2015

REPORT OF THE THIRTY-SECOND ANNUAL MEETING OF THE COUNCIL

Happy Valley – Goose Bay, Canada

2 - 5 JUNE 2015

President:	Mr Steinar Hermansen (Norway)
Vice-President:	Mr Jóannes Hansen (Denmark (in respect of the Faroe Islands and Greenland))
Secretary:	Dr Peter Hutchinson

CNL(15)54

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Report of the Thirty-Second Annual Meeting of the Council of the North Atlantic Salmon Conservation Organization

Hotel North 2, Happy Valley-Goose Bay, Canada

2 - 5 June 2015

1. Opening of the Meeting

1.1 In the absence of the President, the Vice-President of NASCO, Mr Jóannes Hansen (Denmark (in respect of the Faroe Islands and Greenland)) opened the meeting. Mr Richard Nadeau, Head of the Canadian Delegation to NASCO welcomed delegates to the Thirty-Second Annual Meeting of NASCO. He indicated that it was a pleasure for Canada to welcome delegates to the beautiful location of Happy Valley – Goose Bay for such important discussions. Mr Carl McLean, Deputy Minister of Lands and Natural Resources, Nunatsiavut Government, welcomed delegates to Labrador, wished them an enjoyable stay and productive meeting and indicated that salmon is an important component for food security in the aboriginal food fishery. Mr Jamie Snook, Mayor of Happy Valley – Goose Bay made a welcoming address (Annex 1). Mr Craig Taylor, Director Northern Region, Northern Fisheries and Aquaculture, Government of Newfoundland and Labrador, welcomed delegates on behalf of the Government of Newfoundland and Labrador and wished them a productive meeting and stated that he hoped they would enjoy the surroundings and meeting local people. The Vice-President thanked the Canadian hosts for their welcoming addresses and then made an Opening Statement (Annex 2).

1.2 The representatives of Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, the Russian Federation and the United States of America made Opening Statements (Annex 3).

1.3 An Opening Statement was made by the representative of the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) (Annex 4).

1.4 An Opening Statement was made by the representative of the North Pacific Anadromous Fish Commission (NPAFC) (Annex 5).

1.5 An Opening Statement was made on behalf of the Non-Government Organisations (NGOs) attending the Annual Meeting (Annex 6).

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

1.7 A list of participants at the 32nd Annual Meetings of the Council and Commissions of NASCO is given in Annex 7.

2. Adoption of Agenda

2.1 The Council adopted its Agenda, CNL(15)47 (Annex 8).

3. Financial and Administrative Issues

3.1 Report of the Finance and Administration Committee

The Chairman of the Finance and Administration Committee, Mr Raoul Bierach (Norway), presented the report of the Committee, CNL(15)5. On the recommendation of the Committee, the Council took the following decisions:

(i) to accept the 2014 audited accounts, FAC(15)2;

(ii) to ask that the Vice-President of NASCO write to the Chairman of the OSPAR Commission with regard to the operation of the Memorandum of Understanding between the two organisations, and in particular concerning the OSPAR Commission's Draft Recommendation on Furthering the Protection and Conservation of the Atlantic salmon (*Salmo salar*) in Regions I, II, III and IV of the OSPAR Maritime area;

(iii) to adopt a budget for 2016 and to note a forecast budget for 2017, CNL(15)19 (Annex 9);

(iv) to appoint Chiene + Tait of Edinburgh as auditors for the 2015, 2016 and 2017 accounts, or such other company as may be agreed by the President, Chairman of the Finance and Administration Committee and Secretary;

(v) to authorise the Secretary to contribute a further sum of up to £10,000, subject to budgetary considerations, from the 2015 budget towards the film 'Atlantic salmon – Lost at Sea';

(vi) to adopt the report of the Finance and Administration Committee, CNL(15)5.

4. Scientific, Technical, Legal and Other Information

4.1 Secretary's Report

The Secretary made a report to the Council, CNL(15)6, on: the status of ratifications of, and accessions to, the Convention and membership of the regional Commissions; the receipt of contributions for 2015; applications for observer status to NASCO; applications to conduct scientific research fishing; fishing for salmon in international waters by non-NASCO Parties; NASCO's public relations work; the FAO FIRMS partnership; the possibility of organising an International Year of the Salmon that is being discussed within the North Pacific Anadromous Fish Commission (NPAFC); and any new studies relating to the socio-economic values of the wild Atlantic salmon.

He reported that no applications had been made to conduct scientific research fishing in accordance with the NASCO Resolution during 2015. There had been no changes to the status of ratifications of, and accessions to, the Convention or in the membership of the regional Commissions. All contributions for 2015 had been received, and there were no arrears.

There had been one application for NGO status from the Foyle Association of Salmon and Trout Anglers (FASTA) since the last Annual Meeting. The objectives of FASTA include encouraging and promoting measures designed to improve fish stocks. Following consultation with the President, observer status had been granted to FASTA. NASCO now has thirty-five organisations with accredited observer status.

The Secretary reported that the Norwegian and Icelandic coastguards had again been contacted to obtain details of airborne surveillance flights over the area of international waters north of the Faroe Islands, but that no information had been provided for the period from 1 April 2014 – 31 March 2015. No new information has been obtained from ports or about landings and transhipments over the last year to suggest that there has been any fishing for salmon by vessels from non-NASCO Parties. The External Performance Review Panel had concluded that NASCO had demonstrated that it had responded quickly to address IUU fishing in areas beyond fisheries jurisdiction by vessels registered to non-Parties. However, it felt that NASCO should consider enhancing its current surveillance efforts by requesting the cooperation of NEAFC and NAFO in reporting on any suspected IUU fishing activities for salmon that may be detected in their Monitoring, Control and Surveillance operations. A report on liaison with NEAFC and NAFO is contained in CNL(15)15.

Last year, the Council was advised that the North Pacific Anadromous Fish Commission (NPAFC) was considering organising an International Year of the Salmon (IYS). The Council had recognised that this may be a very good opportunity to raise awareness of the salmon globally, the issues facing them and the considerable efforts being made to conserve and restore them and had asked that the Secretary liaise with the NPAFC Secretariat and report back on any developments. A representative of NPAFC, Mr Mark Saunders, attended the 2015 Annual Meeting and made presentations to the International Atlantic Salmon Research Board (IASRB), its Scientific Advisory Group (SAG) and the Council. The Council agreed to ask the Secretary and the Head of the US Delegation, Mr Dan Morris, to continue to liaise with NPAFC on arrangements for an IYS and to consider NASCO's possible involvement in, and contribution to, such an initiative.

4.2 **Report on the Activities of the Organization in 2014**

In accordance with Article 5, paragraph 6 of the Convention, the Council adopted a Report on the Activities of the Organization in 2014, CNL(15)7.

4.3 **Announcement of the Tag Return Incentive Scheme Grand Prize**

The Vice-President announced that the winner of the $2,500 Grand Prize was Mr Eirik Monge, Vigrestad, Norway. The winning tag was of Norwegian origin and had been applied to a hatchery smolt released in the river Imsa in April 2013. It was recaptured in Fuglestadelva, Rogaland, Norway on 16 August 2014, weighing 1.1kg. The Council offered its congratulations to the winner.

4.4 **Scientific Advice from ICES**

The representative of ICES presented the report of the Advisory Committee (ACOM), CNL(15)8 (Annex 10). The Chairman of the Finance and Administration Committee indicated that ICES had asked NASCO for feedback on the format of the advice. The Committee had asked that the Secretary liaise with ICES on some possible changes to the format of the ACOM report. The representative of the European Union highlighted a number of additional changes to the format of the advice.

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

The Report of the Meeting of the Board, CNL(15)9 (Annex 11), was presented by its Chairman, Mr Raoul Bierach (Norway).

4.6 **Report of the Working Group on Stock Classification**

In 2014, the Council had recognised the value of a consistent and uniform approach to presenting information on stock status for use with the rivers database and had established a Working Group (comprising Raoul Bierach (Norway), Gérald Chaput (Canada), Stephen Gephard (USA) (Chairman) and John McCartney (European Union)) with the following Terms of Reference:

1. Recommend a classification system to be used by jurisdictions to indicate stock status relative to conservation limits, or where these have not been established other reference points or indicators of abundance.

2. Develop recommendations to address the following:
    a. What time period the stock indicators cover (e.g. annual, averaged over five years);
    b. Frequency of updates;
    c. How the absence of any data will be reported; and
    d. How other relevant information to describe stock status can be taken into account in relation to NASCO's goals for salmon management, e.g. biodiversity and harvestable surplus.

3. Recommend changes to the NASCO Rivers database to implement the recommended classification system.

The Chairman advised the Council that there had been inter-sessional exchanges by correspondence and the Group had met during the Annual Meeting. An interim report was presented verbally to the Council. The Chairman indicated that the Group had considered that a system based exclusively on Conservation Limits would be overly simplistic. A second category was, therefore, added that requires the local agency to assess the various impacts that are affecting a stock and represent the severity of those impacts with a numerical code. Such impacts could include hydropower development, genetic threats from aquaculture escapees, excessive harvest, selective harvest and many other things. The Working Group will provide a spreadsheet into which the Parties will be requested to enter the names of their rivers as well as their Conservation

Limit range and the Impact Assessment Score and the spreadsheet will automatically assign the stock into a Stock Classification Category, of which there will be seven (the same number as exists currently) for the rivers database. It should be noted that the Impact Assessment Code will not be able to elevate a stock to a lower risk category than dictated by its Conservation Limit. It can only lower a stock to a higher risk category if there are factors that warrant such a move. There will be opportunities to use other factors to assist with category assignment if there is no Conservation Limit calculated for a particular river. Each stock category will have a unique colour assigned to it for use in the web-based Rivers Database map.

There are more details to be developed, including guidance for Parties when assigning scores to their rivers. It is the intent of the Working Group to work on the additional details inter-sessionally prior to the 2016 Annual Meeting so as to submit a proposal to the Council for its consideration at that meeting.

4.7 Report of the Standing Scientific Committee

The Acting Chairman of the Standing Scientific Committee (SSC), Dr Paddy Gargan (European Union), presented a draft request to ICES for scientific advice. Upon the recommendation of the Committee, the Council adopted a request for scientific advice from ICES, CNL(15)11 (Annex 12).

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

5.1 Special Session: Evaluation of Annual Progress Reports under the 2013 – 2018 Implementation Plans

The primary purpose of the Annual Progress Reports (APRs) under the 2013 – 2018 Implementation Plans is to provide details of: any changes to the management regime for salmon and consequent changes to the Implementation Plans; actions that have been taken under the Implementation Plans in the previous year; significant changes to the status of stocks, and a report on catches; and actions taken in accordance with the provisions of the Convention.

The 2015 APRs are contained in documents CNL(15)21 to CNL(15)38 and CNL(15)40. A summary of the 2015 returns (CNL(15)13) was presented. As in 2014, the 2015 APRs had been subject to a critical evaluation by a Review Group. The purpose of the evaluation was to ensure that jurisdictions had provided a clear account of progress in implementing and evaluating the actions detailed in their Implementation Plans, along with the information required under the Convention.

Mr Ted Potter (European Union) presented the report of the Implementation Plan/Annual Progress Report Review Group, CNL(15)12 (Annex 13), during a Special Session of the Council. Where shortcomings had been identified in the APRs, the Review Group had developed questions which were sent to the jurisdictions with a request that they provide written responses prior to the Annual Meeting. These responses are contained in CNL(15)18 (Annex 14). There were wide-ranging discussions during the Special Session and these are contained in CNL(15)51 (Annex 15).

The Review Group had highlighted that evaluating the progress made on actions was very difficult when the descriptions of the planned actions in the IP were vague or imprecise. It had also indicated that APRs should not rely on links to information on the internet but should provide a brief, stand-alone summary of the progress made. The Review Group had also noted that a number of the 2015 APRs had provided similar information to that provided in 2014. Overall, the Review Group had considered that the most common fault with the information provided on progress with actions was a lack of quantitative information on what has been achieved and/or what the results have been and all Parties/jurisdictions had been asked to address this in future APRs. The Review Group had also highlighted that timely reporting was essential if the evaluations were to be fair and balanced. The Council asked that the Secretary highlight these issues when requesting the 2016 APRs. The Council asked that the Review Group meet for two days to undertake the evaluations of the 2016 APRs.

5.2 **Theme-based Special Session: 'Maintaining and improving river connectivity with particular focus on impacts of hydropower'**

At its Thirty-First Annual Meeting, the Council had asked the APR Review Group to identify a topic for a half day Theme-based Special Session to be held during the 2015 Annual Meeting and develop a Programme. The Review Group had noted that several IPs and APRs had highlighted threats and management challenges posed by obstructions, including hydropower facilities, to both upstream and downstream salmon migration. While progress in improving river connectivity had been reported, including closure of some hydropower stations and dam removal projects, concerns had been expressed about the increase in applications for 'run of the river' hydropower installations in salmon rivers in response to the need to meet renewable energy targets. The Review Group had, therefore, agreed that the topic of the 2015 Theme-based Special Session should be 'Maintaining and improving river connectivity, with particular focus on impacts of hydropower'. A Programme for the session had been developed, CNL(15)14. The objectives of the Session were to:

1. Balance the pressures to refurbish existing and install new obstructions against the potential impacts on river connectivity, with particular reference to hydropower developments;
2. Mitigate the impacts of existing obstructions, including hydropower schemes, on salmon populations;
3. Evaluate the benefits and costs of removing dams and other obstructions.

The report of the Theme-based Special Session is contained in document CNL(15)56. The Council agreed to hold a one-day Theme-based Special Session during its 2016 Annual Meeting on the theme of developments in relation to minimising the impacts of farmed salmon on wild salmon stocks. A Steering Committee, comprising Ms Heidi Hansen (Norway), Dr Paddy Gargan (European Union), Mr Willie Cowan (European Union), Mr Paul Knight (NGOs) and a representative from the United States was appointed to work with the Secretary in developing a Programme and Objectives for the session.

5.3 **Progress in implementing the 'Action Plan for Taking Forward the Recommendations of the External Performance Review and the Review of the 'Next Steps' for NASCO', CNL(13)38**

In 2013, the Council had adopted an 'Action Plan for taking forward the recommendations of the External Performance Review and the review of the 'Next Steps' for NASCO' (CNL(13)38). The Secretary reported on progress in implementing the recommendations in the Action Plan, CNL(15)15 (Annex 16). The recommendations in the plan relate to:

- actions which had been implemented or planned at the time the 'Action Plan' was developed and for which there was a need to monitor progress and evaluate outcomes (section 1);
- new actions developed in response to the recommendations contained within the External Performance Review Report and the review of the 'Next Steps' for NASCO (section 2);
- actions to strengthen NASCO's work on the management of salmon fisheries (section 3).

The Council welcomed the progress that had been made to implement the recommendations. The Secretary was asked to continue to liaise with NEAFC and NAFO in relation to IUU fishing by non-NASCO Parties and by-catch in pelagic fisheries. The Secretary was also asked to seek cooperation from ICCAT with regard to any information relating to IUU fishing for salmon by non-NASCO Parties. A further update on progress would be presented at the 2016 Annual Meeting.

5.4 **Liaison with the Salmon Farming Industry**

In 2013, the Council agreed that an item should be retained on its Agenda entitled 'Liaison with the Salmon Farming Industry', during which a representative of the International Salmon Farmers' Association (ISFA) would be invited to participate in an exchange of information on issues concerning impacts of aquaculture on wild salmon. The regular meetings of the Liaison Group would not be continued, but, if a specific need arose, consideration could be given to convening a joint *Ad hoc* group. The Vice-President indicated that the Secretary had consulted the President of ISFA, Mr Trond Davidson, who had indicated that ISFA would be represented at the Thirty-Second Annual Meeting by Mr Murray Hill (Canada) but that it did not intend to raise any issues with the Council. The item will be retained on the Agenda for the 2016 Annual Meeting.

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

In accordance with the 'Strategic Approach for NASCO's Next Steps', this item had been included on the Council's Agenda and ICES had been requested to provide relevant information, which is contained in document CNL(15)8. This information included new opportunities for sampling salmon at sea, new opportunities for collecting information on salmon bycatch in pelagic fisheries and an update on sea lice investigations in Norway. Relevant information is also presented in the summary of Annual Progress Reports, CNL(15)13.

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

In 2014, the Council agreed that Parties/jurisdictions be requested to advise the Secretariat of any new studies relating to the socio-economic values of the wild Atlantic salmon and that future Theme-based Special Sessions be held on integrating socio-economic factors in decisions relating to habitat protection, restoration and enhancement and to aquaculture. An update on any new information provided is contained in the Secretary's Report (see paragraph 4.1 above). None had been provided.

5.7 **Management and Sampling of the St Pierre and Miquelon Salmon Fishery**

A report on the management of the salmon fishery at St Pierre and Miquelon, CNL(15)16 (Annex 17), was presented by the representative of France (in respect of St Pierre and Miquelon). This report was also considered in the North American Commission.

The representative of Canada thanked France (in respect of St Pierre and Miquelon) for the presentation and stressed the need for enhanced involvement of France (in respect of St Pierre and Miquelon) in NASCO as a full member. He referred to the depleted state of salmon stocks in Canada and the need for harvest controls in the fishery. The representative of the United States supported the statement by Canada and expressed concern about the continuance of the fishery without agreement within NASCO. He noted that while the catch had declined in 2014, compared to 2013, the number of permits had increased and if all fishermen had catches at the same level as the most successful then the total catch would have been large. There had been additional discussions concerning the fishery at St Pierre and Miquelon during the meeting of the North American Commission. The representative of France (in respect of St Pierre and Miquelon) indicated that the reporting to NASCO on the management of the fishery would continue as would the scientific sampling programme and there will be further discussions in Paris, in conjunction with St Pierre and Miquelon, about future participation in NASCO's work.

5.8 **Reports on the Conservation Work of the Three Regional Commissions**

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

6. Other Business

6.1 The representative of Denmark (in respect of the Faroe Islands and Greenland) made a closing statement (Annex 18).

6.2 The representative of the European Union thanked the representative of Denmark (in respect of the Faroe Islands and Greenland) for the positive message in its closing statement and indicated that her delegation was pleased with the result achieved in the West Greenland Commission. This had involved a huge amount of work and the European Union acknowledged the strong commitment of Greenland to the measure adopted and she looked forward to working together with other members of the Commission in the future. The representative of Canada echoed the views expressed by the European Union and stressed that Canada is committed to working in cooperation

with Greenland. He acknowledged the hard work undertaken and expressed a willingness to work with Greenland in future. The representative of the United States thanked Denmark (in respect of the Faroe Islands and Greenland) for its closing statement and its commitment to the work of the Commission. He looked forward to working cooperatively with Greenland and the other members of the Commission in future.

7. Date and Place of Next Meeting

7.1 In 2014 the Council had accepted an invitation from the European Union to hold its Thirty-Third Annual Meeting during 7 – 10 June 2016 in Germany. The representative of the European Union advised the Council that the Thirty-Third Annual Meeting would be held in Bad-Neuenahr, Germany.

7.2 The Council agreed to hold its Thirty-Fourth Annual Meeting during 6 – 9 June 2017 at a location to be decided.

8. Report of the Meeting

8.1 The Council agreed the report of its meeting.

9. Press Release

9.1 The Council agreed a Press Release, CNL(15)53 (Annex 19).

Note: The annexes mentioned above begin on page 21, following the French translation of the report of the meeting. A list of Council papers in included in Annex 20.

CNL(15)54

Compte rendu de la trente-deuxième session annuelle du Conseil de l'Organisation pour la conservation du saumon de l'Atlantique Nord

Hotel North 2, Happy Valley-Goose Bay, Canada

2 - 5 juin 2015

1. Ouverture de la session

1.1 En l'absence du Président, le Vice-Président de l'OCSAN, M. Jóannes Hansen (Danemark (pour les Iles Féroé et le Groenland)) a ouvert la session. M. Richard Nadeau, Directeur de la délégation canadienne auprès de l'OCSAN a accueilli les délégués à la Trente-deuxième session annuelle de l'OCSAN. Il a indiqué que c'était un plaisir pour le Canada d'accueillir des délégués dans la région magnifique de Happy Valley – Goose Bay pour des discussions aussi importantes. M. Carl McLean, Ministre-adjoint du Gouvernement du Nunatsiavut pour les Ressources naturelles, a accueilli les délégués au Labrador, leur a souhaité un agréable séjour et une réunion productive et a indiqué que le saumon est une composante importante pour la sécurité alimentaire de la pêcherie alimentaire aborigène. M. Jamie Snook, Maire de Happy Valley – Goose Bay a présenté un discours de bienvenue (Annexe 1). M. Craig Taylor, Directeur de la région Nord, des Pêcheries et de l'Aquaculture du Nord, Gouvernement de Terre Neuve et Labrador, a accueilli les délégués au nom du Gouvernement de Terre Neuve et Labrador et leur a souhaité une réunion productive et a déclaré qu'il souhaitait qu'ils profitent des environs et rencontrent la population locale. Le Vice-Président a remercié les hôtes Canadiens pour leurs discours de bienvenue, il a ensuite présenté une Déclaration d'ouverture (Annexe 2).

1.2 Les représentants du Canada, du Danemark (pour les Iles Féroé et le Groenland), de l'Union européenne, de la Norvège, de la Fédération de Russie et des Etats-Unis ont prononcé des déclarations d'ouverture (Annexe 3).

1.3 Une déclaration d'ouverture a été prononcée par le représentant de la Commission européenne consultative pour les pêches et l'aquaculture dans les eaux intérieures (CECPAI) (Annexe 4).

1.4 Une déclaration d'ouverture a été prononcée par le représentant de la Commission du poisson anadrome du Pacifique Nord (CPAPN) (Annexe 5).

1.5 Une déclaration d'ouverture a été prononcée au nom d'Organisations Non Gouvernementales (ONGs) présentes à la Session annuelle (Annexe 6).

1.6 Le Vice-Président a exprimé son appréciation aux Parties et aux organisations observatrices pour ces déclarations et a clos l'ouverture de la session.

1.7 Une liste des participants à la trente-deuxième session annuelle du Conseil et des Commissions de l'OCSAN est donnée en Annexe 7.

2. Adoption de l'ordre du jour

2.1 Le Conseil a adopté son ordre du jour, le CNL(15)47 (Annexe 8).

3. Questions financières et administratives

3.1 Rapport du Comité financier et administratif

Le Président du Comité financier et administratif, M. Raoul Bierach (Norvège), a présenté le rapport du Comité, CNL(15)5. Sur les conseils du Comité, le Conseil a pris les décisions suivantes :

(i) accepter les comptes vérifiés de 2014, FAC(15)2;

(ii) demander que le Vice-président de l'OCSAN écrive au Président de la Commission OSPAR concernant le fonctionnement du Mémorandum d'entente entre les deux organisations et en particulier l'Ebauche de recommandation sur la promotion de la protection et conservation du saumon Atlantique (Salmo salar) de la Commission OSPAR dans les Régions I, II, III et IV de la zone maritime d'OSPAR;

(iii) d'adopter un budget pour 2016 et de noter un budget prévisionnel pour 2017, CNL(15)19 (Annexe 9);

(iv) mandater Chiene + Tait d'Edimbourg en tant que commissaires aux comptes pour 2015, 2016 et 2017, ou toute autre société convenue par le Président, le Président du Comité financier et administratif et le Secrétaire;

(v) autoriser le Secrétaire à contribuer un montant supplémentaire pouvant aller jusqu'à £10,000, sous réserve des considérations budgétaires, tiré du budget 2015 pour le film 'Saumon Atlantique – Perdu en mer' ;

(vi) adopter le rapport du Comité financier et administratif, CNL(15)5.

4. Informations scientifiques, techniques, juridiques et autres

4.1 Rapport du Secrétaire

Le Secrétaire a fait un rapport au Conseil, CNL(15)6, sur : les statuts de ratifications de, et d'accession à la Convention ; le statut de membre des Commissions régionales; la réception des contributions pour 2015; les demandes effectuées pour le statut d'observateur de l'OCSAN; les demandes effectuées pour mener une pêche à des fins de recherche scientifique; pêche au saumon en eaux internationales par des Parties extérieures à l'OCSAN ; travail de relations publiques de l'OCSAN; le partenariat des FAO FIRMS; la possibilité d'organiser une année internationale du saumon, possibilité qui est actuellement discutée avec la Commission du poisson anadrome du Pacifique Nord (CPAPN); et toutes nouvelles études relatives aux valeurs socio-économiques du saumon Atlantique sauvage.

Il a rapporté qu'il n'y avait eu aucune candidature pour exercer une pêche à des fins de recherches scientifiques conformément à la Résolution de l'OCSAN courant 2015. Aucun changement aux statuts des ratifications ou aux accessions à la Convention ou

au statut de membre des Commissions régionales. Toutes les contributions pour 2015 ont été reçues, et il n'y avait pas d'arriérés.

Une candidature au statut d'ONG a été effectuée par la Foyle Association of Salmon and Trout Anglers (FASTA) depuis la dernière Session annuelle. Les objectifs de la FASTA incluent des mesures d'encouragement et de promotion conçues pour améliorer les stocks de poisson. Suite à une consultation avec le Président, le statut d'observateur a été accordé à la FASTA. Trente-cinq organisations ont maintenant le statut d'observateur accrédité de l'OCSAN.

Le Secrétaire a rapporté que les garde-côtes norvégiens et islandais avaient encore une fois été contactés pour obtenir des informations sur les vols de surveillance aérienne au-dessus de la zone des eaux internationales au nord des Iles Féroé, mais qu'aucunes informations n'avaient été fournies pour la période du 1 avril 2014 – 31 mars 2015. Aucunes nouvelles informations n'ont été obtenues de la part des ports ou au sujet des atterrissages et transbordements au cours de l'année actuelle qui permettre de suggérer qu'il y a eu de la pêche au saumon par des navires de Parties extérieures à l'OCSAN. Le Comité externe de révision de la performance avait conclu que l'OCSAN avait fait la preuve qu'ils avaient réagi rapidement pour traiter la pêche INN au-delà de la zone de juridiction de pêche par des navires portant pavillon de pays non membres. Cependant, le sentiment était que l'OCSAN devrait envisager de renforcer leurs efforts de surveillance en demandant la coopération de la CPANE et la NAFO en rapportant toute activité suspecte de pêche INN au saumon qui serait détecté dans le cadre de leurs opérations de suivi, de contrôle et de surveillance. Un rapport sur la liaison avec la CPANE et la NAFO est inclus en CNL(15)15.

L'année dernière, le Conseil a été informé que la Commission du poisson anadrome du Pacifique Nord (CPAPN) envisageait d'organiser une année internationale du saumon (IYS). Le Conseil avait reconnu que ceci pouvait constituer une excellente opportunité de sensibiliser davantage le public au saumon partout dans le monde, aux questions qu'il soulève, et aux efforts considérables consacrés à leur conservation et leur restauration, et il avait demandé au Secrétaire d'entrer en contact avec le Secrétariat de la CPAPN et de rapporter tous développements. Un représentant de la CPAPN, M. Mark Saunders, a assisté à la Session annuelle de 2015 et effectué des présentations pour la Commission internationale de recherche sur le saumon atlantique (CIRSA), son Groupe de conseil scientifique (SAG) et le Conseil. Le Conseil a accepté de demander au Secrétaire et au Directeur de la délégation des Etats-Unis, M. Dan Morris, de maintenir le lien avec la CPAPN concernant les dispositions pour une IYS et d'envisager la possibilité d'une implication et d'une contribution de l'OCSAN dans une telle initiative.

4.2 **Rapport sur les activités de l'Organisation en 2014**

Conformément au paragraphe 6 de l'Article 5 de la Convention, le Conseil a adopté un Rapport des activités de l'Organisation en 2014, CNL(15)7.

4.3 **Annonce du gagnant du Grand Prix du Programme incitatif au renvoi des étiquettes**

Le Vice-président a annoncé que le gagnant du Grand Prix de $2,500 était M. Eirik Monge, Vigrestad, Norvège. L'étiquette gagnante était d'origine norvégienne et avait été appliquée à un saumoneau relâché dans la rivière Imsa en avril 2013. Il a été recapturé dans la Fuglestadelva, dans le Rogaland, en Norvège le 16 août 2014, et pesait 1.1kg. Le Conseil a adressé ses félicitations au gagnant.

4.4 **Conseils scientifiques du CIEM**

Le représentant du CIEM a présenté le rapport du Comité consultatif (ACOM), CNL(15)8 (Annexe 10). Le Président du Comité financier et administratif a indiqué que le CIEM avait demandé à l'OCSAN des retours sur le format des consultations. Le Comité avait demandé que le Secrétaire entre en contact avec le CIEM concernant la possibilité de changements au format du rapport ACOM. La représentante de l'Union européenne a souligné un certain nombre de changements supplémentaires au format des consultations.

4.5 **Rapport de la Commission internationale de recherche sur le saumon atlantique**

Le Rapport de la Commission, CNL(15)9 (Annexe 11), a été présenté par son Président, M. Raoul Bierach (Norvège).

4.6 **Compte rendu du Groupe de travail sur la classification des stocks**

En 2014, le Conseil avait reconnu la valeur d'une approche pertinente et uniforme pour présenter les informations relatives au statut des stocks devant être utilisées dans la base de données sur les rivières et avait établi un Groupe de travail (comprenant Raoul Bierach (Norvège), Gérald Chaput (Canada), Stephen Gephard (Etats-Unis) (Président) et John McCartney (Union européenne)) dont les Termes de référence étaient les suivants :

1. Recommander un système de classification devant être employé par les juridictions pour indiquer le statut du stock en matière de limites de conservation, ou bien lorsque celles-ci n'ont pas été établies, d'autres points de référence ou d'indicateurs d'abondance.

2. Développer des recommandations pour traiter les points suivants:
    a. Le délai que les indicateurs de stock couvrent (e.g. annuel, moyenne sur cinq ans);
    b. Fréquence des mises à jour;
    c. Le reporting de l'absence de données quelles qu'elles soient; et
    d. Comment d'autres informations pertinentes pour décrire le statut des stocks peuvent être prises en compte concernant les objectifs de l'OCSAN en termes de gestion du saumon, e.g. biodiversité et surplus qu'il est possible de collecter.

3. Recommander des changements pour la base de données sur les rivières de l'OCSAN afin de mettre en œuvre le système de classification recommandé.

Le Président a informé le Conseil qu'il y avait eu des échanges inter-session par correspondance et le Groupe s'était réuni au cours de la Session annuelle. Un rapport intérimaire a été présenté oralement au Conseil. Le Président a indiqué que le Groupe avait considéré qu'un système fondé exclusivement sur des Limites de conservation serait excessivement simpliste. Une seconde catégorie a donc été ajoutée qui requiert de la part de l'agence locale qu'elle évalue les différents impacts qui affectent un stock et qu'elle présente la gravité de ces impacts à l'aide d'un code numérique. Le développement de l'énergie hydroélectrique, les menaces génétiques que représentent les fugitifs issus de l'aquaculture, une collecte excessive, une collecte sélective sont autant d'impacts qu'il est possible d'évaluer. Le Groupe de travail fournira une feuille de calcul sur laquelle les Parties devront saisir les noms de leurs rivières ainsi que l'étendue de leur Limite de conservation et la Note d'évaluation d'impact et la feuille de calcul assignera automatiquement le stock à l'une des sept Catégories de classification de stock (le même nombre qu'actuellement) pour la base de données sur les rivières. Il faut noter que le Code d'évaluation d'impact ne pourra pas remonter un stock vers une catégorie de risque inférieur à ce qui est déterminé par ses Limites de conservation. Il ne peut que faire descendre un stock vers une catégorie de risque supérieur si certains facteurs justifient un tel changement. L'utilisation d'autres facteurs pourra être opportune et contribuera à l'assignation d'un stock à une catégorie s'il n'existe pas de calcul de Limite de conservation pour une rivière spécifique donnée. Une couleur spécifique sera assignée à chacune des catégories ; ces couleurs figureront sur la carte en ligne de la base de données sur les rivières.

De plus amples précisions doivent être développées, y compris en sur les directives pour les Parties lorsqu'elles assigneront des notes à leurs rivières. Le Groupe de travail compte travailler sur ces précisions entre les sessions préalablement à la Session annuelle de 2016 pour soumettre au Conseil une proposition à étudier lors de cette session.

4.7 Compte rendu du Comité scientifique permanent

Le Président suppléant du Comité scientifique permanent (SSC), le Dr Paddy Gargan (Union européenne), a présenté un projet de demande de conseils scientifiques au CIEM. Sur recommandation du Comité, le Conseil a adopté une demande de conseils scientifiques auprès du CIEM, CNL(15)11 (Annexe 12).

5. Conservation, restauration, accroissement et gestion rationnelle du saumon atlantique dans le cadre de l'approche préventive

5.1 Séance spéciale : évaluation des rapports de progrès annuels réalisés dans le cadre des programmes d'application de 2013 – 2018

L'objectif principal des rapports de progrès annuels (APR) conformément aux Programmes d'application pour 2013 – 2018 est de fournir des informations sur tous changements du régime de gestion du saumon et sur les changements des Programmes d'application en découlant ; les mesures qui ont été prises conformément aux Programmes d'application l'année précédente ; les changements significatifs aux

statuts des stocks, et un rapport sur les prises ; et les mesures prises conformément aux dispositions de la Convention.

Les APR de 2015 sont contenus dans les documents CNL(15)21 à CNL(15)38 et CNL(15)40. Un résumé des comptes rendus de 2015 (CNL(15)13) a été présenté. Comme en 2014, les APR de 2015 avaient fait l'objet d'une évaluation critique par un Comité de révision. L'objectif de l'évaluation était d'assurer que les juridictions avaient fourni un récit clair du progrès de l'application et de l'évaluation des mesures précisées dans leurs Programmes d'application, parallèlement aux informations requises prévues par la Convention.

M. Ted Potter (Union européenne) a présenté le compte-rendu du Comité de révision des Programmes d'application/rapports de progrès annuel, CNL(15)12 (Annexe 13), au cours d'une session spéciale du Conseil. Là où des défauts avaient été identifiés dans les APR, le Comité de révision avait développé des questions auxquelles les juridictions destinataires avaient reçu la demande de répondre, par écrit, avant la Session annuelle. Ces réponses sont contenues en CNL(15)18 (Annexe 14). Des discussions touchant à des sujets vastes ont eu lieu au cours de la Session spéciale et celles-ci figurent en CNL(15)51 (Annexe 15).

Le Comité de révision avait souligné qu'évaluer le progrès effectué sur les mesures était très difficile lorsque les descriptions des mesures prévues dans l'IP sont vagues ou imprécises. Il a aussi été indiqué que les APR ne devraient pas s'appuyer sur des liens vers des informations sur internet mais devraient fournir un court résumé indépendant du progrès effectué. Le Comité de révision avait aussi noté qu'un certain nombre des APR de 2015 avaient fourni des informations similaires à celles fournies en 2014. Dans l'ensemble, le Comité de révision avait considéré que l'erreur la plus courante dans les informations fournies sur le progrès des mesures était un manque d'informations quantitatives pour démontrer un progrès et/ou quels étaient les résultats et il avait été demandé à toutes les Parties/juridictions de traiter ceci dans les APR futurs. Le Comité de révision avait aussi souligné qu'un reporting en temps voulu était essentiel pour que les évaluations soient justes et équilibrées. Le Conseil a demandé que le Secrétaire insiste sur ces questions lors de la demande des APR de 2016. Le Conseil a demandé que le Comité de révision se réunisse pendant deux jours pour évaluer les APR de 2016.

5.2 **Séance spéciale thématique : 'Maintenance et amélioration de la connectivité des rivières en se concentrant en particulier sur les impacts de l'énergie hydraulique'**

Lors de sa trente-et-unième session annuelle, le Conseil avait demandé au Comité de révision d'APR d'identifier un sujet pour une session spéciale thématique d'une demi-journée devant avoir lieu lors de la session annuelle de 2015, et de développer un Programme. Le Comité de révision avait noté qu'un certain nombre d'IPs et d'APR avaient attiré l'attention sur les menaces et les défis de gestion que représentent, pour les migrations de saumon, des obstructions telles que des installations hydroélectriques, aussi bien en amont qu'en aval. Le progrès pour améliorer la connectivité des rivières avait été rapporté, y compris la clôture de certaines stations hydroélectriques et des projets de suppression de barrage, mais des inquiétudes avaient été exprimées au sujet de l'augmentation des demandes d'installations hydroélectriques 'au fil de l'eau' dans les rivières à saumon pour répondre au besoin d'objectifs à atteindre dans le domaine

des énergies renouvelables. Le Comité de révision avait donc accepté que le sujet de la session spéciale thématique 2015 soit le 'Maintien et amélioration de la connectivité des rivières, en se concentrant en particulier sur les impacts de l'énergie hydraulique'. Un Programme pour la session avait été développé, CNL(15)14. Les objectifs de la session étaient de :

1. équilibrer les pressions pour rénover les obstructions existantes et en installer des nouvelles parant aux impacts potentiels sur la connectivité des rivières, référence particulière étant faite aux développements hydroélectriques;
2. mitiger les impacts des obstructions existantes, y compris ceux des centrales électriques sur les populations de saumon;
3. évaluer les avantages et coûts de la suppression des barrages et autres obstructions.

Le rapport de la session spéciale thématique est contenu dans le document CNL(15)56. Le Conseil a accepté de tenir une Session spéciale thématique d'une journée au cours de la Session annuelle de 2016 sur le thème des développements pour minimiser les impacts du saumon d'élevage sur les stocks de saumon sauvage. Un Comité de direction comprenant Mme Heidi Hansen (Norvège), Dr Paddy Gargan (Union Européenne), M. Willie Cowan (Union Européenne), M. Paul Knight (ONGs) et un représentant des Etats-Unis) a été nommé pour travailler avec le Secrétaire sur le développement d'un Programme et d'Objectifs pour la session.

5.3 **Progrès effectué dans l'application du 'Plan d'action pour mettre en œuvre les conseils de l'étude externe des performances et la révision des 'Prochaines Etapes' pour l'OCSAN', CNL(13)38**

En 2013, le Conseil avait adopté un 'Plan d'action pour mettre en œuvre les conseils de l'étude externe des performances et la révision des 'Prochaines Etapes' pour l'OCSAN' (CNL(13)38). Le Secrétaire a rendu compte des progrès de la mise en œuvre des conseils dans le Plan d'action, CNL(15)15 (Annexe 16). Les conseils dans le plan sont liés à :

- Des actions mises en œuvre ou planifiées à l'époque du développement du 'Plan d'action' avait été développé et pour lesquelles un suivi du progrès et une évaluation des résultats était nécessaire (section 1);
- nouvelles actions développées en réponse aux recommandations contenues dans le Rapport d'étude externe des performances et la révision des 'Prochaines étapes' de l'OCSAN (section 2);
- actions pour renforcer le travail de gestion des pêcheries au saumon de l'OCSAN (section 3).

Le Conseil a accueilli le progrès effectué pour mettre en œuvre les conseils. Il a demandé au Secrétaire de poursuivre sa liaison avec la CPANE et la NAFO concernant la pêche INN par des Parties non-membres de l'OCSAN et des captures accessoires dans les pêcheries pélagiques. Il a aussi demandé au Secrétaire de rechercher la coopération d'ICCAT pour toutes informations relatives à la pêche au saumon INN par des Parties non-membres de l'OCSAN. Une autre mise à jour du progrès serait présentée lors de la session annuelle de 2016.

5.4 Liaison avec l'industrie salmonicole

En 2013, le Conseil a convenu qu'un point devrait être maintenu dans son ordre du jour intitule « Liaison avec l'industrie salmonicole », au cours duquel un représentant de l'Association des producteurs de saumon internationaux (ISFA) serait invité à participer à un échange d'informations sur des questions relatives à l'impact de l'aquaculture sur le saumon sauvage. Les réunions régulières du Groupe de liaison ne se poursuivraient pas, mais, si un besoin spécifique se présentait, on envisagerait de convoquer un groupe mixte *Ad hoc*. Le Vice-président a indiqué que le Secrétaire avait consulté le Président de l'ISFA, M. Trond Davidson, qui avait indiqué que l'ISFA serait représentée lors de la trente-deuxième session annuelle par M. Murray Hill (Canada) mais qu'elle n'avait pas encore de question à soulever avec le Conseil. Ce point serait maintenu à l'ordre du jour pour la Session annuelle 2016.

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

Conformément à l' 'Approche stratégique des 'Prochaines étapes de l'OCSAN', ce point a été inclus à l'ordre du jour du Conseil et il a été demandé au CIEM de fournir des informations adéquates, contenues dans le document CNL(15)8. Ces informations incluaient de nouvelles opportunités d'échantillonnage de saumon en mer, des nouvelles opportunités pour récolter des informations sur les prises accessoires de saumon dans les pêcheries pélagiques et une mise à jour sur les enquêtes relatives aux poux de mer en Norvège. Des informations pertinentes sont aussi présentées dans le résumé des rapports de progrès annuel, CNL(15)13.

5.6 Incorporation des facteurs sociaux et économiques dans la gestion du saumon

En 2014, le Conseil a accepté de demander aux Parties/juridictions de conseiller le Secrétariat en matière de nouvelles études relatives aux valeurs socio-économiques du saumon sauvage Atlantique et que des sessions thématiques soit tenues à l'avenir sur l'intégration des facteurs économiques aux décisions sur la protection, la restauration et l'amélioration de l'habitat et à l'aquaculture. Une mise à jour des nouvelles informations fournies est contenue dans le rapport du Secrétaire (voir paragraphe 4.1 ci-dessus). Il n'en avait été fourni aucune.

5.7 Pêcherie de saumons à St Pierre et Miquelon – Gestion et Échantillonnage

Un rapport sur la gestion de la pêcherie au saumon à St Pierre et Miquelon, CNL(15)16 (Annexe 17), a été présenté par la représentante de la France (pour St Pierre et Miquelon). Ce rapport a aussi été étudié dans la Commission Nord-Américaine.
Le représentant du Canada a remercié la France (pour St Pierre et Miquelon) pour la présentation et a insisté sur le besoin de valoriser l'implication de la France (pour St Pierre et Miquelon) dans l'OCSAN en tant que membre à part entière. Il a fait référence à l'état d'épuisement des stocks de saumon au Canada et le besoin de contrôle des collectes dans la pêcherie. Le représentant des Etats-Unis a soutenu la déclaration du Canada et a exprimé son inquiétude concernant la continuité de la pêcherie sans accord au sein de l'OCSAN. Il a noté que bien que le nombre de prises avait baissé en 2014, par rapport à 2013, le nombre de délivrances de permis avait augmenté et si tous les pêcheurs avaient un niveau de prises équivalent à celui des meilleurs alors le total des

prises serait élevé. Des discussions supplémentaires avaient eu lieu sur la pêcherie à St Pierre et Miquelon au cours de la réunion de la Commission Nord-américaine. La représentante de la France (pour St Pierre et Miquelon) a indiqué que le reporting auprès de l'OCSAN sur la gestion de la pêcherie se poursuivrait de même que le programme d'échantillonnage scientifique et davantage de discussions auraient lieu à Paris, de pair avec St Pierre et Miquelon, au sujet d'une participation future au travail de l'OCSAN.

5.8 **Rapports des trois Commissions régionales concernant leurs activités de conservation**

Le Président de chacune des trois Commissions régionales a présenté un rapport au Conseil concernant les activités de leur Commission respective.

6. Divers

6.1 Le représentant du Danemark (pour les Iles Féroé et le Groenland) a prononcé une déclaration de clôture (Annexe 18).

6.2 La représentante de l'Union européenne a remercié le représentant du Danemark (pour les Iles Féroé et le Groenland) pour le message positif dans sa déclaration de clôture et a indiqué que sa délégation était satisfaite du résultat atteint par la Commission du Groenland occidental. Une quantité considérable de travail avait été effectuée et l'Union européenne a reconnu l'engagement fort du Groenland pour la mesure adoptée et elle se réjouit de travailler avec d'autres membres de la Commission à l'avenir. Le représentant du Canada a rappelé les points de vue exprimés par l'Union européenne et a insisté sur le fait que le Canada s'engage à coopérer avec le Groenland. Il a reconnu le travail assidu entrepris et a exprimé une volonté de travailler avec le Groenland à l'avenir. Le représentant des Etats-Unis a remercié le Danemark (pour les Iles Féroé et le Groenland) pour sa déclaration de clôture et son engagement dans le travail de la Commission. Il se réjouit de coopérer avec le Groenland et les autres membres de la Commission à l'avenir.

7. Date et lieu de la prochaine session

7.1 En 2014 le Conseil avait accepté une invitation de l'Union Européenne de tenir sa trente-troisième session annuelle les 7 – 10 juin 2016 en Allemagne. La représentante de l'Union européenne a informé le Conseil que la trente-troisième session annuelle aurait lieu à Bad-Neuenahr, en Allemagne.

7.2 Le Conseil a accepté de tenir sa trente-quatrième session annuelle les 6 – 9 juin 2017 reste à déterminer le lieu.

8. Compte rendu de la session

8.1 Le Conseil a accepté un compte rendu de la session.

9. Communiqué de presse

9.1 Le Conseil a convenu d'un Communiqué de presse, CNL(15)53 (Annexe 19).

Note : Une liste d'articles du Conseil est incluse en Annexe 20

Annex 1

Welcoming Address made by Mr Jamie Snook, Mayor of Happy Valley – Goose Bay, at the Thirty-Second Annual Meeting of NASCO

Good morning Ladies and Gentlemen. As Mayor, I am honoured to host such a prestigious event in our community with so many international dignitaries.

On behalf of the Town and Council of Happy Valley-Goose Bay, I would like to welcome you to the 32nd Annual Meeting of the North Atlantic Salmon Conservation Organization. I trust that you will enjoy the hospitality our community has to offer throughout the week.

For those participating in the post-NASCO tour, I know that you will also enjoy your excursion to North West River, and into Rigolet, Nunatsiavut at the weekend.

We are a vibrant, multi-cultural community always seeking to establish new partnerships and connections with stakeholders locally, provincially, nationally and internationally.

Our connection to nature, our traditions and diverse cultures make Labrador a fitting venue for the 2015 NASCO meeting.

Labradorians have significant connections to Atlantic salmon. Some of the world's finest fly-fishing operations contribute to our local economy. There is a healthy recreational fishery and as the Province's largest Aboriginal populated community, salmon is an important food source for families.

For residents of Happy Valley-Goose Bay and surrounding communities, it is part of our culture to access the land and water – by foot, all-terrain vehicles, snowmobiles and boats.

We take pride in being able to access our natural environment so we can harvest wood, berries, fish and country foods. It is directly connected to our quality of life and sense of wellness.

To tangibly illustrate this point, our Town happens to be a leader in wastewater treatment, due in large part to the advocacy efforts of a local aboriginal elder who persistently advocated and educated our community on the negative habitat impacts from untreated waste.

Our Town Council continues to respect this culture and has made it a priority to facilitate these activities through strategic investments to ensure the future sustainability of our community.

As another example, we have recently partnered with local stakeholders such as Healthy Waters Labrador, the Labrador Hunting and Fishing Association, Environment Canada, and the Department of Fisheries and Oceans to preserve and enhance a local wetland and creek area for salmonids.

We value Canada's regulatory and monitoring regime for the recreational Atlantic salmon fishery, and the Aboriginal fishery for food, social and ceremonial purposes.

Salmon, and various other natural resources, sustain the way of life for many groups and communities in Northern Canada.

I will say, and as this group knows, Canada cannot do it alone. All countries have to do their part, and working in conjunction with NASCO is key to the long-term preservation and sustainability of our community.

Through my position as Mayor of Happy Valley-Goose Bay and my role as Executive Director at the Torngat Wildlife, Plants and Fisheries Secretariat, I am eager to participate in NASCO 2015.

Thank you, and I wish all delegates success in their deliberations.

Annex 2

Opening Statement made by the Vice-President of NASCO

Distinguished Delegates, Observers, Ladies and Gentlemen:

I would like to thank our hosts for the very warm welcome to Happy Valley - Goose Bay for this Thirty-Second Annual Meeting of NASCO. I would like to add my welcome to you all.

One of the benefits of meeting close to the salmon is that we have an opportunity to learn more about the challenges and opportunities facing the resource in different parts of the North Atlantic and its importance to local communities. I am sure we will be very well briefed this week and leave with a clearer understanding of the issues facing the salmon here in Labrador.

Personal circumstances mean that our President, Steinar Hermansen, cannot be with us this week, but he sends his best wishes to you all for a productive meeting and an enjoyable stay in Happy Valley-Goose Bay. In Steinar's absence I very much look forward to working with you all.

We have a very full week ahead of us. As you know, there will be negotiations for regulatory measures in both the North-East Atlantic and West Greenland Commissions. Much preparatory work has been done inter-sessionally by the West Greenland Commission, in an excellent cooperative spirit, including agreement on a new plan for enhanced monitoring and management of the salmon fishery at West Greenland.

However, much remains to be resolved this week. In addition, in accordance with our 'Action Plan for taking forward the findings of the External Performance Review and the review of the 'Next Steps' process', we will have agenda items in each Commission to focus on Mixed-Stock Fisheries. You will recall this was important to Faroes and Greenland in ensuring fairness and balance in the management of distant-water fisheries.

We will also hold two Special Sessions: one to focus on the evaluations of the second cycle of APRs and another, Theme-based Special Session, to look at the issue of river connectivity with particular focus on hydroelectric developments. These sessions are intended to allow for an open exchange among Parties and the NGOs and I encourage you all to take advantage of this opportunity.

Last year, our International Atlantic Salmon Research Board agreed that its priority should be studies to partition marine mortality of migrating Atlantic salmon. The Board resolved to encourage the development of large international collaborative telemetry projects that together build upon and expand local efforts and, as a first step, organised a Telemetry Workshop that was held last December. The Workshop was charged, *inter alia*, with advising on where collaborative programmes are most likely to succeed in delivering the information the Board seeks and, in the light of the recommendations made, the Board will need to consider carefully the role it can play to support the development of an international programme, building on the success and identity of the SALSEA Programme to date.

All of our work this week takes place against a background of scientific advice from ICES that again highlights that the abundance of salmon remains low, critically low in some regions, linked to poor survival at sea. I personally believe that the need for international cooperation

on this resource has never been higher. We are all here, this week, because we care about the Atlantic salmon and all contributions to our deliberations will be welcome.

I would like to thank our Canadian hosts for inviting us to Happy Valley-Goose Bay, for the arrangements made for the meeting and the hospitality and tours they have organised for us. Thanks also to our Secretariat for the preparations made not only for this meeting but for all the inter-sessional meetings held over the last year.

Despite the challenges facing the Atlantic salmon, I am confident that the excellent spirit of cooperation that exists within NASCO, including the valuable support of our NGO partners, will stand us in good stead during our deliberations this week to conserve this most remarkable and precious resource.

Thank you for your attention.

Annex 3

Opening Statements made by the Parties

Opening Statement made by Canada

Mr Vice-President, distinguished Guests, Heads of Delegations, Commissioners, Delegation Members, Observers, Ladies and Gentlemen, it is with great pleasure that Canada welcomes you all to Happy Valley-Goose Bay, Labrador, for the 32nd Annual Meeting of NASCO.

My name is Richard Nadeau, Head of the Canadian Delegation to NASCO, and Regional Director General for the Quebec Region of Fisheries and Oceans Canada.

I will begin by recognizing the tremendous amount of work, effort, and expertise that has been necessary to prepare this Annual Meeting and I wish to thank the NASCO Secretary and his excellent team for all their work. I will also take the opportunity to thank Cal Wenghofer who was in charge of planning the event at our end with the help of many people in Happy Valley-Goose Bay that I will not name here for fear of missing someone (to the exception maybe of Beverly White of the Torngat Secretariat and Andrea Gibson from DFO).

One may wonder why Happy Valley-Goose Bay. Among the reasons for hosting the 32nd Annual Meeting in this beautiful area is to show the NASCO community how important Atlantic salmon is to the residents of Labrador and to their cultural heritage. To this extent we have engaged many local leaders and residents in the preparations and attendance at this meeting, and we will also have the opportunity to visit a remote community to experience Labrador history and witness the important role natural resources, including salmon, play in the life of Labradorians.

This meeting, here this week, is extremely important for NASCO and for Canada given the situation facing many of our salmon stocks. The returns in most Canadian rivers were disastrous last year and Canada has already taken some steps to improve the situation. The Minister of Fisheries and Oceans has established a Ministerial Advisory Committee (MAC) to consult all groups interested in the conservation of salmon in Atlantic Canada and make recommendations on measures that could be put in place to improve returns. The MAC released interim recommendations on fisheries management measures that could be put in place in Nova Scotia, New Brunswick and Prince Edward Island and the Minister acted promptly on these recommendations in ordering the implementation of mandatory Catch and Release in all three provinces starting this year.

We have a lot of work in front of us. As much as I recognize the work that needs to be done, I also want to acknowledge that we have to rely upon the relationships built over the years to have these difficult discussions that hopefully will lead to viable long term commitments to better protect and conserve wild Atlantic salmon.

Just to say a few things about our ambitious agenda for the week, we have much to do and not that much time. It is critical that we use this time wisely and work to everyone's best interests to achieve our objectives. With new regulatory measures for the WGC and NEAC, looking at the current status of salmon, Implementation Plans, Annual Progress Reports, important research and discussions on mixed-stocks, it is important that we stay focussed. Everyone or almost everyone here represents people or communities dependent on salmon in some way and understands the value and importance of salmon. If we undertake our discussions with this in mind I am sure we will come to agreement where it is important to reach agreement.

In 2014 many North American salmon rivers had their worst year ever in terms of returns and in Canada we are already putting in place measures to help improve the situation, but we cannot do it alone. We will be asking our neighbours from Greenland and St Pierre and Miquelon to take a hard look at their salmon fishery practices and see how they can help improve the situation in our rivers ultimately to the benefit of their communities.

To conclude, I wish to thank everyone for joining us here in Labrador. We look forward to this week's meetings and all of the productive discussions.

Thank you.

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

Vice-President, distinguished Delegates, Observers, Ladies and Gentlemen

On behalf the Faroe Islands and Greenland, I would like to begin by thanking our Canadian hosts for arranging this meeting and making us feel so welcome here in Happy Valley-Goose Bay.

Many years ago now, the Faroes and Greenland made the decision to refrain from all commercial fisheries of wild salmon in our waters. This was done in order to protect and rebuild the stocks. The decision came with a high price for our fishing industries, as they could no longer conduct commercial fisheries for wild salmon. In the interest of preserving the salmon stocks, we have maintained this policy.

We have kept our side of the bargain.

Despite these measures, the state of the stocks has not improved.

Therefore, evidently it is necessary to consider other factors in order to achieve sustainable management of wild salmon including fisheries elsewhere as well as factors causing mortality at sea.

We are of the view that the best and fairest solution would be if NASCO could regulate fisheries for wild salmon in the homewaters of all Parties and jurisdictions of NASCO.

Nevertheless, the Faroe Islands and Greenland are pleased that over the last few years there has been more emphasis on fisheries below their Conservation Limits, and particularly on Mixed-Stock Fisheries, within NASCO.

Also it was an important step in the right direction when, in 2013, the Parties submitted the new Implementation Plans for the period up to 2018.

We are very pleased that we have established a procedure where Parties now submit written Annual Progress Reports and that these reports are thoroughly reviewed before being discussed at the Annual Meeting.

We come here in good spirit and in the hope that, through a positive dialogue and joint efforts, we can come closer to achieving our vision for the wild salmon.

Finally, Vice-President, I would like yet again to thank our hosts and the Secretariat for the excellent preparations for this meeting. Thank you for your time and attention.

Opening Statement made by the European Union

Mr Vice-President, Mr Secretary, distinguished Delegates, Observers, Ladies and Gentlemen

The European Union is thankful to the Canadian authorities for their hospitality and for selecting this unique venue, the "hub" of Labrador, for NASCO's Thirty-Second Annual Meeting. A special acknowledgement goes to the Secretary and to his staff, for their relentless work to ensure, as on previous occasions, a seamless, smooth and pleasant meeting.

It is the second time this year that the EU delegation crosses the Atlantic to attend NASCO meetings. Many Atlantic salmon stocks embark in a similar, though much longer and perilous journey to feed and grow to adults, and eventually return to their home rivers to spawn and ensure the continuity and survival of the species. We made this journey inspired by the very same reason and moved by a sense of urgency to protect, conserve and restore our Atlantic salmon stocks, in line with NASCO's conservation objectives. We enshrined those objectives into our laws and strive to achieve them across the EU Member States and jurisdictions. Our strong political commitment to the preservation, conservation and restoration of Atlantic salmon has been often translated into drastic measures, such as the closure of fisheries in many rivers, estuarine and coastal areas. Vast amounts of public funds have been invested in several projects, from habitat restoration and dam removal, to improvement of water quality, and research on mortality factors. Additional funds have already been earmarked for the years to come, and progress of ongoing projects is being carefully monitored.

However, measures and sacrifices taken in home countries will not bear their fruits if not complemented by an equally strong level of commitment at NASCO. The EU is confident that such a level of commitment will inspire our discussions during this Annual Meeting and that the resulting outcomes will live up to the high expectations that brought us all the way to Happy Valley-Goose Bay.

As far as the EU is concerned, those expectations result from the rather worrying picture emerging from the recent ICES scientific advice, indicating that in 2014 many southern European rivers hit some of the historically low records in salmon return rates. This record comes on top of what has often been a pattern of constant decline over the last years. Attempting to halt and reverse such decline is part of our responsibility. Failing to do that, might lead to irreversible biodiversity, cultural heritage, and economic losses.

The EU trusts that the scientific advice will thus guide negotiations and final deliberations at this Annual Meeting. The EU is particularly looking forward to fruitful and successful discussions on the new regulatory measures at West Greenland and at the Faroe Islands.

Opening Statement made by Norway

On behalf of Norway, I would like to thank Canada for hosting the Thirty-Second Annual Meeting of NASCO.

NASCO has gone through an important change over the last years.

In our opinion those changes have worked well and fulfilled our expectations. Thus, we feel NASCO has managed to uphold its relevance to Atlantic salmon management. In particular, we would like to focus on salmon fisheries management and the introduction of NASCO guidelines, which has contributed significantly to advancements in national policies, management strategies and research.

The establishment of the National Scientific Advisory Committee on salmon management in Norway has proven essential to promote the scientific work of estimating spawning target achievement and giving catch advice.

Despite some local and regional differences, the Pre-Fishery Abundance in Norway has continued to be at a historically low level in 2014. Nevertheless, mostly due to stricter fisheries regulations in recent years, spawning targets have been met for an increasing number of stocks.

With regard to fisheries maybe our biggest challenge remains the River Teno in northern Norway, where many stocks have especially poor status, and there are no known impacts other than overharvesting. As many of you are well aware, negotiations with our colleagues in Finland have been ongoing for a number of years. Unfortunately, there is still no final agreement in place. Although it concerns us that the conclusion of the negotiations has been postponed several times, we are still optimistic and hopeful that new regulations will be in effect from the 2017 fishing season.

We are also content to report that together with our colleagues from the Russian Federation we have been following up on salmon management and fisheries issues of common interest and that our future collaboration on salmon management and research will be based on a MoU, which is about to be signed.

Finally, we apologise for having to repeat ourselves, but as last year, we still have severe concerns about the future of our stocks. The grilse component is still very low and sea survival seems not to have improved in general. Adverse human impacts remain high and increasing in some areas. All this combined with climate change underlines the necessity for our continued common effort, and the need for NASCO to strengthen its role as a forum contributing to common understanding of challenges and management approaches.

Norway would like to thank Canada and the Secretariat for excellent preparations and the Norwegian delegation looks forward to a productive and successful meeting.

Opening Statement made by the Russian Federation

Mr Vice-President, distinguished Delegates, Observers, Ladies and Gentlemen

On behalf of the Russian delegation I am pleased to greet all participants at the Thirty-Second Annual Meeting of NASCO in Happy Valley-Goose Bay, Labrador, Canada.

First, I take this opportunity to thank Canada for hosting this meeting in this picturesque province renowned in the world as a prestigious place for recreational Atlantic salmon fishing.

I feel that Canada and Russia have the same view on where we should go in Atlantic salmon management to achieve our task in conserving the resource for future generations. There are no commercial fisheries for wild Atlantic salmon in Canada and the effort in commercial fisheries in Russia has been noticeably reduced over the past two decades. This reduction is aimed at conserving Atlantic salmon stocks and enhancing recreational fisheries. In both countries, a recreational fishery with well-developed and widely used Catch and Release principle seems to be the most valuable and important way of the rational exploitation of Atlantic salmon stocks. At the same time there are some Aboriginal fisheries for food, social and ceremonial purposes in Canada and there are traditional Pomor coastal salmon fisheries in the White Sea in Russia. Nowadays these fisheries are viewed more as a social measure – a traditional way of fishing by local people.

Rational management of Atlantic salmon stocks in Russia could not be productive and fruitful without NASCO's recommendations that cover the whole range of the problems relating to conservation and management of Atlantic salmon. This year the Theme-Based Special Session will focus on maintaining and improving river connectivity with particular focus on impacts of hydropower. This is a great opportunity for Parties and observer organisations to present information relevant to the theme of the session. Therefore, I would like to mention a joint Finnish-Russian pilot project conducted in 2014 to study the feasibility of adult salmon transfers over the Upper-Tuloma dam and investigate their spawning migration. The large River Tuloma system discharges into the Barents Sea in the Murmansk region of the Russian Federation with the source of the upper tributaries of the system in Finland. The pilot experiment showed the good potential for future activities attempting to start salmon stock-rebuilding in the upper parts of the Tuloma system.

And in conclusion I would like to thank Canada for hosting this Annual Meeting once again for hospitality, and wish all of us success in working together during this week. Mr Vice-President, my delegation is looking forward to having important and fruitful discussions during this meeting.

Thank you for your attention!

Opening Statement made by the United States

Mr Vice-President, Secretary Hutchinson, distinguished Delegates, Observers, Ladies and Gentlemen:

The US Delegation to the 32nd Annual Meeting of NASCO is delighted to be here in Happy Valley-Goose Bay, Canada, with colleagues and friends who share a common purpose – to provide for the conservation, restoration, and rational management of Atlantic salmon throughout its range.

On behalf of the United States, I offer my sincere thanks to our Canadian hosts for their hospitality and for the excellent accommodations. Being in Labrador, once again close to the salmon, will inspire us to redouble our commitment to NASCO as the best forum in which to collaborate towards fulfilling our profound shared responsibility and purpose. I also wish to express our sincere appreciation for our Secretary and his staff, whose hard work has prepared the stage for our deliberations this week. Well done, and thank you for your tireless efforts in support of this body.

In late February, many of us here today were in another stunning location, Nuuk, Greenland, for an intersessional meeting of the West Greenland Commission. I extend the appreciation of the United States to the Parties of the Commission, especially to our gracious hosts in Greenland, Emanuel Rosing and Katrine Kaergaard, to our chairman, Ted Potter, and to Paul Knight for representing the Non-Governmental Organizations, and, of course, to the Secretary, who coordinated the meeting. The discussions at the inter-sessional meeting were challenging but effective in advancing our understanding of one another's interests and informing our deliberations this week of a possible regulatory measure for the Mixed-Stock Fishery off West Greenland, which includes catch of some stocks that are below their conservation limits. We certainly have more work to do to, and we are confident that the spirit of open inquiry and collaboration engendered in Nuuk will continue here in Happy Valley-Goose Bay.

As I mentioned, some salmon stocks originating in North America are in a grave condition, and accordingly, have been the subject of new emphasis and inquiry by governments and NGOs. We commend Canada for having recently convened a Ministerial Advisory Committee on Atlantic Salmon to focus on conservation, restoration, and salmon science. We appreciate Canada's commitment to Atlantic salmon, as witnessed through important conservation and management actions that have already been taken based on the Committee's recommendations, and we are eager to hear the Committee's other ideas for the best, lasting solutions to conserve, protect, and rebuild salmon stocks of Canadian origin. In the United States, we have recently launched a national campaign focused on our eight most critically endangered marine species – with Atlantic salmon topping the list. The campaign is called "Species in the Spotlight," and it will serve to focus resources and attention on a national scale to these eight imperiled marine species. We will keep you posted as this program is implemented.

Also, the United States recently designated the Penobscot River in Maine as a National Habitat Focus Area. As many of you know, the Penobscot is a crucial river for US Atlantic salmon, as approximately 75% of all US returns have come from this river. This designation helps to align the priorities of federal agencies to give special emphasis to the Penobscot in support of protections, collaborative restoration efforts, and education about the importance of healthy rivers.

During the Theme-based Special Session on improving river connectivity on Wednesday, we will hear two presentations from the US delegation about important accomplishments and work underway in the Penobscot. One will highlight the significant efforts we have undertaken to address the threats to anadromous species posed by dams in the Penobscot as well as in other rivers in Maine. The second presentation will be from John Banks, who will describe the successful collaboration of the Penobscot River Restoration Trust, a consortium of NGOs, the Penobscot Nation, state agencies, communities, and federal partners, which led to the removal of major dams in the watershed and improved access to many miles of habitat in the river. Mr. Banks is a Native American and member of the Penobscot Nation, for whom Atlantic salmon is a culturally foundational species, central to the tribe's history, ceremony and sustenance. Since 1989, the Penobscot Nation has voluntarily suspended its sustenance catch of Atlantic salmon out of concern for the health of the species. As you know, commercial and recreational fishing for federally endangered salmon in the United States are prohibited, and we continue to make major investments in the recovery of the species. Still, there is work to be done. In order to restore critically low stocks of salmon, it will be necessary to continue to make sacrifices, and tough management calls are unavoidable. We greatly look forward to working with and learning from all of the Parties this week. We look forward to taking a good look at the science, the status and trends in Atlantic salmon, and what sort of new precautions are needed to protect and restore salmon populations.

Of course, NASCO's consideration of work in homewaters and our accountability relative to NASCO agreements are driven primarily through the Implementation Plan process. We, the Parties, must continue to work to make the Implementation Plan process as robust and effective as possible. Submission of Implementation Plans and annual reports that mark accomplishments against those plans appropriately highlight the progress and shortfalls in each jurisdiction and aid transparent review and more effective implementation of NASCO's agreements. We are looking forward to a rigorous discussion of the 2014 annual reports during the Special Session slated for Wednesday morning. We urge all Parties and observers to take full advantage of the Implementation Plan process and this Special Session.

In closing, I would like to reiterate the serious concern of the United States with regard to critically endangered US populations of Atlantic salmon. The risk of extinction of these populations is real, and our responsibility, individually and collectively, to avoid such an outcome cannot be overstated.

Thanks once again to our hosts and the Secretariat for the excellent preparations for this meeting. The United States looks forward to working with you all this week to ensure a successful meeting.

Thank you.

Annex 4

Opening Statement made by the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC)

Mr Vice-President, Mr Secretary, Delegates, Observers, Ladies and Gentlemen. I am grateful for the opportunity to provide an Opening Statement on behalf of the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) at this the 32nd Annual Meeting of NASCO.

By way of background, EIFAAC is a statutory, advisory fishery body under the Constitution of the Food and Agriculture Organization (FAO) of the United Nations. Established in 1957, it is an inter-governmental forum for collaboration and information exchange on inland fisheries and aquaculture across European countries. EIFAAC has currently 34 members including the European Union.

Governments, institutions and agencies, including NASCO, can benefit from international advice derived from the EIFAAC's network linking policy-makers, managers, scientists and others working on inland fisheries and aquaculture issues.

EIFAAC's mission is to promote the long-term sustainable development, utilisation, conservation, restoration and responsible management of European inland fisheries and aquaculture and to support sustainable economic, social, and recreational activities through:

- providing advice and information;
- encouraging enhanced stakeholder participation and communication; and
- the delivery of effective research.

EIFAAC currently has active project groups looking at a number of prioritised research areas that may be of interest to NASCO Parties. These include:

- fish passage best practice;
- the management/threat of aquatic invasive species in Europe;
- support the 2015 fish passage symposium;
- the 2nd International Sea Trout Symposium – 20th to 22nd October, Ireland;
- the downstream passage of fish at hydropower dams.

The EIFAAC project on recreational angling may be of particular interest, as it is supporting a discussion between stakeholders, including anglers, managers, scientists, commercial interests, equipment providers and legislators on the future of recreational fisheries. This project will culminate in an EIFAAC Symposium which will be hosted by the Norwegian Government from the 15th-17th of June in Lillehammer. I am delighted that NASCO will be actively involved in this important symposium.

EIFAAC and NASCO share the common goal of wild Atlantic salmon conservation while respecting the social, economic and cultural value of this unique species. EIFAAC is well positioned to offer expert advice and support to NASCO on issues affecting the Atlantic salmon in the freshwater element of its lifecycle.

I would like to take this opportunity to thank our hosts and facilitators for their wonderful welcome to Happy Valley-Goose Bay and for the facilities and hospitality provided. Finally, can I wish all of you a productive an enjoyable NASCO session.

Annex 5

Opening Statement made by the North Pacific Anadromous Fish Commission (NPAFC)

Dear Mr Vice-President, distinguished Delegates, Ladies and Gentlemen,

My name is Mark Saunders. It is my pleasure to attend the Thirty-Second NASCO Annual Meeting as an observer on behalf of the North Pacific Anadromous Fish Commission (NPAFC). The NPAFC, as an international commission dedicated to the conservation of salmon in the North Pacific Ocean, shares a great deal in common with NASCO. I would like to extend our appreciation to members of the NASCO Council and the Executive Secretary, Dr Peter Hutchinson, for inviting NPAFC to attend. The NPAFC considers this meeting an important opportunity to strengthen our cooperation in fields of information exchange, planning, organizational and scientific activities to further the attainment of the objectives of our Conventions.

The NPAFC and NASCO face similar challenges, some of which include climate change effects on anadromous stocks, persistence of the illegal, unreported and unregulated fishing in the high seas and funding restraints. In this environment, our organizations can benefit from closer relationships to facilitate the exchange of experiences and ideas to inform enforcement and scientific plans required to sustain salmon.

The NPAFC just completed its 2015 Annual Meeting and International Symposium, which were held in Kobe, Japan, on May 11-15 and 17-19 2015, respectively. The Symposium reviewed the progress toward completing the objectives of the NPAFC Science Plan in development of understanding of ecological mechanisms regulating marine distribution and production of anadromous populations under climate change. A new NPAFC Science Plan for 2016-2020 will be developed on the basis of this review. Therefore, this is a good time to engage with NASCO before this important step for our Commission.

At the Annual Meeting, the NPAFC endorsed, in principle, the concept of an International Year of the Salmon (IYS) initiative. The IYS is envisioned to be an intense, forward-looking and collaborative international research program directed at filling critical knowledge gaps, developing analytical tools and training a new generation of scientists to understand salmon and their future. Our hope is that this meeting will make it possible to work together with NASCO to jointly continue scoping the IYS. I look forward to discussing the IYS with you and learning more about the activities of NASCO. I wish you success in your meetings this week.

Thank you

Annex 6

Opening Statement made by NASCO's Accredited Non-Government Organisations

The NGOs thank the Council and welcome this opportunity to attend the 32nd Annual Meeting of NASCO at Happy Valley-Goose Bay. We would also like to thank our Canadian hosts for their excellent organisation and hospitality and the Secretariat for their leadership, support and hard work. We look forward to frank discussions and a productive outcome over the coming week.

Wild Atlantic salmon runs in 2014 were disappointing throughout most of eastern Canada, all of the North-Eastern United States and in Europe. The NGOs are alarmed at the steep decline in numbers of wild Atlantic salmon, which, last year, reached a crisis state in many rivers.

Despite these concerning warning signs, there are still Parties at NASCO failing to abide by their agreed international responsibilities towards protecting wild Atlantic salmon. Failure to implement NASCO guidelines on mixed-stock coastal netting and failure to protect wild Atlantic salmon from the impacts of marine open-pen salmon farming are the principal concerns.

It is frustrating to note that most of the Parties with salmon aquaculture operations have not presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment. This lack of accountability cannot continue if NASCO is to live up to its goal of transparency and accountability that was identified in the 'Next Steps' process.

The NGOs anticipate that the Theme-based Special Session for 2016 will be one based on NASCO's aquaculture agreement and progress by Parties to implement it. We have had Theme-based Special Sessions on mixed-population fisheries and habitat. Next year is the time for a Theme-based Special Session on aquaculture that, we hope, includes discussion on new technologies, such as land-based, closed containment operations.

This year, NASCO will be developing new multi-year regulatory agreements for the Greenland and Faroese salmon fisheries. The Faroese have had no harvest since 2000. Greenland, however, reported 58 tonnes in 2014, up from 33 tonnes in 2012 and the largest harvest since 1997. This is a worrying trend in Greenland, especially with 72% of harvested fish in 2014 being of North American origin and those stocks being so depleted in many home rivers.

The NGOs look forward to discussions on the recommendations from the Working Group on Monitoring and Control that met last autumn. We participated in this group and support the recommendations wholeheartedly.

We expect the Faroe Islands to continue their responsible approach towards marine exploitation, and for Greenland to catch only what is necessary to support a well monitored subsistence fishery. We also urge all other Parties to take whatever measures are necessary to minimise adverse impacts on wild salmon stocks in their home waters.

We are looking forward to this year's Theme-based Special Session on river connectivity. In-river hydroelectric schemes can cause significant obstructions to both upstream and

downstream migrations, but there are many other potential barriers to the free movement of salmon throughout river and estuarine systems. The Theme-based Special Session will be a welcome opportunity to explore how Parties tackle these issues in their home countries, and what still needs to be done to meet the primary outcome of the Salmon Summit in La Rochelle back in 2011 – to ensure that our rivers produce the highest possible number of healthy wild smolts to start the marine-phase of their life cycle.

The NGOs believe that there should be absolutely no harvest of salmon from populations that are not surpassing minimum Conservation Limits and fisheries should only target populations that are known to be surpassing these minimum limits. We completely support fairness and balance between harvest of salmon domestically and on feeding grounds – a fish saved from one Mixed-Stock Fishery should not be threatened by another when it returns to its homewaters.

The NGOs urge the Parties to remember that NASCO's objective is the protection and conservation of wild Atlantic salmon. The time to act on behalf of this iconic fish is now, and this should be the fundamental basis to our meeting this week.

Annex 7

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Annex 8

CNL(15)47

Thirty-Second Annual Meeting of the Council

Hotel North 2, Happy Valley – Goose Bay, Canada

2 - 5 June, 2015

Agenda

1. Opening of the Meeting

2. Adoption of Agenda

3. Financial and Administrative Issues

3.1 Report of the Finance and Administration Committee

4. Scientific, Technical, Legal and Other Information

4.1 Secretary's Report

4.2 Report on the Activities of the Organization in 2014

4.3 Announcement of the Tag Return Incentive Scheme Grand Prize

4.4 Scientific Advice from ICES

4.5 Report of the International Atlantic Salmon Research Board

4.6 Report of the Working Group on Stock Classification

4.7 Report of the Standing Scientific Committee

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

5.1 Special Session: Evaluation of Annual Progress Reports under the 2013 - 2018 Implementation Plans

5.2 Theme-based Special Session: 'Maintaining and improving river connectivity with particular focus on impacts of hydropower'

5.3 Progress in implementing the 'Action Plan for Taking Forward the Recommendations of the External Performance Review and the Review of the 'Next Steps' for NASCO', CNL(13)38

5.4 Liaison with the Salmon Farming Industry

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

5.6 Incorporating Social and Economic Factors in Salmon Management

5.7 Management and Sampling of the St Pierre and Miquelon Salmon Fishery

5.8 Reports on the Conservation Work of the Three Regional Commissions

6. Other Business

7. Date and Place of Next Meeting

8. Report of the Meeting

9. Press Release

Annex 9

CNL(15)19

North Atlantic Salmon Conservation Organization
2016 Budget and 2017 Forecast Budget (Pounds Sterling)

		Budget 2016	Forecast 2017
	Expenditure		
1.	Staff-related costs	322,700	332,500
2.	Travel and subsistence	28,000	22,000
3.	Research and advice	60,000	62,000
4.	Contribution to Working Capital Fund	0	0
5.	Meetings	9,000	35,000
6.	Office supplies, printing and translation	23,500	26,000
7.	Communications	16,000	17,500
8.	Headquarters Property	40,000	42,000
9.	Office furniture and equipment	6,500	6,500
10.	Audit and other expenses	9,000	10,000
11.	Tag Return Incentive Scheme	4,500	4,800
12.	International Atlantic Salmon Research Fund	0	0
13.	Contribution to Contractual Obligation Fund	94,000	103,000
14.	Contribution to Recruitment Fund	15,000	15,000
	Total Expenditure	**628,200**	**676,300**
	Income		
15.	Contributions - Contracting Parties	571,200	619,300
16.	General Fund – Interest	2,000	2,000
17.	Income from Headquarters Property	55,000	55,000
18.	Surplus or Deficit (-) from 2014	0	0
	Total Income	**628,200**	**676,300**

2016 Budget & 2017 Forecast Budget (Pounds Sterling) - Expenditure by Sub-section

		Budget 2016	Forecast 2017
1.	**Staff-related costs**		
1.1	Secretariat members	235,600	243,000
1.2	Support staff	1,500	1,500
1.3	Staff Fund contributions, allowances, & other staff costs	85,600	88,000
	Total	**322,700**	**332,500**
2.	**Travel and subsistence**		
2.1	Travel to post and Annual Meeting	7,000	0
2.2	Official travel and subsistence	21,000	22,000
	Total	**28,000**	**22,000**
3.	**Research and advice**		
3.1	Annual contribution to ICES	60,000	62,000
3.2	Other research and advice	0	0
	Total	**60,000**	**62,000**
4.	**Contribution to Working Capital Fund**	**0**	**0**
5.	**Meetings**		
5.1	Costs of Annual Meeting	4,000	30,000
5.2	Costs of other meetings	5,000	5,000
	Total	**9,000**	**35,000**
6.	**Office supplies, printing and translation**		
6.1	Office supplies	17,000	19,000
6.2	Printing	4,500	5,000
6.3	Translations	2,000	2,000
	Total	**23,500**	**26,000**
7.	**Communications**		
7.1	Telecommunications	5,000	6,000
7.2	Postage and courier services	3,000	3,000
7.3	IT support & website	8,000	8,500
7.4	Communications, professional support and design	0	0
	Total	**16,000**	**17,500**
8.	**Headquarters Property**		
8.1	Capital and interest payments	0	0
8.2	Maintenance, services and other building-related costs	40,000	42,000
	Total	**40,000**	**42,000**
9.	**Office furniture and equipment**		
9.1	Furniture	0	1,500
9.2	Equipment	6,500	5,000
	Total	**6,500**	**6,500**
10.	**Audit and other expenses**		
10.1	Audit and accountancy fees	4,500	5,000
10.2	Bank charges and insurances	1,000	1,000
10.3	Miscellaneous	3,500	4,000
	Total	**9,000**	**10,000**
11.	**Tag Return Incentive Scheme**	**4,500**	**4,800**
12.	**Contribution to IASRF**	**0**	**0**
13.	**Contribution to Contractual Obligation Fund**	**94,000**	**103,000**
14.	**Contribution to Recruitment Fund**	**15,000**	**15,000**
	Total Expenditure	**628,200**	**676,300**

2015 Budget Contributions (Pounds Sterling) Adjusted for Confirmed rather than Provisional 2013 Catches (tonnes)

Party	2013 catch (provisional)	2013 catch (confirmed)	2015 contribution (provisional)	2015 contribution (confirmed)	Adjustment
Canada	136	137	73,363	74,526	1163
Denmark (Faroe Islands and Greenland)	47	47	43,333	43,617	283
European Union	404	382	163,790	158,668	-5,121
Norway	475	476	187,746	190,951	3,205
Russian Federation	78	78	53,793	54,263	470
USA	0	0	27,475	27,475	0
Total	**1,140**	**1,120**	**549,500**	**549,500**	**0**

Note: A positive adjustment represents an underpayment in 2015.

NASCO Budget Contributions for 2016 and Forecast Budget Contributions for 2017 (Pounds Sterling)

Party	2014 catch (provisional)	2016 contribution	Adjustment from 2015	2016 adjusted contribution	2017 forecast contribution
Canada	106	69,196	1163	70,359	75,023
Denmark (Faroe Islands and Greenland)	58	50,795	283	51,078	55,072
European Union	308	146,634	-5,121	141,512	158,981
Norway	490	216,404	3,205	219,610	234,627
Russian Federation	81	59,612	470	60,082	64,632
USA	0	28,560	0	28,560	30,965
Total	**1,043**	**571,200**	**0**	**571,200**	**619,300**

Column totals in both tables can be in error by a few pounds due to rounding.

Five-year NASCO Budgeted Expenditure and Income Projections 2016 - 2020

		2016	Forecast 2017	Forecast 2018	Forecast 2019	Forecast 2020
	Expenditure					
1	Staff related costs	322,700	332,500	342,500	353,000	363,000
2	Travel & Subsistence	28,000	22,000	29,000	29,000	30,000
3	Research & advice	60,000	62,000	65,000	68,000	70,000
4	Contribution to Working Capital	0	0	0	0	0
5	Meetings	9,000	35,000	9,000	9,000	10,000
6	Office supplies, printing and translations	23,500	26,000	28,000	29,000	30,000
7	Communications	16,000	17,500	18,500	19,000	19,000
8	Headquarters Property	40,000	42,000	42,000	42,000	45,000
9	Office furniture & equipment	6,500	6,500	6,500	6,500	6,500
10	Audit & other expenses	9,000	10,000	11,000	12,000	12,000
11	Tag return incentive scheme	4,800	4,800	4,800	4,800	4,800
12	International Cooperative Research	0	0	0	0	0
13	Contribution to Contractual Obligation Fund	94,000	103,000	50,000	50,000	50,000
14	Contribution to Recruitment Fund	15,000	15,000	15,000	15,000	15,000
	Total	**628,200**	**676,300**	**621,300**	**637,300**	**655,300**
	Income					
15	Contributions of Contracting Parties	571,200	619,300	564,300	580,300	598,300
16	Interest Received on General Fund	2,000	2,000	2,000	2,000	2,000
17	Income from HQ property	55,000	55,000	55,000	55,000	55,000
	Total	**628,200**	**676,300**	**621,300**	**637,300**	**655,300**

Annex 10

Council

CNL(15)8

Report of the ICES Advisory Committee

(Section 10.1 only)

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

10. NORTH ATLANTIC SALMON STOCKS

10.1 Introduction

10.1.1 Main Tasks

At its 2014 Statutory Meeting, ICES resolved (C. Res. 2014/2/ACOM10) that the Working Group on North Atlantic Salmon [WGNAS] (chaired by Ian Russell, UK) should meet in Moncton, Canada, 17–26 March 2015 to consider questions posed to ICES by the North Atlantic Salmon Conservation Organization (NASCO).

The sections of the report that provide the responses to the terms of reference are identified below.

a)	With respect to Atlantic salmon in the North Atlantic area:	Section 10.1
	i) provide an overview of salmon catches and landings, including unreported catches by country, catch and release, and production of farmed and ranched Atlantic salmon in 2014[1];	10.1.5
	ii) report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];	10.1.6
	iii) provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations[3];	10.1.7
	iv) provide a compilation of tag releases by country in 2014; and	10.1.9
	v) identify relevant data deficiencies, monitoring needs, and research requirements.	10.1.8 & 10.1.13
b)	With respect to Atlantic salmon in the Northeast Atlantic Commission area:	Section 10.2
	i) describe the key events of the 2014 fisheries[4];	10.2.1
	ii) review and report on the development of age-specific stock conservation limits;	10.2.1
	iii) describe the status of the stocks;	10.2.1
	iv) provide catch options or alternative management advice for the 2015/16–2017/18 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5];	10.2.1
	v) advise on options for taking into account the recent genetic analysis that suggests there was a significant contribution of North American origin stocks to the historical mixed-stock fisheries in Faroese waters for the provision of catch advice[6];	10.1.10
	vi) update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice; and	10.2.1
	vii) advise on what data would enhance the development of the catch options.	10.1.11

c)	With respect to Atlantic salmon in the North American Commission area:	Section 10.3
	i) describe the key events of the 2014 fisheries (including the fishery at St Pierre and Miquelon)[4];	10.3.1
	ii) update age-specific stock conservation limits based on new information as available;	10.3.1
	iii) describe the status of the stocks;	10.3.1
	iv) provide catch options or alternative management advice for 2015–2018 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5];	10.3.1

v)	update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice;	10.3.1
vi)	considering the available contemporary data on stock origin of salmon in the Labrador fisheries, estimate the catches by stock origin and describe their spatial and temporal distribution; and	10.1.12
vii)	considering the available contemporary data on stock origin of salmon in the Saint-Pierre and Miquelon fishery, estimate the catches by stock origin and describe their spatial and temporal distribution.	10.1.12
d)	With respect to Atlantic salmon in the West Greenland Commission area:	Section 10.4
i)	describe the key events of the 2014 fisheries[4];	10.4.1
ii)	describe the status of the stocks[7];	10.4.1
iii)	provide catch options or alternative management advice for 2015–2017 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[5];	10.4.1
iv)	update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice; and	10.4.1
v)	considering the available contemporary data on stock origin of salmon in the West Greenland fishery, estimate the catches by stock origin and describe their spatial and temporal distribution.	10.1.12

Notes:

1. With regard to question a) i, for the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal. Numbers of salmon caught and released in recreational fisheries should be provided.
2. With regard to question a) ii, ICES is requested to include reports on any significant advances in understanding of the biology of Atlantic salmon that is pertinent to NASCO, including information on any new research into the migration and distribution of salmon at sea and the potential implications of climate change for salmon management.
3. With regards to question a) iii, NASCO is particularly interested in case studies highlighting successes and failures of various restoration efforts employed across the North Atlantic by all Parties/jurisdictions and the metrics used for evaluating success or failure.
4. In the responses to questions b) i, c) i and d) i, ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For home-water fisheries, the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Information on any other sources of fishing mortality for salmon is also requested.
5. In response to questions b) iv, c) iv, and d) iii, provide a detailed explanation and critical examination of any changes to the models used to provide catch advice and report on any developments in relation to incorporating environmental variables in these models.
6. In response to question b) v, this should include consideration of the implications of the new genetic results with regard to the factors previously identified by ICES as requiring management decisions for the finalization of the risk framework for the provision of catch advice for the Faroes fishery (i.e. annual or seasonal catch advice, sharing agreement, choice of management units to consider, and specified management objectives).

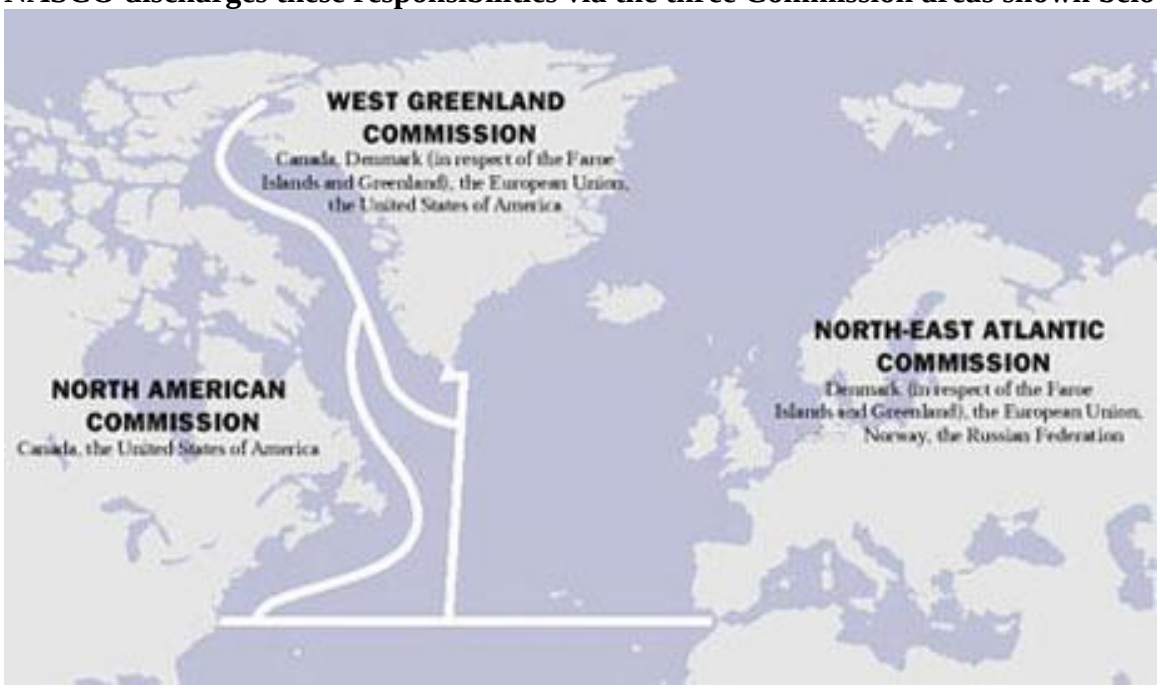
In response to question d) ii, ICES is requested to provide a brief summary of the status of North American and Northeast Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions b) iii and c) iii.

In response to the terms of reference, the Working Group considered 35 Working Documents. A complete list of acronyms and abbreviations used in this report is provided in Annex 1. References cited are listed in Annex 2.

10.1.2 Management framework for salmon in the North Atlantic

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

NASCO discharges these responsibilities via the three Commission areas shown below:



10.1.3 Management objectives

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

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

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

NASCO's Action Plan for Application of the Precautionary Approach (NASCO, 1998) provides an interpretation of how this is to be achieved:

- "Management measures should be aimed at maintaining all stocks above their conservation limits by the use of management targets".
- "Socio-economic factors could be taken into account in applying the precautionary approach to fisheries management issues".
- "The precautionary approach is an integrated approach that requires, *inter alia*, that stock rebuilding programmes (including as appropriate, habitat improvements, stock enhancement, and fishery management actions) be developed for stocks that are below conservation limits".

10.1.4 Reference points and application of precaution

Atlantic salmon has characteristics of short-lived fish stocks: mature abundance is sensitive to annual recruitment because there are only few age groups in the adult spawning stock. Incoming recruitment is often the main component of the fishable stock. For such fish stocks, the ICES maximum sustainable yield (MSY) approach is aimed at achieving a target escapement (MSY $B_{escapement}$, the amount of biomass left to spawn). No catch should be allowed unless this escapement can be achieved. The escapement level should be set so there is a low risk of future recruitment being impaired.

ICES considers that to be consistent with the MSY and the precautionary approach, fisheries should only take place on salmon from rivers where stocks have been shown to be at full reproductive capacity. Furthermore, due to differences in the status of individual stocks within stock complexes, mixed-stock fisheries present particular threats.

Conservation limits (CLs) for North Atlantic salmon stock complexes have been defined by ICES as the level of stock (number of spawners) that will achieve long-term average maximum sustainable yield. In many regions of North America, the CLs are calculated as the number of spawners required to fully seed the wetted area of the rivers. The definition of conservation in Canada varies by region and in some areas, historically, the values used were equivalent to maximizing/optimizing freshwater production. These are used in Canada as limit reference points and they do not correspond to MSY values. Reference points for Atlantic salmon are currently being reviewed for conformity with the Precautionary Approach policy in Canada and revised reference points are expected to be developed. In some regions of Europe, pseudo stock–recruitment observations are used to calculate a hockey-stick relationship, with the inflection point defining the national CLs. In the remaining regions, the CLs are calculated as the number of spawners that will achieve long-term average MSY, as derived from the adult-to-adult stock and recruitment relationship (Ricker, 1975; ICES, 1993). NASCO has adopted the region-specific CLs (NASCO, 1998). These CLs are limit reference points (S_{lim}); having populations fall below these limits should be avoided with high probability.

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

Where there are no specific management objectives for the assessment of the status of stocks and advice on management of national components and geographical groupings of the stock complexes in the NEAC area, the following shall apply:

- ICES considers that if the lower bound of the 90% confidence interval of the current estimate of spawners is above the CL, then the stock is at full reproductive capacity (equivalent to a probability of at least 95% of meeting the CL).

- When the lower bound of the confidence interval is below the CL, but the midpoint is above, then ICES considers the stock to be at risk of suffering reduced reproductive capacity.
- Finally, when the midpoint is below the CL, ICES considers the stock to suffer reduced reproductive capacity.

For catch advice on the mixed-stock fishery at West Greenland (catching non-maturing 1SW fish from North America and non-maturing 1SW fish from Southern NEAC), NASCO has adopted a risk level (probability) of 75% of simultaneous attainment of management objectives in seven geographic regions (ICES, 2003) as part of an agreed management plan. NASCO uses the same approach for catch advice for the mixed-stock fishery, affecting six geographic regions for the North American stock complex. ICES notes that the choice of a 75% risk (probability) for simultaneous attainment of six or seven stock units is approximately equivalent to a 95% probability of attainment for each individual unit (ICES, 2013).

There is no formally agreed management plan for the fishery at Faroes. However, ICES has developed a risk-based framework for providing catch advice for fish exploited in this fishery (mainly MSW fish from NEAC countries). Catch advice is provided at both the stock complex and country level and catch options tables provide the probability of meeting CLs in the individual stock complexes or countries, and in all the stock complexes or countries simultaneously. ICES has recommended (ICES, 2013) that management decisions should be based principally on a 95% probability of attainment of CLs in each stock complex/country individually. The simultaneous attainment probability may also be used as a guide, but managers should be aware that this will generally be quite low when large numbers of management units are used.

Recent genetic investigations have indicated that North American origin fish contributed a higher proportion of the catch in the historical mixed-stock fishery at Faroes than previously thought. In light of these findings, ICES has been asked to advise on management options that take the North American fish into account; further details are provided in Section 10.1.10 of this report.

10.1.5 Catches of North Atlantic salmon

10.1.5.1 Nominal catches of salmon

Figure 10.1.5.1 displays reported total nominal catch of salmon in four North Atlantic regions from 1960 to 2014. Nominal catches of salmon reported for countries in the North Atlantic for 1960–2014 are given in Table 10.1.5.1. Catch statistics in the North Atlantic include fish farm escapees, and in some Northeast Atlantic countries also ranched fish.

Icelandic catches have traditionally been split into two separate categories, wild and ranched, reflecting the fact that Iceland has been the main North Atlantic country where large-scale ranching has been undertaken with the specific intention of harvesting all returns at the release site, and with no prospect of wild spawning success. The release of smolts for commercial ranching purposes ceased in Iceland in 1998, but ranching for rod fisheries in two Icelandic rivers continued into 2014 (Table 10.1.5.1). Catches in Sweden have also now been split between wild and ranched categories over the entire time-series. The latter fish represent adult salmon which have originated from hatchery-reared smolts and which have been released under programmes to mitigate for hydropower development schemes. These fish are also exploited

very heavily in home waters and have no possibility of spawning naturally in the wild. While ranching does occur in some other countries, this is on a much smaller scale. Some of these operations are experimental and at others harvesting does not occur solely at the release site. The ranched component in these countries has therefore been included in the nominal catch.

Reported catches in tonnes for the three NASCO Commission Areas for 2005–2014 are provided below.

Area	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NEAC	1998	1867	1409	1533	1163	1415	1419	1250	1092	938
NAC	142	140	114	162	129	156	182	129	143	109
WGC	15	22	25	26	26	40	28	33	47	58
Total	2156	2029	1548	1721	1318	1610	1629	1412	1282	1106

The provisional total nominal catch for 2014 was 1106 t, 176 t below the updated catch for 2013 (1282 t). The 2014 catch was the lowest in the time-series and followed the previous lowest in the time-series in 2013. Catches were at or below the previous five- and ten-year averages in the majority of countries, except Sweden, Finland, France, Spain, and Greenland.

ICES considers that mixed-stock fisheries present particular threats to stock status. These fisheries predominantly operate in coastal areas and NASCO specifically requests that the nominal catches in home-water fisheries be partitioned according to whether the catch is taken in coastal, estuarine, or riverine areas. The 2014 nominal catch (in tonnes) was partitioned accordingly and is shown below for the NEAC and NAC Commission Areas. Figure 10.1.5.2 and Table 10.1.5.2 present these data on a country-by-country basis. There is considerable variability in the distribution of the catch among individual countries. In most countries the majority of the catch is now taken in freshwater, and the coastal catch has declined markedly. However, nominal catches in freshwater have also declined in many countries as a result of increasing use of catch-and-release in rod fisheries.

AREA	COAST		ESTUARY		RIVER		TOTAL
	Weight	%	Weight	%	Weight	%	Weight
NEAC	325	35	52	6	562	60	939
NAC	10	9	40	37	59	54	109

Coastal, estuarine, and riverine catch data aggregated by region are presented in Figure 10.1.5.3. In Northern NEAC, about half the catch has typically been taken in rivers and half in coastal waters (although there are no coastal fisheries in Iceland and Finland), with estuarine catches representing a negligible component of the catch in this area. There has been a steady reduction in the proportion of the catch taken in coastal waters over recent years. In Southern NEAC, catches in all fishery areas have declined dramatically over the period. While coastal fisheries have historically made up the largest component of the catch, these fisheries have declined the most, reflecting widespread measures to reduce exploitation in a number of countries. Since 2007, the majority of the catch in Southern NEAC has been taken in freshwater.

In North America, the total catch over the period 2004–2014 has been fluctuating around 140t. The majority of the catch in this area has been taken in riverine fisheries; the catch in coastal fisheries has been relatively small in any year (15 t or less).

10.1.5.2 Unreported catches

The total unreported catch in NASCO areas in 2014 was estimated to be 287 t. There was no estimate for Russia, or for Spain and St. Pierre and Miquelon, although catches in the latter two areas are small. The unreported catch in the NEAC area in 2014 was estimated at 256 t, and that for the West Greenland and North American Commission areas at 10 t and 21 t, respectively. The following table shows unreported catch by NASCO commission areas in the last ten years:

Area	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NEAC	605	604	465	433	317	357	382	363	272	256
NAC	85	56	-	-	16	26	29	31	24	21
WGC	10	10	10	10	10	10	10	10	10	10

The 2014 unreported catch by country is provided in Table 10.1.5.3. It has not been possible to separate the unreported catch into that taken in coastal, estuarine, and riverine areas. Over recent years efforts have been made to reduce the level of unreported catch in a number of countries (e.g. through improved reporting procedures and the introduction of carcass tagging and logbook schemes).

10.1.5.3 Catch-and-release

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

The nominal catches do not include salmon that have been caught and released. Table 10.1.5.4 presents C&R information from 1991 to 2014 for countries that have records; C&R may also be practised in other countries while not being formally recorded. There are large differences in the percentage of the total rod catch that is released, in 2014 ranging from 19% in Norway (this is a minimum figure, as statistics were collected on a voluntary basis) to 82% in UK (Scotland), reflecting varying management practices and angler attitudes among countries. C&R rates have typically been highest in Russia (average of 84% in the five years 2004 to 2008) and are believed to have remained at this level. However, there were no obligations to report C&R fish in Russia in 2009 and records since 2010 are incomplete. Within countries, the percentage of fish released has tended to increase over time. There is also evidence from some countries that larger MSW fish are released in higher proportions than smaller fish. Overall, more than 135 000 salmon were reported to have been caught-and-released around the North Atlantic in 2014.

10.1.5.4 Farming and sea ranching of Atlantic salmon

The provisional estimate of farmed Atlantic salmon production in the North Atlantic area for 2014 is 1555 kt. The production of farmed salmon in this area has been over one million tonnes since 2009. The 2014 total represents a 4% increase on 2013 and a 16% increase on the previous five-year mean. Norway and UK (Scotland) continue to produce the majority of the farmed salmon in the North Atlantic (79% and 10%, respectively). Farmed salmon production in 2014 was above the previous five-year averages in all North Atlantic salmon producing countries except Ireland.

Worldwide production of farmed Atlantic salmon has been in excess of one million tonnes since 2002 and has been over two million tonnes since 2012. The total worldwide production in 2014 is provisionally estimated at around 2171 kt (Figure 10.1.5.4), a 3% increase on 2013. Production outside the North Atlantic is estimated to have accounted for 22% of the total in 2014. Production outside the North Atlantic is dominated by Chile.

The worldwide production of farmed Atlantic salmon in 2014 was over 1900 times the reported nominal catch of Atlantic salmon in the North Atlantic.

The total harvest of ranched Atlantic salmon in countries bordering the North Atlantic in 2014 was 21 t, taken in Iceland, Sweden, and Ireland (Figure 10.1.5.5). No estimate of ranched salmon production was made in Norway in 2014, where such catches have been very low in recent years (< 1 t), and in UK (Northern Ireland) where the proportion of ranched fish has not been assessed since 2008 due to a lack of microtag returns.

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

10.1.6.1 Interactions between farmed and wild salmon – UK (Northern Ireland)

In UK (Northern Ireland) a study was finished in 2014 using genetic methods to detect the presence of farm-escaped fish in samples taken from the commercial fishery in 2006 and 2007. The study used genetic assignment techniques to assign a sample of 1100 individuals taken along the Northern Irish coast between Downhill and Cushendun to a genetic baseline consisting of 1100 juveniles from ten regional rivers, as well as a sample (350 individuals) from two commonly used Norwegian origin aquaculture strains. All samples were genotyped for a suite of 17 microsatellite loci and a panel of 90 Single Nucleotide Polymorphism (SNP) markers. Assignments were performed using various genetic assignment software packages utilizing Bayesian, frequency-based, and maximum likelihood methods to assign samples to baseline populations. There were two assignment groups: 'wild' and 'farmed'. The percentage of samples assigned to the 'farmed' group using the various methods ranged from 0.7% to 2.9% for the microsatellites, and 1.2% to 1.7% for SNPs.

10.1.6.2 Tracking and acoustic tagging studies in Canada

There is growing interest in the development of techniques to help investigate salmon mortality at sea and to better partition mortality between different periods of the marine phase of the life-cycle. To this end, NASCO's International Atlantic Salmon Research Board (IASRB) adopted a resolution in 2014 to further support the development of telemetry programmes in the ocean.

ICES reviewed the results of ongoing projects led by the Atlantic Salmon Federation (ASF) in collaboration with the Ocean Tracking Network, Miramichi Salmon Association (MSA), Restigouche River Watershed Management Committee, Department of Fisheries and Oceans (DFO) and others, to assess estuarine and marine survival of tagged Atlantic salmon released in rivers of the Gulf of St Lawrence (GoSL), Canada. More than 2300 smolts from four rivers (Cascapedia, Restigouche, and the southwestern and northwestern branches of the Miramichi) have been tagged with acoustic transmitters over a period of twelve years, 2003 to 2014. A number of kelts have also been tagged. Acoustic arrays to detect tagged fish have been positioned at the head of tide of each river, at the exit from the bays to the GoSL and at the

Strait of Belle Isle (SoBI) leading to the Labrador Sea, more than 800 km from the point of release.

A statistical model has been developed to better distinguish the imperfect detection of tagged smolts on the sonic arrays from apparent survival during their out migration. The model has reduced uncertainty in expected values of the annual and river-specific detection probabilities at the head of tide and bay exit arrays. However, it was not possible to distinguish the probabilities of detection from the probabilities of survival at the last array (SoBI). The head of tide and outer bay arrays were in place in all years. The SoBI array has been deployed since 2007, so the probabilities of detection at the bay exits were estimated using the years 2007 to 2013 when the SoBI array was operational. The predicted posterior probability distributions for the bay arrays were used as probability distributions of detection in the years when the SoBI array was not in place (2003 to 2006). The probabilities of detection and survival to SoBI can only be estimated with a prior assumption at this array. The prior was derived using sentinel tags (fixed tags adjacent to SoBI receivers) placed at three distances near two receivers.

The probability of smolt survival through freshwater (Figure 10.1.6.1a) was high for Cascapedia (median range 0.94 to 0.95) and highly variable in SW Miramichi (0.71 to 0.89) and Restigouche (0.72 to 0.91). The survival rate through freshwater was negatively associated with migration duration. The survival rates from release to the outer bays leading to the GoSL (Figure 10.1.6.1b) varied annually, ranging between 0.50 and 0.80, except for the NW Miramichi where estimated survival decreased below 0.30 over the last two years. The contribution of smolts to the diet of striped bass is being examined in this area where the spatial and temporal overlap of the two species has been documented (using acoustic tags); investigations are continuing. The inferred survival rates through the GoSL to the Labrador Sea were highly variable (Figure 10.1.6.1c).

The SoBI receiver array (between Labrador and Newfoundland) appears to be the primary route for smolts and kelts exiting the GoSL. The only other possible exit is through the Cabot Strait, and this array has been in place since 2012. Only two smolt tags were detected on the Cabot array (originating from Miramichi in 2012 and Cascapedia in 2013).

Salmon kelts have been acoustically tagged since 2008 (272 from Miramichi and 42 from Restigouche). In the Miramichi, 32 kelts have also been tagged with satellite archival pop-up tags (2012 to 2014). Detections through the freshwater and bays were high in most years (> 0.80), with the exception of 2014 (Restigouche = 0.60, Miramichi = 0.76).

ICES encourages the continuation of this tracking programme as information from it is expected to be useful in the assessment of marine mortality of North American salmon stocks. ICES also notes that these techniques are being proposed for other areas in line with the NASCO IASRB resolution.

10.1.6.3 Diseases and parasites

Update on the Red Vent Syndrome

Over recent years, there have been reports from a number of countries in the NEAC and NAC areas of salmon returning to rivers with swollen and/or bleeding vents (ICES, 2014a). The condition, known as red vent syndrome (RVS or Anasakiasis), has been noted since 2005, and has been linked to the presence of a nematode worm, *Anisakis simplex* (Beck *et al.*, 2008). A

number of regions within the NEAC area observed a notable increase in the incidence of salmon with RVS in 2007 (ICES, 2008). Levels in the NEAC area were typically lower from 2008 (ICES, 2009; 2010b; 2011).

Trapping records for rivers in UK (England & Wales) and France suggested that levels of RVS increased again in 2013, with the observed levels being the highest in the time-series for some of the monitored stocks. In 2014, three rivers in UK (England & Wales) were monitored for the presence of RVS (Tyne, Dee, and Lune). In the Tyne and the Dee levels were 8% and 25% respectively, both near the top end of the ranges recorded for these rivers. For the Lune, levels dropped significantly to 10%; however, the sample size was small.

In France, the level of infestation continued to be monitored in the Bresle and Scorff rivers in 2014. In the river Bresle, less than 10% of the fish were "moderately" affected, compared with an average of 25% in this category in previous years. In the river Scorff, 29% were "moderately" affected in 2014, compared with an average of 22% in previous years.

There is no clear indication that RVS affects either the survival of the fish in freshwater or their spawning success. Recent results have also demonstrated that affected vents show signs of progressive healing in freshwater (ICES, 2014a).

Update on sea lice investigations in Norway

The surveillance programme for sea lice infection on wild salmon smolts and sea trout at specific localities along the Norwegian coast continued in 2014 (Nilsen *et al.*, 2014). For most areas sea lice infestation rates were low to moderate in the salmon smolt migration period as a result of coordinated efforts among fish farms to reduce infestation levels at this time. In two areas, Romsdalsfjord and Vikna, salmon smolts were probably exposed to elevated levels of sea lice, especially late-migrating smolts.

In general, sea lice are still regarded as a serious problem for salmonids in Norway (Skilbrei *et al.*, 2013; Krkošek *et al.*, 2013), and especially for sea trout (Nilsen *et al.*, 2014). The use of chemicals to keep lice levels below a threshold value of 0.5 mature female lice per salmon has shown a sharp increase in recent years, as sea lice have developed resistance towards one or more of the most commonly used chemical agents. Multi-resistant sea lice are now present in all areas except Finnmark County in northernmost Norway (Aaen *et al.*, 2015; www.fhi.no). A recent study demonstrated how resistance to the most commonly used pesticide, emamectin benzoate, spread rapidly through the panmictic North Atlantic sea lice population from 1999 (Besnier *et al.*, 2014).

Norway has a regime of "National salmon fjords" that restrict salmon farming and other activities close to "National salmon rivers". A recent study has evaluated the effect of such protected areas on the effects of sea lice from fish farms on salmon and sea-trout (Serra-Llinares *et al.*, 2014). When the size and shape of protected areas are such that fish farms are kept at a minimum distance (in the study calculated to at least 30 km), wild fish seem unaffected by the direct lice infection pressure imposed by fish farms (Serra-Llinares *et al.*, 2014). However, this distance is considered likely to be site-dependent.

10.1.6.4 Progress with implementing the Quality Norm for Norwegian salmon populations

In August 2013, a management system – The Quality Norm for Wild Populations of Atlantic Salmon ("Kvalitetsnorm for ville bestander av atlantisk laks (*Salmo salar*)") – was adopted by the Norwegian government (Anon., 2013). This system was based on an earlier proposal by the Norwegian Scientific Advisory Committee for Atlantic Salmon Management (Anon., 2011a). A more detailed description of the Quality Norm is given in ICES (2014a). Recent progress in 2014 involved establishing a preliminary classification according to the conservation limit and the harvest potential dimension of the Quality Norm, based on assessments for the period 2010–2013. The first classification of populations based on both dimensions (conservation limit and harvest potential, and genetic integrity) is planned for 2015.

10.1.6.5 Changing biological characteristics of salmon

ICES has previously reported changes in the biological characteristics of salmon, including the size of returning 1SW fish (ICES, 2010a; 2013). For example, decreasing mean fork lengths have been observed in returning adult 1SW fish in the rivers Bush and Bann in UK (Northern Ireland) since 1973 (ICES, 2013).

In 2014, ICES noted anecdotal reports of some very small 1SW salmon returns from various areas in NAC. However, available evidence from traps and counting facilities did not indicate below-average return size on monitored rivers in 2014 (e.g. Miramichi, Nashwaak, La Have, Sandhill). Stocks will continue to be monitored in 2015.

10.1.6.6 Determining sex ratios in Atlantic salmon populations

The sex ratio of Atlantic salmon spawners is a key parameter for estimating egg deposition rates and assessing the status of salmon populations. The monitoring of out-migrating smolts or returning adults both provide opportunities for assessing sex ratios. However, accurate sexing of out-migrating smolts requires lethal sampling. For returning adults, external examination can provide an indication of a fish's sex, particularly with the onset of male kype formation for fish sampled in the autumn. However, accurate sexing of adult salmon during the summer spawning migration ideally also requires lethal sampling. Given that lethal sampling is never desirable, and is often impossible in small and threatened populations, a simple non-lethal method to determine salmon sex is preferred. Recent work has identified sex-determining genomic regions in Atlantic salmon (Yano *et al*., 2012, 2013; Eisbrenner *et al.*, 2014). Use of the *sdY* locus (Yano *et al*., 2013) has allowed accurate sexing of Atlantic salmon in Newfoundland and Labrador populations. As expected, comparison with visual external sexing during the summer migration revealed significant discrepancies (males mis-sexed as female).

ICES welcomed the development of this new genetic-based tool for refining sex ratios and production estimates in Atlantic salmon populations, particularly for populations in which abundance of salmon is very low and sacrificing individual fish is not justifiable.

10.1.6.7 Update on EU project ECOKNOWS – embedding Atlantic salmon stock assessment at a broad ocean scale within an integrated Bayesian life-cycle modelling framework

Within the Atlantic salmon case study of the EU-FP7 ECOKNOWS project (http://www.ecoknows.eu/), a hierarchical Bayesian life-cycle model was developed that captures the joint dynamics of the five regional stock units considered by ICES for stock assessment in the Southern European stock complex: France, UK (England & Wales), Ireland and UK (Northern Ireland), Southwest Iceland, and UK (Scotland) (Massiot-Granier *et al*., 2014). The new modelling approach provides improvement to models currently used by ICES, and potentially paves the way toward harmonizing the stock assessment models used in the Atlantic (WGNAS) and the Baltic (WGBAST).

- The existing biological knowledge on Atlantic salmon demography is first integrated into an age- and stage-based life-cycle model, which explicitly incorporates the variability of life histories (river and sea ages) and accounts for natural and fishing mortality due to the sequential fisheries along the migration routes.
- The model is built in a full Bayesian probabilistic rationale. Uncertainties are accounted for in both estimations and forecasting.
- The model provides a framework for harmonizing the structure and parameterization between different stock units, while maintaining the specificities and associated levels of detail in data assimilation.
- The hierarchical structure provides a tool for separating out signals in the variability of demographic traits at different spatial scales: (1) common trends shared by the five stock units of the Southern European stock complex, and (2) fluctuations specific to each stock unit.

The life-cycle model is expandable and provides a framework for structuring further research and data collection:

- It offers possibilities for extending the model by incorporating additional sources of data: (1) time-series of egg-to-smolt data to provide information on density-dependent egg-to-smolt survival rates and smolt age composition, and (2) smolt tagging and recapture data to improve the estimates of return rates.
- It would enable trends in survival and proportion maturing to be correlated with environmental factors likely to influence populations at various spatial scales (global versus local influence).
- It could be used to assess how management and environmental scenarios can affect population dynamics at the scale of all stock complexes in the North Atlantic Ocean.

It has not been possible for ICES to utilize the model as yet. Ongoing issues include: (1) improving the computational tractability of the model (running time is still too long), and (2) assessing the possibility of transferring the methodology to the stock assessment model for North America. Continued efforts are being made to address these issues.

10.1.6.8 New opportunities for sampling salmon at sea

Knowledge of the salmon's marine life-cycle, including migration routes and feeding areas for salmon from different parts of the distribution range is still limited, even though recent projects such as the EU-funded SALSEA–Merge project have provided much valuable information. To

advance our understanding of salmon at sea further sampling is needed, but with the low density of salmon in the ocean obtaining such samples is costly. Thus, opportunities to obtain samples from research cruises targeting other species provides a potential cost-effective alternative to targeted studies.

The International Ecosystem Survey of the Nordic Seas (IESSNS) is a collaborative programme involving research vessels from Iceland, the Faroes, and Norway; surveys are carried out annually in July–August and present such an opportunity. The area surveyed (2.45 million km^2 in 2014) overlaps in time and space with the known distribution of post-smolts in the North Atlantic, and as these cruises target pelagic species such as herring and mackerel, bycatch of salmon post-smolts and adult salmon is not uncommon. ICES has been in contact with the coordinator of the IESSNS surveys, who is keen to facilitate collaboration with WGNAS. Preliminary discussions have taken place to clarify sampling protocols and to identify appropriate individuals to carry out subsequent analysis of any salmon samples. These are expected to provide valuable information on the distribution of salmon at sea, the size, sex, and diet of individual fish and will also enable stock origin to be investigated using genetic techniques. Furthermore, the IESSNS survey data will provide information on salmon distribution in relation to other pelagic species, to hydrography, and to plankton abundance.

10.1.6.9 New opportunities for collecting information on salmon bycatch in pelagic fisheries

ICES has received information from the Institute of Marine Research (IMR), Bergen, Norway, related to a new tagging initiative and a wide-scale tag screening programme in the Northeast Atlantic. The tagging programme is directed at pelagic species (herring and mackerel) using glass-encapsulated passive integrated transponder (PIT) tags/RFID tags (radio frequency identity tags). Tag detection relies on the installation of antenna-reader systems at ports of landing. To date, such detectors have been installed at eight factories processing herring and mackerel; these are located in Norway (1), Iceland (1, with 2 more planned), Faroes (1), and Scotland (5, with 1 more planned). Further detectors are also planned in Ireland (3) and Denmark (1). By end 2015, there may be as many as 22 RFID detector systems screening herring and mackerel catches around Europe.

PIT/RFID tags are also widely used in juvenile salmon, and to some extent also in adult salmon. ICES received reports of 29 895 salmon being tagged with PIT/RFID tags in 2014 (4951 adults, 21 814 smolts, 3130 parr). The tag detectors will thus be able to detect such tags should post-smolt or adult salmon be taken as bycatch in the mackerel and herring fisheries. ICES has contacted the programme coordinators at IMR and has been advised that all tag detections will be registered and stored in an IMR database, and that information on any salmon caught will be available. ICES will therefore provide IMR with details of the tag number series used in salmon PIT/RFID tagging investigations, and relevant contact details, so that tag recapture details (date, location, etc.) can be reported back to appropriate researchers.

10.1.7 NASCO has asked ICES to provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and to develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations

The Working Group on the Effectiveness of Recovery Actions for Atlantic Salmon (WGERAAS) had its second meeting on 12–16 May 2014 at ICES HQ in Copenhagen.

WGERAAS has focused on the evaluation of case studies and development of a river-specific database (Database on Effectiveness of Recovery Actions for Atlantic salmon, DBERAAS) to support the case studies by providing an overview of the impact of a list of stressors and the effect of recovery actions across the species range. An interim report has been produced (ICES, 2014b) presenting eight case studies and an analysis of a partially completed database using data from rivers that were the focus of recovery or rebuilding action investigations. The results from the analysis showed the potential of a complete DBERAAS for analysis of population stressors and recovery and rebuilding actions, and for assessing the effects of such actions across varying spatial scales.

For 2015, WGERAAS aims to collect more case studies, specifically on populations impacted by stressors such as invasive species and diseases, as well as populating DBERAAS. Analysis of both DBERAAS and case studies will indicate under what conditions recovery actions are successful and when they are unsuccessful. Recommendations on future recovery and restoration actions for Atlantic salmon will be based on this analysis. WGERAAS plans to meet during the second part of 2015 and report to ICES in 2016.

10.1.8 Reports from ICES expert groups relevant to North Atlantic salmon

WGRECORDS

The Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species (WGRECORDS) was established to provide a scientific forum in ICES for work on diadromous species. The role of the Group is to coordinate work on these species, organize expert groups, theme sessions for ICES Annual Science Conference, and symposia, and help to deliver the ICES Science Plan.

WGRECORDS held an informal meeting in June 2014, during the NASCO Annual Meeting in St Malo, France. The requirements for expert groups to address new and ongoing issues related to diadromous species were discussed, as were issues arising from the NASCO Annual Meeting. The annual meeting of WGRECORDS was held in September 2014, during the ICES Annual Science Conference (ASC) in Á Coruna, Spain. Updates were received from expert groups of particular relevance to North Atlantic salmon which had been established by ICES following proposals by WGRECORDS. The following are the ongoing, recently held, or proposed expert groups which WGRECORDS has proposed to ICES:

- Ongoing – Working Group on Effectiveness of Recovery Actions for Atlantic Salmon (WGERAAS). Next meeting in autumn 2015. An update is provided in Section 10.1.7.
- Recent – Workshop on Lampreys and Shads (WKLS) held in October 2014.
- Proposed – Working Group on Data-Poor Diadromous Fish (WGDAM) to be held in October 2015.
- Proposed – Workshop of a Planning Group on the Monitoring of Eel Quality: "Development of standardized and harmonized protocols for the estimation of eel quality".
- Proposed – Joint Workshop of the Working Group on Eel and the Working Group on Biological Effects of Contaminants: "Are contaminants in eels contributing to their decline?".

Theme sessions and symposia may be developed and proposed by WGRECORDS. In 2014, a theme session proposed by WGRECORDS was held at the ICES ASC entitled: "Analytical

approaches to using telemetry data to assess marine survival of diadromous and other migratory fish species".

This theme session focused particularly on approaches for estimating mortality of fish using electronic tags. In particular, the theme session highlighted the benefits of cooperation between research groups in North America, including Ocean Tracking Network (OTN), Atlantic Cooperative Telemetry network (ACT), and Florida Atlantic Coast Telemetry network (FACT), and the opportunities for researchers in Europe to start applying these techniques. An international salmon telemetry programme, which is being supported by NASCO and developed by NASCO Member States, was outlined at the session. The aim of the programme is to describe the migration pathways of Atlantic salmon in the sea and to help in partitioning the marine mortality of salmon populations from different regions in space and time.

Of particular relevance to NASCO is the theme session developed by WGRECORDS for the ICES Annual Science Conference in September 2015, entitled: "Practical application of genetic stock identification for the conservation, management, and restoration of diadromous fish species".

A theme session has also been proposed for the ICES ASC in 2016, entitled: "Planning the future for diadromous and other migratory fish – What can be done to respond to climate change and other processes potentially affecting natural mortality over broad geographic scales?".

10.1.9 NASCO has asked ICES to provide a compilation of tag releases by country in 2014

Data on releases of tagged, fin-clipped, and otherwise marked salmon in 2014 were provided by ICES and are compiled as a separate report (ICES, 2015a). A summary of tag releases is provided in Table 10.1.9.1.

10.1.10 NASCO has asked ICES to advise on options for taking into account the recent genetic analysis that suggests there was a significant contribution of North American origin stocks to historical mixed-stock fisheries in Faroese waters for the provision of catch advice

In the context of this question, NASCO has asked ICES to consider the implications of the new genetic results with regard to the factors previously identified by ICES as requiring management decisions for the finalization of the risk framework for the provision of catch advice for the Faroes fishery (i.e. annual or seasonal catch advice, sharing arrangement, choice of management units to consider, and specified management objectives).

10.1.10.1 New estimates of the composition of the Faroes catch

A number of studies have indicated that some North American salmon migrate to the northeast Atlantic and that North American fish were caught in the Faroes fishery when it operated in the 1970s and 1980s. ICES (2007) reported the recapture in the Faroes fishery of about six salmon tagged as smolts in Canada in the 1970s and 1980s. It is difficult to use these results to estimate the proportion of North American fish in the total Faroes catch because of differences in tagging programmes in different countries, but they suggested that few North American fish were caught at the Faroes at that time. Based on the recapture of 87 salmon tagged in the Faroes

fishery area between November 1992 and March 1995, Hansen and Jacobsen (2003) estimated that 6.9% (95% Cl – 1.6% to 13.6%) of all the tagged fish originated from Canada. Tucker *et al.* (1999) measured the ^{137}Cs concentrations in adult salmon that had returned to the St. Marguerite River, Canada, and found that 43% of the samples had concentrations characteristic of the Faroe, Norwegian, North, and Irish seas. However, these results do not provide a clear basis for estimating the contribution of North American fish to the Faroes catches.

Genetic analysis of scale samples collected at the Faroes has provided new information on the stock composition of salmon catches in the area. DNA was extracted from 656 scale samples (87 1SW and 487 MSW non-farm origin fish and 82 farmed escapees), collected during the 1993/94 and 1994/95 research fisheries and analysed against the genetic baseline of European salmon developed during the EU SALSEA–Merge project (Anon., 2011b).

A total of 105 fish (5 1SW and 100 MSW non-farm origin fish) were identified as probably being of North American origin, 61 using unique alleles at the SsaD486 microsatellite locus (and confirmed by exclusion analysis) and 44 by exclusion analysis alone (Vasemägi *et al.*, 2001). These results were confirmed by cluster analysis (Pritchard *et al.,* 2000; Jombart and Ahmed, 2011) and by conformation analysis. North American fish therefore accounted for 5.7% of the 1SW non-farmed origin fish overall, but were only identified in February 1994, in which month they accounted for 11.9% of the non-farmed origin 1SW fish in the samples. However, in most months the samples of 1SW fish were very small and so the results provide no clear evidence of any seasonal trend in the proportion of North American fish in the catches. MSW North American fish accounted for 20.5% of all MSW non-farmed origin fish in the samples, with the percentages varying between 11.1% in March 1994 and 29.9% in February 1995 (Figure 10.1.10.1). This partly reflected a difference in the proportions between the two fishing seasons, with 14.5% of the samples being identified as North American in the 1993/94 season compared to 25.6% in the 1994/95 season. There was no consistent seasonal trend in the estimated proportion of North American fish in the catches at Faroes and so the overall percentages for 1SW (5.7%) and MSW (20.5%) salmon have been used in subsequent analyses.

After the putative North American fish were removed from the analysis, the composition of the European component was investigated using the remaining 551 fish (82 1SW and 387 MSW non-farmed origin and 82 farmed). Individual genetic assignments of the EU fish were performed using the Bayesian assignment method implemented in the GENECLASS2 software package (Rannala and Mountain, 1997; Piry *et al*., 2004), and mixed-stock analysis was undertaken using the conditional maximum likelihood method as implemented in the ONCOR software package (Millar, 1987; Kalinowski *et al*., 2007). These methods were both used to assign fish to four hierarchical levels of regional assignment units (RAUs). At the broad geographical scale (Level 1), there were three RUAs, namely, Iceland, Northern Europe, and Southern Europe, while at the finest supportable scale (Level 4), 17 RAUs could be distinguished (Gilbey *et al.,* submitted).

At Level 1, 89.3% of the 1SW wild European fish (n = 82) were assigned to Southern Europe, 9.5% to Northern Europe, and 1.2% to Iceland using the ONCOR analysis. The number of 1SW fish in each monthly sample was ≤ 7 except in February 1994 (n = 31) and December 1994 (n = 37); in these months 94% and 89%, respectively, of the samples were assigned to Southern Europe (by GENECLASS2). The data therefore provide no evidence of any change in the proportion of Northern and Southern European fish through the season.

The Level 1 ONCOR assignment of the MSW non-farmed origin European salmon showed a decreasing trend in the proportion of Southern European fish and an increasing trend in the proportion of Northern European fish over the course of the 1993/94 and the 1994/95 seasons (Figure 10.1.10.2). For the two seasons combined the mean estimate of the proportion of Southern European fish declined from 55.8% in November to 15.4% in March, while the proportion of Northern European fish increased from 43.3% in November to 84.6% in March, with a clear trend in the stock composition during the course of the fishing season. Icelandic MSW fish were only identified (by GENECLASS2 analysis) in November (1%) and December (3%) samples. In view of this, the overall monthly results for the two seasons combined were used in the subsequent analysis.

The geographic areas covered by the Level 3 and Level 4 RAUs (Figure 10.1.12.1) do not align closely with the national/regional areas used by ICES for the assessment of pre-fishery abundance (PFA) and the provision of catch advice (ICES, 2014a) and in some areas the RAUs overlap geographically (e.g. in UK and Ireland). In addition, the sample sizes for some groups in the genetic analysis were very small (e.g. 1SW fish from Northern Europe). It is therefore not possible to use the genetic results to estimate the composition of the Faroes catch based on the PFA assessment areas. However, an approximate comparison suggests that the genetic assignment proportions broadly match the relative estimates of PFA within the assessment areas.

The scale samples analysed in this study were collected in November, December, February, and March. This did not reflect the full seasonal extent of the Faroes commercial fishery, which generally operated from November until at least April. The fishery followed a similar pattern each year, with catches increasing from November to December and then again from January to February, before declining towards the end of the fishing season. The genetic assignments provide no evidence that the proportion of the Faroes 1SW catch originating from Southern Europe, Northern Europe, and Iceland changed over the course of the season and so the proportions derived from the ONCOR analysis were combined with the proportion from North America to give an overall 1SW stock composition of: 84.2% Southern European, 9.0% Northern Europe, 1.2% Icelandic, and 5.7% North American (Table 10.1.10.1).

As there was a temporal trend in the genetic assignment proportions to Northern and Southern Europe for the samples from non-farmed origin MSW salmon (Figure 10.1.10.2), the monthly proportions (for the 1993/94 and 1994/95 seasons combined) therefore have to be applied to the average seasonal breakdown of the MSW catch for the 1983/84 to 1990/91 commercial fishery seasons to estimate the overall composition for the MSW catch. The genetic assignments for November and December samples have been applied to the commercial catches for the same months, the February samples to the catches in January and February, and the March samples to the catches between March and the end of the fishing season. This provides an estimate of the overall composition of the MSW catch of: 20.9% Southern European, 58.0% Northern Europe, 0.6% Icelandic, and 20.5% North American (Table 10.1.10.2).

As indicated above, it is not possible to use the genetic assignments at Levels 3 and 4 to estimate the composition of the catches to country/regional level, but they suggest that the composition within the stock complexes is broadly similar to the relative proportions of the PFA estimates and so the breakdown of catches at this level can be made by applying the relative proportions of PFA.

Uncertainty in the estimates

While the new genetic results are thought to provide the best available data on the contribution of North American salmon to the Faroes fishery, it is important to note the following uncertainties:

1. The samples were collected more than 20 years ago. Since that time there has been a substantial change in the proportions of North American and European fish in the catches at West Greenland, with the proportion from North America increasing from around 60% in the early 1990s to over 80% in recent years. There may have been similar changes, in either direction, in the proportions migrating to the Northeast Atlantic.
2. A significant proportion of the fish sampled from the Faroes fishery are thought to have been fish farm escapees, based on scale reading using the method of Hansen *et al.* (1999). It might have been expected that the genetic analysis would assign these fish to Norwegian regions, the area from which many farmed stocks originated, but while none of these fish was identified as being of North American origin, 25% were assigned to Southern Europe. This may be because there were no farmed fish samples in the baseline used in the genetic analysis, but it could also indicate errors in the identification of farm escapees.
3. The samples were collected from a research fishery. The vessels that were fishing had previously operated in the commercial fishery and there should not have been any differences in the fishing methods used, but this cannot be discounted entirely.
4. Scales have only been analysed from two seasons in the 1990s. Between 11% and 30% of the samples from eight months were identified as North American, but it is possible that these were not representative years.
5. The new results suggest that the overall exploitation rate on the North American stock may have been similar to that on the Northern European stock complex and considerably higher than that on the Southern European stock complex. This is a surprising finding which requires further validation.

There has been some independent confirmation of the genetic identification of North American fish; four of the fish tagged in the fishery and recaptured in North America were included in the genetic analysis and were identified as North American. The DNA samples identified as being North American have been sent to a Canadian laboratory to be run against a North American baseline; this work has not yet been completed.

While the continent of origin of these samples requires further confirmation, ICES agreed that the result provided the best available estimate of the proportion of North American fish that might be caught in a fishery at the Faroes. The remainder of this section is based on the assumption that significant numbers of North American fish may be vulnerable to a fishery at the Faroes. If the Faroes fishery re-opens, it is important that new samples should be collected and genetically analysed against both European and North American baselines.

10.1.10.2 Options and implications of using the new genetic results

In the context of the ICES advice to NASCO, the presence of North American fish in the Faroes catches has implications for the assessment of PFA of both NEAC and NAC stocks and the provision of catch advice for the Faroes fishery.

PFA assessment for NEAC

ICES (2012a) has previously estimated that none of the 1SW salmon, but 2.5% of the MSW salmon caught in the Faroes fishery originated from North America. Therefore, since 2012, the MSW catch figures have been reduced by 2.5% before estimating the PFA of European stocks and developing catch advice for the Faroes fishery. Based on the results of the new genetic studies these proportions have been increased to 5.7% and 20.5% for 1SW and MSW salmon, respectively. This has reduced the estimated catch of European stocks in the fishery and, as a consequence, reduced the estimated PFA of non-maturing 1SW salmon in the NEAC area by up to about 2% in the early 1980s when the Faroes fishery was at its height. As the fishery has not operated since 2001, PFA estimates for the years since then will not have been affected.

PFA assessment for NAC

The Working Group does not currently take into account the catch of North American fish in the Faroes fishery when estimating the PFA of North American stocks. If 5.7% of the 1SW fish and 20.5% of the MSW fish caught at the Faroes were North American, it would mean that an average of 270 1SW and 23 700 MSW North American fish were caught each season between 1983/84 and 1990/91. Including these data in the stock assessment would increase the estimated PFA of maturing 1SW North American salmon by an average of about 330 fish per year between 1984 and 1995, and the estimated PFA of non-maturing 1SW North American salmon by an average of 28 800 fish per year between 1983 and 1994. As the Faroes fishery has not operated since 2001, the PFA estimates since that time would not have been affected.

10.1.10.3 NEAC catch options

ICES has previously proposed a framework for the provision of catch advice for the Faroes fishery and used this to provide advice in 2013; ICES has applied the same approach in the present advice. ICES (2011, 2012a, 2013, 2014a) also noted that NASCO would need to agree upon the following issues before the risk framework could be formally adopted:

- choice of management units (MUs);
- specification of management objectives;
- share arrangement for the Faroes fishery; and
- season to which any TAC should apply (January to December or October to May).

NASCO has asked ICES to comment on the implications of the new genetic results with regard to these factors.

Choice of management units

The stock complexes previously used for the provision of NEAC catch advice (Southern NEAC and Northern NEAC) are significantly larger than each of the six management units used for North American salmon (2SW only) in the catch advice for the West Greenland fishery, and ICES (2010b) has advised that the NEAC catch advice should ideally be based on smaller management units. ICES (2012a) proposed a method to estimate the stock composition of the Faroes catch at a national level based on tag returns and the PFA estimates, and was thereby able to run the risk framework using management units based on countries as well stock complexes. The new genetics results are thought to provide improved estimates of the composition of European stocks in the Faroes catches and also indicate that the contribution of

North American fish may be greater than for many European countries. The options for taking this new information into account are:

a) Continue using only NEAC MUs in the risk framework

In this case, the estimated catch of North American salmon would be removed from each TAC option, and the estimated catches of salmon from European stock complexes or countries would be reduced overall because of the increased North American component. There have also been some changes in the relative proportions among the European management units (complexes or countries) such that the estimated catches from individual management units may go up or down. Thus, while the overall estimated impact of a Faroes TAC on European stocks may be expected to decrease as a result of the new genetic results, the effects on individual management units (complexes or countries) may increase or decrease.

If North American salmon were not included in the risk framework, the status of North American stocks could still be taken into account as independent information influencing the overall catch advice.

b) Add North America as a single 'region' in the risk framework

North America could be added to the NEAC risk framework as a single region with one (MSW only) or two (1SW and MSW) additional management units. Only MSW salmon (non-maturing 1SW PFA) are considered in the West Greenland risk framework, and this may also be appropriate for NEAC, where the catch of 1SW North American fish appears to be very small. PFA forecasts for North America could be included in the risk assessment in the same way as for the NEAC management units (see Section 10.2, Table 10.2.1), and the advice could be provided in the same format with an additional column for North America.

c) Adding six North American 'regions' in the risk framework

This option is similar to option 'b', but the North American stocks would be split into the six management units currently used for the West Greenland catch advice. This would result in six additional management units if only MSW stocks were included and 12 additional management units if both 1SW and MSW stocks were included, although not all regions would have to be included if it was found that North American salmon from some regions do not migrate to the Faroes area. The West Greenland catch advice is based only on the MSW management units, and as the catches of 1SW at the Faroes appear to be very small, the same may be appropriate for the Faroes catch advice. The average size of these management units would be similar to the size of the Icelandic management units and larger than the management units for France, Sweden, and UK (Northern Ireland), although some North American management units are very small (e.g. USA).

ICES has previously advised that it is desirable to go down to country/region level. However, at present there is very limited information on the proportions of the North American fish caught at Faroes originating from the different management units, and it would not be appropriate to adopt this option before more information is obtained on the North American fish found in the Faroes area. It is hoped that the planned genetic analysis of the Faroes samples against a North American genetic baseline will begin to provide such information. ICES therefore considers that option (b) may be the most appropriate at the current time.

Specification of management objectives

The management objectives provide the basis for determining the risks to stocks in each management unit associated with different TAC options in the Faroes fishery. ICES currently provides catch option tables showing the probabilities of each management unit meeting or exceeding its spawner escapement reserve (SER) individually and the probability of simultaneous attainment of this management objective within all of the management units (ICES, 2013). ICES recommendation is that management decisions are based principally on a 95% probability of attainment of SERs in each management unit (stock complex or country) individually. If North American management units were added to the Faroes risk framework the same management objective could be applied to each management unit. If North American stocks were included as a single stock complex, this could be based on the sum of the CLs for the four northern regions and the rebuilding requirements for USA and Scotia–Fundy, or using an alternative approach.

Share allocation for the Faroes fishery

The Faroes 'sharing allocation' establishes the proportion of any harvestable surplus within the NEAC area that could be made available to the Faroes fishery through the TAC. Thus for any TAC option being evaluated for the Faroes, the risk assessment is based on the total combined harvest (Faroes plus home-water fisheries) being equal to the TAC divided by the Faroes share. This approach assumes that homewater countries then have the option to manage exploitation of individual river stocks on the basis of their status. The share allocation has to be determined before the catch advice is developed in order that the current risk framework can be run.

ICES previously proposed that the share allocation could be derived using the same approach as for West Greenland, where the allocation (0.4) is based on the proportion of the total harvest of North American fish that was taken at West Greenland between 1986 and 1990. There is no biological basis for this choice, and European stocks/fisheries were not taken into account in setting this share agreement, although the status of European stocks is taken into account in the catch advice.

ICES (2010b) proposed using the same approach and baseline period to establish the share allocation for the Faroes fishery. This gave a potential share allocation of 0.075 to the Faroes, being the proportion of the total harvest of European fish that was taken at the Faroes between 1986 and 1990. Following discussion within NASCO, one Party proposed an alternative baseline period of 1984–1988, which would give a share allocation of 0.084 to the Faroes; in the absence of further advice from NASCO, ICES used this value (ICES, 2012a, 2013). The calculation of the share agreement on this basis (i.e. excluding North American fish) would not be affected by the new genetic results.

If one or more North American management units was included in the NEAC risk framework, the share agreement could continue to be based only on NEAC stocks (in a similar way to West Greenland) or it could be calculated based on the share of the total catch of salmon from all management units that was taken at Faroes during a reference period. Alternatively, two share allocations could be agreed, with the 'expected' total harvest of North American and European fish under any TAC calculated separately before the risk analysis was conducted, or another approach might be used.

Season to which any TAC should apply

The Faroes fishery has historically operated between October/November and May/June, but the historical TACs applied to a calendar year. This means that two different cohorts of salmon of each age class were exploited under each TAC. ICES (2011) recommended that NASCO manage any fishery on the basis of fishing seasons (i.e. October to June) and that catch advice should be provided on this basis. The new genetic results have no implications for this decision.

10.1.11 NASCO has asked ICES to advise on what data would enhance the development of the NEAC catch options

10.1.11.1 Modelling approach for the catch options risk framework

The model for assessing catch options for the Faroes fishery relies on assessment of the biological characteristics of a catch that would occur at the Faroes consequent on the allocation of a given TAC. The TAC option (tonnes) is converted to numbers of fish using the mean weights of salmon caught in the Faroes fishery and then converted to numbers of wild fish, using an estimate of the proportion of fish farm escapees in the catch. Numbers by sea-age class (1SW and MSW) are estimated according to the proportion of each age group observed in historical catch sampling programmes at the Faroes. In the past, there has also been a requirement to discard any fish less than 60 cm total length caught in the Faroes fishery. The proportion of the 1SW catch subsequently discarded is derived from historical surveys and, as 80% of these fish were estimated to die (ICES, 1986), these mortalities are included as fishery losses. Finally, the 1SW fishery losses are reduced to take account of the proportion that will not mature as 1SW fish (Youngson and Webb, 1993). The survivors from this group are accounted for in the MSW fish taken in the following year.

This derived catch, by sea-age group, is allocated to management units (currently individual countries or country aggregations) based on genetic analysis of historical scale samples of the Faroes fishery and relative PFA. For each management unit, the catch is raised by the Faroes share allocation to give the total potential harvest of fish. Harvests are adjusted for natural mortality and subtracted from the stock forecasts, which are then compared with the spawner escapement reserves to evaluate attainment of the management objective.

10.1.11.2 Derivation of parameters currently used to characterize the Faroes fishery

The data used to determine the biological characteristics of the Faroes fishery are largely taken from sampling programmes conducted in commercial and research fisheries in Faroese waters in the 1980s and 1990s (Table 10.1.11.1). Improvements to these data may be possible by subjecting existing samples to techniques not available when the samples were originally analysed. Thus, for example, as genetic analyses are being used to provide more reliable estimates of the stock composition of the catch, it may also be also possible to use such techniques to estimate the proportion of fish farm escapees in the catch.

Improvements to parameter estimates could also be achieved by collecting contemporary data to reliably characterize a possible future fishery. In addition, the value of such a programme would be to test the extent to which contemporary samples fall within the range already seen in the historical data. Such a sampling programme should be designed to adequately cover the spatial and temporal range likely to be found in a commercial fishery. Fishing methods,

including vessel and gear specifications, should also be consistent with the methods used in a commercial fishery.

10.1.11.3 Derivation of parameters currently used to assess the status of stocks

The allocation of a TAC depends upon the management objectives being met for relevant management units. In general, the run-reconstruction and forecast models used to estimate stock abundance in the NEAC area rely on reported catch raised by estimates of unreported catch and exploitation rates to provide estimates of the numbers of fish returning to home waters and subsequently escaping to spawn. Estimates of lagged eggs, derived from estimates of sex ratio, fecundity, and smolt ages, provide PFA forecasts used in the catch advice.

In this regard, improvements to the estimation of these data inputs and parameters would enhance the advice which ICES is able to provide. Similarly, improvements might be expected from developments in the modelling process, which would reduce the dependence on reported catch data by allowing the integration of more reliable abundance indicators, such as counter and trap data, where available.

With respect to biological reference points, increasing the number of countries able to provide river-specific CLs and thus reducing the reliance on the 'pseudo' stock–recruitment relationships currently used would increase the reliability of the advice provided by ICES.

10.1.11.4 Estimates of natural marine mortality

Estimates of natural marine mortality (M) are used to raise estimates of home-water returns to PFA in both the run-reconstruction and forecast models. Currently, a constant marine mortality rate (0.03 per month) is used both throughout the time-series and throughout the period after the first sea winter. Estimates of marine mortality which more accurately characterize variation over the time-series or partition mortality through the migration would also enhance the advice which ICES is able to provide.

10.1.12 NASCO has asked ICES to estimate catches by stock origin and describe their spatial and temporal distribution, considering the available contemporary data on stock origin of salmon in various mixed-stock fisheries

ICES was asked to consider the available contemporary data on stock origin of salmon, to estimate the catches by stock origin, and to describe the spatial and temporal distribution of salmon from the Labrador subsistence fisheries as well as for the fisheries in Saint Pierre and Miquelon (SPM) and at West Greenland. The Labrador and SPM fisheries are of relevance to stocks in the NAC area, while the West Greenland fishery exploits fish from both NAC and NEAC areas.

Recent genetic stock identification efforts provide an opportunity to identify the origin of North American salmon caught in the Labrador and SPM fisheries, and of both North American and European Atlantic salmon sampled from the fishery at West Greenland. The stock composition and variation in composition of salmon harvested in these mixed-stock fisheries has been determined based on a recently developed North American genetic baseline for Atlantic salmon, which allows assignment to regional reporting groups (Bradbury *et al.*, 2014a; Moore *et al.*, 2014), and a similar baseline for European origin salmon (Gilbey *et al.*, submitted). For North America, twelve regional groups can be reliably identified using 15 microsatellite loci

(Figure 10.1.12.1) and these largely approximate regional clusters identified in landscape analyses of population structure (Dionne *et al.*, 2008; Bradbury *et al.*, 2014b). For Europe, 14 regional groups can be reliably identified (Figure 10.1.12.1).

For the North American samples, assignment to the 12 reporting groups was based on mixture analysis using the Bayesian mixture model from Pella and Masuda (2001) as implemented in cBAYES (Neaves *et al.*, 2005). The accuracy of assignment (94.5%) in these analyses was very high. The power of the baseline to resolve rare contributions was examined using simulations; accurate estimation of the rare stock contributions was possible when these represented from 0.5% to 1.0% and above. For the European samples, regional assignments were made using the GENECLASS2 individual assignment algorithm (Piry *et al.*, 2004). In both NAC and NEAC, the regional groups from the genetic assignments do not correspond directly to the regions used by ICES to characterize stock status and to provide catch advice.

10.1.12.1 Labrador fishery origin and composition of the catches

Tissue samples from salmon sampled from the Labrador subsistence fisheries during 2006 to 2014 were genetically typed to the twelve regional groups. The estimated proportional contributions of the twelve groups based on combined samples for 2006 to 2011 and for 2012 to 2014 are shown in Table 10.1.12.1.

The Labrador Central (LAB) regional group represents the majority (almost 92–96%) of the salmon caught in the Labrador subsistence fishery, with minor contributions from all the other regional groups (Table 10.1.12.1; Bradbury *et al.*, 2014a). Raised to estimated catches of salmon in 2012 to 2014, the Central Labrador regional group represented 96% of the catch, followed by Ungava/Northern Labrador (UNG), Quebec/Labrador South (QLS), and Newfoundland (NFL) at about 1% each (Table 10.1.12.2). No USA origin salmon were identified in the mixed-stock analysis of samples from 2012 to 2014 and raised catches for those years are essentially zero. However, Bradbury *et al.* (2014a) previously reported the presence of USA origin salmon in the samples from the fisheries in 2006 to 2011 with raised harvest estimates of 30 to 40 fish per year. The annual catch estimates differ somewhat if annual sampling results are used (as opposed to aggregated results); because of the smaller annual sample sizes the estimates of raised catches are more uncertain.

10.1.12.2 Saint Pierre and Miquelon (SPM) fishery origin and composition of the catches

Sampling of the salmon catches was conducted in 2004, 2011, 2013, and 2014. The number of tissue samples collected for these years was 138, 73, 71, and 71, respectively, for a total of 353 individual samples over the four years. Estimates of stock composition showed consistent dominance of three regions: Gulf of St. Lawrence, Gaspé Peninsula, and Newfoundland (Figure 10.1.12.2).

Raised to estimated catches of salmon in 2004 to 2014, the origin of the catches at SPM is dominated by three regional groups: Gulf of St. Lawrence (GUL) at 38%, Quebec (GAS, QUE) at 32% and Newfoundland (NFL) at 24% (Table 10.1.12.3). The Scotia-Fundy area of Canada has comprised about 3% of the catch, on average, whereas salmon of US origin have not occurred in the fishery. The annual values differ somewhat if annual sampling results are used because of the smaller annual sample sizes and the estimates of raised catches are more uncertain.

ICES welcomed the analysis of the catches at SPM which has addressed gaps identified in the previous sampling activities (ICES, 2011, 2012a). The ongoing collaboration between French and Canadian researchers was encouraged to ensure that adequate samples are collected and that the North American genetic baseline is used in the analysis of these samples. Continued analysis of additional years will be informative of the characteristics of the salmon age and size structure, the origin of the fish, and variation in the stock-specific characteristics of the catches.

10.1.12.3 West Greenland fishery origin and composition of the catches

Continent of origin spatial and temporal distribution

Continent of origin contributions to the West Greenland fishery vary annually, but have generally increased for North America over the time-series (1982–2014). Mean North American contributions have increased from 52% in the 1980s to 71% in the 1990s, on to 74% in the 2000s and 81% since 2010. Spatial trends are difficult to discern as data are not available for all NAFO Divisions in all years due to resource limitations of the sampling programme (Figure 10.1.12.3).

There appears to be a temporal pattern of increasing European contribution to the fishery as the fishing season progresses (Figure 10.1.12.4). According to the available sample data, the European contribution to the harvest is estimated to be approximately 18% for the first month of the fishery (August) and 34% during the last month of the fishery (October). However, the beginning and end of the fishing season are characterized by low sample sizes. Caution is advised in interpreting Figure 10.1.12.4 as the results may be biased by the number of samples, the NAFO Division where the samples were collected, and the standard week when the samples were collected. Available samples are not uniformly distributed across all NAFO Divisions and standard weeks of the fishing season.

Region of origin spatial and temporal distribution

Tissue samples from salmon sampled in the West Greenland fishery were genetically typed to continent of origin and the 2011–2014 North American origin samples and the 2002 and 2004–2012 European origin samples were assessed against regional baselines.

For the North American samples, the estimated proportional contributions of each of the twelve groups for individual year samples (2011–2014) and overall (combined years) are shown in Table 10.1.12.4.

The number of salmon from each regional group in the harvest of North American origin Atlantic salmon during 2011–2014 were estimated using the mixture analysis. Three regional groups in NAC contribute the majority of the North American origin salmon in the West Greenland fishery: Quebec (UNG, QUE, GAS, ANT), Gulf of St. Lawrence (GUL), and Labrador (LAB, QLS) (Table 10.1.12.4). Smaller contributions are from Newfoundland (NFL, AVA), Scotia–Fundy (NOS, FUN), and USA. These estimates raised to estimated catches in West Greenland are shown in Table 10.1.12.5 (based on assignments for all years combined). The values differ somewhat if annual sampling results are used, but because of the smaller sample sizes annually these estimates of raised catches are more uncertain.

For the European samples, the estimated proportional contributions of each of the 14 groups for all years combined are shown in Table 10.1.12.6. More than 90% of the harvested European

fish were assigned to three regions: N Scotland and N&W Ireland, Irish Sea, and S&E Scotland. The S&E Scotland region, which includes some of the east coast of England, is considerably the largest contributor to the West Greenland fishery, representing almost 40% of the European fish caught. Substantial numbers of fish were also assigned to the Irish Sea (26.6%), which are principally fish originating in English (west coast), Welsh, and Scottish (Solway) rivers, and in the large rivers of Ireland's east and south coast. The region delineated on the basis of the west and north coasts of Ireland and Scotland represents an additional 25.2% of the total. Overall, Scotland appears to be a major contributor to the fishery with almost 70% of the fish being assigned.

The number of salmon from each regional group in the harvest of European origin Atlantic salmon during the 2002 and 2004–2012 fisheries were deterministically estimated by applying both year-specific and overall contribution estimates to the estimated number of European origin fish harvested. Estimated catches based on the overall values are presented in Table 10.1.12.7. The primary contributor (S&E Scotland) contributed between 239 and 1036 fish annually. Rivers in northern Europe contributed small numbers to the harvest annually (approximately 8%); stocks from France and Spain contributed approximately 2% overall. While there is some annual variation, the contributions by regional group have not varied substantially between 2002 and 2012. As with the North American results, the annual estimates differ when using year-specific estimates versus overall estimates. Due to the smaller sample sizes of the year-specific values, the estimates of raised catches are more uncertain.

North American estimated annual regional contributions were compared in samples collected before and after 15 September; these were consistent between the two time periods. Dates of capture for the European origin samples were not available to ICES and therefore similar analysis was not possible.

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

ICES recommends that the Working Group on North Atlantic Salmon (WGNAS) should meet in 2016 (Chair: Jonathan White, Ireland) to address questions posed by ICES, including those posed by NASCO. The Working Group intends to convene at ICES Headquarters in Copenhagen, Denmark. The meeting will be held from 30 March to 8 April 2016.

List of recommendations

1) ICES recommends that sampling and supporting descriptions of the Labrador and Saint-Pierre & Miquelon mixed-stock fisheries be continued and expanded (i.e. sample size, geographic coverage, tissue samples, seasonal distribution of the samples) in future years to improve the information on biological characteristics and stock origin of salmon harvested in these mixed-stock fisheries.
2) ICES recommends that additional monitoring be considered in Labrador to better estimate salmon returns in that region.
3) ICES recommends further analysis of the data collected in 2015 from fishers in the West Greenland fishery following a phone survey, and continuation of this survey programme in future years. Information gained on the level of total catches for this fishery will provide for a more accurate assessment of the status of stocks and assessment of risk with varying levels of harvest.

4) ICES recommends that efforts to improve the Greenland catch reporting system continue and that detailed statistics related to catch and effort should be made available to the Working Group for analysis.

5) ICES recommends a continuation and expansion of the broad geographic sampling programme at West Greenland (multiple NAFO divisions including factory and non-factory landings) to more accurately estimate continent and region of origin and biological characteristics of the mixed-stock fishery.

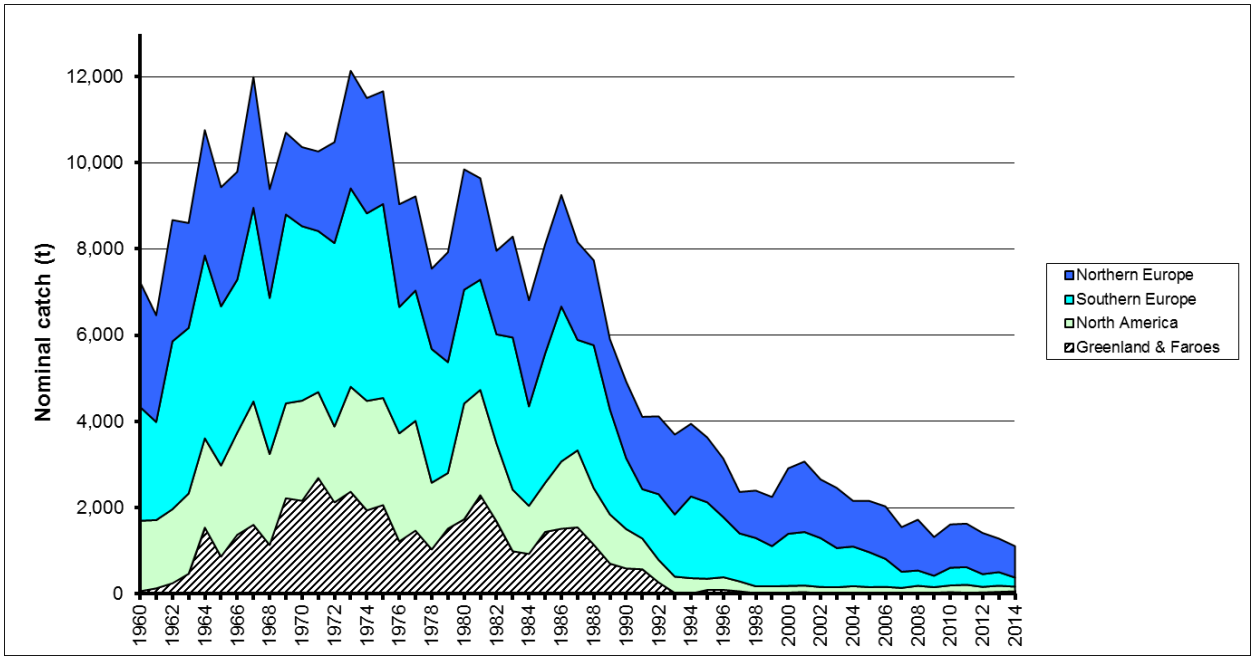


Figure 10.1.5.1 Reported total nominal catch of salmon (tonnes round fresh weight) in four North Atlantic regions, 1960 to 2014.

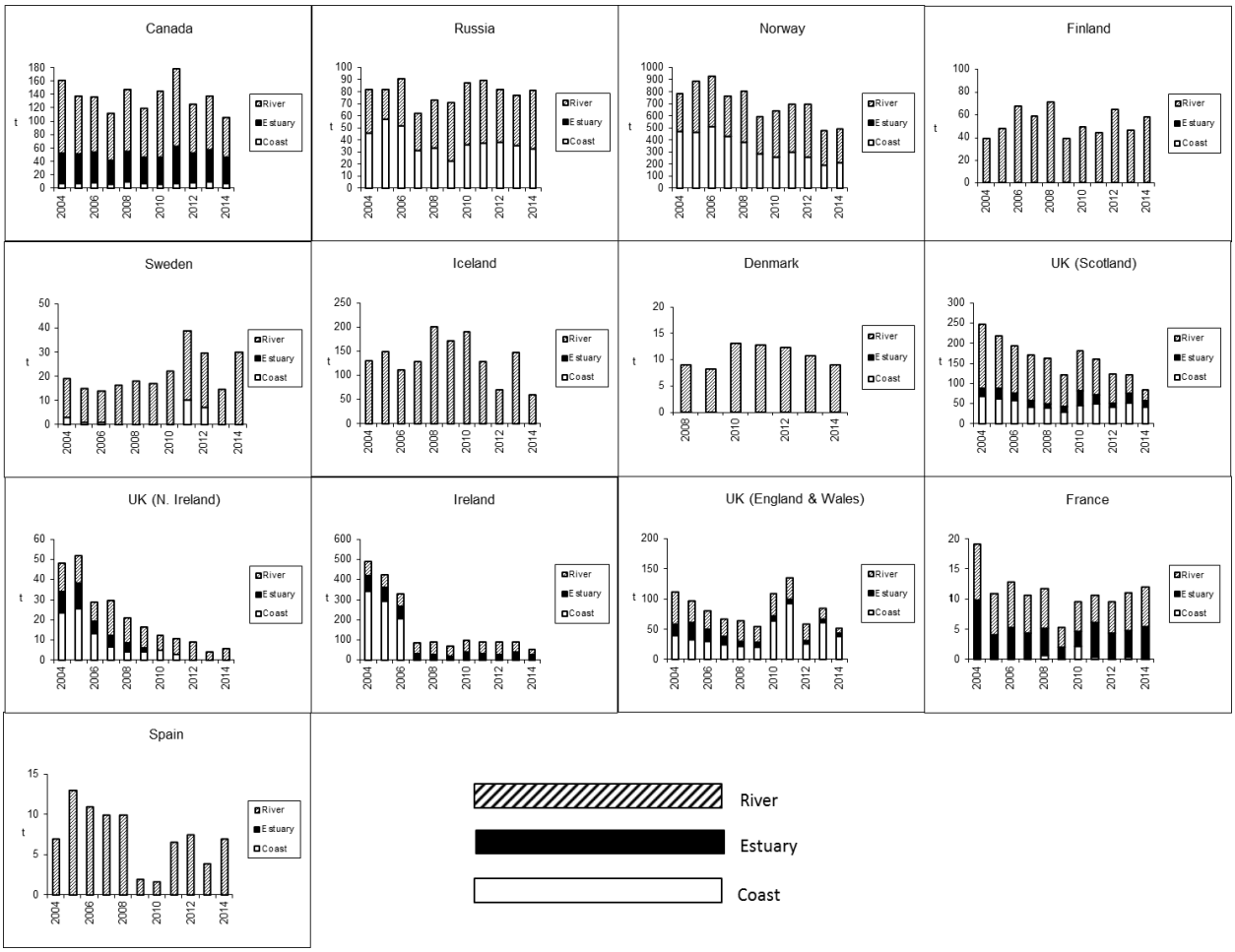


Figure 10.1.5.2 Nominal catch (t) by country taken in coastal, estuarine, and riverine fisheries, 2004–2014 (for Denmark: 2008–2014). Note that the scales on the *y*-axes vary.

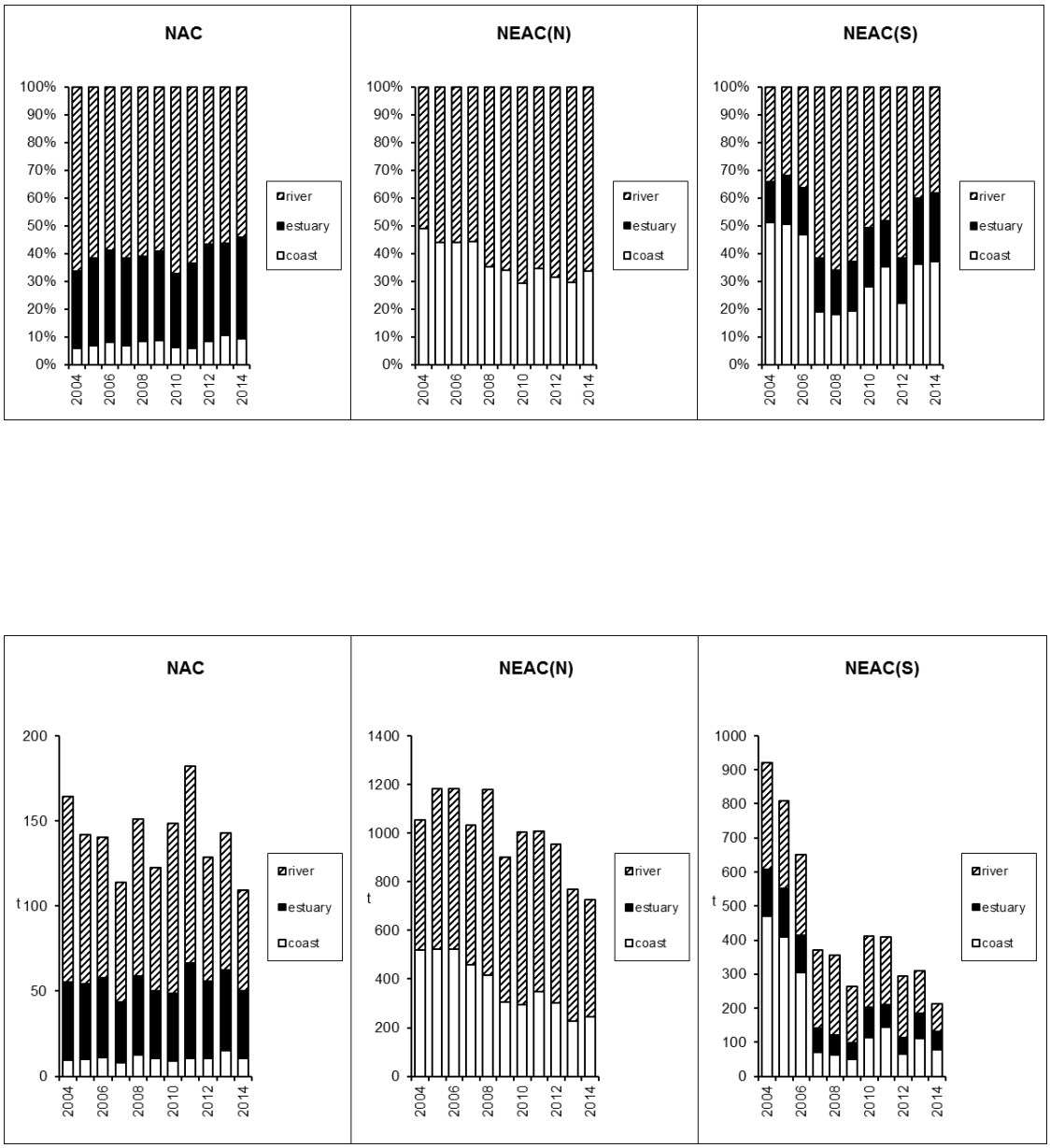


Figure 10.1.5.3 Percentages of nominal catch (top panel) and nominal catch in tonnes (bottom panel) taken in coastal, estuarine, and riverine fisheries for the NAC area, and for the Northern and Southern NEAC areas, 2004–2014. Note that the scales of the *y*-axes vary in the bottom panels.

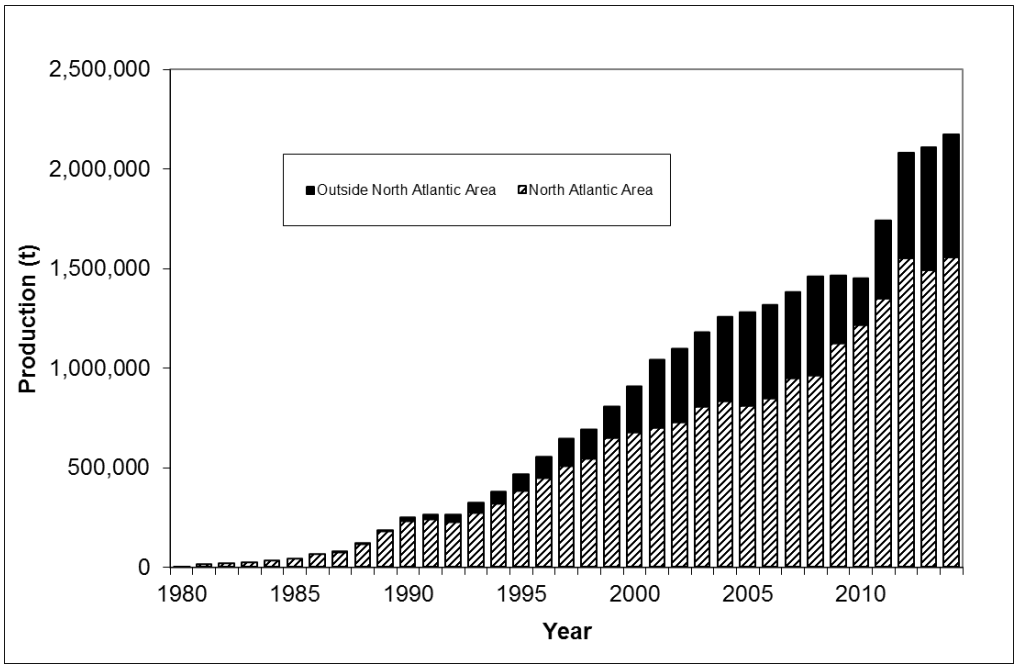


Figure 10.1.5.4 Worldwide production of farmed Atlantic salmon, 1980 to 2014.

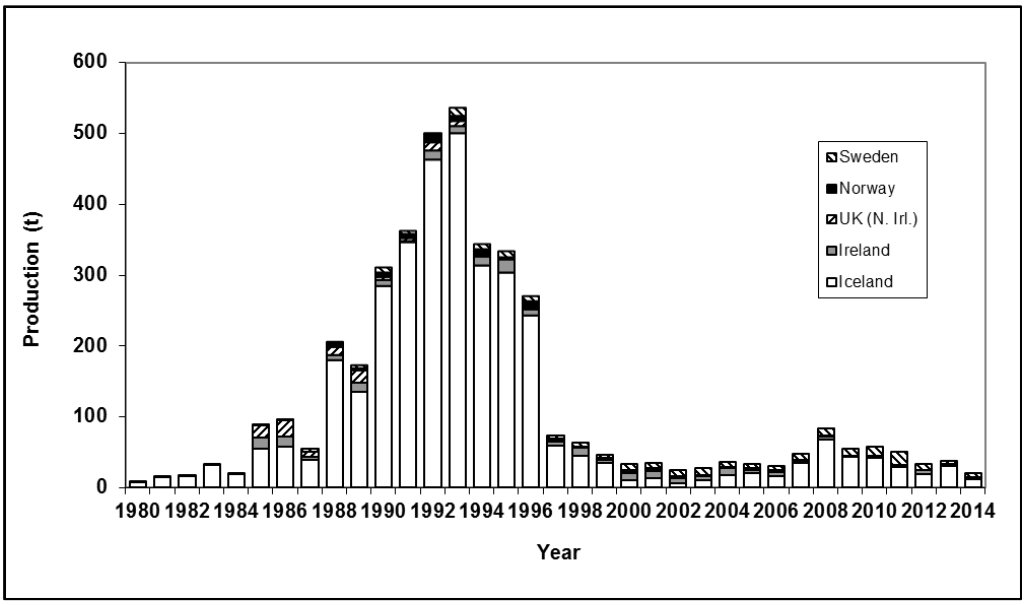


Figure 10.1.5.5 Production of ranched Atlantic salmon (tonnes round fresh weight) in the North Atlantic, 1980 to 2014.

(a)

(b)

(c)

Figure 10.1.6.1 The proportion of tags detected (blue triangle) versus the estimated probability of survival (corrected for incomplete detections, orange circle) for acoustically tagged Atlantic salmon smolts from their release site to: (a – top panels) the head of tide; (b – middle panels) the exit into the Gulf of St. Lawrence; and (c – bottom panels) the Strait of Belle Isle (exit of the Gulf of St. Lawrence to the Labrador Sea).

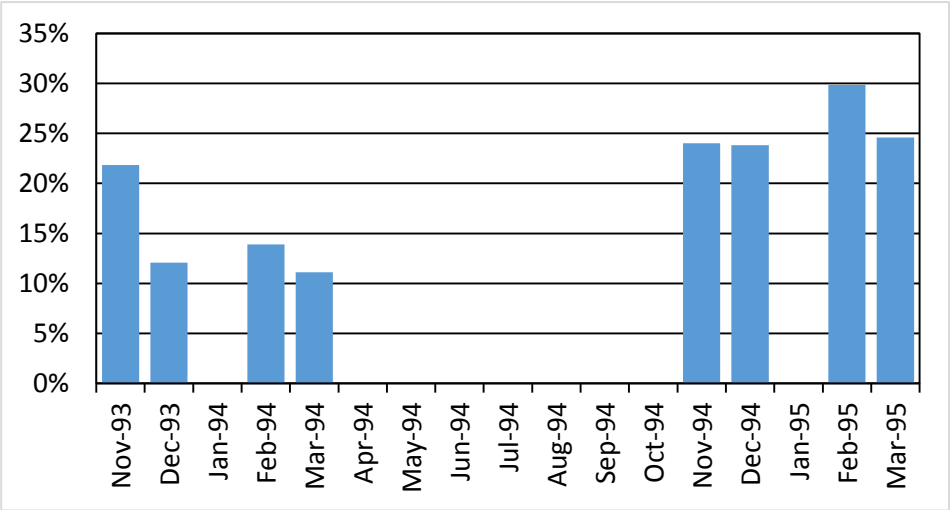


Figure 10.1.10.1 Proportion of North American fish in monthly samples of salmon scales collected from non-farmed origin MSW salmon caught in the Faroes research fishery between November 1993 and March 1995.

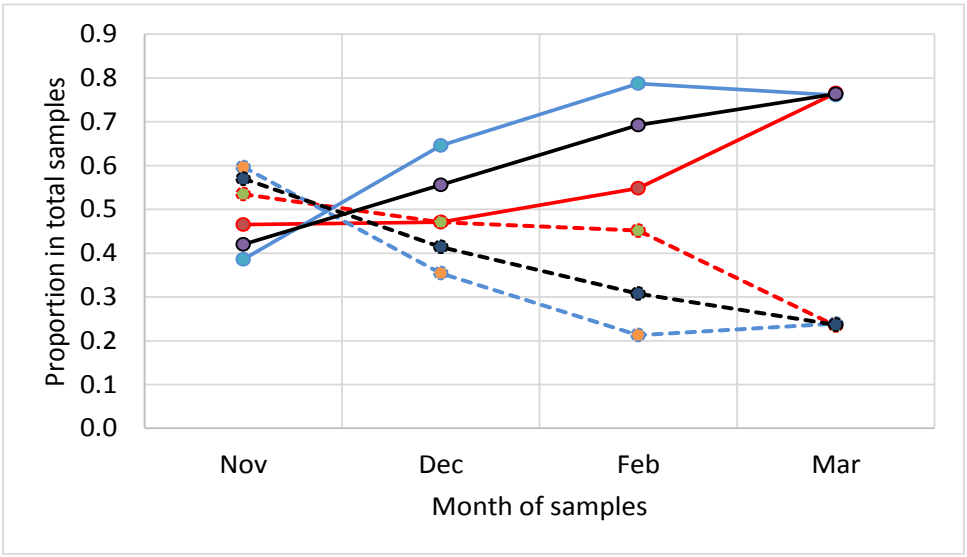


Figure 10.1.10.2 Proportions of Northern European (solid lines) and Southern European (dashed lines) salmon identified in monthly samples of scales collected from non-farmed origin MSW fish caught in the Faroes research fishery in the 1993/94 (blue line) and 1994/95 (red lines) seasons, and for both seasons combined (black lines).

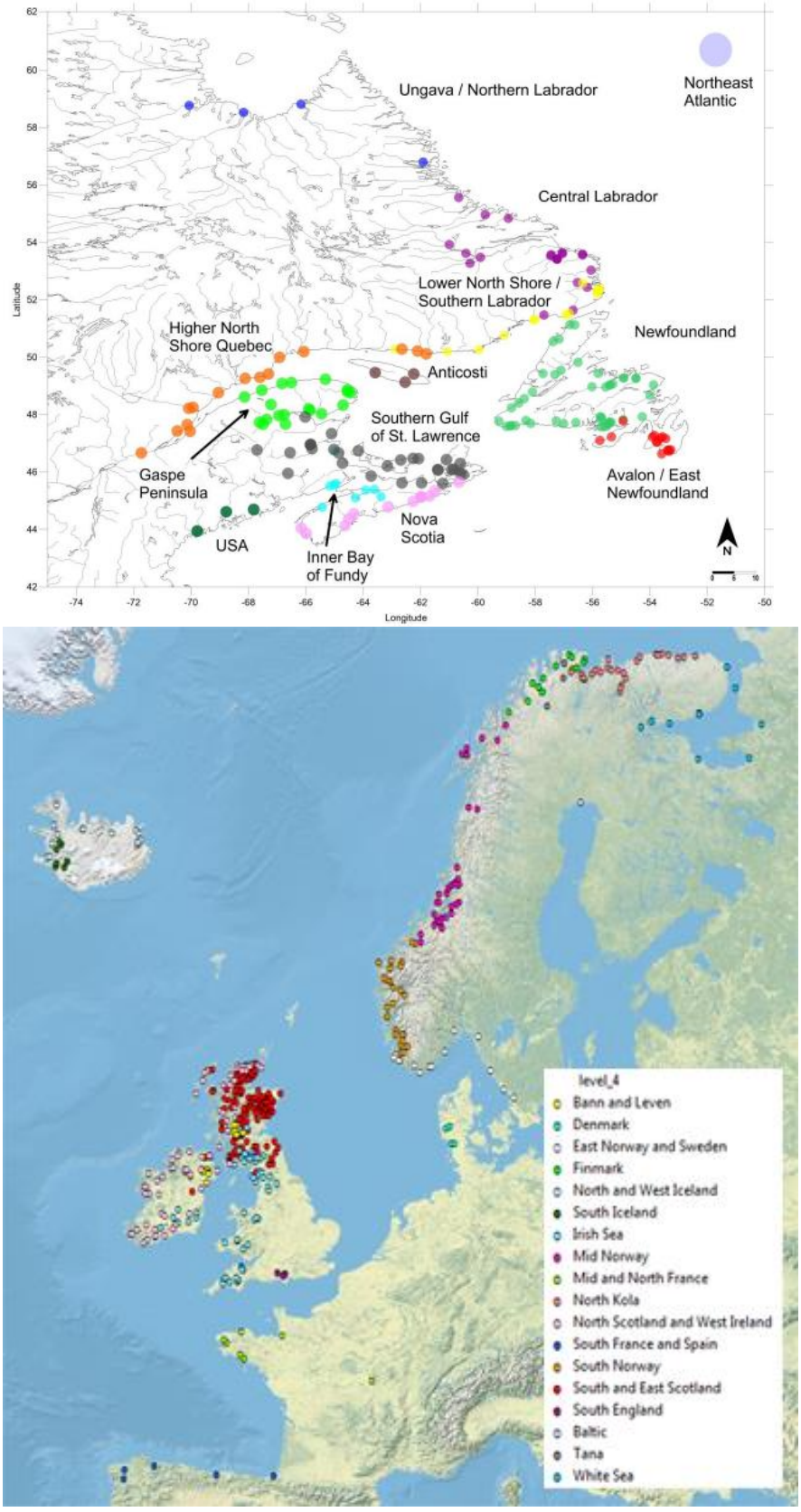


Figure 10.1.12.1 Regional assignment groups for the North American (top) and European (bottom) origin salmon.

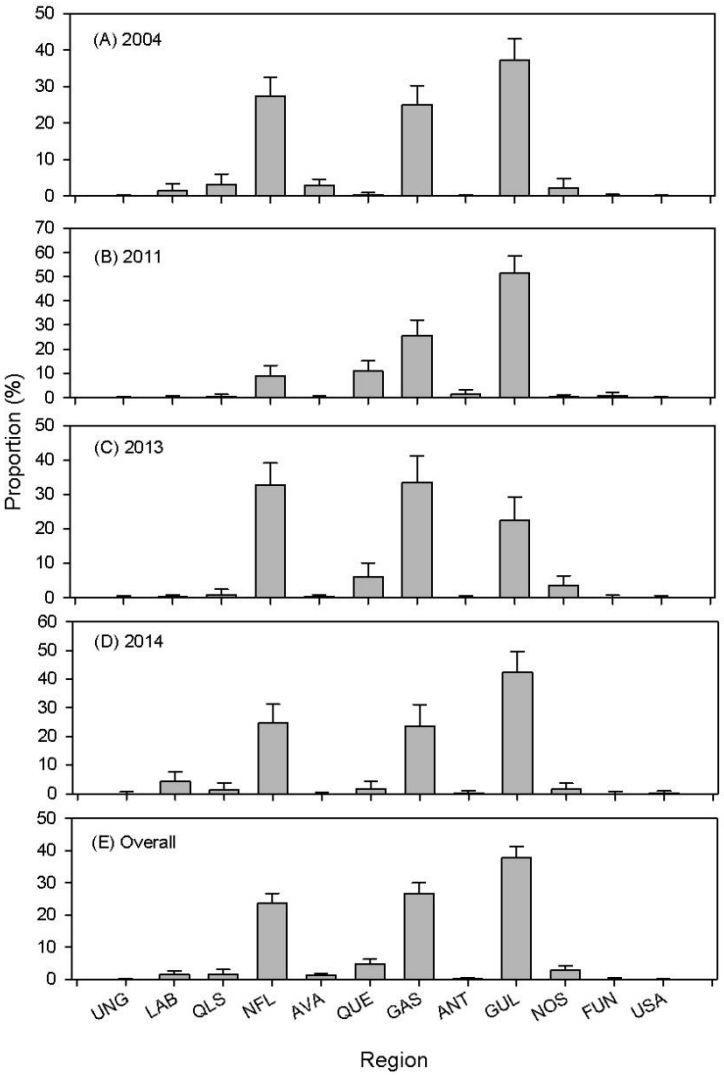


Figure 10.1.12.2 Genetic mixture estimates of composition of samples from the Saint Pierre and Miquelon Atlantic salmon fishery by year: (A) 2004, (B) 2011, (C) 2013, (D) 2014, and (E) overall. Error bars represent standard error of the estimates. Baseline locations refer to the regional assignment groups shown in Figure 10.1.12.1.

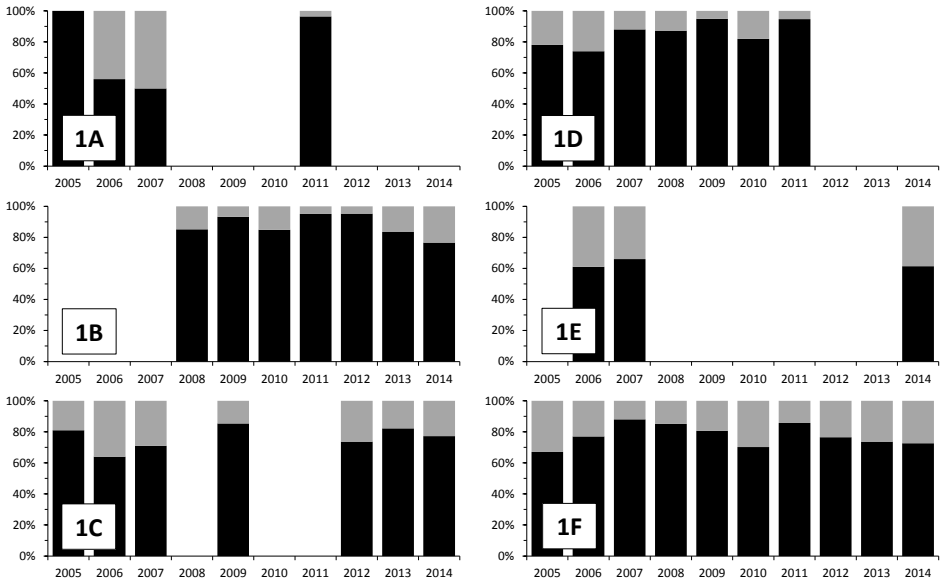


Figure 10.1.12.3 Year- and division-specific estimates of continent of origin contributions (%) to the 2005–2014 harvests in the West Greenland fishery. Data represent year and division combinations where samples are available.

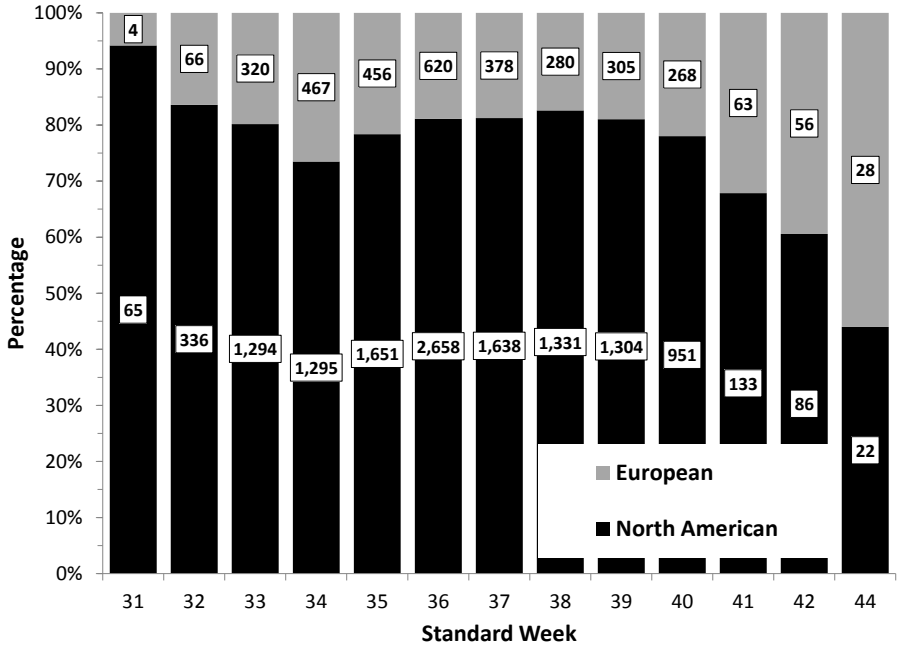


Figure 10.1.12.4 Continent of origin estimates by standard week for the 2005–2014 combined harvests at West Greenland. Sample sizes are provided in the text boxes.

Table 10.1.5.1 Reported total nominal catches of salmon by country (in tonnes round fresh weight), 1960 to 2014 (2014 figures include provisional data).

	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes & Greenland				Total	Unreported catches	
Year	Canada (1)	USA	St. P&M	Norway (2)	Russia (3)	Iceland Wild	Iceland Ranch (4)	Sweden Wild	Sweden Ranch (15)	Denmark	Finland	Ireland (5,6)	UK (E & W)	UK (N.Irl.) (6,7)	UK (Scotl.)	France (8)	Spain (9)	Faroes (10)	East Grld.	West Grld. (11)	Other (12)	Reported Nominal Catch	NASCO Areas (13)	International waters (14)
1960	1,636	1	-	1,659	1,100	100	-	40	0	-	-	743	283	139	1,443	-	33	-	-	60	-	7,237	-	-
1961	1,583	1	-	1,533	790	127	-	27	0	-	-	707	232	132	1,185	-	20	-	-	127	-	6,464	-	-
1962	1,719	1	-	1,935	710	125	-	45	0	-	-	1,459	318	356	1,738	-	23	-	-	244	-	8,673	-	-
1963	1,861	1	-	1,786	480	145	-	23	0	-	-	1,458	325	306	1,725	-	28	-	-	466	-	8,604	-	-
1964	2,069	1	-	2,147	590	135	-	36	0	-	-	1,617	307	377	1,907	-	34	-	-	1,539	-	10,759	-	-
1965	2,116	1	-	2,000	590	133	-	40	0	-	-	1,457	320	281	1,593	-	42	-	-	861	-	9,434	-	-
1966	2,369	1	-	1,791	570	104	2	36	0	-	-	1,238	387	287	1,595	-	42	-	-	1,370	-	9,792	-	-
1967	2,863	1	-	1,980	883	144	2	25	0	-	-	1,463	420	449	2,117	-	43	-	-	1,601	-	11,991	-	-
1968	2,111	1	-	1,514	827	161	1	20	0	-	-	1,413	282	312	1,578	-	38	5	-	1,127	403	9,793	-	-
1969	2,202	1	-	1,383	360	131	2	22	0	-	-	1,730	377	267	1,955	-	54	7	-	2,210	893	11,594	-	-
1970	2,323	1	-	1,171	448	182	13	20	0	-	-	1,787	527	297	1,392	-	45	12	-	2,146	922	11,286	-	-
1971	1,992	1	-	1,207	417	196	8	17	1	-	-	1,639	426	234	1,421	-	16	-	-	2,689	471	10,735	-	-
1972	1,759	1	-	1,578	462	245	5	17	1	-	32	1,804	442	210	1,727	34	40	9	-	2,113	486	10,965	-	-
1973	2,434	3	-	1,726	772	148	8	22	1	-	50	1,930	450	182	2,006	12	24	28	-	2,341	533	12,670	-	-
1974	2,539	1	-	1,633	709	215	10	31	1	-	76	2,128	383	184	1,628	13	16	20	-	1,917	373	11,877	-	-
1975	2,485	2	-	1,537	811	145	21	26	0	-	76	2,216	447	164	1,621	25	27	28	-	2,030	475	12,136	-	-
1976	2,506	1	3	1,530	542	216	9	20	0	-	66	1,561	208	113	1,019	9	21	40	<1	1,175	289	9,327	-	-
1977	2,545	2	-	1,488	497	123	7	9	1	-	59	1,372	345	110	1,160	19	19	40	6	1,420	192	9,414	-	-
1978	1,545	4	-	1,050	476	285	6	10	0	-	37	1,230	349	148	1,323	20	32	37	8	984	138	7,682	-	-
1979	1,287	3	-	1,831	455	219	6	11	1	-	26	1,097	261	99	1,076	10	29	119	<0,5	1,395	193	8,118	-	-
1980	2,680	6	-	1,830	664	241	8	16	1	-	34	947	360	122	1,134	30	47	536	<0,5	1,194	277	10,127	-	-
1981	2,437	6	-	1,656	463	147	16	25	1	-	44	685	493	101	1,233	20	25	1,025	<0,5	1,264	313	9,954	-	-
1982	1,798	6	-	1,348	364	130	17	24	1	-	54	993	286	132	1,092	20	10	606	<0,5	1,077	437	8,395	-	-
1983	1,424	1	3	1,550	507	166	32	27	1	-	58	1,656	429	187	1,221	16	23	678	<0,5	310	466	8,755	-	-
1984	1,112	2	3	1,623	593	139	20	39	1	-	46	829	345	78	1,013	25	18	628	<0,5	297	101	6,912	-	-
1985	1,133	2	3	1,561	659	162	55	44	1	-	49	1,595	361	98	913	22	13	566	7	864	-	8,108	-	-
1986	1,559	2	3	1,598	608	232	59	52	2	-	37	1,730	430	109	1,271	28	27	530	19	960	-	9,255	315	-
1987	1,784	1	2	1,385	564	181	40	43	4	-	49	1,239	302	56	922	27	18	576	<0,5	966	-	8,159	2,788	-
1988	1,310	1	2	1,076	420	217	180	36	4	-	36	1,874	395	114	882	32	18	243	4	893	-	7,737	3,248	-
1989	1,139	2	2	905	364	141	136	25	4	-	52	1,079	296	142	895	14	7	364	-	337	-	5,904	2,277	-
1990	911	2	2	930	313	141	285	27	6	13	60	567	338	94	624	15	7	315	-	274	-	4,925	1,890	180-350

Table 10.1.5.1 continued

Year	NAC Area			NEAC (N. Area)								NEAC (S. Area)						Faroes & Greenland				Total Reported	Unreported catches	
	Canada (1)	USA	St. P&M	Norway (2)	Russia (3)	Iceland Wild	Iceland Ranch (4)	Sweden Wild	Sweden Ranch (15)	Denmark	Finland	Ireland (5,6)	UK (E & W)	UK (N.Irl.) (6,7)	UK (Scotl.)	France (8)	Spain (9)	Faroes (10)	East Grld.	West Grld. (11)	Other (12)	Nominal Catch	NASCO Areas (13)	International waters (14)
1991	711	1	1	876	215	129	346	34	4	3	70	404	200	55	462	13	11	95	4	472	-	4,106	1,682	25-100
1992	522	1	2	867	167	174	462	46	3	10	77	630	171	91	600	20	11	23	5	237	-	4,119	1,962	25-100
1993	373	1	3	923	139	157	499	44	12	9	70	541	248	83	547	16	8	23	-	-	-	3,696	1,644	25-100
1994	355	0	3	996	141	136	313	37	7	6	49	804	324	91	649	18	10	6	-	-	-	3,945	1,276	25-100
1995	260	0	1	839	128	146	303	28	9	3	48	790	295	83	588	10	9	5	2	83	-	3,629	1,060	-
1996	292	0	2	787	131	118	243	26	7	2	44	685	183	77	427	13	7	-	0	92	-	3,136	1,123	-
1997	229	0	2	630	111	97	59	15	4	1	45	570	142	93	296	8	4	-	1	58	-	2,364	827	-
1998	157	0	2	740	131	119	46	10	5	1	48	624	123	78	283	8	4	6	0	11	-	2,395	1,210	-
1999	152	0	2	811	103	111	35	11	5	1	62	515	150	53	199	11	6	0	0	19	-	2,247	1,032	-
2000	153	0	2	1,176	124	73	11	24	9	5	95	621	219	78	274	11	7	8	0	21	-	2,912	1,269	-
2001	148	0	2	1,267	114	74	14	25	7	6	126	730	184	53	251	11	13	0	0	43	-	3,069	1,180	-
2002	148	0	2	1,019	118	90	7	20	8	5	93	682	161	81	191	11	9	0	0	9	-	2,654	1,039	-
2003	141	0	3	1,071	107	99	11	15	10	4	78	551	89	56	192	13	9	0	0	9	-	2,457	847	-
2004	161	0	3	784	82	111	18	13	7	4	39	489	111	48	245	19	7	0	0	15	-	2,157	686	-
2005	139	0	3	888	82	129	21	9	6	8	47	422	97	52	215	11	13	0	0	15	-	2,156	700	-
2006	137	0	3	932	91	93	17	8	6	2	67	326	80	29	192	13	11	0	0	22	-	2,029	670	-
2007	112	0	2	767	63	93	36	6	10	3	58	85	67	30	171	11	9	0	0	25	-	1,548	475	-
2008	158	0	4	807	73	132	69	8	10	9	71	89	64	21	161	12	9	0	0	26	-	1,721	443	-
2009	126	0	3	595	71	126	44	7	10	8	36	68	54	17	121	4	2	0	0	26	-	1,318	343	-
2010	153	0	3	642	88	147	42	9	13	13	49	99	109	12	180	10	2	0	0	40	-	1,610	393	-
2011	179	0	4	696	89	98	30	20	19	13	44	87	136	10	159	11	7	0	0	28	-	1,629	421	-
2012	126	0	3	696	82	50	20	21	9	12	64	88	58	9	124	10	8	0	0	33	-	1,412	403	-
2013	137	0	5	475	78	125	29	10	4	11	46	87	84	6	123	11	4	0	0	47	-	1,282	306	-
2014	106	0	4	490	81	47	13	24	6	9	58	52	52	5	83	12	7	0	0	58	-	1,106	287	-
Average																								
2009-2013	144	0	4	621	82	109	33	14	11	11	48	86	88	11	141	9	4	0	0	35	-	1,450	373	-
2004-2013	143	0	3	728	80	110	33	11	9	8	52	184	86	23	169	11	7	0	0	28	-	1,686	484	-

Key:

1. Includes estimates of some local sales, and, prior to 1984, by-catch.
2. Before 1966, sea trout and sea charr included (5% of total).
3. Figures from 1991 to 2000 do not include catches taken in the recreational (rod) fishery.
4 From 1990, catch includes fish ranched for both commercial and angling purposes.
5. Improved reporting of rod catches in 1994 and data derived from carcase tagging and log books from 2002.
6. Catch on River Foyle allocated 50% Ireland and 50% N. Ireland.
7. Angling catch (derived from carcase tagging and log books) first included in 2002.
8. Data for France include some unreported catches.
9. Weights estimated from mean weight of fish caught in Asturias (80-90% of Spanish catch).
10. Between 1991 & 1999, there was only a research fishery at Faroes. In 1997 & 1999 no fishery took place; the commercial fishery resumed in 2000, but has not operated since 2001.
11. Includes catches made in the West Greenland area by Norway, Faroes, Sweden and Denmark in 1965-1975.
12. Includes catches in Norwegian Sea by vessels from Denmark, Sweden, Germany, Norway and Finland.
13. No unreported catch estimate available for Canada in 2007 and 2008.
Data for Canada in 2009 and 2010 are incomplete.
No unreported catch estimate available for Russia since 2008.
14. Estimates refer to season ending in given year.
15. Catches from hatchery-reared smolts released under programmes to mitigate for hydropower development schemes; returning fish unable to spawn in the wild and exploited heavily.

Table 10.1.5.2 The catch (tonnes round fresh weight) and % of the nominal catch by country taken in coastal, estuarine, and riverine fisheries, 2004–2014.

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	Weight
Canada	2004	7	4	46	29	109	67	161
	2005	7	5	44	32	88	63	139
	2006	8	6	46	34	83	60	137
	2007	6	5	36	32	70	63	112
	2008	9	6	47	32	92	62	147
	2009	7	6	40	33	73	61	119
	2010	6	4	40	27	100	69	146
	2011	7	4	56	31	115	65	178
	2012	8	6	45	36	73	58	126
	2013	10	7	47	35	80	58	137
	2014	7	6	40	38	59	56	106
Finland	2004	0	0	0	0	39	100	39
	2005	0	0	0	0	47	100	47
	2006	0	0	0	0	67	100	67
	2007	0	0	0	0	59	100	59
	2008	0	0	0	0	71	100	71
	2009	0	0	0	0	38	100	38
	2010	0	0	0	0	49	100	49
	2011	0	0	0	0	44	100	44
	2012	0	0	0	0	64	100	64
	2013	0	0	0	0	46	100	46
	2014	0	0	0	0	58	100	58
France	2004	0	0	10	51	9	49	19
	2005	0	0	4	38	7	62	11
	2006	0	0	5	41	8	59	13
	2007	0	0	4	42	6	58	11
	2008	1	5	5	39	7	57	12
	2009	0	4	2	34	3	62	5
	2010	2	22	3	26	5	52	10
	2011	0	3	6	54	5	43	11
	2012	0	1	4	44	5	55	10
	2013	0	3	4	40	6	57	11
	2014	0	2	5	43	7	55	12
Iceland	2004	0	0	0	0	130	100	130
	2005	0	0	0	0	149	100	149
	2006	0	0	0	0	111	100	111
	2007	0	0	0	0	129	100	129
	2008	0	0	0	0	200	100	200
	2009	0	0	0	0	171	100	171
	2010	0	0	0	0	190	100	190
	2011	0	0	0	0	128	100	128
	2012	0	0	0	0	70	100	70
	2013	0	0	0	0	147	100	147
	2014	0	0	0	0	59	100	59
Ireland	2004	342	70	76	16	71	15	489
	2005	291	69	70	17	60	14	421
	2006	206	63	60	18	61	19	327
	2007	0	0	31	37	52	63	83
	2008	0	0	29	33	60	67	89
	2009	0	0	20	30	47	70	67
	2010	0	0	38	39	60	61	99
	2011	0	0	32	37	55	63	87
	2012	0	0	28	32	60	68	88
	2013	0	0	38	44	49	56	87
	2014	0	0	26	49	27	51	53

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	Weight
Norway	2004	469	60	0	0	316	40	785
	2005	463	52	0	0	424	48	888
	2006	512	55	0	0	420	45	932
	2007	427	56	0	0	340	44	767
	2008	382	47	0	0	425	53	807
	2009	284	48	0	0	312	52	595
	2010	260	41	0	0	382	59	642
	2011	302	43	0	0	394	57	696
	2012	255	37	0	0	440	63	696
	2013	192	40	0	0	283	60	475
	2014	213	43	0	0	277	57	490
Russia	2004	46	56	0	0	36	44	82
	2005	58	70	0	0	25	30	82
	2006	52	57	0	0	39	43	91
	2007	31	50	0	0	31	50	63
	2008	33	45	0	0	40	55	73
	2009	22	31	0	0	49	69	71
	2010	36	41	0	0	52	59	88
	2011	37	42	0	0	52	58	89
	2012	38	46	0	0	45	54	82
	2013	36	46	0	0	42	54	78
	2014	33	41	0	0	48	59	81
Spain	2004	0	0	0	0	7	100	7
	2005	0	0	0	0	13	100	13
	2006	0	0	0	0	11	100	11
	2007	0	0	0	0	10	100	10
	2008	0	0	0	0	10	100	10
	2009	0	0	0	0	2	100	2
	2010	0	0	0	0	2	100	2
	2011	0	0	0	0	7	100	7
	2012	0	0	0	0	8	100	8
	2013	0	0	0	0	4	100	4
	2014	0	0	0	0	7	100	7
Sweden	2004	3	16	0	0	16	84	19
	2005	1	7	0	0	14	93	15
	2006	1	7	0	0	13	93	14
	2007	0	1	0	0	16	99	16
	2008	0	1	0	0	18	99	18
	2009	0	3	0	0	17	97	17
	2010	0	0	0	0	22	100	22
	2011	10	26	0	0	29	74	39
	2012	7	24	0	0	23	76	30
	2013	0	0	0	0	15	100	15
	2014	0	0	0	0	30	100	30
UK England & Wales	2004	39	35	19	17	53	47	111
	2005	32	33	28	29	36	37	97
	2006	30	37	21	26	30	37	80
	2007	24	31	13	18	30	51	67
	2008	22	34	8	13	34	53	64
	2009	20	37	9	16	25	47	54
	2010	64	59	9	8	36	33	109
	2011	93	69	6	5	36	27	136
	2012	26	45	5	8	27	47	58
	2013	61	73	6	7	17	20	84
	2014	38	74	4	8	9	17	52

Country	Year	Coast		Estuary		River		Total
		Weight	%	Weight	%	Weight	%	Weight
UK N. Ireland	2004	23	48	11	22	14	29	48
	2005	25	49	13	25	14	26	52
	2006	13	45	6	22	9	32	29
	2007	6	21	6	20	17	59	30
	2008	4	19	5	22	12	59	21
	2009	4	24	2	15	10	62	16
	2010	5	39	0	0	7	61	12
	2011	3	24	0	0	8	76	10
	2012	0	0	0	0	9	100	9
	2013	0	1	0	0	4	99	4
	2014	0	0	0	0	6	100	6
UK Scotland	2004	67	27	20	8	160	65	247
	2005	62	29	27	12	128	59	217
	2006	57	30	17	9	119	62	193
	2007	40	24	17	10	113	66	171
	2008	38	24	11	7	112	70	161
	2009	27	22	14	12	79	66	121
	2010	44	25	38	21	98	54	180
	2011	48	30	23	15	87	55	159
	2012	40	32	11	9	73	59	130
	2013	50	42	26	22	44	37	120
	2014	41	49	17	20	26	31	83
Denmark	2008	0	1	0	0	9	99	9
	2009	0	0	0	0	8	100	8
	2010	0	1	0	0	13	99	13
	2011	0	0	0	0	13	100	13
	2012	0	2	0	0	12	98	12
	2013	0	0	0	0	11	100	11
	2014	0	0	0	0	9	100	9
Totals								
NEAC	**2014**	**325**	**35**	**52**	**6**	**562**	**60**	**939**
NAC	**2014**	**10**	**9**	**40**	**37**	**59**	**54**	**109**

Table 10.1.5.3 Estimates of unreported catches by various methods, in tonnes by country within national EEZs in the North East Atlantic, North American, and West Greenland Commissions of NASCO, 2014.

Commission Area	Country	Unreported Catch t	Unreported as % of Total North Atlantic Catch (Unreported + Reported)	Unreported as % of Total National Catch (Unreported + Reported)
NEAC	Denmark	6	0.4	40
NEAC	Finland	6	0.4	9
NEAC	Iceland	2	0.1	3
NEAC	Ireland	6	0.4	10
NEAC	Norway	210	15.1	30
NEAC	Sweden	3	0.2	9
NEAC	France	3	0.2	20
NEAC	UK (E & W)	10	0.7	16
NEAC	UK (N.Ireland)	0	0.0	6
NEAC	UK (Scotland)	10	0.7	11
NAC	USA	0	0.0	0
NAC	Canada	21	1.5	17
WGC	West Greenland	10	0.7	15
	Total Unreported Catch *	287	20.6	
	Total Reported Catch of North Atlantic salmon	1,107		

* No unreported catch estimate available for Russia in 2014.
Unreported catch estimates not provided for Spain & St. Pierre et Miquelon

Table 10.1.5.4 Numbers of fish caught and released in rod fisheries along with the % of the total rod catch (released + retained) for countries in the North Atlantic where records are available, 1991–2014. Figures for 2014 are provisional.

Year	Canada [4]		USA		Iceland		Russia [1]		UK (E&W)		UK (Scotland)		Ireland		UK (N Ireland) [2]		Denmark		Norway [3]	
	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch	Total	% of total rod catch
1991	22,167	28	239	50			3,211	51												
1992	37,803	29	407	67			10,120	73												
1993	44,803	36	507	77			11,246	82	1,448	10										
1994	52,887	43	249	95			12,056	83	3,227	13	6,595	8								
1995	46,029	46	370	100			11,904	84	3,189	20	12,151	14								
1996	52,166	41	542	100	669	2	10,745	73	3,428	20	10,413	15								
1997	50,009	50	333	100	1,558	5	14,823	87	3,132	24	10,965	18								
1998	56,289	53	273	100	2,826	7	12,776	81	4,378	30	13,464	18								
1999	48,720	50	211	100	3,055	10	11,450	77	4,382	42	14,846	28								
2000	64,482	56	0	-	2,918	11	12,914	74	7,470	42	21,072	32								
2001	59,387	55	0	-	3,611	12	16,945	76	6,143	43	27,724	38								
2002	50,924	52	0	-	5,985	18	25,248	80	7,658	50	24,058	42								
2003	53,645	55	0	-	5,361	16	33,862	81	6,425	56	29,170	55								
2004	62,316	57	0	-	7,362	16	24,679	76	13,211	48	46,279	50					255	19		
2005	63,005	62	0	-	9,224	17	23,592	87	11,983	56	46,165	55	2,553	12			606	27		
2006	60,486	62	1	100	8,735	19	33,380	82	10,959	56	47,669	55	5,409	22	302	18	794	65		
2007	41,192	58	3	100	9,691	18	44,341	90	10,917	55	55,660	61	13,125	40	470	16	959	57		
2008	54,887	53	61	100	17,178	20	41,881	86	13,035	55	53,347	62	13,312	37	648	20	2,033	71	5,512	5
2009	52,151	59	0	-	17,514	24			9,096	58	48,418	67	10,265	37	847	21	1,709	53	6,696	6
2010	55,895	53	0	-	21,476	29	14,585	56	15,012	60	78,357	70	15,136	40	823	25	2,512	60	15,041	12
2011	71,358	57	0	-	18,593	32			14,406	62	64,813	73	12,753	39	1,197	36	2,153	55	14,303	12
2012	43,287	57	0	-	9,752	28	4,743	43	11,952	65	63,370	74	11,891	35	5,014	59	2,153	55	18,611	14
2013	50,630	59	0	-	23,133	34	3,732	39	10,458	70	54,003	80	10,682	37	1,507	64	1,932	57	15,953	15
2014	39,534	59	0	-	14,017	44	8,479	52	7,368	77	37,139	82	5,400	35	1,065	50	1,918	61	20,281	19
5-yr mean 2009-2013	54,664	57			18,094	29	7,687	46	12,185	63	61,792	73	12,145	38	1,878	41	2,092	56	14,121	12
% change on 5-year mean	-28	3			-23	51	10	13	-40	22	-40	13	-56	-7	-43	22	-8	9	44	63

Key:

[1] Since 2009 data are either unavailable or incomplete, however catch-and-release is understood to have remained at similar high levels as before.

[2] Data for 2006-2009 is for the DCAL area only; the figures from 2010 are a total for UK (N.Ireland).

[3] The statistics were collected on a voluntary basis, the numbers reported must be viewed as a minimum.

[4] Released fish in the kelt fishery of New Brunswick are not included in the totals for Canada.

[5] 2014 information based on Loughs Agency, DCAL area only.

Table 10.1.9.1 Summary of Atlantic salmon tagged and marked in 2014 – 'Hatchery' and 'Wild' juvenile refers to smolts and parr.

		Primary Tag or Mark				
Country	Origin	Microtag	External mark[2]	Adipose clip	Other Internal[1]	Total
Canada	Hatchery Adult	0	2,559	288	1,350	**4,197**
	Hatchery Juvenile	0	17	328,318	65	**328,400**
	Wild Adult	0	2,294	0	170	**2,464**
	Wild Juvenile	0	8,906	17,971	372	**27,249**
	Total	**0**	**13,776**	**346,577**	**1,957**	**362,310**
Denmark	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	102,450	0	328,000	10,000	440,450
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**102,450**	**0**	**328,000**	**10,000**	**440,450**
France	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile[3]	0	0	469,738	0	469,738
	Wild Adult[3]	620	0	0	0	620
	Wild Juvenile	3,101	3,000	0	0	6,101
	Total	**3,721**	**3,000**	**469,738**	**0**	**476,459**
Iceland	Hatchery Adult	0	72	0	0	72
	Hatchery Juvenile	24,755	0	0	0	24,755
	Wild Adult	0	34	0	0	34
	Wild Juvenile	5,357	0	0	0	5,357
	Total	**30,112**	**106**	**0**	**0**	**30,218**
Ireland	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	194,102	0	0	0	194,102
	Wild Adult	0	0	0	0	0
	Wild Juvenile	5,164	0	0	0	5,164
	Total	**199,266**	**0**	**0**	**0**	**199,266**
Norway	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	84,634	3,798	0	0	88,432
	Wild Adult	0	179	0	0	179
	Wild Juvenile	768	3,204	0	0	3,972
	Total	**85,402**	**7,181**	**0**	**0**	**92,583**
Russia	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	1,532,971	0	1,532,971
	Wild Adult	0	1,751	0	0	1,751
	Wild Juvenile	0	0	0	0	0
	Total	**0**	**1,751**	**1,532,971**	**0**	**1,534,722**
Spain	Hatchery Adult	0	0	0	0	**0**
	Hatchery Juvenile	77,333	0	202,564		**279,897**
	Wild Adult	0	0	0	0	**0**
	Wild Juvenile	0	0	0	0	**0**
	Total	**77,333**	**0**	**202,564**	**0**	**279,897**
Sweden	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile[4]	0	4000	167,665	0	171,665
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	500	0	0	500
	Total	**0**	**4,500**	**167,665**	**0**	**172,165**
UK (England &	Hatchery Adult	0	0	0	0	0
Wales)	Hatchery Juvenile	0	0	64,121	0	64,121
	Wild Adult	0	630	0	48	678
	Wild Juvenile	1,981	0	9,052	58	11,091
	Total	**1,981**	**630**	**73,173**	**106**	**75,890**
UK (N. Ireland)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	11,664	0	39,606	0	51,270
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	0	0
	Total	**11,664**	**0**	**39,606**	**0**	**51,270**
UK (Scotland)	Hatchery Adult	0	0	0	0	0
	Hatchery Juvenile	0	0	202,373	257	202,630
	Wild Adult	0	282	0	107	389
	Wild Juvenile	3,832	0	281	2,346	6,459
	Total	**3,832**	**282**	**202,654**	**2,710**	**209,478**
USA	Hatchery Adult	0	616	0	2,542	3,158
	Hatchery Juvenile	0	92,354	164,815	2,027	259,196
	Wild Adult	0	0	0	0	0
	Wild Juvenile	0	0	0	50	50
	Total	**0**	**92,970**	**164,815**	**4,619**	**262,404**
All Countries	Hatchery Adult	0	3,247	288	3,892	7,427
	Hatchery Juvenile	494,938	100,169	3,500,171	12,349	4,107,627
	Wild Adult	620	5,170	0	325	6,115
	Wild Juvenile	20,203	15,610	27,304	2,826	65,943
	Total	**515,761**	**124,196**	**3,527,763**	**19,392**	**4,187,112**

[1] Includes other internal tags (PIT, ultrasonic, radio, DST, etc.)
[2] Includes Carlin, spaghetti, streamers, VIE etc.
[3] Includes external dye mark.
[4] The 4000 external tagged hatchery juveniles also adipose fin-clipped

Table 10.1.10.1 Estimation of the overall Level 1 composition of 1SW catch at the Faroes.

Geographic Region	Estimated proportion by continent	Genetic assignments within Europe	Overall genetic assignments
Southern NEAC)		89.3%	84.2%
Northern NEAC)	94.3%	9.5%	9.0%
Iceland)		1.2%	1.2%
North America	5.7%		5.7%

Table 10.1.10.2 Estimation of the overall Level 1 composition of MSW catch at the Faroes.

Catch/ assignments	Region	Months				Total season	
		Nov	Dec	Jan-Feb	Mar-June		
Mean MSW catch	Fishery	7,671	27,809	28,865	51,466	115,812	
Proprtion NA	N America	-	-	-	-	20.5%	
Genetic assignment proportions	Southern NEAC	55.8%	37.6%	27.0%	15.4%		
	Northern NEAC	43.3%	59.5%	73.0%	84.6%		
	Iceland	1.0%	3.0%	0.0%	0.0%		
Overall composition of landed catch	Southern NEAC	3,403	8,313	6,196	6,301	24,213	**20.9%**
	Northern NEAC	2,641	13,155	16,752	34,615	67,162	**58.0%**
	Iceland	61	663	0.00	0.00	724	**0.6%**
	North America	1,573	5,701	5,917	10,551	23,741	**20.5%**

Table 10.1.11.1 Derivation of parameters currently used in the catch options analysis.

Parameter	Derivation
Mean weight of salmon in the fishery	Drawn randomly from the observed values of the 1985/1986 to 1990/1991 fishing seasons.
Proportion by sea age	Estimated from scale samples collected in the fisheries between fishing seasons 1985/1986 and 1990/1991.
Discard rates	Estimated from the proportions of fish less than 60 cm in catch samples between fishing seasons 1982/1983 and 1994/1995.
Mortality rates of discarded fish	Estimated from experimental fisheries conducted within the 1985/1986 to 1990/1991 fishing seasons.
Proportions of fish farm escapees	Estimated from samples taken in the 1980/1981 to 1994/1995 fishing seasons (ICES, 1996), corrected to take account of the reduction in the proportion of farm escapees in Norwegian coastal waters between 1989 and 2008 (ICES, 2013).
The proportion of the 1SW catch that will not mature as 1SW fish	Derived from samples collected in the fisheries between 1985/1986 and 1990/1991.
Proportions of catches by management unit	Genetic analysis of scales collected in the fisheries between 1993 and 1995 are used to assign catch to stock complexes (Northern and Southern NEAC and NAC). Within NEAC stock complexes, relative PFA estimates between 2001 and 2013 are used to assign catch to countries.

Table 10.1.12.1 Contributions of regional groups (percentages, mean and standard error) to the Labrador subsistence fisheries catches based on mixture analysis of samples in 2006 to 2011 (Bradbury *et al.*, 2014) and in 2012 to 2014.

Region code	Region name	2006 to 2011	2012 to 2014
UNG	Ungava–Northern Labrador	0.48 (0.27)	2.67 (0.71)
LAB	Central Labrador	96.03 (0.715)	95.31 (0.93)
QLS	Lower North Shore–Southern Labrador	1.34 (0.49)	0.02 (0.10)
NFL	Newfoundland	0.86 (0.36)	1.05 (0.44)
AVA	Avalon–East Newfoundland	0.002 (0.04)	0.001 (0.05)
QUE	Higher North Shore Quebec	0.30 (0.27)	0.04 (0.11)
GAS	Gaspe	0.35 (0.34)	0.23 (0.27)
ANT	Anticosti	0.001 (0.05)	0.000 (0.03)
GUL	Southern Gulf of St Lawrence	0.36 (0.21)	0.66 (0.37)
NOS	Nova Scotia	0.01 (0.05)	0.004 (0.06)
FUN	Inner Bay of Fundy	0.01 (0.05)	0.002 (0.04)
USA	USA	0.28 (0.16)	0.01 (0.06)

Table 10.1.12.2 Estimated annual catches (number of fish – median, 10th to 90th percentiles) by regional group of North American origin salmon in the Labrador subsistence fisheries (aboriginal and resident), 2012 to 2014, based on genetic stock identification of combined samples (2012–2014). Regional groups are shown in Figure 10.1.12.1.

Acronym	2012	2013	2014	Average (prop.)
Catch (number)	14 204	13 538	12 968	13 570
UNG	365 (256–501)	352 (246–487)	338 (233–473)	351 (0.026)
LAB	13 543 (13 363–13 704)	12 904 (12 741–13 060)	12 368 (12 208–12 509)	12 938 (0.957)
QLS	0 (0–9)	0 (0–6)	0 (0–4)	0 (0)
NFL	145 (77–243)	139 (74–228)	128 (69–209)	137 (0.010)
AVA	0 (0–0)	0 (0–0)	0 (0–0)	0 (0)
QUE	0 (0–21)	0 (0–18)	0 (0–17)	0 (0)
GAS	20 (2–81)	18 (1–80)	16 (1–79)	18 (0.001)
ANT	0 (0–0)	0 (0–0)	0 (0–0)	0 (0)
GUL	86 (34–169)	78 (29–163)	80 (32–150)	81 (0.006)
NOS	0 (0–0)	0 (0–0)	0 (0–0)	0 (0)
FUN	0 (0–0)	0 (0–0)	0 (0–0)	0 (0)
USA	0 (0–1)	0 (0–2)	0 (0–1)	0 (0)

Table 10.1.12.3 Estimated annual catches (number of fish – median, 10th to 90th percentiles) by regional group of North American origin salmon in the Saint Pierre and Miquelon salmon fishery, 2004 to 2014, based on genetic stock identification of combined samples (2004, 2011, 2013, 2014). Regional groups are shown in Figure 10.1.12.1.

Acronym	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average (prop.)
Samples											335	
Catch (number)	1 235	1 458	1 577	863	1 570	1 535	1 233	1 666	643	2 351	1 690	1 438
UNG	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–1)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–1)	0 (0–3)	0 (0–2)	0 (0)
LAB	16 (4–36.1)	18 (5–41)	19 (6–46)	11 (3–26)	20 (6–46)	18 (5–42)	15 (4–34)	22 (5–46)	8 (2–18)	29 (9–67)	20 (6–48)	17 (0.013)
QLS	15 (3–41)	18 (3–52)	19 (3–52)	11 (2–30)	19 (3–53)	17 (4–50)	16 (3–42)	20 (4–62)	7 (1–23)	28 (6–79)	20 (3–58)	17 (0.012)
NFL	292 (246–339)	340 (288–396)	371 (310–433)	204 (169–239)	371 (313–429)	360 (305–414)	289 (245–336)	392 (332–452)	151 (127–179)	550 (471–632)	400 (339–458)	338 (0.239)
AVA	12 (4–25)	14 (4–32)	15 (5–33)	8 (2–18)	15 (5–34)	16 (4–33)	12 (4–27)	16 (5–35)	6 (1–14)	23 (7–48)	16 (5–35)	13 (0.010)
QUE	54 (33–82)	65 (39–97)	71 (41–108)	38 (23–59)	71 (43–105)	70 (42–105)	56 (34–83)	76 (48–114)	28 (17–44)	107 (65–159)	75 (46–115)	64 (0.046)

Table 10.1.12.3 (continued)

Acronym	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average (prop.)
GAS	326 (276–377)	385 (332–442)	417 (358–480)	229 (196–268)	418 (357–479)	408 (345–467)	327 (278–377)	441 (377–509)	170 (144–198)	627 (537–720)	449 (384–513)	381 (0.270)
ANT	1 (0–8)	1 (0–10)	1 (0–9)	1 (0–6)	1 (0–11)	1 (0–10)	1 (0–8)	1 (0–11)	0 (0–5)	2 (0–14)	2 (0–10)	1 (0.001)
GUL	467 (418–523)	550 (490–620)	597 (531–661)	324 (289–361)	591 (529–656)	581 (520–643)	464 (415–517)	630 (561–695)	242 (213–272)	887 (796–980)	641 (573–704)	543 (0.384)
NOS	32 (15–58)	38 (18–70)	42 (20–74)	23 (10–42)	41 (20–75)	41 (20–75)	33 (15–58)	43 (20–78)	18 (8–32)	63 (31–111)	44 (21–79)	38 (0.027)
FUN	0 (0–6)	0 (0–6)	0 (0–7)	0 (0–4)	0 (0–7)	0 (0–6)	0 (0–6)	0 (0–7)	0 (0–2)	0 (0–9)	0 (0–6)	0 (0)
USA	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–1)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–2)	0 (0–1)	0 (0–3)	0 (0–2)	0 (0)

Table 10.1.12.4 Contributions of North American origin regional groups (percentages, mean and standard error) from mixture analysis of genetic samples collected from the 2011 to 2014 West Greenland fisheries. Year-specific results and overall results for all years combined are shown. Contributions of shaded regions are indistinguishable from zero. Regional groups are shown in Figure 10.1.12.1.

Region code	Region name	2011	2012	2013	2014	Overall
UNG	Ungava–Northern Labrador	4.74 (0.52)	1.60 (0.58)	4.49 (1.10)	7.47 (1.31)	5.84 (1.19)
LAB	Central Labrador	19.91 (1.07)	17.05 (1.69)	21.23 (2.26)	21.26 (2.31)	21.76 (2.28)
QLS	Lower North Shore–Southern Labrador	4.21 (0.75)	1.45 (1.08)	4.56 (1.55)	4.95 (1.60)	5.78 (1.64)
NFL	Newfoundland	4.47 (0.74)	4.95 (1.36)	5.49 (1.71)	3.49 (1.46)	6.90 (1.72)
AVA	Avalon–East Newfoundland	0.03 (0.05)	0.05 (0.11)	0.04 (0.09)	0.05 (0.11)	0.08 (0.19)
QUE	Higher North Shore Quebec	5.36 (0.81)	7.20 (1.54)	7.10 (1.69)	3.39 (1.44)	5.38 (1.68)
GAS	Gaspe	28.98 (1.41)	33.79 (2.50)	24.32 (2.79)	24.57 (2.77)	28.95 (2.90)
ANT	Anticosti	1.02 (0.29)	0.89 (0.44)	1.40 (0.64)	0.72 (0.50)	1.18 (0.65)
GUL	Southern Gulf of St Lawrence	29.33 (1.35)	30.47 (2.33)	28.28 (2.77)	33.50 (2.73)	22.86 (2.65)
NOS	Nova Scotia	0.85 (0.3)	0.85 (0.52)	1.93 (0.87)	0.18 (0.35)	0.17 (0.37)
FUN	Inner Bay of Fundy	0.05 (0.09)	0.05 (0.12)	0.28 (0.49)	0.13 (0.27)	0.08 (0.19)
USA	USA	1.07 (0.27)	1.66 (0.55)	0.88 (0.50)	0.31 (0.32)	1.03 (0.56)

Table 10.1.12.5 Estimated catches (number of fish – median, 10th to 90th percentiles) of North American origin salmon at West Greenland in 2011 to 2014, based on genetic stock identification using all samples processed from the 2011 to 2014 sampling. Regional groups are shown in Figure 10.1.12.1.

Acronym	Region name	2011	2012	2013	2014	Average of medians (proportion of total)
Number of NAC tissue samples					1 984	
North American origin estimated catch		6 800	7 800	11 500	12 800	9 725
UNG	Ungava–Northern Labrador	320 (273 to 374)	369 (316 to 424)	541 (463 to 623)	609 (527 to 701)	459 (0.05)
LAB	Central Labrador	1 350 (1 260 to 1 446)	1 558 (1 455 to 1 669)	2 291 (2136 to 2449)	2 543 (2 373 to 2 711)	1 935 (0.20)
QLS	Lower North Shore–Southern Labrador	286 (221 to 356)	327 (255 to 401)	476 (378 to 603)	538 (418 to 666)	406 (0.04)
NFL	Newfoundland	304 (240 to 371)	349 (270 to 429)	511 (410 to 618)	564 (456 to 690)	431 (0.04)
AVA	Avalon–East Newfoundland	0 (0 to 6)	0 (0 to 6)	1 (0 to 10)	1 (0 to 9)	0 (0.00)
QUE	Higher North Shore Quebec	360 (297 to 439)	414 (334 to 505)	606 (504 to 742)	683 (558 to 820)	515 (0.05)
GAS	Gaspe	1 973 (1 853 to 2 079)	2 256 (2 126 to 2 390)	3 324 (3 132 to 3 525)	3 706 (3 518 to 3 933)	2814 (0.29)
ANT	Anticosti	68 (44 to 97)	77 (50 to 111)	113 (77 to 162.1)	125 (85 to 180)	95 (0.01)
GUL	Southern Gulf of St Lawrence	1 993 (1 879 to 2 109)	2 284 (2 165 to 2 406)	3 382 (3 189 to 3 554)	3 746 (3 545 to 3 961)	2 851 (0.29)
NOS	Nova Scotia	54 (31 to 86)	62 (37 to 100)	93 (56 to 143)	104 (62 to 158)	78 (0.01)
FUN	Inner Bay of Fundy	1 (0 to 9)	1 (0 to 11)	1 (0 to 15)	1 (0 to 19)	1 (0.00)
USA	USA	72 (49 to 98)	81 (57 to 115)	120 (84 to 167)	134 (91 to 183)	101 (0.01)

Table 10.1.12.6 Overall contributions of European origin regional groups for samples collected during the 2002 and 2004–2012 fisheries. Regional groups are shown in Figure 10.1.12.1.

Acronym	Region name	Overall
NW Icld.	Iceland NW	0.2%
N Kola	N. Kola	0.5%
Finnmark	Finnmark	0.0%
E Nor. & Swd.	E. Norway and Sweden	0.8%
Mid Nor.	Mid Norway	1.5%
S Nor.	S. Norway	0.6%
Den.	Denmark	0.2%
N Scot. & N&W Ire.	N. Scotland and N&W Ireland	25.2%
BannLev	BannLev	2.2%
Irish Sea	Irish Sea	26.6%
S&E Scot.	S&E Scotland	39.9%
S. Eng.	South England	0.3%
N&W Fra.	N&W France	1.8%
S Fra. & Spn.	S. France and Spain	0.1%

Table 10.1.12.7 Estimated catches (number of fish) by regional group of European origin salmon at West Greenland in 2002 and 2004–2012, based on genetic stock identification. The overall estimated contributions of regional groups from the time periods 2002 and 2004–2012 were deterministically applied to the estimated harvest of European origin salmon. Regional groups are shown in Figure 10.1.12.1.

Year	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012
Estimated NEAC catch	1 000	1 500	1 200	1 800	1 900	1 300	800	2 600	600	2 100
Iceland NW	2	3	2	3	3	2	1	5	1	4
N. Kola	5	8	6	9	10	7	4	13	3	11
Finnmark	0	1	1	1	1	1	0	1	0	1
E. Norway and Sweden	8	12	9	14	15	10	6	20	5	16
Mid Norway	15	23	18	27	29	20	12	39	9	32
S. Norway	6	10	8	12	12	8	5	17	4	13
Denmark	2	3	3	4	4	3	2	6	1	5
N. Scotland and N&W Ireland	252	378	302	454	479	328	202	655	151	529
BannLev	22	32	26	39	41	28	17	56	13	45
Irish Sea	266	399	319	479	505	346	213	691	160	558
S&E Scotland	399	598	478	717	757	518	319	1 036	239	837
South England	3	5	4	6	6	4	3	8	2	7
N&W France	18	28	22	33	35	24	15	48	11	39
S. France and Spain	1	2	2	2	3	2	1	4	1	3

Annex 1 Glossary of acronyms and abbreviations

1SW *(One-Sea-Winter).* Maiden adult salmon that has spent one winter at sea.

2SW *(Two-Sea-Winter).* Maiden adult salmon that has spent two winters at sea.

ACOM *(Advisory Committee)* of ICES. The Committee works on the basis of scientific assessment prepared in the ICES expert groups. The advisory process includes peer review of the assessment before it can be used as the basis for advice. The Advisory Committee has one member from each ICES Member Country under the direction of an independent chair appointed by the Council.

BCI *(Bayesian Credible Interval).* The Bayesian equivalent of a confidence interval. If the 90% BCI for a parameter A is 10 to 20, there is a 90% probability that A falls between 10 and 20.

BHSRA *(Bayesian Hierarchical Stock and Recruitment Approach)*. Models for the analysis of a group of related stock–recruitment datasets. Hierarchical modelling is a statistical technique that allows the modelling of the dependence among parameters that are related or connected through the use of a hierarchical model structure. Hierarchical models can be used to combine data from several independent sources.

C&R *(Catch and Release).* Catch and release is a practice within recreational fishing intended as a technique of conservation. After capture, the fish are unhooked and returned to the water before experiencing serious exhaustion or injury. Using barbless hooks, it is often possible to release the fish without removing it from the water (a slack line is frequently sufficient).

CL, i.e. S_{lim} *(Conservation Limit).* Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that undesirable levels are avoided.

COSEWIC *(Committee on the Status of Endangered Wildlife in Canada).* COSEWIC is the organization that assesses the status of wild species, subspecies, varieties, or other important units of biological diversity, considered to be at risk of extinction in Canada. COSEWIC uses scientific, Aboriginal traditional, and community knowledge provided by experts from governments, academia, and other organizations. Summaries of assessments on Atlantic salmon are currently available to the public on the COSEWIC website (www.cosewic.gc.ca).

CPUE *(Catch Per Unit of Effort).* A derived quantity obtained from the independent values of catch and effort.

CWT *(Coded Wire Tag).* The CWT is a length of magnetized stainless steel wire 0.25 mm in diameter. The tag is marked with rows of numbers denoting specific batch or individual codes. Tags are cut from rolls of wire by an injector that hypodermically implants them into suitable tissue. The standard length of a tag is 1.1 mm.

DFO *(Department of Fisheries and Oceans).* DFO and its Special Operating Agency, the Canadian Coast Guard, deliver programmes and services that support sustainable use and development of Canada's waterways and aquatic resources.

DNA *(Deoxyribonucleic Acid).* DNA is a nucleic acid that contains the genetic instructions used in the development and functioning of all known living organisms (with the exception of RNA – Ribonucleic Acid viruses). The main role of DNA molecules is the long-term storage of information. DNA is often compared to a set of blueprints, like a recipe or a code, since it contains the instructions needed to construct other components of cells, such as proteins and RNA molecules.

DST *(Data Storage Tag).* A miniature data logger with sensors including salinity, temperature, and depth that is attached to fish and other marine animals.

ECOKNOWS *(Effective use of Ecosystems and biological Knowledge in fisheries).* The general aim of the ECOKNOWS project is to improve knowledge in fisheries science and management. The lack of appropriate calculus methods and fear of statistical over-partitioning in calculations, because of the many biological and environmental influences on stocks, has limited reality in fisheries models. This reduces the biological credibility perceived by many stakeholders. ECOKNOWS will solve this technical estimation problem by using an up-to-date methodology that supports more effective use of data. The models will include important knowledge of biological processes.

ENPI CBC *(European Neighbourhood and Partnership Instrument Cross-Border Cooperation).* ENPI CBC is one of the financing instruments of the European Union. The ENPI programmes are being implemented on the external borders of the EU. It is designed to target sustainable development and approximation to EU policies and standards; supporting the agreed priorities in the European Neighbourhood Policy Action Plans, as well as the Strategic Partnership with Russia.

FWI *(Framework of Indicators).* The FWI is a tool used to indicate if any significant change in the status of stocks used to inform the previously provided multi-annual management advice has occurred.

GRAASP *(Genetically based Regional Assignment of Atlantic Salmon Protocol).* GRAASP was developed and validated by twelve European genetic research laboratories. Existing and new genetic data were calibrated and integrated in a purpose-built electronic database to create the assignment baseline. The unique database created initially encompassed 32 002 individuals from 588 rivers. The baseline data, based on a suite of 14 microsatellite loci, were used to identify the natural evolutionary regional stock groupings for assignment.

ICPR *(The International Commission for the Protection of the River Rhine).* ICPR coordinates the ecological rehabilitation programme involving all countries bordering the river Rhine. This programme was initiated in response to catastrophic river pollution in Switzerland in 1986 which killed hundreds of thousands of fish. The programme aims to bring about significant ecological improvement of the Rhine and its tributaries, enabling the re-establishment of migratory fish species such as salmon.

ISAV *(Infectious Salmon Anaemia Virus).* ISAV is a highly infectious disease of Atlantic salmon caused by an enveloped virus.

LE *(Lagged Eggs).* The summation of lagged eggs from 1- and 2-sea-winter fish is used for the first calculation of PFA.

LMN *(Labrador Métis Nation).* LMN is one of four subsistence fisheries harvesting salmonids in Labrador. LMN members are fishing in southern Labrador from Fish Cove Point to Cape St Charles.

MSY *(Maximum Sustainable Yield).* The largest average annual catch that may be taken from a stock continuously without affecting the catch of future years; a constant long-term MSY is not a reality in most fisheries, where stock sizes vary with the strength of year classes moving through the fishery.

MSW *(Multi-Sea-Winter).* A MSW salmon is an adult salmon which has spent two or more winters at sea and may be a repeat spawner.

NG *(Nunatsiavut Government).* NG is one of four subsistence fisheries harvesting salmonids in Labrador. NG members are fishing in the northern Labrador communities.

NSERC *(Natural Sciences and Engineering Research Council of Canada).* NSERC is a Canadian government agency that provides grants for research in the natural sciences and in engineering. Its mandate is to promote and assist research. Council supports a project to develop a standardized genetic database for North America.

OSPAR (*Convention for the Protection of the Marine Environment of the North-East Atlantic*). OSPAR is the mechanism by which fifteen Governments of the west coasts and catchments of Europe, together with the European Community, cooperate to protect the marine environment of the Northeast Atlantic. It started in 1972 with the Oslo Convention against dumping. It was broadened to cover land-based sources and the offshore industry by the Paris Convention of 1974. These two conventions were unified, updated, and extended by the 1992 OSPAR Convention. The new annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities that can adversely affect the sea.

PFA *(Pre-Fishery Abundance).* The numbers of salmon estimated to be alive in the ocean from a particular stock at a specified time. In the previous version of the stock complex Bayesian PFA forecast model two productivity parameters are calculated, for the *maturing* (PFAm) and *non-maturing* (PFAnm) components of the PFA. In the updated version only one productivity parameter is calculated and used to calculate total PFA, which is then split into PFAm and PFAnm based upon the *proportion of PFAm* (p.PFAm).

PGA *(The Probabilistic-based Genetic Assignment model).* An approach to partition the harvest of mixed-stock fisheries into their finer origin parts. PGA uses Monte Carlo sampling to partition the reported and unreported catch estimates to continent, country, and within-country levels.

PGCCDBS *(The Planning Group on Commercial Catches, Discards and Biological Sampling).*

PGNAPES *(Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys)*. PGNAPES coordinates international pelagic surveys in the Norwegian Sea and to the west of the British Isles, directed in particular towards Norwegian spring-spawning herring and blue whiting. In addition, these surveys collect environmental information. The work in the group has progressed as planned.

PIT *(Passive Integrated Transponder).* PIT tags use radio frequency identification technology. PIT tags lack an internal power source. They are energized on encountering an electromagnetic field emitted from a transceiver. The tag's unique identity code is programmed into the microchip's non-volatile memory.

PSAT (*Pop-up Satellite Archival Tags*). Used to track movements of large, migratory, marine animals. A PSAT is an archival tag (or data logger) that is equipped with a means to transmit the data via satellite.

PSU *(Practical Salinity Units).* PSU are used to describe salinity: a salinity of 35‰ equals 35 PSU.

Q Areas for which the Ministère des Resources naturelles et de la Faune manages the salmon fisheries in Québec.

RFID *(Radio-frequency identification)*. RFID is the wireless use of electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags. Such tags are commonly used on fish, including salmon.

RR model *(Run-Reconstruction model).* RR model is used to estimate PFA and national CLs.

RVS *(Red Vent Syndrome).* This condition has been noted since 2005, and has been linked to the presence of a nematode worm, *Anisakis simplex*. This is a common parasite of marine fish and is also found in migratory species. The larval nematode stages in fish are usually found spirally coiled on the mesenteries, internal organs, and less frequently in the somatic muscle of host fish.

SALSEA (*Salmon at Sea*). SALSEA is an international programme of cooperative research designed to improve understanding of the migration and distribution of salmon at sea in relation to feeding opportunities and predation. It differentiates between tasks which can be achieved through enhanced coordination of existing ongoing research, and those involving new research for which funding is required.

SARA *(Species At Risk Act).* SARA is a piece of Canadian federal legislation which became law in Canada on December 12, 2002. It is designed to meet one of Canada's key commitments under the International Convention on Biological Diversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy. SARA defines a method to determine the steps that need to be taken in order to help protect existing relatively healthy environments, as well as recover threatened habitats. It identifies ways in which governments, organizations, and individuals can work together to preserve species at risk and establishes penalties for failure to obey the law.

SCICOM *(Science Committee)* of ICES. SCICOM is authorized to communicate to third-parties on behalf of the Council on science strategic matters and is free to institute structures and processes to ensure that *inter alia* science programmes, regional considerations, science disciplines, and publications are appropriately considered.

SER *(Spawning Escapement Reserve).* The CL increased to take account of natural mortality between the recruitment date (assumed to be 1st January) and the date of return to home waters.

SFA *(Salmon Fishing Areas).* Areas for which the Department of Fisheries and Oceans (DFO) Canada manages the salmon fisheries.

SGBICEPS *(The Study Group on the Identification of Biological Characteristics For Use As Predictors Of Salmon Abundance).* The ICES study group established to complete a review of the available information on the life-history strategies of salmon and changes in the biological characteristics of the fish in relation to key environmental variables.

SGBYSAL *(Study Group on the Bycatch of Salmon in Pelagic Trawl Fisheries).* The ICES study group that was established in 2005 to study Atlantic salmon distribution at sea and fisheries for other species with a potential to intercept salmon.

SGEFISSA (*Study Group on Establishing a Framework of Indicators of Salmon Stock Abundance*). SGEFISSA is a study group established by ICES which met in November 2006.

SGERAAS (*Study Group on Effectiveness of Recovery Actions for Atlantic Salmon*). SGERAAS is the previous acronym for WGERAAS (*Working Group on Effectiveness of Recovery Actions for Atlantic Salmon*).

SGSSAFE (*Study Group on Salmon Stock Assessment and Forecasting*). The study group established to work on the development of new and alternative models for forecasting Atlantic salmon abundance and for the provision of catch advice.

S_{lim}, i.e. CL *(Conservation Limit).* Demarcation of undesirable stock levels or levels of fishing activity; the ultimate objective when managing stocks and regulating fisheries will be to ensure that there is a high probability that the undesirable levels are avoided.

SSGEF *(SCICOM Steering Group on Understanding Ecosystem Functioning).* SSGEF is one of five Steering Groups of SCICOM (Science Committee of ICES). Chair: Graham Pierce (UK); term of office: January 2012–December 2014.

SST (*Sea surface temperatures*). SST is the water temperatures close to the surface. In practical terms, the exact meaning of surface varies according to the measurement method used. A satellite infrared radiometer indirectly measures the temperature of a very thin layer of about 10 micrometres thick of the ocean which leads to the phrase skin temperature. A microwave instrument measures sub-skin temperature at about 1 mm. A thermometer attached to a moored or drifting buoy in the ocean would measure the temperature at a specific depth, (e.g. at one meter below the sea surface). The measurements routinely made from ships are often from the engine water in-takes and may be at various depths in the upper 20 m of the ocean. In fact, this temperature is often called sea surface temperature, or foundation temperature.

SVC *(Spring Viraemia of Carp)*. SVC is a contagious and potentially fatal viral disease affecting fish. As its name implies, SVC may be seen in carp in spring. However, SVC may also be seen in other seasons (especially in autumn) and in other fish species, including goldfish and the European wells catfish. Until recently, SVC had only been reported in Europe and the Middle East. The first cases of SVC reported in the United States were in spring 2002 in cultivated ornamental common carp (Koi) and wild common carp. The number of North American fish species susceptible to SVC is not yet known.

TAC *(Total Allowable Catch).* TAC is the quantity of fish that can be taken from each stock each year.

WFD *(Water Framework Directive).* European Council Directive 2000/60/EC (WFD) aims to protect and enhance the water environment, updates all existing relevant European legislation, and promotes a new approach to water management through river-based planning. The Directive requires the development of River Basin Management Plans (RBMP) and Programmes of Measures (PoM) with the aim of achieving Good Ecological Status or, for artificial or more modified waters, Good Ecological Potential.

WGBAST *(Assessment Working Group on Baltic Salmon and Trout*). The Assessment Working Group on Baltic Salmon and Trout assesses the status and trends of salmon and sea trout stocks in the Baltic Sea and provides annual catch advice on salmon. The latest WGBAST meeting took place in Aarhus, Denmark, 26 March–2 April 2014, and was chaired by Tapani Pakarinen (Finland).

WGERAAS *(Working Group on Effectiveness of Recovery Actions for Atlantic Salmon).* The task of the Working Group is to provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations. The Working Group held its first meeting in Belfast in February 2013. The latest meeting was held 12–16 May 2014 at ICES in Copenhagen.

WGF *(West Greenland Fishery).* Regulatory measures for the WGF have been agreed by the West Greenland Commission of NASCO for most years since the establishment of NASCO. These have resulted in greatly reduced allowable catches in the WGF, reflecting declining abundance of the salmon stocks in the area.

WGRECORDS *(Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species)*. WGRECORDS was reconstituted as a Working Group from the Transition Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species (TGRECORDS).

WKADS *(Workshop on Age Determination of Salmon).* WKADS took place in Galway, Ireland, 18–20 January 2011, with the objectives of reviewing, assessing, documenting and making recommendations on current methods of ageing Atlantic salmon. The Workshop focused primarily on digital scale reading to measure age and growth with a view to standardization.

WKADS2 (*A second Workshop on Age Determination of Salmon*). The Workshop took place 4–6 September 2012 in Londonderry, Northern Ireland to addressed recommendations made at the previous WKADS meeting in 2011 (ICES CM 2011/ACOM:44) to review, assess, document, and make recommendations for ageing and growth estimations of Atlantic salmon using digital scale reading, with a view to standardization. Available tools for measurement, quality control, and implementation of inter-laboratory QC were considered.

WKDUHSTI (*Workshop on the Development and Use of Historical Salmon Tagging Information from Oceanic Areas*). This workshop, established by ICES, was held in February 2007.

WKSHINI (*Workshop on Salmon historical information – new investigations from old tagging data*). This workshop met 18–20 September 2008 in Halifax, Canada.

WKLUSTRE *(Workshop on Learning from Salmon Tagging Records).* This ICES Workshop established to complete compilation of available data and analyses of the resulting distributions of salmon at sea.

This glossary has been extracted from various sources. It was initially based on the EU SALMODEL report, but has subsequently been updated at successive Working Group meetings.

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Annex 11

CNL(15)9

Report of the Fourteenth Meeting of the International Atlantic Salmon Research Board

Hotel North 2, Happy Valley – Goose Bay, Monday 1 June 2015

1. Opening of the Meeting

1.1 The Chairman, Mr Raoul Bierach, opened the meeting and welcomed members of the Board, their scientific advisers and observers to Happy Valley – Goose Bay.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The Board adopted its Agenda, ICR(15)4 (Annex 2).

3. Election of Officers

3.1 The Board elected Mr Rory Saunders (USA) as its Chairman, to serve from the close of the Fourteenth Annual Meeting of the International Atlantic Salmon Research Board. The Board thanked Raoul Bierach for his excellent work for the Board over the last four years.

4. Report of the Scientific Advisory Group

4.1 The Chairman of the Board's Scientific Advisory Group (SAG), Dr Niall Ó Maoiléidigh, presented a report on the Group's meeting, SAG(15)7 (Annex 3). During its meeting the SAG had reviewed:

- the updated inventory of marine research. It was noted that information had been compiled for the ECOKNOWS project and would be provided to the Secretariat for inclusion in the inventory before it is uploaded to the website;
- the report of the Telemetry Workshop (see section 5 below);
- an application by the Atlantic Salmon Trust and University College Dublin for funding from the Board. A sum of £6,000 was sought for a project to investigate the application of eDNA technology in the assessment of pelagic by-catch of Atlantic salmon. The SAG noted that the Board's current priority is research to partition mortality of salmon at sea through an international telemetry programme. The SAG noted with interest the proposed project and would be interested in the findings, particularly if these clarify the scale of by-catch, not just the presence or absence of salmon. The SAG noted that there are other ongoing initiatives that could increase understanding of by-catch, including a

PIT tagging programme of pelagic fish and the International Ecosystem Survey of the Nordic Seas (IESSNS);

- progress in establishing a metadatabase of salmon survey data and sample collections of relevance to mortality of salmon at sea. Since last year, some inconsistencies in the entries for the nine candidate datasets had been addressed and additional information included. The metadatabase had been made available on the Board's website. New candidate datasets had been identified and new information had been prepared for the SALSEA-Merge PGNAPES genetic and feeding databases and they will be included in the metadatabase after the Annual Meeting;
- a progress report on a project funded (£18,300) in 2014 by the IASRB to support further development of the North American genetic baseline and to undertake finer scale assignments of salmon caught at West Greenland, SAG(15)4.

4.2 In the light of the recommendations from the SAG, the Board decided:

- to ask the Parties to provide to the Secretariat, by 1 July, any changes or updates for the inventory, including the additional project referred to in 4.1 above, prior to it being uploaded to the IASRB website;
- to include the new datasets for the SALSEA-Merge PGNAPES genetic and feeding databases in the metadatabase; the SAG Chairman will follow-up on the West Greenland Sampling Programme Biological Characteristics dataset.

5. Report of the IASRB Telemetry Workshop

5.1 In 2014, the Board had endorsed the need for an international acoustic tracking programme and adopted a Resolution (ICR(14)10) encouraging Parties to continue the development of local collaborative telemetry projects, encouraging the development of large international collaborative projects building on local efforts and encouraging Parties to make efforts to identify funding sources. The Board had noted that the telemetry programme should build on the success and identity of the SALSEA Programme and had recognised that, following the Workshop, there may be a role for the Board in coordinating efforts and supporting fund raising initiatives. In order to take this initiative forward, the Board had supported the convening of a Telemetry Workshop which was held in London in December 2014 and was co-convened by Tim Sheehan (USA) and Ted Potter (European Union). The report of the Telemetry Workshop (ICR(15)3) (Annex 4) was presented by Mr Potter.

5.2 Information presented at the Workshop indicated that studies involving acoustic tracking of post-smolts have been ongoing in the North American Commission area for many years and have successfully tracked fish from rivers draining into the Gulf of St Lawrence (through the Strait of Belle Isle and the Cabot Strait) and from rivers draining into the Gulf of Maine up past Halifax, Nova Scotia, Canada. In comparison, many studies in the North-East Atlantic Commission (NEAC) area have been confined to estuary or fjord limits. The Workshop divided into three groups, on the basis of NASCO Commission areas, to consider ideas for new collaborative telemetry studies. It was noted that it would be important to develop links with groups working on acoustic telemetry with other species but the salmon projects should be steered by researchers working on salmon. While the Workshop had not been able to establish project Steering

Committees, it had developed outline project plans (including testable hypotheses, equipment and support needs, timelines for field work and duration, ball park budget costs and funding options) for future telemetry-based studies to estimate and partition marine mortality of salmon and improve understanding of migration and distribution patterns and project leaders had been identified. It was noted, however, that the project leaders identified at the Workshop might not be those that would ultimately take the projects forward. Nonetheless, they will be an initial point of contact for the projects.

5.3 The Workshop had recognised that the IASRB could play an important role by serving as a forum for information exchange and collaboration among research groups, by; facilitating coordination; supporting fund-raising initiatives; and providing funds as resources permit. The Workshop had proposed that the Secretary should write to the European Commission, DG Research, to update them on the Board's focus since completion of the SALSEA-Merge project. It was also hoped that this might influence the focus of future calls for research proposals, e.g. under Horizon 2020 as it did under the FP7 Programme.

5.4 The Secretary indicated that, following consultation with the Board, he had written to DG Research as requested by the Workshop to update it on developments since the completion of the SALSEA-Merge project, indicating the Board's current research priorities and offering to meet to discuss the outcome of the Telemetry Workshop.

5.5 The Board recognised that if the international telemetry programme is to proceed, it would be important to liaise with the outline project leaders with a view to following progress and, where appropriate, to provide support to assist with their implementation. It was noted that there may be a need to start with local projects and gradually move seaward. This was the approach to the telemetry projects in the Gulf of St Lawrence. Close collaboration with scientists working on other species would be important. In this regard it was noted that networks of telemetrists have been established in North America e.g. the East Coast Atlantic Cooperative Telemetry Network (ACT). The Board was informed of the recent establishment of a European Aquatic Animal Telemetry Network (EAATN). This group will hold its first meeting at the Third International Conference on Fish Telemetry to be held in Halifax, Nova Scotia in July.

5.6 Mr Mark Saunders, representative of the North Pacific Anadromous Fish Commission (NPAFC), provided an update on the International Year of the Salmon (IYS). The IYS is an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research focused on salmon, and their relation to people. New technologies, observations and analytical methods, some developed exclusively during the IYS, will be focused on gaps in knowledge that prevent the clear and timely understanding of the future of salmon in a rapidly changing world. The IYS will support research under five broad scientific themes:

1. Status of Salmon: to understand the present status of salmon and their environment;
2. Salmon in a changing salmosphere: to understand and quantify the effects of natural environmental variability and anthropogenic factors affecting salmon distribution and abundance and to make projections of their future changes;

3. New Frontiers: to develop new technologies and analytical methods to advance salmon science and to explore the uncharted regions of the salmosphere;

4. Human Dimension: to investigate the cultural, social and economic elements that depend upon sustainable salmon populations;

5. Information Systems: to develop an integrated archive of accessible electronic data collected during the IYS and tools to support future research.

The Board recognised that there were some potential synergies between NPAFC's proposed IYS and the Board's international telemetry programme.

5.7 The Board recognised the high value of the SALSEA brand and the strong impact of NASCO as the international forum for consultation and cooperation on wild Atlantic salmon. The Board reaffirmed its commitment to an international telemetry project under the SALSEA brand, named 'SALSEA-Track'. Specifically, the Board will support SALSEA-Track as a continuing commitment to understanding the factors affecting mortality of salmon at sea, to make funds available to prepare a vision statement for SALSEA-Track and to advance existing initiatives towards an integrated collaborative telemetry programme. Last year, the Board had recognised that in order to support fund-raising it would need to provide some 'seed corn' funding. This had not been done because it had been decided to wait until the findings of the Telemetry Workshop were available, and their implications for the Board were known. In the case of the SALSEA Programme, several million pounds had been raised with 'seed corn' funding of £30,000. The Chairman indicated that it would now be important to raise some funds and that Members of the Board should be consulted to see if funds could be made available.

5.8 The representative of the European Union indicated after reviewing research priorities, he was exploring the possibility of obtaining funds for two projects relating to marine survival of salmon, one regarding telemetry studies, and the other in relation to impacts of sea lice on wild salmonids.

6. Progress reports on projects funded by the Board

6.1 Progress reports on projects funded by the Board had been made to the SAG. Last year, the Board had agreed to make £12,000 available to support the Telemetry Workshop (see item 5 above) and a project to support the further development of the North American genetic baseline and to undertake finer-scale assignments of salmon caught at West Greenland. A report on the Workshop is contained in ICR(15)3 and on the genetic study in SAG(15)4.

6.2 In 2012, the Board had funded two projects (£6,000 each) entitled '*Genetic stock of origin identification of European salmon captured at West Greenland'* and '*Genetic stock identification of salmon caught in the Faroes fishery*'. Last year, progress reports on both of these projects were presented to the Board (SAG(14)5 and SAG(14)6 respectively) and it was noted that the obligations for reporting back to the Board had been met. No further progress reports were, therefore, made although updates are included in the ACOM advice, CNL(15)8.

7. Finance and administrative issues

7.1 The Secretary introduced document ICR(15)2 presenting the Board's accounts for 2014. The decision had been taken not to have the 2014 accounts audited because of the limited funds held and the small number of transactions in the year. At the end of 2014, the balance of the International Atlantic Salmon Research Fund was £12,300. This is higher than anticipated, largely because only £3,700 was utilised of the £12,000 budgeted for the Telemetry Workshop.

7.2 In 2013, the Sub-Group on the Future Direction of Marine Research noted that the Board had very limited resources and recognised that if it is to continue to play a role in supporting research on salmon at sea, it should consider how it can address this issue. The Board has been able to support important new projects e.g. the genetic studies of historic samples from West Greenland and the Faroe Islands and the ongoing study to develop a North American genetic baseline and undertake finer-scale analysis of samples from West Greenland. The funds contributed by the Board had been useful in levering additional resources from other funding sources.

7.3 The Board decided that it would not have its 2015 accounts audited, unless significant additional funds were contributed before the end of the year. In the event that this was not the case, the Secretariat was asked to provide income and expenditure statements.

8. Other business

8.1 There was no other business.

9. Report of the meeting

9.1 The Board agreed a report of its meeting.

10. Date and Place of next meeting

10.1 The Board agreed to hold its next meeting in conjunction with the Thirty-Third Annual Meeting of NASCO in Germany.

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

List of Participants

Canada
Bud Bird
Tony Blanchard
Gérald Chaput

Denmark (in respect of the Faroe Islands and Greenland)
Jóannes Hansen
Sigga Jacobsen

European Union
Jaakko Erkinaro
Cathal Gallagher
John McCartney
Denis Maher
Michael Millane
Niall Ó Maoiléidigh
Ted Potter
Stamatis Varsamos

Norway
Raoul Bierach (Chairman)
Peder Fiske
Roy Langåker

Russian Federation
Konstantin Drevetnyak

US
Jeff Murphy
Rory Saunders
Tim Sheehan

North Pacific Anadromous Fish Commission
Mark Saunders

NGOs
Tony Andrews
Niall Greene
John Gregory
Dave Meerburg

Secretariat
Peter Hutchinson

ICR(15)4

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Election of Officers
4. Report of the Scientific Advisory Group
5. Report of the IASRB Telemetry Workshop
6. Progress reports on projects funded by the Board
7. Finance and administrative issues
8. Other business
9. Report of the meeting
10. Date and Place of next meeting

SAG(15)7

Report of the Meeting of the Scientific Advisory Group of the International Atlantic Salmon Research Board

Hotel North 2, Happy Valley – Goose Bay, Canada Monday 1 June 2015

1. Opening of the meeting

1.1 The Chairman of the Scientific Advisory Group (SAG), Dr Niall Ó Maoiléidigh (European Union), opened the meeting and welcomed participants to Happy Valley – Goose Bay.

1.2 A list of participants is contained in Annex 1.

2. Adoption of the Agenda

2.1 The SAG adopted its Agenda, SAG(15)5 (Annex 2).

3. Report of the IASRB Telemetry Workshop

3.1 In 2014, the Board had endorsed the need for an international acoustic tracking programme and adopted a Resolution, (ICR(14)10) (Annex 3), encouraging Parties to continue the development of local collaborative telemetry projects, encouraging the development of large international collaborative projects building on local efforts and encouraging Parties to make efforts to identify funding sources. The Board had noted that the telemetry programme should build on the success and identity of the SALSEA Programme and recognised that, following the Workshop, there may be a role for the Board in coordinating efforts and supporting fund-raising initiatives. In order to take this initiative forward, the Board had supported the convening of a Telemetry Workshop which was held in December 2014 and was co-convened by Tim Sheehan (USA) and Ted Potter (European Union).

3.2 Mr Ted Potter presented the report of the Telemetry Workshop (ICR(15)3). He reported that studies involving acoustic tracking of post-smolts have been ongoing in the North American Commission area for many years and have successfully tracked fish from rivers draining into the Gulf of St Lawrence (through the Strait of Belle Isle and the Cabot Strait) and from rivers draining into the Gulf of Maine up past Halifax, Nova Scotia, Canada. In comparison, many studies in the North-East Atlantic Commission (NEAC) area have been confined to estuary or fjord limits. The Workshop had divided into three groups on the basis of NASCO Commission areas, to consider ideas for new collaborative telemetry studies. It was noted that it would be important to develop links with groups working on acoustic telemetry with other species, but that the salmon projects should be steered by researchers working on salmon. The Workshop developed outline project plans (including testable hypotheses, equipment and support needs, timelines for field work and duration, ball park budget costs and funding options) for

future telemetry-based studies to estimate and partition marine mortality of salmon and improve understanding of migration and distribution patterns.

3.3 The Workshop recognised that the IASRB could play an important role by serving as a forum for information exchange and collaboration among research groups, by facilitating coordination (e.g. on the use of equipment, the tagging activities and the operation of detector arrays over large geographic areas), by supporting fund-raising initiatives and by providing funds as resources permit. It was noted that it would be important to build on the success and identity of the SALSEA Programme and it was agreed that the new phase should be referred to as SALSEA-Track. While Steering Committees were not established for each project during the Workshop, potential project leaders were identified in the project plans. It is hoped that they will liaise with the IASRB through the NASCO Secretariat to provide updates on progress and, in the event that they feel the Board can assist, in taking the projects forward. The Workshop had clearly outlined several key projects which could be progressed, although it was noted that the existing infrastructure is more advanced in the North American Commission.

3.4 The SAG discussed the mechanism to take these projects forward suggesting that it should be done in a progressive way, starting with freshwater/estuarine studies while developing coastal and oceanic approaches in specific areas where salmon post-smolts were known to migrate. It was noted that there were already a number of initiatives in place for establishing telemetry arrays in existing monitored rivers and their estuaries, where information on smolt to adult survival would be available from existing tagging studies. These had been funded or were planned to be funded either by individual Parties and jurisdictions or through various funding opportunities, including from the EU and other sources. The next phase would be to establish arrays in adjacent coastal waters to provide information on tagged fish further out to sea. Finally, various approaches would be taken to estimating mortality rates in the open ocean using telemetric arrays or by use of drifters, bioprobes and automated underwater vehicles (AUVs or gliders). The latter two phases would probably require a single, large, coordinated project submission by a technically suitable consortium for funding or possibly three smaller coordinated project submissions, and would require multi-year support and commitments to longer term funding of 10 years or more. It has been pointed out that the possibility of liaising/cooperating with telemetry projects focused on other species could be a more cost/effort efficient approach that should be considered and further explored.

3.5 The representative of the North Pacific Anadromous Fish Commission (NPAFC) outlined the similarities and overlap with initiatives for an International Year of the Salmon which could be developed with NASCO and include both Pacific and Atlantic salmon initiatives in an eight year project for research investment aimed at identifying causes of marine mortality in the Northern hemisphere and the impacts on economies and food security.

3.6 The need for an information leaflet or ‘vision’ was proposed, which would outline to potential funders the critical need to move research out from rivers and estuaries and into the high seas and the way NASCO proposed to do this. The SAG recommended that the Secretariat develop a draft ‘vision’ document for consideration by the SAG.

3.7 The Board had previously agreed that it would be important to have reserves available to it so that it could continue to support initiatives such as the Greenland and Faroes GSI projects; the Board's support had assisted in securing additional funding from other sources. These projects had resulted in new information of value to management with limited financial support from the Board. 'Seed corn' funding had been made available to support fund-raising under the SALSEA Programme.

4. Review of the updated inventory of research

4.1 An overview of the updated inventory of research relating to salmon mortality in the sea, ICR(15)2, was presented. For 2015, the total annual expenditure on the 40 ongoing projects (2 are uncosted) is approximately £5.6 million. Approximately half of the expenditure is associated with long-term monitoring programmes. There are nine new projects, several of which involve acoustic telemetry.

4.2 At the 2014 meeting of the SAG, two European Commission funded projects (AquaTrace and EcoKnows) and a number of Genetic Stock Identification (GSI) projects (GSI of Labrador, Saint Pierre and Miquelon and West Greenland mixed-stock fisheries) had been identified as potential candidates for inclusion in the inventory. The Secretariat had been asked to coordinate with the appropriate Parties to request inventory submissions. This year, a new Canadian project was included in the inventory entitled 'Genomic stock identification techniques provide distribution information of regional groups of Atlantic salmon from eastern North America and estimates of exploitation in mixed stock marine fisheries'. The objective of this project is to identify, to regional groups, the origin of salmon from mixed-stock fisheries at Labrador (Canada), Saint-Pierre and Miquelon and West Greenland; estimate the total catch by regional group and examine region specific variations in distribution at sea and availability of Atlantic salmon in marine fisheries. The SAG was advised that the Chairman had compiled information on the ECOKNOWS project for inclusion in the inventory and that this would be provided to the Secretariat so that it can be included in the inventory prior to its uploading to the website. The SAG was advised that the AtlantOS project included elements relating to telemetry and might, therefore, be appropriately included in the inventory.

4.3 The SAG had previously noted that because there is insufficient time available to thoroughly review the inventory at its meetings or at the meetings of the ICES Working Group on North Atlantic Salmon, the Board had agreed that review of the inventory should continue to be conducted by a SAG Sub-Group every 3 or 4 years. It was last reviewed in 2012 by the Sub-Group on the Future Direction of Research on Marine Survival of Salmon and, if this schedule continues to be followed, then the next review of the inventory would be due in 2016 or 2017 and the SAG would develop a recommendation to the Board on the timing of the next review at its 2016 or 2017 meeting.

4.4 Last year, the SAG had suggested that the Parties could be requested to provide an indication as to whether entries in the inventory had direct relevance to management and whether they could further indicate whether they were assessment related, ecologically related etc. While this had not been done, given the existing reporting burden, it was noted that one of the TORs for the Sub-Group on the Future Direction of Research on Marine Survival of Salmon, which reported in 2013, was to review the outcome of recent

scientific investigations in the inventory and summarise the findings which have significant management implications. The SAG noted that the next review might usefully also include a summary of the findings which have significant management implications.

4.5 The SAG recommended to the Board that the Parties be asked to provide any comments on the inventory to the Secretariat by 1 July and, thereafter, that the revised inventory (including details of the ECOKNOWS project) be uploaded to the IASRB website. The SAG encouraged the continued updating of the inventory which in the past had proven to be attractive to potential funders as it indicated the importance placed on marine research by Parties to NASCO and that the research projects had been reviewed to identify gaps in the programme.

5. Review of project applications for potential funding by the Board

5.1 Mr Tony Andrews, Atlantic Salmon Trust, presented document SAG(15)3, containing an application to the Board for funding (£6,000) for a study to investigate the application of eDNA technology in the assessment of pelagic by-catch of Atlantic salmon.

5.2 The SAG noted that the Board's current priority is research to partition mortality of salmon at sea through an international telemetry programme. The SAG is also aware that there are a number of ongoing initiatives related to by-catch of salmon in pelagic fisheries including a new tagging initiative and a wide-scale tag screening programme in the Northeast Atlantic directed at pelagic species (herring and mackerel) using PIT /RFID tags with reader systems at ports of landing. By the end of 2015, there may be detector systems screening herring and mackerel catches at as many as 22 landing sites around Europe and this may allow detection of tagged salmon (currently ~30,000 are tagged annually). Furthermore, the International Ecosystem Survey of the Nordic Seas (IESSNS) is a collaborative programme involving research vessels from Iceland, the Faroes and Norway; surveys are carried out annually in July - August and present an opportunity not only to obtain more information on salmon at sea, but also on by-catch. 2.45 million km^2 were surveyed in 2014 and the area overlaps in time and space with the known distribution of post-smolts in the North Atlantic. The NASCO Secretariat is also liaising with NAFO and NEAFC on by-catch.

5.3 The SAG noted with interest the proposed application of eDNA to the assessment of by-catch and would be interested in the project findings if it proceeds, particularly if these clarify the scale of the by-catch rather than just confirm the presence of salmon post-smolts in catches of pelagic fisheries.

6 Developments in relation to the SALSEA Programme

(a) Report on Progress in establishing a metadatabase of salmon survey data and sample collections of relevance to mortality of salmon at sea.

6.1 The Secretary provided an up-date on the metadatabase of salmon survey data and sample collections of relevance to mortality of salmon at sea. The Board had previously decided that it could play an important role with regard to marine salmon survey data and sample coordination by establishing a metadatabase of existing datasets and sample

collections. In order to take this initiative forward, a list of candidate datasets was developed for inclusion in the metadatabase and specific points of contact were identified. In 2014, it was reported that information had been provided for the candidate datasets and this had been included in the metadatabase. The SAG had agreed that the then Chairman, Mr Tim Sheehan, should review the candidate dataset entries for entry inconsistencies and provide suggested changes and clarifying text for the guidance document, and work with the points of contact to incorporate webpage links for published reports relevant to each entry as available and as appropriate. This work was completed during 2014 and the metadatabase had been made available on the IASRB's website.

6.2 The metadatabase currently includes nine entries:

- Greenland tag recaptures (data)
- SALSEA-Merge biological samples (biological samples)
- External tag recoveries from tagging programmes in Canada, USA, EU, Norway and Russia and international adult salmon tagging at Faroes and Greenland (data)
- Faroes CWT recoveries (data)
- Greenland catch data (data)
- North-East Atlantic Run-Reconstruction data (data)
- SALSEA Greenland (biological samples)
- SALSEA North America biological samples (biological samples)
- North American Run-Reconstruction Data (data)

6.3 The Secretariat had been asked to request that Parties/jurisdictions provide details of any new datasets that should be considered for inclusion in the metadatabase. A few candidate datasets were identified (West Greenland Sampling Programme biological characteristics and SALSEA-Merge PGNAPES genetic and feeding databases). The Chairman reported that he had prepared the information for the SALSEA-Merge PGNAPES genetic and feeding databases separately as these were not combined into one database and would include this information in the metadatabase and send it to the Secretariat after the Annual Meeting. He would follow up on the West Greenland Sampling Programme Biological Characteristics dataset.

6.4 The SAG discussed the high value of archival scale collections that, as a result of advances in analytical methods, can now be used for genetic, stable isotope and further growth studies. Additional information may be obtained in the future in response to further advances in analytical methods. The SAG noted that these collections may be lost when individual scientists retire unless appropriate arrangements are in place to archive them and ensure their safe storage so that they may be available for analysis. It was recognised that some initiatives (such as that of the Atlantic Salmon Trust in the UK which will include storage of grey literature and some historic scale samples by the Freshwater Biological Association) are underway to safeguard these collections and there may be opportunities to share best practice. Given the importance of these collections, the SAG agreed that it would be useful to consider this matter further at its next Annual Meeting.

(b) Progress reports on projects funded by the IASRB

6.5 In 2013, the Board had been advised that a surplus of approximately £18,300 remained of the funds provided by the US to purchase salmon under SALSEA Greenland. The Board had agreed that the US should be consulted on the use of these funds and in 2014 the US had indicated that the funds would be used to support further development of the North American genetic baseline and to undertake finer scale assignments of salmon caught at West Greenland. Subsequently, an application for research funding was received from Dr Ian Bradbury (Canada) and this had been circulated to Members of the Board on 13 August 2014. The application was granted and the funding was provided in December 2014. A report on this project was made available to the Board, SAG(15)4, and was presented by Mr Tim Sheehan (USA).

(c) Other activities

6.6 In 2013, the SAG Sub-Group on the Future Direction of Research on Marine Survival of Salmon had considered that a priority should be to analyse the remaining samples and data arising from the SALSEA Programme and encouraged the Board to explore opportunities to support these analyses. The Board had been advised of ongoing initiatives on such analyses and had recognised that for the remaining samples, it would be important to first clarify what samples are available, how their analysis could benefit management and how much the analyses would cost. In 2014, it had been noted that no further action was required from the Board with regard to analysing the remaining SALSEA samples given the significant cost which would be involved in analysing these and limited extra benefit to management. However, the Board had encouraged Parties and jurisdictions to highlight the availability of these remaining samples.

7. Other business

7.1 There was no other business.

8. Report of the meeting

8.1 The SAG agreed a report of its meeting.

9. Date and place of the next meeting

9.1 The SAG agreed to hold its next meeting in conjunction with the Thirty-Third Annual Meeting of NASCO in Germany during 7 – 10 June 2016.

9.2 In closing the meeting, the Chairman thanked the participants for their contributions to the meeting.

List of Participants

Canada
Tony Blanchard
Gérald Chaput
Murray Hill

European Union
Cathal Gallagher
John McCartney
Denis Maher
Michael Millane
Niall Ó Maoiléidigh (Chairman)
Ted Potter
Stamatis Varsamos

Norway
Peder Fiske

US
Jeff Murphy
Tim Sheehan

North Pacific Anadromous Fish Commission
Mark Saunders

NGOs
Tony Andrews
Niall Greene
John Gregory
Dave Meerburg

Secretariat
Peter Hutchinson

SAG(15)5

Agenda

1. Opening of the meeting
2. Adoption of the Agenda
3. Report of the IASRB Telemetry Workshop
4. Review of the updated inventory of research
5. Review of project applications for potential funding by the Board
6. Developments in relation to the SALSEA Programme
   - (a) Report on Progress in establishing a metadatabase of salmon survey data and sample collections of relevance to mortality of salmon at sea
   - (b) Progress reports on projects funded by the IASRB
   - (c) Other activities
7. Other business
8. Report of the meeting
9. Date and place of the next meeting

ICR(14)10

Resolution of the International Atlantic Salmon Research Board (IASRB) on Research on Salmon at Sea

NOTING *that there has been a substantial decline in salmon stocks throughout much of their migratory range over the last two to three decades despite substantial reductions in exploitation;*

NOTING *the advice from the International Council for the Exploration of the Sea (ICES) that there has been a substantial reduction in survival of salmon at sea possibly resulting from natural factors and/or anthropogenic pressures;*

WELCOMING *the major advances in understanding of the distribution and migration of salmon at sea that have been made under the SALSEA Programme;*

TAKING INTO ACCOUNT *the role of the IASRB to promote collaboration and co-operation on research into the causes of marine mortality of Atlantic salmon and the opportunities to counteract it;*

DESIRING *to encourage studies to partition marine mortality of migrating Atlantic salmon in order to support the conservation and management of Atlantic salmon stocks across the North Atlantic;*

RECOGNISING *the potential that a large international collaborative telemetry project has to provide valuable new information on migration paths and quantitative estimates of mortality during phases of the marine life-cycle of salmon;*

RESOLVES *as follows:*

- *to encourage NASCO Parties to continue the development of local collaborative telemetry projects;*
- *to encourage the development of large international collaborative telemetry projects that together build upon and expand local efforts;*
- *to request Parties to make efforts to identify funding sources to support telemetry projects;*
- *to support the development of the SALSEA Programme by facilitating international collaboration in these areas.*

ICR(15)3

Report of NASCO's International Atlantic Salmon Research Board's Telemetry Workshop

NEAFC Headquarters, 22 Berner's Street, London, W1T 3DY
1 – 3 December 2014

1. Opening of the meeting

1.1 The Co-Conveners, Mr Ted Potter (EU) and Mr Tim Sheehan (USA), opened the meeting and welcomed participants to London. The Secretary of NASCO and the International Atlantic Salmon Research Board (IASRB), Dr Peter Hutchinson, added his welcome and thanked participants for agreeing to contribute to the future work of the Board in developing an international telemetry programme. He thanked NEAFC for allowing the Workshop to be held at its Headquarters and the Co-Conveners for their preparations for the meeting.

1.2 Mr Potter provided the background to the reasons for the IASRB hosting the Workshop. He indicated that the IASRB had been established in 2001 to promote collaboration and cooperation on research into the causes of the increase in marine mortality of Atlantic salmon and the opportunities to counteract it. In 2005, the IASRB had adopted an international cooperative research programme, the SALSEA Programme, which outlined a wide range of research on factors that may affect marine survival. The IASRB agreed that its specific focus should be on the research areas requiring substantial international coordination, namely migration and distribution of salmon at sea. Under this programme there had been marine surveys in both the North-East (SALSEA-Merge) and Northwest (SALSEA North America) Atlantic, enhanced sampling of the fishery at West Greenland (SALSEA West Greenland) and other smaller-scale projects.

1.3 Following completion of these projects, in 2013 the IASRB had reviewed its research priorities and had agreed that a particular focus for future work should be studies to partition mortality of salmon among the phases of the marine migration. It had, therefore, established a Telemetry Sub-Group that had reported in 2014. The continuing need to identify the presence, timing and location of survival bottlenecks for salmon at sea was recognised by the IASRB, and it had charged the Telemetry Sub-Group with developing a 'roadmap' outlining an international collaborative telemetry project to monitor the progress of salmon along their migration routes, to and from the marine feeding areas, and to estimate stage/area-specific mortality rates. He indicated that, in order to facilitate this process, the Board had decided to host a Telemetry Workshop to serve as a catalyst by bringing together and encouraging appropriate scientists to pursue large-scale international collaborative telemetry studies. He thanked all participants for contributing to the Workshop and for providing information for inclusion in the inventories of ongoing and planned telemetry studies. The Ocean Tracking Network

(OTN) had provided a considerable amount of information for the inventories and he thanked Dr Whoriskey for this valuable contribution.

1.4 A list of participants is contained in Annex 1.

2. Nomination of a Rapporteur

2.1 The Secretary was appointed as Rapporteur for the meeting.

3. Adoption of the Agenda

3.1 The Workshop adopted its Agenda, SRBTW(14)2 (Annex 2).

4. Consideration of the Terms of Reference

4.1 In light of the recommendations from the Board's Telemetry Sub-Group (see SAG(14)4), the IASRB had resolved to support and facilitate the development of an international telemetry programme with the objectives of monitoring progress of salmon along their migration routes to and from the marine feeding areas and estimating stage- and area- specific mortality rates of these salmon during the marine phase of their lifecycle, including the transition from the freshwater to the marine environment. In order to proceed with the development of this programme, the IASRB had decided to convene a Workshop with the following Terms of Reference:

- Develop an inventory of ongoing and planned marine telemetry studies on Atlantic salmon;
- Develop an inventory of ongoing and planned telemetry studies on other species in the areas of the North Atlantic frequented by salmon;
- Develop an inventory of the current (temporary and permanent) and planned location of acoustic receiver deployments in the areas of the North Atlantic frequented by salmon;
- Recommend areas where collaborative programmes are most likely to provide the best partitioned estimates of mortality of emigrating post-smolts from multiple rivers with an outline of the scale and cost of such studies;
- Identify strategic partners, including equipment manufacturers, that may assist with implementation of proposed new activities;
- Advise on appropriate linkages with existing or planned ocean tracking programmes, both on the high seas and near shore/in estuaries;
- Explore options for tagging adult salmon in the sea and recommend areas where programmes are most likely to provide estimates of mortality;
- Establish one or more Steering Committees to develop more detailed plans for coordinated telemetry studies in selected areas and to seek funding.

4.2 The Workshop discussed whether the IASRB's intention was to establish a long-term monitoring network of acoustic arrays or to undertake specific shorter-term projects aimed at better understanding factors affecting marine mortality in particular areas and at specific times. It was noted that acoustic tracking projects in the Gulf of Maine and

Gulf of St Lawrence had demonstrated the potential for such methods to be used to identify the migration routes of emigrating post-smolts and to quantify the mortality occurring during different phases of this migration and importantly its variability among years. The acoustic tracking studies in North America had been initiated with short-term funding with renewals allowing long-term data sets to develop over time. The ability to build or maintain long-term data series in these circumstances can be problematic. Nevertheless, it was suggested that a similar approach might be used in other parts of the North Atlantic, noting that some funders, including the European Commission, would only support projects that would deliver results in three to five years. It is anticipated that the proposed programme would seek to build on the success of the North American studies to extend the areas and times for which information on marine mortality is available around the North Atlantic and that there would be a role for coordination of these through the IASRB.

4.3 It was noted that the priority is to estimate mortality rates in the first year at sea and that improved knowledge of distribution and migration would assist in identifying the factors responsible (e.g. aquaculture, renewable energy installations, climate change). However, studies on adult salmon could also provide valuable information that could inform ICES assessment models. Data logging 'pop-off' satellite transmitters applied to salmon caught at West Greenland and kelts returning to sea after spawning have demonstrated the potential to increase understanding of the migration routes and behaviour of salmon at later life stages and the factors affecting them. It is hoped that these programmes can also be developed and expanded. It was noted that the causes of marine mortality may be natural or anthropogenic and knowledge of the cause of mortality is required before remedial action can be considered.

4.4 Clarification was sought as to NASCO's research priorities. The Workshop was informed that the IASRB, which reports to the Council of NASCO and comprises representatives of each NASCO Party and NASCO's accredited NGOs, had agreed that, building on the success of the SALSEA Programme, it wished to encourage studies to partition marine mortality of migrating Atlantic salmon. At its 2014 meeting, the IASRB had unanimously adopted a Resolution on Research on Salmon at Sea, ICR(14)10, encouraging NASCO Parties to continue the development of local collaborative telemetry projects, encouraging the development of large international collaborative telemetry projects that together build upon and expand local efforts, and requesting that NASCO Parties make efforts to identify funding sources to support telemetry projects. Copies of the Resolution were made available to the Workshop participants. The Workshop agreed that the output from its meeting would be a report which would outline possible telemetry studies to address the IASRB's research priority of partitioning marine mortality of Atlantic salmon with a focus on mortality in the first year at sea. The report would also make recommendations for the establishment of Steering Committee(s) to refine the studies, identify strategic partners, possible funding options, and timelines and advise on the future role of the IASRB.

5. Development of inventories of ongoing and planned marine telemetry studies

5.1 Mr Sheehan reported on progress in establishing inventories of ongoing and planned marine telemetry studies. Prior to the Workshop, participants had been requested to provide summary information on ongoing and planned tracking programmes including details of the tagging agency, the country, the location/river where acoustic receivers

had been or are planned to be deployed (i.e. in-river, estuary or coastal/oceanic), the general area or latitude and longitude of the receivers in the marine environment, the species being studied and contact details. In addition, considerable information had been provided by the OTN, with regard to the location of individual receivers in their database, and obtained from miscellaneous reports. While the data were not complete a substantial overview of North Atlantic telemetry assets had been prepared and was presented to the Workshop.

NASCO Commission area	Number of active receiver assets
NEAC	84
NAC	709
WGC	0

Table 1: *Inventory of individual receiver assets included within the OTN database by NASCO Commission area*

	Freshwater		**Estuarine**		**Coastal/oceanic**	
	Current	Planned	Current	Planned	Current	Planned
North-East Atlantic Commission (NEAC)						
Belgium	1	-	1	-	1	-
Denmark	-	-	-	-	2	-
Ireland	6	-	6	3	4	-
Norway	1	1	4	3	4	3
UK (England and Wales)	4	2	3	3	3	2
UK (Northern Ireland)	2	1	2	-	1	-
UK (Scotland)	-	-	-	2	-	2
Total	**14**	**4**	**16**	**11**	**15**	**7**
North American Commission (NAC)						
USA	1	-	1	-	1	1
Total	**1**	**-**	**1**	**-**	**1**	**1**
West Greenland Commission (WGC)						
USA	-	-	-	-	-	1
Total	**-**	**-**	**-**	**-**	**-**	**1**
Grand Total	**15**	**4**	**17**	**11**	**16**	**9**

Table 2: *Summary of current and planned telemetry monitoring projects of which the Workshop participants were aware in freshwater, estuarine and/or coastal/oceanic environments by NASCO Commission area and jurisdiction not accounted for in the OTN database. Project entries could represent single receiver or multiple receiver deployments.*

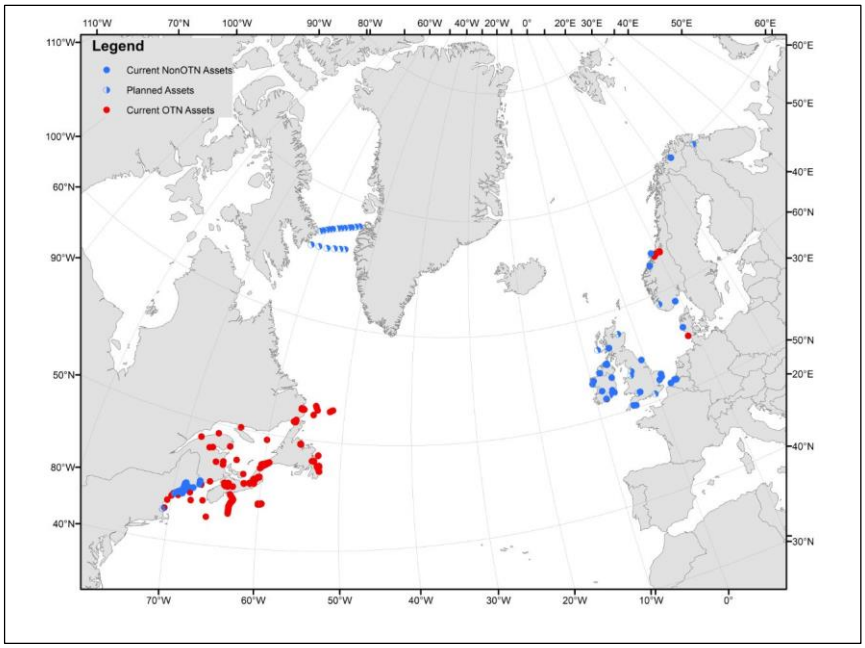

Figure 1: *Current and planned telemetry assets in the North Atlantic. Current assets represent individual receiver locations and were provided by OTN. Details of non-OTN assets were provided by the Workshop participants or obtained from miscellaneous reports and may represent single or multiple assets.*

5.2 There were marked differences in the resolution of the data, with detailed information provided by OTN but more general information provided by the Workshop participants. It was noted that there was limited current deployment of OTN receivers in Europe although several projects of potential use for salmon tracking are under negotiation. The Workshop also noted that a major project proposal, Coast Track, had narrowly failed to obtain funding from the EU under the Seventh Framework Programme, but the reasons for its lack of success were not known. Reference was made to a proposed oceanographic monitoring programme at West Greenland that if successful would result in two lines of buoys from Baffin Island across to West Greenland (~300km) to which receivers could be added. A summary of the collated information is presented in Tables 1 and 2 and displayed in Figure 1.

5.3 Other potential assets include miscellaneous bioprobes, drifters, autonomous underwater vehicles (AUVs also known as gliders), oceanographic buoys, ocean monitoring stations and buoys attached to fixed fishing gear. Information was presented indicating that the OTN had recently successfully deployed AUVs (Wave Gliders®) along the Halifax acoustic receiver line, which runs from the shore to approximately 250km offshore, upload data from bottom-mounted acoustic receiver models equipped with acoustic modems and then transmit that data back to shore via satellite. Using AUVs to download receiver data would result in significant cost savings for managing these types of programmes as expensive ship time is no longer required to download data. AUVs can also serve as mobile receivers listening for tagged animals.

5.4 OTN has tagged and released grey seal 'bioprobes' on Sable Island, Nova Scotia, Canada. These seals each carry a satellite tag to record location and oceanographic conditions, as well as an acoustic transmitter/receiver. The receivers will detect and

record the approach (within approximately 0.5km) of other tagged animals. Such bioprobes have been used in studies on seal-cod interactions since 2001 and they may also be useful in studies under sea ice.

5.5 NOAA Fisheries uses oceanographic buoys and other platforms of opportunity to detect acoustically tagged salmon in the Gulf of Maine. These platforms of opportunity have resulted in large numbers of detections of numerous different species tagged and released by a large number of different tagging groups in North America.

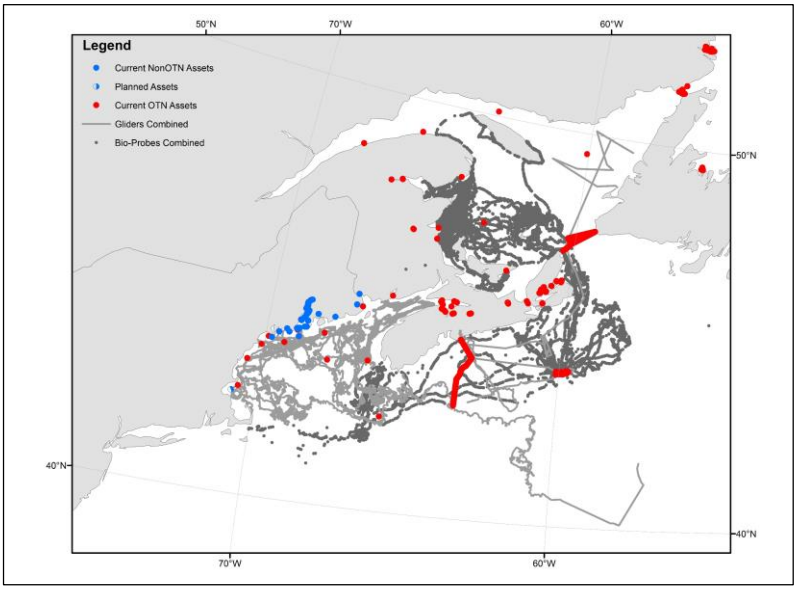

Figure 2: *Maps showing the spatial coverage of all assets types deployed or planned to be deployed (prior to the workshop) within the North American Commission. Assets included current and planned receiver locations overlaid with drifters, bioprobes and gliders tracks. The figure is designed to show the extent to which the area could be covered by telemetry monitoring assets if all deployment efforts were coordinated in time and space.*

5.6 It was noted that the majority of global telemetry equipment in the marine environment is manufactured by Vemco, but it was recognised that there could be local 'hotspots' of gear from other manufacturers such as Thelma Biotel, Lotek and Starr Oddi (see paragraph 7.2 below). At present, there are limited OTN assets in Europe, yet there is a large number of scientists using the technology for focussed individual studies in Europe. If these investigators could be brought together into a network, great potential exists to expand geographic coverage in the region through sharing of detections among researchers and to foster collaborative research. The AtlantOS Horizon 2020 programme (Blue Growth 8 call) has been invited to the grant phase, and includes a Work Package to begin to develop a European Aquatic Animal Telemtry Network. Funding for this work may begin to flow as early as April 2015. Tracking of salmon post-smolts in the NEAC area has predominantly been conducted within estuaries and fjords and it has not extended as far from the rivers as it has in the NAC area. A major telemetry-based research proposal, CoastTrack, had narrowly failed to secure EU funding under the Seventh Framework Research Programme (FP7) but a tracking programme on eels (EELIAD) had been successful. It was noted that links have been made in the Northwest Atlantic between researchers working on salmon and other species so that information on detections is exchanged but these links are less well developed in the North-East Atlantic.

5.7 The Workshop noted the findings from a recent study conducted at the University of St Andrews (www.abc.net.au/science/articles/2014/11/19/4131980.htm) that claimed that acoustic tags on fish may aid predators in detecting prey, potentially increasing predation of tagged animals and possibly skewing study findings – the so-called 'dinner bell effect'. The study had been conducted in laboratory conditions and not in the wild. It was noted that only a tiny fraction of wild smolts are being tagged and so the chance of seals learning this behaviour in the open ocean was very small; in addition the predators of seals (e.g. large sharks) are also being tagged which could negatively condition seals to signals from acoustic tags. The Workshop noted that it would be valuable to undertake investigations into the effects of tagging on survival of salmon and this could be done by tagging groups of fish at different intervals before their release. Where PIT tags are already being applied to salmon, a proportion of the fish could also be tagged with 'dummy' acoustic tags to detect differences in survival between tagged and untagged fish. If both 'dummy' and real acoustic tags were used then the 'dinner bell effect' could be tested in the wild.

6. Identification of the most suitable areas for new collaborative telemetry studies (ToR 4 & 7)

6.1 As previously indicated, studies involving acoustic tracking of post-smolts have been ongoing in the North American Commission area for many years (including in the Gulf of Maine and Gulf of St Lawrence) and have successfully tracked fish from rivers draining into the Gulf of St Lawrence (through the Strait of Belle Isle and the Cabot Strait) and from rivers draining into the Gulf of Maine up past Halifax, Nova Scotia, Canada. In comparison, many studies in the North-East Atlantic (NEAC) area have been confined to estuary or fjord limits. The Workshop divided into three groups, on the basis of NASCO Commission areas, to consider ideas for new collaborative telemetry studies. It was noted that it would be important to develop links with groups working on acoustic telemetry with other species but the salmon projects should be steered by researchers working on salmon.

(a) North American Commission (NAC) area

6.2 The Workshop noted that the objective of the IASRB is to obtain information on mortality of salmon at sea and that there have been ongoing acoustic tracking programmes, and considerable assets deployed, in the Gulf of Maine, Gulf of St Lawrence and off the coast of Halifax which have confirmed the potential of acoustic tagging to address the IASRB's objectives. Discussions were held on what further research might be needed in the North American Commission area.

6.3 Dr John Kocik (NOAA) indicated that studies on the Penobscot and Narraguagus rivers had indicated that, for the first partition, approximately 50% of tagged smolts were lost in the estuary and it would now be valuable to determine the factor or factors responsible for inter-annual variability in this mortality. The next partition indicates that of the smolts entering the Gulf of Maine approximately 25 - 30% reach the Halifax acoustic receiver line 21 – 24 days later. He indicated that the receivers in the nearshore Gulf of Maine had a spacing of ~400m resulting in a detection efficiency of approximately 97%. It was noted that detections of post-smolts on the Halifax receiver line were concentrated in the area from 20 to 50 km offshore and so it was not felt that many fish went round the line. However, some individuals were detected along the

entire length of the line which extends >100 nautical miles offshore, and the detection efficiency of the Halifax line (800m spacing) is thought to be between 50 - 100% depending on conditions. The Workshop discussed whether there would be merit in installing a second Halifax line or reducing the spacing of the receivers in the existing line. It was noted that the last array along the migration pathway is always the most problematic for statistically robust estimates of mortality rates. However, the terminal arrays could still provide minimum estimates of mortality to that point in the migration. While a second line would improve the detection efficiency and therefore provide more data on migration dynamics and more robust estimates of survival, because of its length it would be expensive (257 units would cost approximately $1 million). An alternative might be to add extra receivers to the line at the points where most salmon detections are made. Interest was also expressed in a full-grid design array rather than a line allowing accurate positioning by triangulation. Since approximately 75% of the mortality appears to occur in the first few weeks at sea, it may not be cost effective to move further offshore to study the remaining 25% of mortality. However, a lower percentage of smolts leaving fjords in Norway die in the early marine phase so there may be merit in siting arrays further offshore in the NEAC area.

6.4 Mr Jon Carr (Atlantic Salmon Federation) reported on ongoing projects being conducted by the Atlantic Salmon Federation (in collaboration with the OTN, Miramichi Salmon Association, DFO and others) to assess estuarine and marine survival of tagged Atlantic salmon released in rivers of the Gulf of St Lawrence. Acoustic arrays have been installed across both the Strait of Belle Isle and, since 2012, across the Cabot Strait, effectively providing an acoustic 'gate' to count fish as they exit from the Gulf of St Lawrence. Few post-smolts appear to use the Cabot Strait as an exit from the Gulf of St. Lawrence although the array is deep and there are concerns about the detection efficiency of the currently deployed receivers. A total of 248 smolts (24 St Jean, 39 Cascapedia, 105 Miramichi, and 80 Restigouche) and 41 kelts (16 Miramichi and 25 Restigouche) were acoustically tagged in 2013. Of the 41 kelts, 11 from the Miramichi were also tagged with archival pop-up tags; these were set to release after four months and information was derived from seven of the tags that left the Miramichi River, two of which transmitted information from the northern Labrador Sea in early September.

6.5 Mr Carr indicated that the OTN Wave Glider® was used within the Gulf of St Lawrence to detect acoustically tagged salmon. The movements of the Wave Glider® were controlled to pass through areas expected to contain tagged post-smolts and kelts on their migration through the Strait of Belle Isle. Four salmon kelts were detected. He indicated that there is also interest in tagging salmon in the Inner Bay of Fundy with a view to identifying critical habitat and investigating aquaculture interactions and to seek cooperation from those involved in research on eels and striped bass. However, it was recognised by the Workshop that Inner Bay of Fundy stocks undertake limited marine migrations so the findings, although of interest to the management of these particular stocks, may be rather specific to that area.

6.6 Consideration has also been given to installing an acoustic array off Labrador (and to tagging smolts in the Goose River, Labrador) and to installing a second array in the Strait of Belle Isle to better assess salmon survival to this point in the migration. There was also a concern about whether tag battery life would be adequate to allow tracking of tagged smolts to an array off Labrador, although it was noted that V8 and V9 tags

have a battery life of 6 months and could be applied to smolts >13 cm in length. Mr Carr noted that there is some uncertainty about where best to site new lines and consideration is being given to migration modelling to inform any such decisions. A second array would allow mark – recapture estimates to be made of mortality.

6.7 Mr Carr indicated that the ASF is also interested in acoustic tagging of salmon at West Greenland. If genetic samples of tagged fish were taken at the time of tagging, they may be assigned to their river/region of origin (e.g. originating from the Gulf of St Lawrence) and receivers could be deployed to detect their return. The view was expressed that satellite tagging might be more appropriate for salmon in their second summer at sea and that such tags are particularly suited to migration studies. It was noted, however, that large tags (e.g. Pop-off Satellite Archival Tags or PSATs) can affect subsequent survival of tagged fish depending on capture method, handling of the fish and tag application.

6.8 The Workshop discussed whether or not tagging of kelts (using larger, longer life acoustic tags) could be used as a surrogate for smolt tagging. It appears that for some stocks in the NEAC area there is similarity in the migration routes of smolts and kelts. Studies in the Gulf of St Lawrence indicate that kelts that spawn in alternate years do follow similar migration routes to post-smolts, as they both exit the Gulf of St Lawrence though the Strait of Belle Isle, but those spawning in consecutive years probably remain inside the Gulf of St Lawrence. It was also noted that while post-smolt survival is declining, kelt survival in some circumstances is increasing. However, valuable information might still be obtained by tagging kelts particularly with regard to migration and distribution and mortality vectors.

6.9 With regard to new studies in the NAC area, the Workshop discussed approaches to improving detection efficiency of existing deployments (including installing new receiver lines/grids in the Strait of Belle Isle, off Labrador and off south-east Newfoundland, and use of platforms of opportunity, drifters and AUVs), additional releases of tagged fish and collaboration with researchers working on species other than salmon. The Workshop developed, in outline, a number of new telemetry projects for the NAC area and these are described in section 7 below.

6.10 It was noted that it would be valuable to develop a North Atlantic-wide inventory of platforms of opportunity (e.g. oceanographic buoys, oil rigs etc.). The workshop participants were informed that funding for this effort has already been secured and that the work will commence by OTN in the near-term. Since these assets (arrays, buoys, oil rigs, ocean monitoring stations, AUVs etc.) are widely dispersed there would need to be careful consideration given to how downloading of data could be managed.

(b) North-East Atlantic Commission area

6.11 The Workshop recognised that compared to the NAC area there were fewer opportunities in the NEAC area to site acoustic arrays that could close off areas of the marine environment into which multiple rivers flow as is the case for the Gulf of St Lawrence. Nonetheless, there had been several salmon smolt tracking studies in estuaries and for a limited distance offshore in several countries, including through fjords in Norway (up to 170km from river mouths to full sea water) and in Lough Foyle on the border between Ireland and the UK (Northern Ireland). Such studies may ideally

be conducted on salmon index rivers where smolt trapping facilities already exist, but it was noted that there was a need for additional index river studies since there are large areas around the North-East Atlantic with no such sites. Reference was made to a feasibility study for deploying a line of receivers from Malin Head in Northern Ireland to the Scottish coast and the convenient location of index rivers in Northern Ireland (River Bush) and Wales (River Dee). There were considerable discussions about approaches to extending the detection further offshore, beyond estuaries and fjords, and some areas were identified where full arrays might be installed. The Workshop agreed that it would be important to establish a number of NEAC tracking studies before investing large sums in offshore work and that the feasibility of deploying arrays in the Norwegian Sea would need careful consideration given their potential length and the depth of the water.

6.12 The Workshop also discussed the role of migration models as a tool to assist in siting acoustic arrays. Reference was made to a particle drift model developed as an output from the SALSEA Merge project. It was noted that while migration models can be informative they depend on adequate input data to test migration paths and the particle (fish) behaviour. The SALSEA-Merge model was believed to assume that much of the movement of post-smolts was a result of passive tidal transport. Such a model may not accurately portray smolt migration in areas where smolts leaving freshwater have to migrate significant distances against the residual coastal and oceanic currents. Nevertheless, it was also suggested that variation in wind driven currents could have marked effects on migration routes and that modelling might assist in this regard. The utility of using smolt migration models for designing large scale telemetry monitoring projects should be considered further.

6.13 Another approach to planning receiver deployments may be to initially establish 'porous' arrays, with widely spaced receivers, or receivers on buoys in a number of locations in association with tagging in several rivers in a region. It was noted that initial trials with such arrays and offshore gliders in the NAC area might inform studies in the NEAC area. Additional receivers might then be deployed as information was gathered of the detection 'hot spots' i.e. a progressive approach. The question arose as to how funders would perceive such a progressive, stepwise approach compared to a large initiative and it was suggested that funding from the EU would probably require results in a three to five year period. It was noted that the systems deployed in the Gulf of St Lawrence have developed over a period of years and that alternative funding mechanisms would need to be identified that permitted the staged development of a network of individual receivers and arrays.

6.14 There were discussions about an appropriate approach to tagging adult salmon and whether this should involve applying PSATs to fish caught, for example at Faroes or Spitzbergen, or to kelts in rivers. It was recognised that salmon from many river stocks occurred in the waters around the Faroes and that there had been no fishery there for many years. However, if there was interest in conducting a limited research or experimental fishery in the future PSATs might be applied at reasonable cost, although the tags themselves are expensive (~$4,000 each) and there were challenges in using fish caught by long-lines. In these circumstances, consideration might be given to further kelt tagging as a method of obtaining information on marine mortality of salmon after their first summer at sea. Issues concerning whether kelts can be a surrogate for either post-smolt or maiden adult fish are discussed in 6.8 above and 6.18 below.

6.15 On the basis of the discussions outlined above, the Workshop considered a number of approaches to partitioning marine mortality of salmon in the North-East Atlantic including:

- better coverage of basic index river studies using a range of methods (CWTs and PIT tags) in order to provide estimates of return rate (not natural mortality) for the marine phase;
- integrated acoustic tagging as part of index river studies to provide estimates of natural mortality to headland limits (estuaries, fjords and including the freshwater/saltwater transition);
- adoption of various approaches to partition mortality in the next marine phase for different index river stocks, recognising that there is limited data on migration routes (see map below of possible approximate sitings of arrays which would all be final arrays so potentially poor estimation of mortality):
    - West coast Scottish arrays (full arrays with high detection efficiency);
    - Malin Head, Northern Ireland (full array with high detection efficiency);
    - North Sea (loose array based on existing platforms of opportunity using information from OTN);
    - Norwegian coast, north and south gateways.
- consideration studies out into the Norwegian Sea and using drifters/AUVs etc. if this approach proves to be valuable in the North American commission area;
- development of a single integrated EU funded programme.

(c) West Greenland Commission area

6.16 Mr Sheehan indicated that PSAT technology is generally suitable for work with Atlantic salmon of the size range at West Greenland although there is a need to refine the catch methods (gill nets) and tagging techniques. Detailed information on migration routes, migration rates and environmental conditions experienced can be derived from the data obtained. He reported on investigations into the migration over the autumn and winter of salmon tagged at West Greenland in September 2010, 2011 and 2012. PSATs were attached to 25 Atlantic salmon and preliminary results suggest that two tags remained on the fish until the programmed pop-off date (April 1), three fish were predated, eight popped off for unknown reasons, and twelve did not transmit any data for reasons that are unknown but need to be determined. The existing data are currently undergoing full analysis but there is interest in planning for extending the preliminary studies and possibly in including acoustic tags.

6.17 These studies can provide valuable information on mortality of adult salmon to inform ICES assessment models (e.g.in order to improve confidence in the natural mortality values (M) for adult salmon in the sea) and on migration dynamics which can be informative of larger ecological based questions and investigations. These are currently based on the mortality schedule model. It was noted that PSATs cost around $4,000 each and that they provide information only about the individuals tagged whereas acoustic systems are more ecosystem oriented allowing for collaboration with those working on other species. There is some uncertainty about the continuation of support

for the operation of the Argos satellite network and any future PSAT tagging programme would be dependent on the availability of this or an alternative monitoring platform.

6.18 The Workshop discussed the relative merit of tagging non-maturing 1SW salmon at West Greenland or kelts in homewaters. It was noted that tagging kelts could provide 6 - 12 months of data but that there was interest in determining survival from the feeding grounds back to homewaters for use in the ICES assessment models but it was unclear if tagging kelts could provide this information. It was also noted that the proportion of Southern European salmon at West Greenland has declined in recent years and is currently around 20%. As a result few tagged salmon at Greenland would be expected to return to European rivers.

7. Recommendations for the development of detailed plans for projects in selected areas and approaches to fund-raising (ToR 8), identification of strategic partners and appropriate linkages to existing and planned tracking programmes, etc. (ToR 5 & 6)

7.1 Before considering approaches to developing detailed plans for projects in selected areas and approaches to fund-raising, the Workshop considered developments concerning tag technology and discussed compatibility issues. The Workshop noted that for satellite tags there should be no issue of compatibility provided that the tags can upload their data to the ARGOS satellite or its successor. However, it was recognised that there are several manufacturers of acoustic tags and receivers although the majority of the equipment deployed in marine environments worldwide is manufactured by Vemco with currently approximately 25,000 receivers deployed. It was noted that some funding agencies have strict rules concerning competitive tendering for equipment, including the EU.

7.2 Mr Mark Jollymore, President and CEO of Vemco, provided an update on developments in tag technology and Vemco's position on compatibility. He indicated that, at the request of its customers, Vemco had primarily focused on smaller transmitter technology, aimed at salmon smolt research but also for use on many other species. With the introduction of the V4 transmitter weighing only 0.4g, it seems likely that transmitters are now small enough for most applications, but the development of smaller transmitters may be possible if there is a demand. He indicated that Vemco is presently focusing on various forms of sensors for its products and is in the early phases of testing a predation transmitter and dissolved oxygen sensor with a view to having these commercially available in the next two years. In addition, Vemco is ready to release integrated acoustic release and transponding receivers to the market and currently has a high-residency receiver in beta test. These new transmitters and receivers are part of a very high level of investment in recent years to bring new tools and technology to the research community. He noted that considerable competition exists within the fish research community between technologies and tools (e.g. satellite tracking, archival tagging, acoustic telemetry) and also specifically within acoustic telemetry (e.g. Vemco, Thelma Biotel, HTI, ATS, Lotek). In several cases of this competition, the technologies co-exist without interfering or compromising the data integrity being obtained. This encourages investment in new technologies and products for the community. He stated that in cases where claims are made that the products are compatible with the Vemco system these claims are false; those products claiming

compatibility are the result of deliberate efforts to reverse engineer the Vemco developed and proprietary system and thereby compromise the integrity of the global coding system by duplicating codes. Furthermore, Vemco will be evolving its worldwide coding systems as it brings new technologies and tools to the research community without regard for these cloned tags and receivers and will thus render the clones incompatible in part or in whole.

7.3 The Workshop was advised that OTN intends to develop an inventory of platforms around the North Atlantic and Dr Whoriskey agreed to keep the IASRB informed of developments in this regard via the NASCO Secretariat.

7.4 The Workshop developed outline project plans for future telemetry-based studies to address the approaches discussed above (section 6) to estimate and partition marine mortality of salmon and improve understanding of migration and distribution patterns. Each of the proposed plans, provides the following information:

- Testable hypotheses;
- Potential project leaders;
- Equipment and support needs;
- Equipment manufacturers;
- Potential timelines for field work and duration;
- Potential linkages and partners;
- Funding options;
- Ball park budget costs.

7.5 The following outline project plans are initial working documents developed in the limited time available at the Workshop; they will need further development over time and their implementation will be dependent on funding being available:

North American Commission (NAC)

- Drifters and Bioprobes: Options for detecting acoustically tagged fish in large geographic areas (North American and/or North-East Atlantic Commissions), SRBTW(14)3 (Annex 3)

  Line arrays for detecting the movement of acoustically tagged animals and to estimate survival rates have been used in many locations with relatively narrow passage points and in locations in which the movement of animals is assumed to be generally unidirectional. Using line arrays in areas in which animals can disperse over much broader areas is a challenge because of the narrow spatial coverage afforded by these arrays and the short time period which acoustically tagged animals may be in the vicinity of any of the receivers in the array. The use of bioprobes or drifters arrays may be informative in these areas. The Workshop was advised that there are new platforms being deployed (e.g. in the Labrador Sea by Laval University) but this project is a novel idea and would require funding. The IASRB might be able to assist with fund raising initiatives.

- New Receiver Lines/Arrays/Grids (North American Commission area), SRBTW(14)4 (Annex 4)

  Additional receiver detection points would greatly advance our understanding of the marine phase of Atlantic salmon. Additional receiver arrays at key location would provide more robust stock-specific estimates of mortality, migration routes and dynamics during the first year at sea. A number of different potential receiver arrays have been suggested, each addressing a specific aim and information need, but other locations could also be considered. The Workshop was advised that it is likely that the installation of at least one new array would proceed but priorities need to be resolved and funding secured.

- Platforms of Opportunity in the North American Commission area: Stationary Platforms of Opportunity Receiver Exchange (SPORE), SRBTW(14)5 (Annex 5)

  Receivers deployed on existing buoys and platforms associated with collection of environmental monitoring (oceanography and weather buoys) and offshore commercial enterprises (fishing, aquaculture, offshore energy etc.) can be a cost-effective way to obtain baseline acoustic monitoring data. These associations of fish location data with environmental data provide an opportunity to exchange information and expertise with oceanographers and others to better understand seasonal salmon distributions in changing oceans. The Workshop was advised that such an approach will proceed in 2015 in the Gulf of Maine with a second phase being considered for 2016 – 2019. It is not clear if the approach will be implemented elsewhere.

- North American Commission kelt satellite tagging, SRBTW(14)6 (Annex 6)

  PSATs offer the ability to provide information on stock-specific migration routes, behaviour and mortality of post-spawned Atlantic salmon kelts. When combined with results from ongoing post-smolt acoustic telemetry projects, insights may also be gained into the commonalities of kelt and post-smolt migration patterns. The Workshop was advised that ASF has been releasing a limited number of PSAT tags on kelts from the Miramichi River over the past few years. There have been some preliminary discussions of expanding this effort to other river systems, both in USA and Canada, and effort towards this will likely proceed.

North-East Atlantic Commission (NEAC)

- Generic Index River Sites in the North-East Atlantic Commission area, SRBTW(14)7 (Annex 7)

  The proposal would be to establish at least four index sites (build on existing index rivers and/or establish new index rivers) spread over the NEAC area, with the aim of quantifying marine survival from leaving to returning to the river; quantifying where the mortalities occur by partitioning mortality among river mouth/estuary, near coastal area, and the remaining stay at sea; quantifying variation in mortality among years; and analyzing critical periods for mortality and possible causes of mortality.

- Malin Head to Islay Receiver Array (North-East Atlantic Commission area), SRBTW(14)8 (Annex 8)

  The development of telemetry receiver arrays in the North Atlantic/Irish Sea area would allow researchers to investigate a number of key issues impacting the productivity of a number of United Kingdom and Irish Atlantic salmon stocks and other marine species migrating through this area. Key questions to be addressed are: what is the mortality during the early marine phase of Foyle, and Irish Sea salmon; what is the usage of the north channel by basking shark and other elasmobranchs; what is the usage of the north channel by cetacean species; what is the movement of sea trout in the north channel? The Workshop was advised that if funding was secured, the aim would be to further investigate the early marine migration phase in the tidal river and L Foyle in 2016 and initiate a feasibility study on the Malin Head to Islay array. Progress would be dependent on its outcome.

- North Sea Loose Array (North-East Atlantic Commission area), SRBTW(14)9 (Annex 9)

  A broad distribution of receivers deployed on existing platforms and moorings in the area between Scotland and Norway may provide partial coverage of a relatively narrow area sectioning the North Sea from the Atlantic. Possible sites could be oceanographic and weather buoys and particularly offshore commercial enterprises (fishing, aquaculture, offshore energy, etc.). Some of these will provide environmental monitoring in addition to acoustic monitoring data. The aim is to use these opportunities to cover approximately 30% of the area along a rough line from Northern Scotland to Southern Norway. The aim would be to conduct the project during 2016 - 2019 if funding can be secured.

- West-coast Scottish arrays

  Plans for tracking smolts are currently being prepared as part of programme of work involving Marine Scotland Science and the freshwater fisheries and aquaculture sectors. The initial focus of development of investigations into possible interactions between aquaculture and wild salmon has been establishment of experiments using fish treated with agents that kill parasites. This work is being coupled with models of lice dispersion from salmon farms. Salmon smolts have already been tracked in a pilot project in Loch Linnhe. The possibility of extending that work to develop models of salmon dispersal patterns is being assessed. There is also an early stage assessment of the feasibility of establishing a curtain of acoustic listening devices between the Hebrides and mainland Scotland.

- Studies of migration along the European shelf edge and into the Norwegian Sea using drifters/AUVs etc., SRBTW(14)10 (Annex 10)

  A particle drift model, developed as an output from the SALSEA Merge project (2009 to 2011), indicated a strong likelihood that most southern European post-smolts (Spain, France, Ireland and UK) use the European shelf edge current as a marine 'highway', following currents to summer/autumn feeding grounds in the Norwegian sea. The SALSEA-Merge model assumed that much of the movement

of post-smolts was a result of passive transport. This model and the associated hypotheses surrounding the migration paths of southern European post-smolts should be tested to see if it accurately portrays smolt migration, particularly in areas where smolts leaving freshwater have to migrate significant distances against the residual coastal and oceanic currents. Similarly, wind driven currents could have marked effects on migration routes and more information on movements of post-smolts in key areas would greatly assist in developing such models further. Potential methods to test the current migration hypotheses include deploying acoustic tag detection systems on a range of bioprobes, drifters, autonomous underwater vehicles (AUVs also known as gliders), oceanographic buoys, ocean monitoring stations and buoys attached to fixed fishing gear. Deployment of fixed receivers on oceanic platforms or establishing oceanic monitoring stations would be difficult in areas where the shelf edge was distant from the coastline. Where the shelf edge was closer, e.g. off the North West of Ireland, such platforms or arrays could be considered which would allow tracking of post-smolts from Spain, France, Ireland and the UK. Fixed moorings could be employed on the shelf and potentially on the upper continental slope. Alternatively, deployment of AUVs would allow strategic tracking of post-smolts at key points along the shelf edge which narrow to only 10s or 20s of kms. These AUVs would allow confirmation of pre-suppositions relating to the use of the shelf edge as a marine 'highway' as well as providing information on survival of electronically tagged groups of post-smolts released from each of the southern European salmon producing countries.

- North-East Atlantic Commission kelt satellite tagging, SRBTW(14)11 (Annex 11)

  Atlantic salmon kelts from different rivers migrate in spring to feeding areas before returning after one or more years. Kelts from different rivers use separate feeding areas that are defined by oceanographic processes which vary from year to year. The use of satellite tags will allow researchers to address: the extent of fine-scale population mixing/segregation in the ocean; stock-specific and population structure (spatial and age) migration strategies; mortality/success in relation to habitat occupation in feeding area; return/ predation rates and type; migration dynamic linkages with oceanographic conditions. The Workshop was advised that some work is already ongoing but other sources of funding would be needed to expand the research to other areas and in scale.

- Sub-adult satellite tagging at Faroes, SRBTW(14)12 (Annex 12)

  The application of PSATs to salmon captured and released at the Faroe Island, combined with genetic assignment techniques, will allow researchers to investigate: the partitioning of mortality between life stages; the extent of fine-scale population mixing/segregation in the ocean; stock-specific and population structure (spatial and age) homeward migration strategies; mortality/success in relation to habitat occupation in feeding areas; return/ predation rates and type; and migration dynamic linkages with oceanographic conditions.

West Greenland Commission (WGC)

- Adult satellite/acoustic tagging at Greenland, SRBTW(14)13 (Annex 13)

  This technology, in combination with genetic assignment methods, offers the ability to provide information on stock-specific migration routes, behavior and mortality during the second year at sea. The Workshop was advised that it is anticipated that there is a high probability that this work will be pursued but it will probably be dependent on additional funding being made available.

7.6 The Telemetry Sub-Group (see SAG(14)4) had suggested that the proposed telemetry programme should make best use of the fish capture facilitates on existing index rivers in the NAC and NEAC areas. Figures 4 and 5 below show the locations of current and historic smolt monitoring sites and potential smolt monitoring sites.

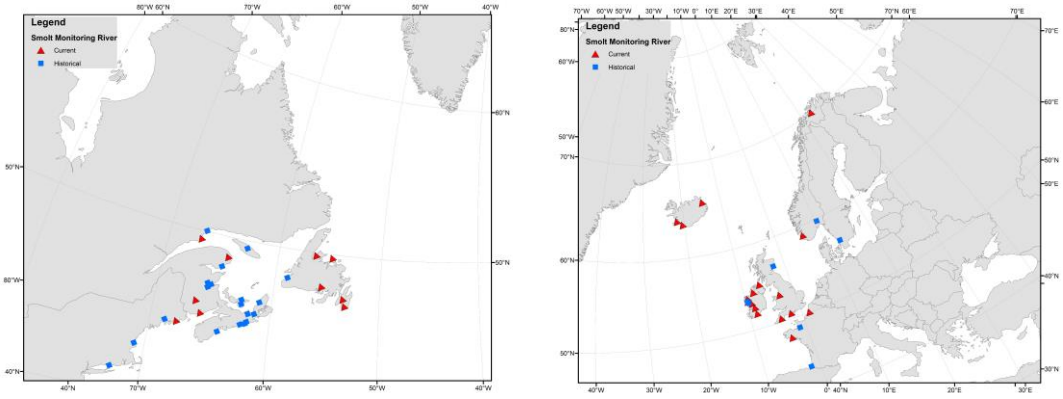

Figure 3: *Location of current and historic smolt monitoring sites in the NAC (left) and NEAC (right) areas. (Source: Report of the ICES Working Group on North Atlantic Salmon. Tables 3.3.6.1, 3.3.6.2, 4.3.5.1, 4.3.5.2, 4.3.5.3 and 4.3.5.4 ICES CM 2014/ACOM:09).*

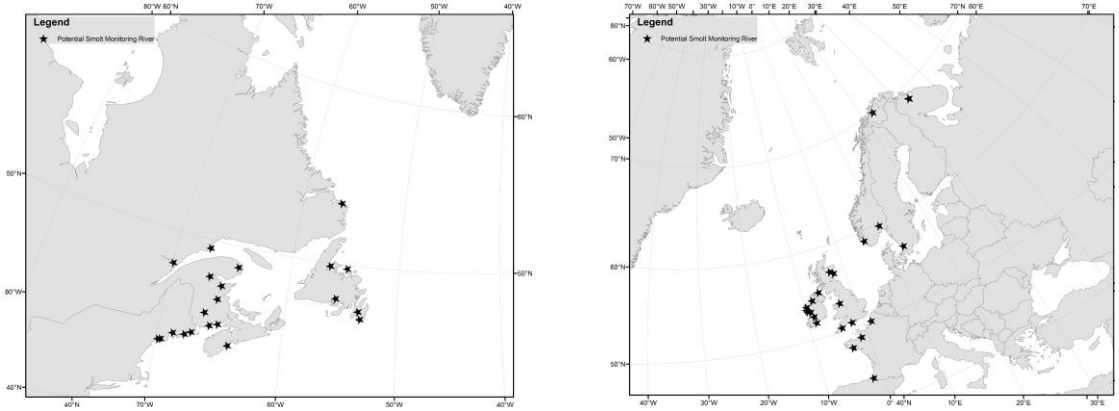

Figure 4: *Location of potential smolt monitoring rivers in the NAC (left) and NEAC (right) areas. (Source: Report of the SAG Sub-Group on Telemetry. (2014). Annex 1 of NASCO document SAG(14)4).*

8. Future role of the IASRB

8.1 The Secretary reported on the role that the IASRB had played in relation to developing, promoting, implementing and publicising the SALSEA Programme. He indicated that the Board had first developed an inventory of research to demonstrate the extent of research on salmon at sea being undertaken by NASCO Parties/jurisdictions their partners. This inventory was used to identify research gaps and priorities to inform development and implementation of the SALSEA Programme through a public/private partnership. The Board had been able to support implementation of the SALSEA Programme in a number of ways:

- NASCO had provided 'seed-corn' funding (£30,000) to support fund-raising initiatives and professional advisors had been engaged to develop an approach to fund-raising and identify potential funding sources. As a result of these initiatives substantial funding had been secured;
- Individual NASCO Parties/jurisdictions had contributed funds either to support the general work of the Board or to fund specific projects under the SALSEA programme. For example, the United States had provided funds to facilitate enhanced sampling under the SALSEA West Greenland project. Endorsement by the IASRB, and in some cases partial financial support, had enabled a number of projects to be undertaken including genetic stock assignment of historical samples from the West Greenland and Faroes salmon fisheries and most recently to a project that will enhance the North American genetic baseline and facilitate finer-scale assignment of samples from West Greenland;
- NASCO Parties/jurisdictions had supported research domestically as contributions to the SALSEA Programme e.g. vessel time was contributed by Canada and additional resources contributed by Canada and the United States to support SALSEA North America;
- The NASCO Secretariat and the Chairman of the IASRB had made representations to DG Research and DG Environment in support of the SALSEA Programme and this had led to substantial funds (£3.5 million) being awarded to the SALSEA-Merge project under the EU Seventh Framework Research Programme;
- The Secretariat and Chairman of the IASRB had sought funding from private sources and substantial funds had generously been donated to the SALSEA Merge project by the TOTAL Foundation (£200,000) and the Atlantic Salmon Trust. The Ocean Foundation had also expressed an interest in the SALSEA Programme but had not been able to contribute funds at that time.

8.3 The Workshop noted that at its last meeting, the IASRB had recognised that the SALSEA Programme had been well publicised and there was awareness of it among potential funders and that this could be built on with regard to future telemetry studies.

8.4 Professor Ken Whelan outlined a number of potential funding sources including the EU Horizon 2020 Programme. This Programme is the biggest EU Research and Innovation Programme with nearly €80 billion of funding available over 7 years (2014 to 2020). Funding opportunities under Horizon 2020 are set out in multiannual work programmes, which cover the large majority of support available, and they include a section on Climate Action, Environment, Resource Efficiency and Raw Materials the

objectives of which include the protection and sustainable management of natural resources and ecosystems. Of the total funds available under Horizon 2020, €200 million was earmarked for marine research and innovation over the first two years of the Programme (2014/15) although this initial allocation will already have been committed to projects. He noted that there is considerable interest in the Commission in better understanding impacts of aquaculture escapees and appropriate management measures to minimise them. He also referred to the recently signed Galway Agreement on Atlantic Ocean Cooperation which is a commitment to connect the ocean science capacity of EU, Canada and the United States with a joint focus on the North Atlantic Ocean, including its connections to the Arctic Ocean and the Mediterranean Sea. The goal is to better understand the Atlantic Ocean and promote the sustainable management of its resources. He suggested that it would be important to influence national representatives with regard to the next framework programme in 2018 and that there may be funding opportunities under other EU initiatives such as COST actions and the LIFE Programme. In this regard he suggested that it would be helpful for the Secretary to update key contacts in DG Environment and DG Research on developments since the completion of the SALSEA-Merge project, and to offer that the Secretary and IASRB Chairman or one of the Workshop Co-Conveners meet with them. Professor Whelan agreed to provide the contacts details to the Secretary.

8.5 As noted by the IASRB's Telemetry Sub-Group, the proposed international telemetry programme is an exciting proposal that has the potential to answer key questions relating to the conservation and management of Atlantic salmon. It will have a high profile, being dependent upon extensive international collaboration and partnerships between scientists and industry. There is also great potential to partner with private sector foundations and NGO groups with an interest in supporting research initiatives and collaborate with researchers and organisations focused on a variety of other marine species that utilise the North Atlantic and Arctic Oceans. It will, therefore, further raise the profile of NASCO as a leader in marine resource management. The Workshop recognised that the IASRB could play an important role by serving as a forum for information exchange and collaboration among research groups, by facilitating coordination (e.g. on the use of equipment, the tagging activities and the operation of detector arrays over large geographic areas), by supporting fund-raising initiatives and by providing funds as resources permit. While Steering Committees were not established for each project during the Workshop, potential project leaders were identified in the project plans and it is hoped that they will liaise with the IASRB through the NASCO Secretariat to provide updates on progress and in the event that they feel the Board can assist in taking the projects forward. In this regard, it was noted that the IASRB Sub-Group on the Future Direction of Research on Marine Survival of Salmon, SAG(13)2, had indicated that the Board has very limited resources and had recognised that if it is to continue to play a role in supporting research on salmon at sea it should consider how it can address that situation. The Workshop recommended that the Secretary should write to DG Research and DG Environment to update key contacts on the work of the Board since the completion of the SALSEA-Merge project and in particular its interest in acoustic telemetry studies to partition marine mortality.

9. Any other business

9.1 The Workshop was advised of a further telemetry Workshop that is being held in late January by the Norwegian Institute for Nature Research (NINA) and Inland Fisheries Ireland (IFI) in order to share and improve skill sets and knowledge in aspects of telemetry, and to support development of an expert network, with a view to future project collaboration.

10. Report of the Meeting

10.1 The report of the Workshop was agreed by correspondence after the meeting.

11. Close of the Meeting

11.1 The Co-Conveners thanked participants for their contributions and closed the meeting.

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SRBTW(14)2

Agenda

1. Opening of the meeting
2. Nomination of a Rapporteur
3. Adoption of the agenda
4. Consideration of the Terms of Reference, ICR(14)11
5. Development of inventories of ongoing & planned marine telemetry studies (ToR 1-3)
   a. Atlantic salmon
   b. Other species in areas of the North Atlantic frequented by salmon
   c. Collation and presentation of data
6. Identification of the most suitable areas for new collaborative telemetry studies (ToR 4 & 7)
   a. North American Commission area
   b. North-East Atlantic Commission area
   c. West Greenland Commission area
7. Identification of strategic partners and appropriate linkages to existing and planned tracking programmes, etc. (ToR 5 & 6)
8. Next Steps
   a. Recommendations for the development of detailed plans for projects in selected areas and approaches to fund-raising (ToR 8)
   b. Future role of the IASRB
9. Any other business
10. Report of the Meeting
11. Close of the Meeting

SRBTW(14)3

Drifters and BioProbes: Options for detecting acoustically tagged fish in large geographic areas (North American and/or North-East Atlantic Commissions)

Background

Atlantic salmon are assumed to undertake directed movements at sea that take them over a large spatial domain over an extended period of time. Line arrays for detecting the movement of telemetry marked animals and to estimate apparent survival rates have been used in many locations with relatively narrow passage points and in locations in which the movement of animals is assumed to be generally uni-directional (see various ref papers). The probabilities of detection of these linear arrays are quite high because of close spacing of a limited number of receivers. Detection and apparent survival probabilities can be estimated using mark and recapture models for a sequence of arrays traversed by animals in a sequential manner, up to the last array location. Linear arrays with proximal receiver deployments that provide a near 100% probability of detection if the fish passes within the receiver field can provide robust information on numbers of animals within or passing through the line but the spatial and temporal coverage is limited to the spatial coverage of the line and the limited time the animals are in the range of the receivers.

Moving the detection infrastructure in areas in which animals can disperse over much broader areas is a challenge for line arrays because of their narrow spatial coverage and the short time period during which acoustically tagged animals may be in the vicinity of any of the receivers in the array.

Skeletal grid deployments

To address the challenge of monitoring large areas, a spatially broad grid of receivers would be deployed, for which individually there would be a low probability of detection of tagged animals in the grid field but for which the tagged animal would be in the overall potential field of detection for an extended period of time. Because the animal is constantly transmitting its identification and is moving within the receiver field, the probabilities of detection become a multiple of the instantaneous individual probability detections and the time the animal is in the detection field. Even with very low probabilities of detections at individual receivers, the combination of constant id transmission, cumulative time within the receiver field and movement of the animal within the field can produce a high number of detections. In addition, the movements of animals, including swimming speeds and other migration characteristics, can be characterized. Loss rates based on intervals of time can also be calculated (but not loss rates and location at the same time?).

For example, if a project has access to 400 receivers for deployment in the Labrador Sea with which to answer questions on migration behavior and apparent survivals, the choice is whether to establish a few fixed linear arrays with high probabilities of detection of fish that are in the range of the line (space and time) or to establish a grid of widely spaced receivers with low

probabilities of detection of an animal but for which the animal has an extended residence time within the spatial area of the grid.

For a grid of 400 receivers spaced 50 km apart, the spatial domain would be 1000 km by 1000 km, an area that should contain salmon post-smolts over a period of ten weeks or more (at 25 km per day based on 1 body length per second, mean length of 30 cm). Placing receivers 50 km apart (at corners of a square grid), and assuming a tagged fish is detectable if it passes within 500 m of a receiver, then the probability of a tagged fish being detected when the tag transmits is about 0.8% (500/50000 * pi/4). For simplicity, we will assume that the probability of a tagged animal being detected on a given day is this value of 0.8%. If the animal lives for seven days and remains within the domain of the grid, then the probability of detecting it at least once during the week is 5.4%. If 100 animals move into the grid domain on day zero, the expected number of detections registered over the seven day period is:

val2.5pc	**median**	**val97.5pc**
2	7	12

If 200 tagged animals move into the grid domain on day zero, the expected number of detections over seven days will be:

val2.5pc	**median**	**val97.5pc**
7.0	13.0	21.0

If fish die at a rate of 10% per week, then the expected number of detections per week from 100 fish would be:

week	**val2.5pc**	**median**	**val97.5pc**
2	2	6	11
3	2	5	10
4	1	5	10
5	1	4	9
6	1	4	8

For a starting pool of 200 tags, the expected number of detections would be:

	mean	sd	MC_error	val2.5pc	median	val97.5pc
d[2]	12.06	3.375	0.03373	6	12	19
d[3]	10.83	3.233	0.03144	5	11	18
d[4]	9.779	3.028	0.03055	4	10	16
d[5]	8.835	2.884	0.02893	4	9	15
d[6]	7.861	2.78	0.02815	3	8	14
d[7]	7.191	2.655	0.02682	2	7	13
d[8]	6.383	2.474	0.02377	2	6	12
d[9]	5.773	2.358	0.02589	2	6	11
d[10]	5.186	2.283	0.02236	1	5	10

The expected detections would be higher than this, as the probability of the fish being detected on any given day is the product of the number of transmissions in a 24 hour period and the rate of movement of the animal within the receiver grid, this will need to be modeled to determine optimal tag numbers.

This grid design should provide data to estimate the probability of detection (for the grid overall) and the apparent number of animals alive per given time step (daily, weekly, etc). It would also provide data on location of animals within the grid per given time step.

Options for deploying grids

- Bottom deployments could be undertaken but bathymetry constraints (depth) may limit their capacity to detect salmon in the upper portion of the water column.
- A grid of floating / drifter / high flyer receivers could be deployed in the area of interest. To maintain the grid domain structure, low drag drifters would be best. VR2 logger and satellite beacons could be used to track and retrieve the drifters for data download:

  -requirements: drifter / high flyers ~ $2500 per unit ($1000 for satellite deployed high flyer, $1500 for VR2) and radio tag for aiding location of units $???
  - vessel for deployment: opportunistic deployment on established surveys or charter vessel for deployment and retrieval
  - oceanographers to model potential movements of drifters and to assist in study design
  - pilot study:
    - in Gulf of St. Lawrence (mid-June to Mid-July), twelve drifters. Potential lead: DFO
    - in Gulf of Maine (end of May to mid-July), twelve drifters. Potential lead: NOAA
  - period of interest for Labrador Sea: early July to mid-September

- bioprobes. deployment of satellite transmitters linked to VR2W on grey seals in the southern Gulf of St. Lawrence
  - as with the drifters but actively move in the potential domain of salmon post-smolts during migration to Labrador Sea
  - $6000 per bioprobe
  - pilot study: six bioprobes in southern Gulf of St. Lawrence
  - dates: mid-June + for 11 months

- Potential linkages/partners
  - In southern Gulf of St. Lawrence, linkages with tracking of Atlantic cod to study interactions with grey seals, tracking of bluefin tuna (?), possibly American eel and striped bass

- Funding options
  - DFO inhouse research envelopes (International Governance Strategy, Strategic Program for Ecosystem Research and Assessment (SPERA))
  - NGO Atlantic Salmon Conservation Fund

- Ballpark budget/cost
  - $2500 per drifter X 12 per pilot area = $30,000 for capital
  - DFO southern Gulf research vessel Perley (4 days to deploy, 4 days to retrieve)
  - DFO Teleost September multi-species survey to recover drifters

    - in Gulf of Maine (end of May to mid-July), twelve drifter. Potential lead: NOAA

SRBTW(14)4

New Receiver Lines/Arrays/Grids (North American Commission Area)

Hypothesis/question:

- There have been major advances in our understanding of the marine ecology of emigrating post-smolts from North American rivers with the development of acoustic tagging and tracking technology. Starting in the mid-1990's, individual researchers began deploying small numbers of acoustic receivers in freshwater, estuarine and coastal environments. Coupled with these efforts was in-river monitoring efforts for Atlantic salmon, where emigrating smolts were captured, tagged and released. The tag emitted an ultrasonic pinger which was detectable by these receivers, thereby allowing for the monitoring of emigrating smolts/post-smolts through riverine and coastal environments. Technological advances and increased collaboration between researchers allowed for the development of larger projects tracking Atlantic salmon from multiple rivers as well as other marine species. With the establishment of the Ocean Tracking Network and the continued advances in these monitoring programs, acoustic receiver arrays now extend across much of North American range of Atlantic salmon and large numbers of detections are being recorded for Atlantic salmon hundreds of kilometres away from their natal rivers.
- Even given these advances, our ability to track migrating Atlantic salmon is somewhat limited and additional receiver detection points would greatly advance our understanding of the marine phase of Atlantic salmon. Additional receiver arrays at key locations would provide more robust stock-specific estimates of mortality, migration routes and dynamics during the first year at sea. A number of different potential receiver arrays have been suggested below, each addressing a specific aim and information need, but other locations could also be considered:

1. Passamaquoddy/Cobscook Bay arrays

    a. Installation of estuarine array(s) and utilization of platforms of opportunity (e.g. salmon net pen moorings (active and fallow locations), navigational buoys, commercial fishers etc.) within the Bay of Fundy/Passamaquoddy Bay/Cobscook Bay area would provide the necessary infrastructure for increasing the spatial distribution of tagged migrating Atlantic salmon within North America and would provide opportunities for investigating the causes of early marine mortality for an Endangered southern Canadian population.

2. Strait of Belle Isle triangular array

    a. A triangular array deployed offshore and to the east of the Strait of Belle Isle would allow for more robust mortality estimates for fish migrating through the Gulf of St Lawrence and would provide information on the initial Labrador Sea migration dynamics.

3. Strait of Belle Isle grid

   a. A gridded array of receivers deployed offshore and to the east of the Strait of Belle Isle would allow for more robust mortality estimates for fish migrating through the Gulf of St Lawrence and would provide information on the initial Labrador Sea migration dynamics. The gridded array would provide increased spatial coverage, increased temporal coverage, but decreased detection efficiency.

4. Newfoundland array

   a. A receiver array off the southeastern coast of Newfoundland, across the Grand Banks, would provide a natural extension of the Ocean Tracking Network Halifax array. This array would likely intercept migrating Atlantic salmon from the southern North American population or salmon that exit the Gulf of Saint Lawrence via the Cabot Strait. This array would allow for more robust estimates of mortality for salmon populations migrating from southern North American to the Labrador Sea while also providing information on the initial Labrador Sea migration dynamics.

Potential leads

- Atlantic Salmon Federation, NOAA Fisheries Northeast Fisheries Science Center, Department of Fisheries and Oceans, and Ocean Tracking Network

Equipment/support needs

- Passamaquoddy/Cobscook Bay arrays
  - Acoustic tags (St John River) – 300 (or more) *$400 = $120K/annum
  - Receivers: 50 *$1.5k = $75k
  - Deployment support
  - Incidentals * $2k/annum
- Strait of Belle Isle triangular array
  - VR2W Receivers – 1.5K (VR2) * 60 = $90k OR VR4s?
  - Deployment equipment - $100 *60 = $6k
  - Vessel/deployment –10K (5K deploy and 5K retrieve)/annum
- Strait of Belle Isle grid
  - Needs further examination (VR4 vs VR2W)
- Newfoundland array
  - Needs further examination (VR4 vs VR2W)

Equipment manufactures

- Vemco

Potential timelines

- Proposals, 2016
- Field work, 2017
- Duration, 10 years

Potential linkages/partners

- Any and all researchers with OTN NW Atl. detections

Funding options

-

Ballpark budget/cost

- Passamaquoddy/Cobscook Bay arrays
  - Capital: $100k
- Strait of Belle Isle triangular array
  - VR4 approach
    - unknown
  - VR2W approach
    - Initially $100k, then $25k/annum
- Strait of Belle Isle grid
  - VR4 approach
    - unknown
  - VR2W approach
    - Initially $100k, then $25k/annum
- Newfoundland array
    - VR4 or VR2W approach needs tbd
- Tags per annum: >$120K
- Incidentals per annum: $5k
- Travel/deployment costs per annum: $10k
- Personnel (In kind?)

SRBTW(14)5

Platforms of Opportunity in the North American Commission area: Stationary Platforms of Opportunity Receiver Exchange (SPORE)

Hypothesis/question:
Broad spatial coverage of Atlantic salmon marine habitat is needed to better understand migration time/space elements and to study variability in marine survival. Because dedicated receiver lines and grids are expensive to develop and maintain, a broad distribution of receivers deployed on opportunistic ocean assets can provide useful baseline acoustic monitoring data that is associated with collection of environmental monitoring (oceanography and weather buoys) and offshore commercial enterprises (fishing, aquaculture, offshore energy, etc.). Tier 1 monitoring using VR2W-type equipment with annual or semi-annual equipment exchange. Tier 2 monitoring using Cabled VR-4/VR-2 monitoring for real-time data monitoring. These associations of fish location data with environmental and commercial enterprise data provide an opportunity to exchange information and expertise with oceanographers and others to better understand seasonal salmon distributions in changing oceans.

Potential Lead:
NOAA Fisheries Northeast Fisheries Science Center, Department of Fisheries and Oceans, Atlantic Salmon Federation, and Ocean Tracking Network

Equipment/support needs:
- VR2W (30, 200)
- Cabled VR-4 (3,10)
- Sentinel Tags (30, 50)
- Cooperative Development of Mounting Systems Custom to Partners Gear
- 4 months data management support, equipment distribution, and troubleshooting

Equipment manufacturers:
Vemco, University of Maine Oceans Lab, Local Machine Shop

Potential timelines
- Field work – Seasonal 2015 (Phase I); 2016-2019 (Phase II)
- Duration – 2015 +, long-term monitoring

Potential linkages/partners: Integrated Ocean Observing System (IOOS); Atlantic Cooperative Telemetry Network (ACT), Offshore energy developers, Fishers and Aquaculture, Coast Guard, Other fish research community -sturgeon, eel, and shark researchers (Goulette *et al*. 2014).

Funding options:
- Baseline – Cooperative with NOAA-F NEFSC and University of Maine Ocean Observing System (10 locations) since 2005.
- Phase I – expand tier 1 monitoring to 5 additional NOAA stations in Gulf of Maine and 15 total in Gulf of St. Lawrence. Establish tier 2 monitoring on 3 Gulf of Maine Stations. Total of 30 stations and 3 real-time.

- Phase II – based on results of North Atlantic wide inventory consult with Salmon Telemetry Group to prioritize coverage and foster new partnerships to expand coverage to 50-75 stations in both the Gulf of Maine and St. Lawrence and 50 stations on the continental shelf in the vicinity of the Strait of Belle Isle. Total of 200 stations and 10 real-time.

Ballpark budget/cost:

- Phase I – $83K
- Phase II - $477K purchase year, $109K-$125 thereafter

SRBTW(14)6

North American Commission kelt satellite tagging

Hypothesis/question

- Iteroparity is an important life history trait of Atlantic salmon. Individuals can contribute to future generations via spawning contributions in multiple years, thereby increasing both individual and population level productivity. These repeat spawners were historically an important component for many North American Atlantic salmon populations. Repeat spawners are more efficient spawners due to past experiences and are typically larger than maiden spawners and, therefore, more fecund. For many North American populations, the repeat spawner component has been lost or significantly reduced due to a variety of anthropogenic impacts (e.g. dams) and increased marine mortality.

- Pop-off Satellite Archival Tags (PSATS) have recently been used to study the migration of post-spawned Atlantic salmon kelts in both North America and Europe. This technology offers the ability to provide information on stock-specific migration routes, behavior and mortality of post-spawned Atlantic salmon kelts. When combined with results from ongoing post-smolt telemetry projects, insights may also be gained into the commonalities of kelt and post-smolt migration patterns. Data may also be obtained on adult mortality rates at sea.

Potential leads

- Atlantic Salmon Federation, NOAA Fisheries Northeast Fisheries Science Center, Miramichi Salmon Association, Department of Fisheries and Oceans, and the Restigouche Watershed Management Council

Equipment/support needs

- Rivers (n=4) – Penobscot, Miramichi, Restigouche, St John Rivers
- Satellite archive tags – $4K * 10 per river = $160K
- Acoustic tags - $400 * 10 = 16K
- Misc equipment – $2K

Equipment manufactures

- Vemco
- Microwave telemetry/Wildlife Computers

Potential timelines

- Miramichi operational since 2012
- Proposals, 2015
- Field work, 2016
- Duration, 3 years

Potential linkages/partners

- European colleagues to standardized methods

Funding options

- In-kind salary support
- New Brunswick Wildlife Trust Fund
- Atlantic Salmon Conservation Fund
- *National Science Foundation*
- Pew Charitable Trusts
- NOAA/NMFS International Science
- Atlantic Salmon Federation
- NASCO Parties
- Others?

Ballpark budget/cost

- $175K per year (scalable)

SRBTW(14)7

Generic Index River Sites in the North-East Atlantic Commission area

Aim

Establish at least four index sites (build on existing index rivers and/or establish new index rivers) spread over the NEAC area, with the aim for each site to:

1. Quantify total sea survival, from leaving the river to returning to river
2. Quantify where the mortalities occur by separating total sea mortality into mortality in 1) river mouth/estuary, 2) near coastal area, and 3) remaining stay at sea.
3. Quantify variation in mortality among years.
4. Analyze critical periods for mortality and possible causes for mortality.

By this provide scientists/managers/NASCO with quantitative mortality estimates and in addition be able to identify how large the mortality is in coastal areas where it is possible to implement management measures (dependent on the causes of mortality), and how large the mortality is in ocean areas, where management measures are more difficult to implement. This will both facilitate stock assessment models - and identification, implementation and evaluation of quantitative effects of management measures.

Methods

1. *Quantify total sea survival, from leaving the river to returning to river*

   Use for instance PIT-based systems with antennas recording all tagged fish returning (tagged with PIT-tags as pre-smolts or smolts), wolf traps or other total traps in combination with individual tagging of fish, mark recapture methods or other possible methods to record individual-based survival.

2. *Quantify where the mortalities occur by separating total sea mortality into mortality 1) in river mouth/estuary, 2) near coastal area and 3) during remaining stay at sea.*

   Tag smolts with acoustic tags and record their survival through river mouths and in near coastal areas by deploying arrays of acoustic receivers in river mouths/estuaries and as far out on the coast as possible (outer fjords, sea lochs, outer bays, “Irish lines”, “Scottish lines”, line between Denmark and Norway… etc.). Preferably, lines with full coverage so all tagged fish passing are recorded, or double lines so recording efficiency of inner line can be estimated.

   Acoustic arrays can be deployed at sites where several index rivers are covered by the same arrays (for instance “Irish lines”, “Scottish lines”, Trondheimsfjord area in Norway covering 10-20 important salmon rivers, including Gaula, Orkla, Nidelva, Stjørdalselva, which are among the largest Norwegian salmon rivers). If a fjord site in Norway is selected, arrays close to the coast north and south of the site can be deployed to record migration direction of the post-smolts after leaving the fjord

It will be a challenge to separate between live smolts and predators. For example, depth tags or other methods can be used to identify behavioural signatures that can be used to distinguish between live smolts and tags in potential predators.
Lice-induced mortality should preferably be identified in index rivers in areas with salmon farming to be able to identify "general ocean mortality" from salmon lice induced mortality. This can be done by large-scale experiments in the same areas comparing groups of fish protected against salmon lice with chemical treatment and control groups. The main aim in this respect is not to focus on aquaculture, but this is needed to be able to identify general ocean mortality from anthropogenic mortality in coastal areas. (The post-smolts are infested by salmon lice in the coastal areas, but the lice has usually not developed to stages causing mortality before the salmon have migrated into the ocean areas).

4. *Analyze critical periods for mortality and possible causes for mortality.*

Use data collected under 1. and 2. To compare 1-, 2- and 3-sea-winter salmon for evaluation of mortality in the first, second and third year at sea. Use data collected at tagging (length, mass, smolt quality, age etc.) to analyse which were the fish that survived and which were the fish that died – are there any characteristics/patterns that can be used to identify causes for mortality (coastal mortality and ocean mortality separately)?

Are there any effects of environmental factors on coastal and ocean survival? Water discharge in river, coastal/ocean temperatures, salinities etc.?

Compare results among rivers in cases where there are several rivers within the same index site.

Use scale samples from returning fish (collected by using traps, from fisheries etc.) in the same rivers for possible analyses of when during the ocean migration growth was slow/fast to try to evaluate critical periods. Early post-smolt phase in ocean potentially critical period?

Compare similarities and differences in results between the index sites in different geographical areas, and knowledge on which areas fish from the different sites/geographical areas use in the ocean, to discuss possible causes for mortalities (do sites with salmon using different ocean areas show similar or different patterns, for instance).

If total traps are used or where recaptures are high, it is also possible to tag a sub-sample of fish from the same rivers (smolts or kelts?) with DST-tags to get information on, for example, temperatures experienced during the ocean migration and migration routes/ocean feeding areas (based on light, depth, temperature).

Potential Leads
Kim Aarestrup

Equipment needs
1) Wolf traps or other total traps, PIT-tags and PIT antennas
2) Acoustic transmitters and receivers
3) Scale samples, other equipment to record smolt quality etc.

Manufactures

1) Oregon RFID, Biomark and others
2) Thelma, VEMCO, Lotek, others?
3) Different equipment

Potential timelines

Long-term study. Aim is to establish long-term data series with survival data.
BUT, will obtain results in the first study year that can be used and published (coastal data after a few months of field work, survival of one-sea winter after one year, two-sea-winter after two years etc.)

Other linkages/partners

Sites and salmon scientists in Ireland, Scotland, Norway, Denmark, other countries?

Funding options

National management authorities in different countries? Industry (hydropower, aquaculture)? Others?

Ballpark costs

€350 000 - €500 000, or more, per site per year

SRBTW(14)8

Malin Head to Islay Receiver Array (North-East Atlantic Commission area)

Hypothesis/question

- The development of large scale telemetry receiver arrays in North America has greatly advanced the understanding of Atlantic salmon early marine migration. These large receiver arrays have provided detection information for a large number of other species migrating through the areas of coverage as well. The development of similar telemetry receiver arrays in the North Atlantic/Irish Sea area would allow researchers to investigate a number of key issues impacting the productivity of a large number of United Kingdom and Irish Atlantic salmon stocks migrating through this area in addition to other marine species migrating in this area. Key questions to be addressed are:
  - What is the mortality of the early marine phase of Foyle and Irish Sea salmon?
  - What is the usage of the North Channel of the Irish Sea by basking shark and other elasmobranchs?
  - What is the usage of the North Channel by cetacean species?
  - What is the movement of sea trout in the North Channel?

Potential leads

- Loughs Agency, Glasgow University and Queens University Belfast

Equipment/support needs

- 100 acoustic detectors with 600m range

Equipment manufactures

- Vemco, Lotek, Thelma, Biotel

Potential timelines

- Field work, 2016-2022
- Duration, 2016-2023

Potential linkages/partners

- Marine Scotland, Marine Institute, Agri-Food and Bioscience Institute, Inland fisheries Ireland, Rivers And Fisheries Trusts Of Scotland, Department of Culture, Arts and Leisure, and Department of Agriculture and Rural Development

Funding options

- INTERREG V

Ballpark budget/cost

- £2,000,000

SRBTW(14)9

North Sea Loose Array (North-East Atlantic Commission area)

Hypothesis/question:
Understanding of Atlantic salmon migration routes is needed to better understand behavior and timing of the migration as well as potentially sectioning the marine survival and identifying potential migration corridors. Because of scale, dedicated receiver lines and grids are expensive to develop and maintain. However, a broad distribution of receivers deployed on opportunistic ocean assets in the area between Scotland and Norway may provide useful for at least partial coverage of a relatively narrow area sectioning the North Sea from the Atlantic. Possible sites could be oceanography and weather buoys and particularly offshore commercial enterprises (fishing, aquaculture, offshore energy, etc.). Some of these will in addition to baseline acoustic monitoring data also offer collection of environmental monitoring. The aim is to use these opportunities to cover approximately 30 % of the area going from a rough line from Northern Scotland to Southern Norway using VR2W-type equipment with annual or semi-annual equipment exchange.

Potential Lead:
Someone in Scotland/Norway, and Ocean Tracking Network

Equipment/support needs:
- 160 VR2W
- Various Partners owning platforms, Marine institutes?
- Management support, equipment distribution, and troubleshooting

Equipment manufacturers:
Vemco, Others?

Potential timelines
- Field work – 2016-2019 at the earliest
- Duration – 2-10 years

Potential linkages/partners:
Energy companies, Military, OTN

Funding options:
- OTN
- EU project?
- Energy companies (INSITE project?)

Ballpark budget/cost:
- €400,000 (or more) NB: NO TAGGING

SRBTW(14)10

Studies of migration along the European shelf edge and into the Norwegian Sea using drifters/AUVs etc.

Testable hypotheses

A particle drift model, developed as an output from the SALSEA-Merge project (2009 to 2011), indicated a strong likelihood that most southern European post-smolts (Spain, France, Ireland and UK) use the European shelf edge current as a marine 'highway', following currents to summer/autumn feeding grounds in the Norwegian sea. The SALSEA-Merge model assumed that much of the movement of post-smolts was a result of passive transport. This model and the associated hypotheses surrounding the migration paths of southern European post-smolts should be tested to see if it accurately portrays smolt migration, particularly in areas where smolts leaving freshwater have to migrate significant distances against the residual coastal and oceanic currents. Similarly, wind driven currents could have marked effects on migration routes and more information on movements of post-smolts in key areas would greatly assist in developing such models further. The utility of using smolt migration models for designing large scale telemetry monitoring projects should be considered further. Currently tagged fish are only being recorded in areas local to their tagging, i.e. at the mouths of estuaries or fjord systems. The next time they are encountered is on their return migration. We do not currently know where the subsequent mortality occurs. By setting up acoustic monitoring lines further along the postulated routes of migration, and extending from those, we should be able to determine what proportion die en route, and what proportion in the feeding/growing areas.

Potential methods to test the current migration hypotheses include deploying acoustic tag detection systems on a range of bioprobes, drifters, autonomous underwater vehicles (AUVs also known as gliders), oceanographic buoys, ocean monitoring stations and buoys attached to fixed fishing gear. Deployment of fixed receivers on oceanic platforms or establishing oceanic monitoring stations would be difficult in areas where the shelf edge was distant from the coastline. Where the shelf edge was closer, e.g. off the North West of Ireland, such platforms or arrays could be considered which would allow tracking of post-smolts from Spain, France, Ireland and the UK. Fixed moorings could be employed on the shelf and potentially on the upper continental slope. Also, some consideration could be given to investigating the availability of existing platforms along the shelf edge to mount detectors (e.g. gas and oil platforms such as Corrib Gas, Schiehallion etc).

Alternatively, deployment of AUVs would allow strategic tracking of post-smolts at key points along the shelf edge which narrow to only 10s or 20s of kms. These AUVs would allow confirmation of pre-suppositions relating to the use of the shelf edge as a marine 'highway' as well as providing information on survival of electronically tagged groups of post-smolts released from each of the southern European salmon producing countries.

One risk of assuming that the fish pass through such restricted 'gateways' is that they may go wider, i.e. around our array of glider transect, missed by the detectors and then incorrectly assigned as having died prior to reaching the detector array or transect. In response to this, we should consider deployment of a minimum of two gliders. One would be deployed in the area where the models suggest the most likely migration route to be. Simultaneously, the second

glider would cover a much wider transect, ideally covering an entire ocean "gap" e.g. between Ireland and Scotland, to cover all fish migrating up through the Irish Sea, or between Shetland and Faroe, with the first glider focusing on the shelf edge region.

Potential project leaders
Spain, France, Ireland (Marine Institute), Scotland (Marine Scotland), Norway (IMR).

Equipment and support needs
Information was presented indicating that the OTN had recently successfully deployed AUVs (Wave Gliders®) along the Halifax acoustic receiver line, which runs from the shore to approximately 250 km offshore, upload data from bottom-mounted acoustic receivers and then transmit that data back to shore via satellite. Using AUVs to download receiver data would result in significant cost savings for managing these types of programmes as expensive ship time is no longer required to download data. AUVs can also serve as mobile receivers listening for tagged animals.

Equipment manufacturers
Liquid Technologies produce the "Waveglider". There may be other manufacturers.

Potential timelines for field work and duration
Essentially the deployment of AUVs (e.g. wave gliders) would be carried out to coincide with model predicted location of stocks from specific areas between April and June (West coast of Ireland), June - July (west of Scotland) and August - October (west of Norway in the Norwegian sea). Could start rapidly given commitment for some small requirement for shiptime to deploy AUVs. Carried out over three years all three locations above could be well covered.

Potential linkages and partners
There are good opportunities for linkages between the Marine academic and technical institutes from Spain, France, Ireland, UK and Norway making this an attractive international proposal.

Funding options
National research/management authorities in different countries
Industry (hydropower, aquaculture)
EU – Interreg.
EU funds in 2015 in relation to Arctic, Blue Growth, Climate and TransAtlantic calls.
Pew Charitable Trust and other philanthropic organizations

Ball park budget costs
Offshore array of receivers - North West of Ireland on shelf – €100K
Acoustic Tags – assume these will come as part of the nearshore tracking initiatives.
Deployment could be included with ship costs indicated below.
Costs of personnel – Could also be linked with personnel costs indicated below for AUV tracking.

Wave glider with acoustic receiver technology– Possibly consider two gliders – use one on a short track to test highway – other covers longer track. Refine tracks with more info
Acoustic Tags – assume these will come from nearshore tracking initiatives.

Assume three tracking lines
North West Ireland (Southern UK, Spain, France, Ireland)
Scottish/Irish line
Norwegian sea line (or lines)

Cost per wave glider (Liquid Technologies web page) = $300,000 US, (old version of glider is only $175, 0000)
Probability of detection analysis based on ranges, speeds, directions etc.
10km bands probability will have a good detection range.
Costs of personnel – €70k over three years.
Costs for marine support – Approx €80K (10 sea days @8K per day)

SRBTW(14)11

North-East Atlantic Commission kelt satellite tagging

Hypothesis/question

- Atlantic salmon kelts from different rivers make migrations in spring to feeding areas before returning after one or more years. Kelts from different rivers use separate feeding areas that are defined by oceanographic processes (~ variable year to year). The use of satellite tags on kelts will allow researchers to address the following questions:
  - The extent of fine-scale population mixing/segregation in the ocean
  - Stock-specific and population structure (spatial and age) migration strategies
  - Mortality/success in relation to habitat occupation in feeding area
  - Return/ predation rates and type
  - Migration dynamic linkages with oceanographic conditions

Potential leads

-

Equipment/support needs

- Three or four sites, PSAT/ MRPAT/ SURV 50 individuals per site during two year tagging programme. €1m equipment.
- Two sites, one year, 50 DSTs at each site. Expectation of 10% recovery. ~€300k
- Logistics of tagging programme are considerable, half year of dedicated time per site per year (two people for three months)…4y in total. ~€300,000 or more
- Laboratory work ~£1m
- Analysis and assessment ~£1m

Equipment manufactures

- Platform agnostic, so Microwave, Wildlife, Vemco, etc. Within EU would require tendering in any event.

Potential timelines

- Proposal, 2015
- Field work start in 2016
- Duration, 5 years

Potential linkages/partners

- Consider as part of large multispecies ocean climate project a la CLIOTOP, TOPP or similar. Link to other large-scale ocean basin projects. Sharks (basking, porbeagle), whales, seals etc. Integration of pelagic/ mesopelagic.
- Linkages with work in Ireland, Norway, Sweden, Denmark, UK, North American partners and Greenland
- Linkages with post-smolt telemetry efforts

Funding options

- EU funds in 2015 in relation to Arctic, Blue Growth, Climate and TransAtlantic calls
- Pew charitable Trust and other philanthropic organizations

Ballpark budget/cost

- €4m and €6m per year (scalable)

SRBTW(14)12

Sub-adult satellite tagging at Faroes

Hypothesis/question:

- Atlantic salmon sub-adults from different populations mix on feeding areas around the Faroes. Historically, commercial fisheries exploited this resource and provided access to marine Atlantic salmon to researchers. The use of satellite tags on fish captured and released at the Faroe Island feedings areas, combined with genetic assignment techniques, will allow researchers to address the following questions:
  - Partitioning mortality between life stages
  - The extent of fine-scale population mixing/segregation in the ocean
  - Stock-specific and population structure (spatial and age) homeward migration strategies
  - Mortality/success in relation to habitat occupation in feeding area
  - Return/ predation rates and type
  - Migration dynamic linkages with oceanographic conditions

Potential leads

-

Equipment/support needs (per year)

- Two field seasons, PSAT/ MRPAT/ SURV 100 individuals per site during two year tagging programme. €1m equipment
- Tagging programme staffing ~€300k
- Analysis and assessment ~€1m

Equipment manufactures

- Platform agnostic, so Microwave, Wildlife, Vemco, etc.

Potential timelines

- Align to other efforts in NEAC/ NAC, so 2016 at earliest

Potential linkages/partners

- Align to other efforts in NEAC/ NAC, so 2016 at earliest.

Funding options

- International focused

Ballpark budget/cost

- €3m (estimated and scalable)

SRBTW(14)13

Adult satellite/acoustic tagging at Greenland

Hypothesis/question:

- While great advances in our understanding of mortality, dynamics and ecology of Atlantic salmon during their first year at sea have been made over the past few decades, very little is known about salmon during their second year at sea. The West Greenland Atlantic salmon stock complex is comprised of Atlantic salmon originating from both Europe and North America. During the summer and early fall, fish are in close proximity to the West Greenlandic coast. This provides an opportunity for researchers to access fish that have survived through one year at sea and are generally destined to return to natal rivers as two-sea winter maiden spawners. These two-sea winter maiden spawners are often a critical component of the spawning stock for many salmon population across the North Atlantic as they contribute a significant number of eggs given their larger size.
- Pop off Satellite Archival Tags (PSATS) have recently been used to study the migration of post-spawned Atlantic salmon kelts in both North America and Europe and have also been used on Atlantic salmon captured, tagged and released at Greenland. This technology, in combination with genetic assignment methods, offers the ability to provide information on stock-specific migration routes, behavior and mortality during the second year at sea.

Potential leads

- NOAA Fisheries Northeast Fisheries Science Center, Greenland Institute of Natural Resources, Atlantic Salmon Federation, Department of Fisheries and Oceans and other European partners and agencies

Equipment/support needs (per year)

- Satellite tags - $4K per *20 = $80K
- Argos fees ($1K) *20 = $20K
- Acoustic tags - $400 per *50 = 20K
- Travel to Greenland - $10K/per *2 = $20K
- Telemetry receivers – existing receivers + a few new receivers
- Rod/reel gear - $200
- Misc supplies – $2K

Equipment manufactures

- Vemco
- Microwave telemetry/Wildlife Computers

Potential timelines

- Proposal, 2015
- Field work, 2016
- Duration, 3 years

Potential linkages/partners

Funding options

- In-kind salary support
- NMFS International Science
- ASF
- NASCO Parties
- Others?

Ballpark budget/cost

- $150K per year (scalable)

Annex 12

CNL(15)11

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 by country, including unreported catches and catch and release, and production of farmed and ranched Atlantic salmon in 2015[1];

1.2 report on significant new or emerging threats to, or opportunities for, salmon conservation and management[2];

1.3 provide a review of examples of successes and failures in wild salmon restoration and rehabilitation and develop a classification of activities which could be recommended under various conditions or threats to the persistence of populations[3];

1.4 advise on possible effects of salmonid aquaculture on wild Atlantic salmon populations focusing on the effects of sea lice, genetic interactions and the impact on wild salmon production[4];

1.5 provide a time series of numbers of river stocks with established CLs and trends in numbers of stocks meeting their CLs by jurisdiction;

1.6 provide a compilation of tag releases by country in 2015; and

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

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

2.1 describe the key events of the 2015 fisheries[5];

2.2 review and report on the development of age-specific stock conservation limits;

2.3 describe the status of the stocks;

2.4 advise on the source of uncertainties and possible biases in the assessment of catch options for the Faroes fishery resulting from the use of samples and data collected in the fishery in the 1980s and 90s. Should it be considered that biases are likely to compromise the catch advice, advise on any new sampling which would be required to improve these assessments;

*In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required:**

2.5 provide catch options or alternative management advice for 2016/17-2018/19 fishing seasons, with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[6]; and

2.6 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

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

3.1 describe the key events of the 2015 fisheries (including the fishery at St Pierre and Miquelon)[5];

3.2 update age-specific stock conservation limits based on new information as available;

3.3 describe the status of the stocks;

*In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required:**

3.4 provide catch options or alternative management advice for 2016-2019 with an assessment of risks relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[6]; and

3.5 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

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

4.1 describe the key events of the 2015 fisheries[5];

4.2 describe the status of the stocks[7];

4.3 compare contemporary indices of abundance of salmon in the West Greenland fishery to historical estimates and suggest options for improving future estimates;

4.4 estimate the effects of modifying the timing of the West Greenland salmon fishery, including altering the start date, with regard to harvest and exploitation of contributing stocks;

4.5 advise on changes to temporal and/or spatial fishery patterns that may provide increased protection for weaker stocks;

*In the event that NASCO informs ICES that the Framework of Indicators (FWI) indicates that reassessment is required:**

4.6 provide catch options or alternative management advice for 2016 - 2019 with an assessment of risk relative to the objective of exceeding stock conservation limits, or pre-defined NASCO Management Objectives, and advise on the implications of these options for stock rebuilding[6]; and

4.7 update the Framework of Indicators used to identify any significant change in the previously provided multi-annual management advice.

Notes:

1. *With regard to question 1.1, for the estimates of unreported catch the information provided should, where possible, indicate the location of the unreported catch in the following categories: in-river; estuarine; and coastal. Numbers of salmon caught and released in recreational fisheries should be provided.*
2. *With regard to question 1.2, ICES is requested to include reports on any significant advances in understanding of the biology of Atlantic salmon that is pertinent to NASCO, including information on any new research into the migration and distribution of salmon at sea and the potential implications of climate change for salmon management.*
3. *With regards to question 1.3, NASCO is particularly interested in case studies highlighting successes and failures of various restoration efforts employed across the North Atlantic by all Parties/jurisdictions and the metrics used for evaluating success or failure.*
4. *In response to question 1.4, ICES is requested to review and update the findings of the ICES/NASCO symposium on the impacts of aquaculture and the request for advice from OSPAR in June 2010.*
5. *In the responses to questions 2.1, 3.1 and 4.1, ICES is asked to provide details of catch, gear, effort, composition and origin of the catch and rates of exploitation. For homewater fisheries,*

the information provided should indicate the location of the catch in the following categories: in-river; estuarine; and coastal. Information on any other sources of fishing mortality for salmon is also requested. For 4.1 ICES should review the results of the recent phone surveys and advise on the appropriateness for incorporating resulting estimates of unreported catch into the assessment process.

6. *In response to questions 2.5, 3.4 and 4.6, provide a detailed explanation and critical examination of any changes to the models used to provide catch advice and report on any developments in relation to incorporating environmental variables in these models.*
7. *In response to question 4.2, ICES is requested to provide a brief summary of the status of North American and North-East Atlantic salmon stocks. The detailed information on the status of these stocks should be provided in response to questions 2.3 and 3.3.*

* **The aim should be for NASCO to inform ICES by 31 January of the outcome of utilising the FWI**

Attendees:
Konstantin Drevetnyak, (NEAC, manager representative)
Peder Fiske (NEAC, scientist representative)

Tony Blanchard (NAC, manager representative)
Tim Sheehan, (NAC, scientist representative)

Katrine Kaergaard (WGC, manager representative)
Ted Potter (WGC, scientist representative)

Ian Russell (ICES representative, Observer)

Patrick Gargan Coordinator

New questions, originator:

- 1.4, Norway
- 1.5, EU
- 2.4, EU
- 4.3, WGC
- 4.4, NGOs

Annex 13

CNL(15)12

Report of the Meeting of the Implementation Plan/Annual Progress Report Review Group

Hotel Nine Zero, Tremont Street, Boston MA, USA
14 and 15 April 2015

1. Opening of the Meeting

1.1 The Review Group nominated Mr Ted Potter (EU) to chair the meeting. He noted that the main task before the Review Group was to evaluate the 2015 Annual Progress Reports (APRs) to ensure that Parties/jurisdictions had provided a clear account of progress in implementing the actions detailed in their Implementation Plans (IPs) and the additional information required under the Convention. The Council had requested that the APRs be submitted by 1 April 2015, and the Group was advised that most, but not all, Parties/jurisdictions, had been able to meet this deadline. The Chair reminded the members of the Group that they had been appointed to represent NASCO and not their Party/Organisation. He noted that the Review Group would also need to decide on arrangements for presentation of its report to the Council and confirm the arrangements for the 2015 Theme-based Special Session on the topic of '*Maintaining and improving river connectivity with particular focus on impacts of hydropower*'.

1.2 The members of the Review Group are Paddy Gargan, Katrine Kaergaard, Paul Knight, Ted Potter, Rory Saunders and Sue Scott. The NASCO Secretary coordinated the arrangements but was unable to attend the meeting itself.

2. Adoption of the Agenda

2.1 The Review Group adopted its agenda, IP(15)2 (Annex 1), after including a new item 7 'Recommendations for the third round of Implementation Plans'.

3. Review of the Terms of Reference and Consideration of Working Methods

Implementation Plans

3.1 The Council had agreed (see CNL(12)44) that the purpose in evaluating the IPs is to ensure that, as far as possible, they provide a fair and equitable account of the actions that each jurisdiction intends to take to implement NASCO's Resolutions and Guidelines. Most of the IPs had been reviewed prior to NASCO's Thirtieth (2013) Annual Meeting. The Review Group had been asked by the Council to assess each response to the questions in the IP template as: 'satisfactory answers/information' (assigned a score of 1); 'unclear or incomplete answers/information' (assigned a score of 2); and 'clear omissions or inadequacies in answers/information' (assigned a score of 3). Where the Review Group had considered that IPs contained answers in categories 2 or 3, these had been returned to the Party/jurisdiction with guidance on how the Group considered the IP should be improved. Re-submitted plans were then re-evaluated to

determine whether the areas highlighted had been addressed. Where clear omissions or inadequacies (i.e. scores of 3) remained, these had been highlighted in the Group's 2013 and 2014 reports to the Council, CNL(13)12 and CNL(14)11.

Annual Progress Reports (APRs)

3.2 The primary purpose of APRs is to provide details of:

- any changes to the management regime for salmon and consequent changes to the IP;
- actions that have been taken under the IP in the previous year;
- significant changes to the status of stocks, and a report on catches; and
- actions taken in accordance with the provisions of the Convention.

3.3 The Council had agreed (see CNL(12)44) that the purpose of the evaluation of the APRs is to ensure that Parties/jurisdictions have provided a clear account of progress in implementing and evaluating the actions detailed in their IPs and have provided the information required under the Convention. Where the Review Group identified shortcomings, it had been asked to develop a list of questions to be sent to the Party/jurisdiction concerned. In 2014, Parties/jurisdictions had responded to the Review Group's questions at the Annual Meeting and had provided written responses to the questions after that meeting. However, for the 2015 review, the Council had agreed that Parties/jurisdictions should provide written responses to the questions in advance of the Annual Meeting so that these could be distributed and discussed during a Special Session of the Council to be held during the Thirty-Second Annual Meeting.

Working Methods

3.4 The Review Group adopted the same working methods as it had adopted in 2013 and 2014. Further details are contained in the Group's 2013 and 2014 reports, CNL(13)12, and CNL(14)11, respectively. In summary, the Review Group adopted the following 'ground rules' in undertaking its 2015 evaluations:

(a) Initial reviewers were appointed for each APR (predominantly the same reviewers as for the IPs and 2014 APR evaluations) and asked to lead the discussion within the Group and to produce an initial evaluation of each APR. This included an assessment of progress against each of the actions in the IP and the reporting on: new initiatives or achievements for salmon conservation and management; stock status and new factors affecting salmon abundance; catch statistics; and the additional information required under the Convention;

(b) In reporting the evaluations, the initial reviewers remained anonymous but in the event that one or more members of the Review Group did not agree with a particular aspect or aspects of the evaluation, the report would indicate that there were dissenting views but not disclose which members of the Group expressed the dissenting views unless they wished to be identified;

(c) The Group drew on information in the IPs, but commented only on the information presented in the APRs;

(d) Because not all Parties/jurisdictions were represented on the Group, it was agreed that a member of the Review Group from a NASCO Party/jurisdiction whose APR was being reviewed would not be present during the initial review

of that report. The members of the Group were appointed by the Council to represent NASCO, not their Party/Organisation.

3.5 For each APR, the Review Group assessed whether satisfactory responses had been provided on:

- any changes to the IP, new initiatives and significant changes in stock status;
- the provision of complete catch data;
- progress made on each action; and
- other returns required under the Convention.

3.6 When all evaluations were complete, a consistency check was undertaken of all the assessments. As with the 2014 review, the template used for the evaluations provided a general assessment of the APR, a more detailed commentary on progress on each of the actions (relating to management of salmon fisheries, habitat protection and restoration, and aquaculture and related activities) and a list of questions to be sent to the Parties/jurisdictions for response, in writing, prior to the Annual Meeting.

4. Progress report on receipt of Implementation Plans and evaluation of any new IPs

Implementation Plan Evaluations prior to the 2014 Annual Meeting

4.1 In its report to the Council's Thirty-First (2014) Annual Meeting, the Review Group had noted that it had reviewed 17 IPs and of these 10 were considered to be satisfactory. The Group had emphasised that a score of '1' simply meant that a satisfactory answer/information had been provided and it did not mean that the Party/jurisdiction concerned was necessarily meeting NASCO guidelines or agreements. In some cases, responses were considered to be satisfactory even when the response was incomplete, provided that an action had been identified to begin to address any major shortcoming.

4.2 The Review Group had considered that the following IPs contained clear omissions or inadequacies: Canada; Denmark (in respect of the Faroe Island and Greenland) - Faroe Islands; EU - Spain (Asturias); EU - Spain (Cantabria); EU - Spain (Galicia); EU - UK (Scotland); and the Russian Federation. For these Parties/jurisdictions, the Review Group had noted that it was clear that providing quantitative data to demonstrate progress towards the international goals for sea lice and containment (questions 4.2 and 4.3 in the IP template, respectively) was challenging. However, the Group had expressed the opinion that the IPs for all Parties/jurisdictions with salmon farming should present quantitative data in a transparent manner to demonstrate progress towards the international goals for sea lice and containment rather than describing only the management measures in place. The Group had recommended that this aspect should be addressed through the APRs or, if that was not feasible, prior to the start of the next IP cycle.

4.3 The Review Group had noted that, in the case of the Faroe Islands, there are no self-sustaining wild salmon stocks to protect from aquaculture related impacts, but the IP recognises that wild stocks from other countries migrate into the Faroese zone and that there is a need for measures consistent with NASCO agreements. It also noted that the IP for the Russian Federation refers to the development of new legislation in relation to aquaculture including measures to protect the wild stocks. This legislation has since entered into force but the Group did not know if this will provide a mechanism for provision of such information in the future.

Implementation Plan Evaluations since the 2014 Annual Meeting

4.4 Since its 2014 report to the Council, the Review Group had evaluated a new IP from EU - Spain (Navarra), CNL(14)77. This new plan was considered by the Review Group to be satisfactory.

4.5 At its 2014 Annual Meeting, the Council had asked that where a Party/jurisdiction had changed its IP, it should send the revised IP to the Secretariat no later than 1 December each year. The Review Group noted that revised IPs had been provided by Canada, CNL(14)73, EU - Germany, CNL(14)70, EU - UK (England and Wales), CNL(14)71, EU - UK (Northern Ireland), CNL(14)69, EU - UK (Scotland), CNL(14)76, Norway, CNL(14)74, and the United States, CNL(14)75. The Review Group did not re-evaluate these IPs but it noted that the changes made in revising IPs ranged from minor editorial changes to the inclusion of a new action (EU - Germany) and the removal of an action (United States).

4.6 It is the Council's intention that IPs apply for a period of five years (2013 - 2018), and generally require no annual modification unless circumstances change significantly. The Review Group noted that the template used in the updated IP for EU – UK (Scotland) had been modified for some, but not all, actions to allow for progress to be reported. The Group reiterates that the Council's intention is that progress is reported through the APRs and not in updating the IPs, not least because the IPs are not re-evaluated and any progress included in the IP but not in the APR would not be included in that evaluation.

4.7 Those IPs that had previously been identified to contain clear inadequacies or omissions (as listed in paragraph 4.2 above) and which had been updated in 2014 (i.e. Canada and EU - UK (Scotland)) were checked to see if any new information had been provided that would affect the Group's assessment and lead to a satisfactory evaluation. This was not the case.

Jurisdictions not submitting Implementation Plans

4.8 At the time of the Review Group's meeting, no IPs had been received for EU - France and EU - Portugal although it is understood that a Plan for EU - France is under preparation. The continuing lack of IPs for these two jurisdictions is a concern to the Review Group, particularly as it is now approximately half way into the second reporting cycle. Given the significant challenges facing salmon managers in the southern part of the species' range, it is important that these jurisdictions report on the measures being taken to safeguard the resource. Notwithstanding this shortcoming, the Review Group remains of the opinion that, overall, the 2013 - 2018 IPs are an improvement over those provided in the first cycle, not least because they include measurable outcomes and the amount of information provided was more amenable to evaluation. Furthermore, the Group welcomes the progress made by some jurisdictions in contributing to this reporting process for the first time. However, the Group believes that there is scope for further improvements to address the aims of the NASCO 'Next Steps' process and has developed some suggestions for the next reporting cycle in section 7 below.

5. Evaluation of the 2015 Annual Progress Reports and development of feedback to the Parties/jurisdictions

Overview of the 2014 Annual Progress Report Evaluations

5.1 Last year, the Review Group had noted that, as it was the first year of reporting through APRs, some teething problems were to be expected. Overall, however, the reporting had worked well; generally the 2014 APRs were submitted on time and the template ensured that the amount of information provided, particularly when compared to the previous Focus Area Reports, was amenable to review and was better focused on outcomes of actions to address particular threats/challenges identified in the IPs. Some APRs had provided very limited information on which to assess progress and some information had not been presented in the appropriate sections of the template. The Review Group had suggested, and the Council had agreed, to some changes to the template that were intended to further enhance reporting in the 2015 and subsequent APRs. In particular, the APR template had been changed to read 'Progress on Action to Date' rather than 'Monitoring/Enforcement Results' and clarification was provided to indicate that a brief overview with a quantitative measure of progress was being sought. The APR template had also been modified to indicate that information on stock status should be provided through the IPs every 5 years while section 2.1 of the APR should only briefly highlight any significant changes that might have occurred since the IP was prepared or updated. Clarification had also been provided to indicate that the 'Description of Actions' or 'Expected Outcomes' should remain as submitted in the IP and that these would be included in the APR template by the Secretariat. Changes had also been made to 'Current Status of Action (e.g. 'Not Started', 'Ongoing', 'Completed')' to clarify that a one or two word answer is expected and to indicate that 'Achieved objective?' should only be completed in the template where an action had been completed.

2015 Annual Progress Report Evaluations

5.2 The revised APR template, incorporating the changes referred to in paragraph 5.1 above, had been issued to all Parties/jurisdictions by the Secretariat on 9 January 2015. The Council had asked that the APRs be completed and returned to the Secretariat by 1 April 2015 for critical evaluation by the Review Group. As requested by the Council, the Secretariat had included in the APR template for each Party/jurisdiction the 'Description of Actions' and 'Expected Outcomes' as contained in the IPs. The Review Group was advised that some Parties/jurisdictions had made changes to these fields in completing the APR template resulting in differences between the APR and the IP. The Review Group, therefore, recommends that in future, the Secretariat be asked to make these fields in the template non-editable before issuing the template to the Parties/jurisdictions for completion.

5.3 Where the Review Group considered that there were shortcomings in an APR, the Council had requested that it develop a list of questions to be sent to the Party/jurisdiction concerned by 1 May. The Review Group agreed that the questions should be sent to the Parties/jurisdictions by the Secretary as soon as possible after its meeting and that each Party/jurisdiction should be asked to respond in writing to these questions no later than 15 May so that the responses can be circulated prior to, and discussed at, the Special Session scheduled to be held during the 2015 Annual Meeting.

5.4 Sixteen APRs were submitted prior to, or shortly after, the deadline of 1 April. Two further APRs were received either immediately before (Russian Federation) or during (Canada) the Review Group's meeting, approximately two weeks after the deadline for submission. The Review Group evaluated the following APRs:

Party/jurisdiction	**Document No.**	**Date received by Secretariat**
Canada	CNL(15)38	14/04/2015
Denmark (in respect of the Faroe Islands and Greenland) – Faroe Islands	CNL(15)31	31/03/2015
Denmark (in respect of the Faroe Islands and Greenland) - Greenland	CNL(15)28	30/03/2015
EU - Denmark	CNL(15)35	27/03/2015
EU - Finland	CNL(15)33	02/04/2015
EU - Germany	CNL(15)21	20/03/2015
EU - France		
EU - Ireland	CNL(15)36	02/04/2015
EU - Portugal		
EU - Spain (Asturias)	CNL(15)23	27/03/2015
EU - Spain (Cantabria)	CNL(15)24	27/03/2015
EU - Spain (Galicia)	CNL(15)25	27/03/2015
EU - Spain (Navarra)	CNL(15)26	27/03/2015
EU - Sweden	CNL(15)22	23/03/2015
EU - UK (England and Wales)	CNL(15)27	27/03/2015
EU - UK (Northern Ireland)	CNL(15)29	30/03/2015
EU - UK (Scotland)	CNL(15)34	02/04/2015
Norway	CNL(15)30	31/03/2015
Russian Federation	CNL(15)37	13/04/2015
United States	CNL(15)32	31/03/2015

5.5 The Review Group's evaluations of these APRs are contained in document IP(15)3 (Annex 2). The Review Group noted that while the clarification made to the reporting template had further improved the consistency of the reporting, several Parties/jurisdictions' APRs had not provided a clear account of progress in implementing and evaluating some or all of the actions detailed in their IPs as had been requested by the Council. These reports either included one or more gaps in the 'Progress on Action to Date', or the comment provided bore no relationship to the proposed action. Those APRs that the Review Group considered provided a clear and comprehensive report of progress on all ongoing and completed actions are listed in the table below:

Party/jurisdiction	Document No.
Canada	CNL(15)38
Denmark (in respect of the Faroe Islands and Greenland) - Greenland	CNL(15)28
EU - Germany	CNL(15)21
EU - UK (England and Wales)	CNL(15)27
Norway	CNL(15)30
Russian Federation	CNL(15)37

5.6 The Review Group prepared a summary table (Table 1 below) to provide an overview of the number of actions in each IP/APR, the progress with their implementation and the extent to which that progress was reported (i.e. Not started, Ongoing (with clear progress report), Ongoing (without clear progress report), Completed (with clear progress report), Completed (without clear progress report)) for each Party/jurisdiction. This table should be interpreted with care taking account of the explanatory footnotes.

5.7 The Review Group noted that a number of Parties/jurisdictions reported some interesting and useful developments towards addressing NASCO's Resolutions, Agreements and Guidelines, including:

- Canada: The establishment of a Ministerial Advisory Committee on Atlantic Salmon to make recommendations on addressing low returns of Atlantic salmon on the East coast of Canada;
- EU - UK (England and Wales): The introduction of a ban on stocking salmon in Wales;
- EU - Finland, EU - UK (Northern Ireland) and the Russian Federation: Significant advances in developing river specific conservation limits;
- EU - Germany: plans to establish a separate locally adapted indigenous salmon population in tributaries of the Rhine in North Rhine Westphalia;
- EU - UK (Scotland): the completion of an independent review of the management of salmon and freshwater fisheries and launch of a public consultation on statutory measures to introduce a licensing system for killing wild salmon with associated carcass tagging;
- EU - Sweden: Ongoing work to establish criteria for best available technology for hydropower generation (scheduled for completion in 2015);
- Norway: A new regulation putting the responsibility on the aquaculture industry to fund and organize recapture of escaped salmon through a mandatory fee on each licence;
- USA: the transition to measurable survival standards at hydro-electric dams within the freshwater range of endangered salmon in Maine.

5.8 The Review Group noted that evaluating the progress made on actions was very difficult when the descriptions of the planned actions in the IP were vague or imprecise. The Review Group had previously highlighted such shortcomings in some of the IPs but not all of these had been improved. The Review Group has, therefore, noted this difficulty in its evaluation of some of the APRs.

5.9 The Review Group had previously asked that the APRs should not rely on links to information on the internet to report progress on an action, but such links had still been included in a number of the 2015 APRs. While such links may be helpful in providing additional information, the APR itself should provide a brief, stand-alone summary of the progress made.

5.10 The Review Group noted that a number of the 2015 APRs had provided similar information to that provided in 2014 even when the Review Group had sought clarification or further detail. When preparing future APRs, Parties/jurisdictions are reminded to take account of any previous questions asked by the Review Group to ensure that the reported progress is clear.

5.11 Overall, the Review Group considered that the most common fault with the information provided on progress with actions was a lack of quantitative information on what has been achieved and/or what the results have been. All Parties/jurisdictions are asked to address this in future APRs. The Review Group noted some examples of good practice in this respect, including: the detailed summary of enforcement activities provided by Canada (Action F4); and the clear and concise information on enforcement and log book returns provided by EU - Ireland (Actions F1 and F2).

5.12 All the evaluations of the 2015 APRs were agreed unanimously by the Review Group.

Parties/jurisdictions not submitting APRs

5.13 The Review Group welcomes the improvement in the number of Parties/jurisdictions submitting an APR and the timeliness of reporting. However no APRs (or IPs) had been received from EU - France or EU - Portugal by the time the Group met to undertake its evaluations. This is a serious concern to the Group because the purpose of IPs and APRs is to provide a simple and transparent approach for reporting on the implementation of NASCO's Resolutions, Agreements and Guidelines as agreed under the 'Next Steps' process and on actions taken in accordance with the Convention. The current IPs cover the period 2013 - 2018 so the 2015 APRs represent close to the mid-point of the reporting cycle. Furthermore, the APRs for Canada and the Russian Federation were received well after the deadline (see 5.4 above) leaving little time for their evaluation. Timely reporting is important if the evaluation process is to be thorough and consistent.

6. Arrangements for presenting the Group's report to the Council

6.1 The Review Group agreed that the Chairman would present its report to the Council during the Special Session at the Thirty-Second Annual Meeting. The Group agreed that this should briefly summarise the Group's working methods and provide an overview of the evaluations in terms of completeness and timeliness of reporting and progress to date. The circulation of the responses to the Group's questions ahead of the Annual Meeting should facilitate a richer discussion at the meeting involving all Parties and NGOs.

7 Recommendations for the third round of Implementation Plans

7.1 The Review Group discussed shortcomings in the process for developing actions under the IPs and reporting progress in the APRs that the Group thought should be considered in the preparation for the next cycle of reporting. In this regard, the Review Group noted that many of the actions that were planned by Parties/jurisdictions had been vague or unclear making it difficult to assess progress. In other cases, actions had little bearing on NASCO agreements or guidelines, even when the Party/jurisdiction was not abiding by the terms of the agreements and guidelines. The Review Group suggested that, within the next round of IPs, it may be necessary to include specific topic areas on which Parties/jurisdictions would be expected to provide an action if they do not demonstrate that they were fully compliant with NASCO agreements and guidelines.

7.2 The Review Group had previously noted the difficulty in assessing progress on actions that are unclear or imprecise. Greater efforts should be made in the next round of IPs to ensure that all actions are clearly and concisely described. Any IPs that do not do so should not be accepted by the Review Group but returned to the Party/jurisdiction for revision.

7.3 The Review Group has noted particular problems with obtaining information from some Parties/jurisdictions with marine salmon farms to demonstrate progress towards NASCO's international goals for sea lice and containment. There may be a need to include some standard questions in the template for the next round of IPs with a view to ensuring that such information is provided by all Parties/jurisdictions with marine salmon farms.

8. Arrangements for the Theme-based Special Session

8.1 At the Thirty-First Annual Meeting of NASCO, in order to improve information exchange on a chosen topic, the Council had held its first Theme-based Special Session. The programme for this session, on the topic of '*Management of single and mixed stock fisheries, with particular focus on stocks below their conservation limit*', had been developed by a Steering Committee that had also organised and chaired the session and prepared the report. The Council had recognised that in view of the excellent exchanges during the 2014 session it would hold another Theme-based Special Session during the 2015 Annual Meeting. The Review Group had been asked to identify a topic and develop the Programme.

8.2 On the basis of its evaluations of the 2014 APRs, the Review Group had noted that a number of Parties/jurisdictions have concerns about the increase in applications for 'run of the river' hydro-electric installations in salmon rivers and had recommended that the Council consider this issue as a topic for a future Theme-based Special Session. Accordingly, the Review Group had agreed that the topic for the 2015 Theme-based Special Session should be '*Maintaining and improving river connectivity with particular focus on impacts of hydropower*' and a Programme has been developed, CNL(15)14. The Review Group discussed the chairing and conduct of the Theme-based Special Session and agreed that it would be useful to prepare a publication of the presentations and discussions as had been done for the 2014 session.

8.3 The Review Group noted that guidance had already been sent to the Parties/jurisdcitions relating to the information that they should prepare for the Theme-based Special Session. For those Parties/jurisdictions making presentations, written contributions had been requested by 30 April 2015. The Review Group agreed that these reports should be included in the final report, along with a synthesis of best practice and helpful guidance.

8.4 The Review Group also proposed that time for questions during the Special Session itself should be carefully orchestrated by the Group. It was agreed that the time available after each presentation should be used to seek comments from other Parties/jurisdictions addressing similar issues to the speaker. It was further agreed that the final discussion should be structured around the three objectives of the session, with questions targeted at key Parties/jurisdictions. Approximately 15 minutes should be spent on each of the session objectives, which are to review and share best practice on the approaches taken by NASCO Parties/jurisdictions to:

1. balance the pressures to refurbish existing and install new obstructions against the potential impacts on river connectivity, with particular reference to hydropower developments;
2. mitigate the impacts of existing obstructions, including hydropower schemes, on salmon populations; and
3. evaluate the benefits and costs of removing dams and other obstructions.

8.5 The Review Group agreed that the main output from the Theme-based Special Session should be a comprehensive document that highlights best practice. It was agreed that all Parties/jurisdictions should be reminded by the Secretary before the Annual Meeting that they may be asked to respond to questions during the Theme-based Special Session. They should also be requested to provide brief written answers to the following questions, as detailed in the programme, by 31 August so that these could be included in the report of the session:

- describe arrangements in place for consultation and information exchange among relevant agencies and stakeholders in relation to hydropower developments;
- indicate, briefly, work underway to improve the evidence base relating to fish passage;
- describe how conservation of productive capacity is taken into account in evaluating options for hydropower developments;
- where hydropower developments are approved, on the basis of overriding socio-economic factors, describe how any losses of productive capacity are minimised and compensation or mitigation measures agreed so that there is no net loss of productive capacity;
- highlight any examples of initiatives to improve fish passage, with particular reference to hydropower developments, which involve collaboration between governments and other stakeholders.

8.6 The Review Group agreed that all members of the Group should be involved in managing the session (e.g. one for the introduction, two to chair the two presentation sessions, two to lead the final discussion and one to present the concluding remarks).

9. Report of the Meeting

9.1 The Review Group agreed a report of its meeting.

10. Any other business

10.1 There was no other business.

11. Close of the Meeting

11.1 The Chair thanked the members of the Review Group for their contribution to the meeting and wished them a safe journey home. He undertook to liaise with the Secretary so that the Group's questions for the Parties/jurisdictions could be sent out at the earliest opportunity.

Table 1: Summary overview of progress on the actions reported in the APRs

		Denmark (in respect of the Faroe Islands and Greenland)		European Union															
	Canada	Faroe Islands	Greenland	Denmark	Finland	France	Germany	Ireland	Portugal	Spain - Asturias	Spain - Cantabria	Spain - Galicia	Spain - Navarra	Sweden	UK - England & Wales	UK - Northern Ireland	UK - Scotland	Norway	Russian Federation	USA
Actions Related to the Management of Salmon Fisheries																				
F1	OG	OG	OG	OG-NP	OG		OG	OG		OG-NP	NS	NS	NS	OG	OG	OG	OG	OG	OG	OG
F2	OG		OG	OG-NP	OG		OG	OG		OG-NP	NS	NS	OG	OG	OG	OG	OG-NP	OG	OG	OG
F3	OG			OG-NP				OG			NS	OG-NP	OG	OG	OG	OG-NP	OG	OG	OG	OG
F4	OG										NS	OG	OG	OG	OG	OG-NP	OG	OG	CD	
F5	OG										OG			OG	OG		OG-NP			
F6														OG						
F7														NS						
F8														OG						
F9														OG						
F10														OG						
F11														OG						
Actions Related to Habitat Protection and Restoration																				
H1	OG		OG	OG-NP	OG-NP		OG	OG		OG-NP	NS	NS	NS	OG-NP	OG	OG	OG-NP	OG	OG	OG
H2	OG			OG-NP			OG	OG		OG-NP	OG	OG-NP	NS	OG	OG	OG-NP	OG-NP	OG	OG	OG
H3	OG			OG-NP			OG	OG		CD-NP	NS	OG		OG	OG	OG	OG-NP	OG		OG-NP
H4								OG-NP			NS	OG		OG	OG	OG	OG-NP	OG		OG
H5														OG		OG				
H6																OG				
Actions Related to Aquaculture and Associated Activities																				
A1	OG	OG			OG		OG	OG-NP			NS			OG	OG	OG	OG	OG	OG	OG
A2	OG				OG-NP		OG	OG-NP						OG	OG		OG-NP	OG	OG	OG
A3	OG							OG							OG		OG-NP	OG	OG	OG
A4	OG																	OG		OG-NP

Key: *NS = Not Started; OG = Ongoing - with clear progress report; OG-NP = Ongoing - without clear progress report; CD = Completed - with clear progress report; CD-NP = Completed - without clear progress report.*

Note: *The table above is intended to show for each Party/jurisdiction which actions in the Implementation Plan have been initiated and are ongoing, which have yet to commence, and which are completed. It should be noted that the Implementation Plans specify the planned timescales for implementing the actions and these will differ, with not all scheduled to commence in 2013 and some continuing beyond 2018. The scope of the work under each action will also differ. In some cases, an action to address a particular threat/challenge might comprise a number of different elements and although the action is shown as ongoing it does not mean that all elements have commenced or conversely that some are not completed. Some actions that are shown as ongoing were reported as completed for 2014 but are scheduled to occur annually during the period of the Implementation Plan. There is also a wide range in the number of actions in each Implementation Plan.*

IP(15)2

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Review of the Terms of Reference and Consideration of Working Methods
4. Progress report on receipt of Implementation Plans and evaluation of any new IPs
5. Evaluation of the 2015 Annual Progress Reports and development of feedback to the Parties/jurisdictions
6. Arrangements for presenting the Group's report to the Council
7. Recommendations for the third round of Implementation Plans
8. Arrangements for the Theme-based Special Session
9. Report of the Meeting
10. Any other business
11. Close of the Meeting

IP(15)3

Evaluation of Annual Progress Reports and Questions from the Review Group to Parties/jurisdictions

Canada, CNL(15)38

The APR notes a marked difference in the salmon returns to the Maritime provinces and Quebec, where they were generally very poor in 2014, and to Newfoundland and Labrador where they were generally very good, although the Review Group was aware that the return estimates for Labrador were based on a single index river. The APR provides catch data for the in-river, estuarine and coastal fisheries with full details of unreported catches and catch and release. In December 2014, Canada announced the creation of a Ministerial Advisory Committee on Atlantic Salmon to make recommendations on addressing low returns of Atlantic salmon. Through the Recreational Fisheries Conservation Partnerships Program, $2.1 million was contributed to 68 projects relating to Atlantic salmon.

The Implementation Plan identifies 12 proposed actions but, as previously reported by the Review Group, the precise activities that were planned are unclear, making it difficult to evaluate the progress made. Nevertheless, the APR provides clear and detailed reports on most of the areas covered.

Actions related to management of salmon fisheries: A scientific review of limit reference points and approaches for establishing the other reference points is underway and is expected to be published in summer 2015 and a number of new measures have been introduced with the aim of reducing recreational harvests in New Brunswick, Nova Scotia and Quebec to sustainable levels (Action F1). New Aquatic Invasive Species Regulations are expected to be put in place in 2015 (Action F2). Liming has continued on the West River, Nova Scotia (funded by the Atlantic Salmon Federation and Nova Scotia Salmon Association) and has resulted in increased pH and smolt production (Action F3). Very useful data have been provided on enforcement activities undertaken in 2014, and the establishment of a new National Fisheries Intelligence Service is expected to enhance this work (Action F4). Measures are already in place to restrict by-catch of salmon, and the implementation of these is continuing (Action F5).

Actions related to habitat protection and restoration: Specialised review teams have been established under the Fisheries Protection Program (FFP) to manage specific activities that impact salmon, and significant funding has been provided under three federal programs to provide ongoing support to conservation and enhancement activities (Action H1). Guidelines are being prepared on pipeline watercourse crossings, transportation watercourse crossings, large and medium water intakes and marine and coastal infrastructure to support the development of performance-based standards (Action H2). Inter-jurisdictional discussions and collaborative activities are ongoing, but no new agreements have been struck (Action H3).

Actions related to aquaculture and associated activities: New Aquaculture Activities Regulations (AAR) have been developed to clarify conditions under which aquaculture operators may treat their fish and deposit organic matter. A bay management area plan was adopted for Newfoundland and Labrador in 2014 (Action A1). New Brunswick has revised its

Governance Framework for Containment and plans to make the necessary regulatory changes in 2016, and the Newfoundland and Labrador Code of Containment was updated in 2014 (Action A2). Canada's National Code on Introductions and Transfers of Aquatic Organisms was reviewed and updated in 2013 and continues to be implemented (Action A3). Canada has previously decided to permit the commercial production of transgenic Atlantic salmon in contained facilities; in 2014, there were no known regulatory violations in relation to these activities (Action A4).

Questions for written response prior to the 2015 Annual Meeting:

1. *Given the very poor returns of large salmon in 2014 what actions are planned to implement measures to further protect these stock components in the Maritime provinces and Quebec (Action F1)?*
2. *In what way does the Policy for the Conservation of Wild Atlantic Salmon guide Canada's actions in relation to regulatory responsibilities for fisheries, habitat and aquaculture (Actions F1 and H3)? How is progress under the Policy reviewed?*
3. *When will the guidelines on pipeline watercourse crossings, transportation watercourse crossings, large and medium water intakes and marine and coastal infrastructure be delivered and what processes are being applied to manage these areas in the meantime (Action H2).*
4. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in a transparent manner in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Canada has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided? (Actions A1 and A2).*

Denmark (in respect of the Faroe Islands and Greenland) – Faroe Islands, CNL(15)31

There are no self-sustaining salmon populations in the Faroe Islands. The APR notes that there is interest in conducting a research fishery for salmon in the Faroes in support of development of a Risk Framework; any proposal will be discussed with NASCO Parties.

The Implementation Plan identifies only two proposed actions, and the APR reports on the progress made to address these in 2014.

Actions related to management of salmon fisheries: Action F1 indicates that the Faroe Islands will manage any salmon fishery through international cooperation and 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. Consistent with the advice from ICES, no salmon fishery was conducted by the Faroe Islands in 2014.

Actions related to habitat protection and restoration: Because of the small size of the Faroese rivers, there is no historic record of any natural wild salmon population in Faroese rivers. Since there are no self-supporting wild salmon stocks in Faroese rivers, there are no actions in the Implementation Plan relating to habitat protection and restoration.

Actions related to aquaculture and associated activities: The Implementation Plan indicates that 25 marine farms produced 77t of salmon in 2012. During 2014 monitoring and enforcement by the Faroese Veterinary Authority continued and the APR indicates that had there been an issue with regard to sea lice and containment, these matters would have been dealt with in accordance with the regulatory procedures. Rearing of transgenic salmon is not permitted under the Veterinary Law (Action A1).

Questions for written response prior to the 2015 Annual Meeting:

1. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. The Faroe Islands have not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided (Action A1)?*
2. *What are the regulatory measures in place in the Faroes to combat potential sea lice in salmon farms (e.g. treatment threshold levels, fallowing, single year class stocking, etc (Action A1))?*

Denmark (in respect of the Faroe Islands and Greenland) – Greenland, CNL(15)28

The APR provides catch data for the calendar year 2014, which was the highest in recent years. The Review Group notes that the same estimate of unreported catch has been provided by Greenland since the 1990s (not by ICES as indicated in the APR). However, the APR indicates that a phone survey has been conducted to increase awareness among fishermen of the need to report additional information for the 2014 fishery and to assist the licensed fishermen in correctly reporting the new information required; the Review Group welcomed this development and looks forward to presentation of the findings.

The Implementation Plan identifies three actions and the APR describes progress on each of these.

Actions related to management of salmon fisheries: A new reporting system was implemented in 2012 that requires that effort data are provided (number of nets, net type, hours fished); a phone survey was conducted by the GFLK in an effort to improve the reporting for 2014 and this has increased awareness of the way to complete the reporting forms. A similar phone survey is planned after the 2015 season (Action F1). In 2012 and 2013, a quota of 35t was set for landings to fish factories; this quota is reviewed and revised as necessary in the light of catches and biological data; in 2014 the quota was reduced to 30t because the previous quotas had not been fully utilised and in the light of the ICES advice (Action F2).

Actions related to habitat protection and restoration: There is only one salmon river in Greenland, the Kapisillit River, and a protection plan is under development for the entire river including the estuary in order to safeguard it from pollution, development of agriculture and gill netting (Action H1). The APR indicates that a report identifying areas that should be protected as part of the biodiversity strategy has been completed but the process has been delayed by the Government elections in the autumn of 2014. The work is expected to resume in 2015.

Actions related to aquaculture and associated activities: There is no aquaculture in Greenland and consequently there are no proposed actions in the Implementation Plan.

Questions for written response prior to the 2015 Annual Meeting:

1. *Based on the initial results from the phone survey, is it possible to provide an indication of the accuracy of reported and unreported catches (Action F1)?*

European Union - Denmark, CNL(15)35

The APR provides catch data for the in-river, estuarine and coastal fisheries and indicates that Denmark is seeking to increase salmon production by 25% by 2020.

The Implementation Plan identifies six proposed actions, but no information has been provided in the 2015 APR on any progress made with these.

Actions related to management of salmon fisheries: Denmark has a national cormorant plan to regulate recruitment of cormorants where predation on salmonids is perceived to be a problem, (Action F1). Action F2 refers to an evaluation of by-catch of salmon and sea trout in the Ringkøbing Fjord. Action F3 relates to the development of more reliable reference points for four wild salmon stocks. No progress has been reported on these three planned actions.

Actions related to habitat protection and restoration: There are three actions in the IP that involve an evaluation of the benefits of removing obstructions in rivers (Action H1), general habitat restoration work (Action H2), and identification and quantification of spawning and nursery habitats that can be opened (Action H3). No progress has been reported on these three planned actions.

Actions related to aquaculture and associated activities: No actions were proposed in the Implementation Plan.

Questions for written response prior to the 2015 Annual Meeting:

1. *What action has been taken to regulate recruitment of cormorants on salmon rivers in Denmark in 2014 (Action F1)?*
2. *When is the research project on by-catch of salmon and sea trout in the Ringkøbing Fjord expected to report (Action F2)?*
3. *What was the result of the assessment under the new management plan 2013/2014 regarding whether reliable reference points can be established for Danish salmon rivers (Action F3)?*
4. *What progress has been made with removing the ~1,500 migratory obstructions referred to in the IP, and what benefits have been recorded to salmon and sea trout populations (Action H1)?*
5. *What progress has been made with restoring about 1,000 km of river, mostly smaller streams, from earlier canalisation, pipe-laying and dredging (Action H2)?*
6. *What progress has been made with identifying and quantifying spawning and nursery habitat that will be opened up (Action H3)?*
7. *What measures are planned to achieve the 25% increase in salmon production in Danish rivers by 2020 (Section 4.2)?*

European Union – Finland, CNL(15)33

The APR provides catch data and unreported catches for the in-river fisheries in Finland; catch and release is reported to be very low but no statistics are provided and it is not clear if reporting is required. The APR notes that this practice may increase in future in order to conserve stocks and the Review Group considers that it will be important to ensure that reporting procedures are in place if this is the case. An important achievement in Finland in 2014 has been the establishment of Conservation Limits for practically all populations of the tributaries and the main stem of the River Teno, providing a sound basis for stock assessments in support of management.

The Implementation Plan identifies only five proposed actions, but the APR provides very little information on the progress made to address them in 2014, despite some improvement compared to the 2014 APR. The Review Group again encourages more detailed reporting on progress against each action in the 2016 APR. For Action F2, progress has been reported in the 'Description of Action'.

Actions related to management of salmon fisheries: A new regulatory regime for the River Teno is being negotiated with Norway with a view to reducing fishing mortality where attainment of reference points is not achieved. The APR indicates that some progress has been made in defining common goals and in developing proposals for new regulations based on biological reference points but there have been delays in completing the agreement (Action F1). Conservation Limits have been established for 24 populations in the Teno stock complex, and attainment has been assessed for nine populations (an increase from five previously) and for the entire system (Action F2).

Actions related to habitat protection and restoration: The Implementation Plan indicates that there are only minor habitat issues in the Atlantic salmon rivers in Finland. The APR indicates that guidance has been issued to road constructors (Action H1).

Actions related to aquaculture and associated activities: A network of 24 disinfection stations has been set up, and training of the personnel at these stations and at fishing license sales points has been undertaken to prevent the spread of *Gyrodactylus salaris* (Action A1). Monitoring for the occurrence of escaped farm salmon originating in Norway continued in 2014, but, as in the 2014 APR, no results have been provided (Action A2).

Questions for written response prior to the 2015 Annual Meeting:

1. *The Review Group notes with concern that the timescale for development of a new agreement for the Teno River appears to be delayed, possibly by at least two years. What measures will be put in place to protect the stocks that are below their Conservation Limits until a new agreement is adopted (Action F4)?*
2. *When will complete river specific Conservation Limits be established for the all River Teno salmon stocks and when will these be made available to ICES for use in developing advice to NASCO (Action F2)?*
3. *Given that recommendations have been given to road constructors, what monitoring has been undertaken on the use of these recommendations and compliance of construction work with them (Action H1)?*

4. *What measures are taken to remove escaped farmed salmon from the River Teno when they are discovered in the monitoring programme (Action A2)?*

European Union – Germany, CNL(15)21

The APR highlights a number of important new developments in 2014, including the installation of fish protection devices on two hydropower plants and genetic studies to investigate the origin and diversity of stocks. In addition, a helpful and extensive summary of new factors and significant changes in stock status has been provided.

The Implementation Plan identifies seven proposed actions and the APR provides a clear and comprehensive report on the progress made to address them in 2014. Detailed supplementary information is provided in appendices to the APR. The APR has taken account of the Review Group's questions from 2014, although no estimate of unreported catch has been provided.

Actions related to management of salmon fisheries: Fishing has been prohibited in several zones and information campaigns targeted at fishermen in several federal states have been used since 2013 to reduce by-catches and illegal catches of salmon, but no data are provided on the extent of the problem; the Netherlands has been asked to examine fishing activities at the coast to ensure that salmon are not taken (Action F1). An interesting project is underway on part of the Agger river with the aim of developing a self-sustaining salmon population by gradually reducing the stocking (Action F2).

Actions related to habitat protection and restoration: An ambitious programme is underway to restore good fish passage at 250 barrages in federal waterways, and this will benefit salmon restoration in the rivers Rhine, Ems, Weser and Elbe; implementation is taking longer than anticipated, however planning of more than 30 projects had started by the beginning of 2015; one fishway is under construction and three have been completed and are being monitored (Action H1). A management plan for the Rhine containing a description of measures for migrating fish and a list of obstacles that will be modified by 2012 has been drafted, but no details have been provided (Action H2). There are plans to improve longitudinal connectivity at 116 sites on the river Elbe and its primary tributaries; it is expected that 35 sites (30%) will be completed by the end of 2015, 46 locations (40%) are in planning and the work on 26 sites has not yet begun (22%). No details of progress for 2014 have been provided (Action H3).

Actions related to aquaculture and associated activities: The Review Group noted with interest the plans to establish a separate locally adapted indigenous salmon population in tributaries of the Rhine in North Rhine Westphalia and the successful trial operation of the hatchery in 2014 (Action A1). Progress has been made concerning the harmonisation of the genetic monitoring of salmon in the Rhine catchment based on the approach developed under the SALSEA programme. The monitoring will continue (Action A2).

Questions for written response prior to the 2015 Annual Meeting:

1. *Reference is made to cormorant predation on downstream migrating smolts in the Rhine. Have any mitigation measures been considered (Section 2.2)?*
2. *What caused the slower than expected progress in implementing measures to improve fish passage in Actions H1 and H3?*

European Union – Ireland, CNL(15)36

The APR provides catch data for the river and estuary fisheries and details of the total unreported catch and catch and release. It also provides a detailed summary of the status of stocks and the stock forecasts and catch advice for 2015.

The Implementation Plan identifies ten proposed actions but, as previously reported by the Review Group, the precise activities that were planned for some actions are unclear, making it difficult to evaluate the progress made. Nevertheless, the APR provides clear and comprehensive reports on many of the areas covered and useful quantitative data are provided to demonstrate progress on monitoring programmes etc. The Review Group is keen to see more quantitative information provided in the APRs and therefore welcomes the information provided relating to fisheries and habitat. However, reports of progress on two actions relating to aquaculture are missing.

Actions related to management of salmon fisheries: Enforcement activities concerning illegal fishing in 2014 are well described including man hours spent, number of nets seized, number of on-the-spot fines issued and number of prosecutions (Action F1). Efforts are being made to improve catch reporting through the use of national carcass tagging and logbooks; the percentage of recreational fishermen that did report was lower than in 2013, but all anglers who do not return logbooks are written to and a proportion taken to court; an electronic licence application system is in place and 35% of anglers purchased licenses on line (Action F2). A national reporting mechanism for fish counter data and validation has been put in place in 2014 (Action F3).

Actions related to habitat protection and restoration: Improvement has been made concerning agricultural enrichment and initiatives to improve water quality through improved agricultural practices. The APR indicates that Ireland has virtually eliminated seriously polluted river sites, and 71% of Irish river channels are unpolluted (i.e. good status or higher), which is very positive (Action H1). The Forestry Act was passed into law in October 2014, and a GIS-based management system is being used to ensure that planting, felling and road building operations in forests are approved only following detailed environmental consultation with a range of public bodies and the general public (Action H2). The EPA has developed a National Inspection Plan to protect water quality and human health by using a two-strand approach of education and awareness strategies linked with a risk-based inspection process (Action H3). No progress has been reported in relation to reducing lice levels on salmon farms under Action H4.

Actions related to aquaculture and associated activities: No progress was reported in relation to preventing the escape of farmed salmon or on actions to recapture farmed salmon following escape events (Action A1) or on measures to reduce sea lice levels in farms (Action A2). *Neoparamoeba perurans* was detected in many marine farms, however early and repeated treatment kept mortality at a very low level; Pancreas Disease (PD) was diagnosed on a number of sites in 2014; and disease mitigation measures are in place on all sites in an effort to keep PD related loss to a minimum (Action A3).

Questions for written response prior to the 2015 Annual Meeting:

1. *To what extent was annual fallowing of sites, use of single generation sites, avoidance of partial lice treatments and harvesting remote from grower sites used in 2014 to reduce the potential impact of sea lice infestation at salmon farms (Action H4)?*
2. *How quickly were escape events reported by the farmers in 2014, how promptly were measures put in place to recapture a significant proportion of the stock and were these considered to have been successful (Action A1)?*
3. *How many times were lice thresholds exceeded and were any orders made to require early harvesting (Action A2)?*

European Union – Spain (Asturias), CNL(15)23

There are no salmon fisheries in estuaries or the sea but the APR provides catch data for the in-river fisheries. No catch and release data are provided but the response to a question in 2014 indicates it is 100% from mid to end July and unreported catch reported as negligible.

The Implementation Plan identifies five planned actions; the APR indicates that three of these are ongoing and two have been completed, but no progress has been reported on any action (compared to the 2014 APR when progress was described for five actions).

Actions related to management of salmon fisheries: Action F1 seeks to increase surveillance on rivers in order to decrease poaching and Action F2 aims to regulate river catches to avoid over exploitation. While both actions are described as ongoing, no progress reports have been provided.

Actions related to habitat protection and restoration: An annual programme of cleaning and maintenance of the ladders in mini plants and removing obstacles impeding the movement of salmon upstream has been completed for 2014 but no progress report has been provided (Action H1). An up-to-date inventory of river obstacles that impede passage in the river network has been completed, but no details have been provided (Action H3). Efforts to increase awareness of the effects of climate change on salmon at the southern limit of their distribution are ongoing but no report on progress has been provided (Action H2).

Actions related to aquaculture and associated activities: There are no actions relating to aquaculture in the IP, since as indicated in the APR, only local broodstock are used in hatcheries and there is no commercial aquaculture.

Questions for written response prior to the 2015 Annual Meeting:

1. *What progress has been made with increasing surveillance in order to reduce poaching (Action F1)?*
2. *What new measures have been introduced to regulate river catches in order to avoid overfishing (Action F2)?*
3. *What actions have been taken to clean and maintain fish ladders and remove obstacles impeding the upstream movement of salmon (Action H1)?*
4. *What action has been taken to increase public awareness of the risks of climate change to salmon stocks in Asturias (Action H2)?*
5. *How many obstacles to migration were identified in the inventory and what measures are planned to improve fish passage at these obstacles (Action H3)?*

European Union – Spain (Cantabria), CNL(15)24

There are no salmon fisheries in estuaries or the sea but the APR provides catch data for the in-river fisheries, including unreported catch and catch and release.

The Implementation Plan identifies 10 planned actions; the APR indicates that work has not started on eight of the actions and is ongoing on the other two (compared to work ongoing on four actions in the 2014 APR).

Actions related to management of salmon fisheries: Action F1 aims to reduce exploitation of MSW salmon and Action F2 relates to promotion of catch and release among stakeholders. Action F3 relates to the development of Conservation Limits and management targets, and Action F4 seeks to establish exploitation levels. No work has started on these four planned actions, but juvenile surveys have been undertaken on the index river (Action F5).

Actions related to habitat protection and restoration: The IP includes four actions: to improve fish passage by removing dams, removing culverts, installing fishways and upgrading road-stream crossings (Action H1); to conduct research on the impacts of hydropower and implement new regulations to require fish passage facilities (Action H2); to provide appropriate river flows by implementing sustainable abstraction programmes (Action H3); and to develop integrated catchment management to reduce land-use impacts (Action H4). No work has started on three of these planned actions. However, fish screen installation projects are ongoing at ten hydro-electric developments on two salmon rivers, Saja-Besaya and Asón (Action H2).

Actions related to aquaculture and associated activities: No work has started on the single planned action to regulate salmonid stocking by implementing and enforcing the existing and a proposed new stocking programme (Action A1).

Questions for written response prior to the 2015 Annual Meeting:

1. *The Review Group notes that all the actions in the IP were scheduled to commence in 2014. Progress was reported on four actions last year compared to only two in the 2015 APR. When will work commence on the majority of the planned actions?*
2. *What plans are there to initiate the collection of data from the index river on sea survival, run-timing, stock diversity and smolt and sea age (Action F5)?*
3. *When will results be available from the studies of fish screens at 10 hydroelectric developments on the rivers Saja-Besaya and Asón (Action H2)?*

European Union – Spain (Galicia), CNL(15)25

There are no salmon fisheries in the sea, but the APR provides catch data for the in-river and estuary fisheries. Unreported catch and catch and release is reported to be unknown.

The Implementation Plan identifies eight proposed actions; the APR indicates that work has not started on three of the actions but is ongoing on the remaining five. The APR indicates that a major initiative to re-organise the sport-fisheries on the river Ulla has been completed and that the stocking programme has continued on the rivers Sor and Anllóns (A Coruña province).

Actions related to management of salmon fisheries: Action F1 aims to develop Conservation Limits for, at least, the Rivers Eo and Ulla (Action F1). Action F2 involves working with the central government of Spain to develop fishing rules and undertake research in the River Miño. Neither of these planned actions has commenced. New reaches of the rivers Mera, Anllóns and Sor have been declared 'salmon areas' so as to afford a higher protection for parr, as natural baits are banned in these areas, although as this was reported last year it is not clear if there has been further progress (Action F3). The development of a Conservation/Restoration Plan for salmon rivers in the A Coruña province is nearly complete; stocking programmes have been initiated in the rivers Anllóns and Sor using fish from nearby rivers (Action F4).

Actions related to habitat protection and restoration: Action H1 relates to implementation of guidelines for the management of riparian vegetation. This planned action has not commenced. Several programmes related to implementation of the WFD are ongoing, but no details of progress to date have been provided (Action H2). Guidelines for the implementation of compensation flows in river basin management plans are under discussion (Action H3). As reported last year, three dams were removed in 2013 in the upper Eo river, and the river is now accessible to its historical limit; demolition of seven dams in the lower Ulla basin (related to the Margal-Ulla LIFE project) is due to begin next year (Action H4).

Actions related to aquaculture and associated activities: There are no actions relating to aquaculture in the IP.

Questions for written response prior to the 2015 Annual Meeting:

1. *When will Conservation Limits be established for the rivers Eo and Ulla, Masma, Mandeo and Lérez (Action F1)?*
2. *What progress has been made in cooperating with the central government of Spain in order to develop fishing rules and research on the salmon population of the River Miño?*
3. *When will criteria for management of riparian vegetation be developed (Action H1)?*
4. *What action has been taken to implement compensation flows under the guidelines of River Basin Management Plans (Action H3)?*
5. *What action was taken in 2014 to remove obstacles, construct fishways and improve accessibility (Action H4)?*

European Union – Spain (Navarra), CNL(15)26

The APR provides catch data for the in-river fisheries and there are no fisheries in estuaries or the sea. No data were provided for catch and release.

The Implementation Plan identifies six proposed actions; the APR indicates that work has not started on three of the actions but has been completed for 2014 on the other three.

Actions related to management of salmon fisheries: Due to lack of funding, work has not started on the development of reference limits for indicators of conservation status (Action F1). Biological data have been collected on rod caught salmon and monitoring of juveniles and smolts has been undertaken (Action F2). A TAC of 66 salmon was set for the rod fishery in 2014 based on the number of returning salmon over the last five years (Action F3). Broodstock collection and fry rearing and stocking (after marking) have been undertaken on the Bidasoa river and its tributaries in 2014 (Action F4).

Actions related to habitat protection and restoration: No work has started on the two planned actions to update salmonid mesohabitat maps (Action H1) and to improve river connectivity (Action H2).

Actions related to aquaculture and associated activities: There are no actions relating to aquaculture in the Implementation Plan.

Questions for written response prior to the 2015 Annual Meeting:

1. *When are Conservation Limits expected to be developed for salmon stocks in Navarra and, given that the stock status is considered unfavourable, on what basis is the TAC set (Action F1)?*
2. *When are the salmonid mesohabitat maps expected to be updated and how are assessments of the potential impacts of construction work undertaken without these data (Actions H2)?*
3. *Has the Life project been funded and if not what plans are there to evaluate the fishways and improve connectivity (Action H3)?*

European Union – Sweden, CNL(15)22

The APR provides complete catch data for the calendar year 2014. The APR indicates that the Swedish Government has initiated the development of a national plan for the conservation and management of both Atlantic and Baltic salmon, taking into account international agreements; the plan will be presented in Autumn 2015. New legislation was implemented in 2014 banning the use of gill nets for salmon fishing in coastal waters (depth >3 m), however catches did not decrease and the Swedish Agency for Marine and Water Management has filed a law suit against responsible fishermen.

The Implementation Plan identifies 18 proposed actions and the APR provides brief information on the progress made to address them in 2014. The APR indicates that work on only one action has not yet commenced (an improvement from six actions in the 2014 APR). However, the report is lacking in quantitative information on actions achieved.

Actions related to management of salmon fisheries: To reduce exploitation of wild fish, a new regulation setting a bag limit of two salmon per angler per day in the sea was introduced in 2014; preliminary surveys suggest increased recruitment in weak stocks (Action F1). A ban on gill net fishing in coastal waters deeper than 3m was introduced in 2014; there have been some initial problems with illegal fishing following introduction of the ban (Action F2). Fin clipping of reared salmon and trout has continued (167,665 in 2014) and allows wild and reared salmon to be distinguished (Action F3). Sampling began in 2014 in support of the establishment of a genetic baseline for salmon stocks with data analysis planned for late 2015; the baseline will allow identification of stocks in mixed-stock fisheries (Action F4). The index river Ätran/Högvadsån continued to be operated in 2014 for smolt and spawner census, and the 2014 run was above the fifteen year average (Action F5). Work in establishing Conservation Limits and management targets is progressing as planned and should be completed in 2015/16 (Action F6). Work in establishing in-river exploitation levels using tag returns and catch and effort data has not yet started due to lack of funding (Action F7). More detailed catch statistics are being sought, including information on catch and release and effort; a plan for collection of better catch statistics was prepared in 2014, but its implementation is lacking due to legal problems and the reporting from the non-commercial fishery being voluntary; further work is required and the project is ongoing (Action F8). Reducing over-exploitation of MSW fish in rivers through restrictions on landing large fish was not enforced in 2014, but further action is planned including providing information to sport fishing associations to reduce landing of large fish (Action F9). Juvenile surveys were conducted, but no details have been provided on the number of rivers surveyed; some rivers still lack monitoring but, subject to funding being available, will be surveyed in 2015 (Action F10). No new fish management units (FMUs) were established in 2014 as the authorities cannot require this under current legislation (Action F11).

Actions related to habitat protection and restoration: Liming of 78% of rivers in Sweden is essential to maintain their productivity, and this work was ongoing in 2014 although no details of the numbers of rivers treated in 2014 or the results of monitoring have been provided (Action H1). A database of habitat surveys is being developed by the Swedish University of Agricultural Sciences, but no details have been provided (Action H2). An action for continued habitat restoration in salmon rivers was planned for 2015 but has been postponed one year (Action H3). No information has been provided on progress in 2014 in establishing criteria for best available technology (BAT) for hydropower generation, but the action is scheduled for completion in autumn 2015; last year's APR indicated that scientific background documents were published in 2013 and guidance was to be developed during spring 2014 (Action H4).

Work in establishing criteria, and a work plan for surveillance of hydropower plants according to Environmental Law and the BAT is ongoing and will be finished in autumn 2015 (Action H5).

Actions related to aquaculture and associated activities: Annual monitoring of rivers for the presence of *G. salaris* was undertaken as planned in 2014 and no new infested rivers were detected (Action A1). Genetic screening for escaped farmed salmon will be undertaken when the genetic baseline scheduled for late 2015 (see Action F4) has been established (Action A2).

Questions for written response prior to the 2015 Annual Meeting:

1. *How many MSW fish are expected to be saved by the introduction of the two fish per day bag limit (Action F1)?*
2. *What is the timescale for the lawsuit intended to address the increase in illegal fishing referred to in Action F2?*
3. *Is new legislation planned to facilitate the formation of fish management units and in what timescale. If not, how will progress be made on Action F11?*
4. *How many rivers were subject to liming in 2014, how effective was it and how many rivers still remain untreated (Action H1)?*
5. *What type of measures are planned for the restoration of habitat in salmon rivers (other than continuation of liming and application of best practice at hydroelectric facilities) and in how many rivers will these be implemented (Action H3)?*

European Union – UK (England and Wales), CNL(15)27

The APR provides complete catch data for the calendar year 2014; the low catches were affected by low river flows and probably also by the consequent low angling effort. The APR indicates that Natural Resources Wales has decided to end the stocking of salmon (and sea trout) into Welsh rivers, to be replaced from 2015 by alternative means of delivering benefit for fish and fisheries.

The Implementation Plan identifies 12 proposed actions and the APR provides a clear and comprehensive progress report on each of them.

Actions related to management of salmon fisheries: An annual assessment of the status of salmon stocks was completed for 2014 to determine, *inter alia,* the need for emergency regulatory controls (Action F1). Net limitation orders (NLOs) were reviewed for the fisheries in the joint estuaries of the rivers Tamar, Tavy and Lynher and restrictions introduced to protect the weakest of the stocks; a catch limit of 10 salmon per licence was introduced for the Solway haaf nets (Action F2). A new NLO was introduced for the Severn Estuary mixed-stock fishery for lave and seine nets and catch limits per net were set; a review of the Anglian fishery NLO is underway with new regulations scheduled for 2016; and an investigation is underway into the possibility of limiting catches in the North-East coast fishery, and a genetic study is ongoing to investigate use of SNP markers in discriminating among river stocks contributing to the fishery (Action A3). Catch and release fishing in rod fisheries is being jointly promoted with stakeholders and has increased from 10% in 1993 to >60% in the last four years, with 2014 levels estimated at 77%, the highest in the time series (Action F4). A high (yet unspecified) level of compliance in the use of carcass tags has been seen amongst licensed net fishers in 2014 with no evidence of the sale of illegally caught fish; intelligence-led targeted operations have continued in order to reduce illegal fishing resulting in successful convictions and 'Buyer beware' campaigns have been conducted (Action F5).

Actions related to habitat protection and restoration: There was substantial progress with the Keeping Rivers Cool Project in 2014 with riparian shade maps being completed for all catchments in England and distributed to RBMP Catchment coordinators; approximately 20,000 trees had been planted by 2014 and 9.5 km of fencing erected (Action H1). Climate change is considered in RBMPs and the final plans are expected to be published by the end of 2015; a review of the impacts of thermal emissions on the marine environment has been published (Action H1). Progress in re-connecting salmon habitat in 2014 was also substantial with work being undertaken on 12 barriers to fish migrations in England, improving access for salmon to 185 km of river, and completion of one fish pass and 25 easements in Wales in 2014, improving access to about 150 km of river; research is continuing into the effects of new in-river hydropower schemes and an investigation into the effectiveness of different approaches to screening has commenced; and a report on the potential cumulative effects of hydropower has been published (Action H2). Actions have been taken to provide appropriate river flows; the Restoring Sustainable Abstraction Programme has prevented damage to the environment associated with 135 unsustainable abstraction licences (44 in salmon rivers); and the Water Act entered into force in 2014 (Action H3). Progress on a number of actions concerning integrated catchment management is reported including in relation to sources of sediment, stakeholder engagement, incentive schemes, pollution prevention and soil protection, and Good Agricultural and Environmental Condition (Action H4).

Actions related to aquaculture and associated activities: All stocking is regulated on an ongoing basis; Natural Resources Wales has decided to end the stocking of salmon (and sea trout) into Welsh rivers, mainly intended to mitigate for upland impounding reservoirs, and alternative approaches will be adopted including easing of barriers to migration (Action A1). With effect from 1 January 2015 only triploid brown trout, or the progeny of local broodstock schemes, may be stocked into rivers in England and Wales (Action A1). New live fish movement legislation came into force on 1 January 2015; a five-year programme to eradicate the highly invasive topmouth gudgeon has been developed and implemented; and a new app, 'AquaInvaders', has been developed (Action A2). More than 3,000km of river were improved or prevented from deterioration through controls on discharges; and research into the effects of fish farms has been completed and is expected to be published in 2015 (Action A3).

Questions for written response prior to the 2015 Annual Meeting:

1. *What levels of compliance have been achieved in the carcass tagging programme (Action F5)?*
2. *When is it expected that the new fish passage regulations will be implemented (Action H2)?*
3. *Is any work in Wales being conducted to eradicate non-native fish at high risk sites (Action A2)?*
4. *Why does the Import of Live Fish Act now only apply to the ornamental fish sector and does this increase the risks of importing non-native fish or diseases and parasites (Action A2)?*

European Union - UK (Northern Ireland), CNL(15)29

The Review Group notes that new salmon conservation legislation has been introduced to prevent the taking of salmon from rivers failing to meet their management targets in order to conserve their productive capacity.

The Implementation Plan identifies 11 planned actions and the APR reports progress made to address most of them in 2014, although no progress is reported for Action F3.

Actions related to management of salmon fisheries: New legislation was introduced in 2014 to control commercial netting in the DCAL area based on an assessment of individual stocks contributing to the fishery and it was planned to establish a standing scientific committee on salmon for the DCAL area in 2015 (Action F1). There has been no commercial netting of salmon in the Loughs Agency area since 2010 (Action F1). Voluntary catch and release was requested in the DCAL area in 2012 and 2013, and enforcement patrols in 2013 indicated that a significant number of anglers complied with this request. Last year's APR indicated that legislation would be in place in 2014 to make catch and release mandatory unless agreed criteria are met and new legislation is now in place to control harvesting based on an assessment of individual river stocks; it is reported that 90% of salmon were returned after capture in the DCAL area in 2014 (Action F2). No progress for 2014 has been reported on the introduction of mandatory catch and release before 1 June in the DCAL area to protect MSW salmon (Action A3). Monitoring of compliance with legislation is carried out through planned patrols, response to reports of illegal activity and working with private water bailiffs but no details are provided of activities in 2014 (Action F4).

Actions related to habitat protection and restoration: An interdepartmental working group has been established to review and update current protocols and procedures used to grant permissions for hydropower; and assessment of the impact on fisheries of water abstraction licensing and planning applications continued in 2014 (Action H1). Assessment of the impact of drainage and other works on fisheries continued in 2014 (Action H2). Monitoring programmes were undertaken in 2014 in relation to trade and sewage waste discharge which now include indicative EU Water Framework Directive classifications; and procedures are in place to deal with incidents but no data have been provided on enforcement actions taken (Action H3). A programme of works has been initiated to identify structures on major salmon rivers that could be barriers to migration and improvement works have been undertaken on five rivers. Post-enhancement monitoring has been carried out on the Sixmile Water following improvement works in 2013. The restoration hatchery programme was continued on the River Lagan in 2014. Extensive habitat improvements were conducted in the Foyle area including the planting of 1,500 trees in the Upper Roe catchment. An overall continuity classification covering the majority of Northern Ireland is being developed (Action H4). To reduce illegal alterations to salmon habitat, an advisory leaflet has been prepared for the DCAL area and distributed to the public (Action H5). In order to develop an inventory of current and potential salmon habitat, surveys were conducted in the Glenarm and Kilkeel rivers and habitat information has been reviewed on the Melvin system. (Action H6).

Actions related to aquaculture and associated activities: Data collected to assess sea lice levels in a wild salmon stock indicated that 74% and 90% of wild fish had no sea lice in 2012 and 2013, respectively. The level of genetic introgression of escaped farmed salmon on wild salmon stocks was analysed in 2014. Between 2.6% and 6.7% of juveniles sampled across ten rivers in Northern Ireland were classed as being farmed or part-farmed origin, compared to an

earlier study, based on returning adults, which showed that between 0.7% and 2.9% were of farmed origin (Action A1).

Questions for written response prior to the 2015 Annual Meeting:

1. *Please provide clarification regarding the current management of mixed-stock fisheries and the extent of closures in the Loughs Agency area and the DCAL areas?*
2. *Was the new catch and release legislation in place for 2014 and if so was it effective? What information is available on catch and release in the Loughs Agency area?*
3. *What progress has been made with regard to the imposition of mandatory catch and release of all rod caught salmon before 1st June in the DCAL area (Action F3)?*
4. *Please provide details on the number of net seizures, prosecutions, or other measurable progress in Action F4?*
5. *What monitoring data can be presented to demonstrate progress in terms of levels of sea lice on farmed fish and numbers of escaped farmed salmon (Action A1)?*
6. *Are the results of the genetic analysis described in Action A1 available?*

European Union – UK (Scotland), CNL(15)34

A revised IP with 12 proposed actions (some of which are quite ambitious) was submitted in December of 2014 and the Review Group notes that substantial improvements have been made. In October 2014, an independent review of the management of salmon and freshwater fisheries in Scotland was published and major policy recommendations are currently before the Scottish Parliament. The APR does not provide catch data for calendar year 2014, but the reason for this is explained in section 2.2d.

The APR has provided little or no measurable progress on many of the planned actions in the APR. Further clarification is, therefore, sought on a number of items below.

Actions related to management of salmon fisheries: An independent review of the management of salmon and freshwater fisheries reported to Scottish Ministers in October 2014 (Action F1a). This included a recommendation for urgent action to improve the regulation of the killing of salmon and the Scottish Government has launched a public consultation on measures to ban the killing of salmon except under license and to introduce carcass tags to support the licensing scheme (Action F4b). Research has commenced into the economic and financial contribution of wild fisheries in Scotland (Action F1b). No clear progress has been reported on the implementation of local fishery management plans (Action F2a), but initial funding has been secured to investigate engineering requirements, options and costs involved in the deployment of a network of counters (Action F2b and F3a). With regard to assessing the nature of mixed-stock fisheries, a paper on the use of genetics to identify regions of origin of salmon will be submitted in 2015, and a paper has been published as a contribution to better understanding coastal migrations of adult salmon (Action F3b). Scoping work will commence in 2015 in relation to studies on migration routes of smolts (Action F3c). In 2014, 154 nets were seized and 164 offences reported (Action F4a). Action F5a-i includes one action relating to investigation of the impacts of marine renewables and eight actions relating to delivery of a framework for sustainable aquaculture; very little progress has been reported other than the launch of the Scottish Aquaculture Innovation Centre. A link is provided to the industry's enhanced, voluntary quarterly publication of sea lice data, but the latest report appears to be for May 2013 and is no longer available, and no summary of progress is provided in the APR.

Actions related to habitat protection and restoration: The Review Group notes Scotland's apparently bold climate change adaptation plans; no progress has been reported on the majority of these plans although monitoring is being put in place to allow assessment of the efficacy of management actions to be assessed (Action H1a-f). The Review Group also notes a seemingly comprehensive programme to improve river connectivity through the identification and easing / removal of barriers, but no clear progress has been reported (Action H2a-b). Similarly there are plans to ensure appropriate provision of river flows, but no information is provided on progress made in 2014 other than indicating the approach that will be used for monitoring (Action H3a-b). Scotland has proposed taking an integrated catchment management approach to reduce the impact of land use, but no information is provided on progress made in 2014 other than indicating the approach that will be used for monitoring (Action H4).

Actions related to aquaculture and associated activities: Regulation of salmonid and freshwater fish stocking in Scottish rivers has continued with the ASFB granting 33 consents and MSS 2 consents, and 38 offences reported in 2014 (Action A1). The APR indicates that work is continuing on contingency planning arrangements for *Gyrodactylus,* including a 'live test' of the agreed plan, but no details have been provided and no progress is reported on

Implementing European Council Regulation No. 708/2007 concerning Use of Alien and Locally Absent Species in Aquaculture (Action A2). Action A3 relates to actions taken under the Aquaculture and Fisheries (Scotland) Act 2013. It is difficult to evaluate progress on Action A3 because the planned activities to ensure that farmed and wild fisheries and their interactions are managed effectively are not clear. Reference is made to the expected Scottish Technical Standard in the spring of 2015 and technical requirements regulations are planned to go before the Scottish Parliament in 2016. A link to website site providing an update on the work of a Ministerial Working Group is provided but no summary of progress has been provided.

Questions for written response prior to the 2015 Annual Meeting:

1. *What progress has been made with developing the Scottish salmon counter network, what is the timeframe for completing this work, and could details of the peer reviewed genetic study be provided (Action F2b, F3a and F3b)?*
2. *In the absence of meaningful Conservation Limits and assessment of spawning escapement through the counter network, how will harvest levels be established under the present management regime and if licensing is introduced in future following the consultation process (Action F1 and F2)*
3. *What progress has been made with developing and implementing the monitoring/research strategy for potential marine renewables and salmonid interactions and what is the timeframe for completing this work (Action F5a)? What progress has been made with the planned enhanced industry-led voluntary sea lice reporting over 30 river catchment areas and what information was reported in 2014 (Action F5d)? What is the expected timeframe for the DEPOMOD modelling tool to enhance SEPA discharge consents (Action F5f)?*
4. *What progress has been made with the implementation of a national river temperature monitoring strategy for salmon rivers and what is the expected timeframe for identifying sensitive areas and taking appropriate management action (Action H1b)? In what ways is climate change considered within strategic environmental frameworks (Action H1e)?*
5. *How many high priority barriers were removed from salmon rivers in 2014 (Action H2)?*
6. *What level of stocking was consented, was it consistent with NASCO guidelines and what were the offences for? What penalties were applied when offences were committed (e.g. would there be fines for an offence) (Action A1)?*
7. *What progress has been made with the implementation of the EU Regulation on the Use of Alien and Locally Absent Species in Aquaculture (Action A2)?*
8. *How was the Scottish Aquaculture Innovation Centre designed to be responsive to Actions F5a - i?*
9. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Scotland has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided (Action A3?*

Norway, CNL(15)30

The APR provides catch data for the in-river, estuarine and coastal fisheries. A new regulation entered into force in February 2015 putting the responsibility on the aquaculture industry to fund and organise recapture of escaped salmon through a mandatory fee on each licence. The fund will be managed by a board consisting of members appointed from management authorities as well as the industry. Extraordinary regulations were implemented in some regions during 2014, in response to lower than expected salmon runs.

The Implementation Plan identifies 12 planned actions and details have been provided of progress made on all of these; all are ongoing.

Actions related to management of salmon fisheries: New advice has been developed on regulatory measures for 2016-2018 and this will be implemented by the end of 2015 although no details of the measures are provided (Action F1). An increasing number of rivers are subject to mandatory mid-season assessment of the fishery and salmon run, and pre-agreed measures applied. Specific toolkits for implementing this are being developed for each river; legislation is being developed to introduce similar requirements for the sea fisheries (Action F2). Work is continuing to improve Conservation Limits that make better use of GIS-information for prediction of habitat characterisation and more stock recruitment data series (Action F3). Negotiations between Finland and Norway are continuing on a new management regime for the River Tano/Teno but delays are reported and Norway is considering replacing the current bilateral agreement with a national management regime. However, Norway's primary goal remains to have a new bilateral agreement in place in 2017 (Action F4).

Actions related to habitat protection and restoration: Liming is continuing on 21 salmon rivers; stocks have been re-established in some rivers, and catches on affected rivers have increased from 10 tonnes in the 1980s to 45-50 tonnes today. A new plan of action (2016-2020) for the national liming program will be completed in 2015 (Action H1). Assessments have been carried out as part of the review of the rules of operations for the largest and oldest hydropower plants, and revised flow requirements have been implemented on a number of rivers. The terms of hydropower licenses are being revised for several important salmon rivers. Prioritising of habitat improvements, including flow requirements, and measures to mitigate barriers caused by roads are planned as part of the implementation of the WFD river basin management plans (Actions H2 and H3). Partly as a result of the implementation of the National Atlantic Salmon Watercourses and Fjords scheme, fewer plans for major developments on salmon rivers are being approved leading to increased protection of salmon populations (Action H4).

Actions related to aquaculture and associated activities: The Norwegian Veterinary Institute has been monitoring the sensitivity of drugs against sea lice and taking more severe action, including compulsory slaughtering and reduced permitted site biomass, against fish farms that are exceeding the sea lice limits in a more or less systematic manner (Action A1). The effect of stricter requirements on mesh size to reduce escape of 'juvenile' salmon is being evaluated. Use of sterile fish is being tested on a commercial scale at several sites and experience of the use of these fish is expected to increase through the issuing of new 'green licences'. The resistance weir in the River Etne is still being operated and will be evaluated and testing of DNA methods for tracing origin of escapes is continuing (Action A2). A new action plan for the control of *Gyrodactylus salaris* for 2014 - 2016 has been adopted and treatment of rivers is continuing (Action A3). Measures have been implemented to reduce the

spawning stock of pink salmon in rivers in Finnmark county and a monitoring programme implemented (Action A4).

Questions for written response prior to the 2015 Annual Meeting:

1. *The Review Group notes with concern that the timescale for development of a new agreement for the Tana River appears to be delayed. What measures will be put in place to protect the stocks that are below their Conservation Limits until a new agreement is adopted (Action F4)?*
2. *What progress has been made with the development of a regional carrying capacity model for sea lice; and what results have emerged from the monitoring programme of sensitivity of drugs against sea lice (Action A1)?*
3. *What proportion of farms have exceeded the sea lice limit and on how many has action been taken to require slaughtering and/or reduction of site maximum allowed biomass (Action A1)?*
4. *What actions have been taken to remove pink salmon and have any self-reproducing populations been established? Does the monitoring indicate that minnow populations are expanding their range towards salmon areas (Action A4)?*

Russian Federation, CNL(15)37

The Implementation Plan identifies nine proposed actions, and the APR provides a clear report on the progress made to address them in 2014. The APR provides the complete nominal catch data in section 2.2 but no unreported catch data and incomplete data on catch and release have been provided. In all other respects the APR has been completed satisfactorily.

Actions related to management of salmon fisheries: There has been continued progress in identifying where unreported catches may be occurring and in estimating these catches, particularly from the Tuloma River where it was estimated that 30 - 50% of adult returns were taken by illegal in-river fisheries; no other estimates were available for 2014. Measures to reduce the level of unreported catches in the Varzuga River were developed. The Review Group notes that the APR indicates that further studies to estimate the scale of unreported catches and additional measures to reduce them are needed (Action A1). A comprehensive genetic baseline has been established through the Kolarctic Salmon Project (2011 - 2013), allowing for precise identification of wild salmon caught at sea to individual rivers/regions, providing opportunities for more adaptive and informed management of coastal salmon fisheries (Action F2). Conservation Limits have been set for all salmon stocks in the Murmansk region. Estimates of adult returns to Murmansk rivers were derived by direct counting at barrier fences and fish ladder (3 stocks) and by mark-recapture in recreational fisheries (5 stocks). In the Arkhangelsk region and the Nenets Autonomous Region Conservation Limits have been set for exploited salmon stocks, but no Conservation Limits have been established, to date, in the Republic of Karelia (Action F3). New Fishing Regulations for the Northern Fisheries basin came into force in 2014 providing clearer legislation to manage the fisheries conducted by indigenous small nations of the north (Action F4).

Actions related to habitat protection and restoration: The task to reassess the carrying capacity of the Barents Sea rivers of the Murmansk region was completed. The re-assessment of the carrying capacity of the White Sea rivers of the Murmansk and Archanglesk regions is underway. The study to estimate salmon habitat and productive capacity in the Republic of Karelia has been planned (Action H1). While general recommendations on habitat restoration have been developed for a number of rivers, no detailed habitat plans have yet been developed for specific rivers (Action H2).

Actions related to aquaculture and associated activities: A new Federal Law came into force in relation to aquaculture on 1 January 2014, and a number of by-laws also came into force in 2014, but the APR indicates that more are required (Action A1). Monitoring is undertaken for *G. salaris* in a number of rivers, and the parasite is present in the Keret River in Karelia. While the APR highlights a risk of further spread of the parasite in rivers of the Republic of Karelia and a risk of its introduction to the Murmansk region through recreational fisheries and through freshwater aquaculture activities, no measures to prevent this have yet been introduced although new veterinary measures for aquaculture activities were under development in 2014 for the Murmansk region (Action A2). A comprehensive scientific evaluation is required prior to any introduction of aquatic species, and no movements originating from outside the North-East Atlantic Commission area of reproductively viable non-indigenous anadromous salmonids or their gametes have occurred (Action A3).

Questions for written response prior to the 2015 Annual Meeting:

1. *What progress has been made in developing and implementing a procedure for voluntary reporting of catch and release? What are the reasons why such reporting cannot be made mandatory?*
2. *Given the very high level of unreported catch estimated on the Tuloma River, what measures are planned to address this and what measures are planned in other rivers (Action F1)?*
3. *In the light of the findings of the Kolarctic Salmon Project, what is the expected timescale for implementing management measures in the coastal fisheries so as to ensure the protection of the weakest contributing stocks (Action F2)?*
4. *When will detailed plans be developed for habitat protection and restoration on specific rivers (Action H2)?*
5. *In answer to a question on A1 in last year's report, the Russian Federation indicated that it would provide more information on how sea lice are managed under the new Federal Law on aquaculture. This information is not contained in this year's APR, and the Review Group requests that it be provided.*
6. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. The Russian Federation has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided? (Action A1)*

United States of America, CNL(15)32

In December 2014, the USA updated its Implementation Plan (CNL(14)75) to more accurately reflect the current status of Atlantic salmon in southern New England. Programs in Maine remain largely unchanged. New information on hatcheries supplementing recreational fisheries and conservation hatcheries supporting endangered salmon populations have been included and the status of stocks has been re-aligned to mirror information in the rivers database.

The Implementation Plan identifies eleven proposed actions, one less than in the 2014 APR following removal of Action H5, relating to strategic evaluation of limited resources in the light of climate change. The APR provides a clear and comprehensive report on the progress made to address most of the planned actions in 2014. In 2014, the Penobscot River was selected as a habitat focus under NOAA's Habitat Blueprint, thereby elevating restoration efforts through fiscal investments. The transition to measurable survival standards at hydro-electric dams in the range of endangered salmon in Maine began in earnest in 2014. Each dam in the mainstem of the Penobscot River (with the exception of Weldon Dam) must now pass 96% of all smolts within 24 hours and 95% of all adults within 48 hours. The dam owners must also be able to demonstrate that these performance standards are being achieved through quantitative studies.

Actions related to management of salmon fisheries: The US continued to work with other Parties to the West Greenland Commission including at the 2014 annual, intersessional and working group meetings and supported continued sampling of the West Greenland salmon fishery. In the North American Commission, the US reviewed information on the mixed-stock fishery at Labrador and supported efforts to monitor and sample the St Pierre and Miquelon salmon fishery (Action F1). In order to minimise possible bycatch of sea run salmon, there is a prohibition on retaining landlocked salmon and brown trout > 25 inches in length in over 30 specific waters, and fishing regulations explain that sea run salmon are endangered and cannot be removed from the water. There are also consultations among biologists in order to reduce the effects of competition and predation on salmon, although this has not yet led to a comprehensive conservation plan covering the salmon's range (Action F2). The closure of all directed fisheries for salmon was maintained in 2014, databases relating to vessel landings, dealer sales and observer programmes, were queried for presence of salmon in catches and no reports of Atlantic salmon having been caught were found. Using recent estimates of discards from databases to estimate total discards of federally managed species (including Atlantic salmon) across 56 commercial fleets, it was estimated that approximately 49 pounds of Atlantic salmon would have been discarded on an annual basis (using data from July 2012 through June 2013). Surveillance in rivers is routinely conducted for potential poaching activity although no results were provided (Action F3).

Actions related to habitat protection and restoration: The first dam on the Falls River, a tributary of the Connecticut River, was removed in the fall of 2014 and within a week an adult salmon was observed upstream of the former dam. In 2014, 33 additional aquatic connectivity projects were completed across the Gulf of Maine DPS and a total of over 229 km of stream were made accessible as a result of these projects (Action H1). An archive of enforcement and monitoring results in relation to implementation of the Clean Water Act is available online, and, in summary, fines over the last five years amounted to ~$180,000 with no fines in 2014 (Action H2). Consultations continued in 2014 among federal agencies where their activities occur in or near areas where Atlantic salmon Essential Fish Habitat (EFH) is designated and

conservation recommendations were issued which may include measures to avoid, minimise, mitigate or otherwise offset adverse effects on salmon habitat. However, no details have been provided. (Action H3). Under the Endangered Species Act, the United States has designated critical habitat for Atlantic salmon. NOAA and USFWS conduct consultations with other federal agencies pursuant to the Endangered Species Act which requires all federal agencies to ensure that any action they undertake or fund does not prevent the survival and recovery of endangered Atlantic salmon. In 2014, NOAA and USFWS completed well over 100 consultations. In each consultation, conservation recommendations made by NOAA and/or USFWS led to changes in actions that prevented degradation of designated critical habitat and reduced incidental mortality to levels that did not prevent the survival and recovery of endangered salmon (Action H4).

Actions related to aquaculture and associated activities: Monitoring has continued in relation to the protective measures agreed in 2003 and in 2014 no aquaculture-origin fish were reported captured in Maine rivers. Monitoring for the incidence of sea lice on sea-run salmon returning to the Penobscot River continued in 2014. After detection of the causative agent of Bacterial Kidney Disease and clinical signs of the disease in some fish at two Atlantic salmon net-pen facilities in 2013, biosecurity measures and routine fish health surveillance were increased in 2014 and strict disinfection and biosecurity protocols applied. Test results have shown little infectious pressure in 2014 with very few fish having tested positive and there has been no elevated mortality and no fish expressing any clinical signs of BKD (Action A1). Fish health status in the Northeast Region is reviewed annually and guidelines have been developed that enable prevention of importations or transfer among States of baitfish infected with listed pathogens. Revisions to the existing fish health guidelines were completed in 2014 to include fish importation, movement and transfer between all states in the Northeast United States (Action A2). Broodstock management protocols have been implemented at conservation hatcheries to maintain genetic diversity of the hatchery stock rebuilding program and a parr collection programme, initiated in 2013, continued in 2014 to reduce reliance on sea-run fish for broodstock. Estimates of genetic diversity are used to monitor if genetic diversity within seven broodstock populations is being maintained over time. Pedigree lines have been established for the Dennys populations to reduce the rate loss of genetic diversity and to increase estimates of effective population size (Action A3). Coordination with state programs that stock salmonids to support recreational fisheries is said to occur on a river-by river basis, but no details have been provided on progress in 2014 (Action A4).

Questions for written response prior to the 2015 Annual Meeting:

1. *What were the results of the surveillance conducted in rivers in 2014 to identify any poaching activity for Atlantic salmon (Action F2)?*
2. *By what date will the comprehensive conservation plan for Atlantic salmon in Maine, referred to in Action F2, be implemented)?*
3. *How many rivers were monitored for escaped farmed salmon in 2014 and was monitoring only implemented when an escape event was notified (Action A1)?*
4. *The US indicated in a response to a question raised by the Review Group in 2014 that in order to gain a better understanding of the temporal and spatial distribution of sea lice throughout the Gulf of Maine, NOAA National Marine Fisheries Service (NMFS) had funded studies to investigate the presence and abundance of sea lice on wild fish communities in embayments with salmon farms (Cobscook Bay) and areas without (Penobscot Bay). Can the results of these studies be provided?*

Annex 14

CNL(15)18

Written responses from the Parties/jurisdictions to the questions raised by the Implementation Plan/Annual Progress Report Review Group

Canada

1. *Given the very poor returns of large salmon in 2014 what actions are planned to implement measures to further protect these stock components in the Maritime provinces and Quebec (Action F1)?*

   The Ministerial Advisory Committee on Atlantic Salmon (MAC) has made a number of interim recommendations some of which have already been implemented such as no retention and fishing with single barbless hooks for all recreational fisheries in the Maritime Provinces (NB, NS, PEI).

   Maritimes Region: in 2014 only three rivers were open to catch and release angling during cold water periods with barbless flies. In 2015 the intent is to open those same 3 rivers to catch and release angling with single hook barbless flies. However, if counts at index rivers suggest returns similar to or fewer than those of 2014, additional in-season measures on these three rivers will be considered.

   Quebec's salmon fishery is managed by the Province. Quebec has a system of river by river management where closures are instituted when returns are low and this system will continue.

2. *In what way does the Policy for the Conservation of Wild Atlantic Salmon guide Canada's actions in relation to regulatory responsibilities for fisheries, habitat and aquaculture (Actions F1 and H3)? How is progress under the Policy reviewed?*

   The Wild Atlantic Salmon Conservation Policy was developed as part of the response to address the decline in salmon populations. Strategies and action plans were developed under the Policy to address: the need for monitoring and assessment of population status; the conservation and protection of Atlantic salmon habitat; the integrated fisheries management planning process; a collaborative approach to conservation; and, a post-season review process.

   Wild salmon continue to be conserved by managing populations in "Salmon Management Areas" (SMAs). The status of SMAs are evaluated through monitoring programs in index rivers and assessed against selected benchmarks, and reported publicly.

   The goal, principles, and objectives of the Wild Atlantic Salmon Conservation Policy guide the regulatory actions of the Department in aquaculture.

3. *When will the guidelines on pipeline watercourse crossings, transportation watercourse crossings, large and medium water intakes and marine and coastal infrastructure be delivered and what processes are being applied to manage these areas in the meantime (Action H2).*

   The guidelines will be completed over the next couple of years. In the interim, existing Fisheries Protection Program guidance for "Projects Near Water" will be followed (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html).

4. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in a transparent manner in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Canada has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided? (Actions A1 and A2)?*

   Canada provides annual containment data in its report to the North American Commission which is publicly available on NASCO's website (http://www.nasco.int/2013commissiondocs.html).

   Canada remains committed to the objectives of SLG(09)5 (Guidelines on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks). Sea lice monitoring is conducted and results are reported to the responsible authority in each salmon producing province. Sea lice monitoring results form the basis for management action by regulators as well as operators. Management actions involving treatments by farms are also reported to the regulator in all the salmon producing provinces. In determining thresholds for action, possible impacts to both wild and farmed populations are considered. Provinces have developed management regimes that are appropriate to these two objectives and manage accordingly. Based on the regimes in place, Canada is confident that sea lice levels are being managed at levels that do not pose a risk to wild Atlantic salmonid populations.

Denmark (in respect of the Faroe Islands):

1. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. The Faroe Islands have not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided (Action A1)?*

2. *What are the regulatory measures in place in the Faroes to combat potential sea lice in salmon farms (e.g. treatment threshold levels, fallowing, single year class stocking, etc (Action A1))?*

Comprehensive measures have been taken to improve the methods for treatment of sea lice in the Faroese aquaculture industry. Executive Order no. 163 from 2009 on monitoring of sea lice requires counting every other week in the summer and once a month in the winter. The purpose of these regulations is to reduce the occurrence of sea lice in farmed fish and to impair resistance to preventative treatment. The Executive Order requires regular sampling for, and reporting of, sea lice in farmed fish and sets out the required procedures for treatment, which can also require coordinated efforts between different fish farming facilities.

All fish farms must have a contingency plan which describes potential risks and preparedness e.g. escapes and outbreak of diseases. The contingency plans must be approved by the Food and Veterinary Agency (Executive Order no. 134 from 2009). The contingency plan shall describe procedures regarding sea lice counting and treatment and must document that the farm is capable of following the procedures defined in the Executive Order. The executive order states that the FVA can demand prompt treatment. If the treatment fails, the companies are required to report to the FVA. The FVA can demand simultaneous treatment in all farms situated in the same fjord or in several fjords if necessary.

Since 2009, the Aquaculture Research Station (*P/F Fiskaaling*) has, in close cooperation with the aquaculture industry and the Food and Veterinary Agency, initiated several research projects regarding the challenges with sea lice e.g. refractoriness, genes and countings. In order to develop natural methods to combat sea lice, the Research Station has initiated research on the lumpfish, *Cyclopterus lumpus,* as a cleaner-fish.

There are thus strict regulatory measures in place in the Faroes to combat sea lice in salmon farms based on treatment threshold levels, fallowing, single year class stocking. As well as this a database is kept of sea lice level in all aquaculture plants, and in case levels sea lice would exceed threshold level swift and decisive measures would immediately been taken. For reasons of confidentiality and competition the information in the database classed as confidential.

Denmark (in respect of Greenland):

1. *Based on the initial results from the phone survey is it possible to provide an indication of the accuracy of reported and unreported catches?*

   In order to obtain better knowledge about the fisheries and non reported catches, a phone interview was conducted among the licensed fishermen, asking questions about catches, effort, by-catches biological observations and opinion. In total 321 professional fishermen had obtained a license in 2014, but only 98 had reported catches by February 2015. The interviewers managed to get in touch with 207 people including at least 11 nonprofessional fishermen. In 119 cases, licensed fishermen informed that they had had catches but seemingly without reporting by the end of the season. The total underreporting by these 119 people amounted to 12.2 tons in the 2014 season. After the interview had been conducted, 98 of the 321 license holders, where still unaccounted for. About 2/3 of the unreported catch was provided by the 8 highest observations of non-reported catches and the majority of the 119 people that that had failed to report catches had taken minor amounts. There are several ways to estimate the catches of the remaining 98 license holders, (mean, weighted mean, mean (Log x) or weighted mean(log x), leading to different estimates of unreported catches for the unaccounted 98. The different methods gives different estimates but it seems likely that the unreported catches is something around 8-16 t. Several other

conclusions that can be drawn from phone survey; Those who did report by the end of the season report fairly accurately. All factory landings had been registered and that factory landings are accurate. That 4/5 licensed fishermen fish to some extent every year, but that 2/3 catch about 100 kg or less per year and that many license holders just fish for their own consumption. That is that there is a general perception of increasing amounts of salmon in Greenlandic waters and strong wishes for increased landing opportunities, extension of the season and that fishermen in only need to use a few gillnets to obtain their catches.

It was not possible to do a similar survey among non-licensed non-professional fishermen since no license is required for this segment. Therefore, a phone survey on this segment would involve a random survey of all citizens of which only a fractions would ever have caught a salmon.

European Union - Denmark

1. *What action has been taken to regulate recruitment of cormorants on salmon rivers in Denmark in 2014 (Action F1)?*

   Overall, the management plan shall ensure that cormorants can survive and are continuously protected as a Danish breeding bird and simultaneously ensuring that the number of cormorants will not be an unacceptable nuisance neither to fish stocks nor to fishery. According to the plan, plot owners and can seek permission through the Danish Nature Agency to shoot away a limited number of cormorants except in a three months period from 1 May to 31 July. By means of noise it is permitted to frightening away cormorants seeking feed in rivers. The Danish Nature Agency is in the process of revising the current management plan.

2. *When is the research project on by-catch of salmon and sea trout in the Ringkøbing Fjord expected to report (Action F2)?*

   Ongoing

3. *What was the result of the assessment under the new management plan 2013/2014 regarding whether reliable reference points can be established for Danish salmon rivers (Action F3)?*

   No results provided at this stage. A revision of the plan is awaited.

4. *What progress has been made with removing the ~1,500 migratory obstructions referred to in the IP, and what benefits have been recorded to salmon and sea trout populations (Action H1)?*

   Ongoing. At this stage, monitoring covers two rivers/streams – Villestrup Å and Gudenå. So far information is only provided with respect to sea trout and does not include information on salmon. It seems that the information obtained is very valuable.

5. *What progress has been made with restoring about 1,000 km of river, mostly smaller streams, from earlier canalisation, pipe-laying and dredging (Action H2)?*

   Ongoing

6. *What progress has been made with identifying and quantifying spawning and nursery habitat that will be opened up (Action H3)?*

   Spawning and nursery habitats have been quantified with respect to Ribe Å, while similar exercise has not yet taken place with respect to Varde Å and Store Å.

7. *What measures are planned to achieve the 25% increase in salmon production in Danish rivers by 2020 (Section 4.2)?*

   Unfortunately, this information should not have been included in this context. The 25 % increase in production refers to the expected results from future aquaculture production outside rivers and will mainly consist of production of rainbow trout.

European Union – Finland

1. *The Review Group notes with concern that the timescale for the development of a new agreement for the River Teno appears to be delayed, possibly by at least two years. What measures will be put in place to protect the stocks that are below their Conservation Limits until a new agreement is adopted (Action F4)?*

   The primary goal for Finland is to conclude a new fisheries agreement between Finland and Norway for the River Teno. Finland considers that a new agreement will be the most effective way to enhance the status of salmon stocks not reaching the conservation limits and to adjust the management measures in a way that is compatible with the NASCO Agreements and Guidelines and also to target these measures more precisely to weak sub stocks. Issues that have prolonged the negotiation process are related to the diverging interests and fishing rights of the local population, which have led to different ways of utilising the fishing rights in the neighbouring countries.

   If a new agreement were not finalized for the year 2017, Finland is prepared to implement the national management regime to reduce fishing pressure in line with the NASCO Guidelines. The new Fishing Act adopted in May 2015 will enter into force 2016, providing a good toolbox for the management decisions. The new Fishing Act also calls for actions to ensure the sustainable use and management of fish resources with the aim to preserve biological diversity.

   Finland will seek opportunities to undertake management actions that will reduce the fishing pressure targeting the weak stocks before 2017. For example, the local fishing right owners have placed some tributaries under protection for this purpose. Previously, there have been suggestions for temporary management actions from both countries, but because of diverging interests of the local population in the neighbouring countries the suggestions have not lead to common decisions.

2. *When will complete river specific Conservation Limits be established for all the River Teno salmon stocks and when will these be made available to ICES for use in developing advice to NASCO (Action F2)?*

   A complete river specific list of Conservation Limits has recently been established and published (Falkegård et al. 2014). However, attainment has been assessed only for nine individual populations and for the entire system. Increasing the number of assessed populations depends on the availability of relevant monitoring data. For instance, fishing effort in many of the individual tributaries is very low and thus no reliable catch information is or will be available. In the absence of other means of abundance assessment, e.g. spawner counts or juvenile assessments, there are no realistic possibilities for assessing the CL attainment in many tributaries. Nonetheless, possibilities to include new populations in the annual assessment procedure for CL attainment of the Teno system will be considered.

   The Teno river system is the only single river case where the ICES procedure for estimating ('national') PFAs, spawners and CLs have been applied. Within this framework, assessments of CL attainments in individual populations of the River Teno will not contribute much to the advice to NASCO, which is based on stock status assessments on the levels of stock complex, country or region. One possible development in the future could be the use of combined CL for the Teno system, based on the recently established river specific CLs (Falkegård et al 2014, see above), instead of the CL based on the 'hockey stick' model constructed within the ICES assessment.

   Falkegård, M., Hindar, K., Fiske, P., Erkinaro, J., Orell, P., Niemelä, E., Kuusela, J., Finstad, A.G. & Foldvik, A. 2014. Revised first generation spawning targets for the Tana/Teno river system. – NINA Report, 1087, 68 p.

3. *Given that recommendations have been given to road constructors, what monitoring has been undertaken on the use of these recommendations and compliance of construction work with them (Action H1)?*

   The area concerned is extremely sparsely populated and the road network there is also very thin, mainly composed of very few main roads. Thus in practice we know in full detail that that no harmful road construction works have been done without a specific monitoring scheme.

4. *What measures are taken to remove escaped farmed salmon from the River Teno when they are discovered in the monitoring programme (Action A2)?*

   Based on the annual monitoring the numbers of escaped salmon have been very small and so far no specific action has been considered necessary.

   In a very large river system like the River Teno the removal of escaped farmed salmon is virtually impossible, especially as their numbers in salmon catches are very low. In the current monitoring programme, adult fish counts are carried out by snorkelling or video surveillance, and there are no activities where adult salmon would be handled. Therefore, escaped farmed salmon cannot be removed in connection with monitoring activities.

European Union - Germany

1. *Reference is made to cormorant predation on downstream migrating smolts in the Rhine. Have any mitigation measures been considered (Section 2.2)?*

   Mitigation measures according to the locally and temporally high impacts of cormorants on fish stocks vary from one German federal state to the next. Most federal states have special cormorant regulations which comprise derogations to scaring cormorants away from vulnerable fish stocks and fish farms. The aim of the most of these regulations is to reduce overall cormorant numbers, by killing cormorants locally to reinforce scaring at specific sites or prevent the settlement of new breeding colonies.

2. *What caused the slower than expected progress in implementing measures to improve fish passage in Actions H1 and H3?*

   There are a number of constraints and uncertain factors that result in delays according to implementing measures to improve fish passage. For example, long planning processes, the unexpectedly long time to negotiate with the different stakeholders at each individual site, financing constraints, the lack of human resources, and the time required to implement findings and promising new approaches into operation.

European Union - Ireland

1. *To what extent was annual fallowing of sites, use of single generation sites, avoidance of partial lice treatments and harvesting remote from grower sites used in 2014 to reduce the potential impact of sea lice infestation at salmon farms (Action H4)?*

   The sea lice control and management strategy in Ireland has five principal components:

   - Separation of generations.
   - Annual fallowing of sites.
   - Early harvest of two-sea-winter fish.
   - Targeted treatment regimes, including synchronous treatments.
   - Agreed husbandry practises.

   Therefore annual fallowing of sites, use of single generation sites and avoidance of partial lice treatments were carried out at all aquaculture sites in 2014, as in other years, to reduce the potential impact of sea lice infestation at salmon farms.

2. *How quickly were escape events reported by the farmers in 2014, how promptly were measures put in place to recapture a significant proportion of the stock and were these considered to have been successful (Action A1)?*

   Arising from events in Bantry Bay in early 2014 there is no evidence of a large-scale fish escape - but the possibility that fish escaped and survived cannot be ruled out. There have been no reported occurrences of escapees being detected in neighbouring rivers. Two putative escapees were determined, by both scale analysis and DNA profile, to be of wild origin.

3. *How many times were lice thresholds exceeded and were any orders made to require early harvesting (Action A2)?*

As has been the case in previous years, sea lice levels on smolts in 2014 were low. Ninety four percent of sea lice inspections on smolts were below the Treatment Trigger Levels (TTL), this compares with 100 % in 2013 and 98% in 2012. Sea lice levels on one-sea-winter salmon rose in 2014 compared to 2013 which were the lowest on record. In 2014 71% of inspections were below TTL compared to 82% in 2013 and 74% in 2012. During the spring period in the Northwest 61% of inspections were below the TTL compared to 95% in 2013. In the West, for the same period, 61% were below TTL compared to 78% in 2013. The Southwest continued to have no breaches of protocol levels in 2014.

The sea lice levels for one-sea-winter salmon outside the spring period show that 48% of inspections were below TTL in the Northwest, 62% were below in the West and 100% in the Southwest. These compare to 67% in the Northwest, 53% below in the West, and 100% in the Southwest during 2013.

Sea lice levels in excess of 10 L. salmonis mobiles per fish on one-sea-winter salmon nationally were recorded on 23 occasions compared to 13 occasions in 2013 and 17 in 2012, 11 of these inspections had means of greater than 20 mobile L. salmonis per fish which was greater than 2013, when 8 inspection recorded sea lice levels in excess of 20 mobile L. salmonis per fish. Four of these inspections had levels greater than 40 L. salmonis per fish, compared to 5 in 2013. The highest mean sea lice level recorded for one-seawinter salmon was 137.67 mobile L. salmonis per fish, this compares to 84.02 mobile L. salmonis per fish in 2013 and 71.72 mobile L. salmonis per fish in 2012. There were no unusually high numbers of Caligus elongatus recorded in 2014.

Average sea lice levels in the first half of 2014 were higher than the same periods in both 2013 and 2012. This increase was primarily as a result of infestation levels at three bays. Many factors have contributed to these increases including challenges to fish health, husbandry practices and treatment efficacy. A further factor is undoubtedly regression towards the mean, following 3 years of very low sea lice infections. The sea lice levels recorded in 2014 underline the requirement to optimise sea lice control by; ensuring the early implementation of strategic winter treatments; optimising treatment efficacy, including treatment rotation; and the implementation of SBM practices.

[NOTE – Q3. This information is extracted directly from the 2014 Annual Sea Lice Report - O'Donohoe P., Kane F., Kelly S., McDermott T., Drumm, A. and Jackson, D. (2015) National Survey of Sea Lice (Lepeophtheirus salmonis Kroyer and Caligus elongatus Nordmann) on Fish Farms in Ireland– 2014. Irish Fisheries Bulletin No. 45, Marine Institute.]

European Union – Spain (Asturias)

1. *What progress has been made with increasing surveillance in order to reduce poaching (Action F1)?*

   Maintenance of monitoring programmes.

2. *What new measures have been introduced to regulate river catches in order to avoid overfishing (Action F2)?*

   There are no new measures, but regulation has been maintained including quotas per person and the catch and release periods have been increased.

3. *What actions have been taken to clean and maintain fish ladders and remove obstacles impeding the upstream movement of salmon (Action H1)?*

   An annual cleaning of fish ladders is performed in order to assure that it is works properly.

4. *What action has been taken to increase public awareness of the risks of climate change to salmon stocks in Asturias (Action H2)?*

   This matter is outside the scope of regional authority competences that manages salmon stocks and conservation.

5. *How many obstacles to migration were identified in the inventory and what measures are planned to improve fish passage at these obstacles (Action H3)?*

   Medium and small dams have installed fish passage in those areas considered of interest for the species.

   In big dams, due to difficulty to install fish passage, it is not recommended the installation.

European Union – Spain (Cantabria)

1. *The Review Group notes that all the actions in the IP were scheduled to commence in 2014. Progress was reported on four actions last year compared to only two in the 2015 APR. When will work commence on the majority of the planned actions?*

2. *What plans are there to initiate the collection of data from the index river on sea survival, run-timing, stock diversity and smolt and sea age (Action F5)?*

3. *When will results be available from the studies of fish screens at 10 hydroelectric developments on the rivers Saja-Besaya and Asón (Action H2)?*

   Answers pending.

European Union – Spain (Galicia)

1. *When will Conservation Limits be established for the rivers Eo and Ulla, Masma, Mandeo and Lérez (Action F1)?*

   Our hope is to develop CLs for rivers Eo and Ulla in the period and to derive proper curves and limits for rivers Mandeo, Masma and Lérez. (Action F1).

2. *What progress has been made in cooperating with the central government of Spain in order to develop fishing rules and research on the salmon population of the River Miño?*

   Research and assessment of salmon-parr densities in Spanish tributaries of the river Miño is ongoing, as cooperation with the Government of Spain in the development of annual fishing rules is in progress. But there is still a great deal to be done.

3. *When will criteria for management of riparian vegetation be developed (Action H1)?*

   The general guidelines for the management of riparian vegetation in Natura 2000 rivers were established and approved during 2014 (*DECRETO 37/2014, do 27 de marzo, polo que se declaran zonas especiais de conservación os lugares de importancia comunitaria de Galicia e se aproba o Plan director da Rede Natura 2000*). Nearly 80% of main salmon rearing areas are included in SACs. But there is still a need of a practical document for the application of this guidelines on salmon areas (Action H1).

4. *What action has been taken to implement compensation flows under the guidelines of River Basin Management Plans (Action H3)?*

   Some of the new River Basin Management Plans for the period 2015-2021 which affect salmon basins in Galicia are still in the public-stakeholders participation phase, prior to submission to Parliament during this year. All of these Plans include Compensation Flows guidelines (Action H3) that are expected to be better than those applied to the date.

5. *What action was taken in 2014 to remove obstacles, construct fishways and improve accessibility (Action H4)?*

   During 2014 there was no improvement in this action (H4). A tendering procedure for the remotion of some dams in the Ulla basin was recently initiated (*RESOLUCIÓN de 9 de abril de 2015, de la Secretaría General Técnica de la Consellería de Medio Ambiente, Territorio e Infraestructuras, por la que se anuncia la licitación por el procedimiento abierto no sujeto a regulación armonizada, para la contratación de la obra para la demolición/modificación de los obstáculos en la cuenca del río Ulla, dentro del proyecto Life+ Margal Ulla (LIFE NAT/ES/000514), cofinanciado por la Unión Europea en un 49,39 %, a través del programa Life+).*

European Union – Spain (Navarra)

1. *When are Conservation Limits expected to be developed for salmon stocks in Navarra and, given that the stock status is considered unfavourable, on what basis is the TAC set (Action F1)?*

   It is not scheduled a date to establish conservation limits due to lack of funds. The TAC is set based on the 15 percent of the average of returning salmon over the past 5 years.

2. *When are the salmonid mesohabitat maps expected to be updated and how are assessments of the potential impacts of construction work undertaken without these data (Actions H2)?*

   Currently there is not scheduled a date to establish conservation limits due to lack of funds. So far, the impact of the works has been assessed based on existing maps, dates back to 2008.

3. *Has the Life project been funded and if not what plans are there to evaluate the fishways and improve connectivity (Action H3)?*

   Life project is still being evaluated. There are no alternative plans.

European Union – Sweden

1. *How many MSW fish are expected to be saved by the introduction of the two fish per day bag limit (Action F1)?*

   Sport fishing in the sea is mainly targeting sea trout. The fishing mortality for salmon was estimated to be very low in this fishery even before the bag limit was introduced. It is estimated that the bag limit will result in nearly none fishing mortality for salmon in sport fishing in the sea.

2. *What is the timescale for the lawsuit intended to address the increase in illegal fishing referred to in Action F2?*

   The timescale in the court is not known. It depends on how the court gives priority to the lawsuit and if the court decision will be appealed.

3. *Is new legislation planned to facilitate the formation of fish management units and in what timescale. If not, how will progress be made on Action F11?*

   Fish management units are already formed in many of the rivers. An inventory will be made in 2015 by the need to form additional fish management units. Based on the assessed need measures will be proposed for formation of fish management units.

4. *How many rivers were subject to liming in 2014, how effective was it and how many rivers still remain untreated (Action H1)?*

   All salmon rivers and their tributaries with salmon that require liming are present included in a liming program. Of the 23 rivers 20 (91%) are limed, some only in tributaries above the salmon habitat. The effect is monitored with samples of water chemistry, benthic invertebrates and electrofishing. The results are evaluated annually by the County boards and reported to the Swedish Agency for Marine and Water Management. Generally the goal of keeping pH above 6 and the levels of labile aluminum at non-toxic levels are reached. Certain years a few of the salmon reaches may face short periods during spring thaw with lowered pH (5.5-6).The exact extent of such periods is not summarized but it is insignificant for the salmon production in every river, and the liming program are successively adapted. A recent (2015) evaluation showed that the frequency of acid episodes has declined exponentially in limed rivers, as a consequence of successive adjusted of lime doses and strategies. As a consequence the ecological status of the fish fauna has reached that of fish in neutral reference rivers.

5. *What type of measures are planned for the restoration of habitat in salmon rivers (other than continuation of liming and application of best practice at hydroelectric facilities) and in how many rivers will these be implemented (Action H3)?*

   The restoration work is planned by the County boards using national and international (EU) funding. Of the 23 rivers restoration work is in progress in 8; Rivers Enningdslälven (habitat restoration), Örekilsälven (improved fishway, habitat restoration), Bratteforsån (habitat), Säveån (fishway, habitat), Rolfsån (fishways, habitat), Nissan (improved fishways planned), Fylleån (improved fishway planned) and Rönne å (fishways, habitat). In most rivers more activities are planned according to the EU Water framework directive. A list of measures required for achieving good ecological status or good ecological potential will be established in 2017.

European Union – UK (England and Wales)

1. *What levels of compliance have been achieved in the carcass tagging programme (Action F5)?*

   All the evidence from our enforcement officers indicates very high compliance (>95%) with the carcass tagging programme in England and Wales. Through actively promoting the programme since its introduction in 2009 and having conducted intelligence-led targeted buyer beware campaigns and dealer checks across the country, there is high awareness of the programme by restaurants and fishmongers and very few cases of illegal practice have been detected.

   Alongside the requirement to tag net caught salmon, nets men are also required to keep a logbook. This is used to record the carcass tag number, date of capture etc., which we use to monitor catches and helps underpin compliance. To ensure no ambiguity, alongside the requirement for netted salmon to be carcass tagged before sale, a ban on the sale of rod caught salmon was introduced in 2009.

2. *When is it expected that the new fish passage regulations will be implemented (Action H2)?*

   Work is continuing on the proposed new fish passage regulations. We aim to publicly consult on proposals later this year and to introduce the new legislation in 2016.

3. *Is any work in Wales being conducted to eradicate non-native fish at high risk sites (Action A2)?*

   The only high-risk non-native species found is Wales is Top Mouth Gudgeon (Pseudorasbora parva). This species has been recorded at three sites in Wales, and an eradication programme has been underway since 2012. Two sites remain to be treated, and work will begin on these as soon as resources become available. In the meantime Natural Resources Wales will continue working closely with site owners and others to ensure Top Mouth Gudgeon are contained within these sites.

4. *Why does the Import of Live Fish Act now only apply to the ornamental fish sector and does this increase the risks of importing non-native fish or diseases and parasites (Action A2)?*

   In January 2015 Defra and Welsh Government introduced new legislation regulating the introduction of fish into inland waters in England, Wales and the Border River Esk catchment area in Scotland, and the keeping of fish in those waters.

   The new 'Live fish Movements' legislation has introduced a permitting scheme which minimises the risk posed to the environment by inappropriate and illegal fish movements into our lakes, rivers and waterways and provides more effective enforcement powers to remove illegal non-native fish from these inland waters where these are found. As a result of this new legislation, it was necessary to amend the relevant ILFA Orders in England and Wales to prevent duplication of legislation in relation to live fish movements in inland waters.

   The current ILFA Orders continue to apply to all water bodies that do not meet the definition of an inland water such as aquaria, research and conservation facilities (zoos, laboratories etc.) and ponds that are below 0.4 hectares in size. Therefore, the current ILFA Orders now mainly apply to the trade in ornamental fish. The Live Fish Movement legislation and the ILFA Orders therefore complement each other to maintain the scope and protective measures as set out in the previous regulatory regime.

European Union – UK (Northern Ireland)

1. *Please provide clarification regarding the current management of mixed-stock fisheries and the extent of closures in the Loughs Agency area and the DCAL areas?*

   DCAL AREA

   Management Objectives for DCAL area Mixed Stock Fisheries.
   The DCAL area commercial salmon fishery represents a Mixed Stock Fishery (MSF) with a number of contributory stocks. NASCO guidelines indicate that management of homewater MSFs should be based on the status of individual river stocks and knowledge of the stocks that contribute to the fishery with conservation best achieved if the fishery targets

stocks at full reproductive capacity. Salmon harvest from DCAL area MSFs requires that the collective of stocks exploited reaches a threshold level equivalent to the "management target" of 125% of the conservation limit (CL). Importantly in accordance with NASCO guidelines for MSFs, this must be attained in all the individual contributing rivers or other stock units potentially exploited. Additionally, this precautionary reference point should be met or exceeded consistently over a number of years (≥3/5 most recent years) before commercial exploitation can be permitted, a stipulation which gives some confidence that targets will continue to be met given unpredictable inter-annual variation in stock levels.

Salmon exploitation by a MSF necessitates a management threshold set at a level above the CL to ensure there is a high probability of stocks exceeding their CL, in line with NASCO guidelines. A management target (MT) of 125% of CL for all the contributing rivers/stock units exploited by the DCAL area commercial MSF has been adopted as a precautionary reference point. The Management Objective for the DCAL area MSF is that before commercial harvest can be considered, all the contributory stocks must consistently exceed their individual MTs (≥3/5 most recent years).

Currently the management objective has not been met and the DCAL area commercial fishery is completely closed. This is reviewed annually by an independent SSC on salmon that provide scientific advice to DCAL on the management of the stocks.

2. *Was the new catch and release legislation in place for 2014 and if so was it effective? What information is available on catch and release in the Loughs Agency area?*

   Catch and release legislation was in place for the 2014 fishery (DCAL area). Catch returns and enforcement patrols indicate that the measure was generally well adhered to. Restrictions on tackle (barbless hooks) and advice on best practice have enhanced the efficacy of the measure.

   In the Loughs Agency area, the Agency introduced compulsory catch and release on the River Finn and the River Foyle which was strictly enforced and generally accepted by anglers.

3. *What progress has been made with regard to the imposition of mandatory catch and release of all rod caught salmon before 1st June in the DCAL area (Action F3)?*

   The legislation has been in place for the DCAL area since 2003 and enforcement patrols would confirm that anglers have been compliant with this.

4. *Please provide details on the number of net seizures, prosecutions, or other measurable progress in Action F4?*

   In the DCAL area 3763 land and water based patrols carried out. 1 angler detected with unlawfully caught salmon and 2 illegal nets were seized.

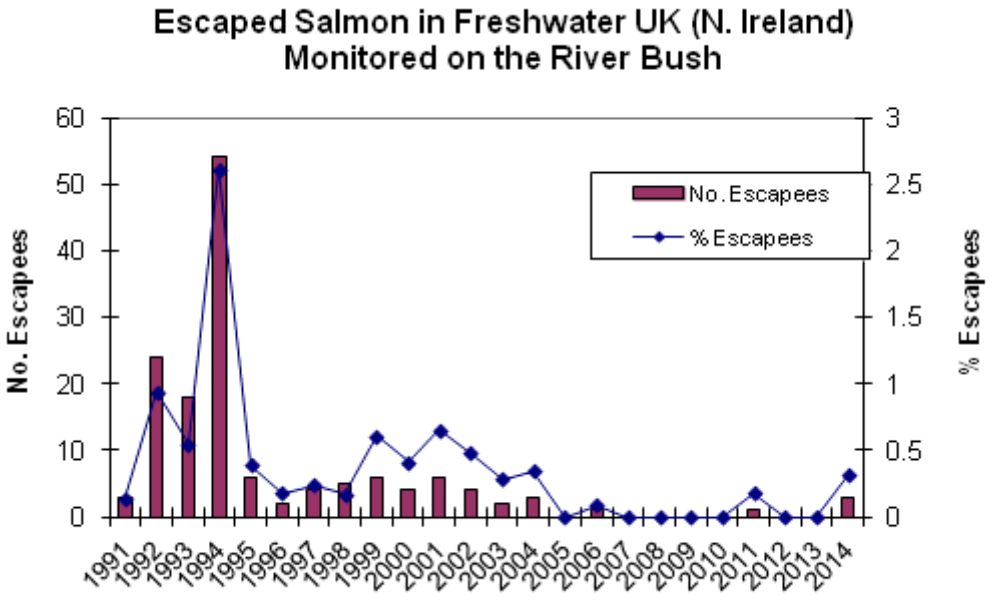
The table below shows the relevant seizures in the Loughs Agency area related to illegal salmon fishing, the court cases are currently going through the court process.

Seizures 2014	
Boat	**8**
Car	**1**
Net	**94**
Rod	**54**
Fish	**136**
Other items	**23**
Total	**184**

5. *What monitoring data can be presented to demonstrate progress in terms of levels of sea lice on farmed fish and numbers of escaped farmed salmon (Action A1)?*

Sea lice on Farmed fish = DARD

Long term monitoring data on farmed salmon escapees is available from the River Bush. The time series extends for 24 years and indicates an overall decline in the number of farmed salmon detected at the Bush trap (Figure 1). In the first 10 years from 1991 – 2000 an average of 12.6 farmed salmon/year were detected representing 0.62% of the wild salmon run. In the most recent 10 year period from 2005 – 2014 an average of 0.5 farmed salmon/year were detected representing 0.06% of the wild salmon run.



Summary of Northern Salmon harvest reposts showing prevalence of *Lepeophtheirus salmonis* observed.

				Number of Lice/Fish		
Date	No. Of fish Checked	No. Of positives (total lice seen)	Percentage fish infected	1	2	3
15/04/2015	345	10	2.8%	Max		
18/02/2015	425	1	0.2%	Max		
21/01/2015	302	1	0.3%	Max		
03/12/2014	259	4	1.5%	Max		
12/11/2014	199	4	2.0%	Max		
08/10/2014	364	3	0.8%	Max		
03/09/2014	471	7	1.5%	Max		
09/07/2014	287	0	0.0%			
25/06/2014	333	1	0.3%	Max		
21/05/2014	410	0	0.0%			
30/04/2014	674	14	2.1%	Max		
19/02/2014	435	20	4.6%	Max		
15/01/2014	424	22	5.2%	Max		

6. *Are the results of the genetic analysis described in Action A1 available?*

   The full Report will be available next year

European Union – UK (Scotland)

1. *What progress has been made with developing the Scottish salmon counter network, what is the timeframe for completing this work, and could details of the peer reviewed genetic study be provided (Action F2b, F3a and F3b)?*

   As indicated in the Implementation Plan, project funding was secured in 2014 to investigate the engineering requirements, technology options and costs of deploying and running counters in different environmental settings around Scotland. This project commenced in July 2014 and is scheduled to conclude by the end of 2015. The results of the project will be considered and the timescale for development of the counter network will be determined by available resources.

Report entitled "Accuracy of assignment of Atlantic salmon (*salmo salar*) to rivers and regions of Scotland and north east England based on single nucleotide polymorphism markers" has completed the internal review system within Marine Scotland and will be submitted in due course.

2. *In the absence of meaningful Conservation Limits and assessment of spawning escapement through the counter network, how will harvest levels be established under the present management regime and if licensing is introduced in future following the consultation process (Action F1 and F2)?*

   The public consultation inviting views on conservation measures which would seek to ban the killing of wild salmon except under license along with an accompanying carcass tagging scheme closed on 30 April 2015. As the results of this exercise are currently being considered by Scottish ministers, it would be inappropriate to comment in detail on possible future assessment or management regimes. In line with assessment programmes elsewhere, however, it is expected that where counter data does not currently exist, stock abundance will be estimated from reported fishery data and biological reference points will be transported from stocks where such parameters may be estimated to those where data is currently insufficient.

3a. *What progress has been made with developing and implementing the monitoring/research strategy for potential marine renewables and salmonid interactions and what is the timeframe for completing this work (Action F5a)?*

   A National Research and Monitoring Strategy for Diadromous Fish National Research and Monitoring Strategy for Diadromous Fish (NRMSD): to investigate the potential for interactions between diadromous fish and wind, wave and tidal renewable energy developments (was published in 2014. The critical areas of interest can be considered under two main themes:

   - **Theme 1**: current and priority research actions specific to offshore and marine renewable energy development
   - **Theme 2**: current and near-term research actions to implement a better understanding of Atlantic salmon populations to support the knowledge-base underlying risk assessments for offshore marine renewables energy developments.

   To ensure that the themes and research objective questions are aligned with the prevailing and emerging research demands for offshore and marine renewable energy development, a programme of engagement has been designed which includes a management steering group and on-going direct stakeholder consultations. Additionally advice and evidence from Scottish National Heritage, Crown Estate, Joint Nature Conservation Committee and other academic research organisations will be established.

   Work is in hand on several areas, including improvements to fish counters in rivers, design of a national counter network, the distribution and tracking of smolts at sea, timing of smolt runs, and depth utilization of returning adults at sea. Recently completed work on AC electromagnetic fields (emf) concluded that adult and post-smolt salmon were insensitive to fields of the strength likely to be generated by power transmission cables at sea.

3b. *What progress has been made with the planned enhanced industry-led voluntary sea lice reporting over 30 river catchment areas and what information was reported in 2014 (Action F5d)?*

The Scottish Salmon Producers Organisation (SSPO) produces quarterly reports on fish health management which provide information for 30 regions of the north-west coast, western and northern isles of Scotland. They are based on information supplied by farms during the relevant period. The reports include information on Farm Management Areas, stocking, fallowing, strategic treatments and average sea lice counts.

The reporting regions broadly mirror those for the wild salmon and sea trout fisheries. The sea lice numbers reported are average adult female lice count per fish for each reporting region.

4 reports were published during 2014 and they can be accessed on the SSPO website. An annual summary report for 2014 is also available on the website.

3c. *What is the expected timeframe for the DEPOMOD modelling tool to enhance SEPA discharge consents (Action F5f)?*

The recoded AUTODEPOMOD modelling tool is expected to be completed by the end of May 2015.

4. *What progress has been made with the implementation of a national river temperature monitoring strategy for salmon rivers and what is the expected timeframe for identifying sensitive areas and taking appropriate management action (Action H1b)? In what ways is climate change considered within strategic environmental frameworks (Action H1e)?*

Full details of the river Scotland River Temperature Monitoring Network are available on the Marine Scotland website.

In 2013 Marine Scotland Science (MSS) and the University of Birmingham received NERC CASE PhD funding to help take assist with the development of a national temperature network. A novel method was developed for designing the composition of the new network in 2014 and presented to the British Hydrological Society national conference. A paper has subsequently been submitted on this network design approach. During 2013 and 2014 MSS also developed infrastructure to manage data collection and store data (FL Environmental Observation Database – FLEObs) and calibration procedures and statistical approaches for correcting for logger bias. Standard Operating Procedures have been developed for all aspects of the work and the project has been brought under the Joint Code of Practice ensuring appropriate quality control (JCoP). Logger deployment is progressing in collaboration with local fisheries managers. Most of the loggers should be deployed by the end of May 2015. The anticipated timeline for deliverables is as follows:

- May 2015 - Complete deployment
- Autumn 2015 – Data download and storage, data exploration and model development
- Spring 2016 – Understand and model spatial variability in thermal regimes
- Summer 2016 – Identify areas sensitive to high temperatures and climate change
- Autumn 2016 – Assess potential of riparian land use to mitigate high temperature

- Winter 2016/2017 - Construct models to predict future water temperature changes
- Summer 2017 – Routine data download and storage, repeat model fitting, annual reporting

In addition to the SRTMN, MSS has been developing a program of complementary process based research to further understand the influence of riparian shading on river temperature, the potential for climate change mitigation and the optimal locations for riparian planting. Recent examples of this work include:

Garner, G., I. Malcolm, J. Sadler, and D. Hannah (2014), What causes cooling water temperature gradients in forested stream reaches?, *Hydrology and Earth System Sciences Discussions*, *11*(6), 6441-6472.

Garner, G., I. A. Malcolm, J. P. Sadler, C. P. Millar, and D. M. Hannah (2014), Inter-annual variability in the effects of riparian woodland on micro-climate, energy exchanges and water temperature of an upland Scottish stream, *Hydrological Processes*.

Finally, MSS has been working with local fisheries trusts to monitor and predict the effects of current large scale riparian planting projects on river temperature and fish productivity

5. *How many high priority barriers were removed from salmon rivers in 2014 (Action H2)?*

6. *What level of stocking was consented, was it consistent with NASCO guidelines and what were the offences for? What penalties were applied when offences were committed (e.g. would there be fines for an offence) (Action A1)?*

   Details were included within the APR - The ASFB Annual Report suggests that they granted 33 consents and reported 38 offences in 2014 whilst MSS granted 2 equivalent consents. We do not have details relating to any action taken as a result of the offences being reported.

7. *What progress has been made with the implementation of the EU Regulation on the Use of Alien and Locally Absent Species in Aquaculture (Action A2)?*

   The Alien and Locally Absent Species in Aquaculture (Scotland) Regulation 2015 was laid before the Scottish Parliament on 5th March 2015 and came into force on 3rd April 2015. The 2015 Regulations will provide a safeguard against the potential for adverse environmental effects associated with the use of alien and locally absent species in aquaculture, while also providing a Scottish focus. A guidance document to accompany the 2015 Regulation is currently being produced and will be published on the Scottish Government's web-pages.

8. *How was the Scottish Aquaculture Innovation Centre designed to be responsive to Actions F5a - i?*

   The Scottish Aquaculture Innovation Centre (SAIC) is one of eight Innovation Centres established by the Scottish Government in 2013-2014. Its aim is to transform the relationship between the aquaculture industry and research community and generate closer connections between both to foster innovative industry-relevant collaboration. The SAIC Board is industry-led. It comprises a Chair, four members from the aquaculture industry, one from the University of Stirling (recognising its role as the administrative hub) and one

from the academic community. The Board is supported by SAIC's Independent Scientific Panel - comprising eight highly regarded researchers. It provides expert and independent opinion to the SAIC Board on the scientific quality of proposals for SAIC funding. The Panel also supports SAIC with insights into relevant developments in related scientific fields or other parts of the world. This will help the Innovation Centre to identify possible synergies and avoid duplication in its project funding decisions.

The Four Priority Innovation Actions identified by SAIC are: Improved sea lice control; Alternative sustainable feeds for fin fish; Rapid detection methods for viral pathogens and disease; and Development of secure, health certified Scottish mollusc spat production systems. On 27 March 2015 SAIC announced £3.4 million funding for two projects on the use of cleaner fish for biological control of sea lice to enhance the environmental sustainability of the industry. The projects aim to build numbers and quality of farmed cleaner fish available; and identify a vaccine to improve their health, welfare and performance when deployed to sea.

9. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and Escaped Farmed Salmon on Wild Salmon Stocks. Scotland has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided (Action A3?*

Data requested below:

Sea Lice: Of a total 267 active seawater fish farm sites during 2014, sea lice inspections were conducted at 86 (32.2%) and enhanced sea lice inspections were conducted at a further 29 (10.9%). All farms inspected were found to have effective sea lice management in place for the aquaculture animals under their care, which met the requirements of the regulatory regime under the Aquaculture and Fisheries (Scotland) Act 2007. No reports of increased sea lice loads or lice-induced mortality of wild salmonids attributable to the farms was reported to the Marine Scotland's Fish Health Inspectorate during 2014.

Containment: Of a total 416 active fish farm sites during 2014, containment inspections were conducted at 144 (34.6%) and enhanced containment inspections were conducted at a further 30 (7.2%). 2 incidents resulting in escaped fish were reported from freshwater fish farms in 2014 which resulted in the loss of 5 fish. Assuming an estimate of 80 million fish held in freshwater fish farms at any point during 2014 this shows that 99.999994% of fish were contained. Ten incidents resulting in escaped fish were reported from seawater fish farms in 2014 which resulted in the loss of 184,613 fish. Assuming an estimate of 72 million fish held in seawater fish farms at any point during 2014 this shows that 99.74% of fish were contained.

Information relating to the inspection and operational activities of Marine Scotland's Fish Health Inspectorate is published on a regular basis. For each yearly quarter, a summary of case inspections and outcomes is published per region, along with summary information relevant to enhanced inspections conducted under the Aquaculture and Fisheries (Scotland) Act 2007.

Norway

1. *The Review Group notes with concern that the timescale for development of a new agreement for the Tana River appears to be delayed. What measures will be put in place to protect the stocks that are below their Conservation Limits until a new agreement is adopted (Action F4)?*

   At a meeting on ministerial level in late 2011 it was agreed to introduce temporary measures to reduce fishing mortality in the Tana river before a new agreement is adopted. Consequently, the local fisheries management in Norway introduced substantive regulatory measures aimed at reducing the fishing pressure from 2012 on. However, as this was met with what the local management considered to be only minor actions from Finland, the regulatory measures were suspended in 2013. Furthermore, in annual negotiations regarding the tourist fisheries, Finland has since 2012 rejected all proposals to reduce fishing mortality.

   For 2015 the local fisheries management has established zones where fishing is forbidden in the uppermost tributaries Karasjohka and Iesjokha. The MSW salmon stocks in these tributaries are considered to be some of the most threatened in the Tana River system. In addition, the local management has forbidden the seine fishery in the Norwegian part of the watercourse.

   For 2016 the local management is prepared to introduce substantive measures to reduce fishing mortality in all fisheries if this is met with comparable actions from Finland. Furthermore, Norway will propose a substantial reduction in fishing mortality caused by tourist anglers in regional negotiations concerning 2016.

2. *What progress has been made with the development of a regional carrying capacity model for sea lice; and what results have emerged from the monitoring programme of sensitivity of drugs against sea lice (Action A1)?*

   This topic is now under debate on basis of a White Paper on sustainable and predictable growth in the aquaculture industry. The Parliament will debate and draw conclusions in June 2015. One of the proposals is to establish sea lice as a factor/indicator for regulation of the production capacity of salmon aquaculture in production areas (regional approach).
   Results obtained in the surveillance program for resistance to chemotherapeutants against sea lice show a pronounced increase in prescribed medicines used as delousing agents.

   Furthermore, reduced sensitivity and resistance to the medicines tested in bioassays are generally widespread along the coast, but seem less prominent in the far north and far south. Compared to the surveillance in 2013, however, there seems to be a loss of sensitivity to deltamethrin and azamethiphos in Finnmark. The results for hydrogen peroxide were generally better than for other medicines, but loss of sensitivity was indicated in areas in Hordaland and Trøndelag.

3. *What proportion of farms have exceeded the sea lice limit and on how many has action been taken to require slaughtering and/or reduction of site maximum allowed biomass (Action A1)?*

   It is not possible to answer the question directly, as sea-lice counts are reported weekly provided the sea-temperature is above 4 degrees Celcius. The total number of reports are approximately 500 per week. However, the statistics show that at any time, 60 percent of all sites have less than 0,1 adult females, while 30 percent is in the range between 0,1 and 0,49. The regulations set out that the sea-lice count should not exceed 0,5 adult females.

   A total of 7 sites were given resolution on compulsory slaughtering in 2014, (2 in the North and 5 in the South-West part of Norway). The corresponding number for 2013 was 8, (6 in the North and 2 in the South-West). Furthermore 7 sites (3 in Western Norway, 3 in Mid N. and 1 in North N.) have been given notice that the NFSA is considering a reduction in site MAB in 2014. These cases are in process.

4. *What actions have been taken to remove pink salmon and have any self-reproducing populations been established? Does the monitoring indicate that minnow populations are expanding their range towards salmon areas (Action A4)?*

   Pink salmon have been caught in the county of Finnmark since the late 50s. This was caused by massive releases of smolts in rivers linked to the White Sea. Previously catches were depending on regular releases of smolts in north-west Russia. Stocking of pink salmon ceased more than ten years ago, and there are now clear signs that the species has established self-reproducing populations in the Barents Region – including rivers in Finnmark. The pink salmon has a two-year cycle and we expect a major new incursion in 2015.

   Two actions will be implemented:

   - Following up the monitoring efforts. A Norwegian - Russian environmental cooperation project has been prepared
   - Measures to catch pink salmon in the most vulnerable rivers in Finnmark using traditional fishing methods

   The results from the monitoring of minnows indicate that the species is expanding its range towards salmon areas. An example is the river Namsen in mid-Norway, which is one of the country's best salmon rivers. In this river, minnow was registered in the upper parts about 10 years ago. The species spread downstream and is now found in salmon areas. The consequences for the production of salmon in the river Namsen is not known, but there are plans to investigate the issue.

Russian Federation

1. *What progress has been made in developing and implementing a procedure for voluntary reporting of catch and release? What are the reasons why such reporting cannot be made mandatory?*

   In accordance with current legislation the recreational Atlantic salmon fisheries in Russia are allowed at fishing sites only. Each salmon fishery is licensed by a Territorial Directorate

of the Federal Agency for Fisheries. Since 2009 the Territorial Directorates issued licences for users of the fishing sites in compliance with the quota allocation made by the Regional Commissions on Regulation of Harvesting the Anadromous Fish. The licence gives a legal right to the user of the fishing site to organize salmon fisheries. The user of the fishing site is obliged to report catches to the Territorial Directorates of the Federal Agency for Fisheries twice a month. Once the allocated quota is fished the fishery must be closed. A quota is set for catch-and-retain fisheries only. There is no quota or catch/bag limits for catch-and-release. Therefore there were no obligations to report caught-and-released fish since 2009. However, some users of fishing sites with most developed catch-and-release fisheries in the Kola Peninsula have been collecting catch statistics on catch-and-release fishing on a voluntary basis since yearly 1990s. This catch statistics are available for fisheries research institutions. No information can be provided in this response on why such reporting cannot be made mandatory.

2. *Given the very high level of unreported catch estimated on the Tuloma River, what measures are planned to address this and what measures are planned in other rivers (Action F1)?*

   Stricter enforcement of existing laws to reduce the high level of unreported catch was implemented in 2014 on a number of rivers and planned for 2015.

3. *In the light of the findings of the Kolarctic Salmon Project, what is the expected timescale for implementing management measures in the coastal fisheries so as to ensure the protection of the weakest contributing stocks (Action F2)?*

   The findings of the Kolarctic Salmon Project were used for developing recommendations for the Regional Commission on Regulation of Harvesting the Anadromous Fish in Murmansk region in 2015. The quota allocation for coastal salmon fisheries in the White Sea has been made on the basis of data on salmon stock contributions to the fisheries. No Atlantic salmon fisheries are allowed in the Russian Federation in the Barents Sea by law.

4. *When will detailed plans be developed for habitat protection and restoration on specific rivers (Action H2)?*

   The inventory of the Barents Sea rivers has been established and the work on developing the inventory of salmon rivers of the White sea basin of Murmansk and Archangelsk regions is under way. General recommendations on habitat restoration were prepared for a number of salmon rivers in the Murmansk region. No detailed plans have been developed for specific rivers yet.

5. *In answer to a question on A1 in last year's report, the Russian Federation indicated that it would provide more information on how sea lice are managed under the new Federal Law on aquaculture. This information is not contained in this year's APR, and the Review Group requests that it be provided.*

   No new information is available.

6. *The Review Group considers that all Parties and jurisdictions with salmon farming should have presented quantitative data in their Implementation Plans to provide a baseline for demonstrating progress towards the international goals for sea lice and containment in the NASCO Guidance on Best Management Practices to Address Impacts of Sea Lice and*

Escaped Farmed Salmon on Wild Salmon Stocks. The Russian Federation has not provided these data. Can the results of monitoring and enforcement for sea lice and escaped farmed salmon be provided? (Action A1)

No information on monitoring and enforcement for sea lice and escaped farmed salmon can be provided.

United States

1. *What were the results of the surveillance conducted in rivers in 2014 to identify any poaching activity for Atlantic salmon (Action F2)?*

   The National Marine Fisheries Service's Office of Law Enforcement, the Maine Department of Marine Resource's Marine Patrol, and the Maine Department of Inland Fisheries and Wildlife's Warden Service have the responsibility, among others, of enforcing federal and state laws pertaining to the protection of Atlantic salmon. These enforcement agencies cooperate with all levels of overt enforcement, this being the best deterrent to thwart illegal activity. These agencies also engage in covert operations that have resulted in several high profile cases in recent years (though none were made public in calendar year 2014). Both Federal and State agencies investigate and prosecute vigorously all violations. The Maine Warden Service produces an annual report on its activities. The most recent available is a summary of activities in calendar year 2013 (http://www.maine.gov/ifw/warden_service/pdfs/_2013MWS%20Annual%20Report.pdf). It reveals that roughly 20% of the Maine Warden Service's activities are directed at compliance with fishing regulations (including, but not limited to, Atlantic salmon surveillance activities). In Connecticut, the state environmental police closely monitor activities in salmon streams. In 2014, one officer observed an adult salmon holding in a popular trout fishing pool and reported this to the Inland Fisheries Division, which also investigated. The officer advised anglers to stop fishing and monitored the site until the salmon moved upstream.

2. *By what date will the comprehensive conservation plan for Atlantic salmon in Maine, referred to in Action F2, be implemented)?*

   There is currently no specific date set for the Maine Department of Inland Fisheries and Wildlife to conduct a comprehensive conservation plan as described in section F2 (and A4). There is, however, progress in curtailing stocking of non- native salmonids in salmon rivers. For example, within the freshwater range of the endangered salmon in Maine only one salmon river (the Sandy River, a tributary to the Kennebec) still has an active brown trout stocking program. The Maine Department of Inland Fisheries and Wildlife and the Maine Department of Marine Resources have agreed that the stocking locations of non-native salmonids will be spatially segregated from Atlantic salmon.

3. *How many rivers were monitored for escaped farmed salmon in 2014 and was monitoring only implemented when an escape event was notified (Action A1)?*

   Maine Department of Marine Resources staff conduct routine monitoring of the abundance and status of adult Atlantic salmon (and other fish species) at permanent fishways to monitor fish returns to the Penobscot, Kennebec, Androscoggin, Narraguagus, and Pleasant Rivers.

Various dam owners also conduct similar routine monitoring on the Union River and the Saco River. The St. Croix Waterway Commission also operates a trap at the Milltown Dam on the St. Croix River and monitors for escaped farmed salmon. The placement of a temporary barrier weir on the Dennys River was not necessary since there were no reported escapes from U.S. farms in 2014. These fish counting facilities are typically operated from May through early November each year. Staff update the statewide trap catch summary (http://www.maine.gov/dmr/searunfish/trapcounts.shtml) weekly or more often during the peak of the fish migrations.

All fishways on salmon rivers in southern New England have traps that retain salmon and are regularly staffed and monitored. This monitoring is done at all times, not just in relation to escape events. No escaped farmed salmon were observed in 2014.

4. *The US indicated in a response to a question raised by the Review Group in 2014 that in order to gain a better understanding of the temporal and spatial distribution of sea lice throughout the Gulf of Maine, NOAA National Marine Fisheries Service (NMFS) had funded studies to investigate the presence and abundance of sea lice on wild fish communities in embayments with salmon farms (Cobscook Bay) and areas without (Penobscot Bay). Can the results of these studies be provided?*

   Both studies referenced in the previous annual report from last year are still in progress. Data are being analyzed, and one study is still underway with data still being collected. As such, preliminary results are not yet available.

Annex 15

CNL(15)51

Summary of the Discussions during the Special Session on the Evaluation of Annual Progress Reports under the 2013 - 2018 Implementation Plans

Ms Sue Scott (Atlantic Salmon Federation, NGO Co-Chair): highlighted the need for the Implementation Plans (IPs) and Annual Progress Reports (APRs) to provide clear evidence of progress in protecting and conserving wild Atlantic salmon. Following the first reporting cycle, the Council had agreed that NASCO Parties and jurisdictions should identify actions to be taken with measurable outcomes in the second round of IPs that applied to the period 2013 - 2018. She noted that without this information it is very hard to review progress.

Ms Francesca Arena (European Union): noted that there are two clear messages from the Review Group's report. First, there needs to be quantitative information in the APRs to provide evidence of progress towards the measurable goals for the actions contained in the IPs. There is room for improvement on this aspect. Second, she referred to the progress made in the number of jurisdictions submitting IPs/APRs. She indicated that she welcomed the improvements in the transparency in reporting and looked forward to further improvements in future.

Mr Emanuel Rosing (Denmark (in respect of the Faroe Islands and Greenland)): thanked the Review Group for its work and indicated that his delegation recognised that the IP/APR reporting process was a step in the right direction but considers that, in the interests of fairness and balance, the NASCO Convention should apply equally to all Parties.

Ms Sue Scott (Atlantic Salmon Federation, NGO Co-Chair): referred to new measures in Canada intended to protect grilse in the Maritime Provinces and Quebec and asked what measures would be implemented to protect large salmon, particularly those below their conservation limits.

Mr Richard Nadeau (Canada): responded that for Nova Scotia, New Brunswick and Prince Edward Island there was a policy of no retention of salmon. In Quebec, the management is on a river-by-river basis linked to attainment of conservation limits, and retention of salmon has been prohibited on a number of rivers with a mid-season review to determine if the closure should be maintained. Additionally, any river can be closed in the event of concerns about stock status. He referred to the establishment of a Ministerial Advisory Committee on Atlantic salmon, but noted that it has not yet reported its findings which are due later in the year.

Mr Dave Meerburg (Atlantic Salmon Federation): noted that the Canadian APR makes reference to changes being made to the conservation limits following a scientific review 12 - 18 months ago. He asked when the new conservation limits would be put in place and made available to the ICES Working Group on North Atlantic Salmon (WGNAS) for use in the assessments, including those relating to the West Greenland Commission.

Mr Richard Nadeau (Canada): responded that although the process started 18 months ago, the new conservation limits will not be introduced until after the Ministerial Advisory Committee on Atlantic salmon has reported. In response to a follow-up question from Mr Meerburg, he indicated that hopefully the new conservation limits could be made available to ICES in time for the 2016 assessments.

Mr Andrew Graham-Stewart (Salmon and Trout Association (Scotland)): indicated that the Salmon and Trout Association was greatly encouraged by Scotland's direction of travel with regard to mixed-stock fisheries. If the principle of only harvesting stocks that are clearly sustainable is adhered to, then the proposed new system of licensing, carcass tagging and quotas proposed for 2016 will represent real and welcome progress. He was, however, concerned about the Scottish Government's response on sea lice monitoring and enforcement. Specifically, the following statement:

'Of a total of 267 seawater fish farm sites that were active during 2014, sea lice inspections were conducted at 86 and enhanced sea lice inspections were conducted at a further 29. All farms inspected were found to have effective sea lice management in place for the aquaculture animals under their care, which met the requirements of the regulatory regime under the Aquaculture and Fisheries (Scotland) Act 2007. No reports of increased sea lice loads or lice-induced mortality of wild salmonids attributable to the farms was reported to the Marine Scotland's Fish Health Inspectorate during 2014.'

He indicated that this wording gives the impression that all is well with sea lice control in Scotland which he considered to be very far from the truth. He noted that last year, for example, Marine Harvest had lost control at its sites in Wester Ross. The situation became progressively worse and by the time the fish were eventually harvested, the average number of adult female lice per farmed fish was 40. He added that in the north-west Highlands, salmon farms of the well-known company Loch Duart (supplier of farmed salmon to royalty and celebrity chefs) recently exceeded the industry's Code of Good Practice thresholds for sea lice treatment for an astonishing 24 months out of 27. He noted that just before this year's wild smolt runs, lice numbers were 16 times over the threshold. He stressed that these were not isolated incidents and billions of sea lice larvae spread from salmon farms to infect wild fish. He added that just two weeks prior to the Annual Meeting, two post-smolt sea trout carrying over 500 sea lice were caught during sweep net monitoring. He noted that no enforcement action is taken against farms when they breach sea lice guidelines. As long as they continue to treat against lice, when they are above the industry's thresholds, the farmers are not committing any offence. In the meantime, he believes that wild fish have no protection whatsoever. He asked the Scottish Government to confirm that this situation is untenable and indeed intolerable and, if so, when does the Scottish Government intend to bring forward and/or employ measures to ensure that wild fish have statutory, legal protection when lice numbers on farms are out of control? He indicated that he was referring to a statutory requirement for farms to immediately cull out all stock when sea lice levels exceed a certain limit and treatment, as happens all too often, is having no effect.

Mr Willie Cowan (European Union – UK (Scotland)): noted that the issues referred to were disappointing as the Scottish Government is working with both sectors to address the interactions between farmed and wild salmon. There has been much activity and investment both in relation to research and the practical management of sea lice, including the use of cleaner fish (wrasse) which are proving to be successful in most areas where they are being deployed. He referred to the Scottish Government-funded Aquaculture Innovation Centre

whose priority is the management and control of sea lice. The work with both the salmon farming industry and the wild fish sector is ongoing to manage interactions.

Mr Niall Greene (Salmon Watch Ireland): acknowledged that the information presented in the APR for Ireland in relation to the status of salmon stocks and their management and on habitat protection and restoration is a fair description of the situation in Ireland. However, he indicated that there were numerous inadequacies in the APR in relation to aquaculture. He wished to illustrate the chaotic state of the Irish Government's management of salmon farming by using a case study relating to escapees. He stated that the Irish NGO 'Friends of the Irish Environment' had described the situation as 'a complete breakdown of the salmon farming licensing system'. He indicated that on 4 March 2014, a farmer in the south of Ireland had reported an escape of 230,000 salmon to the authorities following a severe storm on 1 February, a month beforehand. The licence conditions require reports to be submitted within four days of the escape event and he asked what legal or administrative action would be taken in respect of the delay in reporting the event or, more importantly, for any deficiencies in the management of the farm. He referred to a statement in the APR in relation to this escape event that indicated that 'there is no evidence of a large-scale fish escape - but the possibility that fish escaped and survived cannot be ruled out. There have been no reported occurrences of escapes being detected in neighbouring rivers'. However, the same authorities in Ireland, seem to have reported the event as an escape to ICES. Furthermore, he noted that the Irish authorities have consistently rebuffed efforts to gain access to the two engineering reports carried out into the incident on the grounds that it was not in the public interest. He noted that in a 2011 report into the escape of 80,000 fish, the inspector had commented that 'if more rigorous/frequent mooring inspections had been carried out it is possible, even likely, that there would have been earlier detection which would have avoided the November 2010 failures'. An Assistant Secretary in the Department of Agriculture, Food and the Environment had agreed with the inspector's report but there was no response other than the Minister of Agriculture, Food and the Marine indicating, in a response to a Parliamentary Question, that new cage specifications were being developed for inclusion in a new protocol. He noted that the engineering report for 2012 - 2014, seen by Friends of the Irish Environment, highlights a litany of other transgressions: farms located outside their licensed areas; GPS not working; cages in bad condition; sites that were overstocked by up to three times their permitted tonnage; and failure to provide stocking figures. In 2014, the Irish Government filed a Programme of Measures with the European Commission in relation to salmon farming. This included a new Monitoring and Compliance Unit which had been established to strengthen the adherence to the terms and conditions of all aquaculture licences. There is no evidence (and no reference in the APR) that this unit, if it indeed exists, has made any difference to a situation in which salmon farmers basically do whatever they want. In over 30 years of Irish salmon farming, not one farmer has ever been prosecuted for licence transgressions and there is only one recorded incident of punitive administrative action having been taken. He considered that this was a system out of control, but that this was not the impression given by the APR.

Mr Denis Maher (European Union - Ireland): responded that he was gratified by the comments from Mr Greene relating to the information presented in the APR on stock status and protection of stocks for which his department, the Department of Communications, Energy and Natural Resources, is responsible. A separate department, the Department of Agriculture, Food and the Marine is responsible for aquaculture development and licensing. There is a significant level of contact between departments on the issue of the interactions between wild and farmed salmonids and the Department of Agriculture, Food and the Marine was consulted on the three questions submitted in advance of the meeting and for which responses have been

provided. He added that in relation to the questions raised he would contact the Department of Agriculture, Food and the Marine. That department had indicated that 'there was no evidence of a large escape but the possibility that fish escaped and survived can't be ruled out', and he indicated that he could not expand on that information since investigations are a matter for that department. However, the Department of Communications, Energy and Natural Resources will continue to engage with the Department of Agriculture, Food and the Marine to seek responses to the questions raised on the escape incident and what sanctions might be imposed on licencees in this and other instances where licence terms appear to be breached or there appears to be a failure to report escapes adequately.

Mr Torfinn Evensen (Norske Lakseelver): welcomed the acknowledgement of the need to recapture escaped farmed salmon in Norway but noted that the system was not yet fully established nor was it clear who was responsible for implementing it. A new regulation indicates that recapture actions should be planned, but the industry may not support the implementation of recapture efforts. He suggested that the effective recapture of escapees requires marking of all farmed salmon, for example by the removal of the adipose fin, and that tracing of escapees to the farm of origin could be achieved by tagging farmed salmon using, for example, coded wire tags. He asked what progress had been made towards implementing this new obligation to recapture farmed salmon and towards achievement of NASCO's goal of zero escapes.

Mr Helge Lorentzen (Norway): indicated that discussions were ongoing but, as in Ireland, different Ministries are involved in protection of wild salmon and aquaculture development and regulation in Norway. He noted that it is no secret that a new White Paper on future aquaculture developments has just been finalised that contains proposals for actions and the expectation is that the responsible authorities will follow-up on that. The Directorate of the Environment will do its upmost to ensure that the proposals are implemented.

Mr Noel Carr (Federation of Irish Salmon and Sea Trout Anglers): referred to coastal netting of wild salmon in Norway and the findings of the recent research programme, Kolarctic Salmon. He stated that it is clear from this research that multiple stocks, including salmon from Russia, are exploited in the coastal fishery in Finnmark, and he asked the Russian delegation to comment on the management measures in place in Norway. He also asked if it was possible that sea lice from Norwegian salmon farms were damaging salmon smolts migrating from Russian rivers. With regard to aquaculture in Ireland, he noted that there is denial and confusion in relation to salmon farming and the Department of Agriculture, Food and the Marine needs to be challenged as to why Ireland's marine environment is being put at risk.

Ms Francesca Arena (European Union): noted that most questions during the Special Session had focussed on the issue of aquaculture, specifically sea lice and containment. While colleagues working on aquaculture were not present at the 2015 Annual Meeting, there is clearly interest in a Theme-based Special Session on this topic at the 2016 Annual Meeting with appropriate expertise participating so as to review best practice in minimising impacts of aquaculture on the wild salmon stocks.

Mr Denis Maher (European Union - Ireland): indicated that the Department of Communications, Energy and Natural Resources supports the development of aquaculture where this is environmentally sustainable and while that department does not have a mandate for aquaculture development, it is responsible for the protection of wild salmon stocks. He

noted that some media reports had emerged in recent days about the engineering report and these are being examined by the Department of Agriculture, Food and the Marine and that this Department is also investigating the serious matter of alleged dumping of farmed salmon. In addition, responses to questions raised regarding this alleged incident of dumping of farmed fish would be sought

Mr Paul Knight (Salmon and Trout Association, NGO Co-Chair): indicated that the NGOs supported holding a Theme-based Special Session on aquaculture during the 2016 Annual Meeting and suggested that a full day should be devoted to this important topic. He noted that NASCO's role is to conserve and restore wild salmon and not to promote aquaculture, so it will be important to review what progress has been made to protect wild salmon stocks. At present, aquaculture practices in relation to sea lice and containment are not sustainable.

Mr Daniel Morris (United States): stated that it had been an interesting Special Session during which the Parties had been challenged with some interesting questions and on the basis of the dialogue there could be a need for improvements over the coming year. He noted that in reviewing the APRs, it is important to look not only for shortcomings but successes and there was much to be learned from the information presented, e.g. in relation to the utility of carcass tagging and measures to improve fish passage.

Mr Jóannes Hansen (Vice-President of NASCO): thanked the Review Group for its work in evaluating the APRs and for its recommendations for improvements to future reporting. He thanked all those who had asked questions and welcomed the transparent approach to reviewing progress in implementing NASCO's agreements. He then closed the Special Session.

Annex 16

CNL(15)15

Report on Progress in Implementing the Measures contained in the 'Action Plan for taking forward the recommendations of the External Performance Review and the review of the 'Next Steps' for NASCO'

In 2013, the Council adopted an 'Action Plan for taking forward the recommendations of the External Performance Review and the review of the 'Next Steps' for NASCO (CNL(13)38). Last year, a comprehensive progress report on each of the recommendations contained in the Action Plan was presented to the Council, CNL(14)14. The following tables present an update for 2015 which should be read in conjunction with last year's report. Where there is no new progress to report on a recommendation or where a recommendation had been completed last year the recommendations have not been included in this report (EPR24, 27, 32, 69 and NS10, 11, 12 and 15 in section 1 and 2.3 and 2.5 in section 2).

Section 1 contains recommendations which had been implemented or planned at the time the Action Plan was developed in 2013 but for which there was a need to monitor progress and evaluate outcomes. In order to minimise the length of this report, the recommendations themselves are not described here but are referred to by their number in the Action Plan.

Section 2 contains recommendations for which further action was required for their implementation. For ease of reference we have numbered the nine decisions in the Action Plan.

Section 3 contains actions to strengthen NASCO's work on the management of salmon fisheries.

Secretary
Edinburgh
28 May 2015

Section 1: Recommendations of the External Performance Review Panel (EPR) and 'Next Steps' Review Group (NS) that have been implemented or are planned and for which there may be a need to monitor progress and evaluate outcomes

	2015 Update on Actions taken
EPRs 1, 2, 3, 36, 48, 50, 52, 53, 57 and 58. NS 1, 4, 5, 6, 8, 9 and 13	In its 2015 report, the Review Group notes that a new IP had been received for EU – Spain (Navarra), and that this was considered to be satisfactory. The Review Group noted that revised IPs had been provided by Canada, EU - Germany, EU - UK (England and Wales), EU - UK (Northern Ireland), EU - UK (Scotland), Norway, and the United States. The Review Group did not re-evaluate these IPs, but it noted that the changes made ranged from minor editorial changes to the inclusion of a new action (EU - Germany) and the removal of an action (United States). Since the Group's meeting a further IP has been received from EU – France and this is currently being evaluated. The Review Group had previously noted the difficulty in assessing progress on actions that are unclear or imprecise and has recommended that greater efforts should be made in the next round of IPs (2018-)to ensure that all actions are clearly and concisely described. Any IPs that do not do so should not be accepted by the Review Group but returned to the Party/jurisdiction for revision. For the 2015 APRs, the Review Group noted that while the clarification made to the reporting template had further improved the consistency of the reporting, several Parties'/jurisdictions' APRs had not provided a clear account of progress in implementing and evaluating some or all of the actions detailed in their IPs. These reports either included one or more gaps in the 'Progress on Action to Date', or the comment provided bore no relationship to the proposed action. The Review Group has provided a table summarising, for each jurisdiction, whether each action is ongoing, completed or has not yet started and it has also indicated whether the progress reports for ongoing and completed actions are clear or unclear. Overall, the Review Group considered that the most common fault with the information provided on progress with actions was a lack of quantitative information on what has been achieved and/or what the results have been. The Review Group has asked that all Parties/jurisdictions address this in future APRs. Where the Review Group considered that there were shortcomings in an APR, it developed a list of questions and each Party/jurisdiction was asked to respond in writing to these questions no later than 15 May. The Group's report will be presented at a Special Session during the Thirty-Second Annual Meeting to allow discussion of the Group's findings and for questions to be addressed to the Parties.
EPR2 and NS2	While the Socio-economics Working Group has not met since 2008, a Sub-Group has worked to develop information for inclusion on the NASCO website. In 2014, the Council held a Theme-based Special Session on the topic of '*Management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limit'* One of the objectives of this session was to consider how socio-economic considerations, including the interests of indigenous people, are weighed against conservation needs and, where fishing is permitted on stocks below their Conservation Limits, the approaches being used to ensure that exploitation is limited to a level that permits stock rebuilding within a stated timeframe. Last year the Council asked that Parties/jurisdictions be requested to advise the Secretariat of any new studies relating to the socio-economic values of the wild Atlantic salmon and agreed that future Theme-based Special Sessions might be held on integrating socio-economic factors in decisions relating to habitat protection, restoration and enhancement and to aquaculture. A further Theme-based Special Session will be held at the 2015 Annual Meeting on the topic of '*Maintaining and improving river connectivity with particular focus on impacts of hydropower*'. One of the objectives of the session is to evaluate the benefits and costs of removing dams and other obstructions.

EPR4 and NS14	The 2014 Theme-based Special Session on the topic of '*Management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limit*', was very successful and the report has been published and distributed (see CNL(14)68). A half-day Theme-based Special Session will be held in 2015 on the topic of '*Maintaining and improving river connectivity with particular focus on impacts of hydropower*'.
EPR 33	Since the last Annual Meeting of the West Greenland Commission, its *Ad hoc* Working Group on Monitoring and Control has met and there has been an intersessional meeting of the Commission. Important preparatory work was undertaken at these meeting including development of a Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGCIS(15)5, and a Framework for a Multi-Annual Regulatory Measure for Fishing for Salmon at West Greenland for 2015, 2016 and 2017, WGC(15)8. There will be negotiations for new regulatory measures or decisions in both the North-East Atlantic and West Greenland Commissions at the 2015 Annual Meeting. There is an agenda item in the North-East Atlantic Commission to allow for development a risk framework for the Faroese fishery.
EPRs 41 and 43	At its 2014 Annual Meeting, the IASRB agreed that its priority was to encourage studies to partition marine mortality of migrating Atlantic salmon in order to support the conservation and management of Atlantic salmon stocks across the North Atlantic It adopted a Resolution, ICR(14)6, encouraging NASCO Parties to continue the development of local collaborative telemetry projects and to encourage the development of large international collaborative telemetry projects that together build upon and expand local efforts. In support of this, the Board organised a Telemetry Workshop which was held in London in December 2014. The report, ICR(15)3, will be considered at the Board's 2015 Annual Meeting. The Board has continued to support research projects related to salmon at sea. In 2012, the Board had supported two projects (£6,000 each) as follows: 'Genetic stock of origin identification of European salmon captured at West Greenland' and 'Genetic stock identification of salmon caught in the Faroes fishery'. The funding provided by the Board had allowed these two projects to proceed and had led to other funds being made available. In 2014, the Board supported a project (£18,300) entitled '*Enhancement of a North American Atlantic salmon genetic baseline for individual and stock identification and application of the baseline to historical scales collected at West Greenland'.* In its 2015 advice, ICES has provided details of new opportunities for research on salmon at sea and for collecting information on salmon bycatch in pelagic fisheries (see section 2.6 below).
EPRs 42 and 46	A Theme-based Special Session, on the topic of '*Management of single and mixed stock fisheries, with particular focus on stocks below their conservation limit*', was held at the 2014 Annual Meeting. The objectives of this session were to allow for an exchange of information on: • Progress in establishing conservation limits, or alternative reference points, and the approaches being used to manage fisheries in their absence; • How management measures are used to ensure the protection of the weakest contributing stocks in mixed-stock fisheries; • How socio-economic considerations, including the interests of indigenous people, are weighed against conservation needs and, where fishing is permitted on stocks below their CLs, the approaches being used to ensure that exploitation is limited to a level that permits stock rebuilding within a stated timeframe. Consistent with section 3 of the Action Plan (see below), an item on '*Mixed-stock fisheries conducted by members of the Commission*' has been included on each Commission agenda for the 2015 Annual Meetings. Each Party with MSFs has been requested to submit a paper providing a brief description of any MSFs still operating, the most recent catch data, any updates to the IP relating to MSFs and any changes or developments in the management of MSFs in this IP period to implement NASCO's agreements.

	The 2015 APRs were evaluated by the Review Group and its findings are contained in document CNL(15)12. The 2014 Theme-based Special Session on the topic of '*Management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limit*', was highly successful and the report has been published and distributed (see CNL(14)68).
EPRs 47, 49 and 54	The Review Group has reported that sixteen APRs were submitted prior to, or shortly after, the deadline of 1 April. Two further APRs were received either immediately before (Russian Federation) or during (Canada) the Review Group's meeting, approximately two weeks after the deadline for submission. An IP and an APR (catch statistics only) were received for EU – France after the Review Group's meeting had concluded. The IP for EU – France is being reviewed by correspondence. The Review Group has stressed that timely reporting is important if the evaluation process is to be thorough and consistent.
EPR 51	A Theme- based Special Session was held at the 2014 Annual Meeting to allow for an exchange of information on, *inter alia*, how management measures are used to ensure the protection of the weakest contributing stocks in mixed-stock fisheries. With regard to fishing for salmon beyond areas of fisheries jurisdiction by non-NASCO Parties, there have been no sightings since the early 1990s but no information was obtained from the Norwegian coastguard in 2014/15. In accordance with the External Review Panel's recommendation, NAFO and NEAFC have been consulted on this matter (see section 2 below).
EPRs 59 and 61	At the intersessional meeting of the West Greenland Commission, a Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGCIS(15)5, was adopted. This plan had been developed after an evaluation of the management of the fishery against six tenets for effective management of an Atlantic salmon fishery There was support, in principle, for evaluating the fisheries of other members of the Commission after further consultation and consideration of the approach to be adopted prior to, and at, the Annual Meeting. Estimates of unreported catch are contained in document CNL(15)13. Consultations have commenced with NEAFC and NAFO on IUU fishing by non-NASCO Parties (see 2.1 below).
EPR 73 NS 16	The President of NASCO wrote to the Icelandic Minister for Fisheries and Agriculture on 27 October 2014, updating him on NASCO matters and encouraging Iceland to re-accede to the NASCO Convention. The President requested that the Parties to NASCO also make individual representations to the Minister. No response has been received to date.
EPR 74	The Secretary of NASCO wrote to the representative of France (in respect of St Pierre and Miquelon) on 17 February 2015 reiterating that the Council of NASCO believes that full membership of NASCO by France (in respect of St Pierre and Miquelon) would better facilitate cooperation and dialogue among interested Parties and, as requested, enclosing further information on the financial implications of accession to the Convention for France (in respect of St Pierre and Miquelon). Two representatives of France (in respect of St Pierre and Miquelon) will attend the 2015 Annual Meeting.
	The Chairman of EIFAAC attended the 2014 Annual Meeting of NASCO and will attend the 2015 Annual Meeting. NASCO is supporting an EIFAAC symposium on Recreation Fisheries to be held in Lillehammer, Norway, in June 2015. At the 2015 Annual Meeting, the Finance and Administration Committee will be reviewing the operation of the MoUs between NASCO and ICES and NASCO and the OSPAR Commission and will make its recommendations to the Council.

Section 2: Recommendations of the External Performance Review Panel (EPR) and 'Next Steps' Review Group (NS) that require further action for their implementation

2.1 IUU Fishing by non-NASCO Parties *(This refers to recommendations contained within EPR6 – 8, EPR63, EPR64 and EPR72)*

Decision: *A problem of fishing for salmon by vessels registered to non-NASCO Parties occurred in the North-East Atlantic in the late 1980s and early 1990s. NASCO took diplomatic action to address the problem and there have been no sightings of vessels registered to non-NASCO Parties fishing for salmon in international waters in the North-East Atlantic since the early 1990s. However, it is recognised that airborne surveillance of this area is limited, particularly during winter months. The Secretariat should continue to liaise with the Parties and the coastguard authorities. It should also seek cooperation from NEAFC and NAFO to use their MCS to identify any activity by vessels in their areas of competence that may be fishing for salmon in international waters and to compile information in accordance with the Council's Resolution on Fishing for Salmon on the High Seas, CNL(92)54. The Parties should coordinate with their delegations to NAFO and NEAFC, as appropriate, on this issue. In the event that there is evidence of such activity, it will be drawn to the Council's attention so that appropriate measures can be considered.*

2014 Update: The Secretariat has continued to liaise with the coastguard authorities in Norway and Iceland concerning information from airborne surveillance flights. During July, August and September 2013, the Norwegian coastguard carried out eight surveillance flights over the area of international waters north of the Faroe Islands in the Northern Norwegian Sea. No fishing for salmon was observed in 2013 as has been the case since the early 1990s. No information has been provided by the Icelandic coastguard, but in 2012/13 it did not undertake any flights over this area of international waters. In the 1990s when fishing by non-NASCO Parties was known to have occurred, information was also obtained from ports and from fishery protection vessel patrols but no such information has been received since then.

The Secretariat has contacted NAFO and NEAFC to seek cooperation in using their MCS to identify any activity by vessels that may be fishing for salmon in international waters. The NAFO Secretariat has advised that NAFO is willing to assist NASCO with regard to fishing for salmon in international waters and indicated that most of the surveillance in the NAFO Regulatory Area is conducted by Canada. The NAFO Secretariat will advise whether the Parties or NAFO will respond. There will be an opportunity to discuss this further with the NAFO and NEAFC Secretariats at the 2014 Regional Secretariats Network (RSN) meeting.

2015 Update: The NEAFC Parties coordinate a comprehensive airborne and shipborne surveillance programme associated with fisheries for its regulated species. The NEAFC Secretariat also operates a VMS system and this combined with the surveillance operations, provides a real time flow of information on the fishery through the NEAFC Secretariat. NEAFC has not detected any IUU fishing by non-NEAFC Parties since 2006 although any such activity associated with tuna vessels may have been reported directly to ICCAT rather than to NEAFC. It is thought that NEAFC initiatives (and those of ICCAT e.g. its catch certification scheme) have effectively addressed IUU fishing in the NEAFC area. Furthermore, prior to 2006, the activity detected by NEAFC was associated with IUU trawling for pelagic redfish, mostly at depths between 200 - 600m and so it would be unlikely to result in catches of salmon. The NEAFC surveillance programme focuses on the areas of the regulated fisheries and while there may be areas that would not be covered, where any IUU fishing for salmon might still go undetected, an exchange of information between the NEAFC and NASCO Secretariats would increase the current temporal and spatial coverage of surveillance. This would be consistent with the External Performance Review and should supplement any information NASCO receives from the coastguard airborne surveillance operated by Norway in relation to the area of international waters north of the Faroe Islands. The Council might wish to ask the NASCO Secretary to continue to liaise with the NEAFC Secretary on arrangements for an exchange of information on IUU fishing and bycatch of salmon.

The NAFO Secretary has indicated that surveillance in the NAFO regulatory area is conducted by NAFO Contracting Parties and, as most of the airborne surveillance is conducted by Canada, the Council might wish to ask that the Secretariat consult Canada with a view to any activity that might involve IUU fishing for salmon being drawn to NASCO's attention. The fishery in the NAFO area is predominantly for demersal species. The NAFO Secretary has agreed to send NASCO the NAFO IUU list whenever it is updated but no vessels have been added to the NAFO IUU list since 2006. The NAFO Secretary has also advised that landings of fish caught in the NAFO regulatory area can only be made at authorised ports and that these ports would not allow landings from vessels involved in IUU activity. Under NAFO rules, 'authorized ports' are ports designated to receive landings of NAFO-managed species by NAFO-authorised fishing vessels that have fished in the NAFO Regulatory Area. However, a vessel that has not been fishing NAFO-managed species could land salmon at undesignated ports with no obligation on the port state to notify NAFO. As a result, NAFO would probably not be aware of the activity and would not be in a position to advise NASCO. Nevertheless the Secretary of NAFO has indicated that if NAFO becomes aware of any such activity, it would advise NASCO either formally or informally.

The Council might wish to ask the NASCO Secretary to continue to liaise with the NAFO Secretary to continue the exchange of information on IUU fishing .

2.2 IUU Fishing – NASCO Parties *(This refers to recommendations contained within EPR60 and EPR62)*

Decision: *In response to requests from NASCO, ICES has advised that over recent years efforts have been made to reduce the level of unreported catch in a number of countries through improved reporting procedures, carcass tagging and logbook schemes. Consistent with the 1993 Minimum Standard for Catch Statistics, CNL(93)51, jurisdictions should continue to take measures to reduce the level of unreported catches. The IP template, CNL(12)42, seeks information on the current level of unreported catch and the measures being taken to reduce this. The APR template, CNL(12)43, seeks details of the estimated unreported catch from in-river, estuarine and coastal fisheries. There will be a need to monitor progress and evaluate outcomes. A Special Session was held on this topic in 2007 to review approaches to estimating and minimise such catches. The need for the development of guidelines on approaches to minimising unreported catches and for a Special Session on this topic could be considered in the light of the information provided in the next reporting cycle. ICES has reviewed the methods used to calculate unreported catches and has provided suggestions for how estimates of unreported catch should be included in regional, national and international assessments. Best practice guidelines have not, however, been developed by the Council and in the first instance, the Secretariat should review FAO's IUU IPOA with regard to any guidance the IPOA may include on best practice in minimising unreported catches and report back to the Council.*

2014 Update: All Parties/jurisdictions are requested to report annually to NASCO on the level of unreported catch (and information is also provided to ICES). NASCO's 2012 External Performance Review had concluded that timely reporting on estimates of unreported catches and measures taken to reduce such catches is essential. Last year, in its report to the Council (CNL(13)12), the Implementation Plan Review Group had indicated that most, but not all Parties/jurisdictions had provided an estimate of the level of unreported catch in their Implementation Plan. Most Parties/jurisdictions also described a range of measures being taken to reduce unreported catches and these include:

- carcass tagging;
- logbooks;
- ban on the sale of rod caught salmon;
- measures to increase awareness among fishermen of the need to report catches (including issuing reminders, campaigns in the media and deposits on catch reports);
- targeted enforcement activity to reduce illegal fishing;
- a requirement to report any bycatch in fisheries for other species and use of observers on vessels to document any bycatch of salmon.

For 2013, the estimated unreported catch was 295t down from 398t in 2012 (no estimate was available for the Russian Federation and not all EU Member States provided an estimate) (see CNL914)12). An estimate of unreported catch for 2013 is also included in the ICES ACOM report of 306t down from 404t in 2012. ICES has again noted that over recent years efforts have been made to reduce the level of unreported catch in a number of countries (e.g. through improved reporting procedures and the introduction of carcass tagging and logbook schemes). Nonetheless, the estimate of unreported catch in 2013 equates to approximately 20% of the reported catch and not all Parties/jurisdictions have provided an estimate.

NASCO's Guidelines for the Management of Salmon Fisheries, CNL(09)43), provide some general guidance in relation to unreported catches including that estimates of the level of unreported catches and other mortalities associated with the fishery should be collected for all salmon fisheries; information should be sought on the by-catch of salmon in fisheries for other species and efforts made to identify their river of origin; and managers should be able to enforce the measures that are in place to regulate fishing activity and to minimise the level of unreported catches.

The International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing is a voluntary instrument that was approved by the FAO Committee on Fisheries (COFI) in 2001. It was developed because COFI was concerned about an apparent increase in IUU fishing including fishing vessels flying 'flags of convenience'. It contains an Introduction and sections on the Nature and Scope of IUU Fishing and the IPOA; Objectives and Principles; Implementation of Measures to Prevent, Deter and Eliminate IUU Fishing (sub-divided into All State Responsibilities, Flag State Responsibilities, Coastal State Measures, Port State Measures, Internationally Agreed Market-Related Measures, Research, and Regional Fisheries Management Organizations); Special Requirements of Developing Countries; Reporting; and the Role of FAO. The objective of the IPOA is to prevent, deter and eliminate IUU fishing by providing all States with comprehensive and transparent measures by which to act, including through appropriate regional fisheries management organizations. There are certainly elements in the IPOA that could be supportive of NASCO's initiatives with regard to IUU fishing but many of these relate to IUU fishing by non-NASCO Parties (see 2.1 above) and there have been no sightings of such activity since the early 1990s. The IPOA could, however, be helpful if such activity occurs in future. For example, the IUU IPOA indicates that: States should discourage their nationals from flagging fishing vessels under the jurisdiction of a State that does not meet its flag State responsibilities; States should ratify, accept or accede to *inter alia* the 1995 UN Fish Stocks Agreement and the 1993 FAO Compliance Agreement; States should avoid flagging vessels with a history on non-compliance and should deter vessels from reflagging for the purpose of non-compliance with conservation and management measures; States should require vessels seeking permission to enter their ports to provide reasonable advanced notice of their entry, a copy of their authorisation to fish and information including quantities of fish onboard; and where a port State has clear evidence that a vessel that has been granted access to its ports has engaged in IUU fishing, landings or transhipment should not be allowed and it should report the matter to the flag State of the vessel.

There are also some elements that appear consistent with NASCO's initiatives to reduce IUU fishing for salmon by NASCO Parties such as recommendations that States should undertake comprehensive and effective monitoring, control and surveillance of fishing and that they should ensure compliance with and enforcement of policies and measures related to IUU fishing adopted by relevant regional fisheries management organizations. However, the IPOA does not contain best practice guidance on minimising unreported catches in salmon fisheries and appropriate measures may differ among Parties. It may, therefore, be more appropriate to share experience of measures to minimise unreported catches through the IPs/APRs (including holding a further Special Session on this topic which might result in development of guidance).

2015 Update: Estimates of unreported catch are contained in document CNL(15)13. At the intersessional meeting of the West Greenland Commission, a Plan for Implementation of Monitoring and Control Measures in the Salmon Fishery at West Greenland, WGCIS(15)5, was adopted. This plan had been developed after an evaluation of the management of the fishery against six tenets for effective management of an Atlantic salmon fishery There was support, in principle, for evaluating the fisheries of other members of the Commission after further consultation and consideration of the approach to be adopted prior to, and at, the Annual Meeting.

2.4 Rivers database *(This refers to recommendations contained within EPR40 and NS7)*

Decision: *All jurisdictions have contributed to the database and the information is available on the NASCO website. This information has already been used in research projects and is a valuable PR tool. The Council will convene a Working Group, to work by correspondence or at the Annual Meeting, to develop recommendations for revisions to the stock categories that are used in the database that better reflect status of stocks relative to attainment of conservation limits. The Parties would then be requested to update the stock category information held in the database and provide information on threats to those stocks. With the available information, the NASCO Secretariat should be requested to prepare an overview of the status of stocks around the North Atlantic and the threats to them using the information contained in the rivers database. The EPR considered that the Strategic Approach had provided a comprehensive framework for the work of NASCO and it will be used in the next cycle of reporting.*

2014 Update: The 2013 request for scientific advice from ICES (CNL(13)10) included a request to provide a review of the stock status categories currently used by the jurisdictions of NASCO, including within their IPs, and to advise on common approaches that may be applicable throughout the NASCO area. ICES has advised that the database is an important source of information on Atlantic salmon stocks and rivers but notes that the stock categories used in the database do not reflect the use of conservation limits (CLs) and management targets (MTs) in making management decisions, the approach agreed by NASCO.

ICES reports that the NASCO categories 'maintained', 'not present but potential', and 'restored' are descriptive and do not appear to have a close parallel with the other species or river stock classifications generally in use. They clearly relate to special categories for stocks which have been or might be subject to special intervention, possibly including stocking. The NASCO categories 'Threatened with loss' and 'Not threatened with loss', while relating more directly to stock status, were also difficult to align directly with categories based on attainment of stock indicators because the terminology is imprecise and interpretation of these categories tends to encompass several categories in other systems.

NASCO has recommended the development of CLs for all stocks. However, these have not yet been developed by some jurisdictions, where alternative stock abundance indicators may be used in management. ICES recognises that the implementation of any standardized classification scheme may also be difficult but considered that it might be possible to develop a classification more closely reflecting the generally applied categories used for describing stock status and providing management advice (i.e. CLs). A preliminary and tentative example was provided. However, it was recognised that approaches would need to be developed to enable compliance with the classification criteria to be averaged over time periods and thus avoid the need for assessment and updating of the Rivers Database on an annual basis. In addition, some degree of expert judgement would also be required for stocks that do not currently have CLs. The Council may wish to decide on the next steps with regard to the classification system used in the rivers database.

2015 Update: A Working Group, comprising scientists and managers, has been established to recommend a classification system to be used by jurisdictions to indicate stock status relative to conservation limits, or where these have not been established other reference points or indicators of abundance. The Group has been asked to develop recommendations to address the following: what time period the stock indicators cover (e.g. annual, averaged over five years); frequency of updates; how the absence of any data will be reported; and how other relevant information to describe stock status can be taken into account in relation to NASCO's goals for salmon management, e.g. biodiversity and harvestable surplus. The Group will also recommend changes to the NASCO Rivers database to implement the recommended classification system. Once the Council has agreed a classification system and the database has been updated an overview of stock status can be prepared.

2.6 Research on Salmon at Sea (including bycatch) *(This refers to recommendations contained within EPR10, EPR55-56 and NS3)*

Decision: *The annual request to ICES seeks information on bycatch in new and existing fisheries. ICES has advised that the current salmon fisheries in both the NEAC and NAC areas probably have no or only minor influence on the marine ecosystem. For the WGC area ICES has indicated that there is no information on by-catch of other species in the salmon fishery that is practiced with nearshore surface gillnets. This fishery has been restricted to an internal-use fishery (~20 tonnes) since 1998 by NASCO*

agreements. The need for a by-catch strategy in NASCO might be considered if the ICES advice on this issue changed. If that was the case, the Secretariat could be requested to prepare a review of the International Guidelines on Bycatch/Discards. NASCO's Guidelines for the Management of Salmon Fisheries, CNL(09)43, indicate that information should be sought on the by-catch of salmon in fisheries for other species and efforts made to identify their river of origin. Such information should be reported to NASCO. Concern was raised about bycatch of salmon in pelagic fisheries (e.g. for herring and mackerel) in the NEAC area. In the light of the new information and tools developed through the SALSEA Programme, the Council recommends that jurisdictions undertake further studies to assess by-catch in pelagic fisheries such as those recently undertaken by Russia, Iceland and the Faroe Islands. Further liaison with the pelagic RAC is also encouraged. The Secretariat might also liaise with NAFO and NEAFC regarding availability of information on by-catch of salmon obtained through their observer programmes. The Board's role is to promote collaboration and cooperation on research into the causes of mortality of salmon at sea and the opportunities to counteract it. It has agreed to review its working methods in 2013; its TORs require that it maintain an inventory of research relating to mortality of salmon at sea. This includes information on long-term monitoring programmes in freshwater. It will be a matter for the Council to decide if it wishes to have a broader inventory of research relating to other aspects of NASCO's work. The Parties considered that Theme-based Special Sessions might allow for a further exchange on research priorities and needs. A Sub-Group of the SAG has met and provided recommendations to the IASRB for future research for consideration during the 2013 Annual Meeting.

2014 Update: In 2013, ICES was asked to provide recommendations on how a targeted study of pelagic bycatch in relevant areas might be carried out with an assessment of the need for such a study considering the current understanding of pelagic bycatch impacts on Atlantic salmon populations in 2014. The advice from ICES is contained in document CNL(14)8. In summary, ICES advises that the latest information highlights ongoing uncertainty on the salmon bycatch question, but new screening programmes, considered by ICES to provide the most reliable data, suggest relatively low levels of bycatch in the mackerel catches. ICES noted the markedly higher salmon bycatch rates recorded in the IESSNS surveys, but cautions that it is unclear how representative these might be of the bycatch in the commercial fishery given differences in the design and operation of the gears used. In any event, the capture rates remain low relative to the estimates of total NEAC PFA (< 2%). Given that estimates of the bycatch of salmon in the pelagic fisheries are highly uncertain, ICES considers it would be informative to increase efforts to obtain reliable estimates of the bycatch of salmon and made a number of recommendations as to how this might be achieved. These include, collating all available information on post-smolt and salmon marine distribution; collating information of possible interceptive pelagic fisheries in areas frequented by Atlantic salmon (in cooperation with scientists working on pelagic fish assessments); reviewing pelagic fisheries and investigating ways to intercalibrate survey trawls with commercial trawls; and carrying out comprehensive catch screening on commercial vessels fishing in areas with known high densities of salmon post-smolts or adults (this would require significant resources, coordination and funding). The Council may wish to consider if further action is needed.

The Secretariat has contacted NAFO and NEAFC about possible availability of information on by-catch of salmon obtained through their observer programmes. NAFO has responded indicating a willingness to assist but highlighting that the NAFO regulated species are mainly groundfish stocks. Some NAFO Parties report catches of salmon through STATLANT but NAFO indicates that it is not clear what fishery these come from and this issue will be raised at the upcoming NAFO Scientific Council meeting.

The IASRB agreed to focus on the partitioning of marine mortality of salmon and, through its Scientific Advisory Group, has established a Telemetry Sub-Group to develop and document a roadmap outlining a large scale international collaborative telemetry project to ultimately provide information on migration paths and quantitative estimates of mortality during phases of the marine life-cycle of salmon. The report of this Sub-Group will presented to the SAG and the Board at the 2014 Annual Meeting (see document SAG(14)4). The Board's response to the Sub-Group's recommendations will be presented to the Council, CNL(14)9.

The Secretariat has been advised by Professor Ken Whelan that the Atlantic Salmon Trust (AST) attended the 2012 and 2013 General Assembly of the Pelagic Regional Advisory Council and gave presentations at each event, including details of the work of the IASRB. The Trust has recently joined the Pelagic RAC in an observer capacity

and was advised that an application from the IASRB to join the Pelagic RAC would be welcomed, as the experience and expertise of the various salmon interest groups would be of benefit to the Pelagic RAC's work, possibly through involvement of scientists and managers on its Working Groups. The AST has advised that there was great interest within the Pelagic RAC in the research carried out under SALSEA and the potential development by the IASRB of an international tracking programme. The Pelagic RAC suggested that the IASRB could seek a briefing on pelagic surveys currently underway which could be of direct relevance to its work on salmon at sea. It was noted that the pelagic scientists may benefit from a technical workshop convened between salmon and pelagic scientists to update the pelagic scientists on the stock discrimination techniques developed under SALSEA. ICES has advised that if efforts are to be made to obtain reliable estimates of the bycatch of salmon (see above) there will be a need for close cooperation between WGNAS scientists and those working on pelagic fish assessments.

2015 Update: At its 2014 Annual Meeting, the IASRB agreed that its priority was to encourage studies to partition marine mortality of migrating Atlantic salmon in order to support the conservation and management of Atlantic salmon stocks across the North Atlantic It adopted a Resolution, ICR(14)6, encouraging NASCO Parties to continue the development of local collaborative telemetry projects and to encourage the development of large international collaborative telemetry projects that together build upon and expand local efforts. In support of this, the Board organised a Telemetry Workshop which was held in London in December 2014. The report, ICR(15)3, will be considered at the Board's 2015 Annual Meeting. The Board has continued to support research projects related to salmon at sea. In 2012, the Board had supported two projects (£6,000 each) as follows: 'Genetic stock of origin identification of European salmon captured at West Greenland' and 'Genetic stock identification of salmon caught in the Faroes fishery'. The funding provided by the Board had allowed these two projects to proceed and had led to other funds being made available. In 2014, the Board supported a project (£18,300) entitled '*Enhancement of a North American Atlantic salmon genetic baseline for individual and stock identification and application of the baseline to historical scales collected at West Greenland'.*

ICES has identified new opportunities to sample salmon at sea. The International Ecosystem Survey of the Nordic Seas (IESSNS) is a collaborative programme involving research vessels from Iceland, the Faroes, and Norway; surveys are carried out annually in July–August and present such an opportunity. The area surveyed (2.45 million km^2 in 2014) overlaps in time and space with the known distribution of post-smolts in the North Atlantic, and as these cruises target pelagic species such as herring and mackerel, bycatch of salmon post-smolts and adult salmon is not uncommon. ICES has been in contact with the coordinator of the IESSNS surveys, who is keen to facilitate collaboration with WGNAS. Preliminary discussions have taken place to clarify sampling protocols and to identify appropriate individuals to carry out subsequent analysis of any salmon samples. These are expected to provide valuable information on the distribution of salmon at sea, the size, sex, and diet of individual fish and will also enable stock origin to be investigated using genetic techniques. Furthermore, the IESSNS survey data will provide information on salmon distribution in relation to other pelagic species, to hydrography, and to plankton abundance.

With regard to bycatch of salmon in pelagic fisheries, although NEAFC does not operate an observer programme, skippers of vessels fishing for regulated species are required to maintain logbooks of all species caught and information may be recorded on adult salmon catches, but probably not post-smolts. The NEAFC Secretariat has indicated that it would be willing to raise with the NEAFC Parties the possibility of future cooperation with NASCO on this issue and IUU fishing with the nature and scope of the cooperation subject to an exchange of letters between the two Secretariats. The Council might therefore wish to ask the NASCO Secretary to continue to liaise with the NEAFC Secretary on arrangements for an exchange of information on IUU fishing and bycatch of salmon. The NAFO Secretary has advised that the fishery in the NAFO regulatory area is predominantly targeted at groundfish, with the exception of the initiation in recent years of a pelagic fishery for redfish to the south of Greenland. Information provided by the NEAFC Secretary indicates that this fishery is mostly at depths between 200 - 600m and so it would be unlikely to result in catches of salmon. In this fishery, observer programmes are operated by both NAFO and NEAFC. Salmon have not been reported to date by the NAFO observers. However, the NAFO's fisheries management team will advise NASCO if catches of salmon are recorded by NAFO observers.

ICES has reported on a new tagging initiative and a wide-scale tag screening programme in the Northeast Atlantic. The tagging programme is directed at pelagic species (herring and mackerel) using glass-encapsulated passive integrated transponder (PIT) tags/RFID tags (radio frequency identity tags). Tag detection relies on the installation of antenna-reader systems at ports of landing. To date, such detectors have been installed at eight factories processing herring and mackerel; these are located in Norway (1), Iceland (1, with 2 more planned), Faroes (1), and Scotland (5, with 1 more planned). Further detectors are also planned in Ireland (3) and Denmark (1). By end 2015, there may be as many as 22 RFID detector systems screening herring and mackerel catches around Europe. PIT/RFID tags are also widely applied to salmon (29 895 in 2014). The tag detectors will thus be able to detect such tags should post-smolt or adult salmon be taken as bycatch in the mackerel and herring fisheries.

2.7 Public relations *(This refers to recommendations contained within EPR68 and EPR70 – 71)*

Decision: *The IPs and APRs in the second cycle of reporting will be made available on the NASCO website. NASCO has 34 accredited NGOs which now participate in most of the meetings and improvements have been made to the website. Stakeholder consultation meetings are a tool to be considered when a specific need for seeking broad input is identified. The Council has agreed that its initial priorities in Public Relations are its websites and the Salmon Rivers database. The work to enhance the website is on-going and should continue. The Council believes that NASCO should be the source of information on salmon stock status around the North Atlantic and has agreed to develop a State of the Salmon report using the updated stock categories in the rivers database (see above). The Council should keep its PR approach under review and consider if further actions are needed.*

2014 Update: Since last year, further improvements have been made to the NASCO and IASRB websites. The new IPs and first APRs have been made available on the website together with the outcome of their evaluation. NASCO has supported the production of a film entitled 'Atlantic salmon: Lost at Sea' and served on the Steering Committee and contributed to a Discussion Forum on the Atlantic salmon held by the Royal Society of Edinbugh in November 2013. Further details of NASCO's activities relating to PR are contained in document CNL(14)6. The 2013 request for scientific advice from ICES (CNL(13)10) included a request to provide a review of the stock status categories currently used by the jurisdictions of NASCO, including within their IPs, and to advise on common approaches that may be applicable throughout the NASCO area (see 2.4 above).

2015 Update: Since last year, further improvements and updates have been made to the NASCO and IASRB websites. New IPs and the 2015 APRs have been made available on the website together with the outcome of their evaluation. See also 2.4 above.

2.8 Future role for NASCO on aquaculture *(This refers to recommendations contained within NS17)*

Decision: *Aquaculture remains a focus area for NASCO in terms of concerns over impacts on wild Atlantic salmon. In general, NASCO has established the goal to minimise adverse impacts to wild stocks from aquaculture activities. However, it is for the Parties and jurisdictions to identify and implement appropriate measures to meet this goal. Progress will be tracked as Implementation Plans and Annual Reports are submitted. Some more specific measures are contained in the NAC Protocols, appended to the Williamsburg Resolution.*

2014 Update: At the 2013 Annual Meeting, the Council agreed that an item should be retained on the Council's agenda entitled 'Liaison with the Salmon Farming Industry', during which a representative of the International Salmon Farmers' Association (ISFA) could be invited to participate in an exchange of information on issues concerning impacts of aquaculture on wild salmon. The regular meetings of the Liaison Group would not be continued, but, if a specific need arose, consideration could be given to convening a joint *ad hoc* group. A representative of ISFA will attend the 2014 Annual Meeting. The Review Group has reported that five IPs contained clear omissions or inadequacies in the responses to either or both questions 4.2 and 4.3 concerning demonstration of progress towards the international goals for sea lice and containment. The 2014 APRs include updates on progress on actions relating to aquaculture, introductions and transfers and transgenics and have been evaluated by the APR Review Group.

Questions have been asked to those Parties/jurisdictions whose IPs contained clear omissions or inadequacies in the responses to either or both questions 4.2 and 4.3 as to how progress towards the international goals will be monitored. The Group's report will be presented in a Special Session at the Annual Meeting, when jurisdictions will answer any questions raised by the Group in relation to the APRs. The Review Group has developed a table showing the status (not started, ongoing or completed) of each action for each jurisdiction and this will be updated annually.

2015 Update: The 2015 APRs include updates on progress on actions relating to aquaculture, introductions and transfers and transgenics and have been evaluated by the APR Review Group. The Group's report will be presented in a Special Session at the Annual Meeting, when jurisdictions will answer any questions raised by the Group in relation to the APRs. The Review Group has developed a table showing the status (not started, ongoing or completed) of each action for each jurisdiction and this year has indicated whether the report on progress for ongoing and completed actions was clear or unclear. Where IPs had previously been identified as containing clear inadequacies or omissions were updated in 2014 checks were made to see if any new information had been provided that would affect the Group's assessment and lead to a satisfactory evaluation. This was not the case.

2.9 Meeting schedule and structure *(This refers to recommendations contained within NS18)*

Decision: *The Parties are invited to submit proposals for changes to the structure, frequency and location of NASCO meetings to the Secretariat who will prepare a paper, based on these submissions, for consideration by the Council at its 2013 Annual Meeting. The intention is to explore options for changes to the structure, frequency and location of NASCO meetings with a view to ensuring the most effective use of the time available and expertise present. The Parties may choose to communicate with each other during the development of these papers and Canada committed to circulate its draft to the other Parties.*

2014 Update: Prior to NASCO's 2013 Annual Meeting, papers were received from Canada, Norway, the Russian Federation and the US and collated by the Secretariat (see document CNL(13)16). No suggestions were made regarding the location of NASCO meetings. The Council decided not to change the frequency (i.e. annual) of its meetings or the policy on the location of its Annual Meeting, but agreed to change its structure on a trial basis for 2014 using the papers from Norway and the US as a basis to improve the opportunities for exchange of information during the meeting. The Agendas for the 2014 Annual Meeting have been adapted in accordance with the proposals from Norway and the US and a full-day Theme-based Special Session will be held on the topic of '*Management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limit*'. A Programme for this session has been developed by the Steering Committee which comprised representatives of NASCO's Parties and its accredited NGOs.

2015 Update: The Council recognised that the 2014 Theme-based Special Session had allowed for very valuable exchanges and decided to hold a half day Theme-based Special Session during the Thirty-Second Annual Meeting on the topic of '*Maintaining and improving river connectivity, with particular focus on impacts of hydropower*'. The Programme is contained in document CNL(15)14. The Council has agreed to consider a topic and appoint a Steering Committee for a 2016 Theme-based Special Session to be held during the Thirty-Third Annual Meeting.

Section 3: Strengthening the work of NASCO

Following a comprehensive discussion among the Parties in relation to the options for strengthening the work of NASCO (see FVN(13)12) it was agreed that in addition to the actions in sections 1 and 2, the priority area for special focus is in the area of fisheries management. The Parties renewed their commitment to the following actions:

Recommendation	Action taken
3.1 During the 2013 Council meeting, critically review the new 5-year Implementation Plans which include the following sections: (a) information on reference points used to assess the status of stocks; (b) the decision-making process for fisheries management, including predetermined decisions taken under different stock conditions (e.g. the stock level at which fisheries are closed); (c) identification of whether fisheries are permitted to operate on salmon stocks that are below their reference point and, if so, how many fisheries there are and what approach is taken to managing them that still promotes stock rebuilding; and (d) identification of any mixed-stock salmon fisheries and an explanation of how they are managed to ensure that all the contributing stocks are meeting their conservation objectives.	***2014 Update:*** *The IPs were evaluated by a Review Group whose findings were presented at a Special Session during the 2013 Annual Meeting. The Council asked the Parties to take the opportunity to revise their IPs, including those considered by the Review Group to be satisfactory, so as to clarify any unclear/incomplete answers. Most Parties took advantage of this opportunity. Since 2013, new IPs have been received from EU – Spain (Asturias, Cantabria and Galicia).* *The Review Group had noted inter alia that:* • *river-specific conservation limits have been established by some Parties/jurisdictions for all or most of their rivers. Progress is being made in most other Parties/jurisdictions towards development of these conservation limits and in the meantime juvenile abundance data and/or catch statistics are being used as temporary reference points by some jurisdictions;* • *many of the responses provided information on the organizations that are involved in the decision-making process but not on how decisions are taken in response to different stock conditions;* • *that fisheries are permitted to operate on stocks that are below their reference point in several jurisdictions, but the number of fisheries involved and the management measures applying to these fisheries to promote stock rebuilding were not always clearly described;* • *most IPs clearly indicated whether or not a Party/jurisdiction had mixed-stock fisheries and how these are defined. Where Parties/jurisdictions have such fisheries, the IPs generally provided information on catches but clear descriptions of how the fisheries are managed to ensure that all the contributing stocks are meeting their conservation objectives were often lacking.* *During the 2014 Annual Meeting, there will be a Theme-based Special Session on the topic of management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limits. The objectives of this session are to allow for an exchange of information on:*

		• *Progress in establishing conservation limits, or alternative reference points, and the approaches being used to manage fisheries in their absence;* • *How management measures are used to ensure the protection of the weakest contributing stocks in mixed-stock fisheries;* • *How socio-economic considerations, including the interests of indigenous people, are weighed against conservation needs and, where fishing is permitted on stocks below their CLs, the approaches being used to ensure that exploitation is limited to a level that permits stock rebuilding within a stated timeframe.* ***2015 Update:*** *In its 2015 report, the Review Group notes that a new IP had been received for EU – Spain (Navarra), and that this was considered to be satisfactory. The Review Group noted that revised IPs had been provided by Canada, EU - Germany, EU - UK (England and Wales), EU - UK (Northern Ireland), EU - UK (Scotland), Norway, and the United States. The Review Group did not re-evaluate these IPs but it noted that the changes made in revising IPs ranged from minor editorial changes to the inclusion of a new action (EU - Germany) and the removal of an action (United States). Since the Group's meeting a further IP has been received from EU – France.*
3.2	During each annual Council meeting, critically review the annual progress reports from each Party, paying particular attention to progress against actions relating to the management of salmon fisheries.	***2014 Update:*** *A Special Session is to be held at the 2014 Annual Meeting to allow for presentation and discussion of the evaluations of the APRs under the IPs. During this Special Session, Parties will be given the opportunity to respond to any questions the APR Review Group may raise in connection with their APRs and there will be an opportunity for all delegates to raise questions.* ***2015 Update:*** *For the 2015 APRs, the Review Group noted that while the clarification made to the reporting template had further improved the consistency of the reporting, several Parties/jurisdictions' APRs had not provided a clear account of progress in implementing and evaluating some or all of the actions detailed in their IPs. These reports either included one or more gaps in the 'Progress on Action to Date', or the comment provided bore no relationship to the proposed action. The Review Group has provided a table summarising for each jurisdiction whether each action is ongoing, completed or has not yet started and it has also indicated whether the progress reports for ongoing and completed actions are clear or unclear. Overall, the Review Group considered that the most common fault with the information provided on progress with actions was a lack of quantitative information on what has been achieved and/or what the results have been. The Review Group has asked that all Parties/jurisdictions address this in future APRs. Where the Review Group considered that there were shortcomings in an APR, it developed a list of questions and each Party/jurisdiction was asked to respond in writing to these questions no later than 15 May. The Group's report will be presented at a Special Session during the Thirty-Second Annual Meeting to allow discussion of the Group's findings and for questions to be addressed to the Parties.*

3.3	Ensure there are agenda items in each of the Commissions to allow for a focus on mixed-stock fisheries	***2014 Update:*** *For the 2013 Annual Meeting, a new item was included on the North-East Atlantic Commission's Agenda specifically focused on management of mixed-stock fisheries. At the 2014 Annual Meeting, there is to be a one-day Theme-based Special Session on the topic of management of single and mixed stock fisheries, with particular focus on fisheries on stocks below their conservation limits. The intention is to facilitate a greater exchange of information and the objectives of the session are detailed in 3.1 above. As such, no agenda items on mixed-stock fisheries have been included on the Commission agendas for 2014 because of the Theme-based Special Session but such items will be included on the 2015 agendas for all three Commissions.* ***2015 Update:*** *An item on 'Mixed-stock fisheries conducted by members of the Commission' has been included on each Commission agenda for the 2015 Annual Meetings. Each Party with MSFs has been requested to submit a paper providing a brief description of any MSFs still operating, the most recent catch data, any updates to the IP relating to MSFs and any changes or developments in the management of MSFs in this IP period to implement NASCO's agreements.*
3.4	Focus the first Council new theme-based Special Session on mixed-stock fisheries.	***2014 Update:*** *See point 3.1 above* ***2015 Update:*** *The report of the Theme-based Special Session has been published and widely distributed.*
In addition, the Parties agreed to explore opportunities to strengthen their commitment to implement the NASCO Guidelines on Management of Salmon Fisheries *inter alia* by the use of a Protocol or Resolution.		***2014 Update:*** *The Secretariat has not been advised of any new Protocols or Resolutions that are being developed by Parties.* ***2015 Update:*** *The Secretariat has not been advised of any new Protocols or Resolutions that are being developed by Parties.*

Annex 17

CNL(15)16

Management and Sampling of the St Pierre and Miquelon Salmon Fishery

1. As in previous years, we have received a report from the Sécrétariat Général de la Mer in Paris containing information on the management of the salmon fishery at St Pierre and Miquelon, details of catches and of the number of licenses issued. This information is attached. The total catch in 2014 was 3.811 tonnes and there were 82 authorised fishermen (12 professional licenses and 70 recreational licenses). We are advised that the genetic analysis carried out by Genindexe will be released shortly. Many in-river fishermen reported parr in the Belle River (Langlade) in 2014. A study will be conducted to see if the river could sustain more salmon if their return to the river was facilitated by dredging of the river mouth. The increasing seal population is considered to be affecting the salmon fishery and a seal count will be undertaken in 2015 and, if necessary, a cull may be considered.

2. France (in respect of St Pierre and Miquelon) has been invited to attend the Thirty-Second Annual Meeting and will be represented by Ms Christiane Laurent-Monpetit (Ministère de l'Outre-mer, Paris) and Mr Herlé Goraguer (IFREMER, St Pierre and Miquelon).

Secretary
Edinburgh
21 May 2015

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

PREMIER MINISTRE

Secrétariat
Général de la Mer

Le Secrétaire général

Paris, 13 May 2015

N° 301/SGMER

Affaire suivie par Marie-Sophie DUFAU-RICHET
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Le Secrétaire général de la mer
To
The Secretary of the North Atlantic Salmon Conservation Organization

RE: Annual Report from France (in respect of St Pierre and Miquelon)

On the occasion of the 32nd Annual Meeting of the North Atlantic Salmon Conservation Organization (NASCO), from 2 – 5 June 2015 at Happy Valley-Goose Bay, I am pleased to advise that the report from France (in respect of St Pierre and Miquelon) was sent to you by e-mail on 29 April 2015. I confirm that this may now be circulated to all delegates.

The administrative components of the report are provided by the St Pierre and Miquelon Maritime Office (Directorate for Territories, Agriculture and the Sea) and the scientific information has been provided by the French Research Institute for Exploitation of the Sea (IFREMER), including the genetic analyses carried out by Genindexe which will be released shortly.

In 2014 the salmon catch decreased to 3,811kg. During the last fishing season, 456 boat inspections were carried out, allowing the boats to be checked on different occasions. Furthermore, preparatory meetings on salmon conservation have been organised for the whole fishing community.

Finally, I would like to advise you that IFREMER's sampling programme continues, with a similar sample size (71) and studies are underway in the Belle-Rivière which could lead to the re-opening of the river mouth.

Mr Peter Hutchinson
Secretary of NASCO
11 Rutland Square
Edinburgh
EH1 2AS
United Kingdom

Michel Aymeric

Annual Report on the Atlantic Salmon Fishery at Saint Pierre and Miquelon
2014 Season

1. Legislation

Salmon fishing at Saint Pierre and Miquelon is regulated by the Rural and Maritime Fishery Law, in particular Book IX, the Orders of 20 March 1987 and 24 March 2015, to revise the Annexes of Decree No 87-182, which were repealed and integrated into the Rural and Maritime Fishery Law by Decree No 1608/2014 of December 2014.

This legislation establishes the following:

- The fishery is subject to authorisation and an Annual Fishery Plan
- The minimum capture size is 48cm
- Nets must be declared and marked
- The minimum mesh size is 125mm
- The fishery season is restricted to 1 May – 31 July
- Fishing gear must not be placed within 300m of a river mouth.
- Restricted fishing effort:
  - 3 x 360m nets for professional fishermen
  - 1 x 180m net for recreational fishermen
- All catch must be declared (through annual declarations and a fishing log)
- All catch in the recreational fishery must be tagged

456 boat inspections were carried out in 2014, 380 of which were of recreational vessels and 76 were professional vessels. The inspections were carried out over 37 days, both in the morning and in the evening.

2. Authorisation

Authority to fish is granted to professional fishermen (who may sell their catch) and recreational fishermen (who are not permitted to sell their catch).

The allocation procedure is based on fishery precedence and on compliance with catch declaration obligations throughout the previous year.

The Maritime Affairs Service deals with requests for permission to fish and allocates each authorised fisher with a specific site to fish for the entire season. The overall fishery site plan is mapped and published by Order of the Prefect.

In 2014, 12 professional permits were issued and 70 recreational permits were issued. The number of licenses issued has increased over the last 3 years, although the number of fishers has remained constant since 2005 (an average of 50 fishers per year over the last 10 years).

3. Salmon catch

The total 2014 catch stands at:

Professional catch: 2,250kg (2,291kg in 2013). 526 salmon caught.
Recreational catch: 1,561kg (3,011kg in 2013). 525 salmon caught.

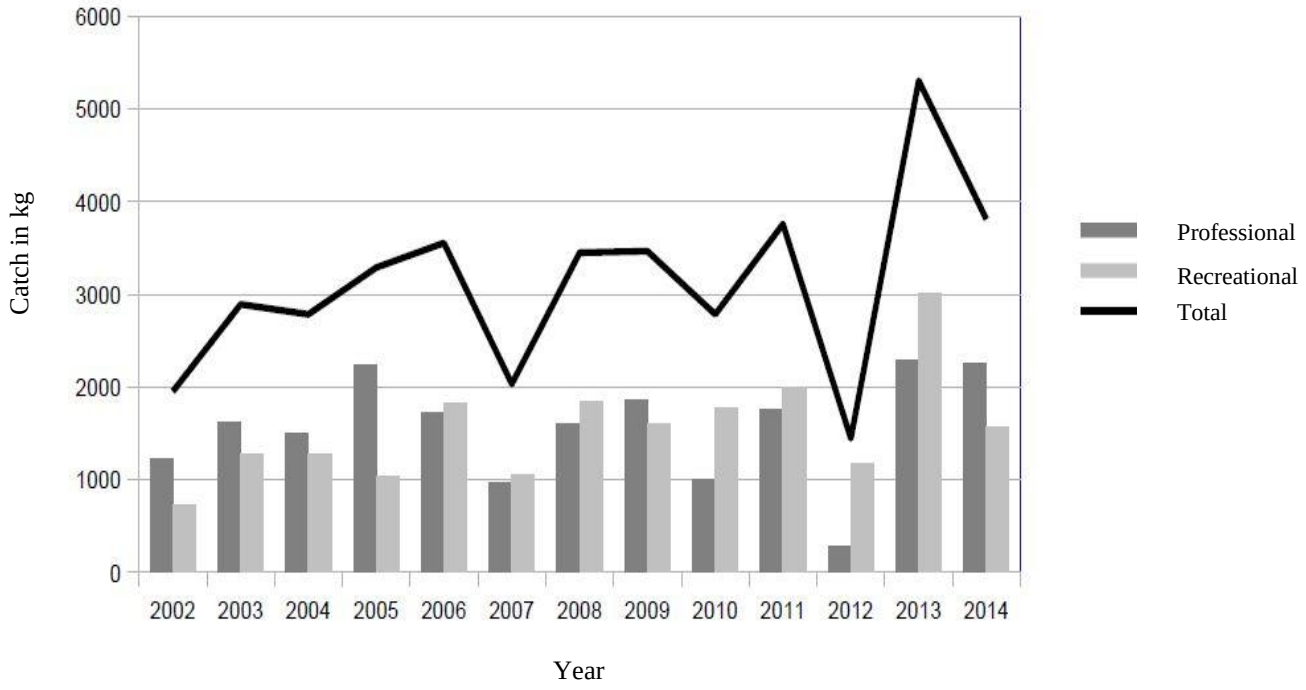
The total weight of the 2014 catch was therefore 3,811kg, compared to 5,302kg in 2013.

The 525 salmon caught by 50 recreational boats averages around 10 salmon per recreational fisher. However, the highest catch by a single recreational vessel was 44 salmon. It should also be noted that many boats only fish for a very short period and bring their nets in well before the end of the permitted time-frame, when they consider that their catch is sufficient for their personal use and that of their immediate circle.

The 526 salmon caught by 11 professional vessels averages around 48 salmon per professional fisher. The highest catch by a single professional vessel was 256 salmon, while one professional license holder did not fish.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Professional Fishery													
No. of licenses	12	12	13	14	13	13	9	8	9	9	9	9	12
Catch volume	**1223**	**1620**	**1499**	**2243**	**1730**	**970**	**1604**	**1864**	**1002**	**1764**	**278**	**2291**	**2250**
Recreational Fishery													
No. of licenses	42	42	42	52	52	53	55	50	57	58	60	64	70
Catch Volume	**729**	**1272**	**1285**	**1044**	**1825**	**1062**	**1846**	**1600**	**1780**	**1992**	**1168**	**3011**	**1561**
Total catch	1952	2892	2784	3287	3855	2032	3450	3464	2782	3756	1446	5302	3811

Salmon catch at St Pierre and Miquelon 2002 – 2014



There is no export of salmon and all salmon caught are consumed by the local market. Most are retained for personal consumption, with only a few sold to restaurants or individuals through a local fishmonger, or directly by the fisher to individuals at market.

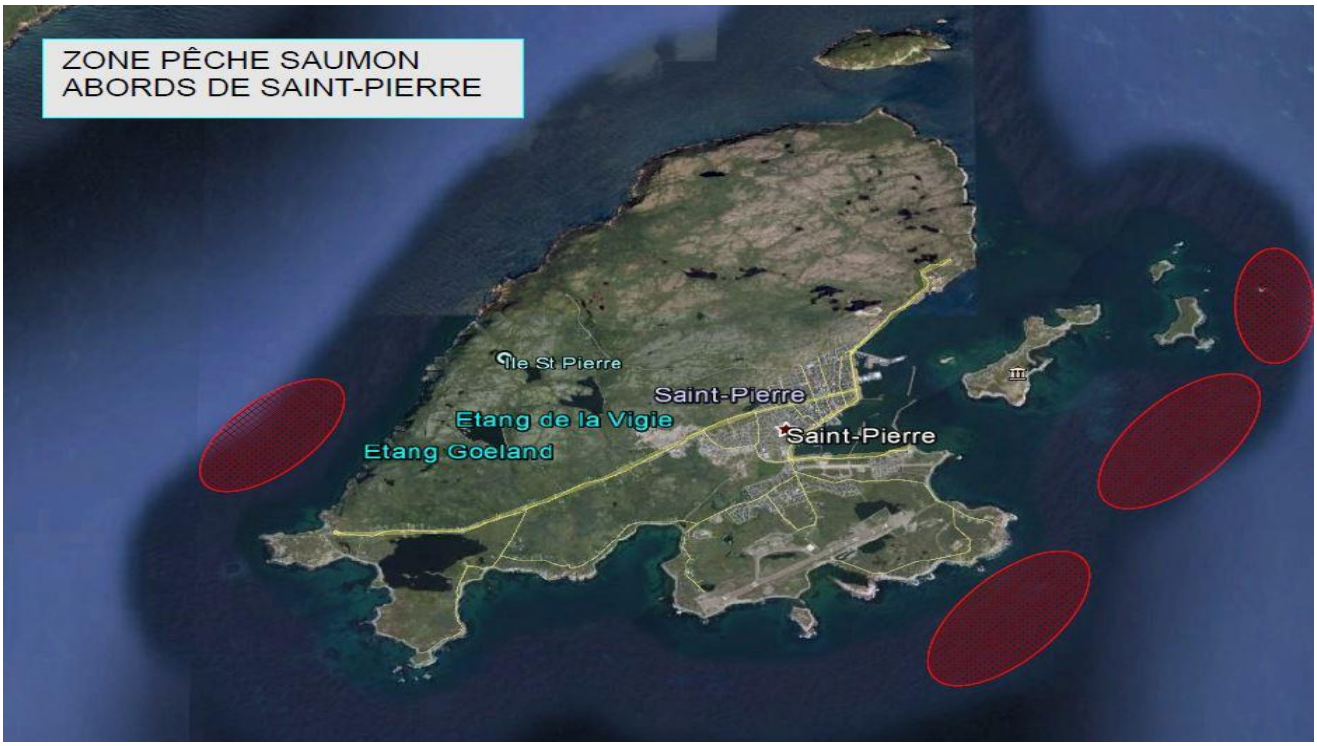
It should be noted that there is no salmon fishing in the archipelago's rivers and that around 16 tonnes of farmed salmon are imported from Canada. The annual consumption of salmon is approximately 3 kg per inhabitant.

4. Profile of fishers/location of fishing sites

The average fisher on the archipelago is male (there are no female salmon fishers on the archipelago) with an average age of 58 (the oldest being 76 and the youngest 38).

The fishing sites are located around the archipelago as follows:


ZONE PÊCHE SAUMON
ABORDS LANGLADE
Etang Ynachi
Anse du Gouvernement
Saint-Pierre-et-Miquelon
Anse aux Soldats
Grande Miquelon
Miquelon-Langlade
Anse du Sud-Ouest
Grand Etang du Cap B
Etang Goeland


ZONE PÊCHE SAUMON
ABORDS DE SAINT-PIERRE
Ile St Pierre
Saint-Pierre
Etang de la Vigie
Saint-Pierre
Etang Goeland

5. 2015 Projects

5.1 *Parr Study in the Belle river*

Many in-river fishers reported the presence of parr in the Belle river (Langlade) in 2014. A study will be carried out to determine whether the river, whose mouth is frequently obstructed, could sustain more salmon if their return to the river was facilitated by dredging the river mouth. An awareness campaign will be launched in April to ensure that anglers can distinguish between parr and trout. Depending on the results, it is planned to dredge the river mouth and establish a fisheries exclusion zone to facilitate the return of salmon to the river (see map below).

5.2 *Seal count*

The archipelago's increasing seal population is affecting the salmon fishery. An accurate seal count will be carried out in 2015 and, if necessary, a cull may be carried out on the Prefect's orders.

Deputy Director, Head of Maritime Affairs

Amaury de Guillebon

Annex 18

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

Chair, Secretary, distinguished Delegates, Observers, Ladies and Gentlemen,

The unusual closing remarks in the West Greenland Commission have put Denmark (in respect of the Faroe Islands and Greenland) in the position where we find it necessary to make the following statement:

We believe we have had constructive exchanges and that Denmark (in respect of the Faroe Islands and Greenland) has cooperated fully by working in the Review Group, the Standing Scientific Committee, the West Greenland Commisssion's *Ad hoc* Working Group, the inter-sessional meetings of the West Greenland Commission and over the last three days. We believe this demonstrates our commitment to the management of wild salmon.

We have further improved the regulatory measures and have, on several occasions, repeated our commitment to continue improving these measures in order to accommodate and reassure the other Parties of the West Greenland Commission.

Therefore, we find that the closing remarks in the West Greenland Commission undermine the work of this Organization, including that undertaken over the last year, and its spirit of cooperation and mutual respect.

We will now return to our administration and will seriously consider our options as to how to move forward.

Annex 19

CNL(15)53

Press Release

North Atlantic Salmon Conservation Organization (NASCO)
Thirty-Second Annual Meeting, Happy Valley – Goose Bay, Canada
2 - 5 June 2015

New rules adopted for Atlantic salmon fisheries and major research initiative for the species to be pursued

Scientific information presented at the Annual Meeting of the North Atlantic Salmon Conservation Organization highlighted the continuing low, and in some areas, critically low abundance of salmon throughout the North Atlantic and the need for urgent action to improve understanding of these declines in abundance and to control threats.

New measures were agreed for the salmon fisheries around the Faroe Islands and at West Greenland. For the salmon fishery at the Faroe Islands, a new multi-annual measure was agreed such that management decisions will be made with due consideration to the scientific advice, which indicates that there should be no fishery in 2016, 2017 and 2018. Under similar measures adopted previously, there has been no commercial fishery at the Faroe Islands for nearly 20 years. Regarding the West Greenland salmon fishery, a new plan was agreed as part of a new regulatory measure that, when implemented, will further improve monitoring and control of that fishery. Unfortunately, however, consensus could not be reached on the level of a catch limit for the fishery. Nevertheless, Greenland committed to limit its total annual catch to 45t in 2015, 2016 and 2017.

Building on the recent marine surveys under the Salmon at Sea (SALSEA) Programme, NASCO's International Atlantic Salmon Research Board has developed plans for an ambitious and innovative programme of research to track salmon from their rivers of birth out into the ocean. This important intiative will improve knowledge of where mortality is occuring and what is causing it. This programme is called SALSEA – Track.

Ensuring accessible habitat is fundamental to the health of Atlantic salmon. A primary focus at the meeting this week concerned river connectivity with particular focus on the impacts of hydropower. A very successful themed session, organised with the accredited NGOs, was held to explore this topic and numerous presentations on actions being taken in rivers across the North Atlantic to enhance river connectivity were made. The resulting information sharing will help inform future management.

NASCO Vice President, Joannes Hansen, who was the acting President for the meeting, said '*habitat loss through destruction, degradation or fragmentation is a major threat to wildlife and Atlantic salmon is no exception. It is clear, however, that where habitat is improved, salmon can respond despite the current period of low marine survival.*'

The meeting also provided an important opportunity for NASCO Parties to report on the progress made in implementing actions related to NASCO agreements on the management of

fisheries, habitat protection and restoration, and aquaculture and related activities. These reports had been critically evaluated by a Review Group of the Parties and accredited NGOs. This process of reporting, review and public discussion of the progress Parties have made in meeting their responsibilities enhances accountability and improves implementation with NASCO agreements.

The Organization had received a warm welcome in The Thirty-Third Annual Meeting of NASCO will be held during June 7 - 10, 2016 in Germany.

Notes for Editors:

NASCO is an intergovernmental organization formed by a treaty in 1984 and is based in Edinburgh, Scotland. Its objectives are the conservation, restoration and rational management of wild Atlantic salmon stocks, which do not recognise national boundaries. It is the only intergovernmental organisation with this mandate which it implements through international consultation, negotiation and co-operation.

The Parties to the Convention are: Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, Russia and USA. There are 35 non-government observers accredited to the Organization.

The 2015 meeting included almost 100 delegates, including scientists, policy makers and representatives of Inter-Governmental Organisations and Non-Governmental Organisations who met to discuss the present status of wild Atlantic salmon and to consider management issues.

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Annex 20

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