivals.

The repeat spawning return rates of 1SW maiden salmon have not increased significantly over the past 30 years. The returns rates are relative to maiden fish prior to in-river exploitation, and since there is exploitation of this age group by both the Native and recreational fisheries, survival of maiden fish to a second return was expected to be lower. In addition to being more abundant in recent years, repeat spawners from the Miramichi grow substantially between spawning events. These larger fish of proportionally greater abundance in the river are of interest to the recreational fishermen, produce more eggs per fish than maiden spawners, and provide a buffer to the annual spawning escapement when smolt to maiden spawner survivals are low.

Over the 1971 to 2002 period, the average length of 1SW and 2SW maiden salmon has increased. The 2SW salmon from the Miramichi River during 1999 to 2002 are the largest of the time series and the mean size increased in 1986, two years after the home water commercial fishery moratorium. The mean size of 1SW salmon of the last four years were also the largest of the time series and the change in size was also first observed in 1986. The change in size was also observed for the 2SW fish, however, it is not obvious how the fishing gear could have been selecting the larger 2SW salmon. Similar increases in mean size of 1SW salmon were observed in the Nashwaak River and the Saint John River, both Bay of Fundy stocks. The mean size in the last three years of both 1SW and 2SW salmon have been average to less than average for the 1986 to 2002 period. Similar to the Miramichi, the change in mean size also first occurred in 1986. It is possible that exploitation with nets was still taking place on these stocks in 1984 and 1985.

Many historical commercial fisheries were prosecuted early in the season and frequently not in proportion to the timing of the fish entering the river. Evidence of the effect of fisheries exploitation in coastal waters on time of entry of salmon to rivers was evident in the time series of catches at the estuary trapnet in the Miramichi. The 50^{th} percentile count of large salmon at the trapnet in the 1950s and 1960s was post Sept. 1 but became progressively earlier in 1970 to 1972 following the closure of the directed commercial fisheries in the Maritimes and in the last part of the time series, the median date oscillated around mid-August.

With management of salmon fisheries in eastern Canada now restricted mainly to home rivers, a number of stock characteristics were expected to have changed. Most notably, the mean size-at-age of salmon has increased in many rivers in which net fisheries of salmon historically occurred. Reduced exploitation in both the marine and freshwater environments has benefited the Miramichi River by providing repeat spawners as a buffer to the maiden salmon population when the latter is low.

6.9.3 NASCO has requested ICES to provide an analysis of existing biological and/or tag return data, and recommendations for required data collections, to identify the origin of Atlantic salmon caught at St Pierre and Miquelon

A small Atlantic salmon fishery occurs off the coast of Saint-Pierre and Miquelon. A total of six tag returns of North American origin have been reported from this fishery since 1976.

Tag code	Country of origin	River of release	Year of release	Recovery date	Total length (cm)	Total weight (g)
BBS75332	CAN	Miramichi River, NB	1974	05/23/1976[1]	77	4,200
BBS84564	CAN	Miramichi River, NB	1973	5/28/1976	80	4,200
BBK78583	CAN	Morell River, PEI	1976	05/21/1977	76	3,975
BBX00427	CAN	Liscomb River, NS	1980	06/17/1981	51	1,200
AW14198	CAN	St John River, NB	1984	06/25/1985	85	3,966
A3458	USA	Penobscot River, ME	1980[2]	06/27/1981	80	3,600[3]

[1]capture response indicates that catch occurred in a research net
[2]fish was tagged as returning adult captured at the Veazie Trap
[3]estimated gutted weight

Fishery generated tag return data are not necessarily representative of the occurrence of tags within the catch. Not all countries/regions have large scale tagging operations, tagging operations are often not representative of countries/regions and internal tags, such as coded wire tags, would not have been detected as there was not a system set up to identify and recover these tags. As well, publicity concerning the existence of past tagging programs and instructions on the procedure to return tags from this fishery was not targeted on this area. Catch composition in terms of country/region of origin can therefore not be determined from these data. However, these types of data do confirm that North American fish from both Canada and USA have both been historically susceptible to capture in the Saint-Pierre and Miquelon fishery.

Given the increase in the number of licensed Saint-Pierre and Miquelon gillnet fishermen, the increase in reported catch and the historic tag return data, a biological sampling program is needed to investigate the composition and origin of the Saint-Pierre and Miquelon Atlantic salmon catches. These data are essential to characterize the effects that this fishery may have on the Atlantic salmon populations of North America and, in particular, on their “endangered” populations.

The following types of data are essential to gaining a better understanding of the composition of the Saint-Pierre and Miquelon Atlantic salmon fishery and for determining the effect that this fishery has on the Atlantic salmon resources of North America.

A biological sampling program for the Saint-Pierre and Miquelon gillnet fishery should be an international cooperative effort between USA, Canada, France and the local government of Saint-Pierre and Miquelon. At a minimum, an individual sampler will need to be coupled with a local contact and stationed in Saint-Pierre for a period of 2-3 weeks during the period when the fishery is expected to be prosecuted (June through August). The local contact would be essential for connecting the sampler with individuals who would likely be gillnetting during this period. The sampler would collect information related to fishing effort (description of gear, number of nets fished, soak time etc.) as well as catch (type and amount of species caught). In addition, detailed biological data needs to be collected for each individual Atlantic salmon sampled: including individual length and individual weight data plus a scale and genetic sample. The presence or absence of any external tags, clips or marks should also be noted for each individual as well as any abnormal physical features. Additional support from the countries involved could result in an increase of the number of sampling teams. This increase could be used to widen the sampling coverage in both time and space. Increased sampling may be valuable, depending on the spatial and temporal occurrence of the fishery, which is currently unknown.

Table 6.3.1. 2SW spawning requirements for North America by country, management zone and overall. Management zones are shown in Figure 6.9.1.1.

Country	Stock Area	Management zone	2SW spawner requirement	
Canada	Labrador	SFA 1	7,992	
		SFA 2	25,369	
		SFA 14B	1,390	
	Subtotal			34,746
	Newfoundland	SFA 3	240	
		SFA 4	488	
		SFA 5	233	
		SFA 6 to 8	13	
		SFA 9 to 12	212	
		SFA 13	2,544	
		SFA 14A	292	
	Subtotal			4,022
	Gulf of St. Lawrence	SFA 15	5,656	
		SFA 16	21,050	
		SFA 17	537	
		SFA 18	3,187	
	Subtotal			30,430
	Québec	Q1	2,532	
		Q2	1,797	
		Q3	1,788	
		Q5	948	
		Q6	818	
		Q7	2,021	
		Q8	11,195	
		Q9	3,378	
		Q10	1,582	
		Q11	3,387	
	Subtotal			29,446
	Scotia-Fundy	SFA 19	3,138	
		SFA 20	2,691	
		SFA 21	5,817	
		SFA 22	0	
		SFA 23	13,059	
	Subtotal			24,705
Total				123,349
USA	Connecticut		9,727	
	Merrimack		2,599	
	Penobscot		6,838	
	Other Maine rivers		9,668	
	Paucatuck		367	
Total				29,199
North American Total				152,548

Table 6.9.1.1

Fishing mortalities of 2SW salmon equivalents by North American fisheries, 1972-2002.
Only mid-points of the estimated values have been used.

Year	CANADA										USA	Total	Terminal Fisheries as a % of Total
	MIXED STOCK				TERMINAL FISHERIES IN YEAR i								
	NF-LAB Comm 1SW (Yr i-1) (b)	% 1SW of total 2SW equivalents	NF-LAB Comm 2SW (Yr i) (b)	NF-Lab comm total	Labrador rivers (a)	Nfld rivers (a)	Quebec Region	Gulf Region	Scotia - Fundy Region	Canadian total	Year i		
1972	20,857	9	153,775	174,632	314	633	27,417	22,389	6,801	232,186	346	232,532	25
1973	17,971	6	219,175	237,146	719	895	32,751	17,914	6,680	296,105	327	296,433	20
1974	24,564	7	235,910	260,475	593	542	47,631	21,430	12,734	343,405	247	343,652	24
1975	24,181	7	237,598	261,779	241	528	41,097	15,677	12,375	331,696	389	332,085	21
1976	35,801	10	256,586	292,388	618	412	42,139	18,090	11,111	364,758	191	364,949	20
1977	27,519	8	241,217	268,736	954	946	42,301	33,433	15,562	361,932	1,355	363,287	26
1978	27,836	11	157,299	185,135	580	559	37,421	23,806	10,781	258,281	894	259,175	29
1979	14,086	10	92,058	106,144	469	144	25,234	6,300	4,506	142,798	433	143,231	26
1980	20,894	6	217,209	238,103	646	699	53,567	29,832	18,411	341,257	1,533	342,789	31
1981	34,486	11	201,336	235,822	384	485	44,375	16,329	13,988	311,383	1,267	312,650	25
1982	34,341	14	134,417	168,757	473	433	35,204	25,709	12,353	242,929	1,413	244,342	31
1983	25,701	12	111,562	137,263	313	445	34,472	27,097	13,515	213,105	386	213,491	36
1984	19,432	14	82,807	102,238	379	215	24,408	6,040	3,971	137,252	675	137,927	26
1985	14,650	11	78,760	93,410	219	15	27,483	2,741	4,930	128,798	645	129,443	28
1986	19,832	12	104,890	124,723	340	39	33,846	4,575	2,824	166,346	606	166,952	25
1987	25,163	13	132,208	157,371	457	20	33,807	3,790	1,370	196,814	300	197,115	20
1988	32,081	21	81,130	113,211	514	29	34,262	3,916	1,373	153,304	248	153,552	26
1989	22,197	16	81,355	103,551	337	9	28,901	3,507	265	136,569	397	136,966	24
1990	19,577	18	57,359	76,937	261	24	27,986	2,841	593	108,642	696	109,338	30
1991	12,048	14	40,433	52,481	66	16	29,277	1,934	1,331	85,106	231	85,337	39
1992	9,979	14	25,108	35,087	581	67	30,016	4,405	1,114	71,271	167	71,438	51
1993	3,229	7	13,273	16,502	273	63	23,153	2,971	1,110	44,072	166	44,238	63
1994	2,139	5	11,938	14,077	365	80	24,052	2,376	756	41,706	1	41,707	66
1995	1,242	3	8,677	9,918	420	92	23,331	2,022	330	36,113	0	36,113	73
1996	1,075	3	5,646	6,721	320	108	22,413	2,577	766	32,905	0	32,905	80
1997	969	3	5,390	6,360	175	136	18,574	2,072	581	27,898	0	27,898	77
1998	1,155	7	1,872	3,027	276	129	11,256	2,283	322	17,293	0	17,293	82
1999	179	1	894	1,073	311	111	9,032	1,380	450	12,355	0	12,355	91
2000	152	1	1,115	1,267	404	372	9,425	2,048	193	13,709	0	13,709	91
2001	286	2	1,380	1,666	336	277	10,104	1,970	255	14,608	0	14,608	89
2002	263	3	1,158	1,421	221	264	7,297	526	273	10,002	0	10,002	86
2003	299	-	-	-	-	-	-	-	-	-	-	-	-

NF-Lab comm as 1SW = NC1(mid-pt) * 0.677057 (M of 0.03 per month for 13 months to July for Canadian terminal fisheries)
NF-Lab comm as 2SW = NC2 (mid-pt) * 0.970446 (M of 0.03 per month for 1 month to July of Canadian terminal fisheries)
Terminal fisheries = 2SW returns (mid-pt) - 2SW spawners (mid-pt)
a - starting in 1993, includes estimated mortality of 10% on hook and released fish
b - starting in 1998, there was no commercial fishery in Labrador; numbers reflect size of aboriginal fish harvest in 1998-2002 and resident food fishery harvest in 2000-2002

Table 6.9.1.2

History of fishing-related mortalities of North American salmon as 2SW equivalents, 1972-2002.

Year	Canadian total	USA total	North America Grand Total	% USA of Total North America	Greenland total	NW Atlantic Total	Harvest in homewaters as % of total NW Atlantic
1972	232,186	346	232,532	0.15	206,814	439,346	53
1973	296,105	327	296,433	0.11	144,348	440,781	67
1974	343,405	247	343,652	0.07	173,615	517,267	66
1975	331,696	389	332,085	0.12	158,583	490,668	68
1976	364,758	191	364,949	0.05	200,464	565,413	65
1977	361,932	1,355	363,287	0.37	112,077	475,364	76
1978	258,281	894	259,175	0.34	136,386	395,561	66
1979	142,798	433	143,231	0.30	85,446	228,677	63
1980	341,257	1,533	342,789	0.45	143,829	486,618	70
1981	311,383	1,267	312,650	0.41	135,157	447,807	70
1982	242,929	1,413	244,342	0.58	163,718	408,060	60
1983	213,105	386	213,491	0.18	139,985	353,476	60
1984	137,252	675	137,927	0.49	23,897	161,824	85
1985	128,798	645	129,443	0.50	27,978	157,421	82
1986	166,346	606	166,952	0.36	100,098	267,050	63
1987	196,814	300	197,115	0.15	123,472	320,586	61
1988	153,304	248	153,552	0.16	124,868	278,420	55
1989	136,569	397	136,966	0.29	83,947	220,913	62
1990	108,642	696	109,338	0.64	43,634	152,972	71
1991	85,106	231	85,337	0.27	52,560	137,897	62
1992	71,271	167	71,438	0.23	79,571	151,008	47
1993	44,072	166	44,238	0.38	30,091	74,329	60
1994	41,706	1	41,707	0.00	0	41,707	100
1995	36,113	0	36,113	0.00	0	36,113	100
1996	32,905	0	32,905	0.00	15,343	48,247	68
1997	27,898	0	27,898	0.00	15,776	43,674	64
1998	17,293	0	17,293	0.00	12,088	29,381	59
1999	12,355	0	12,355	0.00	2,175	14,530	85
2000	13,709	0	13,709	0.00	3,863	17,572	78
2001	14,608	0	14,608	0.00	4,005	18,613	78
2002	10,002	0	10,002	0.00	6,989	16,992	59
2003	299	-	299	-	1,499	-	-

Greenland harvest of 2SW equivalents = NG1 * 0.718924 (M of 0.03 per month for 11 months to July of Canadian terminal fisheries)

Table 6.9.1.3. Hook-and-release Atlantic salmon caught and released by recreational fishermen in Canada, 1984 – 2002.

Year	Newfoundland			Nova Scotia			New Brunswick					Prince Edward Island			Quebec			CANADA*		
	Small	Large	Total	Small	Large	Total	Small Kelt	Small Bright	Large Kelt	Large Bright	Total	Small	Large	Total	Small	Large	Total	**SMALL**	**LARGE**	**TOTAL**
1984				939	1,655	2,594	661	851	1,020	14,479	17,011							**2,451**	**17,154**	**19,605**
1985		315	315	1,323	6,346	7,669	1,098	3,963	3,809	17,815	26,685			67				**6,384**	**28,285**	**34,669**
1986		798	798	1,463	10,750	12,213	5,217	9,333	6,941	25,316	46,807							**16,013**	**43,805**	**59,818**
1987		410	410	1,311	6,339	7,650	7,269	10,597	5,723	20,295	43,884							**19,177**	**32,767**	**51,944**
1988		600	600	1,146	6,795	7,941	6,703	10,503	7,182	19,442	43,830	767	256	1,023				**19,119**	**34,275**	**53,394**
1989		183	183	1,562	6,960	8,522	9,566	8,518	7,756	22,127	47,967							**19,646**	**37,026**	**56,672**
1990		503	503	1,782	5,504	7,286	4,435	7,346	6,067	16,231	34,079			1,066				**13,563**	**28,305**	**41,868**
1991		336	336	908	5,482	6,390	3,161	3,501	3,169	10,650	20,481	1,103	187	1,290				**8,673**	**19,824**	**28,497**
1992	5,893	1,423	7,316	737	5,093	5,830	2,966	8,349	5,681	16,308	33,304			1,250				**17,945**	**28,505**	**46,450**
1993	18,196	1,731	19,927	1,076	3,998	5,074	4,422	7,276	4,624	12,526	28,848							**30,970**	**22,879**	**53,849**
1994	11,105	2,343	13,448	796	2,894	3,690	4,153	7,443	4,790	11,556	27,942	577	147	724				**24,074**	**21,730**	**45,804**
1995	12,383	2,588	14,971	979	2,861	3,840	770	4,260	880	5,220	11,130	209	139	348		922	922	**18,601**	**12,610**	**31,211**
1996	22,227	3,092	25,319	3,526	5,661	9,187						472	238	710		1,718	1,718	**26,225**	**10,709**	**36,934**
1997	17,362	3,810	21,172	717	3,358	4,075	3,457	4,870	3,786	8,874	20,987	210	118	328	182	1,643	1,825	**26,798**	**21,589**	**48,387**
1998	25,314	4,351	29,665	687	2,520	3,207	3,154	5,760	3,452	8,298	20,664	233	114	347	297	2,680	2,977	**35,445**	**21,415**	**56,860**
1999	18,119	4,534	22,653	591	2,161	2,752	3,155	5,631	3,456	8,281	20,523	192	157	349	298	2,693	2,991	**27,986**	**21,282**	**49,268**
2000	27,778	6,030	33,808	407	1,303	1,710	3,154	6,689	3,455	8,690	21,988	101	46	147	445	4,008	4,453	**38,574**	**23,532**	**62,106**
2001	21,969	5,137	27,106	527	1,199	1,726	3,094	6,166	3,829	11,252	24,341	202	103	305	809	4,674	5,483	**32,767**	**26,194**	**58,961**
2002	23,993	4,574	28,567	936	1,196	2,132	2,362	7,351	2,927	5,349	17,989	207	31	238	812	4,687	5,499	**35,661**	**18,764**	**54,425**

* totals for all years prior to 1997 are incomplete and are considered minimal estimates
blank cells indicate no information available

Figure 6.9.1.1. Map of Salmon Fishing Areas (SFAs) and Quebec Management Zones (Qs) in Canada.

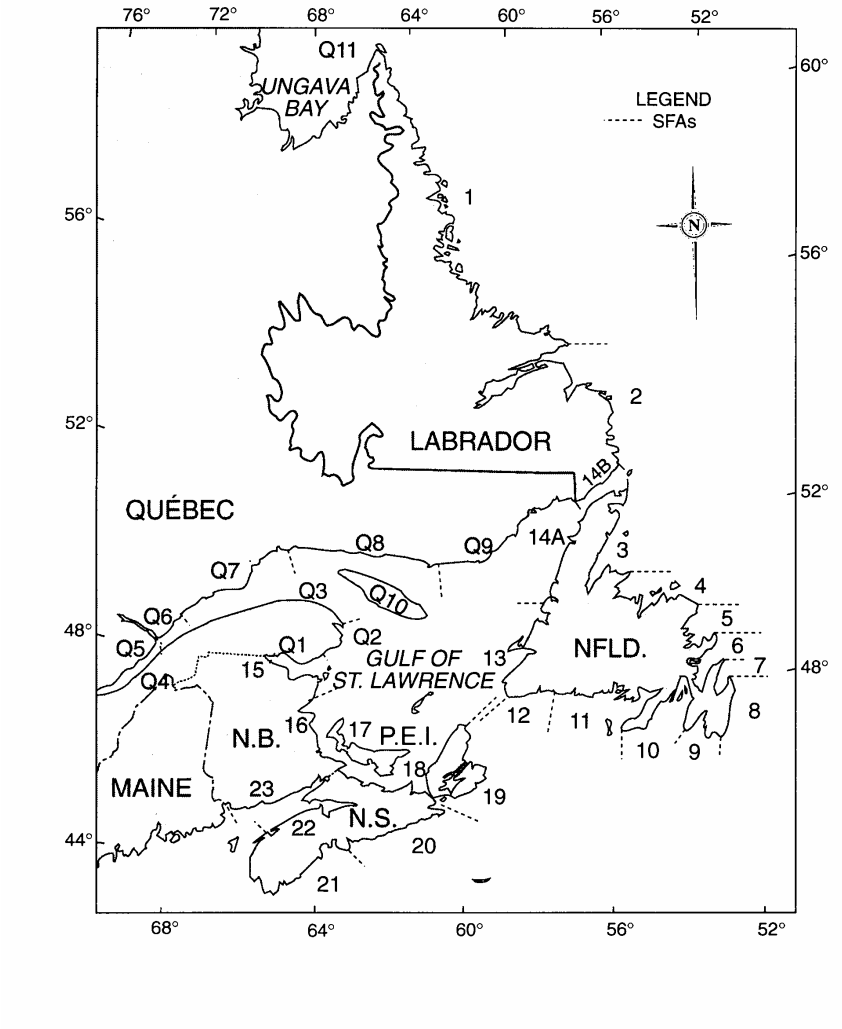


Figure 6.9.1.2. Harvest (t) of small salmon, large salmon, and combined in Canada, 1960-2002 by all users.

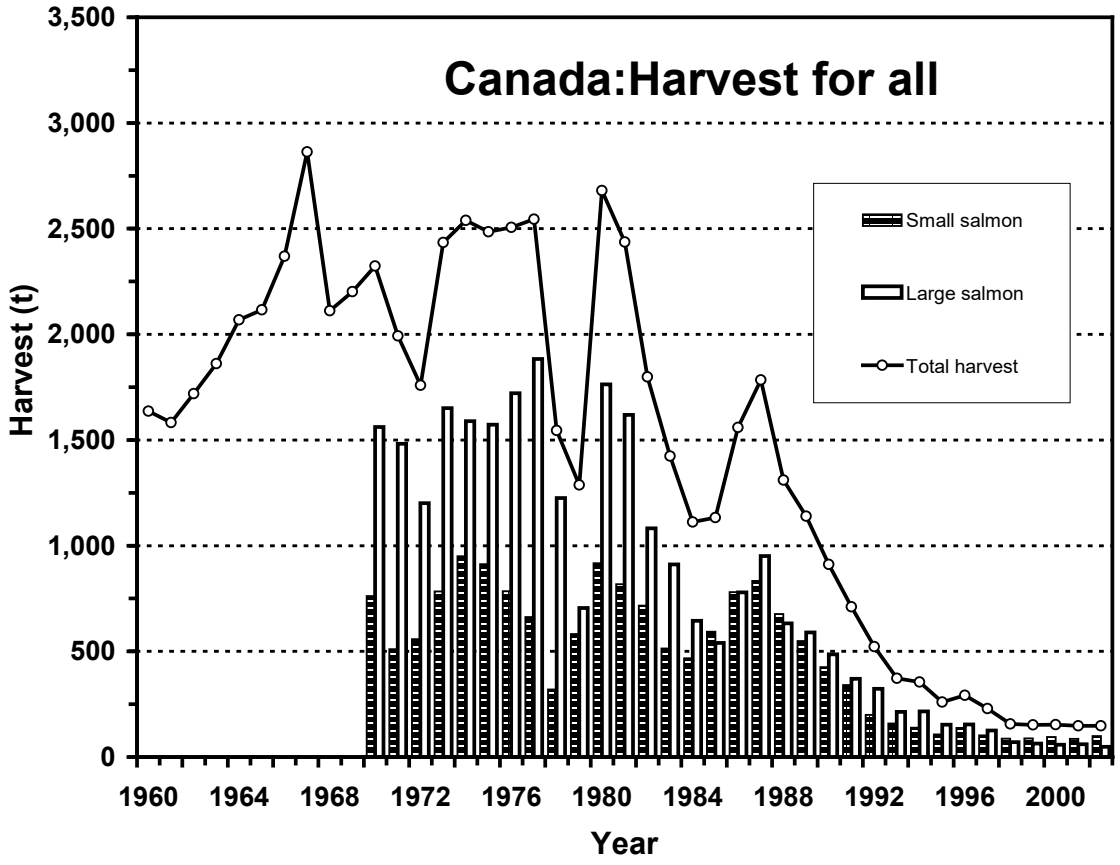


Figure 6.9.1.3 Harvest (number) of small and large salmon and both sizes combined in the recreational fisheries of Canada, 1974 to 2002.

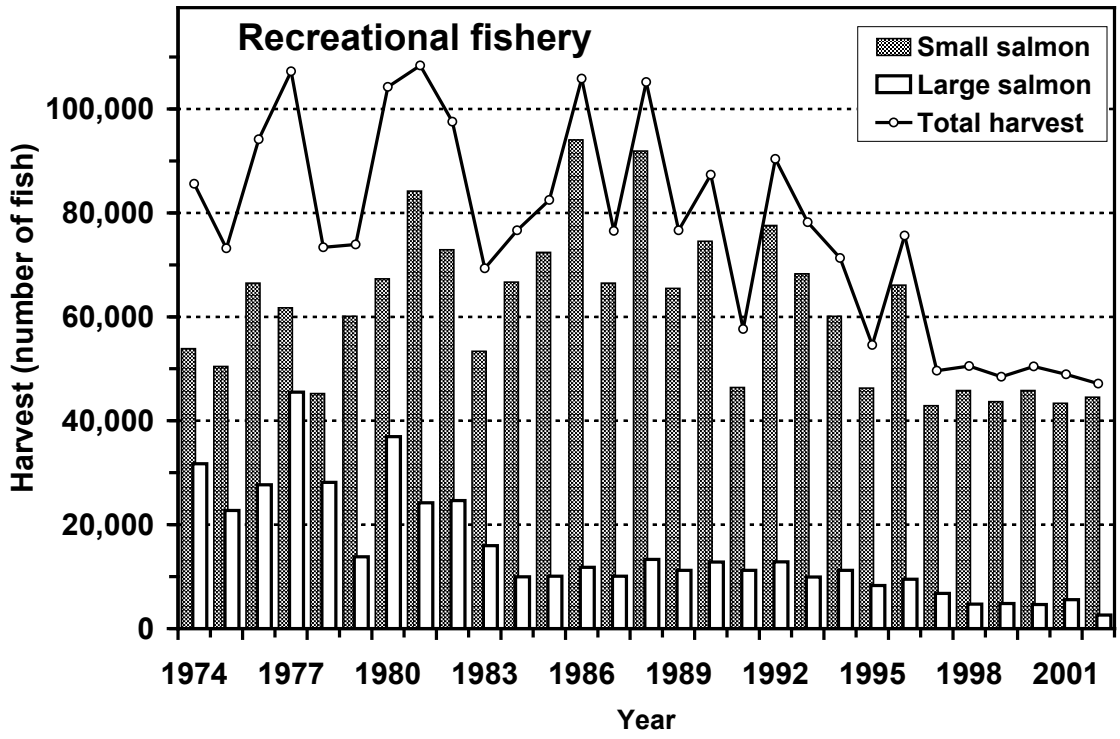


Figure 6.9.1.4 Comparison of estimated mid-points of 1SW returns to and 1SW spawners in rivers of six geographic areas in North America. Returns and spawners for Scotia-Fundy do not include those from SFA 22 and a portion of SFA 23.

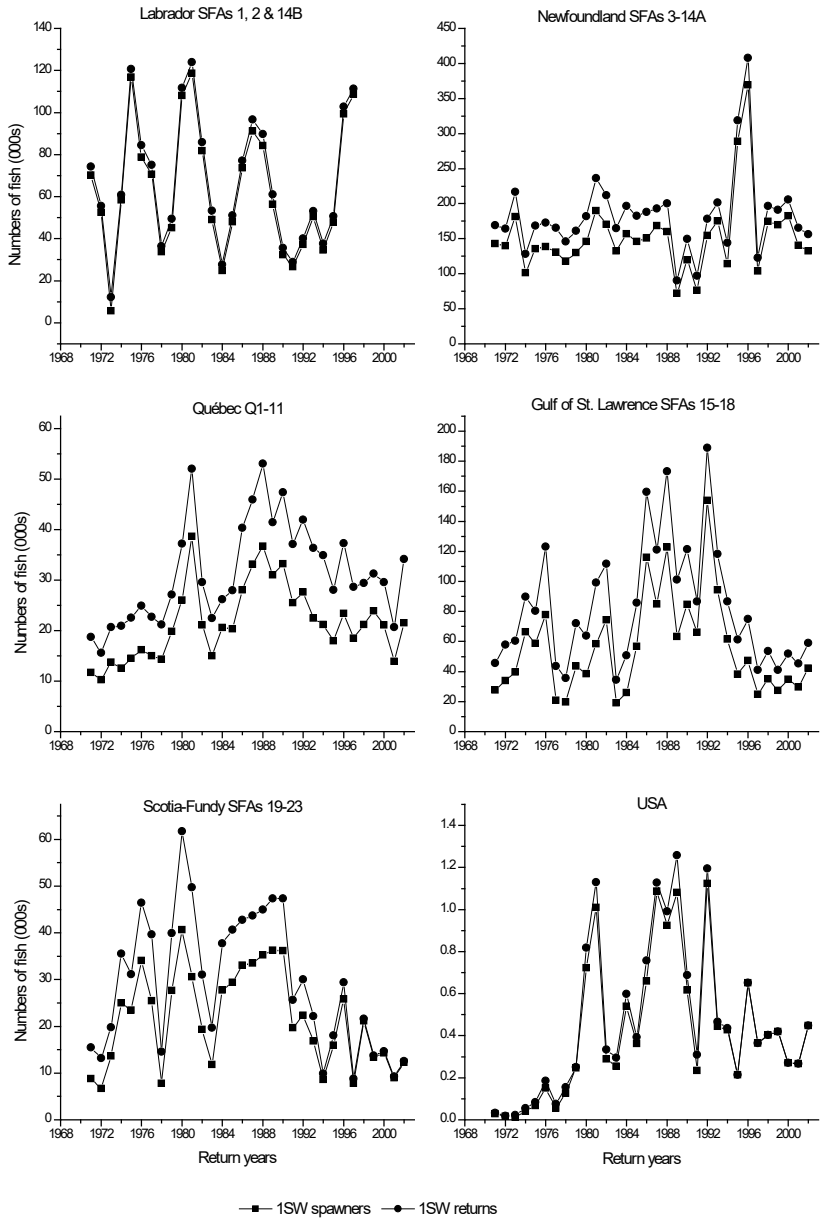


Figure 6.9.1.5 Comparison of estimated mid-points of 2SW returns, 2SW spawners, and 2SW conservation requirements for six geographic areas in North America. Returns and spawners for Scotia-Fundy do not include those from SFA 22 and a portion of SFA 23.

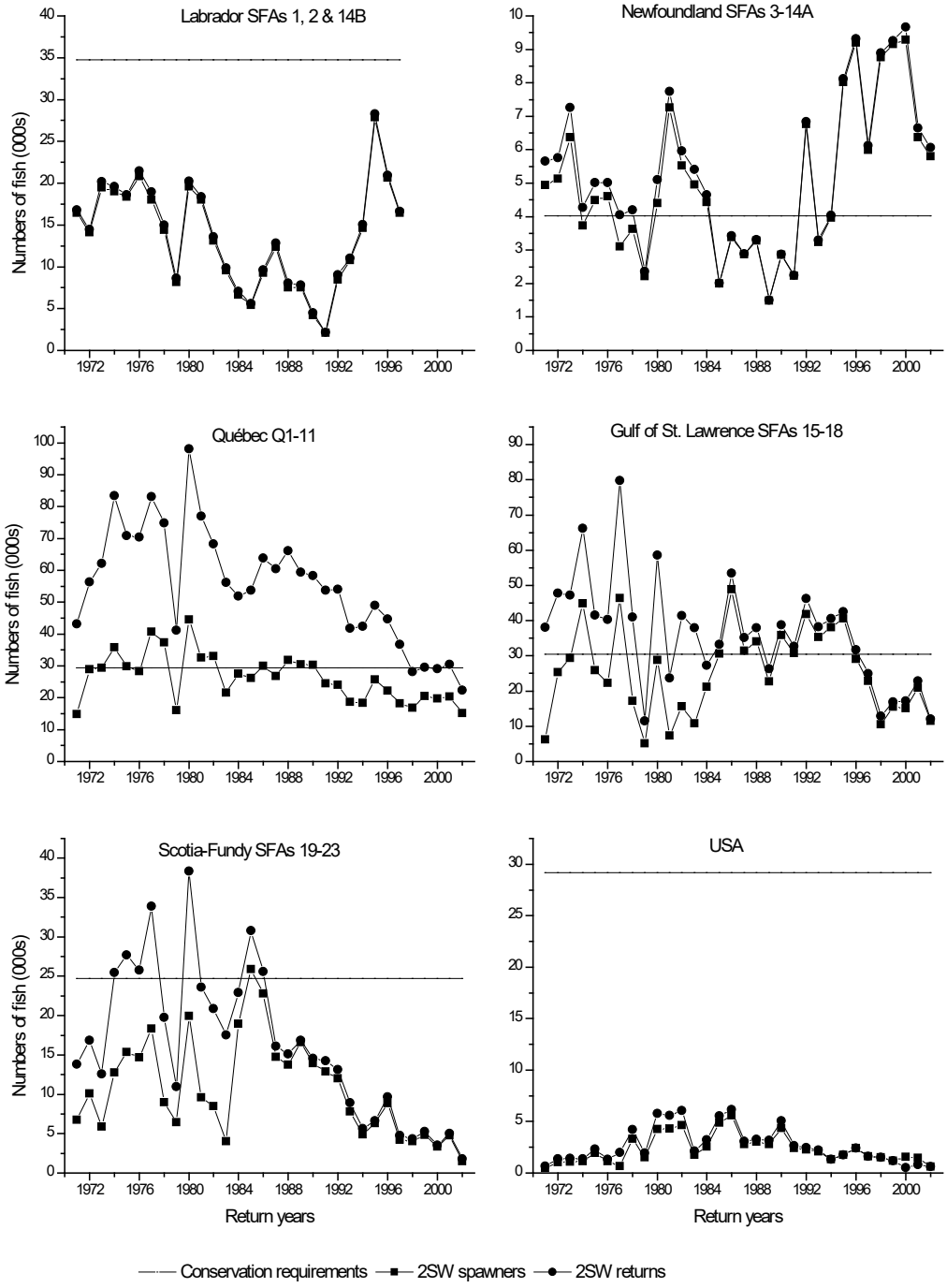


Fig. 6.9.1.6. Prefishery abundance estimate of maturing and non-maturing salmon in North America. Open symbols are for the years that returns to Labrador were assumed as a proportion of returns to other areas in North America.

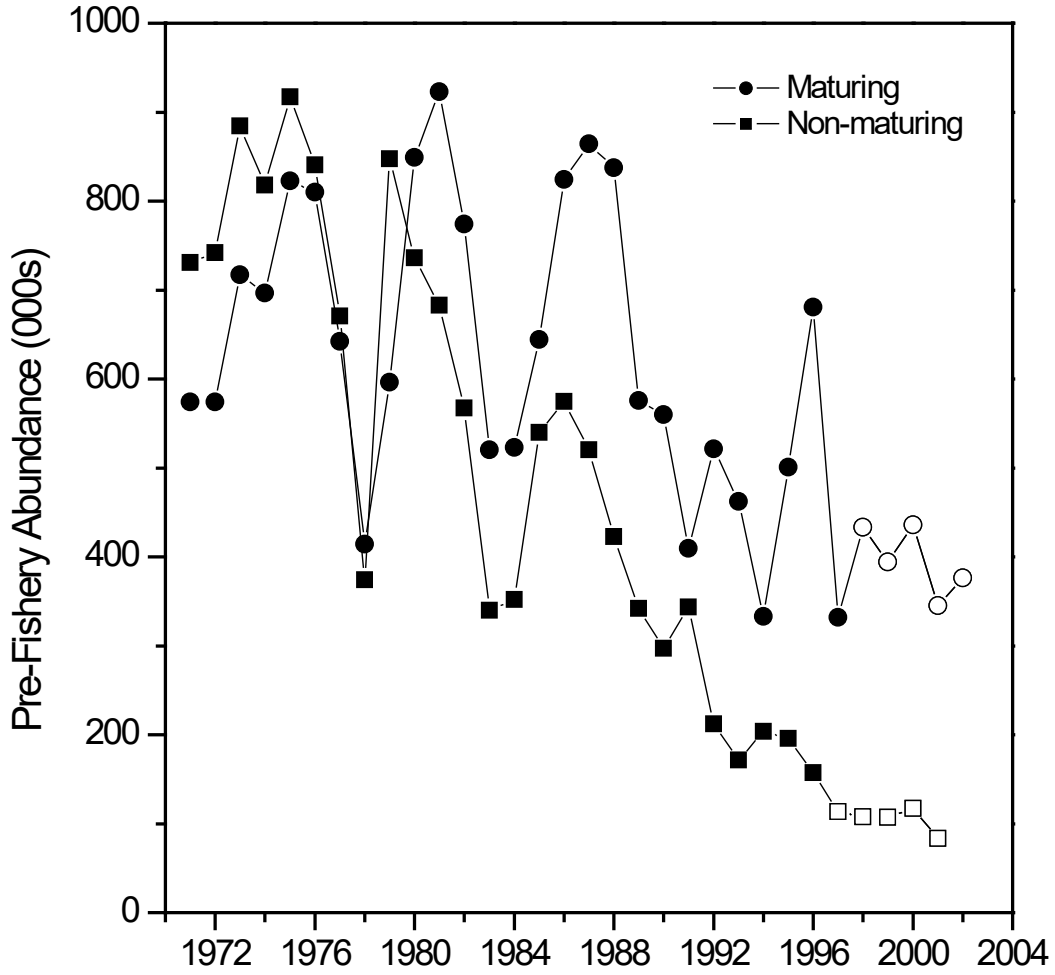


Fig. 6.9.1.7. Total 1SW recruits (non-maturing and maturing) originating in North America.

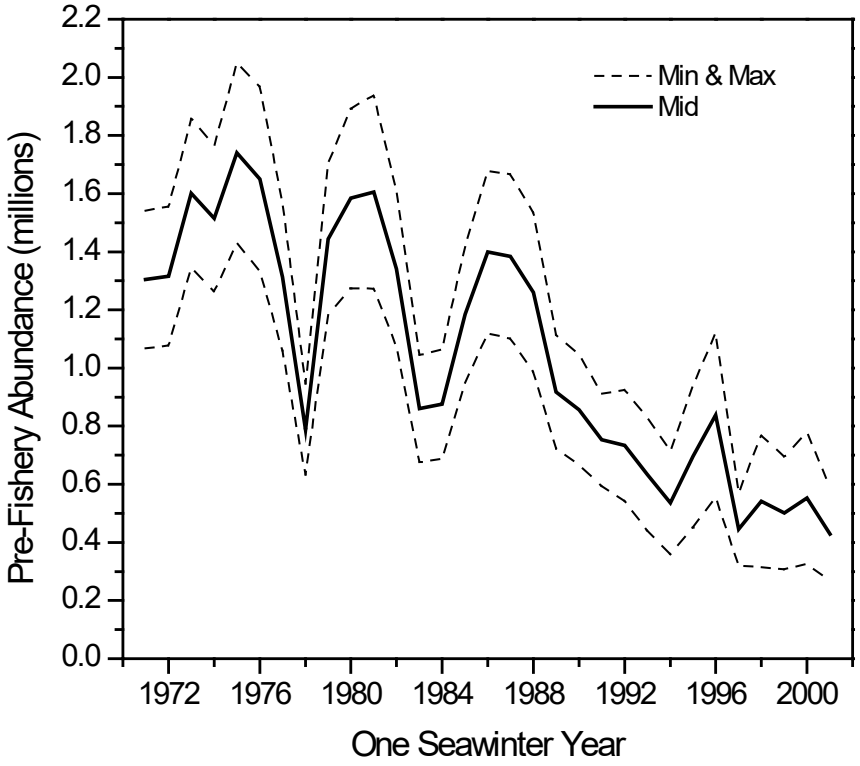


Figure 6.9.1.8. Egg depositions relative to conservation limits in 85 rivers of North America in 2002. The black slice represents the proportion of the limit achieved. A solid black circle indicates the egg deposition limit was attained or exceeded.

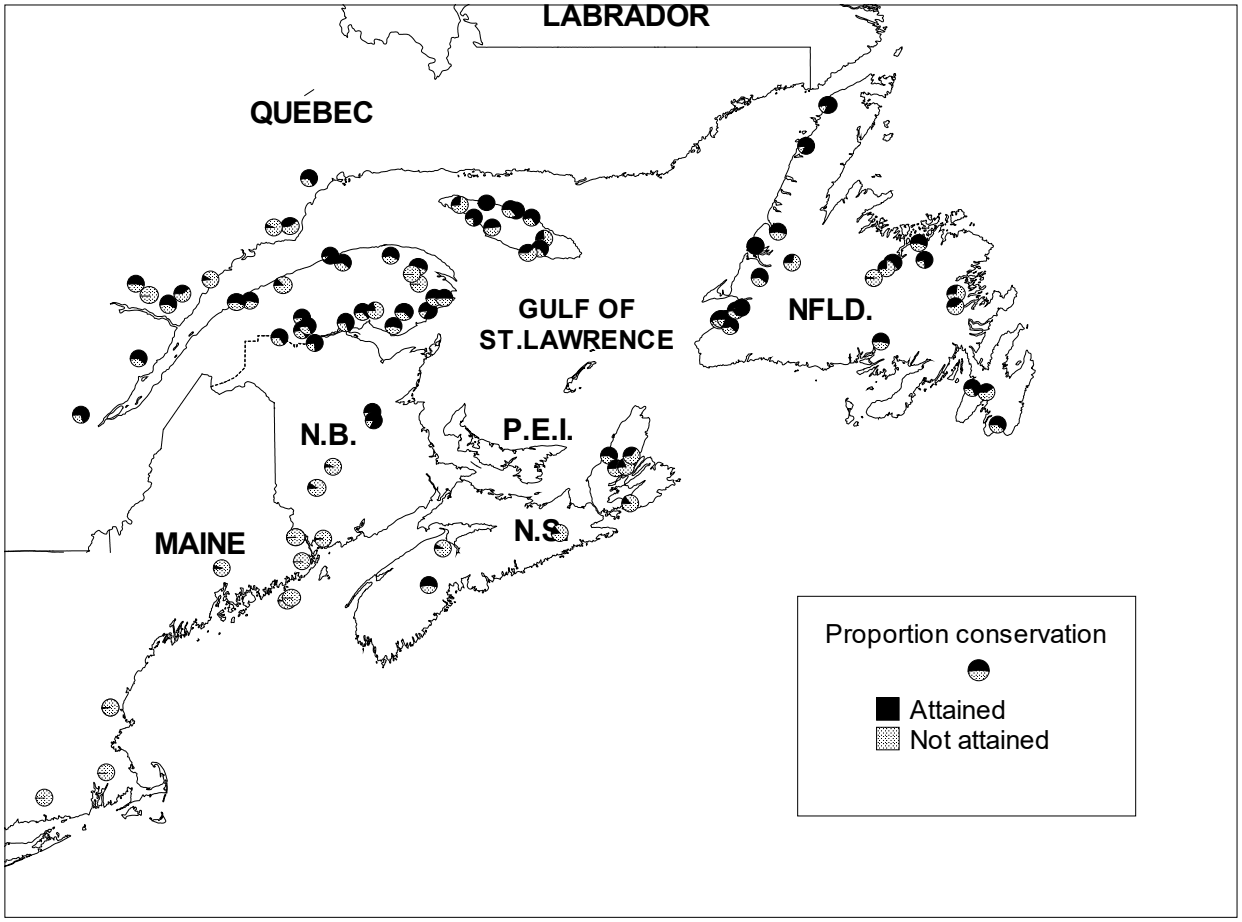
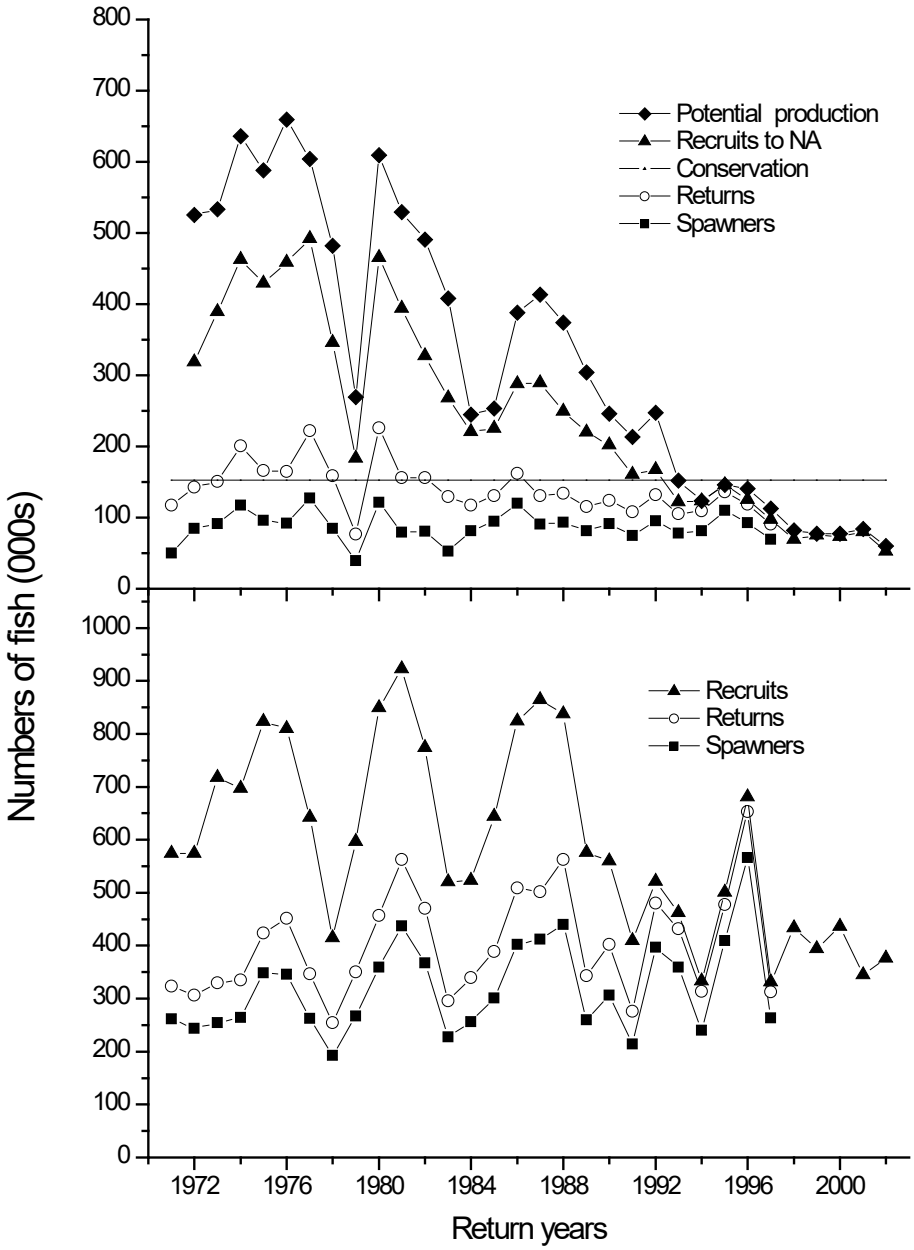


Figure 6.9.1.9 Top panel: comparison of estimated potential 2SW production prior to all fisheries, 2SW recruits available to North America, 1971-2002 and 2SW returns and spawners for 1971-97, as 1998-2002 data for Labrador are unavailable. The horizontal line indicates the 2SW conservation limits. Bottom panel: comparison of potential maturing 1SW recruits, 1971-2002 and returns and 1SW spawners for 1971-97 return years as Labrador data for 1998-2002 are unavailable.



7 WEST GREENLAND COMMISSION

7.1 Status of stocks/exploitaton

ICES considers the stock complex at West Greenland to be outside safe biological limits.

The salmon caught in the West Greenland fishery are mostly (>90%) non-maturing 1SW salmon, many of which would return to homewaters in Europe or North America as MSW fish if they survived the fishery. There are also 2SW salmon and repeat spawners, including salmon that had originally spawned for the first time after 1-sea-winter. The most abundant European stocks in West Greenland are thought to originate from the UK and Ireland, although low numbers may originate from northern European rivers. Most MSW stocks in North America are thought to contribute to the fishery at West Greenland.

ICES notes that the North American stock complex of non-maturing salmon has declined to record levels and is in tenuous condition. Increased spawning escapements to rivers of some areas of eastern North America resulted in improved abundance of the juvenile life stages. Despite the closure of Newfoundland commercial fisheries in 1992 and subsequently in Labrador in 1998 and Québec in 2000, sea survival of adults returning to rivers has not improved and in some areas has declined further. The abundance of maturing 1SW salmon has also declined in many areas of eastern North America. Associations between 1SW returns in year I and 2SW returns in year i+1 observed in several rivers in eastern Canada suggest that abundance of 2SW salmon in 2003 in eastern Canada will be slightly improved from 2002 . Smolt production in 2001 and 2002 in monitored rivers of eastern Canada were less than or similar to the average of the last five years and unless sea survival improves, the abundance of non-maturing 1SW salmon in the Northwest Atlantic is not expected to improve above the levels of the last five years.

The Working Group also noted that the PFA of non-maturing 1SW salmon from Southern Europe has been declining steadily since the 1970s (Figure 5.1.3), and the preliminary quantitative prediction of PFA for this stock complex indicates that PFA will remain close to present low levels for each of the next two years (537,000 and 524,000 fish) (Figure 5.4.1). There is evidence from the prediction that PFA will decrease in the near future and the spawning escapement has not been significantly above the conservation limit for the last six years (Figure 5.1.4). ICES advises that precautionary reductions in exploitation rates be pursued for as many stocks as possible, in order to ensure that conservation requirements are met for each river stock with high probability. ICES also notes that mixed stock fisheries present particular threats to conservation.

In European and North American areas, the overall status of stocks contributing to the West Greenland fishery is at the lowest level recorded, and as a result, the status of stocks within the West Greenland area is thought to be extremely low compared to historical levels. There has been no significant increase in survival index for the stock. Status of relevant stocks in the NEAC and NAC areas are presented in the relevant commission sections of this report.

ICES noted that tentative exploitation rates for non-maturing 1SW fish at West Greenland can be calculated by dividing the harvest of 1SW salmon of N. American origin at West Greenland by the PFA estimate for the corresponding year. This indicates exploitation rates in recent years have averaged around 10%. Compared to values prior to 1993, which averaged 26%, this suggests that recent management measures in this fishery have reduced exploitation in this stock complex.

7.2 Management objectives

The general NASCO management objectives apply (See Section 3). However, based on past performance, there is no reason to expect the abundance of salmon in the North Atlantic to be proportional to the regional 2SW spawner requirements. Assuming that the abundance of Atlantic salmon in 2003 will be proportional to the abundance of lagged spawners in the last five years when lagged spawner estimates across regions were available, it is possible to calculate the number of salmon required to return to North America to achieve region-specific conservation requirements. For example, to achieve the Newfoundland 2SW requirement of 4,022 2SW salmon, a total of 72,062 fish would be required to leave West Greenland at the PFA_{NA} stage (See Section 4). In the regions with lower stock performance, total PFA_{NA} abundance of about 454,000 fish would be required for the Scotia-Fundy region, and PFA_{NA} abundance of almost 1.9 million fish would be required for achieving the USA conservation requirements (See Section 4).

There is a zero chance that the returns to USA rivers will meet or exceed the conservation limit, about 29,000 2SW salmon, in 2004. There is little chance of returns in 2004 being sufficient to meet the Scotia-Fundy requirement even in the absence of high seas fisheries. There would be a small chance that the PFA_{NA} abundance in 2003 would be sufficient to meet the conservation requirements based on the realized returns in recent years and the anticipated PFA of salmon in 2003 (See Section 4).

NASCO has therefore considered that Alternative Management Objectives could be to meet the conservation limits simultaneously in the four northern regions of North America: Labrador, Newfoundland, Quebec, and Gulf. For the two southern regions, Scotia-Fundy and USA, an alternate objective to that of achieving the conservation requirement would be to achieve increases in returns relative to previous years with the intention that this will lead to the rebuilding of stocks, i.e. assess fisheries relative to the objective of achieving a pre-agreed increase in returns relative to the realized returns of a previous time. Rates of improvement from previous years could be as low as 10% for those stocks that are approaching a stock status objective. A greater improvement as might be associated with more aggressive rebuilding rates might be to seek a 25% improvement over returns of a previous time period. These rates of increase refer to current stock size and not to percent of conservation limits. In Section 4, it was shown that stocks with low productivity such as these take a long time to rebuild to conservation limits.

ICES noted that if a moving average is used, and these stocks continue to decline, so will the baseline value. ICES therefore draws to the attention of NASCO the need to establish the range of years to define the baseline and the percentage increase from that baseline. This will provide ICES with the criteria to assess performance of the fisheries management

7.3 Reference points

As precautionary reference points have not been developed for these stocks, management advice is therefore referenced to the S_{lim} conservation limit. Thus, these limits should be avoided with high probability (ie at least 75%).

Sampling of the fishery at West Greenland since 1985 has shown that both European and North American stocks harvested are primarily (greater than 90%) 1SW non-maturing salmon that would mature as either 2 or 3SW salmon, if surviving to spawn. Usually less than 3% of the harvest is composed of salmon that have previously spawned and a few percent are 2SW salmon that would mature as 3SW or older salmon. For this reason, conservation limits defined previously for North American stocks have been limited to this cohort (2SW salmon on their return to homewaters) that may have been at Greenland as 1SW non-maturing fish. These numbers have been documented previously by ICES and are in Section 6.3. The 2SW spawner limits of salmon stocks from North America total 152,548 fish, with 123,349 and 29,199 required in Canadian and USA rivers, respectively.

Conservation limits for the NEAC area have been split into 1SW and MSW components on the basis of the average age composition of catches in the past ten years. The stocks have also been partitioned into northern and southern stock complexes, and tagging information and biological sampling indicates that the majority of the European salmon caught at West Greenland originate from the southern stock complex. The current conservation limit estimate for southern European MSW stocks is approximately 263,000 fish. There is still considerable uncertainty in the conservation limits for European stocks and estimates may change from year to year as the input of new data affects the 'quasi-stock-recruitment relationship'. ICES has previously noted that outputs from the national PFA model are only designed to provide a guide to the status of stocks in the NEAC area. Previously, the conservation limits for MSW salmon in the NEAC area have not been incorporated into the □odelling of catch options for West Greenland.

7.4 Advice on management

ICES has provided management advice for the West Greenland fishery, based on NAC stocks as before, and for the first time in 2003 for the NAC and NEAC stock complexes combined:

NAC
Even in the absence of fisheries on the non-maturing 1SW salmon at West Greenland in 2003 and subsequently on the returning 2SW salmon to North America in 2004, there is only a 28% chance that the abundance of salmon will be sufficient to achieve the conservation requirements for 2SW salmon in the four northern regions. There is a better chance of realizing increases in returns to the southern North American stocks however at a

fishery of 50 t in West Greenland in 2003, the chance of an improvement of 25% or more in both regions falls to less than 50% (Table 7.4.1).

There are no fishery allocations that would ensure the objective of achieving the conservation requirements for 2SW salmon in the four northern regions or an alternative objective of seeing an increased number of 2SW salmon returning to the under-escaped southern regions of North America. ICES recommends that there should be no exploitation of the 2002 smolt cohort as non-maturing 1SW fish in North America or at West Greenland in 2003 and also recommends that the cohort should not be exploited as mature 2SW fish in North America in 2004. Exceptions are in-river harvests from stocks which can be shown to be above biologically-based spawning escapement requirements. Furthermore, exploitation rates on this cohort (including possible by-catch in other fisheries) should be minimized in the North American and West Greenland commission areas. ICES reiterates that, in order to meet the primary NASCO objective of meeting conservation limits in all areas of North America, there should be no catch at West Greenland.

NEAC

In the absence of any fishery at West Greenland, there is a less than 75% probability that the MSW conservation limit for southern Europe will be met (Table 7.4.1). ICES recommends that there should be no exploitation of the 2002 smolt cohort as non-maturing 1SW fish at West Greenland in 2003 and also recommends that the cohort should not be exploited as mature 2SW fish in the southern NEAC area in 2004. Exceptions are in-river harvests from stocks which can be shown to be above biologically-based spawning escapement requirements. ICES reiterates that, in order to meet the primary NASCO objective of meeting conservation limits in all areas of southern NEAC, there should be no catch at West Greenland.

NAC/NEAC combined

There are no fishery allocations that would ensure the objective of achieving the conservation requirements for 2SW salmon in the NAC or NEAC areas (Table 7.4.1).

7.5 Relevant factors to be considered in management

For all fisheries, ICES considers that management of single stock fisheries should be based upon assessments of the status of individual stocks. Conservation would be best achieved if fisheries can be targeted at stocks that have been shown to be above biologically-based escapement requirements. Fisheries in estuaries and rivers are more likely to fulfil this requirement.

7.6 Catch forecast for 2003

Catch Advice for the NAC

The pre-fishery abundance of salmon in 2003 is expected to be among the lowest on record (Figure 7.9.4.10). In the absence of any marine-induced fishing mortality, there is a low probability (28% probability) that the returns of 2SW salmon to North America in 2004 will be sufficient to meet the conservation requirements of the four northern regions (Labrador, Newfoundland, Quebec, and Gulf) (Table 7.4.2). There is a higher probability (71%) that the returns in the southern regions (Scotia-Fundy and USA) will increase by at least 10% relative to the returns of the previous five years if the predicted PFA abundance is realized (Table 7.4.2).

The model presently describes two phases of salmon production in the Northwest Atlantic. Our ability to detect a phase shift in recruitment per spawner in the northwest Atlantic during the last two decades was enhanced with the passage of time. The lower recruitment rates, which may not replace the spawners that generated them, are evident throughout eastern Canada and U.S., especially so in the southern regions. The reduced relative rate of recruitment does not suggest that the problem is entirely in the marine environment. The problem may be an integration of factors across all aquatic habitats of Atlantic salmon. Large areas of production have been lost or are severely impacted by anthropogenic factors. Given the presently described condition of salmon stocks, there is no evidence in the stock status from any of the regions in North America that there will be a turnaround in productivity in the ocean in 2003.

Combining catch advice for NAC/NEAC

ICES also considered for the first time a process for the provision of catch advice for West Greenland based on the combined PFA and CLs of the NAC and NEAC areas, in which the PFA for NAC and NEAC are applied in parallel to the Greenland fishery and then combined at the end of the process into a single catch advice table.

The parameters of the NAC risk analysis have not changed and are described in Section 7.9.4.

For the NEAC evaluation, the following parameter inputs were used.

- For 2003, the forecast for the southern Europe MSW salmon on January 1 of the first sea-winter year is 524,000 fish (95% C.I. 315,000 to 840,000).
- The PFA_{NEAC} for 2003 is adjusted for 8 months of natural mortality (0.03 per month) which equates to 79% survival to bring the fish to August of the fishery year at Greenland.
- The sharing arrangement for the West Greenland fishery used in this example corresponds to the sharing arrangement used for the provision of catch advice for the NAC area. The sharing arrangement negotiated with one of the commission areas automatically determines the arrangement for the other area as the West Greenland fishery cannot selectively harvest fish on the basis of their continent of origin. Historically, the West Greenland share of the total NEAC MSW harvest was on average 40% from 1970 to 1993.
- The biological characteristics of the fish at West Greenland are simultaneously derived for fish from both continents.
- The conservation limit for the southern NEAC MSW salmon is 262,935 fish.

7.7 Medium- to long-term projections

North American stocks
Catch options which could be derived from the prefishery abundance forecast for 2003 (111,042) would apply principally to North American fisheries in 2004 and hence the level of fisheries in 2003 needs to be accounted for before providing these catch options.

Accounting for mortality and the conservation limit and considering an allocation of 60% of the surplus to North America, the only risk averse catch option for 2SW salmon in 2004 is zero catch. This zero catch option refers to the composite North American fisheries. As the biological objective is to have all rivers reaching or exceeding their conservation limits, river-by-river management will be necessary. On individual rivers, where conservation limits are being achieved, there are no biological reasons to restrict the harvest.

NEAC stocks
The quantitative prediction for the southern NEAC MSW stock component gives a projected PFA (at 1st January 2003) of 524,000 fish for catch advice in 2003. No projections are available beyond that for this stock complex.

7.8 Comparison with previous assessment and advice

An evaluation of the effect of the updates to the model used to provide catch advice for North American 2SW stocks at West Greenland is provided in Section 7.9.4, below.

7.9 Response to specific requests for information from NASCO:

7.9.1 NASCO has requested ICES to: describe the events of the fisheries in 2002 and the status of stocks

Catch and effort in 2002

At its annual meeting in June 2002 NASCO agreed to a revised ad hoc management programme for the 2002 fishery at West Greenland that as in the previous year incorporated the use of real-time data to allocate quota for the commercial fishery. The commercial fishery is defined as landings sold to processing plants and excludes reported private landings (not sold to plants) and unreported catch. The commission noted that the forecast pre-fishery abundance is considered to be highly uncertain, but also that there appears to be a relationship between the estimated pre-fishery abundance and catch per unit of effort in West Greenland, measured as average daily landings per licensed fisherman. Two harvest periods were implemented with quotas dependent on the observed average CPUE during the fishery in the first harvest period.

The initial quota for the first quota period of up to two weeks was set at 20 t, and additional quota was allocated for the subsequent harvest period of a maximum of five weeks based on catch per unit effort observed in the fishery. The maximum quota for the fishery as a whole would have depended on the observed average commercial CPUE during the first period of fishing, being 20, 38 and 55 t, respectively for three levels of CPUE.

Shortly before the opening date of the fishing season (August 12) the Organization of Fishermen and Hunters in Greenland and the North Atlantic Salmon Fund agreed to suspend the commercial fishery for salmon in 2003. The subsistence fishery was not affected by this agreement. As is the past, there was no quota limit set for the subsistence fishery. The authorities did not apply a closing date for the fishing season, i.e. the season was open till the end of the year.

By regulation, all catches including landings to local markets, privately purchased salmon, and salmon caught by food fishermen, are to be reported on a daily basis to the Fishery Licence Office. By the end of the year a total of 9 t of landed salmon was reported (Table 7.9.1.1). The geographical distribution of catches by Greenland vessels is given in Table 7.9.1.2 for the years 1977-2002. The unusually high proportion of catch observed in southern Greenland in 2000 and 2001 is not indicated for the 2002 season, being close to the average for the period 1995-1999.

Licences for the salmon fishery were issued to fishers fishing for factories, local markets, hotels, hospitals etc., while fishing for personal use was permitted without licence for residents of Greenland. The number of reporting fishers in the salmon fishery has decreased sharply since 1987, when a catch of more than 900 t was allowed and more than 500 licenses were active in the fishery. During the 2002 season 41 fishers reported catches, the lowest number on record.

Landing reports were received from August 15 until December 11. Due to a lesser incentive for a thorough and early reporting of catches many of the reports combined more than one landing of salmon. Some of the reports were probably also sent to the License Office with a considerable delay in relation to the time of fishing. Because of these changes in reporting, the Working Group was unable to estimate average CPUE values for that part of the fishery in 2002, which is comparable with the commercial fishery in preceding years. As a result, it was not possible to update the data series used to develop the *ad hoc* management programme used in the previous two years.

Due to the character of this fishery, which includes provisions for personal consumption, some unreported catch likely occurs. Unreported catch is primarily associated with personal consumption or subsistence fishing, which appears to have remained relatively stable through time. There is presently no quantitative approach for estimating the magnitude of unreported catch; however, based on local knowledge it is at the same level used for recent years (around 10 t).

Biological characteristics of the catches

Biological characteristics (length, weight, and age) were recorded from 1,297 fish in catches from NAFO Div. 1C, 1D and 1F in 2002 and presented in Tables 7.9.1.3 to 7.9.1.5 together with corresponding data from sampling in Greenland since 1968.

The general downward trend in mean length and weight (unadjusted for sampling date) of both European and North American 1SW salmon observed from 1969–1995 reversed in 1996, when mean lengths and weights increased (Table 7.9.1.3, Section 7.9.1.4). In 2000, a decrease was observed, mainly in the North American component where the mean lengths and weights were among the lowest observed in the time series. In 2001 and 2002, mean lengths and mean weights increased again to a level close to the overall average for the recent decade.

Distribution of the catch by river age in 1968-2002 as determined from scale samples is shown in Table 7.9.1.4. The percentage of the European origin salmon that were river age-1 fish has been quite variable through the later years with relatively high values in 1998-2000, the 2000 value being the highest on record, but the percentage decreased thereafter to 10 % in 2002. A low percentage of this group suggests a low contribution from Southern European stocks. In 1998 and 1999 low percentages of 7.6 and 7.2 %, respectively, of river age-3 were observed, the lowest on record. In 2002, the percentage was 18 %, close to the overall mean of 16.9 %. The mean river age of the contribution from Southern European stocks reflects these changes in percentages,

with the overall mean age of 2.0 years. The percentage of river age-2 salmon of North American origin declined somewhat from 1998, which was close to the overall mean value of 33.5 %, to 26.7 in 2002. In 2001 the lowest value on record was observed (15.2 %). The mean river age of the catch has varied throughout the last 10 years, but in 2002 is above age 3.0, the overall mean.

The sea-age composition of the samples collected from the West Greenland fishery showed no significant changes in the percentages in the North American component of fish from 1998 to 2002 (Table 7.9.1.5). The percentage of 1SW salmon in the European component has been very high since 1997 (99.3 %), and was 100 % from 1999 to 2000.

Continent of Origin of catches at West Greenland

In total, 1,374 specimens, representing 44 % by number of the landings, were sampled for presence of tags, fork length, weight, scales, and tissue samples for DNA analysis. The limitation of the fishery to subsistence fishing caused severe practical problems for the sampling teams; however, the sampling program was successful in adequately sampling the Greenland catch temporally and spatially.

No disease sampling was conducted in 2002 because of logistical difficulties, however, the Working Group recommends that it be done in 2003.

In total, 338 (67.5 %) of the salmon sampled from the 2002 fishery were of North American (NA) origin and 163 (32.5 %) fish were determined to be of European origin .

Applying the continental percentages for reported catch by NAFO Division results in estimates of 6.4 t (2200 salmon) of North American origin and 2.6 t (900 salmon) of European origin fish landed in West Greenland in 2002. For divisions without samples the overall average weight and continent of origin splits were assumed. Quota reductions have resulted in an overall reduction in the numbers of both North American and European salmon landed at West Greenland until 1999. The number of North American salmon remained about the same in 1999 and 2000 (5-6,000 salmon), but increased in 2001. In 2002, the number of landed salmon decreased to the lowest number on record. A high percentage of European salmon in Div. 1F was observed in 2000-2002 (Table 7.9.1.6, Figure 7.9.1.1).

Elaboration on Status of the stocks in the West Greenland Commission area

Southern European Stock

The main contributor to the abundance of the European component of the West Greenland stock complex is non-maturing 1SW salmon from southern Europe. The percentage of European fish in catches at West Greenland was around 30% in the early 1990's and the 2000's, but was below 20% from 1996 to 1999. A Run-Reconstruction Model was used to estimate the pre-fishery abundance of non-maturing 1SW salmon from 1971 to the present. These have declined since the 1970s, with the 2001 abundance of 546,939 being the 3rd lowest estimate on record (Figure 5.1.3b). The contributions of countries within NEAC to this PFA, based on tagging data are: France, 2.7%; Ireland, 14.7%; UK (England &Wales), 14.9%; UK (Northern Ireland), <0.01%; UK (Scotland), 64.5%; and northern NEAC countries, 3.2%. Southern European MSW salmon stocks in the Southern NEAC area show a consistent decline over the past 10-15 years, and the estimated overall spawning escapement has been below conservation limits (S_{lim}) in four out of the past six years. Information from individual countries is summarized below:

France:
- MSW returns second lowest in the time series
- MSW spawners below CL in 2002.

Ireland:
- MSW returns above the median value for the time series
- MSW spawners above the median value for the time series
- MSW numbers subject to considerable uncertainty as the sea age composition of the catch is not known accurately
- MSW spawners at or above CL in 2002.

UK (England & Wales):
- MSW returns 20% below the median value for the time series
- MSW spawners close to the median value for the time series
- MSW spawners at or above CL in 2002

UK (Northern Ireland):
- Historical trends unclear as the sea age composition of the catch is unknown for most of the time series.
- MSW spawners at or above CL in 2002

UK (Scotland):
- MSW fish estimated to contribute between 40% & 70% of the spawning stock
- MSW returns second lowest in the time series
- MSW spawners below CL in 2002

North American Stock

The North American Run-Reconstruction Model was used to update the estimates of pre-fishery abundance of non-maturing and maturing 1SW salmon from 1971-2001. The total population of 1SW and 2SW Atlantic salmon in the northwest Atlantic has declined since the 1970s, with the 2001 abundance of 428,300 being the lowest estimate (Figure 6.9.1.7). The percentage of North American salmon in the West Greenland catch was less than 70 % for all but one year until 1992, and then increased from 60% to 90% from 1995 to 1999, and has averaged approximately 67% from 2000 to 2002 (Table 7.9.1.6). In 2002, the overall conservation limit (S_{lim}) for 2SW salmon was not met in any area except Newfoundland. Specifically:

Newfoundland:
- 2SW and 3SW salmon are a relatively small component of this stock complex
- 2SW returns third lowest in the last 10 years
- 2SW spawners in 2002 at approximately 1.5 times the 2SW stock conservation limits (S_{lim})

Labrador:
- 2SW salmon historically an important part of this stock complex
- 2SW returns peaked in 1995, and decreased again in 1996 and 1997
- no estimate is given after 1997 from this area when the commercial fishery, the basis for the return and spawner model for Labrador, ended

Québec:
- 2SW and 3SW salmon an important part of this stock complex
- 2SW returns lowest in a 32-year time-series
- 2SW spawners in 2002 at 52% of 2SW conservation limit (S_{lim})

Gulf of St. Lawrence:
- 2SW salmon an important part of this stock complex
- 2SW returns second lowest in a 32-year time-series
- 2SW spawners in 2002 at 38% of 2SW conservation limit (S_{lim})

Scotia-Fundy:
- 2SW salmon historically an important part of this stock complex
- 2SW returns lowest in a 32-year time-series
- 2SW spawners in 2002 at 6% of 2SW conservation limit (S_{lim})
- inner Bay of Fundy stocks listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada

United States:
- 2SW salmon historically an important part of this stock complex
- 2SW returns second lowest in a 32-year time-series
- 2SW returns in 2002 at 3% of 2SW conservation limit (S_{lim})
- stocks in 8 rivers listed as Endangered under the Endangered Species Act

7.9.2 NASCO has requested ICES to: provide information on the origin of Atlantic salmon caught at West Greenland at a finer resolution than continent of origin (river stocks, country or stock complexes)

Within a mixed stock fishery, the identification of the origin and composition of the exploited resource is essential for the responsible management of the shared resource. This is especially true for stocks that are protected under various nation-specific Endangered species legislations. In addition, the NASCO Decision Structure requires that the stock composition of mixed stock fisheries be considered while developing management plans. As an example, the West Greenland Atlantic salmon fishery falls within this category.

A major genetic dichotomy exists between populations from either side of the North Atlantic Ocean and between European populations in Baltic and Atlantic drainages (Ståhl 1987). One microsatellite locus has shown almost perfect separation of North American and European Atlantic salmon (Taggart et al. 1995; Koljonen et al. 2002). Such hypervariable nuclear DNA marker types can in theory be used to distinguish any distinct population group from one another, provided that there is a demonstrated positive correlation between genetic and geographic distance and that a sufficient number of unlinked loci are studied. However, it remains to be seen how well these markers estimate finer scale composition within a mixed stock fishery where a large number of populations are contributing.

Data collected for continent of origin assignments for the West Greenland mixed stock fishery have been based on 4,373 Atlantic salmon genotypes (individuals): 459 from Europe and 3,914 from North America with 600 of these from Canadian stocks. These data have also been used to do preliminary assignments of countries, and thus stock complex within Europe, and between Canada and USA. What follows describes an approach for estimating the catch of fish from the USA Distinct Population Segment (DPS), eight rivers in Maine collectively listed as Endangered.

All genetically characterized individuals from the 2002 West Greenland fishery were assigned to continent of origin and country of origin (for NA assigned individuals only). Unanalysed individuals from the catch were assigned to continent of origin (COO) according to a binomial distribution from known (genetically analysed) COO assignments. Furthermore, all North American (NA) origin individuals were assigned to country of origin according to a binomial distribution from the country of origin assignments provided. The regional assignments within the USA were calculated according to the proportion of the 2SW adult returns to all Atlantic salmon rivers within the USA. For the DPS estimate, a Pert distribution, based on the mean estimate, 90% confidence intervals and a truncation of the minimum value (at 0) generated from the linear regression model was used to generate the estimate. Finally the regional assignments were adjusted for natural mortality to estimate the increase in returns that would have resulted with no commercial harvest.

It is estimated that the reference dataset correctly assigns continent of origin 100% of the time whereas the country of origin assignments (USA vs. Canada) are estimated to be 92.2% for assigning USA samples back to the USA and 88.0% for assigning Canadian samples back to Canada (Spidle et al. 2003). These accuracies reflect the high degree of genetic separation between continents and the much lower separation on the country scale (Figure 7.9.2.1). The composition of the reference dataset greatly affects its assignment accuracy, both in terms of the spatial coverage of samples within the dataset as compared with the unknown samples and the quantity of samples within these reference sets. If a reference dataset is used to classify unknown samples, but the reference dataset does not include known samples from the range of possible populations or there are a disproportionate number of samples from one known group or another, the misclassification rate can rise significantly above that recorded through cross validation procedures on the reference dataset. However, if the classification accuracies of the reference dataset are known, the misclassification rates can be accounted for and the tallies produced for the PGA can be adjusted.

While trying to identify USA origin fish in the 2002 West Greenland catch, biological inconsistencies were identified that confounded the model outputs. The cause of these inconsistencies appears to be related to the assignment accuracy of the reference dataset as determined by cross validation procedures. Whenever using genetic data to assign individuals to continent, country or region, external supporting data should be used to corroborate your assignments. Supporting evidence can come from past tagging studies or biological characteristics.

Classifying Southern and Northern European stock complexes in the West Greenland catch has direct applicability to the forecast of PFA. However, finer scale classification within continent will also be useful in evaluating the effects of other fisheries on salmon stocks.

This example shows the need for the identification of country or region of origin for the management of mixed stock fisheries. Presently, the reference datasets used for these assignments lack adequate spatial and temporal sample coverage to consistently assign to finer scale with acceptable assignment accuracy. This is especially true for the European and Canadian stock complexes. Efforts need to be taken to bolster these reference datasets by collecting and analysing samples from additional populations over as wide a geographic scale as possible.

7.9.3 NASCO has requested ICES to: evaluate the extent to which the objectives of any significant management measures introduced in the last five years have been achieved.

There have been the following significant changes in the management regime at West Greenland since 1993:

- First, NASCO adopted a new management model (Anon. 1993) based upon ICES' assessment of the PFA of non-maturing 1SW North American salmon and the spawner escapement requirements for these stocks. This resulted in a substantial reduction in the TAC agreed to by NASCO from 840 t in 1991 to 258 t in 1992, and further reductions in subsequent years.
- The next change in management was the suspension of fishing in 1993 and 1994 following the agreement of compensation payments by the North Atlantic Salmon Fund. Due to the closure of the fishery in the two years no sampling could be carried out in Greenland, and no biological data were collected.
- In 1998, NASCO agreed on a subsistence fishery of 20 t, which in the past has been estimated for internal consumption at Greenland. In 1999, a multi-year management was agreed restricting the annual catch to that amount used for internal consumption.
- An *ad hoc* management arrangement for 2001 was agreed by NASCO, implementing an adaptive quota calculation, based upon three harvest periods. The resulting total quota for all harvest periods was 114 t.
- A revised *ad hoc* management arrangement for 2002 was agreed to by NASCO. In addition, an agreement was negotiated between the North Atlantic Salmon Fund and its partners, and the Greenland Association of Hunters and Fishers (KNAPK), to suspend the commercial part of the salmon fishery. The agreement is for a total of five years, and is automatically renewed annually unless one of the parties gives notice in advance of the fishing season of their intention to withdraw.

To calculate a possible TAC for those years according to the agreed quota allocation model (Anon. 1993) biological parameters from sampling in 1992 were used (Table 7.9.3.1). The variables in the table (percent of origin, mean weights, and percent of 1SW fish) are used in the analyses.

The numbers of fish spared by the 1993-1994 closures are shown in Table 7.9.3.1. The potential catches in the years 1993 and 1994 of 89 and 137 t, respectively correspond to the TACs calculated in accordance with the quota allocation computation model that was agreed by NASCO at its annual meeting in 1993. For the successive years nominal catch figures are used. The table contains the number of salmon returning to home waters provided no fishing of the given magnitude took place in Greenland. The biological parameters given in the table represent the annual sampling data.

The mean number for 1993-2002 of potentially returning fish per ton caught at Greenland is calculated to 166 and 92 salmon for North America and Europe, respectively.

To estimate the number of salmon spared by the suspension of the fishery in 2002 the following assumptions are made:

- Excluding year 2000 the availability of salmon and the potential effort in 2002 is assumed to be close to average for the recent five years (1997-2001).
- The non-commercial landings in 2002 would have been close to average for the recent five years (as above) had there been a commercial fishery.

The average commercial catch for the period was 27,900 kg, and the non-commercial part was 4,800 kg. The difference between the reported non-commercial catch in 2002 and the five-year average is 4,200 kg, leaving 23,700 kg as a potential commercial landing in 2002. The corresponding number of salmon is 5,400 and 2,500 salmon of North American and European origin, respectively.

In the current analysis the effects of the management measures taken at West Greenland have been examined in terms of numbers of fish only. Thus it has been difficult to show direct benefits to home-water stocks from these

measures. The Working Group recommends that other indices of change, i.e. changes in age composition, size at age and sea survival, should also be included in this evaluation.

Following on the above recommendation, ICES reviewed an analysis of the impacts of variations of the West Greenland fishery on expected returns to rivers. The analysis was based on an examination of the 1SW to 2SW relationship demonstrated for several stocks in eastern Canada and focused on the explanatory power of the West Greenland catches on the residuals of the relationship (Figure 4.3.3.2).

The analysis indicated that the variations in high seas exploitation at Greenland could be detected in the returns of 2SW salmon in home waters in the Maritimes, but only after correcting for the 1SW abundance of the same cohort. The benefits of reduced exploitation can only be appropriately evaluated if the variations in natural mortality are accounted for, as is the case for the 1SW-2SW associations. This also requires that the returns of one age group, in this case the 1SW age group, be exempt from exploitation, which has been the case for the 1SW maturing age group in North America since the closure of the commercial fisheries in 1992-1998. The reduced exploitations at West Greenland has benefited the rivers of the Maritimes although it is clear that fishing at West Greenland does not seem to be the major constraint on 2SW salmon in some areas of eastern Canada.

7.9.4 NASCO has requested ICES to: provide a detailed explanation and critical examination of any changes to the model used to provide catch advice and of the impacts of any changes to the model on the calculated quota.

The following updates were made in the model to forecast PFA for the North American Commission Area.

- Labrador was not included in the lagged spawners index due to lack of data
- Returns to Gulf and USA regions, excluded in previous years, were included in the lagged spawners index
- A two phase regression between PFA and lagged spawners was used to account for phases in productivity
- The habitat index did not provide a statistical improvement to the model and so was not included

These developments are described fully below, together with the integration of the model results into a risk framework for providing catch advice:

Evaluating Atlantic salmon biological data for phase shifts

For the past two years ICES has noted that there is a potential problem of non-stationary relationships in spawners to PFA. In 2002, the report included regressions of CPUE (kg/reported landings) and North American and Southern European PFA, with residuals demonstrating a shift in the relationship following the 1992-1993 closure (ICES 2002/ACFM:14, Figure 5.1.2.1). This year, ICES examined biological data from all three Commission areas for non-stationarity, specifically attempting to identify the transition year(s) where a phase shift was evident. It was hoped that this evaluation would inform the modeling process and facilitate change to integrate trends contained in the time-series of PFA and lagged spawner in NEAC and NAC.

North-East Atlantic Commission

Anon. (2003) provides a critical examination of selected NEAC stock and recruitment relationships Six rivers were considered: the R. Frome UK (England and Wales), the Girnock Burn and the R. North Esk UK (Scotland), the R. Bush and R. Burrishoole (Ireland) and the R. Ellidaar (Iceland). Stock (S) and recruits (R) were expressed in eggs. Recruitment was estimated from estimated returns of adult salmon back to the coast, prior to any homewater fishery.

For all the six rivers analysed, there is a drop in the recruitment process occurring in the mid 1980s. In four of the six instances, the productivity (Ricker α parameter - recruits produced per stock unit at low egg depositions) has also dropped significantly. Causes for this phenomenon are unclear although it certainly relates, at least partly, to changes in marine survival observed over the last three decades and to habitat changes (degradation of spawning areas or loss of specific spawning areas).

A non-parametric ratio test (NPRATIO) was used to investigate phase changes in time series of marine survival for salmon stocks in the southern part of the NEAC area Rago (1993).

Data for 1SW survival rates were available for five Irish stocks (Shannon hatchery, Screebe hatchery, Burrishoole hatchery, Corrib hatchery and wild), two UK (N. Ireland) stocks (Bush hatchery and wild) and one

UK (Scotland) stock (N. Esk wild), while survival data were available for 2SW fish from four Irish stocks (Shannon hatchery, Burrishoole hatchery, Corrib Hatchery and Corrib wild), and one UK (Scotland) river (N. Esk wild). The time series extended from 1980 through 1998 smolt migration years. The results of this analysis provide some support of a phase change in marine survival consistent with other observed stock dynamic changes occurring in other stocks from the North East Atlantic and North America, particularly around the 1989/1990 period for 2SW stocks and possibly earlier for 1SW stocks. The percentage of Southern NEAC stock caught in the Greenland fishery has ranged from 10% to 66% and is estimated to be 33% presently. Therefore, the results of the 2SW analysis may be particularly pertinent to the identification of phase shifts affecting the dynamics of the Greenland fishery.

North American Commission

The relation between the returns of 1SW and MSW from a given smolt cohort was examined for three data sets from Québec for 1980 – 2001. The data were: estimates of total salmon returns in Québec and of returns from two index rivers. Returns were corrected based on estimates of captures made in home water, but not those in the distant fisheries. The regressions of 1SW to 2SW returns for a cohort were developed and residuals plotted against year (Figure 7.9.4.1). In each analysis the residuals for the regressions demonstrate two periods, namely from 1980 and 1990 and the period starting in 1991. A similar regression approach did not produce evidence for a shift in survival rate of hatchery 2SW returns to the Penobscot River. However, inverse weight estimates for North America show an increase in theoretical M in the second year over the last decade (Figure 4.2.1.1).

On the LaHave River, Nova Scotia, the natural log of recruits per spawner (survival index) determined at Morgans Falls had normal variance to 1986 but has been below replacement (zero line) ever since (Figure 7.9.4.2). The shift in population stability was not associated with an acute loss in freshwater productivity monitored by both juvenile densities and smolt emigration. However, the drop in the survival index (Ln(R/S)) in 1986 is associated with the decline in smolt age two-sea age two (age 2.2) and is equivalent to the 1990 PFA year.

Greenland Commission Area

The whole weight of 1SW North American salmon in the West Greenland fishery (uncorrected for sampling date) was examined in two independent tests. Mean 1SW salmon whole weights from 1969-2002 were regressed against year to determine when the relationship became significant by casting forward in groups of four years. There was a significant decline in weight from 1969 to the early 1990's, followed by a significant increase in weight. These data were also analyzed using the randomization method described for Southern NEAC survival, identifying the break in the same time period.

Therefore ICES concluded that the phase shift, which occurred around the end of the 1980s to early 1990s, needed to be considered when providing catch advice for the West Greenland fishery in 2003.

Overview of provision of catch advice

Although advances have been made in our understanding of the population dynamics of Atlantic salmon and the exploitation occurring in the fisheries, the concerns about the implications of applying TACs to mixed-stock fisheries are of concern. In principle, adjustments to catches in mixed-stock fisheries provided by means of an annually adjusted TAC would reduce mortality on the contributing populations. However, benefits to particular stocks would be difficult to demonstrate, in the same way that damages to individual stocks are difficult to identify.

The aim of management is to regulate catches while achieving overall spawning escapement reflecting the spawner limits in individual North American and European rivers. In order to achieve the desired level of exploitation for a given level of predicted abundance, a TAC could be fixed or some form of effort adjustment introduced. Such an assessment would also depend on a forecast of pre-fishery abundance for both North American and European salmon stocks.

To date, the advice for any given year has been dependent on obtaining a reliable predictor of the abundance of non-maturing 1SW North American stocks prior to the start of the fishery in Greenland. Gill net fisheries in Greenland harvest one-sea-winter (1SW) salmon about one year before they mature and return to spawn in North American rivers. This component was also harvested on their return as 2SW salmon in commercial fisheries in eastern Canada, angling and native fisheries throughout eastern Canada, and angling fisheries in the northeastern USA. The fishery in Greenland harvests salmon that would not mature until the following year, while the fishery in Labrador (closed in 1998) harvested a mix from the non-maturing component as well as

maturing 1SW and MSW salmon. The commercial fisheries in Québec and the Maritime provinces of Canada harvested maturing 1SW and MSW salmon.

ICES had advocated models based on thermal habitat in the northwest Atlantic and spawning stock indices to forecast pre-fishery abundance and provide catch advice for the West Greenland fishery. While the approach had been consistent since 1993, the models themselves have varied slightly over the years. Changes have been made to these models in attempts to improve their predictive capabilities and add more biological reality. In particular, the models since 1996 have used a spawning stock surrogate variable (lagged spawners) in an attempt to describe the variations in parental stock size of the non-maturing 1SW component (PFA). The models of previous years included the following predictor variables: 1993 - thermal habitat in March; 1994 - thermal habitat in March; 1995 -thermal habitat in January, February, and March; and 1996-2001 - thermal habitat in February and lagged spawners from the Labrador, Newfoundland, Québec, and Scotia-Fundy regions of Canada. In 2000-2001, the model was based on the natural log of PFA relative to the natural log of spawners and habitat variables. In this way, the survival rate of salmon (PFA / Spawners) has a mean survival level that is modified by the habitat environmental variable.

ICES had previously noted that because the method of estimating spawning escapement for Labrador was based on commercial catches and exploitation rates which ended in 1997 following closure of the commercial fishery, lagged spawner values would have missing components in year 2003. Thus, an alternative index of salmon abundance is required and described below.

North American run-reconstruction model

ICES has used the North American run-reconstruction model to estimate pre-fishery abundance of 1SW non-maturing and maturing 2SW fish adjusted by natural mortality to the time prior to the West Greenland fishery (Section 6.9.1). Region-specific estimates of 2SW returns are shown in Figs. 6.9.1.4 and 6.9.1.5. Estimates of 2SW returns prior to 1998 in Labrador are derived from estimated 2SW catches in the fishery using a range of assumptions regarding exploitation rates and origin of the catch. With the closure of the Labrador fishery, 1998 to 2000 returns were estimated as a proportion of the total for other areas based on historical data.

Update of thermal habitat

ICES has been using the relationship between marine habitat, an index of 2SW lagged spawners and estimated pre-fishery abundance to forecast pre-fishery abundance in the year of interest (ICES 1993/Assess:10; 1994/Assess:16; 1995/Assess:14; 1996/Assess:11, 1997/Assess:10; 1998/ACFM:15, 1999/ACFM:14; 2000/ACFM:13, and 2001/ACFM:15). Marine habitat is measured as a relative index of the area suitable for salmon at sea, termed thermal habitat, and was derived from sea surface temperature (SST) data obtained from the National Meteorological Center of the National Ocean & Atmospheric Administration and previously published catch rates for salmon from research vessels fishing in the northwest Atlantic (Reddin *et al*. 1993 and ICES 1995/Assess:14). The SST data were determined by optimally interpolating SSTs from ships of opportunity, earth observation satellites (AVHRR), and sea ice cover data. The area used to determine available salmon habitat encompassed the northwest Atlantic north of 41°N latitude and west of 29°W longitude and includes the Davis Strait, Labrador Sea, Irminger Sea, and the Grand Bank of Newfoundland.

Thermal habitat has been updated to include 2002 and January and February 2003 year data. Two periods of decline in the available habitat are identified (1980 to 1984 and 1988 to 1995) in the February index (Table 7.9.4.1 and Figure 7.9.4.3). Available habitat for February is unchanged from 2002. The 2003 February value is more than 10% higher than the long-term mean of 1,661.

Update of Lagged Spawners

The lagged spawner variable used in the model is an index of the 2SW parental stock of the PFA. It provides a means of examining the value in managing for spawning escapement and predicting recruitment in the extant seas fisheries. Previous analyses indicated that the sum of lagged spawner components from Labrador, Newfoundland, Québec, and Scotia-Fundy, and excluding Gulf and U.S., was the strongest explanatory variable for the model. Inclusion of the Gulf spawning component reduced the explanatory power of the variable.

ICES recognized the problems inherent in this variable. The exclusion of a major component of the spawning stock contributing to the PFA was less than satisfactory. As well, spawning escapement estimates for Labrador

are not available for the years 1998-2001. The previously formulated lagged spawner variable is therefore not available beyond 2002.

ICES investigated two approaches to resolve the issue: 1) estimating lagged spawners for Labrador using data from other areas to develop a relative spawner index, and 2) continue the lagged spawner index and exclude the Labrador time series.

A relative (time) index of spawners is sufficient to assess population dynamics or recruits per spawner. Covariance models can be used to derive relative indices and are used extensively in fisheries assessment for standardizing catch rates by vessel type or gear type or for season or area effects (Hilborn and Walters 1992; Gavaris 1980). An analysis using simulated series indicated that the covariance models could not account for missing components of index series when there are trends present. The ratio of Labrador spawners to the sum of the remaining region spawners fluctuated around 0.2 from 1978 to 1988, decreased and fluctuated around 0.1 from 1989 to 1999 and rose rapidly to over 0.4 in 2002. Such variation is difficult to capture in any model and the subsequent behaviour of the ratio beyond the measured year is unpredictable. If a ratio were used to fill in the missing years for Labrador, the Labrador spawner values would simply be adjusted as a fixed proportion of the trend in the sum of the spawners in the remaining regions, an assumption which cannot be tested with existing information or verified until alternative indices of spawner abundance for Labrador become available.

Patterns of standardized spawner indices (annual number/mean for period) without Labrador did not differ greatly from the sequence of spawner abundance with Labrador included. The trends in lagged spawners have fluctuations that demonstrate consistent patterns among adjacent areas. The trend is down since 1989 for USA and Scotia-Fundy spawners. There is a downward trend for Quebec spawners since the mid-1980s whereas Gulf spawners recovered quickly after the 1984 management plan, remained high through 1990 to 2000 and are declining into 2003. Newfoundland, like Labrador, has an increasing trend in spawner abundance since the mid-1990s, consistent with the management plan that increased escapement.

The variation in Labrador spawners has been much greater than the variation of the sum of the regions (Figure 7.9.4.4). The sum of the other region spawners declined from 1978 to 1988 and rose rapidly in 1989, directly as a response to the management plan of 1984 which imposed the closure of the commercial fishery and the mandatory release of large salmon in the Maritimes – the stepped increase in 1989 was driven by the Gulf stock. Subsequent to 1989, lagged spawners have been declining almost continually and most rapidly into 1992 (Figure 7.9.4.4). The exclusion of the Labrador time series in the North American spawner index is not ideal but is easier to defend in the context of the information available. Excluding the spawner series from Labrador is equivalent to assuming that the trend in Labrador is correlated with the trend of the remaining five regions.

In light of the analyses conducted, ICES developed a new lagged spawner index for North America, which consists of the sum of the lagged spawners from the five regions (US, Scotia-Fundy, Gulf, Quebec, Newfoundland) excluding Labrador (Table 7.9.4.1). Spawner estimates are available for these regions and are anticipated to continue into the future. ICES recognized however that this is not an ideal situation as this spawner index may not be an unbiased measure of the overall lagged spawner abundance from North America, particularly as the impression into the late 1990s was that spawning escapement in Labrador was estimated to have been rising rapidly. However, the exclusion of Labrador did allow the lagged spawner series to be extended back in time one more year, the 1977 year of PFA.

Forecast models for pre-fishery abundance of 2SW salmon

North American Forecast Model

The 2002 forecast of pre-fishery abundance was based on a modeling approach where habitat acts on PFA through survival rather than on absolute abundance.

This model relates directly to a survival relationship, whereby the survival rate of salmon (PFA / Spawners) has a mean survival level that is modified by the habitat variable.

The basis for the model was the same two predictor variables as used from 1999 to 2001: thermal habitat for February (term H2) and lagged spawners (sum of lagged spawners from Labrador, Newfoundland, Scotia-Fundy, and Quebec, term SLNQ) (ICES 1996/Assess:11). This was justified on the basis of studies showing that salmon stocks over wide geographic areas tend to have synchronous survival rates and that the winter period

may be the critical stage for post-smolt survival and maturation (Scarnecchia et al. 1989; Reddin and Shearer 1987; Friedland et al. 1993; Friedland et al. 1998).

With the development of an alternative lagged spawner index for 2003, the model was fitted with the new lagged index series and the February habitat index, as in previous years. Revised PFA values (based on updated information from previous years) were also used . The data are summarized in Table 7.9.4.1 and Figure 7.9.4.4. **The model was not significant ($p = 0.27$) with an r^2 value of 0.11.**

The absence of a significant association between the PFA, lagged spawner index and habitat was expected given the analyses from previous years which indicated that the inclusion of Gulf Region lagged spawners resulted in a non-significant model. However, an analysis of the sequence of PFA and lagged spawner values revealed structure within the data set that had not appeared previously and that could not be accounted for by the model used in previous years. Specifically, when perceived over time, two states of Atlantic salmon production become evident with a transition state from 1988 to 1990 (Figure 7.9.4.5). Other indicators of a change in stock dynamics were examined by ICES and many were consistent with this time period (see above). Average relative production, expressed as PFA / lagged spawner index, was 7.6 during 1977 to 1988 and averaged only 1.9 during the 1992 to 2001 period (Figure 7.9.4.5). This dynamic indicates that mortality of salmon between the spawner and PFA recruit stage has changed in the last 15 years. To capture this dynamic, a model that incorporated a break into two time periods, termed phases, was fitted to the data. The position of the change between the high production phase and the lower, more recent production phase was considered to be 1989 as this PFA year is the midpoint in the slide from a low spawner index and high PFA abundance to a high spawner index and unchanged PFA abundance (Figure 7.9.4.5).

The model fitted was similar to the previous year models with the addition of an "indicator variable" to capture the change between the phases. The year 1989 was considered transitional. It was alternatively placed in either the upper phase or lower phase in two runs of the model. The model was fitted initially using the annual mid-point values of PFA_{NA} and LS_{NA} (Table 7.9.4.1).

The thermal habitat variable was not a significant ($P > 0.50$) explanatory variable of PFA variability after accounting for the lagged spawners and the phase shift. Lagged spawner index and the phase shift were highly significant and accounted for more than 82% of the variance in $Ln(PFA_{NA})$. The year 1989, in either the first phase or the second phase, did not affect the overall explanatory power of the lagged spawner and phase shift variables. Therefore, the model selected for generating the PFA_{NA} for 2003 and the catch advice included $Ln(LS_{NA})$ and a phase shift variable set around 1989 (Figure 7.9.4.6). The two phases share a common PFA_{NA}/LS_{NA} slope but with an intercept change which describes the large change in productivity between the two phases. The year 1989 is allocated to either phase using an uninformative prior.

Using the current model to estimate the 2002 pre-fishery abundance using the updated value for 2001 yields a PFA_{NA} prediction that is less than half of the previous year value (Figure 7.9.4.7). The impact of the change in the model and the hypothesis of the change in dynamic are evident in the PFA prediction.

For 2003, the PFA_{NA} forecast is among the lowest of the time series with a median value of 111,000 fish and about a 10% chance the abundance will be sufficient to meet the spawner reserve of 212,000 2SW salmon to North America (Figure 7.9.4.8).

Stochastic Analyses for North American PFA

Although the exact error bounds for the estimates of pre-fishery abundance (NN1(i)) are unknown, minimum and maximum values of component catch and return estimates have been estimated. Simulation methods were used to generate the probability density function of NN1(i) (PFA_{NA}). These estimates were then used to develop the risk analysis and catch advice presented in Section 7.6. Managers may use this information to determine the relative risks borne by the stock (i.e., not meeting spawning limits S_{lim}) versus the fishery (e.g., reduced catches).

Determining the probability of 2003 being in one of the phases

In the case of the phases described by the lagged spawner and PFA_{NA} model, it seems reasonable to expect that 2003 will be in the lower phase, as observed over the last ten years. However, to provide a PFA_{NA} for 2003, a quantification of the probability of being in either phase is required. The approach taken to estimate this probability was to examine the historical changes in PFA_{NA} from year t to year t+2. The two-year lag is used

because current year PFA (i.e 2002) is not available due to its dependence upon 2SW returns in the next year. These historical observations are used to estimate the possible values of PFA_{NA} in the predicted year from the observed PFA_{NA} two years earlier under the assumption that the rate of change in PFA_{NA} is stationary over time. Application of these observed rates of change to last year's PFA_{NA} results in a distribution of potential PFA_{NA} values for the forecast year. These values are not used for catch advice, but rather to determine the probability of being in each phase of the two-phase regression.

For the 2003 forecast of PFA_{NA}, the probability of being in the first phase (similar to 1977-1988 time period) is 4.8% and the probability of being in the lower productivity phase is 95.2% . The predicted PFA_{NA} is then a modeled average distribution, which can be thought of as a weighted combination of the two possible predicted PFA distributions from the two regressions, with weights determined by the probability of being in each phase.

The NEAC forecast model

ICES has previously considered the development of a model to forecast the pre-fishery abundance of PFA non-m (PFA of non-maturing potential MSW) salmon from the Southern European stock group (comprising Ireland, France, and all parts of UK) (ICES 2002/ACFM:14). Stocks in this group are the main European contributors to the West Greenland fishery (See Section 7.9.1). The model took a similar form to that used for North American PFA forecasts, with lagged spawners and the same habitat index as that used in the North American model. Both year and spawner terms were found to be significant predictors but the habitat variable had no significant effect. Therefore, this year, lagged spawners and year were used as the main input variables, together with the historical PFA values obtained from the run-reconstruction model. ICES therefore considered an alternative model for 2003 that used only the year and spawner terms to predict PFA. The model was fitted to data from 1977-2002 to provide a revised PFA prediction for 2002 and a forecast of PFA in 2003. ICES noted that the revised prediction of 2002 PFA for southern NEAC MSW stocks was within 1.3% of the previous forecast.

The predictions using this model and the bootstrapped 95% confidence intervals are given in Section 5, together with the trend in PFA non-m. It should be noted that the confidence intervals are wide and this reflects the uncertainty around the point estimate. These predictions have been used as an input to the provision of quantitative catch advice for this stock complex for 2003.

Development of catch advice for 2003 in a risk framework

The provision of catch advice in a risk framework involves incorporating the uncertainty in all the factors used to develop the catch options. The ranges in the uncertainties of all the factors will result in assessments of differing levels of precision. The analysis of risk involves four steps: 1) identifying the sources of uncertainty; 2) describing the precision or imprecision of the assessment; 3) defining a management strategy; and 4) evaluating the probability of an event (either desirable or undesirable) resulting from the fishery action. Atlantic salmon are managed with the objective of achieving spawning conservation limits. The undesirable event to be assessed is that the spawning escapement after fisheries will be below the conservation limit.

A composite spawning limit (S_{lim}) for the North American 2SW stock complex was developed by summing the spawning limits of Salmon Fishing Areas in Canada and river basins within the USA. Details on the methodology to estimate and update the spawner limits are provided in (ICES 1996/Assess:11).

The fishery allocation for West Greenland is for fisheries on 1SW non-maturing salmon in 2003, whereas the allocation for North America can be harvested in fisheries on 1SW salmon in 2003 and/or in fisheries on 2SW salmon in 2004. To achieve spawner limits, a reserve of fish must be set aside prior to fishery allocation in order to meet spawner limits and allow for natural mortality in the intervening months between the fishery and return to river. The spawner limit for North America is 152,548 2SW fish. Thus, 212,189 pre-fishery abundance fish must be reserved ($152{,}548/\exp^{(-.03*11)}$) to equate to inriver S_{lim} because of natural mortality between Greenland and Canada (Table 7.9.4.2a).

Fisheries are managed for harvests of fish, not for escapes of fish. As such the development of catch advice in a risk analysis framework considers the consequences to the objective of meeting conservation limits in the rivers of North America of catching different quantities of fish. The risk consists of not having sufficient numbers of fish returning after the harvesting has taken place and the evaluation of the risk of not meeting the conservation limits depends upon the degree of uncertainty associated with the predicted number of salmon returning to the rivers to spawn.

The risk analysis of catch options for Atlantic salmon from North America incorporates the following input parameter uncertainties:

- the uncertainty in attaining the conservation requirements simultaneously in different regions,
- the uncertainty of the pre-fishery abundance forecast, and
- the uncertainty in the biological parameters used to translate catches (weight) into numbers of North American origin salmon.

The three primary inputs are the PFA_{NA} forecast for the year of the fishery, the harvest level being considered (t of salmon), and the spawner requirements in the rivers of North America. The uncertainty in the PFA_{NA} is accounted for in the resampling approach described above. The number of fish of North American and European origin in a given catch (t) is conditioned by the continent of origin of the fish (propNA, propE), by the average weight of the fish in the fishery ($Wt1SW_{NA}$, $Wt1SW_{E}$) and a correction factor by weight for the other age groups in the fishery (ACF). These parameters define how many fish originating from the NAC and NEAC areas will be in the fishery. Since these parameters are not known, they must be borrowed from previous year values. For the 2003 fishery, it was assumed that the parameters for $Wt1SW_{NA}$, $Wt1SW_{E}$, propNA, and propE, and the ACF could vary uniformly within the values observed in the past five years (Tables 7.9.3.1, 7.9.1.6).

Harvest

For a level of fishery under consideration, the weight of the catch is converted to fish of each continent's origin and subtracted from one of the simulated forecast values of PFA_{NA}. The fish that escape the Greenland fishery are immediately discounted by the fixed sharing fraction (Fna) historically used in the negotiations of the West Greenland fishery. The sharing fraction chosen is the 4:6 West Greenland:North America split. Any sharing fraction can be considered and incorporated at this stage of the risk assessment. After the fishery, fish returning to home waters are discounted for natural mortality from the time they leave West Greenland to the time they return to rivers, a total of 11 months at a rate of M = 0.03 (equates to 28.1% mortality). The fish that survive to homewaters are then distributed among the regions and the total fish escaping to each region is compared to the region's 2SW spawning requirements.

Spawning Requirements

The spawning requirement risk profile for North America was described previously in ICES 1997/Assess:10. Briefly, North America is divided into six stock areas that correspond to the areas used to estimate returns and spawning escapements . Under the assumption of equal production from all stock areas (i.e., recruitment in direct proportion to the spawner requirement) just over 172,000 fish should escape to North America as spawners to achieve the spawner requirement in all six stock areas at a 50% probability level. This value is higher than the point estimate for the North American stock complex (152,548 2SW salmon,) because it includes the annual variation in proportion female and the objective to have sufficient escapement in six stock areas simultaneously.

ICES had previously expressed concerns that the spawning requirement used for North America is for the continent as a whole and does not reflect the expected returns to the six regions, i.e. even if 172,000 2SW salmon reach the coast of North America, there will likely be severe under-escapement in some regions. Specifically, the 2SW returns to Scotia-Fundy, and USA have been below their corresponding conservation limits since 1985. For the 1998 to 2002 PFA years, the most recent years when estimates of lagged spawners are available for all regions of North America, the Quebec and Gulf regions have accounted for a disproportionate number of lagged spawners relative to their 2SW requirements (Figure 7.9.4.9). Alternative management objectives have therefore been considered (Section 7.2).

The final step in the risk analysis of the catch options involves combining the conservation requirement with the probability distribution of the returns to North America for different catch options (Table 7.9.4.2c). The returns to North America are partitioned into regional returns based on the regional proportions of lagged spawners for the 1998 to 2002 period (Table 7.9.4.2b). Estimated returns to each region are compared to the conservation objectives of Labrador, Newfoundland, Quebec, and Gulf. Estimated returns for Scotia-Fundy and US are compared to the objective of achieving at least a 10% increase or a 25% increase relative to average returns of the previous five years. The management objectives are shown in Table 7.9.4.2c.

Critical evaluations of updates to the model

Critical evaluations of the various updates to the model were carried out during the process of developing catch advice, and are summarized below:

- A comparison of the 2003 PFA estimates from the updated model to the configuration of the model used last year is not possible because the lagged spawner index for Labrador cannot be estimated. However, application of the updated model to estimate the 2002 PFA produced a lower estimate (median 135,000) than the estimate provided last year (median 325,000). (Figure 7.9.4.10)
- The lagged spawner variable used in the model declines in 2003 to its lowest value and is used to predict PFA using relative spawner abundances that are outside the range of previously observed values. The uncertainty of associations increases as the predictor variable gets farther from the mean, which is the case for the 2003 projection.
- A jack-knife analysis of the two-phase regression model demonstrated that the model has better predictive capacity for the more recent years than for the earlier years. The 1989 value seems to fit better with the second phase than with the first phase (Figure 7.9.4.11 and Figure 7.9.4.12). However, residuals were positive for the years 1989 to 2001, demonstrating that the model underestimates subsequent PFA values.
- To compute the probability of achieving a given level of stock increase for the USA and Scotia-Fundy regions of North America, ICES used the recent a 5-year average of returns. ICES noted that if a moving average is used, and these stocks continue to decline, so will the baseline value. ICES draws attention of managers of the need to establish the range of years to define the baseline and the percentage increase from that baseline. This will provide the ICES with the criteria to assess performance of the fisheries management.

Continuing Model Development

ICES previously considered, juvenile abundance indices as an alternative to the lagged spawner variable. As surrogates of potential smolt production, a juvenile index model is conceptually more attractive because juveniles represent a life-stage closer to the PFA than the lagged spawner variable currently used. Consequently, some of the noise corresponding to the stochasticity in the recruitment process should be reduced, favoring a more direct link between the predictors and the PFA. Unfortunately, the Working Group has noted that alternate variables do not negate any of the assumptions within a model, and are also influenced by non-stationarity. Therefore ICES, suspended investigation of juvenile abundance indices to focus on issues of non-stationarity that may apply to any relationship between a predictive variable and PFA.

Table 7.4.1. Probability profiles for the management objectives of achieving the 2SW conservation limits simultaneously in the four northern areas of North America (Labrador, Newfoundland, Quebec, Gulf) and achieving increases in returns from the previous five-year average (examples: minimally 10% or minimally 25% increase in returns of 2SW salmon in 2003) in the two southern areas (Scotia-Fundy and USA) relative to quota options for West Greenland. A sharing arrangement of 40:60 (Fna) of the salmon from North America was assumed.

Probability of meeting management objectives			
West Greenland Harvest Tons	Simultaneous Conservation (Lab, NF, Queb, Gulf)	Simultaneous Improvement (SF, USA) of Returns in 2004	
		>=10% of prev. avg.	>=25%of prev. avg.
0	**0.28**	0.71	0.62
5	0.26	0.68	0.60
10	0.25	0.66	0.58
15	0.24	0.64	0.55
20	0.23	0.61	0.53
25	0.22	0.59	0.50
30	0.21	0.56	0.48
35	0.20	0.54	0.46
40	0.19	0.52	0.44
45	0.19	0.49	0.42
50	0.18	0.47	0.40
100	0.12	0.29	0.25
500	0.02	0.03	0.02

Table 7.4.2. Probability profiles for the management objectives of achieving the 2SW conservation limits simultaneously in the four northern areas of North America (Labrador, Newfoundland, Quebec, Gulf), achieving increases in returns from the previous five-year average (examples: minimally 10% or minimally 25% increase in returns of 2SW salmon in 2003) in the two southern areas (Scotia-Fundy and USA), and achieving the MSW conservation limit for southern Europe relative to quota options for West Greenland. A sharing arrangement of 40:60 (Fna) of the salmon at West Greenland, regardless of continent of origin was assumed.

Probability of meeting management objectives				
West Greenland Harvest Tons	NAC Conservation (Lab, NF, Queb, Gulf)	Simultaneous Improvement (SF, USA) of Returns in 2004		Southern Europe Conservation MSW
		>=10% of prev. avg.	>=25%of prev. avg.	
0	**0.28**	0.71	0.62	0.73
5	0.26	0.68	0.60	0.72
10	0.25	0.66	0.58	0.72
15	0.24	0.64	0.55	0.71
20	0.23	0.61	0.53	0.71
25	0.22	0.59	0.50	0.71
30	0.21	0.56	0.48	0.70
35	0.20	0.54	0.46	0.70
40	0.19	0.52	0.44	0.70
45	0.19	0.49	0.42	0.69
50	0.18	0.47	0.40	0.69
100	0.12	0.29	0.25	0.65
500	0.02	0.03	0.02	0.37

Table 7.9.1.1. Nominal catches of salmon, West Greenland 1977-2002 (metric tons round fresh weight).

Year	Total	Quota
1977	1,420	1,191
1978	984	1,191
1979	1,395	1,191
1980	1,194	1,191
1981	1,264	1,265[2]
1982	1,077	1,253[2]
1983	310	1,191
1984	297	870
1985	864	852
1986	960	909
1987	966	935
1988	893	-[3]
1989	337	-[3]
1990	274	-[3]
1991	472	840
1992	237	258[4]
1993	0[1]	89[5]
1994	0[1]	137[5]
1995	83	77
1996	92	174[4]
1997	58	57
1998	11	20[6]
1999	19	20[6]
2000	21	20[6]
2001	43	114[7]
2002	9	-[5,8]

[1] The fishery was suspended.
[2] Quota corresponding to specific opening dates of the fishery.
[3] Quota for 1988-90 was 2,520 t with an opening date of 1 August and annual catches not to exceed the annual average (840 t) by more than 10%. Quota adjusted to 900 t in 1989 and 924 t in 1990 for later opening dates.
[4] Set by Greenland authorities.
[5] Quotas were bought out.
[6] Fishery restricted to catches used for internal consumption in Greenland.
[7] Calculated final quota in *ad hoc* management system.
[8] No factory landing allowed.

Table7.9.1.2. Distribution of nominal catches (metric tons), Greenland vessels (1977-2002).

	NAFO Division							Total	East	Total
Year	1A	1B	1C	1D	1E	1F	NK	Westgrl.	Greenland	Greenland
1977	201	393	336	207	237	46	-	1,420	6	1,426
1978	81	349	245	186	113	10	-	984	8	992
1979	120	343	524	213	164	31	-	1,395	+	1,395
1980	52	275	404	231	158	74	-	1,194	+	1,194
1981	105	403	348	203	153	32	20	1,264	+	1,264
1982	111	330	239	136	167	76	18	1,077	+	1,077
1983	14	77	93	41	55	30	-	310	+	310
1984	33	116	64	4	43	32	5	297	+	297
1985	85	124	198	207	147	103	-	864	7	871
1986	46	73	128	203	233	277	-	960	19	979
1987	48	114	229	205	261	109	-	966	+	966
1988	24	100	213	191	198	167	-	893	4	897
1989	9	28	81	73	75	71	-	337	-	337
1990	4	20	132	54	16	48	-	274	-	274
1991	12	36	120	38	108	158	-	472	4	476
1992	-	4	23	5	75	130	-	237	5	242
1993[1]	-	-	-	-	-	-	-	-	-	-
1994[1]	-	-	-	-	-	-	-	-	-	-
1995	+	10	28	17	22	5	-	83	2	85
1996	+	+	50	8	23	10	-	92	+	92
1997	1	5	15	4	16	17	-	58	1	59
1998	1	2	2	4	1	2	-	11	-	11
1999	+	2	3	9	2	2	-	19	+	19
2000	+	+	1	7	+	13	-	21	-	21
2001	+	1	4	5	3	28	-	43	-	43
2002	+	+	2	4	1	2	-	9	-	9

[1]) The fishery was suspended
+) Small catches <0.5 t
-) No commercial landings

Table 7.9.1.3. Annual mean fork lengths and whole weights of Atlantic salmon caught at West Greenland, 1969-1992 and 1995-2002. Fork length (cm); whole weight (kg). NA = North America; E = Europe.

	Whole weight (kg)									Fork length (cm)					
	Sea age & origin									Sea age & origin					
	1SW		2SW		PS		All sea ages		TOTAL	1SW		2SW		PS	
Year	NA	E	NA	E	NA	E	NA	E		NA	E	NA	E	NA	E
1969	3.12	3.76	5.48	5.80	-	5.13	3.25	3.86	3.58	65.0	68.7	77.0	80.3	-	75.3
1970	2.85	3.46	5.65	5.50	4.85	3.80	3.06	3.53	3.28	64.7	68.6	81.5	82.0	78.0	75.0
1971	2.65	3.38	4.30	-	-	-	2.68	3.38	3.14	62.8	67.7	72.0	-	-	-
1972	2.96	3.46	5.85	6.13	2.65	4.00	3.25	3.55	3.44	64.2	67.9	80.7	82.4	61.5	69.0
1973	3.28	4.54	9.47	10.00	-	-	3.83	4.66	4.18	64.5	70.4	88.0	96.0	61.5	-
1974	3.12	3.81	7.06	8.06	3.42	-	3.22	3.86	3.58	64.1	68.1	82.8	87.4	66.0	-
1975	2.58	3.42	6.12	6.23	2.60	4.80	2.65	3.48	3.12	61.7	67.5	80.6	82.2	66.0	75.0
1976	2.55	3.21	6.16	7.20	3.55	3.57	2.75	3.24	3.04	61.3	65.9	80.7	87.5	72.0	70.7
1977	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1978	2.96	3.50	7.00	7.90	2.45	6.60	3.04	3.53	3.35	63.7	67.3	83.6	-	60.8	85.0
1979	2.98	3.50	7.06	7.60	3.92	6.33	3.12	3.56	3.34	63.4	66.7	81.6	85.3	61.9	82.0
1980	2.98	3.33	6.82	6.73	3.55	3.90	3.07	3.38	3.22	64.0	66.3	82.9	83.0	67.0	70.9
1981	2.77	3.48	6.93	7.42	4.12	3.65	2.89	3.58	3.17	62.3	66.7	82.8	84.5	72.5	-
1982	2.79	3.21	5.59	5.59	3.96	5.66	2.92	3.43	3.11	62.7	66.2	78.4	77.8	71.4	80.9
1983	2.54	3.01	5.79	5.86	3.37	3.55	3.02	3.14	3.10	61.5	65.4	81.1	81.5	68.2	70.5
1984	2.64	2.84	5.84	5.77	3.62	5.78	3.20	3.03	3.11	62.3	63.9	80.7	80.0	69.8	79.5
1985	2.50	2.89	5.42	5.45	5.20	4.97	2.72	3.01	2.87	61.2	64.3	78.9	78.6	79.1	77.0
1986	2.75	3.13	6.44	6.08	3.32	4.37	2.89	3.19	3.03	62.8	65.1	80.7	79.8	66.5	73.4
1987	3.00	3.20	6.36	5.96	4.69	4.70	3.10	3.26	3.16	64.2	65.6	81.2	79.6	74.8	74.8
1988	2.83	3.36	6.77	6.78	4.75	4.64	2.93	3.41	3.18	63.0	66.6	82.1	82.4	74.7	73.8
1989	2.56	2.86	5.87	5.77	4.23	5.83	2.77	2.99	2.87	62.3	64.5	80.8	81.0	73.8	82.2
1990	2.53	2.61	6.47	5.78	3.90	5.09	2.67	2.72	2.69	62.3	62.7	83.4	81.1	72.6	78.6
1991	2.42	2.54	5.82	6.23	5.15	5.09	2.57	2.79	2.65	61.6	62.7	80.6	82.2	81.7	80.0
1992	2.54	2.66	6.49	6.01	4.09	5.28	2.86	2.74	2.81	62.3	63.2	83.4	81.1	77.4	82.7
1995	2.37	2.67	6.09	5.88	3.71	4.98	2.45	2.75	2.56	61.0	63.2	81.3	81.0	70.9	81.3
1996	2.63	2.86	6.50	6.30	4.98	5.44	2.83	2.90	2.88	62.8	64.0	81.4	81.1	77.1	79.4
1997	2.57	2.82	7.95	6.11	4.82	6.90	2.63	2.84	2.71	62.3	63.6	85.7	84.0	79.4	87.0
1998	2.72	2.83	6.44	-	3.28	4.77	2.76	2.84	2.78	62.0	62.7	84.0	-	66.3	76.0
1999	3.02	3.03	7.59	-	4.20	-	3.09	3.03	3.08	63.8	63.5	86.6	-	70.9	-
2000	2.47	2.81	-	-	2.58	-	2.47	2.81	2.57	60.7	63.2	-	-	64.7	-
2001	2.89	3.03	6.76	5.96	4.41	4.06	2.95	3.09	3.00	63.1	63.7	81.7	79.1	75.3	72.1
2002	2.84	2.92	7.12	-	5.00	-	2.89	2.92	2.90	62.6	62.1	83.0	-	75.8	-

Table 7.9.1.4. River age distribution (%) and mean age for all North American origin salmon caught a West Greenland, 1968-1992 and 1995-2002.

	River age								Mean
Year	1	2	3	4	5	6	7	8	age
North American origin									
1968	0.3	19.6	40.4	21.3	16.2	2.2	0.0	0.0	3.4
1969	0.0	27.1	45.8	19.6	6.5	0.9	0.0	0.0	3.1
1970	0.0	58.1	25.6	11.6	2.3	2.3	0.0	0.0	2.6
1971	1.2	32.9	36.5	16.5	9.4	3.5	0.0	0.0	3.1
1972	0.8	31.9	51.4	10.6	3.9	1.2	0.4	0.0	2.9
1973	2.0	40.8	34.7	18.4	2.0	2.0	0.0	0.0	2.8
1974	0.9	36.0	36.6	12.0	11.7	2.6	0.3	0.0	3.1
1975	0.4	17.3	47.6	24.4	6.2	4.0	0.0	0.0	3.3
1976	0.7	42.6	30.6	14.6	10.9	0.4	0.4	0.0	3.0
1977	-	-	-	-	-	-	-	-	-
1978	2.7	31.9	43.0	13.6	6.0	2.0	0.9	0.0	3.0
1979	4.2	39.9	40.6	11.3	2.8	1.1	0.1	0.0	2.7
1980	5.9	36.3	32.9	16.3	7.9	0.7	0.1	0.0	2.9
1981	3.5	31.6	37.5	19.0	6.6	1.6	0.2	0.0	3.0
1982	1.4	37.7	38.3	15.9	5.8	0.7	0.0	0.2	2.9
1983	3.1	47.0	32.6	12.7	3.7	0.8	0.1	0.0	2.7
1984	4.8	51.7	28.9	9.0	4.6	0.9	0.2	0.0	2.6
1985	5.1	41.0	35.7	12.1	4.9	1.1	0.1	0.0	2.7
1986	2.0	39.9	33.4	20.0	4.0	0.7	0.0	0.0	2.9
1987	3.9	41.4	31.8	16.7	5.8	0.4	0.0	0.0	2.8
1988	5.2	31.3	30.8	20.9	10.7	1.0	0.1	0.0	3.0
1989	7.9	39.0	30.1	15.9	5.9	1.3	0.0	0.0	2.8
1990	8.8	45.3	30.7	12.1	2.4	0.5	0.1	0.0	2.6
1991	5.2	33.6	43.5	12.8	3.9	0.8	0.3	0.0	2.8
1992	6.7	36.7	34.1	19.1	3.2	0.3	0.0	0.0	2.8
1995	2.4	19.0	45.4	22.6	8.8	1.8	0.1	0.0	3.2
1996	1.7	18.7	46.0	23.8	8.8	0.8	0.1	0.0	3.2
1997	1.3	16.4	48.4	17.6	15.1	1.3	0.0	0.0	3.3
1998	4.0	35.1	37.0	16.5	6.1	1.1	0.1	0.0	2.9
1999	2.7	23.5	50.6	20.3	2.9	0.0	0.0	0.0	3.0
2000	3.2	26.6	38.6	23.4	7.6	0.6	0.0	0.0	3.1
2001	1.9	15.2	39.4	32.0	10.8	0.7	0.0	0.0	3.4
2002	0.6	26.7	44.8	16.9	10.1	0.9	0.0	0.0	3.1
Mean	3.0	33.5	38.2	17.2	6.8	1.3	0.1	0.0	3.0

cont.

Table 7.9.1.4. cont. River age distribution (%) and mean age for all European origin salmon caught a West Greenland, 1968-1992 and 1995-2002.

	River age								Mean
Year	1	2	3	4	5	6	7	8	age
European origin									
1968	21.6	60.3	15.2	2.7	0.3	0.0	0.0	0.0	2.0
1969	0.0	83.8	16.2	0.0	0.0	0.0	0.0	0.0	2.2
1970	0.0	90.4	9.6	0.0	0.0	0.0	0.0	0.0	2.1
1971	9.3	66.5	19.9	3.1	1.2	0.0	0.0	0.0	2.2
1972	11.0	71.2	16.7	1.0	0.1	0.0	0.0	0.0	2.1
1973	26.0	58.0	14.0	2.0	0.0	0.0	0.0	0.0	1.9
1974	22.9	68.2	8.5	0.4	0.0	0.0	0.0	0.0	1.9
1975	26.0	53.4	18.2	2.5	0.0	0.0	0.0	0.0	2.0
1976	23.5	67.2	8.4	0.6	0.3	0.0	0.0	0.0	1.9
1977	-	-	-	-	-	-	-	-	-
1978	26.2	65.4	8.2	0.2	0.0	0.0	0.0	0.0	1.8
1979	23.6	64.8	11.0	0.6	0.0	0.0	0.0	0.0	1.9
1980	25.8	56.9	14.7	2.5	0.2	0.0	0.0	0.0	1.9
1981	15.4	67.3	15.7	1.6	0.0	0.0	0.0	0.0	2.0
1982	15.6	56.1	23.5	4.2	0.7	0.0	0.0	0.0	2.2
1983	34.7	50.2	12.3	2.4	0.3	0.1	0.1	0.0	1.8
1984	22.7	56.9	15.2	4.2	0.9	0.2	0.0	0.0	2.0
1985	20.2	61.6	14.9	2.7	0.6	0.0	0.0	0.0	2.0
1986	19.5	62.5	15.1	2.7	0.2	0.0	0.0	0.0	2.0
1987	19.2	62.5	14.8	3.3	0.3	0.0	0.0	0.0	2.0
1988	18.4	61.6	17.3	2.3	0.5	0.0	0.0	0.0	2.1
1989	18.0	61.7	17.4	2.7	0.3	0.0	0.0	0.0	2.1
1990	15.9	56.3	23.0	4.4	0.2	0.2	0.0	0.0	2.2
1991	20.9	47.4	26.3	4.2	1.2	0.0	0.0	0.0	2.2
1992	11.8	38.2	42.8	6.5	0.6	0.0	0.0	0.0	2.5
1995	14.8	67.3	17.2	0.6	0.0	0.0	0.0	0.0	2.0
1996	15.8	71.1	12.2	0.9	0.0	0.0	0.0	0.0	2.0
1997	4.1	58.1	37.8	0.0	0.0	0.0	0.0	0.0	2.3
1998	28.6	60.0	7.6	2.9	0.0	1.0	0.0	0.0	1.9
1999	27.7	65.1	7.2	0.0	0.0	0.0	0.0	0.0	1.8
2000	36.5	46.7	13.1	2.9	0.7	0.0	0.0	0.0	1.8
2001	16.0	51.2	27.3	4.9	0.7	0.0	0.0	0.0	2.2
2002	10.1	65.2	18.4	6.3	0.0	0.0	0.0	0.0	2.2
Mean	18.8	61.7	16.9	2.4	0.3	0.0	0.0	0.0	2.0

Table 7.9.1.5. Sea-age composition (%) of samples from commercial catches at West Greenland, 1985-2002.

Year	North American			European		
	1SW	2SW	Previous Spawners	1SW	2SW	Previous spawners
1985	92.5	7.2	0.3	95.0	4.7	0.4
1986	95.1	3.9	1.0	97.5	1.9	0.6
1987	96.3	2.3	1.4	98.0	1.7	0.3
1988	96.7	2.0	1.2	98.1	1.3	0.5
1989	92.3	5.2	2.4	95.5	3.8	0.6
1990	95.7	3.4	0.9	96.3	3.0	0.7
1991	95.6	4.1	0.4	93.4	6.5	0.2
1992	91.9	8.0	0.1	97.5	2.1	0.4
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	96.8	1.5	1.7	97.3	2.2	0.5
1996	94.1	3.8	2.1	96.1	2.7	1.2
1997	98.2	0.6	1.2	99.3	0.4	0.4
1998[1]	96.8	0.5	2.7	99.4	0.0	0.6
1999[1]	96.8	1.2	2.0	100.0	0.0	0.0
2000[1]	97.4	0.0	2.6	100.0	0.0	0.0
2001	98.2	1.3	0.5	97.8	2.0	0.3
2002[1]	97.3	0.9	1.8	100.0	0.0	0.0

[1] Catches for local consumption only.

Table 7.9.1.6. The weighted proportions and numbers of North American and European Atlantic salmon caught at West Greenland 1982 -1992 and 1995 -2002. Numbers are rounded to the nearest hundred fish.

	Proportion weighted by catch in number		Numbers of Salmon caught	
Year	NA	E	NA	E
1982	57	43	192,200	143,800
1983	40	60	39,500	60,500
1984	54	46	48,800	41,200
1985	47	53	143,500	161,500
1986	59	41	188,300	131,900
1987	59	41	171,900	126,400
1988	43	57	125,500	168,800
1989	55	45	65,000	52,700
1990	74	26	62,400	21,700
1991	63	37	111,700	65,400
1992	45	55	46,900	38,500
1993	-	-	-	-
1994	-	-	-	-
1995	67	33	21,400	10,700
1996	73	27	22,400	9,700
1997	85	15	18,000	3,300
1998	79	21	3,100	900
1999	91	9	5,700	600
2000	65	35	5,100	2,700
2001	69	31	9,400	4,700
2002	68	32	2,200	900

Table 7.9.3.1. Number of salmon returning to home waters provided no fishery took place at Greenland. The average number of potentially returning salmon per ton caught in Greenland is also given.

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Nominal catch at Greenland (tons) [1]:	89	137	83	92	58	11	19	21	43	9
Proportion of NA fish in catch (PropNA):	0.540	0.540	0.680	0.732	0.796	0.785	0.910	0.650	0.670	0.680
Proportion of EU fish in catch (PropEU):	0.460	0.460	0.320	0.268	0.204	0.215	0.090	0.350	0.330	0.320
Mean weight, NA fish, all sea ages (kg):	2.655	2.655	2.450	2.830	2.630	2.760	3.090	2.470	2.950	2.890
Mean weight, EU fish, all sea ages (kg):	2.745	2.745	2.750	2.900	2.840	2.840	3.030	2.810	3.090	2.920
Mean weight of all sea ages (NA+EU fish):	2.696	2.696	2.546	2.849	2.673	2.777	3.085	2.589	2.996	2.900
Proportion of 1SW NA-fish in catch:	0.919	0.919	0.968	0.941	0.982	0.968	0.968	0.974	0.982	0.973
Catch of 1SW NA fish:	16635	25607	22300	22392	17238	3029	5416	5383	9590	2066
Catch of 1SW EU fish:	13706	21098	9349	8000	4091	806	546	2548	4510	962
Natural mortality during migration to NA:	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Natural mortality during migration to EU:	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Additional fish if no fishery at Greenland:										
2SW fish returning to NA (numbers):	**11960**	**18410**	**16032**	**16098**	**12393**	**2177**	**3894**	**3870**	**6895**	**1485**
Percent of conservation limit [2]:	**6.2**	**9.5**	**8.6**	**8.9**	**6.9**	**1.2**	**2.1**	**2.5**	**4.5**	**1.0**
2SW fish returning to EU (numbers):	**10782**	**16597**	**7354**	**6293**	**3218**	**634**	**430**	**2004**	**3547**	**757**
Percent of conservation limit [3]:	**4.1**	**6.3**	**2.8**	**2.4**	**1.2**	**0.2**	**0.2**	**0.8**	**1.3**	**0.3**

[1] Figures for 1993 and 1994 correspond to calculated quotas.

[2] As estimated annually by ICES

[3] Conservation limit for Southern Europe, Table 3.4.3.1

Average number of salmon potentially returning to home waters per ton caught in Greenland:	
2SW fish returning to NA (numbers per ton, average of 1993-2002):	**166**
2SW fish returning to EU (numbers per ton, average of 1993-2002):	**92**

Table 7.9.4.1. Pre-fishery abundance estimates, thermal habitat index for February based on sea surface temperature (H2), lagged spawner index for North America excluding Labrador, and the phase shift indicator set in its initial state.

Year	Pre-fishery abundance			Thermal Habitat	Lagged spawners minus Labrador			Initial
	Low	High	Mid-point	February (H2)	Low	High	Mid-point	Phase
1977	574,920	766,372	670,646	1915	45,090	80,829	62,960	1
1978	325,305	423,344	374,325	1951	58,384	103,147	80,766	1
1979	725,526	969,725	847,626	2058	66,110	112,944	89,527	1
1980	626,689	845,357	736,023	1823	57,102	97,266	77,184	1
1981	589,902	775,292	682,597	1912	62,334	108,205	85,270	1
1982	491,624	642,955	567,290	1703	64,593	110,555	87,574	1
1983	279,866	399,920	339,893	1416	47,729	79,186	63,458	1
1984	290,764	413,708	352,236	1257	48,387	80,341	64,364	1
1985	455,247	624,679	539,963	1410	54,463	93,169	73,816	1
1986	490,306	658,712	574,509	1688	48,067	83,130	65,599	1
1987	443,842	596,469	520,156	1627	44,071	77,569	60,820	1
1988	359,581	485,900	422,740	1698	47,579	80,871	64,225	1
1989	278,895	404,946	341,920	1642	61,637	104,129	82,883	1
1990	249,811	344,253	297,032	1503	69,100	121,987	95,544	2
1991	281,550	405,602	343,576	1357	66,400	120,760	93,580	2
1992	167,152	256,606	211,879	1381	58,010	104,664	81,337	2
1993	118,437	224,357	171,397	1252	58,993	103,174	81,084	2
1994	136,738	270,339	203,538	1329	57,595	101,676	79,636	2
1995	144,226	247,195	195,710	1311	58,448	105,458	81,953	2
1996	121,464	192,680	157,072	1470	57,314	102,216	79,765	2
1997	80,262	147,151	113,706	1594	57,149	102,362	79,756	2
1998	68,710	147,114	107,912	1849	48,723	91,197	69,960	2
1999	66,708	147,773	107,241	1741	45,750	94,631	70,191	2
2000	77,373	156,796	117,084	1634	50,240	98,612	74,426	2
2001	54,615	111,372	82,993	1685	46,422	85,616	66,019	2
2002	.	.	.	1865	36,092	66,200	51,146	1
2003	.	.	.	1864	31,356	58,249	44,803	1

Table 7.9.4.2. A - Regional spawner requirement (2SW salmon), lagged spawners contributed by each region to PFA in last five years with available data, and the PFA number of fish required to meet region specific conservation limits if the returns to the regions are in proportion to the average lagged spawner distributions of 1992 to 2002. B - 2SW returns to the regions of North America, 1998 to 2002. C – Management objectives for the NAC area used to develop the risk analysis of catch options for the 2003 fishery.

Achieved lagged spawners by PFA year

	Region						North
	Labrador	Newfoundland	Quebec	Gulf	Scotia-Fundy	US	America
1998	6285	4368	21312	36629	6080	1571	76245
1999	9930	3994	19459	39019	5764	1954	80120
2000	14098	6574	22055	35913	7845	2039	88524
2001	22118	8490	22898	26914	6056	1661	88137
2002	22527	7215	20286	18113	4133	1400	73672
Total	74957	30641	106010	156588	29878	8625	406698
% of total NA	18.4%	7.5%	26.1%	38.5%	7.3%	2.1%	

A **Sum of LNQG** 90.5%

2SW Conservation Limit

Number of fish	34,746	4,022	29,446	30,430	24,705	29,199	152,548
Prop. of NA	0.228	0.026	0.193	0.199	0.162	0.191	

Spawner Reserve corrected for 11 months of M at 0.03 per month 212,189

PFA required to meet regional 2SW requirements based on average from 1998 to 2002

254,479	72,062	152,490	106,685	453,940	1,858,520	

2SW Returns to regions in past five years

	Region					
	Labrador	Newfoundland	Quebec	Gulf	Scotia-Fundy	US
1998	.	8887	28095	12838	4366	1526
1999	.	9258	29562	16933	5295	1168
B 2000	.	9660	29155	17145	3559	533
2001	.	6654	30480	22826	5001	788
2002	.	6066	22404	11996	1770	617
Average		8105	27939	16348	3998	926

Management objectives for NAC area

	Region				**Region**		
	Labrador	**Newfoundland**	**Quebec**	**Gulf**	Scotia-Fundy	US	
	2SW Conservation Limit				**Average returns**		
C **Number of fish**	34,746	4,022	29,446	30,430	3,998	926	
	2SW Conservation Limit				**Increase relative to previous five years**		
					4,398	**1,019**	**+10%**
Total	**98,644**				**4,997**	**1,158**	**+25%**

Figure 7.9.1.1. Number of North American and European salmon caught at West Greenland 1982-1992 and 1995-2002.

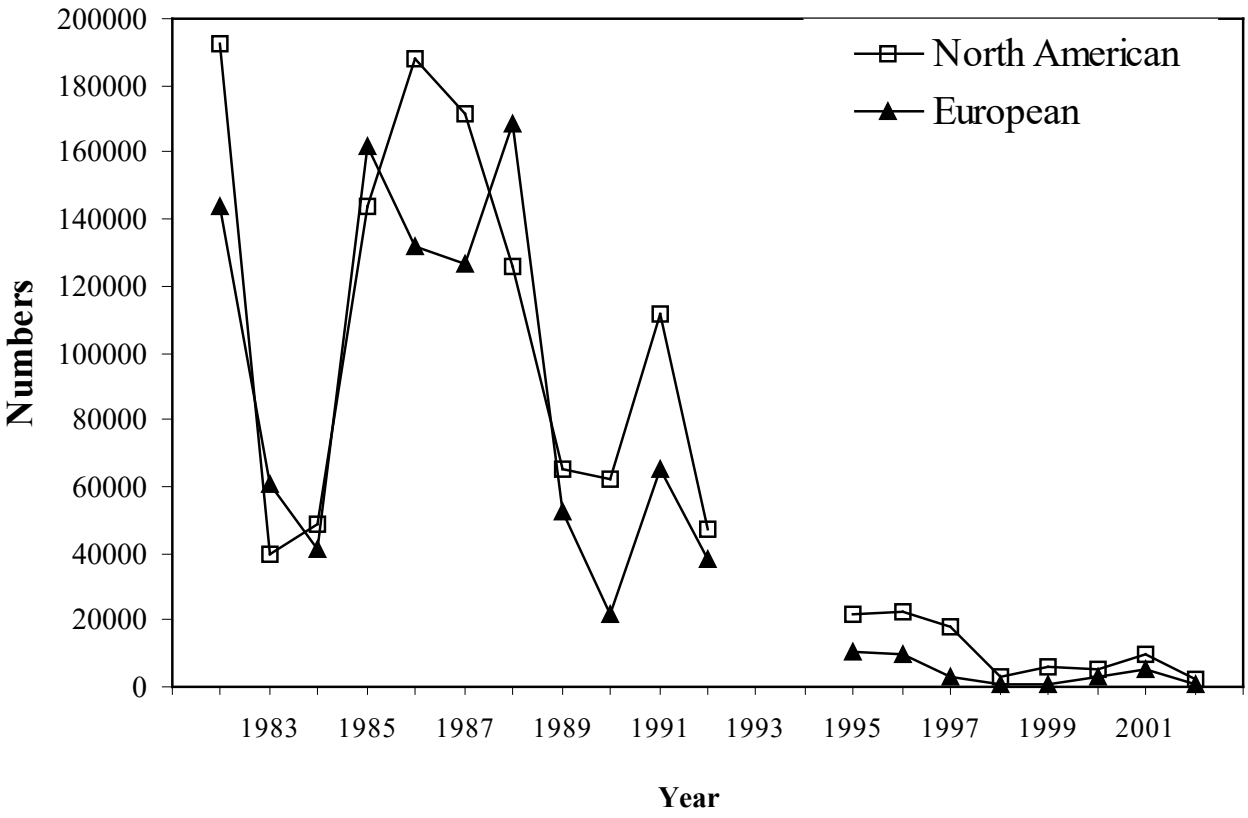
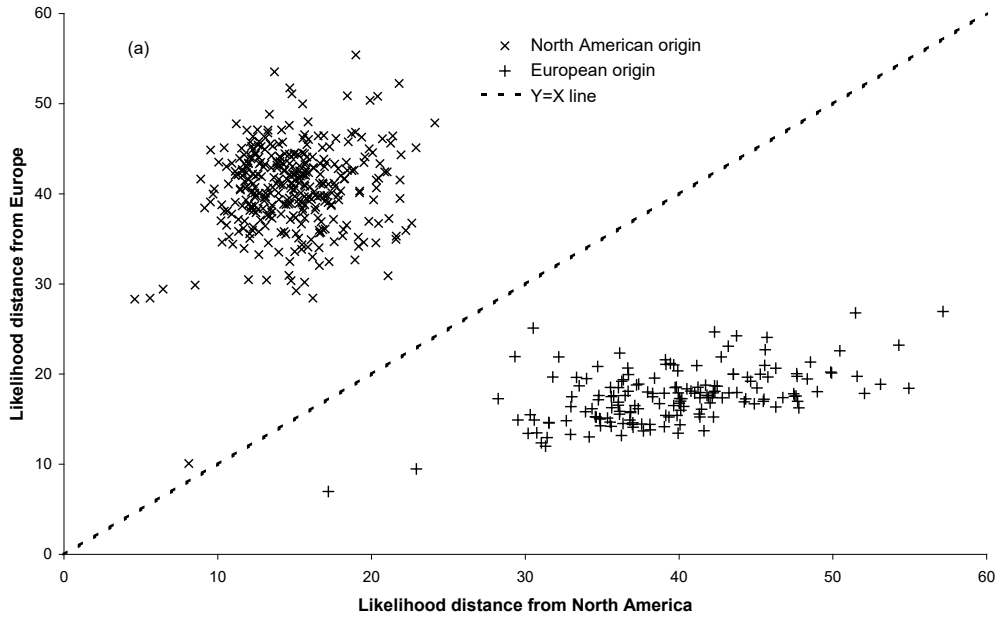


Figure 7.9.2.1. (a) Maximum likelihood distances from North American and European assigned samples collected from the 2002 West Greenland Atlantic salmon fishery. Points above the Y=X line are assigned North America origin. (b) Maximum likelihood distances from Canada and Maine assigned samples collected from the 2002 West Greenland Atlantic salmon fishery. Points above the Y=X line are assigned Maine origin.



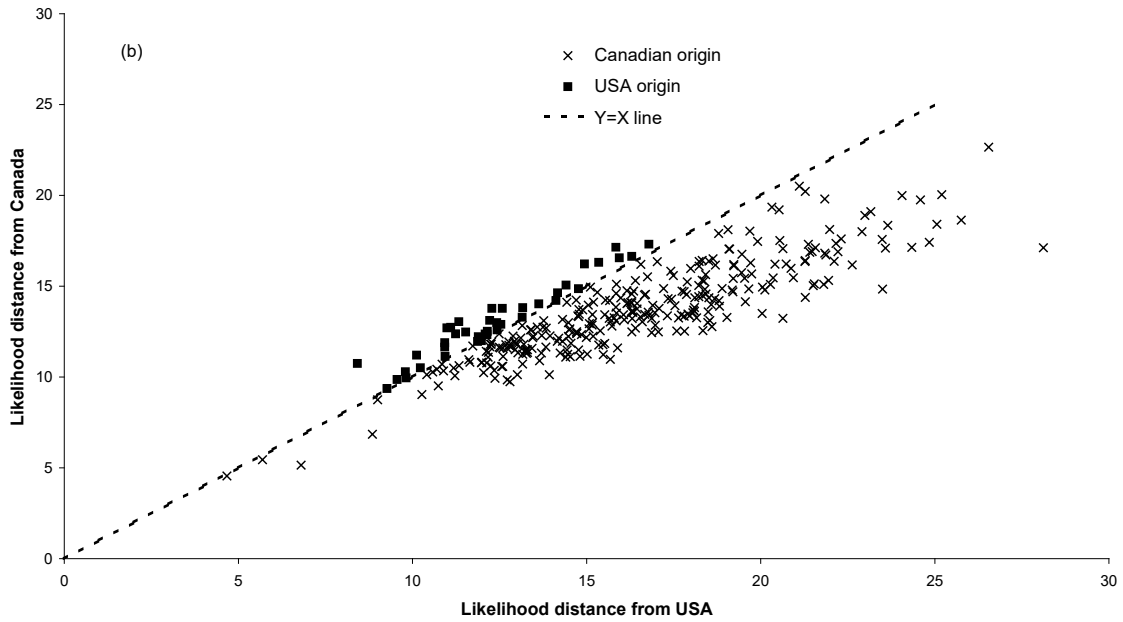


Fig 7.9.4.1. Relation between 1SW returns and corresponding MSW for total Québec returns (A) and 1SW and corresponding 2SW returns on St-Jean (B) and the Trinité Rivers (C).

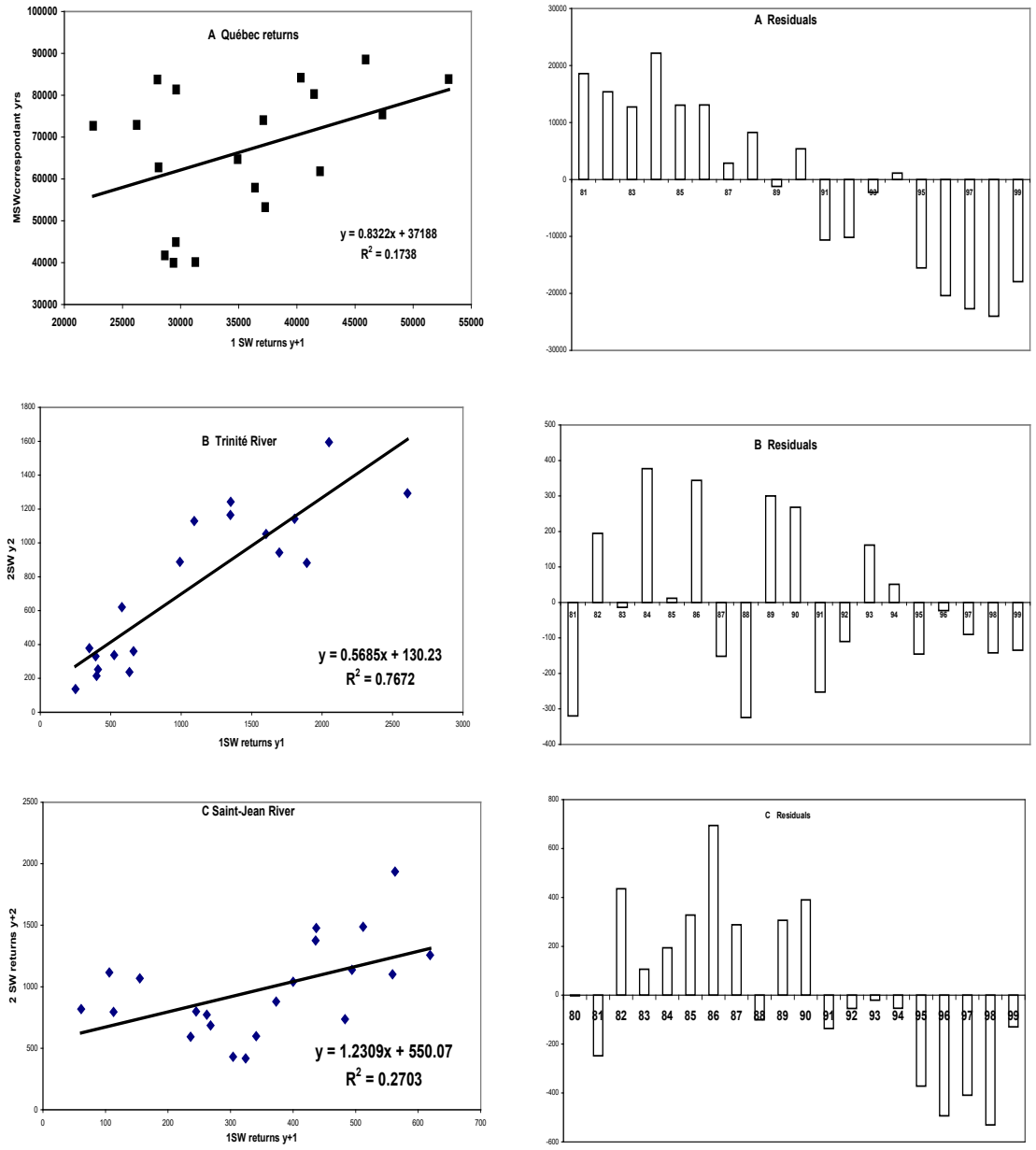


Figure 7.9.4.2. Phase shift in recruits per spawner for wild salmon in the LaHave River, NB Canada.

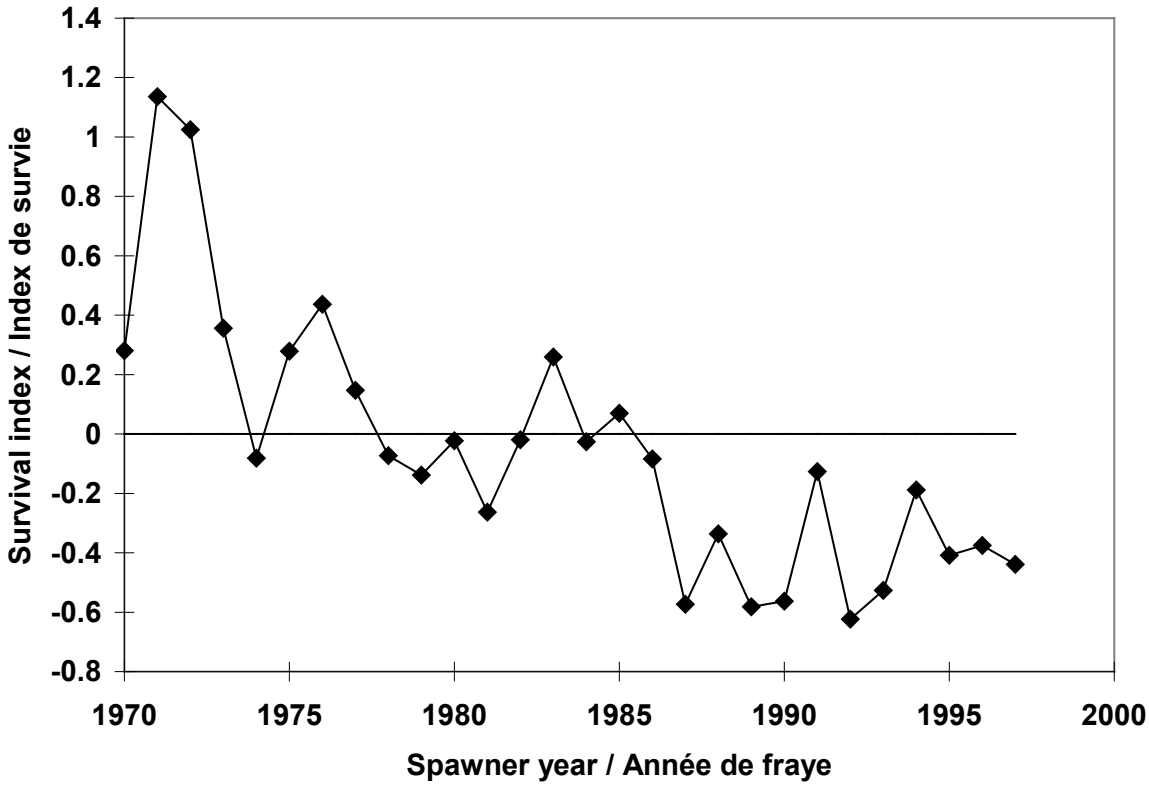


Figure 7.9.4.3. Lagged spawner index (upper panel), PFA (middle) and February habitat index (lower) used in the forecasting of PFA abundance for the NAC area.

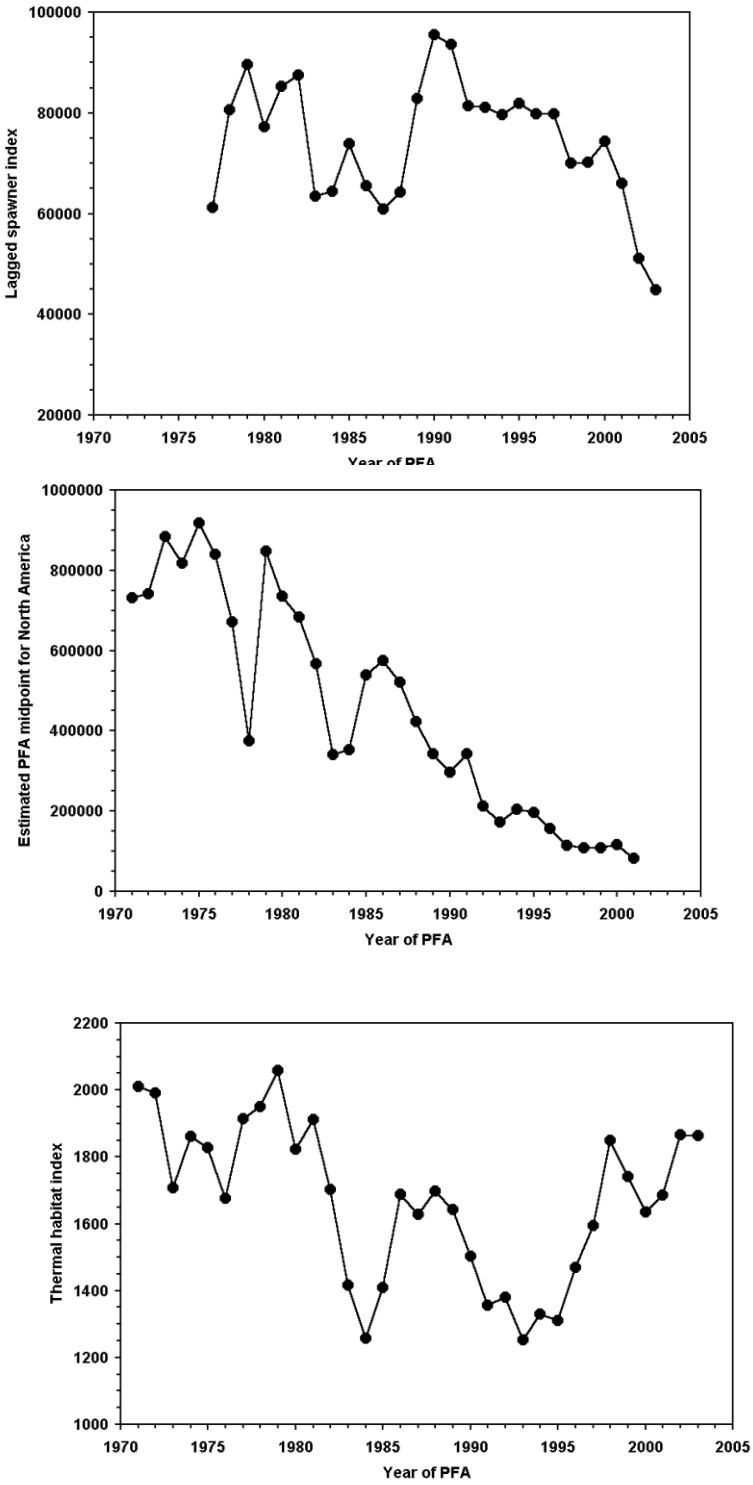


Figure 7.9.4.4. Standardized lagged spawners for Labrador, sum of other regions, and total for North America. Open symbols are data without Labrador spawner estimates.

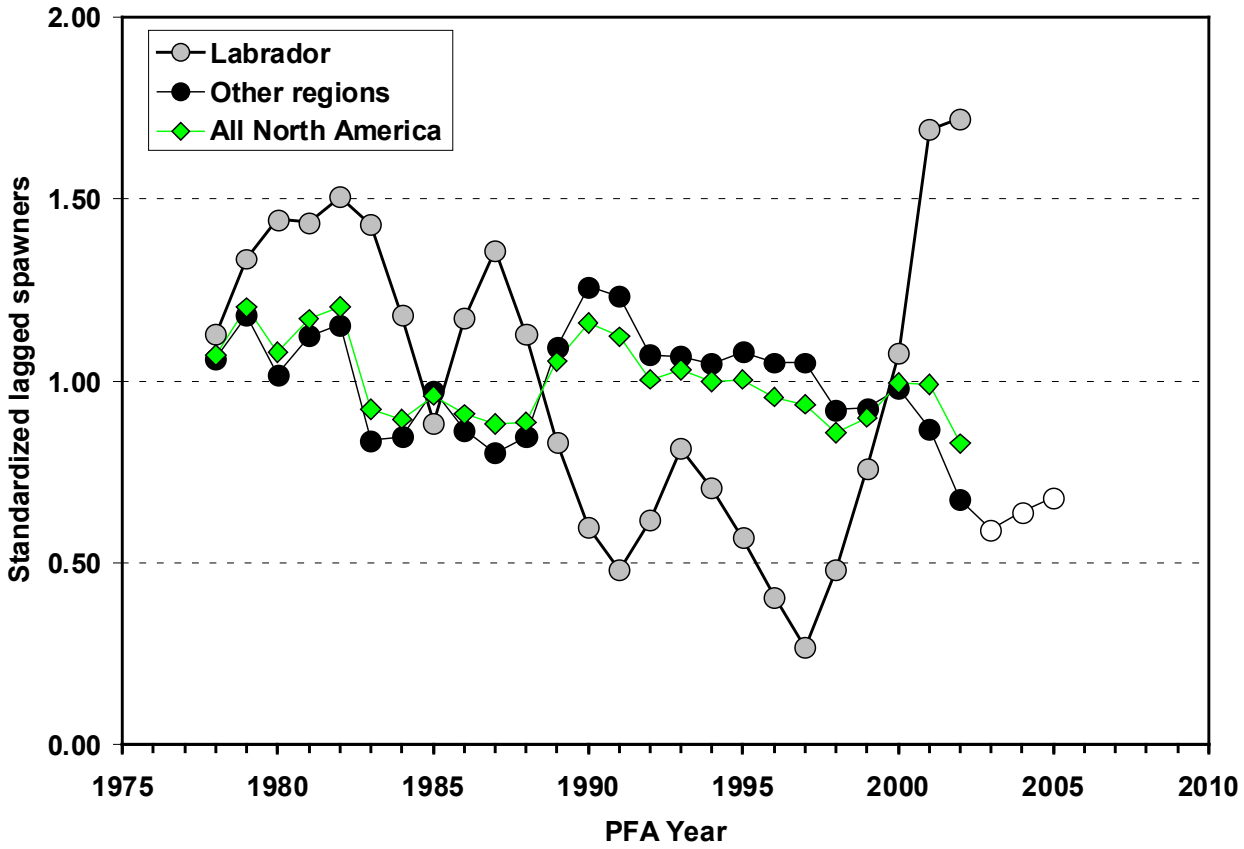


Figure 7.9.4.5. PFA (mid-point) and lagged spawner (mid-point) association for the NAC area showing the sequence from 1977 to 2001 (upper panel) and the relative change of the PFA (recruit) to lagged spawner index over the time series (lower panel).

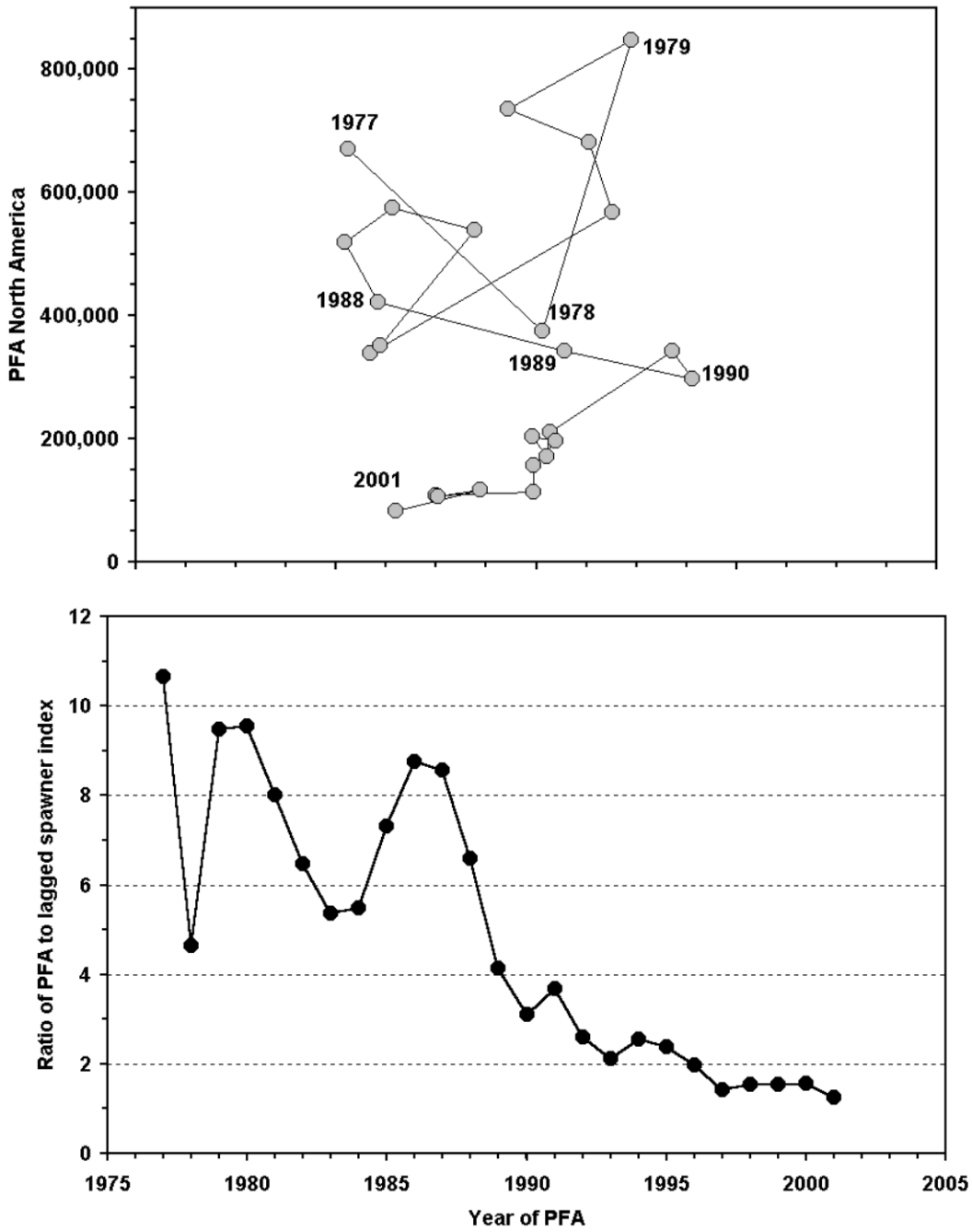


Figure 7.9.4.6. PFA (mid-point) and lagged spawner (mid-point) association for the NAC area modeled using an intercept variable to capture the dynamic change in productivity among the two time periods. The 1989 year was assigned using an uninformative prior to the time periods. The trend lines in the graph illustrate the PFA_{NA}/LS_{NA} trajectories for the two time periods.

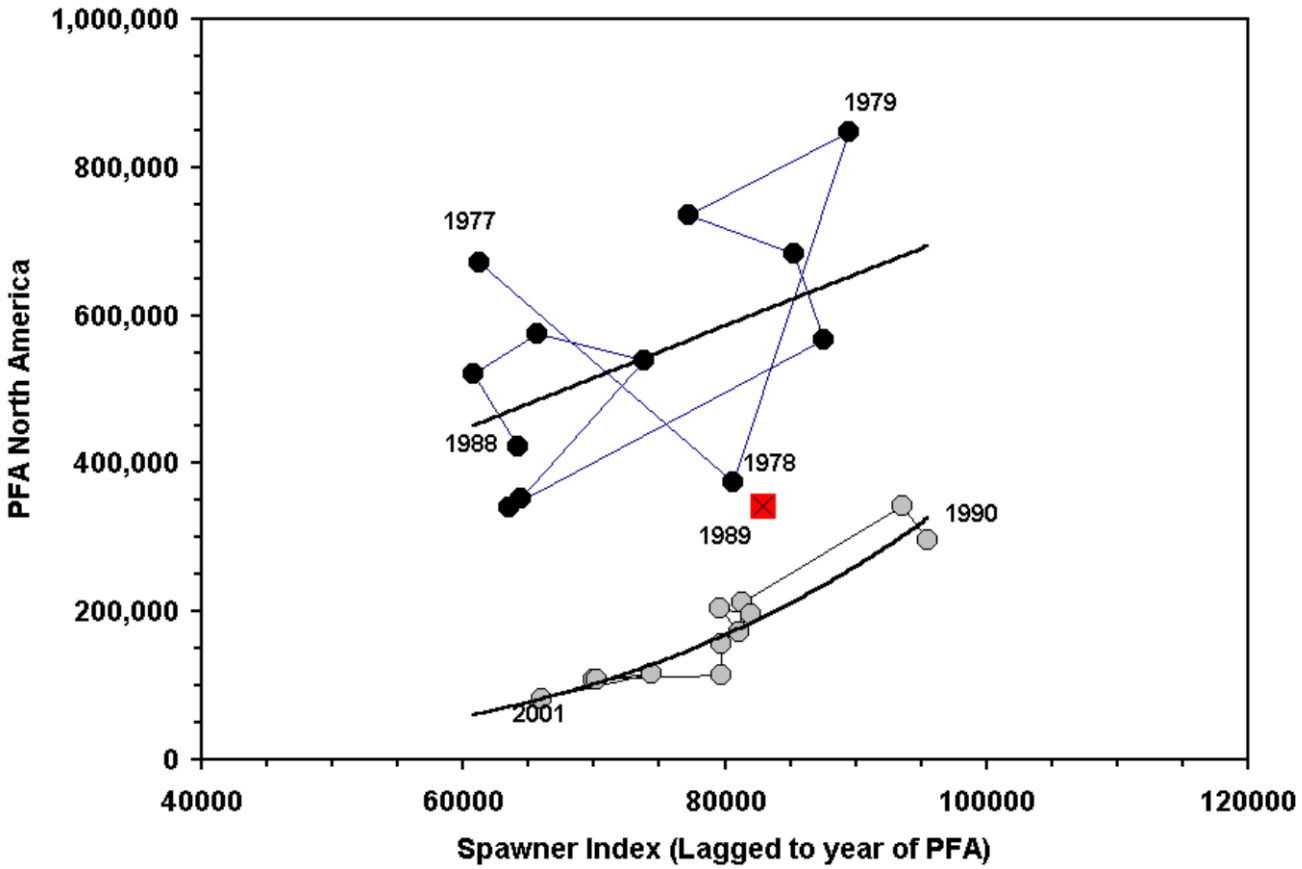
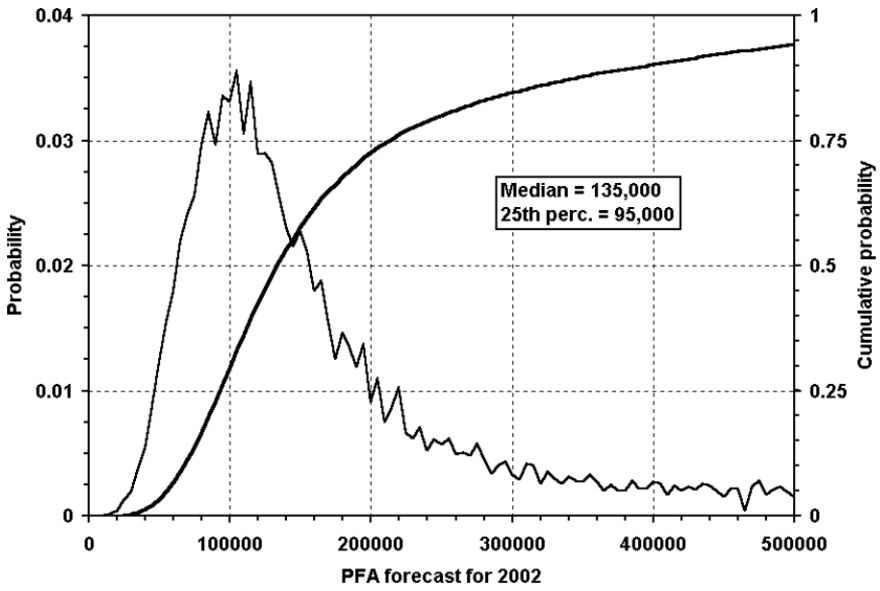


Figure 7.9.4.7. Revised PFA_{NA} estimate for the 2002 PFA year using the updated model (upper panel) and value forecast using the previous year's formulation (lower panel).



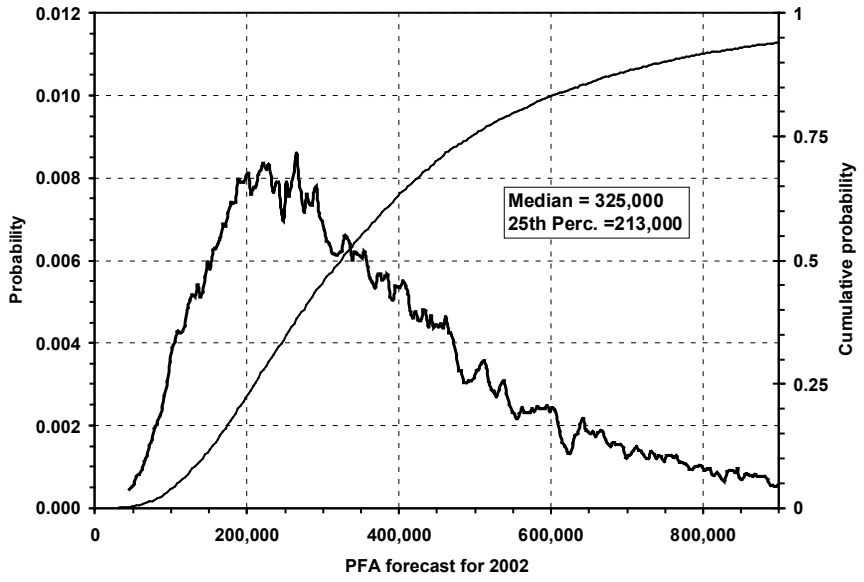
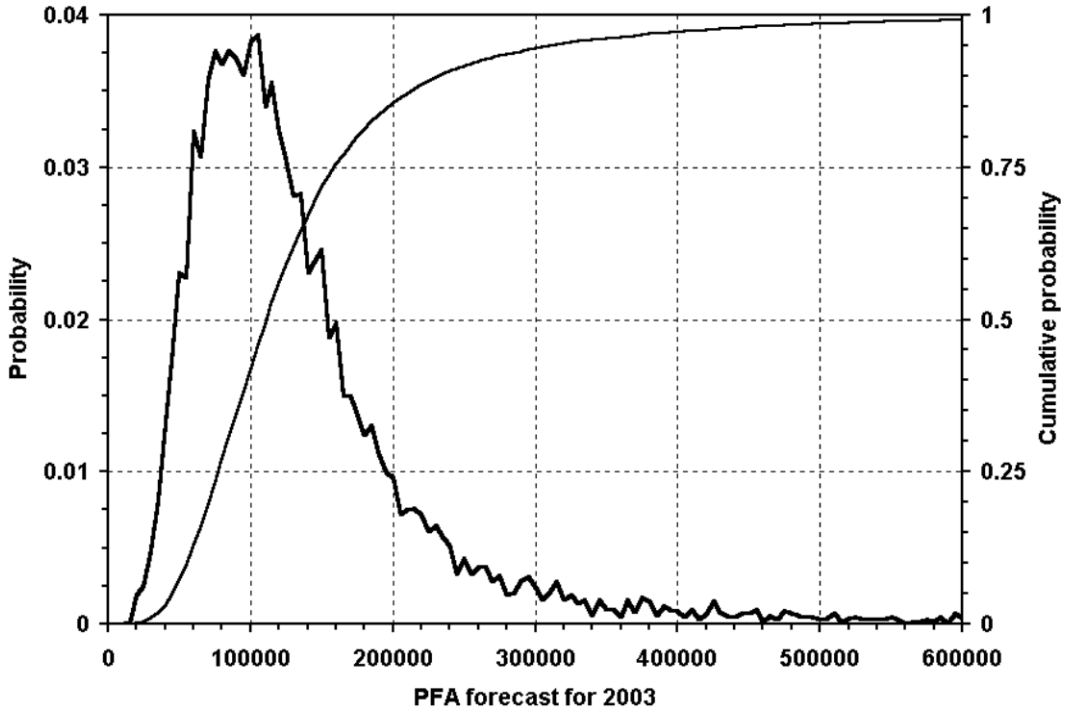


Figure 7.9.4.8. PFA_{NA} forecast estimate distribution for the year 2003 non-maturing 1SW salmon based on the phase shift and lagged spawner index model of 2003. The percentile of the forecast by 5% percentiles is shown in the lower panel.



Percentiles	PFA
5	45200
10	55800
15	63900
20	70800
25	77300
30	84200
35	90800
40	97800
45	104100
50	111400
55	118700
60	127000
65	136000
70	146400
75	158600
80	175400
85	196700
90	231900
95	311000

Figure 7.9.4.9. Average lagged spawners in the six regions of North America for the PFA years 1998 to 2002 and the 2SW spawner requirement in each region expressed as a proportion of the total for North America.

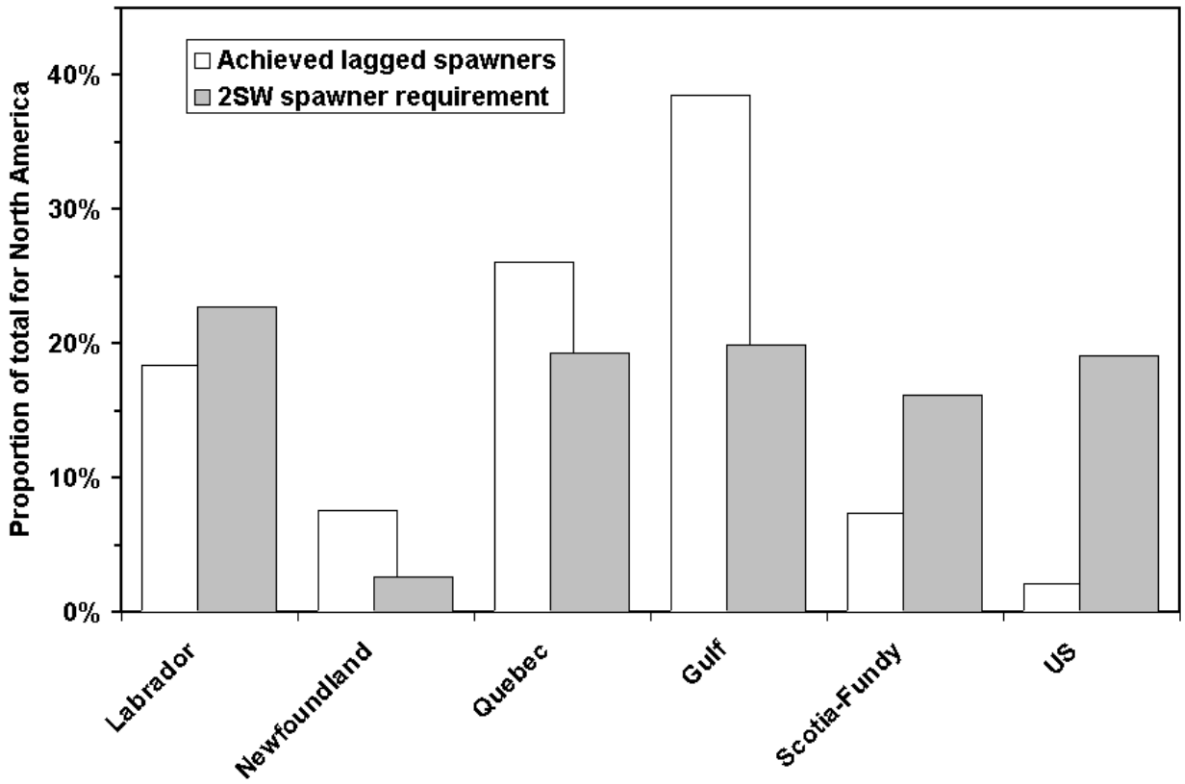


Figure 7.9.4.10. PFA_{NA} estimated for 1971 to 2001 and predicted PFA_{NA} for 2002 and 2003. There are two PFA_{NA} predictions for 2002. The open square is the value from the 2002 assessment using the lagged spawner variable, which included Labrador and excluded Gulf and US and the thermal habitat index. The dashed lines encompass the minimum to maximum range of the PFA estimated value. The shaded circles are the new model estimates for 2002 and 2003 using the revised lagged spawner index and a phase shift variable. The error bars on the predicted values describe the 5th to 95 th percentile range.

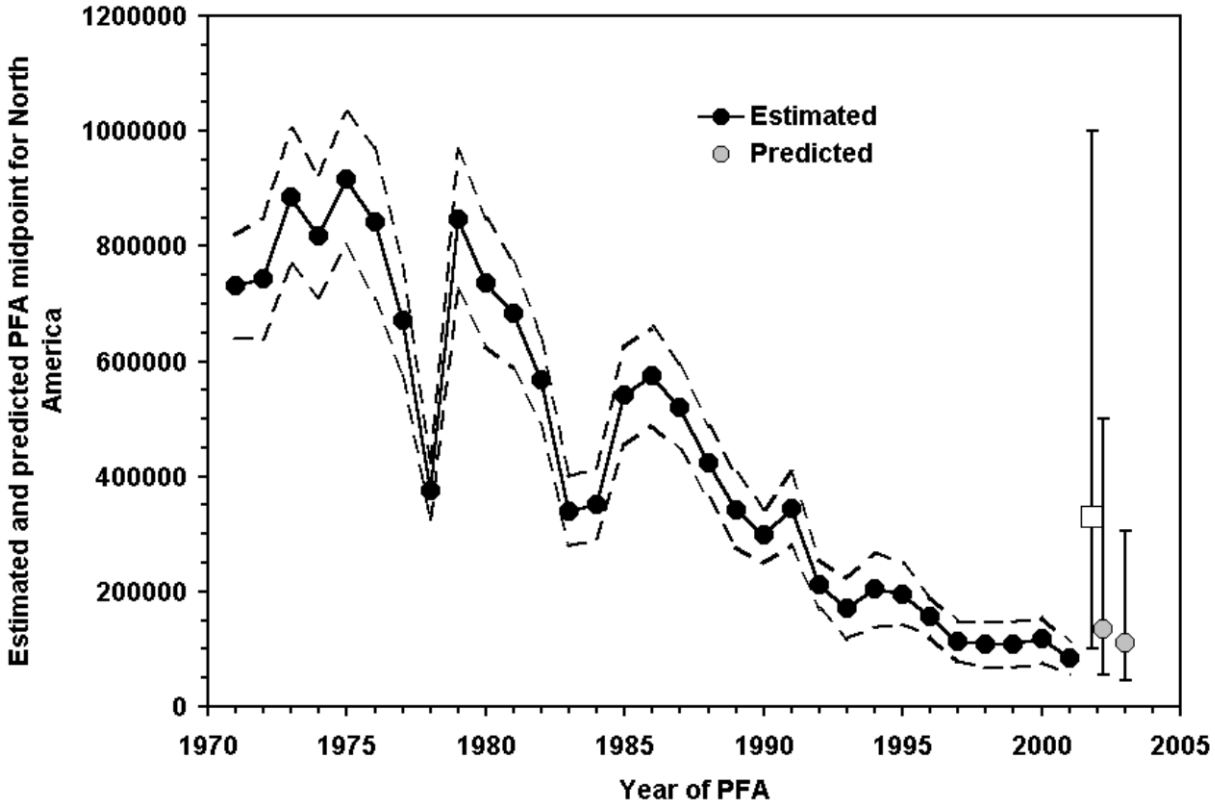


Figure 7.9.4.11. Observed estimates, jacknifed historical predictions, and simulated forecasts (Upper Panel A) of pre-fishery abundance from the multiplicative model with 1989 in Phase 1. The residual pattern from the jacknifed predictions is shown in the lower panel (Lower Panel B).

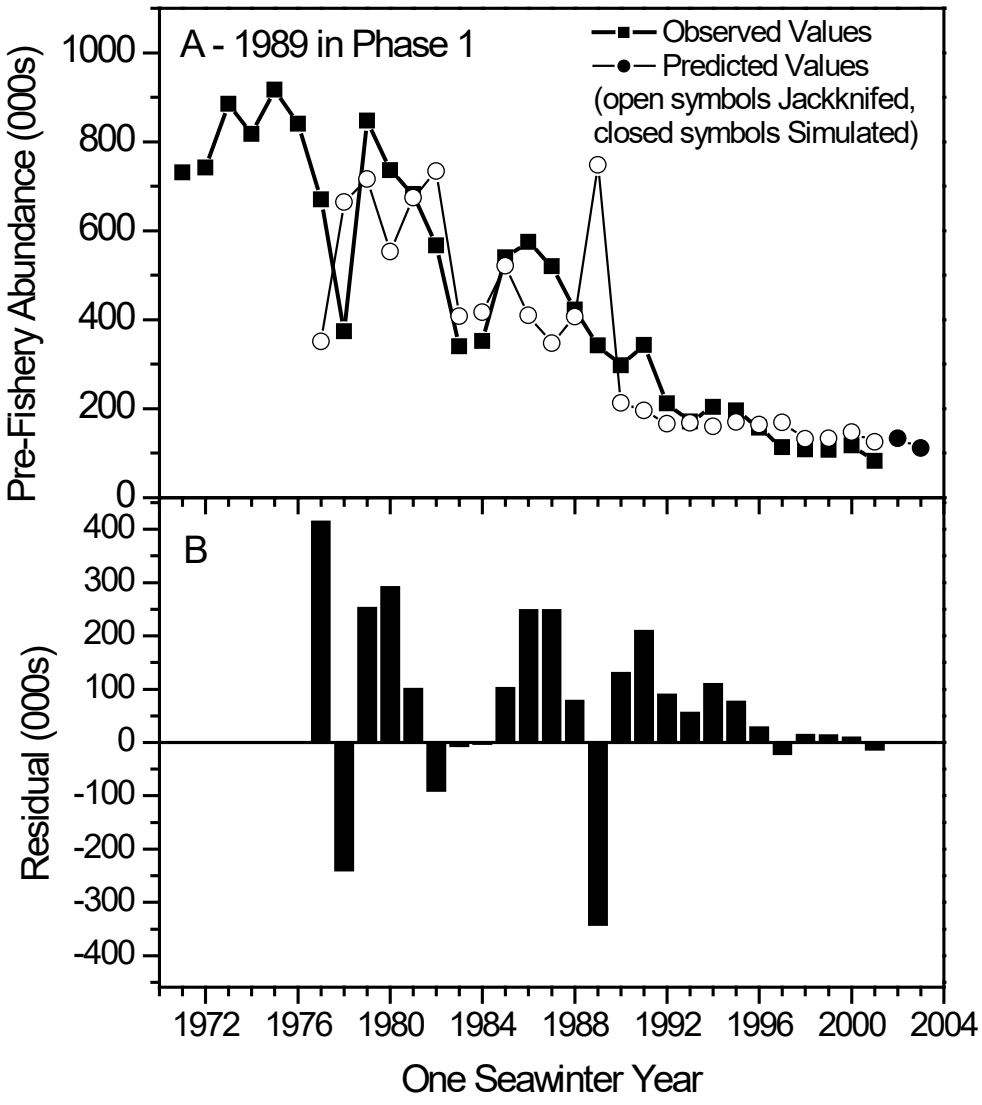
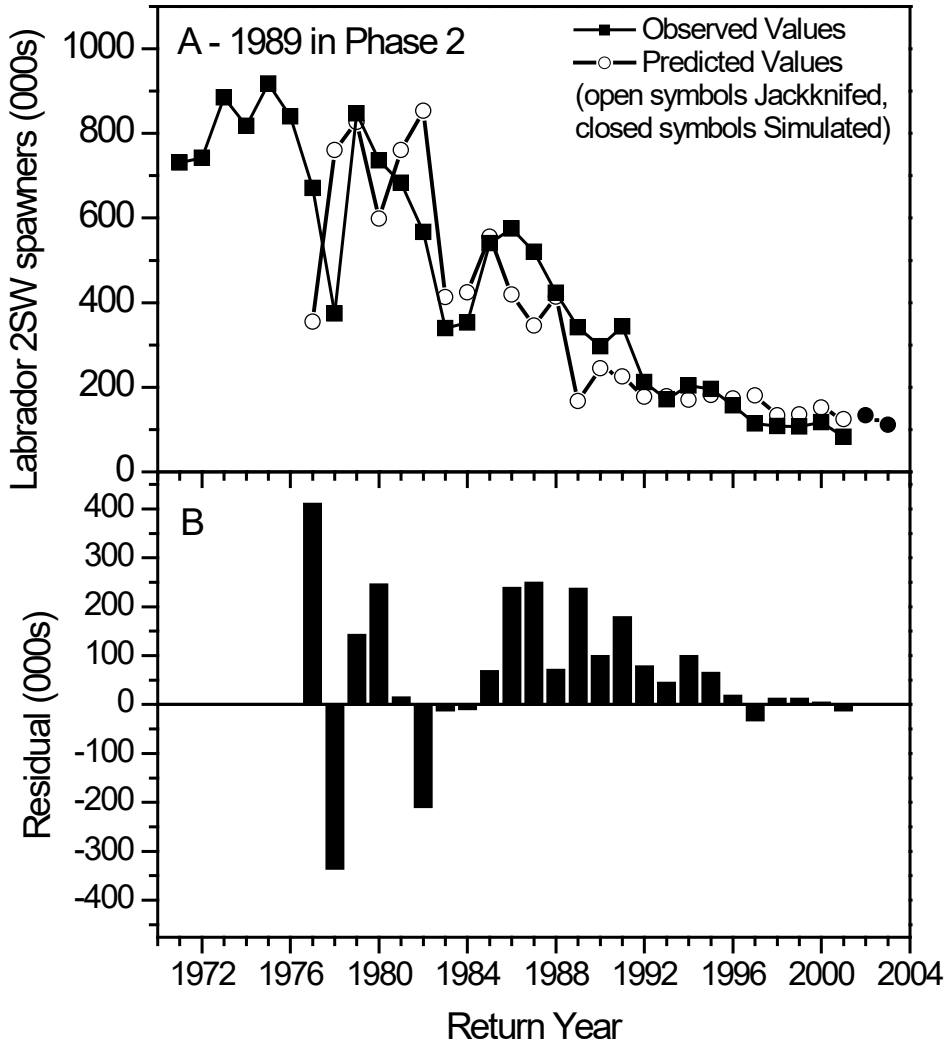


Figure 7.9.4.12. Observed estimates, jackknifed historical predictions, and simulated forecasts (Upper Panel A) of pre-fishery abundance from the multiplicative model with 1989 in Phase 2. The residual pattern from the jackknifed predictions is shown in the lower panel (Lower Panel B).



List of Participants

List of Participants

* Denotes Head of Delegation

CANADA

*Mr Guy Beaupré	Representative Department of Fisheries and Oceans, Ottawa, Ontario
Chief George Ginnish	Representative Eel Ground First Nation, New Brunswick
Mr Pierre Tremblay	Representative Sainte-Foy, Quebec
Mr Jacque Robichaud	President of NASCO Ottawa, Ontario
Mrs Julia Barrow	Department of Fisheries and Oceans, Ottawa, Ontario
Mrs Monique Begin	Societé de la faune et des parcs du Quebec, Quebec
Mr Peter Cronin	New Brunswick Department of Natural Resources and Energy, Fredericton, New Brunswick
Mr Jim Gillespie	Quispamsis, New Brunswick
Ms Nell Halse	New Brunswick Salmon Growers' Association, Letang, New Brunswick
Mr Murray Hill	Department of Fisheries, Pictou, Nova Scotia
Mr Sandi McGeachy	Department of Agriculture, Fisheries and Aquaculture, Fredericton, New Brunswick
Mr Brian Meaney	Department of Fisheries and Aquaculture, St John's, Newfoundland
Mr David Meerburg	Department of Fisheries and Oceans, Ottawa, Ontario
Mr John Moores	Department of Fisheries and Oceans, Ottawa, Ontario
Mr Rex Porter	Department of Fisheries and Oceans, St John's, Newfoundland
Ms Sue Scott	Atlantic Salmon Federation, New Brunswick
Mr Berkley Slade	Department of Fisheries and Oceans, St John's, Newfoundland

Mr William Taylor	Atlantic Salmon Federation, St Andrews, New Brunswick
Mr Serge Tremblay	Societé de la faune et des parcs du Quebec, Quebec
Mr Tim Young	Department of Fisheries and Oceans, Ottawa, Ontario

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

*Mr Emanuel Rosing	Representative Greenland Home Rule, Nuuk, Greenland
Mr Árni Olafsson	Representative Ministry of Foreign Affairs, Copenhagen, Denmark
Mr Hedin Weihe	Representative Ministry of Fisheries and Maritime Affairs, Torshavn, Faroe Islands
Mr Toennes Berthelsen	Organization of Fishermen and Hunters in Greenland, Nuuk, Greenland
Dr Jan Arge Jacobsen	Fisheries Laboratory of the Faroes, Torshavn, Faroe Islands
Mr Per Kanneworff	Greenland Institute of Natural Resources, Nuuk, Greenland
Mr Lars Dyrlov Madsen	Greenland Home Rule, Nuuk, Greenland
Mr John Rajani	Mission of the Faroe Islands to the United Kingdom, London, UK

EUROPEAN UNION

*Mr Ole Tougaard	Representative European Commission, Brussels, Belgium
Mr Andrew Thomson	Representative European Commission, Brussels, Belgium
Ms Carmen Beraldi	Secretaria General de Pesca, Madrid, Spain
Dr Malcolm Beveridge	Fisheries Research Services, Pitlochry, UK
Ms Elizabeth Black	Environment Agency, Penrith, UK
Dr Paul Brady	SEERAD, Edinburgh, UK
Ms Hazel Campbell	Department of Culture, Arts and Leisure, Belfast, UK

Mr Richard Cowan	DEFRA, London, UK
Mr David Dunkley	SEERAD, Edinburgh, UK
Mr Lal Faherty	Western Regional Fisheries Board, Galway, Ireland
Mr Peter Funegard	National Board of Fisheries, Gothenburg, Sweden
Dr Paddy Gargan	Central Fisheries Board, Dublin, Ireland
Mr Jose Luis Gonzalez Serrano	Secretaria General de Pesca Maritima, Madrid, Spain
Dr Lars Karlsson	National Board of Fisheries, Alvkarleby, Sweden
Ms Eija Kirjavainen	Ministry of Agriculture and Forestry, Department of Fisheries and Game, Helsinki, Finland
Mr Julian Maclean	Fisheries Research Services, Montrose, UK
Dr Guy Mawle	Environment Agency, Bristol, UK
Mr Pentti Munne	Ministry of Agriculture and Forestry, Department of Fisheries and Game, Helsinki, Finland
Mr John O'Connor	Central Fisheries Board, Dublin, Ireland
Mr George O'Doherty	Department of Communications, Marine and Natural Resources, Dublin, Ireland
Dr Niall Ó Maoileidigh	Marine Institute, Dublin, Ireland
Mr Ted Potter	Centre for Environment, Fisheries and Aquaculture Science, Lowestoft, UK
Mr Frank Sheridan	Department of Communications, Marine and Natural Resources, Dublin, Ireland
Dr Eric Verspoor	Fisheries Research Services, Aberdeen, UK
Mr Andrew Wallace	Association of Salmon Fishery Boards, Edinburgh, UK
Dr Ken Whelan	Marine Institute, Newport, Ireland

ICELAND

*Mr Guðmundur B Helgason	Representative Ministry of Agriculture, Reykjavik

Mr Arni Isaksson	Representative Directorate of Freshwater Fisheries, Reykjavik

NORWAY

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

RUSSIAN FEDERATION

*Dr Boris Prischepa	Representative Murmanrybvod, Murmansk
Dr Svetlana Krylova	Murmanrybvod, Murmansk
Ms Elena Samoylova	PINRO, Murmansk
Dr Alexander Zubchenko	PINRO, Murmansk

USA

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

Mr Scott Burns	World Wildlife Fund (USA), Washington, DC
Mr Stephen Chase	Atlantic Salmon Federation, St Andrews, New Brunswick
Ms Mary Colligan	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Tom Grasso	World Wildlife Fund (USA), Washington, DC
Mr Christopher Legault	National Marine Fisheries Service, Woods Hole, Massachusetts
Mr Joseph McGonigle	AquaBounty Farms, Waltham, Massachusetts
Mr Andrew Minkiewicz	US Senate, Oceans, Fisheries and Coast Guard Subcommittee, Washington, DC
Mr Pasquale Scida	National Marine Fisheries Service, Gloucester, Massachusetts
Mr Timothy Sheehan	National Marine Fisheries Service, Woods Hole, Massachusetts
Ms Boyce Thorne-Miller	SeaWeb, Washington DC
Ms Joan Trial	Maine Atlantic Salmon Commission, Bangor, Maine
Mr John Ward	National Marine Fisheries Service, Silver Spring, Maryland

STATES NOT PARTIES TO THE CONVENTION

Mr Oleksandr Tsvietkov	Consulate of the Ukraine, Edinburgh, UK

INTER-GOVERNMENT ORGANIZATIONS

Dr Walter Crozier	Chairman, ICES Working Group on North Atlantic Salmon, Bushmills, Northern Ireland
Mr David de G Griffith	International Council for the Exploration of the Sea, Copenhagen, Denmark
Dr Walter Ranke	International Baltic Sea Fishery Commission, Warsaw, Poland

NON-GOVERNMENT ORGANIZATIONS **

Mr Brian Davidson	Association of Salmon Fishery Boards, UK
Captain Jeremy Read Dr Derek Mills Dr Richard Shelton	Atlantic Salmon Trust, UK
Mr Chris Poupard	European Anglers Alliance
Mr Richard Behal Mr Noel Carr	Federation of Irish Salmon and Sea-Trout Anglers, Ireland
Mr Yves Giroux	Féderation Québecoise pour le saumon Atlantique, Canada
Mr Patrick Martin	Fondation Saumon, France
Mr John Gregory	Institute of Fisheries Management, UK
Mr Patrick Byrne	National Anglers Representative Association, Ireland
Mr Bjornulf Kristiansen	Norges Bondelag (Norwegian Farmers Union), Norway
Mr Aage Wold	Norskelakseelver (Norwegian Salmon Rivers), Norway
Mr Oyvind Fjeldseth	Norwegian Association of Hunters and Anglers, Norway
Mr William Shearer Mr Robert Ritchie	Salmon Net Fishing Association of Scotland, UK
Mr Paul Knight Mr Patrick Fothringham Mr David Henderson	Salmon and Trout Association, UK
Mr Ian Calcott Prof David Mackay	Scottish Anglers National Association, UK
Mr Newell McCreight	Ulster Angling Federation, UK

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

SALMON LIAISON GROUP REPRESENTATIVE

Mr James Ryan	Chairman, Salmon Liaison Group

SECRETARIAT

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

Support Staff

Ms Shauna Cranney	SEERAD, Edinburgh, UK